TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

TIMSS

TIMSS 2019

INTERNATIONAL RESULTS IN MATHEMATICS AND SCIENCE

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IEA
TIMSS & PIRLS International Study Center
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TIMSS 2019 International Results in Mathematics and Science
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Publishers: TIMSS & PIRLS International Study Center,
Lynch School of Education and Human Development,
Boston College and
International Association for the Evaluation of Educational Achievement (IEA)

Library of Congress Catalog Card Number: 2020922702
ISBN-978-1-889938-54-7

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IEA TIMSS 2019

About TIMSS 2019

Overview

IEA's TIMSS 2019 is the seventh assessment cycle of TIMSS, the Trends in International Mathematics and Science Study. TIMSS 2019 was conducted at the fourth and eighth grades in 64 countries and 8 benchmarking systems. Inaugurated in 1995, TIMSS has been conducted every four years since, providing 24 years of trends in mathematics and science achievement.

The TIMSS assessments of student achievement are updated with each cycle in collaboration with the participating countries, who review the frameworks describing the mathematics and science content to be assessed and participate in item development. TIMSS also provides important policy relevant data about students' contexts for learning mathematics and science based on questionnaires completed by students and their parents or caregivers, teachers, and school principals. Taken together, TIMSS provides comparative data about countries' student achievement over time and in relation to key home, school, and classroom variables.

TIMSS 2019 continues the long history of international assessments in mathematics and science conducted by IEA—the International Association for the Evaluation of Educational Achievement. An independent international cooperative of national research institutions and government agencies, IEA pioneered international comparative assessments of educational achievement in the 1960s to gain a deeper understanding of the effects of policies across countries' different systems of education. IEA has been conducting international assessments of mathematics and science and collecting data about the factors associated with achievement in countries around the world for more than 50 years. TIMSS at the fourth grade is complemented by IEA's PIRLS—the Progress in International Reading Literacy Study—conducted every five years since 2001.

TIMSS and PIRLS are directed by IEA's TIMSS & PIRLS International Study Center at Boston College, in close cooperation with IEA Amsterdam, IEA Hamburg, and Statistics Canada. Each participating country has a National Research Coordinator who is responsible for implementing TIMSS in accordance with international procedures and to TIMSS' standards of technical excellence.

Transition to Computer-Based Assessment

In 2019, TIMSS began the transition to computer-based assessment by introducing a computerized version—eTIMSS. Half the participating countries in 2019 chose to administer the new eTIMSS version, while the other half continued to administer the paper-based version.

Every effort was made to have the eTIMSS and paperTIMSS assessments be as similar as possible, while capitalizing on new item types, such as drag-and-drop and drop-down menus, and automated scoring through keypad entry. The goal of item development was to ensure that eTIMSS and paperTIMSS measured the same mathematics and science constructs using the same assessment items, as much as possible.

To provide a bridge between eTIMSS and paperTIMSS, eTIMSS countries also administered the paperTIMSS trend items to a separate sample of students, typically in the same schools. The bridge data form an intermediate link (or bridge) between eTIMSS countries' computer-based data in 2019 and their paper-based data in 2015 as well as to the paperTIMSS countries in 2019.

Participating Countries

As shown below, 64 countries participated in TIMSS 2019, including some distinct education systems within countries that have always participated separately throughout IEA's long history (e.g., the Dutch-speaking part of Belgium and Hong Kong Special Administrative Region (SAR) of the People's Republic of China). In addition, TIMSS 2019 had 8 benchmarking participants, (e.g., regional entities, such as provinces and municipalities).

Countries and benchmarking participants could choose to participate in the fourth grade assessment, the eighth grade assessment, or both. In 2019, 58 countries and 6 benchmarking entities participated in the TIMSS fourth grade assessment, and 39 countries and 7 benchmarking participants participated in the eighth grade assessment.

Countries Participating in TIMSS 2019

Albania
Armenia
Australia
Austria *
Azerbaijan
Bahrain
Belgium (Flemish)
Bosnia and Herzegovina
Bulgaria
Canada *
Chile *
Chinese Taipei *
Croatia *
Cyprus
Czech Republic *
Denmark *
Egypt
England *
Finland *
France *
Georgia *
Germany *
Hong Kong SAR *
Hungary *
Iran, Islamic Rep. of
Ireland
Israel *
Italy *
Japan
Jordan
Kazakhstan
Korea, Rep. of *
Kosovo
Kuwait
Latvia
Lebanon
Lithuania *
Malaysia *
Malta *
Montenegro
Morocco
Netherlands *
New Zealand
North Macedonia
Northern Ireland
Norway *
Oman
Pakistan
Philippines
Poland
Portugal *
Qatar *
Romania
Russian Federation *
Saudi Arabia
Serbia
Singapore *
Slovak Republic *
South Africa
Spain *
Sweden *
Turkey *
United Arab Emirates *
United States *

Benchmarking Participants

Ontario, Canada *
Quebec, Canada *
Moscow, Russian Fed. *
Madrid, Spain *
Gauteng, RSA
Western Cape, RSA
Abu Dhabi, UAE *
Dubai, UAE *

* Transitioned to eTIMSS

TIMSS 2019 Assessment Frameworks

The TIMSS 2019 mathematics and science assessments are based on comprehensive frameworks developed collaboratively with the participating countries. The TIMSS 2019 Mathematics Framework and the TIMSS 2019 Science Framework are each organized around two dimensions: a content dimension specifying the content to be assessed and a cognitive dimension specifying the thinking processes to be assessed.

In mathematics, TIMSS 2019 at the fourth grade assessed three content domains: number, measurement and geometry, and data. The eighth grade assessment had four content domains: number, algebra, geometry, and data and probability. In science, the TIMSS 2019 fourth grade assessment included three content domains: life science, physical science, and Earth science. The eighth grade included four content domains: biology, chemistry, physics, and Earth science. The proportion of each assessment devoted to the content domains differed to reflect curricular emphases in each grade. In both grades and both subjects, TIMSS 2019 assessed three cognitive domains: knowing, applying, and reasoning.

The TIMSS assessments include a substantial number of items to cover the breadth of mathematics and science content addressed in the frameworks. The fourth grade mathematics and science assessments each include approximately 175 items and the eighth grade mathematics and science assessments each include approximately 220 items.

Achievement Data

The *TIMSS 2019 International Mathematics and Science Results* report presents TIMSS 2019 average mathematics and science scale scores and score distributions at the fourth and eighth grades for each participating country and benchmarking system. Scaling the TIMSS 2019 achievement data proceeded in two phases: calibrating the paperTIMSS and bridge data on the TIMSS 2019 achievement scales, and linking the eTIMSS data to these scales via the bridge data. This process enabled the eTIMSS and paperTIMSS achievement results to be reported on the same achievement scale in each grade and subject.

Trends are reported across the seven TIMSS assessment cycles for countries that have comparable data from previous TIMSS assessments. Average scale scores also are provided by gender and for each of the content and cognitive domains. To provide an interpretation for the average scale scores, TIMSS relates performance on the assessment items to four international benchmarks on the achievement scales: Low, Intermediate, High, and Advanced. Students' performance at each of the benchmarks is described in terms of the items that students reaching the benchmark answered correctly.

Contextual Data

The goal of TIMSS is to provide the best policy-relevant information to help improve mathematics and science teaching and learning. TIMSS 2019 included student, teacher, and school questionnaires

and the Early Learning Survey (also called the "home questionnaire") completed by students' parents or caregivers. Many of the questionnaire items were developed and analyzed as item response theory (IRT) scales to provide robust indicators of important aspects of schooling (e.g., school safety, students' attitudes toward learning mathematics and science, the impact of an early start). Together, the questionnaire results provide a wealth of information about the home, school, and classroom contexts in which students learn mathematics and science. The results from the questionnaires are reported in the Home & School Contexts and Classroom Contexts parts of this report.

The *TIMSS 2019 Encyclopedia: Education Policy and Curriculum in Mathematics and Science report* is a qualitative companion to the quantitative results summarized in this report. The *TIMSS 2019 Encyclopedia* comprises chapters written by each country and benchmarking participant that describe the structure of these countries' education systems and their mathematics and science curricula and initiatives. It also includes the results from the TIMSS 2019 Curriculum Questionnaire, completed by each TIMSS National Research Coordinator.

Students Assessed

TIMSS assesses students in participating countries in their fourth year of formal schooling, provided the mean age at the time of testing is at least 9.5 years, and in their eighth year of formal schooling, provided the mean age at the time of testing is 13.5 years. Because education systems vary in structure and in policies and practices with regard to age of starting school and promotion and retention, there are differences across countries in how the target grades are labeled and in the average age of students. Moreover, some countries choose to administer TIMSS to a different grade than the fourth or eighth years of formal schooling. Norway chose to assess fifth and ninth grade students to obtain better comparisons with Sweden and Finland. South Africa and its benchmarking systems assessed fifth and ninth grade students to better match their curricula and to maintain trend measurement. Turkey also chose to assess students in the fifth grade.

In each grade, nationally representative samples of approximately 4,000 students from 150 to 200 schools participated in TIMSS 2019. Including the mathematics and science assessments and context questionnaires, more than 330,000 students, 310,000 parents, 11,000 schools, and 22,000 teachers participated in the fourth grade assessment, and a further 250,000 students from 8,000 schools, and 30,000 teachers participated in the eighth grade assessment.

Appendix B of this report provides information about the grades assessed in each country, including the country's name of that grade or grades, as well as the mean age of students in each grade assessed in TIMSS 2019.

Quality Assurance

TIMSS 2019 made every effort to attend to the quality and comparability of the data through careful planning and documentation, cooperation among participating countries, standardized procedures,

and rigorous attention to quality control throughout. The assessments were administered to nationally representative and well-documented probability samples of students in each country. Staff from Statistics Canada and IEA Hamburg worked with National Research Coordinators on all phases of sampling activities to ensure compliance with sampling and participation requirements, with the few exceptions from compliance annotated in the data exhibits. IEA Amsterdam worked with the TIMSS & PIRLS International Study Center to manage an extensive series of verification checks to ensure the comparability of translations of the assessment items and questionnaires, and to conduct an international quality assurance program of school visits to monitor and report on the administration of the assessment. IEA Hamburg staff worked closely with National Research Coordinators during the project to organize data collection operations and to check all data for accuracy and consistency within and across countries.

Finally, full documentation of the many technical activities required to conduct TIMSS 2019 is provided in *Methods and Procedures: TIMSS 2019 Technical Report*. This volume includes detailed information about the processes used to develop and implement the TIMSS 2019 assessments, including sampling, translation verification, data collection, scaling, linking, and data analysis.

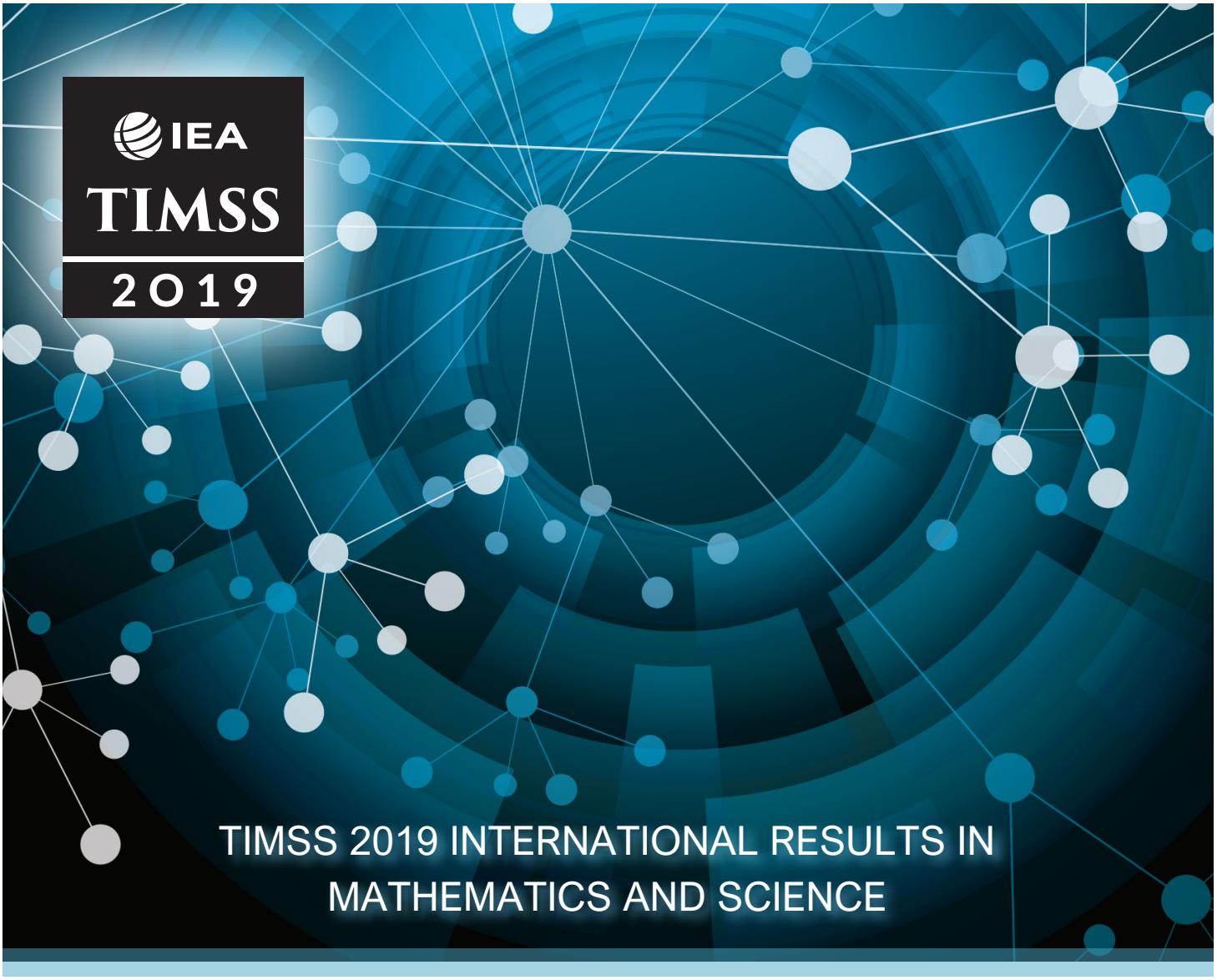
About this Report

The *TIMSS 2019 International Mathematics and Science Results* report presents results from TIMSS 2019 in 14 chapters. Report readers can view the TIMSS 2019 results using the navigation buttons across the top of the report website, or access each chapter using the side menu. Exhibits and report text can be downloaded and printed from the Download Center in the side menu and on pages throughout the website.

The report is organized in three parts:

- **Countries' Mathematics & Science Achievement** presents achievement results in four chapters, one for each grade and subject assessed in TIMSS: Mathematics Grade 4, Science Grade 4, Mathematics Grade 8, and Science Grade 8.
- **Home & School Contexts** presents results pertaining to the home and school contexts in which students learn, in four chapters: Home Environment Support; School Composition and Resources; School Climate; and School Discipline and Safety.
- **Classroom Contexts** presents results pertaining to students' classrooms contexts for learning mathematics and science: Teacher Preparation, Professional Development and Job Satisfaction; Challenges to Teaching and Learning; Students' Attitudes; Mathematics Curriculum and Instruction; Science Curriculum and Instruction; and Technology in Instruction.

Appendices A through H provide information about country participation in TIMSS 2019 and earlier TIMSS assessments; population coverage, sample sizes, and participation rates; additional achievement results, including the Test-Curriculum Matching Analysis (TCMA); and information about the organizations and individuals responsible for TIMSS 2019.



COUNTRIES' MATHEMATICS & SCIENCE ACHIEVEMENT

IEA
TIMSS & PIRLS
International Study Center
Lynch School of Education
BOSTON COLLEGE

Mathematics Grade 4

Average Mathematics Achievement

Average Achievement and Scale Score Distributions

The TIMSS 2019 fourth grade mathematics assessment was based on a comprehensive assessment framework developed collaboratively with the participating countries to reflect their curricular goals. The fourth grade mathematics assessment included three content areas—number, which included prealgebra (50%); measurement and geometry (30%); and data (20%). In accordance with the framework, the majority of TIMSS 2019 mathematics items assessed fourth grade students' applying and reasoning skills. To cover the framework at the fourth grade, the TIMSS 2019 mathematics assessment comprised 175 assessment items. This cycle marked the beginning of the transition to a computer-based assessment system. More than half of the TIMSS 2019 countries administered the assessment in an "e" (electronic) format and almost half administered the assessment in a paper format, as in TIMSS 2015. The "e" countries also administered the trend items in the paper format to provide a bridge to the TIMSS 2015 and TIMSS 2019 paper-based assessments. At the fourth grade, the paper-based assessment also was available in a less difficult version, with some items being less difficult, and the rest of the items in common with the regular version. Some countries opted to administer the less difficult TIMSS mathematics assessment at fourth grade in order to better measure student achievement of their student populations. The assessment was carefully designed and analyzed, so that the TIMSS 2019 mathematics achievement results for all 58 countries are reported on the same TIMSS fourth grade mathematics scale.

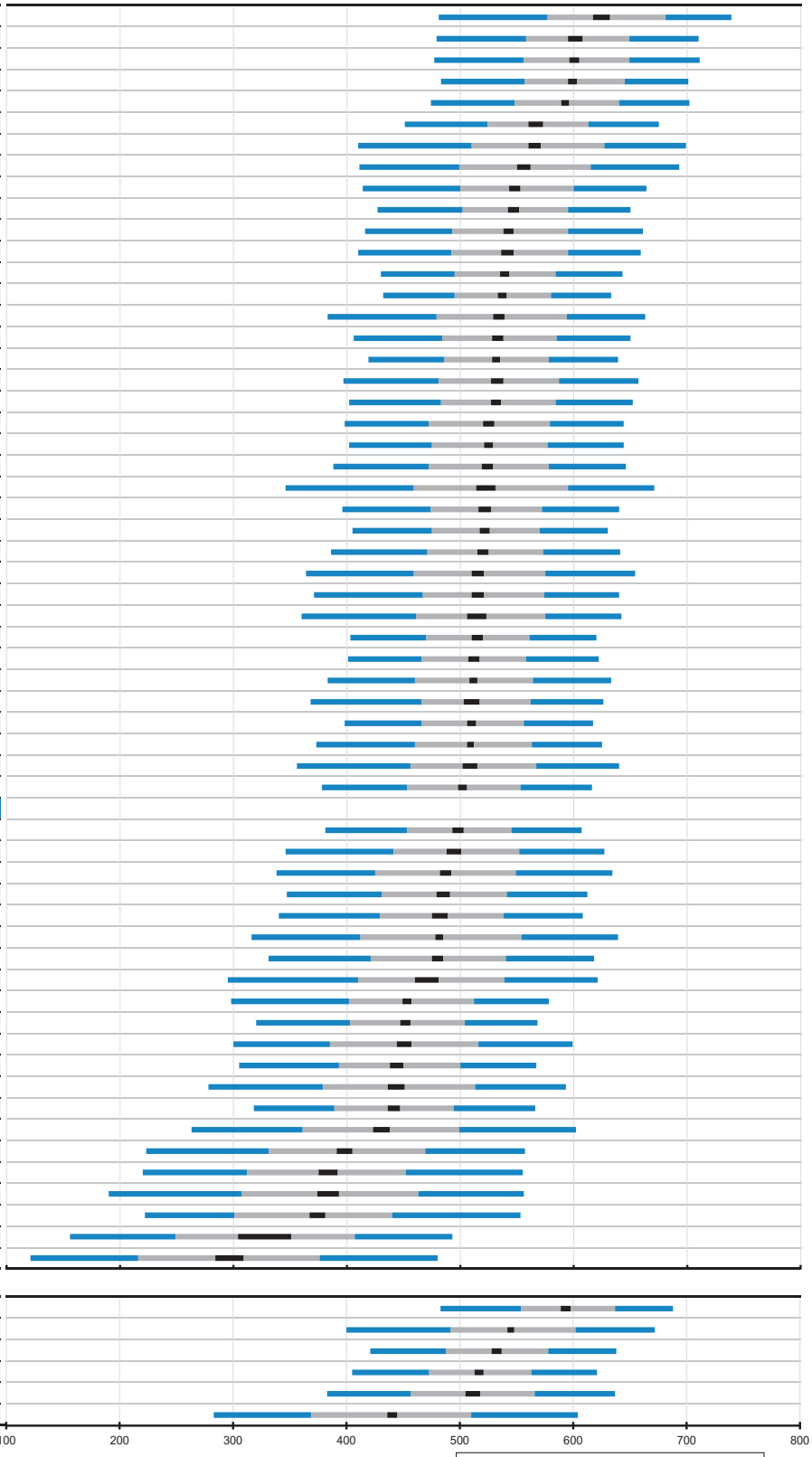
Exhibit 1.1 presents the average achievement at the fourth grade for each participating country (from highest to lowest) together with the scale score distribution underlying the average scale score. Exhibit 1.2 shows whether relatively small differences in average achievement between one country and the next are statistically significant.

The five East Asian countries had the highest average achievement, with Singapore having higher average achievement than all of the other TIMSS 2019 countries. Singapore was followed by Hong Kong SAR, Korea, and Chinese Taipei, whose students had similar average achievement that was higher than all the rest of the countries except Singapore. Fourth grade students in Japan had higher achievement than students in all of the other countries except the other four East Asian countries. In turn, the Russian Federation and Northern Ireland, which performed similarly, had higher achievement than all of the other remaining countries. England and Ireland, and then Latvia, Norway (fifth grade), and Lithuania also performed very well. Essentially, Exhibit 1.2 shows clusters of several similarly performing countries, followed by the next highest achieving clusters of similarly performing countries, and so on.

A number of fourth grade TIMSS 2019 participating countries performed well. Thirty-six countries (including those discussed above) had higher average achievement than the centerpoint of 500 (Exhibit 1.1), which is a point of reference on the TIMSS fourth grade mathematics scale that remains constant from TIMSS assessment to TIMSS assessment. However, there was a considerable difference between the highest average achievement and the lowest. Also, the scale score distributions show that there is wide variation in achievement in every country. Every TIMSS 2019 country has some higher achieving and some lower achieving students.

Exhibit 1.1: Average Mathematics Achievement and Scale Score Distributions

Country	Average Scale Score	
[3] Singapore	625 (3.9)	▲
† Hong Kong SAR	602 (3.3)	▲
Korea, Rep. of	600 (2.2)	▲
Chinese Taipei	599 (1.9)	▲
Japan	593 (1.8)	▲
[2] Russian Federation	567 (3.3)	▲
† Northern Ireland	566 (2.7)	▲
[2] England	556 (3.0)	▲
Ireland	548 (2.5)	▲
[2] Latvia	546 (2.6)	▲
† Norway (5)	543 (2.2)	▲
[2] Lithuania	542 (2.8)	▲
Austria	539 (2.0)	▲
≡ Netherlands	538 (2.2)	▲
[2] † United States	535 (2.5)	▲
Czech Republic	533 (2.5)	▲
† Belgium (Flemish)	532 (1.9)	▲
Cyprus	532 (2.9)	▲
Finland	532 (2.3)	▲
[2] Portugal	525 (2.6)	▲
† Denmark	525 (1.9)	▲
Hungary	523 (2.6)	▲
[2] Turkey (5)	523 (4.4)	▲
Sweden	521 (2.8)	▲
Germany	521 (2.3)	▲
Poland	520 (2.7)	▲
Australia	516 (2.8)	▲
Azerbaijan	515 (2.7)	▲
Bulgaria	515 (4.3)	▲
Italy	515 (2.4)	▲
[2] Kazakhstan	512 (2.5)	▲
[1 2] Canada	512 (1.9)	▲
[2] Slovak Republic	510 (3.5)	▲
Croatia	509 (2.2)	▲
Malta	509 (1.4)	▲
[2] Serbia	508 (3.2)	▲
Spain	502 (2.1)	
TIMSS Scale Centerpoint	**500**	
Armenia	498 (2.5)	
Albania	494 (3.4)	
[2] New Zealand	487 (2.6)	▽
France	485 (3.0)	▽
[1] Georgia	482 (3.7)	▽
United Arab Emirates	481 (1.7)	▽
Bahrain	480 (2.6)	▽
North Macedonia	472 (5.3)	▽
Montenegro	453 (2.0)	▽
Bosnia and Herzegovina	452 (2.4)	▽
Qatar	449 (3.4)	▽
[2] Kosovo	444 (3.0)	▽
Iran, Islamic Rep. of	443 (3.9)	▽
Chile	441 (2.7)	▽
Oman	431 (3.7)	▽
[2] Saudi Arabia	398 (3.6)	▽
Morocco	383 (4.3)	▽
Kuwait	383 (4.7)	▽
South Africa (5)	374 (3.6)	▽
[2 Ψ] Pakistan	328 (12.0)	▽
[2 Ψ] Philippines	297 (6.4)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	593 (2.2)	▲
[2] Dubai, UAE	544 (1.6)	▲
Quebec, Canada	532 (2.3)	▲
Madrid, Spain	518 (2.2)	▲
[2] Ontario, Canada	512 (3.3)	▲
Abu Dhabi, UAE	441 (2.2)	▽



The TIMSS achievement scale was established in 1995 based on the combined achievement distribution of all countries that participated in TIMSS 1995. To provide a point of reference for country comparisons, the scale centerpoint of 500 was located at the mean of the combined achievement distribution. The units of the scale were chosen so that 100 scale score points corresponded to the standard deviation of the distribution.

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.2: Significance of Differences Between Countries' Average Mathematics Achievement

Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly higher (▲) than that of the comparison country, significantly lower (▽), or if there is no statistically significant difference.

Country	Average Scale Score	Singapore	Hong Kong SAR	Korea, Rep. of	Chinese Taipei	Japan	Russian Federation	Northern Ireland	England	Ireland	Latvia	Norway (5)	Lithuania	Austria	Netherlands	United States	Czech Republic	Belgium (Flemish)	Cyprus	Finland	Portugal	Denmark	Hungary	Turkey (5)	Sweden	Germany	Poland	Australia	Azerbaijan	Bulgaria	Italy	Kazakhstan	Canada	Slovak Republic	Croatia
Singapore	625 (3.9)		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hong Kong SAR	602 (3.3)	▽				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Korea, Rep. of	600 (2.2)	▽				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Chinese Taipei	599 (1.9)	▽				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Japan	593 (1.8)	▽	▽	▽	▽		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Russian Federation	567 (3.3)	▽	▽	▽	▽	▽			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Northern Ireland	566 (2.7)	▽	▽	▽	▽	▽			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
England	556 (3.0)	▽	▽	▽	▽	▽	▽	▽			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ireland	548 (2.5)	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Latvia	546 (2.6)	▽	▽	▽	▽	▽	▽	▽	▽					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Norway (5)	543 (2.2)	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Lithuania	542 (2.8)	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Austria	539 (2.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Netherlands	538 (2.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽										▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
United States	535 (2.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Czech Republic	533 (2.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Belgium (Flemish)	532 (1.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Cyprus	532 (2.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽								▲	▲		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Finland	532 (2.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽							▲	▲	▲		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Portugal	525 (2.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		▽								▲	▲	▲	▲	▲	▲	▲	▲
Denmark	525 (1.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽								▲	▲	▲	▲	▲	▲	▲	▲
Hungary	523 (2.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽								▲	▲		▲	▲	▲	▲	▲
Turkey (5)	523 (4.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽														▲	▲	▲	▲
Sweden	521 (2.8)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽												▲	▲	▲	▲
Germany	521 (2.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽												▲	▲	▲	▲
Poland	520 (2.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽												▲	▲	▲	▲
Australia	516 (2.8)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽												
Azerbaijan	515 (2.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽												
Bulgaria	515 (4.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽													
Italy	515 (2.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽												
Kazakhstan	512 (2.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽								
Canada	512 (1.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽								
Slovak Republic	510 (3.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽								
Croatia	509 (2.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽								
Malta	509 (1.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		▽				
Serbia	508 (3.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽								
Spain	502 (2.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		▽
Armenia	498 (2.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Albania	494 (3.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
New Zealand	487 (2.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
France	485 (3.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Georgia	482 (3.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
United Arab Emirates	481 (1.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Bahrain	480 (2.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
North Macedonia	472 (5.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Montenegro	453 (2.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Bosnia and Herzegovina	452 (2.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Qatar	449 (3.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Kosovo	444 (3.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Iran, Islamic Rep. of	443 (3.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Chile	441 (2.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Oman	431 (3.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Saudi Arabia	398 (3.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Morocco	383 (4.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Kuwait	383 (4.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
South Africa (5)	374 (3.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Pakistan	328 (12.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Philippines	297 (6.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Benchmarking Participants																																			
Moscow City, Russian Fed.	593 (2.2)	▽	▽	▽	▽		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Dubai, UAE	544 (1.6)	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Quebec, Canada	532 (2.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽							▲	▲	▲		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Madrid, Spain	518 (2.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽											▲	▲	▲
Ontario, Canada	512 (3.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽								
Abu Dhabi, UAE	441 (2.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽

▲ Average achievement significantly higher than comparison country
▽ Average achievement significantly lower than comparison country

Significance tests were not adjusted for multiple comparisons. Five percent of the comparisons would be statistically significant by chance alone.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.2: Significance of Differences Between Countries' Average Mathematics Achievement

(Continued)

Country	Average Scale Score	Malta	Serbia	Spain	Armenia	Albania	New Zealand	France	Georgia	United Arab Emirates	Bahrain	North Macedonia	Montenegro	Bosnia and Herzegovina	Qatar	Kosovo	Iran, Islamic Rep. of	Chile	Oman	Saudi Arabia	Morocco	Kuwait	South Africa (5)	Pakistan	Philippines
Singapore	625 (3.9)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hong Kong SAR	602 (3.3)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Korea, Rep. of	600 (2.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Chinese Taipei	599 (1.9)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Japan	593 (1.8)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Russian Federation	567 (3.3)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Northern Ireland	566 (2.7)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
England	556 (3.0)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ireland	548 (2.5)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Latvia	546 (2.6)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Norway (5)	543 (2.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Lithuania	542 (2.8)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Austria	539 (2.0)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Netherlands	538 (2.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
United States	535 (2.5)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Czech Republic	533 (2.5)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Belgium (Flemish)	532 (1.9)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Cyprus	532 (2.9)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Finland	532 (2.3)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Portugal	525 (2.6)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Denmark	525 (1.9)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hungary	523 (2.6)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Turkey (5)	523 (4.4)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Sweden	521 (2.8)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Germany	521 (2.3)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Poland	520 (2.7)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Australia	516 (2.8)	▲		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Azerbaijan	515 (2.7)	▲		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Bulgaria	515 (4.3)			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Italy	515 (2.4)	▲		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Kazakhstan	512 (2.5)			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Canada	512 (1.9)			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Slovak Republic	510 (3.5)				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Croatia	509 (2.2)			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Malta	509 (1.4)			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Serbia	508 (3.2)				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Spain	502 (2.1)	▽				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Armenia	498 (2.5)	▽	▽				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Albania	494 (3.4)	▽	▽	▽				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
New Zealand	487 (2.6)	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
France	485 (3.0)	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Georgia	482 (3.7)	▽	▽	▽	▽	▽							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
United Arab Emirates	481 (1.7)	▽	▽	▽	▽	▽							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Bahrain	480 (2.6)	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
North Macedonia	472 (5.3)	▽	▽	▽	▽	▽	▽	▽					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Montenegro	453 (2.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Bosnia and Herzegovina	452 (2.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲
Qatar	449 (3.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽							▲	▲	▲	▲	▲	▲	▲
Kosovo	444 (3.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲
Iran, Islamic Rep. of	443 (3.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲
Chile	441 (2.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽					▲	▲	▲	▲	▲	▲	▲
Oman	431 (3.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		▲	▲	▲	▲	▲	▲
Saudi Arabia	398 (3.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		▲	▲	▲	▲	▲
Morocco	383 (4.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				▲	▲
Kuwait	383 (4.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				▲	▲
South Africa (5)	374 (3.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				▲	▲
Pakistan	328 (12.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		▲
Philippines	297 (6.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	
Benchmarking Participants																									
Moscow City, Russian Fed.	593 (2.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Dubai, UAE	544 (1.6)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Quebec, Canada	532 (2.3)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Madrid, Spain	518 (2.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ontario, Canada	512 (3.3)			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Abu Dhabi, UAE	441 (2.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				▲	▲	▲	▲	▲	▲	▲

Country	Benchmarking Participants	Moscow City, Russian Fed.	Dubai, UAE	Quebec, Canada	Madrid, Spain	Ontario, Canada	Abu Dhabi, UAE
Singapore		▲	▲	▲	▲	▲	▲
Hong Kong SAR		▲	▲	▲	▲	▲	▲
Korea, Rep. of		▲	▲	▲	▲	▲	▲
Chinese Taipei		▲	▲	▲	▲	▲	▲
Japan			▲	▲	▲	▲	▲
Russian Federation		▽	▲	▲	▲	▲	▲
Northern Ireland		▽	▲	▲	▲	▲	▲
England		▽	▲	▲	▲	▲	▲
Ireland		▽		▲	▲	▲	▲
Latvia		▽		▲	▲	▲	▲
Norway (5)		▽		▲	▲	▲	▲
Lithuania		▽		▲	▲	▲	▲
Austria		▽		▲	▲	▲	▲
Netherlands		▽	▽		▲	▲	▲
United States		▽	▽		▲	▲	▲
Czech Republic		▽	▽		▲	▲	▲
Belgium (Flemish)		▽	▽		▲	▲	▲
Cyprus		▽	▽		▲	▲	▲
Finland		▽	▽		▲	▲	▲
Portugal		▽	▽	▽	▲	▲	▲
Denmark		▽	▽	▽	▲	▲	▲
Hungary		▽	▽	▽		▲	▲
Turkey (5)		▽	▽			▲	▲
Sweden		▽	▽	▽		▲	▲
Germany		▽	▽	▽		▲	▲
Poland		▽	▽	▽		▲	▲
Australia		▽	▽	▽			▲
Azerbaijan		▽	▽	▽			▲
Bulgaria		▽	▽	▽			▲
Italy		▽	▽	▽			▲
Kazakhstan		▽	▽	▽			▲
Canada		▽	▽	▽	▽		▲
Slovak Republic		▽	▽	▽	▽		▲
Croatia		▽	▽	▽	▽		▲
Malta		▽	▽	▽	▽		▲
Serbia		▽	▽	▽	▽		▲
Spain		▽	▽	▽	▽	▽	▲
Armenia		▽	▽	▽	▽	▽	▲
Albania		▽	▽	▽	▽	▽	▲
New Zealand		▽	▽	▽	▽	▽	▲
France		▽	▽	▽	▽	▽	▲
Georgia		▽	▽	▽	▽	▽	▲
United Arab Emirates		▽	▽	▽	▽	▽	▲
Bahrain		▽	▽	▽	▽	▽	▲
North Macedonia		▽	▽	▽	▽	▽	▲
Montenegro		▽	▽	▽	▽	▽	▲
Bosnia and Herzegovina		▽	▽	▽	▽	▽	▲
Qatar		▽	▽	▽	▽	▽	▲
Kosovo		▽	▽	▽	▽	▽	
Iran, Islamic Rep. of		▽	▽	▽	▽	▽	
Chile		▽	▽	▽	▽	▽	
Oman		▽	▽	▽	▽	▽	▽
Saudi Arabia		▽	▽	▽	▽	▽	▽
Morocco		▽	▽	▽	▽	▽	▽
Kuwait		▽	▽	▽	▽	▽	▽
South Africa (5)		▽	▽	▽	▽	▽	▽
Pakistan		▽	▽	▽	▽	▽	▽
Philippines		▽	▽	▽	▽	▽	▽
Benchmarking Participants							
Moscow City, Russian Fed.			▲	▲	▲	▲	▲
Dubai, UAE		▽		▲	▲	▲	▲
Quebec, Canada		▽	▽		▲	▲	▲
Madrid, Spain		▽	▽	▽			▲
Ontario, Canada		▽	▽	▽			▲
Abu Dhabi, UAE		▽	▽	▽	▽	▽	

▲ Average achievement significantly higher than comparison country
▽ Average achievement significantly lower than comparison country

Significance tests were not adjusted for multiple comparisons. Five percent of the comparisons would be statistically significant by chance alone.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

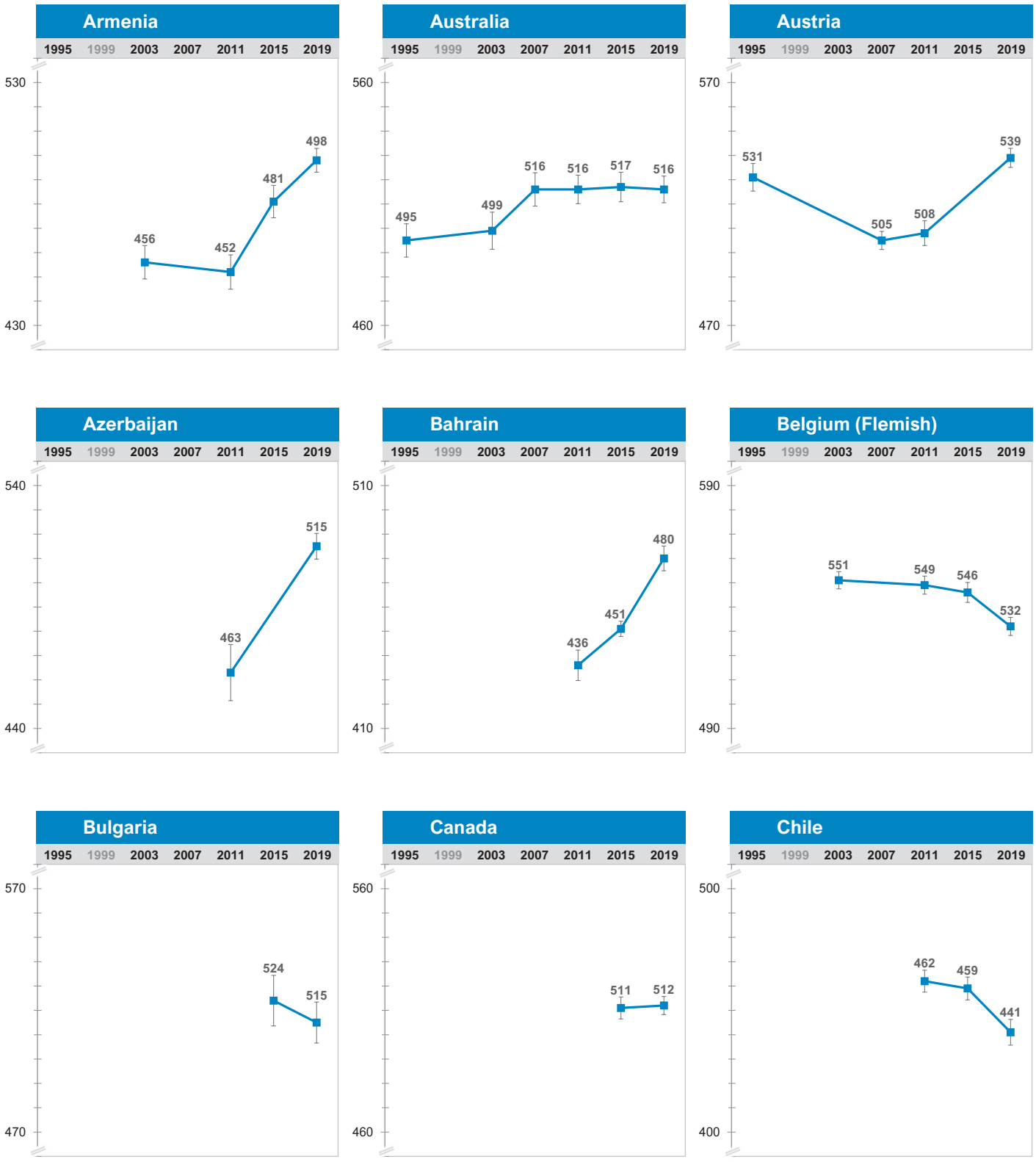
Trends in Average Achievement

Exhibit 1.3 graphs the differences in average mathematics achievement between assessment cycles for TIMSS 2019 countries that have comparable data from previous assessments, while Exhibit 1.4 provides more detail. The countries are presented in alphabetical order in both exhibits. The trends in mathematics achievement at the fourth grade signal more improvements than downturns across the assessment cycles internationally. However, since 1995, most countries have had some periods of increases and decreases in average achievement as well as periods of stability.

Most recently, for the 45 countries that participated in both TIMSS 2015 and 2019, 14 had increases in average achievement, and 8 had declines. The trends in average achievement between 2007 and 2019, as well as between 1995 and 2019, show considerably more progress than declines in average mathematics achievement at the fourth grade over the long term. In 2019, compared with 2007, the 21 countries in both assessments had 14 increases and no decreases. In 2019, compared with 1995, the 16 countries in both assessments had 13 increases and 1 decrease.

Exhibit 1.3: Trend Plots of Average Mathematics Achievement Across Assessment Years◊

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 1.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



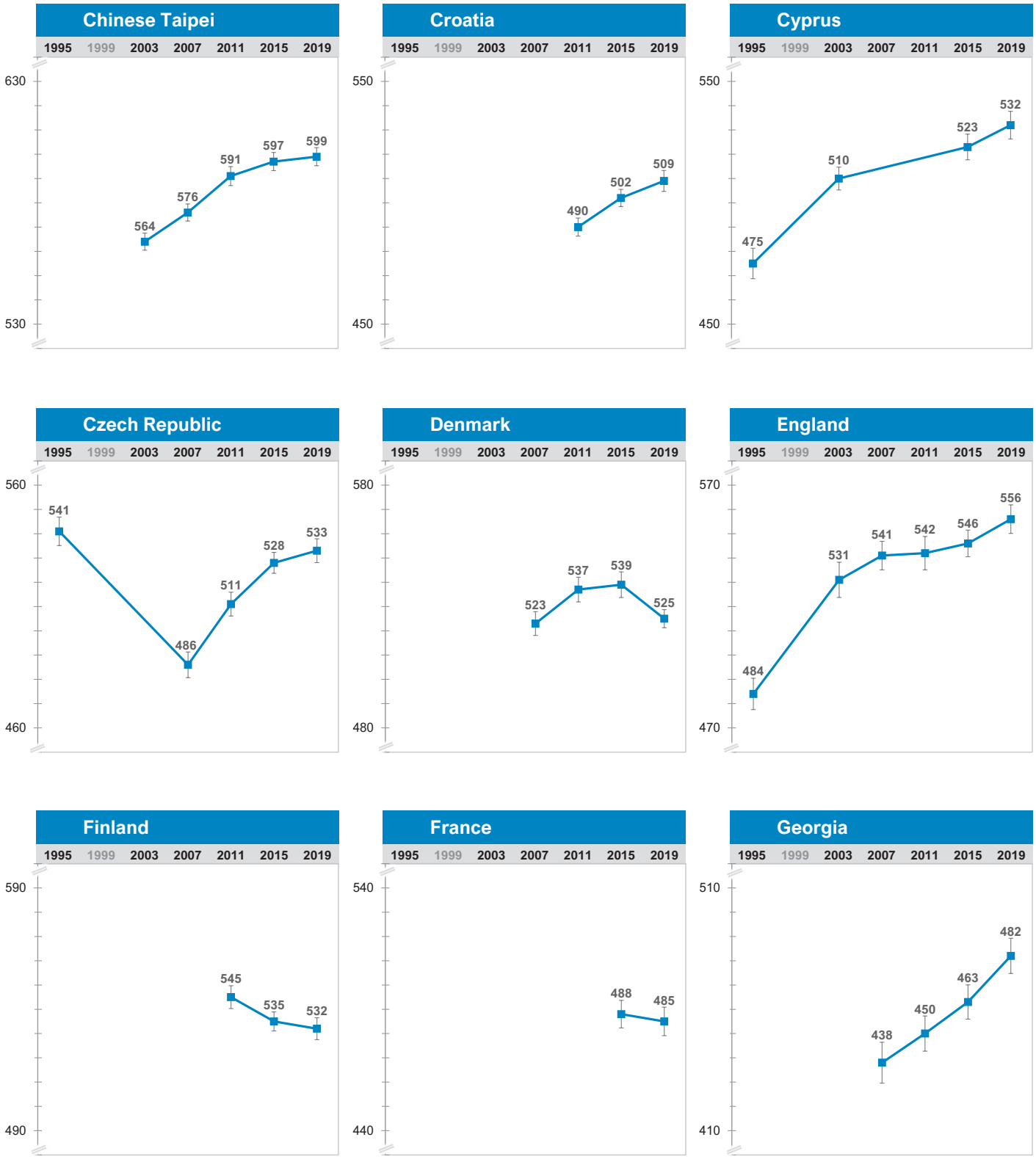
◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.3: Trend Plots of Average Mathematics Achievement Across Assessment Years◊

(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 1.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



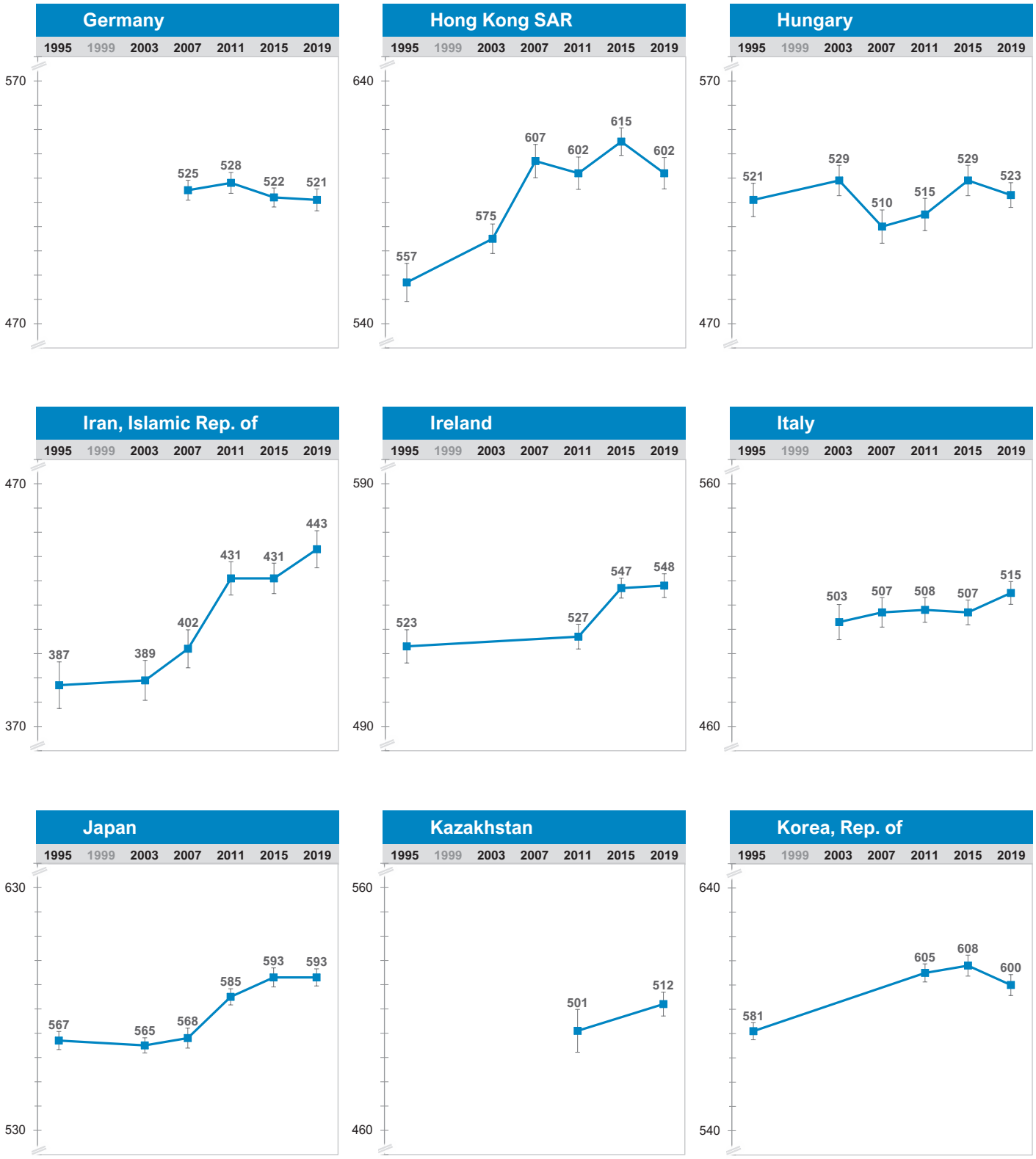
◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.3: Trend Plots of Average Mathematics Achievement Across Assessment Years◊

(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 1.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



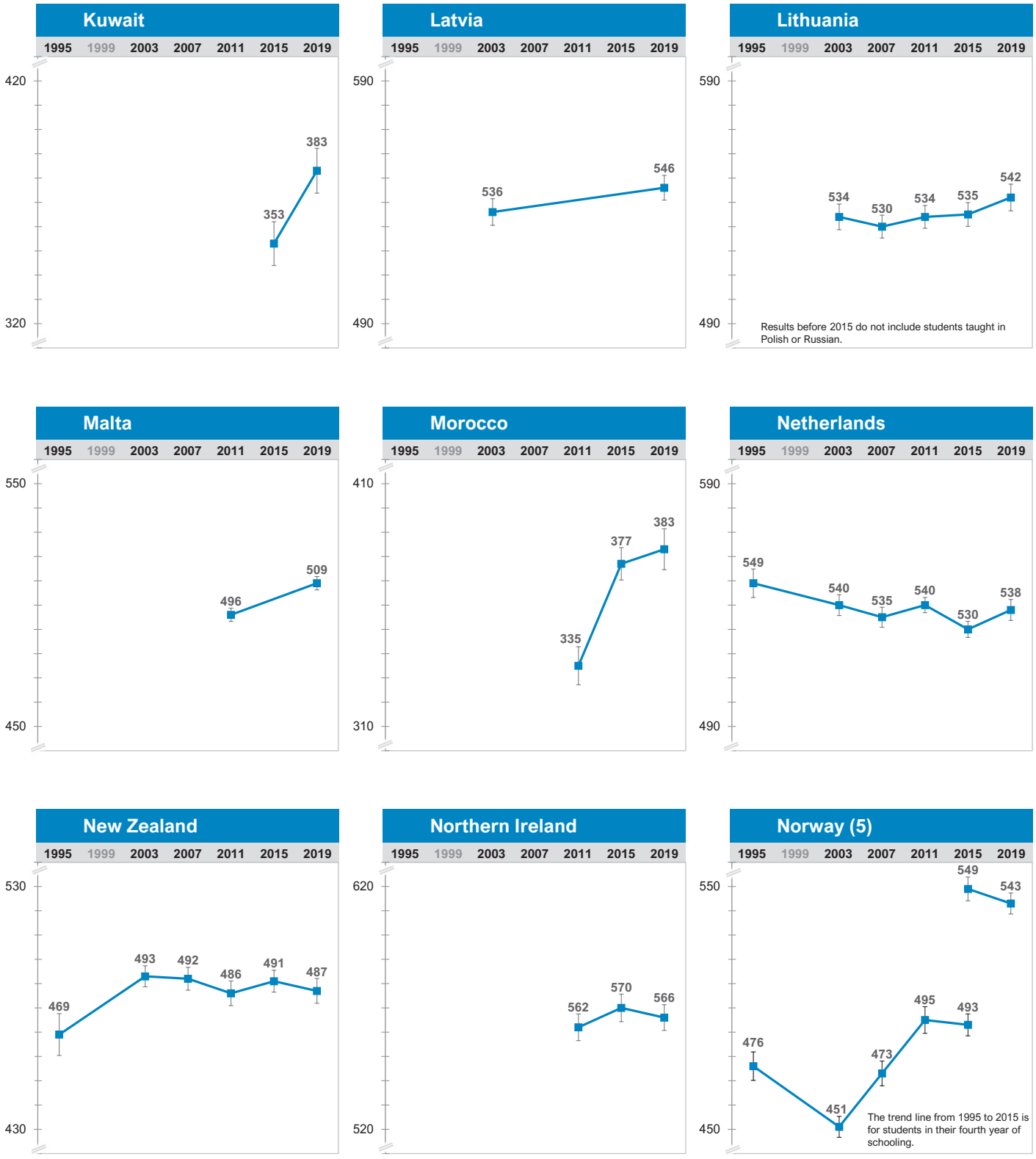
◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.3: Trend Plots of Average Mathematics Achievement Across Assessment Years◊

(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 1.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



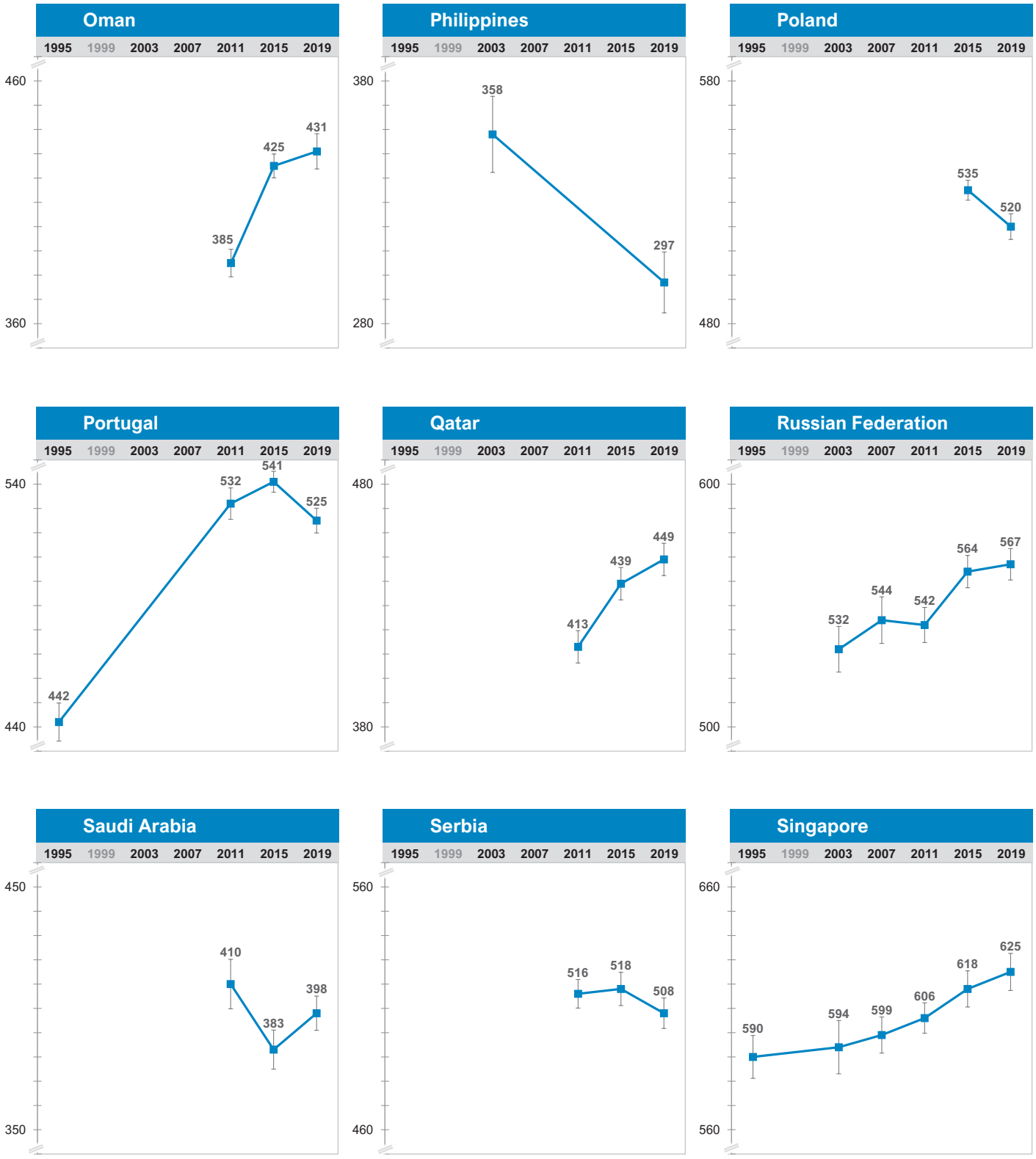
◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.3: Trend Plots of Average Mathematics Achievement Across Assessment Years◊

(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 1.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



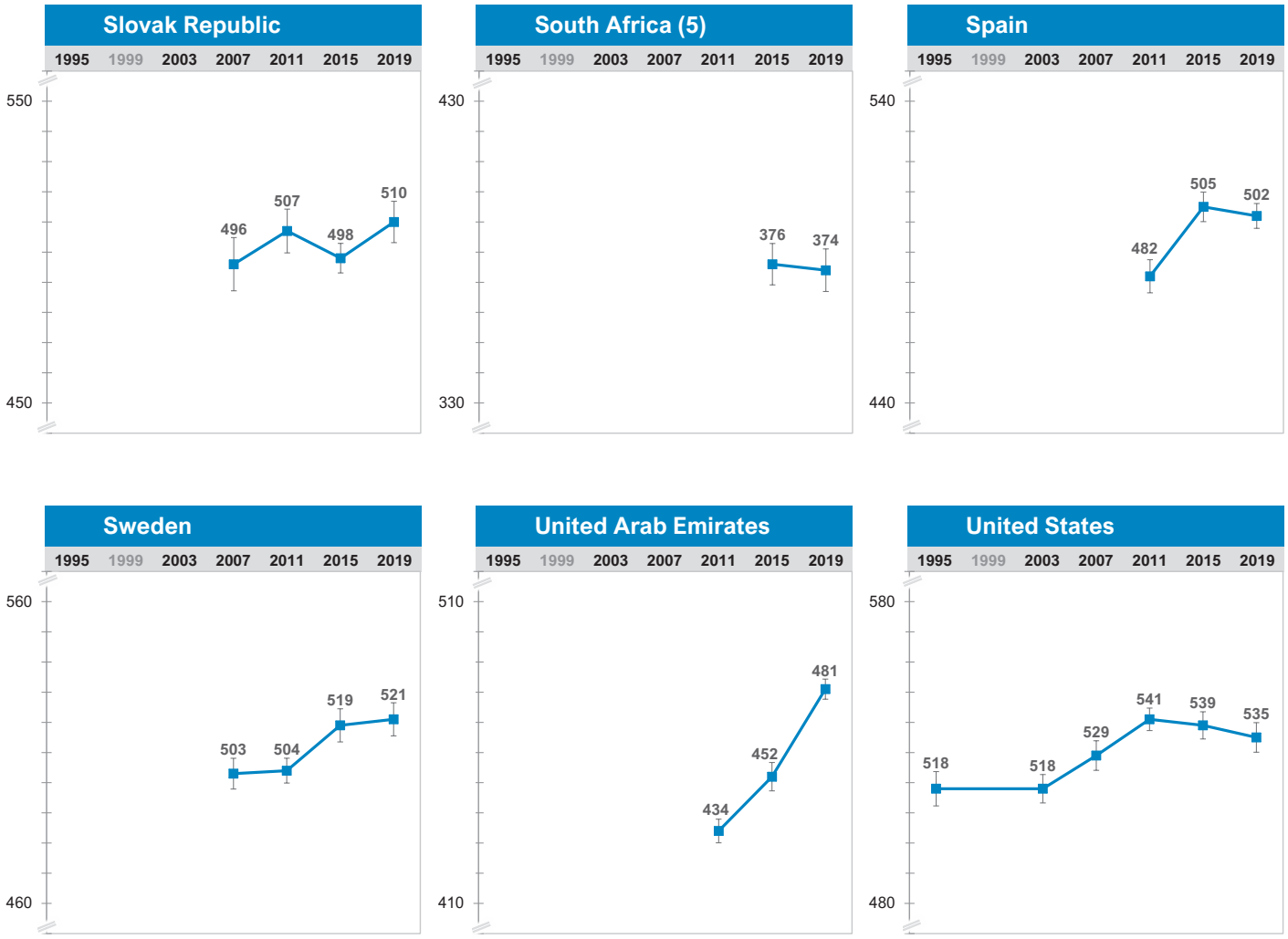
◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.3: Trend Plots of Average Mathematics Achievement Across Assessment Years◊

(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 1.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

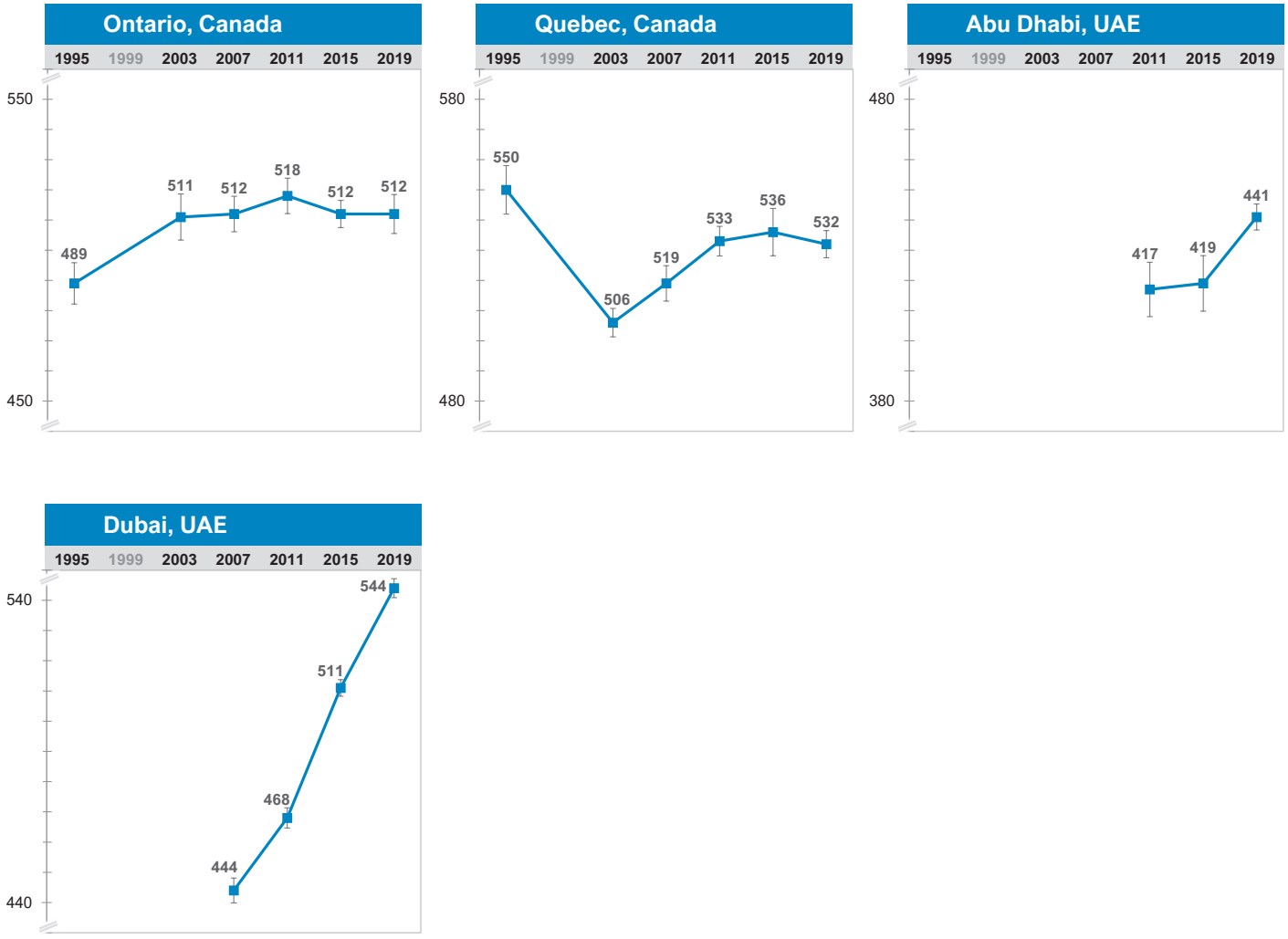
SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.3: Trend Plots of Average Mathematics Achievement Across Assessment Years◊

(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 1.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.

Benchmarking Participants



◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

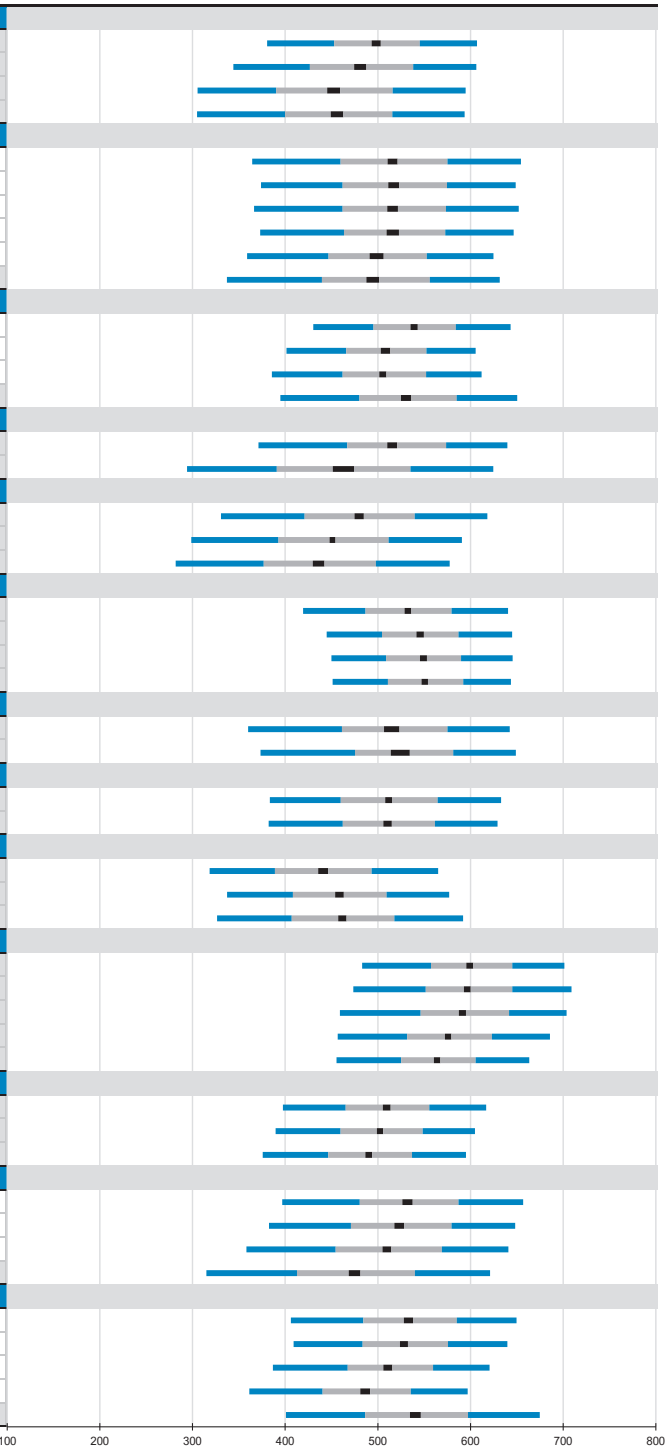
SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.4: Differences in Average Mathematics Achievement Across Assessment Years

Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▽) than the performance in the column year.

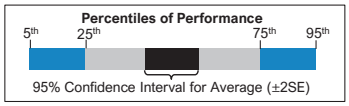
Country	Average Scale Score	Differences Between Years				
		2015	2011	2007	2003	1995
Armenia						
2019	498 (2.5)	17 ▲	46 ▲		42 ▲	
2015	481 (3.4)		29 ▲		25 ▲	
2011	452 (3.6)				-4	
2003	456 (3.5)					
Australia						
2019	516 (2.8)	-1	0	0	17 ▲	21 ▲
2015	517 (3.1)		1	1	19 ▲	23 ▲
2011	516 (3.0)			0	17 ▲	21 ▲
2007	516 (3.5)				17 ▲	22 ▲
† 2003	499 (3.9)					4
≡ 1995	495 (3.5)					
Austria						
2019	539 (2.0)		31 ▲	34 ▲		9 ▲
2011	508 (2.6)			3		-22 ▽
2007	505 (1.9)					-25 ▽
≡ 1995	531 (2.9)					
Azerbaijan						
2019	515 (2.7)		53 ▲			
2 2011	463 (5.9)					
Bahrain						
2019	480 (2.6)	29 ▲	44 ▲			
2 2015	451 (1.6)		15 ▲			
2011	436 (3.2)					
Belgium (Flemish)						
† 2019	532 (1.9)	-13 ▽	-17 ▽		-18 ▽	
† 2015	546 (2.1)		-4		-5	
2011	549 (1.9)				-1	
2 2003	551 (1.8)					
Bulgaria						
2019	515 (4.3)	-9				
2015	524 (5.3)					
Canada						
1 2 2019	512 (1.9)	1				
1 2 † 2015	511 (2.3)					
Chile						
2019	441 (2.7)	-18 ▽	-21 ▽			
2015	459 (2.4)		-3			
2011	462 (2.3)					
Chinese Taipei						
2019	599 (1.9)	3	8 ▲	23 ▲	35 ▲	
2015	597 (1.9)		5 ▲	21 ▲	33 ▲	
2011	591 (2.0)			15 ▲	27 ▲	
2007	576 (1.8)				12 ▲	
2003	564 (1.8)					
Croatia						
2019	509 (2.2)	7 ▲	19 ▲			
2015	502 (1.8)		12 ▲			
2 2011	490 (1.9)					
Cyprus						
2019	532 (2.9)	9 ▲			22 ▲	57 ▲
2015	523 (2.7)				13 ▲	48 ▲
2003	510 (2.4)					35 ▲
1995	475 (3.2)					
Czech Republic						
2019	533 (2.5)	5	22 ▲	47 ▲		-8
2015	528 (2.2)		17 ▲	42 ▲		-12 ▽
2011	511 (2.5)			24 ▲		-30 ▽
2007	486 (2.7)					-54 ▽
1995	541 (3.0)					

Mathematics Achievement Distribution



▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower



See Appendix A for country participation in previous TIMSS assessments.
See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

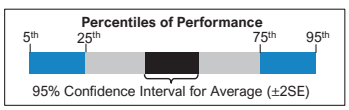
Exhibit 1.4: Differences in Average Mathematics Achievement Across Assessment Years

(Continued)

Country	Average Scale Score	Differences Between Years					Mathematics Achievement Distribution
		2015	2011	2007	2003	1995	
Denmark							
† 2019	525 (1.9)	-14 ▽	-12 ▽	1			
2 † 2015	539 (2.7)		2	16 ▲			
2 2011	537 (2.6)			14 ▲			
† 2007	523 (2.5)						
England							
2 2019	556 (3.0)	10 ▲	13 ▲	14 ▲	25 ▲	72 ▲	
2015	546 (2.8)		4	5	15 ▲	62 ▲	
2011	542 (3.5)			1	11 ▲	58 ▲	
2007	541 (3.0)				10 ▲	57 ▲	
† 2003	531 (3.7)					47 ▲	
3 † 1995	484 (3.3)						
Finland							
2019	532 (2.3)	-3	-13 ▽				
2015	535 (2.0)		-10 ▽				
2011	545 (2.4)						
France							
2019	485 (3.0)	-3					
2015	488 (2.9)						
Georgia							
1 2019	482 (3.7)	19 ▲	32 ▲	43 ▲			
1 2015	463 (3.6)		13 ▲	25 ▲			
1 2011	450 (3.7)			12 ▲			
1 2007	438 (4.3)						
Germany							
2019	521 (2.3)	-1	-7 ▽	-4			
2015	522 (2.0)		-6 ▽	-4			
2011	528 (2.2)			3			
2007	525 (2.1)						
Hong Kong SAR							
† 2019	602 (3.3)	-13 ▽	0	-5	27 ▲	45 ▲	
† 2015	615 (2.9)		13 ▲	8	40 ▲	58 ▲	
2 2011	602 (3.4)			-5	27 ▲	45 ▲	
2007	607 (3.5)				32 ▲	50 ▲	
† 2003	575 (3.1)					18 ▲	
1995	557 (4.0)						
Hungary							
2019	523 (2.6)	-6	8	14 ▲	-5	2	
2015	529 (3.2)		14 ▲	19 ▲	1	8	
2011	515 (3.4)			6	-13 ▽	-6	
2007	510 (3.5)				-19 ▽	-12 ▽	
2 2003	529 (3.2)					7	
1995	521 (3.5)						
Iran, Islamic Rep. of							
2019	443 (3.9)	12 ▲	12 ▲	41 ▲	54 ▲	56 ▲	
2015	431 (3.2)		1	29 ▲	42 ▲	45 ▲	
2011	431 (3.5)			28 ▲	42 ▲	44 ▲	
2007	402 (4.0)				13 ▲	15 ▲	
2 2003	389 (4.2)					2	
1995	387 (4.9)						
Ireland							
2019	548 (2.5)	1	21 ▲			26 ▲	
2015	547 (2.1)		20 ▲			24 ▲	
2011	527 (2.6)					5	
2 1995	523 (3.5)						
Italy							
2019	515 (2.4)	8 ▲	7 ▲	8 ▲	12 ▲		
2 2015	507 (2.6)		-1	0	4		
2011	508 (2.6)			1	5		
2007	507 (3.1)				4		
2003	503 (3.7)						

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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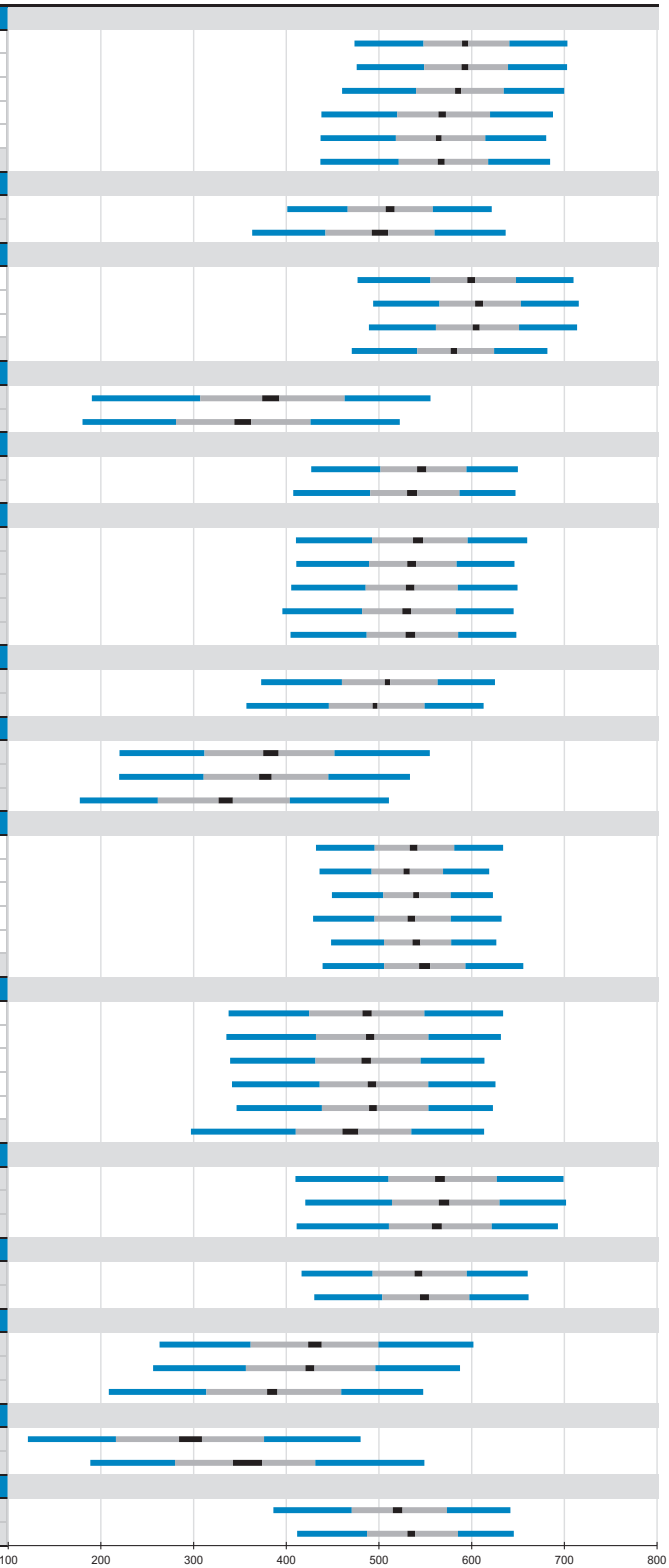
Exhibit 1.4: Differences in Average Mathematics Achievement Across Assessment Years

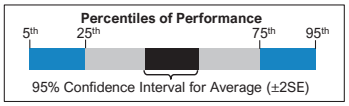
(Continued)

Country	Average Scale Score	Differences Between Years					Mathematics Achievement Distribution
		2015	2011	2007	2003	1995	
Japan							
2019	593 (1.8)	0	8 ▲	25 ▲	28 ▲	26 ▲	
2015	593 (2.0)		7 ▲	25 ▲	28 ▲	26 ▲	
2011	585 (1.7)			17 ▲	21 ▲	18 ▲	
2007	568 (2.1)				4	1	
2003	565 (1.6)					-3	
1995	567 (1.9)						
Kazakhstan							
[2] 2019	512 (2.5)		11 ▲				
[2] 2011	501 (4.5)						
Korea, Rep. of							
2019	600 (2.2)	-8 ▽	-5			19 ▲	
2015	608 (2.2)		3			27 ▲	
2011	605 (1.9)					24 ▲	
[2] 1995	581 (1.8)						
Kuwait							
2019	383 (4.7)	30 ▲					
Ψ 2015	353 (4.6)						
Latvia							
[2] 2019	546 (2.6)				10 ▲		
2003	536 (2.8)						
Lithuania							
[2] 2019	542 (2.8)	7	8 ▲	12 ▲	8 ▲		
[2] 2015	535 (2.5)		2	6	1		
[1 2] 2011	534 (2.4)			4	0		
[1] 2007	530 (2.4)				-4		
[1] 2003	534 (2.7)						
Malta							
2019	509 (1.4)		13 ▲				
2011	496 (1.4)						
Morocco							
2019	383 (4.3)	6	49 ▲				
2015	377 (3.4)		43 ▲				
Ж 2011	335 (4.0)						
Netherlands							
≡ 2019	538 (2.2)	8 ▲	-3	3	-3	-12 ▽	
† 2015	530 (1.7)		-10 ▽	-5	-11 ▽	-19 ▽	
† 2011	540 (1.6)			5	0	-9 ▽	
‡ 2007	535 (2.1)				-5	-14 ▽	
† 2003	540 (2.2)					-9 ▽	
≡ 1995	549 (3.0)						
New Zealand							
[2] 2019	487 (2.6)	-3	1	-5	-6	18 ▲	
2015	491 (2.3)		4	-2	-3	21 ▲	
2011	486 (2.6)			-6	-7 ▽	17 ▲	
2007	492 (2.4)				-1	23 ▲	
2003	493 (2.2)					24 ▲	
1995	469 (4.4)						
Northern Ireland							
† 2019	566 (2.7)	-4	3				
‡ 2015	570 (2.9)		8				
† 2011	562 (2.8)						
Norway (5)							
† 2019	543 (2.2)	-6					
2015	549 (2.5)						
Oman							
2019	431 (3.7)	5	46 ▲				
2015	425 (2.5)		41 ▲				
Ψ 2011	385 (2.9)						
Philippines							
[2] Ψ 2019	297 (6.4)				-62 ▽		
2003	358 (8.0)						
Poland							
2019	520 (2.7)	-15 ▽					
2015	535 (2.1)						



▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower



Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 1.4: Differences in Average Mathematics Achievement Across Assessment Years

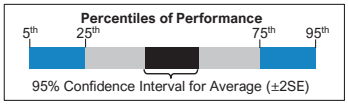
(Continued)

Country	Average Scale Score	Differences Between Years 2015	2011	2007	2003	1995
Portugal						
[2] 2019	525 (2.6)	-16 ▽	-7			83 ▲
[2] 2015	541 (2.2)		9 ▲			99 ▲
2011	532 (3.3)					90 ▲
[2] 1995	442 (4.0)					
Qatar						
2019	449 (3.4)	10 ▲	36 ▲			
2015	439 (3.4)		26 ▲			
[2] 2011	413 (3.4)					
Russian Federation						
[2] 2019	567 (3.3)	3	25 ▲	23 ▲	35 ▲	
2015	564 (3.4)		22 ▲	20 ▲	32 ▲	
2011	542 (3.7)			-2	10	
2007	544 (4.9)				12	
[2] 2003	532 (4.8)					
Saudi Arabia						
[2] 2019	398 (3.6)	15 ▲	-12			
Ψ 2015	383 (4.1)		-27 ▽			
2011	410 (5.2)					
Serbia						
[2] 2019	508 (3.2)	-10 ▽	-8			
[3] 2015	518 (3.5)		2			
[2] 2011	516 (3.0)					
Singapore						
[3] 2019	625 (3.9)	8	20 ▲	26 ▲	31 ▲	35 ▲
[2] 2015	618 (3.8)		12 ▲	18 ▲	23 ▲	27 ▲
[2] 2011	606 (3.2)			6	11	16 ▲
2007	599 (3.8)				5	9
2003	594 (5.6)					4
1995	590 (4.5)					
Slovak Republic						
[2] 2019	510 (3.5)	12 ▲	3	14 ▲		
2015	498 (2.5)		-9	2		
2011	507 (3.7)			11		
2007	496 (4.5)					
South Africa (5)						
2019	374 (3.6)	-2				
2015	376 (3.5)					
Spain						
2019	502 (2.1)	-3	20 ▲			
[2] 2015	505 (2.5)		23 ▲			
2011	482 (2.8)					
Sweden						
2019	521 (2.8)	3	17 ▲	19 ▲		
[2] 2015	519 (2.8)		15 ▲	16 ▲		
2011	504 (2.1)			1		
2007	503 (2.6)					
United Arab Emirates						
2019	481 (1.7)	30 ▲	47 ▲			
2015	452 (2.4)		17 ▲			
2011	434 (2.0)					
United States						
[2] † 2019	535 (2.5)	-4	-6	6	16 ▲	17 ▲
[2] † 2015	539 (2.3)		-1	10 ▲	21 ▲	21 ▲
[2] 2011	541 (1.9)			12 ▲	22 ▲	23 ▲
[2] † 2007	529 (2.5)				11 ▲	11 ▲
† 2003	518 (2.4)					0
1995	518 (2.9)					

Mathematics Achievement Distribution

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower



Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

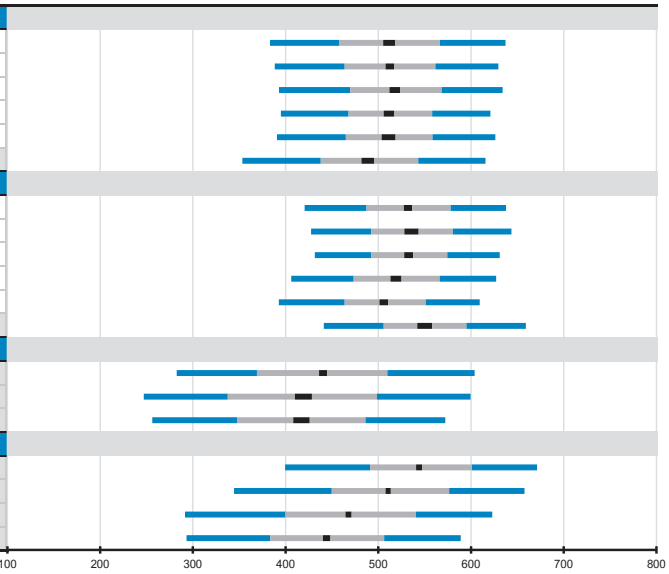
SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.4: Differences in Average Mathematics Achievement Across Assessment Years

(Continued)

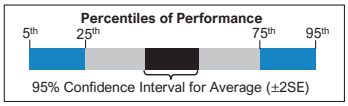
Country	Average Scale Score	Differences Between Years 2015	2011	2007	2003	1995
Benchmarking Participants						
Ontario, Canada						
[2] 2019	512 (3.3)	-1	-6	0	1	23 ▲
2015	512 (2.3)		-5	1	1	24 ▲
2011	518 (3.0)			6	7	29 ▲
[2] 2007	512 (3.0)				0	23 ▲
2003	511 (3.9)					23 ▲
[2] 1995	489 (3.5)					
Quebec, Canada						
2019	532 (2.3)	-4	-1	13 ▲	26 ▲	-18 ▽
[≡] 2015	536 (4.0)		3	17 ▲	30 ▲	-14 ▽
2011	533 (2.5)			14 ▲	27 ▲	-17 ▽
[2] 2007	519 (3.0)				13 ▲	-31 ▽
2003	506 (2.4)					-44 ▽
1995	550 (4.1)					
Abu Dhabi, UAE						
2019	441 (2.2)	21 ▲	23 ▲			
[2 Ψ] 2015	419 (4.7)		2			
2011	417 (4.6)					
Dubai, UAE						
[2] 2019	544 (1.6)	33 ▲	76 ▲	100 ▲		
2015	511 (1.4)		43 ▲	66 ▲		
2011	468 (1.7)			24 ▲		
[‡] 2007	444 (2.1)					

Mathematics Achievement Distribution



▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower



Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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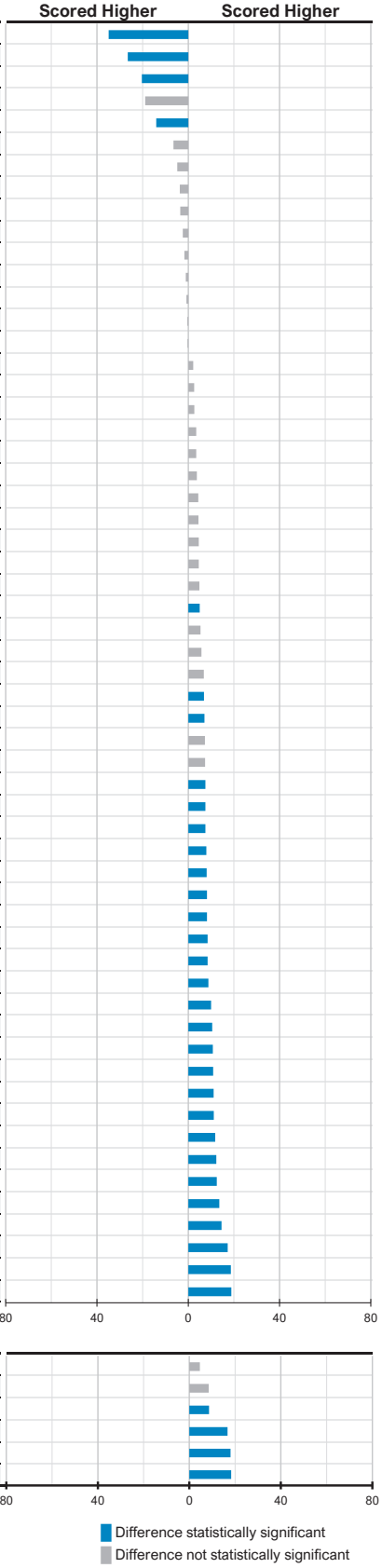
Average Achievement by Gender

Exhibit 1.5 shows the differences in average mathematics achievement between girls and boys. In TIMSS 2019, fourth grade boys had higher average achievement than girls in close to half of the 58 participating countries. More specifically, girls had higher average achievement than boys in 4 countries, there was gender equity in average mathematics achievement in 27 countries, and boys had higher average achievement than girls in 27 countries (although the differences were small).

Exhibit 1.5: Average Mathematics Achievement by Gender

Country	Girls		Boys		Difference (Absolute Value)	Gender Difference
	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score		Girls Scored Higher / Boys Scored Higher
2 Ψ Philippines	48 (0.7)	315 (6.6)	52 (0.7)	280 (6.4)	35 (3.7)	
2 Saudi Arabia	48 (0.8)	412 (4.9)	52 (0.8)	385 (5.8)	26 (8.1)	
South Africa (5)	50 (0.6)	384 (4.0)	50 (0.6)	364 (3.7)	20 (2.9)	
2 Ψ Pakistan	45 (4.7)	338 (16.4)	55 (4.7)	319 (11.8)	19 (16.0)	
Oman	50 (0.7)	438 (3.6)	50 (0.7)	424 (4.4)	14 (2.9)	
Kuwait	47 (2.6)	387 (6.0)	53 (2.6)	380 (6.9)	7 (8.9)	
Bahrain	49 (1.2)	482 (3.2)	51 (1.2)	477 (3.5)	5 (4.3)	
Azerbaijan	47 (0.9)	517 (3.1)	53 (0.9)	514 (3.1)	4 (3.0)	
Morocco	49 (0.7)	385 (4.8)	51 (0.7)	382 (4.3)	3 (2.9)	
Armenia	48 (0.8)	499 (2.6)	52 (0.8)	497 (3.2)	2 (2.8)	
2 Serbia	50 (0.9)	509 (3.4)	50 (0.9)	507 (4.0)	2 (3.9)	
Qatar	50 (1.5)	450 (5.1)	50 (1.5)	449 (3.2)	1 (5.2)	
Japan	48 (0.5)	593 (2.2)	52 (0.5)	593 (1.9)	1 (2.2)	
2 Kazakhstan	49 (0.7)	512 (3.0)	51 (0.7)	512 (2.6)	0 (2.4)	
North Macedonia	48 (0.6)	472 (5.9)	52 (0.6)	472 (5.4)	0 (4.0)	
Bulgaria	48 (0.9)	514 (4.7)	52 (0.9)	516 (4.6)	2 (3.6)	
Finland	49 (0.9)	531 (2.9)	51 (0.9)	533 (2.8)	3 (3.2)	
Albania	49 (0.9)	493 (3.8)	51 (0.9)	495 (3.9)	3 (3.6)	
† Northern Ireland	50 (1.0)	564 (3.2)	50 (1.0)	568 (3.7)	3 (4.2)	
2 Turkey (5)	52 (1.4)	521 (4.5)	48 (1.4)	525 (5.6)	3 (4.9)	
Chinese Taipei	48 (0.6)	597 (2.4)	52 (0.6)	601 (2.3)	4 (2.7)	
† Norway (5)	48 (0.9)	540 (2.7)	52 (0.9)	545 (2.9)	4 (3.5)	
2 Kosovo	49 (1.0)	442 (3.1)	51 (1.0)	447 (3.7)	5 (3.3)	
2 Lithuania	49 (0.9)	540 (2.9)	51 (0.9)	544 (3.7)	5 (3.8)	
2 Latvia	50 (0.9)	544 (2.9)	50 (0.9)	548 (3.0)	5 (2.7)	
Montenegro	47 (0.6)	450 (2.6)	53 (0.6)	455 (2.4)	5 (3.0)	
Korea, Rep. of	47 (0.7)	597 (2.3)	53 (0.7)	602 (2.8)	5 (2.5)	
2 New Zealand	48 (1.3)	484 (3.7)	52 (1.3)	490 (3.3)	5 (4.6)	
† Hong Kong SAR	46 (1.3)	599 (3.5)	54 (1.3)	604 (3.9)	6 (3.3)	
Ireland	50 (1.1)	545 (3.2)	50 (1.1)	552 (2.9)	7 (3.7)	
† Denmark	50 (0.8)	521 (2.2)	50 (0.8)	528 (2.6)	7 (2.9)	
Sweden	50 (1.1)	518 (3.2)	50 (1.1)	525 (3.1)	7 (2.8)	
2 England	50 (1.0)	552 (4.0)	50 (1.0)	560 (3.0)	7 (3.8)	
Iran, Islamic Rep. of	49 (2.1)	439 (6.4)	51 (2.1)	447 (5.3)	7 (8.8)	
Malta	49 (0.7)	505 (2.1)	51 (0.7)	513 (1.9)	7 (2.7)	
1 Georgia	49 (0.9)	478 (3.9)	51 (0.9)	486 (4.1)	7 (3.3)	
Austria	49 (1.0)	535 (2.8)	51 (1.0)	543 (2.1)	8 (2.9)	
3 Singapore	49 (0.5)	621 (4.0)	51 (0.5)	629 (4.2)	8 (2.8)	
Poland	49 (0.8)	516 (3.0)	51 (0.8)	524 (3.0)	8 (2.8)	
United Arab Emirates	50 (1.1)	477 (2.5)	50 (1.1)	486 (2.3)	8 (3.4)	
2 Russian Federation	51 (1.1)	563 (3.6)	49 (1.1)	571 (3.5)	8 (2.5)	
≡ Netherlands	49 (1.0)	533 (2.2)	51 (1.0)	542 (3.0)	9 (3.0)	
Chile	50 (1.3)	437 (3.4)	50 (1.3)	445 (3.1)	9 (3.7)	
Bosnia and Herzegovina	49 (0.7)	447 (2.7)	51 (0.7)	456 (2.8)	9 (2.6)	
Australia	49 (0.8)	511 (2.9)	51 (0.8)	521 (3.3)	10 (2.9)	
Germany	50 (0.8)	516 (2.8)	50 (0.8)	526 (2.4)	10 (2.5)	
† Belgium (Flemish)	51 (0.8)	527 (2.1)	49 (0.8)	538 (2.8)	11 (3.2)	
Czech Republic	49 (0.9)	527 (2.7)	51 (0.9)	538 (3.1)	11 (2.9)	
2 † United States	49 (0.8)	529 (3.0)	51 (0.8)	540 (2.9)	11 (2.9)	
Hungary	48 (1.0)	518 (3.0)	52 (1.0)	529 (3.1)	11 (3.0)	
Croatia	50 (1.2)	504 (2.6)	50 (1.2)	515 (2.7)	12 (3.1)	
Italy	50 (0.8)	509 (2.7)	50 (0.8)	521 (3.2)	12 (3.4)	
2 Slovak Republic	49 (1.0)	503 (3.5)	51 (1.0)	516 (4.2)	12 (3.6)	
France	49 (1.0)	478 (3.3)	51 (1.0)	491 (3.5)	14 (3.0)	
Spain	47 (0.8)	495 (2.5)	53 (0.8)	509 (2.6)	15 (2.8)	
2 Portugal	48 (0.9)	516 (2.9)	52 (0.9)	533 (2.9)	17 (2.6)	
Cyprus	52 (0.7)	523 (3.0)	48 (0.7)	542 (3.5)	19 (3.2)	
1 2 Canada	49 (0.8)	502 (2.5)	51 (0.8)	521 (2.0)	19 (2.4)	
International Average	**49 (0.2)**	**499 (0.5)**	**51 (0.2)**	**503 (0.5)**		
Benchmarking Participants						
Abu Dhabi, UAE	50 (1.5)	438 (2.8)	50 (1.5)	443 (3.2)	5 (4.0)	
2 Dubai, UAE	49 (2.4)	540 (3.2)	51 (2.4)	548 (2.3)	9 (4.4)	
Moscow City, Russian Fed.	49 (1.0)	588 (2.5)	51 (1.0)	597 (2.5)	9 (2.2)	
Madrid, Spain	49 (1.0)	510 (2.6)	51 (1.0)	526 (2.4)	17 (2.7)	
Quebec, Canada	48 (0.8)	523 (3.0)	52 (0.8)	541 (2.4)	18 (3.0)	
2 Ontario, Canada	49 (1.6)	502 (4.9)	51 (1.6)	521 (3.2)	18 (4.4)	



Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
See Appendix B.2 for target population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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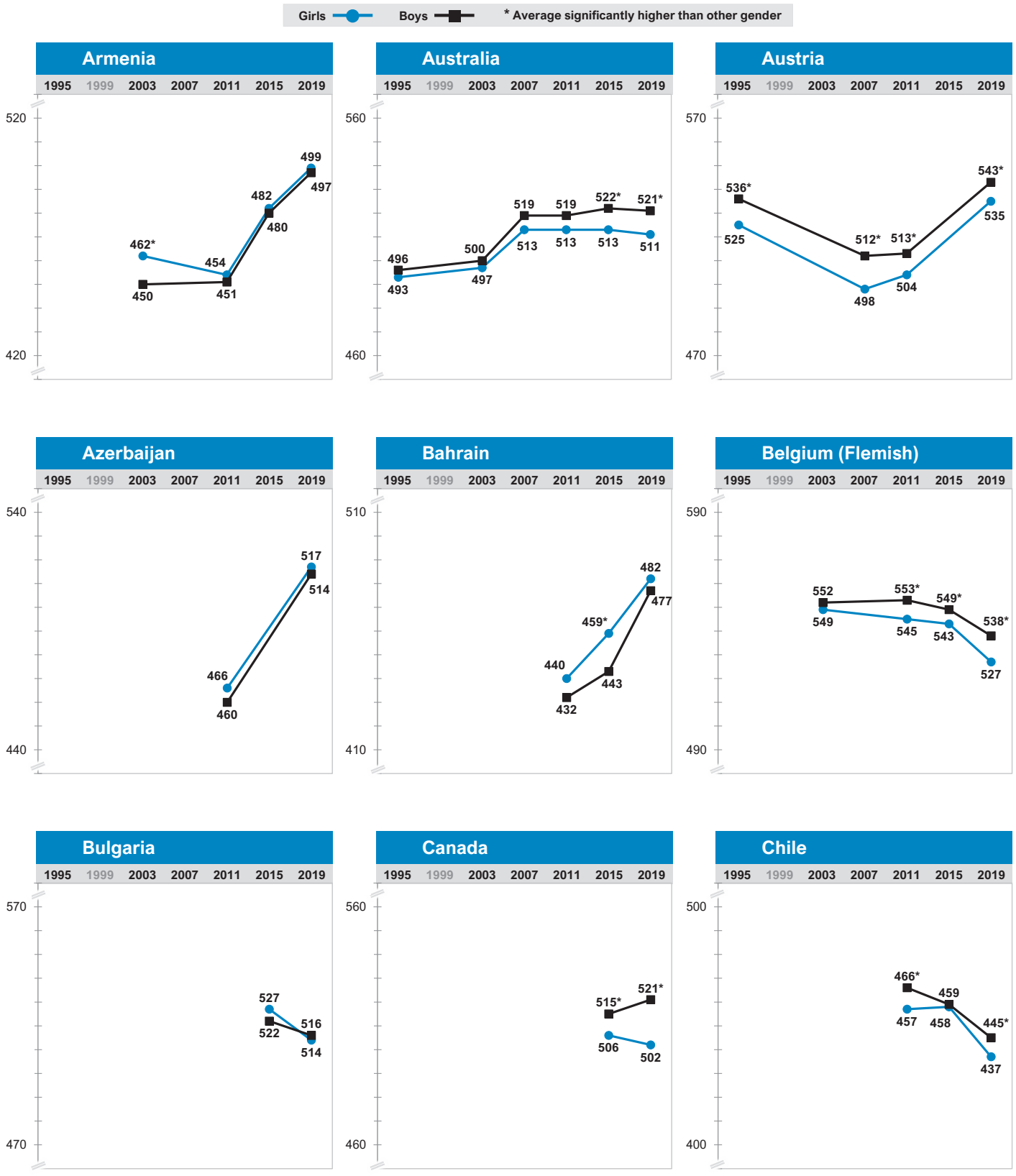
Trends in Average Achievement by Gender

For the TIMSS 2019 countries with comparable data from previous TIMSS assessments, Exhibit 1.6 contains graphs of average mathematics achievement across assessments by gender. The countries are presented in alphabetical order. The difference in average mathematics achievement between boys and girls has remained relatively stable in most countries, with any overall increases or decreases in achievement from assessment to assessment occurring similarly for both girls and boys. However, a number of countries with no gender gap in TIMSS 2015 had a gap favoring boys in TIMSS 2019, including Chile, Georgia, Germany, Hungary, Poland, the Russian Federation, Singapore, Sweden, and the United Arab Emirates. On a more positive note, the gender gap in average achievement favoring boys in TIMSS 2015 was closed in Chinese Taipei, England, and Hong Kong SAR, while the gap favoring girls was closed in Bahrain, Finland, and Kuwait.

Exhibit 1.6: Trend Plots of Average Mathematics Achievement Across Assessment Years by Gender◊

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



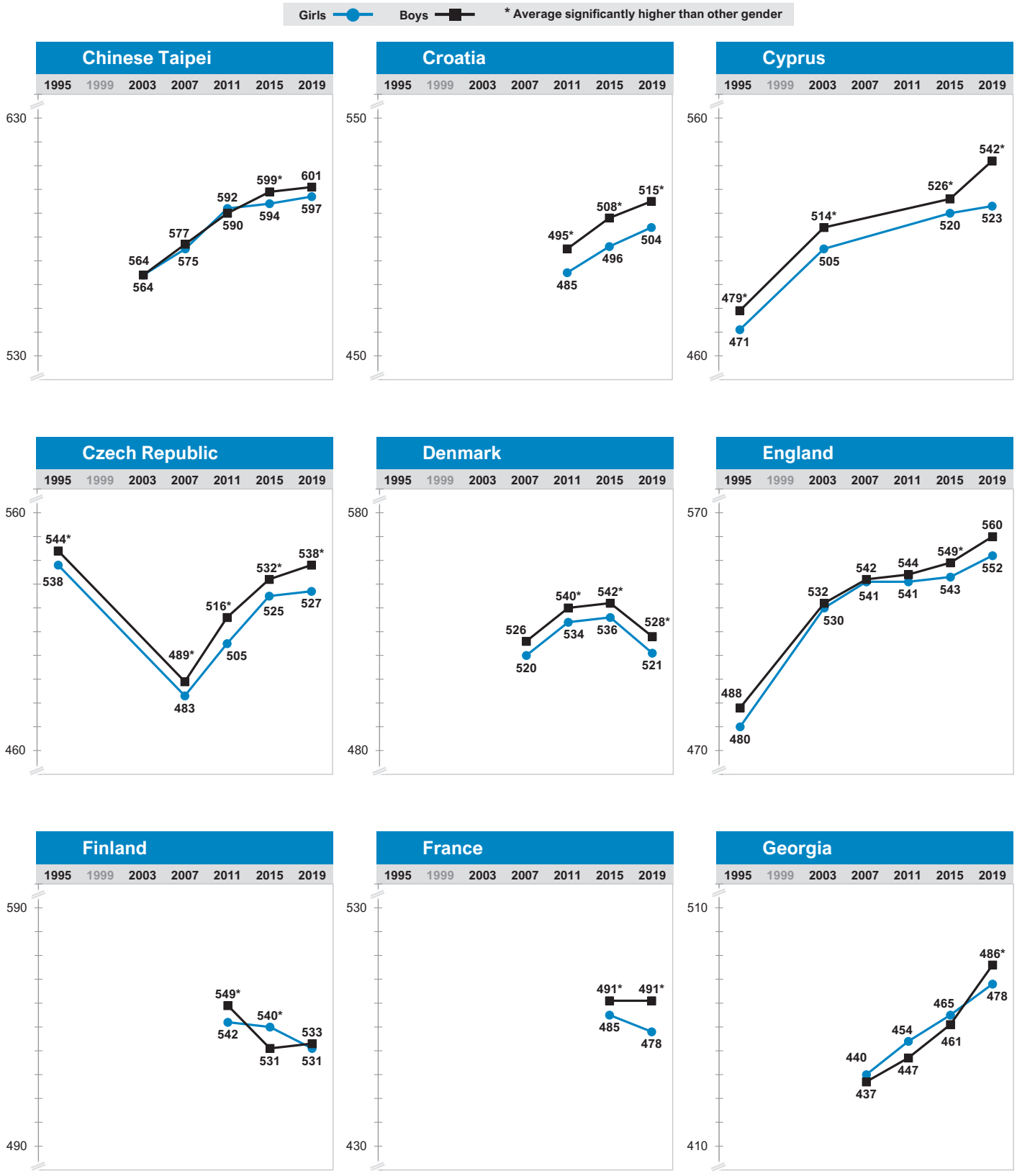
◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.6: Trend Plots of Average Mathematics Achievement Across Assessment Years by Gender◊

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



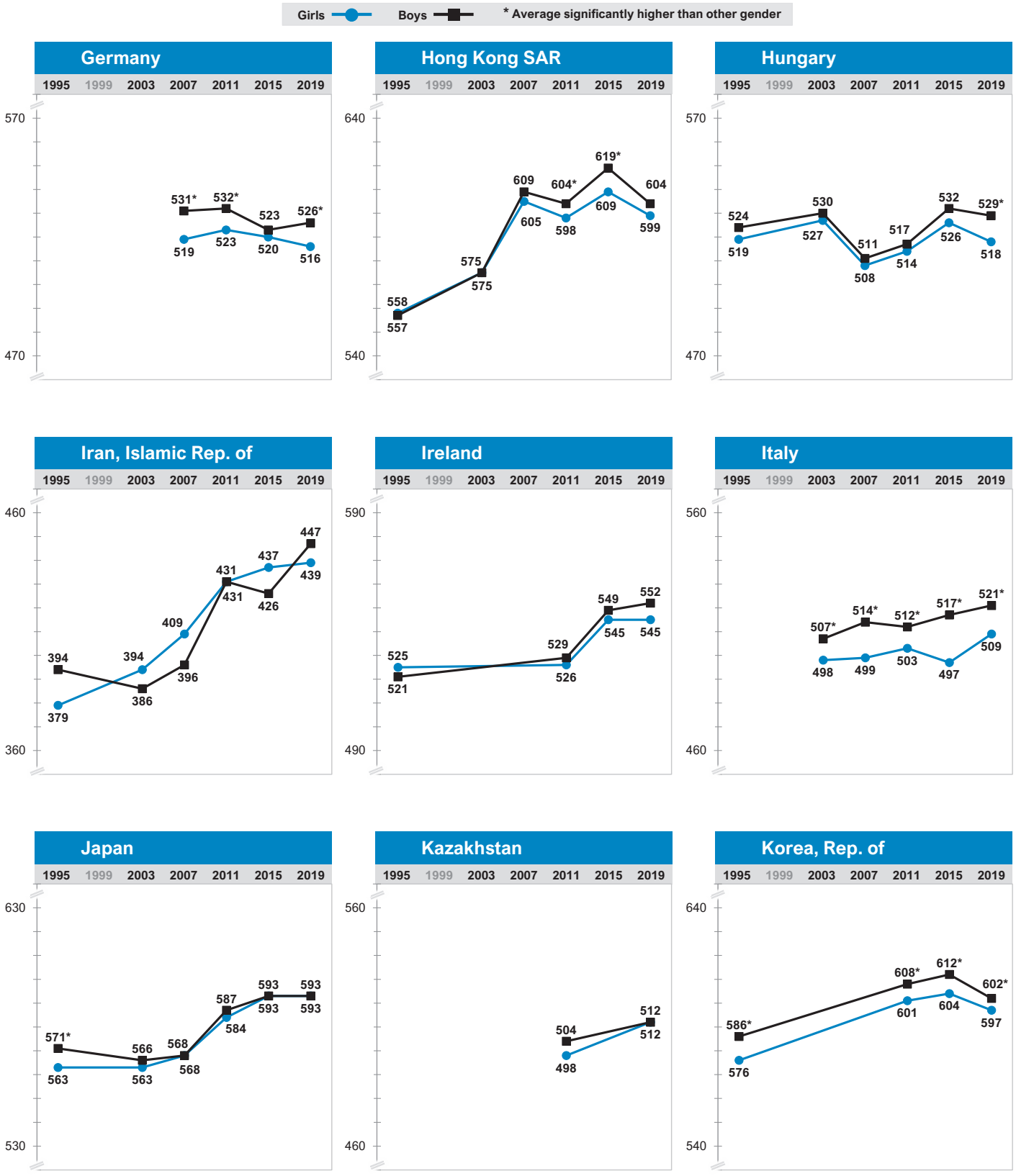
◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.6: Trend Plots of Average Mathematics Achievement Across Assessment Years by Gender◊

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
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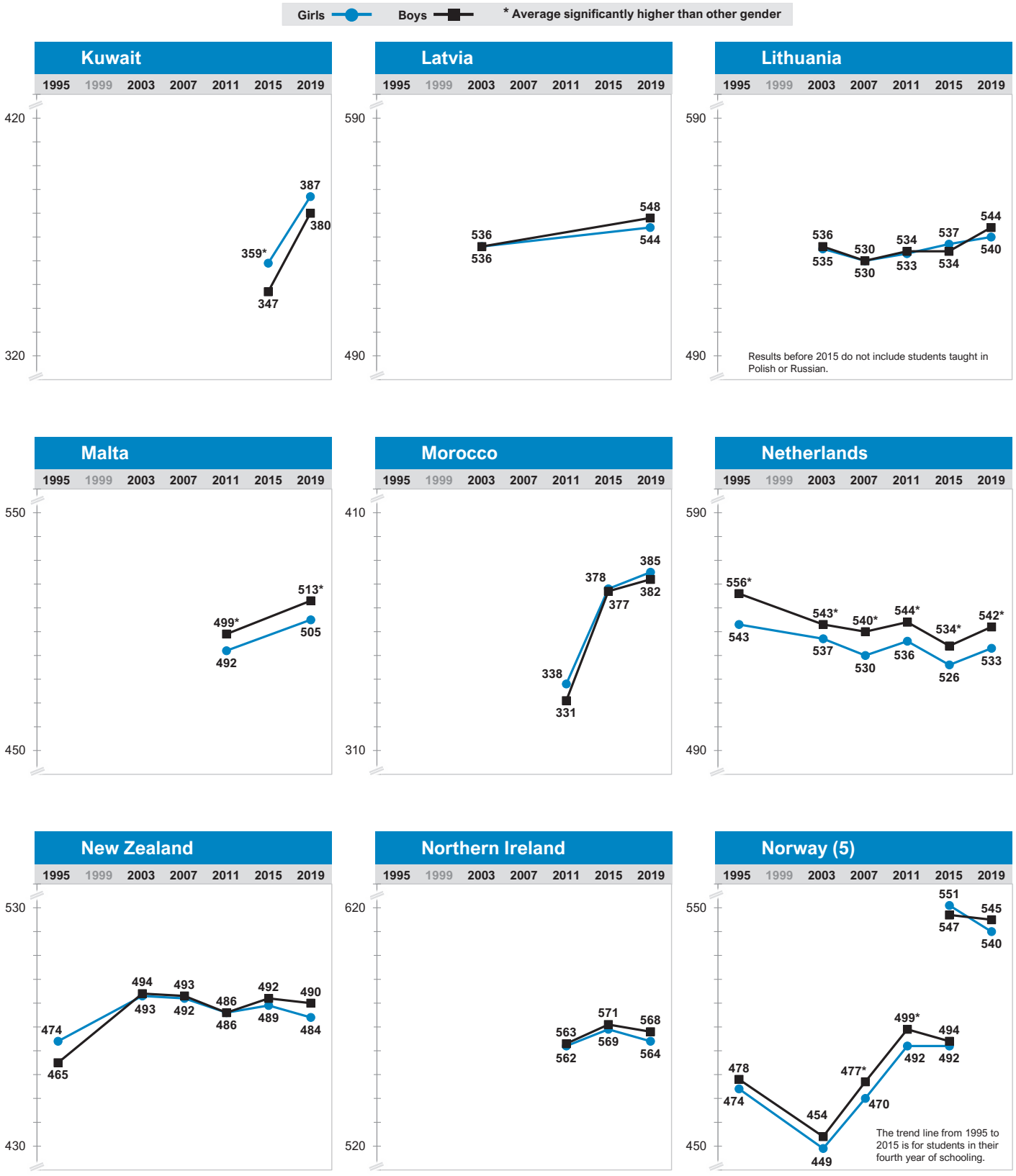
SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.6: Trend Plots of Average Mathematics Achievement Across Assessment Years by Gender◊

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



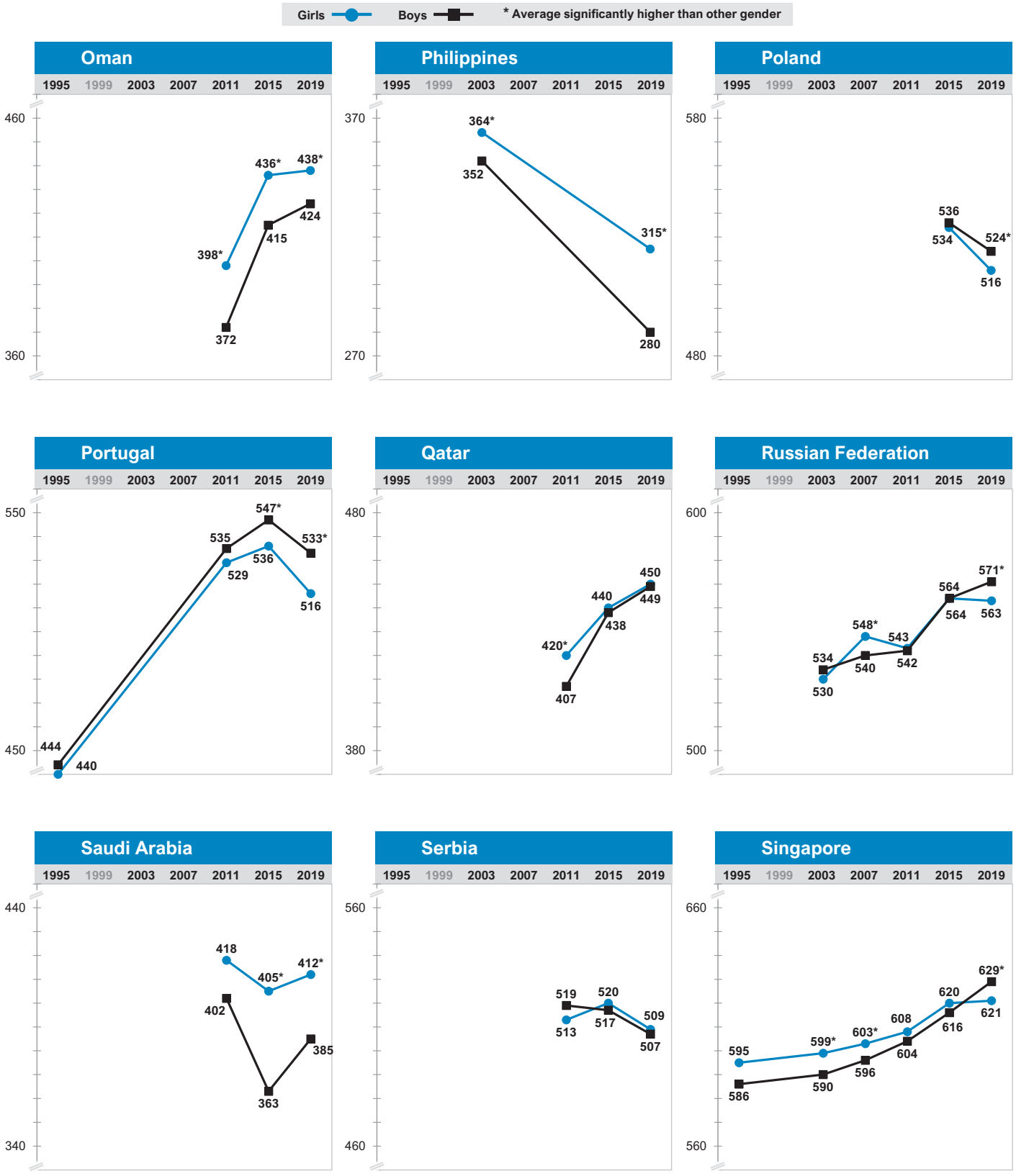
◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.6: Trend Plots of Average Mathematics Achievement Across Assessment Years by Gender◊

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



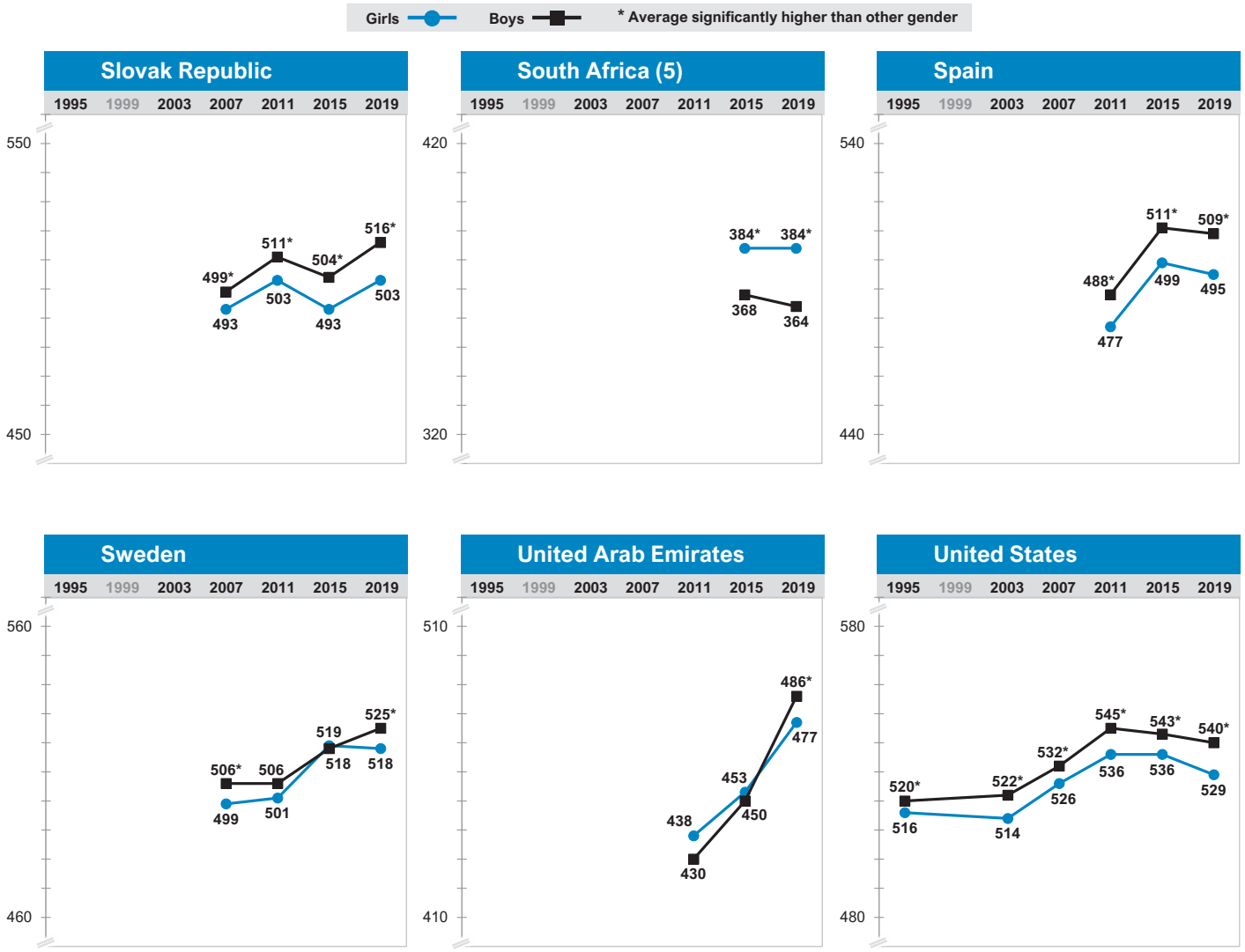
◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.6: Trend Plots of Average Mathematics Achievement Across Assessment Years by Gender◊

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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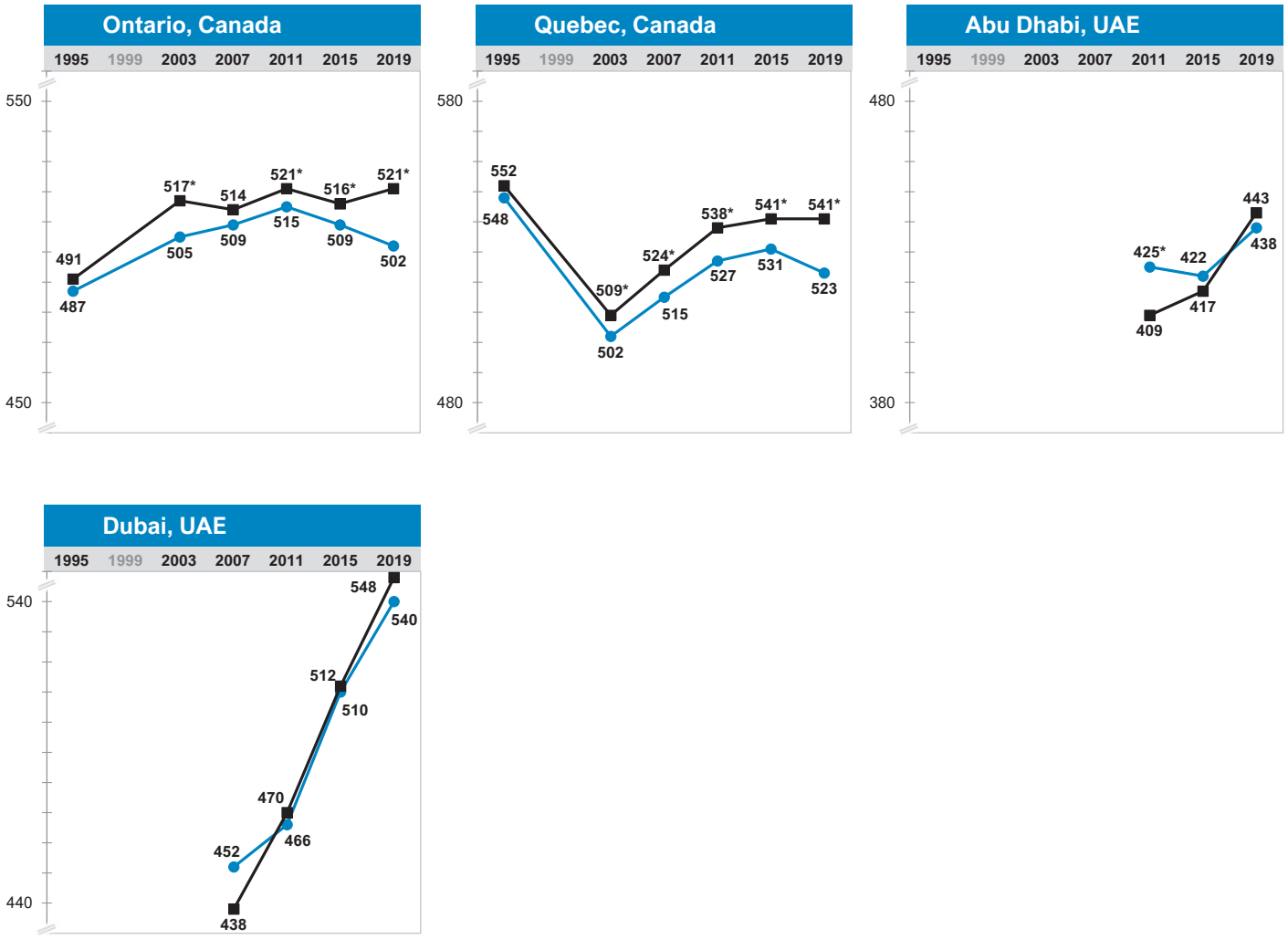
Exhibit 1.6: Trend Plots of Average Mathematics Achievement Across Assessment Years by Gender◊

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.

Girls — Boys — * Average significantly higher than other gender

Benchmarking Participants



◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Performance at TIMSS International Benchmarks in Mathematics

TIMSS 2019 International Benchmarks

To provide an interpretation of the results on the TIMSS fourth grade mathematics achievement scale in relation to the students' performance on the assessment items, TIMSS describes achievement at four points along the scale as International Benchmarks: Advanced International Benchmark (625), High International Benchmark (550), Intermediate International Benchmark (475), and Low International Benchmark (400). The descriptions of mathematics achievement at the International Benchmarks were updated from TIMSS 2015 based on an analysis of the items that students with average achievement at each of the benchmarks answered successfully in TIMSS 2019.

Exhibit 1.7 summarizes what fourth grade students who reached each of the TIMSS International Benchmarks in 2019 could do in mathematics. The progression in mathematics achievement is evident from benchmark to benchmark, from demonstrating basic mathematics knowledge at the Low International Benchmark to applying and justifying their mathematical understanding at the Advanced International Benchmark. As much as possible, each description references achievement in the three content areas covered in the assessment at the fourth grade: number, measurement and geometry, and data. The following tables show the target percentages for the content and cognitive domains.

Target Percentages of Assessment Devoted to Content and Cognitive Domains – TIMSS 2019 Fourth Grade Mathematics

Content Domain	Percentage
Number	50%
Measurement and Geometry	30%
Data	20%

Cognitive Domain	Percentage
Knowing	40%
Applying	40%
Reasoning	20%

The interactive map of the benchmark descriptions links to example items. It provides an overview of the mathematics understanding demonstrated by the fourth grade students who performed at the four different levels on the achievement scale. The following sections provide more information about students' achievement in TIMSS 2019 at each International Benchmark as well as more detailed descriptions of each level together with example items.

Exhibit 1.7: Summary of TIMSS 2019 International Benchmarks of Mathematics Achievement

● **Advanced** International Benchmark	
625	*Students can apply their understanding and knowledge in a variety of relatively complex situations and explain their reasoning.* Students can solve a variety of multistep word problems involving whole numbers and show an understanding of fractions and decimals. They can apply knowledge of two- and three-dimensional shapes in a variety of situations. Students can interpret and represent data to solve multistep problems.
○ **High** International Benchmark	
550	*Students apply conceptual understanding to solve problems.* They can apply conceptual understanding of whole numbers to solve two-step word problems. They show understanding of the number line, multiples, factors, and rounding numbers, and operations with fractions and decimals. Students can solve simple measurement problems. They demonstrate understanding of geometric properties of shapes and angles. Students can interpret and use data in tables and a variety of graphs to solve problems.
● **Intermediate** International Benchmark	
475	*Students can apply basic mathematical knowledge in simple situations.* They can compute with three- and four-digit whole numbers in a variety of situations. They have some understanding of decimals and fractions. Students can identify and draw shapes with simple properties. They can read, label, and interpret information in graphs and tables.
○ **Low** International Benchmark	
400	*Students have some basic mathematical knowledge.* They can add, subtract, multiply, and divide one- and two-digit whole numbers. They can solve simple word problems. They have some knowledge of simple fractions and common geometric shapes. Students can read and complete simple bar graphs and tables.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

Downloaded from http://timss2019.org/download

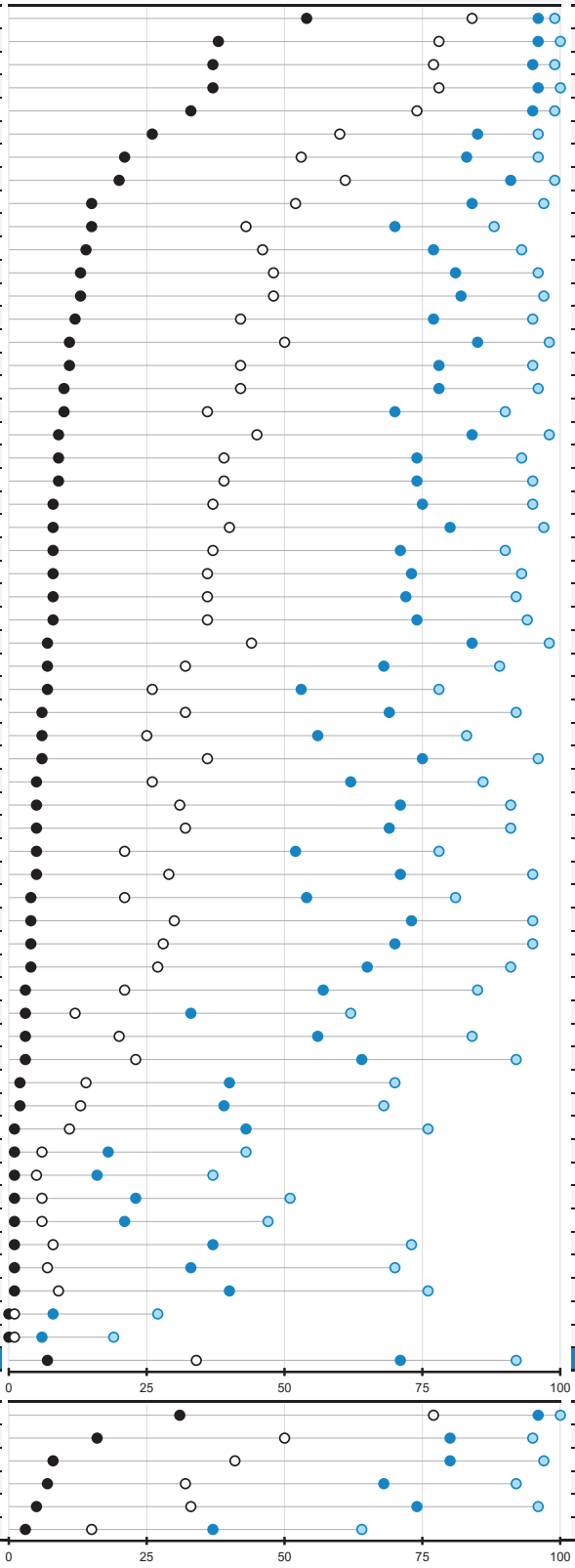
Percentages of Students Reaching International Benchmarks

Exhibit 1.8 presents the percentages of students reaching each TIMSS 2019 International Benchmark. The results are presented in descending order according to the percentage of students reaching the Advanced International Benchmark, which is indicated on the graph with black dots. Because students who reached the Advanced Benchmark also reached the other benchmarks, the percentages illustrated in the exhibit and shown in the columns to the right are cumulative. The five highest-performing East Asian countries had the highest percentages of students reaching the Advanced International Benchmark. More than half of the fourth grade students reached the Advanced International Benchmark in Singapore (54%), and one-third or more did so in Hong Kong SAR (38%), Korea (37%), Chinese Taipei (37%), and Japan (33%). Northern Ireland had about one-fourth (26%) of its students reaching the Advanced International Benchmark, and England and the Russian Federation had about one-fifth (21% and 20%, respectively).

Most countries had fewer than 10 percent of their fourth grade students performing at the Advanced level. As a point of reference, Exhibit 1.8 provides the international median percentage of students reaching each benchmark at the bottom of the four right-hand columns. By definition, half the countries have a percentage in that column above the median and half below the median. The median percentages of students reaching the International Benchmarks were as follows: Advanced—7 percent, High—34 percent, Intermediate—71 percent, and Low—92 percent. Many TIMSS 2019 countries had more than 90 percent of their fourth grade students reaching the Low Benchmark, which can be considered a level of minimum proficiency internationally. In 6 countries, essentially all the students reached this benchmark—100 percent in Hong Kong SAR and Chinese Taipei, and 99 percent in Singapore, Korea, Japan, and the Russian Federation.

Not only are the East Asian countries and the Russian Federation educating high percentages of their students to an advanced level, they are educating all of their students to a level of minimal proficiency.

Exhibit 1.8: Percentages of Students Reaching International Benchmarks of Mathematics Achievement



Country	Advanced Benchmark (625)	High Benchmark (550)	Intermediate Benchmark (475)	Low Benchmark (400)
[3] Singapore	54 (2.2)	84 (1.5)	96 (0.7)	99 (0.3)
† Hong Kong SAR	38 (1.9)	78 (1.6)	96 (0.7)	100 (0.2)
Korea, Rep. of	37 (1.4)	77 (1.2)	95 (0.5)	99 (0.2)
Chinese Taipei	37 (1.3)	78 (1.1)	96 (0.5)	100 (0.2)
Japan	33 (1.3)	74 (0.9)	95 (0.4)	99 (0.2)
† Northern Ireland	26 (1.4)	60 (1.4)	85 (1.1)	96 (0.6)
[2] England	21 (1.4)	53 (1.5)	83 (1.2)	96 (0.5)
[2] Russian Federation	20 (1.6)	61 (1.9)	91 (1.0)	99 (0.3)
Ireland	15 (1.0)	52 (1.4)	84 (1.0)	97 (0.5)
[2] Turkey (5)	15 (1.3)	43 (1.8)	70 (1.7)	88 (1.3)
[2] † United States	14 (0.8)	46 (1.3)	77 (1.1)	93 (0.6)
[2] Lithuania	13 (1.1)	48 (1.6)	81 (1.1)	96 (0.6)
† Norway (5)	13 (0.9)	48 (1.3)	82 (1.2)	97 (0.6)
Cyprus	12 (0.9)	42 (1.6)	77 (1.3)	95 (0.6)
[2] Latvia	11 (0.9)	50 (1.7)	85 (1.2)	98 (0.6)
Finland	11 (0.8)	42 (1.3)	78 (1.2)	95 (0.6)
Czech Republic	10 (1.0)	42 (1.5)	78 (1.3)	96 (0.6)
Australia	10 (0.9)	36 (1.2)	70 (1.3)	90 (1.0)
Austria	9 (0.7)	45 (1.4)	84 (1.1)	98 (0.4)
Hungary	9 (0.8)	39 (1.4)	74 (1.3)	93 (0.8)
[2] Portugal	9 (0.7)	39 (1.6)	74 (1.2)	95 (0.7)
† Denmark	8 (0.9)	37 (1.3)	75 (1.0)	95 (0.5)
† Belgium (Flemish)	8 (0.5)	40 (1.2)	80 (1.2)	97 (0.4)
Bulgaria	8 (0.6)	37 (1.7)	71 (1.9)	90 (1.5)
Poland	8 (0.8)	36 (1.4)	73 (1.4)	93 (0.6)
Azerbaijan	8 (0.6)	36 (1.3)	72 (1.5)	92 (0.8)
Sweden	8 (0.8)	36 (1.7)	74 (1.4)	94 (0.7)
≡ Netherlands	7 (0.9)	44 (1.7)	84 (1.1)	98 (0.4)
[2] Serbia	7 (0.7)	32 (1.4)	68 (1.5)	89 (1.1)
United Arab Emirates	7 (0.3)	26 (0.6)	53 (0.8)	78 (0.7)
[1 2] Canada	6 (0.6)	32 (1.0)	69 (0.9)	92 (0.6)
[2] New Zealand	6 (0.5)	25 (1.2)	56 (1.3)	83 (0.9)
Germany	6 (0.6)	36 (1.5)	75 (1.2)	96 (0.6)
Albania	5 (0.6)	26 (1.4)	62 (1.8)	86 (1.3)
[2] Slovak Republic	5 (0.7)	31 (1.7)	71 (1.7)	91 (1.2)
Malta	5 (0.5)	32 (0.9)	69 (0.8)	91 (0.6)
North Macedonia	5 (0.8)	21 (1.8)	52 (2.4)	78 (1.7)
[2] Kazakhstan	5 (0.6)	29 (1.5)	71 (1.4)	95 (0.6)
Bahrain	4 (0.4)	21 (1.0)	54 (1.2)	81 (1.0)
Italy	4 (0.5)	30 (1.5)	73 (1.3)	95 (0.5)
Croatia	4 (0.6)	28 (1.3)	70 (1.5)	95 (0.7)
Spain	4 (0.4)	27 (0.9)	65 (1.3)	91 (1.0)
France	3 (0.5)	21 (1.2)	57 (1.6)	85 (1.2)
Oman	3 (0.8)	12 (1.3)	33 (1.5)	62 (1.3)
[1] Georgia	3 (0.4)	20 (1.4)	56 (2.0)	84 (1.4)
Armenia	3 (0.5)	23 (1.4)	64 (1.6)	92 (0.7)
Qatar	2 (0.4)	14 (1.2)	40 (1.6)	70 (1.4)
Iran, Islamic Rep. of	2 (0.3)	13 (1.0)	39 (1.6)	68 (1.5)
Montenegro	1 (0.2)	11 (0.7)	43 (0.9)	76 (0.9)
Morocco	1 (0.8)	6 (1.1)	18 (1.4)	43 (1.7)
South Africa (5)	1 (0.2)	5 (0.5)	16 (1.1)	37 (1.5)
[2] Saudi Arabia	1 (0.2)	6 (0.6)	23 (1.2)	51 (1.4)
Kuwait	1 (0.2)	6 (0.9)	21 (1.6)	47 (1.8)
[2] Kosovo	1 (0.2)	8 (0.8)	37 (1.5)	73 (1.4)
Chile	1 (0.1)	7 (0.6)	33 (1.4)	70 (1.5)
Bosnia and Herzegovina	1 (0.2)	9 (0.7)	40 (1.5)	76 (1.1)
[2] Ψ Pakistan	0 (0.1)	1 (0.3)	8 (1.5)	27 (4.7)
[2] Ψ Philippines	0 (0.1)	1 (0.2)	6 (0.8)	19 (1.8)
International Median	**7**	**34**	**71**	**92**
Benchmarking Participants				
Moscow City, Russian Fed.	31 (1.5)	77 (1.4)	96 (0.5)	100 (0.2)
[2] Dubai, UAE	16 (0.9)	50 (0.9)	80 (0.8)	95 (0.5)
Quebec, Canada	8 (0.8)	41 (1.4)	80 (1.3)	97 (0.5)
[2] Ontario, Canada	7 (1.0)	32 (1.8)	68 (1.6)	92 (0.9)
Madrid, Spain	5 (0.5)	33 (1.2)	74 (1.5)	96 (0.6)
Abu Dhabi, UAE	3 (0.2)	15 (0.6)	37 (1.0)	64 (1.1)

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
See Appendix B.2 for target population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study - TIMSS 2019
Downloaded from http://timss2019.org/download

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Trends in Percentages of Students Reaching International Benchmarks

Exhibit 1.9 shows the changes in percentages of students reaching the benchmarks for countries that have comparable data from previous assessments. The short-term trends show about the same numbers of increases and decreases, with a few more decreases in the midrange of the scale. Of the 45 countries that participated in both 2015 and 2019, 8 increased and 7 decreased at the Advanced International Benchmark, 9 increased and 9 decreased at the High Benchmark, 8 increased and 9 decreased at the Intermediate Benchmark, and 9 increased and 6 decreased at the Low Benchmark.

In contrast, the longer-term trends show considerable improvement across the percentages of students reaching all four of the benchmarks. Between 2007 and 2019, the 21 countries participating in those two assessments had 11 increases and no decreases at the Advanced level, 13 increases and no decreases at the High level, 14 increases and 2 decreases at the Intermediate level, and 12 increases and 1 decrease at the Low level. Between 1995 and 2019, the 16 countries participating in those two assessments had 12 increases and 2 decreases at the Advanced level, 12 increases and 1 decrease at the High level, and 11 increases with no decreases at both the Intermediate and Low levels.

Exhibit 1.9: Percentages of Students Reaching International Benchmarks of Mathematics Achievement Across Assessment Years

Country	Advanced International Benchmark (625)						High International Benchmark (550)					
	Percent of Students						Percent of Students					
	2019	2015	2011	2007	2003	1995	2019	2015	2011	2007	2003	1995
Singapore	54	50	43 ▲	41 ▲	38 ▲	38 ▲	84	80	78 ▲	74 ▲	73 ▲	70 ▲
Hong Kong SAR	38	45 ▽	37	40	22 ▲	17 ▲	78	84 ▽	80	81	67 ▲	56 ▲
Korea, Rep. of	37	41 ▽	39			25 ▲	77	81 ▽	80			70 ▲
Chinese Taipei	37	35	34	24 ▲	16 ▲		78	76	74 ▲	66 ▲	61 ▲	
Japan	33	32	30 ▲	23 ▲	21 ▲	22 ▲	74	74	70 ▲	61 ▲	60 ▲	61 ▲
Northern Ireland	26	27	24				60	61	59			
England	21	17 ▲	18	16 ▲	14 ▲	7 ▲	53	49 ▲	49	48 ▲	43 ▲	24 ▲
Russian Federation	20	20	13 ▲	16	11 ▲		61	59	47 ▲	48 ▲	41 ▲	
Ireland	15	14	9 ▲			10 ▲	52	51	41 ▲			40 ▲
United States	14	14	13	10 ▲	7 ▲	9 ▲	46	47	47	40 ▲	35 ▲	37 ▲
Lithuania	13	10 ▲	10 ▲	10 ▲	10 ▲		48	44	43 ▲	42 ▲	44	
Norway (5)	13	14					48	50				
Cyprus	12	10			8 ▲	5 ▲	42	39			34 ▲	21 ▲
Latvia	11				10		50				44 ▲	
Finland	11	8 ▲	12				42	43	49 ▽			
Czech Republic	10	8 ▲	4 ▲	2 ▲		16 ▽	42	38	30 ▲	19 ▲		46
Australia	10	9	10	9	5 ▲	6 ▲	36	36	35	35	26 ▲	27 ▲
Austria	9		2 ▲	3 ▲		10	45		26 ▲	26 ▲		42
Hungary	9	13 ▽	10	9	10	11	39	44 ▽	37	35	41	38
Portugal	9	12 ▽	8			1 ▲	39	46 ▽	40			11 ▲
Denmark	8	12 ▽	10	7			37	46 ▽	44 ▽	36		
Belgium (Flemish)	8	10	10		10 ▽		40	47 ▽	50 ▽		51 ▽	
Bulgaria	8	10					37	40				
Poland	8	10					36	44 ▽				
Azerbaijan	8		5 ▲				36		21 ▲			
Sweden	8	5 ▲	3 ▲	3 ▲			36	34	25 ▲	24 ▲		
Netherlands	7	4 ▲	5 ▲	7	5	12 ▽	44	37 ▲	44	42	44	50 ▽
Serbia	7	10 ▽	9 ▽				32	37 ▽	36			
United Arab Emirates	7	5 ▲	2 ▲				26	18 ▲	12 ▲			
Canada	6	6					32	31				
New Zealand	6	6	4 ▲	5	5 ▲	4 ▲	25	26	23	26	26	19 ▲
Germany	6	5	5	6			36	34	37	37		
Slovak Republic	5	4	5	5			31	26 ▲	30	26 ▲		
Malta	5		4 ▲				32		25 ▲			
Kazakhstan	5		7				29		29			
Bahrain	4	2 ▲	1 ▲				21	13 ▲	10 ▲			
Italy	4	4	5	6	6		30	28	28	29	29	
Croatia	4	3	2 ▲				28	24 ▲	19 ▲			
Spain	4	3	1 ▲				27	27	17 ▲			
France	3	2					21	21				
Oman	3	2	1 ▲				12	11	5 ▲			
Georgia	3	2	2	1 ▲			20	15 ▲	12 ▲	10 ▲		
Armenia	3	3	2		2		23	20	14 ▲		13 ▲	
Qatar	2	3	2				14	13	10 ▲			
Iran, Islamic Rep. of	2	1	1 ▲	0 ▲	0 ▲	0 ▲	13	11	9 ▲	3 ▲	2 ▲	3 ▲
Morocco	1	0	0				6	3	2 ▲			
South Africa (5)	1	1					5	5				
Saudi Arabia	1	0	2				6	3 ▲	7			
Kuwait	1	0					6	3 ▲				
Chile	1	1 ▽	2 ▽				7	10 ▽	14 ▽			
Philippines	0				1		1				5 ▽	
Benchmarking Participants												
Dubai, UAE	16	11 ▲	5 ▲	2 ▲			50	35 ▲	22 ▲	12 ▲		
Quebec, Canada	8	9	6	5 ▲	3 ▲	13 ▽	41	42	40	34 ▲	25 ▲	50 ▽
Ontario, Canada	7	6	7	4 ▲	5	4 ▲	32	31	34	29	29	22 ▲
Abu Dhabi, UAE	3	3	1 ▲				15	12	8 ▲			

▲ 2019 percent significantly higher

▽ 2019 percent significantly lower

An empty cell indicates a country did not participate in that year's assessment or did not have comparable data.
See Appendix A for country participation in previous TIMSS assessments.
Results for Lithuania before 2015 do not include students taught in Polish or Russian.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.9: Percentages of Students Reaching International Benchmarks of Mathematics Achievement Across Assessment Years

(Continued)

Country	Intermediate International Benchmark (475) Percent of Students						Low International Benchmark (400) Percent of Students					
	2019	2015	2011	2007	2003	1995	2019	2015	2011	2007	2003	1995
Singapore	96	93	94	92 ▲	91 ▲	89 ▲	99	99	99	98 ▲	97 ▲	96 ▲
Hong Kong SAR	96	98 ▽	96	97	94 ▲	87 ▲	100	100	99	100	99	97 ▲
Korea, Rep. of	95	97 ▽	97 ▽			94	99	100	100			99
Chinese Taipei	96	95	93 ▲	92 ▲	92 ▲		100	100	99 ▲	99 ▲	99 ▲	
Japan	95	95	93 ▲	89 ▲	89 ▲	89 ▲	99	99	99	98 ▲	98 ▲	98 ▲
Northern Ireland	85	86	85				96	97	96			
England	83	80	78 ▲	79 ▲	75 ▲	54 ▲	96	96	93 ▲	94 ▲	93 ▲	82 ▲
Russian Federation	91	89	82 ▲	81 ▲	76 ▲		99	98	97 ▲	95 ▲	95 ▲	
Ireland	84	84	77 ▲			73 ▲	97	97	94 ▲			91 ▲
United States	77	79	81 ▽	77	72 ▲	71 ▲	93	95 ▽	96 ▽	95 ▽	93	92
Lithuania	81	81	79	77 ▲	79		96	96	96	94 ▲	96	
Norway (5)	82	86 ▽					97	98				
Cyprus	77	74			68 ▲	52 ▲	95	93 ▲			89 ▲	79 ▲
Latvia	85				81 ▲		98				96 ▲	
Finland	78	82 ▽	85 ▽				95	97 ▽	98 ▽			
Czech Republic	78	78	72 ▲	59 ▲		79	96	96	93 ▲	88 ▲		95
Australia	70	70	70	71	64 ▲	61 ▲	90	91	90	91	88	86 ▲
Austria	84		70 ▲	69 ▲		77 ▲	98		95 ▲	93 ▲		94 ▲
Hungary	74	75	70	67 ▲	76	72	93	92	90 ▲	88 ▲	94	91
Portugal	74	82 ▽	80 ▽			37 ▲	95	97 ▽	97 ▽			70 ▲
Denmark	75	80 ▽	82 ▽	76			95	96	97	95		
Belgium (Flemish)	80	88 ▽	89 ▽		90 ▽		97	99 ▽	99 ▽		99 ▽	
Bulgaria	71	75					90	92				
Poland	73	80 ▽					93	96 ▽				
Azerbaijan	72		46 ▲				92		72 ▲			
Sweden	74	75	69 ▲	68 ▲			94	95	93	93		
Netherlands	84	83	88 ▽	84	89 ▽	87	98	99	99 ▽	98	99	99
Serbia	68	72	70				89	91	90			
United Arab Emirates	53	42 ▲	35 ▲				78	68 ▲	64 ▲			
Canada	69	69					92	92				
New Zealand	56	59	58	61 ▽	61 ▽	51	83	84	85	85	86 ▽	78 ▲
Germany	75	77	81 ▽	78 ▽			96	96	97 ▽	96		
Slovak Republic	71	65 ▲	69	63 ▲			91	88	90	88		
Malta	69		63 ▲				91		88 ▲			
Kazakhstan	71		62 ▲				95		88 ▲			
Bahrain	54	41 ▲	34 ▲				81	72 ▲	67 ▲			
Italy	73	69 ▲	69 ▲	67 ▲	65 ▲		95	93 ▲	93 ▲	91 ▲	89 ▲	
Croatia	70	67	60 ▲				95	93	90 ▲			
Spain	65	67	56 ▲				91	93	87 ▲			
France	57	58					85	87				
Oman	33	32	20 ▲				62	60	46 ▲			
Georgia	56	47 ▲	41 ▲	35 ▲			84	78 ▲	72 ▲	67 ▲		
Armenia	64	55 ▲	41 ▲		43 ▲		92	84 ▲	72 ▲		75 ▲	
Qatar	40	36	29 ▲				70	65 ▲	55 ▲			
Iran, Islamic Rep. of	39	36	33 ▲	20 ▲	17 ▲	15 ▲	68	65	64	53 ▲	45 ▲	44 ▲
Morocco	18	17	10 ▲				43	41	26 ▲			
South Africa (5)	16	17					37	39				
Saudi Arabia	23	16 ▲	24				51	43 ▲	55			
Kuwait	21	12 ▲					47	33 ▲				
Chile	33	42 ▽	44 ▽				70	78 ▽	77 ▽			
Philippines	6				15 ▽		19				34 ▽	
Benchmarking Participants												
Dubai, UAE	80	66 ▲	50 ▲	37 ▲			95	87 ▲	75 ▲	69 ▲		
Quebec, Canada	80	82	83	74 ▲	69 ▲	87 ▽	97	98	99 ▽	96	94 ▲	98
Ontario, Canada	68	70	73 ▽	71	70	59 ▲	92	93	94	94	94	86 ▲
Abu Dhabi, UAE	37	32 ▲	29 ▲				64	56 ▲	58 ▲			

▲ 2019 percent significantly higher

▽ 2019 percent significantly lower

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Low Benchmark: Full Description and Example Items

Exhibit 1.10 presents the description of fourth grade students' achievement at the Low International Benchmark. Essentially, students demonstrated some basic understanding in each of the content domains: number, measurement and geometry, and data.

Exhibit 1.10.1 shows an example item from the data content domain. Students could read the numbers in the table and use the data to draw two bars on the graph. Nearly all the students in a number of countries completed this task successfully. The international average across countries was 81 percent.

Exhibit 1.10: Description of the TIMSS 2019 Low International Benchmark (400) of Mathematics Achievement

Low International Benchmark

400

Summary

Students have some basic mathematical knowledge. They can add, subtract, multiply, and divide one- and two-digit whole numbers. They can solve simple word problems. They have some knowledge of simple fractions and common geometric shapes. Students can read and complete simple bar graphs and tables.

Students at this level are familiar with numbers into the thousands. They can order, add, and subtract whole numbers. They have some knowledge of multiplication and division involving two-digit numbers. They can solve one-step word problems and number sentences. They can recognize pictorial representations of simple fractions.

Students can recognize basic measurement ideas. They can recognize and visualize common two- and three-dimensional geometric shapes.

Students can read and complete simple bar graphs and tables.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit 1.10.1: Low International Benchmark of Mathematics Achievement – Example Item 1

Country	Percent Full Credit	
† Hong Kong SAR	98 (0.6)	▲
Korea, Rep. of	96 (0.9)	▲
Japan	95 (0.9)	▲
3 Singapore	94 (1.0)	▲
2 Lithuania	93 (1.3)	▲
2 Latvia	93 (1.3)	▲
† Northern Ireland	92 (1.3)	▲
Ireland	90 (1.3)	▲
† Belgium (Flemish)	89 (1.2)	▲
Poland	88 (1.6)	▲
2 Russian Federation	88 (1.5)	▲
Chinese Taipei	88 (1.7)	▲
Czech Republic	87 (1.5)	▲
Australia	87 (1.5)	▲
Austria	86 (1.4)	▲
Finland	86 (2.0)	▲
† Norway (5)	86 (1.7)	▲
2 England	84 (1.8)	▲
2 Portugal	84 (1.5)	▲
≡ Netherlands	84 (1.9)	
Cyprus	84 (1.7)	▲
Sweden	83 (1.8)	
Spain	82 (1.9)	
Hungary	82 (2.3)	
2† United States	82 (1.3)	
Germany	82 (1.9)	
† Denmark	82 (1.7)	
2 Turkey (5)	81 (2.3)	
Azerbaijan	81 (1.7)	
International Average	**81 (0.3)**	
Malta	80 (1.7)	
2 Slovak Republic	80 (1.9)	
Croatia	80 (2.1)	
Italy	79 (2.1)	
2 New Zealand	79 (1.8)	
1 2 Canada	77 (1.5)	▽
2 Serbia	75 (3.3)	
Bulgaria	74 (2.6)	▽
France	71 (2.1)	▽
United Arab Emirates	69 (0.7)	▽
Iran, Islamic Rep. of	69 (1.9)	▽
Bahrain	64 (2.5)	▽
Qatar	63 (2.6)	▽
Oman	61 (1.8)	▽
1 Georgia	61 (2.9)	▽
2 Kazakhstan	60 (2.3)	▽
Chile	59 (2.2)	▽
Armenia	57 (2.9)	▽
Albania	- -	
Bosnia and Herzegovina	- -	
2 Kosovo	- -	
Kuwait	- -	
Montenegro	- -	
Morocco	- -	
North Macedonia	- -	
2 Pakistan	- -	
2 Philippines	- -	
2 Saudi Arabia	- -	
South Africa (5)	- -	
Benchmarking Participants		
Moscow City, Russian Fed.	96 (0.8)	▲
Quebec, Canada	90 (1.3)	▲
Madrid, Spain	86 (1.6)	▲
2 Dubai, UAE	83 (1.1)	▲
2 Ontario, Canada	75 (2.4)	▽
Abu Dhabi, UAE	60 (1.6)	▽

Content Domain: Data

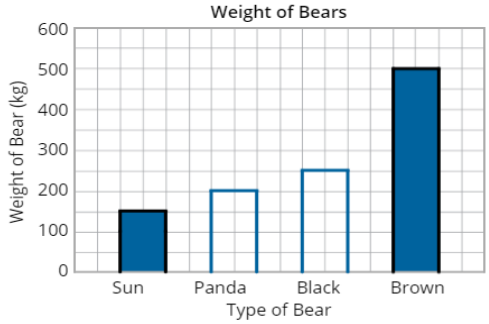
Cognitive Domain: Applying

Description: Represents data from a table in a bar graph

The table shows the weights of 4 bears.

Type of Bear	Weight (kg)
Sun	150
Panda	200
Black	250
Brown	500

Use the data to complete the graph.



The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available. Item not included in TIMSS 2019 less difficult mathematics assessment.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Intermediate Benchmark: Full Description and Example Items

Exhibit 1.11 provides the description of student achievement at the Intermediate International Benchmark. At this level, students could apply their mathematics understanding in a variety of simple situations.

Example 1.11.1 presents an item from the measurement and geometry domain. Students reaching the Intermediate level could complete the symmetrical figure. Ninety-seven percent of the Singaporean fourth grade students could do this task, and the international average was 70 percent.

Example 1.11.2 presents an item from the data domain. High percentages of fourth grade students in a number of countries were able to read data from the line graph. The international average was 68 percent.

Exhibit 1.11: Description of the TIMSS 2019 Intermediate International Benchmark (475) of Mathematics Achievement

Intermediate International Benchmark

475

Summary

Students can apply basic mathematical knowledge in simple situations. They can compute with three- and four-digit whole numbers in a variety of situations. They have some understanding of decimals and fractions. Students can identify and draw shapes with simple properties. They can read, label, and interpret information in graphs and tables.

Students at this level demonstrate an understanding of four-digit whole numbers. They can add and subtract four-digit numbers in a variety of situations, including problems involving two steps. Students can multiply and divide three-digit numbers by a one-digit number. They can identify expressions representing simple situations. Students at this level can add and order decimals and work with non-unit fractions.

Students can solve simple measurement problems such as identifying the appropriate metric unit for linear objects and volume. Students can solve addition and subtraction problems involving hours and minutes. They can identify and draw shapes with simple properties and relate two- and three-dimensional shapes.

Students can read, label, and interpret information in graphs and tables.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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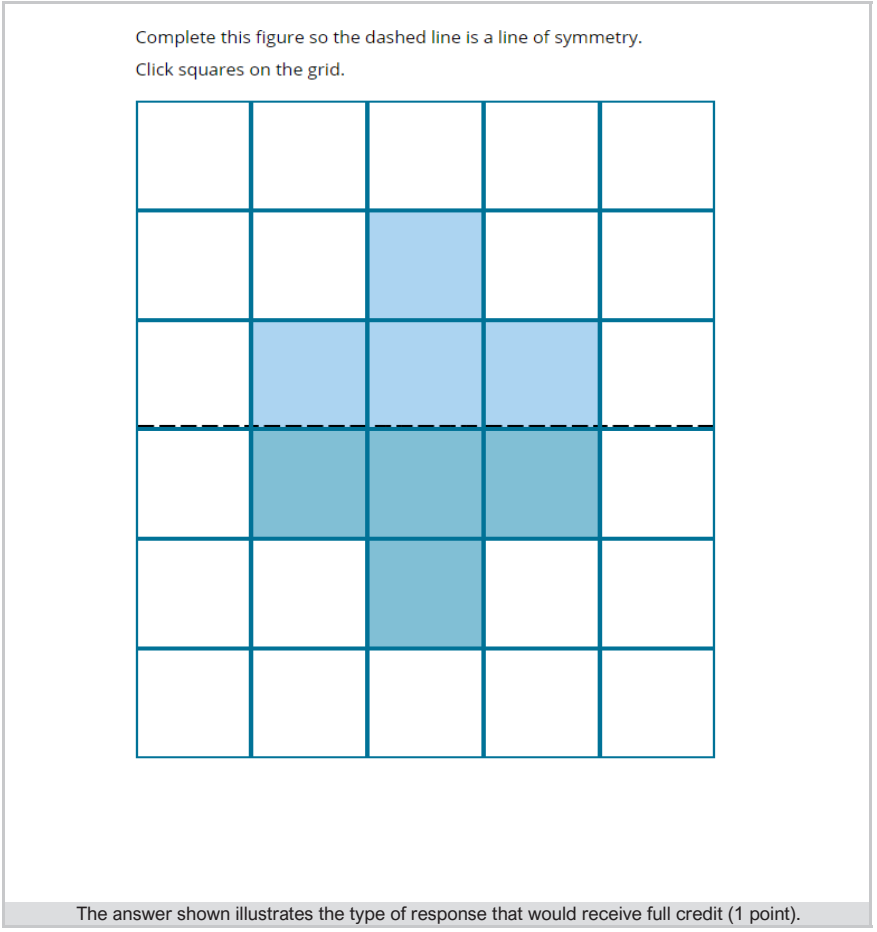
Exhibit 1.11.1: Intermediate International Benchmark of Mathematics Achievement – Example Item 1

Country	Percent Full Credit	
[3] Singapore	97 (0.7)	▲
Cyprus	93 (1.2)	▲
Ireland	92 (1.4)	▲
† Northern Ireland	91 (1.6)	▲
† Denmark	91 (1.5)	▲
† Hong Kong SAR	90 (1.9)	▲
≡ Netherlands	90 (1.3)	▲
Malta	90 (1.4)	▲
Albania	90 (1.8)	▲
Poland	90 (1.2)	▲
† Belgium (Flemish)	89 (1.5)	▲
[2] Latvia	89 (1.6)	▲
[2] England	88 (1.8)	▲
† Norway (5)	88 (1.9)	▲
Australia	86 (1.8)	▲
[2] Lithuania	86 (1.7)	▲
[2] Kosovo	86 (1.9)	▲
Germany	85 (1.8)	▲
[2] Kazakhstan	84 (1.7)	▲
[2] Portugal	84 (2.0)	▲
Finland	82 (1.8)	▲
Hungary	81 (1.7)	▲
Morocco	81 (1.9)	▲
Azerbaijan	79 (2.0)	▲
[2] New Zealand	79 (1.9)	▲
Bulgaria	78 (2.4)	▲
North Macedonia	77 (2.4)	▲
[2] Russian Federation	77 (2.3)	▲
Austria	77 (1.9)	▲
Sweden	76 (2.2)	▲
Italy	73 (2.5)	
[1 2] Canada	72 (1.8)	
France	72 (2.4)	
International Average	**70 (0.3)**	
Oman	70 (2.0)	
Korea, Rep. of	69 (2.3)	
Iran, Islamic Rep. of	68 (2.2)	
[2] Turkey (5)	67 (2.7)	
Czech Republic	66 (2.6)	
Spain	65 (2.5)	▽
[2] Slovak Republic	62 (2.8)	▽
[2†] United States	60 (1.5)	▽
Chinese Taipei	59 (2.4)	▽
[2] Serbia	58 (2.5)	▽
Bahrain	57 (2.4)	▽
Japan	56 (2.5)	▽
United Arab Emirates	55 (1.2)	▽
Croatia	54 (2.9)	▽
South Africa (5)	54 (1.9)	▽
Kuwait	52 (2.6)	▽
Montenegro	52 (2.0)	▽
Chile	51 (2.6)	▽
Armenia	49 (2.5)	▽
Qatar	41 (2.6)	▽
[2] Saudi Arabia	40 (1.9)	▽
[1] Georgia	31 (2.7)	▽
Bosnia and Herzegovina	30 (2.0)	▽
[2] Pakistan	18 (4.7)	▽
[2] Philippines	13 (1.9)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	90 (1.6)	▲
Quebec, Canada	83 (2.2)	▲
[2] Ontario, Canada	74 (3.1)	
[2] Dubai, UAE	73 (1.5)	
Madrid, Spain	65 (3.1)	
Abu Dhabi, UAE	45 (2.1)	▽

Content Domain: Measurement and Geometry

Cognitive Domain: Applying

Description: Completes a symmetric figure on a square grid given half the shape and the line of symmetry



The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 1.11.2: Intermediate International Benchmark of Mathematics Achievement – Example Item 2

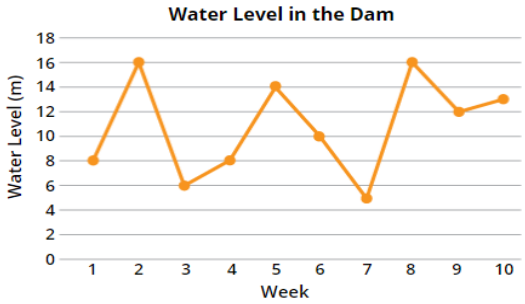
Country	Percent Full Credit	
Japan	95 (0.9)	▲
3 Singapore	92 (0.9)	▲
Chinese Taipei	92 (1.3)	▲
Korea, Rep. of	91 (1.3)	▲
2 England	91 (1.5)	▲
≡ Netherlands	91 (1.4)	▲
† Hong Kong SAR	91 (1.5)	▲
† Norway (5)	88 (1.7)	▲
† Northern Ireland	87 (1.8)	▲
2 Russian Federation	87 (1.5)	▲
Sweden	86 (1.9)	▲
Finland	86 (1.6)	▲
† Belgium (Flemish)	86 (1.6)	▲
2 Lithuania	84 (1.7)	▲
† Denmark	84 (1.7)	▲
Australia	84 (1.6)	▲
2 Portugal	82 (1.6)	▲
2 Latvia	81 (2.0)	▲
Ireland	80 (1.6)	▲
Azerbaijan	79 (2.0)	▲
2† United States	79 (1.4)	▲
Spain	78 (2.5)	▲
2 New Zealand	77 (1.7)	▲
Hungary	76 (1.9)	▲
1 2 Canada	76 (1.3)	▲
Cyprus	75 (1.7)	▲
Malta	74 (2.0)	▲
Czech Republic	73 (2.2)	▲
Germany	71 (2.0)	
Austria	70 (2.4)	
2 Slovak Republic	70 (2.2)	
Italy	69 (2.5)	
2 Turkey (5)	69 (2.4)	
France	68 (2.6)	
International Average	**68 (0.3)**	
Albania	68 (2.2)	
2 Serbia	66 (2.7)	
Poland	65 (2.2)	
2 Kazakhstan	64 (2.2)	
Bahrain	63 (1.8)	▽
United Arab Emirates	62 (0.8)	▽
Bulgaria	62 (2.8)	▽
Chile	61 (2.2)	▽
Qatar	60 (2.3)	▽
Croatia	59 (3.2)	▽
North Macedonia	52 (2.8)	▽
South Africa (5)	52 (1.8)	▽
Iran, Islamic Rep. of	50 (2.4)	▽
1 Georgia	48 (2.9)	▽
Oman	45 (2.0)	▽
2 Kosovo	43 (2.8)	▽
Armenia	42 (2.1)	▽
Montenegro	41 (1.8)	▽
Kuwait	40 (2.6)	▽
2 Saudi Arabia	34 (1.8)	▽
Morocco	32 (2.5)	▽
Bosnia and Herzegovina	32 (1.8)	▽
2 Philippines	28 (2.1)	▽
2 Pakistan	21 (4.2)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	95 (1.1)	▲
Quebec, Canada	84 (1.9)	▲
2 Dubai, UAE	81 (1.2)	▲
Madrid, Spain	80 (2.1)	▲
2 Ontario, Canada	75 (2.1)	▲
Abu Dhabi, UAE	52 (1.2)	▽

Content Domain: Data

Cognitive Domain: Knowing

Description: Reads data from a line graph

The graph shows the water level in a dam for 10 weeks.



What was the water level for week 8?

Answer: 16 m

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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High Benchmark: Full Description and Example Items

Exhibit 1.12 presents the description of achievement at the High International Benchmark. Fourth grade students reaching this level demonstrated proficiency with a variety of topics in the framework.

Exhibit 1.12.1 provides an example from the number domain. Fifty-three percent of the fourth grade students, on average, were able to identify the expression that represented how to calculate the amount of water in the tank. With 79 percent correct, Japan and Singapore had the highest percentages of students answering this item correctly.

Exhibit 1.12.2 provides another example from the number domain. In this item, students were asked to solve a word problem involving fractions. Students in the five high-performing East Asian countries and students in Finland were the most successful—more than 75 percent correct. The international average was 47 percent.

Exhibit 1.12.3 shows an example from the data domain. Two-thirds or more of the fourth grade students in a number of countries were able to complete a pictograph, with 61 percent correct, on average.

Exhibit 1.12: Description of the TIMSS 2019 High International Benchmark (550) of Mathematics Achievement

High International Benchmark

550

Summary

Students apply conceptual understanding to solve problems. They can apply conceptual understanding of whole numbers to solve two-step word problems. They show understanding of the number line, multiples, factors, and rounding numbers, and operations with fractions and decimals. Students can solve simple measurement problems. They demonstrate understanding of geometric properties of shapes and angles. Students can interpret and use data in tables and a variety of graphs to solve problems.

Students at this level apply conceptual understanding of whole numbers to solve two-step word problems. They can multiply two-digit numbers and solve problems based on the number line, fractions, and decimals. They can find multiples of one-digit numbers and factors of numbers up to 30 and can round numbers. Students can identify an expression that represents a situation and can identify and use relationships in a well-defined pattern.

Students can solve a variety of one-step measurement problems. They can classify and compare a variety of shapes and angles based on their properties. They demonstrate understanding of line symmetry and can recognize relationships between two- and three-dimensional shapes.

Students can solve problems by interpreting data presented in tables, pie charts, pictographs, and line and bar graphs. They can compare data from two representations to draw conclusions.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.12.1: High International Benchmark of Mathematics Achievement – Example Item 1

Country	Percent Correct	
Japan	79 (1.6)	▲
[3] Singapore	79 (1.6)	▲
Korea, Rep. of	71 (2.2)	▲
[2] Latvia	70 (2.2)	▲
Finland	67 (1.9)	▲
Czech Republic	66 (2.8)	▲
[2] Russian Federation	65 (2.0)	▲
Poland	65 (1.9)	▲
Chinese Taipei	65 (2.3)	▲
[2] Lithuania	64 (2.5)	▲
Bulgaria	63 (2.9)	▲
† Northern Ireland	63 (2.8)	▲
Ireland	61 (2.4)	▲
[2] Slovak Republic	61 (2.3)	▲
[2] Serbia	59 (2.3)	▲
† Hong Kong SAR	59 (2.7)	▲
Cyprus	57 (2.4)	
† Belgium (Flemish)	56 (2.1)	
Hungary	56 (2.1)	
Croatia	56 (2.8)	
[2] England	55 (2.7)	
[2†] United States	55 (1.6)	
Azerbaijan	54 (2.5)	
Austria	54 (2.2)	
† Norway (5)	54 (2.9)	
Sweden	53 (2.4)	
International Average	**53 (0.3)**	
[2] Kazakhstan	53 (2.2)	
Australia	52 (2.5)	
≡ Netherlands	51 (2.5)	
[2] Portugal	51 (2.3)	
Germany	50 (2.6)	
[2] New Zealand	50 (1.9)	
[1] Georgia	49 (3.0)	
† Denmark	48 (2.4)	▽
France	48 (2.5)	▽
Armenia	47 (2.0)	▽
[2] Turkey (5)	47 (2.4)	▽
Spain	45 (2.4)	▽
[1 2] Canada	42 (1.8)	▽
Malta	40 (1.8)	▽
Italy	40 (2.4)	▽
Bahrain	38 (1.8)	▽
United Arab Emirates	37 (0.9)	▽
Iran, Islamic Rep. of	33 (2.0)	▽
Qatar	30 (2.2)	▽
Oman	29 (2.0)	▽
Chile	23 (1.8)	▽
Albania	- -	
Bosnia and Herzegovina	- -	
[2] Kosovo	- -	
Kuwait	- -	
Montenegro	- -	
Morocco	- -	
North Macedonia	- -	
[2] Pakistan	- -	
[2] Philippines	- -	
[2] Saudi Arabia	- -	
South Africa (5)	- -	
Benchmarking Participants		
Moscow City, Russian Fed.	75 (1.9)	▲
Quebec, Canada	58 (2.4)	
[2] Dubai, UAE	52 (1.8)	
Madrid, Spain	46 (2.3)	▽
[2] Ontario, Canada	39 (3.2)	▽
Abu Dhabi, UAE	28 (1.5)	▽

Content Domain: Number

Cognitive Domain: Applying

Description: Identifies an expression that represents a situation

There were 12 liters of water in the tank.

Ravi then poured 3 liters of water into the tank and Indira poured another 3 liters of water into the tank.

How can the amount of water in the tank be calculated?

A. 12 + (2 + 3)

B. (12 + 3) + (12 + 3)

C. (12 + 2) × 3

D. 12 + (2 × 3)

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available. Item not included in TIMSS 2019 less difficult mathematics assessment.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 1.12.2: High International Benchmark of Mathematics Achievement – Example Item 2

Country	Percent Full Credit	
[3] Singapore	86 (1.4)	▲
Chinese Taipei	82 (1.9)	▲
Finland	80 (1.8)	▲
Korea, Rep. of	79 (1.8)	▲
† Hong Kong SAR	77 (2.9)	▲
Japan	76 (1.9)	▲
† Belgium (Flemish)	67 (2.2)	▲
Ireland	67 (2.1)	▲
[2†] United States	66 (1.5)	▲
† Northern Ireland	64 (2.7)	▲
[2] England	63 (1.8)	▲
Cyprus	62 (2.4)	▲
† Norway (5)	61 (3.1)	▲
Austria	59 (3.0)	▲
≡ Netherlands	58 (3.0)	▲
Poland	57 (2.6)	▲
† Denmark	54 (2.8)	▲
Australia	53 (1.8)	▲
Italy	52 (2.8)	
[2] Portugal	50 (2.3)	
[1 2] Canada	48 (1.9)	
Bahrain	48 (2.2)	
International Average	**47 (0.3)**	
Spain	45 (1.9)	
Sweden	44 (2.9)	
[2] Turkey (5)	44 (2.5)	
Armenia	43 (2.3)	
[2] New Zealand	42 (2.1)	▽
Iran, Islamic Rep. of	41 (2.2)	▽
Malta	40 (1.7)	▽
[2] Russian Federation	39 (2.5)	▽
Czech Republic	38 (2.3)	▽
France	38 (2.4)	▽
United Arab Emirates	37 (1.1)	▽
Qatar	36 (3.1)	▽
[2] Latvia	33 (2.5)	▽
Hungary	30 (2.3)	▽
Chile	29 (2.0)	▽
[2] Lithuania	29 (2.4)	▽
Azerbaijan	28 (2.1)	▽
[2] Kazakhstan	25 (2.0)	▽
Oman	23 (1.8)	▽
[2] Slovak Republic	23 (2.0)	▽
[1] Georgia	20 (2.2)	▽
[2] Serbia	16 (2.0)	▽
Bulgaria	13 (1.8)	▽
Germany	12 (1.7)	▽
Croatia	11 (1.5)	▽
Albania	- -	
Bosnia and Herzegovina	- -	
[2] Kosovo	- -	
Kuwait	- -	
Montenegro	- -	
Morocco	- -	
North Macedonia	- -	
[2] Pakistan	- -	
[2] Philippines	- -	
[2] Saudi Arabia	- -	
South Africa (5)	- -	
Benchmarking Participants		
[2] Dubai, UAE	57 (1.6)	▲
Madrid, Spain	53 (2.4)	▲
Quebec, Canada	52 (2.7)	▲
[2] Ontario, Canada	48 (3.1)	
Moscow City, Russian Fed.	44 (2.8)	
Abu Dhabi, UAE	25 (1.5)	▽

Content Domain: Number

Cognitive Domain: Applying

Description: Solves a word problem involving subtraction of a non-unit fraction from 1

Anna is cycling to her grandmother's house. She has cycled $\frac{3}{8}$ of the way.

What fraction of the distance does Anna have left to cycle?

Answer: $\frac{5}{8}$

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available. Item not included in TIMSS 2019 less difficult mathematics assessment.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 1.12.3: High International Benchmark of Mathematics Achievement – Example Item 3

Country	Percent Full Credit	
† Hong Kong SAR	88 (2.0)	▲
3 Singapore	86 (1.4)	▲
Japan	84 (1.5)	▲
Korea, Rep. of	83 (1.7)	▲
Chinese Taipei	81 (1.8)	▲
2 England	81 (2.1)	▲
† Northern Ireland	80 (2.1)	▲
2 Latvia	80 (2.4)	▲
† Belgium (Flemish)	78 (1.6)	▲
≡ Netherlands	78 (2.1)	▲
Ireland	77 (2.0)	▲
2 Lithuania	77 (1.9)	▲
† Norway (5)	77 (2.4)	▲
Poland	77 (1.6)	▲
Finland	74 (2.0)	▲
2 Russian Federation	74 (2.5)	▲
2 Kazakhstan	74 (2.2)	▲
† Denmark	72 (2.4)	▲
Cyprus	72 (1.9)	▲
Sweden	71 (2.2)	▲
Malta	71 (2.0)	▲
Australia	70 (1.9)	▲
Hungary	69 (1.9)	▲
Austria	68 (2.5)	▲
Germany	68 (1.9)	▲
2 Portugal	67 (1.7)	▲
Azerbaijan	67 (2.1)	▲
2 Turkey (5)	67 (2.7)	▲
2 New Zealand	65 (2.0)	▲
Czech Republic	65 (2.1)	
2† United States	65 (1.5)	▲
1 2 Canada	65 (1.6)	▲
2 Serbia	62 (2.5)	
International Average	**61 (0.3)**	
Bulgaria	61 (2.5)	
Croatia	61 (2.8)	
Albania	59 (2.5)	
2 Slovak Republic	58 (2.4)	
Spain	56 (2.2)	▽
Bahrain	56 (1.7)	▽
Italy	56 (2.6)	▽
1 Georgia	53 (2.9)	▽
North Macedonia	52 (3.0)	▽
France	50 (2.3)	▽
United Arab Emirates	50 (1.0)	▽
Montenegro	48 (2.1)	▽
Iran, Islamic Rep. of	48 (2.7)	▽
2 Kosovo	48 (2.8)	▽
Armenia	46 (2.4)	▽
Qatar	45 (2.4)	▽
Bosnia and Herzegovina	43 (1.9)	▽
Oman	41 (2.0)	▽
Chile	38 (2.3)	▽
2 Saudi Arabia	38 (2.1)	▽
Morocco	34 (2.2)	▽
Kuwait	30 (2.1)	▽
South Africa (5)	29 (1.4)	▽
2 Philippines	17 (1.9)	▽
2 Pakistan	10 (2.1)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	91 (1.4)	▲
2 Dubai, UAE	72 (1.4)	▲
2 Ontario, Canada	68 (2.7)	▲
Quebec, Canada	65 (2.4)	
Madrid, Spain	58 (3.0)	
Abu Dhabi, UAE	37 (1.5)	▽

Content Domain: Data

Cognitive Domain: Reasoning

Description: Represents data from a table in a pictograph

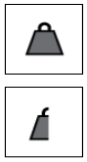
Animal Weights

Animal	Weight (kg)
Cheetah	50
Lion	100
Leopard	75

Make a pictograph of the weight of each animal.

Drag symbols to complete the pictograph. The cheetah has been done for you.

Animal	Weight (kg)
Cheetah	
Lion	
Leopard	



Key: = 50 kg

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Advanced Benchmark: Full Description and Example Items

Exhibit 1.13 presents the description of fourth grade performance at the Advanced International Benchmark. Students reaching the Advanced level demonstrated a solid conceptual understanding of many of the topics in the framework.

Exhibit 1.13.1 shows a multi-part item from the number content domain that required reasoning with odd numbers and multiples. To receive full credit (2 points), students needed to provide two different correct answers. This item was very difficult, with an international average of 24 percent of students receiving full credit. More than half of the Singaporean fourth grade students (55%) received full credit.

Exhibit 1.13.2 shows a multi-part item from the measurement and geometry domain. Students were required to cover the area of a square with three different two-dimensional shapes to receive full credit (2 points). On average, only 21 percent of students received full credit. More than half the fourth grade students received full credit in Korea and Hong Kong SAR (53–54%).

Exhibit 1.13.3 shows another multi-part item from the measurement and geometry domain. Students were asked to visualize the number of faces making up three different three-dimensional shapes. On average, 27 percent of students received full credit.

The last example item illustrating the Advanced benchmark asked students to label the *y*-axis of a bar graph based on tabular data. Internationally, on average, about one-third of the fourth grade students (34%) were able to accomplish this task. Eighty percent or more answered correctly in Japan, Korea, and Hong Kong SAR.

Exhibit 1.13: Description of the TIMSS 2019 Advanced International Benchmark (625) of Mathematics Achievement

Advanced International Benchmark

625

Summary

Students can apply their understanding and knowledge in a variety of relatively complex situations and explain their reasoning. Students can solve a variety of multistep word problems involving whole numbers and show an understanding of fractions and decimals. They can apply knowledge of two- and three-dimensional shapes in a variety of situations. Students can interpret and represent data to solve multistep problems.

Students at this level can solve a variety of multistep word problems involving whole numbers. They can find more than one solution to a problem. Students can solve problems that show an understanding of fractions, including those with different denominators. They can order, add, and subtract one- and two-place decimals.

Students can apply knowledge of two- and three-dimensional shapes in a variety of situations. They can draw parallel lines and solve problems involving area and perimeter of shapes. They can use a ruler to measure lengths of objects beginning or ending at a half-unit and read other measurement scales.

Students can interpret and represent data to solve multistep problems. They can give a mathematical argument to support their solutions.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.13.1: Advanced International Benchmark of Mathematics Achievement – Example Item 1

Country	Percent Full Credit	
[3] Singapore	55 (2.4)	▲
† Northern Ireland	42 (2.7)	▲
Korea, Rep. of	39 (2.5)	▲
Chinese Taipei	38 (2.4)	▲
† Hong Kong SAR	35 (2.9)	▲
[2] Latvia	35 (2.1)	▲
[2] England	34 (2.6)	▲
Poland	32 (2.1)	▲
[2] Russian Federation	31 (1.9)	▲
Czech Republic	29 (2.1)	▲
† Denmark	29 (2.5)	
Cyprus	27 (2.3)	
† Norway (5)	27 (2.3)	
[2†] United States	27 (1.4)	
† Belgium (Flemish)	26 (2.1)	
Ireland	26 (2.5)	
[2] Slovak Republic	26 (2.3)	
[2] Portugal	26 (2.4)	
≡ Netherlands	25 (2.2)	
Germany	25 (2.1)	
Sweden	25 (1.5)	
Japan	25 (2.0)	
Australia	25 (2.0)	
International Average	**24 (0.3)**	
[2] Serbia	24 (2.1)	
Finland	23 (1.7)	
Hungary	23 (2.1)	
[1 2] Canada	23 (1.4)	
Bahrain	22 (1.7)	
[2] New Zealand	21 (1.7)	
[2] Kazakhstan	21 (2.0)	
Malta	21 (1.7)	▽
Austria	21 (1.9)	
United Arab Emirates	20 (0.8)	▽
Azerbaijan	20 (1.9)	▽
Croatia	20 (2.0)	▽
Bulgaria	19 (2.2)	▽
Armenia	19 (2.0)	▽
Italy	18 (2.1)	▽
[2] Lithuania	17 (1.9)	▽
[2] Turkey (5)	16 (1.8)	▽
Spain	15 (1.7)	▽
[1] Georgia	12 (2.0)	▽
Iran, Islamic Rep. of	12 (1.6)	▽
France	12 (1.7)	▽
Oman	11 (1.6)	▽
Qatar	11 (1.5)	▽
Chile	6 (1.0)	▽
Albania	- -	
Bosnia and Herzegovina	- -	
[2] Kosovo	- -	
Kuwait	- -	
Montenegro	- -	
Morocco	- -	
North Macedonia	- -	
[2] Pakistan	- -	
[2] Philippines	- -	
[2] Saudi Arabia	- -	
South Africa (5)	- -	
Benchmarking Participants		
Moscow City, Russian Fed.	38 (2.2)	▲
[2] Dubai, UAE	31 (2.0)	▲
[2] Ontario, Canada	25 (2.3)	
Quebec, Canada	24 (2.3)	
Madrid, Spain	22 (2.1)	
Abu Dhabi, UAE	11 (0.9)	▽

Content Domain: Number

Cognitive Domain: Reasoning

Description: Devises two ways of grouping objects that satisfy two conditions (2 of 2 points)

A teacher wants to put 30 students in groups so that

- each group has the same number of students, **and**
- each group has an odd number of students.

Show two different ways the teacher could make the groups.

Way 1

Number of groups: 6

Number of students in each group: 5

Way 2

Number of groups: 10

Number of students in each group: 3

The answer shown illustrates the type of response that would receive full credit (2 points).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available. Item not included in TIMSS 2019 less difficult mathematics assessment.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

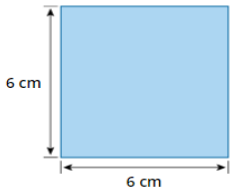
Exhibit 1.13.2: Advanced International Benchmark of Mathematics Achievement – Example Item 2

Country	Percent Full Credit	
Korea, Rep. of	54 (2.0)	▲
† Hong Kong SAR	53 (3.2)	▲
2 Russian Federation	47 (2.3)	▲
3 Singapore	45 (2.1)	▲
Japan	41 (2.3)	▲
Chinese Taipei	40 (2.6)	▲
≡ Netherlands	36 (2.3)	▲
Czech Republic	35 (2.2)	▲
Finland	34 (2.1)	▲
Poland	34 (1.9)	▲
Hungary	31 (2.4)	▲
2 Lithuania	31 (2.2)	▲
2 Latvia	31 (2.1)	▲
Azerbaijan	30 (1.6)	▲
Armenia	28 (2.3)	▲
† Norway (5)	27 (2.7)	▲
Bulgaria	27 (2.7)	▲
† Denmark	26 (2.0)	▲
Sweden	26 (2.1)	▲
† Northern Ireland	26 (2.2)	▲
Albania	25 (2.6)	
Ireland	24 (2.1)	
2 England	24 (2.1)	
† Belgium (Flemish)	24 (1.9)	
Austria	24 (1.8)	
Australia	23 (1.7)	
Italy	22 (1.9)	
2 Portugal	21 (1.8)	
Germany	21 (2.2)	
International Average	**21 (0.2)**	
Cyprus	21 (2.3)	
2 Serbia	20 (2.3)	
1 2 Canada	19 (1.9)	
2 Kazakhstan	19 (2.2)	
2† United States	17 (1.4)	▽
2 New Zealand	16 (1.5)	▽
2 Turkey (5)	16 (1.6)	▽
2 Slovak Republic	16 (1.8)	▽
France	15 (1.5)	▽
United Arab Emirates	14 (0.7)	▽
North Macedonia	14 (2.0)	▽
Malta	12 (1.4)	▽
1 Georgia	12 (1.5)	▽
Montenegro	12 (1.3)	▽
Spain	11 (1.3)	▽
Bahrain	11 (1.3)	▽
Iran, Islamic Rep. of	11 (1.5)	▽
Oman	10 (1.8)	▽
Croatia	10 (1.5)	▽
Bosnia and Herzegovina	9 (1.4)	▽
2 Saudi Arabia	8 (1.0)	▽
Morocco	6 (1.4)	▽
Chile	6 (1.0)	▽
Qatar	6 (1.1)	▽
2 Kosovo	3 (0.8)	▽
Kuwait	3 (0.9)	▽
South Africa (5)	2 (0.5)	▽
2 Pakistan	1 (0.3)	▽
2 Philippines	1 (0.3)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	53 (2.9)	▲
2 Dubai, UAE	23 (1.5)	
Quebec, Canada	21 (2.0)	
2 Ontario, Canada	19 (3.6)	
Madrid, Spain	13 (1.6)	▽
Abu Dhabi, UAE	8 (0.8)	▽

Content Domain: Measurement and Geometry

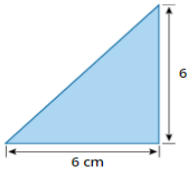
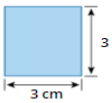
Cognitive Domain: Applying

Description: Determines the number of three different shapes that cover the area of a square (2 of 2 points)



The square above can be made by putting together smaller shapes.

Complete the table with the number of each shape that are needed to cover the whole square.

Shape	Number Needed to Cover the Square Above
	3
	2
	4

The answer shown illustrates the type of response that would receive full credit (2 points).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 1.13.3: Advanced International Benchmark of Mathematics Achievement – Example Item 3

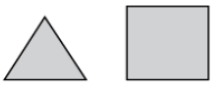
Country	Percent Full Credit	
† Hong Kong SAR	49 (2.4)	▲
Japan	47 (2.0)	▲
† Northern Ireland	46 (2.4)	▲
1 2 Canada	43 (1.6)	▲
2 Lithuania	42 (2.6)	▲
Ireland	40 (2.5)	▲
Korea, Rep. of	38 (2.5)	▲
Cyprus	38 (2.4)	▲
Australia	37 (2.6)	▲
Chinese Taipei	36 (2.2)	▲
2 Portugal	34 (1.9)	▲
3 Singapore	34 (1.9)	▲
2 England	33 (2.5)	▲
2 Russian Federation	33 (1.9)	▲
† Norway (5)	32 (2.8)	
Czech Republic	32 (2.2)	▲
Finland	30 (2.1)	
Austria	30 (2.2)	
Malta	29 (2.3)	
Germany	29 (1.9)	
Sweden	28 (2.1)	
Hungary	27 (2.1)	
International Average	**27 (0.3)**	
2 Serbia	25 (2.3)	
2 New Zealand	25 (1.8)	
2† United States	25 (1.6)	
Chile	25 (1.8)	
Bahrain	23 (1.7)	▽
† Denmark	23 (2.6)	
2 Latvia	22 (2.0)	▽
Poland	22 (2.0)	▽
Azerbaijan	22 (1.6)	▽
2 Slovak Republic	21 (1.8)	▽
2 Turkey (5)	21 (1.8)	▽
United Arab Emirates	21 (0.7)	▽
Spain	20 (1.8)	▽
Italy	20 (1.9)	▽
2 Kazakhstan	19 (1.9)	▽
Oman	18 (1.8)	▽
Croatia	17 (1.9)	▽
≡ Netherlands	17 (1.7)	▽
France	17 (1.6)	▽
Bulgaria	17 (2.0)	▽
1 Georgia	16 (2.2)	▽
Armenia	16 (1.7)	▽
† Belgium (Flemish)	12 (1.2)	▽
Qatar	11 (1.4)	▽
Iran, Islamic Rep. of	4 (0.9)	▽
Albania	- -	
Bosnia and Herzegovina	- -	
2 Kosovo	- -	
Kuwait	- -	
Montenegro	- -	
Morocco	- -	
North Macedonia	- -	
2 Pakistan	- -	
2 Philippines	- -	
2 Saudi Arabia	- -	
South Africa (5)	- -	
Benchmarking Participants		
Quebec, Canada	57 (2.9)	▲
2 Ontario, Canada	43 (2.7)	▲
2 Dubai, UAE	34 (1.7)	▲
Moscow City, Russian Fed.	33 (2.0)	▲
Madrid, Spain	21 (2.2)	▽
Abu Dhabi, UAE	14 (0.9)	▽

Content Domain: Measurement and Geometry

Cognitive Domain: Applying

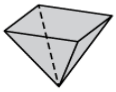
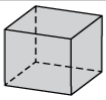
Description: Determines the number of square and triangular faces of three-dimensional shapes (2 of 2 points)

Justin has many of these triangle and square panels that fit together to make three-dimensional shapes.



Justin makes each of the shapes shown below.

Fill in the table. The first one has been done for you.

Three-dimensional shape	Number of triangles	Number of squares
	4	1
	4	0
	0	6
	2	3

The answer shown illustrates the type of response that would receive full credit (2 points).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available. Item not included in TIMSS 2019 less difficult mathematics assessment.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 1.13.4: Advanced International Benchmark of Mathematics Achievement – Example Item 4

Country	Percent Full Credit	
Japan	88 (1.6)	▲
Korea, Rep. of	87 (1.6)	▲
† Hong Kong SAR	80 (2.3)	▲
3 Singapore	77 (1.9)	▲
Chinese Taipei	67 (2.2)	▲
† Norway (5)	54 (2.1)	▲
2 England	52 (2.6)	▲
† Belgium (Flemish)	51 (2.5)	▲
≡ Netherlands	49 (2.2)	▲
2 Latvia	48 (2.3)	▲
† Northern Ireland	47 (2.4)	▲
Cyprus	47 (2.6)	▲
Australia	47 (2.0)	▲
Ireland	47 (2.2)	▲
Sweden	45 (2.4)	▲
1 2 Canada	43 (1.7)	▲
2 Russian Federation	41 (2.7)	▲
2 Lithuania	40 (2.3)	▲
† Denmark	40 (2.6)	▲
2† United States	40 (1.8)	▲
Finland	39 (2.1)	▲
2 Portugal	38 (2.0)	▲
Czech Republic	38 (2.3)	
Austria	38 (2.4)	
Malta	36 (1.9)	
Germany	35 (2.5)	
International Average	**34 (0.3)**	
Hungary	34 (2.6)	
2 Slovak Republic	33 (2.5)	
United Arab Emirates	33 (1.0)	
2 New Zealand	32 (1.8)	
Poland	31 (2.1)	
Italy	30 (2.6)	
Albania	30 (2.7)	
North Macedonia	29 (3.2)	
2 Turkey (5)	28 (2.0)	▽
Bahrain	27 (1.8)	▽
2 Kazakhstan	27 (2.5)	▽
Spain	27 (1.9)	▽
2 Serbia	25 (2.4)	▽
Bulgaria	24 (2.5)	▽
France	24 (2.0)	▽
Qatar	20 (2.0)	▽
Chile	19 (1.6)	▽
Oman	18 (1.8)	▽
Azerbaijan	17 (1.5)	▽
Croatia	16 (2.7)	▽
Morocco	15 (2.0)	▽
Montenegro	14 (1.7)	▽
2 Kosovo	14 (1.6)	▽
2 Saudi Arabia	13 (1.4)	▽
South Africa (5)	11 (1.3)	▽
Kuwait	11 (1.9)	▽
Iran, Islamic Rep. of	11 (1.8)	▽
1 Georgia	8 (1.5)	▽
Bosnia and Herzegovina	8 (1.7)	▽
Armenia	7 (1.4)	▽
2 Philippines	6 (1.0)	▽
2 Pakistan	4 (1.8)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	70 (2.2)	▲
2 Dubai, UAE	51 (2.0)	▲
2 Ontario, Canada	48 (2.7)	▲
Quebec, Canada	46 (2.4)	▲
Madrid, Spain	27 (2.4)	▽
Abu Dhabi, UAE	21 (1.5)	▽

Content Domain: Data

Cognitive Domain: Applying

Description: Determines the y-axis scale for a bar graph given the data in a table

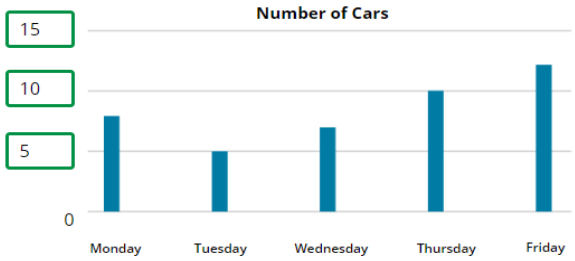
Skylar recorded the number of cars that traveled along her street each morning.

Day	Number of Cars
Monday	8
Tuesday	5
Wednesday	7
Thursday	10
Friday	12

She started making a graph of her data.

What numbers should Skylar use to label the horizontal lines on her graph?

Put the numbers in the boxes on Skylar's graph.



The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Average Achievement in Mathematics Content and Cognitive Domains

TIMSS 2019 Mathematics Content and Cognitive Domains

TIMSS 2019 assessed three content areas in mathematics at the fourth grade: number, measurement and geometry, and data.

Fifty percent of the fourth grade assessment was devoted to the number content domain apportioned as follows: whole numbers (25%); expressions, simple equations, and relationships (15%); and fractions and decimals (10%). The predominant component of the number domain involved computation of whole numbers. The prealgebra concepts included the concept of variables (unknowns) in simple equations, and initial understandings of relationships between quantities. Students were asked to compare, add, and subtract familiar fractions and decimals to solve problems.

Thirty percent of the assessment was devoted to measurement and geometry (15% each). Measurement included using a ruler to measure length, calculating areas and perimeters of simple polygons, and using cubes to determine volumes as well as identifying the properties and characteristics of lines, angles, and a variety of two- and three-dimensional shapes. Geometry included describing and drawing a variety of geometric figures as well as using geometric relationships to solve problems.

The remaining 20 percent of the assessment was devoted to the data content domain, which consisted of two topic areas: reading, interpreting, and representing data (15%) and using data to solve problems (5%). Students were asked to read and recognize various forms of data displays; to collect, organize, and represent the data in graphs and charts to address a simple question; and to use data from one or more sources to solve problems.

Fourth grade students also needed to draw on a range of cognitive skills across the content domains described above. The cognitive skills were categorized into three broad domains—knowing, applying, and reasoning. Forty percent of the fourth grade assessment was devoted to the knowing cognitive domain, 40 percent to applying, and 20 percent to reasoning. The knowing domain covers the facts, concepts, and procedures students need to know, while the applying domain focuses on students' ability to apply knowledge and conceptual understanding to solve problems or answer questions. The reasoning domain goes beyond the solution of familiar problems that may have been routinely practiced in mathematics lessons to encompass unfamiliar situations, complex contexts, and multistep problems.

Average Achievement in Content Domains

Exhibit 1.14 shows countries' average mathematics achievement in each of the three content domains relative to their overall average achievement (presented from highest to lowest overall average achievement). Based on countries' relative strengths and weaknesses, the TIMSS 2019 countries appear to be placing relatively more instructional emphasis on the number content domain and much less

on the data content domain. Of the 55 participating countries for which content domain scores were estimated, 27 had a relative strength in number and 17 had a relative weakness; 19 had a relative strength in measurement and geometry and 23 had a relative weakness, and 11 had a relative strength in data and 33 had a relative weakness. Almost all countries had at least one relative strength or relative weakness compared with their overall achievement, except Albania.

Exhibit 1.14: Average Achievement in Mathematics Content Domains

Country	Overall Mathematics Average Scale Score	Number (83 Items)		Measurement and Geometry (52 Items)		Data (36 Items)	
		Average Scale Score	Difference from Overall Mathematics Score	Average Scale Score	Difference from Overall Mathematics Score	Average Scale Score	Difference from Overall Mathematics Score
[3] Singapore	625 (3.9)	635 (4.0)	10 (1.0) ▲	620 (3.9)	-5 (1.2) ▽	613 (3.8)	-12 (1.5) ▽
† Hong Kong SAR	602 (3.3)	598 (3.6)	-4 (2.1)	608 (3.1)	6 (1.6) ▲	607 (3.6)	5 (3.0)
Korea, Rep. of	600 (2.2)	593 (2.4)	-6 (0.8) ▽	608 (2.6)	8 (1.7) ▲	602 (2.5)	3 (1.5)
Chinese Taipei	599 (1.9)	599 (1.7)	0 (1.2)	607 (1.8)	8 (1.9) ▲	590 (2.4)	-9 (1.5) ▽
Japan	593 (1.8)	586 (1.8)	-7 (1.0) ▽	601 (2.7)	8 (1.9) ▲	606 (2.1)	13 (1.2) ▲
[2] Russian Federation	567 (3.3)	567 (3.4)	0 (1.6)	571 (3.7)	4 (1.3) ▲	560 (3.9)	-7 (2.2) ▽
† Northern Ireland	566 (2.7)	572 (3.1)	7 (1.9) ▲	556 (3.0)	-10 (2.0) ▽	564 (2.5)	-2 (1.3)
[2] England	556 (3.0)	559 (3.3)	3 (1.0) ▲	545 (3.3)	-11 (1.6) ▽	565 (3.1)	9 (1.7) ▲
Ireland	548 (2.5)	555 (2.7)	6 (1.4) ▲	540 (2.7)	-8 (1.2) ▽	543 (3.0)	-6 (1.6) ▽
[2] Latvia	546 (2.6)	547 (2.6)	1 (0.8)	548 (2.8)	2 (0.8)	542 (3.2)	-4 (1.9) ▽
† Norway (5)	543 (2.2)	540 (2.0)	-3 (1.0) ▽	546 (2.8)	4 (1.5) ▲	547 (3.2)	4 (2.4)
[2] Lithuania	542 (2.8)	538 (2.8)	-4 (1.1) ▽	543 (3.0)	1 (1.6)	545 (3.0)	3 (1.8)
Austria	539 (2.0)	542 (1.9)	3 (1.1) ▲	542 (2.4)	2 (1.6)	528 (2.7)	-11 (1.5) ▽
≡ Netherlands	538 (2.2)	533 (2.2)	-5 (1.2) ▽	537 (2.2)	0 (1.5)	549 (3.0)	12 (1.5) ▲
[2] † United States	535 (2.5)	542 (2.6)	8 (0.7) ▲	520 (2.6)	-15 (0.7) ▽	533 (3.0)	-2 (1.5)
Czech Republic	533 (2.5)	536 (2.4)	3 (1.1) ▲	540 (2.9)	7 (1.8) ▲	518 (2.9)	-15 (1.7) ▽
† Belgium (Flemish)	532 (1.9)	526 (2.0)	-6 (1.1) ▽	551 (2.0)	18 (0.9) ▲	527 (2.2)	-6 (1.4) ▽
Cyprus	532 (2.9)	538 (2.8)	6 (0.9) ▲	526 (3.1)	-6 (1.9) ▽	524 (3.4)	-9 (1.2) ▽
Finland	532 (2.3)	528 (2.3)	-4 (1.0) ▽	538 (3.0)	6 (2.2) ▲	534 (2.8)	2 (1.8)
[2] Portugal	525 (2.6)	524 (2.9)	-1 (1.5)	520 (2.9)	-5 (1.6) ▽	528 (2.6)	3 (1.0) ▲
† Denmark	525 (1.9)	518 (2.1)	-7 (1.1) ▽	536 (2.4)	12 (1.8) ▲	525 (2.3)	1 (1.5)
Hungary	523 (2.6)	531 (2.6)	7 (1.0) ▲	519 (3.3)	-4 (2.0) ▽	508 (3.2)	-15 (1.7) ▽
[2] Turkey (5)	523 (4.4)	525 (4.7)	3 (1.1) ▲	527 (4.4)	4 (1.8) ▲	510 (4.5)	-13 (1.4) ▽
Sweden	521 (2.8)	517 (2.9)	-4 (1.4) ▽	521 (3.4)	0 (1.7)	527 (3.5)	6 (1.8) ▲
Germany	521 (2.3)	517 (2.1)	-4 (1.3) ▽	531 (2.6)	10 (1.0) ▲	515 (3.1)	-6 (1.4) ▽
Poland	520 (2.7)	513 (2.8)	-7 (1.0) ▽	529 (2.7)	9 (1.0) ▲	524 (2.9)	4 (1.5) ▲
Australia	516 (2.8)	506 (3.1)	-10 (0.9) ▽	516 (3.3)	0 (1.4)	534 (3.4)	18 (2.1) ▲
Azerbaijan	515 (2.7)	526 (2.7)	10 (1.3) ▲	503 (3.2)	-13 (1.6) ▽	504 (3.0)	-11 (1.0) ▽
Bulgaria	515 (4.3)	521 (4.0)	6 (1.0) ▲	522 (4.9)	7 (2.1) ▲	490 (5.6)	-25 (2.5) ▽
Italy	515 (2.4)	522 (2.5)	7 (1.2) ▲	510 (3.2)	-5 (2.0) ▽	498 (3.0)	-17 (1.5) ▽
[2] Kazakhstan	512 (2.5)	523 (2.4)	11 (1.5) ▲	513 (2.8)	1 (1.9)	481 (3.0)	-31 (1.7) ▽
[1 2] Canada	512 (1.9)	505 (2.1)	-6 (0.8) ▽	511 (1.8)	-1 (0.7)	523 (2.4)	11 (1.4) ▲
[2] Slovak Republic	510 (3.5)	512 (3.6)	2 (1.6)	506 (3.7)	-4 (2.0) ▽	506 (4.1)	-4 (1.9) ▽
Croatia	509 (2.2)	512 (1.9)	2 (1.0) ▲	518 (2.7)	8 (2.0) ▲	494 (2.7)	-15 (2.0) ▽
Malta	509 (1.4)	512 (1.5)	3 (1.0) ▲	497 (1.8)	-12 (1.2) ▽	512 (1.8)	3 (2.1)
[2] Serbia	508 (3.2)	518 (2.9)	10 (1.5) ▲	499 (3.7)	-9 (1.7) ▽	489 (4.2)	-19 (2.0) ▽
Spain	502 (2.1)	506 (1.9)	4 (0.8) ▲	494 (2.2)	-9 (0.8) ▽	499 (2.6)	-3 (1.2) ▽
Armenia	498 (2.5)	518 (2.3)	20 (1.1) ▲	490 (3.0)	-8 (1.3) ▽	446 (4.2)	-52 (2.1) ▽
Albania	494 (3.4)	495 (3.6)	1 (1.5)	496 (3.4)	2 (1.4)	490 (4.0)	-4 (2.5)
[2] New Zealand	487 (2.6)	478 (2.9)	-9 (1.1) ▽	481 (2.7)	-6 (2.4) ▽	504 (3.1)	17 (1.8) ▲
France	485 (3.0)	480 (3.2)	-5 (1.0) ▽	498 (3.3)	13 (1.4) ▲	476 (3.4)	-9 (1.6) ▽
[1] Georgia	482 (3.7)	501 (3.6)	19 (1.8) ▲	470 (4.1)	-12 (2.3) ▽	444 (4.6)	-38 (2.2) ▽
United Arab Emirates	481 (1.7)	485 (1.7)	4 (0.7) ▲	472 (1.8)	-10 (0.8) ▽	476 (1.8)	-5 (0.6) ▽
Bahrain	480 (2.6)	478 (2.6)	-2 (1.0)	474 (2.6)	-6 (1.3) ▽	483 (3.3)	3 (1.7) ▲
North Macedonia	472 (5.3)	472 (5.2)	1 (1.5)	475 (5.8)	3 (2.5)	464 (6.1)	-7 (2.4) ▽
Montenegro	453 (2.0)	454 (2.2)	1 (1.4)	459 (2.1)	7 (1.3) ▲	439 (2.7)	-14 (1.7) ▽
Bosnia and Herzegovina	452 (2.4)	459 (2.3)	7 (1.1) ▲	458 (2.9)	6 (1.6) ▲	413 (3.8)	-39 (2.9) ▽
Qatar	449 (3.4)	455 (3.4)	5 (1.3) ▲	434 (3.4)	-15 (1.3) ▽	445 (3.8)	-4 (1.7) ▽
[2] Kosovo	444 (3.0)	447 (2.8)	3 (0.9) ▲	450 (3.3)	6 (1.4) ▲	423 (3.7)	-21 (1.9) ▽
Iran, Islamic Rep. of	443 (3.9)	446 (4.0)	3 (1.3) ▲	445 (3.6)	2 (1.5)	424 (3.8)	-19 (1.6) ▽
Chile	441 (2.7)	- -	- -	- -	- -	- -	- -
Oman	431 (3.7)	424 (4.0)	-7 (0.8) ▽	429 (4.2)	-2 (1.2)	433 (3.8)	2 (1.9)
[2] Saudi Arabia	398 (3.6)	- -	- -	- -	- -	- -	- -
Morocco	383 (4.3)	383 (4.4)	0 (1.2)	386 (4.5)	2 (1.5)	374 (5.3)	-9 (2.1) ▽
Kuwait	383 (4.7)	- -	- -	- -	- -	- -	- -
South Africa (5)	374 (3.6)	370 (3.6)	-3 (1.1) ▽	362 (3.7)	-11 (1.7) ▽	390 (3.8)	16 (1.5) ▲
[2 Ψ] Pakistan	328 (12.0)	351 (10.9)	24 (2.2) ▲	286 (14.1)	-42 (4.4) ▽	278 (14.5)	-50 (4.3) ▽
[2 Ψ] Philippines	297 (6.4)	308 (6.1)	11 (2.0) ▲	259 (7.1)	-37 (3.0) ▽	291 (7.1)	-6 (1.8) ▽
Benchmarking Participants							
Moscow City, Russian Fed.	593 (2.2)	591 (2.2)	-2 (0.7) ▽	590 (2.4)	-2 (1.2)	603 (2.5)	10 (0.8) ▲
[2] Dubai, UAE	544 (1.6)	548 (1.7)	4 (1.2) ▲	535 (2.1)	-9 (1.1) ▽	546 (2.0)	2 (1.2)
Quebec, Canada	532 (2.3)	530 (2.4)	-3 (1.4)	532 (2.6)	0 (1.6)	535 (3.1)	3 (2.5)
Madrid, Spain	518 (2.2)	524 (2.2)	6 (1.1) ▲	508 (3.4)	-10 (2.4) ▽	513 (2.9)	-5 (2.2) ▽
[2] Ontario, Canada	512 (3.3)	501 (3.6)	-10 (1.8) ▽	516 (3.2)	5 (1.0) ▲	527 (4.0)	15 (2.0) ▲
Abu Dhabi, UAE	441 (2.2)	443 (2.0)	2 (1.2)	429 (2.1)	-11 (1.9) ▽	435 (2.3)	-6 (1.6) ▽

▲ Subscale score significantly higher than overall mathematics score
▽ Subscale score significantly lower than overall mathematics score

Numbers of items are based on the TIMSS 2019 fourth grade mathematics eAssessment items included in scaling.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
See Appendix B.2 for target population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available because average achievement could not be accurately estimated.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Trends in Average Achievement in Content Domains

Exhibit 1.15 presents trends in average achievement for the three mathematics content domains assessed by TIMSS 2019 at the fourth grade—number, measurement and geometry, and data. Of the 55 TIMSS 2019 countries with mathematics content domain scores, 42 also participated in TIMSS 2015 and have comparable data for the two assessment cycles. In each of the three content areas, about just over half the countries showed no or little change in average achievement. For the countries that did have changes, there were similar numbers of increases and decreases: in the number content area, 11 showed improvement and 7 declined; in measurement and geometry, 13 showed improvement and 9 declined; and in data, 10 showed improvement and 7 declined.

In comparison, the longer term trends showed many more improvements than declines. TIMSS began providing scaled results in the content domains in 2007, with 21 countries having trends between 2007 and 2019. Compared with 2007, these countries showed considerable improvement in TIMSS 2019 across the content domains—14 had higher average achievement in number, 12 in measurement and geometry, and 12 in data. One country had lower achievement in number compared with 2007, 3 countries had lower average achievement in measurement and geometry and 2 had lower achievement in data.

Exhibit 1.15: Differences in Achievement for Mathematics Content Domains Across Assessment Years◊

Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▽) than the performance in the column year.

Country	Number				Measurement and Geometry				Data			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
Armenia												
2019	518 (2.3)	8 ▲	34 ▲		490 (3.0)	46 ▲	66 ▲		446 (4.2)	39 ▲	61 ▲	
2015	510 (3.0)		26 ▲		444 (4.6)		20 ▲		407 (5.1)		21 ▲	
2011	484 (3.1)				424 (4.3)				386 (5.0)			
Australia												
2019	506 (3.1)	-3	-2	3	516 (3.3)	-11 ▽	-18 ▽	-20 ▽	534 (3.4)	2	19 ▲	2
2015	509 (3.1)		1	6	527 (3.3)		-7	-9	533 (3.6)		17 ▲	0
2011	508 (3.2)			5	534 (3.0)			-3	515 (3.1)			-17 ▽
2007	503 (3.6)				536 (3.6)				532 (4.3)			
Austria												
2019	542 (1.9)		36 ▲	36 ▲	542 (2.4)		30 ▲	36 ▲	528 (2.7)		13 ▲	27 ▲
2011	506 (2.4)			0	512 (3.4)			6	515 (3.2)			13 ▲
2007	506 (2.1)				506 (2.6)				502 (3.4)			
Azerbaijan												
2019	526 (2.7)		35 ▲		503 (3.2)		66 ▲		504 (3.0)		96 ▲	
2 2011	491 (5.2)				437 (7.2)				407 (6.3)			
Bahrain												
2019	478 (2.6)	26 ▲	39 ▲		474 (2.6)	27 ▲	52 ▲		483 (3.3)	29 ▲	41 ▲	
2 2015	453 (1.7)		14 ▲		447 (1.9)		25 ▲		454 (2.3)		12 ▲	
2011	439 (3.1)				422 (3.8)				442 (4.0)			
Belgium (Flemish)												
† 2019	526 (2.0)	-17 ▽	-25 ▽		551 (2.0)	-13 ▽	-1		527 (2.2)	3	-10 ▽	
† 2015	543 (2.1)		-8 ▽		564 (2.3)		11 ▲		523 (3.0)		-13 ▽	
2011	552 (2.1)				552 (1.9)				536 (2.8)			
Bulgaria												
2019	521 (4.0)	-8			522 (4.9)	-3			490 (5.6)	-15		
2015	529 (4.6)				525 (5.9)				504 (7.6)			
Canada												
1 2 2019	505 (2.1)	2			511 (1.8)	-6 ▽			523 (2.4)	-6		
1 2 † 2015	503 (2.4)				517 (2.5)				528 (2.7)			
Chinese Taipei												
2019	599 (1.7)	0	0	17 ▲	607 (1.8)	11 ▲	35 ▲	42 ▲	590 (2.4)	-1	-10 ▽	14 ▲
2015	599 (1.8)		0	17 ▲	597 (3.0)		24 ▲	31 ▲	591 (2.2)		-9 ▽	15 ▲
2011	599 (2.0)			17 ▲	573 (2.1)			7 ▲	600 (2.6)			24 ▲
2007	583 (1.8)				566 (2.7)				576 (2.4)			
Croatia												
2019	512 (1.9)	14 ▲	21 ▲		518 (2.7)	5	28 ▲		494 (2.7)	-4	6	
2015	498 (1.8)		7 ▲		512 (2.3)		22 ▲		498 (3.0)		10 ▲	
2 2011	491 (1.9)				490 (2.5)				488 (2.9)			
Cyprus												
2019	538 (2.8)	10 ▲			526 (3.1)	2			524 (3.4)	16 ▲		
2015	528 (2.5)				524 (2.8)				507 (3.8)			
Czech Republic												
2019	536 (2.4)	8 ▲	27 ▲	49 ▲	540 (2.9)	9 ▲	27 ▲	53 ▲	518 (2.9)	-7	-1	36 ▲
2015	528 (2.4)		19 ▲	42 ▲	531 (2.5)		18 ▲	44 ▲	525 (3.0)		6	43 ▲
2011	509 (2.5)			23 ▲	513 (3.0)			26 ▲	519 (2.9)			37 ▲
2007	486 (2.7)				487 (3.2)				482 (4.1)			
Denmark												
† 2019	518 (2.1)	-17 ▽	-16 ▽	4	536 (2.4)	-19 ▽	-12 ▽	-9 ▽	525 (2.3)	-1	-6	-1
2 † 2015	535 (2.7)		1	21 ▲	555 (3.2)		7	10 ▲	526 (3.5)		-6	-1
2 2011	534 (2.5)			21 ▲	548 (3.1)			2	532 (2.9)			5
† 2007	513 (2.7)				546 (3.1)				527 (4.0)			
England												
2 2019	559 (3.3)	12 ▲	20 ▲	24 ▲	545 (3.3)	3	0	-6	565 (3.1)	13 ▲	15 ▲	14 ▲
2015	547 (3.2)		8	11 ▲	542 (3.3)		-3	-9 ▽	552 (3.2)		3	2
2011	539 (3.7)			4	545 (3.8)			-6	549 (4.6)			-1
2007	535 (3.2)				552 (3.3)				551 (3.3)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

◊ Trend reporting in content domains using current methodology began with TIMSS 2007.
See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.15: Differences in Achievement for Mathematics Content Domains Across Assessment Years◊

(Continued)

Country	Number				Measurement and Geometry				Data			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
Finland												
2019	528 (2.3)	-4	-17 ▽		538 (3.0)	-1	-5		534 (2.8)	-8	-17 ▽	
2015	532 (2.1)		-14 ▽		539 (2.5)		-4		542 (3.3)		-9	
2011	545 (2.4)				543 (3.0)				551 (3.7)			
France												
2019	480 (3.2)	-3			498 (3.3)	-6			476 (3.4)	0		
2015	483 (3.0)				503 (3.0)				476 (3.1)			
Georgia												
1 2019	501 (3.6)	18 ▲	28 ▲	30 ▲	470 (4.1)	41 ▲	58 ▲	74 ▲	444 (4.6)	10	12	54 ▲
1 2015	483 (3.5)		10 ▲	12 ▲	429 (4.6)		17 ▲	33 ▲	435 (4.4)		2	45 ▲
1 2011	473 (3.2)			2	411 (4.2)			16 ▲	433 (4.2)			43 ▲
1 2007	470 (3.7)				395 (5.9)				390 (5.4)			
Germany												
2019	517 (2.1)	2	-3	-7 ▽	531 (2.6)	0	-5	4	515 (3.1)	-20 ▽	-31 ▽	-17 ▽
2015	515 (2.1)		-5	-9 ▽	531 (2.5)		-5	4	535 (2.6)		-11 ▽	3
2011	520 (2.3)			-4	536 (2.7)			9 ▲	546 (2.8)			14 ▲
2007	524 (2.2)				527 (2.4)				532 (3.7)			
Hong Kong SAR												
† 2019	598 (3.6)	-18 ▽	-6	-10	608 (3.1)	-9	3	-5	607 (3.6)	-4	13 ▲	6
† 2015	616 (3.1)		12 ▲	9	617 (3.4)		12 ▲	3	611 (3.8)		18 ▲	10 ▲
2 2011	604 (3.3)			-4	605 (3.4)			-9	593 (3.7)			-7
2007	608 (3.7)				613 (3.8)				600 (3.3)			
Hungary												
2019	531 (2.6)	-1	16 ▲	16 ▲	519 (3.3)	-17 ▽	-1	13 ▲	508 (3.2)	-5	-2	11 ▲
2015	531 (3.0)		16 ▲	16 ▲	536 (3.6)		16 ▲	29 ▲	513 (3.6)		3	16 ▲
2011	515 (3.3)			0	520 (3.7)			14 ▲	510 (4.1)			13 ▲
2007	515 (3.4)				507 (3.9)				497 (4.3)			
Iran, Islamic Rep. of												
2019	446 (4.0)	11 ▲	6	39 ▲	445 (3.6)	17 ▲	11 ▲	37 ▲	424 (3.8)	9	27 ▲	51 ▲
2015	435 (3.2)		-5	28 ▲	428 (3.5)		-7	19 ▲	416 (3.2)		18 ▲	42 ▲
2011	440 (3.3)			32 ▲	435 (3.7)			26 ▲	397 (4.2)			24 ▲
2007	407 (3.5)				408 (4.0)				374 (5.1)			
Ireland												
2019	555 (2.7)	4	22 ▲		540 (2.7)	-2	20 ▲		543 (3.0)	-5	20 ▲	
2015	551 (2.2)		18 ▲		542 (2.9)		22 ▲		548 (3.8)		25 ▲	
2011	533 (2.6)				520 (3.1)				523 (3.0)			
Italy												
2019	522 (2.5)	12 ▲	12 ▲	12 ▲	510 (3.2)	7	-2	4	498 (3.0)	0	4	0
2 2015	510 (2.4)		0	0	503 (2.8)		-9 ▽	-3	498 (2.9)		3	-1
2011	510 (2.7)			0	513 (3.2)			6	495 (3.2)			-4
2007	510 (2.9)				507 (3.6)				499 (4.0)			
Japan												
2019	586 (1.8)	-6 ▽	2	22 ▲	601 (2.7)	0	12 ▲	26 ▲	606 (2.1)	12 ▲	16 ▲	18 ▲
2015	592 (1.9)		8 ▲	28 ▲	601 (2.5)		12 ▲	26 ▲	593 (2.6)		4	6
2011	584 (1.7)			20 ▲	589 (1.9)			14 ▲	590 (3.0)			2
2007	564 (2.1)				575 (2.7)				588 (3.5)			
Kazakhstan												
2 2019	523 (2.4)		8		513 (2.8)		22 ▲		481 (3.0)		5	
2 2011	515 (4.1)				491 (5.4)				476 (5.5)			
Korea, Rep. of												
2019	593 (2.4)	-16 ▽	-12 ▽		608 (2.6)	-3	0		602 (2.5)	-4	-1	
2015	610 (2.6)		4		610 (2.3)		3		607 (2.6)		4	
2011	606 (2.0)				607 (2.0)				603 (1.8)			
Lithuania												
2 2019	538 (2.8)	0	1	2	543 (3.0)	18 ▲	12 ▲	25 ▲	545 (3.0)	5	18 ▲	16 ▲
2 2015	538 (2.6)		1	2	526 (3.0)		-5	7	540 (3.6)		14 ▲	11 ▲
1 2 2011	537 (2.4)			1	531 (2.9)			12 ▲	526 (2.8)			-3
1 2007	536 (2.2)				518 (3.1)				529 (3.7)			
Malta												
2019	512 (1.5)		14 ▲		497 (1.8)		10 ▲		512 (1.8)		14 ▲	
2011	498 (1.9)				487 (1.5)				498 (1.7)			
Morocco												
2019	383 (4.4)	2	43 ▲		386 (4.5)	1	36 ▲		374 (5.3)	24 ▲	104 ▲	
2015	381 (3.3)		41 ▲		385 (3.8)		35 ▲		351 (4.2)		80 ▲	
✕ 2011	340 (4.0)				350 (3.8)				271 (4.7)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

✕ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 1.15: Differences in Achievement for Mathematics Content Domains Across Assessment Years◊

(Continued)

Country	Number				Measurement and Geometry				Data			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
Netherlands												
≡ 2019	533 (2.2)	2	-10 ▽	-6	537 (2.2)	15 ▲	13 ▲	15 ▲	549 (3.0)	11 ▲	-10 ▽	4
† 2015	531 (2.2)		-12 ▽	-8 ▽	522 (1.9)		-2	0	539 (3.4)		-20 ▽	-6
† 2011	543 (1.7)			4	524 (2.9)			2	559 (2.8)			14 ▲
‡ 2007	539 (2.2)				522 (2.6)				545 (2.8)			
New Zealand												
2 2019	478 (2.9)	-7	-4	-7	481 (2.7)	-7	-2	-14 ▽	504 (3.1)	-2	13 ▲	-3
2015	485 (2.7)		3	0	489 (2.8)		6	-7	506 (2.9)		15 ▲	0
2011	483 (2.7)			-3	483 (2.6)			-12 ▽	491 (2.8)			-15 ▽
2007	485 (2.6)				495 (2.5)				506 (3.0)			
Northern Ireland												
† 2019	572 (3.1)	-2	6		556 (3.0)	-10 ▽	-4		564 (2.5)	-3	9 ▲	
‡ 2015	574 (3.1)		8		566 (3.3)		6		567 (3.8)		12 ▲	
† 2011	566 (2.9)				560 (3.2)				555 (2.9)			
Norway (5)												
† 2019	540 (2.0)	-2			546 (2.8)	-12 ▽			547 (3.2)	-19 ▽		
2015	542 (2.4)				559 (3.5)				566 (3.0)			
Oman												
2019	424 (4.0)	1	40 ▲		429 (4.2)	-2	52 ▲		433 (3.8)	19 ▲	52 ▲	
2015	423 (2.6)		39 ▲		430 (2.9)		54 ▲		414 (2.6)		33 ▲	
Ψ 2011	384 (3.1)				376 (3.2)				381 (3.0)			
Poland												
2019	513 (2.8)	-22 ▽			529 (2.7)	-4			524 (2.9)	-14 ▽		
2015	534 (2.3)				534 (2.5)				538 (2.8)			
Portugal												
2 2019	524 (2.9)	-16 ▽	2		520 (2.9)	-19 ▽	-28 ▽		528 (2.6)	-18 ▽	-20 ▽	
2 2015	541 (2.1)		18 ▲		539 (2.6)		-9		546 (2.8)		-2	
2011	522 (3.6)				548 (4.0)				548 (2.9)			
Qatar												
2019	455 (3.4)	9	38 ▲		434 (3.4)	11 ▲	36 ▲		445 (3.8)	10	29 ▲	
2015	446 (3.4)		29 ▲		423 (4.4)		24 ▲		435 (3.9)		19 ▲	
2 2011	417 (3.4)				399 (4.0)				416 (4.7)			
Russian Federation												
2 2019	567 (3.4)	1	23 ▲	18 ▲	571 (3.7)	14 ▲	29 ▲	28 ▲	560 (3.9)	-13 ▽	27 ▲	31 ▲
2015	567 (3.3)		22 ▲	18 ▲	557 (4.4)		15 ▲	14	573 (3.6)		40 ▲	44 ▲
2011	545 (3.3)			-4	542 (4.2)			-1	533 (4.0)			4
2007	549 (4.4)				543 (6.2)				529 (6.2)			
Serbia												
2 2019	518 (2.9)	-6	-11 ▽		499 (3.7)	-4	2		489 (4.2)	-28 ▽	-13 ▽	
3 2015	524 (3.4)		-5		503 (3.8)		6		517 (3.8)		14 ▲	
2 2011	529 (3.0)				497 (3.7)				503 (3.7)			
Singapore												
3 2019	635 (4.0)	5	16 ▲	24 ▲	620 (3.9)	13 ▲	31 ▲	36 ▲	613 (3.8)	14 ▲	26 ▲	16 ▲
2 2015	630 (4.2)		11 ▲	18 ▲	607 (4.2)		18 ▲	24 ▲	600 (4.1)		12 ▲	3
2 2011	619 (3.4)			8	589 (3.6)			5	588 (3.3)			-9
2007	611 (4.0)				584 (4.2)				597 (3.7)			
Slovak Republic												
2 2019	512 (3.6)	10 ▲	1	12 ▲	506 (3.7)	15 ▲	6	11	506 (4.1)	10	2	23 ▲
2015	502 (2.4)		-9 ▽	2	491 (2.6)		-9	-3	496 (3.8)		-8	14 ▲
2011	511 (3.7)			11 ▲	500 (4.2)			6	504 (4.6)			22 ▲
2007	500 (4.0)				494 (5.3)				482 (5.6)			
South Africa (5)												
2019	370 (3.6)	-8			362 (3.7)	3			390 (3.8)	9		
2015	379 (3.4)				359 (3.7)				381 (4.0)			
Spain												
2019	506 (1.9)	2	20 ▲		494 (2.2)	-9 ▽	17 ▲		499 (2.6)	-9 ▽	20 ▲	
2 2015	504 (2.5)		18 ▲		503 (2.8)		26 ▲		509 (3.1)		30 ▲	
2011	487 (2.9)				476 (2.9)				479 (3.6)			
Sweden												
2019	517 (2.9)	3	17 ▲	22 ▲	521 (3.4)	-1	22 ▲	18 ▲	527 (3.5)	-2	4	0
2 2015	514 (2.7)		14 ▲	19 ▲	523 (3.3)		23 ▲	19 ▲	529 (3.9)		6	2
2011	500 (2.2)			5	500 (2.4)			-4	523 (3.0)			-4
2007	495 (2.5)				503 (2.9)				527 (3.4)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 1.15: Differences in Achievement for Mathematics Content Domains Across Assessment Years◊

(Continued)

Country	Number				Measurement and Geometry				Data			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
United Arab Emirates												
2019	485 (1.7)	30 ▲	47 ▲		472 (1.8)	30 ▲	54 ▲		476 (1.8)	23 ▲	39 ▲	
2015	455 (2.4)		17 ▲		442 (2.7)		24 ▲		453 (2.4)		16 ▲	
2011	438 (2.1)				418 (2.2)				437 (1.9)			
United States												
2† 2019	542 (2.6)	-3	-1	13 ▲	520 (2.6)	-6	-15 ▽	-2	533 (3.0)	-7	-12 ▽	-13 ▽
2† 2015	546 (2.2)		3	16 ▲	525 (2.6)		-9 ▽	3	540 (2.8)		-4	-5
2 2011	543 (2.0)			13 ▲	535 (2.2)			13 ▲	545 (1.8)			-1
2† 2007	529 (2.6)				522 (3.0)				546 (2.8)			
Benchmarking Participants												
Ontario, Canada												
2 2019	501 (3.6)	2	-2	6	516 (3.2)	-10 ▽	-19 ▽	-14 ▽	527 (4.0)	-9	-9	-18 ▽
2015	500 (2.6)		-4	4	526 (2.9)		-9	-3	536 (2.6)		-1	-9
2011	504 (3.4)			9	535 (3.5)			5	536 (3.6)			-9
2 2007	495 (3.5)				530 (3.7)				545 (4.0)			
Quebec, Canada												
2019	530 (2.4)	-3	-2	14 ▲	532 (2.6)	-11 ▽	-4	8	535 (3.1)	-6	-3	12 ▲
≡ 2015	533 (4.2)		1	17 ▲	542 (4.6)		6	18 ▲	541 (5.0)		4	18 ▲
2011	531 (2.6)			16 ▲	536 (3.2)			12 ▲	538 (3.7)			15 ▲
2 2007	515 (3.0)				524 (3.8)				523 (4.4)			
Abu Dhabi, UAE												
2019	443 (2.0)	21 ▲	23 ▲		429 (2.1)	18 ▲	28 ▲		435 (2.3)	12 ▲	17 ▲	
2 Ψ 2015	422 (4.7)		2		412 (5.1)		10		423 (4.8)		5	
2011	420 (4.7)				401 (5.3)				418 (4.4)			
Dubai, UAE												
2 2019	548 (1.7)	34 ▲	74 ▲	95 ▲	535 (2.1)	33 ▲	86 ▲	112 ▲	546 (2.0)	30 ▲	75 ▲	102 ▲
2015	514 (1.5)		40 ▲	61 ▲	503 (1.9)		54 ▲	79 ▲	517 (1.7)		45 ▲	73 ▲
2011	474 (1.7)			21 ▲	449 (2.3)			26 ▲	471 (3.1)			27 ▲
‡ 2007	452 (2.1)				424 (3.4)				444 (3.0)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Average Achievement in Content Domains by Gender

Exhibit 1.16 shows the differences in average achievement between boys and girls in the three mathematics content domains. The differences in average achievement between girls and boys in all three content areas largely reflected the overall TIMSS 2019 results, where boys had higher achievement than girls in close to half the countries (27 out of 55). In the number content domain, girls had higher average achievement than boys in 3 countries, and boys had higher average achievement in 25 countries. In measurement and geometry, girls had higher average achievement than boys in 3 countries, and boys had higher average achievement in 26 countries. In data, girls had higher average achievement than boys in 8 countries, and boys had higher average achievement in 11. countries.

Exhibit 1.16: Average Achievement in Mathematics Content Domains by Gender

Country	Number (83 Items)		Measurement and Geometry (52 Items)		Data (36 Items)	
	Girls	Boys	Girls	Boys	Girls	Boys
Albania	493 (3.8)	497 (4.3)	492 (3.9)	499 (4.0)	494 (4.7) ▲	485 (4.4)
Armenia	520 (2.6)	516 (2.9)	489 (3.1)	491 (3.9)	450 (4.3)	444 (5.0)
Australia	501 (3.0)	511 (3.8) ▲	509 (3.2)	523 (3.9) ▲	531 (4.0)	537 (3.6)
Austria	539 (2.6)	544 (2.2)	534 (3.0)	549 (2.7) ▲	524 (4.2)	532 (2.7)
Azerbaijan	528 (3.2)	524 (3.0)	501 (4.0)	504 (3.4)	508 (3.5) ▲	500 (3.3)
Bahrain	482 (3.5)	475 (3.6)	473 (3.5)	475 (3.4)	487 (3.7)	479 (4.2)
† Belgium (Flemish)	520 (2.1)	533 (2.6) ▲	545 (2.5)	557 (2.7) ▲	523 (2.6)	530 (3.2)
Bosnia and Herzegovina	454 (2.7)	463 (2.6) ▲	452 (3.7)	464 (3.0) ▲	412 (4.0)	414 (4.5)
Bulgaria	520 (4.3)	523 (4.4)	518 (5.5)	525 (5.2)	491 (6.2)	488 (6.1)
1 2 Canada	495 (2.7)	515 (2.4) ▲	500 (2.7)	520 (2.1) ▲	514 (3.0)	531 (2.4) ▲
Chile	- -	- -	- -	- -	- -	- -
Chinese Taipei	597 (2.4)	602 (2.2)	606 (1.9)	609 (2.4)	588 (3.6)	592 (2.7)
Croatia	506 (2.5)	518 (2.5) ▲	514 (3.9)	522 (3.4)	491 (2.9)	497 (3.9)
Cyprus	528 (3.1)	549 (3.5) ▲	515 (3.3)	538 (4.2) ▲	518 (3.7)	529 (4.2) ▲
Czech Republic	531 (2.5)	540 (3.1) ▲	533 (3.5)	547 (3.9) ▲	512 (3.2)	524 (3.5) ▲
† Denmark	513 (2.4)	523 (2.8) ▲	533 (3.4)	540 (2.4) ▲	524 (3.2)	526 (3.4)
2 England	556 (4.4)	562 (3.4)	540 (4.5)	550 (3.2) ▲	561 (4.2)	568 (3.5)
Finland	525 (2.9)	530 (2.8)	537 (3.4)	540 (3.3)	534 (3.6)	534 (3.1)
France	474 (3.6)	487 (3.7) ▲	490 (3.9)	505 (3.9) ▲	470 (4.1)	481 (3.7) ▲
1 Georgia	498 (3.9)	504 (4.0)	466 (4.1)	473 (5.0)	439 (5.4)	449 (5.9)
Germany	512 (2.5)	523 (2.3) ▲	524 (3.2)	538 (2.8) ▲	511 (4.0)	518 (4.2)
† Hong Kong SAR	595 (4.5)	600 (3.8)	600 (3.6)	615 (3.7) ▲	607 (4.4)	607 (4.1)
Hungary	525 (3.0)	535 (3.1) ▲	510 (3.7)	528 (4.1) ▲	503 (4.0)	512 (4.2)
Iran, Islamic Rep. of	443 (6.6)	449 (5.8)	440 (6.0)	450 (5.3)	423 (6.0)	426 (5.4)
Ireland	551 (3.2)	558 (3.2)	538 (3.7)	543 (3.2)	540 (3.8)	545 (3.4)
Italy	515 (2.5)	529 (3.2) ▲	504 (3.5)	516 (3.7) ▲	490 (3.6)	507 (3.8) ▲
Japan	585 (2.2)	587 (2.2)	602 (3.4)	601 (2.6)	608 (2.5) ▲	603 (2.2)
2 Kazakhstan	522 (2.9)	523 (2.8)	512 (3.2)	515 (2.9)	484 (3.6)	479 (3.2)
Korea, Rep. of	589 (2.6)	597 (3.1) ▲	605 (3.0)	610 (3.1)	605 (3.2)	600 (3.5)
2 Kosovo	444 (3.1)	451 (3.5)	448 (3.7)	452 (3.7)	423 (4.3)	423 (5.1)
Kuwait	- -	- -	- -	- -	- -	- -
2 Latvia	543 (2.9)	550 (3.2) ▲	545 (3.1)	550 (3.4)	542 (4.0)	542 (3.3)
2 Lithuania	535 (3.1)	541 (3.6)	542 (3.5)	545 (3.7)	543 (3.9)	547 (4.7)
Malta	510 (2.7)	514 (2.0)	492 (2.4)	502 (2.8) ▲	506 (2.4)	517 (2.7) ▲
Montenegro	450 (2.9)	457 (2.4) ▲	460 (4.0)	459 (3.3)	442 (4.0)	436 (3.3)
Morocco	385 (4.9)	382 (4.5)	386 (5.7)	385 (4.8)	379 (5.8) ▲	369 (5.5)
≡ Netherlands	528 (2.8)	538 (2.8) ▲	530 (2.3)	544 (3.0) ▲	549 (4.0)	550 (3.9)
2 New Zealand	476 (4.3)	481 (3.6)	476 (3.7)	486 (3.4) ▲	503 (4.8)	504 (3.8)
North Macedonia	472 (5.9)	473 (5.3)	476 (6.5)	474 (5.8)	465 (7.5)	464 (6.2)
† Northern Ireland	571 (3.6)	574 (3.8)	551 (3.8)	560 (3.7)	564 (3.1)	564 (4.0)
† Norway (5)	538 (2.6)	542 (2.8)	543 (3.3)	549 (3.6)	548 (3.9)	546 (4.1)
Oman	431 (4.0) ▲	416 (5.1)	433 (4.0) ▲	424 (5.1)	442 (4.3) ▲	423 (4.6)
2 Ψ Pakistan	358 (14.1)	346 (11.9)	296 (19.7)	278 (14.3)	303 (20.3) ▲	257 (12.5)
2 Ψ Philippines	324 (6.5) ▲	293 (6.0)	276 (7.7) ▲	243 (7.4)	315 (7.6) ▲	269 (7.8)
Poland	508 (3.3)	517 (3.1) ▲	524 (3.1)	535 (3.5) ▲	523 (3.7)	525 (3.2)
2 Portugal	516 (3.3)	532 (3.2) ▲	512 (3.5)	528 (3.1) ▲	518 (2.9)	537 (3.3) ▲
Qatar	455 (5.1)	454 (3.2)	432 (5.5)	437 (2.9)	448 (5.7)	443 (3.7)
2 Russian Federation	563 (3.6)	572 (3.6) ▲	566 (4.2)	576 (3.8) ▲	556 (4.2)	564 (4.3) ▲
2 Saudi Arabia	- -	- -	- -	- -	- -	- -
2 Serbia	519 (3.2)	516 (3.9)	496 (4.0)	502 (5.2)	493 (4.1)	486 (5.7)
3 Singapore	631 (4.3)	639 (4.3) ▲	615 (4.0)	625 (4.5) ▲	611 (4.1)	616 (4.3)
2 Slovak Republic	507 (3.6)	518 (4.4) ▲	497 (4.1)	514 (4.4) ▲	501 (4.6)	510 (5.4)
South Africa (5)	381 (4.0) ▲	360 (3.8)	371 (4.3) ▲	354 (3.9)	403 (3.9) ▲	377 (4.4)
Spain	498 (2.7)	513 (2.4) ▲	484 (3.1)	502 (2.9) ▲	491 (3.0)	507 (3.2) ▲
Sweden	513 (3.2)	521 (3.4) ▲	515 (4.1)	528 (3.5) ▲	525 (4.4)	529 (3.8)
2 Turkey (5)	524 (4.8)	527 (6.1)	524 (4.8)	531 (5.5)	510 (4.7)	511 (5.8)
United Arab Emirates	481 (2.5)	489 (2.2) ▲	467 (2.6)	476 (2.5) ▲	472 (2.6)	480 (2.4) ▲
2 † United States	537 (2.9)	547 (3.1) ▲	513 (3.0)	526 (3.0) ▲	527 (3.2)	539 (3.8) ▲
International Average	**506 (0.5)**	**510 (0.5)** ▲	**501 (0.6)**	**508 (0.6)** ▲	**499 (0.7)**	**500 (0.6)**
Benchmarking Participants						
2 Ontario, Canada	491 (5.2)	512 (3.8) ▲	506 (4.8)	526 (3.3) ▲	520 (5.2)	534 (4.0) ▲
Quebec, Canada	520 (2.9)	538 (2.6) ▲	523 (3.0)	540 (3.0) ▲	526 (3.7)	543 (3.2) ▲
Moscow City, Russian Fed.	586 (2.4)	595 (2.5) ▲	586 (2.8)	595 (2.8) ▲	598 (3.3)	608 (3.4) ▲
Madrid, Spain	516 (2.7)	533 (2.5) ▲	498 (3.9)	517 (3.3) ▲	505 (3.8)	521 (3.2) ▲
Abu Dhabi, UAE	441 (3.1)	445 (2.9)	427 (2.9)	432 (3.2)	434 (3.0)	436 (3.3)
2 Dubai, UAE	544 (3.4)	552 (2.4)	531 (3.8)	540 (2.7)	541 (3.8)	551 (2.8)

▲ Average significantly higher than other gender

Numbers of items are based on the TIMSS 2019 fourth grade mathematics eAssessment items included in scaling.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available because average achievement could not be accurately estimated.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Average Achievement in Cognitive Domains

Exhibit 1.17 shows countries' average achievement in the knowing, applying, and reasoning cognitive domains relative to their overall average achievement (from highest to lowest overall average achievement). Interestingly, few countries had a relative strength in the knowing cognitive domain, especially compared with the applying domain. Nine countries had a relative strength in the knowing cognitive domain, and 25 had a relative weakness. Twenty-four countries had a relative strength in the applying cognitive domain, and 10 had a relative weakness. Seventeen countries had a relative strength in the reasoning cognitive domain, and 28 had a relative weakness. Hungary, Croatia, and Malta were the only countries with no relative strengths or weaknesses in the cognitive domains.

Exhibit 1.17: Average Achievement in Mathematics Cognitive Domains

Country	Overall Mathematics Average Scale Score	Knowing (59 Items)		Applying (74 Items)		Reasoning (38 Items)	
		Average Scale Score	Difference from Overall Mathematics Score	Average Scale Score	Difference from Overall Mathematics Score	Average Scale Score	Difference from Overall Mathematics Score
[3] Singapore	625 (3.9)	640 (3.9)	15 (1.7) ▲	626 (3.9)	0 (1.2)	614 (4.0)	-11 (1.5) ▽
† Hong Kong SAR	602 (3.3)	600 (3.0)	-2 (1.8)	606 (3.3)	5 (2.0) ▲	596 (4.2)	-6 (3.1)
Korea, Rep. of	600 (2.2)	612 (3.6)	13 (2.4) ▲	594 (2.5)	-5 (1.2) ▽	596 (2.9)	-3 (2.0)
Chinese Taipei	599 (1.9)	622 (1.9)	22 (1.3) ▲	600 (1.5)	1 (1.5)	576 (1.8)	-23 (1.5) ▽
Japan	593 (1.8)	597 (2.0)	4 (0.9) ▲	593 (2.0)	0 (1.5)	589 (2.2)	-4 (1.5) ▽
[2] Russian Federation	567 (3.3)	555 (3.0)	-12 (1.3) ▽	571 (3.6)	4 (0.9) ▲	573 (3.6)	6 (1.1) ▲
† Northern Ireland	566 (2.7)	574 (3.3)	9 (1.5) ▲	565 (2.8)	-1 (1.4)	558 (2.9)	-7 (1.7) ▽
[2] England	556 (3.0)	563 (3.3)	7 (1.2) ▲	553 (3.3)	-3 (1.5)	554 (3.4)	-2 (2.0)
Ireland	548 (2.5)	550 (3.0)	2 (1.7)	551 (2.7)	3 (1.4) ▲	542 (2.5)	-7 (1.4) ▽
[2] Latvia	546 (2.6)	537 (2.6)	-9 (1.0) ▽	547 (2.7)	0 (0.8)	554 (3.0)	8 (1.3) ▲
† Norway (5)	543 (2.2)	541 (2.3)	-2 (1.2)	540 (2.3)	-3 (0.8) ▽	551 (2.9)	8 (2.6) ▲
[2] Lithuania	542 (2.8)	535 (2.8)	-7 (1.9) ▽	547 (2.7)	5 (1.0) ▲	534 (3.3)	-9 (2.4) ▽
Austria	539 (2.0)	540 (2.0)	1 (1.4)	538 (2.1)	-2 (0.7) ▽	537 (2.4)	-2 (1.6)
≡ Netherlands	538 (2.2)	534 (2.1)	-3 (1.0) ▽	536 (2.2)	-2 (1.3)	546 (2.9)	8 (2.5) ▲
[2] † United States	535 (2.5)	536 (2.6)	2 (0.8) ▲	537 (2.6)	3 (0.8) ▲	524 (2.5)	-11 (0.7) ▽
Czech Republic	533 (2.5)	528 (3.0)	-5 (1.7) ▽	531 (2.6)	-1 (1.0)	541 (2.8)	8 (1.1) ▲
† Belgium (Flemish)	532 (1.9)	546 (2.4)	14 (1.1) ▲	526 (2.0)	-6 (0.9) ▽	530 (2.0)	-2 (0.8) ▽
Cyprus	532 (2.9)	530 (3.3)	-2 (1.8)	536 (3.0)	4 (1.1) ▲	526 (2.9)	-6 (1.0) ▽
Finland	532 (2.3)	531 (2.4)	-1 (1.1)	531 (2.4)	-1 (0.9)	535 (2.5)	3 (0.9) ▲
[2] Portugal	525 (2.6)	523 (2.8)	-2 (1.6)	528 (2.6)	3 (0.7) ▲	519 (2.9)	-6 (1.9) ▽
† Denmark	525 (1.9)	524 (2.2)	-1 (1.7)	520 (2.3)	-5 (1.8) ▽	535 (2.2)	10 (1.6) ▲
Hungary	523 (2.6)	525 (2.6)	1 (1.5)	521 (2.8)	-2 (1.5)	522 (3.0)	-1 (1.2)
[2] Turkey (5)	523 (4.4)	514 (4.4)	-8 (1.3) ▽	531 (4.4)	8 (0.9) ▲	509 (5.1)	-14 (2.2) ▽
Sweden	521 (2.8)	515 (3.1)	-6 (1.7) ▽	518 (2.8)	-3 (1.1) ▽	536 (2.9)	15 (1.4) ▲
Germany	521 (2.3)	523 (2.3)	2 (1.3)	514 (2.5)	-7 (1.2) ▽	531 (2.8)	10 (1.3) ▲
Poland	520 (2.7)	509 (2.7)	-11 (1.1) ▽	521 (2.8)	1 (1.0)	527 (2.8)	7 (1.0) ▲
Australia	516 (2.8)	509 (3.3)	-7 (1.5) ▽	516 (2.9)	0 (1.1)	522 (3.0)	6 (1.6) ▲
Azerbaijan	515 (2.7)	513 (2.3)	-2 (1.1) ▽	519 (3.1)	4 (1.1) ▲	506 (3.1)	-9 (1.2) ▽
Bulgaria	515 (4.3)	511 (4.1)	-4 (1.0) ▽	518 (4.5)	3 (1.0) ▲	509 (5.0)	-6 (1.4) ▽
Italy	515 (2.4)	515 (3.0)	0 (2.0)	517 (2.6)	2 (1.2) ▲	504 (2.9)	-11 (2.0) ▽
[2] Kazakhstan	512 (2.5)	510 (2.3)	-2 (0.9) ▽	514 (2.7)	2 (0.9) ▲	507 (2.7)	-5 (1.2) ▽
[1 2] Canada	512 (1.9)	506 (2.1)	-5 (0.7) ▽	513 (1.9)	1 (0.7) ▲	513 (2.0)	2 (1.1)
[2] Slovak Republic	510 (3.5)	502 (3.3)	-8 (1.2) ▽	508 (3.4)	-2 (1.9)	522 (3.5)	12 (1.3) ▲
Croatia	509 (2.2)	508 (2.2)	-2 (1.1)	509 (2.3)	0 (1.6)	510 (2.8)	0 (1.5)
Malta	509 (1.4)	510 (1.4)	0 (1.5)	508 (1.2)	-2 (1.4)	508 (1.4)	-1 (1.6)
[2] Serbia	508 (3.2)	504 (3.3)	-4 (2.1)	509 (3.5)	1 (1.3)	503 (3.7)	-5 (1.6) ▽
Spain	502 (2.1)	499 (2.4)	-3 (0.8) ▽	506 (1.9)	3 (1.4) ▲	497 (2.0)	-6 (1.5) ▽
Armenia	498 (2.5)	497 (2.7)	-1 (1.4)	501 (2.9)	3 (1.2) ▲	483 (2.9)	-15 (1.7) ▽
Albania	494 (3.4)	492 (3.7)	-2 (1.9)	498 (3.3)	4 (1.0) ▲	490 (3.7)	-4 (2.0) ▽
[2] New Zealand	487 (2.6)	476 (2.7)	-11 (1.7) ▽	487 (2.4)	0 (1.0)	501 (2.7)	14 (1.7) ▲
France	485 (3.0)	488 (3.3)	3 (1.6)	482 (3.1)	-3 (0.9) ▽	480 (3.3)	-5 (1.6) ▽
[1] Georgia	482 (3.7)	473 (3.9)	-8 (2.1) ▽	490 (3.6)	8 (1.2) ▲	469 (4.5)	-13 (2.2) ▽
United Arab Emirates	481 (1.7)	479 (1.6)	-2 (0.7) ▽	484 (1.7)	3 (0.5) ▲	474 (1.7)	-7 (0.7) ▽
Bahrain	480 (2.6)	478 (2.7)	-2 (0.9) ▽	479 (2.6)	0 (1.0)	479 (2.5)	-1 (1.4)
North Macedonia	472 (5.3)	470 (5.6)	-2 (2.1)	477 (5.2)	5 (1.9) ▲	470 (5.7)	-2 (3.6)
Montenegro	453 (2.0)	445 (2.1)	-8 (1.1) ▽	454 (2.1)	1 (1.1)	463 (2.7)	10 (1.9) ▲
Bosnia and Herzegovina	452 (2.4)	444 (2.7)	-8 (1.7) ▽	452 (2.9)	0 (1.9)	461 (3.0)	10 (1.9) ▲
Qatar	449 (3.4)	447 (3.6)	-2 (1.2)	453 (3.4)	4 (1.2) ▲	440 (3.5)	-10 (1.5) ▽
[2] Kosovo	444 (3.0)	445 (3.2)	0 (1.0)	445 (3.0)	1 (1.3)	441 (3.2)	-3 (1.5) ▽
Iran, Islamic Rep. of	443 (3.9)	436 (3.9)	-7 (1.1) ▽	450 (4.0)	7 (1.0) ▲	426 (4.3)	-17 (2.0) ▽
Chile	441 (2.7)	427 (2.6)	-14 (1.0) ▽	446 (3.0)	5 (1.9) ▲	448 (4.0)	7 (2.6) ▲
Oman	431 (3.7)	424 (4.4)	-7 (1.7) ▽	434 (3.5)	3 (1.1) ▲	424 (3.7)	-6 (1.0) ▽
[2] Saudi Arabia	398 (3.6)	- -	- -	- -	- -	- -	- -
Morocco	383 (4.3)	379 (4.4)	-4 (1.0) ▽	387 (4.5)	4 (1.5) ▲	380 (5.2)	-4 (2.1)
Kuwait	383 (4.7)	- -	- -	- -	- -	- -	- -
South Africa (5)	374 (3.6)	372 (3.7)	-1 (0.8)	375 (3.6)	2 (1.0)	370 (3.8)	-3 (1.0) ▽
[2 Ψ] Pakistan	328 (12.0)	327 (12.6)	-1 (2.4)	306 (13.1)	-21 (2.6) ▽	354 (9.3)	27 (3.9) ▲
[2 Ψ] Philippines	297 (6.4)	302 (6.3)	5 (1.5) ▲	286 (6.9)	-10 (1.7) ▽	272 (6.6)	-25 (2.9) ▽
Benchmarking Participants							
Moscow City, Russian Fed.	593 (2.2)	577 (2.1)	-16 (1.2) ▽	599 (2.5)	6 (1.4) ▲	602 (2.8)	9 (1.3) ▲
[2] Dubai, UAE	544 (1.6)	542 (1.8)	-2 (1.2)	547 (1.6)	3 (0.7) ▲	538 (1.8)	-6 (0.8) ▽
Quebec, Canada	532 (2.3)	535 (2.7)	3 (1.3) ▲	533 (2.3)	1 (1.2)	524 (2.8)	-8 (2.2) ▽
Madrid, Spain	518 (2.2)	515 (4.0)	-4 (3.3)	520 (2.4)	2 (1.2)	514 (2.7)	-4 (2.1)
[2] Ontario, Canada	512 (3.3)	504 (3.7)	-8 (1.6) ▽	514 (3.4)	2 (1.1)	516 (3.5)	4 (1.8) ▲
Abu Dhabi, UAE	441 (2.2)	439 (2.0)	-1 (1.2)	442 (2.0)	1 (0.9)	435 (2.4)	-6 (0.8) ▽

▲ Subscale score significantly higher than overall mathematics score
▽ Subscale score significantly lower than overall mathematics score

Numbers of items are based on the TIMSS 2019 fourth grade mathematics eAssessment items included in scaling.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
See Appendix B.2 for target population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available because average achievement could not be accurately estimated.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Trends in Average Achievement in Cognitive Domains

Exhibit 1.18 presents differences in average achievement for the three cognitive domains across four assessment cycles back to 2007, when TIMSS first began providing scaled results in the cognitive domains. Forty-three countries participated in both the TIMSS 2015 and TIMSS 2019 assessments and have comparable cognitive domain scores for the two assessment cycles. The recent trends in the knowing cognitive domain showed increases in 7 countries and decreases in 9 countries. In the applying domain, 12 countries showed increases and 10 decreases. In the reasoning domain, 6 showed increases and 8 decreases.

Between 2007 and 2019 there were more differences in average achievement in the cognitive domains than there were in short-term—almost all of them positive. In the knowing and applying domains, 14 countries had higher average achievement in 2019 than 2007 and 13 had higher average achievement in the reasoning domain. Two countries had lower average achievement in the knowing domain, only 1 country had lower average achievement in the applying domain, and none had lower average achievement in the reasoning domain.

Exhibit 1.18: Differences in Achievement for Mathematics Cognitive Domains Across Assessment Years◊

Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▽) than the performance in the column year.

Country	Knowing				Applying				Reasoning			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
Armenia												
2019	497 (2.7)	3	36 ▲		501 (2.9)	26 ▲	55 ▲		483 (2.9)	25 ▲	41 ▲	
2015	494 (3.5)		33 ▲		475 (3.8)		29 ▲		458 (4.4)		16 ▲	
2011	461 (4.0)				446 (4.0)				442 (3.7)			
Australia												
2019	509 (3.3)	0	-7	-2	516 (2.9)	-5	-3	-6	522 (3.0)	-1	9 ▲	6
2015	509 (3.5)		-7	-2	521 (3.0)		2	-1	523 (3.0)		10 ▲	7
2011	516 (3.4)			5	519 (3.0)			-3	513 (2.7)			-3
2007	511 (4.1)				522 (3.6)				516 (3.7)			
Austria												
2019	540 (2.0)		33 ▲	36 ▲	538 (2.1)		32 ▲	32 ▲	537 (2.4)		24 ▲	31 ▲
2011	507 (2.7)			4	506 (2.8)			0	513 (3.3)			7
2007	504 (2.2)				505 (2.0)				506 (2.4)			
Azerbaijan												
2019	513 (2.3)		40 ▲		519 (3.1)		62 ▲		506 (3.1)		62 ▲	
[2] 2011	473 (6.5)				457 (6.1)				445 (6.2)			
Bahrain												
2019	478 (2.7)	25 ▲	39 ▲		479 (2.6)	29 ▲	48 ▲		479 (2.5)	32 ▲	40 ▲	
[2] 2015	453 (1.8)		15 ▲		450 (1.6)		19 ▲		447 (2.0)		8 ▲	
2011	438 (3.8)				431 (3.3)				439 (3.2)			
Belgium (Flemish)												
† 2019	546 (2.4)	-8 ▽	-18 ▽		526 (2.0)	-18 ▽	-19 ▽		530 (2.0)	-6	-1	
† 2015	554 (2.3)		-10 ▽		544 (2.2)		-2		536 (2.7)		4	
2011	564 (2.0)				546 (2.2)				532 (2.7)			
Bulgaria												
2019	511 (4.1)	-16 ▽			518 (4.5)	-4			509 (5.0)	-11		
2015	527 (5.1)				523 (5.6)				521 (5.8)			
Canada												
[1 2] 2019	506 (2.1)	1			513 (1.9)	3			513 (2.0)	-8 ▽		
[1 2] † 2015	505 (2.4)				510 (2.3)				521 (2.4)			
Chile												
2019	427 (2.6)	-21 ▽	-28 ▽		446 (3.0)	-17 ▽	-17 ▽		448 (4.0)	-18 ▽	-21 ▽	
2015	449 (2.8)		-7		462 (2.4)		0		466 (2.3)		-3	
2011	455 (2.4)				463 (2.4)				469 (2.5)			
Chinese Taipei												
2019	622 (1.9)	1	23 ▲	36 ▲	600 (1.5)	7 ▲	7 ▲	26 ▲	576 (1.8)	1	-1	5
2015	620 (2.3)		21 ▲	35 ▲	593 (2.1)		0	19 ▲	576 (3.1)		-2	5
2011	599 (2.0)			13 ▲	593 (2.1)			19 ▲	577 (2.5)			6
2007	586 (1.9)				574 (1.9)				571 (2.0)			
Croatia												
2019	508 (2.2)	5	13 ▲		509 (2.3)	11 ▲	26 ▲		510 (2.8)	2	17 ▲	
2015	502 (1.9)		8 ▲		499 (1.9)		15 ▲		507 (2.1)		15 ▲	
[2] 2011	495 (1.9)				484 (2.0)				492 (2.9)			
Cyprus												
2019	530 (3.3)	11 ▲			536 (3.0)	8			526 (2.9)	8		
2015	519 (2.8)				529 (2.8)				519 (3.1)			
Czech Republic												
2019	528 (3.0)	9 ▲	26 ▲	57 ▲	531 (2.6)	3	20 ▲	38 ▲	541 (2.8)	-2	19 ▲	50 ▲
2015	519 (2.5)		17 ▲	48 ▲	528 (2.4)		16 ▲	35 ▲	544 (3.0)		21 ▲	52 ▲
2011	502 (2.4)			30 ▲	512 (2.8)			19 ▲	523 (2.5)			31 ▲
2007	472 (2.5)				493 (2.9)				491 (3.6)			
Denmark												
† 2019	524 (2.2)	-12 ▽	-8 ▽	10 ▲	520 (2.3)	-18 ▽	-19 ▽	-7	535 (2.2)	-13 ▽	-8 ▽	10 ▲
[2] † 2015	536 (3.3)		5	22 ▲	538 (2.8)		-1	11 ▲	548 (3.2)		5	22 ▲
[2] 2011	531 (2.7)			18 ▲	539 (2.9)			12 ▲	543 (2.7)			17 ▲
† 2007	514 (2.7)				527 (2.8)				525 (2.5)			
England												
[2] 2019	563 (3.3)	9	11 ▲	17 ▲	553 (3.3)	9	11 ▲	11 ▲	554 (3.4)	14 ▲	23 ▲	15 ▲
2015	554 (3.3)		2	8	544 (3.2)		2	3	540 (3.2)		9	1
2011	552 (4.3)			6	542 (3.7)			0	531 (3.8)			-8
2007	546 (3.6)				542 (3.3)				539 (3.4)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

◊ Trend reporting in cognitive domains using current methodology began with TIMSS 2007.
See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 1.18: Differences in Achievement for Mathematics Cognitive Domains Across Assessment Years◊

(Continued)

Country	Knowing				Applying				Reasoning			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
Finland												
2019	531 (2.4)	1	-17 ▽		531 (2.4)	-5	-13 ▽		535 (2.5)	-5	-10 ▽	
2015	530 (2.2)		-18 ▽		536 (2.1)		-8 ▽		540 (3.1)		-5	
2011	548 (2.6)				544 (2.6)				546 (2.3)			
France												
2019	488 (3.3)	3			482 (3.1)	-7			480 (3.3)	-11 ▽		
2015	484 (2.8)				488 (3.1)				491 (3.4)			
Georgia												
1 2019	473 (3.9)	8	24 ▲	28 ▲	490 (3.6)	29 ▲	42 ▲	59 ▲	469 (4.5)	17 ▲	19 ▲	36 ▲
1 2015	466 (4.0)		16 ▲	21 ▲	461 (4.1)		14 ▲	31 ▲	452 (4.4)		1	19 ▲
1 2011	449 (3.7)			4	447 (3.4)			17 ▲	450 (3.3)			18 ▲
1 2007	445 (4.4)				430 (4.7)				433 (4.7)			
Germany												
2019	523 (2.3)	0	0	9 ▲	514 (2.5)	-1	-14 ▽	-16 ▽	531 (2.8)	-4	-1	2
2015	524 (2.3)		0	9 ▲	515 (2.2)		-13 ▽	-15 ▽	535 (2.4)		3	5
2011	524 (2.4)			9 ▲	528 (2.3)			-2	532 (3.0)			2
2007	515 (2.1)				530 (2.3)				530 (2.9)			
Hong Kong SAR												
† 2019	600 (3.0)	-18 ▽	-19 ▽	-22 ▽	606 (3.3)	-14 ▽	9	0	596 (4.2)	-4	7	0
† 2015	618 (3.1)		-1	-4	621 (3.1)		23 ▲	14 ▲	600 (3.2)		11 ▲	4
2 2011	619 (3.4)			-3	597 (3.4)			-9	589 (3.3)			-7
2007	622 (3.8)				606 (3.8)				596 (3.8)			
Hungary												
2019	525 (2.6)	-8	5	14 ▲	521 (2.8)	-5	8	15 ▲	522 (3.0)	-7	8	12 ▲
2015	532 (3.1)		13 ▲	21 ▲	526 (3.3)		13 ▲	20 ▲	529 (3.6)		15 ▲	20 ▲
2011	519 (3.8)			8	513 (3.3)			7	514 (3.7)			5
2007	511 (3.8)				506 (3.8)				510 (4.3)			
Iran, Islamic Rep. of												
2019	436 (3.9)	7	1	32 ▲	450 (4.0)	15 ▲	22 ▲	52 ▲	426 (4.3)	0	4	26 ▲
2015	429 (3.2)		-6	25 ▲	435 (2.9)		7	38 ▲	426 (3.3)		4	26 ▲
2011	435 (4.0)			31 ▲	427 (3.7)			30 ▲	423 (3.2)			22 ▲
2007	404 (3.9)				397 (4.0)				401 (4.3)			
Ireland												
2019	550 (3.0)	-4	11 ▲		551 (2.7)	3	23 ▲		542 (2.5)	7	32 ▲	
2015	554 (2.9)		15 ▲		549 (2.2)		20 ▲		535 (2.7)		26 ▲	
2011	539 (3.1)				529 (2.7)				510 (3.1)			
Italy												
2019	515 (3.0)	4	5	3	517 (2.6)	13 ▲	11 ▲	18 ▲	504 (2.9)	1	-1	-7
2 2015	511 (2.9)		1	-1	504 (2.5)		-2	5	503 (3.3)		-3	-8
2011	510 (2.8)			-3	506 (2.8)			7	505 (3.2)			-5
2007	512 (3.5)				499 (3.1)				511 (3.4)			
Japan												
2019	597 (2.0)	-4	7 ▲	31 ▲	593 (2.0)	4	14 ▲	23 ▲	589 (2.2)	-6	-3	19 ▲
2015	601 (2.4)		11 ▲	35 ▲	589 (2.1)		10 ▲	19 ▲	595 (2.7)		3	26 ▲
2011	590 (1.7)			24 ▲	579 (1.6)			9 ▲	592 (1.9)			22 ▲
2007	567 (2.4)				570 (2.2)				569 (2.3)			
Kazakhstan												
2 2019	510 (2.3)		7		514 (2.7)		15 ▲		507 (2.7)		6	
2 2011	503 (4.7)				499 (5.0)				501 (4.7)			
Korea, Rep. of												
2019	612 (3.6)	-15 ▽	-2		594 (2.5)	-1	-6		596 (2.9)	-22 ▽	-6	
2015	627 (2.9)		13 ▲		595 (2.1)		-5		619 (2.5)		16 ▲	
2011	614 (2.0)				600 (2.2)				603 (2.3)			
Lithuania												
2 2019	535 (2.8)	3	10 ▲	16 ▲	547 (2.7)	10 ▲	7	7	534 (3.3)	-1	-3	5
2 2015	532 (2.5)		7	13 ▲	537 (2.7)		-4	-4	534 (2.8)		-2	6
1 2 2011	525 (2.9)			5	540 (2.4)			0	536 (2.5)			8 ▲
1 2007	520 (2.8)				540 (2.7)				529 (2.8)			
Malta												
2019	510 (1.4)		6 ▲		508 (1.2)		10 ▲		508 (1.4)		33 ▲	
2011	504 (1.5)				497 (1.9)				475 (1.7)			
Morocco												
2019	379 (4.4)	3	59 ▲		387 (4.5)	12 ▲	55 ▲		380 (5.2)	1	33 ▲	
2015	377 (3.7)		57 ▲		375 (3.6)		43 ▲		379 (3.6)		32 ▲	
✕ 2011	320 (4.3)				332 (3.9)				347 (4.2)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

✕ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 1.18: Differences in Achievement for Mathematics Cognitive Domains Across Assessment Years◊

(Continued)

Country	Knowing				Applying				Reasoning			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
Netherlands												
≡ 2019	534 (2.1)	14 ▲	-3	6	536 (2.2)	5	-4	-4	546 (2.9)	3	2	9 ▲
† 2015	521 (1.8)		-17 ▽	-8 ▽	531 (1.7)		-10 ▽	-10 ▽	543 (2.6)		0	6
† 2011	537 (2.0)			9 ▲	540 (1.7)			0	543 (2.7)			7
‡ 2007	528 (2.3)				540 (2.2)				537 (2.5)			
New Zealand												
2 2019	476 (2.7)	1	0	-8 ▽	487 (2.4)	-10 ▽	-2	-5	501 (2.7)	-2	11 ▲	0
2015	475 (2.6)		-1	-8 ▽	497 (2.5)		7 ▲	4	504 (2.7)		13 ▲	2
2011	476 (3.2)			-7	490 (2.4)			-3	490 (2.5)			-12 ▽
2007	484 (2.7)				493 (2.5)				502 (2.7)			
Northern Ireland												
† 2019	574 (3.3)	-7	-5		565 (2.8)	-11 ▽	0		558 (2.9)	9 ▲	20 ▲	
‡ 2015	582 (3.9)		2		575 (3.2)		11 ▲		550 (3.3)		12 ▲	
† 2011	580 (3.4)				565 (2.9)				538 (3.4)			
Norway (5)												
† 2019	541 (2.3)	-4			540 (2.3)	-10 ▽			551 (2.9)	-5		
2015	544 (3.1)				550 (2.6)				556 (2.9)			
Oman												
2019	424 (4.4)	2	44 ▲		434 (3.5)	6	52 ▲		424 (3.7)	5	34 ▲	
2015	422 (2.7)		43 ▲		428 (2.4)		46 ▲		420 (2.4)		29 ▲	
Ψ 2011	380 (3.2)				382 (2.9)				391 (2.7)			
Poland												
2019	509 (2.7)	-8 ▽			521 (2.8)	-20 ▽			527 (2.8)	-19 ▽		
2015	517 (2.4)				541 (2.1)				546 (2.3)			
Portugal												
2 2019	523 (2.8)	-24 ▽	-8		528 (2.6)	-12 ▽	-6		519 (2.9)	-12 ▽	-11 ▽	
2 2015	548 (2.6)		17 ▲		540 (2.4)		6		532 (2.3)		1	
2011	531 (3.3)				534 (3.7)				531 (3.7)			
Qatar												
2019	447 (3.6)	3	36 ▲		453 (3.4)	19 ▲	42 ▲		440 (3.5)	9	24 ▲	
2015	444 (3.4)		33 ▲		434 (3.5)		23 ▲		431 (4.4)		15 ▲	
2 2011	411 (3.7)				411 (3.4)				416 (4.4)			
Russian Federation												
2 2019	555 (3.0)	-2	14 ▲	16 ▲	571 (3.6)	4	31 ▲	22 ▲	573 (3.6)	3	25 ▲	29 ▲
2015	556 (3.4)		16 ▲	18 ▲	566 (3.7)		27 ▲	18 ▲	570 (4.0)		22 ▲	26 ▲
2011	541 (3.4)			2	539 (3.9)			-9	548 (3.4)			4
2007	539 (5.0)				549 (5.2)				544 (5.1)			
Serbia												
2 2019	504 (3.3)	-9	-16 ▽		509 (3.5)	-12 ▽	-2		503 (3.7)	-14 ▽	-11 ▽	
3 2015	513 (3.5)		-7		521 (3.4)		10 ▲		517 (3.8)		2	
2 2011	520 (3.0)				511 (3.2)				514 (3.9)			
Singapore												
3 2019	640 (3.9)	10	11 ▲	15 ▲	626 (3.9)	6	24 ▲	29 ▲	614 (4.0)	11	26 ▲	30 ▲
2 2015	631 (4.0)		2	5	619 (4.0)		17 ▲	23 ▲	603 (4.5)		15 ▲	19 ▲
2 2011	629 (3.6)			4	602 (3.4)			5	588 (3.7)			4
2007	625 (4.2)				597 (4.1)				584 (4.0)			
Slovak Republic												
2 2019	502 (3.3)	11 ▲	-5	10	508 (3.4)	11 ▲	3	12 ▲	522 (3.5)	6	11 ▲	23 ▲
2015	491 (2.4)		-16 ▽	-1	497 (2.5)		-9	1	515 (2.9)		5	17 ▲
2011	506 (3.7)			15 ▲	505 (3.9)			9	511 (3.8)			12 ▲
2007	491 (4.4)				496 (4.4)				499 (4.8)			
South Africa (5)												
2019	372 (3.7)	-5			375 (3.6)	-1			370 (3.8)	1		
2015	378 (3.6)				377 (3.4)				369 (3.5)			
Spain												
2019	499 (2.4)	-6	17 ▲		506 (1.9)	1	22 ▲		497 (2.0)	-5	14 ▲	
2 2015	505 (2.4)		23 ▲		505 (2.4)		22 ▲		502 (2.5)		19 ▲	
2011	482 (3.4)				483 (3.1)				483 (2.9)			
Sweden												
2019	515 (3.1)	15 ▲	26 ▲	32 ▲	518 (2.8)	-3	10 ▲	12 ▲	536 (2.9)	-6	16 ▲	16 ▲
2 2015	501 (3.4)		12 ▲	18 ▲	521 (2.7)		14 ▲	16 ▲	542 (3.3)		22 ▲	22 ▲
2011	489 (2.2)			6	507 (2.2)			2	520 (2.9)			0
2007	483 (2.6)				506 (2.4)				519 (2.8)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 1.18: Differences in Achievement for Mathematics Cognitive Domains Across Assessment Years◊

(Continued)

Country	Knowing				Applying				Reasoning			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
United Arab Emirates												
2019	479 (1.6)	26 ▲	42 ▲		484 (1.7)	32 ▲	54 ▲		474 (1.7)	29 ▲	41 ▲	
2015	453 (2.7)		16 ▲		452 (2.5)		22 ▲		445 (2.4)		11 ▲	
2011	437 (2.2)				430 (2.0)				434 (2.3)			
United States												
2† 2019	536 (2.6)	-11 ▽	-19 ▽	-5	537 (2.6)	0	-1	13 ▲	524 (2.5)	-7	-2	-1
2† 2015	547 (2.3)		-8 ▽	6	537 (2.4)		-2	13 ▲	531 (2.5)		5	6
2 2011	556 (2.1)			14 ▲	539 (2.1)			15 ▲	525 (2.1)			1
2† 2007	541 (2.8)				524 (2.8)				525 (2.4)			
Benchmarking Participants												
Ontario, Canada												
2 2019	504 (3.7)	-1	-6	6	514 (3.4)	1	-7	0	516 (3.5)	-9 ▽	-6	-11 ▽
2015	505 (2.5)		-5	7	513 (2.3)		-8	0	524 (2.6)		3	-2
2011	510 (3.4)			11 ▲	521 (3.4)			8	522 (3.1)			-5
2 2007	498 (3.5)				513 (3.3)				526 (3.1)			
Quebec, Canada												
2019	535 (2.7)	-7	-1	16 ▲	533 (2.3)	1	4	17 ▲	524 (2.8)	-13 ▽	-10 ▽	1
≡ 2015	542 (4.3)		6	23 ▲	533 (4.1)		3	17 ▲	536 (4.9)		2	14 ▲
2011	536 (2.4)			18 ▲	529 (2.4)			13 ▲	534 (2.5)			12 ▲
2 2007	519 (3.3)				516 (3.1)				523 (3.2)			
Abu Dhabi, UAE												
2019	439 (2.0)	21 ▲	21 ▲		442 (2.0)	20 ▲	29 ▲		435 (2.4)	21 ▲	16 ▲	
2 Ψ 2015	418 (5.1)		0		422 (4.8)		9		414 (4.4)		-5	
2011	418 (4.9)				413 (4.7)				418 (4.5)			
Dubai, UAE												
2 2019	542 (1.8)	29 ▲	71 ▲	88 ▲	547 (1.6)	37 ▲	82 ▲	111 ▲	538 (1.8)	31 ▲	74 ▲	97 ▲
2015	514 (2.0)		42 ▲	60 ▲	510 (1.8)		45 ▲	74 ▲	507 (1.7)		44 ▲	66 ▲
2011	472 (2.4)			18 ▲	465 (2.3)			29 ▲	464 (2.2)			23 ▲
‡ 2007	454 (2.5)				436 (2.2)				441 (3.0)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Average Achievement in Cognitive Domains by Gender

Exhibit 1.19 shows the differences between girls' and boys' average achievement in the cognitive domains of knowing, applying, and reasoning. Reflecting the higher average achievement overall for boys in 27 of the 56 TIMSS 2019 countries for which cognitive domain scores were estimated, boys also had higher average achievement than girls in many countries in the cognitive domains—31 countries in the knowing domain, 15 in the applying domain, and 28 in the reasoning domain. Girls had higher average achievement than boys in all three domains in the same 3 countries—Oman, the Philippines and South Africa (fifth grade).

Exhibit 1.19: Average Achievement in Mathematics Cognitive Domains by Gender

Country	Knowing (59 Items)		Applying (74 Items)		Reasoning (38 Items)	
	Girls	Boys	Girls	Boys	Girls	Boys
Albania	491 (4.2)	493 (4.3)	497 (3.6)	498 (3.8)	487 (3.9)	493 (4.6)
Armenia	497 (3.1)	497 (3.1)	504 (3.0)	499 (3.6)	483 (3.8)	483 (3.4)
Australia	499 (3.4)	519 (4.0) ▲	513 (2.9)	519 (3.5)	517 (3.2)	528 (3.8) ▲
Austria	534 (2.7)	546 (2.3) ▲	536 (2.9)	540 (2.2)	531 (2.9)	543 (3.2) ▲
Azerbaijan	513 (2.9)	513 (3.0)	523 (3.8)	516 (3.6)	507 (3.4)	505 (3.7)
Bahrain	481 (3.3)	474 (3.6)	482 (3.3)	477 (3.6)	482 (3.7)	476 (3.3)
† Belgium (Flemish)	539 (2.7)	554 (2.9) ▲	523 (2.2)	530 (2.6) ▲	524 (2.2)	537 (2.6) ▲
Bosnia and Herzegovina	441 (2.8)	447 (3.5)	447 (3.2)	457 (3.1) ▲	457 (3.9)	466 (3.2) ▲
Bulgaria	509 (4.8)	513 (4.2)	518 (5.2)	519 (4.6)	505 (5.7)	514 (5.3)
1 2 Canada	495 (2.8)	517 (2.3) ▲	505 (2.6)	520 (2.0) ▲	503 (3.0)	523 (2.1) ▲
Chile	420 (3.2)	434 (3.3) ▲	444 (3.6)	447 (3.3)	442 (5.0)	453 (4.3) ▲
Chinese Taipei	619 (2.1)	624 (2.6)	599 (1.9)	601 (2.0)	570 (2.4)	581 (2.9) ▲
Croatia	501 (3.1)	514 (2.5) ▲	504 (2.8)	514 (2.9) ▲	503 (3.6)	516 (3.9) ▲
Cyprus	518 (3.8)	542 (4.2) ▲	530 (3.4)	544 (3.9) ▲	515 (3.0)	539 (3.8) ▲
Czech Republic	520 (3.0)	536 (3.9) ▲	528 (2.8)	535 (3.2) ▲	535 (3.0)	548 (3.6) ▲
† Denmark	517 (3.0)	531 (2.8) ▲	518 (2.9)	522 (2.8)	532 (2.5)	538 (3.0)
2 England	555 (4.4)	570 (3.6) ▲	552 (4.1)	555 (3.4)	550 (5.0)	558 (3.3)
Finland	528 (3.1)	534 (3.0)	532 (3.1)	530 (2.8)	533 (3.1)	538 (3.2)
France	477 (3.7)	497 (3.9) ▲	478 (3.6)	485 (3.5)	472 (3.3)	489 (4.2) ▲
† Georgia	468 (4.5)	479 (4.4) ▲	488 (4.0)	491 (4.1)	463 (4.5)	475 (5.2) ▲
Germany	515 (3.4)	531 (2.8) ▲	510 (3.0)	518 (2.7) ▲	526 (3.8)	537 (2.7) ▲
† Hong Kong SAR	594 (3.7)	605 (3.6) ▲	604 (4.1)	608 (3.8)	590 (4.3)	601 (5.3) ▲
Hungary	519 (3.1)	530 (2.9) ▲	516 (3.4)	526 (3.2) ▲	513 (3.5)	530 (3.7) ▲
Iran, Islamic Rep. of	433 (6.6)	440 (5.4)	447 (6.7)	452 (5.5)	421 (6.5)	432 (5.8)
Ireland	546 (4.1)	554 (3.4)	548 (3.4)	554 (3.0)	538 (3.4)	546 (3.3)
Italy	508 (3.3)	522 (3.7) ▲	511 (2.9)	523 (3.3) ▲	494 (3.5)	514 (3.5) ▲
Japan	597 (2.4)	598 (2.6)	594 (2.8)	591 (2.0)	588 (3.0)	590 (2.5)
2 Kazakhstan	508 (3.1)	511 (3.0)	515 (3.5)	513 (3.1)	507 (3.1)	508 (3.4)
Korea, Rep. of	608 (4.8)	616 (4.3)	594 (2.7)	595 (2.9)	591 (3.1)	601 (3.5) ▲
2 Kosovo	440 (3.8)	449 (3.8) ▲	443 (3.6)	448 (3.6)	441 (4.2)	441 (3.5)
Kuwait	- -	- -	- -	- -	- -	- -
2 Latvia	533 (2.9)	541 (3.1) ▲	546 (3.0)	547 (3.2)	550 (3.8)	559 (3.4) ▲
2 Lithuania	532 (3.2)	538 (3.6)	546 (3.0)	547 (3.7)	529 (3.5)	538 (4.7)
Malta	504 (2.0)	515 (3.0) ▲	504 (1.8)	511 (2.0) ▲	507 (2.5)	509 (2.4)
Montenegro	443 (3.7)	446 (2.4)	453 (2.7)	455 (2.5)	461 (3.4)	465 (3.0)
Morocco	381 (4.9)	377 (4.6)	387 (4.8)	387 (4.7)	382 (5.3)	378 (5.7)
≡ Netherlands	527 (3.3)	541 (3.7) ▲	533 (2.2)	539 (3.1)	541 (3.6)	550 (3.5) ▲
2 New Zealand	469 (4.3)	482 (3.6) ▲	487 (3.7)	488 (3.1)	499 (3.5)	503 (3.5)
North Macedonia	468 (6.5)	472 (5.8)	479 (6.5)	475 (5.2)	470 (6.3)	470 (5.9)
† Northern Ireland	570 (4.0)	579 (4.2)	565 (3.4)	564 (3.7)	556 (3.2)	561 (3.9)
† Norway (5)	535 (2.7)	546 (3.4) ▲	539 (2.8)	540 (3.1)	551 (4.0)	551 (3.9)
Oman	431 (4.4) ▲	417 (5.3)	442 (3.7) ▲	426 (4.2)	431 (3.6) ▲	418 (4.7)
2 Ψ Pakistan	338 (17.0)	318 (12.5)	318 (18.0)	297 (13.2)	354 (13.5)	354 (10.6)
2 Ψ Philippines	320 (6.6) ▲	285 (6.4)	303 (7.7) ▲	271 (6.6)	289 (7.6) ▲	256 (6.3)
Poland	500 (3.3)	518 (2.9) ▲	521 (3.3)	522 (3.0)	523 (3.5)	531 (3.4)
2 Portugal	512 (3.2)	533 (3.7) ▲	520 (3.3)	535 (2.9) ▲	513 (3.3)	525 (3.5) ▲
Qatar	445 (5.7)	450 (3.7)	456 (4.7)	451 (3.8)	438 (5.2)	442 (3.4)
2 Russian Federation	550 (3.2)	559 (3.3) ▲	567 (3.7)	574 (3.9) ▲	568 (4.3)	578 (4.1) ▲
2 Saudi Arabia	- -	- -	- -	- -	- -	- -
2 Serbia	504 (3.5)	505 (4.4)	510 (3.8)	508 (4.3)	501 (5.0)	505 (4.9)
3 Singapore	634 (4.2)	646 (4.4) ▲	623 (4.0)	628 (4.2)	609 (4.2)	619 (4.4) ▲
2 Slovak Republic	493 (3.4)	510 (4.0) ▲	504 (3.7)	512 (4.1) ▲	512 (4.3)	531 (4.2) ▲
South Africa (5)	384 (4.0) ▲	361 (3.9)	385 (3.9) ▲	366 (4.1)	380 (4.8) ▲	361 (3.6)
Spain	490 (3.3)	508 (2.8) ▲	498 (2.3)	512 (2.5) ▲	485 (2.5)	507 (2.9) ▲
Sweden	510 (3.3)	521 (3.8) ▲	515 (3.5)	521 (3.2)	532 (3.5)	539 (3.2) ▲
2 Turkey (5)	512 (4.5)	517 (5.6)	532 (4.6)	530 (5.9)	503 (4.8)	516 (6.9) ▲
United Arab Emirates	475 (2.5)	484 (2.2) ▲	482 (2.6)	487 (2.3)	469 (2.7)	480 (2.2) ▲
2 † United States	528 (3.0)	544 (3.0) ▲	534 (3.0)	541 (2.9) ▲	516 (3.3)	531 (2.8) ▲
International Average	**500 (0.6)**	**507 (0.5)** ▲	**505 (0.6)**	**506 (0.5)** ▲	**500 (0.6)**	**507 (0.6)** ▲
Benchmarking Participants						
2 Ontario, Canada	493 (5.6)	514 (3.4) ▲	506 (4.9)	521 (3.3) ▲	505 (5.4)	526 (3.5) ▲
Quebec, Canada	525 (3.1)	545 (3.0) ▲	526 (2.9)	540 (2.7) ▲	514 (3.8)	533 (2.7) ▲
Moscow City, Russian Fed.	572 (2.2)	581 (3.2) ▲	595 (2.8)	602 (2.8) ▲	596 (3.2)	607 (3.9) ▲
Madrid, Spain	505 (4.1)	524 (4.2) ▲	513 (2.6)	528 (3.0) ▲	503 (3.3)	525 (3.4) ▲
Abu Dhabi, UAE	436 (2.9)	442 (3.0)	441 (2.7)	443 (3.1)	431 (3.1)	438 (3.3)
2 Dubai, UAE	537 (3.6)	547 (2.1) ▲	544 (3.4)	550 (2.2)	533 (3.5)	543 (2.3) ▲

▲ Average significantly higher than other gender

Numbers of items are based on the TIMSS 2019 fourth grade mathematics eAssessment items included in scaling.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available because average achievement could not be accurately estimated.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Science Grade 4

Average Science Achievement

Average Achievement and Scale Score Distributions

The TIMSS 2019 fourth grade science assessment was based on a comprehensive assessment framework developed collaboratively with the participating countries to reflect their curricular goals. The fourth grade science assessment included three content areas—life science, physical science, and Earth science. In accordance with the framework, the majority of the TIMSS 2019 science items assessed students' applying and reasoning skills. To cover the framework at the fourth grade, the TIMSS 2019 science assessment comprised 175 assessment items. This cycle marked the beginning of the transition to a computer-based assessment system. More than half of the TIMSS 2019 countries administered the assessment in an "e" (electronic) format and almost half administered the assessment in a paper format, as in TIMSS 2015. The "e" countries also administered the trend items in the paper format to provide a bridge to the TIMSS 2015 and TIMSS 2019 paper-based assessments. The assessment was carefully designed and analyzed, so that the TIMSS 2019 science achievement results for all 58 countries are reported on the same TIMSS fourth grade science scale.

Exhibit 2.1 presents the average achievement at the fourth grade for each participating country (from highest to lowest) together with the scale score distribution underlying the scale score average. Exhibit 2.2 shows whether relatively small differences in average achievement between one country and the next are statistically significant.

Singapore and Korea performed similarly and had higher average achievement than all of the other countries, followed by the Russian Federation and Japan, whose students had similar achievement. However, the Russian Federation's performance was higher than all the remaining countries, while Japan performed higher than all the remaining countries except Chinese Taipei. Next, fourth grade students in Chinese Taipei performed similarly to students in Japan and Finland and had higher achievement than students in all of the other countries except the four top performing countries and Finland. In turn, Finland performed similarly to Chinese Taipei and had higher achievement than all of the other remaining countries. Latvia, Norway (fifth grade), the United States, Lithuania, Sweden, and England also performed very well. Essentially, Exhibit 2.2 shows clusters of several similarly performing countries, followed by the next highest achieving clusters of similarly performing countries, and so on.

A number of fourth grade TIMSS 2019 participants performed well. Thirty-two countries (including those discussed above) had higher average achievement than the centerpoint of 500 (Exhibit 2.1), which is a point of reference on the TIMSS fourth grade science scale that remains constant from TIMSS assessment to TIMSS assessment. However, although there was little difference between countries from one to the next, there was a considerable difference between the highest

Exhibit 2.1: Average Science Achievement and Scale Score Distributions

Country	Average Scale Score	
[3] Singapore	595 (3.4)	▲
Korea, Rep. of	588 (2.1)	▲
[2] Russian Federation	567 (3.0)	▲
Japan	562 (1.8)	▲
Chinese Taipei	558 (1.8)	▲
Finland	555 (2.6)	▲
[2] Latvia	542 (2.4)	▲
† Norway (5)	539 (2.2)	▲
[2] † United States	539 (2.7)	▲
[2] Lithuania	538 (2.5)	▲
Sweden	537 (3.3)	▲
[2] England	537 (2.7)	▲
Czech Republic	534 (2.6)	▲
Australia	533 (2.4)	▲
† Hong Kong SAR	531 (3.3)	▲
Poland	531 (2.6)	▲
Hungary	529 (2.7)	▲
Ireland	528 (3.2)	▲
[2] Turkey (5)	526 (4.2)	▲
Croatia	524 (2.2)	▲
[1 2] Canada	523 (1.9)	▲
† Denmark	522 (2.4)	▲
Austria	522 (2.6)	▲
Bulgaria	521 (4.9)	▲
[2] Slovak Republic	521 (3.7)	▲
† Northern Ireland	518 (2.3)	▲
≡ Netherlands	518 (2.9)	▲
Germany	518 (2.2)	▲
[2] Serbia	517 (3.5)	▲
Cyprus	511 (3.0)	▲
Spain	511 (2.0)	▲
Italy	510 (3.0)	▲
[2] Portugal	504 (2.6)	
[2] New Zealand	503 (2.3)	
† Belgium (Flemish)	501 (2.1)	
TIMSS Scale Centerpoint	**500**	
Malta	496 (1.3)	▽
[2] Kazakhstan	494 (3.1)	
Bahrain	493 (3.4)	▽
Albania	489 (3.5)	▽
France	488 (3.0)	▽
United Arab Emirates	473 (2.1)	▽
Chile	469 (2.6)	▽
Armenia	466 (3.4)	▽
Bosnia and Herzegovina	459 (2.9)	▽
[1] Georgia	454 (3.9)	▽
Montenegro	453 (2.5)	▽
Qatar	449 (3.9)	▽
Iran, Islamic Rep. of	441 (4.1)	▽
Oman	435 (4.1)	▽
Azerbaijan	427 (3.3)	▽
North Macedonia	426 (6.2)	▽
[2] Kosovo	413 (3.7)	▽
[2] Saudi Arabia	402 (4.1)	▽
Kuwait	392 (6.1)	▽
Ψ Morocco	374 (5.8)	▽
Ж South Africa (5)	324 (4.9)	▽
[2 Ж] Pakistan	290 (13.4)	▽
[2 Ж] Philippines	249 (7.5)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	595 (2.2)	▲
[2] Dubai, UAE	545 (1.7)	▲
[2] Ontario, Canada	524 (3.2)	▲
Madrid, Spain	523 (2.0)	▲
Quebec, Canada	522 (2.5)	▲
Abu Dhabi, UAE	418 (2.8)	▽

The TIMSS achievement scale was established in 1995 based on the combined achievement distribution of all countries that participated in TIMSS 1995. To provide a point of reference for country comparisons, the scale centerpoint of 500 was located at the mean of the combined achievement distribution. The units of the scale were chosen so that 100 scale score points corresponded to the standard deviation of the distribution.

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.2: Significance of Differences Between Countries' Average Science Achievement

Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly higher (▲) than that of the comparison country, significantly lower (▽), or if there is no statistically significant difference.

Country	Average Scale Score	Singapore	Korea, Rep. of	Russian Federation	Japan	Chinese Taipei	Finland	Latvia	Norway (5)	United States	Lithuania	Sweden	England	Czech Republic	Australia	Hong Kong SAR	Poland	Hungary	Ireland	Turkey (5)	Croatia	Canada	Denmark	Austria	Bulgaria	Slovak Republic	Northern Ireland	Netherlands	Germany	Serbia	Cyprus	Spain	Italy	Portugal	New Zealand
Singapore	595 (3.4)			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Korea, Rep. of	588 (2.1)			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Russian Federation	567 (3.0)	▽	▽			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Japan	562 (1.8)	▽	▽				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Chinese Taipei	558 (1.8)	▽	▽	▽				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Finland	555 (2.6)	▽	▽	▽	▽			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Latvia	542 (2.4)	▽	▽	▽	▽	▽	▽							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Norway (5)	539 (2.2)	▽	▽	▽	▽	▽	▽								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
United States	539 (2.7)	▽	▽	▽	▽	▽	▽										▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Lithuania	538 (2.5)	▽	▽	▽	▽	▽	▽										▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Sweden	537 (3.3)	▽	▽	▽	▽	▽	▽												▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
England	537 (2.7)	▽	▽	▽	▽	▽	▽											▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Czech Republic	534 (2.6)	▽	▽	▽	▽	▽	▽	▽													▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Australia	533 (2.4)	▽	▽	▽	▽	▽	▽	▽	▽												▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hong Kong SAR	531 (3.3)	▽	▽	▽	▽	▽	▽	▽	▽													▲	▲	▲		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Poland	531 (2.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽										▲	▲	▲	▲		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hungary	529 (2.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		▽									▲	▲	▲			▲	▲	▲	▲	▲	▲	▲	▲	▲
Ireland	528 (3.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽														▲	▲	▲	▲	▲	▲	▲	▲	▲
Turkey (5)	526 (4.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽																		▲	▲	▲	▲	▲
Croatia	524 (2.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		▽														▲	▲	▲	▲	▲
Canada	523 (1.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽													▲	▲	▲	▲	▲
Denmark	522 (2.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽													▲	▲	▲	▲	▲
Austria	522 (2.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽													▲	▲	▲	▲	▲
Bulgaria	521 (4.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽																		▲	▲	▲
Slovak Republic	521 (3.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽															▲	▲	▲	▲
Northern Ireland	518 (2.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽													▲	▲	▲	▲
Netherlands	518 (2.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽													▲	▲	▲	▲
Germany	518 (2.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽													▲	▲	▲	▲
Serbia	517 (3.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽															▲	▲
Cyprus	511 (3.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽										▲
Spain	511 (2.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		▽	▽	▽	▽				▲	▲
Italy	510 (3.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽						
Portugal	504 (2.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		▽			
New Zealand	503 (2.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽			
Belgium (Flemish)	501 (2.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		
Malta	496 (1.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Kazakhstan	494 (3.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Bahrain	493 (3.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Albania	489 (3.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
France	488 (3.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
United Arab Emirates	473 (2.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Chile	469 (2.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Armenia	466 (3.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Bosnia and Herzegovina	459 (2.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Georgia	454 (3.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Montenegro	453 (2.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Qatar	449 (3.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Iran, Islamic Rep. of	441 (4.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Oman	435 (4.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Azerbaijan	427 (3.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
North Macedonia	426 (6.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Kosovo	413 (3.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Saudi Arabia	402 (4.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Kuwait	392 (6.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Morocco	374 (5.8)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
South Africa (5)	324 (4.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Pakistan	290 (13.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Philippines	249 (7.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Benchmarking Participants																																			
Moscow City, Russian Fed.	595 (2.2)		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Dubai, UAE	545 (1.7)	▽	▽	▽	▽	▽	▽				▲		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ontario, Canada	524 (3.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽																▲	▲	▲	▲	▲
Madrid, Spain	523 (2.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽													▲	▲	▲	▲	▲
Quebec, Canada	522 (2.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽													▲	▲	▲	▲	▲
Abu Dhabi, UAE	418 (2.8)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽

▲ Average achievement significantly higher than comparison country
▽ Average achievement significantly lower than comparison country

Significance tests were not adjusted for multiple comparisons. Five percent of the comparisons would be statistically significant by chance alone.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.2: Significance of Differences Between Countries' Average Science Achievement

(Continued)

Country	Average Scale Score	Belgium (Flemish)	Malta	Kazakhstan	Bahrain	Albania	France	United Arab Emirates	Chile	Armenia	Bosnia and Herzegovina	Georgia	Montenegro	Qatar	Iran, Islamic Rep. of	Oman	Azerbaijan	North Macedonia	Kosovo	Saudi Arabia	Kuwait	Morocco	South Africa (5)	Pakistan	Philippines
Singapore	595 (3.4)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Korea, Rep. of	588 (2.1)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Russian Federation	567 (3.0)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Japan	562 (1.8)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Chinese Taipei	558 (1.8)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Finland	555 (2.6)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Latvia	542 (2.4)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Norway (5)	539 (2.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
United States	539 (2.7)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Lithuania	538 (2.5)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Sweden	537 (3.3)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
England	537 (2.7)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Czech Republic	534 (2.6)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Australia	533 (2.4)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hong Kong SAR	531 (3.3)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Poland	531 (2.6)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hungary	529 (2.7)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ireland	528 (3.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Turkey (5)	526 (4.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Croatia	524 (2.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Canada	523 (1.9)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Denmark	522 (2.4)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Austria	522 (2.6)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Bulgaria	521 (4.9)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Slovak Republic	521 (3.7)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Northern Ireland	518 (2.3)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Netherlands	518 (2.9)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Germany	518 (2.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Serbia	517 (3.5)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Cyprus	511 (3.0)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Spain	511 (2.0)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Italy	510 (3.0)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Portugal	504 (2.6)		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
New Zealand	503 (2.3)		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Belgium (Flemish)	501 (2.1)		▲		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Malta	496 (1.3)	▽					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Kazakhstan	494 (3.1)							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Bahrain	493 (3.4)	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Albania	489 (3.5)	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
France	488 (3.0)	▽	▽					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
United Arab Emirates	473 (2.1)	▽	▽	▽	▽	▽	▽				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Chile	469 (2.6)	▽	▽	▽	▽	▽	▽				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Armenia	466 (3.4)	▽	▽	▽	▽	▽	▽					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Bosnia and Herzegovina	459 (2.9)	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Georgia	454 (3.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Montenegro	453 (2.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Qatar	449 (3.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Iran, Islamic Rep. of	441 (4.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				▲	▲	▲	▲	▲	▲	▲	▲	▲
Oman	435 (4.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				▲	▲	▲	▲	▲	▲	▲	▲
Azerbaijan	427 (3.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽			▲	▲	▲	▲	▲	▲	▲	▲
North Macedonia	426 (6.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				▲	▲	▲	▲	▲	▲	
Kosovo	413 (3.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽			▲	▲	▲	▲	▲	▲
Saudi Arabia	402 (4.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽			▲	▲	▲	▲
Kuwait	392 (6.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽			▲	▲	▲	▲
Morocco	374 (5.8)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		▲	▲	▲
South Africa (5)	324 (4.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		▲	▲
Pakistan	290 (13.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		▲
Philippines	249 (7.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	
Benchmarking Participants																									
Moscow City, Russian Fed.	595 (2.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Dubai, UAE	545 (1.7)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ontario, Canada	524 (3.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Madrid, Spain	523 (2.0)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Quebec, Canada	522 (2.5)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Abu Dhabi, UAE	418 (2.8)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽			▲	▲	▲	▲	▲	▲

Benchmarking Participants	Moscow City, Russian Fed.	Dubai, UAE	Ontario, Canada	Madrid, Spain	Quebec, Canada	Abu Dhabi, UAE
Singapore		▲	▲	▲	▲	▲
Korea, Rep. of	▽	▲	▲	▲	▲	▲
Russian Federation	▽	▲	▲	▲	▲	▲
Japan	▽	▲	▲	▲	▲	▲
Chinese Taipei	▽	▲	▲	▲	▲	▲
Finland	▽	▲	▲	▲	▲	▲
Latvia	▽		▲	▲	▲	▲
Norway (5)	▽		▲	▲	▲	▲
United States	▽		▲	▲	▲	▲
Lithuania	▽	▽	▲	▲	▲	▲
Sweden	▽		▲	▲	▲	▲
England	▽	▽	▲	▲	▲	▲
Czech Republic	▽	▽	▲	▲	▲	▲
Australia	▽	▽	▲	▲	▲	▲
Hong Kong SAR	▽	▽		▲	▲	▲
Poland	▽	▽		▲	▲	▲
Hungary	▽	▽		▲	▲	▲
Ireland	▽	▽				▲
Turkey (5)	▽	▽				▲
Croatia	▽	▽				▲
Canada	▽	▽				▲
Denmark	▽	▽				▲
Austria	▽	▽				▲
Bulgaria	▽	▽				▲
Slovak Republic	▽	▽				▲
Northern Ireland	▽	▽				▲
Netherlands	▽	▽				▲
Germany	▽	▽				▲
Serbia	▽	▽				▲
Cyprus	▽	▽	▽	▽	▽	▲
Spain	▽	▽	▽	▽	▽	▲
Italy	▽	▽	▽	▽	▽	▲
Portugal	▽	▽	▽	▽	▽	▲
New Zealand	▽	▽	▽	▽	▽	▲
Belgium (Flemish)	▽	▽	▽	▽	▽	▲
Malta	▽	▽	▽	▽	▽	▲
Kazakhstan	▽	▽	▽	▽	▽	▲
Bahrain	▽	▽	▽	▽	▽	▲
Albania	▽	▽	▽	▽	▽	▲
France	▽	▽	▽	▽	▽	▲
United Arab Emirates	▽	▽	▽	▽	▽	▲
Chile	▽	▽	▽	▽	▽	▲
Armenia	▽	▽	▽	▽	▽	▲
Bosnia and Herzegovina	▽	▽	▽	▽	▽	▲
Georgia	▽	▽	▽	▽	▽	▲
Montenegro	▽	▽	▽	▽	▽	▲
Qatar	▽	▽	▽	▽	▽	▲
Iran, Islamic Rep. of	▽	▽	▽	▽	▽	▲
Oman	▽	▽	▽	▽	▽	▲
Azerbaijan	▽	▽	▽	▽	▽	▲
North Macedonia	▽	▽	▽	▽	▽	
Kosovo	▽	▽	▽	▽	▽	
Saudi Arabia	▽	▽	▽	▽	▽	▽
Kuwait	▽	▽	▽	▽	▽	▽
Morocco	▽	▽	▽	▽	▽	▽
South Africa (5)	▽	▽	▽	▽	▽	▽
Pakistan	▽	▽	▽	▽	▽	▽
Philippines	▽	▽	▽	▽	▽	▽
Benchmarking Participants						
Moscow City, Russian Fed.		▲	▲	▲	▲	▲
Dubai, UAE	▽		▲	▲	▲	▲
Ontario, Canada	▽	▽				▲
Madrid, Spain	▽	▽				▲
Quebec, Canada	▽	▽				▲
Abu Dhabi, UAE	▽	▽	▽	▽	▽	

▲ Average achievement significantly higher than comparison country
▽ Average achievement significantly lower than comparison country

Significance tests were not adjusted for multiple comparisons. Five percent of the comparisons would be statistically significant by chance alone.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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average achievement and the lowest. Also, the scale score distributions show that there is wide variation in achievement in every country. Every country has some higher achieving and some lower achieving students.

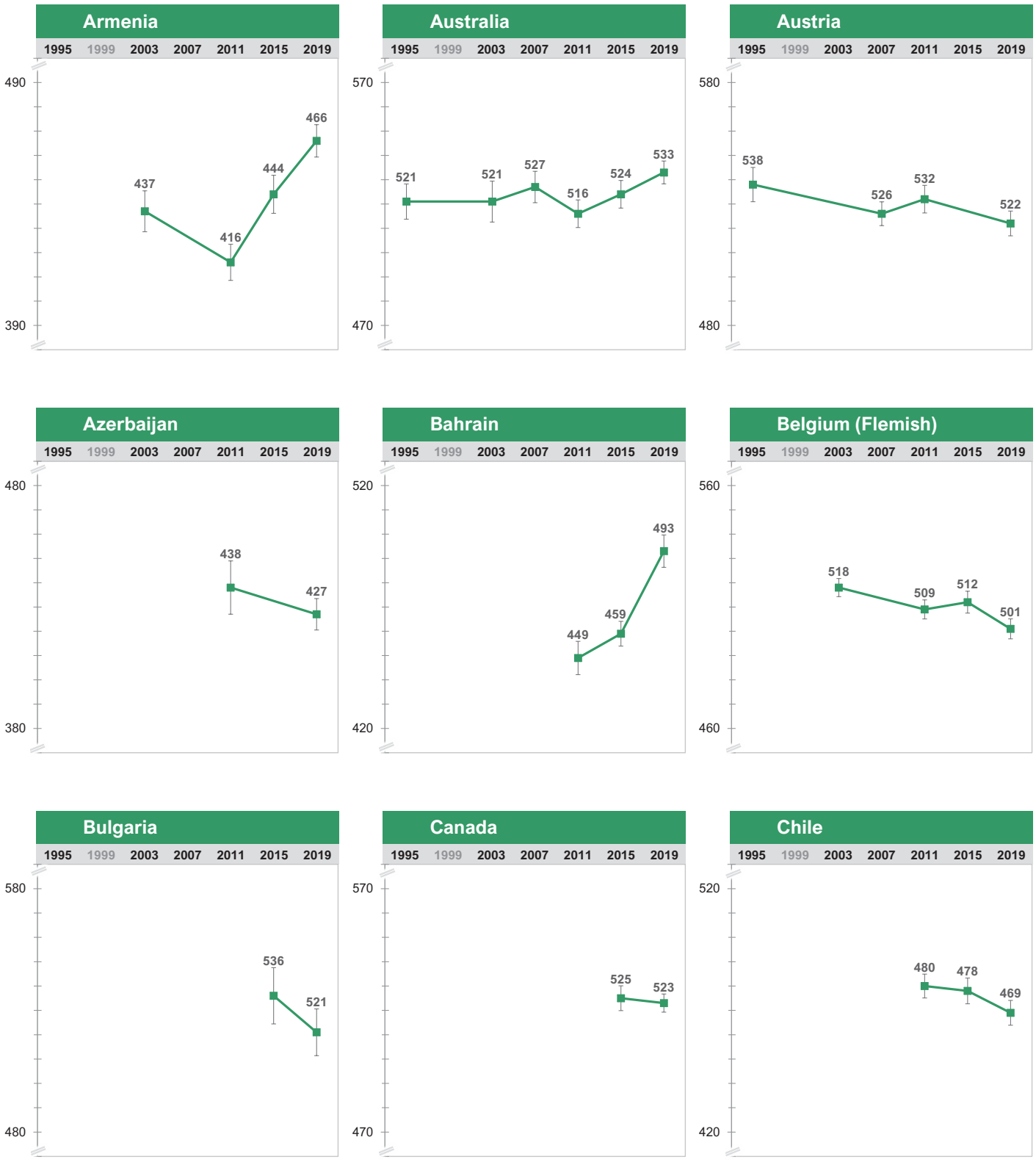
Trends in Average Achievement

Exhibit 2.3 graphs the differences in average science achievement between the assessments for TIMSS 2019 countries that have comparable data from previous assessments, while Exhibit 2.4 provides more detailed results. The countries are presented in alphabetical order in both exhibits. The trends in science achievement at the fourth grade signal more improvements than downturns across the assessment cycles internationally. However, since the inception of TIMSS in 1995, most countries have had some periods of increases and some of decreases in average achievement, as well as periods of stability.

Most recently, for the 44 countries that participated in both TIMSS 2015 and 2019, 10 had increases in average achievement and 10 had declines, but the majority stayed the same. As a midway point, 21 countries participated in both TIMSS 2007 and 2019, with 6 showing increases and 3 declines. For the 16 countries that participated in both 1995 and 2019, most showed improvement—11 with higher average achievement in 2019 and only 2 with lower average achievement.

Exhibit 2.3: Trend Plots of Average Science Achievement Across Assessment Years◊

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 2.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



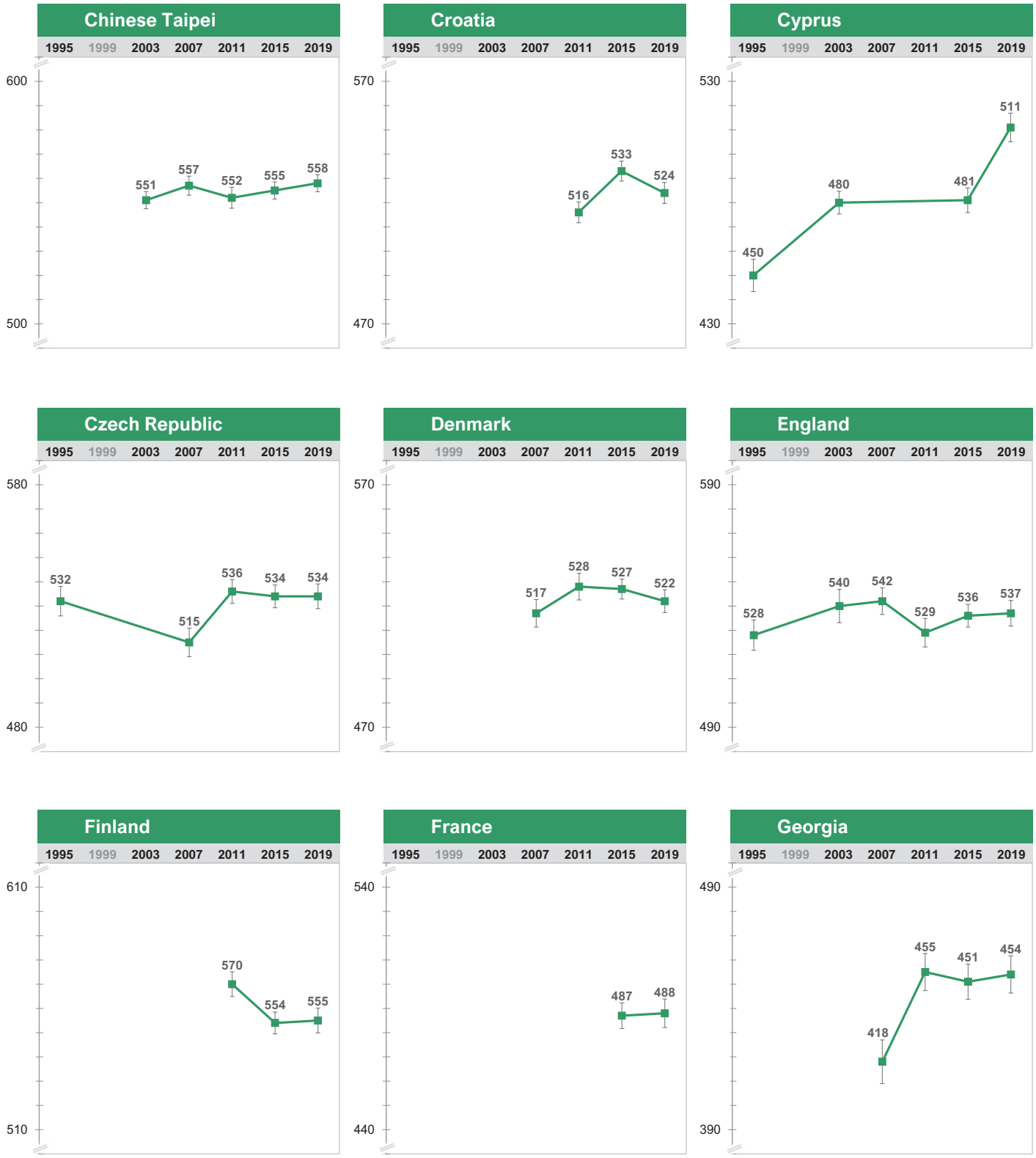
◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.3: Trend Plots of Average Science Achievement Across Assessment Years◊

(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 2.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



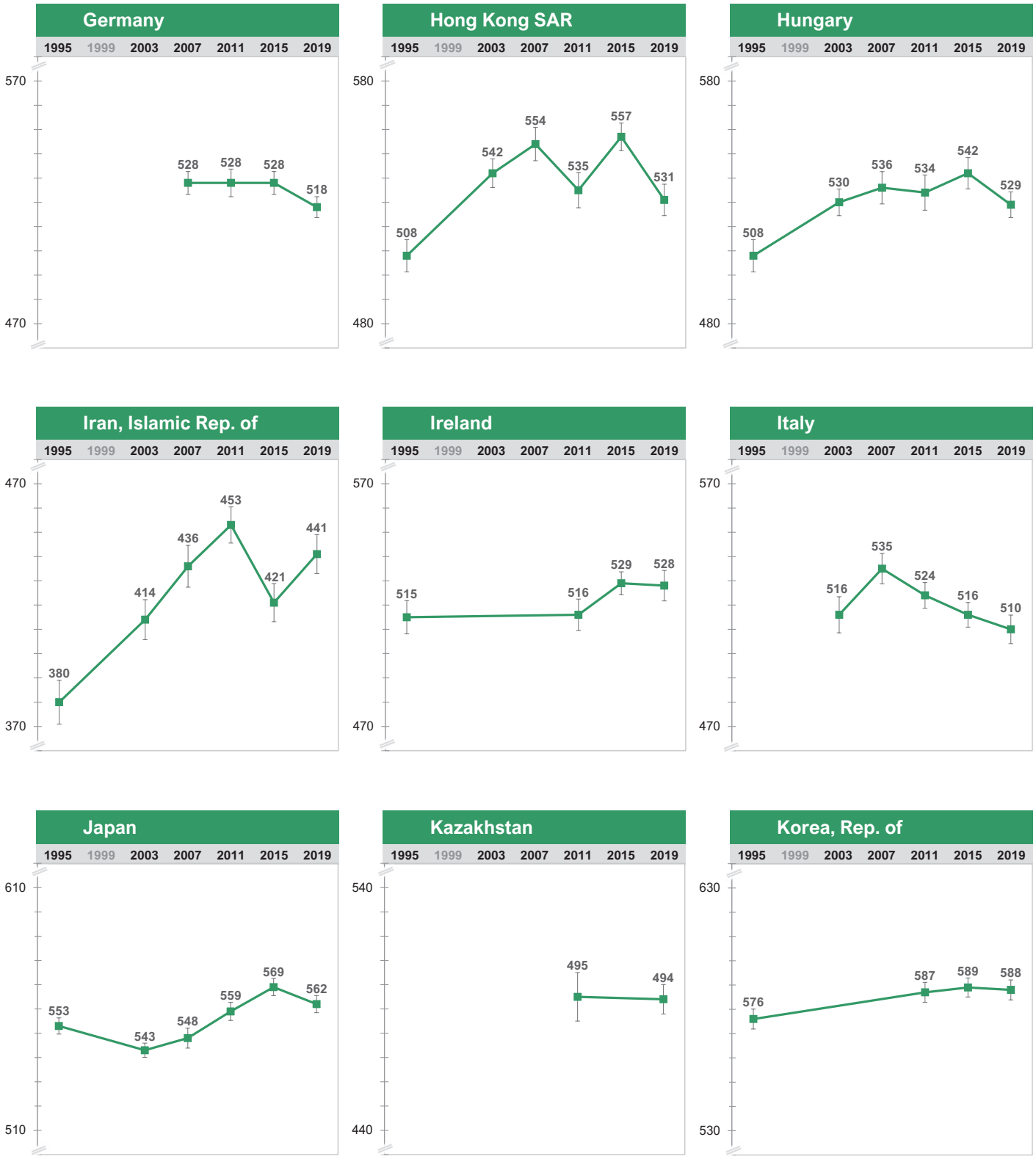
◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.3: Trend Plots of Average Science Achievement Across Assessment Years◊

(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 2.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.3: Trend Plots of Average Science Achievement Across Assessment Years◊

(Continued)

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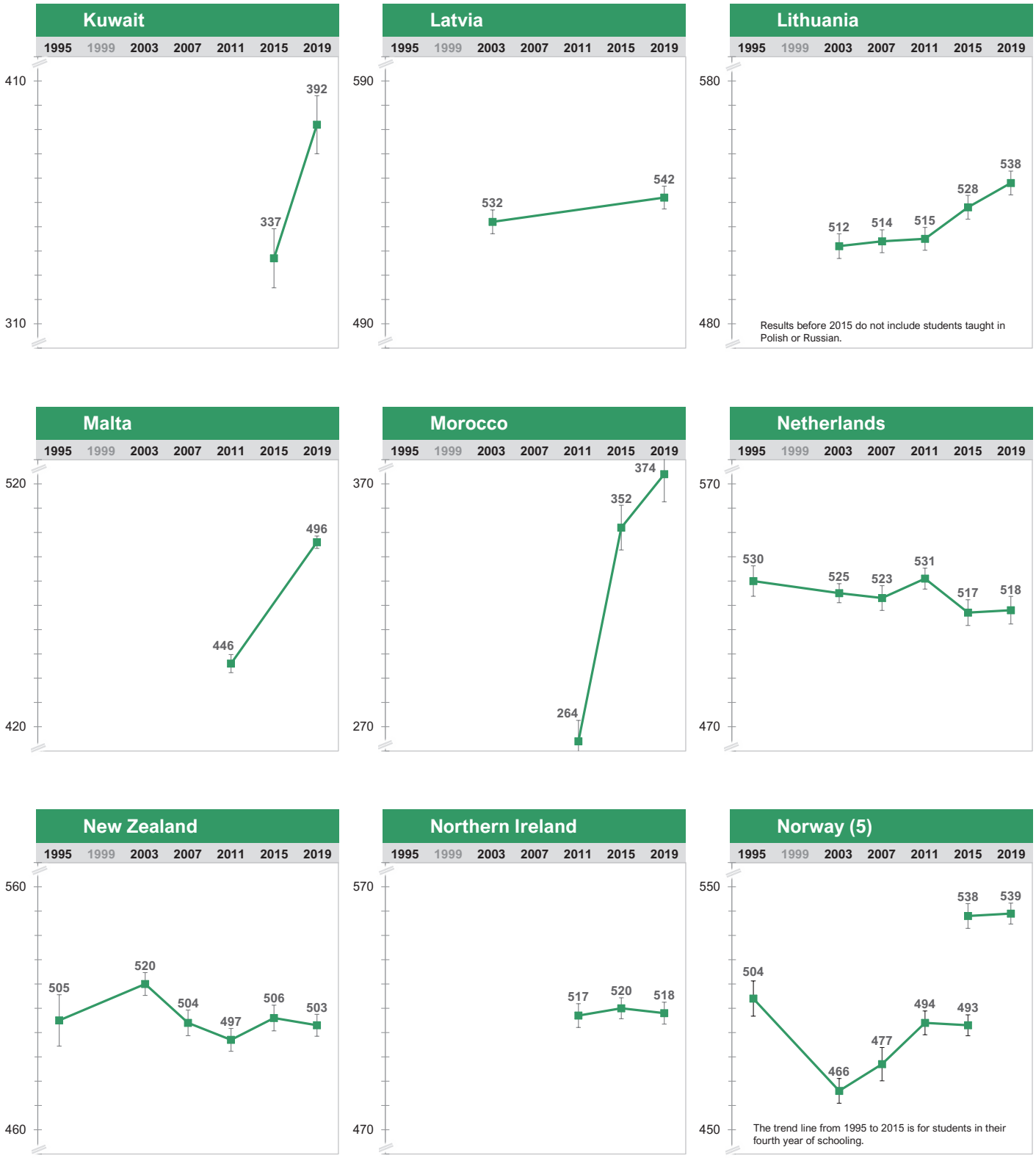


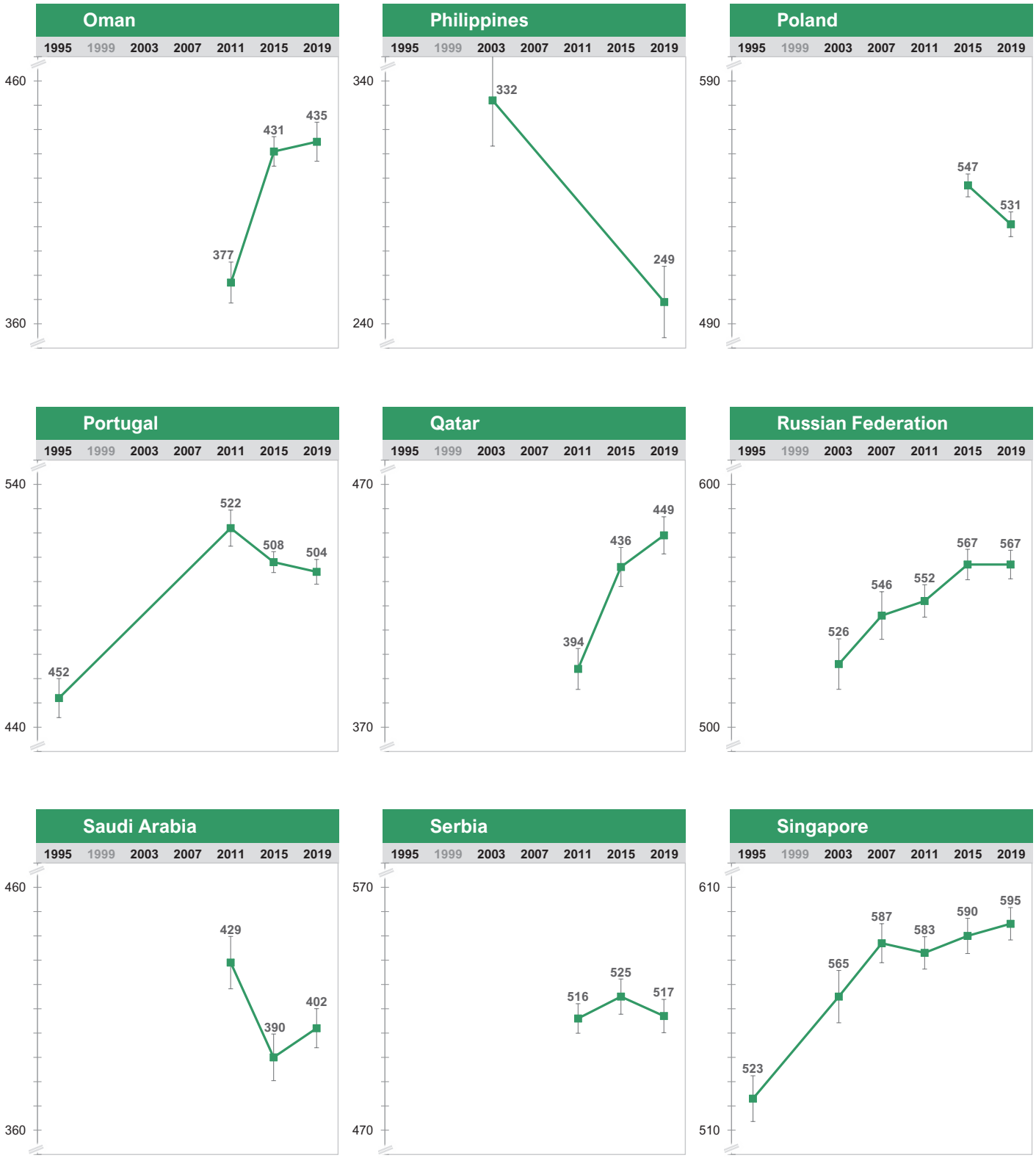
◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.3: Trend Plots of Average Science Achievement Across Assessment Years◊

(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 2.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



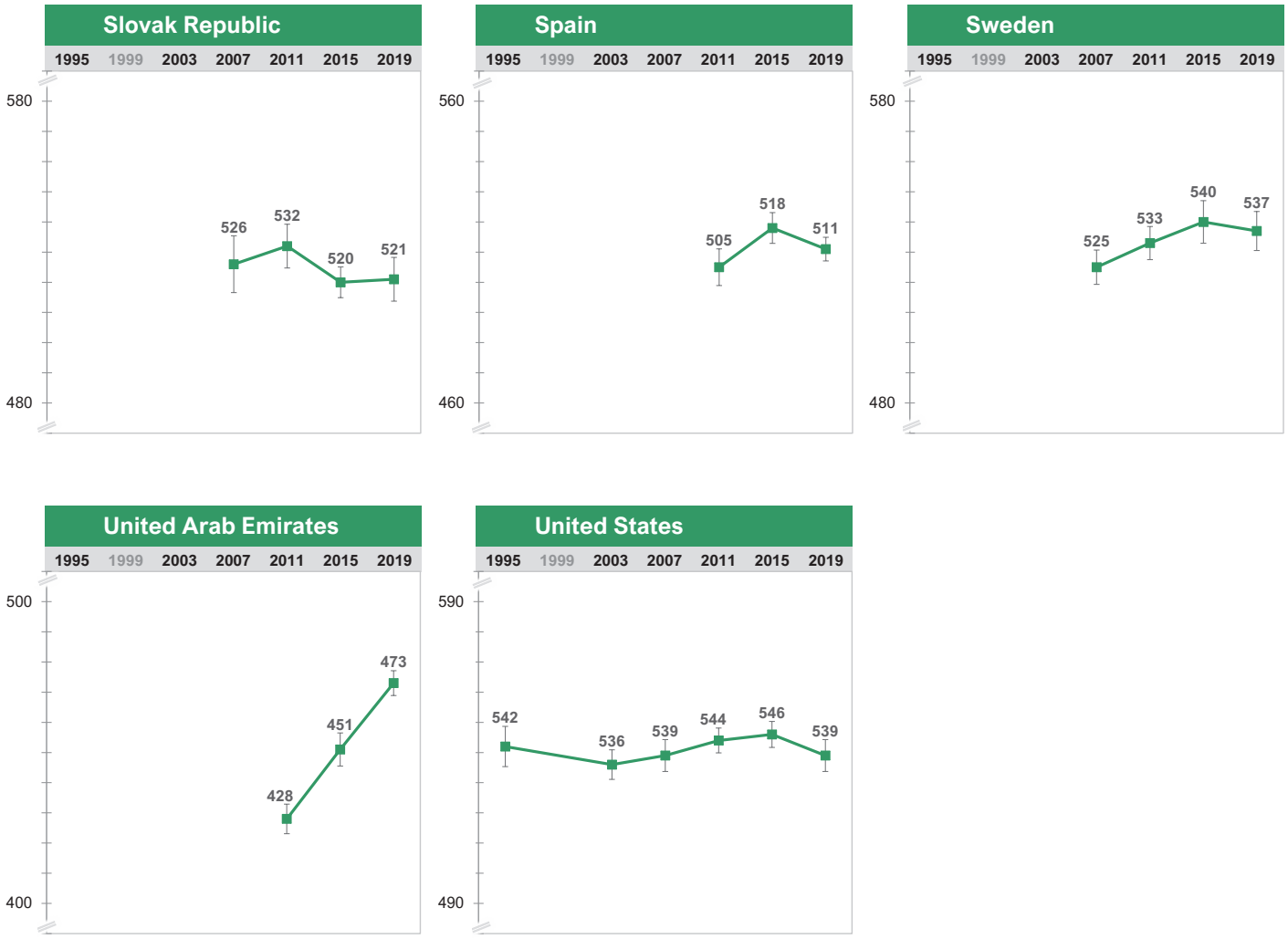
◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.3: Trend Plots of Average Science Achievement Across Assessment Years◊

(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 2.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

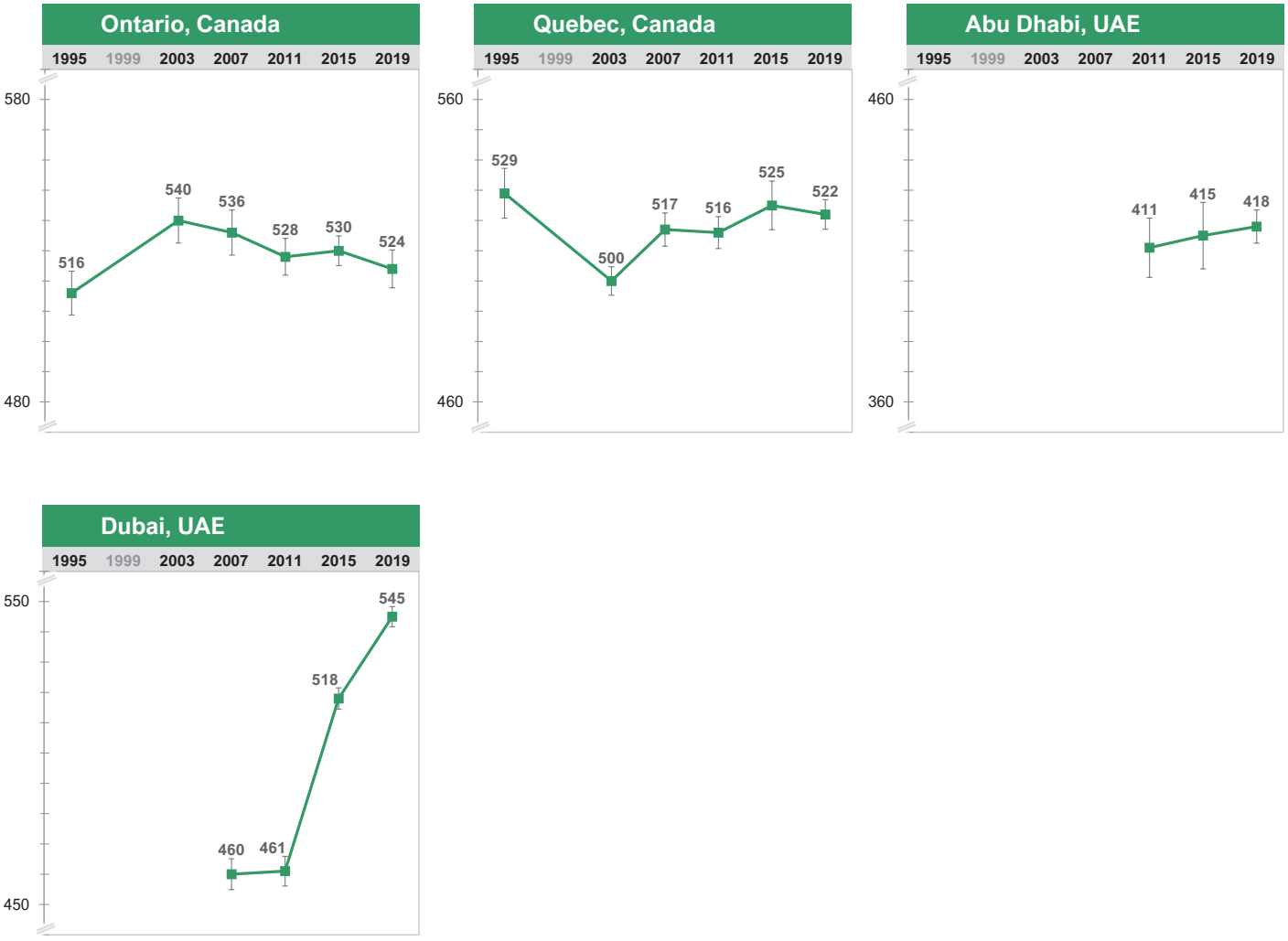
SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.3: Trend Plots of Average Science Achievement Across Assessment Years◊

(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 2.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.

Benchmarking Participants



◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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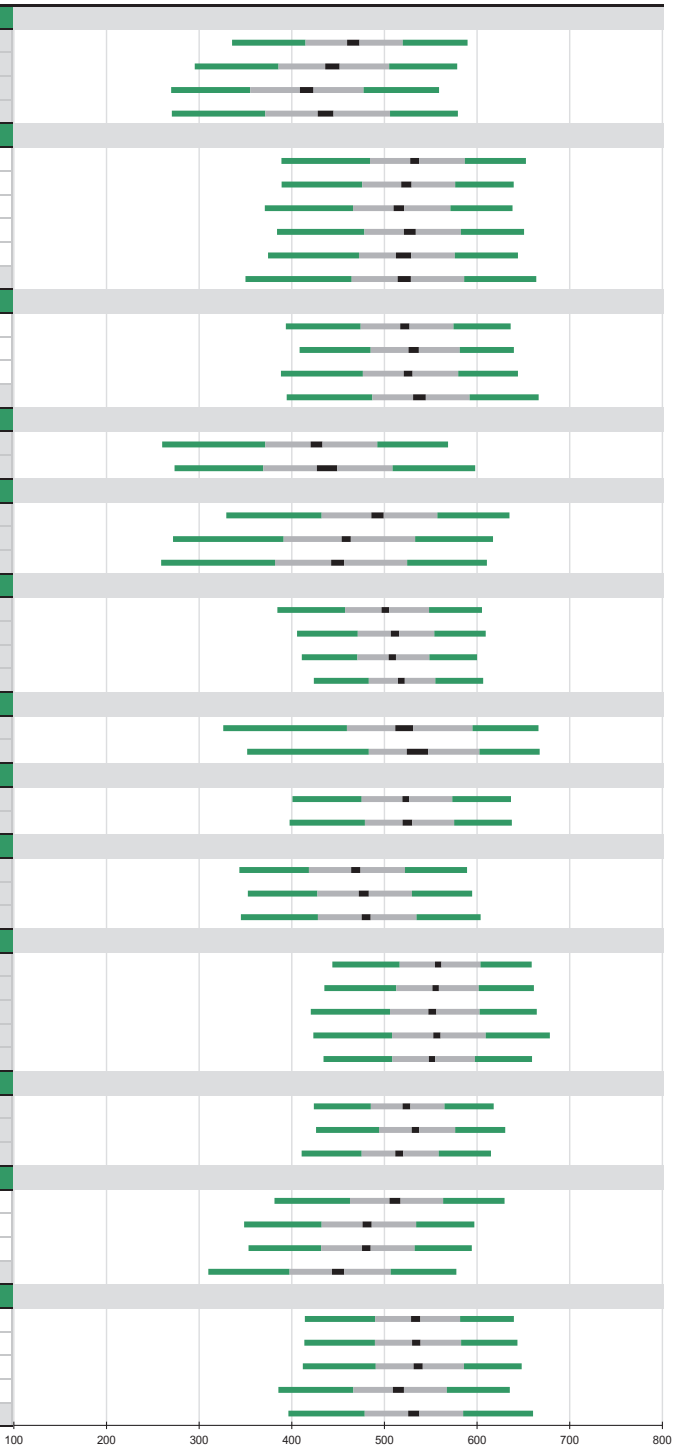
Exhibit 2.4: Differences in Average Science Achievement Across Assessment Years

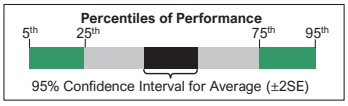
Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▽) than the performance in the column year.

Country	Average Scale Score	Differences Between Years					Science Achievement Distribution
		2015	2011	2007	2003	1995	
Armenia							
2019	466 (3.4)	23 ▲	50 ▲		30 ▲		
2015	444 (4.0)		28 ▲		7		
2011	416 (3.8)				-20 ▽		
2003	437 (4.3)						
Australia							
2019	533 (2.4)	9 ▲	17 ▲	5	12 ▲	11 ▲	
2015	524 (2.9)		8 ▲	-4	3	2	
2011	516 (2.9)			-12 ▽	-5	-6	
2007	527 (3.3)				7	6	
† 2003	521 (4.3)					-1	
≡ 1995	521 (3.7)						
Austria							
2019	522 (2.6)		-9 ▽	-4		-16 ▽	
2011	532 (2.9)			6		-6	
2007	526 (2.5)					-12 ▽	
≡ 1995	538 (3.6)						
Azerbaijan							
2019	427 (3.3)		-11				
2 2011	438 (5.6)						
Bahrain							
2019	493 (3.4)	34 ▲	43 ▲				
2 2015	459 (2.6)		9 ▲				
2011	449 (3.5)						
Belgium (Flemish)							
† 2019	501 (2.1)	-10 ▽	-8 ▽		-17 ▽		
† 2015	512 (2.3)		3		-7 ▽		
2011	509 (2.0)				-10 ▽		
2 2003	518 (1.9)						
Bulgaria							
2019	521 (4.9)	-14					
2015	536 (5.9)						
Canada							
1 2 2019	523 (1.9)	-2					
1 2 † 2015	525 (2.6)						
Chile							
2019	469 (2.6)	-9 ▽	-11 ▽				
2015	478 (2.7)		-3				
2011	480 (2.5)						
Chinese Taipei							
2019	558 (1.8)	3	6 ▲	1	7 ▲		
2015	555 (1.8)		4	-1	4		
2011	552 (2.2)			-5	0		
2007	557 (2.0)				5 ▲		
2003	551 (1.8)						
Croatia							
2019	524 (2.2)	-10 ▽	8 ▲				
2015	533 (2.1)		17 ▲				
2 2011	516 (2.2)						
Cyprus							
2019	511 (3.0)	30 ▲			31 ▲	61 ▲	
2015	481 (2.6)				1	31 ▲	
2003	480 (2.4)					30 ▲	
1995	450 (3.4)						
Czech Republic							
2019	534 (2.6)	-1	-3	19 ▲		2	
2015	534 (2.4)		-2	19 ▲		3	
2011	536 (2.5)			21 ▲		5	
2007	515 (3.0)					-17 ▽	
1995	532 (3.1)						



▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower



See Appendix A for country participation in previous TIMSS assessments.
See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

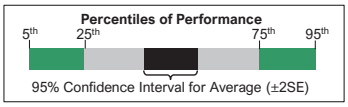
Exhibit 2.4: Differences in Average Science Achievement Across Assessment Years

(Continued)

Country	Average Scale Score	Differences Between Years					Science Achievement Distribution
		2015	2011	2007	2003	1995	
Denmark							
† 2019	522 (2.4)	-5	-6	5			
2 † 2015	527 (2.1)		-1	10 ▲			
2 2011	528 (2.8)			11 ▲			
† 2007	517 (2.9)						
England							
2 2019	537 (2.7)	1	8 ▲	-5	-3	9 ▲	
2015	536 (2.4)		7	-6	-4	8 ▲	
2011	529 (3.0)			-13 ▽	-11 ▽	1	
2007	542 (2.8)				1	14 ▲	
† 2003	540 (3.5)					13 ▲	
3 † 1995	528 (3.2)						
Finland							
2019	555 (2.6)	1	-16 ▽				
2015	554 (2.3)		-16 ▽				
2011	570 (2.6)						
France							
2019	488 (3.0)	0					
2015	487 (2.7)						
Georgia							
1 2019	454 (3.9)	3	-1	37 ▲			
1 2015	451 (3.7)		-4	34 ▲			
1 2011	455 (3.9)			37 ▲			
1 2007	418 (4.6)						
Germany							
2019	518 (2.2)	-10 ▽	-9 ▽	-9 ▽			
2015	528 (2.4)		1	1			
2011	528 (2.9)			0			
2007	528 (2.4)						
Hong Kong SAR							
† 2019	531 (3.3)	-25 ▽	-4	-23 ▽	-11 ▽	23 ▲	
† 2015	557 (2.9)		22 ▲	2	14 ▲	49 ▲	
2 2011	535 (3.7)			-19 ▽	-8	27 ▲	
2007	554 (3.5)				12 ▲	46 ▲	
† 2003	542 (3.0)					35 ▲	
1995	508 (3.4)						
Hungary							
2019	529 (2.7)	-13 ▽	-5	-7	0	22 ▲	
2015	542 (3.3)		8	6	12 ▲	34 ▲	
2011	534 (3.7)			-2	5	27 ▲	
2007	536 (3.4)				6	28 ▲	
2 2003	530 (2.8)					22 ▲	
1995	508 (3.4)						
Iran, Islamic Rep. of							
2019	441 (4.1)	20 ▲	-12 ▽	5	27 ▲	61 ▲	
2015	421 (4.0)		-32 ▽	-15 ▽	7	41 ▲	
2011	453 (3.8)			17 ▲	39 ▲	73 ▲	
2007	436 (4.4)				22 ▲	55 ▲	
2 2003	414 (4.2)					34 ▲	
1995	380 (4.6)						
Ireland							
2019	528 (3.2)	-1	12 ▲			13 ▲	
2015	529 (2.4)		13 ▲			14 ▲	
2011	516 (3.3)					1	
2 1995	515 (3.5)						
Italy							
2019	510 (3.0)	-7	-14 ▽	-25 ▽	-6		
2 2015	516 (2.6)		-7 ▽	-19 ▽	1		
2011	524 (2.7)			-11 ▽	8		
2007	535 (3.2)				20 ▲		
2003	516 (3.8)						

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.4: Differences in Average Science Achievement Across Assessment Years

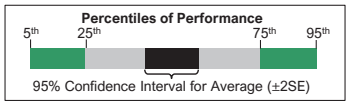
(Continued)

Country	Average Scale Score	Differences Between Years 2015	2011	2007	2003	1995
Japan						
2019	562 (1.8)	-7 ▽	3	14 ▲	18 ▲	8 ▲
2015	569 (1.8)		10 ▲	21 ▲	26 ▲	16 ▲
2011	559 (1.9)			11 ▲	15 ▲	5 ▲
2007	548 (2.1)				4	-5
2003	543 (1.5)					-10 ▽
1995	553 (1.7)					
Kazakhstan						
[2] 2019	494 (3.1)		0			
[2] 2011	495 (5.1)					
Korea, Rep. of						
2019	588 (2.1)	-2	1			12 ▲
2015	589 (2.0)		3			14 ▲
2011	587 (2.1)					11 ▲
[2] 1995	576 (2.1)					
Kuwait						
2019	392 (6.1)	55 ▲				
Ψ 2015	337 (6.2)					
Latvia						
[2] 2019	542 (2.4)				10 ▲	
2003	532 (2.5)					
Lithuania						
[2] 2019	538 (2.5)	10 ▲	23 ▲	24 ▲	26 ▲	
[2] 2015	528 (2.5)		13 ▲	13 ▲	16 ▲	
[1 2] 2011	515 (2.4)			0	3	
[1] 2007	514 (2.4)				2	
[1] 2003	512 (2.6)					
Malta						
2019	496 (1.3)		50 ▲			
2011	446 (1.9)					
Morocco						
Ψ 2019	374 (5.8)	22 ▲	110 ▲			
Ψ 2015	352 (4.7)		89 ▲			
Ж 2011	264 (4.4)					
Netherlands						
≡ 2019	518 (2.9)	1	-13 ▽	-5	-7	-12 ▽
† 2015	517 (2.7)		-14 ▽	-6	-8 ▽	-13 ▽
† 2011	531 (2.2)			8 ▲	6 ▲	1
‡ 2007	523 (2.6)				-2	-7
† 2003	525 (2.0)					-5
≡ 1995	530 (3.2)					
New Zealand						
[2] 2019	503 (2.3)	-3	6	-2	-17 ▽	-3
2015	506 (2.7)		9 ▲	1	-14 ▽	0
2011	497 (2.4)			-7 ▽	-23 ▽	-8
2007	504 (2.7)				-16 ▽	-1
2003	520 (2.4)					15 ▲
1995	505 (5.4)					
Northern Ireland						
† 2019	518 (2.3)	-1	2			
‡ 2015	520 (2.2)		3			
† 2011	517 (2.5)					
Norway (5)						
† 2019	539 (2.2)	2				
2015	538 (2.6)					
Oman						
2019	435 (4.1)	4	58 ▲			
2015	431 (3.1)		54 ▲			
2011	377 (4.3)					
Philippines						
[2] Ж 2019	249 (7.5)				-83 ▽	
2003	332 (9.6)					
Poland						
2019	531 (2.6)	-16 ▽				
2015	547 (2.4)					

Science Achievement Distribution

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower



Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.4: Differences in Average Science Achievement Across Assessment Years

(Continued)

Country	Average Scale Score	Differences Between Years 2015	2011	2007	2003	1995
Portugal						
[2] 2019	504 (2.6)	-4	-18 ▽			52 ▲
[2] 2015	508 (2.2)		-14 ▽			56 ▲
2011	522 (3.8)					70 ▲
[2] 1995	452 (4.1)					
Qatar						
2019	449 (3.9)	13 ▲	55 ▲			
2015	436 (4.1)		42 ▲			
[2] 2011	394 (4.3)					
Russian Federation						
[2] 2019	567 (3.0)	0	15 ▲	21 ▲	41 ▲	
2015	567 (3.2)		15 ▲	21 ▲	41 ▲	
2011	552 (3.4)			6	26 ▲	
2007	546 (5.0)				20 ▲	
[2] 2003	526 (5.3)					
Saudi Arabia						
[2] 2019	402 (4.1)	12	-27 ▽			
2015	390 (4.9)		-39 ▽			
2011	429 (5.5)					
Serbia						
[2] 2019	517 (3.5)	-8	1			
[3] 2015	525 (3.7)		9			
[2] 2011	516 (3.1)					
Singapore						
[3] 2019	595 (3.4)	4	11 ▲	8	29 ▲	71 ▲
[2] 2015	590 (3.7)		7	4	25 ▲	67 ▲
[2] 2011	583 (3.4)			-3	18 ▲	60 ▲
2007	587 (4.1)				22 ▲	63 ▲
2003	565 (5.5)					42 ▲
1995	523 (4.8)					
Slovak Republic						
[2] 2019	521 (3.7)	0	-11 ▽	-5		
2015	520 (2.6)		-11 ▽	-5		
2011	532 (3.7)			6		
2007	526 (4.8)					
Spain						
2019	511 (2.0)	-7 ▽	6			
[2] 2015	518 (2.6)		13 ▲			
2011	505 (3.1)					
Sweden						
2019	537 (3.3)	-3	4	12 ▲		
[2] 2015	540 (3.6)		7	15 ▲		
2011	533 (2.8)			9 ▲		
2007	525 (2.9)					
United Arab Emirates						
2019	473 (2.1)	21 ▲	45 ▲			
2015	451 (2.8)		23 ▲			
2011	428 (2.5)					
United States						
[2†] 2019	539 (2.7)	-7 ▽	-5	0	3	-3
[2†] 2015	546 (2.2)		2	7 ▲	10 ▲	4
[2] 2011	544 (2.1)			5	8 ▲	2
[2†] 2007	539 (2.7)				3	-3
[†] 2003	536 (2.5)					-6
1995	542 (3.4)					

Science Achievement Distribution

▲ Average from more recent year significantly higher

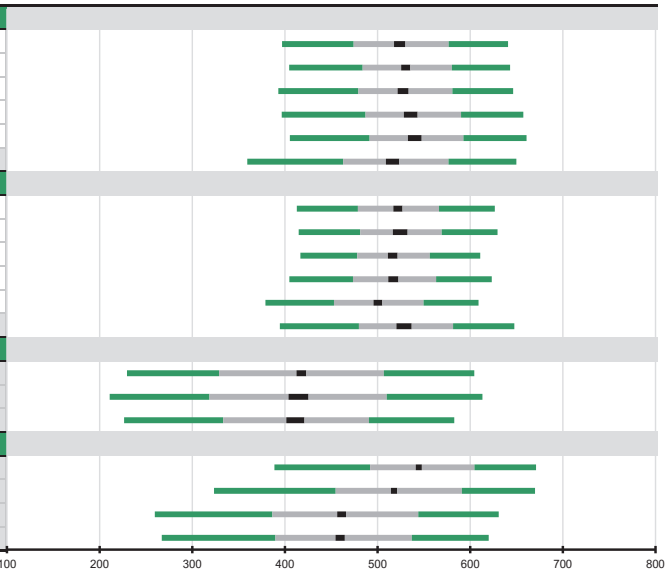
▽ Average from more recent year significantly lower

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.4: Differences in Average Science Achievement Across Assessment Years

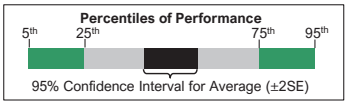
(Continued)

Country	Average Scale Score	Differences Between Years 2015	2011	2007	2003	1995	Science Achievement Distribution
Benchmarking Participants							
Ontario, Canada							
[2] 2019	524 (3.2)	-6	-4	-12 ▽	-16 ▽	8	
2015	530 (2.5)		3	-5	-10 ▽	14 ▲	
2011	528 (3.1)			-8	-13 ▽	11 ▲	
[2] 2007	536 (3.8)				-4	20 ▲	
2003	540 (3.8)					24 ▲	
[2] 1995	516 (3.7)						
Quebec, Canada							
2019	522 (2.5)	-3	6	5	22 ▲	-7	
[≡] 2015	525 (4.1)		8	7	24 ▲	-4	
2011	516 (2.7)			-1	16 ▲	-12 ▽	
[2] 2007	517 (2.8)				17 ▲	-11 ▽	
2003	500 (2.4)					-28 ▽	
1995	529 (4.2)						
Abu Dhabi, UAE							
2019	418 (2.8)	3	6				
[2] 2015	415 (5.6)		3				
2011	411 (5.0)						
Dubai, UAE							
[2] 2019	545 (1.7)	27 ▲	83 ▲	85 ▲			
2015	518 (1.8)		57 ▲	58 ▲			
2011	461 (2.5)			2			
[‡] 2007	460 (2.6)						



▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower



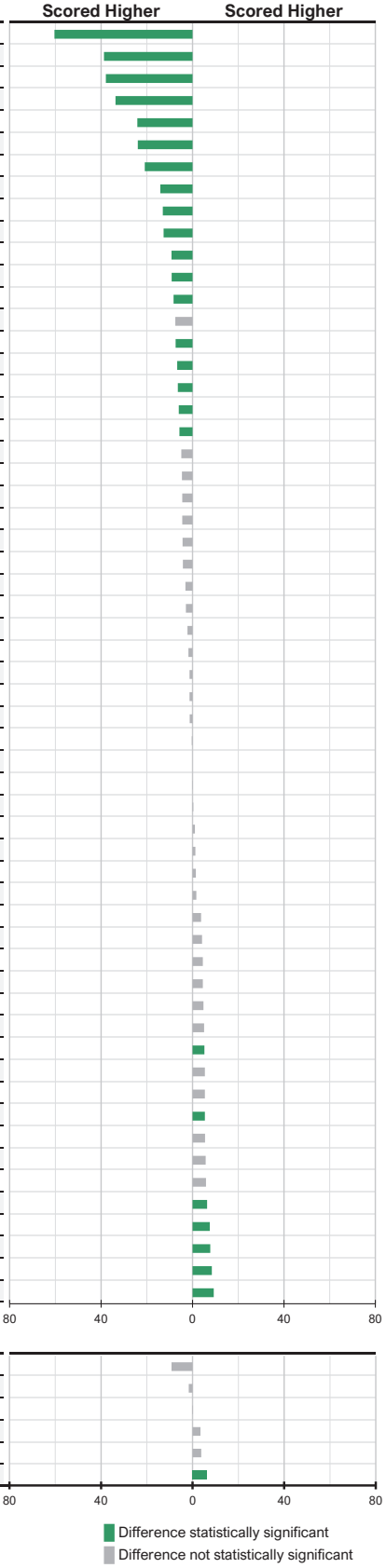
SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Average Achievement by Gender

Exhibit 2.5 shows the differences in average science achievement between girls and boys. In TIMSS 2019, fourth grade girls had higher average achievement than boys in 18 countries, there was gender equity in average science achievement in 33 countries, and boys had higher average achievement than girls in 7 countries.

Exhibit 2.5: Average Science Achievement by Gender

Country	Girls		Boys		Difference (Absolute Value)	Gender Difference
	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score		Girls Scored Higher / Boys Scored Higher
2 Saudi Arabia	48 (0.8)	434 (4.8)	52 (0.8)	373 (6.5)	60 (8.3)	
Kuwait	47 (2.6)	413 (6.9)	53 (2.6)	374 (8.7)	39 (10.3)	
2 Ж Pakistan	45 (4.7)	311 (15.4)	55 (4.7)	273 (14.5)	38 (15.8)	
Bahrain	49 (1.2)	510 (3.8)	51 (1.2)	476 (5.1)	34 (6.1)	
Oman	50 (0.7)	447 (3.8)	50 (0.7)	423 (5.0)	24 (3.6)	
2 Ж Philippines	48 (0.7)	261 (7.8)	52 (0.7)	238 (7.8)	24 (4.9)	
Ж South Africa (5)	50 (0.6)	335 (5.4)	50 (0.6)	314 (5.2)	21 (3.9)	
North Macedonia	48 (0.6)	433 (6.5)	52 (0.6)	419 (6.7)	14 (4.3)	
2 Kosovo	49 (1.0)	420 (4.2)	51 (1.0)	407 (4.0)	13 (3.6)	
Qatar	50 (1.5)	456 (6.0)	50 (1.5)	443 (3.7)	13 (6.1)	
Armenia	48 (0.8)	471 (3.5)	52 (0.8)	462 (4.0)	9 (3.1)	
Ψ Morocco	49 (0.7)	379 (6.4)	51 (0.7)	370 (5.8)	9 (3.7)	
Albania	49 (0.9)	494 (3.9)	51 (0.9)	485 (3.9)	8 (3.4)	
Bulgaria	48 (0.9)	525 (5.3)	52 (0.9)	518 (5.4)	7 (4.3)	
2 Serbia	50 (0.9)	521 (3.5)	50 (0.9)	513 (4.3)	7 (3.5)	
Bosnia and Herzegovina	49 (0.7)	462 (3.1)	51 (0.7)	455 (3.5)	7 (2.9)	
2 Kazakhstan	49 (0.7)	497 (3.6)	51 (0.7)	491 (3.1)	6 (2.8)	
Montenegro	47 (0.6)	457 (2.9)	53 (0.6)	451 (2.8)	6 (2.8)	
Japan	48 (0.5)	565 (2.0)	52 (0.5)	559 (2.1)	6 (2.0)	
Finland	49 (0.9)	557 (3.5)	51 (0.9)	552 (2.4)	5 (3.1)	
2 Latvia	50 (0.9)	544 (2.6)	50 (0.9)	540 (3.0)	5 (2.9)	
2 New Zealand	48 (1.3)	505 (3.2)	52 (1.3)	500 (2.8)	5 (3.9)	
2 Lithuania	49 (0.9)	540 (2.8)	51 (0.9)	536 (3.3)	4 (3.4)	
United Arab Emirates	50 (1.1)	475 (3.1)	50 (1.1)	471 (2.6)	4 (4.0)	
Azerbaijan	47 (0.9)	429 (3.9)	53 (0.9)	425 (3.5)	4 (3.2)	
† Norway (5)	48 (0.9)	541 (2.4)	52 (0.9)	538 (3.1)	3 (3.5)	
Poland	49 (0.8)	532 (2.8)	51 (0.8)	529 (3.2)	3 (3.0)	
Sweden	50 (1.1)	538 (3.6)	50 (1.1)	536 (3.8)	2 (3.3)	
France	49 (1.0)	489 (3.2)	51 (1.0)	487 (3.4)	2 (2.8)	
† Northern Ireland	50 (1.0)	519 (2.9)	50 (1.0)	518 (2.8)	1 (3.4)	
† Denmark	50 (0.8)	523 (2.7)	50 (0.8)	522 (2.8)	1 (2.8)	
Australia	49 (0.8)	533 (2.9)	51 (0.8)	532 (2.7)	1 (2.9)	
≡ Netherlands	49 (1.0)	519 (3.1)	51 (1.0)	518 (3.3)	0 (2.8)	
Croatia	50 (1.2)	524 (2.6)	50 (1.2)	524 (2.7)	0 (3.1)	
† Hong Kong SAR	46 (1.3)	531 (3.1)	54 (1.3)	531 (4.3)	0 (3.6)	
2 England	50 (1.0)	537 (3.6)	50 (1.0)	537 (2.7)	0 (3.5)	
2 Russian Federation	51 (1.1)	567 (3.5)	49 (1.1)	568 (3.3)	1 (3.0)	
Spain	47 (0.8)	511 (2.4)	53 (0.8)	512 (2.5)	1 (2.9)	
Iran, Islamic Rep. of	49 (2.1)	440 (6.6)	51 (2.1)	442 (5.4)	2 (8.7)	
Chinese Taipei	48 (0.6)	557 (2.0)	52 (0.6)	559 (2.2)	2 (2.3)	
† Belgium (Flemish)	51 (0.8)	499 (2.3)	49 (0.8)	503 (2.8)	4 (2.9)	
Cyprus	52 (0.7)	509 (2.8)	48 (0.7)	514 (4.1)	4 (3.3)	
Ireland	50 (1.1)	526 (3.8)	50 (1.1)	530 (3.4)	4 (3.5)	
Germany	50 (0.8)	516 (2.8)	50 (0.8)	520 (2.4)	4 (2.8)	
Malta	49 (0.7)	493 (2.1)	51 (0.7)	498 (2.4)	5 (3.7)	
1 Georgia	49 (0.9)	452 (4.7)	51 (0.9)	457 (4.2)	5 (4.1)	
1 2 Canada	49 (0.8)	520 (2.1)	51 (0.8)	526 (2.2)	5 (2.1)	
2 Turkey (5)	52 (1.4)	524 (4.4)	48 (1.4)	529 (5.2)	5 (4.6)	
2 Slovak Republic	49 (1.0)	518 (3.8)	51 (1.0)	523 (4.4)	5 (3.8)	
2 † United States	49 (0.8)	536 (3.0)	51 (0.8)	541 (3.2)	5 (2.7)	
2 Portugal	48 (0.9)	501 (3.1)	52 (0.9)	506 (2.7)	6 (2.9)	
Austria	49 (1.0)	519 (3.1)	51 (1.0)	525 (3.0)	6 (3.3)	
Chile	50 (1.3)	466 (3.1)	50 (1.3)	472 (3.3)	6 (3.7)	
Hungary	48 (1.0)	526 (3.2)	52 (1.0)	533 (3.1)	6 (3.3)	
Italy	50 (0.8)	506 (3.3)	50 (0.8)	514 (3.3)	8 (2.8)	
3 Singapore	49 (0.5)	591 (3.6)	51 (0.5)	598 (3.8)	8 (2.8)	
Czech Republic	49 (0.9)	529 (3.0)	51 (0.9)	538 (3.0)	8 (3.1)	
Korea, Rep. of	47 (0.7)	583 (2.4)	53 (0.7)	592 (2.5)	9 (2.5)	
International Average	**49 (0.2)**	**493 (0.6)**	**51 (0.2)**	**489 (0.6)**		
Benchmarking Participants						
Abu Dhabi, UAE	50 (1.5)	422 (3.8)	50 (1.5)	413 (3.9)	9 (5.3)	
2 Dubai, UAE	49 (2.4)	545 (3.6)	51 (2.4)	544 (2.4)	2 (5.0)	
Moscow City, Russian Fed.	49 (1.0)	595 (2.5)	51 (1.0)	595 (2.6)	0 (2.5)	
Madrid, Spain	49 (1.0)	521 (2.5)	51 (1.0)	524 (2.3)	3 (2.6)	
2 Ontario, Canada	49 (1.6)	522 (4.0)	51 (1.6)	526 (3.3)	4 (3.7)	
Quebec, Canada	48 (0.8)	519 (2.7)	52 (0.8)	525 (3.0)	6 (2.5)	



Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.
See Appendix B.2 for target population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

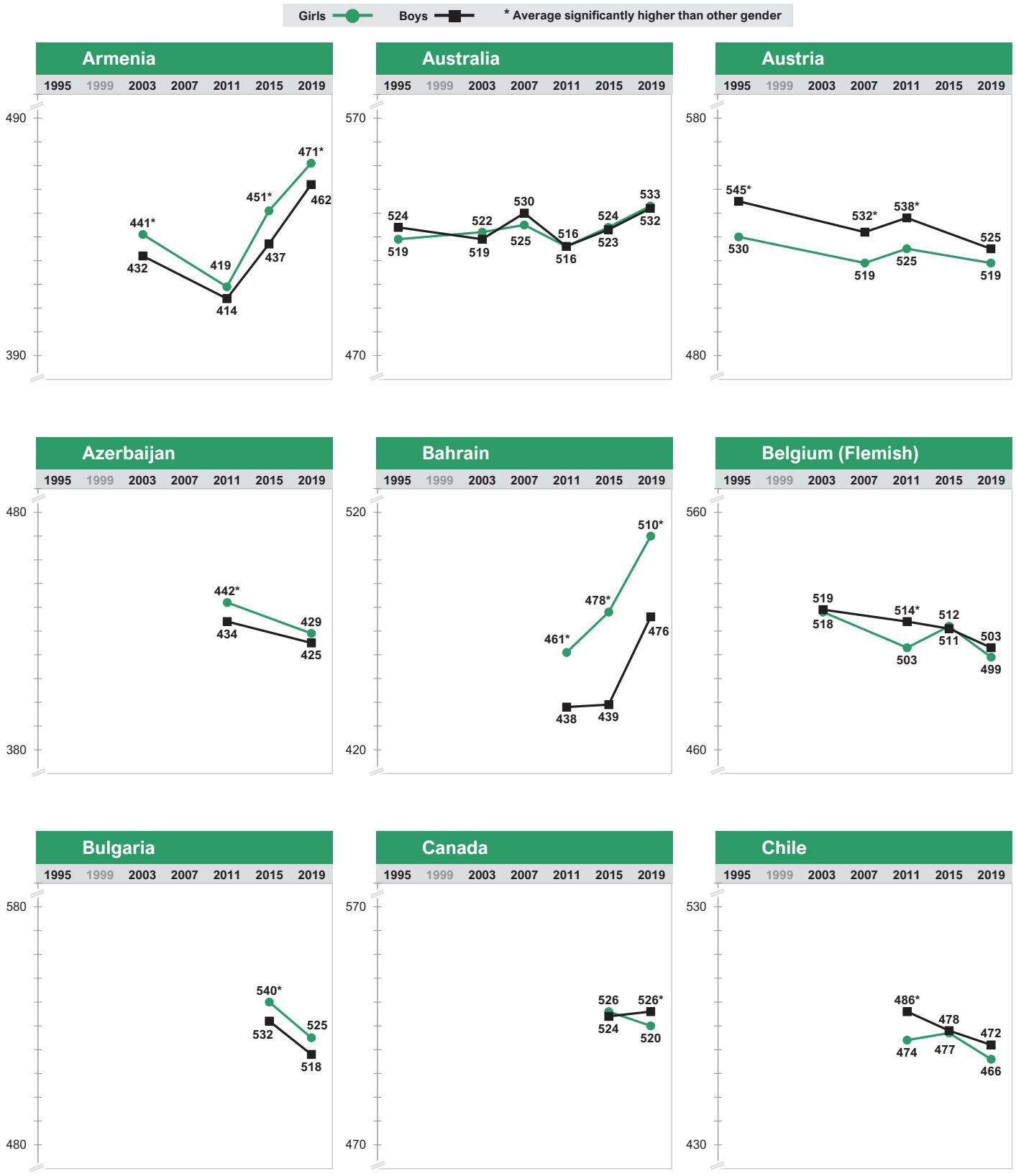
SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Trends in Average Achievement by Gender

For the TIMSS 2019 countries with comparable data from previous TIMSS assessments, Exhibit 2.6 contains graphs of average science achievement across assessments by gender. The countries are presented in alphabetical order. Most recently between 2015 and 2019, there were not a lot of changes, and the changes that did occur were varied. In Chinese Taipei, Hong Kong SAR, Portugal, Slovak Republic, and Spain, the gender gap favoring boys in 2015 closed in 2019. In Bulgaria, Finland, Sweden, and the United Arab Emirates, the gender gap favoring girls in 2015 closed in 2019. In Canada and Singapore, boys had higher average achievement than girls in 2019, whereas there was no gender gap in 2015. In Japan and Serbia, girls had higher achievement than boys in 2019, whereas that was not the situation in 2015.

Exhibit 2.6: Trend Plots of Average Science Achievement Across Assessment Years by Gender◊

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



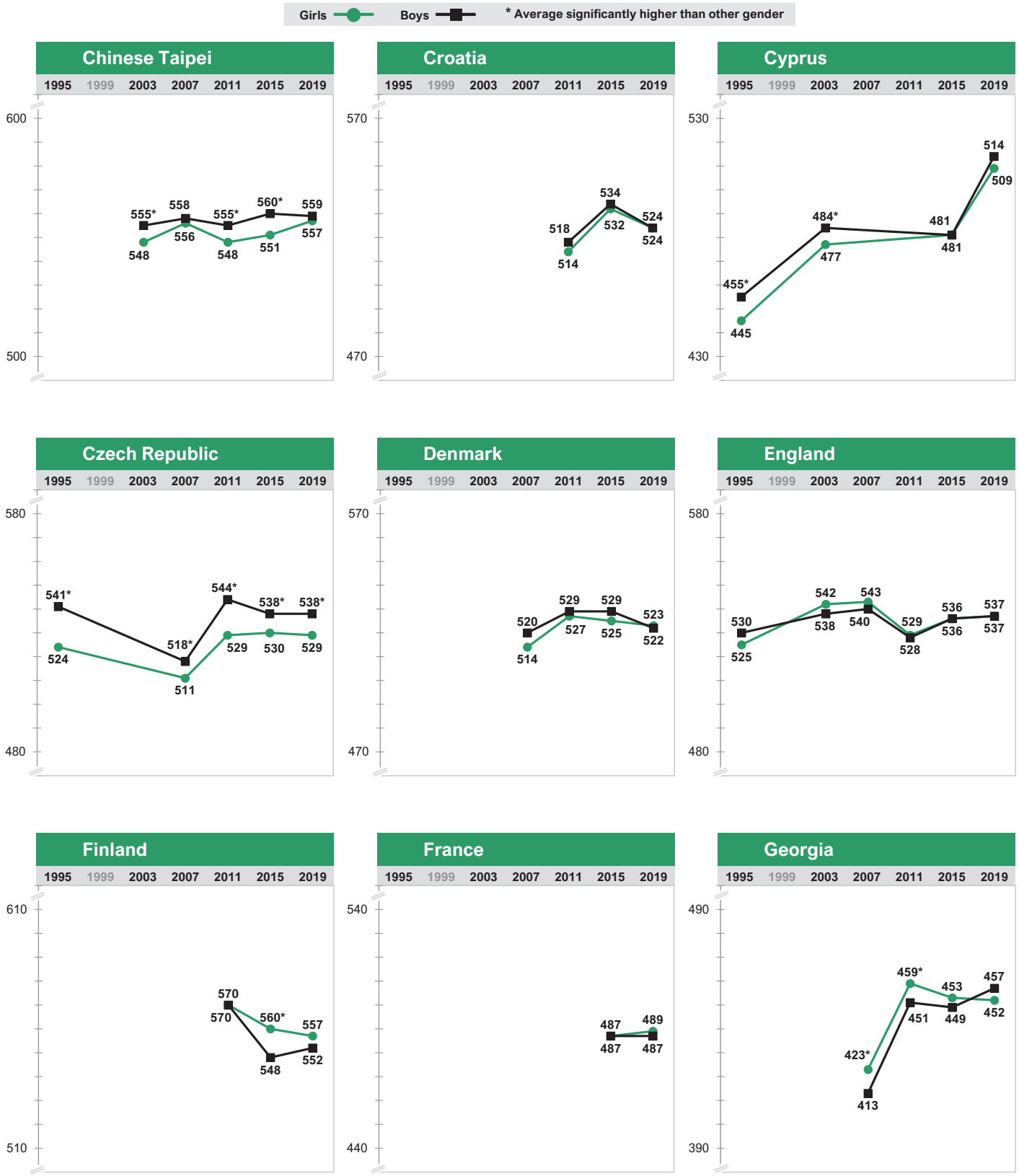
◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.6: Trend Plots of Average Science Achievement Across Assessment Years by Gender◊

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

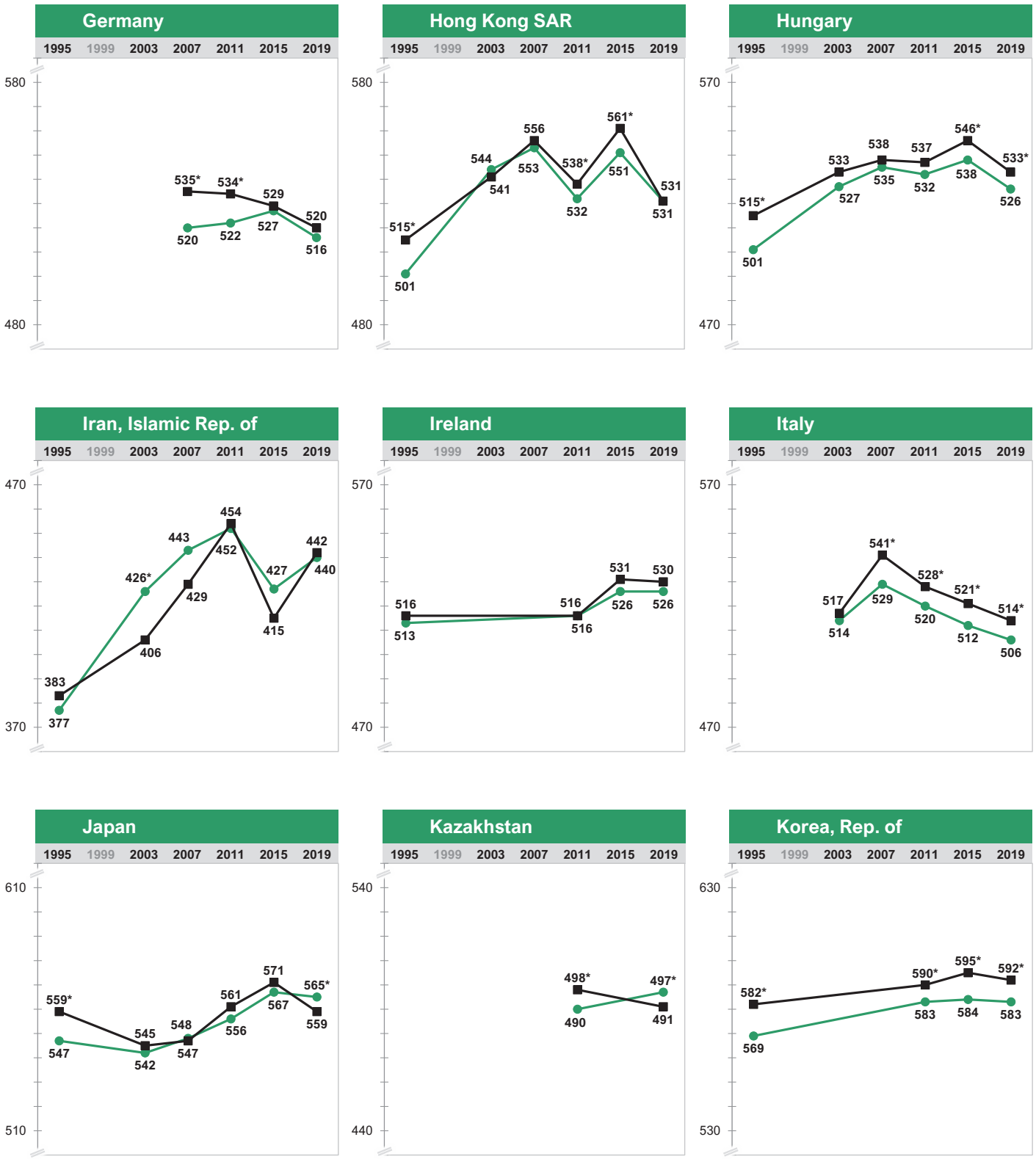
SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.6: Trend Plots of Average Science Achievement Across Assessment Years by Gender◊

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.

Girls — Boys — * Average significantly higher than other gender



◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

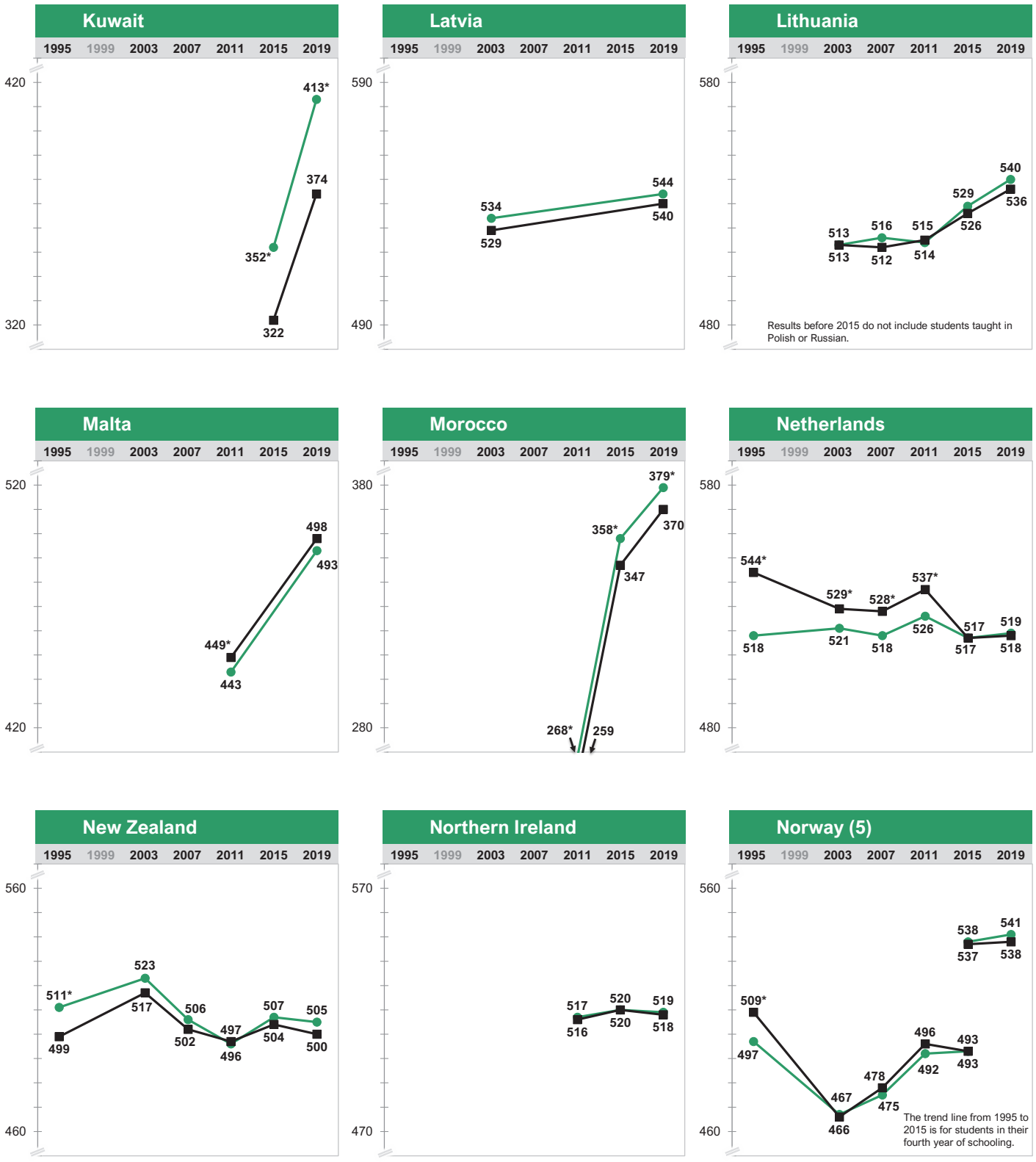
SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.6: Trend Plots of Average Science Achievement Across Assessment Years by Gender◊

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.

Girls — Boys — * Average significantly higher than other gender



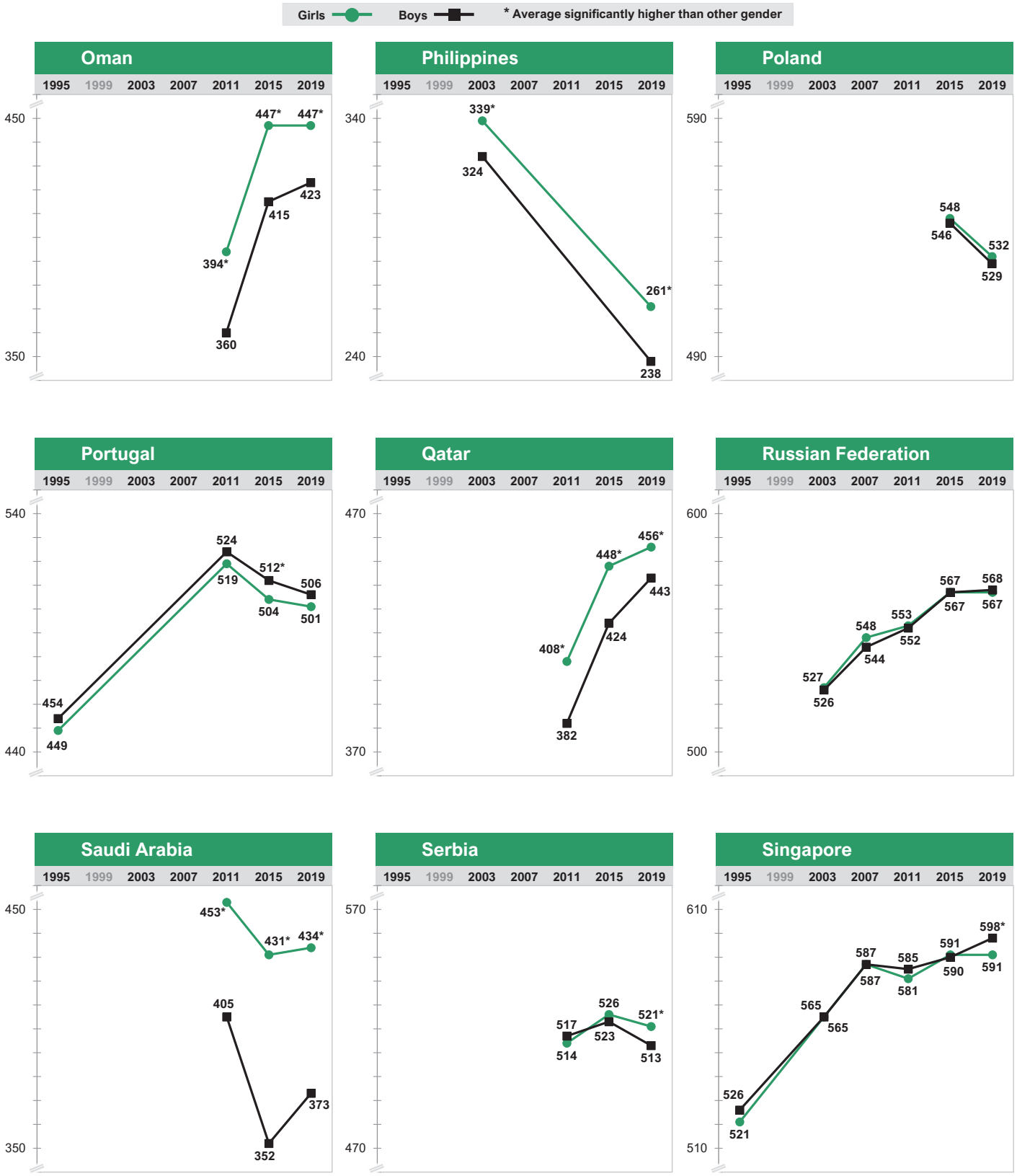
◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.6: Trend Plots of Average Science Achievement Across Assessment Years by Gender◊

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



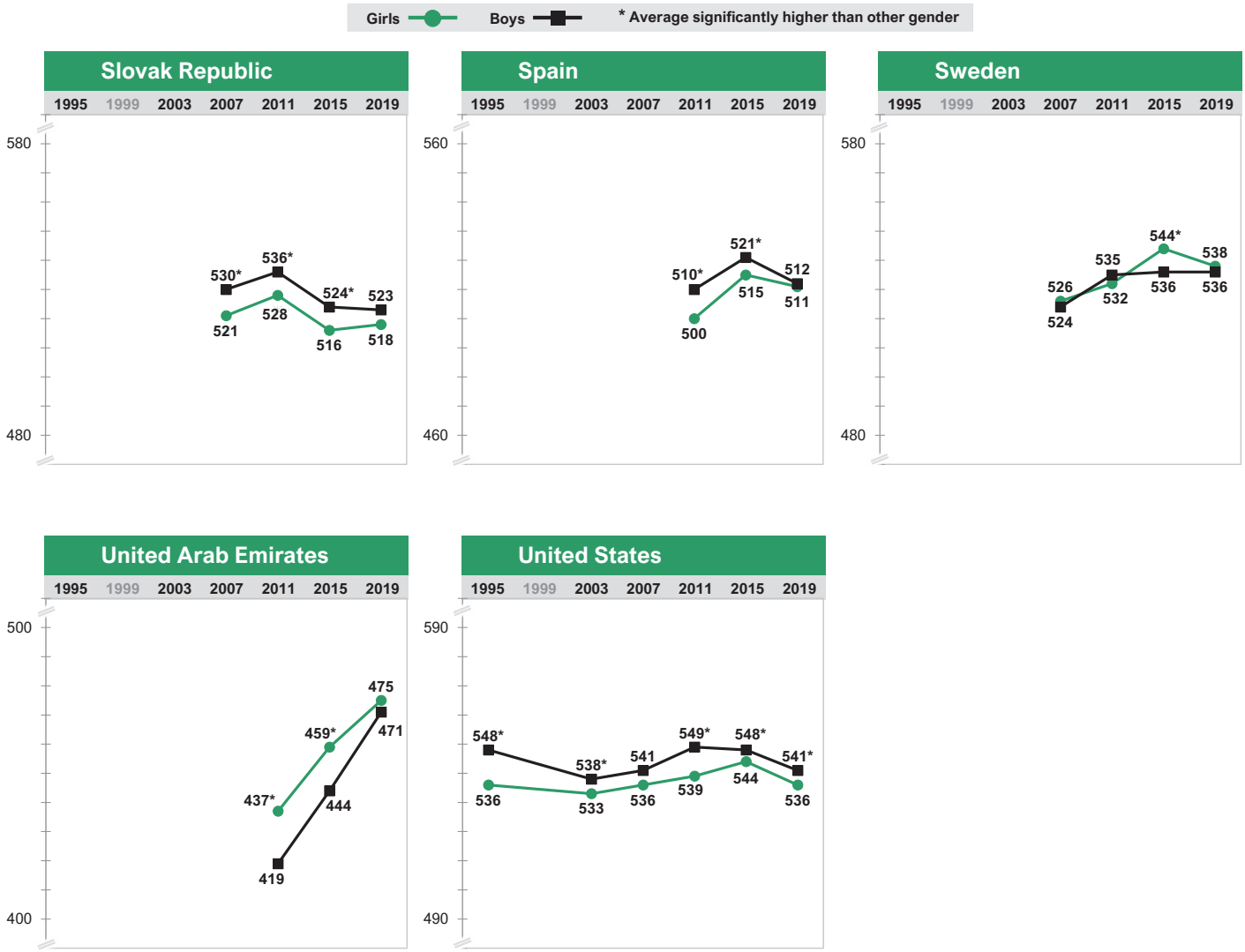
◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.6: Trend Plots of Average Science Achievement Across Assessment Years by Gender◊

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

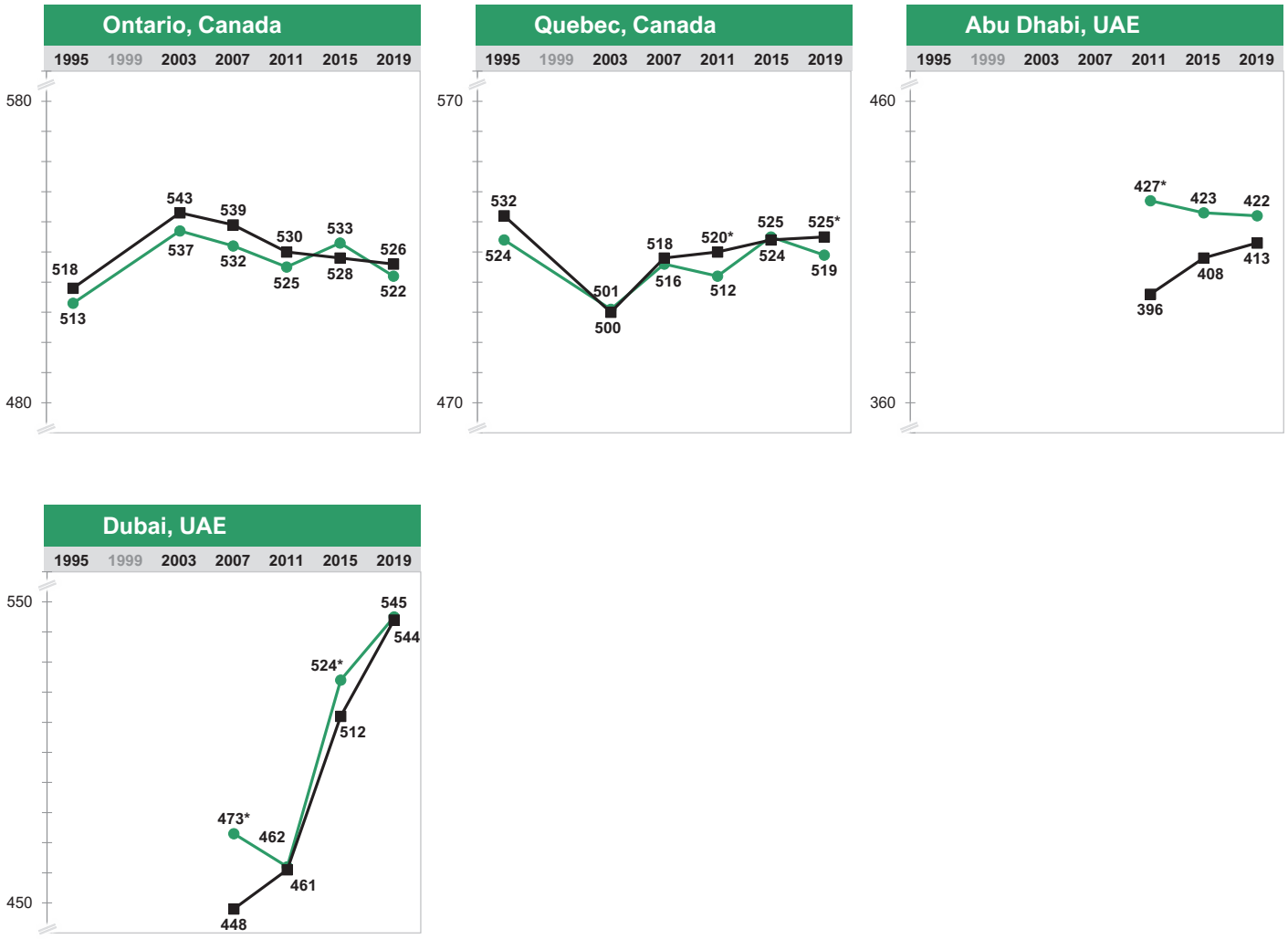
Exhibit 2.6: Trend Plots of Average Science Achievement Across Assessment Years by Gender◊

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.

Girls — Boys — * Average significantly higher than other gender

Benchmarking Participants



◊ There was no TIMSS fourth grade assessment in 1999. See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Performance at TIMSS International Benchmarks in Science

TIMSS 2019 International Benchmarks

To provide an interpretation of the results on the TIMSS fourth grade science achievement scale in relation to the students' performance on the assessment items, TIMSS describes achievement at four points along the scale as International Benchmarks: Advanced International Benchmark (625), High International Benchmark (550), Intermediate International Benchmark (475), and Low International Benchmark (400). The descriptions of science achievement at the International Benchmarks were updated from TIMSS 2015 based on an analysis of the items that students with average achievement at each of the benchmarks answered successfully in TIMSS 2019.

Exhibit 2.7 summarizes what fourth grade students who reached each of the TIMSS International Benchmarks in 2019 could do in science. The progression in science achievement is evident from benchmark to benchmark, from showing limited knowledge of science facts at the Low International Benchmark to communicating their science understanding about a variety of topics in life science, physical science, and Earth science at the Advanced International Benchmark. As much as possible, each description references achievement in the three content areas covered in the assessment at the fourth grade, as well as science practices assessed by TIMSS. Science practices include skills from daily life and school studies that students use systematically to conduct scientific inquiry and investigation. The following tables show the target percentages for the content and cognitive domains.

Target Percentages of Assessment Devoted to Content and Cognitive Domains – TIMSS 2019 Fourth Grade Science

Content Domain	Percentage
Life Science	45%
Physical Science	35%
Earth Science	20%

Cognitive Domain	Percentage
Knowing	40%
Applying	40%
Reasoning	20%

The interactive map of the benchmark descriptions links to example items. It provides an overview of the science understanding demonstrated by the fourth grade students who performed at the four different levels on the achievement scale. The following sections provide more information about students' achievement in TIMSS 2019 at each International Benchmark as well as more detailed descriptions of each level together with example items.

Exhibit 2.7: Summary of the TIMSS 2019 International Benchmarks of Science Achievement

● **Advanced** International Benchmark	
625	*Students communicate their understanding of life, physical, and Earth sciences and demonstrate some knowledge of the process of scientific inquiry.* Students demonstrate knowledge of characteristics and life processes of a variety of organisms. They can communicate understanding of relationships in ecosystems and interactions between organisms and their environment. They communicate understanding of properties and states of matter and physical and chemical changes. Students communicate understanding of Earth's physical characteristics, processes, and history and show knowledge of Earth's revolution and rotation.
○ **High** International Benchmark	
550	*Students communicate and apply knowledge of life, physical, and Earth sciences.* Students communicate knowledge of characteristics of plants, animals, and their life cycles, and apply knowledge of ecosystems and of humans' and organisms' interactions with their environment. Students demonstrate knowledge of states and properties of matter and of energy transfer in practical contexts, and show some understanding of forces and motion. Students know various facts about the Earth's physical characteristics and show basic understanding of the Earth-Moon-Sun system.
● **Intermediate** International Benchmark	
475	*Students show knowledge and understanding of some aspects of science.* Students demonstrate some basic knowledge of plants and animals. They demonstrate knowledge about some properties of matter and some facts related to electricity, and can apply elementary knowledge of forces and motion. They show some understanding of Earth's physical characteristics.
○ **Low** International Benchmark	
400	*Students show limited understanding of scientific concepts and limited knowledge of foundational science facts.*

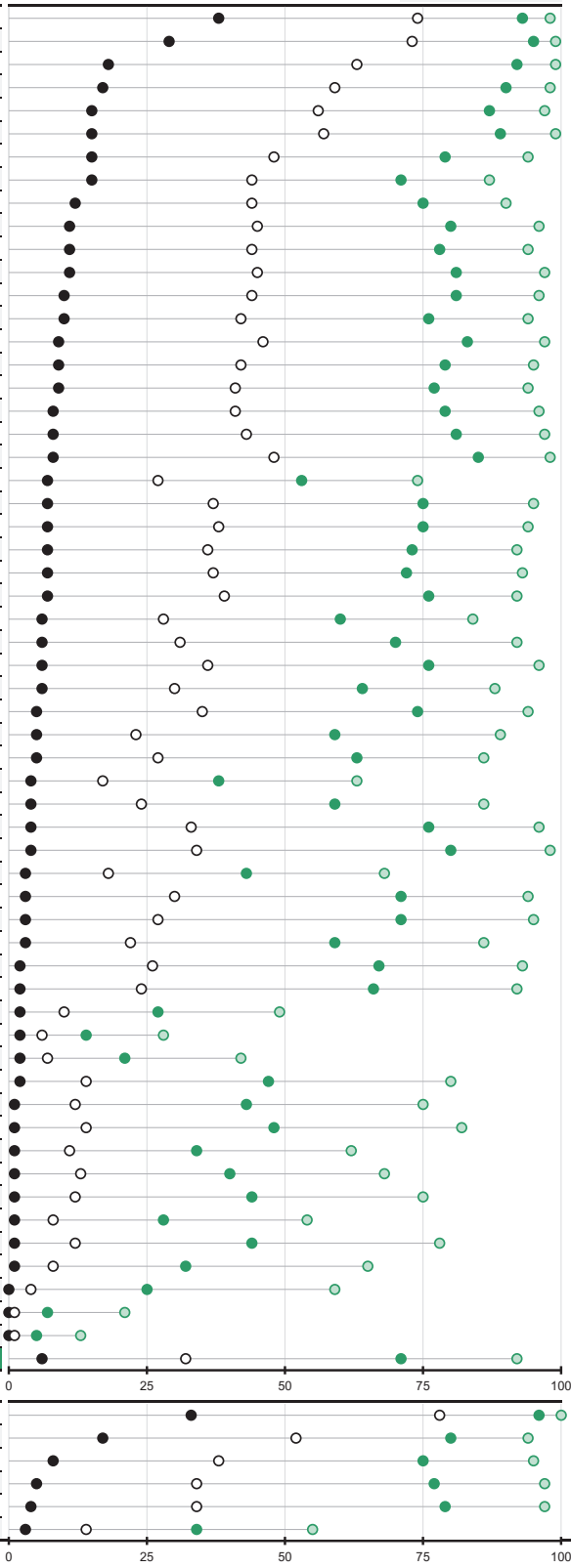
SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Percentages of Students Reaching International Benchmarks

Exhibit 2.8 presents the percentage of students reaching each TIMSS 2019 International Benchmark. The results are presented in descending order according to the percentage of students reaching the Advanced International Benchmark, which is indicated in the graph with black dots. Because students who reached the Advanced Benchmark also reached the other benchmarks, the percentages illustrated in the exhibit and shown in the columns to the right are cumulative. The two highest-performing countries had the highest percentages of students reaching the Advanced International Benchmark—38 percent in Singapore and 29 percent in Korea. The Russian Federation and Japan were next with 17–18 percent.

Most countries had fewer than 10 percent of their fourth grade students performing at the Advanced Benchmark. In general, more countries are having success in educating their fourth grade students to a minimal level of proficiency in science than to an advanced level. As a point of reference, Exhibit 2.8 provides the international median percentage of students reaching each benchmark at the bottom of the four right-hand columns. By definition, half the countries have a percentage in that column above the median and half below the median. The median percentages of students reaching the International Benchmarks were as follows: Advanced—6 percent, High—32 percent, Intermediate—71 percent, and Low—92 percent. Many TIMSS 2019 countries had more than 90 percent of their fourth grade students reaching the Low Benchmark, and in three countries—Korea, the Russian Federation, and Chinese Taipei—essentially all the students (99%) reached this benchmark.

Exhibit 2.8: Percentages of Students Reaching International Benchmarks of Science Achievement



Country	Advanced Benchmark (625)	High Benchmark (550)	Intermediate Benchmark (475)	Low Benchmark (400)
[3] Singapore	38 (1.9)	74 (1.7)	93 (0.9)	98 (0.4)
Korea, Rep. of	29 (1.2)	73 (1.3)	95 (0.6)	99 (0.2)
[2] Russian Federation	18 (1.3)	63 (1.9)	92 (1.0)	99 (0.3)
Japan	17 (0.8)	59 (1.2)	90 (0.7)	98 (0.4)
Finland	15 (1.1)	56 (1.4)	87 (1.0)	97 (0.5)
Chinese Taipei	15 (0.9)	57 (1.1)	89 (0.9)	99 (0.3)
[2] † United States	15 (0.8)	48 (1.3)	79 (1.1)	94 (0.6)
Bulgaria	15 (1.0)	44 (2.0)	71 (2.1)	87 (1.4)
[2] Turkey (5)	12 (1.0)	44 (1.9)	75 (1.7)	90 (1.1)
Sweden	11 (1.0)	45 (1.8)	80 (1.5)	96 (0.6)
Australia	11 (0.9)	44 (1.5)	78 (1.2)	94 (0.7)
[2] Lithuania	11 (0.9)	45 (1.5)	81 (1.4)	97 (0.4)
[2] England	10 (1.1)	44 (1.7)	81 (1.2)	96 (0.6)
Hungary	10 (0.6)	42 (1.3)	76 (1.4)	94 (0.7)
† Norway (5)	9 (0.7)	46 (1.6)	83 (1.2)	97 (0.5)
Poland	9 (0.8)	42 (1.6)	79 (1.3)	95 (0.5)
Ireland	9 (0.6)	41 (1.6)	77 (1.7)	94 (0.8)
† Hong Kong SAR	8 (0.9)	41 (1.8)	79 (1.6)	96 (0.6)
Czech Republic	8 (0.9)	43 (2.2)	81 (1.2)	97 (0.5)
[2] Latvia	8 (0.9)	48 (1.6)	85 (1.2)	98 (0.5)
United Arab Emirates	7 (0.4)	27 (0.7)	53 (0.9)	74 (0.7)
[1 2] Canada	7 (0.6)	37 (1.1)	75 (1.0)	95 (0.4)
Austria	7 (0.7)	38 (1.4)	75 (1.4)	94 (0.8)
[2] Serbia	7 (0.7)	36 (1.7)	73 (1.5)	92 (1.0)
Germany	7 (0.9)	37 (1.3)	72 (1.2)	93 (0.7)
[2] Slovak Republic	7 (0.8)	39 (1.5)	76 (1.6)	92 (1.2)
Bahrain	6 (0.7)	28 (1.3)	60 (1.5)	84 (1.1)
Cyprus	6 (0.8)	31 (1.6)	70 (1.5)	92 (0.8)
† Denmark	6 (0.7)	36 (1.3)	76 (1.3)	96 (0.5)
[2] New Zealand	6 (0.5)	30 (1.3)	64 (1.2)	88 (0.8)
† Northern Ireland	5 (0.7)	35 (1.4)	74 (1.5)	94 (0.7)
[2] Kazakhstan	5 (0.8)	23 (1.5)	59 (1.7)	89 (1.0)
Malta	5 (0.4)	27 (0.8)	63 (0.8)	86 (0.7)
Oman	4 (0.8)	17 (1.3)	38 (1.4)	63 (1.2)
Albania	4 (0.5)	24 (1.5)	59 (1.8)	86 (1.4)
≡ Netherlands	4 (0.9)	33 (1.7)	76 (1.7)	96 (0.6)
Croatia	4 (0.5)	34 (1.4)	80 (1.3)	98 (0.4)
Qatar	3 (0.6)	18 (1.2)	43 (1.7)	68 (1.5)
Spain	3 (0.5)	30 (1.1)	71 (1.3)	94 (0.7)
Italy	3 (0.7)	27 (1.8)	71 (1.6)	95 (0.8)
France	3 (0.4)	22 (1.3)	59 (1.6)	86 (1.0)
[2] Portugal	2 (0.4)	26 (1.4)	67 (1.5)	93 (0.6)
† Belgium (Flemish)	2 (0.3)	24 (1.1)	66 (1.5)	92 (0.6)
Kuwait	2 (0.4)	10 (1.3)	27 (2.0)	49 (2.1)
ж South Africa (5)	2 (0.3)	6 (0.6)	14 (1.2)	28 (1.5)
Ψ Morocco	2 (0.7)	7 (1.1)	21 (1.6)	42 (2.0)
Armenia	2 (0.4)	14 (1.2)	47 (1.7)	80 (1.5)
[1] Georgia	1 (0.4)	12 (1.1)	43 (2.1)	75 (1.8)
Chile	1 (0.2)	14 (0.9)	48 (1.8)	82 (1.3)
North Macedonia	1 (0.4)	11 (1.3)	34 (2.5)	62 (2.6)
Iran, Islamic Rep. of	1 (0.3)	13 (1.0)	40 (1.7)	68 (1.8)
Montenegro	1 (0.2)	12 (0.9)	44 (1.6)	75 (0.9)
[2] Saudi Arabia	1 (0.2)	8 (0.6)	28 (1.1)	54 (1.5)
Bosnia and Herzegovina	1 (0.2)	12 (0.9)	44 (1.5)	78 (1.4)
Azerbaijan	1 (0.2)	8 (0.6)	32 (1.3)	65 (1.5)
[2] Kosovo	0 (0.1)	4 (0.6)	25 (1.6)	59 (1.7)
[2] ж Pakistan	0 (0.1)	1 (0.4)	7 (1.4)	21 (3.2)
[2] ж Philippines	0 (0.0)	1 (0.3)	5 (0.7)	13 (1.4)
International Median	**6**	**32**	**71**	**92**
Benchmarking Participants				
Moscow City, Russian Fed.	33 (1.4)	78 (1.2)	96 (0.5)	100 (0.1)
[2] Dubai, UAE	17 (0.8)	52 (0.8)	80 (0.7)	94 (0.5)
[2] Ontario, Canada	8 (1.0)	38 (1.8)	75 (1.7)	95 (0.8)
Quebec, Canada	5 (0.7)	34 (1.5)	77 (1.7)	97 (0.5)
Madrid, Spain	4 (0.7)	34 (1.2)	79 (1.3)	97 (0.4)
Abu Dhabi, UAE	3 (0.3)	14 (0.8)	34 (0.9)	55 (1.0)

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.
See Appendix B.2 for target population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Trends in Percentages of Students Reaching International Benchmarks

Exhibit 2.9 shows the changes in percentages of students reaching the benchmarks for countries that have comparable data from previous assessments. Most recently, there were about as many decreases as increases at each level across the distribution. Of the 44 countries participating in both 2015 and 2019, 5 increased and 5 decreased at the Advanced International Benchmark, 8 increased and 7 decreased at the High Benchmark, 7 increased and 9 decreased at the Intermediate Benchmark, and 9 increased and 6 decreased at the Low Benchmark.

The recent trends from 2015 differ from previous assessments, when the countries made progress at all but the Advanced Benchmark. The pattern across the benchmarks between 2007 and 2019 shows decreases at the Advanced Benchmark but increases at the other three levels. Of the 21 countries that also participated in TIMSS 2007, 4 increased and 8 decreased at the Advanced International Benchmark, 7 increased and 4 decreased at the High Benchmark, 9 increased and 3 decreased at the Intermediate Benchmark, and 6 increased and only 1 decreased at the Low Benchmark. For the 16 countries with data for 1995 and 2019, although the Advanced International Benchmark had 7 increases and 5 decreases, there were substantial gains at the other three levels—High International Benchmark with 9 increases and 2 decreases, Intermediate International Benchmark with 11 increases and 2 decreases, and Low International Benchmark with 10 increases and 1 decrease.

Exhibit 2.9: Percentages of Students Reaching International Benchmarks of Science Achievement Across Assessment Years

Country	Advanced International Benchmark (625)						High International Benchmark (550)					
	Percent of Students						Percent of Students					
	2019	2015	2011	2007	2003	1995	2019	2015	2011	2007	2003	1995
Singapore	38	37	33	36	25 ▲	14 ▲	74	71	68 ▲	68 ▲	61 ▲	42 ▲
Korea, Rep. of	29	29	29			22 ▲	73	75	73			67 ▲
Russian Federation	18	20	16	16	11 ▲		63	62	52 ▲	49 ▲	39 ▲	
Japan	17	19	14 ▲	12 ▲	12 ▲	15 ▲	59	63 ▽	58	51 ▲	49 ▲	54 ▲
Finland	15	13	20 ▽				56	54	65 ▽			
Chinese Taipei	15	14	15	19 ▽	14		57	56	53 ▲	55	52 ▲	
United States	15	16	15	15	13	19 ▽	48	51	49	47	45	50
Bulgaria	15	16					44	50				
Sweden	11	11	10	8 ▲			45	47	44	37 ▲		
Australia	11	8 ▲	7 ▲	10	9	13	44	39 ▲	35 ▲	41	38 ▲	40
Lithuania	11	7 ▲	4 ▲	3 ▲	3 ▲		45	39 ▲	31 ▲	30 ▲	30 ▲	
England	10	10	11	14 ▽	15 ▽	15 ▽	44	43	42	48	47	42
Hungary	10	14 ▽	13 ▽	13 ▽	10	7 ▲	42	50 ▽	46	47 ▽	42	32 ▲
Norway (5)	9	7					46	44				
Poland	9	12 ▽					42	51 ▽				
Ireland	9	7	7			8	41	40	35 ▲			36 ▲
Hong Kong SAR	8	16 ▽	9	14 ▽	7	5 ▲	41	55 ▽	45	55 ▽	47 ▽	30 ▲
Czech Republic	8	9	10	7		12 ▽	43	43	44	33 ▲		42
Latvia	8				8		48				41 ▲	
United Arab Emirates	7	6	3 ▲				27	22 ▲	14 ▲			
Canada	7	7					37	38				
Austria	7		8	9		13 ▽	38		42 ▽	39		45 ▽
Serbia	7	8	8				36	40 ▽	35			
Germany	7	8	7	10 ▽			37	40	39	41 ▽		
Slovak Republic	7	9	10 ▽	11 ▽			39	40	44 ▽	42		
Bahrain	6	4 ▲	4 ▲				28	19 ▲	17 ▲			
Cyprus	6	2 ▲			2 ▲	1 ▲	31	18 ▲			17 ▲	11 ▲
Denmark	6	7	8 ▽	7			36	39	39	35		
New Zealand	6	6	5	8 ▽	9 ▽	11 ▽	30	32	28	32	38 ▽	35 ▽
Northern Ireland	5	5	5				35	34	33			
Kazakhstan	5		7				23		28 ▽			
Malta	5		2 ▲				27		14 ▲			
Oman	4	4	1 ▲				17	16	7 ▲			
Netherlands	4	3	3	4	3	6	33	30	37	34	32	38
Croatia	4	6 ▽	3				34	41 ▽	30 ▲			
Qatar	3	3	2				18	15	11 ▲			
Spain	3	5 ▽	4				30	34 ▽	28			
Italy	3	4	8 ▽	13 ▽	9 ▽		27	32	37 ▽	44 ▽	35 ▽	
France	3	2					22	20				
Portugal	2	2	7 ▽			2	26	25	35 ▽			13 ▲
Belgium (Flemish)	2	3	2		2		24	27	24		28 ▽	
Kuwait	2	1 ▲					10	4 ▲				
Morocco	2	1	0 ▲				7	5	1 ▲			
Armenia	2	1	1 ▲		2		14	10 ▲	6 ▲		10 ▲	
Georgia	1	1	1	1 ▲			12	12	13	5 ▲		
Chile	1	2	2 ▽				14	16	19 ▽			
Iran, Islamic Rep. of	1	1	3 ▽	2	1 ▲	0 ▲	13	9 ▲	16 ▽	12	7 ▲	3 ▲
Saudi Arabia	1	1	3 ▽				8	8	12 ▽			
Azerbaijan	1		2 ▽				8		13 ▽			
Philippines	0				2		1				6 ▽	
Benchmarking Participants												
Dubai, UAE	17	14 ▲	6 ▲	4 ▲			52	42 ▲	23 ▲	21 ▲		
Ontario, Canada	8	9	9	12 ▽	13 ▽	10	38	41	40	45 ▽	47 ▽	37
Quebec, Canada	5	6	3 ▲	5	3 ▲	9 ▽	34	35	29 ▲	32	25 ▲	40
Abu Dhabi, UAE	3	4	2 ▲				14	15	10 ▲			

▲ 2019 percent significantly higher

▽ 2019 percent significantly lower

An empty cell indicates a country did not participate in that year's assessment or did not have comparable data.
See Appendix A for country participation in previous TIMSS assessments.
Results for Lithuania before 2015 do not include students taught in Polish or Russian.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.9: Percentages of Students Reaching International Benchmarks of Science Achievement Across Assessment Years

(Continued)

Country	Intermediate International Benchmark (475) Percent of Students						Low International Benchmark (400) Percent of Students					
	2019	2015	2011	2007	2003	1995	2019	2015	2011	2007	2003	1995
Singapore	93	90	89 ▲	88 ▲	86 ▲	71 ▲	98	97	97 ▲	96 ▲	95 ▲	89 ▲
Korea, Rep. of	95	96	95			93	99	100	99			99
Russian Federation	92	91	86 ▲	82 ▲	74 ▲		99	99	98 ▲	96 ▲	93 ▲	
Japan	90	93 ▽	90	86 ▲	84 ▲	87 ▲	98	99	99	97	96 ▲	97
Finland	87	89	92 ▽				97	99	99 ▽			
Chinese Taipei	89	88	85 ▲	86 ▲	87		99	98	97 ▲	97 ▲	98	
United States	79	81 ▽	81 ▽	78	78	78	94	95 ▽	96 ▽	94	94	92
Bulgaria	71	77 ▽					87	90				
Sweden	80	82	79	76 ▲			96	96	95	95		
Australia	78	75	72 ▲	76	74	72 ▲	94	94	91 ▲	93	92	89 ▲
Lithuania	81	78	73 ▲	74 ▲	73 ▲		97	96	95 ▲	95	95 ▲	
England	81	81	76 ▲	81	79	72 ▲	96	97	93 ▲	95	94 ▲	90 ▲
Hungary	76	81	78	78	76	67 ▲	94	94	93	93	94	90 ▲
Norway (5)	83	85					97	98				
Poland	79	85 ▽					95	97 ▽				
Ireland	77	79	72 ▲			70 ▲	94	96	92			91 ▲
Hong Kong SAR	79	88 ▽	82	88 ▽	87 ▽	69 ▲	96	98 ▽	96	98 ▽	98 ▽	91 ▲
Czech Republic	81	81	81	72 ▲		77 ▲	97	96	97	93 ▲		95 ▲
Latvia	85				80 ▲		98				96 ▲	
United Arab Emirates	53	46 ▲	36 ▲				74	67 ▲	61 ▲			
Canada	75	77					95	95				
Austria	75		79 ▽	76		79 ▽	94		96	93		94
Serbia	73	77	72				92	93	91			
Germany	72	78 ▽	78 ▽	76 ▽			93	96 ▽	96 ▽	94		
Slovak Republic	76	74	79	75			92	91	94	92		
Bahrain	60	47 ▲	43 ▲				84	72 ▲	70 ▲			
Cyprus	70	56 ▲			55 ▲	39 ▲	92	86 ▲			86 ▲	74 ▲
Denmark	76	78	78	72 ▲			96	96	95	93 ▲		
New Zealand	64	67	63	65	73 ▽	66	88	88	86	87	91 ▽	85
Northern Ireland	74	76	74				94	95	94			
Kazakhstan	59		58				89		84 ▲			
Malta	63		41 ▲				86		70 ▲			
Oman	38	38	23 ▲				63	61	45 ▲			
Netherlands	76	76	86 ▽	79	83 ▽	82 ▽	96	97	99 ▽	97	99 ▽	98 ▽
Croatia	80	83	75 ▲				98	98	96 ▲			
Qatar	43	39	29 ▲				68	64 ▲	50 ▲			
Spain	71	74	67				94	95	92			
Italy	71	75	76 ▽	78 ▽	70		95	95	95	94	91 ▲	
France	59	58					86	88				
Portugal	67	72 ▽	75 ▽			43 ▲	93	96 ▽	95			73 ▲
Belgium (Flemish)	66	73 ▽	73 ▽		79 ▽		92	96 ▽	96 ▽		98 ▽	
Kuwait	27	15 ▲					49	33 ▲				
Morocco	21	17	6 ▲				42	35 ▲	16 ▲			
Armenia	47	38 ▲	26 ▲		38 ▲		80	70 ▲	58 ▲		66 ▲	
Georgia	43	41	44	26 ▲			75	74	75	59 ▲		
Chile	48	53 ▽	54 ▽				82	85	85			
Iran, Islamic Rep. of	40	33 ▲	44 ▽	36	28 ▲	15 ▲	68	61 ▲	72	65	58 ▲	42 ▲
Saudi Arabia	28	25 ▲	35 ▽				54	48 ▲	63 ▽			
Azerbaijan	32		37				65		65			
Philippines	5				19 ▽		13				34 ▽	
Benchmarking Participants												
Dubai, UAE	80	70 ▲	48 ▲	48 ▲			94	86 ▲	72 ▲	72 ▲		
Ontario, Canada	75	79	77	79	81 ▽	71	95	96	94	95	96	90 ▲
Quebec, Canada	77	78	76	74	66 ▲	77	97	97	97	96	91 ▲	94 ▲
Abu Dhabi, UAE	34	35	30				55	55	55			

▲ 2019 percent significantly higher

▽ 2019 percent significantly lower

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Low Benchmark: Full Description and Example Items

Exhibit 2.10 provides the description of fourth grade students' achievement at the Low International Benchmark. Students demonstrated limited understanding of scientific concepts and limited knowledge of foundational science facts in life science, physical science, and Earth science.

Exhibit 2.10.1 shows an example item from the life science domain. On average, 74 percent of the students were able to recognize that the frog was the animal with a backbone. The top performing students on this item were in Hungary and Latvia with 88–89 percent correct.

Exhibit 2.10: Description of the TIMSS 2019 Low International Benchmark (400) of Science Achievement

Low International Benchmark

400

Summary

Students show limited understanding of scientific concepts and limited knowledge of foundational science facts.

Students at this level can recognize that some animals have backbones, that some materials conduct heat better than others, and that water and soil are natural resources.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

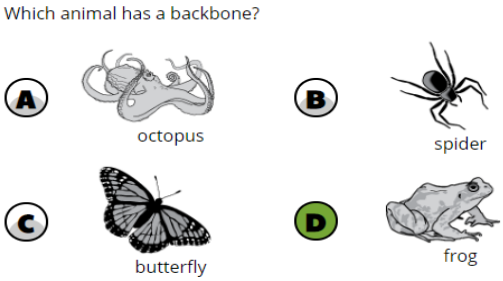
Exhibit 2.10.1: Low International Benchmark of Science Achievement – Example Item 1

Country	Percent Correct	
Hungary	89 (1.6)	▲
2 Latvia	88 (1.6)	▲
Croatia	87 (1.6)	▲
Korea, Rep. of	87 (1.6)	▲
Albania	86 (2.5)	▲
Armenia	85 (1.7)	▲
Chinese Taipei	85 (1.4)	▲
2 Slovak Republic	84 (1.7)	▲
† Norway (5)	83 (2.0)	▲
1 Georgia	83 (1.8)	▲
Bulgaria	83 (2.1)	▲
2† United States	82 (1.2)	▲
2 Serbia	82 (1.9)	▲
Poland	81 (1.6)	▲
Bosnia and Herzegovina	81 (1.7)	▲
2 Turkey (5)	81 (1.8)	▲
Czech Republic	81 (1.9)	▲
North Macedonia	81 (2.1)	▲
2 Russian Federation	80 (1.9)	▲
Japan	80 (1.5)	▲
† Denmark	79 (2.0)	▲
Malta	79 (1.7)	▲
Finland	79 (1.7)	▲
Sweden	79 (1.9)	▲
Australia	78 (1.7)	▲
2 New Zealand	78 (1.8)	▲
1 2 Canada	78 (1.5)	▲
2 Kazakhstan	77 (1.8)	
2 England	77 (2.4)	
France	76 (2.0)	
Azerbaijan	76 (2.0)	
† Northern Ireland	76 (2.0)	
Ireland	76 (2.1)	
Montenegro	75 (1.7)	
Cyprus	75 (1.8)	
2 Lithuania	74 (2.0)	
International Average	**74 (0.3)**	
Morocco	74 (1.7)	
2 Kosovo	74 (1.8)	
† Hong Kong SAR	74 (2.3)	
Germany	73 (2.0)	
Italy	73 (2.2)	
Oman	73 (2.0)	
Austria	72 (2.2)	
United Arab Emirates	72 (1.0)	▽
3 Singapore	72 (1.5)	
Spain	71 (2.7)	
Qatar	70 (2.2)	▽
Chile	67 (2.1)	▽
Bahrain	67 (1.8)	▽
Iran, Islamic Rep. of	64 (2.1)	▽
Kuwait	61 (2.6)	▽
2 Pakistan	61 (3.2)	▽
2 Saudi Arabia	61 (1.8)	▽
2 Portugal	60 (2.3)	▽
South Africa (5)	58 (1.6)	▽
2 Philippines	56 (2.5)	▽
† Belgium (Flemish)	35 (2.1)	▽
≡ Netherlands	27 (2.4)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	79 (1.7)	▲
2 Ontario, Canada	79 (2.1)	▲
2 Dubai, UAE	78 (1.9)	▲
Quebec, Canada	73 (2.6)	
Madrid, Spain	69 (2.4)	▽
Abu Dhabi, UAE	66 (1.6)	▽

Content Domain: Life Science

Cognitive Domain: Knowing

Description: Recognizes an animal that has a backbone



▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Intermediate Benchmark: Full Description and Example Items

Exhibit 2.11 provides the description of student achievement at the Intermediate International Benchmark. At this level, students showed knowledge and understanding of some aspects of science across the three content domains.

Exhibit 2.11.1 presents an item from the life science domain. It illustrates that students reaching the Intermediate Benchmark understood why plastic objects in the ocean are dangerous for sea animals. Sweden, Finland, and Norway (fifth grade) had best achievement on this item, 85–86 percent correct. The international average was 57 percent.

Exhibit 2.11.2 shows an item from the physical science domain. On average, internationally, 66 percent of fourth grade students recognized why wheels on a wagon make it easier to pull. Finland and Korea had the highest percentage correct—87–88 percent.

Exhibit 2.11: Description of the TIMSS 2019 Intermediate International Benchmark (475) of Science Achievement

Intermediate International Benchmark

475

Summary

Students show knowledge and understanding of some aspects of science. Students demonstrate some basic knowledge of plants and animals. They demonstrate knowledge about some properties of matter and some facts related to electricity, and can apply elementary knowledge of forces and motion. They show some understanding of Earth's physical characteristics.

Students show basic knowledge of what plants and animals need to survive as well as some knowledge of the characteristics of animals.

Students can recognize different properties of matter, demonstrate understanding of simple electrical circuits, and apply elementary knowledge of forces and motion, such as the force between a magnet and different materials.

Students show some understanding of Earth's physical characteristics.

Students can relate information in diagrams to some basic science concepts.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit 2.11.1: Intermediate International Benchmark of Science Achievement – Example Item 1

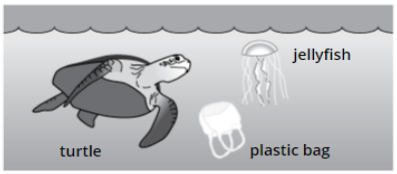
Country	Percent Full Credit	
Sweden	86 (1.8)	▲
Finland	85 (1.4)	▲
† Norway (5)	85 (1.9)	▲
Australia	84 (1.6)	▲
Japan	83 (1.6)	▲
≡ Netherlands	83 (1.8)	▲
3 Singapore	83 (1.2)	▲
Cyprus	83 (1.7)	▲
2 England	81 (2.1)	▲
Ireland	81 (1.9)	▲
2† United States	79 (1.2)	▲
† Denmark	78 (2.2)	▲
† Belgium (Flemish)	78 (2.1)	▲
† Northern Ireland	76 (2.5)	▲
Malta	76 (1.8)	▲
Chinese Taipei	75 (2.2)	▲
1 2 Canada	75 (1.6)	▲
2 Russian Federation	74 (2.3)	▲
Czech Republic	73 (1.9)	▲
Germany	73 (2.1)	▲
Korea, Rep. of	73 (2.1)	▲
2 Lithuania	71 (1.9)	▲
Spain	70 (2.0)	▲
2 New Zealand	70 (1.7)	▲
2 Portugal	70 (2.2)	▲
Austria	70 (2.2)	▲
Hungary	68 (2.0)	▲
Poland	67 (1.9)	▲
Italy	65 (2.1)	▲
2 Slovak Republic	63 (2.4)	▲
France	62 (2.6)	▲
† Hong Kong SAR	62 (3.0)	
Chile	61 (2.1)	
2 Latvia	60 (2.2)	
2 Turkey (5)	58 (2.4)	
International Average	**57 (0.3)**	
2 Serbia	54 (2.7)	
Croatia	51 (2.3)	▽
Bahrain	48 (2.2)	▽
Armenia	45 (2.4)	▽
Qatar	45 (2.6)	▽
United Arab Emirates	44 (1.0)	▽
Bulgaria	42 (3.1)	▽
Albania	40 (2.9)	▽
Bosnia and Herzegovina	39 (2.5)	▽
1 Georgia	36 (2.8)	▽
Montenegro	35 (2.1)	▽
Oman	34 (2.1)	▽
2 Kazakhstan	33 (2.0)	▽
South Africa (5)	28 (1.5)	▽
Kuwait	28 (2.0)	▽
Iran, Islamic Rep. of	21 (1.8)	▽
Morocco	21 (1.9)	▽
Azerbaijan	20 (1.9)	▽
North Macedonia	19 (2.3)	▽
2 Kosovo	17 (1.9)	▽
2 Saudi Arabia	14 (1.4)	▽
2 Philippines	11 (1.5)	▽
2 Pakistan	7 (1.9)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	78 (2.0)	▲
Madrid, Spain	76 (2.6)	▲
2 Ontario, Canada	76 (2.7)	▲
Quebec, Canada	73 (2.4)	▲
2 Dubai, UAE	60 (2.1)	
Abu Dhabi, UAE	34 (1.4)	▽

Content Domain: Life Science

Cognitive Domain: Knowing

Description: States one reason why plastic objects in the ocean are dangerous for sea animals

The picture shows a turtle and jellyfish swimming in the ocean. A plastic bag is floating nearby.



Write down one reason why plastic objects in the ocean are dangerous for animals such as turtles.

The turtle's flippers could get tangled up in the bag and make it hard for it to swim.

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.11.2: Intermediate International Benchmark of Science Achievement – Example Item 2

Country	Percent Correct	
Finland	88 (1.4)	▲
Korea, Rep. of	87 (1.6)	▲
3 Singapore	85 (1.2)	▲
Chinese Taipei	85 (1.5)	▲
† Hong Kong SAR	83 (2.1)	▲
2 Russian Federation	82 (2.1)	▲
2 Lithuania	82 (1.9)	▲
Sweden	81 (1.7)	▲
Ireland	80 (1.9)	▲
2 Latvia	80 (2.0)	▲
2 England	77 (2.1)	▲
† Northern Ireland	76 (2.0)	▲
2 Serbia	76 (2.3)	▲
Australia	76 (2.1)	▲
Hungary	75 (1.9)	▲
† Belgium (Flemish)	74 (2.2)	▲
† Denmark	73 (2.0)	▲
Poland	72 (1.8)	▲
Italy	72 (2.6)	▲
Germany	72 (2.2)	▲
2 New Zealand	72 (2.0)	▲
1 2 Canada	72 (2.1)	▲
2† United States	71 (1.4)	▲
† Norway (5)	71 (2.2)	▲
2 Slovak Republic	70 (2.1)	▲
Croatia	70 (2.8)	
≡ Netherlands	70 (2.4)	
Czech Republic	69 (2.2)	
2 Kazakhstan	68 (1.9)	
Cyprus	68 (1.8)	
Austria	67 (2.2)	
Spain	67 (2.1)	
International Average	**66 (0.3)**	
Malta	66 (2.2)	
Japan	66 (2.2)	
Bulgaria	65 (2.8)	
Albania	64 (2.3)	
Bahrain	63 (1.8)	
2 Portugal	62 (1.9)	▽
Iran, Islamic Rep. of	61 (2.3)	▽
United Arab Emirates	61 (0.8)	▽
2 Turkey (5)	60 (2.6)	▽
Azerbaijan	60 (2.2)	▽
Bosnia and Herzegovina	58 (2.1)	▽
France	58 (2.1)	▽
1 Georgia	55 (2.7)	▽
Qatar	54 (2.2)	▽
2 Kosovo	54 (2.2)	▽
Montenegro	53 (2.1)	▽
Oman	53 (1.8)	▽
North Macedonia	51 (3.0)	▽
Chile	50 (2.1)	▽
2 Saudi Arabia	49 (2.3)	▽
Armenia	48 (2.4)	▽
South Africa (5)	47 (1.5)	▽
Kuwait	45 (2.1)	▽
Morocco	41 (2.0)	▽
2 Pakistan	39 (4.7)	▽
2 Philippines	36 (2.0)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	88 (1.7)	▲
2 Dubai, UAE	77 (1.6)	▲
Madrid, Spain	73 (2.6)	▲
2 Ontario, Canada	72 (3.7)	
Quebec, Canada	68 (2.4)	
Abu Dhabi, UAE	52 (1.4)	▽

Content Domain: Physical Science

Cognitive Domain: Applying

Description: Recognizes the best explanation for why a box on a cart is easier to pull than a box resting directly on the floor

Tina and Mary need to move identical heavy boxes. Tina has to pull harder on her box to move it than Mary does.

Why is it easier for Mary to move her box?

A. Gravity acting on Tina's box is much stronger.

B. Air resistance acting on Tina's box is much greater.

C. The cart increases the magnetic force acting on Mary's box.

D. The cart's wheels decrease the force needed to move Mary's box.

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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High Benchmark: Full Description and Example Items

Exhibit 2.12 presents the description of achievement at the High International Benchmark. Fourth grade students reaching this level could communicate and apply knowledge about various topics in life science, physical science, and Earth science.

Exhibit 2.12.1 provides an example from the life science domain. When shown a picture of a desert, 45 percent of students, on average, identified two living things and two non-living things. Eighty-four percent of the Singaporean fourth grade students successfully completed this task.

Exhibit 2.12.2 shows an example from the physical science domain. On average, internationally, 64 percent of the fourth grade students recognized that a flashlight changed electrical energy into light energy. The highest achievement was posted by Chinese Taipei, Korea, and Hong Kong SAR—80–82 percent.

Exhibit 2.12.3 shows an example from the Earth science domain. Sixty-one percent of Finnish students could explain that the shape of the Moon changes during the month. The average across countries was 37 percent.

Exhibit 2.12: Description of the TIMSS 2019 High International Benchmark (550) of Science Achievement

High International Benchmark

550

Summary

Students communicate and apply knowledge of life, physical, and Earth sciences. Students communicate knowledge of characteristics of plants, animals, and their life cycles, and apply knowledge of ecosystems and of humans' and organisms' interactions with their environment. Students demonstrate knowledge of states and properties of matter and of energy transfer in practical contexts, and show some understanding of forces and motion. Students know various facts about the Earth's physical characteristics and show basic understanding of the Earth-Moon-Sun system.

Students communicate knowledge of characteristics of plants and animals. For example, they can distinguish living things from nonliving things and demonstrate some knowledge of life cycles of plants and animals. Students can apply knowledge of ecosystems and of organisms' interactions with their environment. They can complete food chains and recognize some plant and animal features that provide advantages in a given environment. Students demonstrate an understanding of how germs spread.

Students demonstrate knowledge of states and properties of matter. They understand basic properties of magnets, including the forces between two magnets. Students show some elementary knowledge about how shadows are formed. They apply knowledge of energy transfer in practical contexts and show some understanding of forces and motion, including gravity and air resistance.

Students know various facts about the Earth's physical characteristics and climates, and show basic understanding of the Earth-Moon-Sun system.

Students can make simple inferences using models, tables, and diagrams.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 2.12.1: High International Benchmark of Science Achievement – Example Item 1

Country	Percent Full Credit	
[3] Singapore	84 (1.4)	▲
Armenia	79 (1.8)	▲
[2] Kazakhstan	71 (2.6)	▲
Cyprus	67 (2.4)	▲
[2] Russian Federation	67 (2.2)	▲
[2] Turkey (5)	67 (2.6)	▲
[2] Serbia	66 (2.7)	▲
Czech Republic	64 (1.7)	▲
Italy	63 (2.6)	▲
[2] Slovak Republic	62 (2.3)	▲
Hungary	62 (2.3)	▲
Croatia	62 (2.6)	▲
Bahrain	60 (1.5)	▲
United Arab Emirates	58 (1.1)	▲
Bulgaria	57 (2.6)	▲
Oman	56 (2.1)	▲
Montenegro	55 (1.9)	▲
† Norway (5)	55 (3.0)	▲
[2] Kosovo	55 (2.6)	▲
Malta	52 (2.2)	▲
[2†] United States	52 (1.6)	▲
Australia	51 (2.2)	▲
Qatar	51 (3.0)	▲
Sweden	50 (2.4)	
Poland	50 (2.6)	
Finland	49 (2.0)	▲
[2] Portugal	48 (2.3)	
[2] Latvia	47 (2.3)	
[2] Lithuania	47 (2.7)	
[2] Saudi Arabia	46 (2.0)	
[1 2] Canada	46 (1.3)	
Kuwait	46 (2.3)	
International Average	**45 (0.3)**	
Albania	39 (2.8)	▽
[2] England	38 (2.6)	▽
North Macedonia	38 (3.3)	▽
Bosnia and Herzegovina	38 (2.4)	▽
France	37 (2.2)	▽
Japan	37 (2.3)	▽
Korea, Rep. of	37 (2.4)	▽
Iran, Islamic Rep. of	35 (2.5)	▽
Ireland	34 (2.1)	▽
† Denmark	34 (2.4)	▽
[2] Pakistan	34 (3.6)	▽
Azerbaijan	33 (2.0)	▽
[2] New Zealand	32 (2.0)	▽
Spain	32 (2.2)	▽
[1] Georgia	31 (2.7)	▽
≡ Netherlands	30 (2.3)	▽
† Northern Ireland	29 (2.4)	▽
Austria	27 (2.4)	▽
South Africa (5)	27 (1.6)	▽
Morocco	27 (2.0)	▽
Germany	23 (1.9)	▽
† Hong Kong SAR	23 (2.3)	▽
Chile	20 (2.0)	▽
† Belgium (Flemish)	18 (1.7)	▽
[2] Philippines	15 (1.5)	▽
Chinese Taipei	10 (1.2)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	76 (1.9)	▲
[2] Dubai, UAE	72 (1.5)	▲
[2] Ontario, Canada	52 (2.1)	▲
Abu Dhabi, UAE	42 (1.3)	▽
Quebec, Canada	31 (2.0)	▽
Madrid, Spain	23 (1.9)	▽

Content Domain: Life Science

Cognitive Domain: Knowing

Description: Lists two living things and two nonliving things shown in a picture of a desert ecosystem

The picture below shows a desert.

What are two **living things** shown in the picture?

1. Camel
2. Cactus

What are two **non-living things** shown in the picture?

1. Rock
2. Sand

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 2.12.2: High International Benchmark of Science Achievement – Example Item 2

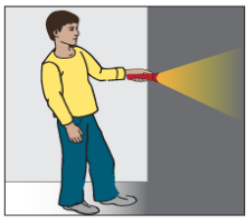
Country	Percent Correct	
Chinese Taipei	82 (1.8)	▲
Korea, Rep. of	81 (2.0)	▲
† Hong Kong SAR	80 (1.9)	▲
Sweden	77 (2.1)	▲
Croatia	75 (2.8)	▲
Finland	74 (2.0)	▲
Japan	74 (1.9)	▲
2 Lithuania	74 (2.1)	▲
Iran, Islamic Rep. of	73 (1.8)	▲
Poland	73 (2.0)	▲
Bulgaria	72 (2.5)	▲
3 Singapore	72 (1.6)	▲
† Belgium (Flemish)	71 (1.7)	▲
2 Slovak Republic	70 (2.3)	▲
2 Serbia	69 (2.1)	▲
† Norway (5)	69 (2.4)	▲
2 Russian Federation	69 (2.0)	▲
Spain	68 (2.0)	▲
Czech Republic	68 (2.2)	▲
† Denmark	67 (2.2)	
Australia	67 (2.0)	
2 Latvia	67 (2.6)	
France	66 (2.3)	
Bahrain	66 (1.8)	
Germany	66 (2.0)	
2 England	66 (2.3)	
Bosnia and Herzegovina	66 (1.8)	
Italy	65 (2.5)	
1 2 Canada	65 (1.4)	
2† United States	65 (1.6)	
Austria	64 (2.1)	
2 New Zealand	64 (2.1)	
International Average	**64 (0.3)**	
Hungary	64 (2.0)	
† Northern Ireland	63 (2.6)	
Ireland	62 (2.5)	
≡ Netherlands	62 (2.3)	
United Arab Emirates	62 (1.1)	
1 Georgia	62 (2.8)	
Qatar	61 (2.4)	
2 Turkey (5)	60 (2.4)	
2 Portugal	60 (2.1)	▽
Cyprus	59 (1.8)	▽
North Macedonia	59 (2.9)	
Malta	59 (2.0)	▽
2 Saudi Arabia	58 (2.1)	▽
Oman	57 (2.0)	▽
Kuwait	57 (2.2)	▽
Albania	56 (2.8)	▽
2 Kazakhstan	56 (2.1)	▽
Montenegro	56 (1.6)	▽
2 Kosovo	54 (2.5)	▽
Chile	52 (2.3)	▽
Azerbaijan	51 (2.4)	▽
Morocco	50 (1.9)	▽
South Africa (5)	50 (1.6)	▽
Armenia	49 (2.3)	▽
2 Philippines	42 (2.1)	▽
2 Pakistan	32 (3.3)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	88 (1.4)	▲
2 Dubai, UAE	73 (1.5)	▲
Quebec, Canada	72 (2.2)	▲
Madrid, Spain	66 (2.5)	
2 Ontario, Canada	61 (2.3)	
Abu Dhabi, UAE	51 (1.7)	▽

Content Domain: Physical Science

Cognitive Domain: Knowing

Description: Recognizes the energy change that occurs when a flashlight is turned on

Jake switches on a flashlight.



One kind of energy changes into another kind of energy in the flashlight.

Which statement describes this change?

A. Electrical energy changes into light energy.

B. Motion energy changes into light energy.

C. Light energy changes into electrical energy.

D. Light energy changes into motion energy.

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 2.12.3: High International Benchmark of Science Achievement – Example Item 3

Country	Percent Full Credit	
Finland	61 (2.0)	▲
† Norway (5)	58 (2.5)	▲
Australia	58 (2.0)	▲
2 Lithuania	56 (2.4)	▲
2† United States	55 (1.7)	▲
Korea, Rep. of	54 (2.1)	▲
2 Turkey (5)	53 (2.4)	▲
2 Russian Federation	53 (2.4)	▲
2 Portugal	52 (2.3)	▲
Sweden	52 (2.5)	▲
Japan	51 (2.1)	▲
3 Singapore	51 (1.8)	▲
Austria	50 (2.3)	▲
Germany	50 (2.3)	▲
Hungary	49 (2.4)	▲
Malta	49 (2.3)	▲
† Belgium (Flemish)	48 (2.1)	▲
Croatia	46 (3.3)	▲
Spain	46 (2.2)	▲
Chinese Taipei	44 (2.3)	▲
2 New Zealand	44 (2.5)	▲
2 Latvia	43 (2.2)	▲
2 Kazakhstan	43 (2.5)	▲
1 2 Canada	43 (1.6)	▲
2 Slovak Republic	42 (2.3)	▲
≡ Netherlands	41 (2.6)	
2 Serbia	41 (2.2)	
Bahrain	40 (1.7)	
Ireland	40 (2.4)	
Cyprus	40 (2.2)	
† Northern Ireland	39 (2.2)	
France	37 (2.4)	
Italy	37 (2.4)	
Czech Republic	37 (2.5)	
International Average	**37 (0.3)**	
2 England	36 (2.6)	
Poland	34 (2.2)	
† Denmark	34 (2.4)	
Armenia	33 (2.2)	
United Arab Emirates	30 (1.0)	▽
Bulgaria	30 (2.4)	▽
Chile	30 (1.8)	▽
Montenegro	28 (1.8)	▽
Albania	28 (2.3)	▽
1 Georgia	27 (2.1)	▽
Bosnia and Herzegovina	26 (1.8)	▽
Qatar	25 (2.0)	▽
† Hong Kong SAR	24 (2.0)	▽
2 Saudi Arabia	20 (1.7)	▽
Oman	19 (1.5)	▽
Azerbaijan	18 (1.6)	▽
South Africa (5)	17 (1.3)	▽
North Macedonia	17 (2.4)	▽
2 Kosovo	15 (1.4)	▽
Morocco	15 (1.8)	▽
Kuwait	15 (1.6)	▽
Iran, Islamic Rep. of	15 (1.6)	▽
2 Pakistan	8 (1.7)	▽
2 Philippines	4 (1.1)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	58 (2.1)	▲
Madrid, Spain	53 (2.5)	▲
Quebec, Canada	48 (2.5)	▲
2 Dubai, UAE	46 (1.8)	▲
2 Ontario, Canada	40 (3.0)	
Abu Dhabi, UAE	23 (1.5)	▽

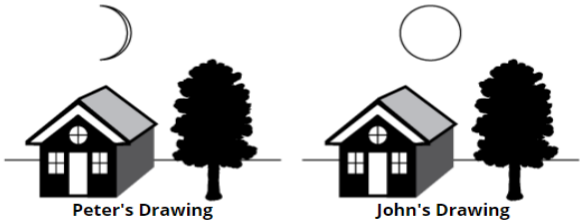
Content Domain: Earth Science

Cognitive Domain: Applying

Description: Using two pictures of the same location, explains that the Moon can look different at different times

One evening Peter went outside and made a drawing of a house, a tree, and the Moon. About 2 weeks later, Peter's brother, John, went outside and made a drawing of the same house, the same tree, and the Moon.

When they compared their drawings, they saw that they drew the Moon differently.



Peter's Drawing | John's Drawing

Whose drawing of the moon is correct?

(Click one box.)

- ☐ Only Peter's drawing of the moon can be correct.
- ☐ Only John's drawing of the moon can be correct.
- ☑ Both drawings of the moon can be correct.

Explain your answer.

The shape of the moon in the sky changes during the month. It looks different on different days.

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Advanced Benchmark: Full Description and Example Items

Exhibit 2.13 presents the description of fourth grade performance at the Advanced International Benchmark. Students reaching the Advanced level could communicate their understanding of science concepts in the three content areas and demonstrate familiarity with the process of scientific inquiry.

Exhibit 2.13.1 shows an item from the life science domain that asks students to identify two competitors in a food web. Bulgaria was by far the highest achieving country, with 69 percent correct. The international average was 30 percent.

Exhibits 2.13.2 and 2.13.3 present a two-part item from the physical science domain about an experiment involving dissolving sugar in water. Part A asked students to recognize three situations that would dissolve the sugar faster—higher water temperature, stirring the water, and smaller sugar cubes. Latvia had the highest percentage correct—74 percent. The international average was 37 percent. Part B asked why the amount of water in each beaker had to be same. The international average was only 21 percent. However, 66 percent of the Singaporean fourth grade students provided the correct explanation.

Exhibit 2.13.4 shows the example from the Earth science domain. Students at the Advanced level demonstrated they understood that Earth's seasons are related to the tilt of its axis and its orbit around the Sun. Chinese Taipei had the highest percentage correct (59%), and the international average was 36 percent.

Exhibit 2.13: Description of the TIMSS 2019 Advanced International Benchmark (625) of Science Achievement

Advanced International Benchmark

625

Summary

Students communicate their understanding of life, physical, and Earth sciences and demonstrate some knowledge of the process of scientific inquiry. Students demonstrate knowledge of characteristics and life processes of a variety of organisms. They can communicate understanding of relationships in ecosystems and interactions between organisms and their environment. They communicate understanding of properties and states of matter and physical and chemical changes. Students communicate understanding of Earth's physical characteristics, processes, and history and show knowledge of Earth's revolution and rotation.

Students demonstrate knowledge of characteristics and life processes of a variety of organisms. Students communicate understanding of relationships in ecosystems and interactions between organisms and their environment, such as explaining adaptations and identifying animals that compete for food. They can evaluate experimental designs to test how light and water affect the growth of plants.

Students communicate understanding of properties and states of matter and of physical and chemical changes. In the context of investigations, students can explain what makes a solid dissolve faster in water, can evaluate methods for separating mixtures of solids, and understand what is important when designing a fair test.

Students communicate understanding of Earth's physical characteristics, processes, and history. For example, they can relate two different environments to the weathering of rocks and recognize how fish fossils are formed. Students show knowledge of Earth's revolution and can describe how the Earth's rotation causes day and night.

Students demonstrate basic knowledge and skills related to scientific inquiry and can recognize how to set up a simple experiment. They can draw conclusions from descriptions and diagrams and from results of experiments.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 2.13.1: Advanced International Benchmark of Science Achievement – Example Item 1

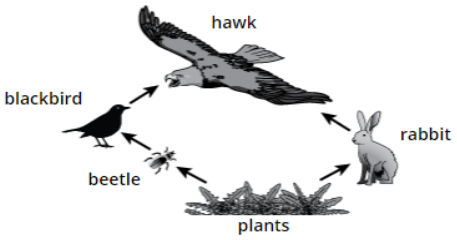
Country	Percent Full Credit	
Bulgaria	69 (2.3)	▲
Korea, Rep. of	56 (2.3)	▲
3 Singapore	54 (2.0)	▲
Chinese Taipei	45 (2.2)	▲
Sweden	45 (2.6)	▲
† Norway (5)	44 (2.2)	▲
Finland	43 (1.7)	▲
2 Slovak Republic	42 (2.3)	▲
2 Serbia	40 (2.7)	▲
2† United States	40 (1.8)	▲
† Hong Kong SAR	40 (2.6)	▲
† Denmark	40 (2.4)	▲
† Northern Ireland	39 (2.8)	▲
Austria	38 (2.9)	▲
Germany	38 (2.3)	▲
Australia	37 (2.3)	▲
2 England	37 (2.7)	▲
Japan	37 (1.9)	▲
2 Russian Federation	37 (2.4)	▲
Poland	37 (2.2)	▲
France	36 (2.8)	▲
Bahrain	35 (1.8)	▲
Ireland	35 (2.1)	▲
Czech Republic	34 (2.2)	
Spain	34 (1.7)	▲
Malta	33 (2.1)	
Italy	31 (2.6)	
Hungary	31 (2.0)	
2 New Zealand	31 (1.6)	
2 Portugal	31 (2.2)	
1 2 Canada	31 (1.9)	
International Average	**30 (0.3)**	
Cyprus	30 (2.5)	
† Belgium (Flemish)	29 (2.2)	
United Arab Emirates	28 (1.1)	▽
≡ Netherlands	27 (2.1)	
2 Latvia	27 (2.1)	
Montenegro	26 (2.1)	▽
Croatia	26 (2.0)	▽
2 Lithuania	26 (2.3)	▽
Chile	24 (2.0)	▽
Albania	22 (2.4)	▽
Armenia	22 (1.8)	▽
Oman	22 (2.0)	▽
Iran, Islamic Rep. of	22 (1.8)	▽
2 Turkey (5)	20 (1.7)	▽
2 Saudi Arabia	20 (1.4)	▽
Qatar	19 (2.1)	▽
Morocco	16 (2.0)	▽
1 Georgia	16 (2.2)	▽
Bosnia and Herzegovina	15 (1.5)	▽
Kuwait	15 (1.9)	▽
South Africa (5)	15 (1.1)	▽
Azerbaijan	14 (1.4)	▽
2 Kazakhstan	13 (1.6)	▽
North Macedonia	13 (1.8)	▽
2 Pakistan	10 (2.3)	▽
2 Philippines	6 (0.9)	▽
2 Kosovo	5 (1.3)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	52 (2.7)	▲
2 Dubai, UAE	41 (2.0)	▲
Madrid, Spain	36 (2.3)	▲
2 Ontario, Canada	32 (3.6)	
Quebec, Canada	30 (2.2)	
Abu Dhabi, UAE	19 (1.3)	▽

Content Domain: Life Science

Cognitive Domain: Applying

Description: Uses a food web to determine which animals are competitors

The picture below shows a food web in a forest ecosystem.



Based on what you see in the food web above, which two animals compete with each other for food?

1. beetle
2. rabbit

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 2.13.2: Advanced International Benchmark of Science Achievement – Example Item 2

Country	Percent Full Credit	
[2] Latvia	74 (2.0)	▲
Chinese Taipei	69 (2.0)	▲
Poland	61 (2.1)	▲
Japan	59 (1.9)	▲
Korea, Rep. of	57 (2.1)	▲
[2] Serbia	55 (2.6)	▲
Finland	54 (2.2)	▲
[2] Russian Federation	52 (2.0)	▲
[2] Lithuania	52 (2.5)	▲
† Belgium (Flemish)	50 (2.0)	▲
[2] Slovak Republic	49 (2.7)	▲
[3] Singapore	48 (1.8)	▲
Sweden	46 (2.6)	▲
† Hong Kong SAR	45 (2.6)	▲
Czech Republic	44 (2.3)	▲
Ireland	44 (2.5)	▲
Hungary	44 (2.3)	▲
≡ Netherlands	43 (2.6)	▲
Bulgaria	43 (2.4)	▲
† Norway (5)	43 (2.6)	▲
† Denmark	42 (2.4)	▲
[1 2] Canada	42 (1.6)	▲
Croatia	41 (2.2)	
Germany	41 (2.0)	▲
Australia	41 (1.8)	▲
† Northern Ireland	41 (2.6)	
Italy	40 (2.3)	
Cyprus	40 (2.3)	
[2] Portugal	38 (2.2)	
[2] New Zealand	37 (1.9)	
International Average	**37 (0.3)**	
Austria	37 (2.1)	
Albania	36 (2.6)	
[2] England	36 (2.6)	
Malta	34 (2.2)	
France	32 (2.5)	▽
Spain	32 (2.4)	▽
Armenia	32 (2.0)	▽
[2†] United States	31 (1.6)	▽
[2] Turkey (5)	30 (1.8)	▽
Bahrain	30 (2.1)	▽
Chile	29 (2.0)	▽
Azerbaijan	28 (2.1)	▽
North Macedonia	28 (2.9)	▽
[2] Kazakhstan	28 (2.0)	▽
United Arab Emirates	27 (0.8)	▽
Bosnia and Herzegovina	27 (1.8)	▽
Montenegro	26 (1.9)	▽
[1] Georgia	25 (2.5)	▽
Qatar	24 (1.7)	▽
Oman	22 (1.8)	▽
Kuwait	21 (1.7)	▽
[2] Philippines	19 (1.6)	▽
[2] Saudi Arabia	18 (1.4)	▽
[2] Kosovo	17 (1.7)	▽
Morocco	15 (2.2)	▽
South Africa (5)	14 (1.2)	▽
Iran, Islamic Rep. of	13 (1.5)	▽
[2] Pakistan	9 (1.9)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	58 (2.2)	▲
Quebec, Canada	43 (2.5)	▲
Madrid, Spain	43 (2.8)	▲
[2] Ontario, Canada	42 (2.9)	
[2] Dubai, UAE	36 (1.8)	
Abu Dhabi, UAE	21 (1.4)	▽

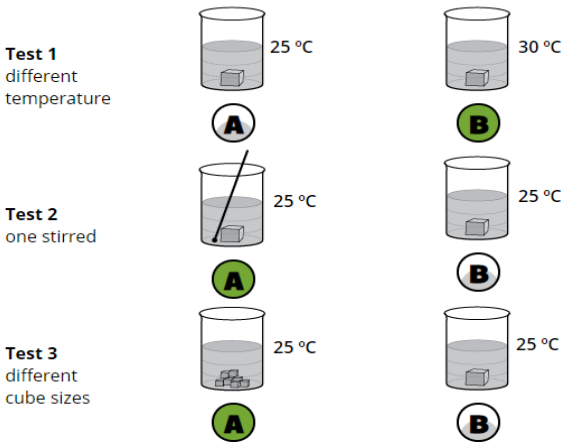
Content Domain: Physical Science

Cognitive Domain: Reasoning

Description: Part A - Recognizes set-ups that will more quickly dissolve a solid in water

Karl is investigating ways to make the same amount of sugar dissolve quickly in water. He sets up three tests.

A. For each of the tests, click the circle under the set-up that will dissolve the sugar faster.



B. Why is it important that the amount of water in each beaker is the same?

To make sure the amount of water did not change the test. Different amounts of water would not make the test fair.

The answer shown for part A illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 2.13.3: Advanced International Benchmark of Science Achievement – Example Item 3

Country	Percent Full Credit	
[3] Singapore	66 (1.7)	▲
[2] England	53 (3.3)	▲
Japan	49 (2.0)	▲
Korea, Rep. of	48 (2.3)	▲
[2] Russian Federation	40 (2.5)	▲
Australia	38 (1.5)	▲
Ireland	35 (2.5)	▲
Finland	34 (2.1)	▲
† Northern Ireland	32 (2.3)	▲
Chinese Taipei	30 (2.5)	▲
Cyprus	30 (1.9)	▲
Armenia	29 (2.3)	▲
≡ Netherlands	28 (2.4)	▲
Oman	28 (2.0)	▲
[2] Serbia	27 (2.4)	▲
[2] Turkey (5)	27 (1.8)	▲
Poland	25 (1.7)	▲
Albania	25 (2.2)	
† Belgium (Flemish)	24 (1.7)	
[1 2] Canada	24 (1.5)	
Czech Republic	23 (1.7)	
Malta	23 (1.7)	
[2] Lithuania	23 (1.9)	
Germany	22 (1.9)	
Bahrain	22 (1.8)	
Spain	21 (2.2)	
Croatia	21 (1.9)	
International Average	**21 (0.2)**	
Hungary	21 (1.7)	
† Hong Kong SAR	20 (2.6)	
[2] Latvia	20 (1.8)	
France	20 (1.7)	
[2] Kazakhstan	20 (1.9)	
[2] Slovak Republic	19 (1.6)	
[2†] United States	19 (1.2)	
† Denmark	18 (1.9)	
Bulgaria	18 (1.6)	
Austria	18 (1.9)	
[2] New Zealand	16 (1.5)	▽
United Arab Emirates	16 (0.6)	▽
[2] Portugal	14 (1.6)	▽
Sweden	14 (1.8)	▽
Iran, Islamic Rep. of	13 (1.7)	▽
Qatar	12 (1.6)	▽
† Norway (5)	11 (1.6)	▽
Italy	10 (1.5)	▽
Bosnia and Herzegovina	10 (1.3)	▽
Azerbaijan	9 (1.1)	▽
North Macedonia	8 (1.4)	▽
Chile	8 (1.0)	▽
Kuwait	6 (1.1)	▽
Montenegro	6 (0.9)	▽
[2] Pakistan	5 (1.6)	▽
[1] Georgia	5 (1.2)	▽
South Africa (5)	5 (1.0)	▽
[2] Saudi Arabia	4 (0.8)	▽
[2] Kosovo	4 (0.9)	▽
Morocco	4 (0.8)	▽
[2] Philippines	1 (0.3)	▽
Benchmarking Participants		
[2] Dubai, UAE	35 (1.9)	▲
Madrid, Spain	27 (2.1)	▲
[2] Ontario, Canada	24 (2.5)	
Moscow City, Russian Fed.	20 (2.2)	
Quebec, Canada	19 (2.0)	
Abu Dhabi, UAE	7 (0.7)	▽

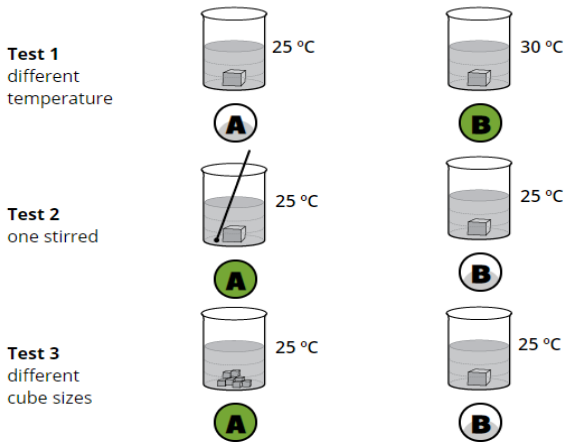
Content Domain: Physical Science

Cognitive Domain: Reasoning

Description: Part B - Explains the importance of controlling a variable in an experiment

Karl is investigating ways to make the same amount of sugar dissolve quickly in water. He sets up three tests.

A. For each of the tests, click the circle under the set-up that will dissolve the sugar faster.



B. Why is it important that the amount of water in each beaker is the same?

To make sure the amount of water did not change the test. Different amounts of water would not make the test fair.

The answer shown for part B illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 2.13.4: Advanced International Benchmark of Science Achievement – Example Item 4

Country	Percent Full Credit	
Chinese Taipei	59 (2.6)	▲
Sweden	55 (2.7)	▲
2 Russian Federation	54 (2.4)	▲
3 Singapore	53 (2.3)	▲
† Norway (5)	52 (2.4)	▲
2 England	48 (2.4)	▲
2 Latvia	47 (2.2)	▲
Finland	47 (2.5)	▲
2 Lithuania	47 (2.1)	▲
Korea, Rep. of	46 (2.4)	▲
2 Slovak Republic	45 (2.4)	▲
Ireland	44 (2.5)	▲
2† United States	44 (1.5)	▲
Germany	43 (2.2)	▲
Australia	43 (2.7)	▲
† Denmark	42 (2.6)	▲
Poland	41 (2.4)	▲
Croatia	41 (3.2)	
United Arab Emirates	41 (1.1)	▲
Hungary	40 (2.5)	
† Hong Kong SAR	40 (2.1)	
Czech Republic	40 (2.6)	
2 Turkey (5)	40 (2.4)	
Bulgaria	40 (2.3)	
France	39 (2.2)	
1 2 Canada	39 (1.4)	
Austria	39 (2.4)	
† Belgium (Flemish)	38 (2.5)	
2 New Zealand	38 (1.8)	
† Northern Ireland	37 (2.6)	
≡ Netherlands	37 (2.5)	
Japan	37 (2.0)	
2 Portugal	36 (2.2)	
International Average	**36 (0.3)**	
2 Kazakhstan	36 (2.3)	
2 Serbia	35 (2.3)	
1 Georgia	35 (2.6)	
Italy	33 (2.3)	
Qatar	32 (2.3)	
Malta	31 (2.2)	▽
Spain	30 (2.0)	▽
Chile	28 (2.0)	▽
Albania	27 (2.7)	▽
Armenia	27 (2.1)	▽
Oman	27 (1.8)	▽
2 Saudi Arabia	27 (1.7)	▽
Bahrain	27 (1.7)	▽
Kuwait	26 (2.1)	▽
Bosnia and Herzegovina	26 (1.6)	▽
Azerbaijan	26 (1.8)	▽
Cyprus	26 (2.2)	▽
South Africa (5)	26 (1.3)	▽
Morocco	24 (2.0)	▽
2 Kosovo	23 (2.3)	▽
2 Pakistan	22 (2.4)	▽
North Macedonia	21 (2.2)	▽
2 Philippines	21 (1.9)	▽
Montenegro	18 (1.6)	▽
Iran, Islamic Rep. of	15 (1.7)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	69 (2.6)	▲
2 Dubai, UAE	53 (1.8)	▲
Quebec, Canada	42 (2.5)	▲
2 Ontario, Canada	36 (2.6)	
Madrid, Spain	35 (2.3)	
Abu Dhabi, UAE	33 (2.0)	

Content Domain: Earth Science

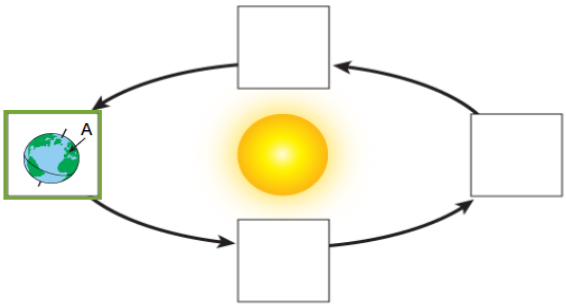
Cognitive Domain: Applying

Description: Places the Earth in a model to show its position relative to the Sun when a labeled city is experiencing summer

Earth's seasons are caused by the tilt of its axis.

It is summer in City A. In what position is the Earth when it is summer in City A?

Drag the Earth to the position that shows it is summer in City A.



The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Average Achievement in Science Content and Cognitive Domains

TIMSS 2019 Science Content and Cognitive Domains

TIMSS 2019 assessed three content areas in science at the fourth grade: life science, physical science, and Earth science.

Forty-five percent of the fourth grade science assessment was devoted to life science topics, including characteristics and life processes of organisms; life cycles, reproduction, and heredity; organisms, environment, and their interactions; ecosystems; and human health. Students were expected to have some knowledge about general characteristics of organisms, how they function, and how they interact with other organisms and with their environment, as well as to be familiar with fundamental science concepts related to life cycles, heredity, and human health.

The topic areas for the physical science content domain made up 35 percent of the assessment, including classification and properties of matter and changes in matter; forms of energy and energy transfer; and forces and motion. Students were asked about physical states of matter (solid, liquid, and gas), as well as common changes in the state and form of matter; common forms and sources of energy and their practical uses; and basic concepts about light, sound, electricity, and magnetism, as well as forces and motion.

The Earth science domain (20% of the assessment) included three topic areas: Earth's physical characteristics, resources, and history; Earth's weather and climates; and Earth in the Solar System. Students were asked about the structure and physical characteristics of Earth's surface and about the use of Earth's most important resources, and were asked to describe some of Earth's processes in terms of observable changes and recognize the time frame over which such changes have occurred. They also were asked about Earth's place in the Solar System based on observations of patterns of change on Earth and in the sky.

Fourth grade students also needed to draw on a range of cognitive skills across the content domains described above. The cognitive skills were categorized into three broad domains—knowing, applying, and reasoning. Forty percent of the fourth grade assessment was devoted to the knowing domain, 40 percent to applying, and 20 percent to reasoning. The knowing domain covers the facts, concepts, and procedures students need to know, while the applying domain focuses on students' ability to apply knowledge and conceptual understanding to solve practical problems or answer questions. The reasoning domain goes beyond the solution of familiar problems to encompass unfamiliar situations, complex contexts, and multistep problems. Also, five science practices fundamental to scientific inquiry were assessed within the content areas and cognitive domains.

Average Achievement in Content Domains

Exhibit 2.14 shows countries' average science achievement in each of the three content domains relative to their overall average achievement (presented from highest to lowest overall average achievement). Based on countries' relative strengths and weaknesses, the TIMSS 2019 countries appear to be placing relatively less instructional emphasis on the Earth science content domain than the other two science content domains. Of the 53 participating countries with scores in the science content domains, 21 had a relative strength in life science and 13 had a relative weakness; 17 had a relative strength in physical science and 21 had a relative weakness, and 10 had a relative strength in Earth science, and 26 had a relative weakness. All countries except Austria had at least one relative strength or relative weakness compared with their overall achievement.

Exhibit 2.14: Average Achievement in Science Content Domains

Country	Overall Science Average Scale Score	Life Science (73 Items)		Physical Science (61 Items)		Earth Science (35 Items)	
		Average Scale Score	Difference from Overall Science Score	Average Scale Score	Difference from Overall Science Score	Average Scale Score	Difference from Overall Science Score
[3] Singapore	595 (3.4)	603 (3.6)	8 (0.9) ▲	613 (3.7)	19 (1.1) ▲	557 (3.9)	-38 (2.0) ▽
Korea, Rep. of	588 (2.1)	574 (2.5)	-13 (1.4) ▽	607 (2.7)	19 (2.7) ▲	587 (2.9)	-1 (1.9)
[2] Russian Federation	567 (3.0)	570 (3.1)	3 (1.2) ▲	572 (2.9)	5 (1.7) ▲	554 (4.4)	-13 (2.5) ▽
Japan	562 (1.8)	550 (2.0)	-11 (1.1) ▽	579 (1.9)	17 (1.1) ▲	559 (1.9)	-2 (1.3)
Chinese Taipei	558 (1.8)	540 (2.0)	-18 (1.5) ▽	573 (1.9)	15 (1.0) ▲	568 (1.8)	10 (1.6) ▲
Finland	555 (2.6)	558 (2.9)	4 (1.5) ▲	544 (3.2)	-10 (2.1) ▽	563 (3.5)	9 (2.2) ▲
[2] Latvia	542 (2.4)	535 (2.7)	-7 (1.5) ▽	553 (3.6)	12 (2.7) ▲	535 (3.7)	-7 (2.8) ▽
† Norway (5)	539 (2.2)	547 (3.0)	8 (2.2) ▲	525 (3.0)	-14 (2.2) ▽	547 (2.9)	7 (1.7) ▲
[2] † United States	539 (2.7)	546 (2.5)	8 (0.8) ▲	527 (2.8)	-12 (0.7) ▽	539 (3.2)	0 (1.6)
[2] Lithuania	538 (2.5)	537 (2.8)	-1 (1.2)	547 (3.0)	9 (1.7) ▲	525 (3.0)	-13 (1.6) ▽
Sweden	537 (3.3)	541 (3.3)	4 (2.4)	525 (3.3)	-12 (1.2) ▽	547 (3.8)	9 (3.2) ▲
[2] England	537 (2.7)	537 (2.6)	0 (1.5)	537 (3.2)	0 (1.9)	533 (2.9)	-4 (1.4) ▽
Czech Republic	534 (2.6)	535 (2.2)	2 (1.6)	528 (2.5)	-6 (1.5) ▽	536 (3.0)	2 (2.6)
Australia	533 (2.4)	539 (2.8)	7 (1.1) ▲	526 (2.7)	-7 (1.2) ▽	527 (2.8)	-6 (1.2) ▽
† Hong Kong SAR	531 (3.3)	523 (3.6)	-8 (1.5) ▽	529 (3.5)	-2 (2.0)	549 (4.5)	18 (2.7) ▲
Poland	531 (2.6)	534 (3.1)	3 (1.7)	526 (2.9)	-5 (1.8) ▽	529 (3.3)	-2 (2.4)
Hungary	529 (2.7)	533 (3.4)	4 (2.1)	524 (2.8)	-6 (1.5) ▽	531 (3.2)	2 (2.0)
Ireland	528 (3.2)	528 (3.5)	0 (1.2)	523 (3.2)	-5 (1.3) ▽	536 (3.8)	8 (2.9) ▲
[2] Turkey (5)	526 (4.2)	519 (4.6)	-8 (1.5) ▽	538 (4.6)	12 (2.2) ▲	524 (4.0)	-2 (1.8)
Croatia	524 (2.2)	520 (2.3)	-4 (1.6) ▽	528 (2.4)	4 (2.3)	523 (3.0)	-1 (2.6)
[1 2] Canada	523 (1.9)	532 (1.9)	9 (0.8) ▲	513 (1.8)	-10 (0.9) ▽	519 (2.2)	-4 (0.9) ▽
† Denmark	522 (2.4)	526 (2.2)	4 (1.9) ▲	507 (2.3)	-15 (2.1) ▽	535 (2.7)	13 (2.4) ▲
Austria	522 (2.6)	523 (2.3)	1 (1.5)	519 (2.6)	-3 (1.5)	524 (3.5)	2 (2.7)
Bulgaria	521 (4.9)	525 (5.2)	4 (1.7) ▲	518 (6.4)	-3 (2.5)	514 (4.8)	-7 (1.9) ▽
[2] Slovak Republic	521 (3.7)	520 (3.9)	-1 (1.3)	525 (3.9)	5 (1.8) ▲	513 (4.4)	-8 (2.5) ▽
† Northern Ireland	518 (2.3)	520 (2.8)	2 (2.1)	511 (2.2)	-8 (1.4) ▽	525 (2.6)	6 (2.5) ▲
≡ Netherlands	518 (2.9)	518 (3.3)	-1 (2.5)	516 (2.8)	-3 (2.0)	521 (3.5)	2 (1.2) ▲
Germany	518 (2.2)	521 (2.3)	3 (1.2) ▲	518 (3.0)	0 (2.1)	509 (4.0)	-9 (3.6) ▽
[2] Serbia	517 (3.5)	521 (3.8)	4 (1.7) ▲	524 (4.2)	7 (2.2) ▲	494 (4.5)	-23 (2.1) ▽
Cyprus	511 (3.0)	515 (3.3)	3 (2.1)	511 (3.2)	0 (1.7)	500 (2.7)	-12 (1.9) ▽
Spain	511 (2.0)	514 (2.2)	3 (0.9) ▲	503 (2.3)	-8 (1.4) ▽	518 (2.4)	7 (1.5) ▲
Italy	510 (3.0)	514 (3.3)	4 (1.2) ▲	502 (3.4)	-8 (1.8) ▽	507 (3.7)	-3 (1.5)
[2] Portugal	504 (2.6)	509 (1.9)	5 (1.7) ▲	496 (2.4)	-7 (1.7) ▽	501 (3.0)	-3 (2.5)
[2] New Zealand	503 (2.3)	510 (2.3)	8 (1.6) ▲	492 (2.1)	-10 (1.4) ▽	503 (3.1)	1 (2.1)
† Belgium (Flemish)	501 (2.1)	500 (2.5)	-1 (1.4)	502 (2.3)	1 (1.4)	496 (2.2)	-5 (1.6) ▽
Malta	496 (1.3)	499 (2.5)	4 (1.9)	492 (2.9)	-4 (2.4)	491 (2.1)	-4 (1.7) ▽
[2] Kazakhstan	494 (3.1)	486 (3.5)	-8 (1.4) ▽	506 (3.3)	12 (1.4) ▲	488 (3.2)	-7 (1.5) ▽
Bahrain	493 (3.4)	492 (3.6)	-1 (1.4)	496 (3.8)	4 (1.4) ▲	478 (4.0)	-15 (1.7) ▽
Albania	489 (3.5)	488 (3.7)	-1 (1.6)	493 (4.1)	4 (1.5) ▲	475 (4.2)	-15 (1.8) ▽
France	488 (3.0)	494 (3.1)	6 (1.2) ▲	477 (3.1)	-10 (1.5) ▽	488 (3.2)	1 (1.5)
United Arab Emirates	473 (2.1)	467 (2.0)	-6 (0.5) ▽	477 (2.2)	5 (0.9) ▲	474 (1.6)	1 (1.0)
Chile	469 (2.6)	478 (2.5)	9 (1.1) ▲	458 (3.8)	-11 (2.3) ▽	460 (4.3)	-9 (3.4) ▽
Armenia	466 (3.4)	476 (3.2)	9 (1.7) ▲	454 (3.4)	-13 (1.2) ▽	451 (3.8)	-15 (2.3) ▽
Bosnia and Herzegovina	459 (2.9)	471 (3.3)	13 (1.3) ▲	450 (3.3)	-8 (1.3) ▽	437 (3.2)	-22 (1.6) ▽
[1] Georgia	454 (3.9)	457 (4.0)	3 (1.2) ▲	452 (4.6)	-2 (2.4)	435 (4.2)	-20 (3.2) ▽
Montenegro	453 (2.5)	464 (2.2)	11 (1.4) ▲	446 (2.8)	-7 (2.0) ▽	434 (3.1)	-20 (1.9) ▽
Qatar	449 (3.9)	448 (4.6)	-1 (1.7)	451 (4.0)	2 (1.3)	442 (5.7)	-7 (3.2) ▽
Iran, Islamic Rep. of	441 (4.1)	430 (4.5)	-11 (2.1) ▽	453 (4.7)	12 (1.9) ▲	438 (4.2)	-3 (1.7)
Oman	435 (4.1)	434 (4.6)	0 (1.8)	437 (4.7)	2 (1.4)	416 (4.5)	-19 (1.9) ▽
Azerbaijan	427 (3.3)	423 (3.4)	-4 (1.3) ▽	427 (3.3)	0 (1.5)	424 (4.7)	-3 (3.3)
North Macedonia	426 (6.2)	422 (5.9)	-4 (2.5)	432 (7.2)	6 (2.8) ▲	409 (7.2)	-17 (2.6) ▽
[2] Kosovo	413 (3.7)	408 (4.3)	-5 (2.5) ▽	415 (4.2)	2 (2.0)	410 (3.9)	-3 (2.0)
[2] Saudi Arabia	402 (4.1)	- -	- -	- -	- -	- -	- -
Kuwait	392 (6.1)	- -	- -	- -	- -	- -	- -
Ψ Morocco	374 (5.8)	364 (5.9)	-10 (1.6) ▽	379 (6.2)	4 (1.9) ▲	350 (6.6)	-24 (2.1) ▽
Ж South Africa (5)	324 (4.9)	- -	- -	- -	- -	- -	- -
[2] Ж Pakistan	290 (13.4)	- -	- -	- -	- -	- -	- -
[2] Ж Philippines	249 (7.5)	- -	- -	- -	- -	- -	- -
Benchmarking Participants							
Moscow City, Russian Fed.	595 (2.2)	595 (2.7)	0 (1.9)	598 (2.7)	4 (2.3)	589 (3.0)	-6 (1.8) ▽
[2] Dubai, UAE	545 (1.7)	537 (1.9)	-7 (1.1) ▽	556 (2.1)	11 (1.1) ▲	542 (2.3)	-3 (1.3) ▽
[2] Ontario, Canada	524 (3.2)	535 (2.9)	11 (1.3) ▲	512 (2.9)	-12 (1.4) ▽	518 (3.4)	-6 (1.2) ▽
Madrid, Spain	523 (2.0)	525 (3.4)	2 (2.5)	514 (2.5)	-9 (2.2) ▽	533 (2.0)	10 (0.8) ▲
Quebec, Canada	522 (2.5)	530 (2.4)	8 (1.3) ▲	514 (2.8)	-8 (1.6) ▽	519 (3.2)	-3 (1.7)
Abu Dhabi, UAE	418 (2.8)	413 (2.5)	-5 (1.1) ▽	418 (2.6)	0 (1.2)	422 (2.1)	4 (2.4)

▲ Subscale score significantly higher than overall science score
▽ Subscale score significantly lower than overall science score

Numbers of items are based on the TIMSS 2019 fourth grade science eAssessment items included in scaling.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.
See Appendix B.2 for target population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available because average achievement could not be accurately estimated.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Trends in Average Achievement in Content Domains

Exhibit 2.15 presents trends in average achievement for the three science content domains assessed by TIMSS 2019—life science, physical science, and Earth science. Of the 53 TIMSS 2019 countries for which science content domain scores were estimated, 42 had comparable data from TIMSS 2015, with each of three content areas showing no recent changes in average achievement for about half the countries. However, in the life science content area, 6 showed improvement and 12 declined; in physical science, 12 showed improvement and 9 declined; and in Earth science, 9 showed improvement and 6 declined.

TIMSS began providing scaled results in the content domains in 2007, with 21 countries having trends between 2007 and 2019. Compared with 2007, in TIMSS 2019 across the content domains in these countries, 7 had higher average achievement in life science and 6 had lower average achievement, 11 had higher average achievement in physical science and 2 had lower average achievement, and in Earth science, 7 had higher average achievement and 7 had lower average achievement.

Exhibit 2.15: Differences in Achievement for Science Content Domains Across Assessment Years◊

Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▽) than the performance in the column year.

Country	Life Science				Physical Science				Earth Science			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
Armenia												
2019	476 (3.2)	31 ▲	51 ▲		454 (3.4)	18 ▲	55 ▲		451 (3.8)	16 ▲	53 ▲	
2015	444 (3.9)		20 ▲		436 (4.3)		37 ▲		435 (4.1)		37 ▲	
2011	424 (3.9)				399 (3.9)				398 (4.1)			
Australia												
2019	539 (2.8)	8	23 ▲	10 ▲	526 (2.7)	10 ▲	12 ▲	5	527 (2.8)	7	7	-9
2015	531 (3.0)		15 ▲	2	516 (2.7)		2	-5	520 (3.3)		0	-16 ▽
2011	516 (3.1)			-14 ▽	514 (3.1)			-7	520 (3.6)			-17 ▽
2007	529 (3.6)				521 (3.8)				536 (4.2)			
Austria												
2019	523 (2.3)		-3	-4	519 (2.6)		-16 ▽	3	524 (3.5)		-15 ▽	-11 ▽
2011	526 (2.8)			-2	535 (2.8)			18 ▲	539 (3.5)			4
2007	528 (2.4)				517 (3.0)				535 (2.6)			
Azerbaijan												
2019	423 (3.4)		-17 ▽		427 (3.3)		-9		424 (4.7)		16	
[2] 2011	440 (5.3)				436 (6.0)				408 (7.3)			
Bahrain												
2019	492 (3.6)	37 ▲	48 ▲		496 (3.8)	31 ▲	44 ▲		478 (4.0)	30 ▲	33 ▲	
[2] 2015	455 (2.9)		11 ▲		465 (3.2)		12 ▲		448 (3.2)		3	
2011	444 (4.2)				453 (4.6)				445 (3.7)			
Belgium (Flemish)												
† 2019	500 (2.5)	-13 ▽	-10 ▽		502 (2.3)	-4	-5		496 (2.2)	-16 ▽	-8 ▽	
† 2015	513 (2.4)		3		506 (3.2)		-1		513 (2.8)		8	
2011	510 (2.5)				507 (2.1)				505 (2.9)			
Bulgaria												
2019	525 (5.2)	-17 ▽			518 (6.4)	-11			514 (4.8)	-18 ▽		
2015	542 (6.3)				529 (6.5)				532 (6.9)			
Canada												
[1 2] 2019	532 (1.9)	-4			513 (1.8)	-5			519 (2.2)	6		
[1 2] † 2015	536 (2.8)				518 (2.7)				513 (3.1)			
Chile												
2019	478 (2.5)	-9 ▽	-12 ▽		458 (3.8)	-8	-13 ▽		460 (4.3)	-5	-15 ▽	
2015	487 (2.6)		-2		466 (2.9)		-5		465 (3.4)		-10 ▽	
2011	490 (2.2)				471 (2.5)				475 (2.8)			
Chinese Taipei												
2019	540 (2.0)	-4	2	-7	573 (1.9)	5	5	9 ▲	568 (1.8)	13 ▲	15 ▲	5
2015	545 (2.0)		7 ▲	-2	568 (2.0)		0	5	555 (2.5)		3	-8 ▽
2011	538 (2.5)			-9 ▽	569 (2.1)			5	553 (2.6)			-10 ▽
2007	547 (2.7)				564 (2.4)				563 (2.9)			
Croatia												
2019	520 (2.3)	-11 ▽	-5		528 (2.4)	-8 ▽	26 ▲		523 (3.0)	-12 ▽	2	
2015	531 (2.6)		6		535 (2.9)		33 ▲		535 (3.4)		14 ▲	
[2] 2011	525 (2.0)				502 (2.7)				521 (2.7)			
Cyprus												
2019	515 (3.3)	34 ▲			511 (3.2)	25 ▲			500 (2.7)	37 ▲		
2015	481 (2.8)				486 (2.7)				463 (3.5)			
Czech Republic												
2019	535 (2.2)	-3	-14 ▽	13 ▲	528 (2.5)	-3	9 ▲	19 ▲	536 (3.0)	4	-2	22 ▲
2015	538 (2.0)		-12 ▽	16 ▲	531 (2.4)		11 ▲	22 ▲	531 (3.0)		-6	18 ▲
2011	550 (3.0)			27 ▲	519 (3.1)			10 ▲	537 (3.2)			24 ▲
2007	522 (3.4)				509 (3.5)				514 (3.6)			
Denmark												
† 2019	526 (2.2)	-8 ▽	-4	0	507 (2.3)	-9 ▽	-19 ▽	5	535 (2.7)	4	8 ▲	16 ▲
[2] † 2015	534 (2.4)		4	7	516 (2.7)		-10 ▽	14 ▲	531 (3.0)		4	12 ▲
[2] 2011	530 (2.7)			3	526 (2.4)			24 ▲	527 (3.0)			8
† 2007	527 (3.4)				502 (3.1)				519 (3.3)			
England												
[2] 2019	537 (2.6)	1	7	2	537 (3.2)	-3	2	-9	533 (2.9)	5	11 ▲	-9 ▽
2015	536 (2.5)		6	0	540 (2.7)		5	-6	527 (3.3)		5	-14 ▽
2011	530 (3.0)			-6	535 (3.4)			-10 ▽	522 (3.8)			-19 ▽
2007	536 (3.1)				546 (3.2)				542 (3.4)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

◊ Trend reporting in content domains using current methodology began with TIMSS 2007.
See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Average Achievement in Content Domains by Gender

Exhibit 2.16 shows differences in average achievement between girls and boys in the three science content domains. The differences in average achievement between girls and boys are very different from content domain to content domain across the TIMSS 2019 countries, with girls having higher achievement in life science than boys in many countries, and boys having higher achievement in physical and Earth science. In the life science content domain, girls had higher average achievement than boys in 26 countries, and boys did not have higher average achievement in any country. In physical science, girls had higher average achievement than boys in 4 countries, and boys had higher average achievement in 13 countries. In Earth science, girls had higher average achievement than boys in 4 countries, and boys had higher average achievement in 16 countries.

Exhibit 2.16: Average Achievement in Science Content Domains by Gender

Country	Life Science (73 Items)		Physical Science (61 Items)		Earth Science (35 Items)	
	Girls	Boys	Girls	Boys	Girls	Boys
Albania	495 (4.2) ▲	482 (4.1)	497 (4.6)	490 (5.3)	476 (5.0)	473 (4.5)
Armenia	482 (3.7) ▲	471 (3.5)	459 (4.0) ▲	449 (3.9)	458 (4.3) ▲	445 (4.9)
Australia	543 (2.9) ▲	535 (3.4)	524 (3.4)	528 (3.3)	524 (3.0)	530 (3.5)
Austria	523 (3.2)	523 (3.5)	514 (3.3)	524 (3.0) ▲	518 (3.8)	529 (4.0) ▲
Azerbaijan	427 (4.1)	420 (3.9)	429 (4.0)	425 (3.9)	425 (6.1)	422 (4.8)
Bahrain	512 (4.5) ▲	473 (5.0)	515 (4.3) ▲	479 (5.7)	494 (4.2) ▲	462 (5.9)
† Belgium (Flemish)	500 (2.4)	500 (3.4)	500 (2.7)	504 (2.5)	489 (2.9)	504 (3.3) ▲
Bosnia and Herzegovina	478 (3.6) ▲	465 (3.7)	452 (4.0)	449 (3.5)	434 (3.6)	439 (4.0)
Bulgaria	533 (5.6) ▲	518 (5.9)	518 (6.7)	518 (7.4)	518 (5.5)	510 (5.8)
1 2 Canada	533 (2.4)	531 (2.0)	508 (2.2)	518 (2.2) ▲	513 (2.5)	524 (2.9) ▲
Chile	477 (2.9)	478 (3.0)	452 (4.7)	463 (4.0) ▲	454 (5.1)	466 (5.0) ▲
Chinese Taipei	542 (3.6)	539 (2.3)	570 (1.9)	576 (2.8)	565 (2.7)	571 (2.0)
Croatia	524 (2.8) ▲	517 (2.5)	526 (3.8)	529 (2.6)	520 (3.7)	527 (3.6)
Cyprus	515 (3.6)	514 (4.0)	507 (3.3)	515 (4.1) ▲	495 (3.1)	505 (3.7) ▲
Czech Republic	536 (2.5)	535 (2.8)	520 (3.2)	536 (2.9) ▲	529 (4.4)	542 (3.5) ▲
† Denmark	533 (2.7) ▲	520 (2.9)	504 (3.4)	510 (3.6)	531 (4.0)	539 (2.8)
2 England	540 (3.7)	535 (3.7)	534 (4.2)	540 (3.6)	532 (3.3)	534 (3.8)
Finland	565 (3.7) ▲	552 (3.3)	544 (3.8)	544 (4.3)	564 (3.7)	562 (5.1)
France	499 (3.5) ▲	489 (3.8)	475 (3.3)	480 (3.9)	488 (4.2)	489 (3.7)
1 Georgia	459 (4.5)	455 (4.6)	446 (5.5)	458 (4.8) ▲	432 (4.9)	438 (6.0)
Germany	525 (3.0) ▲	518 (2.7)	513 (4.4)	524 (4.1)	502 (4.9)	515 (4.3) ▲
† Hong Kong SAR	529 (3.7) ▲	518 (4.4)	525 (3.7)	532 (4.4)	544 (3.9)	554 (5.8) ▲
Hungary	532 (3.7)	534 (4.0)	517 (3.2)	530 (3.6) ▲	527 (4.3)	535 (4.0)
Iran, Islamic Rep. of	432 (6.7)	428 (6.0)	449 (7.6)	457 (6.1)	435 (6.4)	441 (6.0)
Ireland	530 (4.3)	526 (3.6)	520 (4.1)	526 (3.3)	529 (4.8)	543 (3.9) ▲
Italy	514 (4.1)	514 (3.3)	495 (3.5)	508 (4.3) ▲	501 (4.5)	513 (3.7) ▲
Japan	554 (2.4) ▲	547 (2.4)	580 (2.2)	577 (2.2)	558 (2.9)	560 (3.2)
2 Kazakhstan	492 (3.7) ▲	481 (3.7)	509 (3.7)	504 (3.9)	490 (4.8)	485 (4.2)
Korea, Rep. of	572 (3.2)	576 (2.5)	600 (3.3)	613 (2.8) ▲	579 (3.5)	594 (3.7) ▲
2 Kosovo	416 (4.8) ▲	400 (4.8)	423 (4.7) ▲	408 (4.8)	414 (4.3)	406 (5.6)
Kuwait	- -	- -	- -	- -	- -	- -
2 Latvia	540 (2.9) ▲	529 (3.2)	551 (4.0)	556 (4.8)	537 (4.3)	534 (3.9)
2 Lithuania	543 (3.1) ▲	530 (3.7)	545 (3.8)	549 (4.2)	524 (3.7)	526 (3.8)
Malta	501 (3.8)	498 (2.3)	486 (4.8)	497 (3.1)	482 (2.8)	500 (2.8) ▲
Montenegro	469 (3.0) ▲	460 (2.8)	447 (3.1)	445 (3.6)	434 (4.2)	433 (3.8)
Ψ Morocco	371 (6.5) ▲	356 (6.0)	383 (7.0)	374 (6.4)	353 (7.2)	346 (7.7)
≡ Netherlands	520 (3.3)	516 (3.9)	515 (2.8)	516 (4.2)	518 (4.3)	524 (4.6)
2 New Zealand	516 (3.9) ▲	504 (2.8)	493 (2.9)	492 (2.9)	501 (5.4)	505 (3.6)
North Macedonia	431 (7.0) ▲	414 (6.0)	435 (7.5)	429 (7.9)	418 (8.0) ▲	401 (7.7)
† Northern Ireland	523 (3.9)	517 (4.2)	510 (2.7)	512 (2.9)	521 (3.2)	528 (3.9)
† Norway (5)	550 (3.7)	544 (3.6)	525 (3.4)	526 (4.1)	546 (4.5)	548 (3.0)
Oman	447 (5.1) ▲	422 (4.9)	450 (4.6) ▲	424 (5.8)	426 (4.7) ▲	406 (5.8)
2 ж Pakistan	- -	- -	- -	- -	- -	- -
2 ж Philippines	- -	- -	- -	- -	- -	- -
Poland	539 (3.2) ▲	529 (3.6)	525 (3.2)	527 (3.5)	524 (3.7)	534 (3.7) ▲
2 Portugal	508 (2.5)	509 (2.9)	493 (3.3)	499 (2.4) ▲	497 (3.4)	504 (4.1)
Qatar	456 (6.0) ▲	440 (5.2)	456 (6.5)	446 (3.9)	444 (8.0)	440 (5.1)
2 Russian Federation	572 (3.6)	569 (3.3)	570 (3.1)	574 (3.3)	552 (4.9)	557 (4.6)
2 Saudi Arabia	- -	- -	- -	- -	- -	- -
2 Serbia	526 (4.4) ▲	515 (4.4)	526 (4.4)	522 (4.9)	494 (5.6)	494 (4.9)
3 Singapore	601 (3.9)	605 (4.2)	607 (3.9)	619 (4.0) ▲	548 (3.9)	565 (4.5) ▲
2 Slovak Republic	520 (4.0)	520 (4.6)	520 (4.2)	530 (4.7) ▲	507 (5.0)	519 (5.2) ▲
ж South Africa (5)	- -	- -	- -	- -	- -	- -
Spain	515 (2.5)	513 (2.9)	499 (3.2)	507 (2.4) ▲	517 (3.0)	519 (3.3)
Sweden	546 (3.6) ▲	537 (4.0)	523 (4.0)	527 (3.7)	546 (3.6)	547 (4.9)
2 Turkey (5)	518 (4.8)	520 (5.7)	534 (4.9)	543 (5.9)	521 (5.0)	528 (5.0)
United Arab Emirates	471 (3.0)	463 (2.6)	479 (3.3)	476 (2.9)	475 (2.7)	474 (2.3)
2 † United States	547 (2.6)	546 (3.4)	523 (3.7)	531 (3.1)	533 (3.7)	543 (3.4) ▲
International Average	**510 (0.5) ▲**	**503 (0.5)**	**504 (0.6)**	**506 (0.6) ▲**	**499 (0.6)**	**503 (0.6) ▲**
Benchmarking Participants						
2 Ontario, Canada	537 (4.0)	533 (3.0)	508 (4.0)	516 (3.0) ▲	514 (4.6)	522 (3.6) ▲
Quebec, Canada	530 (2.9)	529 (2.9)	508 (3.0)	519 (3.5) ▲	513 (3.3)	524 (3.9) ▲
Moscow City, Russian Fed.	599 (2.7) ▲	592 (3.3)	594 (3.0)	603 (2.9) ▲	586 (4.1)	593 (4.1)
Madrid, Spain	525 (3.1)	524 (4.4)	510 (3.4)	518 (2.4) ▲	531 (2.9)	535 (2.8)
Abu Dhabi, UAE	418 (3.5) ▲	408 (3.6)	422 (3.9)	414 (3.9)	424 (3.0)	419 (3.4)
2 Dubai, UAE	540 (3.6)	535 (2.8)	556 (4.1)	555 (3.0)	541 (3.6)	542 (3.7)

▲ Average significantly higher than other gender

Numbers of items are based on the TIMSS 2019 fourth grade science eAssessment items included in scaling.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.
See Appendix B.2 for target population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available because average achievement could not be accurately estimated.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Average Achievement in Cognitive Domains

Exhibit 2.17 shows countries' average achievement in the knowing, applying, and reasoning cognitive domains relative to their overall average achievement (from highest to lowest overall average achievement). Eighteen countries had a relative strength in the knowing cognitive domain and 11 had a relative weakness, only 9 countries had a relative strength in the applying cognitive domain and 22 had a relative weakness, and 17 had a relative strength in the reasoning cognitive domain, and 15 had a relative weakness. Five countries had no relative strengths or weaknesses in the cognitive domains: Croatia, Germany, Portugal, Malta, and Montenegro.

Exhibit 2.17: Average Achievement in Science Cognitive Domains

Country	Overall Science Average Scale Score	Knowing (69 Items)		Applying (64 Items)		Reasoning (36 Items)	
		Average Scale Score	Difference from Overall Science Score	Average Scale Score	Difference from Overall Science Score	Average Scale Score	Difference from Overall Science Score
[3] Singapore	595 (3.4)	588 (3.7)	-7 (0.9) ▽	595 (3.7)	1 (1.6)	604 (3.5)	9 (1.2) ▲
Korea, Rep. of	588 (2.1)	584 (2.5)	-3 (1.8)	596 (2.6)	8 (1.5) ▲	581 (2.4)	-6 (1.4) ▽
[2] Russian Federation	567 (3.0)	562 (3.3)	-5 (1.7) ▽	572 (3.4)	5 (1.3) ▲	569 (2.8)	2 (1.7)
Japan	562 (1.8)	535 (2.6)	-27 (1.6) ▽	576 (2.2)	15 (1.3) ▲	580 (2.4)	18 (2.2) ▲
Chinese Taipei	558 (1.8)	560 (1.9)	2 (1.3)	561 (2.0)	2 (0.9) ▲	552 (2.7)	-6 (2.0) ▽
Finland	555 (2.6)	553 (2.5)	-1 (1.4)	551 (2.5)	-4 (1.5) ▽	563 (2.4)	8 (1.6) ▲
[2] Latvia	542 (2.4)	539 (3.2)	-3 (2.0)	540 (2.6)	-2 (0.9) ▽	547 (2.5)	5 (1.2) ▲
† Norway (5)	539 (2.2)	540 (2.5)	1 (1.6)	537 (2.4)	-3 (1.1) ▽	540 (2.5)	0 (1.3)
[2] † United States	539 (2.7)	542 (2.7)	3 (1.7) ▲	535 (3.1)	-4 (0.9) ▽	538 (2.7)	0 (1.2)
[2] Lithuania	538 (2.5)	539 (3.1)	1 (1.7)	531 (2.3)	-7 (1.3) ▽	548 (2.9)	10 (2.6) ▲
Sweden	537 (3.3)	540 (3.4)	3 (2.2)	532 (3.1)	-5 (1.2) ▽	541 (3.2)	4 (1.1) ▲
[2] England	537 (2.7)	544 (3.3)	7 (1.5) ▲	526 (3.0)	-11 (1.4) ▽	544 (3.7)	6 (2.8) ▲
Czech Republic	534 (2.6)	538 (2.9)	5 (1.6) ▲	526 (2.5)	-7 (1.8) ▽	539 (3.2)	5 (3.2)
Australia	533 (2.4)	538 (3.0)	5 (1.9) ▲	524 (3.2)	-9 (1.9) ▽	538 (3.0)	5 (1.7) ▲
† Hong Kong SAR	531 (3.3)	537 (3.2)	6 (1.6) ▲	526 (3.1)	-5 (1.8) ▽	531 (3.6)	-1 (2.2)
Poland	531 (2.6)	524 (2.6)	-6 (0.9) ▽	538 (2.5)	7 (1.1) ▲	525 (2.6)	-5 (1.9) ▽
Hungary	529 (2.7)	533 (2.7)	4 (1.4) ▲	526 (3.1)	-4 (2.1)	532 (2.6)	2 (1.2) ▲
Ireland	528 (3.2)	532 (3.4)	4 (1.6) ▲	525 (3.0)	-3 (1.4)	525 (3.8)	-3 (2.1)
[2] Turkey (5)	526 (4.2)	531 (4.5)	4 (1.5) ▲	528 (4.3)	2 (1.1)	521 (4.1)	-6 (1.7) ▽
Croatia	524 (2.2)	526 (2.4)	3 (1.6)	521 (2.3)	-3 (1.6)	522 (2.5)	-2 (2.0)
[1 2] Canada	523 (1.9)	524 (1.9)	1 (1.5)	520 (2.0)	-3 (1.0) ▽	526 (1.8)	2 (1.8)
† Denmark	522 (2.4)	521 (2.0)	-1 (2.3)	519 (2.5)	-3 (1.1) ▽	527 (2.7)	5 (1.7) ▲
Austria	522 (2.6)	523 (3.1)	1 (1.4)	523 (2.4)	1 (1.4)	518 (3.3)	-4 (1.9) ▽
Bulgaria	521 (4.9)	526 (5.4)	5 (1.9) ▲	523 (5.4)	1 (1.6)	508 (5.5)	-14 (1.7) ▽
[2] Slovak Republic	521 (3.7)	527 (3.9)	6 (1.4) ▲	515 (4.3)	-5 (1.9) ▽	516 (4.2)	-5 (2.1) ▽
† Northern Ireland	518 (2.3)	523 (2.9)	4 (2.7)	514 (2.3)	-4 (1.2) ▽	519 (3.2)	1 (2.1)
≡ Netherlands	518 (2.9)	515 (2.8)	-4 (1.9) ▽	517 (3.1)	-1 (2.2)	523 (3.2)	5 (2.0) ▲
Germany	518 (2.2)	520 (2.3)	1 (0.9)	516 (2.5)	-2 (1.7)	519 (2.9)	0 (1.8)
[2] Serbia	517 (3.5)	506 (3.3)	-11 (1.9) ▽	526 (3.9)	9 (1.4) ▲	518 (3.9)	1 (2.4)
Cyprus	511 (3.0)	503 (3.3)	-9 (1.1) ▽	519 (3.0)	8 (1.4) ▲	511 (3.2)	-1 (2.3)
Spain	511 (2.0)	514 (2.2)	3 (1.0) ▲	511 (2.0)	-1 (0.9)	507 (1.8)	-5 (1.5) ▽
Italy	510 (3.0)	515 (3.0)	5 (1.5) ▲	504 (2.7)	-6 (1.0) ▽	508 (2.7)	-2 (1.8)
[2] Portugal	504 (2.6)	502 (2.8)	-1 (2.5)	502 (3.1)	-2 (2.1)	504 (2.0)	0 (1.5)
[2] New Zealand	503 (2.3)	505 (2.7)	2 (1.2) ▲	497 (2.6)	-5 (1.0) ▽	505 (2.6)	2 (2.1)
† Belgium (Flemish)	501 (2.1)	493 (2.7)	-8 (1.7) ▽	501 (2.2)	0 (1.2)	511 (2.4)	10 (1.9) ▲
Malta	496 (1.3)	496 (1.6)	1 (1.4)	496 (2.7)	0 (2.2)	490 (3.8)	-6 (3.5)
[2] Kazakhstan	494 (3.1)	489 (2.9)	-6 (1.7) ▽	494 (3.4)	0 (1.6)	502 (3.4)	8 (2.7) ▲
Bahrain	493 (3.4)	496 (3.7)	4 (1.6) ▲	494 (3.4)	2 (1.6)	482 (3.6)	-11 (2.5) ▽
Albania	489 (3.5)	494 (3.9)	4 (1.5) ▲	485 (3.8)	-4 (2.3)	487 (3.6)	-2 (1.8)
France	488 (3.0)	485 (3.6)	-2 (1.9)	495 (3.0)	7 (1.1) ▲	475 (4.7)	-13 (4.0) ▽
United Arab Emirates	473 (2.1)	482 (2.2)	9 (0.7) ▲	470 (2.1)	-3 (0.9) ▽	462 (1.9)	-11 (1.2) ▽
Chile	469 (2.6)	473 (3.7)	4 (2.3)	461 (3.4)	-8 (1.7) ▽	472 (2.7)	3 (1.6)
Armenia	466 (3.4)	463 (3.4)	-3 (1.6)	453 (3.3)	-13 (1.4) ▽	486 (3.6)	19 (3.5) ▲
Bosnia and Herzegovina	459 (2.9)	451 (3.2)	-7 (1.3) ▽	459 (3.0)	0 (1.1)	469 (3.0)	10 (1.8) ▲
[1] Georgia	454 (3.9)	452 (3.9)	-3 (2.2)	445 (3.7)	-9 (2.1) ▽	465 (4.4)	11 (2.2) ▲
Montenegro	453 (2.5)	451 (3.2)	-2 (1.4)	454 (2.7)	0 (1.9)	451 (3.3)	-2 (1.7)
Qatar	449 (3.9)	455 (4.4)	5 (1.4) ▲	451 (4.2)	1 (1.5)	434 (4.3)	-16 (2.4) ▽
Iran, Islamic Rep. of	441 (4.1)	444 (4.6)	3 (1.7)	440 (4.3)	0 (2.1)	433 (4.9)	-8 (3.1) ▽
Oman	435 (4.1)	- -	- -	- -	- -	- -	- -
Azerbaijan	427 (3.3)	425 (4.0)	-2 (2.1)	419 (4.5)	-8 (2.7) ▽	430 (3.5)	3 (1.4) ▲
North Macedonia	426 (6.2)	- -	- -	- -	- -	- -	- -
[2] Kosovo	413 (3.7)	419 (4.5)	6 (2.2) ▲	406 (3.7)	-7 (1.3) ▽	402 (4.2)	-11 (2.3) ▽
[2] Saudi Arabia	402 (4.1)	- -	- -	- -	- -	- -	- -
Kuwait	392 (6.1)	- -	- -	- -	- -	- -	- -
Ψ Morocco	374 (5.8)	362 (6.1)	-12 (1.5) ▽	378 (6.2)	4 (1.7) ▲	366 (5.5)	-9 (2.0) ▽
Ж South Africa (5)	324 (4.9)	- -	- -	- -	- -	- -	- -
[2] Ж Pakistan	290 (13.4)	- -	- -	- -	- -	- -	- -
[2] Ж Philippines	249 (7.5)	- -	- -	- -	- -	- -	- -
Benchmarking Participants							
Moscow City, Russian Fed.	595 (2.2)	592 (2.1)	-3 (1.2) ▽	603 (2.4)	8 (1.0) ▲	592 (2.9)	-3 (2.1)
[2] Dubai, UAE	545 (1.7)	560 (2.1)	15 (0.8) ▲	541 (2.3)	-4 (1.5) ▽	531 (2.1)	-13 (1.5) ▽
[2] Ontario, Canada	524 (3.2)	525 (3.1)	1 (2.3)	520 (3.1)	-4 (1.2) ▽	528 (3.0)	4 (2.3)
Madrid, Spain	523 (2.0)	523 (3.7)	0 (3.3)	521 (3.8)	-1 (3.5)	520 (3.7)	-3 (3.2)
Quebec, Canada	522 (2.5)	523 (2.8)	1 (1.9)	520 (3.6)	-2 (2.6)	525 (3.0)	3 (3.2)
Abu Dhabi, UAE	418 (2.8)	422 (2.9)	4 (1.7) ▲	415 (3.0)	-3 (1.9)	411 (2.7)	-7 (2.6) ▽

▲ Subscale score significantly higher than overall science score
▽ Subscale score significantly lower than overall science score

Numbers of items are based on the TIMSS 2019 fourth grade science eAssessment items included in scaling.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.
See Appendix B.2 for target population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available because average achievement could not be accurately estimated.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Trends in Average Achievement in Cognitive Domains

Exhibit 2.18 presents differences in average achievement for the three cognitive domains across four assessment cycles back to 2007, when TIMSS first began providing scaled results in the cognitive domains. Forty-one countries for which cognitive domain scores were estimated participated in both the TIMSS 2015 and TIMSS 2019 assessments. The recent trends compared with 2015 in the knowing cognitive domain showed increases in 12 countries and decreases in 9 countries. In the applying domain, 8 countries showed increases and 12 showed decreases. In the reasoning domain, 9 showed increases, and 9 showed decreases. These recent increases in average achievement in the knowing cognitive domain together with the decreases in the applying domain may have contributed to more countries having a relative strength in knowing compared with applying in 2019.

Between 2007 and 2019, 6 countries had higher average achievement and 5 had lower average achievement in knowing; 6 had higher average achievement and 4 had lower average achievement in applying; and 7 had higher average achievement and 3 had lower average achievement in reasoning.

Exhibit 2.18: Differences in Achievement for Science Cognitive Domains Across Assessment Years◊

Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▽) than the performance in the column year.

Country	Knowing				Applying				Reasoning			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
Armenia												
2019	463 (3.4)	18 ▲	51 ▲		453 (3.3)	13 ▲	35 ▲		486 (3.6)	50 ▲	83 ▲	
2015	445 (4.1)		33 ▲		440 (4.8)		22 ▲		435 (4.2)		33 ▲	
2011	412 (4.3)				418 (3.9)				402 (5.1)			
Australia												
2019	538 (3.0)	15 ▲	20 ▲	6	524 (3.2)	1	10 ▲	2	538 (3.0)	10 ▲	20 ▲	9
2015	523 (3.3)		5	-9	522 (2.7)		9 ▲	0	527 (3.0)		10 ▲	-1
2011	517 (2.8)			-14 ▽	513 (3.0)			-9	518 (3.4)			-11 ▽
2007	532 (3.5)				522 (3.8)				528 (4.2)			
Austria												
2019	523 (3.1)		-9 ▽	-8 ▽	523 (2.4)		-10 ▽	-3	518 (3.3)		-7	4
2011	532 (3.0)			1	533 (2.9)			7	525 (3.1)			11 ▲
2007	531 (2.4)				527 (2.7)				514 (2.8)			
Azerbaijan												
2019	425 (4.0)		-20 ▽		419 (4.5)		-20 ▽		430 (3.5)		28 ▲	
[2] 2011	445 (6.4)				439 (5.3)				402 (5.9)			
Bahrain												
2019	496 (3.7)	41 ▲	43 ▲		494 (3.4)	33 ▲	51 ▲		481 (3.6)	26 ▲	39 ▲	
[2] 2015	456 (2.5)		2		462 (3.0)		18 ▲		455 (3.0)		13 ▲	
2011	454 (3.8)				443 (3.8)				442 (4.8)			
Belgium (Flemish)												
† 2019	493 (2.7)	-5	-14 ▽		501 (2.2)	-12 ▽	-10 ▽		511 (2.4)	-15 ▽	3	
† 2015	498 (2.7)		-9 ▽		513 (2.5)		2		526 (2.9)		17 ▲	
2011	507 (2.2)				511 (1.9)				508 (2.6)			
Bulgaria												
2019	526 (5.4)	-25 ▽			523 (5.4)	-14			507 (5.5)	1		
2015	551 (6.5)				536 (6.2)				507 (6.4)			
Canada												
[1 2] 2019	524 (1.9)	2			520 (2.0)	-8 ▽			525 (1.8)	1		
[1 2] † 2015	523 (3.1)				528 (2.6)				524 (2.6)			
Chile												
2019	473 (3.7)	-5	-10 ▽		461 (3.4)	-15 ▽	-19 ▽		472 (2.7)	-5	-5	
2015	477 (3.2)		-5		476 (3.0)		-4		477 (2.5)		0	
2011	483 (2.8)				479 (2.3)				477 (2.8)			
Chinese Taipei												
2019	560 (1.9)	4	18 ▲	17 ▲	561 (2.0)	7 ▲	8 ▲	1	552 (2.7)	-6	-15 ▽	-21 ▽
2015	557 (2.5)		15 ▲	13 ▲	553 (2.6)		1	-6	558 (3.1)		-10 ▽	-16 ▽
2011	542 (2.6)			-1	552 (3.2)			-7	568 (3.1)			-6
2007	544 (2.7)				560 (2.1)				574 (3.3)			
Croatia												
2019	526 (2.4)	-8 ▽	1		521 (2.3)	-9 ▽	11 ▲		522 (2.5)	-14 ▽	10 ▲	
2015	534 (2.9)		9 ▲		530 (2.2)		20 ▲		536 (2.4)		23 ▲	
[2] 2011	526 (2.0)				510 (2.4)				512 (3.5)			
Cyprus												
2019	503 (3.3)	35 ▲			519 (3.0)	30 ▲			511 (3.2)	21 ▲		
2015	467 (3.2)				489 (3.4)				490 (3.6)			
Czech Republic												
2019	538 (2.9)	-6	-12 ▽	18 ▲	526 (2.5)	-2	-8 ▽	11 ▲	539 (3.2)	10 ▲	22 ▲	31 ▲
2015	545 (3.0)		-6	24 ▲	528 (2.1)		-6	13 ▲	529 (2.4)		12 ▲	21 ▲
2011	551 (3.2)			30 ▲	534 (2.7)			19 ▲	516 (3.9)			9
2007	521 (3.0)				515 (3.3)				507 (3.6)			
Denmark												
† 2019	521 (2.0)	-3	-4	4	519 (2.5)	-10 ▽	-12 ▽	6	527 (2.7)	2	0	3
[2] † 2015	524 (2.6)		0	7	529 (2.4)		-2	16 ▲	526 (2.9)		-2	1
[2] 2011	524 (2.6)			7	532 (2.5)			19 ▲	527 (2.9)			3
† 2007	517 (3.3)				513 (3.4)				524 (4.4)			
England												
[2] 2019	544 (3.3)	10 ▲	15 ▲	-4	526 (3.0)	-12 ▽	-7	-11 ▽	544 (3.7)	5	17 ▲	3
2015	533 (2.6)		5	-14 ▽	538 (2.7)		5	1	539 (2.7)		12 ▲	-1
2011	529 (3.4)			-19 ▽	532 (3.2)			-4	526 (4.5)			-14 ▽
2007	547 (3.3)				537 (3.4)				540 (2.8)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

◊ Trend reporting in cognitive domains using current methodology began with TIMSS 2007.
See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 2.18: Differences in Achievement for Science Cognitive Domains Across Assessment Years◊

(Continued)

Country	Knowing				Applying				Reasoning			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
Finland												
2019	553 (2.5)	-3	-26 ▽		551 (2.5)	-2	-17 ▽		563 (2.4)	11 ▲	3	
2015	556 (3.1)		-23 ▽		553 (2.4)		-15 ▽		552 (2.3)		-8 ▽	
2011	579 (2.5)				568 (2.4)				560 (3.0)			
France												
2019	485 (3.6)	4			495 (3.0)	1			475 (4.7)	-6		
2015	482 (3.8)				494 (3.1)				481 (2.8)			
Georgia												
[1] 2019	452 (3.9)	-8	-14 ▽	23 ▲	445 (3.7)	-4	-7	31 ▲	465 (4.4)	40 ▲	43 ▲	86 ▲
[1] 2015	460 (4.2)		-6	31 ▲	449 (4.8)		-3	35 ▲	426 (4.0)		3	46 ▲
[1] 2011	466 (3.8)			37 ▲	452 (4.3)			38 ▲	422 (4.8)			43 ▲
[1] 2007	429 (4.3)				415 (4.7)				379 (6.1)			
Germany												
2019	520 (2.3)	-8 ▽	-5	-9 ▽	516 (2.5)	-13 ▽	-17 ▽	-10 ▽	518 (2.9)	-13 ▽	-8	-7
2015	527 (2.8)		3	-1	529 (2.4)		-4	3	532 (2.3)		6	6
2011	524 (4.0)			-4	533 (2.5)			7 ▲	526 (3.7)			1
2007	529 (2.4)				526 (2.5)				525 (2.8)			
Hong Kong SAR												
[†] 2019	537 (3.2)	-25 ▽	0	-15 ▽	526 (3.1)	-28 ▽	-3	-26 ▽	531 (3.6)	-22 ▽	-11	-32 ▽
[†] 2015	562 (3.0)		25 ▲	9	554 (3.3)		25 ▲	1	552 (4.1)		11	-10
[2] 2011	537 (3.7)			-16 ▽	529 (3.5)			-24 ▽	541 (4.2)			-21 ▽
2007	553 (4.0)				552 (3.5)				563 (4.9)			
Hungary												
2019	533 (2.7)	-17 ▽	-13 ▽	-11 ▽	526 (3.1)	-13 ▽	-4	-6	532 (2.6)	-1	7	4
2015	550 (3.8)		4	6	539 (3.4)		9	7	533 (3.9)		8	5
2011	547 (3.7)			2	530 (3.5)			-2	525 (4.7)			-3
2007	544 (3.5)				532 (3.9)				528 (4.1)			
Iran, Islamic Rep. of												
2019	444 (4.6)	28 ▲	-4	13	440 (4.3)	23 ▲	-11	-2	432 (4.9)	10	-27 ▽	6
2015	416 (4.1)		-32 ▽	-15 ▽	417 (4.5)		-34 ▽	-25 ▽	422 (4.9)		-37 ▽	-5
2011	448 (4.2)			17 ▲	452 (3.8)			9	459 (3.8)			32 ▲
2007	431 (5.0)				443 (4.9)				427 (4.6)			
Ireland												
2019	532 (3.4)	3	14 ▲		525 (3.0)	-5	8		525 (3.8)	0	16 ▲	
2015	529 (2.5)		11 ▲		530 (2.5)		13 ▲		526 (2.9)		17 ▲	
2011	518 (3.8)				517 (3.6)				509 (3.3)			
Italy												
2019	515 (3.0)	-6	-17 ▽	-20 ▽	504 (2.7)	-10 ▽	-19 ▽	-37 ▽	508 (2.7)	-3	-2	-15 ▽
[2] 2015	521 (3.1)		-11 ▽	-14 ▽	513 (3.1)		-10 ▽	-28 ▽	511 (3.5)		2	-12 ▽
2011	532 (3.1)			-3	523 (2.8)			-18 ▽	510 (2.9)			-14 ▽
2007	535 (4.1)				541 (3.3)				523 (3.5)			
Japan												
2019	535 (2.6)	-9 ▽	-3	1	576 (2.2)	0	14 ▲	30 ▲	579 (2.4)	-15 ▽	-12 ▽	6 ▲
2015	544 (2.3)		6 ▲	9 ▲	576 (1.8)		14 ▲	31 ▲	594 (1.8)		3	21 ▲
2011	538 (1.8)			3	562 (1.6)			16 ▲	591 (1.9)			18 ▲
2007	534 (2.6)				546 (3.1)				573 (2.1)			
Kazakhstan												
[2] 2019	489 (2.9)		2		494 (3.4)		-5		502 (3.4)		6	
[2] 2011	486 (5.4)				499 (5.2)				496 (5.8)			
Korea, Rep. of												
2019	584 (2.5)	3	15 ▲		596 (2.6)	2	3		581 (2.4)	-13 ▽	-23 ▽	
2015	582 (2.2)		12 ▲		594 (1.9)		0		594 (2.2)		-11 ▽	
2011	570 (2.1)				593 (2.0)				605 (3.0)			
Lithuania												
[2] 2019	539 (3.1)	16 ▲	32 ▲	28 ▲	531 (2.3)	5	10 ▲	18 ▲	548 (2.9)	10 ▲	32 ▲	27 ▲
[2] 2015	524 (3.0)		16 ▲	12 ▲	526 (2.4)		6	13 ▲	538 (3.0)		22 ▲	17 ▲
[12] 2011	508 (2.8)			-4	521 (2.5)			7	515 (2.7)			-5
[1] 2007	511 (2.3)				513 (3.3)				521 (2.9)			
Malta												
2019	496 (1.6)		60 ▲		496 (2.7)		47 ▲		490 (3.8)		31 ▲	
2011	437 (3.1)				449 (1.7)				459 (4.2)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 2.18: Differences in Achievement for Science Cognitive Domains Across Assessment Years◊

(Continued)

Country	Knowing				Applying				Reasoning			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
Morocco												
Ψ 2019	362 (6.1)	31 ▲	125 ▲		378 (6.2)	21 ▲	122 ▲		365 (5.5)	12	125 ▲	
Ψ 2015	331 (5.6)		94 ▲		357 (4.7)		101 ▲		354 (4.7)		114 ▲	
Ж 2011	237 (6.0)				256 (4.9)				240 (5.1)			
Netherlands												
≡ 2019	515 (2.8)	6	-13 ▽	-6	517 (3.1)	-2	-17 ▽	-7	523 (3.2)	-2	-9 ▽	-2
† 2015	508 (2.4)		-19 ▽	-12 ▽	519 (2.4)		-15 ▽	-6	526 (2.9)		-6	0
† 2011	528 (2.2)			7 ▲	534 (2.0)			10 ▲	532 (3.0)			6
‡ 2007	521 (2.7)				525 (2.4)				526 (2.7)			
New Zealand												
2 2019	505 (2.7)	1	9 ▲	-6	497 (2.6)	-5	0	1	505 (2.6)	-9 ▽	8 ▲	2
2015	504 (2.8)		8 ▲	-7	502 (3.1)		5	6	514 (2.4)		17 ▲	11 ▲
2011	496 (2.7)			-15 ▽	497 (2.8)			1	497 (3.0)			-6
2007	511 (3.4)				496 (2.8)				503 (4.2)			
Northern Ireland												
† 2019	523 (2.9)	5	6		514 (2.3)	-5	-7 ▽		519 (3.2)	-1	16 ▲	
‡ 2015	518 (2.9)		1		519 (2.9)		-3		520 (2.6)		17 ▲	
† 2011	517 (3.1)				521 (2.8)				503 (3.2)			
Norway (5)												
† 2019	540 (2.5)	8 ▲			537 (2.4)	-5			540 (2.5)	3		
2015	533 (3.0)				542 (2.9)				537 (3.8)			
Poland												
2019	524 (2.6)	-19 ▽			538 (2.5)	-16 ▽			525 (2.6)	-17 ▽		
2015	544 (2.5)				554 (2.8)				542 (3.2)			
Portugal												
2 2019	502 (2.8)	-4	-25 ▽		502 (3.1)	-6	-13 ▽		504 (2.0)	-2	-21 ▽	
2 2015	507 (2.9)		-21 ▽		508 (1.9)		-7		506 (1.9)		-19 ▽	
2011	528 (4.4)				515 (4.2)				524 (4.3)			
Qatar												
2019	455 (4.4)	18 ▲	67 ▲		451 (4.2)	20 ▲	62 ▲		434 (4.3)	0	29 ▲	
2015	437 (4.5)		49 ▲		430 (4.7)		41 ▲		433 (4.4)		29 ▲	
2 2011	388 (5.2)				389 (5.4)				404 (4.7)			
Russian Federation												
2 2019	562 (3.3)	-7	9	16 ▲	572 (3.4)	3	16 ▲	22 ▲	569 (2.8)	9	27 ▲	27 ▲
2015	569 (3.9)		15 ▲	23 ▲	568 (3.3)		12 ▲	19 ▲	561 (3.8)		19 ▲	18 ▲
2011	553 (3.8)			7	556 (3.5)			6	542 (4.3)			0
2007	546 (5.5)				550 (5.3)				542 (5.3)			
Serbia												
2 2019	506 (3.3)	-20 ▽	-18 ▽		526 (3.9)	4	20 ▲		518 (3.9)	-3	-2	
3 2015	527 (3.9)		3		522 (4.5)		16 ▲		521 (3.9)		1	
2 2011	524 (2.9)				506 (3.1)				519 (3.0)			
Singapore												
3 2019	588 (3.7)	13 ▲	18 ▲	-11	595 (3.7)	-4	6	8	604 (3.5)	-1	7	27 ▲
2 2015	574 (4.1)		4	-24 ▽	599 (4.0)		10	12 ▲	605 (3.6)		8	29 ▲
2 2011	570 (3.4)			-29 ▽	590 (4.0)			2	597 (3.8)			20 ▲
2007	599 (4.5)				587 (4.2)				576 (4.1)			
Slovak Republic												
2 2019	527 (3.9)	-2	-20 ▽	-4	515 (4.3)	-1	-12 ▽	-11	516 (4.2)	9	2	4
2015	530 (3.3)		-17 ▽	-2	517 (2.8)		-11 ▽	-10	507 (3.4)		-7	-4
2011	547 (3.9)			15 ▲	528 (3.9)			1	514 (4.0)			2
2007	531 (4.9)				527 (5.0)				512 (5.4)			
Spain												
2019	514 (2.2)	-8 ▽	-2		511 (2.0)	-3	12 ▲		507 (1.8)	-10 ▽	11 ▲	
2 2015	522 (3.3)		6		514 (3.3)		15 ▲		517 (2.6)		21 ▲	
2011	516 (3.2)				499 (3.1)				496 (3.0)			
Sweden												
2019	540 (3.4)	2	4	12 ▲	532 (3.1)	-8	2	12 ▲	541 (3.2)	-1	4	13 ▲
2 2015	538 (3.8)		3	10 ▲	540 (3.4)		9 ▲	20 ▲	542 (3.8)		5	14 ▲
2011	536 (2.8)			8	531 (3.0)			11 ▲	537 (3.0)			9
2007	528 (3.1)				520 (3.2)				528 (4.3)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 2.18: Differences in Achievement for Science Cognitive Domains Across Assessment Years◊

(Continued)

Country	Knowing				Applying				Reasoning			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
United Arab Emirates												
2019	482 (2.2)	28 ▲	49 ▲		470 (2.1)	18 ▲	49 ▲		461 (1.9)	17 ▲	36 ▲	
2015	453 (3.3)		21 ▲		452 (3.2)		31 ▲		444 (3.0)		19 ▲	
2011	433 (2.8)				421 (2.6)				426 (2.6)			
United States												
2† 2019	542 (2.7)	-6	-4	-4	535 (3.1)	-11 ▽	-9 ▽	1	538 (2.7)	-3	1	3
2† 2015	548 (2.5)		2	3	546 (2.2)		2	12 ▲	542 (2.7)		4	6
2 2011	546 (1.9)			1	544 (2.2)			10 ▲	537 (2.4)			2
2† 2007	546 (2.7)				534 (3.1)				535 (3.0)			
Benchmarking Participants												
Ontario, Canada												
2 2019	525 (3.1)	-3	-4	-18 ▽	520 (3.1)	-15 ▽	-6	-9	528 (3.0)	-1	-1	-13 ▽
2015	527 (2.8)		-1	-15 ▽	534 (2.5)		9 ▲	6	529 (2.8)		0	-11 ▽
2011	529 (3.0)			-14 ▽	526 (3.3)			-3	529 (3.6)			-11 ▽
2 2007	542 (3.6)				529 (3.7)				540 (3.4)			
Quebec, Canada												
2019	523 (2.8)	-1	4	6	520 (3.6)	-6	6	5	525 (3.0)	-1	5	-1
≡ 2015	524 (4.3)		5	7	525 (4.5)		12 ▲	11 ▲	526 (4.6)		7	0
2011	519 (2.7)			2	514 (2.5)			-1	520 (3.8)			-6
2 2007	517 (2.8)				515 (3.0)				526 (3.6)			
Abu Dhabi, UAE												
2019	422 (2.9)	12	7		415 (3.0)	-2	10		411 (2.7)	-1	-5	
2 2015	410 (6.6)		-4		417 (5.9)		11		412 (5.3)		-5	
2011	415 (5.7)				405 (5.3)				416 (5.2)			
Dubai, UAE												
2 2019	560 (2.1)	37 ▲	92 ▲	99 ▲	541 (2.3)	24 ▲	88 ▲	83 ▲	531 (2.1)	21 ▲	76 ▲	76 ▲
2015	523 (2.3)		55 ▲	62 ▲	517 (2.8)		64 ▲	59 ▲	510 (2.9)		55 ▲	54 ▲
2011	467 (2.5)			7	453 (2.2)			-5	455 (3.7)			-1
‡ 2007	461 (2.8)				458 (3.7)				456 (3.1)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Average Achievement in Cognitive Domains by Gender

Exhibit 2.19 shows the differences between girls' and boys' average achievement in the cognitive domains of knowing, applying, and reasoning. Interestingly, boys had higher average achievement in more countries than girls in the knowing cognitive domain, but the situation was reversed in the applying and reasoning domains. In the knowing domain, girls had higher average achievement than boys in 3 countries, and boys had higher average achievement than girls in 16 countries. However, in the applying domain, girls had higher average achievement than boys in 12 countries compared with only 3 countries where boys had higher achievement than girls, and in the reasoning domain, girls had higher average achievement than boys in 16 countries compared with no countries with higher average achievement for boys.

Exhibit 2.19: Average Achievement in Science Cognitive Domains by Gender

Country	Knowing (69 Items)		Applying (64 Items)		Reasoning (36 Items)	
	Girls	Boys	Girls	Boys	Girls	Boys
Albania	496 (5.0)	491 (4.7)	493 (4.8) ▲	477 (4.4)	492 (3.9) ▲	482 (4.5)
Armenia	469 (3.4) ▲	458 (4.5)	458 (3.8) ▲	449 (3.9)	492 (4.9) ▲	480 (3.7)
Australia	535 (3.0)	540 (3.7)	526 (4.0)	521 (3.5)	541 (3.2) ▲	534 (3.3)
Austria	517 (3.1)	528 (4.1) ▲	520 (3.4)	526 (2.9)	520 (4.3)	517 (3.1)
Azerbaijan	426 (4.5)	424 (4.4)	422 (4.3)	416 (6.5)	434 (5.4)	426 (3.9)
Bahrain	515 (4.5) ▲	479 (5.3)	513 (4.0) ▲	477 (5.0)	498 (4.0) ▲	465 (5.2)
† Belgium (Flemish)	490 (2.9)	497 (3.4) ▲	500 (2.4)	502 (2.6)	511 (2.3)	511 (4.1)
Bosnia and Herzegovina	450 (4.1)	453 (3.2)	463 (3.0) ▲	454 (4.0)	474 (3.5) ▲	464 (3.8)
Bulgaria	529 (5.8)	524 (6.0)	529 (6.5) ▲	517 (5.7)	512 (6.8)	503 (5.9)
1 2 Canada	519 (2.4)	529 (2.0) ▲	517 (2.3)	522 (2.2) ▲	527 (2.2)	524 (2.4)
Chile	468 (4.4)	477 (3.9) ▲	458 (4.1)	463 (3.5)	473 (3.1)	471 (3.8)
Chinese Taipei	556 (2.3)	565 (2.6) ▲	559 (2.5)	562 (2.4)	556 (4.1)	548 (3.0)
Croatia	525 (3.5)	528 (2.3)	521 (2.5)	521 (3.0)	524 (2.8)	519 (3.1)
Cyprus	498 (3.6)	508 (4.0) ▲	519 (3.3)	520 (3.6)	509 (3.9)	512 (4.7)
Czech Republic	532 (4.0)	545 (3.0) ▲	524 (3.0)	529 (3.4)	536 (3.9)	541 (3.2)
† Denmark	518 (2.8)	523 (2.9)	520 (3.0)	518 (2.9)	532 (4.0)	523 (3.1)
2 England	542 (3.9)	545 (4.0)	526 (4.1)	525 (3.4)	548 (3.9) ▲	539 (4.5)
Finland	553 (3.1)	553 (2.7)	554 (3.3)	548 (2.7)	568 (3.1) ▲	557 (3.2)
France	485 (4.0)	486 (4.2)	497 (3.6)	492 (4.0)	478 (4.8)	471 (5.3)
1 Georgia	448 (4.1)	455 (4.6)	445 (4.0)	446 (4.3)	463 (4.6)	467 (5.1)
Germany	517 (3.0)	522 (3.2)	515 (3.2)	517 (2.8)	519 (3.8)	518 (3.5)
† Hong Kong SAR	531 (3.7)	542 (4.1) ▲	528 (3.4)	525 (4.0)	534 (4.0)	528 (4.5)
Hungary	528 (3.5)	538 (3.1) ▲	522 (3.6)	529 (3.7)	531 (3.8)	532 (3.2)
Iran, Islamic Rep. of	441 (7.2)	447 (6.2)	441 (6.7)	440 (5.4)	434 (6.9)	431 (5.9)
Ireland	528 (4.8)	535 (3.5)	524 (4.0)	527 (3.1)	527 (4.7)	524 (4.1)
Italy	507 (3.6)	522 (3.7) ▲	501 (3.2)	506 (3.1)	507 (3.0)	508 (4.2)
Japan	533 (2.5)	537 (3.3)	581 (2.3) ▲	572 (2.9)	585 (3.1)	574 (4.3)
2 Kazakhstan	488 (3.8)	489 (3.4)	499 (3.9) ▲	489 (3.5)	509 (3.5) ▲	495 (4.4)
Korea, Rep. of	573 (2.3)	595 (3.2) ▲	594 (2.9)	598 (2.8)	580 (2.9)	583 (3.7)
2 Kosovo	426 (5.0) ▲	413 (4.8)	415 (4.6) ▲	398 (3.9)	407 (5.6)	398 (5.8)
Kuwait	- -	- -	- -	- -	- -	- -
2 Latvia	538 (3.7)	541 (3.6)	543 (2.8) ▲	537 (3.0)	553 (3.5) ▲	540 (3.4)
2 Lithuania	539 (4.2)	540 (3.8)	534 (2.7)	528 (3.2)	551 (3.6)	545 (3.5)
Malta	491 (2.1)	501 (2.8) ▲	493 (2.8)	499 (3.9)	491 (3.4)	489 (4.7)
Montenegro	451 (3.9)	451 (3.5)	459 (3.3) ▲	449 (2.9)	453 (3.8)	449 (4.0)
Ψ Morocco	365 (6.9)	359 (6.1)	386 (7.0) ▲	370 (6.2)	372 (6.1) ▲	359 (6.1)
≡ Netherlands	512 (3.1)	517 (3.3)	519 (3.6)	515 (3.6)	526 (4.3)	520 (4.1)
2 New Zealand	504 (3.8)	505 (3.6)	500 (3.6)	495 (3.5)	512 (3.5) ▲	498 (3.3)
North Macedonia	- -	- -	- -	- -	- -	- -
† Northern Ireland	521 (3.7)	525 (3.7)	514 (3.6)	514 (3.3)	525 (3.9) ▲	514 (4.0)
† Norway (5)	539 (2.5)	542 (3.6)	538 (2.8)	536 (3.2)	546 (3.5) ▲	535 (3.6)
Oman	- -	- -	- -	- -	- -	- -
2 Ж Pakistan	- -	- -	- -	- -	- -	- -
2 Ж Philippines	- -	- -	- -	- -	- -	- -
Poland	522 (3.3)	526 (3.0)	540 (2.9)	536 (2.9)	531 (3.4) ▲	520 (3.6)
2 Portugal	499 (3.5)	505 (3.2)	500 (3.9)	504 (3.2)	502 (2.9)	505 (2.5)
Qatar	459 (6.6)	450 (4.2)	457 (6.1)	444 (4.5)	442 (6.8) ▲	425 (4.2)
2 Russian Federation	559 (3.9)	566 (3.5) ▲	570 (4.4)	573 (3.2)	571 (4.8)	567 (3.6)
2 Saudi Arabia	- -	- -	- -	- -	- -	- -
2 Serbia	507 (3.7)	506 (4.3)	533 (4.4) ▲	518 (4.8)	522 (3.9)	514 (5.2)
3 Singapore	580 (3.9)	595 (4.2) ▲	591 (4.1)	599 (3.9) ▲	605 (4.0)	603 (3.8)
2 Slovak Republic	522 (3.9)	532 (4.7) ▲	511 (4.1)	519 (5.3) ▲	517 (5.5)	516 (4.8)
Ж South Africa (5)	- -	- -	- -	- -	- -	- -
Spain	511 (2.9)	517 (2.5)	511 (2.4)	511 (2.6)	506 (2.8)	507 (2.5)
Sweden	538 (3.6)	543 (4.3)	534 (3.2)	530 (4.5)	547 (3.2) ▲	535 (4.4)
2 Turkey (5)	527 (5.0)	536 (5.6)	526 (4.4)	530 (5.3)	519 (4.0)	523 (5.3)
United Arab Emirates	482 (3.3)	482 (3.0)	473 (3.2)	467 (2.6)	465 (3.2)	458 (2.3)
2 † United States	537 (3.4)	547 (3.1) ▲	534 (3.1)	536 (3.7)	538 (3.1)	539 (3.2)
International Average	**507 (0.6)**	**510 (0.5)** ▲	**509 (0.5)** ▲	**506 (0.5)**	**512 (0.6)** ▲	**506 (0.6)**
Benchmarking Participants						
2 Ontario, Canada	521 (4.1)	528 (3.2)	519 (3.9)	521 (3.2)	530 (3.9)	526 (3.5)
Quebec, Canada	517 (3.1)	529 (3.4) ▲	516 (4.1)	523 (3.7) ▲	526 (3.6)	524 (3.3)
Moscow City, Russian Fed.	588 (2.8)	595 (2.8)	601 (3.6)	604 (3.4)	593 (2.6)	590 (3.8)
Madrid, Spain	520 (4.5)	527 (3.4) ▲	520 (4.2)	522 (4.0)	519 (3.4)	520 (5.1)
Abu Dhabi, UAE	424 (4.1)	419 (4.3)	420 (4.2)	410 (3.8)	417 (4.1) ▲	405 (3.4)
2 Dubai, UAE	559 (4.2)	560 (3.1)	542 (3.9)	540 (2.7)	534 (4.0)	529 (2.5)

▲ Average significantly higher than other gender

Numbers of items are based on the TIMSS 2019 fourth grade science eAssessment items included in scaling.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.
See Appendix B.2 for target population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available because average achievement could not be accurately estimated.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Mathematics Grade 8

Average Mathematics Achievement

Average Achievement and Scale Score Distributions

The TIMSS 2019 eighth grade mathematics assessment was based on a comprehensive assessment framework developed collaboratively with the participating countries to reflect their curricular goals. The eighth grade mathematics assessment included four content areas—number (30%), algebra (30%), geometry (20%), and data and probability (20%). In accordance with the framework, the majority of TIMSS 2019 mathematics items assess students' applying and reasoning skills. To cover the framework at the eighth grade, the TIMSS 2019 mathematics assessment comprised 211 assessment items. This cycle marked the beginning of the transition to a computer-based assessment system. More than half of the TIMSS 2019 countries administered the assessment in an "e" (electronic) format and almost half administered the assessment in a paper format, as in TIMSS 2015. The "e" countries also administered the trend items in the paper format to provide a bridge to the TIMSS 2015 and TIMSS 2019 paper-based assessments. The assessment was carefully designed and analyzed, so that the TIMSS 2019 mathematics achievement results for all 39 countries are reported on the same TIMSS eighth grade mathematics scale.

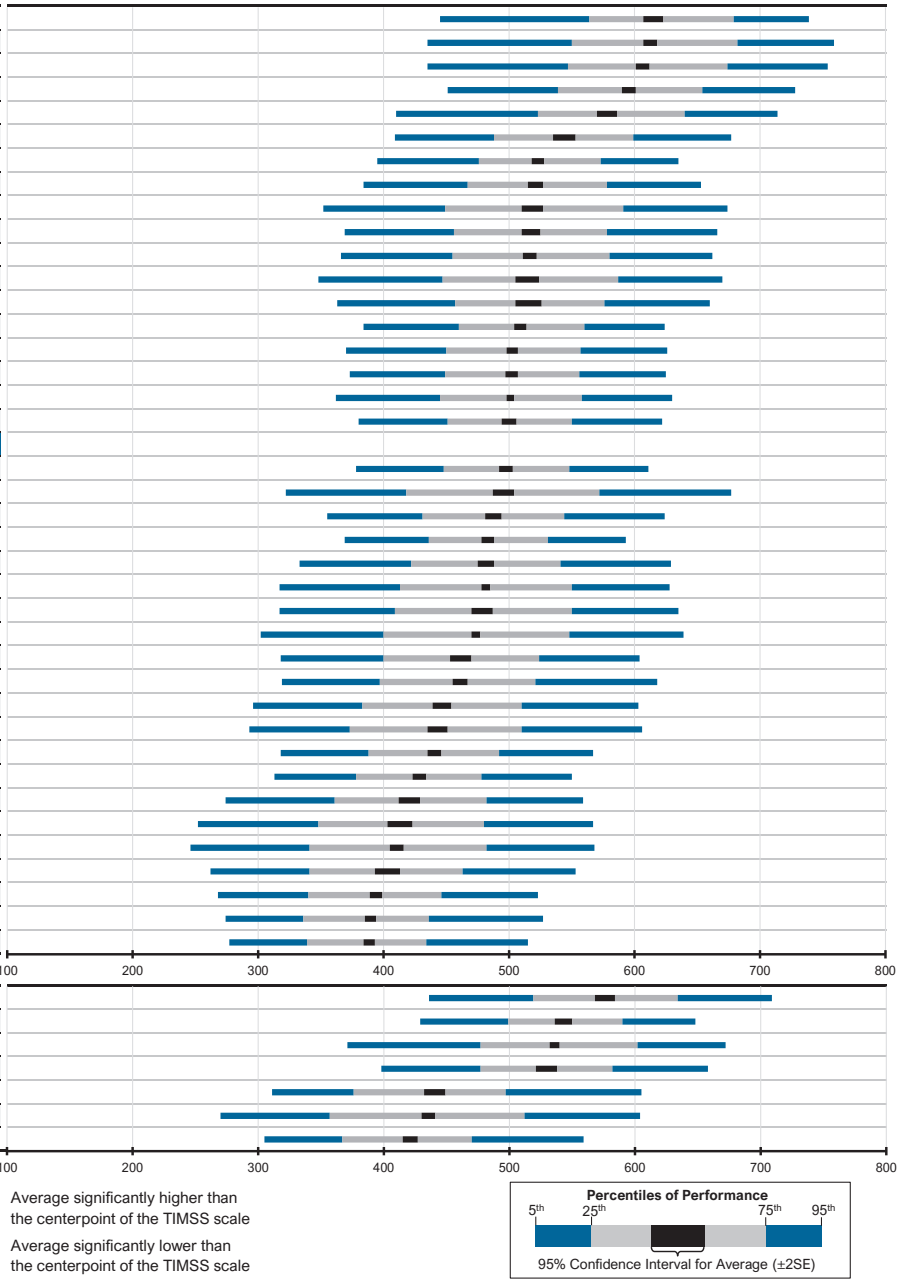
Exhibit 3.1 presents the average achievement at the eighth grade for each participating country from highest to lowest together with the scale score distribution. Exhibit 3.2 shows whether relatively small differences in average achievement between one country and the next are statistically significant.

The five East Asian countries had the highest average achievement, with Singapore, Chinese Taipei, and Korea performing similarly and having higher average achievement than all of the other TIMSS 2019 countries. These three countries were followed by Japan, whose eighth grade students had higher average achievement than students in all of the other countries except those three countries, and then by Hong Kong SAR, whose students had higher average achievement than students in all of the other countries except those four countries. In turn, the Russian Federation had higher achievement than all of the other remaining countries. Next, Ireland, Lithuania, Israel, Australia, Hungary, the United States, and England also performed well. Essentially, Exhibit 3.2 shows clusters of several similarly performing countries, followed by the next highest achieving clusters of similarly performing countries, and so on.

A number of eighth grade TIMSS 2019 participants performed well. Fourteen countries (including those discussed above) had higher average achievement than the centerpoint of 500 (Exhibit 3.1), which is a point of reference on the TIMSS eighth grade mathematics scale that remains constant from TIMSS assessment to TIMSS assessment. However, there was a considerable difference between the highest average achievement and the lowest. Also, the scale score distributions in Exhibit 3.1 show that there is wide variation in achievement in every country. Every country has some higher achieving and some lower achieving students.

Exhibit 3.1: Average Mathematics Achievement and Scale Score Distributions

Country	Average Scale Score	
[2] Singapore	616 (4.0)	▲
Chinese Taipei	612 (2.7)	▲
Korea, Rep. of	607 (2.8)	▲
Japan	594 (2.7)	▲
† Hong Kong SAR	578 (4.1)	▲
[2] Russian Federation	543 (4.5)	▲
Ireland	524 (2.6)	▲
Lithuania	520 (2.9)	▲
[3] Israel	519 (4.3)	▲
Australia	517 (3.8)	▲
Hungary	517 (2.9)	▲
† United States	515 (4.8)	▲
England	515 (5.3)	▲
Finland	509 (2.6)	▲
† Norway (9)	503 (2.4)	
[2] Sweden	503 (2.5)	
Cyprus	501 (1.6)	
Portugal	500 (3.2)	
TIMSS Scale Centerpoint	**500**	
Italy	497 (2.7)	
Turkey	496 (4.3)	
[2] Kazakhstan	488 (3.3)	▽
France	483 (2.5)	▽
† New Zealand	482 (3.4)	▽
Bahrain	481 (1.7)	▽
Romania	479 (4.3)	▽
United Arab Emirates	473 (1.9)	▽
[1] Georgia	461 (4.3)	▽
Malaysia	461 (3.2)	▽
Iran, Islamic Rep. of	446 (3.7)	▽
Ψ Qatar	443 (4.0)	▽
Ψ Chile	441 (2.8)	▽
Lebanon	429 (2.9)	▽
Ψ Jordan	420 (4.3)	▽
[2] Ψ Egypt	413 (5.2)	▽
Ψ Oman	411 (2.8)	▽
Ψ Kuwait	403 (5.0)	▽
[2] Ψ Saudi Arabia	394 (2.5)	▽
Ж South Africa (9)	389 (2.3)	▽
Ψ Morocco	388 (2.3)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	575 (4.2)	▲
‡ Quebec, Canada	543 (3.7)	▲
[2] Dubai, UAE	537 (2.0)	▲
Ontario, Canada	530 (4.3)	▲
Ψ Western Cape, RSA (9)	441 (4.4)	▽
Ψ Abu Dhabi, UAE	436 (2.9)	▽
Ψ Gauteng, RSA (9)	421 (3.0)	▽



The TIMSS achievement scale was established in 1995 based on the combined achievement distribution of all countries that participated in TIMSS 1995. To provide a point of reference for country comparisons, the scale centerpoint of 500 was located at the mean of the combined achievement distribution. The units of the scale were chosen so that 100 scale score points corresponded to the standard deviation of the distribution.

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 3.2: Significance of Differences Between Countries' Average Mathematics Achievement

Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly higher (▲) than that of the comparison country, significantly lower (▽), or if there is no statistically significant difference.

Country	Average Scale Score	Singapore	Chinese Taipei	Korea, Rep. of	Japan	Hong Kong SAR	Russian Federation	Ireland	Lithuania	Israel	Australia	Hungary	United States	England	Finland	Norway (9)	Sweden	Cyprus	Portugal	Italy	Turkey	Kazakhstan	France	New Zealand	Bahrain	Romania	United Arab Emirates	Georgia	Malaysia	Iran, Islamic Rep. of	Qatar	Chile	Lebanon	Jordan	Egypt
Singapore	616 (4.0)				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Chinese Taipei	612 (2.7)				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Korea, Rep. of	607 (2.8)				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Japan	594 (2.7)	▽	▽	▽		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hong Kong SAR	578 (4.1)	▽	▽	▽	▽		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Russian Federation	543 (4.5)	▽	▽	▽	▽	▽		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ireland	524 (2.6)	▽	▽	▽	▽	▽	▽								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Lithuania	520 (2.9)	▽	▽	▽	▽	▽	▽								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Israel	519 (4.3)	▽	▽	▽	▽	▽	▽								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Australia	517 (3.8)	▽	▽	▽	▽	▽	▽									▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hungary	517 (2.9)	▽	▽	▽	▽	▽	▽									▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
United States	515 (4.8)	▽	▽	▽	▽	▽	▽									▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
England	515 (5.3)	▽	▽	▽	▽	▽	▽									▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Finland	509 (2.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Norway (9)	503 (2.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Sweden	503 (2.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Cyprus	501 (1.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Portugal	500 (3.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Italy	497 (2.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Turkey	496 (4.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Kazakhstan	488 (3.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽							▲	▲	▲	▲	▲	▲	▲	▲	▲
France	483 (2.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲
New Zealand	482 (3.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲
Bahrain	481 (1.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲
Romania	479 (4.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽							▲	▲	▲	▲	▲	▲	▲	▲
United Arab Emirates	473 (1.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		▲	▲	▲	▲	▲	▲	▲	▲
Georgia	461 (4.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽			▲	▲	▲	▲	▲	▲
Malaysia	461 (3.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽			▲	▲	▲	▲	▲	▲
Iran, Islamic Rep. of	446 (3.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				▲	▲	▲
Qatar	443 (4.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				▲	▲	▲
Chile	441 (2.8)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				▲	▲	▲
Lebanon	429 (2.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽			▲
Jordan	420 (4.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽			
Egypt	413 (5.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		
Oman	411 (2.8)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	
Kuwait	403 (5.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Saudi Arabia	394 (2.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
South Africa (9)	389 (2.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Morocco	388 (2.3)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Benchmarking Participants																																			
Moscow City, Russian Fed.	575 (4.2)	▽	▽	▽	▽		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Quebec, Canada	543 (3.7)	▽	▽	▽	▽	▽		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Dubai, UAE	537 (2.0)	▽	▽	▽	▽	▽		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ontario, Canada	530 (4.3)	▽	▽	▽	▽	▽	▽				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Western Cape, RSA (9)	441 (4.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				▲	▲	▲
Abu Dhabi, UAE	436 (2.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				▲	▲
Gauteng, RSA (9)	421 (3.0)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽		

▲ Average achievement significantly higher than comparison country
▽ Average achievement significantly lower than comparison country

Significance tests were not adjusted for multiple comparisons. Five percent of the comparisons would be statistically significant by chance alone.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 3.2: Significance of Differences Between Countries' Average Mathematics Achievement

(Continued)

Country	Average Scale Score	Oman	Kuwait	Saudi Arabia	South Africa (9)	Morocco	**Benchmarking Participants**	Moscow City, Russian Fed.	Quebec, Canada	Dubai, UAE	Ontario, Canada	Western Cape, RSA (9)	Abu Dhabi, UAE	Gauteng, RSA (9)
Singapore	616 (4.0)	▲	▲	▲	▲	▲		▲	▲	▲	▲	▲	▲	▲
Chinese Taipei	612 (2.7)	▲	▲	▲	▲	▲		▲	▲	▲	▲	▲	▲	▲
Korea, Rep. of	607 (2.8)	▲	▲	▲	▲	▲		▲	▲	▲	▲	▲	▲	▲
Japan	594 (2.7)	▲	▲	▲	▲	▲		▲	▲	▲	▲	▲	▲	▲
Hong Kong SAR	578 (4.1)	▲	▲	▲	▲	▲			▲	▲	▲	▲	▲	▲
Russian Federation	543 (4.5)	▲	▲	▲	▲	▲		▽			▲	▲	▲	▲
Ireland	524 (2.6)	▲	▲	▲	▲	▲		▽	▽	▽		▲	▲	▲
Lithuania	520 (2.9)	▲	▲	▲	▲	▲		▽	▽	▽		▲	▲	▲
Israel	519 (4.3)	▲	▲	▲	▲	▲		▽	▽	▽		▲	▲	▲
Australia	517 (3.8)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Hungary	517 (2.9)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
United States	515 (4.8)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
England	515 (5.3)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Finland	509 (2.6)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Norway (9)	503 (2.4)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Sweden	503 (2.5)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Cyprus	501 (1.6)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Portugal	500 (3.2)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Italy	497 (2.7)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Turkey	496 (4.3)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Kazakhstan	488 (3.3)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
France	483 (2.5)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
New Zealand	482 (3.4)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Bahrain	481 (1.7)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Romania	479 (4.3)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
United Arab Emirates	473 (1.9)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Georgia	461 (4.3)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Malaysia	461 (3.2)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Iran, Islamic Rep. of	446 (3.7)	▲	▲	▲	▲	▲		▽	▽	▽	▽		▲	▲
Qatar	443 (4.0)	▲	▲	▲	▲	▲		▽	▽	▽	▽			▲
Chile	441 (2.8)	▲	▲	▲	▲	▲		▽	▽	▽	▽			▲
Lebanon	429 (2.9)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▽		▲
Jordan	420 (4.3)		▲	▲	▲	▲		▽	▽	▽	▽	▽	▽	
Egypt	413 (5.2)			▲	▲	▲		▽	▽	▽	▽	▽	▽	
Oman	411 (2.8)			▲	▲	▲		▽	▽	▽	▽	▽	▽	▽
Kuwait	403 (5.0)				▲	▲		▽	▽	▽	▽	▽	▽	▽
Saudi Arabia	394 (2.5)	▽						▽	▽	▽	▽	▽	▽	▽
South Africa (9)	389 (2.3)	▽	▽					▽	▽	▽	▽	▽	▽	▽
Morocco	388 (2.3)	▽	▽					▽	▽	▽	▽	▽	▽	▽
Benchmarking Participants														
Moscow City, Russian Fed.	575 (4.2)	▲	▲	▲	▲	▲			▲	▲	▲	▲	▲	▲
Quebec, Canada	543 (3.7)	▲	▲	▲	▲	▲		▽			▲	▲	▲	▲
Dubai, UAE	537 (2.0)	▲	▲	▲	▲	▲		▽				▲	▲	▲
Ontario, Canada	530 (4.3)	▲	▲	▲	▲	▲		▽	▽			▲	▲	▲
Western Cape, RSA (9)	441 (4.4)	▲	▲	▲	▲	▲		▽	▽	▽	▽			▲
Abu Dhabi, UAE	436 (2.9)	▲	▲	▲	▲	▲		▽	▽	▽	▽			▲
Gauteng, RSA (9)	421 (3.0)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▽	▽	

▲ Average achievement significantly higher than comparison country
▽ Average achievement significantly lower than comparison country

Significance tests were not adjusted for multiple comparisons. Five percent of the comparisons would be statistically significant by chance alone.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

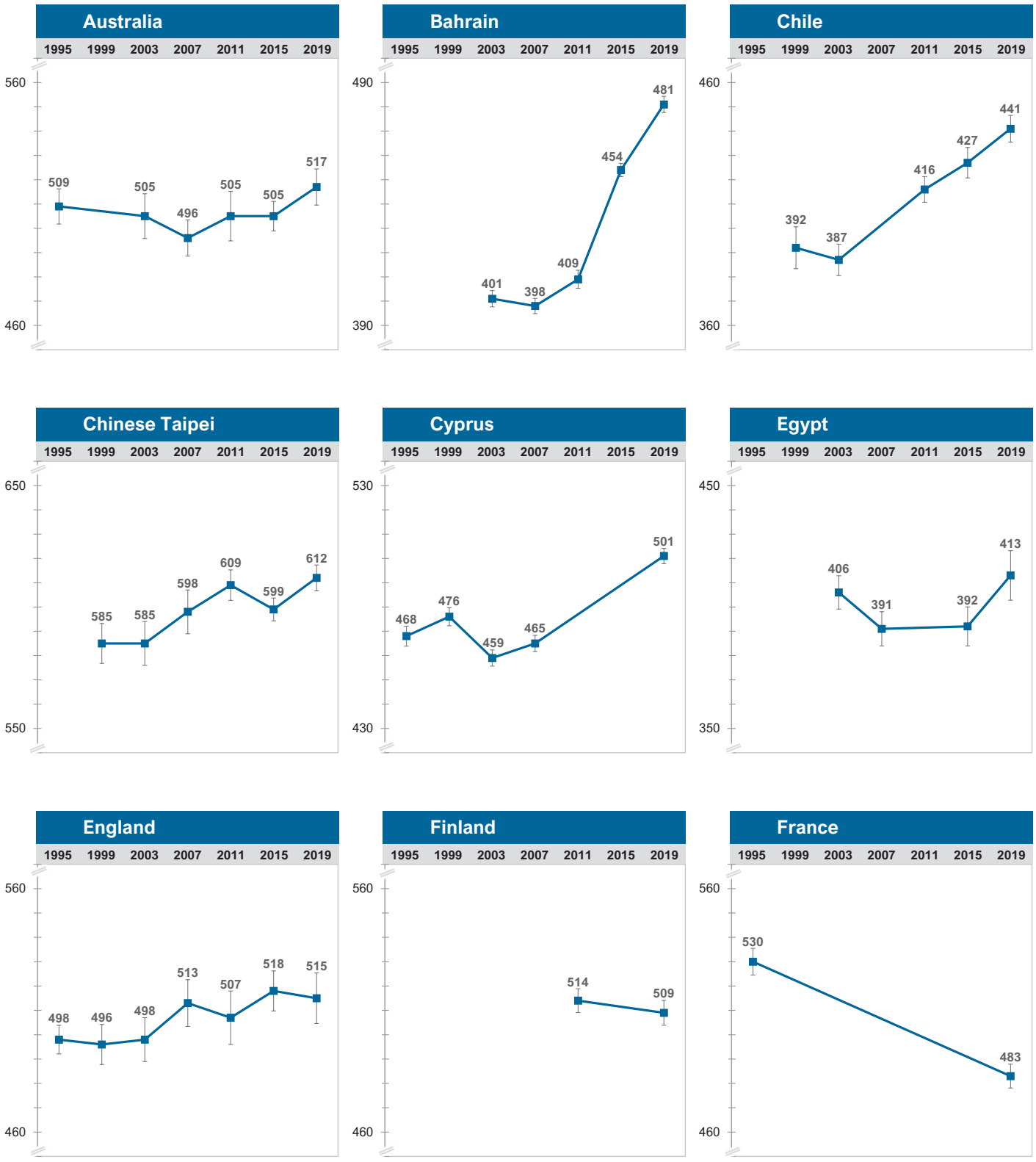
Trends in Average Achievement

Exhibit 3.3 graphs the differences in average mathematics achievement between the assessment cycles for TIMSS 2019 countries that have comparable data from previous assessments, while Exhibit 3.4 provides more details. The countries are presented in alphabetical order in both exhibits. The trends in mathematics achievement at the eighth grade signal more improvements than downturns across the assessment cycles internationally.

Most recently, for the 33 countries that participated in both TIMSS 2015 and 2019, 13 had increases in average achievement and 4 had decreases. The trends between 2007 and 2019, as well as between 1995 and 2019, also show more increases than decreases in average mathematics achievement over the long term. In 2019, compared with 2007, for the 23 countries in both assessments, there were 16 increases and only 2 decreases. In 2019, compared with 1995, for the 18 countries in both assessments, there were 9 increases and 4 decreases.

Exhibit 3.3: Trend Plots of Average Mathematics Achievement Across Assessment Years

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 3.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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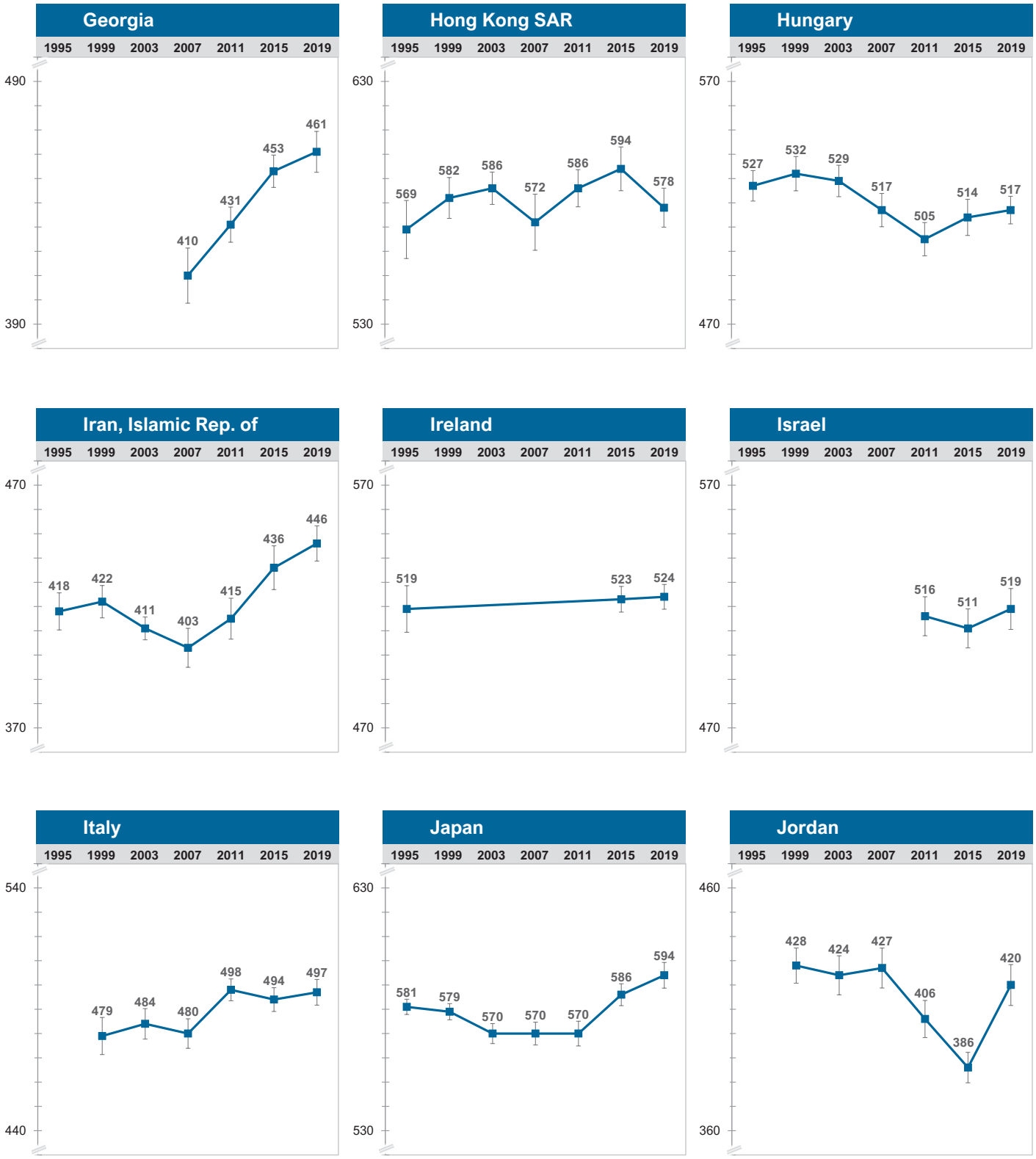
Exhibit 3.3: Trend Plots of Average Mathematics Achievement Across Assessment Years

(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 3.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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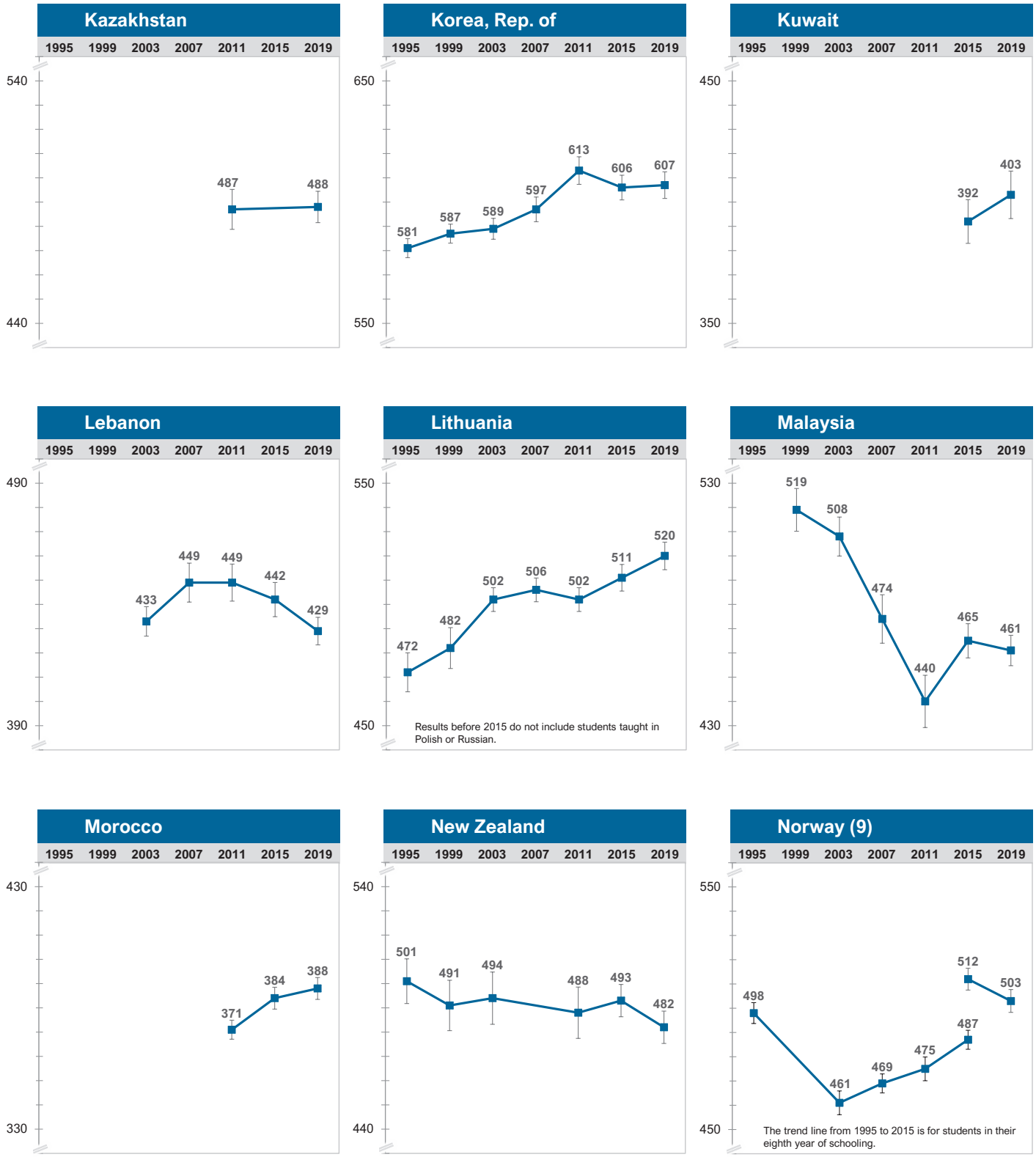
Exhibit 3.3: Trend Plots of Average Mathematics Achievement Across Assessment Years

(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 3.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



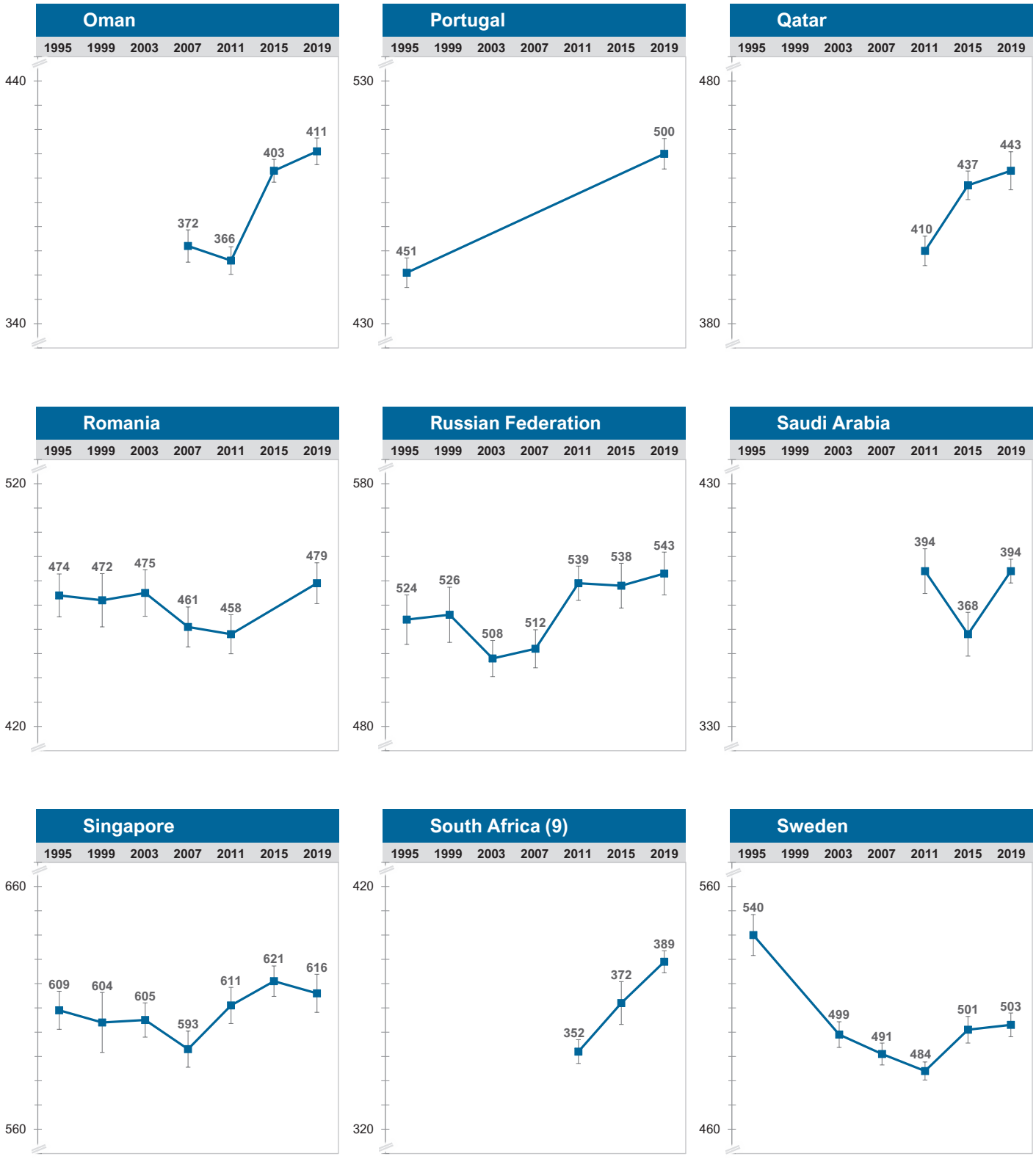
See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 3.3: Trend Plots of Average Mathematics Achievement Across Assessment Years

(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 3.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



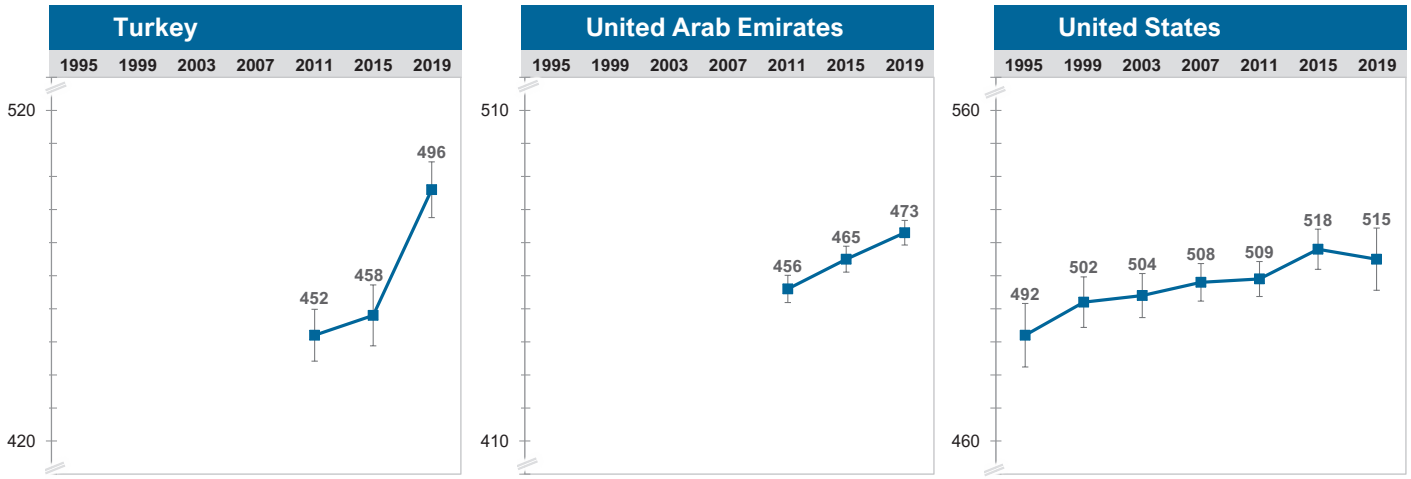
See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

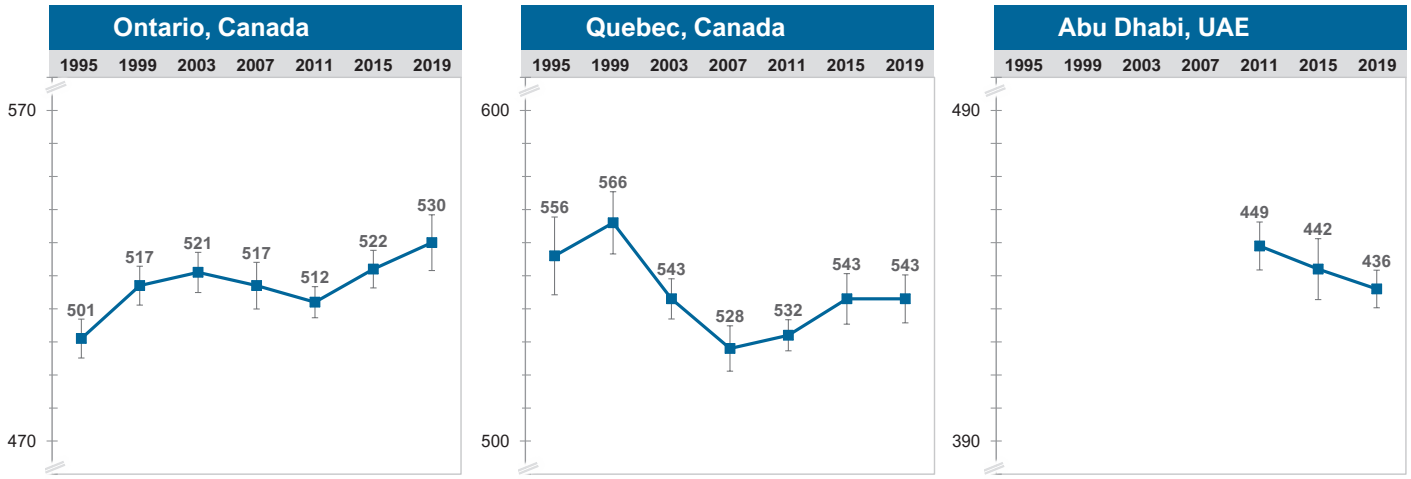
Exhibit 3.3: Trend Plots of Average Mathematics Achievement Across Assessment Years

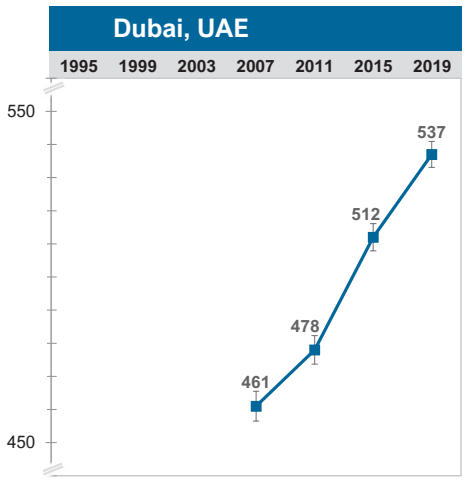
(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 3.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



Benchmarking Participants





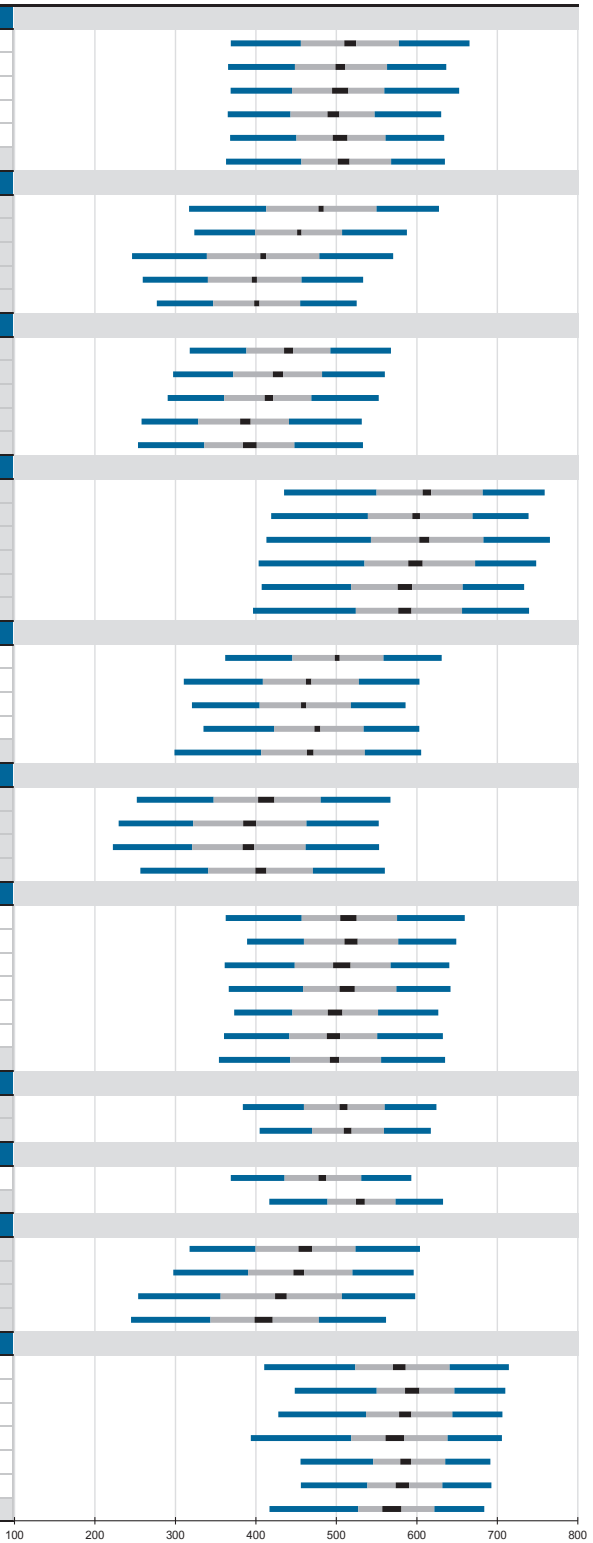
See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 3.4: Differences in Average Mathematics Achievement Across Assessment Years

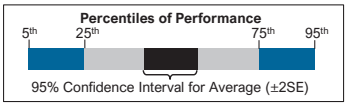
Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▽) than the performance in the column year.

Country	Average Scale Score	Differences Between Years						Mathematics Achievement Distribution
		2015	2011	2007	2003	1999	1995	
Australia								
2019	517 (3.8)	12 ▲	12	21 ▲	13 ▲		8	
2015	505 (3.1)		0	9	0		-4	
2011	505 (5.2)			9	0		-4	
2007	496 (3.8)				-8		-13 ▽	
2003	505 (4.7)						-4	
‡ 1995	509 (3.7)							
Bahrain								
2019	481 (1.7)	27 ▲	72 ▲	83 ▲	80 ▲			
2015	454 (1.4)		45 ▲	56 ▲	53 ▲			
Ψ 2011	409 (1.9)			11 ▲	8 ▲			
2007	398 (1.6)				-3			
2003	401 (1.7)							
Chile								
Ψ 2019	441 (2.8)	13 ▲	24 ▲		54 ▲	48 ▲		
Ψ 2015	427 (3.2)		11 ▲		41 ▲	35 ▲		
2011	416 (2.7)				29 ▲	24 ▲		
2003	387 (3.3)					-6		
1999	392 (4.4)							
Chinese Taipei								
2019	612 (2.7)	13 ▲	3	14 ▲	27 ▲	27 ▲		
2015	599 (2.4)		-10 ▽	1	14 ▲	14 ▲		
2011	609 (3.2)			11	24 ▲	24 ▲		
2007	598 (4.6)				13 ▲	13 ▲		
2003	585 (4.6)					0		
1999	585 (4.2)							
Cyprus								
2019	501 (1.6)			36 ▲	42 ▲	25 ▲	34 ▲	
2007	465 (1.7)				6 ▲	-11 ▽	-2	
2003	459 (1.7)					-17 ▽	-8 ▽	
1999	476 (1.9)						9 ▲	
1995	468 (2.1)							
Egypt								
2 Ψ 2019	413 (5.2)	21 ▲		22 ▲	7			
Ψ 2015	392 (4.1)			2	-14 ▽			
2007	391 (3.6)				-16 ▽			
2003	406 (3.5)							
England								
2019	515 (5.3)	-3	8	2	16 ▲	19 ▲	17 ▲	
2015	518 (4.2)		11	5	20 ▲	22 ▲	21 ▲	
‡ 2011	507 (5.6)			-7	8	10	9	
† 2007	513 (4.9)				15 ▲	17 ▲	16 ▲	
≡ 2003	498 (4.6)					2	1	
† 1999	496 (4.2)						-1	
3 † 1995	498 (3.0)							
Finland								
2019	509 (2.6)		-5					
2011	514 (2.5)							
France								
2019	483 (2.5)						-47 ▽	
1995	530 (2.8)							
Georgia								
1 2019	461 (4.3)	8	30 ▲	52 ▲				
1 2 2015	453 (3.4)		22 ▲	44 ▲				
1 2011	431 (3.7)			22 ▲				
1 2007	410 (5.8)							
Hong Kong SAR								
† 2019	578 (4.1)	-16 ▽	-7	6	-8	-4	9	
2015	594 (4.6)		9	22 ▲	8	12	25 ▲	
2011	586 (3.9)			13	0	4	17 ▲	
† 2007	572 (5.9)				-14 ▽	-10	4	
† 2003	586 (3.4)					4	17 ▲	
† 1999	582 (4.3)						13	
1995	569 (6.1)							



▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower



See Appendix A for country participation in previous TIMSS assessments.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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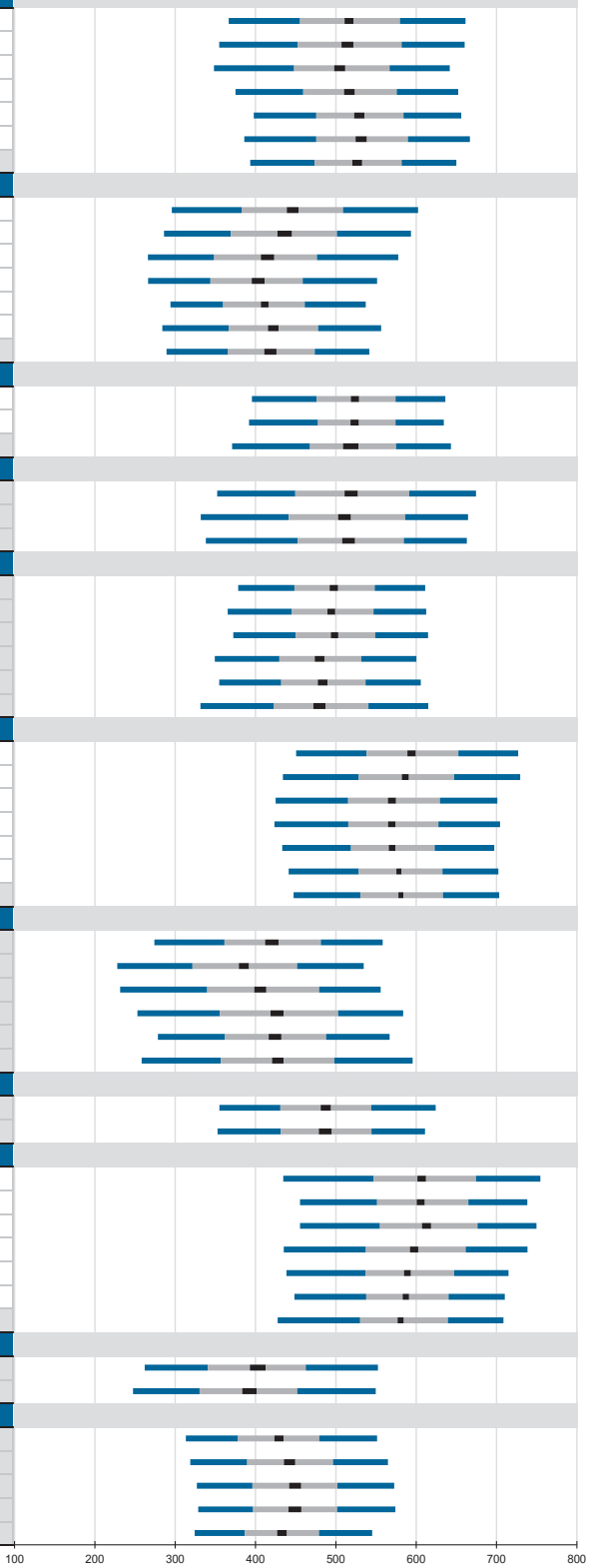
Exhibit 3.4: Differences in Average Mathematics Achievement Across Assessment Years

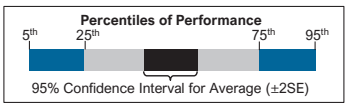
(Continued)

Country	Average Scale Score	Differences Between Years						Mathematics Achievement Distribution
		2015	2011	2007	2003	1999	1995	
Hungary								
2019	517 (2.9)	2	12 ▲	0	-13 ▽	-15 ▽	-10 ▽	
2015	514 (3.8)		10	-2	-15 ▽	-17 ▽	-12 ▽	
2011	505 (3.5)			-12 ▽	-24 ▽	-27 ▽	-22 ▽	
2007	517 (3.5)				-12 ▽	-15 ▽	-10 ▽	
[2] 2003	529 (3.3)					-2	3	
1999	532 (3.6)						5	
1995	527 (3.2)							
Iran, Islamic Rep. of								
2019	446 (3.7)	10	31 ▲	43 ▲	35 ▲	24 ▲	28 ▲	
Ψ 2015	436 (4.6)		21 ▲	33 ▲	25 ▲	14 ▲	18 ▲	
Ψ 2011	415 (4.3)			12	4	-7	-3	
2007	403 (4.1)				-8	-19 ▽	-15 ▽	
[2] 2003	411 (2.4)					-11 ▽	-7	
1999	422 (3.4)						4	
1995	418 (3.9)							
Ireland								
2019	524 (2.6)	0					5	
2015	523 (2.7)						5	
1995	519 (4.9)							
Israel								
[3] 2019	519 (4.3)	8	3					
[3] 2015	511 (4.1)		-5					
[3] 2011	516 (4.1)							
Italy								
2019	497 (2.7)	3	-1	18 ▲	14 ▲	18 ▲		
[2] 2015	494 (2.5)		-4	15 ▲	11 ▲	15 ▲		
2011	498 (2.3)			19 ▲	15 ▲	19 ▲		
2007	480 (3.1)				-4	0		
2003	484 (3.2)					4		
[2] 1999	479 (3.9)							
Japan								
2019	594 (2.7)	8 ▲	24 ▲	24 ▲	24 ▲	16 ▲	13 ▲	
2015	586 (2.3)		17 ▲	17 ▲	17 ▲	8 ▲	5	
2011	570 (2.6)			0	0	-9 ▽	-11 ▽	
2007	570 (2.4)				0	-9 ▽	-11 ▽	
2003	570 (2.1)					-9 ▽	-11 ▽	
1999	579 (1.7)						-2	
1995	581 (1.6)							
Jordan								
Ψ 2019	420 (4.3)	35 ▲	14 ▲	-7	-4	-7		
Ж 2015	386 (3.2)		-20 ▽	-41 ▽	-39 ▽	-42 ▽		
Ψ 2011	406 (3.9)			-21 ▽	-18 ▽	-22 ▽		
2007	427 (4.2)				3	-1		
2003	424 (4.1)					-3		
1999	428 (3.7)							
Kazakhstan								
[2] 2019	488 (3.3)		1					
2011	487 (4.2)							
Korea, Rep. of								
2019	607 (2.8)	1	-6	10 ▲	18 ▲	20 ▲	26 ▲	
2015	606 (2.6)		-7	8 ▲	17 ▲	19 ▲	25 ▲	
2011	613 (2.9)			16 ▲	24 ▲	26 ▲	32 ▲	
2007	597 (2.6)				8 ▲	10 ▲	17 ▲	
2003	589 (2.2)					2	8 ▲	
1999	587 (2.0)						6 ▲	
1995	581 (2.0)							
Kuwait								
Ψ 2019	403 (5.0)	10						
Ψ 2015	392 (4.6)							
Lebanon								
2019	429 (2.9)	-13 ▽	-20 ▽	-20 ▽	-4			
2015	442 (3.6)		-7	-7	9			
2011	449 (3.9)			0	16 ▲			
2007	449 (4.1)				16 ▲			
2003	433 (3.1)							



▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower



Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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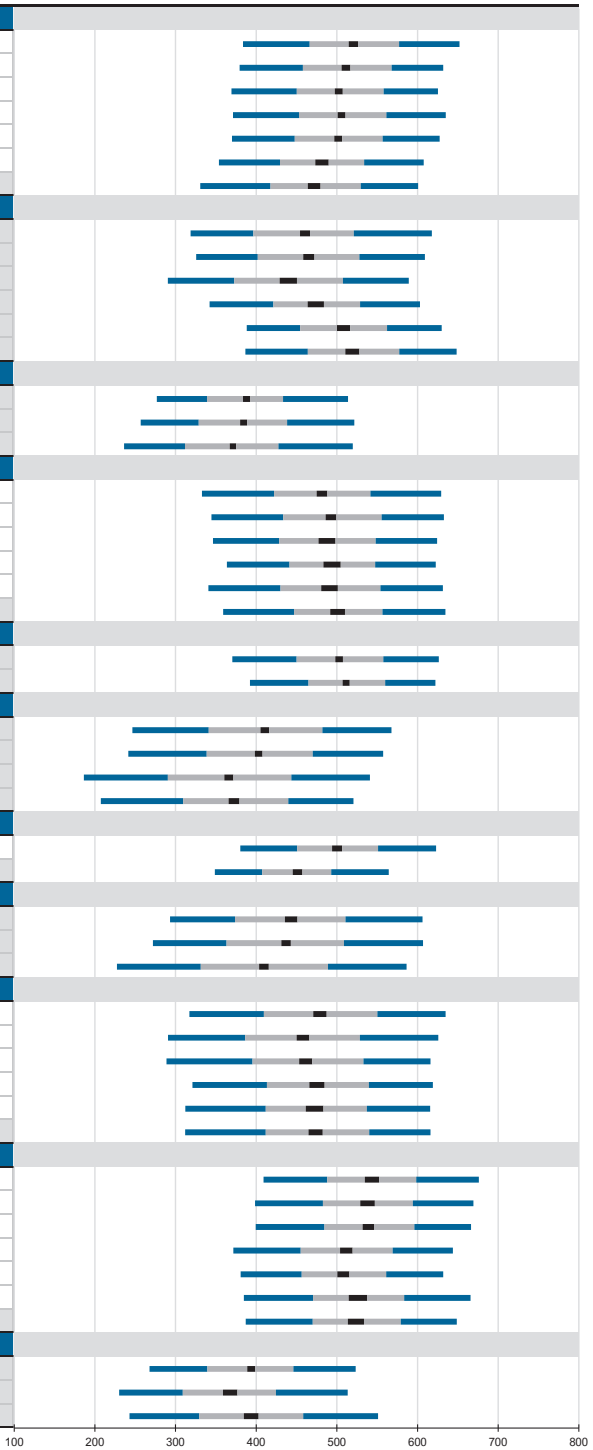
Exhibit 3.4: Differences in Average Mathematics Achievement Across Assessment Years

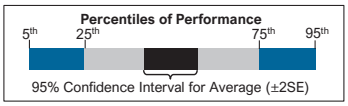
(Continued)

Country	Average Scale Score	Differences Between Years						Mathematics Achievement Distribution
		2015	2011	2007	2003	1999	1995	
Lithuania								
2019	520 (2.9)	9 ▲	18 ▲	15 ▲	19 ▲	39 ▲	49 ▲	
[2] 2015	511 (2.8)		9 ▲	5	10 ▲	30 ▲	39 ▲	
[1] 2011	502 (2.5)			-3	1	21 ▲	31 ▲	
[1] 2007	506 (2.5)				4	24 ▲	34 ▲	
[1] 2003	502 (2.5)					20 ▲	30 ▲	
[1] 1999	482 (4.3)						10	
[1 2] 1995	472 (4.1)							
Malaysia								
2019	461 (3.2)	-5	21 ▲	-13 ▽	-48 ▽	-59 ▽		
2015	465 (3.6)		25 ▲	-9	-43 ▽	-54 ▽		
2011	440 (5.5)			-34 ▽	-69 ▽	-79 ▽		
2007	474 (5.1)				-34 ▽	-45 ▽		
2003	508 (4.1)					-11		
1999	519 (4.5)							
Morocco								
Ψ 2019	388 (2.3)	4	17 ▲					
Ж 2015	384 (2.3)		13 ▲					
Ж 2011	371 (2.0)							
New Zealand								
† 2019	482 (3.4)	-11 ▽	-6		-12	-9	-19 ▽	
† 2015	493 (3.4)		5		-1	2	-8	
2011	488 (5.4)				-6	-3	-13	
2003	494 (5.5)					3	-7	
1999	491 (5.3)						-10	
1995	501 (4.7)							
Norway (9)								
† 2019	503 (2.4)	-9 ▽						
2015	512 (2.3)							
Oman								
Ψ 2019	411 (2.8)	8 ▲	45 ▲	38 ▲				
Ψ 2015	403 (2.4)		37 ▲	31 ▲				
Ψ 2011	366 (2.9)			-6				
2007	372 (3.4)							
Portugal								
2019	500 (3.2)						49 ▲	
1995	451 (3.1)							
Qatar								
Ψ 2019	443 (4.0)	6	34 ▲					
Ψ 2015	437 (3.0)		28 ▲					
Ψ 2011	410 (3.1)							
Romania								
2019	479 (4.3)		21 ▲	18 ▲	4	7	5	
2011	458 (4.1)			-3	-17 ▽	-14 ▽	-16 ▽	
2007	461 (4.2)				-14 ▽	-11	-12 ▽	
2003	475 (4.9)					3	2	
1999	472 (5.6)						-1	
1995	474 (4.5)							
Russian Federation								
[2] 2019	543 (4.5)	5	5	32 ▲	35 ▲	17 ▲	20 ▲	
2015	538 (4.7)		-1	26 ▲	30 ▲	12	14 ▲	
[2] 2011	539 (3.6)			27 ▲	31 ▲	13	15 ▲	
2007	512 (4.0)				4	-14 ▽	-12	
2003	508 (3.8)					-18 ▽	-16 ▽	
1999	526 (5.8)						2	
[2] 1995	524 (5.2)							
Saudi Arabia								
[2] Ψ 2019	394 (2.5)	26 ▲	0					
Ж 2015	368 (4.6)		-26 ▽					
Ψ 2011	394 (4.7)							



▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower



Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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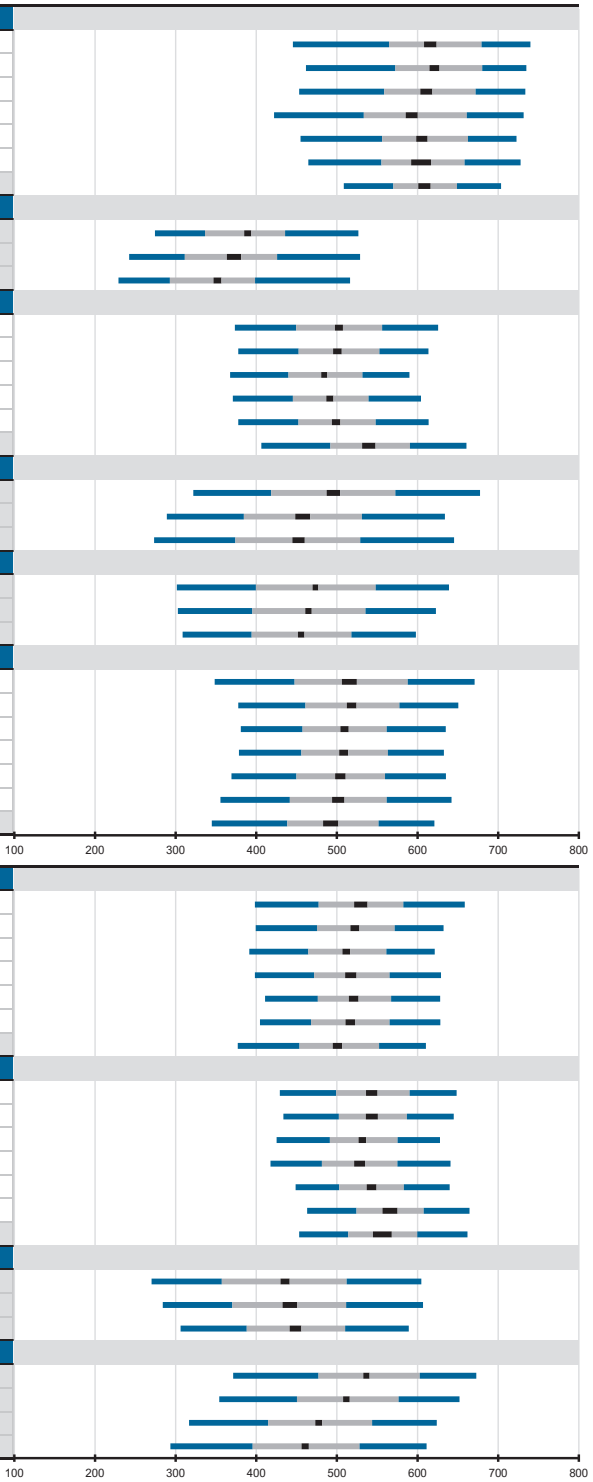
Exhibit 3.4: Differences in Average Mathematics Achievement Across Assessment Years

(Continued)

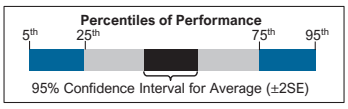
Country	Average Scale Score	Differences Between Years 2015	2011	2007	2003	1999	1995
Singapore							
[2] 2019	616 (4.0)	-5	5	23 ▲	10	11	7
[2] 2015	621 (3.2)		10 ▲	28 ▲	16 ▲	17 ▲	12 ▲
[2] 2011	611 (3.8)			18 ▲	6	7	2
2007	593 (3.8)				-13 ▽	-12	-16 ▽
2003	605 (3.6)					1	-3
1999	604 (6.3)						-4
1995	609 (4.0)						
South Africa (9)							
Ж 2019	389 (2.3)	17 ▲	38 ▲				
Ж 2015	372 (4.5)		20 ▲				
Ж 2011	352 (2.5)						
Sweden							
[2] 2019	503 (2.5)	2	18 ▲	11 ▲	3		-37 ▽
2015	501 (2.8)		16 ▲	9 ▲	2		-39 ▽
2011	484 (1.9)			-7 ▽	-15 ▽		-55 ▽
2007	491 (2.3)				-8 ▽		-48 ▽
2003	499 (2.7)						-41 ▽
1995	540 (4.3)						
Turkey							
2019	496 (4.3)	38 ▲	43 ▲				
2015	458 (4.7)		5				
2011	452 (4.0)						
United Arab Emirates							
2019	473 (1.9)	9 ▲	18 ▲				
2015	465 (2.0)		9 ▲				
2011	456 (2.1)						
United States							
† 2019	515 (4.8)	-3	6	7	11	14 ▲	23 ▲
† 2015	518 (3.1)		9 ▲	10 ▲	14 ▲	17 ▲	26 ▲
[2] 2011	509 (2.7)			1	5	8	17 ▲
[2] † 2007	508 (2.9)				4	7	16 ▲
‡ 2003	504 (3.4)					3	12 ▲
1999	502 (3.9)						9
† 1995	492 (4.9)						
Benchmarking Participants							
Ontario, Canada							
2019	530 (4.3)	7	18 ▲	13 ▲	9	13 ▲	29 ▲
2015	522 (2.9)		11 ▲	5	1	6	22 ▲
[2] 2011	512 (2.4)			-6	-9 ▽	-5	11 ▲
[2] 2007	517 (3.6)				-4	1	17 ▲
[2] 2003	521 (3.1)					4	20 ▲
1999	517 (3.0)						16 ▲
1995	501 (3.0)						
Quebec, Canada							
‡ 2019	543 (3.7)	0	12 ▲	15 ▲	0	-23 ▽	-13
≡ 2015	543 (3.9)		12 ▲	15 ▲	0	-22 ▽	-13
2011	532 (2.4)			3	-12 ▽	-34 ▽	-25 ▽
[3] 2007	528 (3.5)				-15 ▽	-38 ▽	-28 ▽
2003	543 (3.1)					-23 ▽	-13 ▽
1999	566 (4.8)						9
1995	556 (6.0)						
Abu Dhabi, UAE							
Ψ 2019	436 (2.9)	-6	-13 ▽				
2015	442 (4.7)		-7				
2011	449 (3.7)						
Dubai, UAE							
[2] 2019	537 (2.0)	25 ▲	59 ▲	76 ▲			
2015	512 (2.1)		34 ▲	51 ▲			
2011	478 (2.2)			17 ▲			
‡ 2007	461 (2.3)						

Mathematics Achievement Distribution



▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower



Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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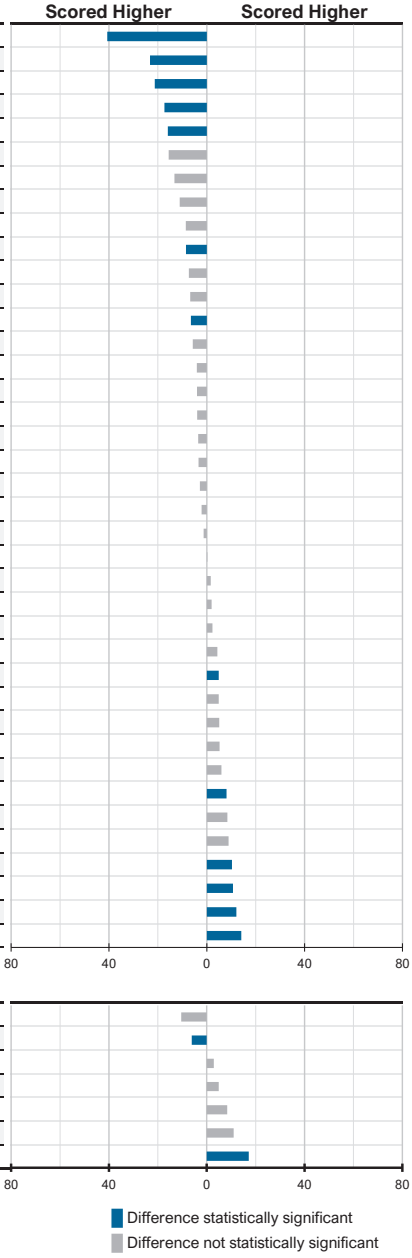
Average Achievement by Gender

Exhibit 3.5 shows the differences in average mathematics achievement between girls and boys. In TIMSS 2019, there was considerable gender equity in average achievement. Girls had higher average achievement than boys in 7 countries, there was gender equity in average mathematics achievement in 26 countries, and boys had higher average achievement than girls in 6 countries.

Exhibit 3.5: Average Mathematics Achievement by Gender

Country	Girls		Boys		Difference (Absolute Value)	Gender Difference
	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score		Girls Scored Higher / Boys Scored Higher
Ψ Oman	48 (1.1)	432 (3.3)	52 (1.1)	391 (4.0)	41 (4.8)	
Ψ Jordan	48 (3.4)	432 (3.8)	52 (3.4)	409 (6.4)	23 (6.7)	
Bahrain	49 (0.9)	492 (2.4)	51 (0.9)	471 (2.2)	21 (3.0)	
2 Ψ Saudi Arabia	49 (0.9)	403 (3.4)	51 (0.9)	385 (3.4)	17 (4.5)	
Romania	51 (0.9)	487 (4.6)	49 (0.9)	471 (4.7)	16 (3.8)	
2 Ψ Egypt	55 (2.0)	420 (5.3)	45 (2.0)	404 (7.9)	16 (8.1)	
Iran, Islamic Rep. of	47 (1.3)	453 (5.0)	53 (1.3)	440 (5.6)	13 (7.6)	
Turkey	50 (1.3)	501 (4.4)	50 (1.3)	490 (5.8)	11 (5.7)	
Ψ Kuwait	53 (2.2)	407 (5.4)	47 (2.2)	398 (7.9)	9 (8.8)	
Malaysia	51 (1.1)	465 (3.0)	49 (1.1)	456 (4.1)	9 (3.4)	
† Hong Kong SAR	46 (2.1)	582 (4.9)	54 (2.1)	575 (5.4)	7 (6.5)	
Ψ Qatar	50 (2.4)	447 (5.0)	50 (2.4)	440 (5.4)	7 (6.6)	
Ж South Africa (9)	52 (0.6)	393 (2.4)	48 (0.6)	386 (2.5)	6 (2.1)	
United Arab Emirates	48 (1.8)	476 (3.4)	52 (1.8)	471 (3.4)	6 (5.6)	
Finland	48 (0.8)	511 (2.6)	52 (0.8)	507 (3.2)	4 (2.8)	
Cyprus	49 (0.6)	503 (2.1)	51 (0.6)	499 (2.3)	4 (3.0)	
2 Kazakhstan	49 (1.1)	490 (3.9)	51 (1.1)	486 (3.7)	4 (3.8)	
† United States	49 (0.9)	517 (4.0)	51 (0.9)	514 (6.1)	4 (3.9)	
2 Singapore	49 (0.7)	617 (4.6)	51 (0.7)	614 (4.4)	3 (4.2)	
2 Sweden	49 (0.9)	504 (3.0)	51 (0.9)	501 (2.9)	3 (3.1)	
Chinese Taipei	50 (0.9)	614 (3.1)	50 (0.9)	611 (3.2)	2 (3.3)	
Ireland	49 (1.1)	524 (2.9)	51 (1.1)	523 (3.4)	1 (3.5)	
† Norway (9)	49 (0.7)	503 (2.7)	51 (0.7)	503 (3.0)	0 (3.2)	
England	53 (1.9)	514 (5.6)	47 (1.9)	516 (7.2)	2 (7.3)	
Lithuania	50 (1.0)	519 (2.8)	50 (1.0)	521 (3.7)	2 (2.9)	
Japan	52 (1.0)	593 (2.9)	48 (1.0)	595 (3.2)	2 (2.8)	
Australia	49 (1.5)	515 (3.6)	51 (1.5)	519 (5.5)	4 (5.4)	
Ψ Morocco	50 (0.7)	386 (2.5)	50 (0.7)	391 (2.6)	5 (2.2)	
2 Russian Federation	48 (1.0)	541 (4.8)	52 (1.0)	546 (4.9)	5 (3.4)	
Korea, Rep. of	48 (1.4)	604 (3.4)	52 (1.4)	609 (3.1)	5 (3.4)	
Lebanon	49 (1.4)	427 (3.5)	51 (1.4)	432 (3.3)	5 (3.5)	
† New Zealand	48 (2.1)	478 (3.6)	52 (2.1)	484 (4.7)	6 (5.2)	
France	49 (0.8)	478 (2.5)	51 (0.8)	487 (3.1)	8 (2.7)	
1 Georgia	48 (1.2)	457 (4.5)	52 (1.2)	465 (5.2)	8 (4.5)	
Ψ Chile	49 (1.6)	436 (3.5)	51 (1.6)	445 (3.8)	9 (4.6)	
Portugal	50 (1.1)	495 (3.3)	50 (1.1)	505 (3.9)	10 (3.4)	
3 Israel	52 (1.7)	514 (4.3)	48 (1.7)	525 (5.3)	11 (4.6)	
Italy	50 (1.0)	491 (3.0)	50 (1.0)	504 (3.3)	12 (3.0)	
Hungary	50 (0.9)	510 (3.2)	50 (0.9)	524 (3.6)	14 (3.5)	
International Average	**50 (0.2)**	**491 (0.6)**	**50 (0.2)**	**488 (0.7)**		
Benchmarking Participants						
Ψ Abu Dhabi, UAE	47 (2.1)	441 (5.4)	53 (2.1)	431 (4.4)	10 (7.9)	
Ψ Gauteng, RSA (9)	55 (0.9)	423 (3.1)	45 (0.9)	417 (3.5)	6 (2.8)	
Ontario, Canada	50 (0.9)	528 (4.4)	50 (0.9)	531 (4.8)	3 (3.3)	
‡ Quebec, Canada	51 (2.0)	541 (4.3)	49 (2.0)	546 (4.0)	5 (3.8)	
2 Dubai, UAE	50 (3.6)	532 (4.8)	50 (3.6)	541 (5.9)	8 (10.0)	
Ψ Western Cape, RSA (9)	55 (1.2)	436 (5.1)	45 (1.2)	447 (5.4)	11 (5.7)	
Moscow City, Russian Fed.	48 (1.1)	566 (4.2)	52 (1.1)	584 (4.8)	17 (3.5)	



Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.
See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

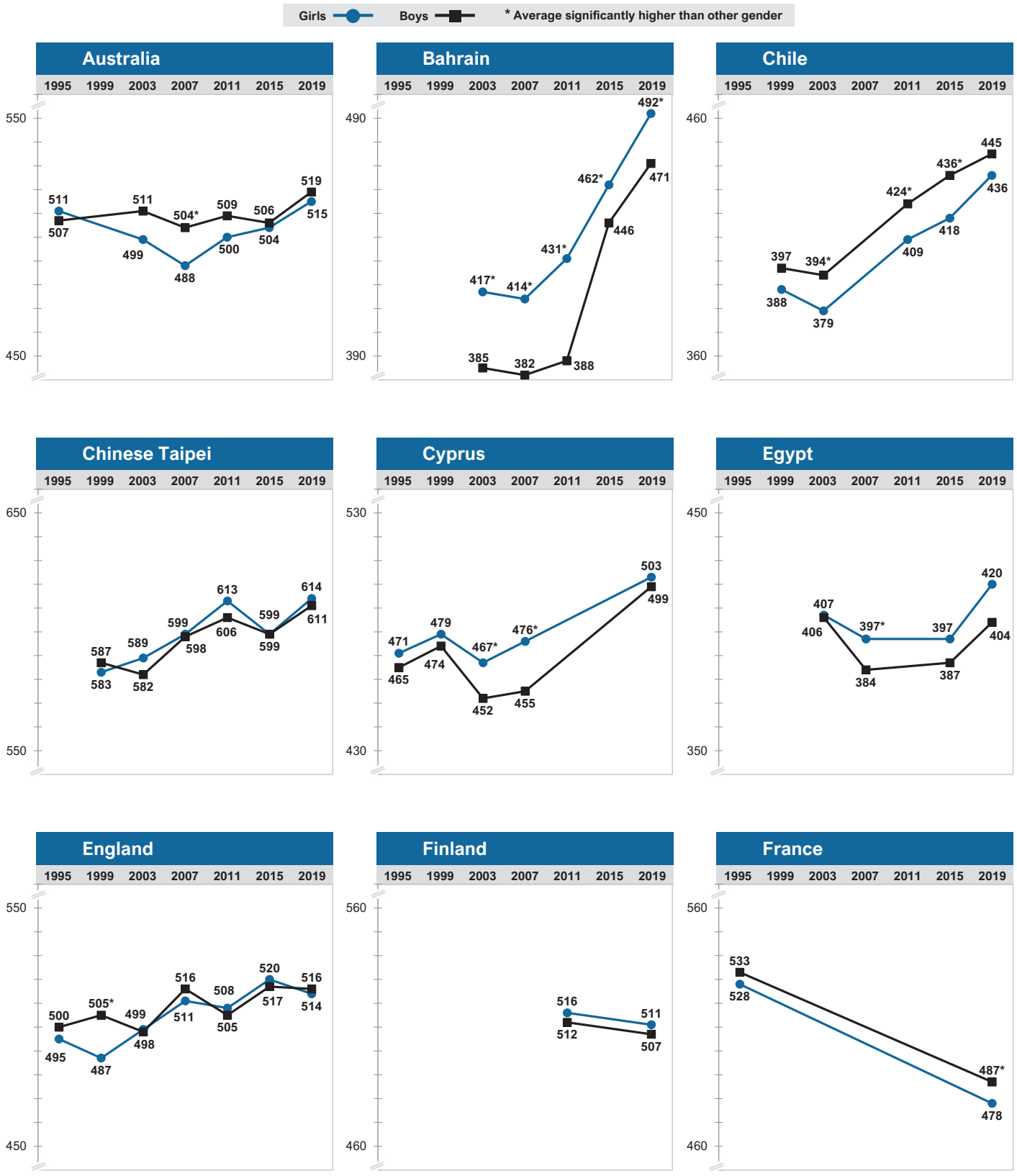
SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Trends in Average Achievement by Gender

For the TIMSS 2019 countries with comparable data from previous TIMSS assessments, Exhibit 3.6 contains graphs of average mathematics achievement across assessments by gender. The countries are presented in alphabetical order. The difference in average mathematics achievement between boys and girls has remained relatively stable in most countries, with any overall increases or decreases in achievement from assessment to assessment occurring similarly for both girls and boys. However, several countries with no gender gap in TIMSS 2015 had a gap favoring boys in TIMSS 2019, including Israel and Morocco, while Saudi Arabia and South Africa (ninth grade) had a gap favoring girls in 2019. Gender gaps in average achievement favoring boys in TIMSS 2015 were closed in Chile, the Russian Federation, and Sweden, and a gap favoring girls was closed in Singapore.

Exhibit 3.6: Trend Plots of Average Mathematics Achievement Across Assessment Years by Gender

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



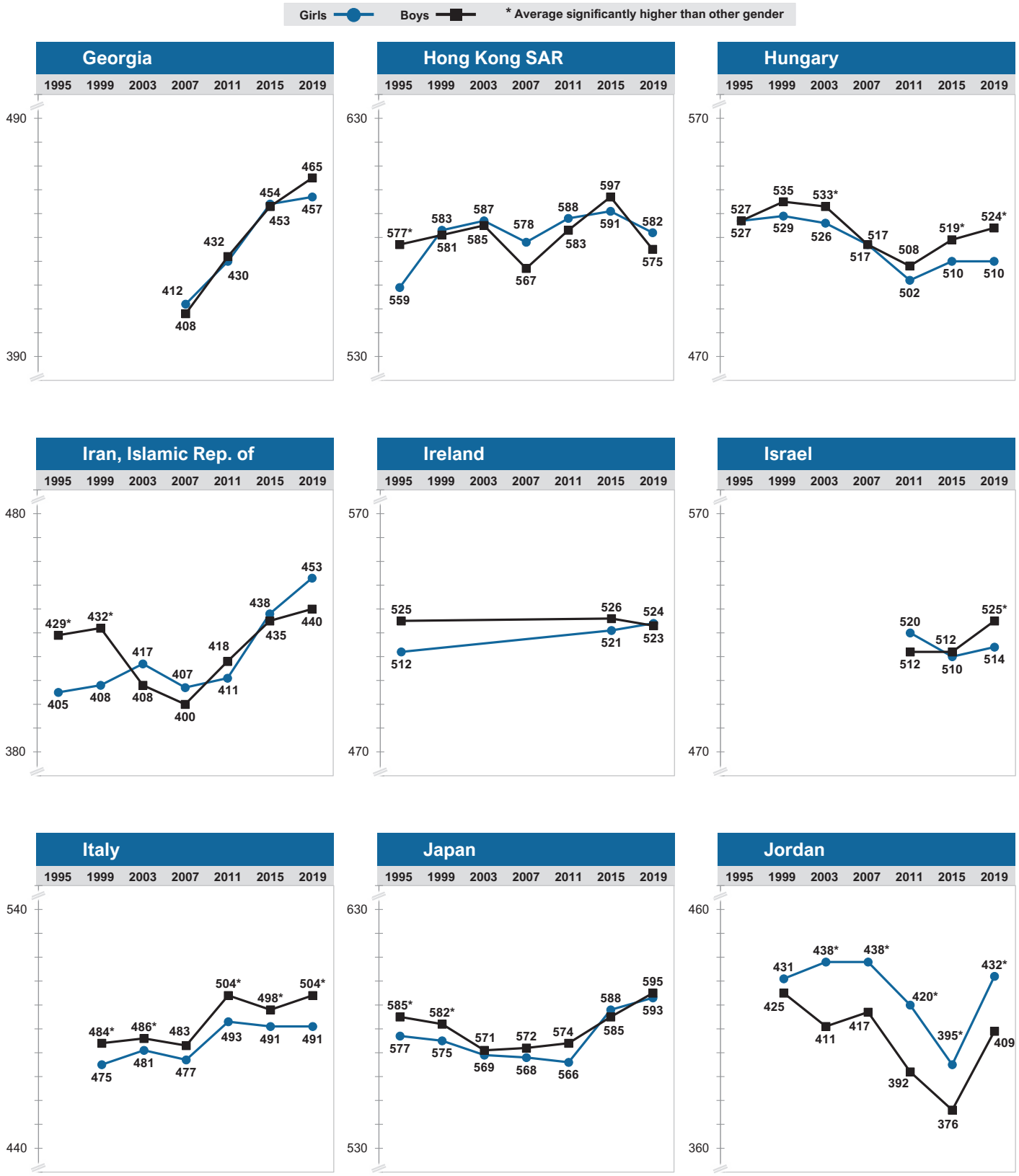
See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 3.6: Trend Plots of Average Mathematics Achievement Across Assessment Years by Gender

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



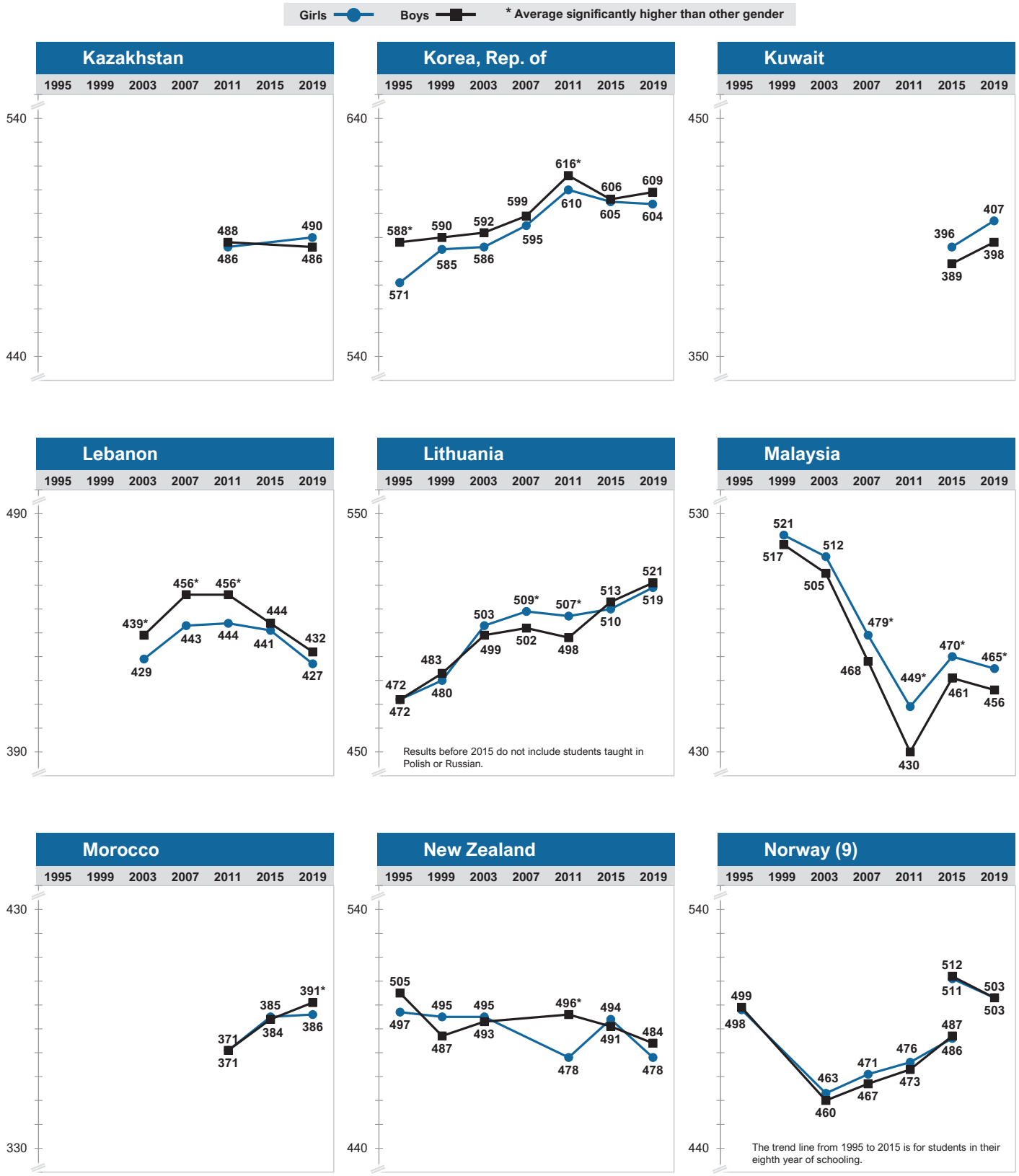
See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 3.6: Trend Plots of Average Mathematics Achievement Across Assessment Years by Gender

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



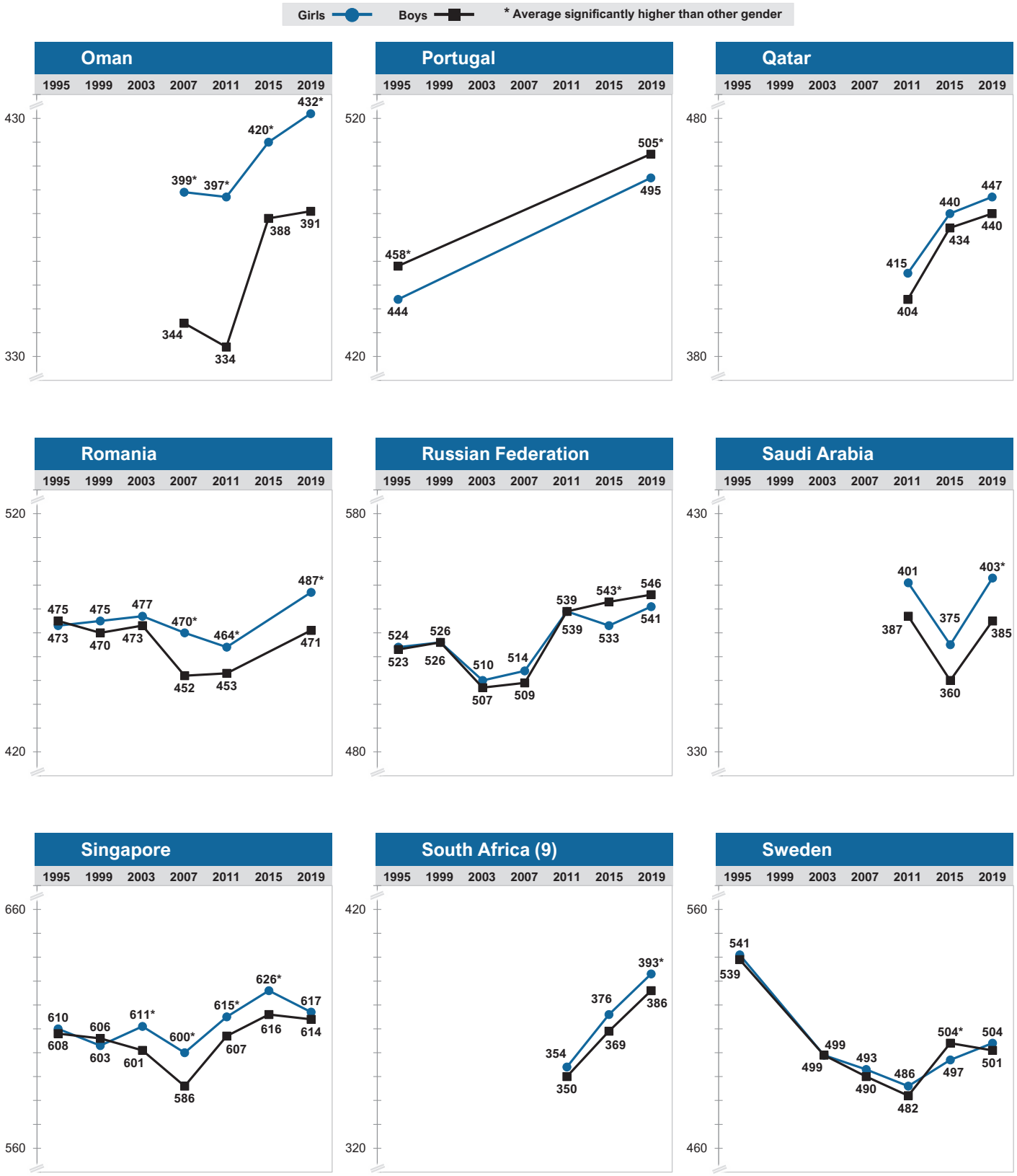
See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 3.6: Trend Plots of Average Mathematics Achievement Across Assessment Years by Gender

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



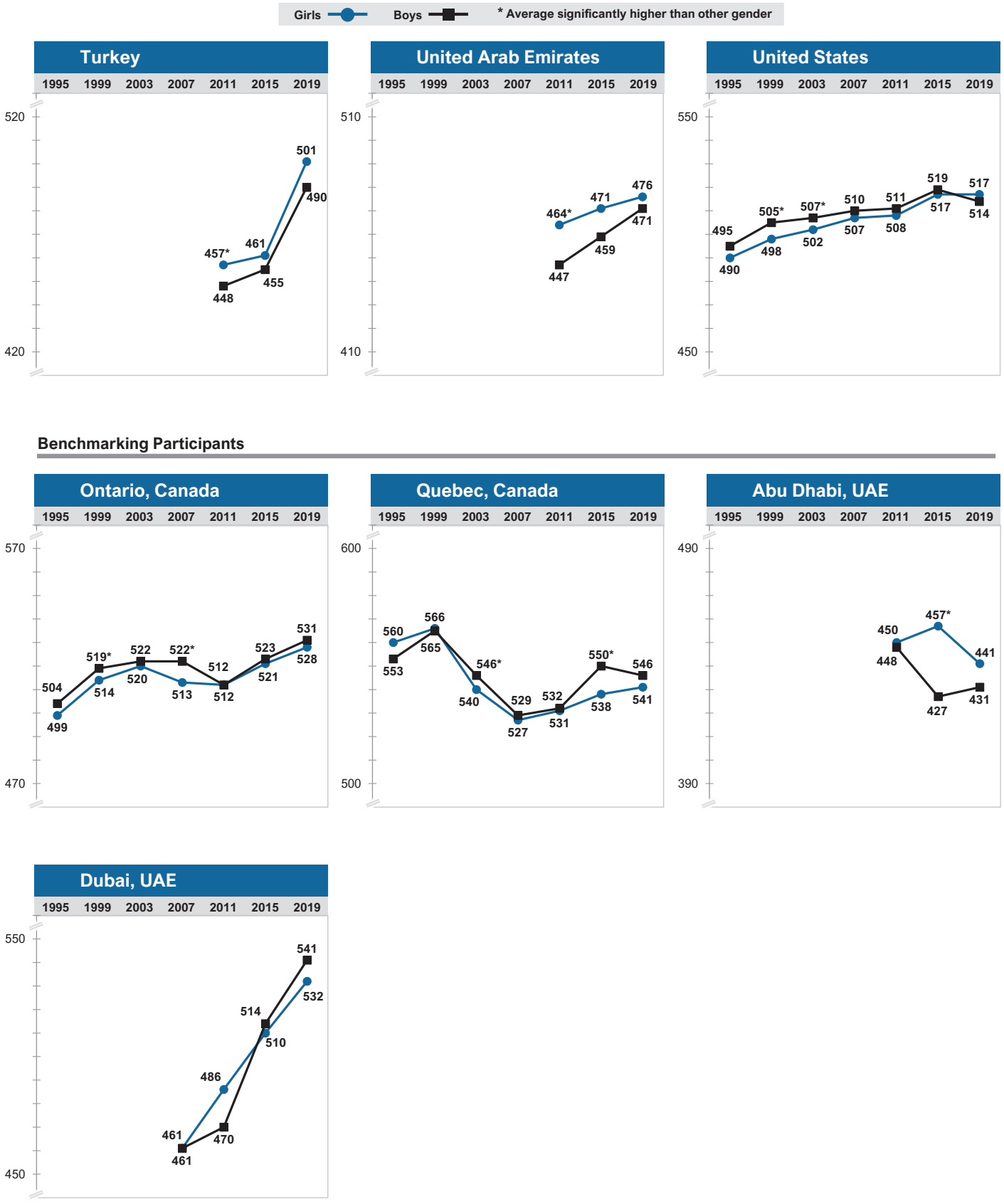
See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 3.6: Trend Plots of Average Mathematics Achievement Across Assessment Years by Gender

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Performance at TIMSS International Benchmarks in Mathematics

TIMSS 2019 International Benchmarks

To provide an interpretation of the results on the TIMSS eighth grade mathematics achievement scale in relation to the students' performance on the assessment items, TIMSS describes achievement at four points along the scale as International Benchmarks: Advanced International Benchmark (625), High International Benchmark (550), Intermediate International Benchmark (475), and Low International Benchmark (400). The descriptions of mathematics achievement at the International Benchmarks were updated from TIMSS 2015 based on an analysis of the items that students with average achievement at each of the benchmarks answered successfully in TIMSS 2019.

Exhibit 3.7 summarizes what eighth grade students who reached each of the TIMSS International Benchmarks in 2019 could do in mathematics. The progression in mathematics achievement is evident from benchmark to benchmark, from demonstrating some knowledge of whole numbers and basic graphs at the Low International Benchmark to applying and reasoning in a variety of complex situations at the Advanced International Benchmark. As much as possible, each description references achievement in the four content areas covered in the assessment at the eighth grade: number, algebra, geometry, and data and probability. The following tables show the target percentages for the content and cognitive domains.

Target Percentages of Assessment Devoted to Content and Cognitive Domains – TIMSS 2019 Eighth Grade Mathematics

Content Domain	Percentage
Number	30%
Algebra	30%
Geometry	20%
Data and Probability	20%

Cognitive Domain	Percentage
Knowing	35%
Applying	40%
Reasoning	25%

The interactive map of the benchmark descriptions links to example items. It provides an overview of the mathematics understanding demonstrated by the eighth grade students who performed at the four levels of the achievement scale. The following sections provide more information about students' achievement in TIMSS 2019 at each International Benchmark as well as more detailed descriptions of each level together with example items.

Exhibit 3.7: Summary of TIMSS 2019 International Benchmarks of Mathematics Achievement

● **Advanced** International Benchmark	
625	*Students can apply and reason in a variety of problem situations, solve linear equations, and make generalizations.* They can solve a variety of fraction, proportion, and percent problems and justify their conclusions. They can understand linear functions and algebraic expressions. Students can use their knowledge of geometric figures to solve a wide range of problems involving angles, area, and surface area. They can calculate means and medians, and understand how changing data points can impact the mean. Students can interpret a wide variety of data displays to draw and justify conclusions, and solve multistep problems. They can solve problems involving expected values.
○ **High** International Benchmark	
550	*Students can apply their understanding and knowledge in a variety of relatively complex situations.* They can solve problems with fractions, decimals, ratios, and proportions. Students at this level show basic procedural knowledge related to algebraic expressions and equations. They can solve a variety of problems with angles, including problems involving triangles, parallel lines, rectangles, and congruent and similar figures. Students can interpret data in a variety of graphs and solve simple problems involving outcomes and probabilities.
● **Intermediate** International Benchmark	
475	*Students can apply basic mathematical knowledge in a variety of situations.* They can solve problems involving whole numbers, negative numbers, fractions, decimals, and ratios. Students have some basic knowledge about properties of two-dimensional shapes. They can read and interpret data in graphs and have some rudimentary knowledge of probability.
○ **Low** International Benchmark	
400	*Students have some knowledge of whole numbers and basic graphs.*

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Percentages of Students Reaching International Benchmarks

Exhibit 3.8 presents the percentage of students reaching each TIMSS 2019 International Benchmark. The results are presented in descending order according to the percentage of students reaching the Advanced International Benchmark, which is indicated in the bar graph with black dots. Because students who reached the Advanced Benchmark also reached the other benchmarks, the percentages illustrated in the exhibit and shown in the columns to the right are cumulative.

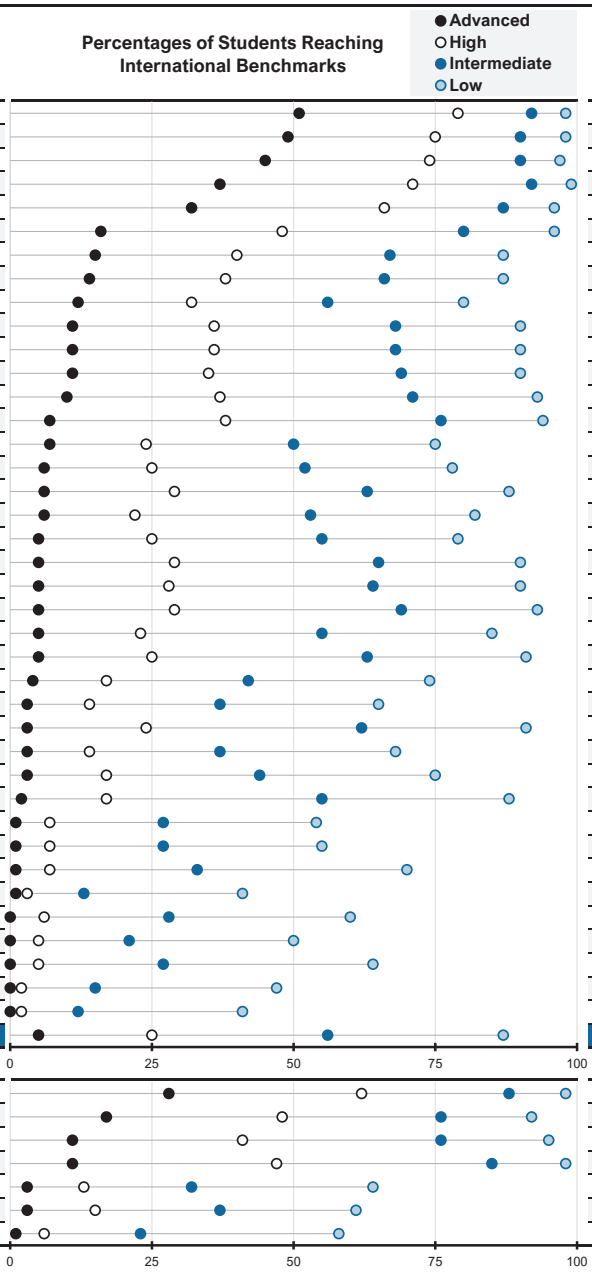
The five high-performing East Asian countries had the highest percentages of students reaching the Advanced International Benchmark. Half the eighth grade students reached the Advanced International Benchmark in Singapore (51%) and Chinese Taipei (49%), as well as 45 percent in Korea, 37 percent in Japan, and 32 percent in Hong Kong SAR. Eight countries had 10 to 16 percent, but most countries had fewer than 10 percent of their eighth grade students reaching the Advanced International Benchmark.

As a point of reference, Exhibit 3.8 provides the international median percentage of students reaching each benchmark at the bottom of the four right-hand columns. By definition, half the countries have a percentage in that column above the median and half below the median. The median percentages of students reaching the International Benchmarks were as follows: Advanced—5 percent, High—25 percent, Intermediate—56 percent, and Low—87 percent. Japan had 99 percent of its students reach the Low Benchmark, Singapore and Chinese Taipei had 98 percent, and Korea had 97 percent.

Not only are Singapore, Chinese Taipei, Korea, and Japan educating high percentages of their students to an advanced level, they are educating almost all of their students to a level of minimal proficiency.

Exhibit 3.8: Percentages of Students Reaching International Benchmarks of Mathematics Achievement

Country	Percentages of Students Reaching International Benchmarks (● Advanced ○ High ● Intermediate ○ Low)	Advanced Benchmark (625)	High Benchmark (550)	Intermediate Benchmark (475)	Low Benchmark (400)
[2] Singapore		51 (2.2)	79 (2.0)	92 (1.1)	98 (0.4)
Chinese Taipei		49 (1.3)	75 (0.9)	90 (0.6)	98 (0.3)
Korea, Rep. of		45 (1.3)	74 (0.9)	90 (0.8)	97 (0.4)
Japan		37 (1.4)	71 (1.1)	92 (0.6)	99 (0.2)
† Hong Kong SAR		32 (1.9)	66 (1.8)	87 (1.4)	96 (0.9)
[2] Russian Federation		16 (1.5)	48 (2.4)	80 (2.0)	96 (0.7)
[3] Israel		15 (1.7)	40 (2.2)	67 (1.8)	87 (1.0)
† United States		14 (1.2)	38 (1.9)	66 (1.9)	87 (1.4)
Turkey		12 (0.9)	32 (1.6)	56 (1.6)	80 (1.4)
Australia		11 (1.4)	36 (1.8)	68 (1.5)	90 (0.8)
Hungary		11 (1.1)	36 (1.4)	68 (1.4)	90 (0.9)
England		11 (1.5)	35 (2.3)	69 (2.2)	90 (1.6)
Lithuania		10 (1.1)	37 (1.7)	71 (1.2)	93 (0.7)
Ireland		7 (0.8)	38 (1.6)	76 (1.3)	94 (0.8)
United Arab Emirates		7 (0.4)	24 (0.7)	50 (0.9)	75 (0.7)
Romania		6 (0.9)	25 (1.6)	52 (1.9)	78 (1.5)
Cyprus		6 (0.5)	29 (1.1)	63 (1.1)	88 (0.8)
† New Zealand		6 (0.5)	22 (1.1)	53 (1.6)	82 (1.4)
Bahrain		5 (0.4)	25 (0.8)	55 (0.9)	79 (0.8)
† Norway (9)		5 (0.6)	29 (1.2)	65 (1.5)	90 (0.8)
[2] Sweden		5 (0.6)	28 (1.3)	64 (1.3)	90 (0.9)
Finland		5 (0.5)	29 (1.2)	69 (1.4)	93 (0.9)
[2] Kazakhstan		5 (0.7)	23 (1.6)	55 (1.8)	85 (1.2)
Portugal		5 (0.6)	25 (1.5)	63 (1.7)	91 (1.1)
Malaysia		4 (0.3)	17 (0.7)	42 (1.6)	74 (1.7)
Ψ Qatar		3 (0.7)	14 (1.5)	37 (1.9)	65 (1.5)
Italy		3 (0.5)	24 (1.4)	62 (1.7)	91 (0.9)
Iran, Islamic Rep. of		3 (0.7)	14 (1.4)	37 (1.6)	68 (1.4)
[1] Georgia		3 (0.8)	17 (1.6)	44 (2.0)	75 (1.8)
France		2 (0.3)	17 (1.2)	55 (1.5)	88 (0.8)
Ψ Oman		1 (0.2)	7 (0.6)	27 (1.0)	54 (1.2)
[2] Ψ Egypt		1 (0.3)	7 (1.1)	27 (2.0)	55 (2.3)
Ψ Chile		1 (0.2)	7 (0.8)	33 (1.5)	70 (1.7)
Ж South Africa (9)		1 (0.1)	3 (0.3)	13 (0.7)	41 (1.3)
Ψ Jordan		0 (0.2)	6 (0.7)	28 (1.7)	60 (2.1)
Ψ Kuwait		0 (0.1)	5 (0.9)	21 (1.9)	50 (2.3)
Lebanon		0 (0.2)	5 (0.6)	27 (1.7)	64 (1.7)
[2] Ψ Saudi Arabia		0 (0.1)	2 (0.3)	15 (0.8)	47 (1.6)
Ψ Morocco		0 (0.1)	2 (0.4)	12 (0.9)	41 (1.2)
International Median		**5**	**25**	**56**	**87**
Benchmarking Participants					
Moscow City, Russian Fed.		28 (2.0)	62 (2.0)	88 (1.2)	98 (0.3)
[2] Dubai, UAE		17 (1.0)	48 (1.1)	76 (0.9)	92 (0.6)
Ontario, Canada		11 (1.7)	41 (2.2)	76 (1.6)	95 (0.8)
‡ Quebec, Canada		11 (1.5)	47 (2.3)	85 (1.6)	98 (0.6)
Ψ Western Cape, RSA (9)		3 (0.7)	13 (1.7)	32 (2.1)	64 (1.8)
Ψ Abu Dhabi, UAE		3 (0.3)	15 (0.7)	37 (1.3)	61 (1.5)
Ψ Gauteng, RSA (9)		1 (0.2)	6 (0.7)	23 (1.5)	58 (1.6)



Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.
See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Trends in Percentages of Students Reaching International Benchmarks

Exhibit 3.9 shows the changes in percentages of students reaching the benchmarks for countries that have comparable data from previous assessments. The trends paint a positive picture of improvement across all four benchmarks. Of the 33 countries participating in both 2015 and 2019, 9 increased and none decreased at the Advanced International Benchmark, 7 increased and 3 decreased at the High Benchmark, 10 increased and 6 decreased at the Intermediate Benchmark, and 10 increased and 4 decreased at the Low Benchmark.

The longer-term trends also show considerable improvement across the percentages of students reaching all four of the benchmarks. Between 2007 and 2019, the 23 countries participating in those two assessments had 15 increases and only 1 decrease at the Advanced level, 16 increases and 2 decreases at the High level, 15 increases and 3 decreases at the Intermediate level, and 12 increases and 3 decreases at the Low level. Between 1995 and 2019, the 18 countries participating in both assessments had 13 increases and 2 decreases at the Advanced level, 9 increases and 4 decreases at the High level, 6 increases and 5 decreases at the Intermediate level, and 5 increases and 5 decreases at the Low level.

Exhibit 3.9: Percentages of Students Reaching International Benchmarks of Mathematics Achievement Across Assessment Years

Country	Advanced International Benchmark (625)							High International Benchmark (550)						
	Percent of Students							Percent of Students						
	2019	2015	2011	2007	2003	1999	1995	2019	2015	2011	2007	2003	1999	1995
Singapore	51	54	48	40 ▲	44 ▲	42 ▲	40 ▲	79	81	78	70 ▲	77	77	84 ▽
Chinese Taipei	49	44 ▲	49	45	38 ▲	37 ▲		75	72 ▲	73	71 ▲	66 ▲	67 ▲	
Korea, Rep. of	45	43	47	40 ▲	35 ▲	32 ▲	31 ▲	74	75	77 ▽	71 ▲	70 ▲	70 ▲	67 ▲
Japan	37	34	27 ▲	26 ▲	24 ▲	29 ▲	29 ▲	71	67 ▲	61 ▲	61 ▲	62 ▲	66 ▲	67 ▲
Hong Kong SAR	32	37	34	31	31	28	23 ▲	66	75 ▽	71	64	73 ▽	70	65
Russian Federation	16	14	14	8 ▲	6 ▲	12	9 ▲	48	46	47	33 ▲	30 ▲	39 ▲	38 ▲
Israel	15	13	12					40	38	40				
United States	14	10 ▲	7 ▲	6 ▲	7 ▲	7 ▲	4 ▲	38	37	30 ▲	31 ▲	29 ▲	30 ▲	26 ▲
Turkey	12	6 ▲	7 ▲					32	20 ▲	20 ▲				
Australia	11	7 ▲	9	6 ▲	7 ▲		7 ▲	36	30 ▲	29 ▲	24 ▲	29 ▲		33
Hungary	11	12	8 ▲	10	11	13	10	36	37	32 ▲	36	41	43 ▽	40
England	11	10	8	8	5 ▲	6 ▲	6 ▲	35	36	32	35	26 ▲	25 ▲	27 ▲
Lithuania	10	6 ▲	5 ▲	6 ▲	5 ▲	3 ▲	2 ▲	37	33	29 ▲	30 ▲	28 ▲	18 ▲	17 ▲
Ireland	7	7					8	38	38					37
United Arab Emirates	7	5 ▲	2 ▲					24	20 ▲	14 ▲				
Romania	6		5	4 ▲	4 ▲	4	4 ▲	25		19 ▲	20 ▲	21	20	21
Cyprus	6			2 ▲	1 ▲	2 ▲	3 ▲	29			17 ▲	13 ▲	19 ▲	19 ▲
New Zealand	6	6	5		5	6	6	22	27 ▽	24		24	26	28 ▽
Bahrain	5	2 ▲	1 ▲	0 ▲	0 ▲			25	12 ▲	8 ▲	3 ▲	2 ▲		
Norway (9)	5	5						29	30					
Sweden	5	3 ▲	1 ▲	2 ▲	3 ▲		12 ▽	28	26	16 ▲	20 ▲	24		46 ▽
Finland	5		4					29		30				
Kazakhstan	5		3					23		23				
Portugal	5						1 ▲	25						7 ▲
Malaysia	4	3 ▲	2 ▲	2 ▲	6	10 ▽		17	18	12 ▲	18	30 ▽	36 ▽	
Qatar	3	3	2					14	14	10 ▲				
Italy	3	3	3	3	3	4		24	24	24	17 ▲	19 ▲	21	
Iran, Islamic Rep. of	3	2	2	1 ▲	0 ▲	1 ▲	0 ▲	14	12	8 ▲	5 ▲	3 ▲	6 ▲	4 ▲
Georgia	3	2	3	1 ▲				17	15	13	7 ▲			
France	2						6 ▽	17						38 ▽
Oman	1	1	0 ▲	0 ▲				7	6	4 ▲	2 ▲			
Egypt	1	0		1	1			7	5		5	6		
Chile	1	1	1		0	1		7	7	5 ▲		3 ▲	4 ▲	
South Africa (9)	1	1	1					3	3	3				
Jordan	0	0	0	1 ▽	1	3 ▽		6	3 ▲	6	11 ▽	8	12 ▽	
Kuwait	0	1						5	5					
Lebanon	0	0	1	1	0			5	8 ▽	9 ▽	10 ▽	4		
Saudi Arabia	0	0	1					2	2	5 ▽				
Morocco	0	0	0					2	2	2				
Benchmarking Participants														
Dubai, UAE	17	10 ▲	5 ▲	3 ▲				48	36 ▲	23 ▲	17 ▲			
Ontario, Canada	11	6 ▲	4 ▲	6 ▲	6 ▲	6 ▲	3 ▲	41	37	31 ▲	33 ▲	34 ▲	32 ▲	26 ▲
Quebec, Canada	11	9	6 ▲	8	8	18 ▽	14	47	47	40 ▲	37 ▲	45	60 ▽	54
Abu Dhabi, UAE	3	3	2 ▲					15	14	12				

▲ 2019 percent significantly higher

▽ 2019 percent significantly lower

An empty cell indicates a country did not participate in that year's assessment or did not have comparable data.
See Appendix A for country participation in previous TIMSS assessments.
Results for Lithuania before 2015 do not include students taught in Polish or Russian.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 3.9: Percentages of Students Reaching International Benchmarks of Mathematics Achievement Across Assessment Years

(Continued)

Country	Intermediate International Benchmark (475) — Percent of Students							Low International Benchmark (400) — Percent of Students						
	2019	2015	2011	2007	2003	1999	1995	2019	2015	2011	2007	2003	1999	1995
Singapore	92	94	92	88 ▲	93	94	98 ▽	98	99	99	97	99	99	100 ▽
Chinese Taipei	90	88 ▲	88 ▲	86 ▲	85 ▲	85 ▲		98	97 ▲	96 ▲	95 ▲	96 ▲	95 ▲	
Korea, Rep. of	90	93 ▽	93 ▽	90	90	91	89	97	99 ▽	99 ▽	98	98	99 ▽	97
Japan	92	89 ▲	87 ▲	87 ▲	88 ▲	90 ▲	91	99	98 ▲	97 ▲	97 ▲	98 ▲	98	98
Hong Kong SAR	87	92 ▽	89	85	93 ▽	92 ▽	88	96	98	97	94	98 ▽	98 ▽	96
Russian Federation	80	78	78	68 ▲	66 ▲	73 ▲	73 ▲	96	95	95	91 ▲	92 ▲	93 ▲	93 ▲
Israel	67	65	68					87	84	87				
United States	66	70	68	67	64	62	61	87	91 ▽	92 ▽	92 ▽	90	87	86
Turkey	56	42 ▲	40 ▲					80	70 ▲	67 ▲				
Australia	68	64	63	61 ▲	65		68	90	89	89	89	90		90
Hungary	68	67	65	69	75 ▽	75 ▽	74 ▽	90	88	88	91	95 ▽	93 ▽	94 ▽
England	69	69	65	69	61 ▲	60 ▲	61 ▲	90	93	88	90	90	88	87
Lithuania	71	68	64 ▲	65 ▲	63 ▲	53 ▲	50 ▲	93	92	90 ▲	90 ▲	90 ▲	85 ▲	81 ▲
Ireland	76	76					73	94	94					91
United Arab Emirates	50	46 ▲	42 ▲					75	73	73				
Romania	52		44 ▲	46 ▲	52	51	52	78		71 ▲	73 ▲	79	79	79
Cyprus	63			48 ▲	45 ▲	53 ▲	51 ▲	88			78 ▲	77 ▲	82 ▲	77 ▲
New Zealand	53	58 ▽	57		59 ▽	57	64 ▽	82	85	84		88 ▽	84	89 ▽
Bahrain	55	39 ▲	26 ▲	19 ▲	17 ▲			79	75 ▲	53 ▲	49 ▲	51 ▲		
Norway (9)	65	70 ▽						90	94 ▽					
Sweden	64	65	57 ▲	60 ▲	64		81 ▽	90	91	89	90	91		96 ▽
Finland	69		73					93		96 ▽				
Kazakhstan	55		57					85		85				
Portugal	63						35 ▲	91						79 ▲
Malaysia	42	45	36	50 ▽	66 ▽	70 ▽		74	76	65 ▲	82 ▽	93 ▽	93 ▽	
Qatar	37	36	29 ▲					65	63	54 ▲				
Italy	62	62	64	54 ▲	56 ▲	53 ▲		91	89	90	85 ▲	86 ▲	82 ▲	
Iran, Islamic Rep. of	37	34	26 ▲	20 ▲	20 ▲	26 ▲	24 ▲	68	63 ▲	55 ▲	51 ▲	55 ▲	61 ▲	59 ▲
Georgia	44	42	36 ▲	26 ▲				75	72	62 ▲	56 ▲			
France	55						81 ▽	88						97 ▽
Oman	27	23 ▲	16 ▲	14 ▲				54	52	39 ▲	41 ▲			
Egypt	27	21 ▲		21 ▲	24			55	47 ▲		47 ▲	52		
Chile	33	28 ▲	23 ▲		15 ▲	16 ▲		70	63 ▲	57 ▲		41 ▲	46 ▲	
South Africa (9)	13	13	9 ▲					41	34 ▲	24 ▲				
Jordan	28	18 ▲	26	35 ▽	30	33 ▽		60	45 ▲	55 ▲	61	60	61	
Kuwait	21	18						50	45					
Lebanon	27	35 ▽	38 ▽	36 ▽	27			64	71 ▽	73 ▽	74 ▽	68		
Saudi Arabia	15	11 ▲	20 ▽					47	34 ▲	47				
Morocco	12	14 ▽	12					41	41	36 ▲				
Benchmarking Participants														
Dubai, UAE	76	67 ▲	53 ▲	47 ▲				92	88 ▲	79 ▲	74 ▲			
Ontario, Canada	76	75	71 ▲	74	75	72	65 ▲	95	95	94	95	97	96	91 ▲
Quebec, Canada	85	86	82	78 ▲	88	93 ▽	90	98	98	98	97	99 ▽	99	99
Abu Dhabi, UAE	37	37	39					61	65	71 ▽				

▲ 2019 percent significantly higher

▽ 2019 percent significantly lower

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Low Benchmark: Full Description

Exhibit 3.10 presents the description of eighth grade students' achievement at the Low International Benchmark. The few eighth grade items in TIMSS 2019 at the Low level indicated that students had some understanding of whole numbers and basic graphs.

Exhibit 3.10: Description of the TIMSS 2019 Low International Benchmark (400) of Mathematics Achievement

Low International Benchmark

400

Summary

Students have some knowledge of whole numbers and basic graphs.

No items at the eighth grade anchored at the Low level in TIMSS 2019. However, TIMSS 2015 indicated that students at this level have an elementary understanding of whole numbers. They could match tables to bar graphs and pictographs.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Intermediate Benchmark: Full Description and Example Items

Exhibit 3.11 provides the description of student achievement at the Intermediate International Benchmark. At this level, students could apply basic mathematical knowledge in a variety of situations.

Exhibit 3.11.1 presents an item from the number domain. As shown in this item, students reaching the Intermediate Benchmark demonstrated familiarity with negative numbers. The international average was 59 percent. The highest performance on the item was in Finland—85 percent of the students responded correctly.

Exhibit 3.11.2 presents a geometry item. Fifty-six percent of the eighth grade students, on average, were able to use the properties of angles to determine the size of a fourth angle in a quadrilateral when given the values of the other three angles. The Singaporean students had the highest achievement, with 90 percent correct.

Exhibit 3.11.3 shows a multi-part item from the data and probability domain. Eighty-three percent of the students in Singapore were able to compute and compare three unit prices based on advertisements. The international average was 56 percent.

Exhibit 3.11: Description of the TIMSS 2019 Intermediate International Benchmark (475) of Mathematics Achievement

Intermediate International Benchmark

475

Summary

Students can apply basic mathematical knowledge in a variety of situations. They can solve problems involving whole numbers, negative numbers, fractions, decimals, and ratios. Students have some basic knowledge about properties of two-dimensional shapes. They can read and interpret data in graphs and have some rudimentary knowledge of probability.

Students at this level can solve problems involving whole numbers, negative numbers, fractions, decimals, and ratios.

Students have some basic knowledge about properties of two-dimensional shapes.

Students can read and interpret data presented in tables, bar graphs, and line graphs. They have some rudimentary knowledge of probability.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 3.11.1: Intermediate International Benchmark of Mathematics Achievement – Example Item 1

Country	Percent Full Credit	
Finland	85 (1.5)	▲
† Norway (9)	82 (2.0)	▲
Chinese Taipei	82 (1.5)	▲
England	82 (1.6)	▲
Japan	81 (1.6)	▲
2 Singapore	80 (2.0)	▲
Ireland	80 (1.7)	▲
† Hong Kong SAR	80 (2.0)	▲
2 Sweden	80 (2.1)	▲
Korea, Rep. of	80 (1.9)	▲
Australia	79 (1.8)	▲
Hungary	76 (2.4)	▲
† United States	70 (1.7)	▲
† New Zealand	69 (2.5)	▲
Lithuania	68 (2.3)	▲
3 Israel	67 (1.9)	▲
Cyprus	65 (1.9)	▲
France	63 (2.3)	▲
2 Russian Federation	61 (3.1)	
Portugal	61 (2.8)	
International Average	**59 (0.3)**	
Italy	57 (2.5)	
Romania	55 (2.4)	
United Arab Emirates	53 (1.2)	▽
Turkey	52 (1.9)	▽
Bahrain	51 (2.2)	▽
Qatar	47 (2.4)	▽
Chile	46 (2.4)	▽
2 Kazakhstan	45 (2.7)	▽
1 Georgia	44 (2.6)	▽
Malaysia	43 (1.6)	▽
2 Egypt	41 (2.3)	▽
Kuwait	39 (2.2)	▽
Jordan	37 (2.2)	▽
Oman	36 (2.0)	▽
Lebanon	36 (2.2)	▽
Iran, Islamic Rep. of	35 (2.3)	▽
2 Saudi Arabia	33 (2.0)	▽
South Africa (9)	25 (1.1)	▽
Morocco	22 (1.4)	▽
Benchmarking Participants		
‡ Quebec, Canada	82 (2.6)	▲
Moscow City, Russian Fed.	75 (1.9)	▲
Ontario, Canada	71 (2.0)	▲
2 Dubai, UAE	70 (1.8)	▲
Abu Dhabi, UAE	44 (2.0)	▽
Western Cape, RSA (9)	40 (2.4)	▽
Gauteng, RSA (9)	30 (1.7)	▽

Content Domain: Number

Cognitive Domain: Knowing

Description: Solves a word problem involving subtraction of negative numbers

On Thursday, the lowest temperature in City X was 6 °C and the lowest temperature in City Y was −3 °C. What was the difference between the lowest temperatures in the cities?

Answer: 9 °C

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

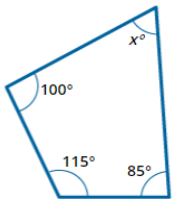
Exhibit 3.11.2: Intermediate International Benchmark of Mathematics Achievement – Example Item 2

Country	Percent Full Credit	
[2] Singapore	90 (1.0)	▲
Japan	89 (1.1)	▲
Korea, Rep. of	86 (2.0)	▲
Chinese Taipei	83 (1.5)	▲
† Hong Kong SAR	81 (2.2)	▲
Ireland	78 (1.9)	▲
Hungary	71 (3.0)	▲
England	70 (2.5)	▲
Lithuania	69 (2.2)	▲
[2] Russian Federation	65 (2.8)	▲
Cyprus	63 (2.0)	▲
† Norway (9)	62 (2.1)	▲
Australia	61 (2.0)	▲
Turkey	61 (2.5)	▲
[2] Kazakhstan	60 (2.7)	
Romania	59 (2.3)	
Finland	58 (2.2)	
Portugal	57 (3.0)	
International Average	**56 (0.4)**	
Italy	55 (2.6)	
[1] Georgia	54 (2.7)	
Bahrain	54 (2.5)	
[2] Sweden	52 (2.1)	
Malaysia	52 (2.1)	
Lebanon	51 (2.9)	
Iran, Islamic Rep. of	51 (2.0)	▽
[2] Egypt	49 (2.7)	▽
Qatar	48 (2.3)	▽
† New Zealand	47 (2.4)	▽
United Arab Emirates	46 (1.2)	▽
[3] Israel	46 (2.5)	▽
Oman	42 (2.1)	▽
Jordan	41 (2.5)	▽
† United States	39 (1.9)	▽
France	36 (2.4)	▽
Kuwait	32 (3.3)	▽
[2] Saudi Arabia	30 (2.2)	▽
South Africa (9)	27 (1.2)	▽
Chile	26 (1.9)	▽
Morocco	26 (1.7)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	75 (2.2)	▲
‡ Quebec, Canada	74 (2.5)	▲
[2] Dubai, UAE	63 (2.3)	▲
Ontario, Canada	58 (3.2)	
Western Cape, RSA (9)	44 (2.5)	▽
Abu Dhabi, UAE	38 (2.1)	▽
Gauteng, RSA (9)	37 (2.0)	▽

Content Domain: Geometry

Cognitive Domain: Applying

Description: Determines the value of an angle in an irregular quadrilateral given the values of the other angles



What is the value of x?

$x =$ 60

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 3.11.3: Intermediate International Benchmark of Mathematics Achievement – Example Item 3

Country	Percent Full Credit	
[2] Singapore	83 (1.3)	▲
Chinese Taipei	81 (1.4)	▲
Japan	81 (1.5)	▲
Korea, Rep. of	80 (2.0)	▲
Ireland	77 (2.5)	▲
† Hong Kong SAR	74 (2.7)	▲
Lithuania	70 (2.5)	▲
Australia	69 (1.8)	▲
[2] Russian Federation	66 (2.7)	▲
Cyprus	66 (2.5)	▲
[2] Kazakhstan	66 (2.7)	▲
Finland	65 (2.2)	▲
France	65 (2.2)	▲
Portugal	65 (2.7)	▲
Italy	64 (2.2)	▲
† United States	63 (1.9)	▲
† New Zealand	61 (2.1)	▲
Hungary	61 (2.4)	
Romania	61 (2.9)	
[3] Israel	59 (2.4)	
England	59 (2.8)	
Malaysia	57 (1.4)	
International Average	**56 (0.4)**	
† Norway (9)	56 (2.6)	
[2] Sweden	55 (2.5)	
Turkey	53 (2.4)	
Lebanon	48 (2.4)	▽
[1] Georgia	44 (2.6)	▽
United Arab Emirates	43 (1.0)	▽
Bahrain	43 (1.9)	▽
Iran, Islamic Rep. of	42 (2.2)	▽
Oman	37 (1.7)	▽
Chile	37 (2.3)	▽
[2] Egypt	35 (1.7)	▽
Jordan	35 (1.8)	▽
Qatar	33 (2.2)	▽
South Africa (9)	32 (1.5)	▽
Morocco	29 (1.7)	▽
Kuwait	21 (1.8)	▽
[2] Saudi Arabia	- -	
Benchmarking Participants		
Moscow City, Russian Fed.	77 (1.9)	▲
‡ Quebec, Canada	72 (2.6)	▲
Ontario, Canada	66 (2.4)	▲
[2] Dubai, UAE	63 (2.2)	▲
Western Cape, RSA (9)	53 (2.1)	
Gauteng, RSA (9)	40 (2.1)	▽
Abu Dhabi, UAE	36 (1.9)	▽

Content Domain: Data and Probability

Cognitive Domain: Applying

Description: Finds and compares the unit prices of four objects

Socks on Sale!
Advertisements

SALE Store Q 6 pairs of socks 24.30 zeds	**SALE** Store R 2 pairs of socks 8.40 zeds
SALE Store S 4 pairs of socks 16.40 zeds	**SALE** Store T 3 pairs of socks 12 zeds

Chen has seen these advertisements for socks and wants to pay the lowest price per pair of socks. Complete the table below to show Chen the price per pair of socks in each store. Store Q has been done for you.

Store	Price Per Pair
Q	4.05 zeds
R	4.2 zeds
S	4.1 zeds
T	4.0 zeds

From which store should Chen buy her socks in order to pay the lowest price per pair?

Store: T

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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High Benchmark: Full Description and Example Items

Exhibit 3.12 presents the description of achievement at the High International Benchmark. Eighth grade students reaching this benchmark could apply their mathematics understanding in a variety of relatively complex situations.

Exhibit 3.12.1 provides an example from the number domain. Fifty-four percent of the eighth grade students, on average, were able to use a ratio to solve a problem. With 87 percent correct, Singapore had the highest percentage correct.

Exhibit 3.12.2 provides an example from the algebra domain. In this item, students were asked to solve a problem by evaluating a formula with exponents. The international average was 35 percent. Seventy-three percent of the Singaporean eighth grade students answered correctly.

Exhibit 3.12.3 shows a reasoning item from the geometry domain. On average, 41 percent of eighth grade students were able to visualize two different cylinders. The highest achievement was in Japan, with 79 percent of the students answering this item correctly.

Exhibit 3.12.4 shows a data interpretation item from the data and probability domain. Eighty-three percent of the Japanese eighth grade students were able to match different types of data to the appropriate graphic displays. The international average was 47 percent.

Exhibit 3.12.5 shows another example item from the data and probability domain, involving outcomes and probabilities. Eighth grade students in Korea posted the highest percentage correct—70 percent. The international average was 43 percent.

Exhibit 3.12: Description of the TIMSS 2019 High International Benchmark (550) of Mathematics Achievement

High International Benchmark

550

Summary

Students can apply their understanding and knowledge in a variety of relatively complex situations. They can solve problems with fractions, decimals, ratios, and proportions. Students at this level show basic procedural knowledge related to algebraic expressions and equations. They can solve a variety of problems with angles, including problems involving triangles, parallel lines, rectangles, and congruent and similar figures. Students can interpret data in a variety of graphs and solve simple problems involving outcomes and probabilities.

Students can solve problems with fractions, decimals, ratios, and proportions.

Students at this level show basic procedural knowledge related to algebraic expressions. They can simplify expressions with integers. They can evaluate a variety of expressions and formulas, including those with exponents. They can identify algebraic expressions that represent real world situations. Students can identify the solutions of linear equations, a pair of simultaneous linear equations in two variables, and identify the values that satisfy two inequalities. They can determine a specific term of a numerical or geometric pattern.

Students can solve a variety of problems with angles, including problems involving triangles, parallel lines, rectangles, and congruent and similar figures. They can identify points in the Cartesian plane to draw lines and shapes. They can visualize rectangular solids.

Students can interpret data from pie charts, line graphs, and bar graphs to solve problems and provide explanations. They can calculate means. They can solve simple problems involving outcomes and probabilities.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 3.12.1: High International Benchmark of Mathematics Achievement – Example Item 1

Country	Percent Correct	
[2] Singapore	87 (1.4)	▲
Japan	82 (1.6)	▲
Korea, Rep. of	81 (1.9)	▲
Chinese Taipei	80 (1.7)	▲
† Hong Kong SAR	72 (2.1)	▲
[3] Israel	70 (2.0)	▲
Ireland	68 (2.3)	▲
England	67 (2.4)	▲
Australia	67 (2.0)	▲
Hungary	66 (2.1)	▲
Lithuania	61 (2.1)	▲
† United States	61 (1.7)	▲
[2] Russian Federation	60 (2.5)	▲
† New Zealand	57 (2.2)	
International Average	**54 (0.3)**	
[2] Kazakhstan	54 (2.5)	
Qatar	53 (2.2)	
Finland	52 (2.0)	
† Norway (9)	52 (2.3)	
Cyprus	52 (2.4)	
United Arab Emirates	52 (1.1)	
Romania	52 (2.3)	
Iran, Islamic Rep. of	51 (2.1)	
[1] Georgia	51 (2.8)	
[2] Sweden	50 (2.6)	
Malaysia	49 (1.9)	▽
France	49 (2.3)	▽
Chile	47 (3.3)	▽
Bahrain	46 (2.1)	▽
Italy	46 (2.5)	▽
Jordan	43 (2.1)	▽
[2] Egypt	43 (1.9)	▽
Portugal	43 (2.3)	▽
Kuwait	40 (2.3)	▽
[2] Saudi Arabia	40 (1.9)	▽
South Africa (9)	38 (1.3)	▽
Turkey	35 (1.9)	▽
Morocco	33 (1.4)	▽
Oman	33 (1.8)	▽
Lebanon	29 (2.1)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	67 (2.3)	▲
[2] Dubai, UAE	66 (2.1)	▲
Ontario, Canada	63 (2.3)	▲
Western Cape, RSA (9)	49 (2.2)	▽
Abu Dhabi, UAE	46 (1.8)	▽
‡ Quebec, Canada	43 (2.4)	▽
Gauteng, RSA (9)	41 (1.7)	▽

Content Domain: Number

Cognitive Domain: Applying

Description: In a word problem dividing a quantity by a given ratio, determines the quantity of one of the parts

A piece of string was 45 cm long. Then, it was divided into two pieces in a ratio of 4:5.

What is the length of the shorter piece of string in cm?

A) 5

B) 20

C) 25

D) 36

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 3.12.2: High International Benchmark of Mathematics Achievement – Example Item 2

Country	Percent Full Credit	
[2] Singapore	73 (2.1)	▲
Chinese Taipei	66 (2.0)	▲
† Hong Kong SAR	66 (2.3)	▲
[2] Russian Federation	60 (2.6)	▲
Korea, Rep. of	55 (2.3)	▲
Ireland	48 (2.4)	▲
Lithuania	48 (2.4)	▲
[2] Kazakhstan	47 (2.7)	▲
[3] Israel	46 (2.4)	▲
Japan	44 (1.9)	▲
† United States	43 (2.3)	▲
Hungary	43 (2.5)	▲
Romania	41 (2.3)	▲
England	40 (2.9)	
Cyprus	39 (1.9)	▲
Australia	37 (2.1)	
United Arab Emirates	36 (1.2)	
International Average	**35 (0.3)**	
Italy	35 (2.7)	
[1] Georgia	34 (2.6)	
Portugal	34 (2.3)	
Turkey	32 (2.2)	
Bahrain	31 (1.7)	
Oman	28 (1.7)	▽
Qatar	28 (2.1)	▽
Lebanon	27 (2.0)	▽
[2] Egypt	27 (2.0)	▽
Finland	25 (1.8)	▽
France	23 (2.0)	▽
† Norway (9)	23 (1.9)	▽
Iran, Islamic Rep. of	22 (1.5)	▽
[2] Sweden	22 (2.0)	▽
Malaysia	22 (1.5)	▽
Jordan	21 (1.8)	▽
† New Zealand	19 (1.5)	▽
South Africa (9)	17 (1.1)	▽
[2] Saudi Arabia	15 (1.6)	▽
Chile	14 (1.5)	▽
Kuwait	12 (1.8)	▽
Morocco	6 (1.0)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	73 (2.1)	▲
[2] Dubai, UAE	52 (2.5)	▲
‡ Quebec, Canada	44 (3.1)	▲
Ontario, Canada	44 (3.2)	▲
Western Cape, RSA (9)	28 (2.5)	▽
Abu Dhabi, UAE	28 (1.3)	▽
Gauteng, RSA (9)	20 (2.0)	▽

Content Domain: Algebra

Cognitive Domain: Applying

Description: Solves a word problem involving evaluating a formula with exponents

The stopping distance (d) meters depends on the speed (v) meters per second of the car when the brakes are applied. A formula for calculating this distance is:

$$d = \frac{2v + v^2}{20}$$

What is the stopping distance when $v = 20$?

$d =$ 22 m

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 3.12.3: High International Benchmark of Mathematics Achievement – Example Item 3

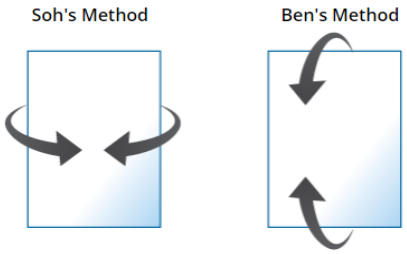
Country	Percent Full Credit	
Japan	79 (1.7)	▲
[2] Singapore	70 (1.7)	▲
† Hong Kong SAR	66 (2.5)	▲
Korea, Rep. of	64 (2.5)	▲
Italy	59 (2.7)	▲
Lithuania	58 (2.6)	▲
Hungary	57 (2.4)	▲
Chinese Taipei	53 (2.2)	▲
[2] Russian Federation	52 (2.5)	▲
† United States	51 (2.3)	▲
[3] Israel	49 (2.2)	▲
England	48 (2.5)	▲
Portugal	48 (2.7)	▲
Turkey	47 (2.0)	▲
Finland	44 (2.0)	
Malaysia	42 (1.9)	
France	42 (2.0)	
International Average	**41 (0.3)**	
† Norway (9)	41 (2.5)	
Bahrain	40 (2.0)	
Cyprus	40 (2.2)	
[2] Kazakhstan	39 (2.3)	
Chile	39 (2.2)	
Romania	39 (2.4)	
United Arab Emirates	38 (1.1)	▽
[2] Sweden	38 (2.5)	
Ireland	35 (2.2)	▽
Qatar	33 (2.1)	▽
Iran, Islamic Rep. of	32 (2.0)	▽
Oman	28 (1.8)	▽
Australia	28 (1.7)	▽
[1] Georgia	27 (2.3)	▽
Jordan	27 (2.1)	▽
Kuwait	26 (2.1)	▽
[2] Egypt	23 (1.8)	▽
Morocco	22 (1.4)	▽
† New Zealand	21 (1.4)	▽
South Africa (9)	21 (0.9)	▽
Lebanon	20 (2.1)	▽
[2] Saudi Arabia	10 (1.2)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	64 (1.9)	▲
Ontario, Canada	60 (2.9)	▲
[2] Dubai, UAE	49 (2.9)	▲
‡ Quebec, Canada	46 (3.0)	
Abu Dhabi, UAE	35 (1.5)	▽
Western Cape, RSA (9)	27 (1.9)	▽
Gauteng, RSA (9)	27 (1.7)	▽

Content Domain: Geometry

Cognitive Domain: Reasoning

Description: Compares properties of two open cylinders made by rolling the same rectangle in different directions

Soh and Ben have identical rectangular pieces of paper. They use different ways to roll their papers into cylinders so that the opposite sides of the paper touch as shown below.



Compare the properties of the two cylinders.

Use the drop-down menus.

Height

Soh's cylinder [>] Ben's cylinder

Diameter

Soh's cylinder [<] Ben's cylinder

Surface Area (with open ends)

Soh's cylinder [=] Ben's cylinder

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 3.12.4: High International Benchmark of Mathematics Achievement – Example Item 4

Country	Percent Full Credit	
Japan	83 (1.2)	▲
[2] Singapore	76 (1.8)	▲
Chinese Taipei	68 (1.8)	▲
Korea, Rep. of	67 (2.2)	▲
Ireland	64 (2.2)	▲
Australia	64 (2.1)	▲
Portugal	63 (2.8)	▲
England	61 (2.7)	▲
† Hong Kong SAR	61 (2.5)	▲
Hungary	58 (2.6)	▲
Lithuania	58 (2.2)	▲
† Norway (9)	58 (2.8)	▲
Turkey	58 (1.9)	▲
France	54 (2.3)	▲
Finland	54 (2.0)	▲
[2] Russian Federation	54 (2.9)	▲
† New Zealand	53 (2.4)	▲
† United States	53 (2.2)	▲
[3] Israel	52 (2.0)	▲
Italy	51 (2.5)	
Cyprus	50 (2.6)	
International Average	**47 (0.3)**	
Bahrain	45 (1.8)	
[2] Sweden	45 (2.3)	
Malaysia	43 (1.8)	▽
United Arab Emirates	40 (0.9)	▽
Romania	38 (2.5)	▽
Chile	37 (2.2)	▽
Oman	37 (2.0)	▽
Qatar	34 (2.5)	▽
Kuwait	33 (2.8)	▽
[2] Kazakhstan	31 (2.0)	▽
[2] Saudi Arabia	29 (2.0)	▽
Jordan	26 (2.2)	▽
South Africa (9)	25 (1.1)	▽
Iran, Islamic Rep. of	25 (1.9)	▽
Lebanon	22 (2.1)	▽
Morocco	21 (1.3)	▽
[1] Georgia	20 (1.8)	▽
[2] Egypt	18 (1.4)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	69 (2.5)	▲
Ontario, Canada	66 (2.3)	▲
‡ Quebec, Canada	65 (2.5)	▲
[2] Dubai, UAE	59 (1.8)	▲
Western Cape, RSA (9)	39 (2.0)	▽
Gauteng, RSA (9)	33 (1.6)	▽
Abu Dhabi, UAE	31 (1.4)	▽

Content Domain: Data and Probability

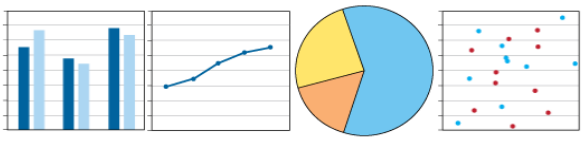
Cognitive Domain: Applying

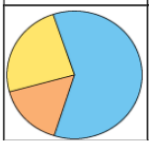
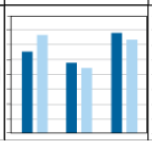
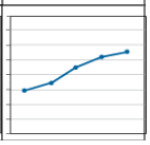
Description: Identifies an appropriate graph for three different types of data

Lee wants to make three graphs to show information about his town.
The titles of his graphs are shown in the table below.

Which type of graph is best for each?

Drag one type of graph to each title.



Job Types of Workers in Town	The Number of Girls and Boys Born Each Year	Town Population Over Time
		

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 3.12.5: High International Benchmark of Mathematics Achievement – Example Item 5

Country	Percent Correct	
Korea, Rep. of	70 (2.0)	▲
[2] Singapore	69 (1.9)	▲
Japan	65 (1.8)	▲
Chinese Taipei	63 (2.1)	▲
Ireland	57 (2.4)	▲
Australia	56 (2.0)	▲
Turkey	55 (2.2)	▲
Bahrain	52 (2.1)	▲
† United States	52 (2.2)	▲
England	50 (2.2)	▲
† Hong Kong SAR	49 (2.9)	▲
Finland	49 (2.1)	▲
Italy	48 (2.5)	▲
† New Zealand	48 (2.3)	▲
† Norway (9)	48 (2.8)	
Lithuania	46 (2.7)	
[3] Israel	46 (2.7)	
Iran, Islamic Rep. of	45 (2.8)	
International Average	**43 (0.4)**	
Hungary	43 (2.3)	
[2] Russian Federation	42 (2.6)	
[2] Sweden	42 (2.7)	
Cyprus	41 (2.4)	
Portugal	41 (2.6)	
[2] Kazakhstan	39 (2.7)	
France	38 (2.4)	▽
United Arab Emirates	38 (1.0)	▽
Chile	36 (1.9)	▽
Malaysia	35 (1.4)	▽
Jordan	34 (2.0)	▽
Oman	34 (1.6)	▽
Qatar	32 (2.3)	▽
Romania	30 (2.4)	▽
Kuwait	30 (2.0)	▽
[2] Egypt	27 (1.8)	▽
[2] Saudi Arabia	27 (1.9)	▽
[1] Georgia	27 (2.2)	▽
Morocco	26 (1.8)	▽
South Africa (9)	25 (1.2)	▽
Lebanon	22 (1.8)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	53 (2.3)	▲
Ontario, Canada	50 (3.0)	▲
‡ Quebec, Canada	50 (2.4)	▲
[2] Dubai, UAE	48 (2.1)	▲
Western Cape, RSA (9)	35 (1.9)	▽
Abu Dhabi, UAE	34 (1.5)	▽
Gauteng, RSA (9)	28 (1.5)	▽

Content Domain: Data and Probability

Cognitive Domain: Applying

Description: Estimates the number of objects in a given probability sample

A bag contains 24 marbles, some white and some black.

A marble is chosen at random, its color is noted, and the marble is placed back into the bag. This is done 120 times, and a white marble appears 70 times.

How many white marbles are likely to be in the bag?

A) 7

B) 10

C) 12

D) 14

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Advanced Benchmark: Full Description and Example Items

Exhibit 3.13 presents the description of eighth grade performance at the Advanced International Benchmark. Students could apply and reason to solve a variety of problems as well as solve linear equations and make generalizations.

Exhibit 3.13.1 shows a multistep problem involving fractions from the number domain. This problem was relatively difficult for eighth grade students, with an international average of 18 percent. The top performances were in Chinese Taipei and Korea, where just over half the students answered correctly (52–53%).

Exhibit 3.13.2 involved students constructing a linear equation to solve a problem about perimeter. The international average was 26 percent. Almost three-fourths (74%) of the Singaporean students successfully completed this task.

Exhibit 3.13.3 shows a reasoning item from the geometry domain, which was based on properties of supplementary angles. Seventy-seven percent of eighth grade students answered correctly in both Japan and Korea. The international average was 26 percent.

Exhibit 3.13.4 presents an item from the data and probability domain that required students to interpret the change in a mean, using decimals and rounding. The international average was 36 percent. The highest percentage correct—71 percent—was in Korea.

Exhibit 3.13: Description of the TIMSS 2019 Advanced International Benchmark (625) of Mathematics Achievement

Advanced International Benchmark

625

Summary

Students can apply and reason in a variety of problem situations, solve linear equations, and make generalizations. They can solve a variety of fraction, proportion, and percent problems and justify their conclusions. They can understand linear functions and algebraic expressions. Students can use their knowledge of geometric figures to solve a wide range of problems involving angles, area, and surface area. They can calculate means and medians, and understand how changing data points can impact the mean. Students can interpret a wide variety of data displays to draw and justify conclusions, and solve multistep problems. They can solve problems involving expected values.

Students can solve a variety of fraction, proportion, and percent problems and justify their conclusions. They can reason with different representations of numbers in abstract and multistep problems.

Students can construct and solve linear equations in one or two variables. They can identify properties of linear functions from tables, graphs, and equations, including slopes and y-intercepts. Students can express generalizations either algebraically or in words, such as expressing the nth term in number patterns. They can simplify algebraic expressions.

Students can use their knowledge of geometric figures to solve a wide range of problems. They can solve a variety of problems about area and surface area, and use the Pythagorean theorem to find the side length of a triangle. Students can use their knowledge of the relationships between geometric figures, parallel lines, and angles to solve problems on the coordinate plane.

Students can calculate means and medians, and understand how changing data points can impact the mean. Students can interpret a wide variety of data displays to draw and justify conclusions, and solve multi-step problems. They can solve problems involving expected values.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 3.13.1: Advanced International Benchmark of Mathematics Achievement – Example Item 1

Country	Percent Full Credit	
Chinese Taipei	53 (2.0)	▲
Korea, Rep. of	52 (2.3)	▲
Japan	47 (2.1)	▲
[2] Singapore	46 (2.1)	▲
Bahrain	30 (1.6)	▲
Cyprus	28 (2.3)	▲
[2] Russian Federation	26 (2.5)	▲
† Hong Kong SAR	24 (2.8)	▲
Ireland	23 (2.1)	▲
Hungary	22 (1.9)	▲
[3] Israel	22 (2.2)	
England	22 (2.8)	
Australia	21 (1.8)	
[2] Kazakhstan	19 (1.9)	
International Average	**18 (0.3)**	
Turkey	18 (1.8)	
Iran, Islamic Rep. of	17 (1.9)	
† United States	17 (1.4)	
Romania	17 (1.8)	
† New Zealand	16 (1.1)	
Lithuania	16 (1.8)	
United Arab Emirates	14 (1.0)	▽
Portugal	14 (1.8)	▽
[2] Sweden	13 (1.8)	▽
Finland	13 (1.4)	▽
† Norway (9)	10 (1.4)	▽
France	10 (1.4)	▽
[2] Egypt	10 (1.3)	▽
Qatar	8 (1.4)	▽
Malaysia	8 (0.9)	▽
Italy	7 (1.2)	▽
Chile	6 (1.0)	▽
Jordan	6 (1.1)	▽
Kuwait	6 (1.3)	▽
Oman	6 (0.8)	▽
South Africa (9)	5 (0.5)	▽
Lebanon	5 (1.2)	▽
Morocco	4 (0.7)	▽
[2] Saudi Arabia	4 (0.9)	▽
[1] Georgia	- -	
Benchmarking Participants		
Moscow City, Russian Fed.	37 (2.9)	▲
[2] Dubai, UAE	25 (2.2)	▲
Ontario, Canada	20 (2.4)	
‡ Quebec, Canada	18 (1.9)	
Western Cape, RSA (9)	12 (1.7)	▽
Abu Dhabi, UAE	10 (1.1)	▽
Gauteng, RSA (9)	7 (1.1)	▽

Content Domain: Number

Cognitive Domain: Reasoning

Description: Solves a multistep problem involving addition and subtraction of fractions

In the square below:

- The numbers in each row add to 1,
- The numbers in each column add to 1, and
- The numbers in both diagonals add to 1.

$\frac{8}{15}$		$\frac{2}{5}$
$\frac{1}{5}$	X	

What is the value of X?

$X = \frac{5}{15}$

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 3.13.2: Advanced International Benchmark of Mathematics Achievement – Example Item 2

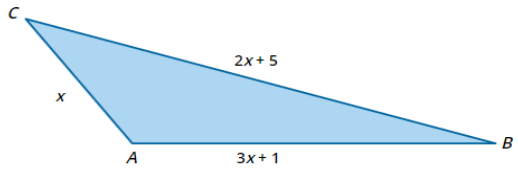
Country	Percent Full Credit	
[2] Singapore	74 (2.1)	▲
Chinese Taipei	66 (1.8)	▲
† Hong Kong SAR	61 (2.4)	▲
Korea, Rep. of	59 (2.8)	▲
[3] Israel	46 (2.7)	▲
Japan	42 (2.1)	▲
Cyprus	41 (2.3)	▲
[2] Russian Federation	40 (3.0)	▲
Romania	36 (2.8)	▲
Lithuania	34 (2.4)	▲
[2] Sweden	34 (2.2)	▲
Hungary	33 (2.6)	▲
[2] Kazakhstan	30 (2.2)	
Australia	29 (1.8)	
International Average	**26 (0.3)**	
[1] Georgia	26 (2.7)	
United Arab Emirates	25 (0.9)	
Bahrain	25 (1.7)	
† United States	24 (1.8)	
Turkey	23 (2.1)	
Ireland	23 (1.7)	
England	22 (2.5)	
Finland	21 (1.7)	▽
† Norway (9)	18 (1.7)	▽
Portugal	18 (1.8)	▽
† New Zealand	17 (1.4)	▽
[2] Egypt	17 (1.9)	▽
Iran, Islamic Rep. of	16 (1.9)	▽
Oman	15 (1.2)	▽
Italy	15 (1.9)	▽
France	14 (1.8)	▽
Lebanon	14 (1.9)	▽
Jordan	13 (1.3)	▽
Malaysia	12 (0.9)	▽
Qatar	12 (1.5)	▽
Kuwait	8 (1.7)	▽
Morocco	6 (1.1)	▽
Chile	5 (1.0)	▽
South Africa (9)	5 (0.5)	▽
[2] Saudi Arabia	3 (0.6)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	51 (2.5)	▲
‡ Quebec, Canada	46 (3.2)	▲
[2] Dubai, UAE	40 (1.9)	▲
Ontario, Canada	26 (2.4)	
Abu Dhabi, UAE	15 (1.2)	▽
Western Cape, RSA (9)	13 (1.9)	▽
Gauteng, RSA (9)	7 (1.2)	▽

Content Domain: Algebra

Cognitive Domain: Applying

Description: Constructs a linear equation for the perimeter of a triangle and solves for the length of one side

The perimeter of triangle *ABC* is 21 cm.



What is the value of *x*?

x = 2.5 cm

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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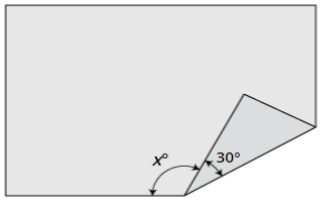
Exhibit 3.13.3: Advanced International Benchmark of Mathematics Achievement – Example Item 3

Country	Percent Correct	
Japan	77 (1.7)	▲
Korea, Rep. of	77 (1.8)	▲
[2] Singapore	76 (1.9)	▲
Chinese Taipei	64 (2.1)	▲
† Hong Kong SAR	56 (2.7)	▲
[2] Russian Federation	34 (2.4)	▲
Hungary	32 (2.1)	▲
[2] Kazakhstan	32 (2.6)	▲
Romania	29 (2.5)	
Lithuania	28 (2.1)	
† Norway (9)	28 (2.3)	
Australia	28 (1.6)	
England	26 (2.3)	
International Average	**26 (0.3)**	
Cyprus	26 (2.0)	
Portugal	26 (2.4)	
Bahrain	25 (1.3)	
Italy	25 (2.1)	
Finland	23 (1.7)	▽
Ireland	22 (2.0)	▽
[3] Israel	21 (1.9)	▽
† New Zealand	20 (1.9)	▽
Iran, Islamic Rep. of	20 (2.0)	▽
[2] Sweden	20 (2.0)	▽
Turkey	19 (1.7)	▽
United Arab Emirates	17 (0.8)	▽
Morocco	17 (1.4)	▽
Malaysia	16 (1.4)	▽
Lebanon	16 (1.6)	▽
France	16 (1.6)	▽
† United States	15 (1.4)	▽
Chile	14 (1.0)	▽
[1] Georgia	13 (2.2)	▽
[2] Egypt	13 (1.4)	▽
Qatar	13 (1.5)	▽
Oman	12 (1.0)	▽
[2] Saudi Arabia	11 (1.4)	▽
Jordan	11 (1.3)	▽
Kuwait	7 (1.5)	▽
South Africa (9)	6 (0.5)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	41 (2.0)	▲
‡ Quebec, Canada	39 (2.8)	▲
[2] Dubai, UAE	27 (2.0)	
Ontario, Canada	25 (2.9)	
Abu Dhabi, UAE	13 (1.0)	▽
Western Cape, RSA (9)	9 (1.2)	▽
Gauteng, RSA (9)	8 (1.1)	▽

Content Domain: Geometry

Cognitive Domain: Reasoning

Description: Uses properties of supplementary angles to solve for an angle



A rectangular piece of paper is folded at one corner, as shown above.
What is the value of x?

Answer: 120

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 3.13.4: Advanced International Benchmark of Mathematics Achievement – Example Item 4

Country	Percent Correct	
Korea, Rep. of	71 (1.9)	▲
Japan	70 (1.9)	▲
Chinese Taipei	69 (1.8)	▲
[2] Singapore	66 (2.1)	▲
† Hong Kong SAR	64 (2.4)	▲
† Norway (9)	52 (2.6)	▲
[3] Israel	47 (2.3)	▲
Finland	47 (2.0)	▲
[2] Sweden	47 (2.4)	▲
Lithuania	46 (2.7)	▲
[2] Russian Federation	44 (3.1)	▲
Australia	43 (1.9)	▲
Ireland	42 (2.4)	▲
† United States	41 (1.6)	▲
Hungary	38 (2.7)	
France	38 (2.1)	
Portugal	37 (2.4)	
Turkey	37 (2.1)	
Italy	37 (2.1)	
International Average	**36 (0.3)**	
Cyprus	36 (2.1)	
† New Zealand	35 (1.8)	
England	35 (2.6)	
[2] Kazakhstan	32 (2.1)	▽
United Arab Emirates	30 (1.0)	▽
Bahrain	28 (2.0)	▽
Chile	27 (2.6)	▽
Malaysia	26 (1.4)	▽
Qatar	25 (2.1)	▽
Iran, Islamic Rep. of	24 (2.0)	▽
[1] Georgia	24 (2.3)	▽
Romania	23 (2.1)	▽
Morocco	21 (1.3)	▽
[2] Egypt	20 (1.6)	▽
Oman	20 (1.3)	▽
Kuwait	19 (1.9)	▽
[2] Saudi Arabia	18 (1.2)	▽
Jordan	17 (1.8)	▽
Lebanon	11 (1.5)	▽
South Africa (9)	10 (0.7)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	53 (2.3)	▲
‡ Quebec, Canada	51 (2.6)	▲
[2] Dubai, UAE	40 (2.3)	
Ontario, Canada	39 (2.6)	
Abu Dhabi, UAE	25 (1.5)	▽
Western Cape, RSA (9)	18 (1.6)	▽
Gauteng, RSA (9)	13 (1.2)	▽

Content Domain: Data and Probability

Cognitive Domain: Applying

Description: Determines the change in a mean given changes in individual scores

A relay team for a 400 m race has 4 runners. They took 12 seconds, 13 seconds, 11 seconds, and 13 seconds, respectively, to complete their legs of the race.

In the next race, 2 of the runners each improved their times by 2 seconds, and the other 2 had the same times as before. By how many seconds did the team's mean running time improve?

A 0 sec.

B 1 sec.

C 2 sec.

D 4 sec.

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Average Achievement in Mathematics Content and Cognitive Domains

TIMSS 2019 Mathematics Content and Cognitive Domains

TIMSS 2019 assessed four content areas in mathematics at the eighth grade: number, algebra, geometry, and data and probability.

The 30 percent of the eighth grade assessment devoted to number consisted of integers (10%); fractions and decimals (10%); and ratio, proportion, and percent (10%). Building on the number content domain at the fourth grade, eighth grade students were asked to compute and solve problems involving more advanced whole number concepts and procedures as well as integers, fractions, and decimals.

Thirty percent of the assessment also was devoted to algebra, which included expressions, operations, and equations (20%) and relationships and functions (10%). Students were asked to solve real world problems using algebraic models and explain relationships involving algebraic concepts. For example, when given one quantity in a formula involving two quantities, they were asked to find the other quantity. They also were given problems involving linear equations and functions.

Twenty percent of the assessment was devoted to geometry. Extending the understanding of shapes and measures assessed at the fourth grade, eighth grade students were asked to analyze the properties of a variety of two- and three-dimensional figures and calculate perimeters, areas, and volumes. They were asked to solve problems and provide explanations based on geometric relationships, such as congruence, similarity, and the Pythagorean theorem.

The remaining 20 percent of the assessment was devoted to the data and probability content domain, which consisted of two topic areas: data (15%) and probability (5%). Students were asked to read and extract the important meaning from a variety of visual displays, demonstrate familiarity with the statistics underlying data distributions, and organize and represent data. There also were some questions related to basic probability concepts.

Eighth grade students also needed to draw on a range of cognitive skills across the content domains described above. These skills were categorized into three broad cognitive domains—knowing, applying, and reasoning. Thirty-five percent of the eighth grade assessment was devoted to the knowing cognitive domain, 40 percent to applying, and 25 percent to reasoning. The knowing domain covers the facts, concepts, and procedures students need to know, while the second domain, applying, focuses on students' ability to apply knowledge and conceptual understanding to solve problems or answer questions. The reasoning domain goes beyond the solution of routine problems to encompass unfamiliar situations, complex contexts, and multistep problems.

Average Achievement in Content Domains

Exhibit 3.14 shows countries' average mathematics achievement in each of the four content domains relative to their overall average achievement (presented from highest to lowest overall average achievement). Based on students' relative strengths and weaknesses at the eighth grade, the TIMSS 2019 countries appear to be placing relatively more instructional emphasis on the algebra content domain and less on the number and data and probability domains. Of the 36 participating countries for which content domain scores were estimated, 7 had a relative strength in number and 14 had a relative weakness; 19 had a relative strength in algebra and 14 had a relative weakness; 14 had a relative strength in geometry, and 17 had relative weakness; and 10 had a relative strength in data and probability, and 21 had a relative weakness. All countries had at least one relative strength or relative weakness compared with their overall achievement.

Exhibit 3.14: Average Achievement in Mathematics Content Domains

Country	Overall Mathematics Average Scale Score	Number (63 Items) Average Scale Score	Number (63 Items) Difference from Overall Mathematics Score	Algebra (61 Items) Average Scale Score	Algebra (61 Items) Difference from Overall Mathematics Score	Geometry (43 Items) Average Scale Score	Geometry (43 Items) Difference from Overall Mathematics Score	Data and Probability (39 Items) Average Scale Score	Data and Probability (39 Items) Difference from Overall Mathematics Score
[2] Singapore	616 (4.0)	611 (4.1)	-5 (1.0) ▽	619 (4.6)	3 (1.3) ▲	619 (3.9)	3 (0.8) ▲	620 (4.9)	4 (2.1) ▲
Chinese Taipei	612 (2.7)	613 (2.7)	1 (1.0)	618 (2.6)	6 (1.4) ▲	623 (2.7)	11 (1.3) ▲	593 (2.5)	-19 (1.6) ▽
Korea, Rep. of	607 (2.8)	605 (2.6)	-2 (1.5)	609 (3.5)	2 (1.1) ▲	617 (2.9)	10 (1.0) ▲	598 (2.6)	-9 (1.7) ▽
Japan	594 (2.7)	578 (3.5)	-16 (1.4) ▽	602 (3.2)	8 (1.3) ▲	610 (3.4)	16 (1.9) ▲	594 (2.5)	0 (0.7)
† Hong Kong SAR	578 (4.1)	570 (4.2)	-9 (1.5) ▽	584 (3.9)	5 (1.5) ▲	596 (4.6)	18 (1.6) ▲	563 (5.6)	-16 (3.5) ▽
[2] Russian Federation	543 (4.5)	541 (4.6)	-2 (1.0) ▽	560 (5.0)	16 (1.1) ▲	540 (5.2)	-3 (1.2) ▽	517 (4.7)	-26 (2.1) ▽
Ireland	524 (2.6)	541 (3.0)	17 (2.1) ▲	505 (2.8)	-18 (1.1) ▽	506 (2.8)	-18 (0.9) ▽	541 (3.4)	17 (2.0) ▲
Lithuania	520 (2.9)	514 (3.0)	-6 (1.4) ▽	518 (2.9)	-2 (1.1) ▽	529 (3.0)	9 (1.2) ▲	522 (3.1)	2 (1.5)
[3] Israel	519 (4.3)	519 (4.2)	0 (1.3)	528 (5.0)	9 (1.2) ▲	506 (4.8)	-13 (1.8) ▽	511 (4.9)	-8 (2.3) ▽
Australia	517 (3.8)	522 (3.9)	4 (0.7) ▲	501 (4.1)	-16 (1.1) ▽	513 (4.0)	-4 (1.0) ▽	533 (3.9)	15 (1.4) ▲
Hungary	517 (2.9)	515 (3.1)	-1 (1.4)	509 (3.0)	-8 (1.0) ▽	521 (3.3)	5 (1.9) ▲	521 (3.2)	4 (2.2)
† United States	515 (4.8)	520 (4.5)	4 (0.7) ▲	520 (5.4)	4 (0.9) ▲	499 (4.8)	-16 (1.1) ▽	509 (5.4)	-6 (1.8) ▽
England	515 (5.3)	519 (5.4)	4 (2.1) ▲	504 (5.8)	-11 (1.6) ▽	509 (5.3)	-6 (1.5) ▽	523 (6.2)	9 (1.9) ▲
Finland	509 (2.6)	515 (2.6)	6 (0.9) ▲	489 (2.9)	-20 (1.2) ▽	511 (3.2)	2 (2.0)	514 (3.6)	5 (1.7) ▲
† Norway (9)	503 (2.4)	507 (2.3)	5 (1.0) ▲	477 (3.0)	-26 (1.7) ▽	502 (2.3)	-1 (1.0)	518 (3.0)	15 (1.3) ▲
[2] Sweden	503 (2.5)	502 (2.4)	-1 (1.3)	496 (2.9)	-7 (1.9) ▽	495 (3.1)	-7 (1.4) ▽	513 (3.7)	11 (2.2) ▲
Cyprus	501 (1.6)	499 (2.2)	-2 (1.8)	515 (2.6)	14 (1.7) ▲	490 (2.3)	-11 (1.5) ▽	493 (2.7)	-8 (2.0) ▽
Portugal	500 (3.2)	492 (3.3)	-8 (1.7) ▽	499 (3.3)	-2 (1.2)	509 (3.3)	9 (1.2) ▲	498 (3.2)	-3 (1.6)
Italy	497 (2.7)	495 (2.4)	-3 (1.4)	491 (2.7)	-7 (2.3) ▽	510 (3.7)	12 (2.4) ▲	494 (3.3)	-4 (2.0)
Turkey	496 (4.3)	493 (4.3)	-2 (1.7)	493 (4.6)	-3 (1.2) ▽	490 (4.2)	-6 (1.4) ▽	502 (4.3)	7 (1.1) ▲
[2] Kazakhstan	488 (3.3)	482 (3.4)	-5 (1.4) ▽	504 (3.7)	16 (1.2) ▲	486 (3.8)	-2 (1.6)	463 (3.3)	-25 (1.5) ▽
France	483 (2.5)	477 (2.6)	-6 (1.2) ▽	468 (2.8)	-15 (1.5) ▽	493 (2.7)	11 (1.6) ▲	496 (2.6)	13 (1.4) ▲
† New Zealand	482 (3.4)	483 (3.6)	2 (1.7)	464 (3.5)	-17 (1.8) ▽	477 (3.4)	-5 (1.6) ▽	496 (3.7)	14 (1.6) ▲
Bahrain	481 (1.7)	473 (2.2)	-8 (1.7) ▽	485 (2.1)	4 (1.5) ▲	493 (2.3)	12 (1.9) ▲	465 (2.0)	-16 (1.3) ▽
Romania	479 (4.3)	478 (4.5)	-1 (1.3)	490 (4.6)	11 (1.7) ▲	472 (4.7)	-7 (1.6) ▽	458 (4.5)	-21 (1.8) ▽
United Arab Emirates	473 (1.9)	474 (1.9)	1 (0.7)	486 (2.1)	12 (0.8) ▲	462 (2.1)	-12 (1.0) ▽	451 (2.1)	-22 (1.0) ▽
[1] Georgia	461 (4.3)	466 (4.7)	5 (1.7) ▲	473 (4.3)	12 (2.2) ▲	449 (4.4)	-12 (2.8) ▽	429 (5.1)	-32 (3.9) ▽
Malaysia	461 (3.2)	458 (3.1)	-3 (1.1) ▽	456 (3.3)	-4 (1.6) ▽	466 (3.7)	6 (2.6) ▲	457 (3.5)	-4 (1.2) ▽
Iran, Islamic Rep. of	446 (3.7)	442 (4.2)	-4 (1.6) ▽	450 (3.8)	4 (1.2) ▲	442 (4.4)	-5 (1.7) ▽	435 (4.0)	-11 (1.5) ▽
Ψ Qatar	443 (4.0)	441 (4.0)	-2 (1.0)	454 (4.0)	10 (1.5) ▲	435 (4.0)	-8 (1.2) ▽	423 (4.7)	-20 (1.9) ▽
Ψ Chile	441 (2.8)	442 (3.2)	1 (1.4)	439 (3.1)	-2 (1.8)	434 (4.3)	-6 (3.2)	434 (3.2)	-6 (1.3) ▽
Lebanon	429 (2.9)	432 (2.7)	2 (1.3)	452 (3.0)	23 (1.3) ▲	422 (3.2)	-7 (2.1) ▽	383 (3.5)	-46 (2.4) ▽
Ψ Jordan	420 (4.3)	408 (4.5)	-12 (1.3) ▽	442 (4.8)	22 (1.2) ▲	413 (4.6)	-7 (3.0) ▽	396 (4.2)	-24 (1.8) ▽
[2] Ψ Egypt	413 (5.2)	414 (5.4)	1 (2.2)	413 (6.0)	0 (2.0)	417 (5.3)	4 (1.3) ▲	380 (5.4)	-33 (1.4) ▽
Ψ Oman	411 (2.8)	392 (3.0)	-19 (1.5) ▽	427 (3.0)	16 (1.4) ▲	418 (3.2)	7 (1.1) ▲	393 (2.9)	-17 (1.4) ▽
Ψ Kuwait	403 (5.0)	- -	- -	- -	- -	- -	- -	- -	- -
[2] Ψ Saudi Arabia	394 (2.5)	- -	- -	- -	- -	- -	- -	- -	- -
Ж South Africa (9)	389 (2.3)	- -	- -	- -	- -	- -	- -	- -	- -
Ψ Morocco	388 (2.3)	377 (2.7)	-11 (1.3) ▽	370 (3.1)	-18 (1.6) ▽	413 (2.2)	25 (1.4) ▲	372 (2.4)	-16 (1.3) ▽
Benchmarking Participants									
Moscow City, Russian Fed.	575 (4.2)	574 (4.5)	-1 (1.5)	592 (4.2)	17 (1.1) ▲	565 (4.4)	-10 (1.1) ▽	564 (4.2)	-11 (1.6) ▽
‡ Quebec, Canada	543 (3.7)	544 (3.9)	1 (1.3)	531 (4.0)	-12 (1.7) ▽	549 (4.4)	6 (2.3) ▲	554 (4.5)	11 (2.8) ▲
[2] Dubai, UAE	537 (2.0)	537 (2.1)	0 (0.8)	547 (2.4)	10 (1.5) ▲	527 (2.6)	-10 (1.7) ▽	525 (2.7)	-11 (1.6) ▽
Ontario, Canada	530 (4.3)	530 (4.3)	1 (1.8)	515 (4.4)	-15 (1.2) ▽	536 (4.8)	6 (2.2) ▲	542 (5.2)	12 (2.5) ▲
Ψ Western Cape, RSA (9)	441 (4.4)	445 (5.2)	3 (3.2)	451 (4.9)	10 (2.3) ▲	427 (5.3)	-14 (3.4) ▽	426 (5.1)	-16 (2.5) ▽
Ψ Abu Dhabi, UAE	436 (2.9)	439 (3.0)	3 (1.8)	448 (3.2)	12 (1.0) ▲	420 (3.4)	-16 (1.5) ▽	411 (3.1)	-25 (1.2) ▽
Ψ Gauteng, RSA (9)	421 (3.0)	421 (3.2)	0 (1.4)	431 (3.7)	11 (1.7) ▲	407 (3.6)	-14 (2.2) ▽	406 (3.5)	-15 (1.9) ▽

▲ Subscale score significantly higher than overall mathematics score
▽ Subscale score significantly lower than overall mathematics score

Numbers of items are based on the TIMSS 2019 eighth grade mathematics items included in scaling.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.
See Appendix B.2 for target population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available because average achievement could not be accurately estimated.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Trends in Average Achievement in Content Domains

Exhibit 3.15 presents trends in average achievement for the four mathematics content domains. The results are very positive, showing more increases than decreases in all four content areas, especially geometry. Thirty TIMSS 2019 countries also participated in TIMSS 2015 and had comparable data for the content domains. In the number content area, 8 showed improvement and 6 showed declines; in algebra, 8 showed improvement and 3 showed declines; in geometry, 12 showed improvement and 2 showed declines; and in data and probability, 8 showed improvement and 5 showed declines.

TIMSS began providing scaled results in the content domains in 2007, with 23 countries having trends between 2007 and 2019. Compared with 2007, there was considerable improvement in TIMSS 2019 across the content domains in these countries—13 had higher average achievement in number, 13 in algebra, 18 in geometry, and 10 in data and probability. Only several of the countries had lower average achievement—2 in number, 1 in algebra, 2 in geometry, and 3 in data and probability.

Exhibit 3.15: Differences in Achievement for Mathematics Content Domains Across Assessment Years◊

Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▽) than the performance in the column year.

Country	Number				Algebra				Geometry				Data and Probability			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007		2015	2011	2007
Australia																
2019	522 (3.9)	10 ▲	9	18 ▲	501 (4.1)	11 ▲	12	27 ▲	513 (4.0)	13 ▲	14 ▲	25 ▲	533 (3.9)	14 ▲	-2	7
2015	511 (3.2)		-1	8	491 (3.4)		2	16 ▲	500 (3.1)		1	12 ▲	519 (3.1)		-16 ▽	-7
2011	513 (5.5)			9	489 (5.3)			15 ▲	499 (5.3)			11	534 (6.0)			8
2007	504 (4.0)				474 (4.2)				488 (4.0)				526 (4.4)			
Bahrain																
2019	473 (2.2)	37 ▲	76 ▲	91 ▲	485 (2.1)	2	61 ▲	88 ▲	493 (2.3)	44 ▲	95 ▲	90 ▲	465 (2.0)	12 ▲	58 ▲	66 ▲
2015	436 (2.0)		39 ▲	54 ▲	483 (2.1)		58 ▲	86 ▲	449 (2.5)		51 ▲	46 ▲	453 (2.2)		46 ▲	53 ▲
Ψ 2011	397 (1.7)			15 ▲	424 (1.7)			28 ▲	398 (2.5)			-5	407 (2.5)			8 ▲
2007	381 (2.5)				397 (1.7)				403 (2.9)				400 (2.6)			
Chile																
Ψ 2019	442 (3.2)	15 ▲	29 ▲		439 (3.1)	25 ▲	36 ▲		434 (4.3)	7	15 ▲		434 (3.2)	5	9 ▲	
Ψ 2015	427 (3.3)		15 ▲		413 (3.4)		11 ▲		428 (3.4)		9		429 (3.8)		4	
2011	413 (2.9)				403 (3.6)				419 (3.0)				426 (3.0)			
Chinese Taipei																
2019	613 (2.7)	23 ▲	16 ▲	27 ▲	618 (2.6)	5	-10 ▽	-11	623 (2.7)	16 ▲	-2	18 ▲	593 (2.5)	5	9 ▲	15 ▲
2015	590 (2.4)		-8	4	613 (2.8)		-15 ▽	-16 ▽	607 (2.6)		-18 ▽	2	588 (2.5)		4	9
2011	598 (3.2)			12 ▲	628 (3.8)			-1	625 (3.7)			20 ▲	584 (2.9)			5
2007	586 (4.3)				629 (5.9)				605 (5.7)				579 (4.6)			
Cyprus																
2019	499 (2.2)			36 ▲	515 (2.6)			44 ▲	490 (2.3)			35 ▲	493 (2.7)			38 ▲
2007	464 (2.2)				471 (2.3)				455 (3.1)				456 (2.1)			
Egypt																
2 Ψ 2019	414 (5.4)	20 ▲		28 ▲	413 (6.0)	-7		8	417 (5.3)	24 ▲		20 ▲	380 (5.4)	42 ▲		22 ▲
Ψ 2015	393 (3.7)			8	420 (4.3)			15 ▲	393 (4.1)			-4	338 (4.4)			-20 ▽
2007	386 (3.6)				405 (3.5)				397 (3.7)				358 (3.9)			
England																
2019	519 (5.4)	-8	7	8	504 (5.8)	11	14	7	509 (5.3)	-6	11	-5	523 (6.2)	-18 ▽	-20 ▽	-29 ▽
2015	528 (4.5)		15 ▲	17 ▲	492 (4.7)		3	-4	514 (4.1)		16 ▲	1	541 (4.7)		-2	-11
‡ 2011	512 (5.9)			1	489 (5.8)			-7	498 (5.9)			-15 ▽	543 (7.0)			-9
† 2007	511 (5.4)				496 (5.1)				513 (5.2)				552 (6.2)			
Finland																
2019	515 (2.6)		-12 ▽		489 (2.9)		-3		511 (3.2)		9 ▲		514 (3.6)		-28 ▽	
2011	527 (2.4)				492 (2.9)				502 (2.9)				542 (3.1)			
Georgia																
1 2019	466 (4.7)	9	31 ▲	50 ▲	473 (4.3)	5	23 ▲	57 ▲	449 (4.4)	8	43 ▲	47 ▲	429 (5.1)	8	38 ▲	79 ▲
1 2 2015	457 (3.4)		22 ▲	40 ▲	469 (3.8)		18 ▲	52 ▲	441 (3.9)		34 ▲	39 ▲	421 (3.7)		30 ▲	71 ▲
1 2011	435 (3.5)			19 ▲	450 (3.9)			34 ▲	406 (4.3)			5	392 (4.5)			42 ▲
1 2007	416 (5.9)				416 (7.6)				402 (7.1)				350 (5.1)			
Hong Kong SAR																
† 2019	570 (4.2)	-25 ▽	-18 ▽	-5	584 (3.9)	-9	1	9	596 (4.6)	-6	-1	16 ▲	563 (5.6)	-34 ▽	-19 ▽	2
2015	594 (4.9)		6	19 ▲	593 (4.7)		10	18 ▲	602 (5.1)		4	22 ▲	597 (5.9)		16 ▲	37 ▲
2011	588 (3.7)			13	583 (4.0)			8	597 (4.4)			18 ▲	581 (4.1)			21 ▲
† 2007	575 (6.0)				575 (6.1)				580 (6.1)				560 (5.9)			
Hungary																
2019	515 (3.1)	-2	6	-5	509 (3.0)	6	12 ▲	1	521 (3.3)	3	20 ▲	11 ▲	521 (3.2)	2	4	-6
2015	518 (4.0)		8	-3	503 (4.1)		6	-5	518 (4.2)		17 ▲	8	519 (3.9)		2	-8
2011	510 (3.8)			-11	496 (4.0)			-11 ▽	501 (4.1)			-9	517 (4.2)			-10
2007	520 (3.8)				508 (3.8)				510 (4.0)				527 (3.9)			
Iran, Islamic Rep. of																
2019	442 (4.2)	10	40 ▲	54 ▲	450 (3.8)	13 ▲	28 ▲	46 ▲	442 (4.4)	-6	4	27 ▲	435 (4.0)	18 ▲	42 ▲	39 ▲
Ψ 2015	432 (4.7)		30 ▲	44 ▲	437 (5.1)		15 ▲	33 ▲	448 (4.7)		10	33 ▲	417 (5.0)		24 ▲	21 ▲
Ψ 2011	402 (5.0)			14 ▲	422 (4.4)			18 ▲	437 (4.7)			23 ▲	393 (4.9)			-3
2007	388 (4.4)				405 (4.2)				414 (4.7)				396 (3.8)			
Ireland																
2019	541 (3.0)	-4			505 (2.8)	4			506 (2.8)	3			541 (3.4)	7		
2015	544 (3.3)				501 (2.8)				503 (3.1)				534 (3.8)			
Israel																
3 2019	519 (4.2)	1	1		528 (5.0)	11	7		506 (4.8)	19 ▲	10		511 (4.9)	8	-4	
3 2015	518 (4.0)		0		517 (4.7)		-4		487 (4.6)		-9		503 (4.9)		-12	
3 2011	518 (4.1)				521 (4.7)				496 (4.4)				515 (4.7)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

◊ Trend reporting in content domains using current methodology began with TIMSS 2007.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
See Appendix B.7 for target population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 3.15: Differences in Achievement for Mathematics Content Domains Across Assessment Years◊

(Continued)

Country	Number				Algebra				Geometry				Data and Probability			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007		2015	2011	2007
Italy																
2019	495 (2.4)	1	-1	14 ▲	491 (2.7)	10 ▲	0	31 ▲	510 (3.7)	6	-2	19 ▲	494 (3.3)	-2	-5	9
[2] 2015	494 (2.7)		-2	14 ▲	481 (3.0)		-10 ▽	21 ▲	504 (3.5)		-8	13 ▲	496 (2.7)		-3	12 ▲
2011	496 (2.8)			16 ▲	491 (2.6)			30 ▲	512 (3.5)			21 ▲	499 (3.1)			15 ▲
2007	480 (3.1)				460 (3.7)				491 (3.6)				485 (3.6)			
Japan																
2019	578 (3.5)	6	21 ▲	20 ▲	602 (3.2)	6	32 ▲	35 ▲	610 (3.4)	12 ▲	24 ▲	26 ▲	594 (2.5)	5	15 ▲	3
2015	572 (2.4)		15 ▲	14 ▲	596 (2.8)		26 ▲	29 ▲	598 (2.6)		12 ▲	14 ▲	589 (2.3)		10 ▲	-2
2011	557 (3.0)			-2	570 (3.1)			3	586 (3.6)			2	579 (3.1)			-11 ▽
2007	558 (2.4)				567 (2.9)				584 (2.5)				591 (2.7)			
Jordan																
Ψ 2019	408 (4.5)	28 ▲	18 ▲	-4	442 (4.8)	24 ▲	10	-3	413 (4.6)	32 ▲	6	-16 ▽	396 (4.2)	50 ▲	17 ▲	-10
Ж 2015	380 (3.2)		-10 ▽	-32 ▽	418 (3.5)		-14 ▽	-28 ▽	381 (3.4)		-26 ▽	-48 ▽	346 (4.0)		-33 ▽	-60 ▽
Ψ 2011	390 (3.8)			-22 ▽	432 (3.9)			-14 ▽	407 (3.7)			-22 ▽	379 (3.9)			-27 ▽
2007	412 (4.8)				445 (4.3)				429 (4.2)				406 (4.3)			
Kazakhstan																
[2] 2019	482 (3.4)		3		504 (3.7)		-2		486 (3.8)		-5		463 (3.3)		18 ▲	
2011	479 (4.1)				506 (4.5)				491 (4.5)				444 (4.4)			
Korea, Rep. of																
2019	605 (2.6)	4	-13 ▽	13 ▲	609 (3.5)	-3	-7	1	617 (2.9)	5	5	17 ▲	598 (2.6)	-3	-18 ▽	-4
2015	601 (2.4)		-17 ▽	9 ▲	612 (2.9)		-4	4	612 (3.4)		0	12 ▲	600 (2.4)		-15 ▽	-1
2011	618 (2.7)			25 ▲	617 (3.3)			9	612 (2.8)			12 ▲	616 (2.6)			14 ▲
2007	592 (2.5)				608 (3.3)				600 (2.7)				602 (2.6)			
Lebanon																
2019	432 (2.7)	-8	-20 ▽	-21 ▽	452 (3.0)	-14 ▽	-19 ▽	-16 ▽	422 (3.2)	-21 ▽	-25 ▽	-33 ▽	383 (3.5)	-12 ▽	-10	-5
2015	440 (4.1)		-11 ▽	-13 ▽	466 (4.0)		-5	-2	444 (4.0)		-4	-12 ▽	395 (4.6)		2	7
2011	451 (3.8)			-1	471 (3.8)			3	447 (3.8)			-8	393 (5.2)			5
2007	453 (3.9)				468 (3.6)				455 (4.2)				388 (5.3)			
Lithuania																
2019	514 (3.0)	3	13 ▲	7	518 (2.9)	21 ▲	26 ▲	31 ▲	529 (3.0)	15 ▲	30 ▲	20 ▲	522 (3.1)	1	7	-3
[2] 2015	511 (2.8)		10 ▲	4	497 (3.3)		5	10 ▲	515 (3.1)		15 ▲	6	521 (2.7)		6	-4
[1] 2011	501 (2.5)			-6	492 (2.8)			5	500 (3.2)			-9 ▽	515 (2.8)			-10 ▽
[1] 2007	507 (2.8)				487 (2.9)				509 (3.1)				526 (2.9)			
Malaysia																
2019	458 (3.1)	-14 ▽	7	-36 ▽	456 (3.3)	-11 ▽	26 ▲	1	466 (3.7)	11 ▲	34 ▲	-8	457 (3.5)	5	27 ▲	-2
2015	472 (3.6)		21 ▲	-22 ▽	467 (3.4)		37 ▲	11	455 (3.9)		23 ▲	-19 ▽	451 (3.8)		22 ▲	-7
2011	451 (5.8)			-43 ▽	430 (5.2)			-26 ▽	432 (6.4)			-42 ▽	429 (5.4)			-30 ▽
2007	494 (5.5)				455 (4.9)				474 (6.3)				459 (5.0)			
Morocco																
Ψ 2019	377 (2.7)	-5	-2		370 (3.1)	-2	14 ▲		413 (2.2)	3	23 ▲		372 (2.4)	19 ▲	40 ▲	
Ж 2015	382 (2.1)		3		372 (2.3)		16 ▲		410 (3.0)		20 ▲		353 (2.9)		21 ▲	
Ж 2011	379 (2.5)				357 (2.6)				390 (2.5)				332 (1.9)			
New Zealand																
† 2019	483 (3.6)	-16 ▽	-9		464 (3.5)	-11 ▽	-8		477 (3.4)	-11 ▽	-6		496 (3.7)	-13 ▽	-18 ▽	
† 2015	500 (3.5)		7		475 (3.5)		3		488 (3.2)		5		509 (3.7)		-5	
2011	492 (6.0)				472 (5.6)				483 (5.6)				513 (6.9)			
Norway (9)																
† 2019	507 (2.3)	-21 ▽			477 (3.0)	6			502 (2.3)	4			518 (3.0)	-24 ▽		
2015	529 (2.6)				471 (2.7)				498 (2.5)				542 (3.2)			
Oman																
Ψ 2019	392 (3.0)	3	42 ▲	38 ▲	427 (3.0)	0	43 ▲	43 ▲	418 (3.2)	3	41 ▲	41 ▲	393 (2.9)	17 ▲	51 ▲	29 ▲
Ψ 2015	389 (2.6)		38 ▲	35 ▲	426 (2.7)		43 ▲	43 ▲	415 (2.8)		38 ▲	38 ▲	376 (3.0)		34 ▲	11 ▲
Ψ 2011	351 (2.9)			-4	383 (2.7)			0	377 (2.6)			0	342 (3.0)			-23 ▽
2007	354 (3.1)				384 (3.5)				377 (3.5)				365 (4.0)			
Qatar																
Ψ 2019	441 (4.0)	6	33 ▲		454 (4.0)	1	29 ▲		435 (4.0)	2	48 ▲		423 (4.7)	6	34 ▲	
Ψ 2015	435 (2.9)		27 ▲		452 (2.6)		27 ▲		433 (3.0)		45 ▲		417 (3.9)		27 ▲	
Ψ 2011	408 (3.6)				425 (2.8)				387 (3.4)				390 (3.6)			
Romania																
2019	478 (4.5)		30 ▲	23 ▲	490 (4.6)		13 ▲	10	472 (4.7)		19 ▲	9	458 (4.5)		29 ▲	42 ▲
2011	448 (4.2)			-7	477 (4.3)			-3	453 (4.5)			-10	429 (4.0)			13 ▲
2007	455 (3.9)				480 (5.0)				463 (4.4)				415 (4.6)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 3.15: Differences in Achievement for Mathematics Content Domains Across Assessment Years◊

(Continued)

Country	Number				Algebra				Geometry				Data and Probability			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007		2015	2011	2007
Russian Federation																
2 2019	541 (4.6)	8	7	32 ▲	560 (5.0)	2	4	35 ▲	540 (5.2)	5	7	30 ▲	517 (4.7)	10	6	34 ▲
2015	533 (4.5)		-1	23 ▲	558 (5.2)		2	33 ▲	536 (5.6)		3	25 ▲	507 (5.0)		-4	24 ▲
2 2011	534 (3.4)			25 ▲	556 (3.8)			31 ▲	533 (4.0)			23 ▲	511 (4.0)			28 ▲
2007	510 (4.1)				525 (4.6)				510 (4.8)				483 (4.5)			
Singapore																
2 2019	611 (4.1)	-18 ▽	0	6	619 (4.6)	-4	4	28 ▲	619 (3.9)	2	10	29 ▲	620 (4.9)	3	13 ▲	31 ▲
2 2015	629 (3.2)		18 ▲	24 ▲	623 (3.4)		8	31 ▲	617 (3.5)		8	27 ▲	617 (3.4)		10	28 ▲
2 2011	611 (3.7)			6	614 (4.1)			23 ▲	609 (4.0)			19 ▲	607 (4.4)			18 ▲
2007	605 (3.8)				591 (4.0)				590 (4.1)				589 (5.2)			
Sweden																
2 2019	502 (2.4)	-11 ▽	-2	-3	496 (2.9)	14 ▲	37 ▲	37 ▲	495 (3.1)	17 ▲	39 ▲	23 ▲	513 (3.7)	1	9	-13 ▽
2015	513 (2.9)		9 ▲	7 ▲	482 (3.2)		23 ▲	23 ▲	478 (3.4)		22 ▲	5	512 (3.7)		8	-14 ▽
2011	504 (1.8)			-2	459 (2.2)			0	456 (2.3)			-17 ▽	504 (2.8)			-22 ▽
2007	505 (1.9)				459 (2.7)				472 (2.8)				526 (3.9)			
Turkey																
2019	493 (4.3)	46 ▲	58 ▲		493 (4.6)	34 ▲	38 ▲		490 (4.2)	27 ▲	35 ▲		502 (4.3)	36 ▲	35 ▲	
2015	447 (4.6)		13 ▲		459 (4.6)		4		463 (4.9)		8		467 (5.2)		-1	
2011	435 (4.0)				455 (4.3)				454 (4.4)				467 (4.0)			
United Arab Emirates																
2019	474 (1.9)	11 ▲	15 ▲		486 (2.1)	1	18 ▲		462 (2.1)	14 ▲	31 ▲		451 (2.1)	2	11 ▲	
2015	464 (1.9)		5		485 (2.0)		17 ▲		447 (2.4)		17 ▲		449 (2.5)		9 ▲	
2011	459 (2.3)				468 (2.2)				431 (2.4)				440 (2.4)			
United States																
† 2019	520 (4.5)	0	6	6	520 (5.4)	-5	8	13 ▲	499 (4.8)	-1	14 ▲	19 ▲	509 (5.4)	-13	-18 ▽	-23 ▽
† 2015	520 (3.1)		6	6	525 (3.1)		13 ▲	18 ▲	500 (3.2)		15 ▲	20 ▲	522 (3.5)		-5	-11 ▽
2 2011	514 (3.0)			0	512 (2.6)			5	485 (2.7)			5	527 (3.3)			-5
2 † 2007	514 (2.9)				507 (3.1)				480 (2.9)				533 (3.4)			
Benchmarking Participants																
Ontario, Canada																
2019	530 (4.3)	1	12 ▲	2	515 (4.4)	7	18 ▲	19 ▲	536 (4.8)	12 ▲	24 ▲	25 ▲	542 (5.2)	10	11	-6
2015	530 (3.0)		11 ▲	2	507 (3.0)		11 ▲	11 ▲	524 (3.5)		12 ▲	13 ▲	531 (3.9)		0	-16 ▽
2 2011	519 (2.8)			-9	497 (2.4)			1	512 (2.8)			1	531 (4.2)			-17 ▽
2 2007	528 (4.2)				496 (3.9)				510 (4.5)				547 (5.1)			
Quebec, Canada																
‡ 2019	544 (3.9)	-13 ▽	1	6	531 (4.0)	0	15 ▲	19 ▲	549 (4.4)	9	21 ▲	22 ▲	554 (4.5)	8	6	14 ▲
≡ 2015	557 (4.3)		14 ▲	19 ▲	530 (4.4)		15 ▲	18 ▲	540 (4.3)		12 ▲	13 ▲	546 (5.0)		-2	6
2011	543 (2.4)			5	516 (2.9)			4	529 (2.6)			1	549 (3.0)			8
3 2007	537 (3.7)				512 (3.6)				527 (3.5)				540 (3.8)			
Abu Dhabi, UAE																
Ψ 2019	439 (3.0)	-3	-13 ▽		448 (3.2)	-14 ▽	-11 ▽		420 (3.4)	-6	-5		411 (3.1)	-15 ▽	-24 ▽	
2015	443 (4.4)		-10		462 (4.5)		3		425 (5.4)		1		426 (5.5)		-8	
2011	452 (4.0)				459 (3.9)				424 (4.5)				434 (4.3)			
Dubai, UAE																
2 2019	537 (2.1)	28 ▲	57 ▲	78 ▲	547 (2.4)	19 ▲	58 ▲	71 ▲	527 (2.6)	31 ▲	74 ▲	82 ▲	525 (2.7)	22 ▲	58 ▲	81 ▲
2015	509 (2.5)		29 ▲	50 ▲	528 (2.7)		40 ▲	53 ▲	496 (2.6)		44 ▲	51 ▲	504 (3.0)		36 ▲	59 ▲
2011	479 (2.4)			21 ▲	489 (2.4)			13 ▲	453 (3.1)			7	468 (2.9)			23 ▲
‡ 2007	458 (3.3)				476 (2.6)				445 (3.6)				444 (3.5)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Average Achievement in Content Domains by Gender

Exhibit 3.16 shows the differences in average achievement between girls and boys in the four mathematics content domains. Boys had a substantial advantage in number (as they did at fourth grade) and girls did in algebra. In the number content domain, girls had higher average achievement than boys in only 4 countries, and boys had higher average achievement in 14 countries. In algebra, girls had higher average achievement than boys in 16 countries, and in no country did boys have higher average achievement. In geometry, girls had higher average achievement than boys in 7 countries, and boys had higher average achievement in 3 countries. In data and probability, girls had higher average achievement than boys in 7 countries, and boys had higher average achievement in 9 countries.

Exhibit 3.16: Average Achievement in Mathematics Content Domains by Gender

Country	Number (63 Items)		Algebra (61 Items)		Geometry (43 Items)		Data and Probability (39 Items)	
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
Australia	515 (3.7)	528 (5.7) ▲	502 (4.1)	501 (5.9)	510 (3.9)	517 (5.8)	532 (3.8)	534 (5.7)
Bahrain	482 (3.1) ▲	464 (2.9)	497 (3.0) ▲	473 (2.8)	503 (3.2) ▲	484 (2.7)	482 (3.1) ▲	449 (3.0)
Ψ Chile	435 (4.2)	448 (3.9) ▲	436 (3.8)	441 (4.3)	431 (5.5)	438 (5.0)	426 (4.4)	442 (4.8) ▲
Chinese Taipei	612 (3.3)	614 (3.5)	623 (3.0) ▲	613 (3.4)	623 (3.2)	623 (3.7)	593 (3.7)	594 (3.4)
Cyprus	495 (3.1)	504 (3.1)	523 (3.7) ▲	507 (2.7)	494 (4.3)	486 (2.8)	494 (3.9)	493 (3.3)
2 Ψ Egypt	419 (5.7)	407 (8.0)	422 (6.3) ▲	401 (8.7)	422 (5.4)	411 (8.2)	390 (5.8) ▲	368 (8.2)
England	513 (5.6)	526 (7.4)	507 (6.5)	500 (7.8)	510 (5.8)	507 (7.2)	523 (6.6)	523 (8.3)
Finland	512 (2.8)	517 (3.1)	495 (3.2) ▲	483 (3.6)	517 (3.7) ▲	504 (3.8)	517 (3.6)	511 (4.4)
France	468 (2.7)	485 (3.3) ▲	468 (3.3)	468 (3.0)	490 (3.4)	496 (3.7)	490 (2.9)	500 (3.5) ▲
1 Georgia	459 (4.5)	473 (6.1) ▲	472 (5.2)	474 (5.5)	447 (4.6)	450 (5.7)	424 (5.7)	435 (6.2)
† Hong Kong SAR	570 (5.0)	569 (5.5)	588 (4.8)	580 (5.3)	602 (5.6)	591 (6.0)	571 (6.4) ▲	555 (7.0)
Hungary	506 (3.8)	525 (3.9) ▲	506 (3.4)	512 (3.8)	514 (3.8)	529 (3.8) ▲	511 (3.4)	531 (4.0) ▲
Iran, Islamic Rep. of	444 (5.5)	440 (6.2)	465 (5.1) ▲	437 (5.8)	450 (5.5) ▲	434 (6.3)	438 (5.1)	433 (6.6)
Ireland	538 (3.4)	544 (4.0)	510 (3.1) ▲	501 (3.7)	504 (3.5)	508 (3.6)	541 (3.6)	540 (4.6)
3 Israel	511 (4.3)	527 (5.2) ▲	526 (5.0)	530 (6.5)	500 (5.1)	513 (5.9) ▲	503 (4.9)	520 (5.9) ▲
Italy	485 (2.7)	505 (3.0) ▲	488 (2.9)	494 (3.6)	506 (4.0)	513 (4.7)	487 (4.0)	501 (4.5) ▲
Japan	573 (3.7)	583 (4.0) ▲	605 (2.9)	600 (4.1)	609 (3.4)	611 (4.0)	592 (2.7)	597 (3.0)
Ψ Jordan	416 (4.0) ▲	401 (6.8)	460 (4.2) ▲	425 (7.1)	425 (5.3) ▲	402 (6.6)	408 (4.0) ▲	385 (6.3)
2 Kazakhstan	483 (4.2)	481 (3.8)	508 (4.2) ▲	499 (4.2)	489 (4.9)	483 (4.1)	462 (4.1)	463 (4.0)
Korea, Rep. of	602 (3.3)	608 (3.2)	611 (4.2)	608 (4.0)	613 (3.9)	621 (3.3)	594 (3.5)	601 (3.0)
Ψ Kuwait	- -	- -	- -	- -	- -	- -	- -	- -
Lebanon	427 (3.2)	436 (3.2) ▲	453 (3.7)	451 (3.6)	420 (3.7)	424 (3.7)	378 (4.5)	388 (4.1) ▲
Lithuania	512 (3.0)	517 (3.7)	520 (3.2)	516 (3.5)	530 (3.8)	529 (4.0)	518 (3.3)	526 (3.9) ▲
Malaysia	460 (3.0)	455 (4.0)	461 (3.0) ▲	451 (4.5)	470 (3.6)	462 (4.8)	464 (3.7) ▲	449 (4.6)
Ψ Morocco	374 (2.8)	381 (3.1) ▲	373 (3.3)	367 (4.5)	407 (2.6)	419 (2.8) ▲	370 (3.7)	375 (2.9)
† New Zealand	477 (3.8)	489 (5.1) ▲	464 (4.1)	464 (5.2)	474 (4.1)	479 (5.1)	492 (3.9)	499 (5.5)
† Norway (9)	503 (2.9)	512 (3.1) ▲	481 (3.5)	474 (3.6)	505 (2.7)	499 (3.2)	518 (3.4)	518 (3.6)
Ψ Oman	411 (3.3) ▲	375 (4.7)	452 (3.3) ▲	403 (4.8)	435 (3.9) ▲	402 (5.1)	418 (3.4) ▲	370 (4.5)
Portugal	483 (3.6)	502 (4.2) ▲	500 (3.8)	498 (4.5)	506 (3.6)	512 (4.2)	487 (3.3)	508 (3.9) ▲
Ψ Qatar	442 (5.1)	440 (5.4)	462 (4.9) ▲	446 (5.4)	440 (5.7)	430 (5.7)	425 (5.9)	422 (6.0)
Romania	484 (4.7) ▲	472 (5.0)	503 (5.2) ▲	477 (5.0)	480 (5.4) ▲	464 (5.5)	464 (5.0) ▲	451 (4.8)
2 Russian Federation	535 (5.0)	547 (5.1) ▲	563 (5.4)	557 (5.3)	538 (5.5)	543 (5.7)	509 (5.2)	525 (5.2) ▲
2 Ψ Saudi Arabia	- -	- -	- -	- -	- -	- -	- -	- -
2 Singapore	611 (4.5)	611 (4.8)	623 (5.1)	615 (5.3)	620 (4.7)	618 (4.4)	623 (5.4)	618 (5.3)
Ж South Africa (9)	- -	- -	- -	- -	- -	- -	- -	- -
2 Sweden	500 (2.8)	504 (3.2)	499 (3.7)	492 (3.2)	500 (4.0)	491 (3.6)	514 (4.8)	512 (4.0)
Turkey	496 (4.7)	490 (5.8)	503 (5.0) ▲	482 (6.3)	496 (4.6) ▲	483 (5.7)	506 (4.7)	498 (5.8)
United Arab Emirates	473 (3.4)	475 (3.3)	493 (3.6) ▲	480 (3.5)	465 (3.7)	459 (3.8)	455 (3.8)	447 (3.6)
† United States	518 (3.7)	522 (5.7)	528 (4.5) ▲	512 (6.8)	500 (4.1)	499 (6.1)	510 (4.4)	509 (7.0)
International Average	**493 (0.7)**	**497 (0.8) ▲**	**503 (0.7) ▲**	**493 (0.8)**	**499 (0.7) ▲**	**495 (0.8)**	**490 (0.7)**	**489 (0.8)**
Benchmarking Participants								
Ontario, Canada	527 (4.3)	533 (4.9)	515 (4.7)	515 (4.7)	535 (5.0)	537 (5.8)	540 (5.2)	543 (6.0)
‡ Quebec, Canada	540 (4.4)	548 (4.7)	529 (4.9)	532 (4.5)	548 (5.0)	550 (4.8)	553 (4.7)	556 (5.7)
Moscow City, Russian Fed.	562 (4.8)	585 (5.1) ▲	588 (4.3)	597 (4.8) ▲	558 (5.3)	572 (5.2) ▲	551 (4.7)	577 (4.8) ▲
Ψ Gauteng, RSA (9)	422 (3.6)	419 (3.6)	437 (4.3) ▲	424 (3.7)	407 (4.0)	406 (3.9)	408 (3.9)	403 (3.7)
Ψ Western Cape, RSA (9)	438 (6.1)	453 (6.0) ▲	449 (5.7)	454 (5.9)	420 (6.0)	435 (6.1) ▲	421 (5.7)	431 (6.0)
Ψ Abu Dhabi, UAE	441 (5.3)	438 (4.6)	457 (5.6) ▲	440 (4.6)	426 (5.8)	414 (5.1)	418 (5.9)	404 (4.9)
2 Dubai, UAE	529 (4.9)	544 (5.9)	546 (5.2)	548 (6.0)	522 (5.3)	532 (6.4)	521 (5.4)	530 (6.5)

▲ Average significantly higher than other gender

Numbers of items are based on the TIMSS 2019 eighth grade mathematics items included in scaling.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.
See Appendix B.7 for target population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available because average achievement could not be accurately estimated.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Average Achievement in Cognitive Domains

Exhibit 3.17 shows countries' average achievement in the knowing, applying, and reasoning cognitive domains relative to their overall average achievement (from highest to lowest overall average achievement). Interestingly, fewer countries had a relative strength in the knowing and applying cognitive domains than they did in the reasoning domain. More countries had a weakness in the knowing domain than in the applying and reasoning domains. Eight countries had a relative strength in the knowing cognitive domain, and 17 had a relative weakness. Six countries had a relative strength in the applying cognitive domain, and 14 had a relative weakness. Sixteen countries had a relative strength in the reasoning cognitive domain, and 9 had a relative weakness. Kazakhstan was the only country with no relative strengths or weaknesses in the cognitive domains.

Exhibit 3.17: Average Achievement in Mathematics Cognitive Domains

Country	Overall Mathematics Average Scale Score	Knowing (64 Items)		Applying (96 Items)		Reasoning (46 Items)	
		Average Scale Score	Difference from Overall Mathematics Score	Average Scale Score	Difference from Overall Mathematics Score	Average Scale Score	Difference from Overall Mathematics Score
[2] Singapore	616 (4.0)	614 (4.3)	-1 (1.4)	614 (3.8)	-2 (0.7) ▽	620 (4.5)	4 (1.0) ▲
Chinese Taipei	612 (2.7)	616 (3.0)	3 (1.5) ▲	610 (2.6)	-3 (1.8)	616 (2.7)	4 (1.9)
Korea, Rep. of	607 (2.8)	614 (3.2)	7 (1.2) ▲	604 (2.7)	-3 (1.2) ▽	609 (3.0)	2 (2.4)
Japan	594 (2.7)	589 (3.1)	-5 (1.2) ▽	596 (2.8)	2 (1.2)	599 (3.2)	5 (1.7) ▲
† Hong Kong SAR	578 (4.1)	580 (4.0)	2 (1.6)	575 (4.0)	-3 (1.1) ▽	582 (4.4)	4 (1.9)
[2] Russian Federation	543 (4.5)	550 (5.2)	6 (2.0) ▲	543 (4.5)	-1 (1.0)	536 (4.8)	-7 (1.7) ▽
Ireland	524 (2.6)	530 (2.8)	7 (1.5) ▲	526 (2.7)	3 (0.9) ▲	508 (3.4)	-16 (1.8) ▽
Lithuania	520 (2.9)	518 (2.8)	-2 (1.1)	524 (3.1)	3 (1.2) ▲	514 (3.6)	-7 (1.5) ▽
[3] Israel	519 (4.3)	516 (4.8)	-3 (1.2) ▽	519 (4.2)	0 (0.8)	525 (4.7)	6 (1.9) ▲
Australia	517 (3.8)	511 (4.0)	-7 (1.2) ▽	521 (3.8)	4 (0.7) ▲	515 (3.9)	-3 (0.8) ▽
Hungary	517 (2.9)	516 (3.1)	-1 (1.0)	517 (3.0)	0 (1.1)	512 (3.0)	-4 (1.3) ▽
† United States	515 (4.8)	522 (5.2)	6 (1.4) ▲	515 (4.9)	0 (0.8)	507 (4.6)	-8 (1.0) ▽
England	515 (5.3)	510 (5.5)	-5 (2.1) ▽	518 (5.3)	3 (1.1) ▲	512 (5.7)	-3 (1.8)
Finland	509 (2.6)	505 (2.5)	-4 (1.1) ▽	510 (2.7)	2 (0.9)	506 (2.9)	-3 (1.5)
† Norway (9)	503 (2.4)	499 (2.3)	-4 (1.6) ▽	504 (2.7)	1 (1.3)	496 (2.8)	-7 (1.9) ▽
[2] Sweden	503 (2.5)	496 (2.6)	-7 (1.6) ▽	501 (2.6)	-1 (1.0)	514 (2.9)	11 (1.3) ▲
Cyprus	501 (1.6)	509 (2.0)	8 (1.6) ▲	496 (1.7)	-5 (1.3) ▽	505 (2.1)	4 (1.3) ▲
Portugal	500 (3.2)	498 (3.5)	-2 (2.0)	497 (3.3)	-4 (1.2) ▽	508 (3.3)	7 (2.2) ▲
Italy	497 (2.7)	492 (2.8)	-5 (2.1) ▽	497 (2.4)	-1 (1.5)	505 (3.6)	7 (1.8) ▲
Turkey	496 (4.3)	494 (5.0)	-1 (1.8)	491 (4.0)	-4 (1.6) ▽	504 (4.1)	8 (1.8) ▲
[2] Kazakhstan	488 (3.3)	488 (3.7)	1 (1.4)	486 (3.2)	-1 (0.8)	487 (3.4)	0 (1.0)
France	483 (2.5)	473 (2.8)	-9 (1.6) ▽	485 (2.6)	2 (1.6)	489 (2.7)	6 (1.5) ▲
† New Zealand	482 (3.4)	468 (3.5)	-14 (2.0) ▽	486 (3.1)	5 (1.1) ▲	486 (3.4)	5 (0.9) ▲
Bahrain	481 (1.7)	471 (1.7)	-10 (0.8) ▽	479 (1.7)	-2 (0.9) ▽	489 (2.1)	8 (1.3) ▲
Romania	479 (4.3)	482 (5.0)	3 (2.0)	475 (4.1)	-4 (1.1) ▽	481 (4.5)	2 (1.4)
United Arab Emirates	473 (1.9)	478 (1.9)	5 (0.8) ▲	466 (1.8)	-8 (0.7) ▽	479 (1.9)	6 (0.9) ▲
[1] Georgia	461 (4.3)	- -	- -	- -	- -	- -	- -
Malaysia	461 (3.2)	451 (3.8)	-9 (1.5) ▽	464 (3.1)	3 (0.9) ▲	462 (3.1)	1 (1.1)
Iran, Islamic Rep. of	446 (3.7)	441 (4.2)	-6 (1.1) ▽	443 (3.5)	-4 (1.1) ▽	457 (4.0)	11 (1.6) ▲
Ψ Qatar	443 (4.0)	443 (4.6)	-1 (1.8)	438 (4.1)	-6 (0.9) ▽	448 (3.8)	4 (1.3) ▲
Ψ Chile	441 (2.8)	434 (3.0)	-7 (1.3) ▽	438 (2.9)	-3 (1.5)	451 (3.2)	10 (2.0) ▲
Lebanon	429 (2.9)	456 (2.9)	26 (1.5) ▲	412 (3.5)	-18 (1.7) ▽	407 (3.7)	-22 (2.4) ▽
Ψ Jordan	420 (4.3)	414 (5.0)	-7 (1.8) ▽	415 (4.0)	-5 (1.1) ▽	431 (4.4)	11 (1.5) ▲
[2] Ψ Egypt	413 (5.2)	416 (5.8)	3 (1.6)	405 (5.3)	-7 (1.6) ▽	411 (5.6)	-2 (1.4)
Ψ Oman	411 (2.8)	406 (2.8)	-4 (1.1) ▽	409 (2.5)	-2 (1.0)	412 (2.8)	1 (1.0)
Ψ Kuwait	403 (5.0)	- -	- -	- -	- -	- -	- -
[2] Ψ Saudi Arabia	394 (2.5)	- -	- -	- -	- -	- -	- -
Ж South Africa (9)	389 (2.3)	- -	- -	- -	- -	- -	- -
Ψ Morocco	388 (2.3)	382 (2.9)	-6 (1.6) ▽	389 (2.4)	0 (1.3)	381 (2.9)	-7 (2.2) ▽
Benchmarking Participants							
Moscow City, Russian Fed.	575 (4.2)	589 (4.2)	14 (1.6) ▲	574 (4.3)	-1 (1.4)	568 (4.2)	-8 (1.4) ▽
‡ Quebec, Canada	543 (3.7)	546 (3.8)	2 (1.9)	544 (4.1)	1 (1.5)	538 (3.8)	-5 (1.0) ▽
[2] Dubai, UAE	537 (2.0)	540 (2.2)	3 (1.1) ▲	532 (2.2)	-4 (1.0) ▽	541 (2.1)	5 (1.1) ▲
Ontario, Canada	530 (4.3)	518 (4.2)	-12 (1.9) ▽	531 (4.5)	1 (1.3)	540 (4.6)	11 (2.3) ▲
Ψ Western Cape, RSA (9)	441 (4.4)	432 (5.9)	-9 (2.3) ▽	442 (4.1)	1 (1.7)	444 (4.8)	3 (2.4)
Ψ Abu Dhabi, UAE	436 (2.9)	440 (3.2)	5 (1.5) ▲	428 (2.9)	-8 (1.3) ▽	441 (2.8)	6 (0.8) ▲
Ψ Gauteng, RSA (9)	421 (3.0)	411 (3.6)	-9 (1.2) ▽	423 (3.3)	2 (2.1)	427 (3.4)	6 (2.5) ▲

▲ Subscale score significantly higher than overall mathematics score
▽ Subscale score significantly lower than overall mathematics score

Numbers of items are based on the TIMSS 2019 eighth grade mathematics items included in scaling.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.
See Appendix B.2 for target population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available because average achievement could not be accurately estimated.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Trends in Average Achievement in Cognitive Domains

Exhibit 3.18 presents differences in average achievement for the three cognitive domains across four assessment cycles back to 2007, when TIMSS first began providing scaled results in the cognitive domains. Trends for countries with comparable data between assessment cycles show more countries have had increases than decreases in average achievement in each of the cognitive domains. Twenty-nine countries had comparable data in the TIMSS 2015 and TIMSS 2019 assessments for the cognitive domains. The recent trends in the knowing cognitive domain showed increases in 9 countries and decreases in 4 countries. In the applying domain, 9 countries showed increases and 3 showed decreases. In the reasoning domain, 13 showed increases and 3 showed decreases.

Between 2007 and 2019, in the knowing, applying, and reasoning domains, there were increases in average achievement in 14 countries, 14 countries, and 16 countries, respectively. There were decreases in average achievement in only 1 country in knowing and reasoning, and 2 countries in applying.

Exhibit 3.18: Differences in Achievement for Mathematics Cognitive Domains Across Assessment Years◊

Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▽) than the performance in the column year.

Country	Knowing				Applying				Reasoning			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
Australia												
2019	511 (4.0)	6	7	21 ▲	521 (3.8)	19 ▲	15 ▲	23 ▲	515 (3.9)	3	9	12 ▲
2015	504 (3.1)		0	15 ▲	502 (3.0)		-4	4	512 (3.1)		6	9
2011	504 (5.2)			14 ▲	506 (4.9)			8	506 (5.2)			3
2007	490 (3.9)				498 (3.8)				503 (4.0)			
Bahrain												
2019	471 (1.7)	8 ▲	60 ▲	82 ▲	479 (1.7)	34 ▲	79 ▲	79 ▲	489 (2.1)	38 ▲	75 ▲	83 ▲
2015	463 (2.3)		52 ▲	74 ▲	445 (1.7)		45 ▲	45 ▲	452 (2.2)		37 ▲	46 ▲
Ψ 2011	411 (2.4)			23 ▲	400 (2.4)			0	415 (2.1)			9 ▲
2007	389 (1.8)				400 (2.4)				406 (2.4)			
Chile												
Ψ 2019	434 (3.0)	11 ▲	28 ▲		438 (2.9)	11 ▲	13 ▲		451 (3.2)	19 ▲	29 ▲	
Ψ 2015	423 (3.4)		17 ▲		427 (3.3)		2		432 (3.3)		10 ▲	
2011	405 (2.9)				425 (2.6)				422 (2.9)			
Chinese Taipei												
2019	616 (3.0)	18 ▲	5	12 ▲	610 (2.6)	8 ▲	-5	13 ▲	616 (2.7)	14 ▲	7	14 ▲
2015	598 (2.9)		-13 ▽	-6	602 (2.5)		-12 ▽	5	602 (2.5)		-7	0
2011	611 (3.6)			7	614 (3.4)			17 ▲	609 (3.4)			7
2007	604 (5.0)				597 (4.8)				602 (4.4)			
Cyprus												
2019	509 (2.0)			45 ▲	496 (1.7)			31 ▲	505 (2.1)			47 ▲
2007	464 (1.8)				465 (2.0)				458 (2.6)			
Egypt												
2 Ψ 2019	416 (5.8)	17 ▲		31 ▲	405 (5.3)	21 ▲		14 ▲	411 (5.6)	32 ▲		25 ▲
Ψ 2015	399 (4.3)			14 ▲	385 (3.9)			-6	379 (4.3)			-7
2007	385 (3.7)				391 (3.9)				386 (3.7)			
England												
2019	510 (5.5)	-3	9	3	518 (5.3)	-1	10	4	512 (5.7)	-10	2	-6
2015	513 (4.1)		12	5	519 (4.1)		11	6	522 (4.4)		12	4
‡ 2011	501 (5.5)			-6	508 (5.6)			-5	510 (5.6)			-8
† 2007	508 (4.7)				514 (5.1)				518 (5.1)			
Finland												
2019	505 (2.5)		-3		510 (2.7)		-10 ▽		506 (2.9)		-5	
2011	508 (2.4)				520 (2.5)				512 (2.7)			
Hong Kong SAR												
† 2019	580 (4.0)	-20 ▽	-11	-3	575 (4.0)	-20 ▽	-12 ▽	3	582 (4.4)	-9	2	15 ▲
2015	600 (5.1)		9	17 ▲	595 (4.5)		8	23 ▲	591 (5.1)		11	24 ▲
2011	591 (4.1)			8	587 (3.8)			15 ▲	580 (4.0)			13
† 2007	583 (6.0)				572 (6.2)				567 (6.1)			
Hungary												
2019	516 (3.1)	5	9	-6	517 (3.0)	1	12 ▲	3	512 (3.0)	-3	10 ▲	-2
2015	511 (3.9)		4	-10	516 (3.8)		11 ▲	3	515 (3.9)		13 ▲	0
2011	507 (3.9)			-15 ▽	505 (3.6)			-9	502 (3.8)			-13 ▽
2007	522 (3.7)				513 (3.5)				515 (3.7)			
Iran, Islamic Rep. of												
2019	441 (4.2)	5	30 ▲	43 ▲	443 (3.5)	8	31 ▲	43 ▲	457 (4.0)	21 ▲	29 ▲	40 ▲
Ψ 2015	435 (4.9)		25 ▲	38 ▲	434 (4.4)		23 ▲	35 ▲	436 (4.7)		8	19 ▲
Ψ 2011	410 (4.4)			13 ▲	411 (4.6)			12	428 (4.3)			11
2007	397 (4.3)				399 (4.4)				417 (3.9)			
Ireland												
2019	530 (2.8)	3			526 (2.7)	6			508 (3.4)	-13 ▽		
2015	527 (3.0)				520 (3.0)				521 (3.1)			
Israel												
3 2019	516 (4.8)	5	0		519 (4.2)	7	6		525 (4.7)	15 ▲	5	
3 2015	511 (4.2)		-5		512 (4.0)		-1		510 (4.4)		-10	
3 2011	516 (4.2)				513 (4.4)				520 (4.2)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

◊ Trend reporting in cognitive domains using current methodology began with TIMSS 2007.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
See Appendix B.7 for target population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 3.18: Differences in Achievement for Mathematics Cognitive Domains Across Assessment Years◊

(Continued)

Country	Knowing				Applying				Reasoning			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
Italy												
2019	492 (2.8)	4	-2	19 ▲	497 (2.4)	2	-6	14 ▲	505 (3.6)	5	8	22 ▲
2 2015	489 (2.7)		-5	15 ▲	495 (2.6)		-8 ▽	13 ▲	500 (2.8)		4	18 ▲
2011	494 (2.7)			20 ▲	503 (2.3)			20 ▲	496 (2.6)			14 ▲
2007	474 (3.4)				482 (3.0)				482 (3.4)			
Japan												
2019	589 (3.1)	11 ▲	31 ▲	20 ▲	596 (2.8)	5	22 ▲	28 ▲	599 (3.2)	8 ▲	20 ▲	22 ▲
2015	578 (2.6)		20 ▲	9 ▲	592 (2.3)		17 ▲	23 ▲	591 (2.6)		12 ▲	14 ▲
2011	558 (2.8)			-11 ▽	574 (2.5)			6	579 (3.0)			2
2007	569 (2.9)				568 (2.3)				577 (2.6)			
Jordan												
Ψ 2019	414 (5.0)	23 ▲	9	-12	415 (4.0)	37 ▲	18 ▲	-6	431 (4.4)	51 ▲	16 ▲	-3
Ж 2015	391 (3.2)		-14 ▽	-35 ▽	378 (3.2)		-19 ▽	-43 ▽	380 (3.3)		-36 ▽	-55 ▽
Ψ 2011	405 (4.2)			-20 ▽	397 (3.7)			-24 ▽	416 (4.0)			-19 ▽
2007	425 (4.5)				421 (4.5)				434 (4.1)			
Kazakhstan												
2 2019	488 (3.7)		-1		486 (3.2)		2		487 (3.4)		5	
2011	489 (4.4)				484 (4.3)				482 (4.9)			
Korea, Rep. of												
2019	614 (3.2)	7	-2	6	604 (2.7)	-2	-12 ▽	4	609 (3.0)	1	-3	17 ▲
2015	607 (2.8)		-9 ▽	-1	606 (2.8)		-10 ▽	6	608 (2.7)		-5	15 ▲
2011	616 (3.1)			8	617 (2.8)			16 ▲	612 (2.6)			20 ▲
2007	608 (3.1)				600 (2.8)				592 (2.5)			
Lebanon												
2019	456 (2.9)	0	-8	-1	412 (3.5)	-27 ▽	-24 ▽	-35 ▽	407 (3.7)	1	-19 ▽	-16 ▽
2015	456 (3.8)		-8	-1	439 (3.9)		3	-8	406 (4.5)		-20 ▽	-17 ▽
2011	464 (3.9)			7	436 (4.1)			-11	426 (4.6)			3
2007	457 (4.2)				447 (4.5)				423 (4.7)			
Lithuania												
2019	518 (2.8)	16 ▲	17 ▲	9 ▲	524 (3.1)	4	16 ▲	13 ▲	514 (3.6)	13 ▲	21 ▲	27 ▲
2 2015	502 (3.1)		0	-7	520 (2.6)		12 ▲	9 ▲	501 (3.0)		9 ▲	14 ▲
1 2011	502 (2.6)			-8 ▽	508 (2.4)			-3	493 (2.6)			6
1 2007	509 (2.7)				511 (2.5)				487 (2.8)			
Malaysia												
2019	451 (3.8)	-21 ▽	7	-22 ▽	464 (3.1)	0	25 ▲	-13 ▽	462 (3.1)	9	35 ▲	-4
2015	472 (3.8)		28 ▲	-1	463 (3.6)		24 ▲	-14 ▽	453 (3.7)		27 ▲	-13 ▽
2011	444 (5.8)			-29 ▽	439 (5.3)			-38 ▽	426 (5.6)			-40 ▽
2007	473 (5.4)				477 (5.2)				466 (4.6)			
Morocco												
Ψ 2019	382 (2.9)	0	19 ▲		389 (2.4)	3	11 ▲		381 (2.9)	7	24 ▲	
Ж 2015	382 (2.4)		19 ▲		385 (2.2)		7 ▲		374 (2.8)		17 ▲	
Ж 2011	363 (2.3)				378 (2.0)				357 (2.8)			
New Zealand												
† 2019	468 (3.5)	-20 ▽	-13 ▽		486 (3.1)	-7	-5		486 (3.4)	-12 ▽	-7	
† 2015	488 (3.4)		7		493 (3.3)		2		499 (3.5)		5	
2011	481 (5.7)				491 (5.2)				494 (5.5)			
Norway (9)												
† 2019	499 (2.3)	-1			504 (2.7)	-13 ▽			496 (2.8)	-20 ▽		
2015	500 (2.3)				516 (2.3)				516 (2.5)			
Oman												
Ψ 2019	406 (2.8)	5	42 ▲	41 ▲	409 (2.5)	8 ▲	49 ▲	44 ▲	412 (2.8)	10 ▲	43 ▲	23 ▲
Ψ 2015	401 (3.1)		37 ▲	36 ▲	401 (2.5)		41 ▲	36 ▲	402 (3.1)		33 ▲	14 ▲
Ψ 2011	365 (3.0)			-1	360 (3.0)			-5	369 (3.0)			-20 ▽
2007	366 (3.6)				365 (3.1)				389 (3.1)			
Qatar												
Ψ 2019	443 (4.6)	3	25 ▲		438 (4.1)	3	41 ▲		448 (3.8)	16 ▲	41 ▲	
Ψ 2015	440 (3.1)		22 ▲		435 (2.9)		39 ▲		431 (2.8)		25 ▲	
Ψ 2011	418 (3.0)				396 (3.4)				406 (3.6)			
Romania												
2019	482 (5.0)		22 ▲	18 ▲	475 (4.1)		22 ▲	14 ▲	481 (4.5)		25 ▲	36 ▲
2011	460 (4.5)			-4	454 (4.0)			-7	455 (4.2)			11
2007	464 (4.5)				461 (4.2)				445 (4.9)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 3.18: Differences in Achievement for Mathematics Cognitive Domains Across Assessment Years◊

(Continued)

Country	Knowing				Applying				Reasoning			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
Russian Federation												
2 2019	550 (5.2)	7	1	29 ▲	543 (4.5)	2	5	33 ▲	536 (4.8)	9	5	37 ▲
2015	543 (5.6)		-5	22 ▲	541 (4.6)		3	31 ▲	528 (5.0)		-4	28 ▲
2 2011	548 (3.8)			28 ▲	538 (3.6)			28 ▲	531 (3.8)			32 ▲
2007	521 (4.5)				510 (3.9)				499 (4.0)			
Singapore												
2 2019	614 (4.3)	-19 ▽	-3	22 ▲	614 (3.8)	-5	1	17 ▲	620 (4.5)	4	16 ▲	31 ▲
2 2015	633 (3.4)		16 ▲	41 ▲	619 (3.2)		7	22 ▲	616 (3.7)		12 ▲	27 ▲
2 2011	617 (3.9)			25 ▲	613 (4.0)			16 ▲	604 (4.3)			15 ▲
2007	592 (3.7)				597 (3.9)				589 (4.5)			
Sweden												
2 2019	496 (2.6)	12 ▲	18 ▲	16 ▲	501 (2.6)	-6	12 ▲	6	514 (2.9)	4	36 ▲	21 ▲
2015	484 (2.8)		7	4	507 (2.8)		17 ▲	12 ▲	509 (3.5)		32 ▲	17 ▲
2011	478 (2.0)			-2	489 (2.2)			-6	478 (2.4)			-15 ▽
2007	480 (2.2)				495 (2.2)				493 (2.8)			
Turkey												
2019	494 (5.0)	47 ▲	54 ▲		491 (4.0)	32 ▲	33 ▲		504 (4.1)	32 ▲	39 ▲	
2015	447 (4.9)		7		460 (4.3)		1		472 (4.8)		7	
2011	441 (4.2)				459 (4.0)				465 (3.7)			
United Arab Emirates												
2019	478 (1.9)	3	11 ▲		466 (1.8)	8 ▲	24 ▲		479 (1.9)	18 ▲	30 ▲	
2015	476 (2.2)		9 ▲		457 (2.1)		16 ▲		461 (2.2)		12 ▲	
2011	467 (2.2)				442 (2.3)				449 (2.2)			
United States												
† 2019	522 (5.2)	-6	3	5	515 (4.9)	0	12 ▲	13 ▲	507 (4.6)	-7	4	1
† 2015	528 (3.5)		9 ▲	11 ▲	515 (3.2)		12 ▲	13 ▲	514 (3.1)		11 ▲	8
2 2011	519 (2.7)			2	503 (2.9)			1	503 (2.7)			-3
2 † 2007	517 (2.9)				502 (3.1)				506 (2.8)			
Benchmarking Participants												
Ontario, Canada												
2019	518 (4.2)	5	15 ▲	9	531 (4.5)	8	21 ▲	13 ▲	540 (4.6)	6	16 ▲	15 ▲
2015	513 (3.0)		10 ▲	4	522 (2.8)		12 ▲	4	534 (3.1)		10 ▲	9
2 2011	503 (2.6)			-6	510 (2.3)			-8	524 (2.7)			-1
2 2007	509 (3.6)				518 (4.0)				526 (3.8)			
Quebec, Canada												
‡ 2019	546 (3.8)	5	18 ▲	21 ▲	544 (4.1)	-2	9	15 ▲	538 (3.8)	0	9	9
≡ 2015	541 (4.2)		13 ▲	16 ▲	546 (4.0)		11 ▲	17 ▲	538 (4.2)		9	10
2011	528 (2.9)			4	536 (2.7)			6	529 (2.7)			1
3 2007	524 (3.1)				529 (3.3)				528 (3.5)			
Abu Dhabi, UAE												
Ψ 2019	440 (3.2)	-13 ▽	-19 ▽		428 (2.9)	-6	-6		441 (2.8)	1	-1	
2015	453 (4.8)		-6		434 (4.7)		-1		440 (4.7)		-2	
2011	459 (3.8)				434 (4.3)				442 (4.2)			
Dubai, UAE												
2 2019	540 (2.2)	19 ▲	52 ▲	75 ▲	532 (2.2)	27 ▲	67 ▲	78 ▲	541 (2.1)	32 ▲	72 ▲	82 ▲
2015	521 (2.3)		33 ▲	56 ▲	505 (2.5)		40 ▲	51 ▲	509 (2.8)		40 ▲	50 ▲
2011	488 (2.4)			23 ▲	465 (2.5)			11 ▲	470 (2.7)			10 ▲
‡ 2007	465 (2.6)				454 (3.2)				460 (3.0)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Average Achievement in Cognitive Domains by Gender

Exhibit 3.19 shows the differences between girls' and boys' average achievement in the cognitive domains of knowing, applying, and reasoning. In the knowing domain, girls had higher average achievement than boys in 8 countries, and boys had higher achievement than girls in 5 countries. In the applying domain, girls had higher average achievement than boys in 5 countries, and boys had higher average achievement than girls in 8 countries. In reasoning, girls had higher average achievement than boys in 8 countries compared with 3 countries where boys had higher average achievement.

Exhibit 3.19: Average Achievement in Mathematics Cognitive Domains by Gender

Country	Knowing (64 Items)		Applying (96 Items)		Reasoning (46 Items)	
	Girls	Boys	Girls	Boys	Girls	Boys
Australia	509 (3.7)	513 (5.8)	519 (3.6)	524 (5.6)	512 (4.0)	517 (5.7)
Bahrain	484 (2.8) ▲	459 (2.2)	489 (2.7) ▲	469 (2.2)	501 (2.9) ▲	478 (2.5)
Ψ Chile	428 (3.8)	439 (4.1) ▲	433 (3.9)	442 (3.9)	447 (3.9)	454 (4.4)
Chinese Taipei	619 (3.4)	613 (3.7)	611 (3.0)	609 (3.2)	616 (3.0)	616 (3.2)
Cyprus	510 (3.5)	507 (2.9)	497 (2.3)	495 (2.3)	509 (3.4) ▲	501 (2.5)
2 Ψ Egypt	426 (5.8) ▲	404 (8.9)	411 (5.6)	399 (7.7)	421 (6.0) ▲	399 (8.6)
England	507 (6.1)	514 (7.3)	519 (5.7)	517 (7.2)	512 (6.1)	512 (7.8)
Finland	506 (2.8)	504 (3.0)	513 (2.9)	508 (3.3)	509 (3.2)	504 (3.5)
France	470 (2.7)	476 (3.6)	480 (2.7)	490 (3.6) ▲	487 (2.5)	491 (3.3)
1 Georgia	- -	- -	- -	- -	- -	- -
† Hong Kong SAR	584 (5.0)	577 (5.3)	580 (5.1)	572 (5.4)	584 (5.7)	580 (5.8)
Hungary	509 (3.5)	523 (3.8) ▲	509 (3.4)	524 (3.6) ▲	504 (3.5)	521 (3.6) ▲
Iran, Islamic Rep. of	452 (5.7) ▲	431 (6.5)	446 (4.7)	440 (5.1)	466 (5.2) ▲	450 (6.0)
Ireland	533 (3.4)	528 (3.6)	527 (2.9)	526 (3.6)	507 (3.5)	509 (4.3)
3 Israel	511 (5.3)	521 (5.6) ▲	513 (4.2)	525 (5.2) ▲	520 (4.6)	530 (6.4)
Italy	487 (2.9)	497 (3.9) ▲	490 (2.9)	504 (3.0) ▲	500 (4.4)	510 (4.1) ▲
Japan	589 (3.6)	589 (3.5)	594 (3.0)	598 (3.2)	598 (3.3)	600 (3.6)
Ψ Jordan	428 (4.5) ▲	400 (7.6)	425 (3.7) ▲	406 (6.1)	446 (4.0) ▲	418 (6.8)
2 Kazakhstan	492 (4.4)	485 (4.3)	488 (3.6)	485 (3.7)	490 (4.1)	484 (4.1)
Korea, Rep. of	612 (4.2)	616 (3.5)	602 (3.5)	606 (2.9)	606 (3.3)	612 (3.7)
Ψ Kuwait	- -	- -	- -	- -	- -	- -
Lebanon	453 (3.7)	458 (3.1)	407 (4.5)	417 (3.6) ▲	408 (4.1)	406 (4.8)
Lithuania	518 (2.9)	519 (3.8)	523 (3.3)	525 (3.6)	513 (3.9)	514 (4.2)
Malaysia	457 (4.2) ▲	446 (4.8)	468 (3.1) ▲	459 (4.2)	462 (3.7)	461 (3.7)
Ψ Morocco	382 (2.9)	382 (3.5)	384 (2.5)	394 (2.9) ▲	381 (3.6)	382 (3.1)
† New Zealand	462 (3.7)	473 (5.2)	483 (3.5)	489 (4.6)	483 (3.4)	489 (5.0)
† Norway (9)	500 (2.8)	499 (2.9)	504 (2.8)	503 (3.4)	496 (3.2)	497 (3.3)
Ψ Oman	432 (3.5) ▲	382 (4.8)	427 (3.1) ▲	392 (3.8)	436 (3.4) ▲	390 (4.2)
Portugal	493 (3.7)	504 (4.3) ▲	492 (3.6)	501 (4.3) ▲	501 (3.8)	514 (3.8) ▲
Ψ Qatar	444 (5.5)	442 (6.1)	442 (5.4)	433 (5.7)	453 (4.8)	442 (5.1)
Romania	490 (5.5) ▲	474 (6.2)	482 (4.6) ▲	468 (4.6)	490 (5.2) ▲	470 (4.8)
2 Russian Federation	549 (5.6)	550 (5.6)	538 (4.8)	547 (4.8) ▲	533 (5.4)	540 (5.1)
2 Ψ Saudi Arabia	- -	- -	- -	- -	- -	- -
2 Singapore	618 (5.0)	611 (4.8)	616 (4.4)	613 (4.2)	622 (5.0)	619 (5.1)
Ж South Africa (9)	- -	- -	- -	- -	- -	- -
2 Sweden	497 (3.6)	495 (2.9)	501 (3.3)	501 (3.1)	516 (3.7)	511 (3.3)
Turkey	503 (5.2) ▲	485 (6.7)	494 (4.4)	488 (5.4)	511 (4.6) ▲	497 (5.4)
United Arab Emirates	483 (3.6)	474 (3.5)	468 (3.4)	464 (3.4)	482 (3.4)	476 (3.4)
† United States	525 (4.4)	519 (6.6)	517 (4.1)	513 (6.3)	508 (3.9)	507 (5.8)
International Average	**499 (0.7) ▲**	**494 (0.8)**	**497 (0.6)**	**496 (0.8)**	**501 (0.7) ▲**	**497 (0.8)**
Benchmarking Participants						
Ontario, Canada	518 (4.1)	518 (5.0)	529 (4.5)	532 (4.9)	538 (4.9)	543 (4.9)
‡ Quebec, Canada	543 (4.3)	548 (4.2)	543 (4.6)	546 (4.5)	533 (4.5)	543 (4.3) ▲
Moscow City, Russian Fed.	582 (4.3)	596 (5.0) ▲	564 (4.4)	583 (5.0) ▲	558 (4.2)	576 (5.2) ▲
Ψ Gauteng, RSA (9)	417 (4.1) ▲	405 (3.9)	424 (3.6)	420 (3.7)	429 (3.7)	424 (3.7)
Ψ Western Cape, RSA (9)	429 (6.3)	437 (7.2)	436 (4.8)	449 (5.1) ▲	439 (5.2)	451 (5.9) ▲
Ψ Abu Dhabi, UAE	448 (5.8)	434 (4.4)	433 (5.5)	424 (4.4)	447 (5.2)	436 (4.2)
2 Dubai, UAE	537 (5.0)	543 (6.3)	527 (5.0)	538 (6.1)	537 (4.9)	546 (5.9)

▲ Average significantly higher than other gender

Numbers of items are based on the TIMSS 2019 eighth grade mathematics items included in scaling.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.
See Appendix B.7 for target population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available because average achievement could not be accurately estimated.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Science Grade 8

Average Science Achievement

Average Achievement and Scale Score Distributions

The TIMSS 2019 eighth grade science assessment was based on a comprehensive assessment framework developed collaboratively with the participating countries to reflect their curricular goals. The eighth grade science assessment included four content areas—biology (35%), chemistry (20%), physics (25%), and Earth science (20%). In accordance with the framework, the majority of TIMSS 2019 science items assessed eighth grade students' applying and reasoning skills, and there is a cross-cutting inquiry strand. To cover the framework at the eighth grade, the TIMSS 2019 science assessment comprised 220 assessment items. This cycle marked the beginning of the transition to a computer-based assessment system. More than half of the TIMSS 2019 countries administered the assessment in an "e" (electronic) format and almost half administered the assessment in a paper format, as in TIMSS 2015. The "e" countries also administered the trend items in the paper format to provide a bridge to the TIMSS 2015 and TIMSS 2019 paper-based assessments. The assessment was carefully designed and analyzed, so that the TIMSS 2019 science achievement results for all 39 countries are reported on the same TIMSS eighth grade science scale.

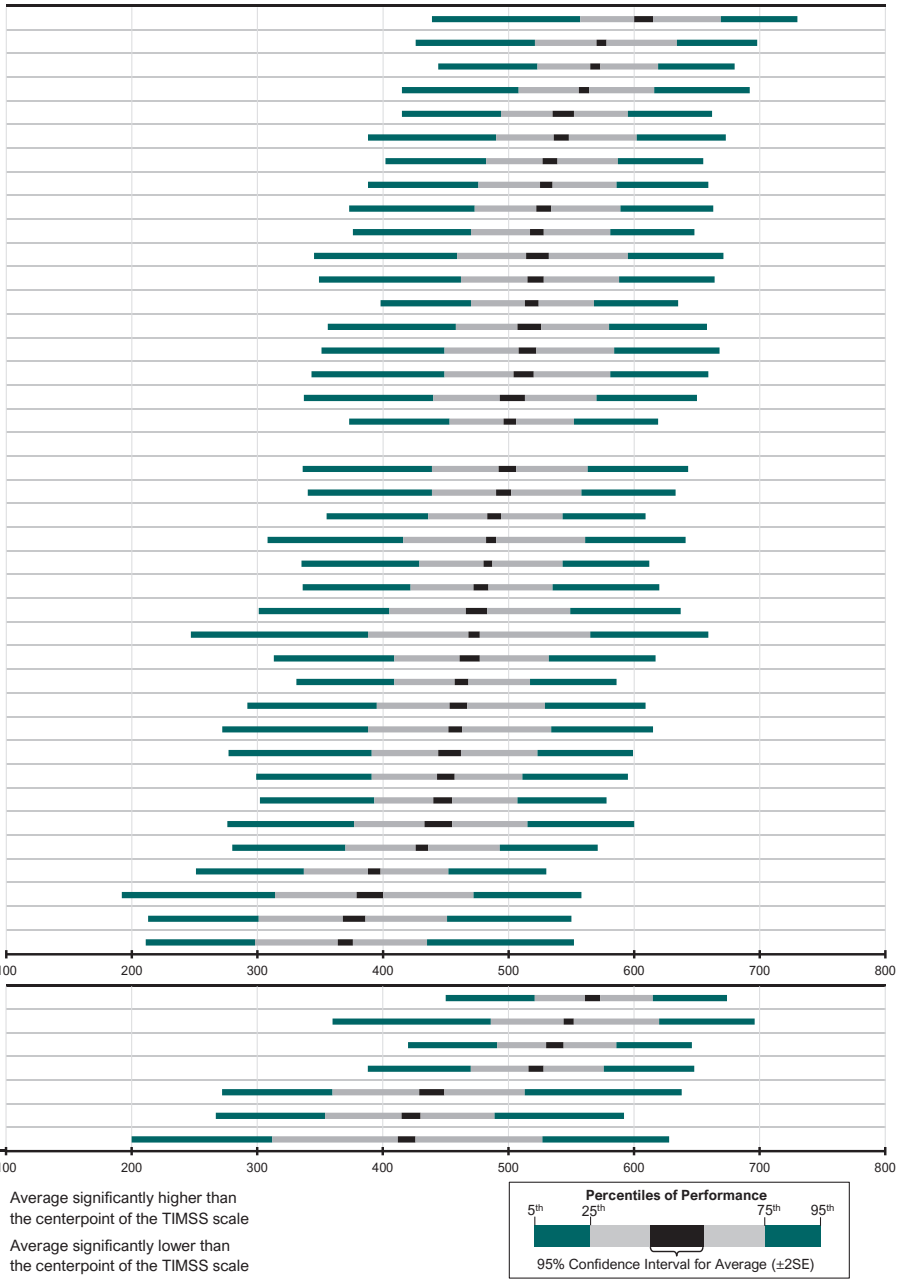
Exhibit 4.1 presents the average achievement at the eighth grade for each participating country (from highest to lowest) together with the scale score distribution underlying the average scale score. Exhibit 4.2 shows whether relatively small differences in average achievement between one country and the next are statistically significant.

Singapore had the highest average achievement, followed by Chinese Taipei and Japan, whose students performed similarly and had higher average achievement than all of the other countries. These three countries were followed by Korea, whose eighth grade students had higher average achievement than students in all of the other countries except the three top-performing countries. Next, the Russian Federation and Finland, followed by Lithuania, and then by Hungary and Australia, and then Ireland and the United States, all performed very well. Essentially, Exhibit 4.2 shows clusters of several similarly performing countries, followed by the next highest achieving clusters of similarly performing countries, and so on.

A number of eighth grade TIMSS 2019 participants performed well. Sixteen countries (including those discussed above) had higher average achievement than the centerpoint of 500 (Exhibit 4.1), which is a point of reference on the TIMSS eighth grade science scale that remains constant from TIMSS assessment to TIMSS assessment. However, there was a considerable difference between the highest average achievement and the lowest. Also, the scale score distributions in Exhibit 4.1 show that there is wide variation in achievement in every country. Every country has some higher achieving and some lower achieving students.

Exhibit 4.1: Average Science Achievement and Scale Score Distributions

Country	Average Scale Score	
[2] Singapore	608 (3.9)	▲
Chinese Taipei	574 (1.9)	▲
Japan	570 (2.1)	▲
Korea, Rep. of	561 (2.1)	▲
[2] Russian Federation	543 (4.2)	▲
Finland	543 (3.1)	▲
Lithuania	534 (3.0)	▲
Hungary	530 (2.6)	▲
Australia	528 (3.2)	▲
Ireland	523 (2.9)	▲
† United States	522 (4.7)	▲
[2] Sweden	521 (3.2)	▲
Portugal	519 (2.9)	▲
England	517 (4.8)	▲
Turkey	515 (3.7)	▲
[3] Israel	513 (4.2)	▲
† Hong Kong SAR	504 (5.2)	
Italy	500 (2.6)	
TIMSS Scale Centerpoint	**500**	
† New Zealand	499 (3.5)	
† Norway (9)	495 (3.1)	
France	489 (2.7)	▽
Bahrain	486 (1.9)	▽
Cyprus	484 (1.9)	▽
[2] Kazakhstan	478 (3.1)	▽
Qatar	475 (4.4)	▽
United Arab Emirates	473 (2.2)	▽
Romania	470 (4.2)	▽
Chile	462 (2.9)	▽
Malaysia	460 (3.5)	▽
Oman	457 (2.9)	▽
Jordan	452 (4.7)	▽
Iran, Islamic Rep. of	449 (3.6)	▽
[1] Georgia	447 (3.9)	▽
Kuwait	444 (5.7)	▽
[2] Saudi Arabia	431 (2.6)	▽
Morocco	394 (2.7)	▽
[2] Egypt	389 (5.4)	▽
Lebanon	377 (4.6)	▽
Ψ South Africa (9)	370 (3.1)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	567 (2.9)	▲
[2] Dubai, UAE	548 (2.0)	▲
‡ Quebec, Canada	537 (3.6)	▲
Ontario, Canada	522 (3.0)	▲
Western Cape, RSA (9)	439 (5.1)	▽
Gauteng, RSA (9)	422 (3.9)	▽
Abu Dhabi, UAE	420 (3.6)	▽



The TIMSS achievement scale was established in 1995 based on the combined achievement distribution of all countries that participated in TIMSS 1995. To provide a point of reference for country comparisons, the scale centerpoint of 500 was located at the mean of the combined achievement distribution. The units of the scale were chosen so that 100 scale score points corresponded to the standard deviation of the distribution.

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 4.2: Significance of Differences Between Countries' Average Science Achievement

Read across the row for a country to compare performance with the countries listed along the top of the chart. The symbols indicate whether the average achievement of the country in the row is significantly higher (▲) than that of the comparison country, significantly lower (▽), or if there is no statistically significant difference.

Country	Average Scale Score	Singapore	Chinese Taipei	Japan	Korea, Rep. of	Russian Federation	Finland	Lithuania	Hungary	Australia	Ireland	United States	Sweden	Portugal	England	Turkey	Israel	Hong Kong SAR	Italy	New Zealand	Norway (9)	France	Bahrain	Cyprus	Kazakhstan	Qatar	United Arab Emirates	Romania	Chile	Malaysia	Oman	Jordan	Iran, Islamic Rep. of	Georgia	Kuwait
Singapore	608 (3.9)		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Chinese Taipei	574 (1.9)	▽			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Japan	570 (2.1)	▽			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Korea, Rep. of	561 (2.1)	▽	▽	▽		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Russian Federation	543 (4.2)	▽	▽	▽	▽				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Finland	543 (3.1)	▽	▽	▽	▽			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Lithuania	534 (3.0)	▽	▽	▽	▽		▽				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hungary	530 (2.6)	▽	▽	▽	▽	▽	▽					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Australia	528 (3.2)	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ireland	523 (2.9)	▽	▽	▽	▽	▽	▽	▽									▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
United States	522 (4.7)	▽	▽	▽	▽	▽	▽	▽									▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Sweden	521 (3.2)	▽	▽	▽	▽	▽	▽	▽	▽								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Portugal	519 (2.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
England	517 (4.8)	▽	▽	▽	▽	▽	▽	▽	▽	▽								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Turkey	515 (3.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Israel	513 (4.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽									▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hong Kong SAR	504 (5.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Italy	500 (2.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
New Zealand	499 (3.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Norway (9)	495 (3.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
France	489 (2.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Bahrain	486 (1.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Cyprus	484 (1.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲
Kazakhstan	478 (3.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲
Qatar	475 (4.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲
United Arab Emirates	473 (2.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽					▲	▲	▲	▲	▲	▲	▲
Romania	470 (4.2)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽							▲	▲	▲	▲	▲
Chile	462 (2.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲
Malaysia	460 (3.5)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲	▲
Oman	457 (2.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽						▲	▲
Jordan	452 (4.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽							
Iran, Islamic Rep. of	449 (3.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽					
Georgia	447 (3.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				
Kuwait	444 (5.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				
Saudi Arabia	431 (2.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Morocco	394 (2.7)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Egypt	389 (5.4)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Lebanon	377 (4.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
South Africa (9)	370 (3.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Benchmarking Participants																																			
Moscow City, Russian Fed.	567 (2.9)	▽	▽			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Dubai, UAE	548 (2.0)	▽	▽	▽	▽			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Quebec, Canada	537 (3.6)	▽	▽	▽	▽						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ontario, Canada	522 (3.0)	▽	▽	▽	▽	▽	▽	▽	▽								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Western Cape, RSA (9)	439 (5.1)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽				
Gauteng, RSA (9)	422 (3.9)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽
Abu Dhabi, UAE	420 (3.6)	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽	▽

▲ Average achievement significantly higher than comparison country
▽ Average achievement significantly lower than comparison country

Significance tests were not adjusted for multiple comparisons. Five percent of the comparisons would be statistically significant by chance alone.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 4.2: Significance of Differences Between Countries' Average Science Achievement

(Continued)

Country	Average Scale Score	Saudi Arabia	Morocco	Egypt	Lebanon	South Africa (9)	Benchmarking Participants	Moscow City, Russian Fed.	Dubai, UAE	Quebec, Canada	Ontario, Canada	Western Cape, RSA (9)	Gauteng, RSA (9)	Abu Dhabi, UAE
Singapore	608 (3.9)	▲	▲	▲	▲	▲		▲	▲	▲	▲	▲	▲	▲
Chinese Taipei	574 (1.9)	▲	▲	▲	▲	▲		▲	▲	▲	▲	▲	▲	▲
Japan	570 (2.1)	▲	▲	▲	▲	▲			▲	▲	▲	▲	▲	▲
Korea, Rep. of	561 (2.1)	▲	▲	▲	▲	▲			▲	▲	▲	▲	▲	▲
Russian Federation	543 (4.2)	▲	▲	▲	▲	▲		▽			▲	▲	▲	▲
Finland	543 (3.1)	▲	▲	▲	▲	▲		▽			▲	▲	▲	▲
Lithuania	534 (3.0)	▲	▲	▲	▲	▲		▽	▽		▲	▲	▲	▲
Hungary	530 (2.6)	▲	▲	▲	▲	▲		▽	▽		▲	▲	▲	▲
Australia	528 (3.2)	▲	▲	▲	▲	▲		▽	▽			▲	▲	▲
Ireland	523 (2.9)	▲	▲	▲	▲	▲		▽	▽	▽		▲	▲	▲
United States	522 (4.7)	▲	▲	▲	▲	▲		▽	▽	▽		▲	▲	▲
Sweden	521 (3.2)	▲	▲	▲	▲	▲		▽	▽	▽		▲	▲	▲
Portugal	519 (2.9)	▲	▲	▲	▲	▲		▽	▽	▽		▲	▲	▲
England	517 (4.8)	▲	▲	▲	▲	▲		▽	▽	▽		▲	▲	▲
Turkey	515 (3.7)	▲	▲	▲	▲	▲		▽	▽	▽		▲	▲	▲
Israel	513 (4.2)	▲	▲	▲	▲	▲		▽	▽	▽		▲	▲	▲
Hong Kong SAR	504 (5.2)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Italy	500 (2.6)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
New Zealand	499 (3.5)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Norway (9)	495 (3.1)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
France	489 (2.7)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Bahrain	486 (1.9)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Cyprus	484 (1.9)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Kazakhstan	478 (3.1)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Qatar	475 (4.4)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
United Arab Emirates	473 (2.2)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Romania	470 (4.2)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Chile	462 (2.9)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Malaysia	460 (3.5)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Oman	457 (2.9)	▲	▲	▲	▲	▲		▽	▽	▽	▽	▲	▲	▲
Jordan	452 (4.7)	▲	▲	▲	▲	▲		▽	▽	▽	▽		▲	▲
Iran, Islamic Rep. of	449 (3.6)	▲	▲	▲	▲	▲		▽	▽	▽	▽		▲	▲
Georgia	447 (3.9)	▲	▲	▲	▲	▲		▽	▽	▽	▽		▲	▲
Kuwait	444 (5.7)	▲	▲	▲	▲	▲		▽	▽	▽	▽		▲	▲
Saudi Arabia	431 (2.6)		▲	▲	▲	▲		▽	▽	▽	▽		▲	▲
Morocco	394 (2.7)	▽			▲	▲		▽	▽	▽	▽	▽	▽	▽
Egypt	389 (5.4)	▽				▲		▽	▽	▽	▽	▽	▽	▽
Lebanon	377 (4.6)	▽	▽					▽	▽	▽	▽	▽	▽	▽
South Africa (9)	370 (3.1)	▽	▽	▽				▽	▽	▽	▽	▽	▽	▽
Benchmarking Participants														
Moscow City, Russian Fed.	567 (2.9)	▲	▲	▲	▲	▲			▲	▲	▲	▲	▲	▲
Dubai, UAE	548 (2.0)	▲	▲	▲	▲	▲		▽		▲	▲	▲	▲	▲
Quebec, Canada	537 (3.6)	▲	▲	▲	▲	▲		▽	▽		▲	▲	▲	▲
Ontario, Canada	522 (3.0)	▲	▲	▲	▲	▲		▽	▽	▽		▲	▲	▲
Western Cape, RSA (9)	439 (5.1)		▲	▲	▲	▲		▽	▽	▽	▽		▲	▲
Gauteng, RSA (9)	422 (3.9)	▽	▲	▲	▲	▲		▽	▽	▽	▽	▽		
Abu Dhabi, UAE	420 (3.6)	▽	▲	▲	▲	▲		▽	▽	▽	▽	▽		

▲ Average achievement significantly higher than comparison country
▽ Average achievement significantly lower than comparison country

Significance tests were not adjusted for multiple comparisons. Five percent of the comparisons would be statistically significant by chance alone.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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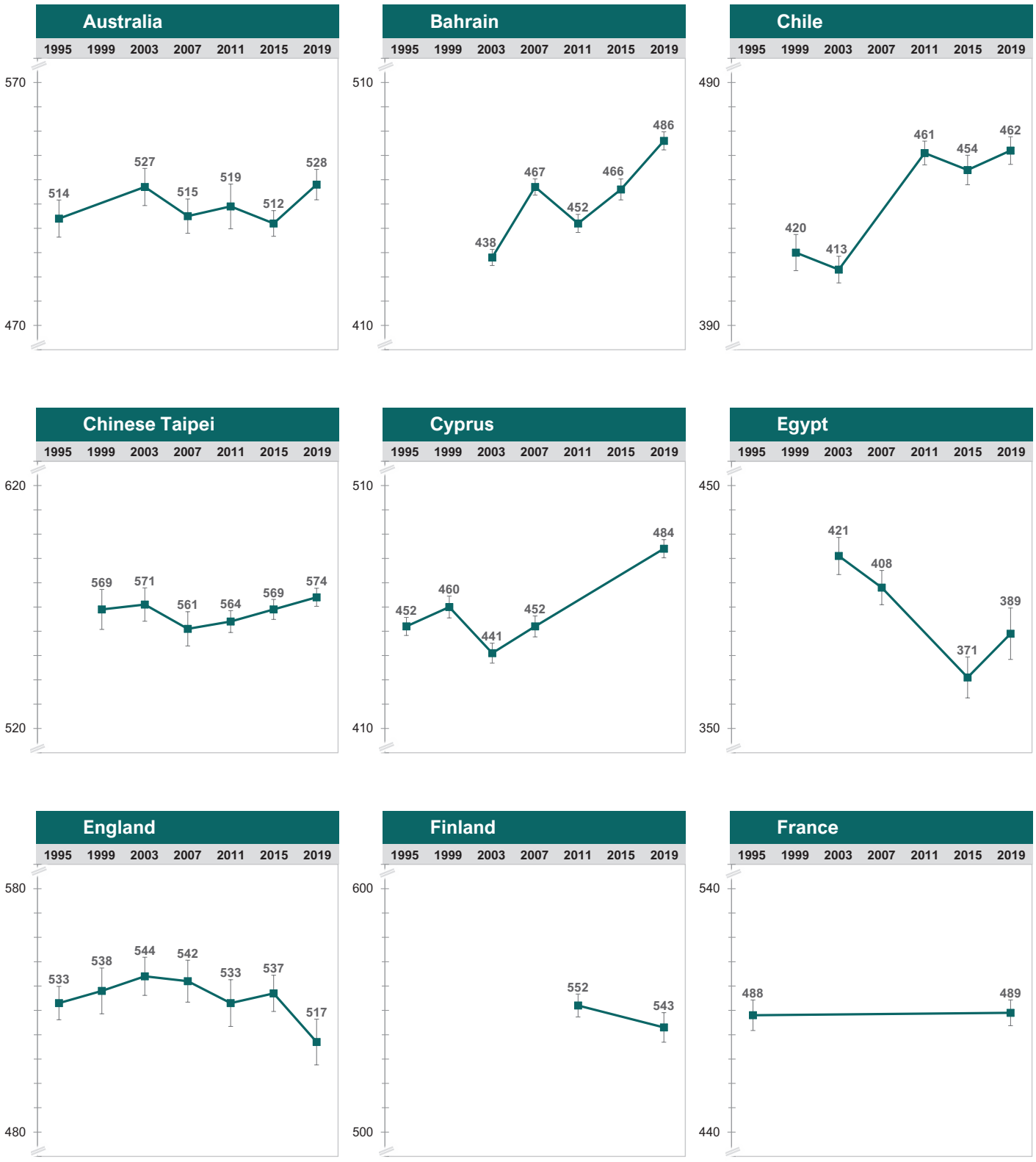
Trends in Average Achievement

Exhibit 4.3 graphs the differences in average science achievement between the assessments for TIMSS 2019 countries that have comparable data from previous assessments, while Exhibit 4.4 provides more details. The countries are presented in alphabetical order in both exhibits. The trends in science achievement at the eighth grade signal more improvements than downturns across the assessment cycles internationally. However, across the seven assessment cycles since 1995, most countries have had some periods of increases and decreases in average achievement as well as periods of stability.

Most recently, for the 33 countries that participated in both TIMSS 2015 and 2019, 11 had increases in average achievement and 5 had declines. Looking at trends between 2007 and 2019 as well as between 1995 and 2019 also shows moderate progress in average science achievement at the eighth grade over the long term, with more countries having increases than decreases. In 2019 compared with 2007, for the 23 countries in both assessments, there were 12 increases and 6 decreases. In 2019 compared with 1995, for the 18 countries in both assessments, there were 8 increases and 4 decreases.

Exhibit 4.3: Trend Plots of Average Science Achievement Across Assessment Years

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 4.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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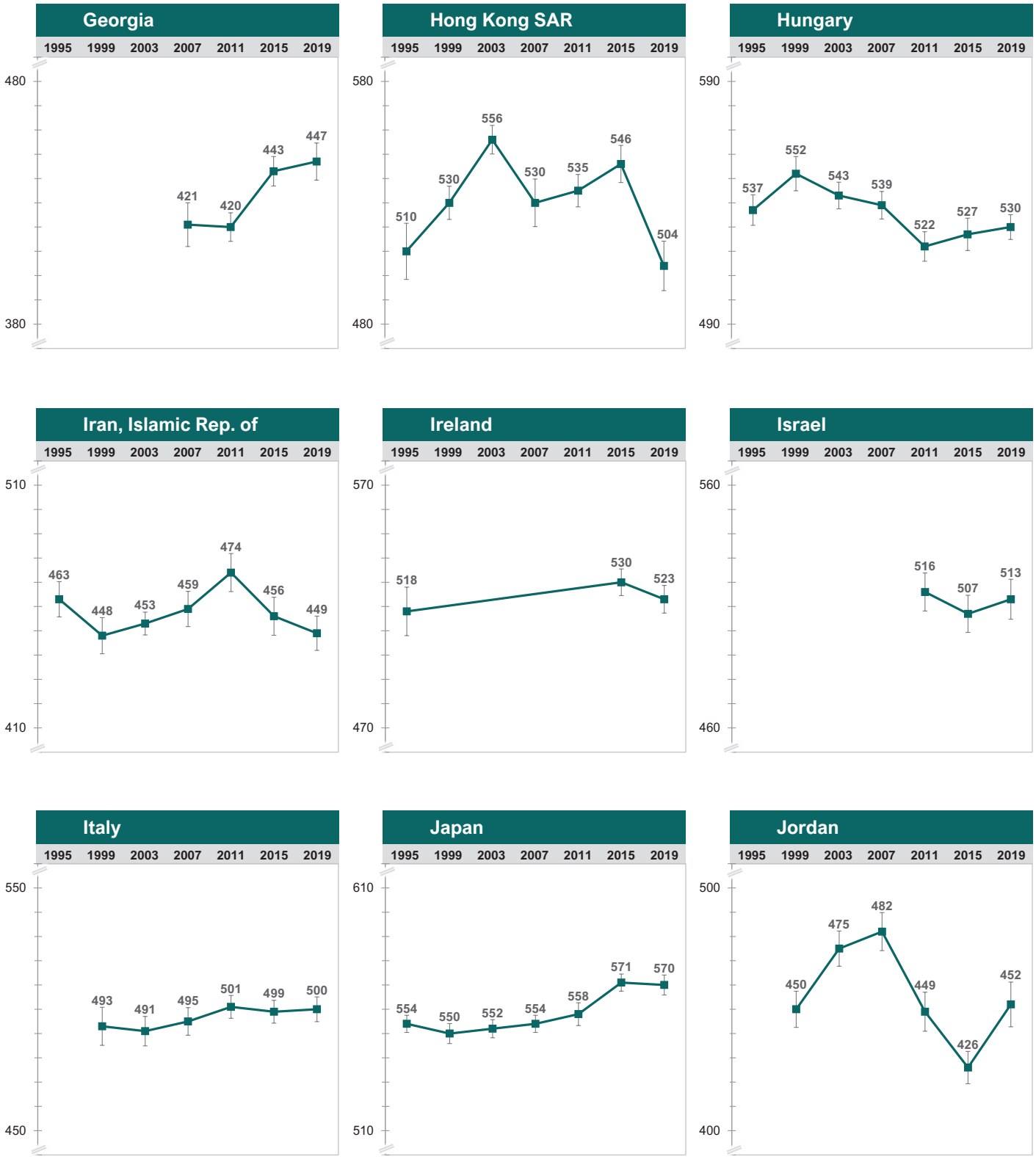
Exhibit 4.3: Trend Plots of Average Science Achievement Across Assessment Years

(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 4.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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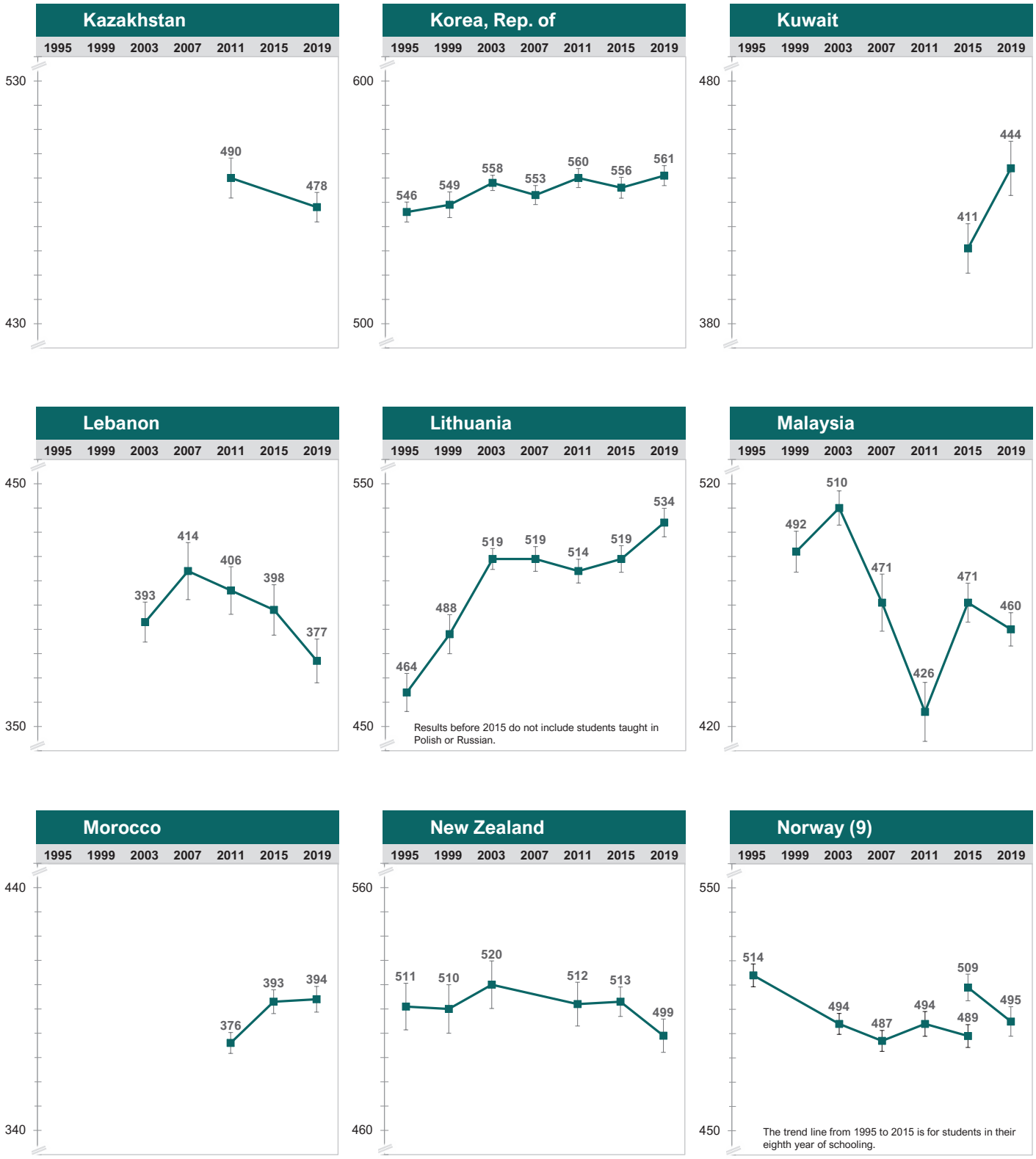
Exhibit 4.3: Trend Plots of Average Science Achievement Across Assessment Years

(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 4.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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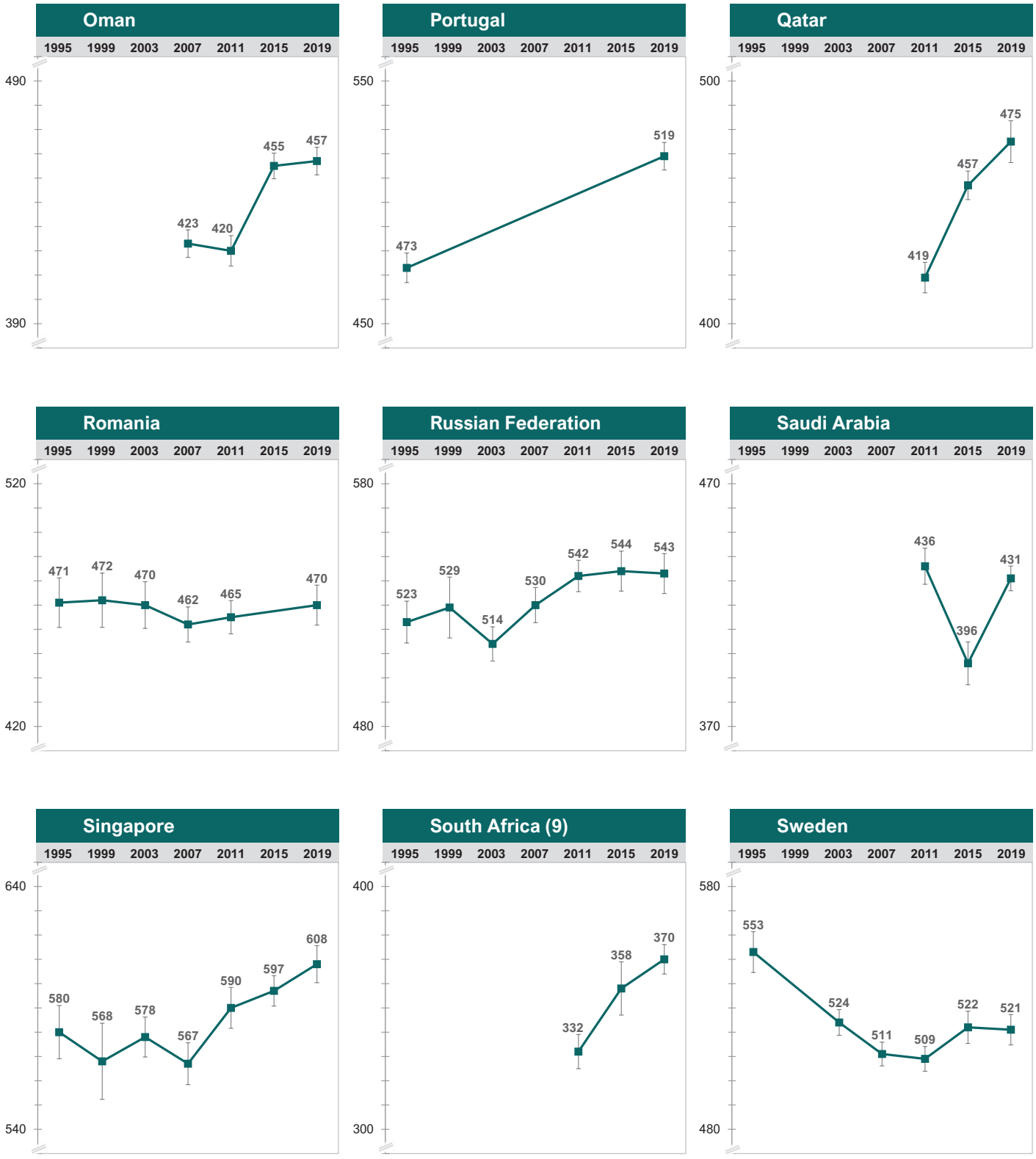
Exhibit 4.3: Trend Plots of Average Science Achievement Across Assessment Years

(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 4.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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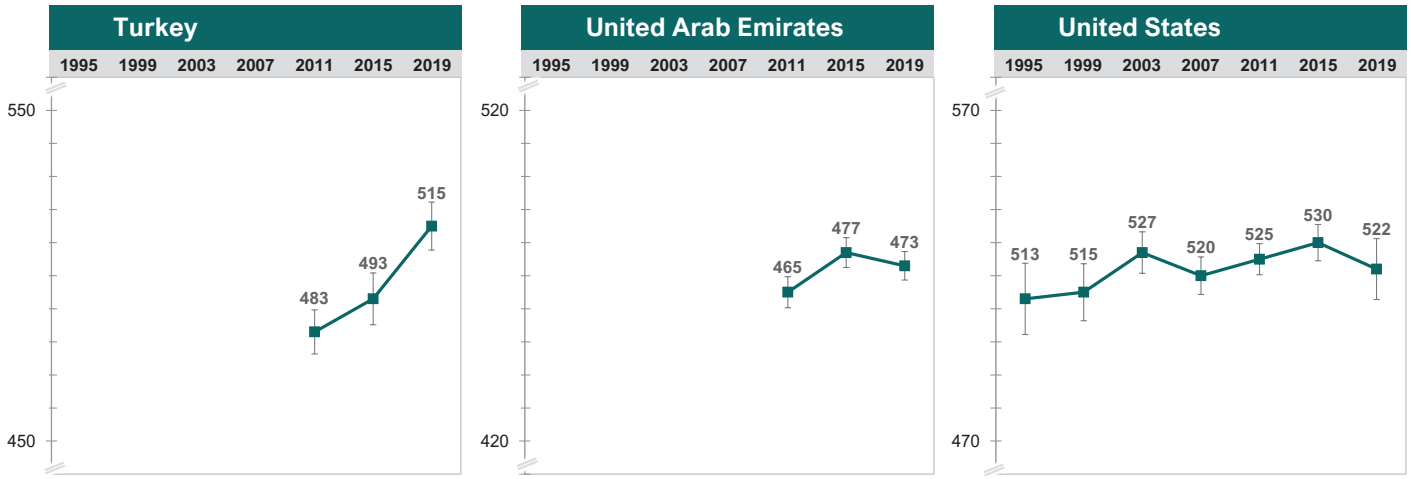
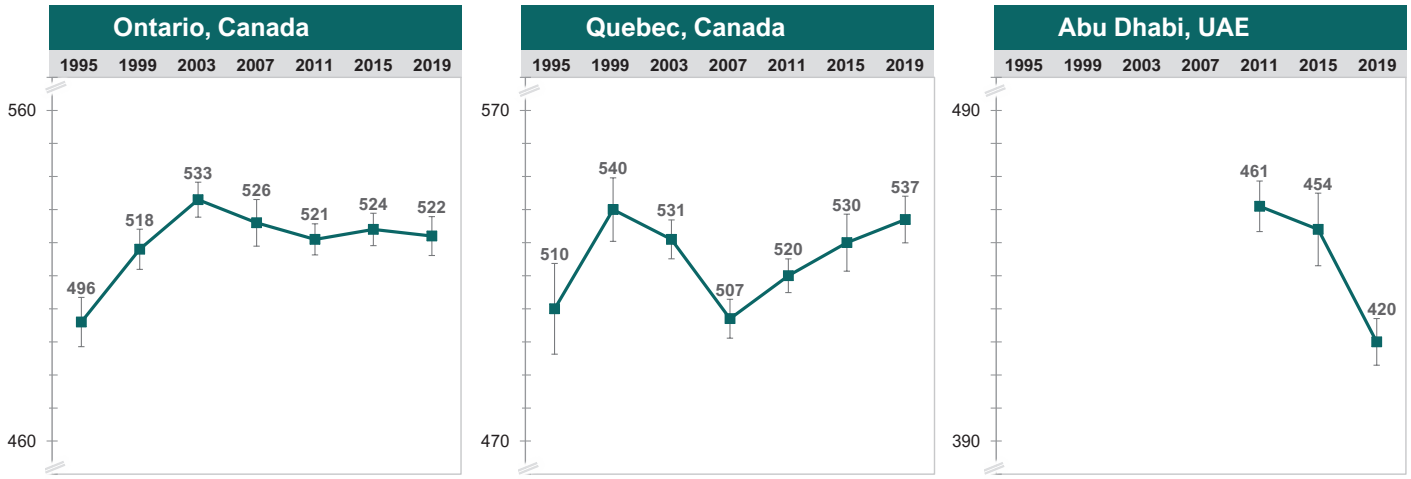
Exhibit 4.3: Trend Plots of Average Science Achievement Across Assessment Years

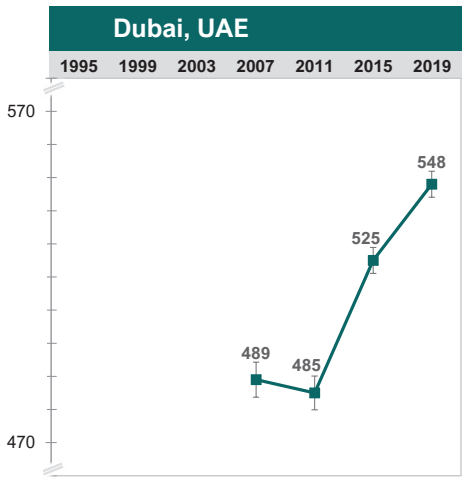
(Continued)

This exhibit displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The accompanying table (Exhibit 4.4) provides details, including statistical significance. See Appendix A for country participation in previous assessments.



Benchmarking Participants





See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.
I The black bars represent the 95% confidence interval.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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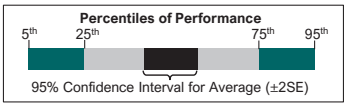
Exhibit 4.4: Differences in Average Science Achievement Across Assessment Years

Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▽) than the performance in the column year.

Country	Average Scale Score	Differences Between Years						Science Achievement Distribution
		2015	2011	2007	2003	1999	1995	
Australia								
2019	528 (3.2)	16 ▲	9	14 ▲	1		15 ▲	
2015	512 (2.7)		-7	-3	-15 ▽		-2	
2011	519 (4.7)			4	-8		6	
2007	515 (3.6)				-12 ▽		1	
2003	527 (3.9)						13 ▲	
‡ 1995	514 (3.9)							
Bahrain								
2019	486 (1.9)	20 ▲	34 ▲	19 ▲	48 ▲			
2015	466 (2.2)		13 ▲	-2	28 ▲			
2011	452 (1.9)			-15 ▽	14 ▲			
2007	467 (1.7)				29 ▲			
2003	438 (1.7)							
Chile								
2019	462 (2.9)	8 ▲	1		49 ▲	42 ▲		
2015	454 (3.1)		-7		41 ▲	34 ▲		
2011	461 (2.5)				49 ▲	41 ▲		
2003	413 (2.8)					-8		
1999	420 (3.8)							
Chinese Taipei								
2019	574 (1.9)	5	11 ▲	13 ▲	3	5		
2015	569 (2.1)		6	8 ▲	-2	0		
2011	564 (2.3)			3	-7	-5		
2007	561 (3.6)				-10 ▽	-8		
2003	571 (3.5)					2		
1999	569 (4.2)							
Cyprus								
2019	484 (1.9)			32 ▲	42 ▲	23 ▲	32 ▲	
2007	452 (2.2)				10 ▲	-9 ▽	0	
2003	441 (2.1)					-19 ▽	-11 ▽	
1999	460 (2.3)						8 ▲	
1995	452 (1.9)							
Egypt								
[2] 2019	389 (5.4)	19 ▲		-19 ▽	-32 ▽			
2015	371 (4.3)			-37 ▽	-50 ▽			
2007	408 (3.6)				-13 ▽			
2003	421 (3.9)							
England								
2019	517 (4.8)	-20 ▽	-16 ▽	-25 ▽	-27 ▽	-22 ▽	-17 ▽	
2015	537 (3.8)		4	-5	-7	-2	3	
‡ 2011	533 (4.9)			-9	-11	-5	0	
† 2007	542 (4.4)				-2	3	8	
≡ 2003	544 (4.0)					5	11 ▲	
† 1999	538 (4.8)						5	
[3] † 1995	533 (3.5)							
Finland								
2019	543 (3.1)		-10 ▽					
2011	552 (2.4)							
France								
2019	489 (2.7)						1	
1995	488 (3.2)							
Georgia								
[1] 2019	447 (3.9)	4	27 ▲	26 ▲				
[1] [2] 2015	443 (3.1)		23 ▲	22 ▲				
[1] 2011	420 (3.0)			-1				
[1] 2007	421 (4.6)							
Hong Kong SAR								
† 2019	504 (5.2)	-42 ▽	-32 ▽	-27 ▽	-53 ▽	-26 ▽	-6	
2015	546 (3.9)		11 ▲	16 ▲	-10 ▽	16 ▲	36 ▲	
2011	535 (3.4)			5	-21 ▽	6	25 ▲	
† 2007	530 (5.0)				-26 ▽	1	20 ▲	
† 2003	556 (3.0)					27 ▲	46 ▲	
† 1999	530 (3.5)						20 ▲	
1995	510 (5.9)							

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower



See Appendix A for country participation in previous TIMSS assessments.
See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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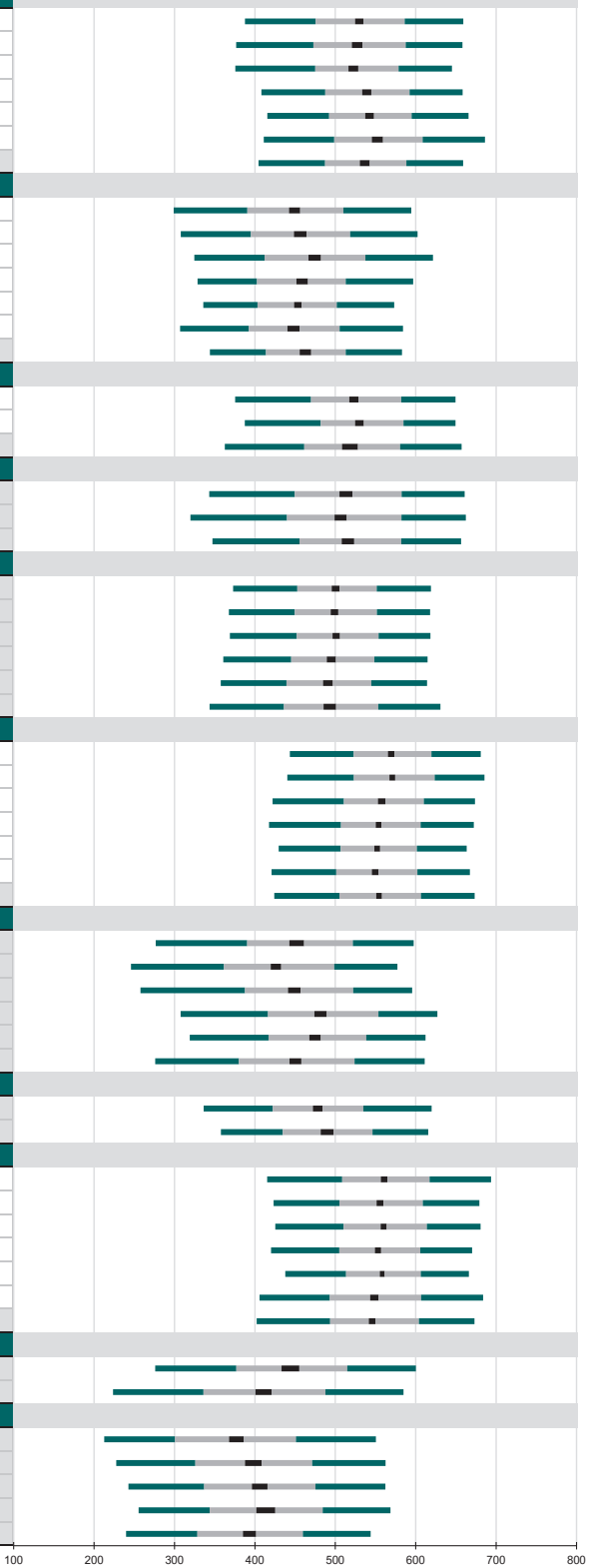
Exhibit 4.4: Differences in Average Science Achievement Across Assessment Years

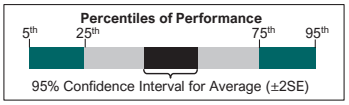
(Continued)

Country	Average Scale Score	Differences Between Years						Science Achievement Distribution
		2015	2011	2007	2003	1999	1995	
Hungary								
2019	530 (2.6)	2	7	-9 ▽	-13 ▽	-23 ▽	-7	
2015	527 (3.4)		5	-12 ▽	-16 ▽	-25 ▽	-9 ▽	
2011	522 (3.1)			-17 ▽	-20 ▽	-30 ▽	-14 ▽	
2007	539 (2.9)				-4	-13 ▽	2	
[2] 2003	543 (2.8)					-10 ▽	6	
1999	552 (3.6)						16 ▲	
1995	537 (3.2)							
Iran, Islamic Rep. of								
2019	449 (3.6)	-7	-25 ▽	-10	-4	1	-13 ▽	
2015	456 (4.0)		-18 ▽	-3	3	8	-6	
2011	474 (4.0)			15 ▲	21 ▲	26 ▲	12 ▲	
2007	459 (3.7)				6	11 ▲	-4	
[2] 2003	453 (2.4)					5	-9 ▽	
1999	448 (3.8)						-15 ▽	
1995	463 (3.7)							
Ireland								
2019	523 (2.9)	-7					5	
2015	530 (2.8)						12 ▲	
1995	518 (5.1)							
Israel								
[3] 2019	513 (4.2)	7	-2					
[3] 2015	507 (3.9)		-9					
[3] 2011	516 (4.0)							
Italy								
2019	500 (2.6)	2	-1	5	10 ▲	7		
[2] 2015	499 (2.4)		-2	4	8 ▲	6		
2011	501 (2.4)			6	10 ▲	8		
2007	495 (2.9)				4	2		
2003	491 (3.1)					-2		
[2] 1999	493 (4.0)							
Japan								
2019	570 (2.1)	-1	12 ▲	16 ▲	17 ▲	20 ▲	15 ▲	
2015	571 (1.8)		13 ▲	17 ▲	19 ▲	21 ▲	16 ▲	
2011	558 (2.4)			4	6	8 ▲	3	
2007	554 (1.8)				2	4	-1	
2003	552 (1.9)					3	-2	
1999	550 (2.1)						-5	
1995	554 (1.8)							
Jordan								
2019	452 (4.7)	26 ▲	3	-30 ▽	-23 ▽	2		
2015	426 (3.4)		-23 ▽	-56 ▽	-49 ▽	-24 ▽		
2011	449 (4.1)			-33 ▽	-26 ▽	-1		
2007	482 (4.0)				7	31 ▲		
2003	475 (3.7)					25 ▲		
1999	450 (3.8)							
Kazakhstan								
[2] 2019	478 (3.1)		-12 ▽					
2011	490 (4.2)							
Korea, Rep. of								
2019	561 (2.1)	5	1	8 ▲	2	12 ▲	15 ▲	
2015	556 (2.2)		-5	2	-3	7 ▲	10 ▲	
2011	560 (2.0)			7 ▲	2	12 ▲	14 ▲	
2007	553 (2.0)				-5 ▽	4	7 ▲	
2003	558 (1.6)					10 ▲	13 ▲	
1999	549 (2.7)						3	
1995	546 (2.1)							
Kuwait								
2019	444 (5.7)	33 ▲						
2015	411 (5.2)							
Lebanon								
2019	377 (4.6)	-21 ▽	-29 ▽	-37 ▽	-17 ▽			
2015	398 (5.3)		-8	-15	5			
2011	406 (5.0)			-8	13			
2007	414 (6.0)				20 ▲			
2003	393 (4.2)							



▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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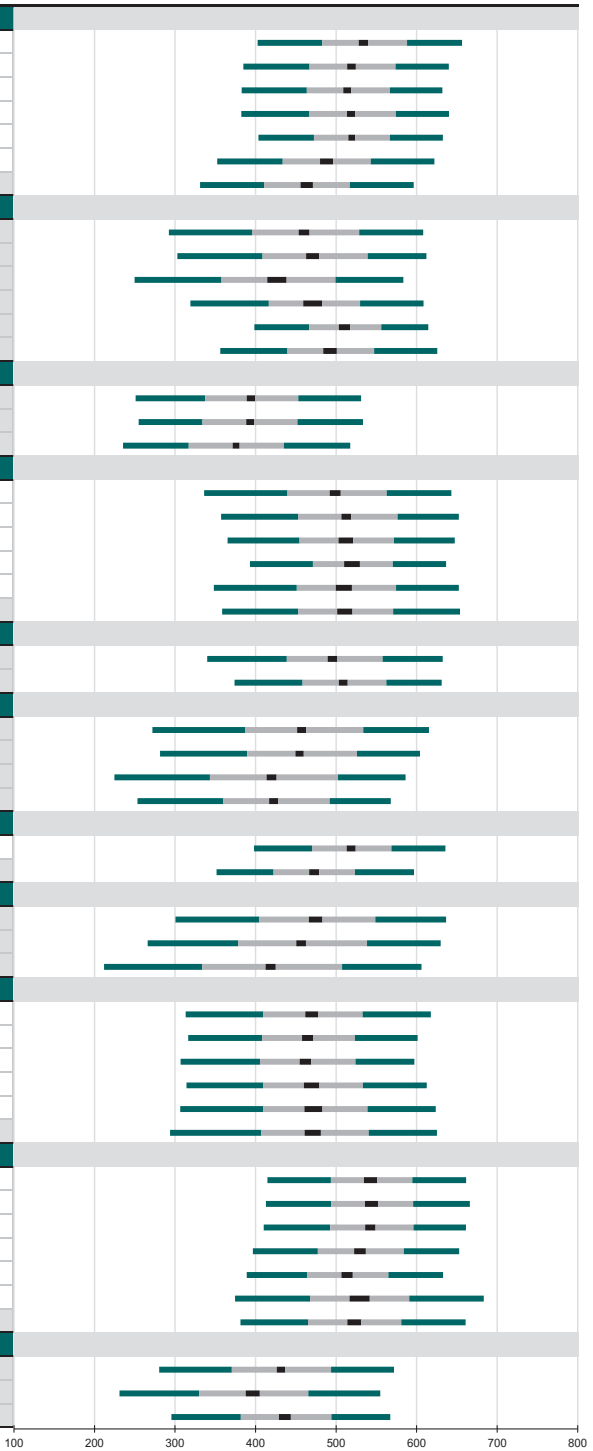
Exhibit 4.4: Differences in Average Science Achievement Across Assessment Years

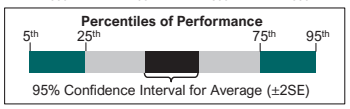
(Continued)

Country	Average Scale Score	Differences Between Years						Science Achievement Distribution
		2015	2011	2007	2003	1999	1995	
Lithuania								
2019	534 (3.0)	15 ▲	20 ▲	15 ▲	14 ▲	46 ▲	70 ▲	
[2] 2015	519 (2.8)		5	1	0	31 ▲	56 ▲	
[1] 2011	514 (2.5)			-5	-6	26 ▲	50 ▲	
[1] 2007	519 (2.6)				-1	30 ▲	55 ▲	
[1] 2003	519 (2.2)					31 ▲	56 ▲	
[1] 1999	488 (4.1)						25 ▲	
[1 2] 1995	464 (4.0)							
Malaysia								
2019	460 (3.5)	-11	34 ▲	-11	-50 ▽	-32 ▽		
2015	471 (4.1)		44 ▲	0	-40 ▽	-22 ▽		
2011	426 (6.2)			-44 ▽	-84 ▽	-66 ▽		
2007	471 (6.0)				-40 ▽	-22 ▽		
2003	510 (3.6)					18 ▲		
1999	492 (4.3)							
Morocco								
2019	394 (2.7)	1	18 ▲					
2015	393 (2.5)		17 ▲					
2011	376 (2.2)							
New Zealand								
† 2019	499 (3.5)	-14 ▽	-13 ▽		-21 ▽	-11	-12 ▽	
† 2015	513 (3.1)		1		-7	3	2	
2011	512 (4.6)				-8	2	1	
2003	520 (5.0)					10	9	
1999	510 (5.1)						-1	
1995	511 (4.9)							
Norway (9)								
† 2019	495 (3.1)	-13 ▽						
2015	509 (2.8)							
Oman								
2019	457 (2.9)	3	37 ▲	35 ▲				
2015	455 (2.7)		35 ▲	32 ▲				
2011	420 (3.2)			-3				
2007	423 (2.9)							
Portugal								
2019	519 (2.9)						46 ▲	
1995	473 (3.1)							
Qatar								
2019	475 (4.4)	18 ▲	56 ▲					
2015	457 (3.0)		38 ▲					
2011	419 (3.2)							
Romania								
2019	470 (4.2)		5	8	0	-2	-1	
2011	465 (3.5)			3	-5	-7	-6	
2007	462 (3.7)				-8	-10	-9	
2003	470 (4.9)					-2	-1	
1999	472 (5.7)						1	
1995	471 (5.2)							
Russian Federation								
[2] 2019	543 (4.2)	-1	0	13 ▲	29 ▲	14	20 ▲	
2015	544 (4.2)		2	15 ▲	30 ▲	15	22 ▲	
[2] 2011	542 (3.3)			13 ▲	29 ▲	13	20 ▲	
2007	530 (3.7)				16 ▲	0	7	
2003	514 (3.6)					-16 ▽	-9	
1999	529 (6.4)						7	
[2] 1995	523 (4.4)							
Saudi Arabia								
[2] 2019	431 (2.6)	35 ▲	-5					
2015	396 (4.5)		-40 ▽					
2011	436 (3.8)							



▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 4.4: Differences in Average Science Achievement Across Assessment Years

(Continued)

Country	Average Scale Score	Differences Between Years						Science Achievement Distribution
		2015	2011	2007	2003	1999	1995	
Singapore								
[2] 2019	608 (3.9)	11 ▲	18 ▲	40 ▲	30 ▲	40 ▲	27 ▲	
[2] 2015	597 (3.2)		7	29 ▲	19 ▲	29 ▲	16 ▲	
[2] 2011	590 (4.3)			23 ▲	12 ▲	22 ▲	10	
2007	567 (4.4)				-11	-1	-13	
2003	578 (4.2)					10	-3	
1999	568 (8.0)						-12	
1995	580 (5.6)							
South Africa (9)								
Ψ 2019	370 (3.1)	12	38 ▲					
2015	358 (5.6)		26 ▲					
Ψ 2011	332 (3.6)							
Sweden								
[2] 2019	521 (3.2)	-1	12 ▲	11 ▲	-3		-31 ▽	
2015	522 (3.4)		13 ▲	12 ▲	-2		-30 ▽	
2011	509 (2.6)			-1	-15 ▽		-43 ▽	
2007	511 (2.5)				-14 ▽		-42 ▽	
2003	524 (2.7)						-28 ▽	
1995	553 (4.3)							
Turkey								
2019	515 (3.7)	22 ▲	32 ▲					
2015	493 (4.0)		10 ▲					
2011	483 (3.4)							
United Arab Emirates								
2019	473 (2.2)	-4	8 ▲					
2015	477 (2.3)		12 ▲					
2011	465 (2.4)							
United States								
† 2019	522 (4.7)	-8	-2	2	-5	7	10	
† 2015	530 (2.8)		5	10 ▲	3	15 ▲	17 ▲	
[2] 2011	525 (2.4)			5	-3	10	12 ▲	
[2] † 2007	520 (2.9)				-7	5	7	
‡ 2003	527 (3.2)					12 ▲	15 ▲	
1999	515 (4.4)						2	
† 1995	513 (5.5)							
Benchmarking Participants								
Ontario, Canada								
2019	522 (3.0)	-2	0	-5	-11 ▽	3	25 ▲	
2015	524 (2.5)		3	-2	-9 ▽	6	28 ▲	
[2] 2011	521 (2.4)			-5	-12 ▽	3	25 ▲	
[2] 2007	526 (3.6)				-7	8	30 ▲	
[2] 2003	533 (2.7)					15 ▲	37 ▲	
1999	518 (3.1)						22 ▲	
1995	496 (3.8)							
Quebec, Canada								
‡ 2019	537 (3.6)	7	17 ▲	30 ▲	6	-4	27 ▲	
≡ 2015	530 (4.4)		10	23 ▲	-1	-11	20 ▲	
2011	520 (2.6)			13 ▲	-11 ▽	-21 ▽	10	
[3] 2007	507 (3.0)				-24 ▽	-34 ▽	-3	
2003	531 (3.0)					-9	21 ▲	
1999	540 (4.9)						30 ▲	
1995	510 (7.0)							
Abu Dhabi, UAE								
2019	420 (3.6)	-34 ▽	-41 ▽					
2015	454 (5.6)		-7					
2011	461 (3.9)							
Dubai, UAE								
[2] 2019	548 (2.0)	23 ▲	63 ▲	59 ▲				
2015	525 (2.0)		40 ▲	36 ▲				
2011	485 (2.6)			-4				
‡ 2007	489 (2.7)							

100 200 300 400 500 600 700 800

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

Percentiles of Performance
5th 25th 75th 95th
95% Confidence Interval for Average (±2SE)

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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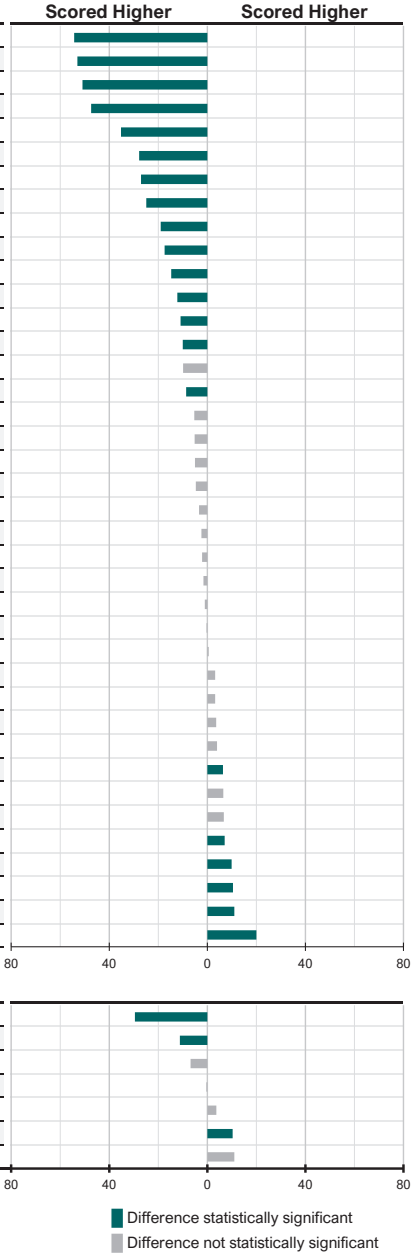
Average Achievement by Gender

Exhibit 4.5 shows the differences in average science achievement between girls and boys. In TIMSS 2019, girls had higher average achievement than boys in 15 countries, there was gender equity in average science achievement in 18 countries, and boys had higher average achievement than girls in 6 countries.

Exhibit 4.5: Average Science Achievement by Gender

Country	Girls		Boys		Difference (Absolute Value)	Gender Difference
	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score		Girls Scored Higher / Boys Scored Higher
Oman	48 (1.1)	485 (3.1)	52 (1.1)	431 (4.5)	54 (5.1)	
Jordan	48 (3.4)	480 (4.0)	52 (3.4)	427 (6.6)	53 (7.6)	
Bahrain	49 (0.9)	512 (2.6)	51 (0.9)	461 (2.8)	51 (3.7)	
[2] Saudi Arabia	49 (0.9)	455 (3.3)	51 (0.9)	408 (3.9)	47 (5.0)	
Kuwait	53 (2.2)	461 (5.7)	47 (2.2)	426 (9.4)	35 (10.3)	
Qatar	50 (2.4)	488 (5.2)	50 (2.4)	461 (6.0)	28 (7.4)	
[2] Egypt	55 (2.0)	402 (6.1)	45 (2.0)	374 (8.2)	27 (9.2)	
United Arab Emirates	48 (1.8)	486 (3.9)	52 (1.8)	461 (4.0)	25 (6.5)	
Finland	48 (0.8)	552 (3.1)	52 (0.8)	533 (3.9)	19 (3.5)	
Iran, Islamic Rep. of	47 (1.3)	459 (4.6)	53 (1.3)	441 (5.4)	17 (7.2)	
Cyprus	49 (0.6)	491 (2.4)	51 (0.6)	476 (2.5)	15 (3.1)	
Ψ South Africa (9)	52 (0.6)	376 (3.2)	48 (0.6)	364 (3.6)	12 (2.8)	
[2] Sweden	49 (0.9)	527 (3.7)	51 (0.9)	516 (3.8)	11 (4.0)	
Romania	51 (0.9)	475 (4.3)	49 (0.9)	465 (4.9)	10 (3.9)	
Turkey	50 (1.3)	520 (3.8)	50 (1.3)	510 (5.1)	10 (5.1)	
[2] Kazakhstan	49 (1.1)	483 (3.4)	51 (1.1)	474 (3.6)	9 (3.4)	
Malaysia	51 (1.1)	463 (3.5)	49 (1.1)	458 (4.3)	5 (3.7)	
Ireland	49 (1.1)	526 (3.0)	51 (1.1)	521 (3.9)	5 (3.8)	
Lebanon	49 (1.4)	379 (5.3)	51 (1.4)	374 (5.2)	5 (5.0)	
† United States	49 (0.9)	525 (3.9)	51 (0.9)	520 (6.1)	5 (4.3)	
England	53 (1.9)	518 (5.5)	47 (1.9)	515 (6.6)	3 (7.2)	
Lithuania	50 (1.0)	535 (3.0)	50 (1.0)	533 (3.6)	2 (2.9)	
† Hong Kong SAR	46 (2.1)	505 (5.9)	54 (2.1)	503 (6.3)	2 (6.5)	
Morocco	50 (0.7)	395 (2.9)	50 (0.7)	393 (2.9)	2 (2.4)	
[1] Georgia	48 (1.2)	447 (4.4)	52 (1.2)	446 (4.5)	1 (4.3)	
Australia	49 (1.5)	529 (3.1)	51 (1.5)	528 (4.6)	0 (4.7)	
† Norway (9)	49 (0.7)	495 (3.5)	51 (0.7)	496 (3.8)	1 (3.9)	
† New Zealand	48 (2.1)	497 (3.6)	52 (2.1)	500 (4.9)	3 (5.0)	
[3] Israel	52 (1.7)	512 (4.5)	48 (1.7)	515 (5.0)	3 (4.6)	
France	49 (0.8)	487 (2.6)	51 (0.8)	490 (3.6)	4 (3.4)	
Chinese Taipei	50 (0.9)	572 (2.4)	50 (0.9)	576 (2.5)	4 (2.9)	
Portugal	50 (1.1)	516 (3.2)	50 (1.1)	522 (3.4)	6 (3.1)	
[2] Singapore	49 (0.7)	604 (4.5)	51 (0.7)	611 (4.5)	7 (4.4)	
[2] Russian Federation	48 (1.0)	539 (4.5)	52 (1.0)	546 (4.6)	7 (3.5)	
Italy	50 (1.0)	497 (2.8)	50 (1.0)	504 (3.0)	7 (2.7)	
Japan	52 (1.0)	565 (2.4)	48 (1.0)	575 (2.5)	10 (2.5)	
Korea, Rep. of	48 (1.4)	555 (2.9)	52 (1.4)	566 (2.6)	10 (3.5)	
Chile	49 (1.6)	457 (3.6)	51 (1.6)	468 (3.9)	11 (4.7)	
Hungary	50 (0.9)	520 (2.9)	50 (0.9)	540 (3.2)	20 (3.1)	
International Average	**50 (0.2)**	**495 (0.6)**	**50 (0.2)**	**485 (0.8)**		
Benchmarking Participants						
Abu Dhabi, UAE	47 (2.1)	436 (6.9)	53 (2.1)	406 (5.8)	30 (10.6)	
Gauteng, RSA (9)	55 (0.9)	427 (4.1)	45 (0.9)	416 (4.3)	11 (3.4)	
[2] Dubai, UAE	50 (3.6)	551 (5.5)	50 (3.6)	544 (6.6)	7 (11.4)	
‡ Quebec, Canada	51 (2.0)	537 (4.1)	49 (2.0)	536 (4.0)	0 (3.7)	
Ontario, Canada	50 (0.9)	520 (3.4)	50 (0.9)	523 (3.5)	4 (3.3)	
Moscow City, Russian Fed.	48 (1.1)	561 (3.2)	52 (1.1)	572 (3.3)	10 (2.8)	
Western Cape, RSA (9)	55 (1.2)	434 (6.1)	45 (1.2)	445 (6.2)	11 (6.8)	



Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
See Appendix B.7 for target population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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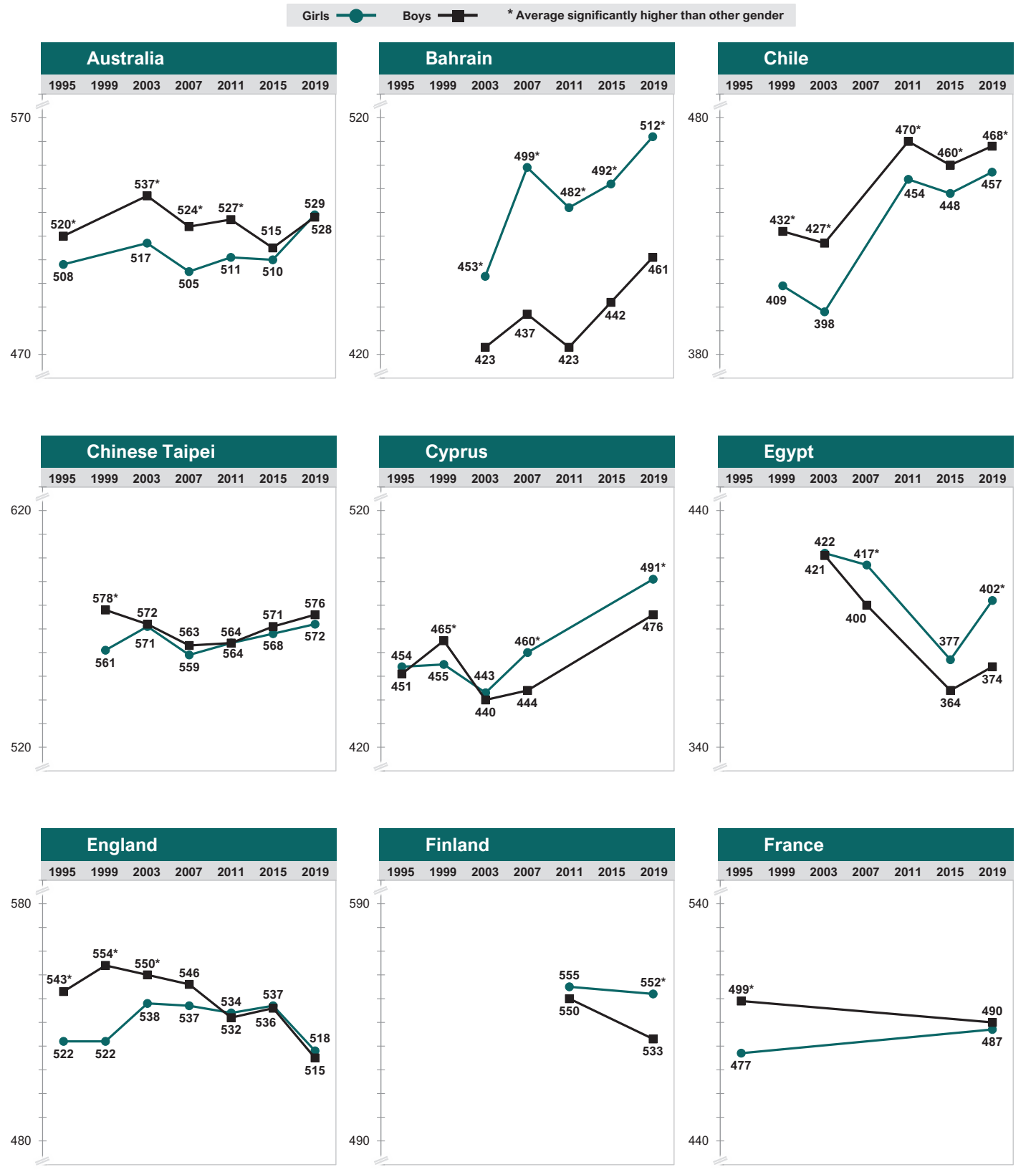
Trends in Average Achievement by Gender

For the TIMSS 2019 countries with comparable data from previous TIMSS assessments, Exhibit 4.6 contains graphs of average science achievement across assessments by gender. The countries are presented in alphabetical order. The difference in average science achievement between boys and girls has remained relatively stable in most countries, with any overall increases or decreases in achievement from assessment to assessment occurring similarly for both girls and boys. However, consistent with girls having average higher achievement than boys in more countries than the other way around, a number of countries with no gender gap in TIMSS 2015 had a gap favoring girls in TIMSS 2019, including Egypt, Iran, South Africa (ninth grade), and Sweden. (Finland, Kazakhstan, and Romania did not have comparable data from 2015, but had a gap favoring girls in TIMSS 2019 that did not exist in 2011.) The gender gap in average achievement favoring girls in TIMSS 2015 was closed in Lebanon, Malaysia, Morocco, and Turkey. Japan and Korea had no gender gap in 2015, but had a gap favoring boys in 2019. The gender gap in average achievement favoring boys in TIMSS 2015 was closed in Hong Kong SAR and the United States.

Exhibit 4.6: Trend Plots of Average Science Achievement Across Assessment Years by Gender

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



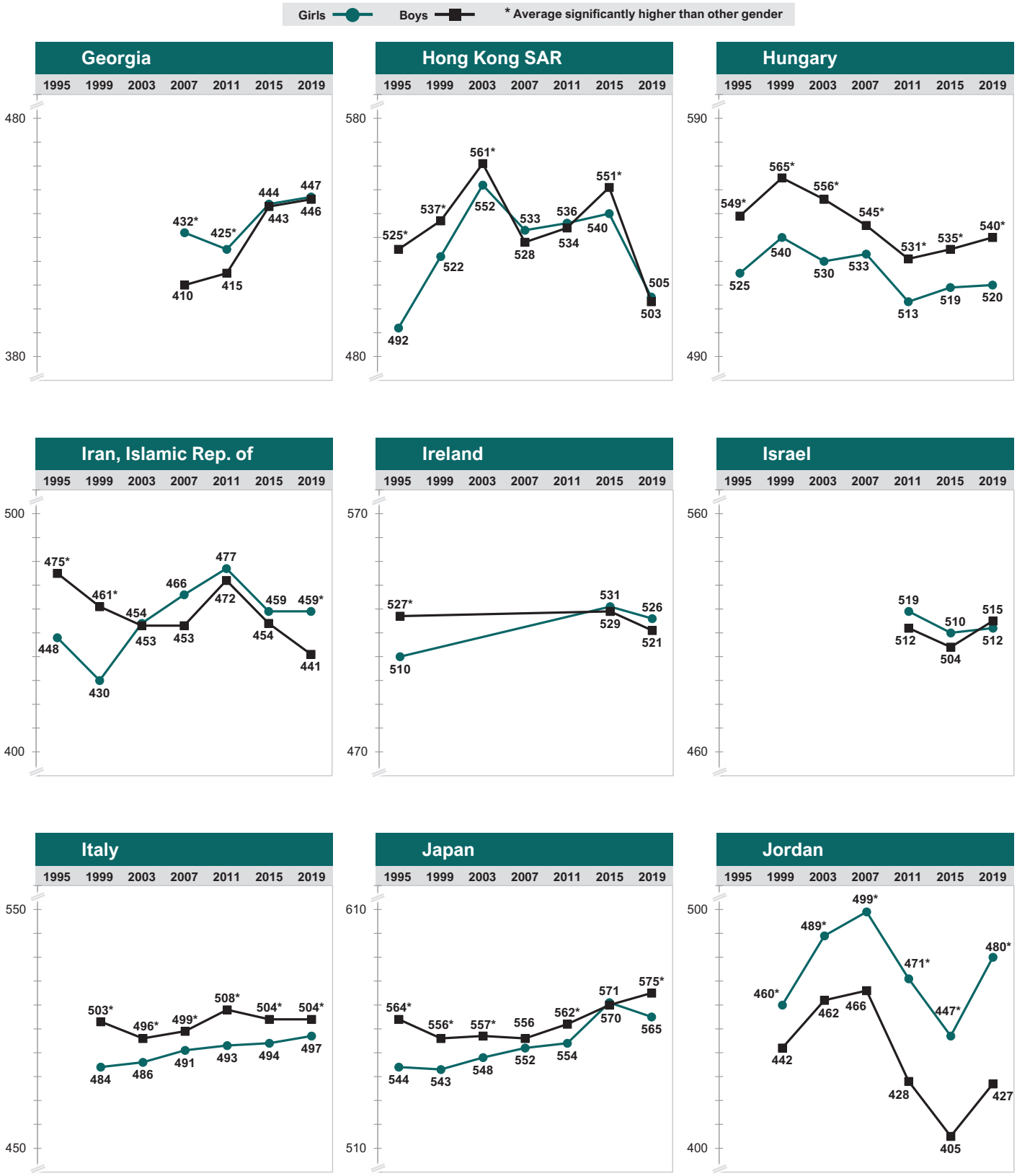
See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 4.6: Trend Plots of Average Science Achievement Across Assessment Years by Gender

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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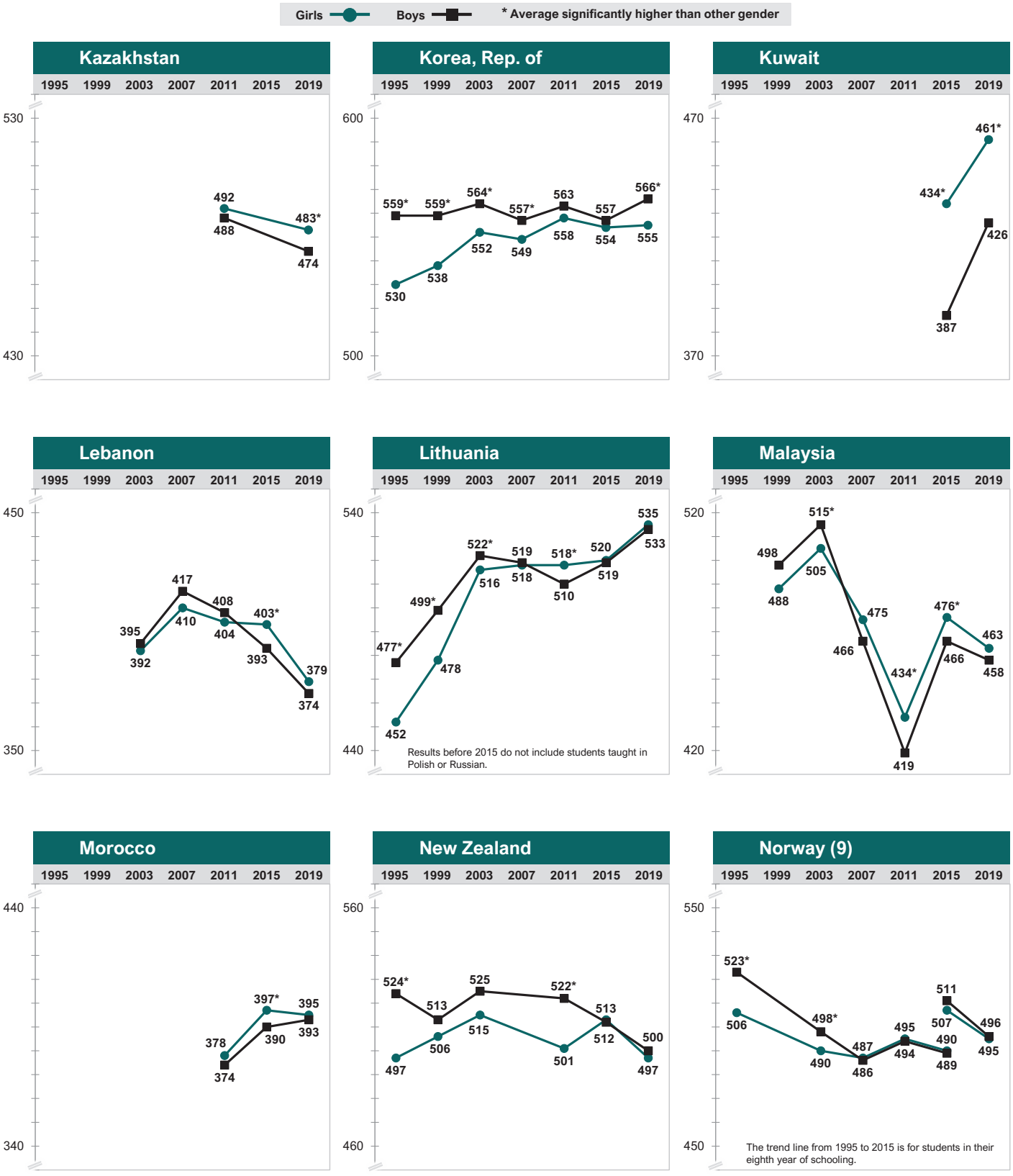
Exhibit 4.6: Trend Plots of Average Science Achievement Across Assessment Years by Gender

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

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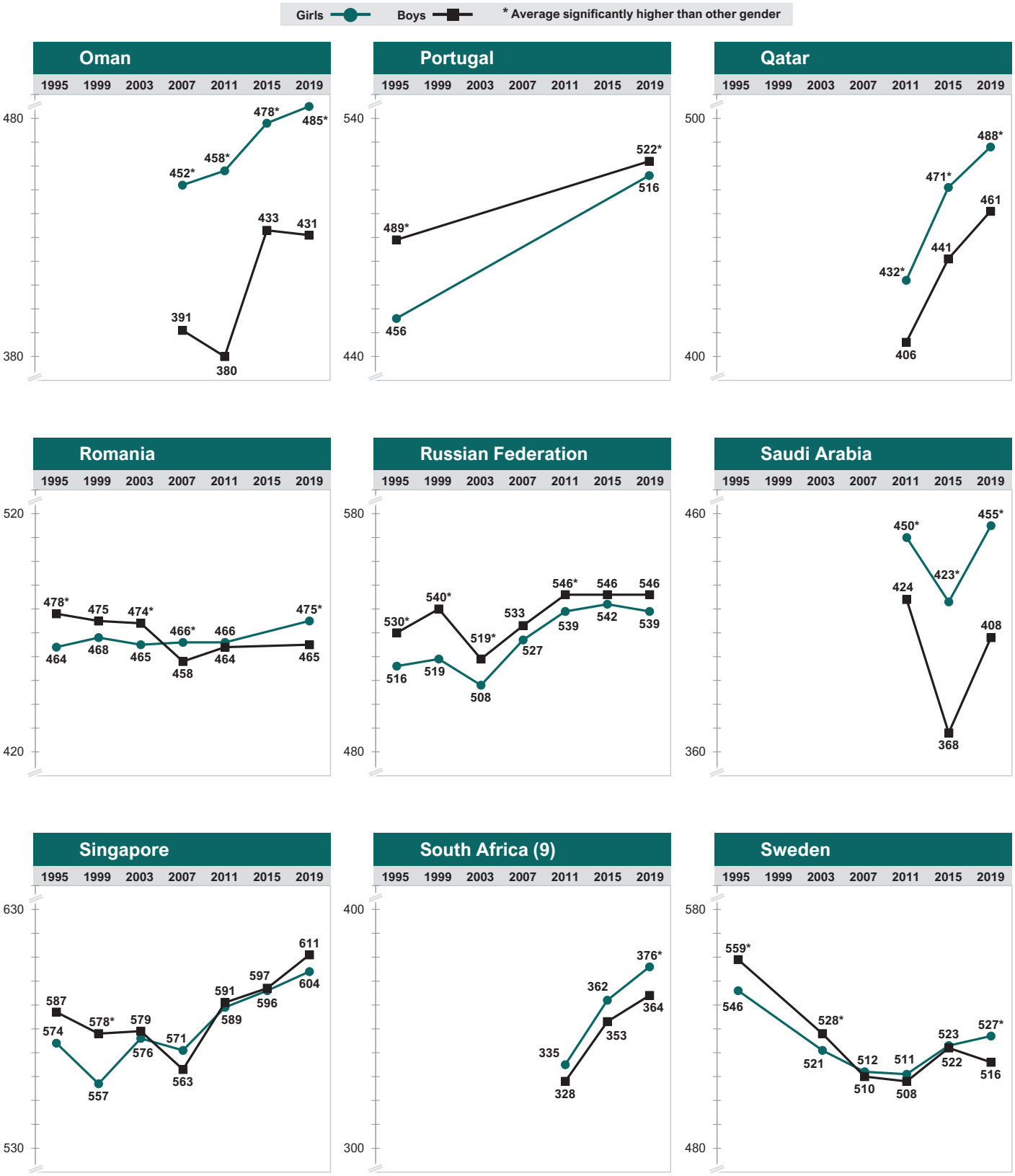
Downloaded from http://timss2019.org/download

Exhibit 4.6: Trend Plots of Average Science Achievement Across Assessment Years by Gender

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

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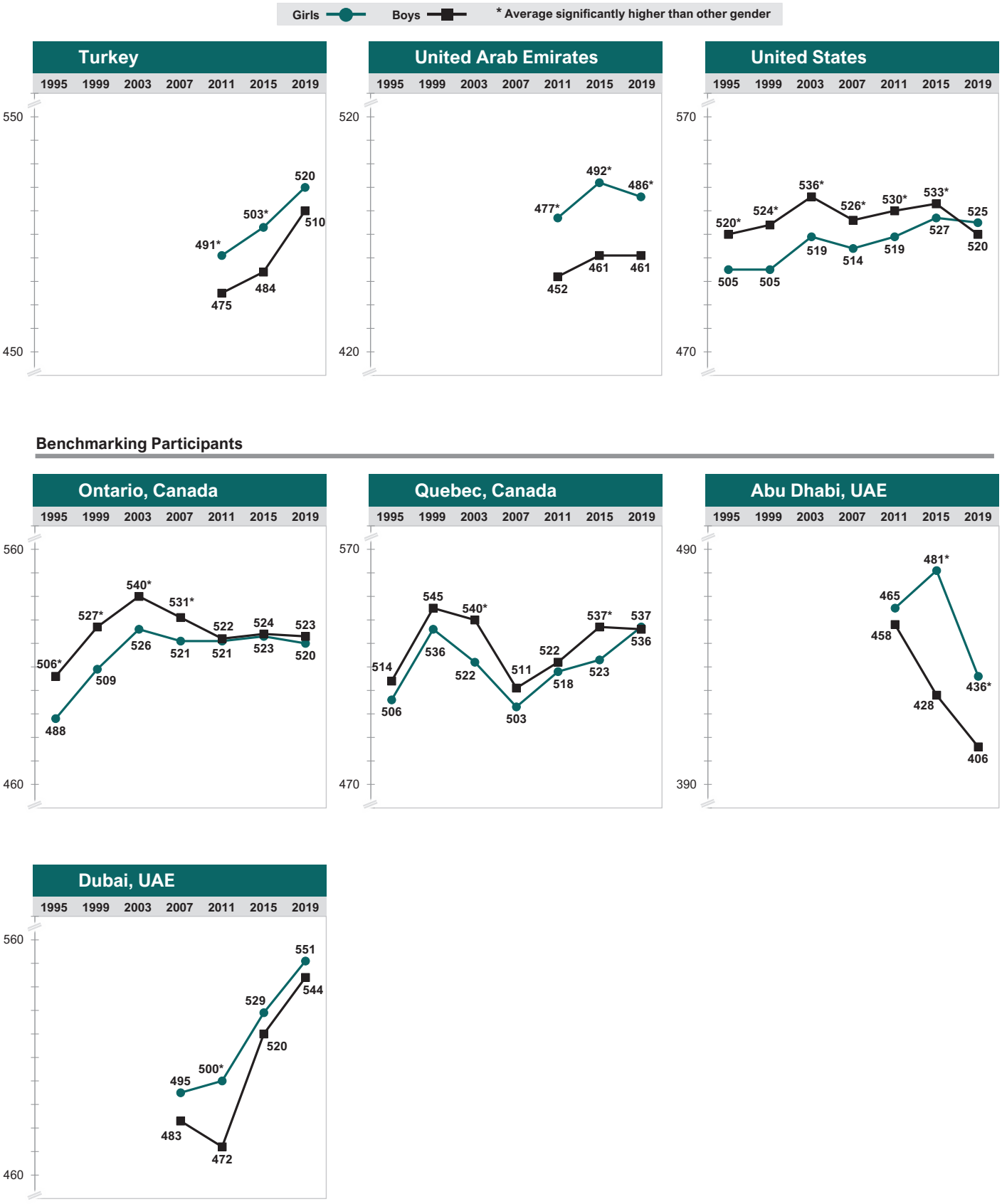
Exhibit 4.6: Trend Plots of Average Science Achievement Across Assessment Years by Gender

(Continued)

This exhibit displays changes in achievement for girls and boys in each country and benchmarking participant that have comparable data from previous assessments. See Appendix A for country participation in previous assessments.



See Appendix A for country participation in previous TIMSS assessments.
The scale interval is 10 points for each country, but a different part of the scale is shown according to each country's average achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Performance at TIMSS International Benchmarks in Science

TIMSS 2019 International Benchmarks

To provide an interpretation of the results on the TIMSS eighth grade science achievement scale in relation to the students' performance on the assessment items, TIMSS describes achievement at four points along the scale as International Benchmarks: Advanced International Benchmark (625), High International Benchmark (550), Intermediate International Benchmark (475), and Low International Benchmark (400). The descriptions of science achievement at the International Benchmarks were updated from TIMSS 2015 based on an analysis of the items that students with average achievement at each of the benchmarks answered successfully in TIMSS 2019.

Exhibit 4.7 summarizes what eighth grade students who reached each of the TIMSS International Benchmarks in 2019 could do in science. The progression in science achievement is evident from benchmark to benchmark, from limited knowledge of science facts at the Low International Benchmark to communicating conceptual understanding in a variety of science contexts at the Advanced International Benchmark. As much as possible, each description references achievement in the four content areas covered in the assessment at the eighth grade— biology, chemistry, physics, and Earth science—as well as science practices assessed by TIMSS. Science practices include skills from daily life and school studies that students use systematically to conduct scientific inquiry and investigation. The following tables show the target percentages for the content and cognitive domains.

Target Percentages of Assessment Devoted to Content and Cognitive Domains – TIMSS 2019 Eighth Grade Science

Content Domain	Percentage
Biology	35%
Chemistry	20%
Physics	25%
Earth Science	20%

Cognitive Domain	Percentage
Knowing	35%
Applying	35%
Reasoning	30%

The interactive map of the benchmark descriptions links to example items. It provides an overview of the science understanding demonstrated by the eighth grade students who performed at the four different levels on the achievement scale. The following sections provide more information about students' achievement in TIMSS 2019 at each International Benchmark as well as more detailed descriptions of each level together with example items.

Exhibit 4.7: Summary of TIMSS 2019 International Benchmarks of Science Achievement

Advanced International Benchmark	
625	*Students communicate understanding of concepts related to biology, chemistry, physics, and Earth science in a variety of contexts.* Students can classify animals into taxonomic groups. They can apply knowledge of cell structures and their functions. Students show some understanding of diversity, adaptation, and natural selection. They also recognize the interdependence of populations of organisms in an ecosystem. Students demonstrate knowledge of the composition of matter and the periodic table of the elements. Students use physical properties of matter to sort, classify, and compare substances and materials. They also recognize evidence that a chemical reaction has occurred. Students communicate understanding of particle spacing and motion in different physical states. Students apply knowledge of energy transfer and electrical circuits, can relate the properties of light and sound to common phenomena, and demonstrate understanding of forces in everyday contexts. Students communicate understanding of Earth's structure, physical features, and processes. They demonstrate knowledge of the Earth's resources and their conservation.
High International Benchmark	
550	*Students apply understanding of concepts from biology, chemistry, physics, and Earth science.* Students can apply knowledge of the characteristics of groups of animals, life processes in humans, cells and their functions, genetic inheritance, ecosystems, and nutrition. Students show some knowledge and understanding of the composition and properties of matter and chemical reactions. They can apply basic knowledge of energy transformation and transfer, electrical circuits, properties of magnets, light, sound, and forces. They can apply knowledge of Earth's physical features, processes, cycles, and history, and show some understanding of Earth's resources and their use.
Intermediate International Benchmark	
475	*Students show and apply some knowledge of biology and the physical sciences.* Students demonstrate some knowledge of characteristics of animals and apply knowledge of ecosystems. They show some knowledge of the properties of matter, chemical changes, and a few physics concepts.
Low International Benchmark	
400	*Students show limited understanding of scientific principles and concepts and limited knowledge of science facts.*

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Percentages of Students Reaching International Benchmarks

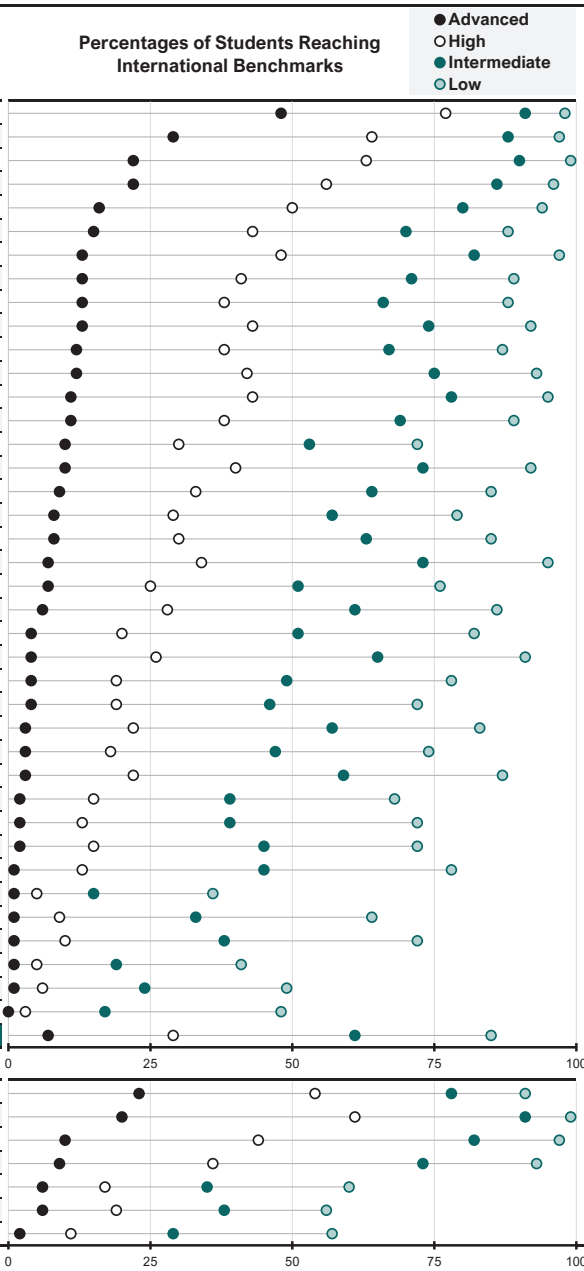
Exhibit 4.8 presents the percentage of students reaching each TIMSS 2019 International Benchmark. The results are presented in descending order according to the percentage of students reaching the Advanced International Benchmark and are indicated in the graph with black dots. Because students who reached the Advanced Benchmark also reached the other benchmarks, the percentages illustrated in the exhibit and shown in the columns to the right are cumulative.

Consistent with Singapore being the highest performing country, nearly half of their eighth grade students (48%) reached the Advanced International Benchmark. The next highest percentages reaching the Advanced level were in Chinese Taipei (29%), Japan (22%), and Korea (22%). Twelve countries had 10 to 16 percent, and the rest of the countries had fewer than 10 percent of their eighth grade students reaching the Advanced International Benchmark.

As a point of reference, Exhibit 4.8 provides the international median percentage of students reaching each benchmark at the bottom of the four right-hand columns. By definition, half the countries have a percentage in that column above the median and half below the median. The median percentages of students reaching the International Benchmarks were as follows: Advanced—7 percent, High—29 percent, Intermediate—61 percent, and Low—85 percent. The Low International Benchmark can be considered a level of minimum proficiency, with Japan (99%) and Singapore (98%) having nearly all of their students reaching this level.

Exhibit 4.8: Percentages of Students Reaching International Benchmarks of Science Achievement

Country	Advanced Benchmark (625)	High Benchmark (550)	Intermediate Benchmark (475)	Low Benchmark (400)
[2] Singapore	48 (1.9)	77 (2.0)	91 (1.2)	98 (0.5)
Chinese Taipei	29 (1.0)	64 (1.0)	88 (0.7)	97 (0.3)
Japan	22 (1.4)	63 (1.1)	90 (0.6)	99 (0.3)
Korea, Rep. of	22 (0.9)	56 (1.1)	86 (0.8)	96 (0.4)
Finland	16 (1.0)	50 (1.5)	80 (1.4)	94 (0.7)
† United States	15 (1.1)	43 (1.8)	70 (1.8)	88 (1.4)
[2] Russian Federation	13 (1.4)	48 (2.3)	82 (1.7)	97 (0.8)
[2] Sweden	13 (1.1)	41 (1.5)	71 (1.5)	89 (0.9)
Turkey	13 (0.9)	38 (1.8)	66 (1.6)	88 (1.0)
Australia	13 (1.2)	43 (1.6)	74 (1.2)	92 (0.7)
[3] Israel	12 (1.3)	38 (1.9)	67 (1.9)	87 (1.2)
Hungary	12 (1.1)	42 (1.5)	75 (1.3)	93 (0.7)
Lithuania	11 (1.0)	43 (1.6)	78 (1.2)	95 (0.6)
England	11 (1.3)	38 (2.1)	69 (2.1)	89 (1.4)
United Arab Emirates	10 (0.4)	30 (0.8)	53 (0.9)	72 (0.7)
Ireland	10 (0.8)	40 (1.4)	73 (1.5)	92 (0.9)
† Hong Kong SAR	9 (1.2)	33 (2.1)	64 (2.3)	85 (1.9)
Bahrain	8 (0.5)	29 (0.8)	57 (0.9)	79 (0.9)
† New Zealand	8 (0.6)	30 (1.4)	63 (1.6)	85 (1.2)
Portugal	7 (0.7)	34 (1.5)	73 (1.7)	95 (1.0)
Qatar	7 (0.9)	25 (1.8)	51 (1.8)	76 (1.4)
† Norway (9)	6 (0.6)	28 (1.4)	61 (1.5)	86 (1.0)
[2] Kazakhstan	4 (0.6)	20 (1.3)	51 (1.7)	82 (1.3)
Italy	4 (0.5)	26 (1.2)	65 (1.5)	91 (0.9)
Romania	4 (0.6)	19 (1.6)	49 (2.1)	78 (1.5)
Oman	4 (0.5)	19 (0.9)	46 (1.1)	72 (1.1)
Cyprus	3 (0.4)	22 (1.1)	57 (1.2)	83 (0.9)
Malaysia	3 (0.4)	18 (0.8)	47 (1.6)	74 (1.7)
France	3 (0.5)	22 (1.4)	59 (1.4)	87 (0.9)
Kuwait	2 (0.5)	15 (1.5)	39 (2.2)	68 (2.2)
Iran, Islamic Rep. of	2 (0.5)	13 (1.4)	39 (1.7)	72 (1.3)
Jordan	2 (0.3)	15 (1.1)	45 (2.0)	72 (1.9)
Chile	1 (0.2)	13 (1.2)	45 (1.5)	78 (1.4)
Ψ South Africa (9)	1 (0.1)	5 (0.4)	15 (0.8)	36 (1.2)
[2] Saudi Arabia	1 (0.2)	9 (0.6)	33 (1.2)	64 (1.2)
[1] Georgia	1 (0.3)	10 (1.4)	38 (1.8)	72 (2.1)
Lebanon	1 (0.2)	5 (0.7)	19 (1.3)	41 (1.9)
[2] Egypt	1 (0.2)	6 (0.7)	24 (1.6)	49 (2.1)
Morocco	0 (0.1)	3 (0.4)	17 (0.9)	48 (1.4)
International Median	**7**	**29**	**61**	**85**
Benchmarking Participants				
[2] Dubai, UAE	23 (0.9)	54 (1.0)	78 (0.7)	91 (0.6)
Moscow City, Russian Fed.	20 (1.5)	61 (1.9)	91 (0.8)	99 (0.3)
‡ Quebec, Canada	10 (1.2)	44 (2.2)	82 (1.5)	97 (0.7)
Ontario, Canada	9 (1.0)	36 (1.5)	73 (1.4)	93 (0.7)
Western Cape, RSA (9)	6 (1.0)	17 (1.9)	35 (1.9)	60 (1.7)
Abu Dhabi, UAE	6 (0.5)	19 (0.9)	38 (1.3)	56 (1.4)
Gauteng, RSA (9)	2 (0.4)	11 (1.0)	29 (1.6)	57 (1.5)



Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
See Appendix B.7 for target population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Trends in Percentages of Students Reaching International Benchmarks

Exhibit 4.9 shows the changes in percentages of students reaching the benchmarks for countries that have comparable data from previous assessments. The trends indicate more improvement at the two higher benchmarks than declines, in contrast to similar improvements but more declines at lower benchmarks. Of the 33 countries participating in both 2015 and 2019, 10 increased and only 1 decreased at the Advanced International Benchmark, 9 increased and 4 decreased at the High Benchmark, 10 increased and 8 decreased at the Intermediate Benchmark, and 8 increased and 8 decreased at the Low Benchmark.

The longer-term trends also show a similar pattern. Between 2007 and 2019, the 23 countries participating in those two assessments had 13 increases and 2 decreases at the Advanced level, 12 increases and 4 decreases at the High level, 10 increases and 5 decreases at the Intermediate level, and 8 increases and 9 decreases at the Low level. Between 1995 and 2019, the 18 countries participating in both assessments had 7 increases and 2 decreases at the Advanced level, 8 increases and 2 decreases at the High level, and 7 increases and 3 decreases at the Intermediate level, as well as 5 increases and 6 decreases at the Low level.

Exhibit 4.9: Percentages of Students Reaching International Benchmarks of Science Achievement Across Assessment Years

Country	Advanced International Benchmark (625) — Percent of Students							High International Benchmark (550) — Percent of Students						
	2019	2015	2011	2007	2003	1999	1995	2019	2015	2011	2007	2003	1999	1995
Singapore	48	42 ▲	40 ▲	32 ▲	33 ▲	29 ▲	29 ▲	77	74	69 ▲	61 ▲	66 ▲	60 ▲	64 ▲
Chinese Taipei	29	27	24 ▲	25 ▲	26	27		64	63	60 ▲	60 ▲	63	61	
Japan	22	24	18 ▲	17 ▲	15 ▲	16 ▲	18 ▲	63	63	57 ▲	55 ▲	53 ▲	52 ▲	54 ▲
Korea, Rep. of	22	19 ▲	20	17 ▲	17 ▲	19 ▲	17 ▲	56	54	57	54	57	50 ▲	50 ▲
Finland	16		13 ▲					50		53				
United States	15	12 ▲	10 ▲	10 ▲	11 ▲	12	11 ▲	43	43	40	38 ▲	41	37 ▲	38
Russian Federation	13	14	14	11	6 ▲	15	11	48	49	48	41 ▲	32 ▲	41	38 ▲
Sweden	13	10 ▲	6 ▲	6 ▲	8 ▲		19 ▽	41	40	33 ▲	32 ▲	38		52 ▽
Turkey	13	8 ▲	8 ▲					38	29 ▲	26 ▲				
Australia	13	7 ▲	11	8 ▲	9 ▲		10	43	34 ▲	35 ▲	33 ▲	40		36 ▲
Israel	12	12	11					38	37	39				
Hungary	12	12	9 ▲	13	14	19 ▽	12	42	42	39	46	46	53 ▽	44
Lithuania	11	8 ▲	6 ▲	8 ▲	6 ▲	5 ▲	2 ▲	43	36 ▲	33 ▲	36 ▲	34 ▲	22 ▲	14 ▲
England	11	14	14	17 ▽	15	17 ▽	15 ▽	38	45 ▽	44	48 ▽	48 ▽	45 ▽	43 ▽
United Arab Emirates	10	7 ▲	4 ▲					30	26 ▲	19 ▲				
Ireland	10	10					11	40	43					38
Hong Kong SAR	9	12	9	10	13 ▽	7	7	33	51 ▽	47 ▽	45 ▽	58 ▽	40 ▽	33
Bahrain	8	6 ▲	3 ▲	2 ▲	0 ▲			29	22 ▲	17 ▲	17 ▲	6 ▲		
New Zealand	8	10 ▽	9		7	10	9	30	36 ▽	34		35	35	34
Portugal	7						2 ▲	34						15 ▲
Qatar	7	6	3 ▲					25	21	14 ▲				
Norway (9)	6	6						28	31					
Kazakhstan	4		4					20		23				
Italy	4	4	4	4	4	6		26	26	27	24	23	26	
Romania	4		3 ▲	2 ▲	4	5	5	19		16	16	20	21	22
Oman	4	3 ▲	2 ▲	1 ▲				19	17 ▲	11 ▲	8 ▲			
Cyprus	3			1 ▲	0 ▲	2 ▲	2 ▲	22			12 ▲	8 ▲	14 ▲	15 ▲
Malaysia	3	3	1 ▲	3	4	5 ▽		18	21 ▽	11 ▲	18	28 ▽	24 ▽	
France	3						2	22						19
Kuwait	2	2						15	10 ▲					
Iran, Islamic Rep. of	2	3	5 ▽	2	1 ▲	1	1	13	15	21 ▽	14	9 ▲	11	11
Jordan	2	1	2	5 ▽	3 ▽	4 ▽		15	9 ▲	15	26 ▽	21 ▽	17	
Chile	1	1	1		1 ▲	1		13	12	12		5 ▲	7 ▲	
South Africa (9)	1	1	1					5	5	4				
Saudi Arabia	1	1	1					9	6 ▲	8				
Georgia	1	1	0	0 ▲				10	10	6 ▲	5 ▲			
Lebanon	1	1	1	1	0			5	7	7	8 ▽	4		
Egypt	1	0		1	1 ▽			6	5		7	10 ▽		
Morocco	0	0	0					3	3	2 ▲				
Benchmarking Participants														
Dubai, UAE	23	14 ▲	7 ▲	6 ▲				54	43 ▲	28 ▲	27 ▲			
Quebec, Canada	10	7	5 ▲	4 ▲	6 ▲	10	7	44	39	34 ▲	27 ▲	39	43	30 ▲
Ontario, Canada	9	7	6 ▲	7	7	7	5 ▲	36	37	35	37	41	34	26 ▲
Abu Dhabi, UAE	6	5	4 ▲					19	20	17				

▲ 2019 percent significantly higher

▽ 2019 percent significantly lower

An empty cell indicates a country did not participate in that year's assessment or did not have comparable data.
See Appendix A for country participation in previous TIMSS assessments.
Results for Lithuania before 2015 do not include students taught in Polish or Russian.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 4.9: Percentages of Students Reaching International Benchmarks of Science Achievement Across Assessment Years

(Continued)

Country	Intermediate International Benchmark (475) Percent of Students							Low International Benchmark (400) Percent of Students						
	2019	2015	2011	2007	2003	1999	1995	2019	2015	2011	2007	2003	1999	1995
Singapore	91	90	87 ▲	80 ▲	85 ▲	84 ▲	91	98	97	96 ▲	93 ▲	95 ▲	95 ▲	99 ▽
Chinese Taipei	88	86	85 ▲	83 ▲	88	86		97	96	96	95 ▲	98	96	
Japan	90	89	86 ▲	85 ▲	86 ▲	84 ▲	85 ▲	99	98	97 ▲	96 ▲	98 ▲	97 ▲	97 ▲
Korea, Rep. of	86	85	86	85	88 ▽	81 ▲	81 ▲	96	97	97	97	98 ▽	96	95
Finland	80		88 ▽					94		99 ▽				
United States	70	75 ▽	73	71	75	67	68	88	93 ▽	93 ▽	92 ▽	93 ▽	87	87
Russian Federation	82	81	81	76 ▲	70 ▲	73 ▲	71 ▲	97	96	96	95 ▲	93 ▲	92 ▲	92 ▲
Sweden	71	73	68	69	75 ▽		83 ▽	89	92 ▽	91	91	95 ▽		97 ▽
Turkey	66	59 ▲	54 ▲					88	83 ▲	79 ▲				
Australia	74	69 ▲	70	70 ▲	76		69 ▲	92	91	92	92	95 ▽		89
Israel	67	64	69					87	84	88				
Hungary	75	74	75	80 ▽	82 ▽	83 ▽	80 ▽	93	92	92	96 ▽	97 ▽	96 ▽	95 ▽
Lithuania	78	72 ▲	71 ▲	72 ▲	74 ▲	57 ▲	45 ▲	95	93 ▲	92 ▲	93 ▲	95	86 ▲	79 ▲
England	69	77 ▽	76 ▽	79 ▽	81 ▽	76 ▽	75 ▽	89	95 ▽	93 ▽	94 ▽	96 ▽	94 ▽	93 ▽
United Arab Emirates	53	53	47 ▲					72	76 ▽	75				
Ireland	73	77 ▽					70	92	94					90
Hong Kong SAR	64	85 ▽	80 ▽	77 ▽	89 ▽	80 ▽	70	85	96 ▽	95 ▽	92 ▽	98 ▽	96 ▽	90
Bahrain	57	49 ▲	44 ▲	49 ▲	33 ▲			79	73 ▲	70 ▲	78	70 ▲		
New Zealand	63	67 ▽	67		73 ▽	66	67	85	88 ▽	90 ▽		94 ▽	88	89 ▽
Portugal	73						49 ▲	95						84 ▲
Qatar	51	46 ▲	34 ▲					76	70 ▲	58 ▲				
Norway (9)	61	68 ▽						86	91 ▽					
Kazakhstan	51		58 ▽					82		86 ▽				
Italy	65	64	65	62	59 ▲	59 ▲		91	89	90	88	87 ▲	86 ▲	
Romania	49		47	46	49	50	51	78		78	77	78	78	77
Oman	46	45	34 ▲	32 ▲				72	72	59 ▲	61 ▲			
Cyprus	57			42 ▲	35 ▲	45 ▲	43 ▲	83			74 ▲	71 ▲	77 ▲	72 ▲
Malaysia	47	52 ▽	34 ▲	50	71 ▽	59 ▽		74	77	62 ▲	80 ▽	95 ▽	87 ▽	
France	59						58	87						89
Kuwait	39	29 ▲						68	55 ▲					
Iran, Islamic Rep. of	39	42	50 ▽	41	38	38	43	72	73	79 ▽	76 ▽	77 ▽	72	81 ▽
Jordan	45	34 ▲	45	56 ▽	53 ▽	42		72	63 ▲	72	79 ▽	80 ▽	69	
Chile	45	40 ▲	43		24 ▲	27 ▲		78	75	79		56 ▲	60 ▲	
South Africa (9)	15	14	11 ▲					36	32	25 ▲				
Saudi Arabia	33	22 ▲	33					64	49 ▲	68				
Georgia	38	38	28 ▲	27 ▲				72	70	62 ▲	61 ▲			
Lebanon	19	24 ▽	25 ▽	28 ▽	20			41	50 ▽	54 ▽	55 ▽	48 ▽		
Egypt	24	20 ▲		27	33 ▽			49	42 ▲		55 ▽	59 ▽		
Morocco	17	17	13 ▲					48	47	39 ▲				
Benchmarking Participants														
Dubai, UAE	78	72 ▲	57 ▲	58 ▲				91	89 ▲	79 ▲	82 ▲			
Quebec, Canada	82	79	76 ▲	68 ▲	82	83	69 ▲	97	97	96	94 ▲	98	98	92
Ontario, Canada	73	77	76	77	81 ▽	72	61 ▲	93	95	96 ▽	96 ▽	97 ▽	95	88 ▲
Abu Dhabi, UAE	38	44 ▽	45 ▽					56	69 ▽	74 ▽				

▲ 2019 percent significantly higher

▽ 2019 percent significantly lower

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Low Benchmark: Full Description

Exhibit 4.10 presents the description of eighth grade students' achievement at the Low International Benchmark. The very few items that anchored at the Low level indicated students had limited understanding of scientific principles and concepts and limited knowledge of science facts.

Exhibit 4.10: Description of the TIMSS 2019 Low International Benchmark (400) of Science Achievement

Low International Benchmark

400

Summary

Students show limited understanding of scientific principles and concepts and limited knowledge of science facts.

Students at this level can read a food web, identify some materials that are attracted to magnets, and know that salt must be removed from clean ocean water to make it safe to drink.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Intermediate Benchmark: Full Description and Example Items

Exhibit 4.11 provides the description of students' achievement at the Intermediate International Benchmark. At this level, the eighth grade students showed and applied some knowledge of biology and physical science.

Exhibit 4.11.1 presents an item from the biology content domain about the advantages of a crocodile's field of vision. On average, 55 percent of the eighth grade students could provide an explanation. The highest achievement was in Japan and Singapore with 84–85 percent correct.

Exhibit 4.11.2 presents an item from the chemistry content domain asking students to distinguish between elements and compounds. Finland and Lithuania had the highest performance—88–89 percent correct. The international average was 61 percent.

Exhibit 4.11.3 shows an example item from physics. Students were able to identify the difference in gravitational attraction as the reason why a rover weighs a different amount on Mars than it does on Earth. With 90 percent correct, the Singaporean eighth graders had the highest achievement. The international average was 69 percent.

Exhibit 4.11: Description of the TIMSS 2019 Intermediate International Benchmark (475) of Science Achievement

Intermediate International Benchmark

475

Summary

Students show and apply some knowledge of biology and the physical sciences. Students demonstrate some knowledge of characteristics of animals and apply knowledge of ecosystems. They show some knowledge of the properties of matter, chemical changes, and a few physics concepts.

Students demonstrate limited knowledge of characteristics of animals and of animals' adaptations to their environment. They can apply knowledge of ecosystems and the interaction of living things with their environment.

Students show some knowledge of the structure and properties of matter and chemical changes.

Students can separate conductors from insulators based on differences in electric current, recognize energy change in an everyday object moving downhill, and recognize that the gravity on Earth is different than on another planet.

Students can interpret information from graphs and pictorial diagrams.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 4.11.1: Intermediate International Benchmark of Science Achievement – Example Item 1

Country	Percent Full Credit	
Japan	85 (1.6)	▲
[2] Singapore	84 (1.5)	▲
Portugal	79 (1.9)	▲
Ireland	76 (2.2)	▲
Korea, Rep. of	75 (2.1)	▲
Turkey	75 (2.0)	▲
[3] Israel	72 (1.9)	▲
Finland	72 (1.8)	▲
France	69 (2.2)	▲
Australia	68 (1.9)	▲
Lithuania	68 (2.4)	▲
[2] Sweden	68 (2.2)	▲
England	67 (2.7)	▲
† United States	66 (1.5)	▲
[2] Russian Federation	65 (2.3)	▲
Hungary	63 (2.4)	▲
Chinese Taipei	63 (1.8)	▲
† New Zealand	62 (2.5)	▲
Italy	62 (2.1)	▲
† Norway (9)	62 (2.7)	▲
Cyprus	56 (2.3)	
International Average	**55 (0.3)**	
[2] Kazakhstan	54 (2.9)	
Bahrain	54 (1.6)	
Romania	49 (2.8)	▽
Chile	48 (2.5)	▽
Qatar	44 (1.8)	▽
Jordan	44 (2.3)	▽
United Arab Emirates	44 (1.0)	▽
Iran, Islamic Rep. of	44 (2.1)	▽
† Hong Kong SAR	40 (2.7)	▽
Oman	38 (2.0)	▽
Kuwait	36 (2.0)	▽
[1] Georgia	35 (3.1)	▽
[2] Saudi Arabia	35 (1.9)	▽
Malaysia	27 (1.5)	▽
Morocco	24 (1.5)	▽
Lebanon	22 (2.2)	▽
[2] Egypt	18 (1.5)	▽
South Africa (9)	14 (0.8)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	80 (2.2)	▲
Ontario, Canada	73 (2.0)	▲
‡ Quebec, Canada	73 (2.6)	▲
[2] Dubai, UAE	65 (1.6)	▲
Western Cape, RSA (9)	36 (2.3)	▽
Abu Dhabi, UAE	34 (1.8)	▽
Gauteng, RSA (9)	24 (1.8)	▽

Content Domain: Biology

Cognitive Domain: Reasoning

Description: Reasons how a crocodile's angle of vision helps it to survive in the environment

Dixon read a fact sheet about crocodiles.

Crocodile Facts

1. Crocodiles have a lifespan of up to 75 years.

2. Crocodiles today look like ancient crocodiles found in fossils.

3. Crocodiles have an angle of vision of 290° as shown in the diagram.

How can a crocodile's angle of vision help it to survive in its environment?

Give one reason.

The crocodile can see predators and prey almost all of the way around its body without moving its head.

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for target population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 4.11.2: Intermediate International Benchmark of Science Achievement – Example Item 2

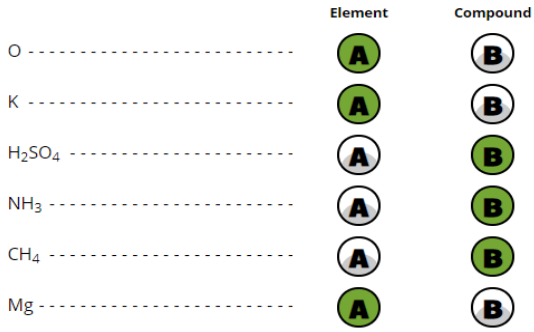
Country	Percent Full Credit	
Finland	89 (1.6)	▲
Lithuania	88 (1.7)	▲
[2] Russian Federation	83 (1.9)	▲
[2] Singapore	78 (1.8)	▲
Chinese Taipei	78 (1.5)	▲
Japan	77 (1.9)	▲
[2] Kazakhstan	75 (2.1)	▲
[1] Georgia	74 (2.9)	▲
England	74 (2.5)	▲
Korea, Rep. of	73 (2.2)	▲
[3] Israel	73 (2.2)	▲
Hungary	72 (1.8)	▲
Portugal	71 (2.2)	▲
† Norway (9)	71 (2.9)	▲
Cyprus	70 (2.3)	▲
Romania	67 (2.3)	▲
Turkey	65 (2.1)	
Italy	64 (3.0)	
Qatar	64 (2.6)	
† United States	63 (2.0)	
International Average	**61 (0.4)**	
Australia	61 (2.3)	
Lebanon	61 (2.8)	
Jordan	60 (2.5)	
[2] Sweden	59 (2.1)	
Ireland	58 (2.6)	
United Arab Emirates	58 (1.0)	▽
Bahrain	56 (2.0)	▽
Oman	54 (1.8)	▽
Chile	49 (2.5)	▽
† New Zealand	48 (3.0)	▽
Kuwait	47 (2.4)	▽
Morocco	45 (1.9)	▽
France	45 (2.6)	▽
[2] Egypt	42 (2.3)	▽
South Africa (9)	41 (1.2)	▽
Malaysia	40 (1.7)	▽
† Hong Kong SAR	39 (2.9)	▽
[2] Saudi Arabia	31 (1.6)	▽
Iran, Islamic Rep. of	29 (1.8)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	90 (1.5)	▲
‡ Quebec, Canada	79 (2.1)	▲
[2] Dubai, UAE	73 (1.7)	▲
Western Cape, RSA (9)	56 (2.5)	▽
Gauteng, RSA (9)	50 (1.8)	▽
Abu Dhabi, UAE	47 (1.7)	▽
Ontario, Canada	32 (2.6)	▽

Content Domain: Chemistry

Cognitive Domain: Applying

Description: From a list of symbols and formulas, recognizes which are elements and which are compounds

Click the circle to show whether each symbol or formula represents an element or compound.



The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for target population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 4.11.3: Intermediate International Benchmark of Science Achievement – Example Item 3

Country	Percent Correct	
[2] Singapore	90 (1.2)	▲
Korea, Rep. of	86 (1.5)	▲
Hungary	84 (1.4)	▲
Ireland	84 (1.7)	▲
[2] Russian Federation	81 (2.1)	▲
Australia	80 (1.6)	▲
Italy	80 (2.0)	▲
England	80 (2.0)	▲
† Norway (9)	79 (1.9)	▲
Cyprus	77 (1.9)	▲
Lithuania	77 (2.1)	▲
† New Zealand	76 (1.8)	▲
† United States	74 (2.4)	▲
Chinese Taipei	74 (1.7)	▲
Finland	73 (1.8)	▲
Portugal	73 (2.6)	
[2] Sweden	72 (2.1)	
Malaysia	72 (1.9)	
[3] Israel	71 (2.1)	
Oman	71 (1.9)	
Bahrain	70 (1.9)	
Romania	69 (2.2)	
International Average	**69 (0.3)**	
Japan	68 (1.7)	
Iran, Islamic Rep. of	67 (1.9)	
Chile	67 (2.6)	
France	67 (2.3)	
Turkey	67 (2.1)	
Qatar	66 (2.2)	
Jordan	65 (2.1)	
Kuwait	65 (2.5)	
United Arab Emirates	65 (1.1)	▽
† Hong Kong SAR	61 (2.7)	▽
[2] Saudi Arabia	59 (1.8)	▽
[2] Egypt	54 (1.8)	▽
South Africa (9)	53 (1.5)	▽
[2] Kazakhstan	48 (2.2)	▽
Morocco	47 (1.9)	▽
[1] Georgia	46 (2.7)	▽
Lebanon	39 (2.6)	▽
Benchmarking Participants		
‡ Quebec, Canada	85 (2.1)	▲
Moscow City, Russian Fed.	84 (2.0)	▲
Ontario, Canada	84 (1.8)	▲
[2] Dubai, UAE	81 (1.7)	▲
Western Cape, RSA (9)	69 (1.6)	
Gauteng, RSA (9)	68 (1.5)	
Abu Dhabi, UAE	53 (1.8)	▽

Content Domain: Physics

Cognitive Domain: Knowing

Description: Recognizes why a vehicle has a different weight on Mars than it does on Earth

Scientists sent a special vehicle to Mars to make a map of the surface of the planet. A diagram of the vehicle is shown.

The vehicle has a different weight on Mars than it has on the Earth.

Why does the vehicle have different weights on the two planets?

A. The vehicle lost mass when it was transported from Earth to Mars.

B. The vehicle gained mass when it began moving on Mars.

C. The magnetic attraction on Earth is different from Mars.

D. The gravitational attraction on Earth is different from Mars.

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for target population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

High Benchmark: Full Description and Example Items

Exhibit 4.12 presents the description of science achievement at the High International Benchmark. Eighth grade students reaching this level demonstrated conceptual understanding of topics related to biology, chemistry, physics, and Earth science.

Exhibit 4.12.1 provides an example from the biology domain. Forty-eight percent of the eighth grade students, on average, were able to explain why increasing the number of gardens reduces the amount of carbon dioxide in the air. With 85 percent success, Singapore had the highest percentage correct.

Exhibit 4.12.2 provides an example from the chemistry domain. In this item, students were asked to interpret the results of a science experiment shown in a diagram and provide evidence. Students in the Russian Federation were the most successful—69 percent correct. The international average was 39 percent.

A physics example is shown in Exhibit 4.12.3. Seventy-eight percent of the students in Chinese Taipei—by far the highest percentage correct—explained that you cannot hear a phone ring in a vacuum because there is no air. The international average was 38 percent.

Exhibit 4.12.4 provides an example from Earth science asking students to identify the shrinking size of polar ice caps as evidence that the Earth is becoming warmer. Chinese Taipei had the highest achievement with 87 percent correct, and 57 percent of eighth grade students internationally answered correctly, on average.

Exhibit 4.12: Description of the TIMSS 2019 High International Benchmark (550) of Science Achievement

High International Benchmark

550

Summary

Students apply understanding of concepts from biology, chemistry, physics, and Earth science. Students can apply knowledge of the characteristics of groups of animals, life processes in humans, cells and their functions, genetic inheritance, ecosystems, and nutrition. Students show some knowledge and understanding of the composition and properties of matter and chemical reactions. They can apply basic knowledge of energy transformation and transfer, electrical circuits, properties of magnets, light, sound, and forces. They can apply knowledge of Earth's physical features, processes, cycles, and history, and show some understanding of Earth's resources and their use.

Students apply knowledge of the characteristics of groups of animals and life processes in humans. They apply knowledge of cells and their functions, recognizing, for example, what happens to an animal's cells as it grows, and distinguishing between plant and animal cells. Students have a basic understanding of genetic inheritance in plants and animals. They can communicate understanding of ecosystems and the interaction of organisms with their environment. Students can apply some knowledge of human health related to nutrition.

Students show some knowledge and understanding of the composition and properties of matter, including identifying structural models of simple substances. Students show some knowledge of chemical reactions.

Students apply basic knowledge of energy transformation and transfer. They demonstrate understanding of parallel electrical circuits as well as properties of magnets. Students demonstrate understanding of light and sound in practical situations. They can identify the forces acting on objects at rest, predict whether an object will float or sink, and analyze force diagrams.

Students apply knowledge of Earth's physical features, processes, cycles, and history. They can interpret weather pattern data to identify climate types and have some understanding of Earth's resources and their use. They can recognize that the planets are visible because they reflect the Sun's light.

Students can combine and interpret information from various types of diagrams, graphs, and tables to draw conclusions.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 4.12.1: High International Benchmark of Science Achievement – Example Item 1

Country	Percent Full Credit	
[2] Singapore	85 (1.5)	▲
Chinese Taipei	69 (2.0)	▲
[2] Kazakhstan	68 (2.3)	▲
Turkey	67 (2.4)	▲
[2] Russian Federation	65 (2.5)	▲
[2] Sweden	63 (2.6)	▲
† Hong Kong SAR	60 (2.9)	▲
Korea, Rep. of	58 (2.5)	▲
Australia	57 (2.0)	▲
Qatar	57 (2.0)	▲
[3] Israel	57 (2.2)	▲
Ireland	56 (2.3)	▲
Lithuania	53 (2.7)	
Cyprus	52 (2.3)	
† United States	51 (2.5)	
Bahrain	50 (2.1)	
Romania	49 (2.5)	
United Arab Emirates	49 (1.2)	
Finland	49 (1.8)	
Kuwait	49 (2.8)	
International Average	**48 (0.4)**	
Jordan	48 (2.6)	
Portugal	47 (3.0)	
Italy	44 (2.4)	
England	44 (2.7)	
Hungary	43 (3.0)	
Oman	42 (2.2)	▽
Japan	42 (1.9)	▽
[2] Saudi Arabia	40 (2.0)	▽
Iran, Islamic Rep. of	40 (2.1)	▽
France	39 (2.2)	▽
[2] Egypt	37 (1.9)	▽
† Norway (9)	37 (2.3)	▽
[1] Georgia	36 (2.7)	▽
Morocco	34 (1.6)	▽
Malaysia	33 (1.7)	▽
† New Zealand	30 (1.9)	▽
Lebanon	29 (2.0)	▽
Chile	24 (1.8)	▽
South Africa (9)	20 (1.1)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	79 (1.7)	▲
[2] Dubai, UAE	66 (2.0)	▲
Ontario, Canada	49 (2.5)	
‡ Quebec, Canada	42 (2.7)	▽
Abu Dhabi, UAE	37 (1.5)	▽
Western Cape, RSA (9)	33 (1.8)	▽
Gauteng, RSA (9)	32 (1.7)	▽

Content Domain: Biology

Cognitive Domain: Reasoning

Description: Explains how roof gardens in cities help reduce the amount of carbon dioxide in the air

In some large cities, owners of large buildings and houses have installed gardens on the roofs. Having more gardens helps reduce the amount of carbon dioxide in the air.

How does increasing the number of gardens help reduce the amount of carbon dioxide in the air?

The trees and plants in the gardens take carbon dioxide out of the air during photosynthesis and give off oxygen.

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 4.12.2: High International Benchmark of Science Achievement – Example Item 2

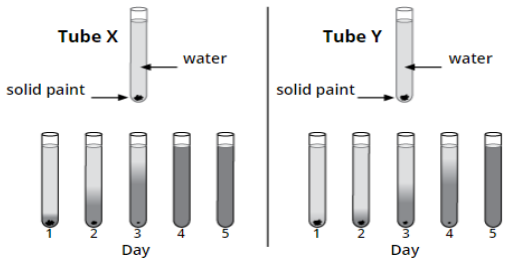
Country	Percent Full Credit	
[2] Russian Federation	69 (1.8)	▲
Japan	67 (2.0)	▲
[2] Singapore	64 (1.9)	▲
Korea, Rep. of	63 (2.4)	▲
Lithuania	59 (2.4)	▲
† United States	55 (1.9)	▲
† New Zealand	52 (1.8)	▲
Chinese Taipei	52 (2.0)	▲
Portugal	51 (2.8)	▲
Hungary	51 (2.2)	▲
Australia	49 (2.0)	▲
Turkey	49 (2.4)	▲
Ireland	49 (2.4)	▲
[3] Israel	48 (2.5)	▲
Finland	48 (1.7)	▲
[2] Sweden	45 (2.6)	▲
† Hong Kong SAR	40 (2.4)	
[2] Kazakhstan	40 (2.8)	
Bahrain	39 (1.9)	
International Average	**39 (0.3)**	
France	38 (2.3)	
Chile	35 (2.3)	
Qatar	35 (2.6)	
Cyprus	34 (2.4)	
Italy	33 (2.4)	▽
Romania	32 (2.4)	▽
† Norway (9)	32 (2.1)	▽
England	31 (2.5)	▽
Morocco	29 (1.6)	▽
Malaysia	27 (1.5)	▽
Iran, Islamic Rep. of	27 (2.1)	▽
[1] Georgia	27 (2.9)	▽
Oman	26 (1.7)	▽
Kuwait	23 (1.7)	▽
United Arab Emirates	21 (0.9)	▽
[2] Saudi Arabia	20 (1.4)	▽
South Africa (9)	20 (0.9)	▽
Jordan	15 (1.4)	▽
Lebanon	13 (1.5)	▽
[2] Egypt	5 (0.7)	▽
Benchmarking Participants		
‡ Quebec, Canada	63 (2.5)	▲
Moscow City, Russian Fed.	59 (2.3)	▲
Ontario, Canada	56 (2.5)	▲
Western Cape, RSA (9)	37 (1.8)	
Gauteng, RSA (9)	36 (1.7)	
[2] Dubai, UAE	35 (2.0)	
Abu Dhabi, UAE	15 (1.1)	▽

Content Domain: Chemistry

Cognitive Domain: Reasoning

Description: Explains the effect of temperature on diffusion in the context of an investigation

Maria placed two identical pieces of solid paint at the bottom of two identical tubes, X and Y, filled with water. On Day 1 she put one tube in a refrigerator and left the other in the warm room. Maria took a picture of each tube at the same time for five days. The diagram shows Maria's pictures from each day.



Which tube was in the refrigerator?

(Click one box.)

☐ Tube X

☑ Tube Y

Explain your answer.

The paint in Tube X spread through the water faster. The test tube is fully dark on day 4 for Tube X. The test tube is not fully dark until day 5 for Tube Y. The cold water made the mixing go more slowly in Tube Y.

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 4.12.3: High International Benchmark of Science Achievement – Example Item 3

Country	Percent Full Credit	
Chinese Taipei	78 (1.8)	▲
Turkey	61 (2.1)	▲
[2] Singapore	59 (2.5)	▲
Japan	56 (2.2)	▲
Lithuania	56 (2.8)	▲
Korea, Rep. of	53 (2.6)	▲
Malaysia	52 (2.0)	▲
† Hong Kong SAR	51 (3.3)	▲
Qatar	50 (2.8)	▲
Jordan	46 (2.3)	▲
[2] Sweden	46 (2.3)	▲
France	44 (2.5)	▲
Finland	44 (2.1)	▲
Hungary	43 (2.2)	▲
[2] Russian Federation	42 (2.8)	
[2] Kazakhstan	42 (2.0)	
[2] Saudi Arabia	41 (2.2)	
[1] Georgia	40 (2.8)	
United Arab Emirates	39 (1.1)	
International Average	**38 (0.4)**	
Portugal	38 (2.7)	
† United States	37 (2.3)	
Cyprus	36 (2.4)	
England	35 (2.8)	
Oman	33 (1.9)	▽
Australia	33 (2.1)	▽
Kuwait	33 (2.8)	▽
Ireland	33 (2.3)	▽
[2] Egypt	32 (2.0)	▽
† New Zealand	31 (2.1)	▽
Romania	30 (2.3)	▽
Morocco	29 (1.7)	▽
Bahrain	29 (1.8)	▽
[3] Israel	26 (2.1)	▽
† Norway (9)	26 (2.0)	▽
Italy	22 (2.3)	▽
Lebanon	19 (1.7)	▽
Iran, Islamic Rep. of	15 (1.4)	▽
South Africa (9)	11 (0.7)	▽
Chile	7 (1.3)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	73 (2.2)	▲
[2] Dubai, UAE	52 (2.0)	▲
Abu Dhabi, UAE	32 (1.7)	▽
‡ Quebec, Canada	28 (2.7)	▽
Ontario, Canada	23 (2.0)	▽
Western Cape, RSA (9)	22 (1.6)	▽
Gauteng, RSA (9)	17 (1.9)	▽

Content Domain: Physics

Cognitive Domain: Applying

Description: Applies knowledge of sound transmission to explain whether a ringing cell phone in a vacuum can be heard outside the vacuum chamber

Nada hangs her cell phone under a glass bowl as shown. The ringer on the phone is turned on. She removes the air from under the bowl so that her phone is in a vacuum.

Nada asks her friend to call her phone. Will they hear it ring?

(Click one box.)

☐ Yes

☑ No

Explain your answer.

There is no air under the bowl for the sound waves to travel through.

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 4.12.4: High International Benchmark of Science Achievement – Example Item 4

Country	Percent Correct	
Chinese Taipei	87 (1.3)	▲
Finland	82 (1.8)	▲
Ireland	79 (1.9)	▲
Hungary	77 (2.1)	▲
Lithuania	76 (2.1)	▲
[2] Singapore	76 (1.9)	▲
Japan	75 (1.8)	▲
Turkey	74 (2.0)	▲
† Norway (9)	70 (2.0)	▲
[2] Sweden	70 (2.0)	▲
England	69 (2.8)	▲
† New Zealand	68 (2.0)	▲
Korea, Rep. of	67 (2.6)	▲
Australia	67 (1.5)	▲
Italy	65 (2.4)	▲
† United States	65 (2.4)	▲
[2] Russian Federation	63 (2.7)	▲
† Hong Kong SAR	63 (2.8)	▲
Cyprus	63 (2.3)	▲
Chile	60 (2.2)	
[3] Israel	58 (2.8)	
France	57 (2.5)	
International Average	**57 (0.4)**	
Portugal	54 (2.8)	
[2] Kazakhstan	52 (2.5)	▽
Romania	52 (2.7)	
Qatar	48 (2.5)	▽
United Arab Emirates	47 (1.1)	▽
Kuwait	45 (2.5)	▽
Bahrain	44 (2.6)	▽
[1] Georgia	44 (2.9)	▽
Oman	43 (2.0)	▽
Malaysia	43 (1.7)	▽
[2] Egypt	40 (1.9)	▽
[2] Saudi Arabia	39 (2.3)	▽
Jordan	36 (1.8)	▽
Iran, Islamic Rep. of	28 (1.5)	▽
Morocco	28 (1.6)	▽
South Africa (9)	24 (1.1)	▽
Lebanon	24 (2.1)	▽
Benchmarking Participants		
‡ Quebec, Canada	78 (2.1)	▲
Ontario, Canada	75 (2.4)	▲
Moscow City, Russian Fed.	72 (2.1)	▲
[2] Dubai, UAE	65 (2.1)	▲
Abu Dhabi, UAE	39 (1.6)	▽
Western Cape, RSA (9)	35 (2.1)	▽
Gauteng, RSA (9)	25 (1.6)	▽

Content Domain: Earth Science

Cognitive Domain: Reasoning

Description: Identifies evidence that the Earth is becoming warmer over time

Scientists have evidence of changes in Earth's climate over the last 650,000 years.

Which of the following statements would be evidence that the Earth is becoming warmer?

A. a decrease in the size of Earth's polar ice caps

B. a decrease in the average depth of Earth's oceans

C. an increase in the number of volcanoes erupting

D. an increase in the number of sunspots

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Advanced Benchmark: Full Description and Example Items

Exhibit 4.13 presents the description of eighth grade performance at the Advanced International Benchmark. Students reaching the Advanced level communicated conceptual understanding of concepts related to biology, chemistry, physics, and Earth science in a variety of contexts.

Exhibit 4.13.1 shows an item from the biology domain asking students to correctly classify seven animals as mammals or non-mammals. On average, 30 percent of the eighth grade students were successful. Japan was the highest achieving country with 75 percent correct.

Exhibit 4.13.2 presents an item from the chemistry domain about the periodic table of elements. The international average was 29 percent correct, and top-achieving Singapore had 60 percent on this item.

Exhibit 4.13.3 shows a physics item that asked what happens to gas molecules inside a balloon when the balloon is heated. Singapore and Israel had the highest performance on this item with 68–69 percent correct. The international average was 41 percent.

The last example item is shown in Exhibit 4.13.4. From the Earth science content domain, the item asked students to recognize what causes a weather balloon to expand as it rises above the ground. On average, 42 percent of the eighth grade students correctly answered that the atmospheric pressure decreases. The highest percentage correct, 68 percent, was posted by Japan.

Exhibit 4.13: Description of the TIMSS 2019 Advanced International Benchmark (625) of Science Achievement

Advanced International Benchmark

625

Summary

Students communicate understanding of concepts related to biology, chemistry, physics, and Earth science in a variety of contexts. Students can classify animals into taxonomic groups. They can apply knowledge of cell structures and their functions. Students show some understanding of diversity, adaptation, and natural selection. They also recognize the interdependence of populations of organisms in an ecosystem. Students demonstrate knowledge of the composition of matter and the periodic table of the elements. Students use physical properties of matter to sort, classify, and compare substances and materials. They also recognize evidence that a chemical reaction has occurred. Students communicate understanding of particle spacing and motion in different physical states. Students apply knowledge of energy transfer and electrical circuits, can relate the properties of light and sound to common phenomena, and demonstrate understanding of forces in everyday contexts. Students communicate understanding of Earth's structure, physical features, and processes. They demonstrate knowledge of the Earth's resources and their conservation.

Students can classify animals into taxonomic groups. They can apply knowledge of cell structures and their functions. Students show some understanding of diversity, adaptation, and natural selection among organisms. They also recognize the interdependence of populations of organisms in an ecosystem.

Students demonstrate knowledge of the composition of matter. They demonstrate understanding of how the elements are arranged in the periodic table. Students use physical properties of matter to sort, classify, and compare substances and materials. They also recognize evidence that a chemical reaction has occurred.

Students communicate understanding of particle spacing and motion in different physical states. They can apply knowledge of energy transfer in practical and abstract contexts. Students can relate the properties of light and sound to common phenomena. They can apply knowledge of electricity. For example, they can recognize components in a circuit, indicate whether parts of a lightbulb are electrical conductors or insulators, and evaluate statements about battery life and bulb brightness in two circuits. Students demonstrate understanding of forces and motion and pressure in everyday contexts.

Students communicate understanding of Earth's structure, physical features, and processes. They also demonstrate knowledge of the Earth's resources and their conservation.

Students can combine and compare information from several sources to draw conclusions. They can interpret information in diagrams, graphs, and tables to identify and explain science concepts.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 4.13.1: Advanced International Benchmark of Science Achievement – Example Item 1

Country	Percent Full Credit	
Japan	75 (1.9)	▲
Chinese Taipei	63 (1.9)	▲
[2] Singapore	62 (2.0)	▲
Hungary	53 (2.8)	▲
† Hong Kong SAR	46 (2.6)	▲
[2] Russian Federation	44 (2.5)	▲
[1] Georgia	42 (3.2)	▲
Italy	41 (2.6)	▲
Romania	40 (2.4)	▲
Finland	37 (1.7)	▲
Lithuania	37 (2.7)	▲
[2] Kazakhstan	35 (2.6)	▲
Australia	35 (1.6)	▲
Portugal	35 (2.6)	▲
[3] Israel	33 (2.5)	
Korea, Rep. of	31 (2.1)	
† New Zealand	30 (2.0)	
† United States	30 (1.9)	
International Average	**30 (0.3)**	
England	27 (2.5)	
Cyprus	27 (2.0)	
United Arab Emirates	27 (1.2)	▽
Lebanon	26 (2.3)	
Bahrain	24 (2.3)	▽
Qatar	22 (1.7)	▽
Malaysia	21 (1.5)	▽
France	21 (1.8)	▽
Turkey	20 (2.0)	▽
Ireland	20 (1.9)	▽
Oman	20 (1.5)	▽
Jordan	18 (1.8)	▽
[2] Sweden	17 (1.7)	▽
† Norway (9)	16 (2.0)	▽
Chile	16 (1.7)	▽
Kuwait	16 (2.3)	▽
Morocco	16 (1.5)	▽
Iran, Islamic Rep. of	12 (1.4)	▽
[2] Saudi Arabia	10 (1.3)	▽
[2] Egypt	7 (1.2)	▽
South Africa (9)	5 (0.4)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	55 (2.5)	▲
[2] Dubai, UAE	37 (2.0)	▲
Ontario, Canada	37 (3.0)	▲
‡ Quebec, Canada	27 (2.2)	
Abu Dhabi, UAE	23 (1.5)	▽
Western Cape, RSA (9)	14 (1.4)	▽
Gauteng, RSA (9)	10 (1.6)	▽

Content Domain: Biology

Cognitive Domain: Applying

Description: Classifies 7 of 7 animals as mammals or non-mammals

Here is a list of animals.

ant	**cat**	**dolphin**	**earthworm**
fish	**frog**	**jellyfish**	

Classify the animals into two groups based on whether or not the animal is a mammal. List the animals in each group in the table.

Mammal	Not a mammal
cat dolphin	ant earthworm fish frog jellyfish

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 4.13.2: Advanced International Benchmark of Science Achievement – Example Item 2

Country	Percent Full Credit	
[2] Singapore	60 (2.1)	▲
Korea, Rep. of	56 (2.0)	▲
Turkey	49 (2.2)	▲
[2] Russian Federation	46 (2.4)	▲
Japan	44 (2.3)	▲
† Norway (9)	44 (2.5)	▲
Chinese Taipei	43 (2.2)	▲
Lithuania	42 (2.8)	▲
Hungary	41 (2.7)	▲
[2] Kazakhstan	40 (2.7)	▲
Australia	40 (2.1)	▲
† New Zealand	38 (2.2)	▲
Finland	36 (2.0)	▲
† United States	35 (1.8)	▲
Ireland	35 (2.3)	▲
[1] Georgia	32 (3.2)	
England	31 (2.7)	
[3] Israel	31 (2.4)	
[2] Sweden	29 (2.6)	
International Average	**29 (0.3)**	
United Arab Emirates	27 (1.1)	
Romania	26 (2.7)	
Bahrain	23 (2.0)	▽
Kuwait	23 (2.3)	▽
Lebanon	23 (2.2)	▽
Italy	21 (2.1)	▽
South Africa (9)	21 (1.1)	▽
Chile	21 (1.9)	▽
† Hong Kong SAR	21 (2.1)	▽
Iran, Islamic Rep. of	19 (2.3)	▽
Jordan	19 (2.1)	▽
[2] Egypt	18 (1.9)	▽
Portugal	17 (1.6)	▽
Qatar	15 (2.3)	▽
Cyprus	15 (1.8)	▽
France	15 (1.5)	▽
Malaysia	11 (1.1)	▽
Oman	8 (1.0)	▽
[2] Saudi Arabia	7 (1.3)	▽
Morocco	6 (1.1)	▽
Benchmarking Participants		
‡ Quebec, Canada	56 (2.7)	▲
Moscow City, Russian Fed.	55 (2.3)	▲
[2] Dubai, UAE	41 (2.0)	▲
Western Cape, RSA (9)	32 (2.1)	
Gauteng, RSA (9)	31 (2.3)	
Abu Dhabi, UAE	23 (1.4)	▽
Ontario, Canada	23 (2.4)	▽

Content Domain: Chemistry

Cognitive Domain: Applying

Description: Uses a portion of the periodic table to order four elements from the smallest atomic number to the largest atomic number

This is a portion of the periodic table of elements.

[1]H							He
Li	Be	B	C	N	O	F	Ne
Na	Mg	Al	Si	P	S	Cl	Ar

Hydrogen (H) is the first element of the periodic table. The nucleus of a hydrogen atom contains one proton. The atomic number of hydrogen is 1.

Four elements from the periodic table are shown below. The elements are not ordered by their atomic numbers.

Drag the four elements below to sort them by atomic number from smallest to largest.

Smallest **Largest**

Helium (He) | Carbon (C) | Fluorine (F) | Sodium (Na)

The answer shown illustrates the type of response that would receive full credit (1 point).

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 4.13.3: Advanced International Benchmark of Science Achievement – Example Item 3

Country	Percent Correct	
[2] Singapore	69 (2.2)	▲
[3] Israel	68 (2.1)	▲
Portugal	56 (2.6)	▲
Korea, Rep. of	56 (2.3)	▲
Bahrain	50 (2.1)	▲
Australia	50 (2.5)	▲
United Arab Emirates	50 (1.0)	▲
[2] Russian Federation	49 (2.5)	▲
England	49 (2.5)	▲
Turkey	49 (2.3)	▲
Chile	47 (2.6)	▲
Qatar	47 (2.4)	▲
† United States	47 (1.7)	▲
Japan	46 (2.6)	▲
Oman	45 (1.8)	▲
Lithuania	43 (2.4)	
[2] Sweden	41 (2.4)	
International Average	**41 (0.4)**	
Italy	40 (2.5)	
† New Zealand	40 (2.6)	
Chinese Taipei	38 (2.0)	
Kuwait	37 (2.3)	
Jordan	37 (2.5)	
France	36 (2.2)	▽
Malaysia	36 (2.1)	▽
[2] Saudi Arabia	36 (1.6)	▽
[1] Georgia	36 (3.0)	
† Hong Kong SAR	35 (3.1)	
[2] Kazakhstan	35 (2.1)	▽
Ireland	34 (2.4)	▽
Finland	34 (2.0)	▽
† Norway (9)	34 (2.1)	▽
Iran, Islamic Rep. of	31 (2.0)	▽
Cyprus	31 (2.2)	▽
Hungary	31 (2.0)	▽
Morocco	28 (1.8)	▽
Romania	27 (2.4)	▽
Lebanon	23 (2.4)	▽
[2] Egypt	22 (2.0)	▽
South Africa (9)	20 (0.9)	▽
Benchmarking Participants		
[2] Dubai, UAE	63 (1.9)	▲
Ontario, Canada	60 (2.6)	▲
Moscow City, Russian Fed.	59 (2.5)	▲
‡ Quebec, Canada	48 (2.8)	▲
Abu Dhabi, UAE	43 (1.9)	
Western Cape, RSA (9)	28 (2.0)	▽
Gauteng, RSA (9)	28 (2.0)	▽

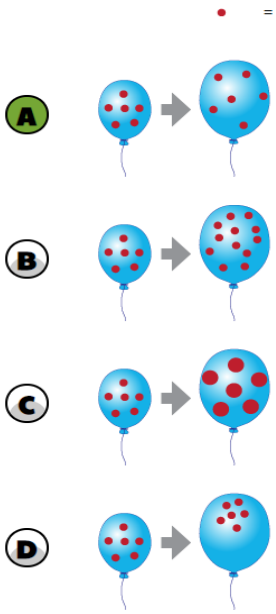
Content Domain: Physics

Cognitive Domain: Applying

Description: Recognizes a diagram of what happens to gas molecules inside a balloon when the balloon expands

Gas inside of a balloon expands when heated.

What happens to the gas molecules when the balloon expands?



▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 4.13.4: Advanced International Benchmark of Science Achievement – Example Item 4

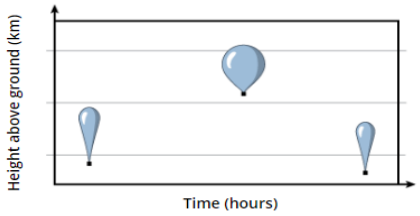
Country	Percent Correct	
Japan	68 (1.9)	▲
[2] Russian Federation	66 (2.6)	▲
Lithuania	65 (2.0)	▲
Korea, Rep. of	63 (2.2)	▲
Chinese Taipei	63 (2.0)	▲
Turkey	62 (2.4)	▲
[2] Kazakhstan	57 (2.4)	▲
Finland	55 (2.0)	▲
Hungary	52 (2.3)	▲
Bahrain	51 (2.0)	▲
† Hong Kong SAR	50 (2.5)	▲
France	49 (2.1)	▲
Italy	45 (2.8)	
[2] Singapore	45 (2.1)	
Romania	43 (2.3)	
England	42 (2.6)	
International Average	**42 (0.3)**	
[1] Georgia	42 (3.0)	
[2] Saudi Arabia	42 (2.0)	
Australia	41 (1.9)	
† United States	40 (1.8)	
Portugal	40 (2.1)	
United Arab Emirates	39 (1.0)	▽
† Norway (9)	39 (2.4)	
Qatar	37 (2.0)	▽
Ireland	36 (2.0)	▽
[2] Sweden	35 (2.2)	▽
[3] Israel	35 (2.7)	▽
† New Zealand	34 (2.5)	▽
Oman	34 (1.8)	▽
Cyprus	34 (2.2)	▽
Kuwait	33 (1.8)	▽
Chile	33 (2.2)	▽
Malaysia	32 (1.7)	▽
Morocco	30 (1.7)	▽
Jordan	29 (2.1)	▽
[2] Egypt	28 (1.8)	▽
Lebanon	25 (2.0)	▽
Iran, Islamic Rep. of	18 (1.5)	▽
South Africa (9)	12 (0.7)	▽
Benchmarking Participants		
Moscow City, Russian Fed.	74 (2.3)	▲
‡ Quebec, Canada	51 (3.3)	▲
[2] Dubai, UAE	47 (1.9)	▲
Ontario, Canada	37 (2.9)	
Abu Dhabi, UAE	37 (1.5)	▽
Gauteng, RSA (9)	18 (1.4)	▽
Western Cape, RSA (9)	18 (1.5)	▽

Content Domain: Earth Science

Cognitive Domain: Knowing

Description: Recognizes why a balloon gets bigger as its height above the ground increases

The diagram shows the height above the ground of a helium-filled weather balloon during a period of several hours.



What causes the balloon to become bigger as its height above the ground increases?

A. Gravity decreases.

B. Atmospheric pressure decreases.

C. The balloon is heated by the Sun.

D. The balloon absorbs air.

▲ Percent significantly higher than international average

▽ Percent significantly lower than international average

See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Average Achievement in Science Content and Cognitive Domains

TIMSS 2019 Science Content and Cognitive Domains

TIMSS 2019 assessed four content areas in science at the eighth grade: biology, chemistry, physics, and Earth science.

Thirty-five percent of the eighth grade science assessment was devoted to biology, including characteristics and life processes of organisms; cells and their functions; life cycles, reproduction, and heredity; diversity, adaptation, and natural selection; ecosystems; and human health. Eighth grade students were asked about how structure relates to function in organisms, cell structure and function, and the processes of photosynthesis and cellular respiration. Other areas assessed included reproduction and heredity, molecular biology and molecular genetics, adaptation and natural selection, and processes and interactions in ecosystems.

Twenty percent of the assessment covered three chemistry topics—composition of matter, properties of matter, and chemical change. Students were asked about elements, compounds, and mixtures; the use of the periodic table; physical and chemical properties of matter; as well as the properties of mixtures and solutions and the properties of acids and bases. The chemical change topic focused on the characteristics of chemical changes and the conservation of matter during chemical changes.

Twenty-five percent of the assessment was devoted to physics, which consisted of five topics: physical states and changes in matter, energy transformation and transfer, light and sound, electricity and magnetism, and motion and forces. For example, eighth grade students were asked to describe processes involved in changes in the state of matter, to identify different forms of energy and describe simple energy transformations, to apply the principle of conservation of total energy in practical situations, and to understand the difference between thermal energy (heat) and temperature.

The remaining 20 percent of the assessment was devoted to Earth science topics. Students were asked about the structure and physical features of Earth, including Earth's structural layers, and the atmosphere, as well as processes, cycles, and patterns, including geological processes that have occurred over Earth's history, the water cycle, and patterns of weather and climate. Earth's resources and their use and conservation also were covered. The area of Earth in the Solar System included identifying how observable phenomena relate to the movements of Earth and the Moon, and describing the features of Earth, the Moon, and other planets.

Eighth grade students also needed to draw on a range of cognitive skills across the content domains already described above. There are three cognitive domains. Thirty-five percent of the eighth grade assessment was devoted to the knowing cognitive domain, 35 percent to applying, and 30 percent to reasoning. The knowing domain covers the facts, concepts, and procedures students need to know, while the applying domain focuses on students' ability to apply knowledge and conceptual understanding to solve practical problems or answer questions. The reasoning domain goes beyond

the solution of familiar problems to encompass unfamiliar situations, complex contexts, and multistep problems. Also, five science practices fundamental to scientific inquiry were assessed within the content areas and cognitive domains.

Average Achievement in Content Domains

Exhibit 4.14 shows countries' average science achievement in each of the four content domains relative to their overall average achievement (presented from highest to lowest overall average achievement). Based on countries' strengths and weaknesses, the TIMSS 2019 countries appear to be placing relatively less instructional emphasis on the chemistry and physics domains. Of the 37 participating countries for which cognitive domain scores were estimated, 11 had a relative strength in biology and 8 had a relative weakness. In chemistry, 10 had a relative strength and 16 had a relative weakness; in physics, 9 had a relative strength and 14 had a relative weakness. In most countries, Earth science tended to be either a relative strength (12 countries) or a relative weakness (19 countries). England and Hungary were the only two countries without at least one relative strength or relative weakness compared with its overall achievement.

Exhibit 4.14: Average Achievement in Science Content Domains

Country	Overall Science Average Scale Score	Biology (75 Items)		Chemistry (42 Items)		Physics (52 Items)		Earth Science (42 Items)	
		Average Scale Score	Difference from Overall Science Score	Average Scale Score	Difference from Overall Science Score	Average Scale Score	Difference from Overall Science Score	Average Scale Score	Difference from Overall Science Score
[2] Singapore	608 (3.9)	622 (4.2)	14 (1.9) ▲	616 (5.0)	8 (1.8) ▲	619 (4.1)	12 (1.0) ▲	562 (4.1)	-46 (1.8) ▽
Chinese Taipei	574 (1.9)	576 (2.2)	2 (1.2)	594 (2.4)	20 (1.2) ▲	555 (2.7)	-19 (2.3) ▽	579 (2.5)	5 (2.0) ▲
Japan	570 (2.1)	574 (2.3)	4 (1.5) ▲	560 (2.7)	-9 (2.1) ▽	570 (2.5)	1 (1.7)	572 (3.2)	2 (2.1)
Korea, Rep. of	561 (2.1)	560 (2.2)	-1 (1.3)	551 (2.5)	-10 (1.6) ▽	569 (2.7)	9 (1.7) ▲	562 (3.2)	1 (2.3)
[2] Russian Federation	543 (4.2)	543 (4.5)	0 (1.4)	551 (4.2)	8 (1.5) ▲	540 (4.7)	-2 (2.6)	533 (4.4)	-10 (1.8) ▽
Finland	543 (3.1)	534 (3.3)	-9 (1.6) ▽	545 (3.8)	3 (2.0)	539 (3.9)	-3 (1.9)	558 (3.5)	16 (2.8) ▲
Lithuania	534 (3.0)	535 (3.0)	1 (1.4)	530 (3.2)	-4 (2.3)	529 (3.5)	-5 (2.0) ▽	534 (3.3)	0 (2.8)
Hungary	530 (2.6)	530 (2.7)	0 (1.2)	527 (3.5)	-2 (2.4)	528 (2.9)	-2 (1.5)	535 (3.9)	5 (2.7)
Australia	528 (3.2)	531 (3.3)	3 (1.4)	515 (3.8)	-14 (1.2) ▽	529 (3.6)	0 (1.1)	533 (3.3)	5 (1.9) ▲
Ireland	523 (2.9)	521 (3.2)	-2 (1.6)	512 (3.9)	-11 (2.4) ▽	519 (3.8)	-4 (1.9) ▽	536 (3.8)	13 (3.1) ▲
† United States	522 (4.7)	530 (4.8)	7 (0.9) ▲	509 (5.2)	-13 (1.8) ▽	515 (5.0)	-8 (1.1) ▽	530 (5.1)	7 (1.2) ▲
[2] Sweden	521 (3.2)	519 (3.4)	-3 (1.8)	509 (3.7)	-13 (1.5) ▽	520 (3.8)	-1 (2.1)	530 (3.2)	9 (1.4) ▲
Portugal	519 (2.9)	527 (3.0)	8 (1.6) ▲	512 (3.5)	-6 (1.8) ▽	497 (3.5)	-22 (1.9) ▽	531 (3.4)	12 (1.8) ▲
England	517 (4.8)	516 (5.2)	-1 (2.0)	512 (6.0)	-5 (3.1)	516 (5.1)	0 (1.2)	517 (5.5)	1 (2.6)
Turkey	515 (3.7)	513 (3.4)	-2 (1.2) ▽	516 (4.8)	0 (2.6)	518 (4.0)	3 (1.9)	509 (3.8)	-6 (1.8) ▽
[3] Israel	513 (4.2)	512 (4.2)	-1 (1.1)	518 (4.6)	5 (1.7) ▲	520 (4.9)	7 (1.6) ▲	495 (4.7)	-18 (2.4) ▽
† Hong Kong SAR	504 (5.2)	501 (5.7)	-3 (1.3) ▽	485 (5.5)	-19 (2.6) ▽	510 (5.6)	6 (2.7) ▲	512 (5.6)	8 (2.7) ▲
Italy	500 (2.6)	508 (2.7)	8 (1.0) ▲	484 (3.0)	-17 (1.9) ▽	487 (4.5)	-14 (3.6) ▽	512 (3.5)	11 (2.1) ▲
† New Zealand	499 (3.5)	498 (3.7)	-1 (1.5)	482 (3.8)	-17 (1.5) ▽	502 (3.8)	3 (1.3) ▲	510 (3.7)	11 (1.3) ▲
† Norway (9)	495 (3.1)	486 (2.8)	-10 (1.6) ▽	492 (3.7)	-3 (2.6)	493 (3.6)	-3 (2.1)	519 (3.9)	23 (2.9) ▲
France	489 (2.7)	488 (2.9)	0 (1.8)	465 (3.2)	-24 (2.0) ▽	491 (3.6)	2 (3.0)	502 (4.3)	14 (3.1) ▲
Bahrain	486 (1.9)	492 (1.9)	6 (1.4) ▲	480 (2.4)	-6 (1.7) ▽	480 (2.6)	-6 (2.1) ▽	475 (2.8)	-11 (2.1) ▽
Cyprus	484 (1.9)	489 (2.4)	5 (1.7) ▲	478 (2.1)	-5 (1.4) ▽	480 (3.6)	-4 (3.3)	473 (2.6)	-11 (2.3) ▽
[2] Kazakhstan	478 (3.1)	476 (3.2)	-2 (1.4)	494 (3.6)	16 (1.9) ▲	476 (3.9)	-3 (2.4)	448 (4.1)	-30 (2.6) ▽
Qatar	475 (4.4)	476 (4.4)	2 (1.2)	474 (4.4)	0 (1.5)	469 (4.4)	-5 (1.7) ▽	465 (5.0)	-10 (2.6) ▽
United Arab Emirates	473 (2.2)	474 (2.5)	1 (0.8)	475 (2.4)	2 (0.7) ▲	469 (2.3)	-4 (0.7) ▽	465 (2.4)	-8 (0.9) ▽
Romania	470 (4.2)	479 (4.4)	9 (1.4) ▲	466 (5.0)	-3 (2.6)	458 (4.3)	-12 (1.5) ▽	453 (4.7)	-16 (3.7) ▽
Chile	462 (2.9)	471 (3.0)	9 (1.2) ▲	442 (2.9)	-20 (1.6) ▽	450 (3.7)	-12 (1.8) ▽	464 (3.3)	2 (1.4)
Malaysia	460 (3.5)	463 (3.7)	2 (1.4)	434 (4.2)	-26 (1.5) ▽	475 (3.4)	15 (1.3) ▲	452 (4.3)	-9 (1.7) ▽
Oman	457 (2.9)	466 (3.3)	9 (1.1) ▲	443 (3.1)	-14 (1.2) ▽	449 (3.1)	-8 (1.1) ▽	449 (3.0)	-9 (1.8) ▽
Jordan	452 (4.7)	457 (5.2)	5 (1.3) ▲	454 (5.3)	2 (1.6)	449 (4.6)	-3 (1.4) ▽	428 (4.7)	-24 (2.5) ▽
Iran, Islamic Rep. of	449 (3.6)	448 (3.7)	-2 (1.2)	450 (4.5)	1 (2.0)	453 (4.2)	4 (2.5)	437 (4.0)	-13 (2.3) ▽
[1] Georgia	447 (3.9)	447 (3.5)	0 (2.1)	456 (4.3)	9 (2.1) ▲	436 (5.0)	-11 (3.3) ▽	431 (3.6)	-16 (2.0) ▽
Kuwait	444 (5.7)	- -	- -	- -	- -	- -	- -	- -	- -
[2] Saudi Arabia	431 (2.6)	- -	- -	- -	- -	- -	- -	- -	- -
Morocco	394 (2.7)	387 (3.0)	-7 (1.1) ▽	402 (3.0)	8 (1.7) ▲	402 (2.9)	8 (1.9) ▲	357 (3.3)	-37 (1.6) ▽
[2] Egypt	389 (5.4)	381 (5.6)	-8 (1.0) ▽	397 (5.9)	8 (1.6) ▲	394 (5.0)	5 (1.9) ▲	367 (5.5)	-22 (1.3) ▽
Lebanon	377 (4.6)	355 (5.1)	-22 (1.9) ▽	412 (4.6)	36 (2.4) ▲	378 (4.9)	1 (2.2)	337 (5.1)	-40 (3.4) ▽
Ψ South Africa (9)	370 (3.1)	359 (3.0)	-11 (1.4) ▽	372 (4.2)	2 (2.4)	381 (3.0)	11 (1.3) ▲	366 (3.2)	-4 (1.6) ▽
Benchmarking Participants									
Moscow City, Russian Fed.	567 (2.9)	565 (3.1)	-1 (1.2)	561 (2.9)	-5 (1.1) ▽	576 (3.6)	10 (2.1) ▲	565 (3.6)	-2 (1.9)
[2] Dubai, UAE	548 (2.0)	554 (2.2)	6 (0.9) ▲	554 (2.2)	6 (1.4) ▲	539 (2.6)	-8 (1.9) ▽	538 (2.3)	-9 (1.7) ▽
‡ Quebec, Canada	537 (3.6)	531 (3.8)	-6 (1.5) ▽	548 (4.1)	12 (1.8) ▲	521 (4.2)	-16 (2.5) ▽	553 (4.5)	16 (2.7) ▲
Ontario, Canada	522 (3.0)	534 (3.2)	13 (1.9) ▲	492 (3.9)	-30 (3.1) ▽	520 (3.5)	-2 (2.5)	520 (3.0)	-2 (1.7)
Western Cape, RSA (9)	439 (5.1)	432 (5.2)	-7 (2.6) ▽	442 (7.2)	2 (5.6)	442 (6.2)	3 (4.2)	442 (6.7)	3 (5.6)
Gauteng, RSA (9)	422 (3.9)	416 (3.9)	-6 (2.1) ▽	423 (4.2)	0 (1.8)	428 (4.5)	6 (2.6) ▲	419 (4.1)	-3 (2.5)
Abu Dhabi, UAE	420 (3.6)	417 (3.9)	-3 (1.2) ▽	421 (4.1)	1 (1.3)	420 (3.8)	0 (1.0)	413 (4.1)	-7 (2.0) ▽

▲ Subscale score significantly higher than overall science score
▽ Subscale score significantly lower than overall science score

Numbers of items are based on the TIMSS 2019 eighth grade science eAssessment items included in scaling.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
See Appendix B.7 for target population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available because average achievement could not be accurately estimated.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Trends in Average Achievement in Content Domains

Exhibit 4.15 presents trends in average achievement for the four science content domains assessed by TIMSS 2019—biology, chemistry, physics, and Earth science. The results are moderately positive, showing more increases than decreases in all four content areas, especially most recently in biology. Thirty-one TIMSS 2019 countries also participated in TIMSS 2015 and have comparable data in the content domains. In the biology content area, 13 showed improvement and 5 showed declines; in chemistry, 8 showed improvement and 8 showed declines; in physics, 9 showed improvement and 5 showed declines; and in Earth science, 10 showed improvement and 5 showed declines.

TIMSS began providing scaled results in the content domains in 2007, with 23 countries having trends between 2007 and 2019. Compared with 2007, in TIMSS 2019, 11 countries showed improvement and 5 showed declines in biology, 8 countries showed improvement and 6 showed declines in chemistry, 11 showed improvement and 6 showed declines in physics, and 12 showed improvement and 6 showed declines in Earth science.

Exhibit 4.15: Differences in Achievement for Science Content Domains Across Assessment Years◊

Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▽) than the performance in the column year.

Country	Biology				Chemistry				Physics				Earth Science			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007		2015	2011	2007
Australia																
2019	531 (3.3)	9 ▲	4	12 ▲	515 (3.8)	22 ▲	13 ▲	10	529 (3.6)	24 ▲	18 ▲	20 ▲	533 (3.3)	11 ▲	0	13 ▲
2015	522 (2.8)		-5	3	493 (3.3)		-8	-12 ▽	505 (2.7)		-6	-4	522 (2.9)		-11	1
2011	527 (4.8)			8	501 (5.0)			-3	511 (5.1)			2	533 (5.5)			13
2007	519 (3.8)				504 (4.0)				509 (4.3)				521 (4.4)			
Bahrain																
2019	492 (1.9)	24 ▲	44 ▲	22 ▲	480 (2.4)	18 ▲	33 ▲	14 ▲	480 (2.6)	19 ▲	23 ▲	17 ▲	475 (2.8)	15 ▲	24 ▲	15 ▲
2015	469 (2.6)		20 ▲	-1	462 (2.8)		15 ▲	-4	461 (2.6)		5	-2	461 (3.5)		9 ▲	0
2011	449 (2.0)			-22 ▽	448 (2.6)			-19 ▽	457 (1.7)			-7 ▽	451 (1.8)			-9 ▽
2007	470 (2.1)				467 (2.9)				463 (1.6)				460 (2.8)			
Chile																
2019	471 (3.0)	12 ▲	10 ▲		442 (2.9)	4	-5		450 (3.7)	11 ▲	-3		464 (3.3)	0	-12 ▽	
2015	459 (3.6)		-3		438 (3.6)		-9		439 (3.8)		-14 ▽		464 (3.2)		-12 ▽	
2011	462 (2.6)				447 (3.0)				453 (2.6)				476 (2.8)			
Chinese Taipei																
2019	576 (2.2)	11 ▲	19 ▲	22 ▲	594 (2.4)	16 ▲	9 ▲	10	555 (2.7)	-5	3	-4	579 (2.5)	-2	11 ▲	27 ▲
2015	565 (2.2)		8 ▲	11 ▲	579 (2.7)		-7	-6	560 (3.0)		8	1	581 (2.7)		12 ▲	29 ▲
2011	557 (2.5)			3	585 (3.8)			1	552 (3.3)			-6	568 (2.8)			16 ▲
2007	554 (3.7)				585 (4.7)				559 (4.2)				552 (3.4)			
Cyprus																
2019	489 (2.4)			45 ▲	478 (2.1)			30 ▲	480 (3.6)			25 ▲	473 (2.6)			20 ▲
2007	444 (2.3)				448 (3.1)				454 (3.6)				453 (2.6)			
Egypt																
[2] 2019	381 (5.6)	33 ▲		-19 ▽	397 (5.9)	2		-7	394 (5.0)	16 ▲		-12	367 (5.5)	16 ▲		-50 ▽
2015	348 (5.0)			-52 ▽	395 (5.0)			-9	378 (4.7)			-28 ▽	351 (4.6)			-65 ▽
2007	400 (3.7)				404 (4.7)				406 (3.8)				417 (4.4)			
England																
2019	516 (5.2)	-26 ▽	-17 ▽	-28 ▽	512 (6.0)	-17 ▽	-17 ▽	-27 ▽	516 (5.1)	-19 ▽	-17 ▽	-32 ▽	517 (5.5)	-18 ▽	-19 ▽	-14
2015	542 (4.0)		9	-2	529 (4.5)		0	-11	535 (3.9)		2	-14 ▽	536 (4.0)		-1	4
‡ 2011	533 (4.8)			-11	529 (5.2)			-11	533 (4.7)			-15 ▽	536 (5.3)			5
† 2007	544 (4.7)				539 (4.7)				549 (4.5)				531 (5.2)			
Finland																
2019	534 (3.3)		-14 ▽		545 (3.8)		-8		539 (3.9)		-1		558 (3.5)		-16 ▽	
2011	548 (2.8)				554 (2.6)				540 (2.9)				574 (3.0)			
Georgia																
[1] 2019	447 (3.5)	0	12 ▲	28 ▲	456 (4.3)	0	61 ▲	48 ▲	436 (5.0)	6	35 ▲	25 ▲	431 (3.6)	11 ▲	13 ▲	15 ▲
[1 2] 2015	447 (3.1)		12 ▲	28 ▲	456 (3.7)		61 ▲	48 ▲	429 (4.6)		28 ▲	19 ▲	420 (3.6)		2	4
[1] 2011	435 (3.2)			16 ▲	395 (3.2)			-13 ▽	401 (4.2)			-9	417 (3.5)			2
[1] 2007	419 (4.1)				408 (5.4)				411 (5.9)				416 (4.5)			
Hong Kong SAR																
† 2019	501 (5.7)	-48 ▽	-35 ▽	-29 ▽	485 (5.5)	-51 ▽	-41 ▽	-36 ▽	510 (5.6)	-30 ▽	-29 ▽	-20 ▽	512 (5.6)	-46 ▽	-28 ▽	-24 ▽
2015	549 (4.7)		13 ▲	19 ▲	536 (4.1)		10	15 ▲	540 (4.1)		2	10	558 (4.3)		19 ▲	23 ▲
2011	535 (3.6)			6	526 (3.6)			5	539 (3.6)			9	539 (3.6)			4
† 2007	529 (5.0)				521 (5.3)				530 (5.4)				535 (5.1)			
Hungary																
2019	530 (2.7)	9 ▲	11 ▲	-5	527 (3.5)	-7	-7	-13 ▽	528 (2.9)	-3	3	-16 ▽	535 (3.9)	13 ▲	24 ▲	0
2015	521 (3.3)		1	-14 ▽	534 (3.6)		0	-6	531 (4.0)		6	-13 ▽	521 (3.9)		10 ▲	-13 ▽
2011	520 (3.0)			-15 ▽	534 (3.3)			-6	525 (3.7)			-19 ▽	511 (3.3)			-24 ▽
2007	535 (2.9)				540 (4.0)				544 (3.7)				535 (3.3)			
Iran, Islamic Rep. of																
2019	448 (3.7)	-1	-18 ▽	3	450 (4.5)	-8	-19 ▽	-7	453 (4.2)	-22 ▽	-30 ▽	-14 ▽	437 (4.0)	-2	-40 ▽	-35 ▽
2015	448 (3.8)		-18 ▽	3	458 (4.6)		-12	1	475 (4.4)		-8	8	439 (4.5)		-38 ▽	-33 ▽
2011	466 (3.9)			21 ▲	469 (4.4)			12 ▲	483 (4.1)			16 ▲	477 (4.0)			5
2007	445 (3.7)				457 (4.1)				467 (4.1)				472 (4.3)			
Ireland																
2019	521 (3.2)	-13 ▽			512 (3.9)	-5			519 (3.8)	-6			536 (3.8)	-6		
2015	534 (2.9)				517 (3.6)				525 (3.2)				542 (3.1)			
Israel																
[3] 2019	512 (4.2)	8	-11		518 (4.6)	3	5		520 (4.9)	11	6		495 (4.7)	2	-9	
[3] 2015	504 (4.2)		-19 ▽		516 (4.6)		2		508 (4.0)		-5		493 (4.0)		-12 ▽	
[3] 2011	523 (4.2)				514 (5.0)				514 (4.1)				504 (4.3)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

◊ Trend reporting in content domains using current methodology began with TIMSS 2007.
See Appendix B.7 for target population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 4.15: Differences in Achievement for Science Content Domains Across Assessment Years◊

(Continued)

Country	Biology				Chemistry				Physics				Earth Science			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007		2015	2011	2007
Italy																
2019	508 (2.7)	13 ▲	5	6	484 (3.0)	-4	-8	6	487 (4.5)	-10	-4	-2	512 (3.5)	-2	-1	10 ▲
[2] 2015	496 (2.6)		-8 ▽	-6	487 (2.4)		-4	9 ▲	496 (2.5)		6	8	514 (2.8)		1	12 ▲
2011	503 (3.0)			1	491 (3.0)			13 ▲	490 (2.8)			2	513 (3.8)			11 ▲
2007	502 (3.2)				478 (3.5)				489 (3.5)				502 (3.5)			
Japan																
2019	574 (2.3)	3	13 ▲	19 ▲	560 (2.7)	-10 ▽	0	2	570 (2.5)	1	12 ▲	7 ▲	572 (3.2)	-2	23 ▲	36 ▲
2015	570 (2.9)		10 ▲	16 ▲	570 (2.4)		10 ▲	11 ▲	570 (2.3)		12 ▲	6 ▲	574 (2.0)		26 ▲	38 ▲
2011	561 (2.3)			6 ▲	560 (2.7)			1	558 (2.8)			-5	548 (2.8)			12 ▲
2007	554 (2.0)				559 (2.4)				563 (2.2)				536 (3.4)			
Jordan																
2019	457 (5.2)	38 ▲	10	-19 ▽	454 (5.3)	17 ▲	-8	-38 ▽	449 (4.6)	25 ▲	3	-28 ▽	428 (4.7)	12 ▲	-8	-54 ▽
2015	420 (3.9)		-28 ▽	-57 ▽	438 (3.8)		-25 ▽	-55 ▽	424 (3.6)		-22 ▽	-53 ▽	416 (3.0)		-20 ▽	-66 ▽
2011	447 (4.4)			-29 ▽	463 (4.4)			-30 ▽	446 (4.2)			-31 ▽	436 (4.3)			-46 ▽
2007	476 (4.2)				493 (4.7)				478 (4.3)				481 (4.2)			
Kazakhstan																
[2] 2019	476 (3.2)		-7		494 (3.6)		-15 ▽		476 (3.9)		-13 ▽		448 (4.1)		-24 ▽	
2011	483 (4.4)				508 (4.7)				489 (4.3)				472 (4.8)			
Korea, Rep. of																
2019	560 (2.2)	6	-1	8 ▲	551 (2.5)	0	0	12 ▲	569 (2.7)	5	-7	-7	562 (3.2)	7	14 ▲	19 ▲
2015	554 (2.2)		-7 ▽	2	550 (2.5)		-1	11 ▲	564 (2.8)		-12 ▽	-12 ▽	554 (2.7)		7	12 ▲
2011	561 (2.3)			9 ▲	551 (2.1)			12 ▲	577 (2.7)			0	548 (3.2)			5
2007	552 (2.0)				539 (3.0)				576 (2.6)				543 (2.4)			
Lebanon																
2019	355 (5.1)	-11	-40 ▽	-44 ▽	412 (4.6)	-25 ▽	-22 ▽	-27 ▽	378 (4.9)	-34 ▽	-27 ▽	-46 ▽	337 (5.1)	-28 ▽	-28 ▽	-41 ▽
2015	366 (6.2)		-29 ▽	-33 ▽	438 (6.2)		3	-2	412 (6.6)		7	-12	365 (6.4)		1	-13
2011	395 (5.2)			-4	435 (5.2)			-5	405 (5.4)			-19 ▽	365 (6.4)			-14
2007	399 (6.7)				440 (6.5)				424 (5.7)				378 (6.8)			
Lithuania																
2019	535 (3.0)	14 ▲	18 ▲	5	530 (3.2)	13 ▲	13 ▲	23 ▲	529 (3.5)	16 ▲	26 ▲	22 ▲	534 (3.3)	16 ▲	18 ▲	17 ▲
[2] 2015	521 (3.1)		4	-9 ▽	517 (3.2)		0	11 ▲	513 (3.6)		10 ▲	6	518 (3.3)		2	1
[1] 2011	517 (2.7)			-13 ▽	517 (2.3)			11 ▲	503 (3.2)			-4	517 (3.5)			0
[1] 2007	530 (2.7)				506 (2.6)				507 (3.1)				517 (3.0)			
Malaysia																
2019	463 (3.7)	-4	36 ▲	-3	434 (4.2)	-39 ▽	8	-41 ▽	475 (3.4)	-5	40 ▲	-7	452 (4.3)	-9	50 ▲	-5
2015	466 (4.4)		39 ▲	1	473 (4.0)		47 ▲	-2	480 (3.9)		45 ▲	-2	460 (4.5)		59 ▲	4
2011	427 (6.2)			-39 ▽	426 (6.5)			-49 ▽	435 (6.6)			-47 ▽	401 (6.5)			-56 ▽
2007	466 (6.2)				475 (5.9)				482 (6.4)				457 (6.1)			
Morocco																
2019	387 (3.0)	7	9 ▲		402 (3.0)	3	28 ▲		402 (2.9)	7	53 ▲		357 (3.3)	-38 ▽	-20 ▽	
2015	380 (2.5)		2		400 (3.0)		25 ▲		395 (2.9)		47 ▲		395 (2.2)		18 ▲	
2011	378 (3.1)				374 (2.3)				349 (2.6)				377 (3.3)			
New Zealand																
† 2019	498 (3.7)	-22 ▽	-16 ▽		482 (3.8)	-16 ▽	-19 ▽		502 (3.8)	-7	-7		510 (3.7)	-7	-13 ▽	
† 2015	520 (3.5)		5		498 (3.5)		-3		508 (3.2)		0		517 (3.6)		-6	
2011	514 (4.8)				501 (5.3)				509 (4.6)				523 (4.8)			
Norway (9)																
† 2019	486 (2.8)	-16 ▽			492 (3.7)	-10 ▽			493 (3.6)	-19 ▽			519 (3.9)	-4		
2015	502 (2.6)				503 (2.9)				512 (3.1)				523 (3.3)			
Oman																
2019	466 (3.3)	12 ▲	59 ▲	59 ▲	443 (3.1)	-9 ▽	35 ▲	35 ▲	449 (3.1)	1	23 ▲	11 ▲	449 (3.0)	-8	17 ▲	17 ▲
2015	454 (2.7)		47 ▲	47 ▲	452 (2.7)		44 ▲	44 ▲	449 (3.0)		22 ▲	10 ▲	456 (2.4)		25 ▲	24 ▲
2011	407 (3.5)			0	408 (3.5)			0	427 (3.3)			-12 ▽	431 (3.0)			-1
2007	408 (3.2)				408 (4.4)				439 (3.1)				432 (2.9)			
Qatar																
2019	476 (4.4)	22 ▲	65 ▲		474 (4.4)	19 ▲	59 ▲		469 (4.4)	10	43 ▲		465 (5.0)	19 ▲	57 ▲	
2015	454 (3.0)		43 ▲		455 (3.6)		39 ▲		459 (3.4)		33 ▲		446 (3.7)		38 ▲	
2011	411 (4.2)				416 (4.0)				426 (3.8)				408 (3.8)			
Romania																
2019	479 (4.4)		21 ▲	22 ▲	466 (5.0)		-2	9	458 (4.3)		2	3	453 (4.7)		-17 ▽	-13 ▽
2011	458 (3.7)			2	469 (4.3)			11	456 (3.9)			2	470 (3.6)			4
2007	457 (3.8)				458 (5.2)				454 (3.8)				466 (4.0)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 4.15: Differences in Achievement for Science Content Domains Across Assessment Years◊

(Continued)

Country	Biology				Chemistry				Physics				Earth Science			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007		2015	2011	2007
Russian Federation																
2 2019	543 (4.5)	4	6	16 ▲	551 (4.2)	-7	-3	11	540 (4.7)	-7	-7	20 ▲	533 (4.4)	1	-2	5
2015	539 (4.4)		2	12 ▲	558 (4.9)		4	18 ▲	548 (4.2)		1	27 ▲	532 (4.7)		-3	4
2 2011	537 (3.3)			10	554 (3.5)			13 ▲	547 (3.6)			26 ▲	535 (3.6)			7
2007	527 (3.9)				540 (4.2)				521 (4.3)				528 (4.2)			
Singapore																
2 2019	622 (4.2)	13 ▲	27 ▲	55 ▲	616 (5.0)	22 ▲	25 ▲	49 ▲	619 (4.1)	11 ▲	17 ▲	37 ▲	562 (4.1)	-3	-4	15 ▲
2 2015	609 (3.5)		15 ▲	42 ▲	593 (3.6)		3	27 ▲	608 (3.1)		7	26 ▲	565 (3.6)		-1	17 ▲
2 2011	594 (4.8)			27 ▲	590 (4.7)			24 ▲	602 (4.2)			19 ▲	566 (4.5)			19 ▲
2007	567 (4.5)				566 (4.8)				582 (4.3)				547 (4.9)			
South Africa (9)																
Ψ 2019	359 (3.0)	3	41 ▲		372 (4.2)	3	36 ▲		381 (3.0)	22 ▲	30 ▲		366 (3.2)	36 ▲	72 ▲	
2015	356 (5.9)		38 ▲		369 (6.1)		33 ▲		359 (5.5)		8		330 (6.4)		36 ▲	
Ψ 2011	318 (3.5)				336 (3.8)				351 (3.6)				294 (3.7)			
Sweden																
2 2019	519 (3.4)	-1	6	3	509 (3.7)	-4	7	10 ▲	520 (3.8)	-4	22 ▲	13 ▲	530 (3.2)	-2	10 ▲	19 ▲
2015	520 (3.6)		7	5	512 (3.6)		10 ▲	13 ▲	524 (3.7)		26 ▲	17 ▲	532 (4.5)		12 ▲	20 ▲
2011	513 (2.9)			-3	502 (2.6)			3	498 (3.2)			-9 ▽	520 (2.7)			8
2007	515 (2.6)				499 (2.8)				507 (3.0)				511 (3.3)			
Turkey																
2019	513 (3.4)	22 ▲	29 ▲		516 (4.8)	22 ▲	39 ▲		518 (4.0)	13 ▲	24 ▲		509 (3.8)	32 ▲	41 ▲	
2015	491 (4.1)		7		493 (4.7)		16 ▲		506 (4.2)		12 ▲		477 (3.9)		9	
2011	484 (3.7)				477 (4.0)				494 (3.6)				468 (3.4)			
United Arab Emirates																
2019	474 (2.5)	0	11 ▲		475 (2.4)	-6	12 ▲		469 (2.3)	-5	8 ▲		465 (2.4)	-10 ▽	-1	
2015	475 (2.4)		12 ▲		481 (3.2)		17 ▲		475 (2.5)		13 ▲		475 (2.4)		8 ▲	
2011	463 (2.4)				464 (2.3)				461 (2.3)				466 (2.5)			
United States																
† 2019	530 (4.8)	-11	0	-1	509 (5.2)	-10	-11	-1	515 (5.0)	-1	1	11 ▲	530 (5.1)	-5	-4	3
† 2015	540 (2.9)		10 ▲	10 ▲	519 (3.2)		-1	9 ▲	516 (2.9)		3	13 ▲	535 (3.1)		2	9
2 2011	530 (2.5)			0	520 (2.6)			10 ▲	513 (2.5)			10 ▲	533 (2.7)			7
2 † 2007	531 (3.0)				510 (3.1)				503 (3.0)				526 (3.7)			
Benchmarking Participants																
Ontario, Canada																
2019	534 (3.2)	-3	3	-3	492 (3.9)	-11 ▽	-3	-12 ▽	520 (3.5)	-2	-2	-3	520 (3.0)	-6	-8	-13 ▽
2015	538 (2.9)		7	0	503 (2.7)		8 ▲	-1	521 (2.9)		0	-1	526 (3.2)		-2	-7
2 2011	531 (2.6)			-6	495 (2.4)			-9 ▽	521 (2.8)			-1	528 (3.4)			-5
2 2007	537 (4.1)				504 (4.1)				523 (4.6)				533 (4.8)			
Quebec, Canada																
‡ 2019	531 (3.8)	4	6	18 ▲	548 (4.1)	18 ▲	33 ▲	53 ▲	521 (4.2)	1	19 ▲	29 ▲	553 (4.5)	10	17 ▲	38 ▲
≡ 2015	527 (4.3)		2	15 ▲	531 (4.6)		15 ▲	35 ▲	520 (4.7)		18 ▲	28 ▲	542 (4.2)		7	28 ▲
2011	525 (2.8)			12 ▲	515 (3.0)			20 ▲	502 (3.1)			10 ▲	536 (2.9)			21 ▲
3 2007	512 (3.2)				495 (3.4)				492 (3.5)				514 (4.3)			
Abu Dhabi, UAE																
2019	417 (3.9)	-35 ▽	-43 ▽		421 (4.1)	-38 ▽	-40 ▽		420 (3.8)	-34 ▽	-39 ▽		413 (4.1)	-41 ▽	-48 ▽	
2015	452 (6.1)		-7		459 (6.7)		-2		454 (5.4)		-5		453 (5.8)		-8	
2011	459 (4.2)				461 (4.1)				459 (3.9)				461 (4.6)			
Dubai, UAE																
2 2019	554 (2.2)	29 ▲	69 ▲	71 ▲	554 (2.2)	26 ▲	67 ▲	62 ▲	539 (2.6)	15 ▲	58 ▲	50 ▲	538 (2.3)	20 ▲	52 ▲	50 ▲
2015	525 (2.4)		40 ▲	42 ▲	528 (2.5)		41 ▲	36 ▲	525 (2.4)		43 ▲	36 ▲	518 (2.3)		31 ▲	30 ▲
2011	485 (2.7)			2	487 (2.4)			-5	482 (2.1)			-7	487 (3.1)			-1
‡ 2007	483 (3.3)				492 (3.9)				489 (3.5)				488 (3.7)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Average Achievement in Content Domains by Gender

Exhibit 4.16 shows the differences in average achievement between girls and boys in the four science content domains. Across the TIMSS 2019 countries, girls had a substantial advantage in biology and chemistry whereas boys had the edge in physics and Earth science. In the biology content domain, girls had higher average achievement than boys in 17 countries, and boys had higher average achievement in 3 countries. In chemistry, girls had higher average achievement than boys in 21 countries, and boys had higher average achievement in only 1 country. In physics, girls had higher average achievement than boys in 6 countries, and boys had higher average achievement in 13 countries. In Earth science, girls had higher average achievement than boys in 4 countries, and boys had higher average achievement in 15 countries.

Exhibit 4.16: Average Achievement in Science Content Domains by Gender

Country	Biology (75 Items)		Chemistry (42 Items)		Physics (52 Items)		Earth Science (42 Items)	
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
Australia	533 (3.2)	529 (4.8)	519 (3.5)	510 (5.3)	524 (3.6)	533 (5.0)	531 (3.3)	536 (4.6)
Bahrain	522 (2.8) ▲	464 (2.7)	514 (3.0) ▲	448 (3.5)	500 (3.8) ▲	461 (2.8)	499 (3.2) ▲	453 (3.7)
Chile	468 (3.6)	475 (4.0)	440 (3.7)	443 (3.8)	442 (3.6)	458 (5.3) ▲	451 (4.6)	476 (4.8) ▲
Chinese Taipei	577 (3.1)	575 (2.7)	598 (3.3)	591 (3.1)	550 (3.3)	560 (3.3) ▲	572 (3.4)	586 (2.8) ▲
Cyprus	500 (3.3) ▲	479 (2.8)	491 (2.7) ▲	466 (3.3)	482 (4.9)	477 (3.7)	473 (3.4)	473 (3.1)
[2] Egypt	393 (6.3) ▲	366 (8.7)	415 (6.2) ▲	376 (9.1)	405 (5.8) ▲	380 (7.8)	375 (6.4)	357 (8.6)
England	518 (5.9)	513 (6.7)	521 (7.5)	502 (7.9)	517 (5.9)	515 (7.2)	513 (6.8)	523 (7.0)
Finland	549 (3.4) ▲	520 (4.1)	561 (4.0) ▲	530 (4.7)	542 (4.0)	537 (5.1)	562 (4.4)	555 (4.0)
France	488 (2.8)	488 (3.8)	467 (3.7)	463 (4.8)	486 (3.5)	495 (4.6) ▲	495 (5.9)	510 (4.5) ▲
[1] Georgia	451 (3.8)	444 (4.2)	462 (4.7)	451 (5.8)	431 (6.0)	441 (5.4)	425 (4.0)	436 (4.7) ▲
† Hong Kong SAR	502 (6.3)	499 (6.8)	492 (6.1)	479 (7.5)	511 (6.1)	509 (7.1)	506 (6.8)	516 (6.7)
Hungary	523 (3.3)	537 (3.2) ▲	521 (3.9)	534 (4.4) ▲	514 (3.4)	542 (3.5) ▲	517 (4.2)	552 (4.6) ▲
Iran, Islamic Rep. of	459 (4.4) ▲	438 (5.8)	467 (5.5) ▲	435 (6.8)	460 (5.2)	448 (6.0)	438 (5.7)	436 (6.0)
Ireland	523 (3.2)	520 (4.4)	525 (4.6) ▲	500 (5.0)	517 (4.1)	520 (4.7)	536 (4.5)	536 (4.2)
[3] Israel	511 (4.5)	513 (5.4)	527 (5.0) ▲	510 (5.6)	514 (5.3)	526 (5.9) ▲	487 (6.1)	503 (5.4) ▲
Italy	506 (3.2)	510 (3.2)	484 (3.4)	483 (3.4)	483 (4.8)	491 (4.8) ▲	503 (4.1)	521 (4.8) ▲
Japan	571 (2.2)	577 (3.2) ▲	560 (2.5)	560 (3.6)	563 (2.8)	578 (3.4) ▲	563 (3.5)	581 (4.9) ▲
Jordan	488 (4.4) ▲	429 (7.1)	488 (4.4) ▲	423 (7.5)	471 (4.3) ▲	429 (6.8)	450 (4.6) ▲	407 (6.7)
[2] Kazakhstan	482 (3.7) ▲	471 (3.7)	501 (4.0) ▲	487 (4.3)	479 (4.4)	472 (4.4)	449 (5.6)	447 (4.7)
Korea, Rep. of	554 (3.0)	565 (2.8) ▲	553 (4.0)	549 (3.7)	563 (3.7)	575 (3.2) ▲	549 (4.3)	574 (3.7) ▲
Kuwait	- -	- -	- -	- -	- -	- -	- -	- -
Lebanon	362 (6.2) ▲	348 (5.3)	420 (4.9) ▲	405 (5.9)	375 (6.0)	380 (5.4)	337 (6.2)	337 (5.9)
Lithuania	540 (3.1) ▲	529 (3.7)	536 (3.2) ▲	524 (3.9)	523 (2.9)	534 (4.6) ▲	530 (3.2)	539 (4.2) ▲
Malaysia	468 (3.9) ▲	457 (4.4)	440 (4.6) ▲	428 (5.1)	475 (4.1)	475 (4.4)	449 (4.7)	454 (4.9)
Morocco	387 (3.5)	386 (3.8)	408 (3.4) ▲	396 (3.6)	403 (3.0)	401 (3.3)	352 (4.1)	362 (4.1)
† New Zealand	500 (3.7)	496 (5.0)	483 (3.8)	481 (6.1)	496 (3.9)	507 (5.4) ▲	502 (3.5)	517 (5.4) ▲
† Norway (9)	489 (3.1)	482 (3.8)	499 (4.8) ▲	486 (4.7)	486 (3.5)	500 (4.6) ▲	513 (5.1)	525 (4.1) ▲
Oman	497 (3.6) ▲	437 (4.8)	480 (3.3) ▲	409 (4.9)	473 (3.6) ▲	427 (5.3)	472 (4.2) ▲	427 (5.4)
Portugal	524 (3.7)	530 (3.7)	514 (3.5)	511 (4.9)	493 (4.0)	500 (4.2)	523 (5.1)	539 (4.0) ▲
Qatar	491 (5.3) ▲	462 (6.4)	497 (5.8) ▲	452 (6.5)	480 (5.6) ▲	459 (5.7)	472 (5.7)	458 (7.2)
Romania	486 (5.0) ▲	472 (4.8)	476 (5.3) ▲	457 (5.8)	460 (4.6)	455 (4.9)	452 (4.6)	455 (5.8)
[2] Russian Federation	545 (4.7)	542 (4.9)	550 (4.6)	552 (4.6)	532 (5.0)	549 (5.1) ▲	522 (5.0)	543 (5.0) ▲
[2] Saudi Arabia	- -	- -	- -	- -	- -	- -	- -	- -
[2] Singapore	621 (4.7)	623 (5.2)	617 (5.8)	614 (5.7)	614 (5.0)	624 (4.8) ▲	551 (5.4)	572 (4.3) ▲
Ψ South Africa (9)	366 (3.2) ▲	352 (3.4)	383 (4.2) ▲	359 (4.9)	383 (3.3)	379 (3.6)	370 (3.6)	362 (4.2)
[2] Sweden	523 (3.9)	515 (4.1)	521 (4.4) ▲	497 (4.4)	524 (4.5)	516 (4.5)	533 (4.3)	528 (4.1)
Turkey	519 (3.9) ▲	507 (4.8)	530 (4.7) ▲	501 (6.7)	519 (4.3)	517 (5.7)	508 (4.3)	510 (5.4)
United Arab Emirates	489 (4.1) ▲	461 (4.3)	494 (4.1) ▲	458 (4.4)	479 (3.8) ▲	460 (3.9)	474 (4.0) ▲	458 (4.1)
† United States	536 (4.0) ▲	524 (6.2)	515 (4.6)	503 (7.0)	514 (4.2)	515 (6.6)	527 (4.5)	532 (6.8)
International Average	**499 (0.7) ▲**	**487 (0.8)**	**499 (0.7) ▲**	**480 (0.9)**	**491 (0.7)**	**490 (0.8)**	**486 (0.8)**	**489 (0.8) ▲**
Benchmarking Participants								
Ontario, Canada	536 (3.4)	533 (3.8)	493 (4.3)	490 (4.4)	516 (4.4)	523 (3.7)	513 (4.7)	527 (4.3) ▲
‡ Quebec, Canada	533 (4.6)	528 (4.1)	553 (4.6)	544 (4.7)	517 (5.1)	525 (4.7)	549 (5.0)	556 (5.1)
Moscow City, Russian Fed.	564 (3.8)	567 (3.5)	561 (3.7)	562 (4.2)	565 (4.3)	586 (4.7) ▲	550 (4.3)	578 (4.4) ▲
Gauteng, RSA (9)	421 (4.4) ▲	409 (4.4)	433 (4.8) ▲	410 (4.7)	429 (4.8)	426 (4.9)	422 (4.7)	414 (5.2)
Western Cape, RSA (9)	427 (6.1)	438 (6.6)	441 (7.2)	443 (9.4)	434 (7.0)	451 (7.2) ▲	435 (7.3)	450 (8.1) ▲
Abu Dhabi, UAE	434 (7.5) ▲	401 (6.0)	443 (7.0) ▲	401 (6.2)	433 (6.6) ▲	409 (5.6)	423 (7.1)	403 (6.3)
[2] Dubai, UAE	558 (5.5)	549 (7.0)	563 (5.8)	545 (7.2)	541 (5.6)	538 (6.7)	537 (5.4)	540 (6.7)

▲ Average significantly higher than other gender

Numbers of items are based on the TIMSS 2019 eighth grade science eAssessment items included in scaling.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
See Appendix B.7 for target population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available because average achievement could not be accurately estimated.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Average Achievement in Cognitive Domains

Exhibit 4.17 shows countries' average achievement in the knowing, applying, and reasoning cognitive domains relative to their overall average achievement (from highest to lowest overall average achievement). Interestingly, in the knowing and reasoning domains, about the same number of countries had relative strengths as had relative weaknesses, but in the applying domain, fewer countries had strengths than weaknesses. Eleven countries had a relative strength in the knowing cognitive domain, and 12 had a relative weakness. Only 6 countries had a relative strength in the applying domain, although 14 had a relative weakness. Thirteen countries had a relative strength in the reasoning cognitive domain, and 16 had a relative weakness. The Russian Federation and Hong Kong SAR were well balanced, with no relative strengths or weaknesses in the cognitive domains.

Exhibit 4.17: Average Achievement in Science Cognitive Domains

Country	Overall Science Average Scale Score	Knowing (75 Items)		Applying (80 Items)		Reasoning (56 Items)	
		Average Scale Score	Difference from Overall Science Score	Average Scale Score	Difference from Overall Science Score	Average Scale Score	Difference from Overall Science Score
[2] Singapore	608 (3.9)	621 (4.2)	13 (1.7) ▲	608 (4.1)	1 (1.6)	595 (4.0)	-13 (0.8) ▽
Chinese Taipei	574 (1.9)	600 (2.4)	26 (1.5) ▲	567 (2.1)	-8 (1.2) ▽	559 (2.1)	-16 (1.0) ▽
Japan	570 (2.1)	563 (2.4)	-7 (1.4) ▽	576 (2.3)	6 (0.8) ▲	570 (2.5)	1 (1.2)
Korea, Rep. of	561 (2.1)	558 (2.6)	-3 (1.5)	560 (2.4)	-1 (1.9)	564 (2.3)	3 (1.7) ▲
[2] Russian Federation	543 (4.2)	543 (4.7)	1 (2.4)	543 (4.5)	0 (1.2)	543 (4.5)	0 (2.9)
Finland	543 (3.1)	545 (3.2)	2 (1.4)	537 (3.3)	-6 (1.1) ▽	548 (3.4)	5 (1.4) ▲
Lithuania	534 (3.0)	527 (3.1)	-6 (1.3) ▽	530 (3.0)	-4 (1.3) ▽	541 (3.2)	7 (1.5) ▲
Hungary	530 (2.6)	537 (3.0)	8 (1.4) ▲	528 (3.1)	-2 (1.8)	524 (3.1)	-5 (1.4) ▽
Australia	528 (3.2)	515 (3.5)	-14 (1.4) ▽	532 (3.4)	4 (0.9) ▲	536 (3.1)	7 (1.0) ▲
Ireland	523 (2.9)	513 (3.0)	-10 (1.7) ▽	521 (3.4)	-2 (1.8)	534 (3.4)	11 (1.6) ▲
† United States	522 (4.7)	515 (4.6)	-8 (1.1) ▽	523 (4.8)	1 (0.9)	528 (4.7)	6 (1.4) ▲
[2] Sweden	521 (3.2)	521 (3.2)	0 (1.1)	518 (3.3)	-3 (1.2) ▽	524 (3.8)	2 (2.3)
Portugal	519 (2.9)	520 (3.1)	2 (1.7)	514 (3.1)	-4 (1.3) ▽	519 (3.5)	1 (2.2)
England	517 (4.8)	520 (5.0)	3 (1.5)	515 (5.1)	-2 (1.8)	513 (5.0)	-3 (1.1) ▽
Turkey	515 (3.7)	506 (4.2)	-9 (1.6) ▽	515 (3.9)	-1 (2.5)	524 (4.0)	8 (2.1) ▲
[3] Israel	513 (4.2)	514 (4.6)	0 (1.6)	509 (4.3)	-4 (1.5) ▽	518 (4.6)	5 (1.9) ▲
† Hong Kong SAR	504 (5.2)	501 (5.7)	-2 (1.8)	501 (5.2)	-2 (1.4)	504 (5.2)	0 (1.3)
Italy	500 (2.6)	507 (2.6)	7 (1.5) ▲	499 (3.4)	-2 (1.8)	495 (4.0)	-5 (2.7)
† New Zealand	499 (3.5)	480 (3.6)	-19 (1.6) ▽	503 (3.8)	4 (1.4) ▲	510 (3.5)	11 (1.1) ▲
† Norway (9)	495 (3.1)	497 (2.5)	2 (1.6)	493 (3.5)	-3 (1.3) ▽	494 (3.6)	-1 (1.3)
France	489 (2.7)	480 (2.9)	-8 (1.7) ▽	482 (2.8)	-7 (1.6) ▽	502 (3.0)	14 (2.2) ▲
Bahrain	486 (1.9)	493 (2.0)	7 (1.2) ▲	481 (2.6)	-5 (2.0) ▽	482 (2.4)	-4 (1.5) ▽
Cyprus	484 (1.9)	482 (3.0)	-1 (2.9)	477 (1.9)	-6 (1.1) ▽	488 (2.3)	4 (1.1) ▲
[2] Kazakhstan	478 (3.1)	463 (3.7)	-15 (1.6) ▽	481 (3.4)	3 (1.5)	482 (3.5)	4 (1.8) ▲
Qatar	475 (4.4)	487 (4.2)	12 (1.6) ▲	469 (4.5)	-5 (1.3) ▽	464 (4.6)	-11 (1.7) ▽
United Arab Emirates	473 (2.2)	482 (2.7)	9 (0.9) ▲	472 (2.2)	-1 (0.6)	461 (2.2)	-12 (0.8) ▽
Romania	470 (4.2)	475 (4.4)	5 (2.6)	467 (4.2)	-3 (1.4) ▽	464 (4.4)	-6 (1.9) ▽
Chile	462 (2.9)	463 (3.3)	1 (1.7)	462 (3.0)	0 (2.1)	458 (3.1)	-5 (2.0) ▽
Malaysia	460 (3.5)	442 (3.9)	-18 (1.1) ▽	473 (3.4)	13 (0.9) ▲	459 (3.7)	-2 (1.5)
Oman	457 (2.9)	461 (3.3)	4 (2.0) ▲	456 (3.4)	-1 (2.2)	450 (3.0)	-7 (1.1) ▽
Jordan	452 (4.7)	455 (5.3)	3 (1.7)	453 (4.9)	1 (1.4)	443 (4.8)	-9 (1.7) ▽
Iran, Islamic Rep. of	449 (3.6)	449 (4.1)	-1 (1.6)	452 (3.5)	2 (0.9) ▲	444 (4.4)	-5 (2.3) ▽
[1] Georgia	447 (3.9)	459 (4.1)	12 (1.7) ▲	440 (3.7)	-7 (2.8) ▽	436 (4.2)	-10 (2.8) ▽
Kuwait	444 (5.7)	- -	- -	- -	- -	- -	- -
[2] Saudi Arabia	431 (2.6)	- -	- -	- -	- -	- -	- -
Morocco	394 (2.7)	380 (3.1)	-14 (1.1) ▽	393 (2.9)	-1 (1.4)	398 (2.8)	4 (1.2) ▲
[2] Egypt	389 (5.4)	396 (5.9)	7 (1.5) ▲	384 (5.7)	-6 (2.0) ▽	378 (5.7)	-11 (1.7) ▽
Lebanon	377 (4.6)	388 (4.4)	11 (2.9) ▲	375 (5.2)	-1 (1.9)	346 (5.2)	-31 (3.1) ▽
Ψ South Africa (9)	370 (3.1)	361 (3.2)	-9 (1.1) ▽	377 (2.9)	7 (0.7) ▲	362 (3.0)	-8 (0.9) ▽
Benchmarking Participants							
Moscow City, Russian Fed.	567 (2.9)	570 (3.0)	4 (0.9) ▲	562 (3.7)	-5 (2.4) ▽	568 (3.1)	2 (1.0)
[2] Dubai, UAE	548 (2.0)	560 (2.3)	13 (1.0) ▲	545 (2.5)	-3 (1.2) ▽	538 (2.3)	-10 (1.6) ▽
‡ Quebec, Canada	537 (3.6)	529 (3.6)	-8 (2.0) ▽	538 (4.2)	1 (2.2)	540 (4.1)	4 (1.5) ▲
Ontario, Canada	522 (3.0)	505 (3.3)	-17 (1.1) ▽	523 (3.5)	1 (2.3)	533 (3.7)	11 (3.3) ▲
Western Cape, RSA (9)	439 (5.1)	427 (6.0)	-12 (2.6) ▽	446 (5.0)	7 (1.5) ▲	438 (5.8)	-1 (4.1)
Gauteng, RSA (9)	422 (3.9)	413 (4.9)	-9 (2.2) ▽	428 (3.7)	6 (2.3) ▲	417 (3.8)	-5 (1.3) ▽
Abu Dhabi, UAE	420 (3.6)	422 (4.3)	1 (1.2)	421 (3.5)	0 (1.4)	412 (3.6)	-8 (1.4) ▽

▲ Subscale score significantly higher than overall science score
▽ Subscale score significantly lower than overall science score

Numbers of items are based on the TIMSS 2019 eighth grade science eAssessment items included in scaling.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
See Appendix B.7 for target population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available because average achievement could not be accurately estimated.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Trends in Average Achievement in Cognitive Domains

Exhibit 4.18 presents differences in average achievement for the three cognitive domains across four assessment cycles back to 2007, when TIMSS first began providing scaled results in the cognitive domains. Trends show more countries have had increases than decreases in average achievement in each of cognitive domains, particularly in the knowing domain. Thirty-one countries participated in both the TIMSS 2015 and TIMSS 2019 assessments and have comparable data in the cognitive domains. The recent trends in the knowing cognitive domain showed increases in 10 countries and decreases in 8 countries. In the applying and reasoning domains, 7 countries showed increases, and 6 showed decreases.

Between 2007 and 2019, in the knowing domain, there were increases in 13 countries compared with declines in 6 countries. In the applying domain, there were increases in 11 countries and declines in 6 countries. In the reasoning domain, 9 countries had increases and 6 had decreases.

Exhibit 4.18: Differences in Achievement for Science Cognitive Domains Across Assessment Years◊

Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▽) than the performance in the column year.

Country	Knowing				Applying				Reasoning			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
Australia												
2019	515 (3.5)	4	1	10 ▲	532 (3.4)	20 ▲	15 ▲	21 ▲	536 (3.1)	23 ▲	9	5
2015	510 (2.7)		-4	6	512 (2.9)		-5	1	513 (2.8)		-14 ▽	-18 ▽
2011	514 (5.1)			9	517 (4.5)			6	526 (5.0)			-4
2007	505 (3.7)				511 (3.7)				530 (4.1)			
Bahrain												
2019	493 (2.0)	31 ▲	35 ▲	25 ▲	481 (2.6)	17 ▲	31 ▲	15 ▲	482 (2.4)	16 ▲	33 ▲	18 ▲
2015	462 (2.5)		4	-6	464 (2.4)		15 ▲	-1	466 (2.8)		18 ▲	3
2011	457 (3.7)			-10 ▽	450 (2.1)			-16 ▽	449 (2.0)			-15 ▽
2007	468 (2.2)				465 (2.2)				464 (2.4)			
Chile												
2019	463 (3.3)	-3	-12 ▽		462 (3.0)	16 ▲	8 ▲		458 (3.1)	9	-2	
2015	466 (3.2)		-10 ▽		446 (3.0)		-7		448 (3.6)		-11 ▽	
2011	476 (3.1)				454 (2.3)				459 (2.7)			
Chinese Taipei												
2019	600 (2.4)	11 ▲	31 ▲	26 ▲	567 (2.1)	1	-3	3	559 (2.1)	-2	8 ▲	15 ▲
2015	589 (2.3)		20 ▲	15 ▲	565 (2.0)		-5	2	560 (2.0)		9 ▲	16 ▲
2011	569 (2.6)			-5	570 (2.6)			6	551 (2.9)			7
2007	574 (3.9)				564 (3.7)				544 (4.0)			
Cyprus												
2019	482 (3.0)			44 ▲	477 (1.9)			24 ▲	488 (2.3)			35 ▲
2007	438 (3.1)				454 (2.4)				453 (2.7)			
Egypt												
[2] 2019	396 (5.9)	24 ▲		-33 ▽	384 (5.7)	13		-14 ▽	378 (5.7)	19 ▲		-7
2015	372 (5.2)			-57 ▽	371 (4.4)			-27 ▽	359 (4.8)			-26 ▽
2007	429 (4.1)				398 (3.8)				385 (3.7)			
England												
2019	520 (5.0)	-3	-14	-17 ▽	515 (5.1)	-24 ▽	-17 ▽	-25 ▽	513 (5.0)	-31 ▽	-24 ▽	-35 ▽
2015	523 (4.1)		-11	-14 ▽	538 (3.9)		7	-1	545 (4.0)		8	-4
‡ 2011	533 (5.1)			-3	531 (4.7)			-8	537 (4.9)			-12
† 2007	536 (5.2)				540 (4.3)				548 (4.6)			
Finland												
2019	545 (3.2)		-20 ▽		537 (3.3)		-12 ▽		548 (3.4)		0	
2011	564 (3.0)				549 (2.5)				547 (3.4)			
Georgia												
[1] 2019	459 (4.1)	6	31 ▲	21 ▲	440 (3.7)	-2	22 ▲	22 ▲	436 (4.2)	4	24 ▲	51 ▲
[1 2] 2015	452 (3.3)		25 ▲	15 ▲	442 (3.1)		24 ▲	24 ▲	432 (3.5)		20 ▲	47 ▲
[1] 2011	428 (3.9)			-10	418 (3.8)			0	412 (3.7)			27 ▲
[1] 2007	438 (5.3)				418 (4.6)				385 (5.0)			
Hong Kong SAR												
† 2019	501 (5.7)	-46 ▽	-43 ▽	-36 ▽	501 (5.2)	-39 ▽	-27 ▽	-21 ▽	504 (5.2)	-47 ▽	-34 ▽	-31 ▽
2015	547 (3.7)		3	10	541 (4.3)		12 ▲	18 ▲	550 (4.4)		12 ▲	15 ▲
2011	544 (3.2)			7	529 (3.4)			6	538 (4.0)			3
† 2007	537 (4.8)				522 (5.1)				535 (5.6)			
Hungary												
2019	537 (3.0)	12 ▲	27 ▲	8	528 (3.1)	0	-4	-23 ▽	524 (3.1)	0	6	-6
2015	525 (3.5)		14 ▲	-5	528 (3.4)		-4	-23 ▽	524 (3.8)		6	-6
2011	511 (3.2)			-19 ▽	532 (3.5)			-19 ▽	518 (3.3)			-12 ▽
2007	530 (3.2)				551 (3.2)				530 (3.4)			
Iran, Islamic Rep. of												
2019	449 (4.1)	-7	-30 ▽	-19 ▽	452 (3.5)	-6	-18 ▽	0	444 (4.4)	-10	-31 ▽	-12 ▽
2015	455 (4.8)		-24 ▽	-13 ▽	457 (4.0)		-13 ▽	6	454 (4.0)		-22 ▽	-2
2011	479 (4.6)			11	470 (3.9)			18 ▲	475 (3.8)			19 ▲
2007	468 (4.1)				452 (4.0)				456 (4.0)			
Ireland												
2019	513 (3.0)	-10 ▽			521 (3.4)	-12 ▽			534 (3.4)	2		
2015	523 (3.2)				533 (3.0)				532 (3.0)			
Israel												
[3] 2019	514 (4.6)	11	-4		509 (4.3)	5	-3		518 (4.6)	7	-1	
[3] 2015	503 (4.3)		-15 ▽		504 (3.8)		-8		511 (4.4)		-8	
[3] 2011	518 (4.2)				512 (4.0)				519 (4.4)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

◊ Trend reporting in cognitive domains using current methodology began with TIMSS 2007.
See Appendix B.7 for target population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 4.18: Differences in Achievement for Science Cognitive Domains Across Assessment Years◊

(Continued)

Country	Knowing				Applying				Reasoning			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
Italy												
2019	507 (2.6)	3	-5	11 ▲	499 (3.4)	2	-1	2	495 (4.0)	2	7	6
[2] 2015	505 (2.6)		-8 ▽	8	496 (2.4)		-4	-1	493 (2.8)		4	4
2011	512 (2.7)			16 ▲	500 (2.3)			3	489 (2.6)			-1
2007	496 (3.6)				497 (2.9)				489 (3.1)			
Japan												
2019	563 (2.4)	-5	22 ▲	21 ▲	576 (2.3)	1	15 ▲	19 ▲	570 (2.5)	0	3	7 ▲
2015	567 (2.2)		27 ▲	26 ▲	575 (1.9)		14 ▲	18 ▲	570 (2.1)		3	7 ▲
2011	541 (2.7)			-1	561 (2.6)			4	568 (2.4)			4
2007	542 (2.4)				556 (2.1)				564 (2.3)			
Jordan												
2019	455 (5.3)	25 ▲	2	-36 ▽	453 (4.9)	28 ▲	2	-31 ▽	443 (4.8)	23 ▲	1	-24 ▽
2015	430 (3.3)		-23 ▽	-62 ▽	425 (3.3)		-26 ▽	-59 ▽	419 (3.6)		-22 ▽	-47 ▽
2011	453 (4.4)			-39 ▽	451 (4.0)			-33 ▽	441 (4.3)			-25 ▽
2007	492 (4.8)				484 (4.3)				466 (4.2)			
Kazakhstan												
[2] 2019	463 (3.7)		-19 ▽		481 (3.4)		-10		482 (3.5)		-5	
2011	483 (4.9)				491 (4.1)				487 (4.4)			
Korea, Rep. of												
2019	558 (2.6)	3	4	8 ▲	560 (2.4)	8 ▲	-1	10 ▲	564 (2.3)	4	0	3
2015	555 (2.9)		2	6	552 (2.2)		-9 ▽	2	560 (2.8)		-3	-1
2011	554 (3.0)			4	561 (2.1)			11 ▲	564 (2.3)			2
2007	550 (2.3)				550 (2.4)				561 (2.3)			
Lebanon												
2019	388 (4.4)	-15 ▽	7	-13	375 (5.2)	-23 ▽	-33 ▽	-43 ▽	346 (5.2)	-36 ▽	-62 ▽	-64 ▽
2015	403 (5.9)		22 ▲	2	398 (5.3)		-10	-20 ▽	381 (6.3)		-27 ▽	-29 ▽
2011	381 (5.7)			-20 ▽	408 (5.2)			-10	408 (5.7)			-2
2007	401 (6.3)				418 (6.1)				410 (6.6)			
Lithuania												
2019	527 (3.1)	14 ▲	12 ▲	10 ▲	530 (3.0)	14 ▲	18 ▲	17 ▲	541 (3.2)	15 ▲	28 ▲	14 ▲
[2] 2015	513 (3.1)		-2	-4	517 (3.4)		4	4	525 (3.2)		13 ▲	-2
[1] 2011	516 (2.4)			-1	512 (2.3)			-1	513 (2.8)			-14 ▽
[1] 2007	517 (2.5)				513 (2.4)				527 (2.7)			
Malaysia												
2019	442 (3.9)	-23 ▽	39 ▲	-16 ▽	473 (3.4)	-3	49 ▲	3	459 (3.7)	-8	20 ▲	-24 ▽
2015	466 (5.1)		63 ▲	8	476 (4.2)		52 ▲	6	467 (3.9)		28 ▲	-15 ▽
2011	403 (7.1)			-55 ▽	424 (6.2)			-46 ▽	439 (6.0)			-44 ▽
2007	458 (6.8)				470 (6.2)				483 (5.5)			
Morocco												
2019	380 (3.1)	-15 ▽	17 ▲		393 (2.9)	2	13 ▲		398 (2.8)	13 ▲	31 ▲	
2015	395 (2.3)		32 ▲		391 (2.8)		11 ▲		385 (2.6)		18 ▲	
2011	363 (2.8)				381 (2.0)				366 (2.3)			
New Zealand												
[†] 2019	480 (3.6)	-23 ▽	-32 ▽		503 (3.8)	-11 ▽	-7		510 (3.5)	-10 ▽	-6	
[†] 2015	503 (3.2)		-8		513 (3.5)		4		520 (3.3)		4	
2011	511 (5.0)				509 (4.4)				515 (4.7)			
Norway (9)												
[†] 2019	497 (2.5)	-3			493 (3.5)	-14 ▽			494 (3.6)	-24 ▽		
2015	500 (3.1)				507 (2.9)				518 (3.0)			
Oman												
2019	461 (3.3)	7	45 ▲	36 ▲	456 (3.4)	3	37 ▲	37 ▲	450 (3.0)	-4	33 ▲	31 ▲
2015	455 (2.9)		38 ▲	30 ▲	454 (2.9)		34 ▲	34 ▲	454 (2.4)		37 ▲	36 ▲
2011	416 (3.4)			-8	419 (3.4)			0	417 (3.0)			-2
2007	425 (3.5)				419 (3.6)				419 (3.8)			
Qatar												
2019	487 (4.2)	39 ▲	69 ▲		469 (4.5)	10	49 ▲		464 (4.6)	10	55 ▲	
2015	448 (3.6)		30 ▲		460 (3.6)		40 ▲		454 (3.2)		45 ▲	
2011	418 (4.5)				420 (3.7)				409 (4.6)			
Romania												
2019	475 (4.4)		18 ▲	24 ▲	467 (4.2)		-1	-1	464 (4.4)		4	11
2011	457 (4.3)			6	468 (3.6)			0	460 (3.7)			7
2007	451 (4.3)				468 (3.7)				453 (3.8)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 4.18: Differences in Achievement for Science Cognitive Domains Across Assessment Years◊

(Continued)

Country	Knowing				Applying				Reasoning			
	Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years			Average Scale Score	Differences Between Years		
		2015	2011	2007		2015	2011	2007		2015	2011	2007
Russian Federation												
2 2019	543 (4.7)	-14 ▽	-14 ▽	3	543 (4.5)	4	4	15 ▲	543 (4.5)	5	10	24 ▲
2015	558 (5.2)		1	17 ▲	538 (4.6)		0	11	538 (3.9)		5	18 ▲
2 2011	557 (3.8)			16 ▲	539 (3.3)			12 ▲	533 (3.2)			13 ▲
2007	541 (4.4)				527 (4.0)				519 (4.0)			
Singapore												
2 2019	621 (4.2)	27 ▲	33 ▲	59 ▲	608 (4.1)	8	19 ▲	38 ▲	595 (4.0)	0	2	26 ▲
2 2015	594 (3.4)		6	32 ▲	600 (3.4)		11 ▲	30 ▲	595 (3.2)		2	26 ▲
2 2011	588 (4.9)			26 ▲	589 (4.4)			19 ▲	592 (4.4)			24 ▲
2007	561 (4.9)				570 (4.5)				568 (4.5)			
South Africa (9)												
Ψ 2019	361 (3.2)	24 ▲	79 ▲		377 (2.9)	9	42 ▲		362 (3.0)	11	23 ▲	
2015	337 (6.7)		55 ▲		368 (5.9)		33 ▲		350 (5.6)		12	
Ψ 2011	282 (4.1)				335 (3.5)				338 (5.0)			
Sweden												
2 2019	521 (3.2)	2	10 ▲	14 ▲	518 (3.3)	0	10 ▲	9 ▲	524 (3.8)	-3	14 ▲	7
2015	519 (3.2)		8	12 ▲	518 (3.5)		10 ▲	9 ▲	526 (4.0)		17 ▲	10 ▲
2011	512 (2.5)			4	508 (2.7)			-1	510 (3.0)			-6
2007	508 (2.6)				509 (2.8)				516 (2.9)			
Turkey												
2019	506 (4.2)	17 ▲	16 ▲		515 (3.9)	22 ▲	37 ▲		524 (4.0)	29 ▲	41 ▲	
2015	489 (4.5)		-1		492 (3.9)		15 ▲		495 (4.2)		12 ▲	
2011	490 (3.7)				478 (3.4)				483 (3.3)			
United Arab Emirates												
2019	482 (2.7)	4	11 ▲		472 (2.2)	-6	8 ▲		461 (2.2)	-12 ▽	5	
2015	478 (2.5)		7		478 (2.4)		14 ▲		473 (2.4)		17 ▲	
2011	471 (2.4)				464 (2.1)				456 (2.5)			
United States												
† 2019	515 (4.6)	-17 ▽	-12 ▽	-1	523 (4.8)	-8	1	6	528 (4.7)	2	5	0
† 2015	532 (3.4)		5	16 ▲	531 (2.8)		9 ▲	14 ▲	526 (2.8)		3	-2
2 2011	527 (2.8)			11 ▲	522 (2.3)			5	524 (2.5)			-5
2 † 2007	516 (3.2)				517 (2.9)				529 (3.0)			
Benchmarking Participants												
Ontario, Canada												
2019	505 (3.3)	-9 ▽	-8	-10 ▽	523 (3.5)	-2	5	-1	533 (3.7)	1	0	-10
2015	514 (2.6)		1	-1	525 (2.4)		7 ▲	1	532 (2.6)		0	-10 ▽
2 2011	513 (2.8)			-2	518 (2.4)			-6	532 (3.0)			-10
2 2007	515 (3.6)				524 (3.8)				542 (4.2)			
Quebec, Canada												
‡ 2019	529 (3.6)	2	9 ▲	30 ▲	538 (4.2)	13 ▲	20 ▲	37 ▲	540 (4.1)	5	19 ▲	18 ▲
≡ 2015	527 (5.1)		7	28 ▲	524 (4.6)		7	24 ▲	535 (4.5)		13 ▲	13 ▲
2011	519 (2.8)			20 ▲	518 (2.9)			17 ▲	522 (3.1)			-1
3 2007	499 (3.3)				500 (3.4)				523 (3.3)			
Abu Dhabi, UAE												
2019	422 (4.3)	-31 ▽	-44 ▽		421 (3.5)	-36 ▽	-40 ▽		412 (3.6)	-42 ▽	-43 ▽	
2015	453 (6.1)		-13		457 (5.9)		-4		454 (5.7)		-1	
2011	466 (4.2)				461 (3.9)				455 (4.3)			
Dubai, UAE												
2 2019	560 (2.3)	33 ▲	68 ▲	65 ▲	545 (2.5)	19 ▲	59 ▲	57 ▲	538 (2.3)	18 ▲	59 ▲	60 ▲
2015	527 (2.5)		35 ▲	32 ▲	525 (2.2)		39 ▲	37 ▲	521 (2.0)		41 ▲	43 ▲
2011	492 (2.9)			-4	486 (2.8)			-2	479 (2.6)			1
‡ 2007	496 (3.5)				488 (3.0)				478 (3.5)			

▲ Average from more recent year significantly higher

▽ Average from more recent year significantly lower

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Average Achievement in Cognitive Domains by Gender

Exhibit 4.19 shows the differences between girls' and boys' average achievement in the cognitive domains of knowing, applying, and reasoning. Reflecting the overall results where girls had higher average achievement in more countries than the reverse, girls had higher average achievement than boys in more countries than the reverse in all three cognitive domains, especially applying and reasoning. In the knowing domain, girls had higher average achievement than boys in 10 countries, and boys had higher achievement than girls in 8 countries. In the applying domain, girls had higher average achievement than boys in 13 countries, and boys had higher average achievement than girls in 4 countries. In reasoning, girls had higher average achievement than boys in 13 countries, compared with 2 countries where boys had higher average achievement.

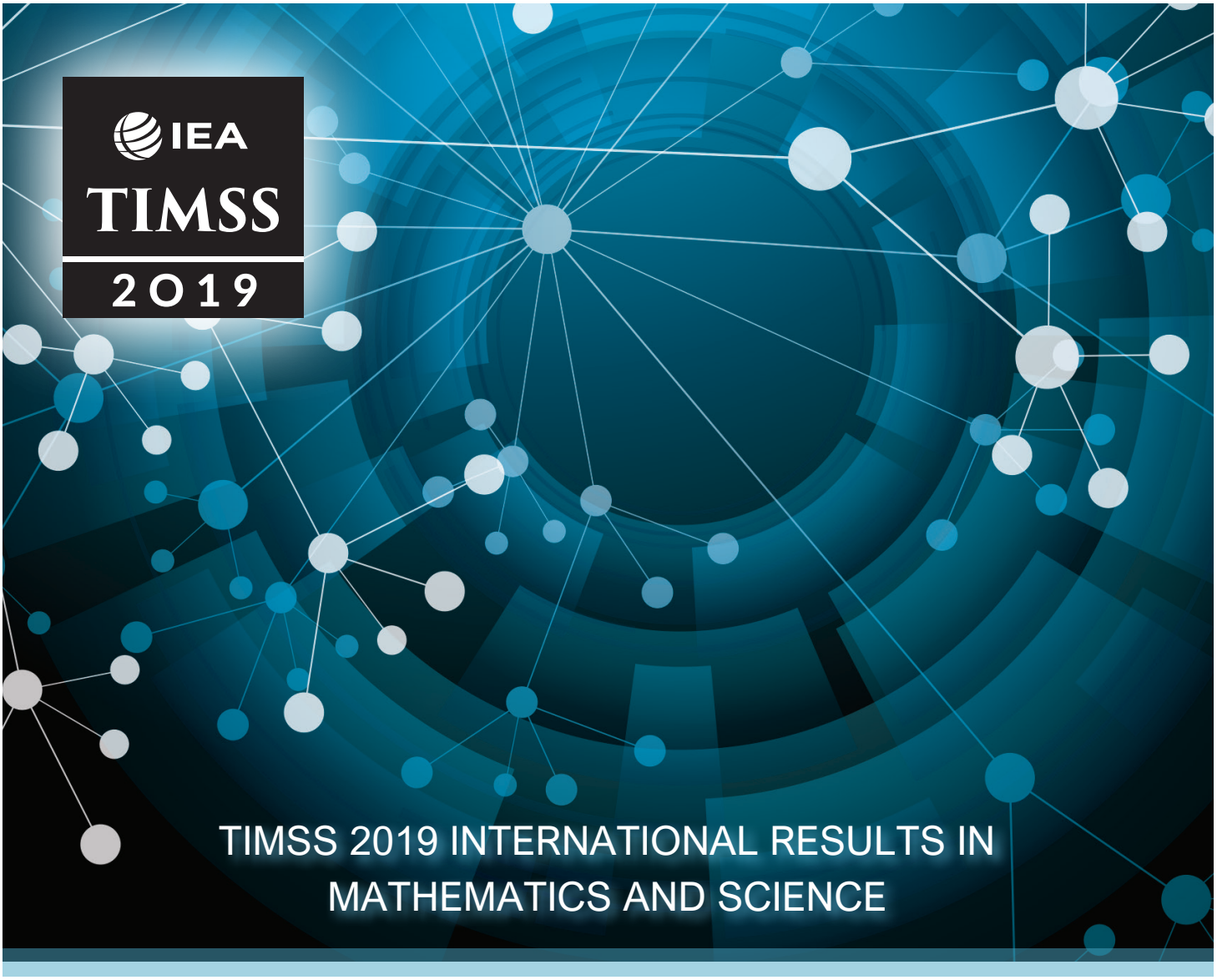
Exhibit 4.19: Average Achievement in Science Cognitive Domains by Gender

Country	Knowing (75 Items)		Applying (80 Items)		Reasoning (56 Items)	
	Girls	Boys	Girls	Boys	Girls	Boys
Australia	511 (3.3)	518 (5.3)	534 (3.2)	530 (4.9)	538 (3.1)	533 (4.7)
Bahrain	520 (2.8) ▲	466 (3.7)	508 (2.6) ▲	454 (3.9)	508 (3.6) ▲	457 (2.6)
Chile	457 (4.1)	469 (4.6) ▲	458 (3.7)	466 (3.9)	450 (4.0)	465 (3.8) ▲
Chinese Taipei	592 (2.9)	608 (2.9) ▲	567 (2.5)	567 (2.9)	560 (2.7)	558 (2.6)
Cyprus	487 (4.1) ▲	478 (3.1)	486 (2.5) ▲	469 (2.9)	497 (3.2) ▲	479 (2.9)
[2] Egypt	406 (6.3) ▲	384 (9.2)	397 (6.3) ▲	367 (8.7)	392 (6.4) ▲	361 (8.4)
England	519 (6.1)	521 (6.9)	517 (6.0)	512 (6.8)	516 (5.7)	510 (6.8)
Finland	553 (3.2) ▲	537 (4.2)	547 (3.4) ▲	527 (4.0)	559 (3.9) ▲	537 (4.1)
France	473 (2.9)	487 (4.7) ▲	480 (3.1)	484 (3.8)	504 (3.2)	501 (3.7)
[1] Georgia	460 (4.6)	457 (5.4)	441 (4.1)	439 (4.9)	434 (4.5)	438 (5.8)
† Hong Kong SAR	493 (6.2)	508 (6.9) ▲	505 (5.7)	499 (6.7)	510 (6.0)	498 (6.4)
Hungary	526 (3.1)	549 (4.3) ▲	516 (3.1)	540 (3.8) ▲	517 (3.4)	532 (3.9) ▲
Iran, Islamic Rep. of	457 (5.0)	442 (6.3)	462 (4.6) ▲	443 (5.3)	454 (4.9) ▲	435 (6.9)
Ireland	512 (3.6)	514 (4.1)	525 (4.1)	518 (4.2)	538 (3.6)	531 (4.6)
[3] Israel	513 (5.2)	514 (5.5)	507 (4.8)	511 (5.0)	516 (4.7)	520 (5.9)
Italy	502 (3.1)	512 (4.2)	495 (3.7)	503 (3.8) ▲	494 (4.5)	496 (4.6)
Japan	555 (3.3)	572 (2.7) ▲	571 (2.5)	581 (2.7) ▲	569 (2.5)	571 (3.0)
Jordan	484 (5.0) ▲	429 (7.4)	481 (4.6) ▲	428 (6.5)	470 (4.0) ▲	417 (6.7)
[2] Kazakhstan	468 (4.6) ▲	459 (4.2)	486 (4.0) ▲	476 (4.1)	486 (3.9) ▲	478 (4.1)
Korea, Rep. of	549 (3.8)	567 (3.0) ▲	554 (3.2)	566 (2.8) ▲	562 (3.4)	566 (2.5)
Kuwait	- -	- -	- -	- -	- -	- -
Lebanon	392 (5.9)	385 (4.4)	377 (6.2)	374 (5.4)	351 (6.1)	341 (6.0)
Lithuania	526 (3.1)	528 (4.0)	532 (3.0)	529 (3.6)	542 (3.2)	539 (3.8)
Malaysia	447 (4.4)	437 (5.0)	475 (3.6)	471 (4.2)	460 (3.9)	457 (4.3)
Morocco	379 (3.5)	381 (3.6)	393 (3.2)	393 (3.3)	401 (3.3)	394 (3.5)
† New Zealand	475 (3.7)	484 (5.3)	500 (4.2)	505 (5.2)	510 (3.6)	509 (5.0)
† Norway (9)	495 (2.7)	500 (3.4)	493 (3.8)	493 (4.3)	494 (4.3)	495 (4.1)
Oman	488 (3.5) ▲	436 (5.1)	485 (4.0) ▲	429 (4.8)	478 (3.4) ▲	424 (4.7)
Portugal	515 (3.5)	526 (3.6) ▲	512 (3.8)	516 (4.0)	517 (3.9)	522 (4.1)
Qatar	499 (4.9) ▲	474 (5.9)	485 (5.7) ▲	454 (6.2)	477 (5.8) ▲	451 (6.3)
Romania	477 (4.7)	473 (5.0)	471 (4.9)	462 (4.9)	469 (4.6) ▲	458 (5.5)
[2] Russian Federation	539 (5.3)	547 (5.0)	539 (4.9)	546 (4.9)	541 (5.2)	545 (4.6)
[2] Saudi Arabia	- -	- -	- -	- -	- -	- -
[2] Singapore	617 (4.9)	624 (4.9)	604 (4.6)	613 (5.0)	591 (4.8)	598 (4.5)
Ψ South Africa (9)	369 (3.2) ▲	352 (3.9)	383 (3.0) ▲	371 (3.5)	365 (3.3) ▲	358 (3.5)
[2] Sweden	522 (4.3)	521 (4.2)	526 (4.0) ▲	510 (4.3)	530 (4.6) ▲	517 (4.7)
Turkey	510 (4.7)	502 (5.6)	521 (4.3) ▲	508 (5.3)	529 (4.1)	519 (5.5)
United Arab Emirates	495 (4.4) ▲	470 (4.7)	486 (3.6) ▲	460 (4.1)	473 (4.0) ▲	450 (3.8)
† United States	515 (4.1)	514 (5.9)	525 (4.2)	521 (6.3)	530 (3.8)	526 (6.2)
International Average	**495 (0.7) ▲**	**490 (0.8)**	**496 (0.7) ▲**	**487 (0.8)**	**496 (0.7) ▲**	**486 (0.8)**
Benchmarking Participants						
Ontario, Canada	499 (3.4)	511 (4.1) ▲	522 (4.1)	524 (3.7)	534 (4.4)	531 (4.1)
‡ Quebec, Canada	527 (4.1)	531 (4.1)	537 (4.4)	538 (4.8)	543 (4.7)	538 (4.7)
Moscow City, Russian Fed.	564 (3.5)	576 (3.5) ▲	556 (4.2)	567 (4.0) ▲	563 (3.6)	573 (3.6) ▲
Gauteng, RSA (9)	421 (5.0) ▲	404 (5.4)	433 (3.9) ▲	423 (4.5)	419 (4.2)	414 (4.4)
Western Cape, RSA (9)	424 (6.9)	431 (7.1)	441 (5.8)	452 (6.4)	430 (6.8)	448 (7.0) ▲
Abu Dhabi, UAE	437 (7.6) ▲	408 (6.4)	437 (6.7) ▲	405 (5.7)	427 (6.6) ▲	398 (5.6)
[2] Dubai, UAE	564 (6.1)	557 (7.5)	549 (5.3)	541 (6.8)	541 (5.7)	535 (6.6)

▲ Average significantly higher than other gender

Numbers of items are based on the TIMSS 2019 eighth grade science eAssessment items included in scaling.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
See Appendix B.7 for target population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available because average achievement could not be accurately estimated.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download



HOME & SCHOOL CONTEXTS

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Home Environment Support

Home Resources

Home Resources for Learning

With information from both parents and students, the TIMSS 2019 results add to the already extensive body of research showing a powerful positive relationship between students' socioeconomic environment and their educational achievement.

The *Home Resources for Learning* scale combines data reported by fourth grade students and their parents. The parents' data were collected using the TIMSS 2019 Early Learning Survey (also called the "Home Questionnaire"), which asked parents to provide information about their child's learning experiences before the child began primary school. As explained in Exhibit 5.1, students provided information about the number of books in their homes and other study supports, while parents provided information about the number of children's books, the parents' levels of education, and the parents' occupations (see About the Scale). As also explained, students were assigned a score on the scale according to the availability of these five home resources for learning.

Exhibit 5.2 presents, for each country, the percentage of students in three categories of the scale, together with average student achievement in mathematics. Countries are ordered by the percentage of students in the "many resources" category, with an average percentage across countries of 17 percent. The majority of students (75%, on average) were assigned to the "some resources" category, with just 8 percent in the "few resources" category. There was a 129-point difference in average mathematics achievement of students in the "many resources" category compared with the "few resources" category (562 vs. 433). Average mathematics achievement for the students in the "some resources" category was in between, at 498 points.

The second panel of Exhibit 5.2 presents a scatterplot showing a modest positive association between countries' average *Home Resources for Learning* and average mathematics achievement.

Exhibit 5.3 presents the same *Home Resources for Learning* data, but this time in conjunction with average science achievement. The overall pattern of results is similar to mathematics, with an average science achievement gap of 143 score points between students in the "many resources" and "few resources" categories (557 vs. 414). Average science achievement for the students in the "some resources" category was again in between, at 488 points. Also similar to mathematics, the scatterplot in the second panel of Exhibit 5.3 shows a modest positive relationship between average *Home Resources for Learning* scores and average science achievement across countries.

Exhibit 5.1: Home Resources for Learning

Students' Results based on Students' and Parents' Reports

About the Scale

Students were scored according to their own and their parents' reports regarding the availability of five resources on the *Home Resources for Learning* scale. Cut scores divide the scale into three categories. Students with **Many Resources** had a score at or above the cut score corresponding to students reporting they had more than 100 books and both home study supports in their home and their parents reporting they had more than 25 children's books in their home, that at least one parent finished university, and that at least one parent had a professional occupation, on average. Students with **Few Resources** had a score at or below the cut score corresponding to students reporting they had 25 or fewer books and neither of the home study supports in their home and their parents reporting they had 10 or fewer children's books in the home, that neither parent had gone beyond upper secondary education, and that neither parent was a small business owner or worked in a clerical or professional occupation, on average. All other students had **Some Resources**.

Number of books in the home (students):

1) 0-10
2) 11-25
3) 26-100
4) 101-200
5) More than 200

Number of children's books in the home (parents):

1) 0-10
2) 11-25
3) 26-50
4) 51-100
5) More than 100

Number of home study supports (students):

1) None
2) Internet connection or own room
3) Both internet connection and own room

Highest level of education of either parent (parents):

1) Finished some primary or lower secondary or did not go to school
2) Finished lower secondary
3) Finished upper secondary
4) Finished post-secondary education
5) Finished university or higher

Highest level of occupation of either parent (parents):

1) Has never worked outside home for pay, general laborer, or semi-professional (skilled agricultural or fishery worker, craft or trade worker, plant or machine operator)
2) Clerical (clerk or service or sales worker)
3) Small business owner
4) Professional (corporate manager or senior official, professional, or technician or associate professional)

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 5.2: Home Resources for Learning

Students' Results based on Students' and Parents' Reports

Country		Many Resources		Some Resources		Few Resources		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Korea, Rep. of		53 (1.6)	624 (2.1)	47 (1.6)	574 (2.4)	0 (0.1)	~ ~	11.9 (0.06)
Sweden	r	39 (1.9)	562 (3.0)	60 (1.8)	510 (2.8)	2 (0.4)	~ ~	11.2 (0.08)
Denmark	s	37 (1.5)	564 (2.9)	62 (1.5)	526 (3.1)	1 (0.2)	~ ~	11.3 (0.04)
Canada	s	36 (1.7)	546 (2.1)	64 (1.7)	511 (3.8)	0 (0.1)	~ ~	11.3 (0.05)
Northern Ireland	s	35 (1.8)	626 (4.5)	63 (1.7)	565 (3.6)	1 (0.3)	~ ~	11.1 (0.07)
Finland		35 (1.1)	567 (2.5)	65 (1.1)	520 (2.5)	1 (0.1)	~ ~	11.2 (0.04)
Ireland		34 (1.4)	587 (2.6)	64 (1.5)	535 (2.7)	1 (0.3)	~ ~	11.1 (0.05)
Norway (5)	s	33 (1.5)	583 (3.9)	66 (1.5)	540 (3.1)	1 (0.2)	~ ~	11.5 (0.05)
Singapore		31 (1.0)	665 (3.4)	67 (1.0)	612 (4.0)	1 (0.2)	~ ~	11.0 (0.04)
Cyprus		29 (1.4)	570 (3.1)	70 (1.3)	522 (2.7)	1 (0.2)	~ ~	10.9 (0.05)
France		28 (1.5)	538 (2.8)	69 (1.4)	471 (2.9)	3 (0.3)	419 (9.3)	10.8 (0.06)
Germany	s	27 (1.4)	572 (3.1)	72 (1.4)	521 (2.7)	1 (0.3)	~ ~	10.8 (0.05)
Hungary		27 (1.4)	574 (3.0)	68 (1.4)	513 (2.5)	5 (0.8)	432 (7.6)	10.6 (0.07)
Belgium (Flemish)		27 (1.1)	567 (2.5)	71 (1.1)	525 (2.1)	3 (0.4)	472 (6.9)	10.7 (0.04)
Hong Kong SAR		27 (1.6)	636 (4.3)	67 (1.5)	595 (3.0)	6 (0.6)	561 (7.4)	10.5 (0.08)
Malta	r	27 (0.7)	553 (2.8)	72 (0.7)	504 (1.7)	1 (0.2)	~ ~	10.8 (0.03)
Czech Republic	r	24 (1.1)	582 (3.2)	75 (1.1)	530 (2.7)	1 (0.2)	~ ~	10.8 (0.04)
Austria		22 (1.0)	584 (2.7)	75 (1.0)	531 (2.0)	2 (0.3)	~ ~	10.6 (0.04)
Poland		22 (1.1)	568 (3.9)	77 (1.0)	509 (2.6)	1 (0.2)	~ ~	10.6 (0.05)
Spain		20 (1.2)	547 (2.8)	75 (1.2)	500 (2.8)	4 (0.6)	447 (9.4)	10.4 (0.06)
Chinese Taipei		20 (1.1)	637 (2.5)	74 (1.1)	593 (1.9)	5 (0.5)	542 (8.2)	10.4 (0.05)
Latvia		19 (1.0)	578 (3.4)	79 (1.0)	541 (2.5)	2 (0.3)	~ ~	10.6 (0.04)
Portugal		19 (1.1)	574 (3.3)	76 (1.1)	521 (2.7)	5 (0.5)	466 (6.3)	10.2 (0.06)
Slovak Republic		19 (1.2)	560 (4.2)	74 (1.4)	507 (2.6)	7 (1.3)	416 (8.5)	10.2 (0.08)
Lithuania	r	16 (1.1)	592 (5.1)	82 (1.0)	535 (2.8)	2 (0.3)	~ ~	10.4 (0.05)
Georgia		15 (1.0)	513 (5.5)	82 (1.1)	478 (4.1)	4 (0.6)	445 (15.7)	10.3 (0.06)
Russian Federation		14 (1.1)	597 (3.8)	84 (1.1)	564 (3.4)	3 (0.5)	537 (12.2)	10.3 (0.06)
Bulgaria		13 (0.8)	578 (3.1)	69 (1.9)	526 (2.7)	18 (2.1)	440 (12.5)	9.6 (0.09)
Serbia		13 (1.0)	574 (3.9)	83 (1.1)	506 (2.5)	4 (0.6)	387 (13.9)	10.0 (0.05)
Japan		12 (0.7)	637 (3.8)	87 (0.7)	589 (1.7)	1 (0.2)	~ ~	10.3 (0.04)
Qatar	r	11 (0.9)	512 (7.4)	87 (1.0)	451 (3.6)	2 (0.3)	~ ~	10.2 (0.04)
Croatia		10 (0.7)	549 (3.6)	87 (1.0)	508 (2.2)	3 (0.9)	448 (15.2)	9.9 (0.05)
Italy		10 (0.8)	552 (4.4)	83 (0.9)	515 (2.5)	7 (0.8)	491 (5.3)	9.8 (0.06)
Montenegro	r	9 (0.5)	507 (5.2)	87 (0.6)	454 (2.1)	4 (0.3)	384 (9.8)	10.0 (0.03)
Bahrain		8 (0.5)	520 (5.9)	88 (0.6)	480 (2.7)	4 (0.3)	461 (6.1)	9.9 (0.03)
North Macedonia		7 (0.9)	550 (7.6)	78 (1.5)	485 (4.7)	15 (1.6)	406 (9.4)	9.3 (0.09)
Kazakhstan		6 (1.0)	552 (9.5)	90 (1.0)	511 (2.4)	4 (0.5)	491 (5.8)	9.8 (0.06)
Turkey (5)		6 (0.7)	625 (5.9)	68 (1.6)	543 (3.8)	26 (1.6)	450 (6.1)	8.7 (0.08)
Armenia		5 (0.6)	534 (5.4)	86 (0.8)	500 (2.4)	9 (0.7)	469 (6.1)	9.5 (0.05)
Albania		5 (0.7)	577 (6.4)	65 (1.7)	505 (3.3)	30 (1.9)	467 (6.0)	8.6 (0.08)
Bosnia and Herzegovina		5 (0.5)	517 (6.0)	89 (0.7)	453 (2.2)	6 (0.5)	410 (6.7)	9.3 (0.05)
Iran, Islamic Rep. of		5 (0.7)	537 (8.7)	70 (1.5)	453 (3.4)	25 (1.4)	405 (7.2)	8.7 (0.07)
Oman		4 (0.4)	505 (6.8)	86 (0.6)	436 (4.0)	10 (0.6)	391 (7.4)	9.4 (0.04)
Chile		4 (0.4)	516 (6.4)	86 (0.7)	444 (2.9)	10 (0.6)	401 (4.6)	9.3 (0.04)
Kuwait	r	4 (0.5)	447 (14.3)	93 (0.5)	388 (4.9)	2 (0.4)	~ ~	9.8 (0.04)
Kosovo		4 (0.6)	503 (7.4)	84 (0.8)	448 (2.7)	12 (0.8)	415 (6.1)	9.1 (0.05)
Saudi Arabia		3 (0.3)	466 (8.2)	88 (0.7)	403 (3.5)	9 (0.7)	383 (7.4)	9.4 (0.05)
Azerbaijan		2 (0.3)	~ ~	86 (0.8)	525 (2.5)	12 (0.8)	495 (5.3)	9.1 (0.04)
South Africa (5)	r	2 (0.3)	~ ~	74 (1.0)	385 (3.7)	24 (1.0)	349 (3.4)	8.5 (0.05)
Morocco		1 (0.2)	~ ~	39 (1.4)	413 (6.5)	60 (1.4)	369 (5.8)	6.9 (0.08)
Pakistan	r	0 (0.2)	~ ~	62 (2.7)	333 (14.5)	38 (2.8)	325 (12.4)	8.0 (0.14)
Philippines		0 (0.1)	~ ~	66 (1.8)	313 (6.8)	34 (1.8)	270 (5.8)	8.1 (0.07)
Australia		- -	- -	- -	- -	- -	- -	- -
England		- -	- -	- -	- -	- -	- -	- -
Netherlands		- -	- -	- -	- -	- -	- -	- -
United States		- -	- -	- -	- -	- -	- -	- -
New Zealand	x	42 (1.6)	549 (3.6)	57 (1.6)	486 (4.1)	1 (0.2)	~ ~	11.4 (0.06)
United Arab Emirates	x	12 (0.4)	557 (2.5)	87 (0.4)	495 (2.3)	1 (0.1)	~ ~	10.4 (0.02)
International Average		**17 (0.1)**	**562 (0.7)**	**75 (0.2)**	**498 (0.5)**	**8 (0.1)**	**433 (1.5)**	
Benchmarking Participants								
Moscow City, Russian Fed.		39 (1.3)	611 (2.3)	60 (1.3)	581 (2.4)	0 (0.1)	~ ~	11.4 (0.05)
Ontario, Canada	s	36 (3.1)	548 (3.9)	64 (3.1)	512 (7.4)	0 (0.1)	~ ~	11.3 (0.09)
Quebec, Canada	s	35 (2.0)	562 (3.1)	65 (1.9)	525 (3.2)	0 (0.2)	~ ~	11.2 (0.07)
Madrid, Spain		32 (1.3)	550 (2.4)	66 (1.3)	510 (2.4)	3 (0.4)	457 (10.1)	10.9 (0.06)
Dubai, UAE	s	19 (0.7)	594 (2.9)	81 (0.7)	549 (2.2)	0 (0.1)	~ ~	10.8 (0.02)
Abu Dhabi, UAE	y	- -	- -	- -	- -	- -	- -	- -

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

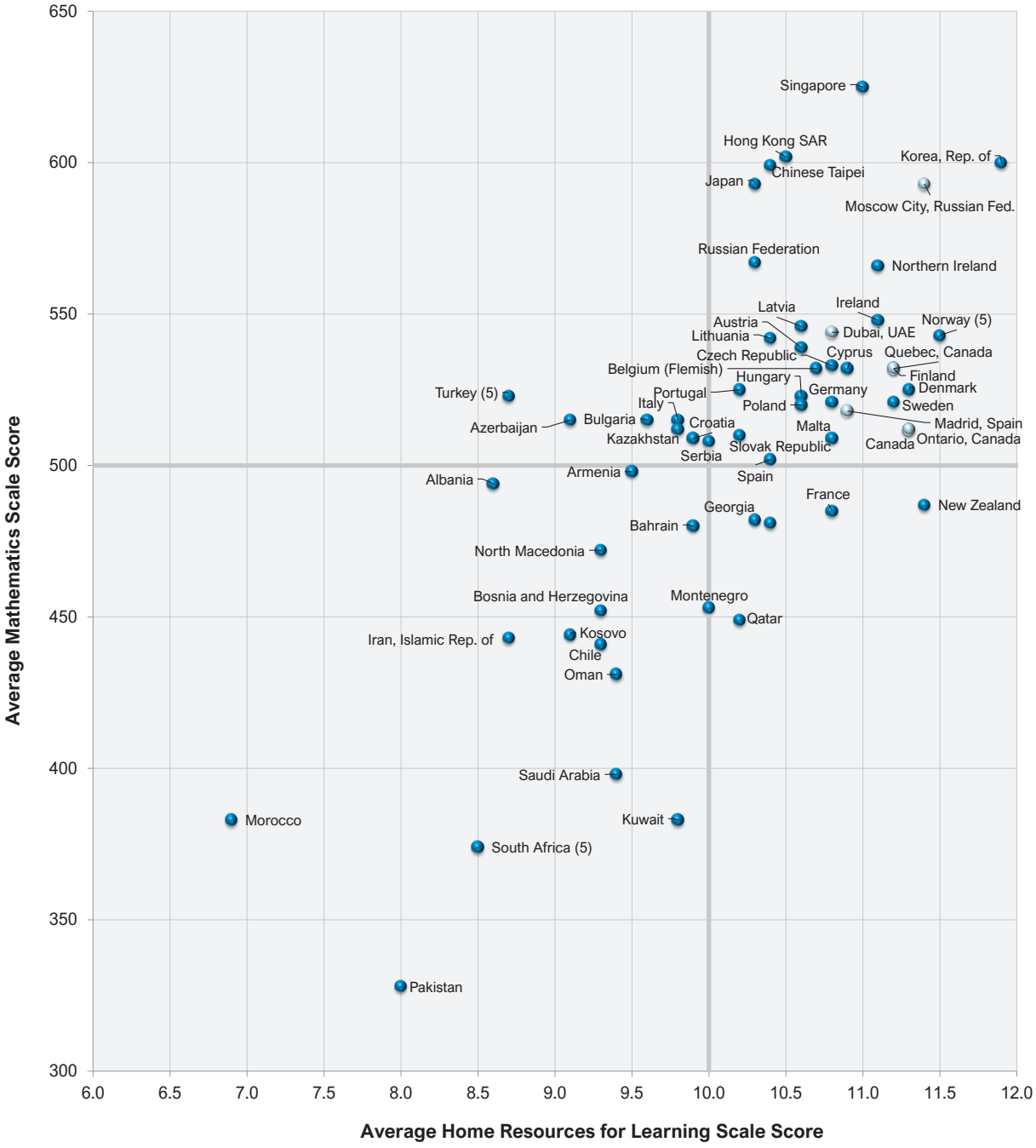
SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 5.2: Home Resources for Learning

Students' Results based on Students' and Parents' Reports

(Continued)

Average Mathematics Achievement by Home Resources for Learning



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 5.3: Home Resources for Learning

Students' Results based on Students' and Parents' Reports

Country		Many Resources		Some Resources		Few Resources		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Korea, Rep. of		53 (1.6)	610 (1.9)	47 (1.6)	564 (2.7)	0 (0.1)	~ ~	11.9 (0.06)
Sweden	r	39 (1.9)	580 (3.2)	60 (1.8)	524 (3.3)	2 (0.4)	~ ~	11.2 (0.08)
Denmark	s	37 (1.5)	560 (2.9)	62 (1.5)	521 (3.1)	1 (0.2)	~ ~	11.3 (0.04)
Canada	s	36 (1.7)	558 (2.2)	64 (1.7)	520 (3.1)	0 (0.1)	~ ~	11.3 (0.05)
Northern Ireland	s	35 (1.8)	565 (3.3)	63 (1.7)	515 (2.6)	1 (0.3)	~ ~	11.1 (0.07)
Finland		35 (1.1)	585 (3.2)	65 (1.1)	545 (2.6)	1 (0.1)	~ ~	11.2 (0.04)
Ireland		34 (1.4)	567 (3.4)	64 (1.5)	514 (3.3)	1 (0.3)	~ ~	11.1 (0.05)
Norway (5)	s	33 (1.5)	579 (3.5)	66 (1.5)	534 (3.5)	1 (0.2)	~ ~	11.5 (0.05)
Singapore		31 (1.0)	640 (3.1)	67 (1.0)	579 (3.4)	1 (0.2)	~ ~	11.0 (0.04)
Cyprus		29 (1.4)	551 (3.8)	70 (1.3)	501 (2.8)	1 (0.2)	~ ~	10.9 (0.05)
France		28 (1.5)	541 (2.8)	69 (1.4)	473 (2.9)	3 (0.3)	417 (10.2)	10.8 (0.06)
Germany	s	27 (1.4)	577 (3.0)	72 (1.4)	519 (2.4)	1 (0.3)	~ ~	10.8 (0.05)
Hungary		27 (1.4)	579 (2.5)	68 (1.4)	519 (2.4)	5 (0.8)	442 (10.3)	10.6 (0.07)
Belgium (Flemish)		27 (1.1)	540 (2.4)	71 (1.1)	493 (2.1)	3 (0.4)	432 (6.3)	10.7 (0.04)
Hong Kong SAR		27 (1.6)	570 (3.9)	67 (1.5)	521 (3.3)	6 (0.6)	492 (8.0)	10.5 (0.08)
Malta	r	27 (0.7)	547 (2.7)	72 (0.7)	488 (1.8)	1 (0.2)	~ ~	10.8 (0.03)
Czech Republic	r	24 (1.1)	578 (3.4)	75 (1.1)	531 (3.0)	1 (0.2)	~ ~	10.8 (0.04)
Austria		22 (1.0)	578 (3.1)	75 (1.0)	514 (2.8)	2 (0.3)	~ ~	10.6 (0.04)
Poland		22 (1.1)	577 (3.6)	77 (1.0)	520 (2.5)	1 (0.2)	~ ~	10.6 (0.05)
Spain		20 (1.2)	553 (2.9)	75 (1.2)	509 (2.2)	4 (0.6)	463 (8.8)	10.4 (0.06)
Chinese Taipei		20 (1.1)	598 (2.7)	74 (1.1)	552 (1.6)	5 (0.5)	496 (7.0)	10.4 (0.05)
Latvia		19 (1.0)	573 (2.7)	79 (1.0)	537 (2.3)	2 (0.3)	~ ~	10.6 (0.04)
Portugal		19 (1.1)	547 (3.3)	76 (1.1)	500 (2.6)	5 (0.5)	453 (5.3)	10.2 (0.06)
Slovak Republic		19 (1.2)	574 (3.6)	74 (1.4)	520 (2.6)	7 (1.3)	396 (11.9)	10.2 (0.08)
Lithuania	r	16 (1.1)	587 (5.5)	82 (1.0)	531 (2.5)	2 (0.3)	~ ~	10.4 (0.05)
Georgia		15 (1.0)	487 (5.1)	82 (1.1)	449 (4.5)	4 (0.6)	432 (20.7)	10.3 (0.06)
Russian Federation		14 (1.1)	599 (4.0)	84 (1.1)	564 (3.0)	3 (0.5)	522 (11.1)	10.3 (0.06)
Bulgaria		13 (0.8)	602 (4.0)	69 (1.9)	536 (3.5)	18 (2.1)	420 (11.7)	9.6 (0.09)
Serbia		13 (1.0)	576 (3.4)	83 (1.1)	517 (2.9)	4 (0.6)	389 (17.0)	10.0 (0.05)
Japan		12 (0.7)	606 (4.4)	87 (0.7)	558 (1.7)	1 (0.2)	~ ~	10.3 (0.04)
Qatar	r	11 (0.9)	513 (7.6)	87 (1.0)	454 (4.4)	2 (0.3)	~ ~	10.2 (0.04)
Croatia		10 (0.7)	562 (3.5)	87 (1.0)	522 (2.2)	3 (0.9)	468 (11.6)	9.9 (0.05)
Italy		10 (0.8)	551 (4.0)	83 (0.9)	511 (2.9)	7 (0.8)	478 (5.8)	9.8 (0.06)
Montenegro	r	9 (0.5)	515 (5.2)	87 (0.6)	454 (2.7)	4 (0.3)	378 (11.6)	10.0 (0.03)
Bahrain		8 (0.5)	552 (6.4)	88 (0.6)	495 (3.4)	4 (0.3)	451 (8.4)	9.9 (0.03)
North Macedonia		7 (0.9)	511 (7.6)	78 (1.5)	439 (5.6)	15 (1.6)	352 (10.1)	9.3 (0.09)
Kazakhstan		6 (1.0)	557 (12.0)	90 (1.0)	492 (2.9)	4 (0.5)	466 (6.2)	9.8 (0.06)
Turkey (5)		6 (0.7)	612 (5.1)	68 (1.6)	546 (3.6)	26 (1.6)	459 (6.4)	8.7 (0.08)
Armenia		5 (0.6)	511 (6.4)	86 (0.8)	467 (3.3)	9 (0.7)	434 (7.3)	9.5 (0.05)
Albania		5 (0.7)	570 (6.3)	65 (1.7)	499 (3.4)	30 (1.9)	464 (5.7)	8.6 (0.08)
Bosnia and Herzegovina		5 (0.5)	518 (6.1)	89 (0.7)	459 (2.9)	6 (0.5)	420 (8.3)	9.3 (0.05)
Iran, Islamic Rep. of		5 (0.7)	541 (6.4)	70 (1.5)	453 (3.6)	25 (1.4)	395 (7.1)	8.7 (0.07)
Oman		4 (0.4)	526 (7.9)	86 (0.6)	443 (4.2)	10 (0.6)	376 (6.5)	9.4 (0.04)
Chile		4 (0.4)	543 (5.9)	86 (0.7)	473 (2.6)	10 (0.6)	424 (3.9)	9.3 (0.04)
Kuwait	r	4 (0.5)	449 (17.7)	93 (0.5)	402 (6.0)	2 (0.4)	~ ~	9.8 (0.04)
Kosovo		4 (0.6)	485 (8.3)	84 (0.8)	417 (3.2)	12 (0.8)	383 (7.7)	9.1 (0.05)
Saudi Arabia		3 (0.3)	477 (9.6)	88 (0.7)	409 (3.9)	9 (0.7)	382 (8.9)	9.4 (0.05)
Azerbaijan		2 (0.3)	~ ~	86 (0.8)	438 (3.0)	12 (0.8)	403 (5.6)	9.1 (0.04)
South Africa (5)	r	2 (0.3)	~ ~	74 (1.0)	340 (5.2)	24 (1.0)	287 (4.7)	8.5 (0.05)
Morocco		1 (0.2)	~ ~	39 (1.4)	404 (7.3)	60 (1.4)	361 (7.4)	6.9 (0.08)
Pakistan	r	0 (0.2)	~ ~	62 (2.7)	295 (15.3)	38 (2.8)	289 (14.4)	8.0 (0.14)
Philippines		0 (0.1)	~ ~	66 (1.8)	269 (7.8)	34 (1.8)	214 (7.2)	8.1 (0.07)
Australia		- -	- -	- -	- -	- -	- -	- -
England		- -	- -	- -	- -	- -	- -	- -
Netherlands		- -	- -	- -	- -	- -	- -	- -
United States		- -	- -	- -	- -	- -	- -	- -
New Zealand	x	42 (1.6)	563 (3.3)	57 (1.6)	501 (3.6)	1 (0.2)	~ ~	11.4 (0.06)
United Arab Emirates	x	12 (0.4)	554 (3.2)	87 (0.4)	492 (2.9)	1 (0.1)	~ ~	10.4 (0.02)
International Average		**17 (0.1)**	**557 (0.8)**	**75 (0.2)**	**488 (0.5)**	**8 (0.1)**	**414 (1.7)**	
Benchmarking Participants								
Moscow City, Russian Fed.		39 (1.3)	615 (2.7)	60 (1.3)	582 (2.3)	0 (0.1)	~ ~	11.4 (0.05)
Ontario, Canada	s	36 (3.1)	560 (3.9)	64 (3.1)	523 (5.4)	0 (0.1)	~ ~	11.3 (0.09)
Quebec, Canada	s	35 (2.0)	554 (3.1)	65 (1.9)	514 (3.3)	0 (0.2)	~ ~	11.2 (0.07)
Madrid, Spain		32 (1.3)	552 (2.3)	66 (1.3)	514 (2.2)	3 (0.4)	472 (9.7)	10.9 (0.06)
Dubai, UAE	s	19 (0.7)	593 (3.8)	81 (0.7)	553 (2.4)	0 (0.1)	~ ~	10.8 (0.02)
Abu Dhabi, UAE	y	- -	- -	- -	- -	- -	- -	- -

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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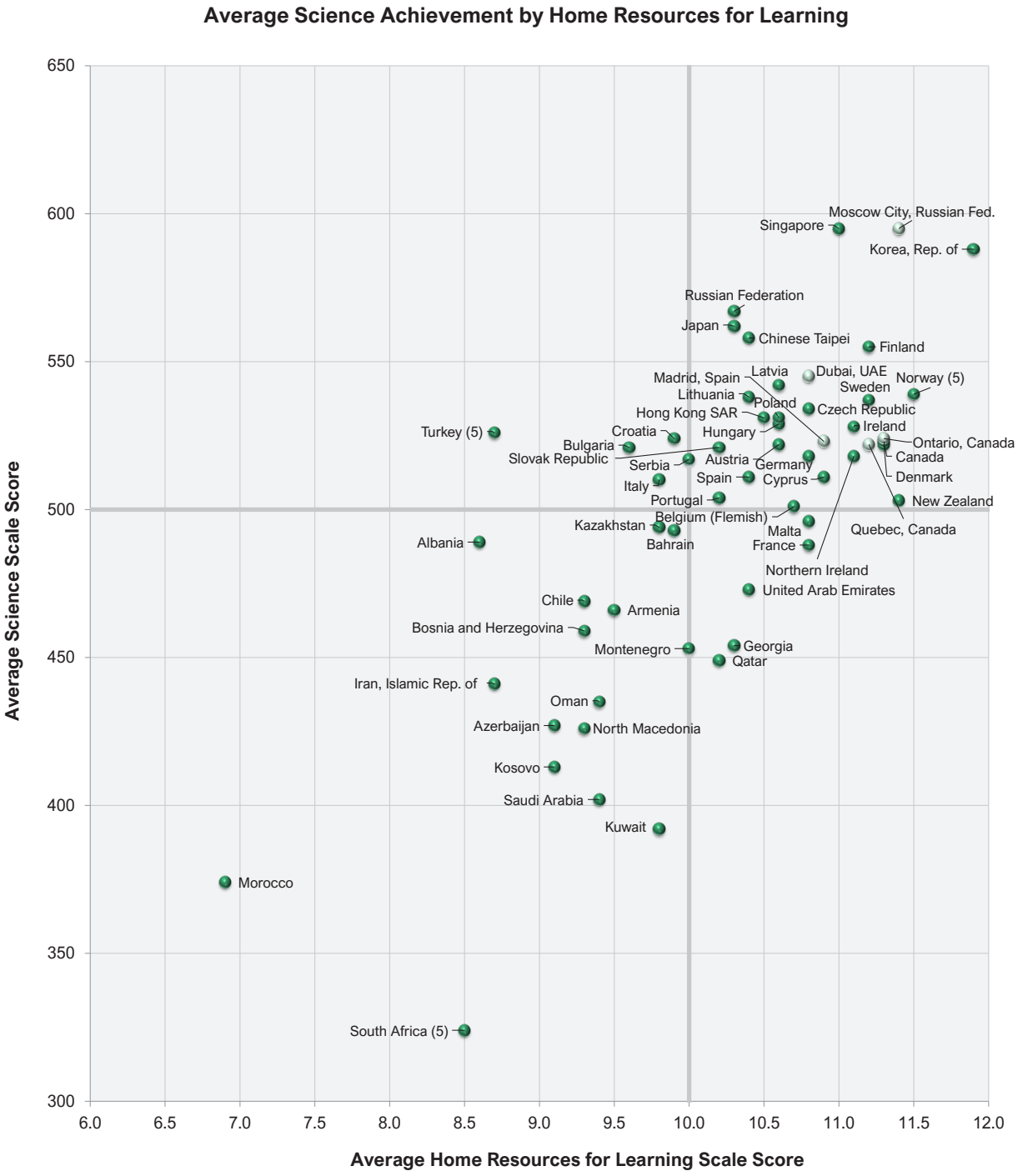
Exhibit 5.3: Home Resources for Learning

Students' Results based on Students' and Parents' Reports

(Continued)



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Home Educational Resources

The TIMSS 2019 results reinforce the already extensive body of research showing a powerful positive relationship between students' socioeconomic environment and their educational achievement. As shown in Exhibit 5.4, the eighth grade *Home Educational Resources* scale is based on students' reports about the number of books and other study supports in their homes, as well as the highest level of their parents' education (see About the Scale). As also explained, students were assigned a score on the scale according to the availability of these three home educational resources.

Exhibit 5.5 presents for each country the percentage of students in three categories of the scale, together with average student achievement in mathematics. Countries are ordered by the percentage of students in the "many resources" category, with an average percentage across countries of 14 percent. Educational resource availability varied widely across countries, with the percentage of students in the "many resources" category ranging from 2 percent in South Africa and Morocco to 40 percent in the Korea. The majority of students (73%, on average) were assigned to the "some resources" category, with 13 percent in the "few resources" category. There was a 113-point difference in the average mathematics achievement of students in the "many resources" category compared with the "few resources" category (546 vs. 433). Average mathematics achievement for the students in the "some resources" category was in between, at 488 points.

The second panel of Exhibit 5.5 presents a scatterplot showing the relationship between average *Home Educational Resources* and average mathematics achievement across countries. There is a modest positive association between *Home Educational Resources* and average mathematics achievement at the country level.

Exhibit 5.6 presents the same *Home Educational Resources* data, but this time in conjunction with average science achievement. The overall pattern of results is similar to mathematics, with an average science achievement gap of 118 score points between students in the "many resources" and "few resources" categories (549 vs. 431). Average science achievement for the students in the "some resources" category was again in between, at 489 points. Also similar to mathematics, the scatterplot in the second panel of Exhibit 5.6 shows a modest positive relationship between average *Home Educational Resources* scores and average science achievement across countries.

Exhibit 5.4: Home Educational Resources

Students' Reports

About the Scale

Students were scored according to their reports regarding the availability of three resources on the *Home Educational Resources* scale. Cut scores divide the scale into three categories. Students with **Many Resources** had a score at or above the cut score corresponding to reporting they had more than 100 books and both home study supports in their home and that at least one parent finished university, on average. Students with **Few Resources** had a score at or below the cut score corresponding to reporting they had 25 or fewer books and neither of the home study supports in the home and that neither parent had gone beyond upper secondary education, on average. All other students had **Some Resources**.

Number of books in the home:

1) 0-10
2) 11-25
3) 26-100
4) 101-200
5) More than 200

Highest level of education of either parent:

1) Finished some primary or lower secondary or did not go to school
2) Finished lower secondary
3) Finished upper secondary
4) Finished post-secondary education
5) Finished university or higher

Number of home study supports:

1) None
2) Internet connection or own room
3) Both internet connection and own room

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 5.5: Home Educational Resources

Students' Reports

Country	Many Resources		Some Resources		Few Resources		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Korea, Rep. of	40 (1.4)	643 (3.5)	58 (1.3)	586 (2.9)	2 (0.2)	~ ~	11.6 (0.04)
Norway (9)	31 (0.9)	538 (3.1)	68 (1.0)	491 (2.6)	2 (0.3)	~ ~	11.4 (0.04)
Australia	25 (1.1)	564 (5.0)	71 (1.0)	507 (3.3)	4 (0.3)	424 (6.1)	11.1 (0.04)
Hungary	25 (1.3)	585 (4.6)	70 (1.4)	500 (3.1)	5 (0.7)	411 (8.4)	10.9 (0.04)
Finland	23 (1.0)	545 (2.9)	75 (1.0)	500 (2.5)	2 (0.3)	~ ~	11.2 (0.04)
Sweden	23 (1.1)	554 (3.3)	73 (1.1)	491 (2.3)	4 (0.4)	442 (6.8)	11.0 (0.05)
Cyprus	22 (0.9)	549 (3.1)	74 (0.9)	492 (1.7)	4 (0.4)	425 (8.2)	10.9 (0.03)
Ireland	20 (1.0)	572 (3.6)	74 (1.0)	517 (2.3)	6 (0.5)	451 (9.0)	10.8 (0.04)
United States	20 (0.9)	583 (4.5)	72 (0.9)	506 (4.4)	8 (0.5)	451 (6.9)	10.7 (0.04)
Georgia	20 (1.2)	495 (6.1)	74 (1.3)	455 (4.3)	6 (1.1)	430 (15.4)	10.8 (0.06)
Japan	18 (0.8)	637 (4.9)	79 (0.7)	587 (2.3)	3 (0.4)	526 (10.2)	10.9 (0.03)
New Zealand	17 (0.9)	540 (4.0)	77 (0.8)	475 (3.4)	6 (0.4)	414 (7.2)	10.8 (0.04)
England	17 (1.3)	575 (8.6)	78 (1.2)	508 (5.1)	5 (0.5)	453 (11.3)	10.7 (0.05)
Chinese Taipei	16 (0.7)	671 (4.7)	70 (0.8)	612 (2.7)	13 (0.6)	543 (4.1)	10.4 (0.03)
Lithuania	16 (0.9)	580 (5.1)	81 (0.9)	513 (3.0)	3 (0.4)	437 (8.2)	10.8 (0.03)
Israel r	16 (1.2)	583 (6.7)	82 (1.2)	523 (4.7)	2 (0.3)	~ ~	11.1 (0.05)
Italy	15 (0.9)	536 (4.4)	72 (1.0)	498 (2.5)	13 (1.0)	452 (5.3)	10.3 (0.05)
France	15 (0.9)	534 (4.2)	78 (0.8)	478 (2.3)	7 (0.5)	432 (4.7)	10.6 (0.04)
Singapore	14 (0.5)	661 (3.8)	78 (0.6)	616 (3.9)	8 (0.6)	536 (8.4)	10.6 (0.03)
Portugal	14 (1.2)	553 (4.1)	70 (1.2)	499 (3.2)	16 (1.0)	460 (4.3)	10.2 (0.06)
Romania	14 (0.9)	559 (5.6)	76 (1.1)	477 (3.9)	10 (1.0)	401 (7.1)	10.3 (0.06)
Hong Kong SAR	13 (0.7)	625 (7.8)	74 (0.9)	577 (4.1)	13 (0.7)	540 (7.0)	10.3 (0.04)
Russian Federation	13 (0.9)	583 (6.9)	81 (0.9)	540 (4.6)	6 (0.7)	503 (8.1)	10.6 (0.05)
United Arab Emirates	12 (0.3)	529 (3.3)	79 (0.3)	473 (1.9)	10 (0.3)	426 (4.2)	10.4 (0.02)
Qatar	11 (0.7)	495 (8.5)	79 (0.8)	445 (4.1)	10 (0.7)	380 (5.5)	10.3 (0.05)
Bahrain	9 (0.4)	507 (5.1)	79 (0.7)	481 (2.0)	12 (0.5)	461 (4.3)	10.2 (0.02)
Turkey	9 (0.7)	605 (5.7)	59 (1.5)	510 (4.4)	32 (1.7)	439 (5.3)	9.5 (0.07)
Iran, Islamic Rep. of	8 (0.7)	530 (8.1)	61 (1.2)	457 (3.8)	31 (1.3)	403 (3.4)	9.5 (0.05)
Kazakhstan	7 (0.6)	519 (7.1)	83 (1.0)	490 (3.2)	10 (0.8)	451 (6.5)	10.2 (0.04)
Oman	7 (0.4)	466 (6.5)	71 (0.8)	420 (2.8)	22 (0.8)	372 (4.2)	9.7 (0.03)
Kuwait	6 (0.4)	432 (10.5)	80 (0.7)	406 (4.9)	14 (0.7)	380 (6.6)	9.9 (0.03)
Lebanon	6 (0.5)	473 (6.0)	73 (1.3)	436 (3.2)	22 (1.3)	396 (3.9)	9.7 (0.05)
Chile	5 (0.4)	519 (6.6)	79 (0.9)	444 (2.8)	16 (0.9)	399 (4.8)	9.9 (0.04)
Saudi Arabia	4 (0.4)	432 (7.2)	69 (1.0)	402 (2.3)	27 (1.1)	369 (3.9)	9.5 (0.05)
Malaysia	4 (0.3)	550 (4.9)	75 (0.8)	468 (2.9)	21 (0.8)	415 (4.9)	9.6 (0.04)
Jordan	4 (0.4)	455 (8.9)	74 (1.1)	428 (3.7)	22 (1.2)	394 (7.1)	9.6 (0.05)
Egypt	4 (0.4)	437 (10.2)	71 (1.1)	424 (4.8)	25 (1.3)	388 (7.0)	9.4 (0.06)
South Africa (9)	2 (0.2)	~ ~	63 (0.7)	396 (2.4)	35 (0.7)	373 (2.5)	9.1 (0.03)
Morocco	2 (0.3)	~ ~	43 (1.0)	400 (3.0)	55 (1.0)	376 (2.3)	8.3 (0.05)
International Average	**14 (0.1)**	**546 (1.0)**	**73 (0.2)**	**488 (0.5)**	**13 (0.1)**	**433 (1.2)**	
Benchmarking Participants							
Moscow City, Russian Fed.	29 (1.4)	602 (6.0)	69 (1.3)	566 (3.7)	2 (0.3)	~ ~	11.3 (0.04)
Ontario, Canada	25 (1.3)	567 (5.6)	73 (1.3)	520 (4.0)	1 (0.3)	~ ~	11.2 (0.04)
Quebec, Canada	18 (1.1)	581 (4.8)	80 (1.1)	537 (3.8)	2 (0.3)	~ ~	10.9 (0.05)
Dubai, UAE	17 (0.5)	578 (4.2)	77 (0.6)	532 (2.0)	6 (0.3)	478 (4.6)	10.8 (0.02)
Abu Dhabi, UAE	10 (0.4)	497 (5.2)	79 (0.5)	438 (3.0)	12 (0.5)	388 (7.3)	10.2 (0.03)
Western Cape, RSA (9)	6 (0.8)	571 (9.0)	60 (0.9)	448 (4.7)	34 (1.1)	407 (3.5)	9.3 (0.06)
Gauteng, RSA (9)	4 (0.5)	497 (10.3)	72 (0.9)	424 (3.2)	24 (0.9)	399 (3.1)	9.5 (0.05)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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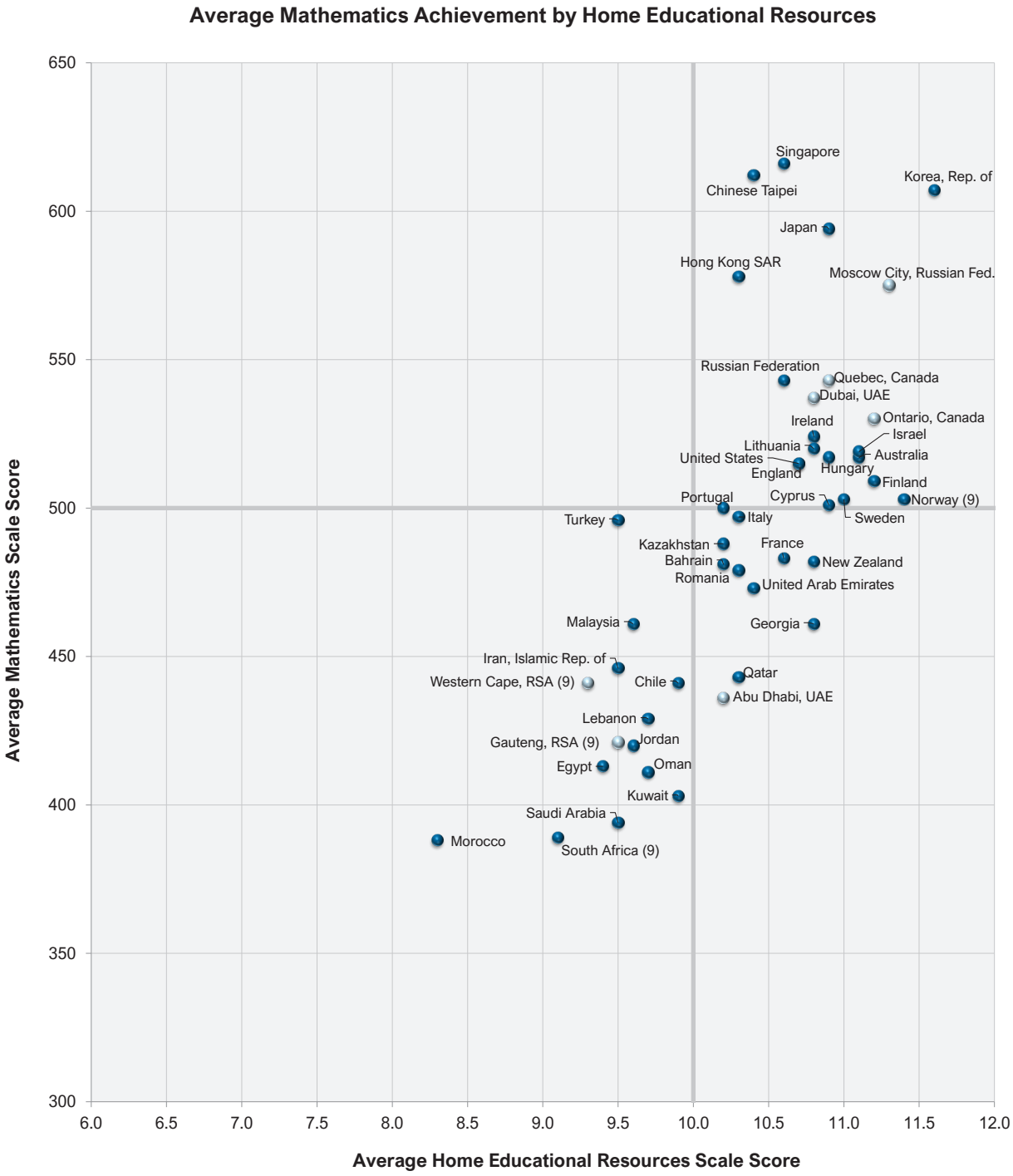
Exhibit 5.5: Home Educational Resources

Students' Reports

(Continued)



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 5.6: Home Educational Resources

Students' Reports

Country	Many Resources		Some Resources		Few Resources		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Korea, Rep. of	40 (1.4)	588 (2.8)	58 (1.3)	545 (2.2)	2 (0.2)	~ ~	11.6 (0.04)
Norway (9)	31 (0.9)	536 (2.9)	68 (1.0)	480 (3.5)	2 (0.3)	~ ~	11.4 (0.04)
Australia	25 (1.1)	580 (3.8)	71 (1.0)	517 (2.8)	4 (0.3)	430 (6.5)	11.1 (0.04)
Hungary	25 (1.3)	589 (4.0)	70 (1.4)	516 (2.7)	5 (0.7)	431 (8.7)	10.9 (0.04)
Finland	23 (1.0)	587 (3.1)	75 (1.0)	532 (3.1)	2 (0.3)	~ ~	11.2 (0.04)
Sweden	23 (1.1)	587 (4.2)	73 (1.1)	509 (3.1)	4 (0.4)	423 (10.2)	11.0 (0.05)
Cyprus	22 (0.9)	531 (3.0)	74 (0.9)	475 (2.2)	4 (0.4)	409 (8.5)	10.9 (0.03)
Ireland	20 (1.0)	581 (3.6)	74 (1.0)	514 (2.6)	6 (0.5)	442 (11.6)	10.8 (0.04)
United States	20 (0.9)	588 (4.3)	72 (0.9)	513 (4.4)	8 (0.5)	455 (7.2)	10.7 (0.04)
Georgia	20 (1.2)	478 (5.7)	74 (1.3)	442 (3.8)	6 (1.1)	415 (16.2)	10.8 (0.06)
Japan	18 (0.8)	607 (3.8)	79 (0.7)	563 (1.8)	3 (0.4)	515 (8.4)	10.9 (0.03)
New Zealand	17 (0.9)	570 (3.5)	77 (0.8)	490 (3.3)	6 (0.4)	418 (9.4)	10.8 (0.04)
England	17 (1.3)	582 (7.6)	78 (1.2)	509 (4.8)	5 (0.5)	444 (10.7)	10.7 (0.05)
Chinese Taipei	16 (0.7)	623 (3.3)	70 (0.8)	574 (1.9)	13 (0.6)	515 (3.6)	10.4 (0.03)
Lithuania	16 (0.9)	589 (4.2)	81 (0.9)	527 (3.2)	3 (0.4)	457 (7.9)	10.8 (0.03)
Israel r	16 (1.2)	572 (6.3)	82 (1.2)	519 (4.3)	2 (0.3)	~ ~	11.1 (0.05)
Italy	15 (0.9)	546 (3.4)	72 (1.0)	501 (2.4)	13 (1.0)	449 (5.5)	10.3 (0.05)
France	15 (0.9)	547 (4.0)	78 (0.8)	483 (2.5)	7 (0.5)	422 (5.6)	10.6 (0.04)
Singapore	14 (0.5)	659 (3.5)	78 (0.6)	607 (3.7)	8 (0.6)	525 (8.4)	10.6 (0.03)
Portugal	14 (1.2)	568 (3.7)	70 (1.2)	518 (2.9)	16 (1.0)	481 (4.6)	10.2 (0.06)
Romania	14 (0.9)	537 (5.7)	76 (1.1)	468 (4.0)	10 (1.0)	404 (6.6)	10.3 (0.06)
Hong Kong SAR	13 (0.7)	553 (9.1)	74 (0.9)	500 (5.2)	13 (0.7)	473 (8.1)	10.3 (0.04)
Russian Federation	13 (0.9)	576 (5.3)	81 (0.9)	541 (4.3)	6 (0.7)	504 (8.6)	10.6 (0.05)
United Arab Emirates	12 (0.3)	538 (3.3)	79 (0.3)	474 (2.3)	10 (0.3)	409 (5.6)	10.4 (0.02)
Qatar	11 (0.7)	524 (7.8)	79 (0.8)	477 (4.5)	10 (0.7)	411 (6.3)	10.3 (0.05)
Bahrain	9 (0.4)	531 (5.0)	79 (0.7)	490 (2.0)	12 (0.5)	433 (5.4)	10.2 (0.02)
Turkey	9 (0.7)	612 (5.7)	59 (1.5)	527 (3.6)	32 (1.7)	467 (5.1)	9.5 (0.07)
Iran, Islamic Rep. of	8 (0.7)	535 (7.4)	61 (1.2)	459 (3.5)	31 (1.3)	409 (3.8)	9.5 (0.05)
Kazakhstan	7 (0.6)	512 (6.9)	83 (1.0)	480 (3.0)	10 (0.8)	441 (5.8)	10.2 (0.04)
Oman	7 (0.4)	513 (5.9)	71 (0.8)	466 (2.9)	22 (0.8)	421 (4.5)	9.7 (0.03)
Kuwait	6 (0.4)	474 (9.4)	80 (0.7)	448 (5.5)	14 (0.7)	420 (7.9)	9.9 (0.03)
Lebanon	6 (0.5)	449 (8.9)	73 (1.3)	389 (4.8)	22 (1.3)	322 (6.4)	9.7 (0.05)
Chile	5 (0.4)	537 (6.0)	79 (0.9)	466 (2.9)	16 (0.9)	420 (4.8)	9.9 (0.04)
Saudi Arabia	4 (0.4)	471 (7.9)	69 (1.0)	441 (2.7)	27 (1.1)	405 (3.6)	9.5 (0.05)
Malaysia	4 (0.3)	549 (4.9)	75 (0.8)	469 (3.1)	21 (0.8)	413 (5.4)	9.6 (0.04)
Jordan	4 (0.4)	489 (11.1)	74 (1.1)	462 (4.2)	22 (1.2)	420 (6.2)	9.6 (0.05)
Egypt	4 (0.4)	422 (9.4)	71 (1.1)	402 (4.9)	25 (1.3)	361 (7.8)	9.4 (0.06)
South Africa (9)	2 (0.2)	~ ~	63 (0.7)	381 (3.2)	35 (0.7)	345 (3.6)	9.1 (0.03)
Morocco	2 (0.3)	~ ~	43 (1.0)	401 (3.2)	55 (1.0)	386 (3.1)	8.3 (0.05)
International Average	**14 (0.1)**	**549 (1.0)**	**73 (0.2)**	**489 (0.6)**	**13 (0.1)**	**431 (1.2)**	
Benchmarking Participants							
Moscow City, Russian Fed.	29 (1.4)	589 (3.6)	69 (1.3)	559 (2.7)	2 (0.3)	~ ~	11.3 (0.04)
Ontario, Canada	25 (1.3)	563 (4.4)	73 (1.3)	510 (2.7)	1 (0.3)	~ ~	11.2 (0.04)
Quebec, Canada	18 (1.1)	581 (5.0)	80 (1.1)	528 (3.6)	2 (0.3)	~ ~	10.9 (0.05)
Dubai, UAE	17 (0.5)	592 (4.0)	77 (0.6)	544 (2.2)	6 (0.3)	477 (5.7)	10.8 (0.02)
Abu Dhabi, UAE	10 (0.4)	499 (6.2)	79 (0.5)	423 (3.7)	12 (0.5)	353 (9.7)	10.2 (0.03)
Western Cape, RSA (9)	6 (0.8)	598 (10.0)	60 (0.9)	450 (5.4)	34 (1.1)	393 (4.0)	9.3 (0.06)
Gauteng, RSA (9)	4 (0.5)	516 (10.8)	72 (0.9)	428 (4.2)	24 (0.9)	391 (4.2)	9.5 (0.05)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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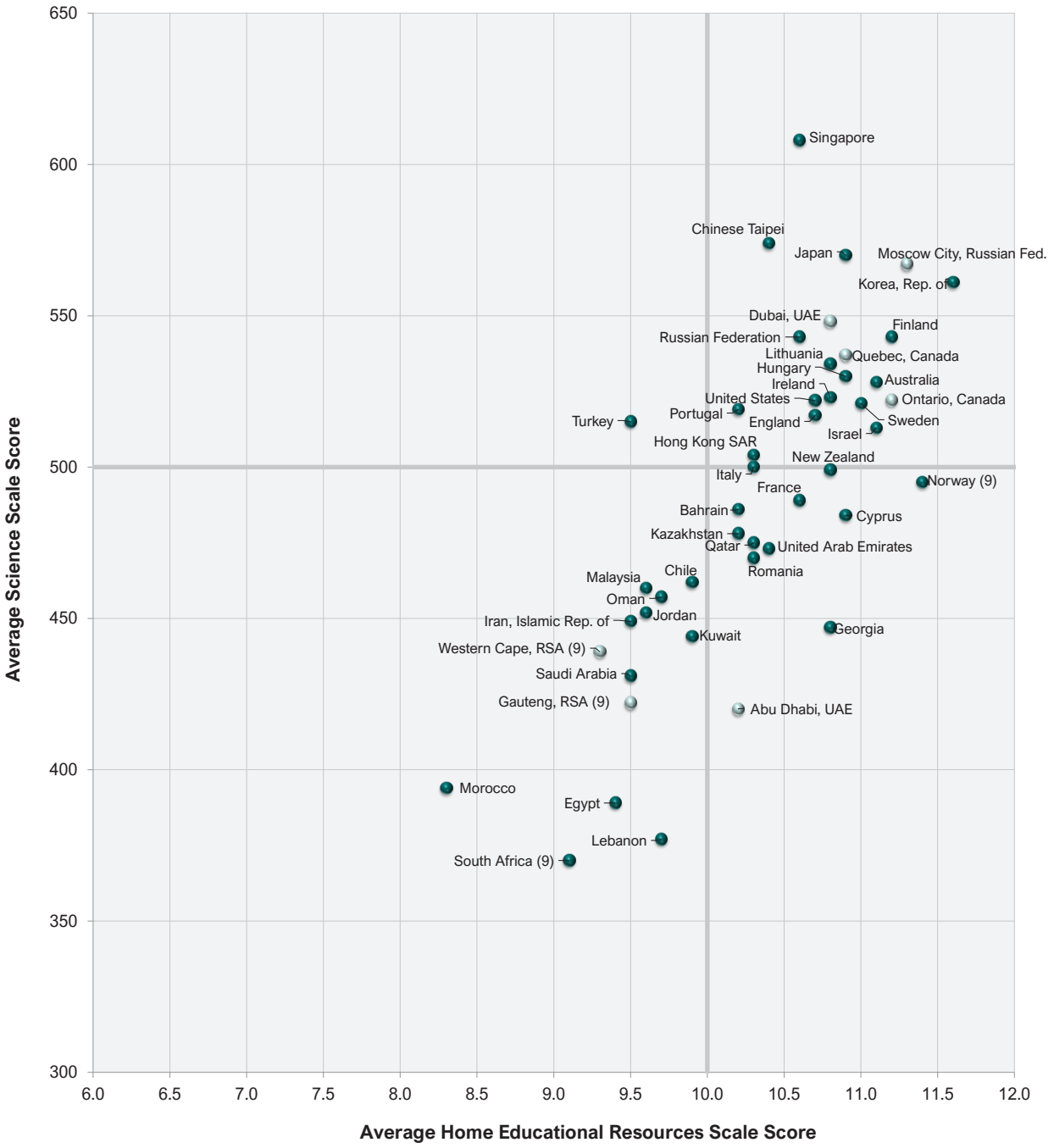
Exhibit 5.6: Home Educational Resources

Students' Reports

(Continued)

Average Science Achievement by Home Educational Resources



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Students Speak the Language of Test

Exhibits 5.7 and 5.8 show the percentages of fourth grade students that "always," "almost always," "sometimes," or "never" speak the language of the TIMSS test at home, together with average achievement in mathematics (Exhibit 5.7) and science (Exhibit 5.8). Exhibits 5.9 and 5.10 provide comparable information for eighth grade students.

About two-thirds of students (63% at fourth grade and 66% at eighth grade), on average, reported "always" speaking the language of the test at home, and most of the remaining students (32% at fourth grade and 30% at eighth grade) reported speaking it "almost always" or "sometimes." There was relatively little variation in average achievement across these categories. However, the few students (5% at fourth grade and 4% at eighth grade, on average) who "never" spoke the language of the test at home had much lower average achievement in both mathematics (442 for both fourth and eighth grades) and science (418 and 428, respectively).

Exhibit 5.7: Students Speak the Language of the Test at Home

Students' Reports

Country	Always		Almost Always		Sometimes		Never	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Albania	87 (1.0)	496 (3.7)	6 (0.6)	508 (8.4)	6 (0.5)	507 (6.7)	1 (0.7)	~ ~
Armenia	74 (1.0)	497 (2.6)	26 (1.0)	502 (4.0)	0 (0.0)	~ ~	0 (0.0)	~ ~
Australia	67 (1.5)	514 (2.8)	13 (0.7)	530 (5.0)	18 (1.2)	515 (6.8)	1 (0.2)	~ ~
Austria	63 (1.2)	549 (2.4)	12 (0.7)	534 (3.2)	21 (0.9)	519 (3.3)	4 (0.4)	517 (6.5)
Azerbaijan	69 (1.5)	520 (2.8)	14 (0.9)	524 (4.1)	16 (1.0)	527 (4.1)	1 (0.3)	~ ~
Bahrain	52 (1.1)	481 (3.0)	12 (0.6)	484 (5.2)	31 (0.8)	482 (3.1)	5 (0.4)	468 (7.8)
Belgium (Flemish)	63 (1.1)	544 (1.8)	11 (0.6)	530 (3.2)	22 (0.9)	503 (3.4)	4 (0.3)	515 (6.4)
Bosnia and Herzegovina	84 (0.9)	450 (2.3)	8 (0.5)	474 (6.0)	6 (0.5)	462 (5.5)	1 (0.2)	~ ~
Bulgaria	69 (1.9)	528 (4.3)	10 (0.8)	536 (9.5)	15 (1.5)	483 (7.3)	6 (1.0)	419 (12.4)
Canada	56 (1.6)	503 (2.3)	19 (0.5)	528 (2.5)	22 (1.2)	518 (5.0)	2 (0.3)	~ ~
Chile	82 (0.8)	441 (2.7)	9 (0.5)	469 (4.8)	8 (0.5)	440 (6.3)	1 (0.2)	~ ~
Chinese Taipei	51 (1.1)	601 (2.1)	17 (0.6)	611 (3.4)	31 (1.0)	595 (2.5)	1 (0.1)	~ ~
Croatia	68 (1.2)	510 (2.3)	20 (0.8)	519 (3.4)	10 (0.7)	504 (5.7)	1 (0.7)	~ ~
Cyprus	56 (1.2)	534 (2.6)	15 (0.7)	542 (4.7)	25 (1.0)	528 (4.7)	5 (0.4)	510 (9.8)
Czech Republic	75 (0.9)	533 (2.6)	15 (0.8)	542 (4.2)	9 (0.5)	520 (5.0)	1 (0.2)	~ ~
Denmark	65 (1.1)	530 (2.2)	22 (0.9)	528 (3.4)	12 (0.8)	500 (4.4)	1 (0.2)	~ ~
England	70 (1.7)	553 (3.7)	13 (0.7)	568 (5.9)	15 (1.3)	560 (5.6)	2 (0.5)	~ ~
Finland	74 (1.2)	538 (2.2)	14 (0.7)	533 (3.9)	10 (0.8)	501 (5.7)	2 (0.3)	~ ~
France	68 (1.3)	490 (3.4)	13 (0.6)	500 (4.4)	18 (1.0)	461 (5.0)	1 (0.2)	~ ~
Georgia	78 (1.1)	480 (4.0)	10 (0.7)	501 (6.4)	11 (0.7)	487 (5.4)	1 (0.6)	~ ~
Germany	62 (1.2)	532 (2.5)	17 (0.7)	531 (4.3)	18 (0.9)	497 (4.1)	2 (0.3)	~ ~
Hong Kong SAR	56 (0.9)	604 (3.2)	14 (0.6)	590 (6.0)	29 (0.8)	607 (3.6)	2 (0.3)	~ ~
Hungary	75 (1.0)	522 (2.8)	16 (0.7)	544 (4.4)	8 (0.6)	509 (5.2)	0 (0.1)	~ ~
Iran, Islamic Rep. of	58 (2.0)	448 (3.6)	10 (0.7)	458 (6.9)	20 (1.2)	446 (6.5)	11 (1.3)	413 (12.5)
Ireland	68 (1.3)	556 (2.7)	14 (0.9)	539 (5.2)	15 (0.8)	540 (3.7)	4 (0.4)	500 (7.5)
Italy	74 (1.1)	519 (2.4)	13 (0.7)	514 (5.4)	11 (0.8)	496 (4.7)	2 (0.4)	~ ~
Japan	92 (0.5)	595 (1.8)	6 (0.4)	572 (4.8)	1 (0.2)	~ ~	0 (0.1)	~ ~
Kazakhstan	66 (1.0)	512 (2.8)	18 (0.8)	512 (4.1)	15 (0.9)	515 (3.7)	1 (0.1)	~ ~
Korea, Rep. of	68 (1.2)	597 (2.3)	17 (0.8)	620 (3.7)	14 (0.8)	590 (3.9)	0 (0.0)	~ ~
Kosovo	87 (0.8)	447 (2.7)	6 (0.5)	461 (7.7)	6 (0.5)	466 (6.9)	0 (0.1)	~ ~
Kuwait	47 (1.9)	375 (5.7)	13 (0.9)	396 (8.7)	29 (1.3)	414 (6.3)	11 (1.2)	381 (9.3)
Latvia	64 (1.0)	545 (3.0)	22 (0.8)	560 (3.3)	13 (0.7)	535 (4.0)	2 (0.3)	~ ~
Lithuania	68 (1.1)	540 (3.1)	21 (0.8)	556 (3.9)	11 (0.8)	528 (4.4)	0 (0.1)	~ ~
Malta	15 (0.6)	497 (3.4)	18 (0.7)	514 (2.9)	51 (0.7)	519 (1.9)	16 (0.6)	490 (4.3)
Montenegro	71 (0.9)	454 (2.3)	12 (0.6)	469 (4.7)	11 (0.4)	457 (4.0)	6 (0.4)	465 (6.7)
Morocco	32 (2.3)	370 (7.0)	15 (1.0)	381 (8.4)	23 (1.5)	416 (7.3)	30 (2.4)	382 (5.7)
Netherlands	64 (1.5)	542 (2.4)	17 (0.9)	544 (3.5)	16 (1.2)	518 (4.1)	3 (0.4)	535 (10.2)
New Zealand	69 (1.0)	486 (2.8)	13 (0.6)	504 (5.5)	17 (0.8)	491 (5.3)	2 (0.2)	~ ~
North Macedonia	79 (1.5)	478 (5.3)	8 (0.7)	501 (8.5)	10 (0.9)	460 (10.8)	3 (0.7)	433 (23.9)
Northern Ireland	83 (1.1)	565 (2.9)	8 (0.6)	586 (5.0)	8 (0.8)	563 (7.1)	2 (0.3)	~ ~
Norway (5)	64 (1.0)	550 (2.4)	25 (0.9)	541 (4.0)	8 (0.6)	517 (5.0)	2 (0.3)	~ ~
Oman	58 (1.6)	436 (4.3)	15 (0.7)	422 (5.6)	20 (1.0)	439 (4.8)	8 (1.0)	429 (12.4)
Pakistan	22 (2.9)	313 (15.0)	10 (1.4)	330 (21.6)	32 (2.9)	347 (14.7)	36 (3.2)	321 (13.4)
Philippines	9 (0.7)	253 (7.4)	16 (0.9)	263 (7.3)	41 (1.4)	337 (6.7)	33 (1.4)	284 (6.9)
Poland	77 (0.9)	515 (2.8)	19 (0.8)	546 (3.7)	5 (0.4)	524 (7.6)	0 (0.1)	~ ~
Portugal	78 (0.6)	526 (2.6)	12 (0.5)	537 (5.0)	9 (0.6)	515 (5.4)	1 (0.2)	~ ~
Qatar	37 (1.8)	429 (3.6)	15 (0.8)	465 (4.6)	39 (1.4)	473 (4.7)	9 (0.6)	444 (6.4)
Russian Federation	81 (0.9)	566 (3.7)	11 (0.6)	575 (5.0)	7 (0.5)	567 (5.1)	1 (0.2)	~ ~
Saudi Arabia	63 (1.2)	402 (3.6)	12 (0.6)	387 (5.9)	19 (0.9)	410 (5.9)	7 (0.6)	398 (7.6)
Serbia	85 (0.9)	509 (3.1)	10 (0.8)	524 (6.4)	5 (0.4)	480 (10.5)	1 (0.2)	~ ~
Singapore	36 (0.6)	625 (4.1)	23 (0.5)	643 (3.7)	39 (0.7)	620 (4.5)	3 (0.2)	578 (11.4)
Slovak Republic	68 (1.4)	514 (3.2)	17 (0.8)	528 (3.7)	12 (1.0)	477 (7.1)	3 (0.6)	438 (20.9)
South Africa (5)	22 (1.1)	406 (6.3)	13 (0.7)	409 (8.4)	53 (1.0)	369 (3.1)	12 (0.8)	315 (4.0)
Spain	62 (1.1)	505 (2.7)	13 (0.6)	521 (3.3)	17 (0.8)	498 (3.2)	9 (0.6)	478 (4.9)
Sweden	63 (1.8)	532 (2.9)	18 (0.8)	524 (4.2)	17 (1.3)	491 (4.9)	2 (0.4)	~ ~
Turkey (5)	74 (1.5)	538 (3.7)	12 (0.6)	540 (6.7)	11 (1.1)	445 (9.3)	3 (0.4)	401 (11.4)
United Arab Emirates	36 (0.4)	467 (2.4)	16 (0.5)	502 (2.7)	41 (0.6)	494 (2.1)	8 (0.2)	467 (3.3)
United States	65 (1.1)	541 (2.9)	13 (0.5)	544 (3.7)	20 (0.8)	521 (4.0)	3 (0.2)	484 (8.0)
International Average	**63 (0.2)**	**502 (0.5)**	**14 (0.1)**	**511 (0.8)**	**18 (0.1)**	**495 (0.8)**	**5 (0.1)**	**442 (2.1)**
Benchmarking Participants								
Ontario, Canada	55 (3.0)	501 (4.2)	21 (1.1)	533 (4.3)	23 (2.1)	523 (8.6)	2 (0.4)	~ ~
Quebec, Canada	53 (1.8)	529 (3.0)	21 (0.9)	536 (3.4)	23 (1.8)	530 (3.7)	3 (0.4)	549 (10.8)
Moscow City, Russian Fed.	78 (0.8)	592 (2.3)	15 (0.7)	601 (3.6)	7 (0.4)	586 (4.7)	1 (0.1)	~ ~
Madrid, Spain	72 (1.0)	517 (2.2)	15 (0.8)	533 (3.3)	12 (0.6)	516 (4.2)	1 (0.3)	~ ~
Abu Dhabi, UAE	39 (0.6)	415 (3.4)	14 (0.4)	455 (3.5)	39 (0.7)	467 (2.6)	9 (0.5)	437 (5.0)
Dubai, UAE	29 (0.6)	535 (2.3)	21 (0.7)	555 (2.9)	43 (0.7)	547 (2.6)	7 (0.4)	530 (5.5)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 5.8: Students Speak the Language of the Test at Home

Students' Reports

Country	Always		Almost Always		Sometimes		Never	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Albania	87 (1.0)	491 (3.8)	6 (0.6)	504 (8.6)	6 (0.5)	503 (6.9)	1 (0.7)	~ ~
Armenia	74 (1.0)	465 (3.6)	26 (1.0)	471 (4.4)	0 (0.0)	~ ~	0 (0.0)	~ ~
Australia	67 (1.5)	536 (2.5)	13 (0.7)	540 (4.4)	18 (1.2)	519 (5.0)	1 (0.2)	~ ~
Austria	63 (1.2)	543 (2.5)	12 (0.7)	511 (3.9)	21 (0.9)	479 (4.1)	4 (0.4)	477 (8.0)
Azerbaijan	69 (1.5)	430 (3.5)	14 (0.9)	444 (4.4)	16 (1.0)	445 (4.6)	1 (0.3)	~ ~
Bahrain	52 (1.1)	496 (4.0)	12 (0.6)	502 (6.3)	31 (0.8)	497 (3.3)	5 (0.4)	463 (7.6)
Belgium (Flemish)	63 (1.1)	515 (1.9)	11 (0.6)	501 (4.1)	22 (0.9)	464 (3.4)	4 (0.3)	469 (6.8)
Bosnia and Herzegovina	84 (0.9)	457 (2.8)	8 (0.5)	483 (7.0)	6 (0.5)	474 (6.4)	1 (0.2)	~ ~
Bulgaria	69 (1.9)	542 (4.8)	10 (0.8)	543 (11.4)	15 (1.5)	474 (8.8)	6 (1.0)	383 (14.6)
Canada	56 (1.6)	523 (2.3)	19 (0.5)	537 (2.4)	22 (1.2)	516 (4.5)	2 (0.3)	~ ~
Chile	82 (0.8)	469 (2.6)	9 (0.5)	493 (5.8)	8 (0.5)	475 (5.1)	1 (0.2)	~ ~
Chinese Taipei	51 (1.1)	559 (2.4)	17 (0.6)	574 (3.5)	31 (1.0)	552 (2.4)	1 (0.1)	~ ~
Croatia	68 (1.2)	525 (2.0)	20 (0.8)	528 (4.6)	10 (0.7)	524 (4.7)	1 (0.7)	~ ~
Cyprus	56 (1.2)	516 (2.6)	15 (0.7)	517 (5.0)	25 (1.0)	504 (4.6)	5 (0.4)	481 (9.7)
Czech Republic	75 (0.9)	534 (2.6)	15 (0.8)	543 (4.3)	9 (0.5)	520 (5.5)	1 (0.2)	~ ~
Denmark	65 (1.1)	529 (2.4)	22 (0.9)	522 (3.5)	12 (0.8)	495 (5.3)	1 (0.2)	~ ~
England	70 (1.7)	537 (3.3)	13 (0.7)	552 (4.9)	15 (1.3)	529 (5.1)	2 (0.5)	~ ~
Finland	74 (1.2)	563 (2.3)	14 (0.7)	556 (4.3)	10 (0.8)	507 (6.0)	2 (0.3)	~ ~
France	68 (1.3)	494 (3.3)	13 (0.6)	498 (4.3)	18 (1.0)	466 (5.4)	1 (0.2)	~ ~
Georgia	78 (1.1)	452 (4.3)	10 (0.7)	478 (6.4)	11 (0.7)	460 (5.8)	1 (0.6)	~ ~
Germany	62 (1.2)	536 (2.4)	17 (0.7)	529 (3.7)	18 (0.9)	478 (4.7)	2 (0.3)	~ ~
Hong Kong SAR	56 (0.9)	531 (3.2)	14 (0.6)	519 (6.3)	29 (0.8)	542 (4.1)	2 (0.3)	~ ~
Hungary	75 (1.0)	529 (2.9)	16 (0.7)	549 (4.4)	8 (0.6)	512 (5.4)	0 (0.1)	~ ~
Iran, Islamic Rep. of	58 (2.0)	452 (3.5)	10 (0.7)	457 (7.9)	20 (1.2)	434 (7.1)	11 (1.3)	395 (13.5)
Ireland	68 (1.3)	536 (3.2)	14 (0.9)	513 (7.4)	15 (0.8)	521 (4.2)	4 (0.4)	481 (8.6)
Italy	74 (1.1)	514 (2.9)	13 (0.7)	510 (6.1)	11 (0.8)	492 (4.9)	2 (0.4)	~ ~
Japan	92 (0.5)	564 (1.8)	6 (0.4)	547 (5.8)	1 (0.2)	~ ~	0 (0.1)	~ ~
Kazakhstan	66 (1.0)	497 (3.5)	18 (0.8)	489 (4.4)	15 (0.9)	493 (4.0)	1 (0.1)	~ ~
Korea, Rep. of	68 (1.2)	585 (2.4)	17 (0.8)	606 (3.3)	14 (0.8)	579 (4.0)	0 (0.0)	~ ~
Kosovo	87 (0.8)	417 (3.4)	6 (0.5)	434 (9.8)	6 (0.5)	430 (6.1)	0 (0.1)	~ ~
Kuwait	47 (1.9)	388 (7.0)	13 (0.9)	411 (9.1)	29 (1.3)	418 (7.9)	11 (1.2)	382 (11.5)
Latvia	64 (1.0)	542 (2.7)	22 (0.8)	554 (3.5)	13 (0.7)	530 (4.5)	2 (0.3)	~ ~
Lithuania	68 (1.1)	538 (2.9)	21 (0.8)	548 (3.6)	11 (0.8)	522 (5.0)	0 (0.1)	~ ~
Malta	15 (0.6)	498 (4.0)	18 (0.7)	505 (3.4)	51 (0.7)	504 (2.2)	16 (0.6)	463 (4.1)
Montenegro	71 (0.9)	455 (2.8)	12 (0.6)	467 (5.4)	11 (0.4)	459 (4.6)	6 (0.4)	467 (6.7)
Morocco	32 (2.3)	362 (9.0)	15 (1.0)	375 (9.8)	23 (1.5)	416 (7.6)	30 (2.4)	365 (7.8)
Netherlands	64 (1.5)	525 (3.0)	17 (0.9)	524 (4.2)	16 (1.2)	495 (4.7)	3 (0.4)	501 (11.8)
New Zealand	69 (1.0)	506 (2.4)	13 (0.6)	512 (5.3)	17 (0.8)	495 (4.7)	2 (0.2)	~ ~
North Macedonia	79 (1.5)	434 (6.5)	8 (0.7)	453 (10.1)	10 (0.9)	408 (10.8)	3 (0.7)	399 (23.4)
Northern Ireland	83 (1.1)	518 (2.5)	8 (0.6)	534 (4.9)	8 (0.8)	519 (5.8)	2 (0.3)	~ ~
Norway (5)	64 (1.0)	548 (2.5)	25 (0.9)	535 (4.0)	8 (0.6)	509 (5.2)	2 (0.3)	~ ~
Oman	58 (1.6)	443 (4.7)	15 (0.7)	426 (7.7)	20 (1.0)	450 (4.7)	8 (1.0)	412 (10.4)
Pakistan	22 (2.9)	280 (16.6)	10 (1.4)	282 (23.7)	32 (2.9)	314 (17.3)	36 (3.2)	280 (17.6)
Philippines	9 (0.7)	196 (8.0)	16 (0.9)	219 (9.4)	41 (1.4)	294 (8.1)	33 (1.4)	231 (8.7)
Poland	77 (0.9)	527 (2.7)	19 (0.8)	551 (3.7)	5 (0.4)	530 (8.2)	0 (0.1)	~ ~
Portugal	78 (0.6)	503 (2.5)	12 (0.5)	521 (5.0)	9 (0.6)	500 (4.2)	1 (0.2)	~ ~
Qatar	37 (1.8)	431 (4.2)	15 (0.8)	468 (5.4)	39 (1.4)	475 (4.8)	9 (0.6)	433 (7.8)
Russian Federation	81 (0.9)	568 (3.3)	11 (0.6)	571 (5.1)	7 (0.5)	559 (4.5)	1 (0.2)	~ ~
Saudi Arabia	63 (1.2)	409 (4.1)	12 (0.6)	391 (6.3)	19 (0.9)	411 (7.2)	7 (0.6)	391 (9.0)
Serbia	85 (0.9)	519 (3.3)	10 (0.8)	532 (6.5)	5 (0.4)	482 (12.4)	1 (0.2)	~ ~
Singapore	36 (0.6)	598 (3.8)	23 (0.5)	611 (3.7)	39 (0.7)	586 (4.0)	3 (0.2)	542 (11.2)
Slovak Republic	68 (1.4)	530 (2.9)	17 (0.8)	535 (3.9)	12 (1.0)	477 (9.4)	3 (0.6)	402 (27.1)
South Africa (5)	22 (1.1)	383 (8.6)	13 (0.7)	374 (11.0)	53 (1.0)	315 (4.1)	12 (0.8)	230 (5.2)
Spain	62 (1.1)	516 (2.5)	13 (0.6)	529 (4.0)	17 (0.8)	503 (3.3)	9 (0.6)	480 (5.1)
Sweden	63 (1.8)	552 (2.7)	18 (0.8)	536 (4.9)	17 (1.3)	496 (5.6)	2 (0.4)	~ ~
Turkey (5)	74 (1.5)	543 (3.4)	12 (0.6)	541 (5.8)	11 (1.1)	445 (8.3)	3 (0.4)	411 (12.6)
United Arab Emirates	36 (0.4)	460 (3.1)	16 (0.5)	498 (3.3)	41 (0.6)	486 (2.6)	8 (0.2)	444 (4.0)
United States	65 (1.1)	547 (3.2)	13 (0.5)	547 (3.6)	20 (0.8)	518 (3.9)	3 (0.2)	477 (7.9)
International Average	**63 (0.2)**	**494 (0.6)**	**14 (0.1)**	**500 (0.9)**	**18 (0.1)**	**482 (0.8)**	**5 (0.1)**	**418 (2.4)**
Benchmarking Participants								
Ontario, Canada	55 (3.0)	522 (3.7)	21 (1.1)	541 (4.0)	23 (2.1)	520 (7.3)	2 (0.4)	~ ~
Quebec, Canada	53 (1.8)	522 (3.2)	21 (0.9)	529 (3.8)	23 (1.8)	513 (3.8)	3 (0.4)	531 (10.6)
Moscow City, Russian Fed.	78 (0.8)	595 (2.2)	15 (0.7)	599 (4.0)	7 (0.4)	586 (4.9)	1 (0.1)	~ ~
Madrid, Spain	72 (1.0)	522 (2.2)	15 (0.8)	536 (3.0)	12 (0.6)	519 (3.9)	1 (0.3)	~ ~
Abu Dhabi, UAE	39 (0.6)	386 (4.6)	14 (0.4)	441 (4.1)	39 (0.7)	452 (3.4)	9 (0.5)	405 (5.3)
Dubai, UAE	29 (0.6)	538 (2.5)	21 (0.7)	556 (3.2)	43 (0.7)	547 (2.7)	7 (0.4)	521 (5.6)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 5.9: Students Speak the Language of the Test at Home

Students' Reports

Country	Always		Almost Always		Sometimes		Never	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia	77 (1.6)	512 (3.2)	14 (0.9)	534 (6.8)	8 (0.7)	542 (11.3)	1 (0.2)	~ ~
Bahrain	55 (0.8)	480 (2.2)	19 (0.5)	494 (3.4)	21 (0.6)	477 (3.6)	4 (0.4)	460 (9.2)
Chile	87 (0.5)	439 (2.9)	11 (0.5)	461 (4.8)	2 (0.3)	~ ~	1 (0.2)	~ ~
Chinese Taipei	66 (1.0)	615 (3.1)	27 (0.9)	624 (3.7)	7 (0.4)	552 (6.1)	0 (0.1)	~ ~
Cyprus	63 (0.9)	501 (1.9)	17 (0.7)	498 (4.5)	15 (0.6)	511 (4.2)	5 (0.4)	492 (7.6)
Egypt	66 (1.9)	408 (5.6)	13 (1.0)	437 (9.5)	16 (1.2)	429 (6.4)	5 (0.8)	398 (9.5)
England	81 (1.6)	516 (5.8)	12 (1.1)	523 (8.4)	6 (0.6)	516 (10.8)	1 (0.2)	~ ~
Finland	83 (0.8)	511 (2.6)	12 (0.6)	505 (3.7)	4 (0.4)	491 (7.1)	1 (0.1)	~ ~
France	75 (1.2)	489 (2.5)	17 (0.9)	472 (3.5)	6 (0.6)	442 (7.4)	1 (0.2)	~ ~
Georgia	83 (1.3)	461 (4.6)	12 (0.8)	478 (6.8)	5 (0.9)	436 (15.9)	1 (0.2)	~ ~
Hong Kong SAR	73 (1.4)	574 (4.1)	11 (0.8)	584 (8.0)	12 (1.0)	597 (8.9)	3 (0.5)	595 (12.5)
Hungary	76 (1.0)	513 (3.3)	18 (0.8)	539 (4.7)	6 (0.5)	499 (8.2)	0 (0.1)	~ ~
Iran, Islamic Rep. of	53 (2.0)	461 (4.4)	15 (0.7)	466 (5.7)	20 (1.5)	419 (6.6)	12 (1.2)	404 (9.0)
Ireland	83 (0.8)	526 (2.6)	7 (0.5)	524 (6.5)	7 (0.6)	513 (6.1)	3 (0.3)	495 (8.1)
Israel	78 (1.1)	518 (4.3)	16 (0.8)	528 (6.6)	5 (0.5)	516 (10.7)	2 (0.2)	~ ~
Italy	76 (1.1)	505 (2.6)	16 (0.7)	482 (4.1)	7 (0.6)	464 (7.2)	1 (0.4)	~ ~
Japan	96 (0.3)	596 (2.7)	3 (0.2)	568 (10.4)	1 (0.2)	~ ~	0 (0.1)	~ ~
Jordan	77 (1.4)	420 (4.4)	12 (1.0)	442 (7.0)	8 (0.6)	412 (7.7)	3 (0.5)	387 (12.9)
Kazakhstan	76 (1.0)	488 (3.5)	17 (0.8)	498 (4.7)	7 (0.5)	460 (6.4)	1 (0.1)	~ ~
Korea, Rep. of	88 (0.6)	606 (2.8)	12 (0.6)	616 (5.3)	0 (0.1)	~ ~	0 (0.1)	~ ~
Kuwait	51 (1.4)	391 (5.8)	11 (0.7)	417 (7.4)	29 (1.0)	418 (5.6)	9 (1.0)	408 (6.7)
Lebanon	7 (0.6)	436 (5.9)	12 (0.7)	454 (4.7)	58 (1.2)	432 (3.3)	23 (1.2)	408 (4.4)
Lithuania	77 (1.1)	523 (2.8)	20 (0.9)	521 (4.5)	3 (0.6)	486 (9.7)	0 (0.1)	~ ~
Malaysia	44 (1.5)	477 (3.1)	16 (0.7)	465 (4.0)	32 (1.1)	442 (4.6)	8 (0.9)	437 (7.7)
Morocco	17 (1.3)	382 (4.9)	15 (0.6)	388 (3.2)	48 (1.2)	390 (2.4)	20 (1.0)	389 (3.5)
New Zealand	74 (2.0)	483 (3.2)	16 (1.0)	481 (4.6)	8 (1.2)	481 (11.3)	1 (0.2)	~ ~
Norway (9)	76 (1.2)	508 (2.3)	14 (0.8)	496 (5.8)	8 (0.6)	487 (5.6)	3 (0.4)	483 (14.7)
Oman	50 (1.5)	409 (3.1)	19 (0.7)	424 (4.1)	25 (1.0)	414 (4.1)	7 (0.7)	389 (8.2)
Portugal	88 (0.6)	501 (3.1)	9 (0.6)	510 (4.8)	2 (0.3)	~ ~	0 (0.1)	~ ~
Qatar	45 (1.2)	416 (4.8)	20 (0.8)	480 (5.1)	28 (1.3)	466 (5.7)	7 (0.5)	427 (7.7)
Romania	87 (1.0)	480 (4.4)	9 (0.7)	504 (7.3)	3 (0.5)	446 (10.9)	1 (0.4)	~ ~
Russian Federation	79 (2.2)	547 (4.1)	14 (1.0)	546 (6.5)	6 (1.3)	500 (16.3)	1 (0.4)	~ ~
Saudi Arabia	69 (1.2)	393 (2.7)	11 (0.6)	416 (3.8)	14 (0.7)	393 (4.9)	6 (0.6)	371 (5.9)
Singapore	44 (0.9)	627 (3.7)	31 (0.8)	617 (4.4)	22 (0.7)	593 (5.8)	3 (0.2)	603 (10.9)
South Africa (9)	14 (0.7)	432 (4.4)	13 (0.4)	430 (3.2)	65 (0.8)	377 (2.5)	8 (0.4)	354 (4.0)
Sweden	71 (1.4)	513 (2.4)	16 (0.9)	489 (4.3)	9 (0.7)	464 (6.7)	3 (0.3)	469 (10.5)
Turkey	77 (1.5)	508 (4.3)	11 (0.7)	499 (7.2)	10 (1.1)	411 (10.5)	2 (0.3)	~ ~
United Arab Emirates	35 (0.4)	466 (2.8)	24 (0.6)	510 (3.3)	34 (0.5)	468 (2.1)	7 (0.3)	431 (5.1)
United States	72 (1.1)	521 (4.9)	18 (0.7)	516 (5.1)	9 (0.5)	493 (7.4)	1 (0.2)	~ ~
International Average	**66 (0.2)**	**491 (0.6)**	**15 (0.1)**	**498 (0.9)**	**15 (0.1)**	**470 (1.4)**	**4 (0.1)**	**442 (2.0)**
Benchmarking Participants								
Ontario, Canada	64 (1.9)	522 (4.3)	21 (1.1)	547 (5.3)	12 (0.9)	546 (5.5)	2 (0.3)	~ ~
Quebec, Canada	64 (2.3)	540 (3.9)	22 (1.0)	547 (4.3)	11 (1.2)	554 (6.3)	4 (0.7)	566 (11.1)
Moscow City, Russian Fed.	80 (0.8)	574 (4.3)	18 (0.7)	585 (5.4)	2 (0.2)	~ ~	0 (0.2)	~ ~
Gauteng, RSA (9)	17 (1.4)	470 (7.0)	22 (0.8)	444 (3.6)	55 (1.4)	400 (3.0)	6 (0.4)	391 (4.7)
Western Cape, RSA (9)	47 (2.8)	454 (6.7)	18 (0.7)	473 (5.9)	32 (2.3)	409 (3.8)	3 (0.4)	397 (8.6)
Abu Dhabi, UAE	20 (0.6)	457 (5.9)	23 (0.7)	465 (3.8)	46 (0.8)	426 (3.5)	11 (0.6)	391 (6.3)
Dubai, UAE	35 (0.9)	517 (3.7)	32 (0.8)	559 (4.0)	29 (1.0)	538 (3.3)	4 (0.4)	520 (8.7)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 5.10: Students Speak the Language of the Test at Home

Students' Reports

Country	Always		Almost Always		Sometimes		Never	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia	77 (1.6)	530 (2.8)	14 (0.9)	534 (5.7)	8 (0.7)	522 (10.3)	1 (0.2)	~ ~
Bahrain	55 (0.8)	478 (2.0)	19 (0.5)	517 (3.7)	21 (0.6)	491 (4.2)	4 (0.4)	445 (10.4)
Chile	87 (0.5)	460 (2.8)	11 (0.5)	489 (4.5)	2 (0.3)	~ ~	1 (0.2)	~ ~
Chinese Taipei	66 (1.0)	576 (2.4)	27 (0.9)	586 (2.9)	7 (0.4)	526 (5.0)	0 (0.1)	~ ~
Cyprus	63 (0.9)	485 (2.3)	17 (0.7)	483 (4.4)	15 (0.6)	483 (4.6)	5 (0.4)	465 (7.6)
Egypt	66 (1.9)	385 (6.0)	13 (1.0)	415 (8.5)	16 (1.2)	406 (6.2)	5 (0.8)	370 (10.5)
England	81 (1.6)	520 (5.3)	12 (1.1)	519 (7.8)	6 (0.6)	504 (12.0)	1 (0.2)	~ ~
Finland	83 (0.8)	548 (3.0)	12 (0.6)	532 (4.6)	4 (0.4)	494 (9.1)	1 (0.1)	~ ~
France	75 (1.2)	496 (2.7)	17 (0.9)	473 (3.8)	6 (0.6)	439 (8.2)	1 (0.2)	~ ~
Georgia	83 (1.3)	445 (4.1)	12 (0.8)	466 (6.0)	5 (0.9)	434 (16.2)	1 (0.2)	~ ~
Hong Kong SAR	73 (1.4)	496 (5.5)	11 (0.8)	525 (9.5)	12 (1.0)	526 (9.9)	3 (0.5)	507 (12.8)
Hungary	76 (1.0)	526 (3.0)	18 (0.8)	550 (4.4)	6 (0.5)	518 (7.5)	0 (0.1)	~ ~
Iran, Islamic Rep. of	53 (2.0)	465 (4.0)	15 (0.7)	473 (5.4)	20 (1.5)	417 (6.1)	12 (1.2)	403 (9.0)
Ireland	83 (0.8)	526 (3.0)	7 (0.5)	521 (7.6)	7 (0.6)	510 (7.0)	3 (0.3)	498 (9.8)
Israel	78 (1.1)	512 (4.2)	16 (0.8)	527 (7.1)	5 (0.5)	519 (10.4)	2 (0.2)	~ ~
Italy	76 (1.1)	510 (2.4)	16 (0.7)	487 (4.3)	7 (0.6)	451 (7.7)	1 (0.4)	~ ~
Japan	96 (0.3)	571 (2.2)	3 (0.2)	552 (8.4)	1 (0.2)	~ ~	0 (0.1)	~ ~
Jordan	77 (1.4)	452 (4.6)	12 (1.0)	480 (7.3)	8 (0.6)	438 (9.6)	3 (0.5)	414 (15.5)
Kazakhstan	76 (1.0)	478 (3.3)	17 (0.8)	492 (4.4)	7 (0.5)	447 (6.8)	1 (0.1)	~ ~
Korea, Rep. of	88 (0.6)	561 (2.2)	12 (0.6)	564 (4.1)	0 (0.1)	~ ~	0 (0.1)	~ ~
Kuwait	51 (1.4)	433 (6.4)	11 (0.7)	465 (7.5)	29 (1.0)	462 (6.5)	9 (1.0)	438 (9.2)
Lebanon	7 (0.6)	397 (8.0)	12 (0.7)	424 (7.1)	58 (1.2)	381 (5.2)	23 (1.2)	337 (6.6)
Lithuania	77 (1.1)	535 (2.9)	20 (0.9)	538 (4.8)	3 (0.6)	498 (10.3)	0 (0.1)	~ ~
Malaysia	44 (1.5)	491 (3.3)	16 (0.7)	468 (3.9)	32 (1.1)	434 (4.2)	8 (0.9)	379 (9.2)
Morocco	17 (1.3)	398 (4.7)	15 (0.6)	405 (3.6)	48 (1.2)	405 (3.0)	20 (1.0)	405 (3.2)
New Zealand	74 (2.0)	506 (3.1)	16 (1.0)	490 (4.4)	8 (1.2)	464 (11.5)	1 (0.2)	~ ~
Norway (9)	76 (1.2)	502 (2.9)	14 (0.8)	488 (6.4)	8 (0.6)	460 (9.0)	3 (0.4)	470 (18.9)
Oman	50 (1.5)	460 (3.3)	19 (0.7)	473 (3.7)	25 (1.0)	454 (4.4)	7 (0.7)	427 (8.8)
Portugal	88 (0.6)	518 (2.8)	9 (0.6)	536 (4.9)	2 (0.3)	~ ~	0 (0.1)	~ ~
Qatar	45 (1.2)	459 (4.8)	20 (0.8)	511 (5.9)	28 (1.3)	482 (6.3)	7 (0.5)	448 (9.1)
Romania	87 (1.0)	471 (4.2)	9 (0.7)	494 (7.9)	3 (0.5)	428 (15.9)	1 (0.4)	~ ~
Russian Federation	79 (2.2)	548 (3.5)	14 (1.0)	544 (5.8)	6 (1.3)	486 (14.3)	1 (0.4)	~ ~
Saudi Arabia	69 (1.2)	431 (2.7)	11 (0.6)	461 (4.4)	14 (0.7)	429 (5.3)	6 (0.6)	404 (6.9)
Singapore	44 (0.9)	623 (3.4)	31 (0.8)	610 (4.5)	22 (0.7)	578 (5.9)	3 (0.2)	579 (11.8)
South Africa (9)	14 (0.7)	436 (5.5)	13 (0.4)	431 (3.7)	65 (0.8)	351 (3.3)	8 (0.4)	311 (5.9)
Sweden	71 (1.4)	540 (2.8)	16 (0.9)	508 (5.7)	9 (0.7)	447 (8.7)	3 (0.3)	443 (12.6)
Turkey	77 (1.5)	527 (3.8)	11 (0.7)	519 (5.5)	10 (1.1)	434 (9.2)	2 (0.3)	~ ~
United Arab Emirates	35 (0.4)	473 (3.0)	24 (0.6)	519 (3.9)	34 (0.5)	460 (2.7)	7 (0.3)	396 (7.0)
United States	72 (1.1)	530 (4.8)	18 (0.7)	523 (4.6)	9 (0.5)	487 (7.1)	1 (0.2)	~ ~
International Average	**66 (0.2)**	**495 (0.6)**	**15 (0.1)**	**502 (0.9)**	**15 (0.1)**	**465 (1.4)**	**4 (0.1)**	**428 (2.4)**
Benchmarking Participants								
Ontario, Canada	64 (1.9)	520 (3.4)	21 (1.1)	534 (4.4)	12 (0.9)	518 (5.1)	2 (0.3)	~ ~
Quebec, Canada	64 (2.3)	535 (4.1)	22 (1.0)	540 (4.5)	11 (1.2)	536 (6.5)	4 (0.7)	543 (11.2)
Moscow City, Russian Fed.	80 (0.8)	566 (3.0)	18 (0.7)	571 (4.1)	2 (0.2)	~ ~	0 (0.2)	~ ~
Gauteng, RSA (9)	17 (1.4)	489 (7.3)	22 (0.8)	459 (4.4)	55 (1.4)	394 (4.0)	6 (0.4)	371 (6.1)
Western Cape, RSA (9)	47 (2.8)	460 (7.6)	18 (0.7)	481 (6.9)	32 (2.3)	392 (5.0)	3 (0.4)	370 (12.7)
Abu Dhabi, UAE	20 (0.6)	461 (7.4)	23 (0.7)	463 (5.2)	46 (0.8)	404 (4.2)	11 (0.6)	340 (8.4)
Dubai, UAE	35 (0.9)	529 (4.0)	32 (0.8)	574 (4.3)	29 (1.0)	547 (3.8)	4 (0.4)	512 (9.9)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Emphasis on Early Literacy and Numeracy Development

Early Literacy and Numeracy Activities Before Primary School

Considerable research, including results from TIMSS and PIRLS, has documented the importance of early childhood learning activities for fostering student achievement during later school years. The *Early Literacy and Numeracy Activities* scale focuses specifically on literacy and numeracy activities, summarizing parents' reports about how often they engaged with their child in nine literacy activities and nine numeracy activities before their child began primary school (see About the Scale in Exhibit 5.11).

Exhibit 5.12 presents the percentage of students whose parents reported "often," "sometimes," and "never or almost never" engaging them in early literacy and numeracy activities, together with average fourth grade mathematics achievement. Countries are ordered by the percentage of students whose parents "often" engaged them in early literacy and numeracy activities. In general, parents reported a good deal of early interaction with their children, with 42 percent of the students having parents who "often" engaged them in such activities and an additional 55 percent with parents who "sometimes" engaged them, on average. Just 3 percent of students had parents who reported "never or almost never" engaging them in early literacy or numeracy activities.

There was a modest positive relationship between the frequency of engagement reported and later mathematics achievement, with the students in the "often" category having higher average achievement than students in the "sometimes" category (516 vs. 495, respectively). In several countries, a small percentage of students (3%, on average) had parents who "never or almost never" engaged them in early literacy and numeracy activities, and these students typically had lower average mathematics achievement (456).

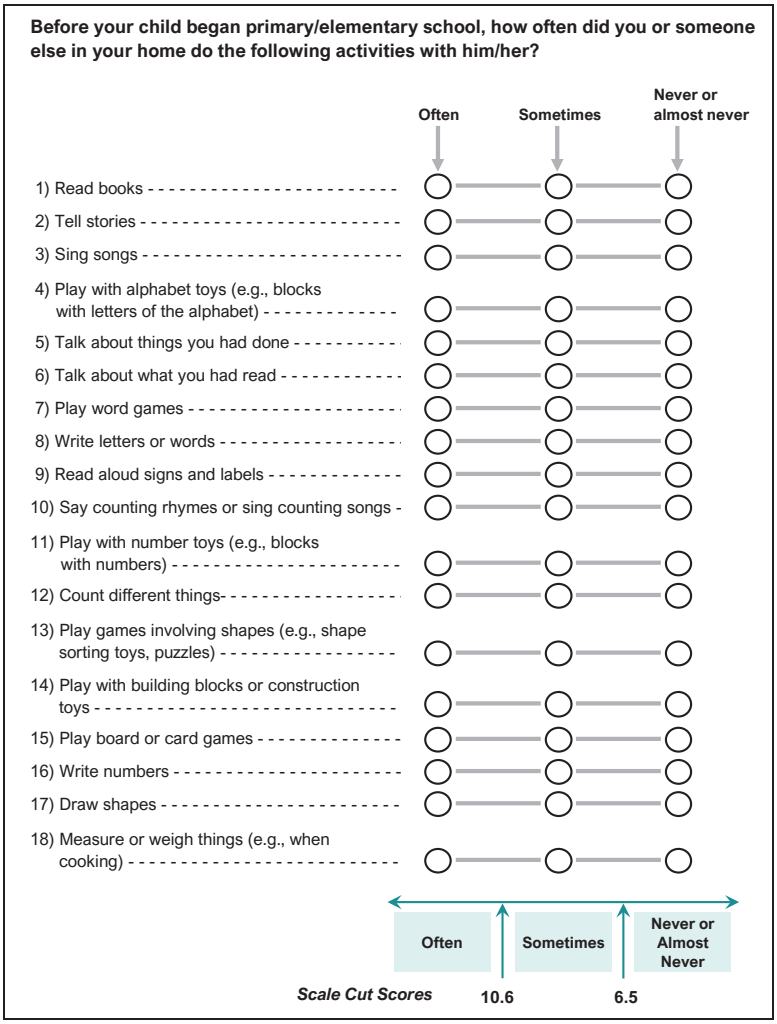
Exhibit 5.13 shows the same student percentages for the *Early Literacy and Numeracy Activities* scale as Exhibit 5.12, but this time together with average fourth grade science achievement. The activities-science achievement relationship was similar to the activities-mathematics achievement relationship, with highest achievement for those whose parents "often" engaged them (507), next for those who were "sometimes" engaged (484), and lowest for those who were "never or almost never" engaged (421).

Exhibit 5.11: Home Early Literacy and Numeracy Activities Before Primary School

Students' Results based on Parents' Reports

About the Scale

Students were scored according to their parents' reports regarding the frequency they or someone in the home engaged their children in the eighteen activities on the *Early Literacy and Numeracy Activities* scale. Cut scores divide the scale into three categories. Students **Often** engaged in early literacy and numeracy activities before primary school had a score at or above the cut score corresponding to their parents reporting they "often" did nine of the eighteen activities and "sometimes" did the other nine, on average. Students **Never or Almost Never** engaged in early literacy and numeracy activities before primary school had a score at or below the cut score corresponding to their parents reporting they "never or almost never" did nine of the eighteen activities and "sometimes" did the other nine, on average. All other students **Sometimes** engaged in early literacy and numeracy activities.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 5.12: Home Early Literacy and Numeracy Activities Before Primary School

Students' Results based on Parents' Reports

Country		Often		Sometimes		Never or Almost Never		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Russian Federation		67 (1.0)	571 (3.0)	32 (1.0)	561 (4.4)	1 (0.2)	~ ~	11.4 (0.05)
Northern Ireland	s	65 (1.4)	592 (4.0)	34 (1.4)	572 (5.3)	1 (0.2)	~ ~	11.6 (0.07)
Serbia		60 (1.2)	523 (3.0)	39 (1.2)	491 (4.3)	1 (0.2)	~ ~	11.1 (0.05)
Malta	r	59 (0.9)	525 (2.0)	40 (0.9)	502 (2.3)	1 (0.2)	~ ~	11.2 (0.04)
Montenegro		59 (0.9)	464 (2.0)	41 (0.9)	444 (2.8)	1 (0.1)	~ ~	11.1 (0.04)
Poland		58 (0.9)	525 (3.0)	42 (0.9)	517 (3.0)	0 (0.1)	~ ~	11.0 (0.03)
Albania		58 (1.8)	508 (4.0)	40 (1.7)	481 (4.0)	2 (0.5)	~ ~	10.9 (0.09)
Ireland		57 (0.9)	563 (3.0)	42 (0.9)	537 (3.1)	1 (0.1)	~ ~	11.2 (0.04)
Kazakhstan		56 (1.7)	519 (3.0)	44 (1.7)	504 (2.8)	0 (0.1)	~ ~	11.0 (0.07)
Canada	s	56 (0.8)	530 (2.0)	43 (0.8)	515 (2.6)	1 (0.2)	~ ~	11.1 (0.04)
Croatia		56 (1.1)	519 (2.0)	44 (1.1)	499 (2.9)	1 (0.2)	~ ~	11.0 (0.05)
Hungary		55 (0.9)	530 (3.0)	44 (0.8)	522 (3.0)	1 (0.5)	~ ~	10.8 (0.05)
Slovak Republic		55 (1.3)	519 (3.0)	44 (1.1)	504 (3.8)	2 (0.6)	~ ~	10.9 (0.07)
North Macedonia		53 (1.4)	488 (6.0)	45 (1.3)	461 (6.1)	1 (0.4)	~ ~	10.9 (0.07)
Bosnia and Herzegovina		53 (0.8)	460 (3.0)	46 (0.8)	443 (2.9)	1 (0.1)	~ ~	10.8 (0.04)
Czech Republic	r	51 (1.1)	546 (3.0)	48 (1.1)	536 (2.8)	0 (0.1)	~ ~	10.7 (0.04)
Cyprus		50 (0.9)	547 (3.0)	49 (0.9)	523 (3.7)	1 (0.2)	~ ~	10.8 (0.05)
Kosovo		49 (1.2)	454 (3.0)	50 (1.2)	439 (3.7)	1 (0.2)	~ ~	10.6 (0.05)
United Arab Emirates	s	48 (0.6)	512 (2.0)	50 (0.6)	490 (2.5)	1 (0.1)	~ ~	10.6 (0.03)
Latvia		48 (1.1)	553 (3.0)	51 (1.0)	541 (2.9)	1 (0.2)	~ ~	10.6 (0.04)
Korea, Rep. of		48 (1.1)	613 (3.0)	50 (1.0)	589 (2.6)	2 (0.2)	~ ~	10.7 (0.05)
Lithuania	r	46 (1.0)	550 (3.0)	53 (1.0)	537 (3.3)	1 (0.2)	~ ~	10.5 (0.04)
Armenia		46 (1.1)	504 (3.0)	52 (1.1)	495 (2.9)	2 (0.4)	~ ~	10.5 (0.05)
Georgia		46 (1.1)	483 (4.0)	53 (1.0)	484 (3.8)	2 (0.4)	~ ~	10.5 (0.05)
Italy		45 (1.1)	524 (3.0)	54 (1.1)	510 (2.6)	1 (0.2)	~ ~	10.5 (0.04)
France		44 (1.0)	503 (4.0)	55 (1.0)	477 (3.4)	1 (0.2)	~ ~	10.4 (0.03)
Spain		43 (0.8)	518 (3.0)	56 (0.8)	498 (3.0)	1 (0.1)	~ ~	10.4 (0.03)
Bahrain		42 (1.0)	492 (3.0)	57 (1.0)	473 (2.8)	1 (0.1)	~ ~	10.3 (0.03)
Germany	s	40 (1.4)	541 (3.0)	59 (1.3)	526 (2.9)	1 (0.2)	~ ~	10.4 (0.05)
Portugal		40 (0.9)	541 (3.0)	59 (0.9)	519 (2.9)	1 (0.4)	~ ~	10.3 (0.04)
Austria		39 (0.9)	550 (3.0)	60 (0.9)	536 (2.3)	1 (0.2)	~ ~	10.2 (0.03)
Bulgaria		39 (1.4)	545 (3.0)	52 (1.3)	512 (5.2)	10 (1.5)	432 (12.7)	9.8 (0.11)
Chile		38 (1.0)	459 (3.0)	60 (1.1)	433 (3.0)	2 (0.3)	~ ~	10.2 (0.04)
Denmark	s	37 (1.3)	548 (3.0)	62 (1.3)	533 (3.0)	1 (0.2)	~ ~	10.2 (0.05)
Norway (5)	s	37 (1.0)	563 (4.0)	62 (1.1)	546 (2.8)	1 (0.3)	~ ~	10.2 (0.04)
Singapore		34 (0.8)	641 (4.0)	62 (0.8)	620 (4.0)	4 (0.2)	605 (8.0)	9.9 (0.04)
Qatar	r	34 (1.0)	473 (4.0)	64 (1.0)	445 (4.0)	2 (0.3)	~ ~	10.0 (0.04)
Kuwait	r	33 (1.2)	405 (6.0)	64 (1.2)	379 (4.7)	2 (0.2)	~ ~	9.9 (0.04)
Finland		32 (0.8)	547 (3.0)	68 (0.9)	530 (2.7)	1 (0.1)	~ ~	10.0 (0.03)
Azerbaijan		29 (1.4)	535 (4.0)	66 (1.4)	519 (2.8)	4 (0.5)	483 (7.5)	9.7 (0.06)
Sweden	r	29 (0.9)	533 (4.0)	69 (0.9)	526 (3.1)	2 (0.3)	~ ~	9.8 (0.04)
Saudi Arabia		28 (0.9)	416 (5.0)	68 (0.9)	394 (4.0)	3 (0.5)	388 (11.2)	9.7 (0.05)
Philippines		28 (1.0)	327 (7.0)	70 (1.0)	287 (6.4)	2 (0.2)	~ ~	9.8 (0.05)
South Africa (5)	r	28 (0.9)	405 (5.0)	68 (0.9)	366 (3.2)	4 (0.5)	344 (8.5)	9.7 (0.05)
Turkey (5)		28 (1.4)	565 (5.0)	56 (1.6)	525 (4.8)	16 (1.8)	443 (9.9)	9.0 (0.14)
Belgium (Flemish)		27 (0.8)	545 (2.0)	71 (0.8)	530 (2.1)	2 (0.3)	~ ~	9.7 (0.04)
Oman		26 (0.8)	460 (6.0)	71 (0.8)	424 (3.8)	2 (0.3)	~ ~	9.8 (0.05)
Chinese Taipei		25 (0.7)	619 (3.0)	71 (0.8)	595 (1.9)	5 (0.4)	572 (5.4)	9.4 (0.03)
Iran, Islamic Rep. of		23 (0.9)	459 (5.0)	71 (1.0)	443 (3.7)	6 (1.1)	396 (18.9)	9.3 (0.08)
Hong Kong SAR		20 (1.2)	622 (4.0)	75 (1.2)	601 (3.7)	4 (0.4)	569 (7.2)	9.3 (0.05)
Japan		20 (0.7)	616 (3.0)	74 (0.7)	590 (1.9)	6 (0.4)	577 (4.5)	9.2 (0.03)
Morocco		13 (0.7)	424 (8.0)	61 (1.7)	387 (5.1)	27 (1.8)	359 (7.1)	7.9 (0.12)
Pakistan	r	12 (1.5)	351 (16.0)	73 (3.2)	333 (14.1)	16 (3.1)	298 (14.1)	8.6 (0.16)
Australia		- -	- -	- -	- -	- -	- -	- -
England		- -	- -	- -	- -	- -	- -	- -
Netherlands		- -	- -	- -	- -	- -	- -	- -
United States		- -	- -	- -	- -	- -	- -	- -
New Zealand	x	60 (1.6)	520 (4.0)	40 (1.6)	499 (3.9)	0 (0.1)	~ ~	11.4 (0.07)
International Average		**42 (0.1)**	**516 (1.0)**	**55 (0.2)**	**495 (0.5)**	**3 (0.1)**	**456 (3.0)**	
Benchmarking Participants								
Moscow City, Russian Fed.		70 (1.1)	596 (2.0)	29 (1.1)	587 (3.2)	1 (0.1)	~ ~	11.7 (0.04)
Ontario, Canada	s	60 (1.4)	530 (4.0)	39 (1.3)	514 (5.0)	1 (0.3)	~ ~	11.3 (0.08)
Dubai, UAE	s	51 (0.9)	564 (2.0)	48 (0.9)	548 (2.7)	1 (0.2)	~ ~	10.8 (0.04)
Madrid, Spain		48 (1.1)	528 (3.0)	51 (1.1)	514 (2.6)	1 (0.2)	~ ~	10.6 (0.05)
Quebec, Canada	r	48 (1.2)	547 (3.0)	51 (1.2)	531 (3.3)	1 (0.3)	~ ~	10.6 (0.05)
Abu Dhabi, UAE	x	46 (1.2)	474 (4.0)	53 (1.1)	449 (3.2)	2 (0.2)	~ ~	10.5 (0.05)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 5.13: Home Early Literacy and Numeracy Activities Before Primary School

Students' Results based on Parents' Reports

Country		Often		Sometimes		Never or Almost Never		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Russian Federation		67 (1.0)	571 (3.0)	32 (1.0)	560 (4.0)	1 (0.2)	~ ~	11.4 (0.05)
Northern Ireland	s	65 (1.4)	538 (3.0)	34 (1.4)	519 (4.3)	1 (0.2)	~ ~	11.6 (0.07)
Serbia		60 (1.2)	533 (3.0)	39 (1.2)	498 (4.6)	1 (0.2)	~ ~	11.1 (0.05)
Malta	r	59 (0.9)	511 (2.0)	40 (0.9)	490 (2.6)	1 (0.2)	~ ~	11.2 (0.04)
Montenegro		59 (0.9)	466 (3.0)	41 (0.9)	443 (3.5)	1 (0.1)	~ ~	11.1 (0.04)
Poland		58 (0.9)	535 (3.0)	42 (0.9)	527 (2.7)	0 (0.1)	~ ~	11.0 (0.03)
Albania		58 (1.8)	503 (4.0)	40 (1.7)	477 (4.1)	2 (0.5)	~ ~	10.9 (0.09)
Ireland		57 (0.9)	542 (3.0)	42 (0.9)	516 (3.6)	1 (0.1)	~ ~	11.2 (0.04)
Kazakhstan		56 (1.7)	506 (4.0)	44 (1.7)	481 (3.5)	0 (0.1)	~ ~	11.0 (0.07)
Canada	s	56 (0.8)	541 (2.0)	43 (0.8)	522 (2.6)	1 (0.2)	~ ~	11.1 (0.04)
Croatia		56 (1.1)	533 (3.0)	44 (1.1)	514 (2.7)	1 (0.2)	~ ~	11.0 (0.05)
Hungary		55 (0.9)	536 (3.0)	44 (0.8)	528 (3.1)	1 (0.5)	~ ~	10.8 (0.05)
Slovak Republic		55 (1.3)	531 (3.0)	44 (1.1)	514 (4.0)	2 (0.6)	~ ~	10.9 (0.07)
North Macedonia		53 (1.4)	444 (6.0)	45 (1.3)	412 (7.2)	1 (0.4)	~ ~	10.9 (0.07)
Bosnia and Herzegovina		53 (0.8)	468 (3.0)	46 (0.8)	448 (3.2)	1 (0.1)	~ ~	10.8 (0.04)
Czech Republic	r	51 (1.1)	544 (3.0)	48 (1.1)	537 (2.8)	0 (0.1)	~ ~	10.7 (0.04)
Cyprus		50 (0.9)	527 (3.0)	49 (0.9)	502 (3.7)	1 (0.2)	~ ~	10.8 (0.05)
Kosovo		49 (1.2)	427 (4.0)	50 (1.2)	403 (4.4)	1 (0.2)	~ ~	10.6 (0.05)
United Arab Emirates	s	48 (0.6)	512 (3.0)	50 (0.6)	484 (3.0)	1 (0.1)	~ ~	10.6 (0.03)
Latvia		48 (1.1)	550 (3.0)	51 (1.0)	536 (2.7)	1 (0.2)	~ ~	10.6 (0.04)
Korea, Rep. of		48 (1.1)	599 (3.0)	50 (1.0)	579 (2.6)	2 (0.2)	~ ~	10.7 (0.05)
Lithuania	r	46 (1.0)	546 (3.0)	53 (1.0)	532 (3.2)	1 (0.2)	~ ~	10.5 (0.04)
Armenia		46 (1.1)	474 (4.0)	52 (1.1)	461 (3.9)	2 (0.4)	~ ~	10.5 (0.05)
Georgia		46 (1.1)	454 (4.0)	53 (1.0)	457 (4.5)	2 (0.4)	~ ~	10.5 (0.05)
Italy		45 (1.1)	519 (3.0)	54 (1.1)	505 (2.9)	1 (0.2)	~ ~	10.5 (0.04)
France		44 (1.0)	506 (3.0)	55 (1.0)	479 (3.6)	1 (0.2)	~ ~	10.4 (0.03)
Spain		43 (0.8)	525 (2.0)	56 (0.8)	508 (2.6)	1 (0.1)	~ ~	10.4 (0.03)
Bahrain		42 (1.0)	514 (4.0)	57 (1.0)	483 (3.5)	1 (0.1)	~ ~	10.3 (0.03)
Germany	s	40 (1.4)	538 (3.0)	59 (1.3)	526 (2.8)	1 (0.2)	~ ~	10.4 (0.05)
Portugal		40 (0.9)	518 (3.0)	59 (0.9)	498 (2.9)	1 (0.4)	~ ~	10.3 (0.04)
Austria		39 (0.9)	535 (3.0)	60 (0.9)	520 (3.1)	1 (0.2)	~ ~	10.2 (0.03)
Bulgaria		39 (1.4)	560 (4.0)	52 (1.3)	518 (5.9)	10 (1.5)	407 (12.6)	9.8 (0.11)
Chile		38 (1.0)	488 (3.0)	60 (1.1)	460 (2.8)	2 (0.3)	~ ~	10.2 (0.04)
Denmark	s	37 (1.3)	548 (3.0)	62 (1.3)	525 (2.9)	1 (0.2)	~ ~	10.2 (0.05)
Norway (5)	s	37 (1.0)	559 (3.0)	62 (1.1)	541 (3.2)	1 (0.3)	~ ~	10.2 (0.04)
Singapore		34 (0.8)	613 (3.0)	62 (0.8)	587 (3.6)	4 (0.2)	577 (7.0)	9.9 (0.04)
Qatar	r	34 (1.0)	480 (5.0)	64 (1.0)	444 (4.6)	2 (0.3)	~ ~	10.0 (0.04)
Kuwait	r	33 (1.2)	422 (7.0)	64 (1.2)	389 (6.0)	2 (0.2)	~ ~	9.9 (0.04)
Finland		32 (0.8)	566 (3.0)	68 (0.9)	554 (2.9)	1 (0.1)	~ ~	10.0 (0.03)
Azerbaijan		29 (1.4)	451 (4.0)	66 (1.4)	430 (3.3)	4 (0.5)	386 (9.5)	9.7 (0.06)
Sweden	r	29 (0.9)	545 (4.0)	69 (0.9)	542 (3.2)	2 (0.3)	~ ~	9.8 (0.04)
Saudi Arabia		28 (0.9)	426 (6.0)	68 (0.9)	397 (4.6)	3 (0.5)	382 (13.2)	9.7 (0.05)
Philippines		28 (1.0)	286 (9.0)	70 (1.0)	236 (7.5)	2 (0.2)	~ ~	9.8 (0.05)
South Africa (5)	r	28 (0.9)	366 (7.0)	68 (0.9)	312 (4.4)	4 (0.5)	282 (12.1)	9.7 (0.05)
Turkey (5)		28 (1.4)	568 (4.0)	56 (1.6)	529 (4.5)	16 (1.8)	442 (10.4)	9.0 (0.14)
Belgium (Flemish)		27 (0.8)	513 (3.0)	71 (0.8)	499 (2.4)	2 (0.3)	~ ~	9.7 (0.04)
Oman		26 (0.8)	471 (6.0)	71 (0.8)	426 (4.2)	2 (0.3)	~ ~	9.8 (0.05)
Chinese Taipei		25 (0.7)	577 (3.0)	71 (0.8)	553 (2.2)	5 (0.4)	532 (5.2)	9.4 (0.03)
Iran, Islamic Rep. of		23 (0.9)	462 (5.0)	71 (1.0)	442 (4.0)	6 (1.1)	374 (14.1)	9.3 (0.08)
Hong Kong SAR		20 (1.2)	553 (5.0)	75 (1.2)	529 (3.6)	4 (0.4)	503 (8.1)	9.3 (0.05)
Japan		20 (0.7)	583 (3.0)	74 (0.7)	559 (2.0)	6 (0.4)	545 (5.3)	9.2 (0.03)
Morocco		13 (0.7)	421 (9.0)	61 (1.7)	379 (6.4)	27 (1.8)	344 (8.8)	7.9 (0.12)
Pakistan	r	12 (1.5)	329 (20.0)	73 (3.2)	289 (15.2)	16 (3.1)	274 (17.7)	8.6 (0.16)
Australia		- -	- -	- -	- -	- -	- -	- -
England		- -	- -	- -	- -	- -	- -	- -
Netherlands		- -	- -	- -	- -	- -	- -	- -
United States		- -	- -	- -	- -	- -	- -	- -
New Zealand	x	60 (1.6)	535 (4.0)	40 (1.6)	512 (3.7)	0 (0.1)	~ ~	11.4 (0.07)
International Average		**42 (0.1)**	**507 (1.0)**	**55 (0.2)**	**484 (0.6)**	**3 (0.1)**	**421 (3.2)**	
Benchmarking Participants								
Moscow City, Russian Fed.		70 (1.1)	598 (2.0)	29 (1.1)	590 (3.2)	1 (0.1)	~ ~	11.7 (0.04)
Ontario, Canada	s	60 (1.4)	541 (4.0)	39 (1.3)	525 (4.7)	1 (0.3)	~ ~	11.3 (0.08)
Dubai, UAE	s	51 (0.9)	569 (3.0)	48 (0.9)	549 (2.9)	1 (0.2)	~ ~	10.8 (0.04)
Madrid, Spain		48 (1.1)	531 (3.0)	51 (1.1)	519 (2.4)	1 (0.2)	~ ~	10.6 (0.05)
Quebec, Canada	r	48 (1.2)	538 (3.0)	51 (1.2)	519 (3.0)	1 (0.3)	~ ~	10.6 (0.05)
Abu Dhabi, UAE	x	46 (1.2)	461 (5.0)	53 (1.1)	431 (4.1)	2 (0.2)	~ ~	10.5 (0.05)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Students Attended Preprimary Education

There was a positive relationship for fourth grade students between the number of years they attended preprimary education and their mathematics achievement (Exhibit 5.14) and science achievement (Exhibit 5.15). According to their parents, a majority of fourth grade students across countries had attended three years or more of preprimary school—56 percent. Beyond that, on average, 17 percent had attended two years, 15 percent attended one year or less, and 12 percent did not attend preprimary school.

The students who attended three years or more had the highest average mathematics achievement (509), and those with less preprimary school attendance had successively lower average achievement (495, 483, and 464, respectively). There was a similar pattern with regard to science achievement, with an average of 500 for those who attended three years or more, and successively lower science achievement for those with less preprimary attendance (489, 472, and 452, respectively).

Exhibit 5.14: Students Attended Preprimary Education

Students' Results based on Parents' Reports

Country		Attended 3 Years or More		Attended 2 Years		Attended 1 Year or Less		Did Not Attend	
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Hungary		95 (0.4)	527 (2.7)	3 (0.4)	506 (9.0)	1 (0.2)	~ ~	0 (0.0)	~ ~
Denmark	s	95 (0.5)	541 (2.6)	3 (0.4)	513 (9.6)	1 (0.2)	~ ~	0 (0.2)	~ ~
Norway (5)	s	94 (0.6)	553 (2.6)	3 (0.4)	536 (10.5)	2 (0.3)	~ ~	1 (0.3)	~ ~
Korea, Rep. of		92 (0.5)	601 (2.3)	6 (0.5)	596 (6.9)	1 (0.2)	~ ~	1 (0.2)	~ ~
Sweden	r	90 (0.9)	532 (2.8)	3 (0.4)	502 (11.7)	3 (0.4)	491 (8.2)	3 (0.5)	484 (9.2)
Belgium (Flemish)		90 (0.6)	539 (1.9)	5 (0.4)	513 (6.0)	3 (0.4)	501 (5.5)	2 (0.2)	~ ~
Italy		89 (0.9)	519 (2.5)	8 (0.8)	499 (4.8)	2 (0.3)	~ ~	1 (0.2)	~ ~
France		88 (0.8)	492 (2.9)	5 (0.5)	469 (8.5)	5 (0.5)	461 (8.2)	2 (0.3)	~ ~
Latvia		84 (0.7)	551 (2.5)	9 (0.5)	531 (5.2)	4 (0.4)	534 (6.7)	3 (0.4)	523 (7.7)
Czech Republic	r	84 (0.8)	543 (2.4)	11 (0.7)	537 (4.9)	4 (0.4)	518 (9.1)	1 (0.2)	~ ~
Singapore		83 (0.6)	633 (3.7)	10 (0.4)	601 (5.5)	4 (0.3)	598 (7.3)	3 (0.2)	585 (8.9)
Portugal		82 (0.9)	533 (2.4)	10 (0.7)	517 (5.4)	5 (0.3)	497 (6.3)	3 (0.3)	484 (8.8)
Austria		80 (1.2)	546 (2.2)	13 (1.1)	537 (5.0)	4 (0.4)	512 (6.0)	2 (0.4)	~ ~
Slovak Republic		77 (1.7)	523 (2.5)	11 (0.7)	500 (7.1)	7 (0.7)	478 (9.4)	6 (0.8)	418 (10.6)
Bulgaria		75 (2.2)	532 (3.0)	13 (1.7)	480 (10.4)	10 (1.0)	469 (12.3)	3 (0.6)	456 (20.3)
Finland		74 (1.1)	535 (2.5)	10 (0.6)	540 (4.7)	15 (0.8)	540 (5.1)	1 (0.2)	~ ~
Lithuania	r	74 (1.2)	550 (3.0)	8 (0.7)	531 (7.0)	15 (0.9)	514 (5.2)	2 (0.4)	~ ~
Georgia		71 (1.3)	485 (3.9)	16 (0.8)	478 (5.0)	7 (0.7)	488 (8.1)	6 (0.8)	464 (7.8)
Poland		70 (1.1)	531 (2.7)	16 (0.8)	510 (4.0)	14 (1.2)	498 (4.8)	1 (0.2)	~ ~
Hong Kong SAR		69 (0.9)	608 (3.7)	6 (0.6)	602 (7.6)	14 (0.8)	603 (5.0)	10 (0.8)	587 (5.3)
Spain		68 (0.8)	518 (2.5)	13 (0.7)	499 (4.3)	9 (0.6)	479 (7.1)	10 (0.5)	476 (5.3)
Germany	s	64 (1.2)	540 (2.6)	8 (0.6)	518 (6.0)	16 (0.8)	534 (4.3)	12 (0.8)	507 (4.8)
Albania		61 (1.6)	508 (3.4)	19 (1.2)	489 (5.8)	13 (0.8)	472 (6.4)	8 (0.9)	475 (11.7)
Croatia		60 (1.8)	520 (2.4)	9 (0.7)	500 (5.6)	14 (1.3)	498 (5.0)	16 (1.4)	494 (4.6)
Chinese Taipei		59 (1.1)	603 (2.1)	36 (0.9)	596 (3.0)	5 (0.5)	594 (6.4)	0 (0.1)	~ ~
Ireland		56 (1.2)	565 (2.6)	25 (1.1)	539 (4.3)	18 (0.9)	532 (3.6)	1 (0.2)	~ ~
Cyprus		56 (1.0)	544 (3.1)	23 (0.7)	530 (3.9)	12 (0.5)	525 (4.6)	9 (0.5)	513 (5.1)
Serbia		55 (1.4)	529 (2.9)	12 (1.3)	499 (8.9)	32 (1.8)	486 (4.5)	1 (0.2)	~ ~
Russian Federation		55 (1.4)	573 (3.9)	10 (0.8)	570 (4.8)	16 (0.8)	564 (3.9)	19 (1.1)	557 (4.7)
Chile		53 (1.2)	447 (3.1)	32 (1.0)	443 (4.0)	12 (0.7)	432 (5.4)	4 (0.3)	420 (8.1)
South Africa (5)	r	51 (1.1)	388 (5.1)	17 (0.8)	383 (4.7)	24 (0.9)	359 (3.8)	8 (0.5)	368 (6.7)
Armenia		51 (1.8)	503 (3.2)	19 (1.1)	492 (3.9)	13 (0.9)	493 (4.0)	17 (1.1)	498 (3.7)
Kazakhstan		49 (1.6)	519 (3.0)	17 (0.8)	507 (3.9)	14 (0.8)	509 (4.6)	20 (1.3)	503 (4.1)
Montenegro		48 (0.9)	469 (2.5)	14 (0.6)	451 (4.4)	15 (0.7)	445 (3.8)	23 (0.8)	435 (3.4)
Canada	s	45 (1.4)	533 (2.5)	25 (0.8)	519 (2.7)	18 (1.0)	519 (6.0)	11 (0.7)	504 (6.9)
Bahrain		39 (1.0)	491 (3.2)	32 (0.8)	483 (3.6)	16 (0.8)	473 (4.9)	13 (0.6)	463 (3.9)
North Macedonia		36 (2.0)	505 (5.4)	9 (0.8)	492 (8.0)	13 (1.0)	478 (8.7)	42 (2.1)	446 (7.0)
Malta	s	35 (0.9)	527 (2.3)	54 (0.9)	515 (2.5)	8 (0.5)	494 (6.1)	3 (0.4)	500 (11.5)
Philippines		33 (1.5)	305 (7.4)	29 (1.8)	300 (8.2)	36 (1.7)	293 (6.9)	2 (0.3)	~ ~
Morocco		31 (0.9)	413 (6.3)	24 (1.1)	391 (5.7)	15 (0.9)	378 (8.2)	30 (1.7)	358 (5.9)
Kuwait	r	29 (0.9)	396 (5.0)	43 (1.0)	384 (5.8)	18 (1.2)	387 (8.1)	10 (0.9)	379 (10.3)
Qatar	r	24 (1.1)	467 (5.3)	38 (1.0)	459 (4.8)	22 (1.0)	461 (6.0)	16 (0.9)	430 (6.2)
Pakistan	s	24 (3.2)	317 (12.3)	4 (0.9)	315 (27.7)	8 (1.5)	333 (15.2)	63 (4.8)	339 (18.4)
Bosnia and Herzegovina		23 (1.3)	473 (3.6)	8 (0.5)	464 (4.6)	50 (1.4)	447 (2.8)	19 (1.2)	445 (4.0)
Azerbaijan		20 (1.1)	533 (3.8)	13 (0.6)	538 (4.0)	28 (1.2)	526 (4.0)	40 (1.6)	513 (3.8)
Oman		17 (0.7)	448 (5.5)	36 (0.9)	448 (5.0)	28 (0.8)	426 (4.4)	19 (0.9)	404 (7.5)
Iran, Islamic Rep. of		16 (1.0)	478 (6.9)	18 (1.0)	458 (5.7)	40 (1.1)	441 (3.9)	26 (1.4)	423 (7.4)
Kosovo		12 (1.1)	465 (6.2)	6 (0.6)	463 (7.0)	49 (1.6)	450 (3.2)	33 (1.6)	432 (4.6)
Saudi Arabia		12 (0.7)	424 (6.8)	18 (1.0)	418 (4.5)	39 (1.0)	399 (4.0)	30 (1.5)	387 (5.6)
Turkey (5)		8 (0.9)	577 (8.4)	16 (1.0)	570 (5.0)	48 (1.6)	521 (5.1)	28 (1.7)	490 (6.4)
Australia		- -	- -	- -	- -	- -	- -	- -	- -
England		- -	- -	- -	- -	- -	- -	- -	- -
Japan		- -	- -	- -	- -	- -	- -	- -	- -
Netherlands		- -	- -	- -	- -	- -	- -	- -	- -
Northern Ireland		- -	- -	- -	- -	- -	- -	- -	- -
United States		- -	- -	- -	- -	- -	- -	- -	- -
New Zealand	x	57 (1.3)	510 (3.7)	33 (1.2)	517 (5.4)	7 (0.9)	515 (11.7)	3 (0.4)	470 (16.2)
United Arab Emirates	x	19 (0.5)	516 (3.4)	38 (0.6)	500 (2.2)	24 (0.7)	514 (3.5)	19 (0.5)	482 (3.4)
International Average		**56 (0.2)**	**509 (0.6)**	**17 (0.1)**	**495 (1.0)**	**15 (0.1)**	**483 (1.0)**	**12 (0.2)**	**464 (1.4)**
Benchmarking Participants									
Madrid, Spain	r	74 (1.3)	530 (2.1)	11 (0.8)	517 (4.1)	8 (0.5)	492 (6.1)	8 (0.8)	487 (6.1)
Quebec, Canada	s	65 (1.3)	543 (2.9)	14 (0.8)	531 (5.5)	15 (0.9)	532 (4.8)	6 (0.5)	518 (7.2)
Moscow City, Russian Fed.		55 (1.1)	597 (2.2)	14 (0.6)	593 (3.3)	18 (0.6)	588 (3.9)	13 (0.7)	581 (4.6)
Ontario, Canada	s	38 (2.6)	535 (4.1)	29 (1.3)	522 (4.3)	17 (2.0)	528 (11.8)	16 (1.3)	506 (9.6)
Dubai, UAE	s	23 (0.9)	569 (2.8)	36 (1.0)	560 (2.9)	26 (0.7)	562 (2.9)	15 (1.0)	536 (5.2)
Abu Dhabi, UAE	y	- -	- -	- -	- -	- -	- -	- -	- -

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 5.15: Students Attended Preprimary Education

Students' Results based on Parents' Reports

Country		Attended 3 Years or More		Attended 2 Years		Attended 1 Year or Less		Did Not Attend	
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Hungary		95 (0.4)	533 (2.8)	3 (0.4)	525 (10.3)	1 (0.2)	~ ~	0 (0.0)	~ ~
Denmark	s	95 (0.5)	535 (2.7)	3 (0.4)	512 (9.4)	1 (0.2)	~ ~	0 (0.2)	~ ~
Norway (5)	s	94 (0.6)	550 (2.6)	3 (0.4)	525 (13.5)	2 (0.3)	~ ~	1 (0.3)	~ ~
Korea, Rep. of		92 (0.5)	588 (2.2)	6 (0.5)	597 (5.9)	1 (0.2)	~ ~	1 (0.2)	~ ~
Sweden	r	90 (0.9)	549 (3.0)	3 (0.4)	511 (12.6)	3 (0.4)	504 (8.8)	3 (0.5)	473 (9.4)
Belgium (Flemish)		90 (0.6)	508 (2.1)	5 (0.4)	485 (5.5)	3 (0.4)	462 (6.8)	2 (0.2)	~ ~
Italy		89 (0.9)	515 (3.0)	8 (0.8)	493 (5.3)	2 (0.3)	~ ~	1 (0.2)	~ ~
France		88 (0.8)	494 (2.8)	5 (0.5)	479 (8.4)	5 (0.5)	461 (9.3)	2 (0.3)	~ ~
Latvia		84 (0.7)	545 (2.3)	9 (0.5)	533 (5.4)	4 (0.4)	530 (7.1)	3 (0.4)	530 (6.3)
Czech Republic	r	84 (0.8)	542 (2.7)	11 (0.7)	539 (5.2)	4 (0.4)	527 (8.9)	1 (0.2)	~ ~
Singapore		83 (0.6)	603 (3.2)	10 (0.4)	571 (5.2)	4 (0.3)	562 (7.3)	3 (0.2)	549 (8.7)
Portugal		82 (0.9)	509 (2.5)	10 (0.7)	507 (4.8)	5 (0.3)	484 (5.4)	3 (0.3)	478 (8.4)
Austria		80 (1.2)	532 (2.9)	13 (1.1)	523 (5.1)	4 (0.4)	478 (7.7)	2 (0.4)	~ ~
Slovak Republic		77 (1.7)	537 (2.4)	11 (0.7)	504 (7.3)	7 (0.7)	482 (10.5)	6 (0.8)	421 (12.0)
Bulgaria		75 (2.2)	543 (3.8)	13 (1.7)	479 (11.0)	10 (1.0)	460 (12.9)	3 (0.6)	427 (25.0)
Finland		74 (1.1)	557 (2.7)	10 (0.6)	561 (4.7)	15 (0.8)	562 (4.7)	1 (0.2)	~ ~
Lithuania	r	74 (1.2)	545 (2.6)	8 (0.7)	531 (6.5)	15 (0.9)	513 (5.1)	2 (0.4)	~ ~
Georgia		71 (1.3)	455 (4.1)	16 (0.8)	451 (6.0)	7 (0.7)	467 (9.8)	6 (0.8)	456 (9.4)
Poland		70 (1.1)	540 (2.6)	16 (0.8)	523 (3.9)	14 (1.2)	511 (4.4)	1 (0.2)	~ ~
Hong Kong SAR		69 (0.9)	536 (3.6)	6 (0.6)	543 (6.4)	14 (0.8)	529 (5.2)	10 (0.8)	516 (5.7)
Spain		68 (0.8)	525 (2.1)	13 (0.7)	510 (4.4)	9 (0.6)	493 (7.2)	10 (0.5)	488 (5.7)
Germany	s	64 (1.2)	540 (2.4)	8 (0.6)	525 (7.3)	16 (0.8)	533 (4.4)	12 (0.8)	497 (7.1)
Albania		61 (1.6)	503 (3.8)	19 (1.2)	490 (5.7)	13 (0.8)	470 (6.2)	8 (0.9)	464 (11.5)
Croatia		60 (1.8)	533 (2.8)	9 (0.7)	515 (5.8)	14 (1.3)	509 (4.9)	16 (1.4)	515 (4.2)
Chinese Taipei		59 (1.1)	559 (2.1)	36 (0.9)	557 (2.4)	5 (0.5)	556 (6.3)	0 (0.1)	~ ~
Ireland		56 (1.2)	543 (3.4)	25 (1.1)	523 (4.8)	18 (0.9)	511 (4.4)	1 (0.2)	~ ~
Cyprus		56 (1.0)	523 (3.1)	23 (0.7)	511 (4.3)	12 (0.5)	504 (4.7)	9 (0.5)	493 (5.1)
Serbia		55 (1.4)	536 (3.1)	12 (1.3)	512 (9.3)	32 (1.8)	497 (4.9)	1 (0.2)	~ ~
Russian Federation		55 (1.4)	572 (3.4)	10 (0.8)	571 (5.2)	16 (0.8)	565 (4.3)	19 (1.1)	559 (4.5)
Chile		53 (1.2)	477 (2.8)	32 (1.0)	469 (4.0)	12 (0.7)	458 (4.5)	4 (0.3)	440 (8.4)
South Africa (5)	r	51 (1.1)	343 (6.9)	17 (0.8)	339 (6.6)	24 (0.9)	304 (5.3)	8 (0.5)	313 (10.1)
Armenia		51 (1.8)	471 (4.1)	19 (1.1)	463 (4.6)	13 (0.9)	455 (5.4)	17 (1.1)	466 (4.6)
Kazakhstan		49 (1.6)	503 (3.8)	17 (0.8)	490 (4.6)	14 (0.8)	491 (5.1)	20 (1.3)	480 (4.3)
Montenegro		48 (0.9)	469 (2.9)	14 (0.6)	457 (6.2)	15 (0.7)	443 (4.7)	23 (0.8)	439 (4.0)
Canada	s	45 (1.4)	537 (2.5)	25 (0.8)	533 (3.1)	18 (1.0)	535 (4.7)	11 (0.7)	521 (5.1)
Bahrain		39 (1.0)	512 (4.1)	32 (0.8)	499 (4.7)	16 (0.8)	484 (4.9)	13 (0.6)	465 (4.6)
North Macedonia		36 (2.0)	461 (6.2)	9 (0.8)	445 (8.2)	13 (1.0)	428 (9.9)	42 (2.1)	400 (8.5)
Malta	s	35 (0.9)	518 (2.9)	54 (0.9)	499 (2.4)	8 (0.5)	483 (7.0)	3 (0.4)	488 (11.2)
Philippines		33 (1.5)	260 (9.0)	29 (1.8)	253 (9.2)	36 (1.7)	242 (8.0)	2 (0.3)	~ ~
Morocco		31 (0.9)	406 (7.8)	24 (1.1)	386 (7.3)	15 (0.9)	365 (10.5)	30 (1.7)	345 (8.1)
Kuwait	r	29 (0.9)	409 (5.9)	43 (1.0)	400 (6.5)	18 (1.2)	397 (10.6)	10 (0.9)	390 (13.4)
Qatar	r	24 (1.1)	468 (5.6)	38 (1.0)	464 (5.6)	22 (1.0)	466 (6.5)	16 (0.9)	426 (6.3)
Pakistan	s	24 (3.2)	281 (15.1)	4 (0.9)	312 (31.2)	8 (1.5)	300 (17.1)	63 (4.8)	300 (18.6)
Bosnia and Herzegovina		23 (1.3)	475 (4.4)	8 (0.5)	474 (5.2)	50 (1.4)	453 (3.1)	19 (1.2)	457 (5.2)
Azerbaijan		20 (1.1)	445 (5.2)	13 (0.6)	452 (4.9)	28 (1.2)	442 (4.5)	40 (1.6)	425 (4.1)
Oman		17 (0.7)	459 (5.8)	36 (0.9)	461 (5.5)	28 (0.8)	433 (4.6)	19 (0.9)	389 (6.7)
Iran, Islamic Rep. of		16 (1.0)	475 (6.9)	18 (1.0)	462 (5.1)	40 (1.1)	440 (4.5)	26 (1.4)	418 (7.1)
Kosovo		12 (1.1)	433 (7.5)	6 (0.6)	436 (8.8)	49 (1.6)	419 (4.1)	33 (1.6)	399 (5.0)
Saudi Arabia		12 (0.7)	423 (7.2)	18 (1.0)	429 (5.8)	39 (1.0)	406 (4.1)	30 (1.5)	389 (7.0)
Turkey (5)		8 (0.9)	572 (7.1)	16 (1.0)	568 (4.4)	48 (1.6)	524 (5.2)	28 (1.7)	496 (6.8)
Australia		- -	- -	- -	- -	- -	- -	- -	- -
England		- -	- -	- -	- -	- -	- -	- -	- -
Japan		- -	- -	- -	- -	- -	- -	- -	- -
Netherlands		- -	- -	- -	- -	- -	- -	- -	- -
Northern Ireland		- -	- -	- -	- -	- -	- -	- -	- -
United States		- -	- -	- -	- -	- -	- -	- -	- -
New Zealand	x	57 (1.3)	525 (3.4)	33 (1.2)	531 (5.1)	7 (0.9)	525 (8.3)	3 (0.4)	481 (12.7)
United Arab Emirates	x	19 (0.5)	511 (3.4)	38 (0.6)	497 (3.1)	24 (0.7)	514 (4.2)	19 (0.5)	479 (4.2)
International Average		**56 (0.2)**	**500 (0.7)**	**17 (0.1)**	**489 (1.1)**	**15 (0.1)**	**472 (1.0)**	**12 (0.2)**	**452 (1.5)**
Benchmarking Participants									
Madrid, Spain	r	74 (1.3)	533 (2.1)	11 (0.8)	517 (4.3)	8 (0.5)	503 (5.5)	8 (0.8)	494 (5.4)
Quebec, Canada	s	65 (1.3)	530 (3.4)	14 (0.8)	524 (5.9)	15 (0.9)	525 (4.5)	6 (0.5)	510 (7.7)
Moscow City, Russian Fed.		55 (1.1)	601 (2.5)	14 (0.6)	587 (3.3)	18 (0.6)	594 (3.6)	13 (0.7)	582 (4.9)
Ontario, Canada	s	38 (2.6)	543 (3.8)	29 (1.3)	531 (4.5)	17 (2.0)	541 (9.0)	16 (1.3)	523 (7.1)
Dubai, UAE	s	23 (0.9)	566 (4.0)	36 (1.0)	563 (3.3)	26 (0.7)	565 (3.3)	15 (1.0)	545 (6.3)
Abu Dhabi, UAE	y	- -	- -	- -	- -	- -	- -	- -	- -

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Literacy and Numeracy Readiness for School

Early Preparation for School

Exhibits 5.16 and 5.17 provide further insight into the relative effects of formal preprimary education and informal literacy and numeracy activities in the home on later achievement in mathematics and science, respectively. The results suggest that preprimary education cannot completely replace parental involvement in preparing children for later success in school. At each level of preprimary attendance, from three years or more down through one year or less, the students whose parents "often" engaged them in early literacy and numeracy activities had higher average mathematics and higher average science achievement than those engaged only "sometimes" or "never."

For both mathematics and science, average achievement was highest (520 and 513, respectively) among the 26 percent of students that had three years or more of preprimary education and whose parents "often" engaged them in literacy and numeracy activities before beginning primary school. It was lowest (469 and 455, respectively) among the 18 percent that had one year or less of preprimary education and parents reporting only "sometimes" or "never" engaging them in literacy and numeracy activities. See About the Scale in Exhibit 5.11 for information about the *Early Literacy and Numeracy Activities* scale.

Exhibit 5.16: Early Preparation for School

Students' Results based on Parents' Reports

Country		Attended Preprimary Education Program for 3 Years or More				Attended Preprimary Education Program for 2 Years				Attended Preprimary Education Program for 1 Year or Less Including Did Not Attend			
		Often Engaged in Early Literacy and Numeracy Activities		Sometimes or Never Engaged in Early Literacy and Numeracy Activities		Often Engaged in Early Literacy and Numeracy Activities		Sometimes or Never Engaged in Early Literacy and Numeracy Activities		Often Engaged in Early Literacy and Numeracy Activities		Sometimes or Never Engaged in Early Literacy and Numeracy Activities	
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Hungary		53 (0.9)	532 (3.0)	43 (0.9)	521 (3.5)	2 (0.2)	~ ~	1 (0.2)	~ ~	1 (0.2)	~ ~	1 (0.2)	~ ~
Korea, Rep. of		45 (1.0)	614 (2.6)	47 (1.1)	590 (2.6)	3 (0.3)	608 (8.6)	3 (0.3)	586 (8.1)	1 (0.1)	~ ~	2 (0.2)	~ ~
Slovak Republic		44 (1.5)	528 (2.8)	33 (1.0)	517 (3.3)	5 (0.4)	513 (7.8)	6 (0.6)	489 (9.5)	5 (0.5)	461 (9.5)	7 (1.0)	444 (11.1)
Czech Republic	r	43 (0.9)	548 (3.2)	41 (1.1)	538 (2.6)	5 (0.4)	539 (6.5)	5 (0.5)	534 (6.3)	3 (0.3)	525 (9.0)	2 (0.3)	~ ~
Latvia		41 (1.1)	556 (2.8)	43 (0.9)	547 (2.9)	4 (0.3)	547 (7.8)	5 (0.4)	517 (7.1)	3 (0.3)	539 (8.3)	4 (0.4)	520 (7.3)
Poland		41 (1.0)	533 (3.2)	28 (0.8)	528 (3.3)	9 (0.6)	512 (5.3)	7 (0.5)	507 (5.2)	8 (0.7)	503 (6.8)	7 (0.7)	494 (5.6)
Italy		41 (1.1)	526 (3.2)	48 (1.1)	513 (2.5)	3 (0.4)	505 (7.4)	5 (0.5)	495 (6.9)	1 (0.2)	~ ~	2 (0.3)	~ ~
Albania		41 (1.6)	518 (4.1)	20 (1.4)	490 (4.8)	9 (0.7)	498 (4.9)	9 (0.8)	481 (9.0)	8 (0.8)	488 (8.1)	12 (1.0)	463 (8.3)
France		40 (1.1)	505 (3.5)	48 (0.8)	482 (3.4)	2 (0.3)	~ ~	3 (0.3)	459 (11.3)	3 (0.3)	488 (11.1)	4 (0.5)	448 (8.0)
Russian Federation		38 (1.2)	577 (3.8)	16 (0.8)	564 (5.0)	7 (0.6)	569 (4.3)	3 (0.3)	573 (9.2)	21 (1.1)	563 (3.8)	14 (0.9)	557 (4.9)
Croatia		36 (1.4)	527 (2.6)	24 (1.0)	510 (3.3)	5 (0.5)	509 (6.7)	4 (0.6)	490 (10.4)	15 (1.1)	508 (4.7)	16 (1.4)	484 (4.2)
Serbia		36 (1.0)	537 (3.0)	19 (0.9)	515 (4.2)	7 (0.8)	519 (8.9)	5 (0.7)	469 (9.8)	18 (1.2)	498 (5.0)	15 (1.1)	466 (6.6)
Denmark	s	36 (1.3)	550 (3.2)	60 (1.3)	535 (3.0)	1 (0.2)	~ ~	2 (0.4)	~ ~	1 (0.2)	~ ~	1 (0.2)	~ ~
Lithuania	r	35 (1.0)	557 (3.3)	39 (1.0)	544 (3.7)	4 (0.5)	535 (9.1)	4 (0.4)	527 (8.2)	7 (0.5)	522 (7.7)	10 (0.8)	510 (4.7)
Norway (5)	s	35 (1.0)	563 (3.7)	59 (1.1)	547 (2.8)	1 (0.2)	~ ~	2 (0.4)	~ ~	1 (0.2)	~ ~	2 (0.4)	~ ~
Georgia		34 (1.2)	484 (4.6)	37 (1.1)	488 (4.4)	7 (0.5)	479 (6.2)	9 (0.6)	478 (6.5)	5 (0.6)	482 (9.6)	8 (0.8)	475 (7.1)
Ireland		34 (0.8)	576 (2.7)	22 (0.8)	550 (3.8)	14 (0.7)	546 (5.0)	11 (0.8)	530 (5.7)	10 (0.6)	542 (4.4)	9 (0.5)	518 (5.4)
Portugal		33 (0.8)	546 (3.0)	49 (0.9)	525 (2.7)	4 (0.4)	533 (8.7)	6 (0.5)	508 (6.3)	3 (0.3)	512 (9.5)	5 (0.4)	481 (6.1)
Bulgaria		33 (1.4)	548 (2.9)	42 (1.7)	519 (3.7)	3 (0.3)	528 (8.1)	10 (1.6)	465 (11.7)	3 (0.3)	531 (11.0)	10 (1.2)	452 (14.9)
Austria		32 (1.1)	553 (3.1)	48 (1.1)	541 (2.5)	5 (0.5)	547 (7.1)	8 (0.8)	531 (5.9)	2 (0.3)	~ ~	4 (0.4)	506 (6.5)
Spain		32 (0.8)	528 (3.0)	36 (0.7)	510 (3.1)	5 (0.5)	505 (5.8)	8 (0.5)	494 (6.5)	7 (0.4)	488 (6.6)	12 (0.6)	471 (5.3)
Montenegro		31 (0.9)	473 (3.1)	17 (0.6)	464 (3.8)	8 (0.5)	462 (4.7)	6 (0.4)	435 (7.1)	21 (0.7)	453 (3.3)	17 (0.6)	423 (4.0)
Cyprus		30 (0.9)	556 (3.3)	25 (0.7)	530 (4.1)	11 (0.6)	540 (4.3)	12 (0.5)	520 (5.1)	8 (0.5)	532 (5.6)	13 (0.6)	513 (5.2)
Singapore		30 (0.8)	645 (4.2)	53 (0.7)	627 (3.7)	3 (0.2)	612 (8.3)	7 (0.3)	597 (5.7)	1 (0.1)	~ ~	5 (0.4)	586 (7.1)
Kazakhstan		30 (1.4)	524 (3.6)	19 (1.1)	513 (3.5)	9 (0.6)	515 (4.7)	7 (0.6)	498 (5.7)	16 (0.8)	515 (4.4)	18 (1.3)	496 (4.0)
Germany	s	28 (1.4)	546 (3.8)	37 (1.1)	535 (3.1)	4 (0.4)	530 (8.8)	5 (0.5)	509 (8.2)	9 (0.6)	535 (5.4)	18 (0.9)	516 (4.1)
Canada	s	27 (1.1)	538 (2.5)	18 (0.7)	526 (3.4)	15 (0.7)	527 (3.3)	10 (0.5)	507 (3.8)	15 (0.9)	517 (6.4)	15 (0.8)	509 (6.1)
Sweden	r	26 (1.0)	537 (3.6)	64 (1.1)	530 (3.1)	1 (0.2)	~ ~	2 (0.4)	~ ~	2 (0.3)	~ ~	5 (0.6)	483 (7.8)
Belgium (Flemish)		25 (0.8)	550 (2.5)	65 (0.9)	536 (2.1)	2 (0.2)	~ ~	4 (0.3)	514 (6.4)	1 (0.2)	~ ~	4 (0.4)	486 (5.3)
Armenia		24 (1.1)	508 (3.4)	26 (1.2)	498 (3.7)	8 (0.5)	498 (4.6)	11 (0.7)	487 (5.4)	13 (0.9)	501 (3.9)	17 (1.3)	492 (4.0)
Finland		23 (0.7)	547 (3.8)	51 (1.1)	530 (2.8)	3 (0.3)	557 (8.1)	7 (0.5)	531 (5.7)	5 (0.5)	548 (6.1)	11 (0.7)	532 (6.6)
North Macedonia	r	23 (1.3)	511 (5.8)	13 (1.0)	497 (6.7)	6 (0.5)	494 (9.1)	4 (0.4)	489 (11.3)	25 (1.3)	470 (7.3)	30 (1.7)	440 (7.3)
Malta	s	22 (0.7)	534 (2.8)	13 (0.7)	515 (3.8)	32 (0.9)	524 (2.9)	22 (0.9)	501 (3.6)	5 (0.5)	506 (6.7)	6 (0.5)	485 (7.6)
Chile		20 (0.8)	462 (3.6)	32 (1.0)	437 (3.5)	12 (0.7)	461 (4.8)	19 (0.9)	433 (4.4)	6 (0.5)	452 (6.9)	9 (0.7)	415 (5.0)
Bahrain		19 (0.7)	503 (4.0)	20 (0.8)	480 (4.2)	14 (0.6)	489 (4.7)	18 (0.9)	479 (4.2)	9 (0.7)	479 (6.2)	19 (0.9)	463 (3.7)
South Africa (5)	r	16 (0.7)	422 (7.3)	35 (0.9)	375 (4.8)	5 (0.3)	415 (7.8)	12 (0.7)	370 (4.8)	8 (0.5)	384 (6.9)	24 (0.9)	356 (3.9)
Hong Kong SAR		15 (1.2)	627 (5.7)	55 (1.3)	603 (4.1)	2 (0.3)	~ ~	4 (0.5)	598 (8.8)	4 (0.5)	608 (6.4)	20 (0.7)	594 (4.6)
Chinese Taipei		14 (0.6)	622 (3.4)	45 (1.0)	597 (2.2)	9 (0.5)	616 (5.2)	27 (0.8)	589 (3.0)	2 (0.2)	~ ~	4 (0.4)	581 (7.8)
Bosnia and Herzegovina		13 (0.9)	475 (4.5)	10 (0.7)	470 (4.3)	4 (0.4)	471 (5.7)	3 (0.3)	454 (6.6)	36 (1.0)	457 (2.7)	33 (1.1)	436 (3.4)
Kuwait	r	12 (0.7)	407 (7.4)	18 (0.7)	388 (5.3)	15 (0.8)	402 (7.5)	29 (0.8)	375 (6.2)	8 (0.5)	407 (9.3)	20 (1.2)	376 (8.0)
Philippines		10 (0.7)	343 (8.6)	23 (1.3)	288 (8.6)	9 (0.7)	337 (9.3)	20 (1.4)	284 (9.0)	10 (0.8)	310 (10.3)	28 (1.4)	287 (6.5)
Qatar	r	10 (0.7)	481 (6.4)	14 (0.6)	457 (5.8)	13 (0.7)	474 (5.9)	25 (1.0)	452 (5.1)	12 (0.7)	471 (6.1)	26 (1.0)	438 (6.0)
Azerbaijan		8 (0.6)	540 (5.5)	12 (0.8)	529 (4.8)	5 (0.4)	547 (5.7)	8 (0.6)	534 (5.4)	17 (1.0)	533 (4.6)	50 (1.5)	514 (3.4)
Kosovo		8 (0.9)	478 (7.2)	4 (0.5)	448 (8.0)	4 (0.4)	471 (8.9)	3 (0.4)	455 (9.3)	39 (1.2)	449 (3.4)	43 (1.4)	438 (3.8)
Morocco		7 (0.5)	436 (10.6)	25 (0.8)	407 (6.0)	4 (0.4)	428 (10.0)	20 (1.0)	384 (6.5)	2 (0.3)	~ ~	42 (1.5)	362 (5.6)
Oman		6 (0.4)	472 (7.4)	11 (0.5)	436 (5.9)	11 (0.7)	469 (11.0)	25 (0.7)	439 (4.0)	10 (0.5)	447 (5.8)	37 (1.0)	410 (5.1)
Iran, Islamic Rep. of		6 (0.5)	480 (10.2)	11 (0.8)	476 (7.3)	5 (0.4)	470 (11.1)	13 (0.8)	454 (5.5)	12 (0.7)	449 (5.1)	53 (1.4)	431 (4.5)
Saudi Arabia	r	5 (0.4)	443 (7.8)	8 (0.5)	412 (9.6)	7 (0.6)	430 (6.4)	11 (0.6)	412 (5.4)	17 (0.8)	406 (6.4)	53 (1.2)	391 (4.0)
Pakistan	s	4 (1.0)	356 (22.8)	20 (2.8)	310 (11.5)	1 (0.5)	~ ~	3 (0.6)	312 (25.1)	6 (1.0)	359 (17.4)	66 (4.0)	337 (17.3)
Turkey (5)		4 (0.4)	594 (8.6)	5 (0.6)	563 (11.3)	6 (0.6)	584 (7.3)	10 (0.6)	560 (5.8)	18 (1.2)	555 (5.1)	58 (1.7)	495 (5.2)
Australia		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
England		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Japan		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Netherlands		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Northern Ireland		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
United States		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
New Zealand	x	35 (1.3)	516 (4.1)	22 (1.2)	502 (5.6)	21 (1.1)	527 (6.5)	12 (0.8)	498 (7.2)	5 (0.5)	515 (13.5)	5 (0.9)	489 (12.9)
United Arab Emirates	x	10 (0.3)	530 (3.7)	9 (0.3)	502 (4.4)	20 (0.4)	510 (2.7)	19 (0.5)	490 (3.0)	20 (0.5)	511 (3.6)	23 (0.5)	490 (3.7)
International Average		**26 (0.1)**	**520 (0.8)**	**30 (0.1)**	**501 (0.7)**	**7 (0.1)**	**508 (1.1)**	**9 (0.1)**	**485 (1.1)**	**9 (0.1)**	**488 (1.2)**	**18 (0.1)**	**469 (1.0)**
Benchmarking Participants													
Moscow City, Russian Fed.		42 (1.2)	598 (2.5)	13 (0.7)	595 (3.7)	10 (0.5)	597 (3.6)	4 (0.4)	583 (5.7)	18 (0.8)	590 (3.6)	12 (0.7)	578 (4.6)
Madrid, Spain	r	38 (1.4)	534 (2.6)	36 (0.9)	525 (2.7)	5 (0.5)	526 (6.6)	5 (0.5)	508 (6.6)	5 (0.4)	503 (7.8)	10 (0.8)	483 (5.8)
Quebec, Canada	s	33 (1.4)	550 (3.3)	32 (1.1)	536 (4.3)	7 (0.7)	540 (7.0)	7 (0.6)	522 (6.8)	9 (0.7)	536 (7.0)	12 (0.8)	521 (5.0)
Ontario, Canada	s	26 (1.8)	540 (4.3)	12 (1.1)	524 (6.3)	18 (1.3)	529 (5.0)	11 (0.8)	510 (5.8)	17 (1.8)	518 (10.9)	15 (1.6)	516 (10.8)
Dubai, UAE	s	13 (0.6)	575 (3.6)	10 (0.5)	561 (4.8)	20 (0.7)	565 (3.3)	17 (0.8)	554 (4.8)	20 (0.7)	561 (4.2)	21 (1.0)	544 (3.9)
Abu Dhabi, UAE	y	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 5.17: Early Preparation for School

Students' Results based on Parents' Reports

Country	Attended Preprimary Education Program for 3 Years or More				Attended Preprimary Education Program for 2 Years				Attended Preprimary Education Program for 1 Year or Less Including Did Not Attend			
	Often Engaged in Early Literacy and Numeracy Activities		Sometimes or Never Engaged in Early Literacy and Numeracy Activities		Often Engaged in Early Literacy and Numeracy Activities		Sometimes or Never Engaged in Early Literacy and Numeracy Activities		Often Engaged in Early Literacy and Numeracy Activities		Sometimes or Never Engaged in Early Literacy and Numeracy Activities	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Hungary	53 (0.9)	537 (2.8)	43 (0.9)	527 (3.6)	2 (0.2)	~ ~	1 (0.2)	~ ~	1 (0.2)	~ ~	1 (0.2)	~ ~
Korea, Rep. of	45 (1.0)	599 (2.8)	47 (1.1)	579 (2.7)	3 (0.3)	606 (7.9)	3 (0.3)	589 (7.5)	1 (0.1)	~ ~	2 (0.2)	~ ~
Slovak Republic	44 (1.5)	541 (3.0)	33 (1.0)	531 (3.0)	5 (0.4)	522 (7.5)	6 (0.6)	487 (10.2)	5 (0.5)	470 (10.4)	7 (1.0)	443 (12.4)
Czech Republic r	43 (0.9)	545 (3.2)	41 (1.1)	539 (2.9)	5 (0.4)	541 (7.2)	5 (0.5)	537 (7.1)	3 (0.3)	530 (9.1)	2 (0.3)	~ ~
Latvia	41 (1.1)	551 (2.7)	43 (0.9)	540 (2.7)	4 (0.3)	548 (7.5)	5 (0.4)	520 (7.4)	3 (0.3)	540 (7.8)	4 (0.4)	521 (5.8)
Poland	41 (1.0)	542 (3.3)	28 (0.8)	536 (2.7)	9 (0.6)	525 (4.7)	7 (0.5)	520 (5.2)	8 (0.7)	516 (6.2)	7 (0.7)	507 (5.1)
Italy	41 (1.1)	522 (3.5)	48 (1.1)	509 (3.1)	3 (0.4)	501 (8.0)	5 (0.5)	488 (7.1)	1 (0.2)	~ ~	2 (0.3)	~ ~
Albania	41 (1.6)	512 (4.7)	20 (1.4)	486 (5.2)	9 (0.7)	497 (5.5)	9 (0.8)	483 (8.4)	8 (0.8)	482 (7.9)	12 (1.0)	457 (8.2)
France	40 (1.1)	508 (3.1)	48 (0.8)	483 (3.5)	2 (0.3)	~ ~	3 (0.3)	468 (11.5)	3 (0.3)	496 (11.5)	4 (0.5)	448 (9.2)
Russian Federation	38 (1.2)	577 (3.3)	16 (0.8)	563 (4.7)	7 (0.6)	571 (5.1)	3 (0.3)	571 (8.7)	21 (1.1)	565 (3.8)	14 (0.9)	556 (4.2)
Croatia	36 (1.4)	539 (3.1)	24 (1.0)	523 (3.5)	5 (0.5)	525 (5.8)	4 (0.6)	503 (9.7)	15 (1.1)	522 (4.2)	16 (1.4)	503 (3.8)
Serbia	36 (1.0)	545 (3.2)	19 (0.9)	520 (4.3)	7 (0.8)	534 (9.6)	5 (0.7)	480 (11.1)	18 (1.2)	510 (5.5)	15 (1.1)	475 (6.5)
Denmark s	36 (1.3)	550 (3.5)	60 (1.3)	527 (2.9)	1 (0.2)	~ ~	2 (0.4)	~ ~	1 (0.2)	~ ~	1 (0.2)	~ ~
Lithuania r	35 (1.0)	552 (2.8)	39 (1.0)	538 (3.2)	4 (0.5)	535 (8.4)	4 (0.4)	528 (7.8)	7 (0.5)	523 (7.3)	10 (0.8)	508 (5.4)
Norway (5) s	35 (1.0)	560 (3.4)	59 (1.1)	543 (2.9)	1 (0.2)	~ ~	2 (0.4)	~ ~	1 (0.2)	~ ~	2 (0.4)	~ ~
Georgia	34 (1.2)	452 (4.5)	37 (1.1)	458 (4.9)	7 (0.5)	452 (6.9)	9 (0.6)	452 (8.2)	5 (0.6)	466 (8.4)	8 (0.8)	459 (9.6)
Ireland	34 (0.8)	553 (3.3)	22 (0.8)	527 (4.9)	14 (0.7)	532 (5.9)	11 (0.8)	513 (5.1)	10 (0.6)	520 (5.3)	9 (0.5)	498 (5.5)
Portugal	33 (0.8)	520 (3.0)	49 (0.9)	502 (3.0)	4 (0.4)	519 (8.0)	6 (0.5)	499 (5.8)	3 (0.3)	502 (7.9)	5 (0.4)	471 (5.8)
Bulgaria	33 (1.4)	564 (3.7)	42 (1.7)	527 (4.7)	3 (0.3)	537 (8.9)	10 (1.6)	461 (12.1)	3 (0.3)	539 (12.8)	10 (1.2)	436 (15.7)
Austria	32 (1.1)	539 (3.6)	48 (1.1)	528 (3.2)	5 (0.5)	534 (7.0)	8 (0.8)	517 (7.0)	2 (0.3)	~ ~	4 (0.4)	457 (7.9)
Spain	32 (0.8)	532 (2.8)	36 (0.7)	519 (2.6)	5 (0.5)	515 (5.2)	8 (0.5)	506 (6.0)	7 (0.4)	507 (6.2)	12 (0.6)	481 (5.4)
Montenegro	31 (0.9)	474 (3.3)	17 (0.6)	460 (4.3)	8 (0.5)	468 (6.4)	6 (0.4)	440 (8.8)	21 (0.7)	457 (3.5)	17 (0.6)	423 (4.8)
Cyprus	30 (0.9)	534 (3.3)	25 (0.7)	509 (4.1)	11 (0.6)	523 (4.4)	12 (0.5)	499 (5.7)	8 (0.5)	513 (5.5)	13 (0.6)	491 (5.1)
Singapore	30 (0.8)	617 (3.4)	53 (0.7)	595 (3.4)	3 (0.2)	586 (7.9)	7 (0.3)	565 (5.5)	1 (0.1)	~ ~	5 (0.4)	550 (6.5)
Kazakhstan	30 (1.4)	512 (4.7)	19 (1.1)	490 (3.9)	9 (0.6)	501 (5.6)	7 (0.6)	477 (5.6)	16 (0.8)	497 (4.5)	18 (1.3)	472 (4.8)
Germany s	28 (1.4)	543 (3.4)	37 (1.1)	537 (3.0)	4 (0.4)	534 (10.4)	5 (0.5)	517 (8.5)	9 (0.6)	530 (6.7)	18 (0.9)	512 (4.3)
Canada s	27 (1.1)	543 (2.9)	18 (0.7)	526 (3.0)	15 (0.7)	542 (3.1)	10 (0.5)	518 (4.8)	15 (0.9)	536 (4.3)	15 (0.8)	523 (4.9)
Sweden r	26 (1.0)	550 (4.2)	64 (1.1)	548 (2.9)	1 (0.2)	~ ~	2 (0.4)	~ ~	2 (0.3)	~ ~	5 (0.6)	484 (8.1)
Belgium (Flemish)	25 (0.8)	519 (2.5)	65 (0.9)	505 (2.4)	2 (0.2)	~ ~	4 (0.3)	486 (6.1)	1 (0.2)	~ ~	4 (0.4)	450 (7.2)
Armenia	24 (1.1)	477 (4.2)	26 (1.2)	465 (4.9)	8 (0.5)	473 (5.5)	11 (0.7)	457 (5.9)	13 (0.9)	470 (5.0)	17 (1.3)	454 (5.0)
Finland	23 (0.7)	566 (3.4)	51 (1.1)	554 (2.9)	3 (0.3)	566 (8.1)	7 (0.5)	559 (5.9)	5 (0.5)	566 (5.5)	11 (0.7)	553 (6.8)
North Macedonia r	23 (1.3)	469 (6.2)	13 (1.0)	450 (8.2)	6 (0.5)	449 (9.1)	4 (0.4)	441 (12.5)	25 (1.3)	427 (8.2)	30 (1.7)	390 (8.5)
Malta s	22 (0.7)	524 (3.3)	13 (0.7)	506 (4.2)	32 (0.9)	506 (2.8)	22 (0.9)	489 (3.7)	5 (0.5)	499 (7.9)	6 (0.5)	470 (8.8)
Chile	20 (0.8)	492 (3.7)	32 (1.0)	468 (3.0)	12 (0.7)	488 (4.5)	19 (0.9)	458 (4.8)	6 (0.5)	476 (6.4)	9 (0.7)	440 (4.6)
Bahrain	19 (0.7)	530 (4.4)	20 (0.8)	496 (5.1)	14 (0.6)	511 (5.5)	18 (0.9)	490 (5.2)	9 (0.7)	493 (6.4)	19 (0.9)	467 (4.4)
South Africa (5) r	16 (0.7)	389 (9.8)	35 (0.9)	325 (6.7)	5 (0.3)	381 (10.2)	12 (0.7)	322 (7.2)	8 (0.5)	339 (9.4)	24 (0.9)	298 (5.5)
Hong Kong SAR	15 (1.2)	557 (7.3)	55 (1.3)	530 (4.0)	2 (0.3)	~ ~	4 (0.5)	539 (7.7)	4 (0.5)	541 (8.1)	20 (0.7)	520 (4.2)
Chinese Taipei	14 (0.6)	577 (3.4)	45 (1.0)	554 (2.5)	9 (0.5)	577 (4.1)	27 (0.8)	551 (2.9)	2 (0.2)	~ ~	4 (0.4)	543 (7.4)
Bosnia and Herzegovina	13 (0.9)	479 (5.0)	10 (0.7)	469 (5.1)	4 (0.4)	483 (6.5)	3 (0.3)	463 (7.5)	36 (1.0)	466 (3.5)	33 (1.1)	442 (3.5)
Kuwait r	12 (0.7)	423 (8.7)	18 (0.7)	399 (6.4)	15 (0.8)	425 (8.1)	29 (0.8)	388 (6.8)	8 (0.5)	422 (12.2)	20 (1.2)	385 (10.5)
Philippines	10 (0.7)	307 (11.1)	23 (1.3)	239 (9.9)	9 (0.7)	298 (11.0)	20 (1.4)	234 (9.7)	10 (0.8)	264 (11.8)	28 (1.4)	235 (7.9)
Qatar r	10 (0.7)	488 (6.8)	14 (0.6)	455 (6.4)	13 (0.7)	485 (6.9)	25 (1.0)	454 (6.0)	12 (0.7)	476 (7.1)	26 (1.0)	438 (6.2)
Azerbaijan	8 (0.6)	455 (7.4)	12 (0.8)	439 (6.0)	5 (0.4)	466 (6.8)	8 (0.6)	445 (6.1)	17 (1.0)	450 (4.9)	50 (1.5)	426 (3.8)
Kosovo	8 (0.9)	452 (7.7)	4 (0.5)	405 (9.7)	4 (0.4)	449 (10.2)	3 (0.4)	423 (11.4)	39 (1.2)	423 (4.2)	43 (1.4)	402 (4.7)
Morocco	7 (0.5)	434 (11.3)	25 (0.8)	399 (7.8)	4 (0.4)	426 (12.2)	20 (1.0)	380 (8.1)	2 (0.3)	~ ~	42 (1.5)	349 (7.9)
Oman	6 (0.4)	484 (8.3)	11 (0.5)	446 (6.6)	11 (0.7)	486 (11.6)	25 (0.7)	449 (4.6)	10 (0.5)	454 (6.4)	37 (1.0)	406 (4.9)
Iran, Islamic Rep. of	6 (0.5)	479 (10.5)	11 (0.8)	473 (7.7)	5 (0.4)	476 (9.8)	13 (0.8)	458 (5.1)	12 (0.7)	452 (5.2)	53 (1.4)	427 (4.9)
Saudi Arabia r	5 (0.4)	446 (9.6)	8 (0.5)	410 (10.1)	7 (0.6)	438 (9.2)	11 (0.6)	423 (5.6)	17 (0.8)	418 (6.8)	53 (1.2)	394 (4.9)
Pakistan s	4 (1.0)	348 (31.0)	20 (2.8)	267 (13.5)	1 (0.5)	~ ~	3 (0.6)	300 (27.7)	6 (1.0)	325 (21.6)	66 (4.0)	298 (17.6)
Turkey (5)	4 (0.4)	588 (7.4)	5 (0.6)	560 (9.6)	6 (0.6)	583 (5.7)	10 (0.6)	558 (5.6)	18 (1.2)	560 (4.7)	58 (1.7)	499 (5.5)
Australia	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
England	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Japan	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Netherlands	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Northern Ireland	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
United States	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
New Zealand x	35 (1.3)	533 (3.9)	22 (1.2)	512 (5.1)	21 (1.1)	540 (6.5)	12 (0.8)	516 (6.6)	5 (0.5)	524 (10.2)	5 (0.9)	502 (10.5)
United Arab Emirates x	10 (0.3)	527 (3.6)	9 (0.3)	494 (5.1)	20 (0.4)	511 (3.6)	19 (0.5)	482 (3.7)	20 (0.5)	513 (4.3)	23 (0.5)	486 (4.2)
International Average	**26 (0.1)**	**513 (0.9)**	**30 (0.1)**	**490 (0.8)**	**7 (0.1)**	**504 (1.1)**	**9 (0.1)**	**477 (1.2)**	**9 (0.1)**	**482 (1.3)**	**18 (0.1)**	**455 (1.1)**
Benchmarking Participants												
Moscow City, Russian Fed.	42 (1.2)	602 (2.7)	13 (0.7)	597 (3.9)	10 (0.5)	590 (3.8)	4 (0.4)	579 (5.8)	18 (0.8)	594 (3.5)	12 (0.7)	582 (4.0)
Madrid, Spain r	38 (1.4)	536 (2.8)	36 (0.9)	529 (2.5)	5 (0.5)	525 (6.1)	5 (0.5)	509 (6.4)	5 (0.4)	513 (7.3)	10 (0.8)	491 (4.7)
Quebec, Canada s	33 (1.4)	538 (3.8)	32 (1.1)	523 (4.2)	7 (0.7)	536 (8.4)	7 (0.6)	513 (6.4)	9 (0.7)	533 (6.2)	12 (0.8)	512 (5.1)
Ontario, Canada s	26 (1.8)	548 (4.6)	12 (1.1)	534 (5.5)	18 (1.3)	539 (4.5)	11 (0.8)	517 (7.2)	17 (1.8)	535 (7.6)	15 (1.6)	529 (8.4)
Dubai, UAE s	13 (0.6)	574 (4.2)	10 (0.5)	555 (6.1)	20 (0.7)	571 (4.6)	17 (0.8)	554 (4.1)	20 (0.7)	569 (3.8)	21 (1.0)	548 (5.3)
Abu Dhabi, UAE y	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Could Do Literacy and Numeracy Tasks When Beginning Primary School

To provide information about the extent to which students enter primary school equipped with some basic literacy and numeracy skills as a foundation for learning, the TIMSS Early Learning Survey (or "Home Questionnaire") included a set of questions asking parents how well their child could do various literacy and numeracy activities when he or she first began primary school. Twelve items formed the *Literacy and Numeracy Tasks* scale in TIMSS 2019 (see About the Scale in Exhibit 5.18).

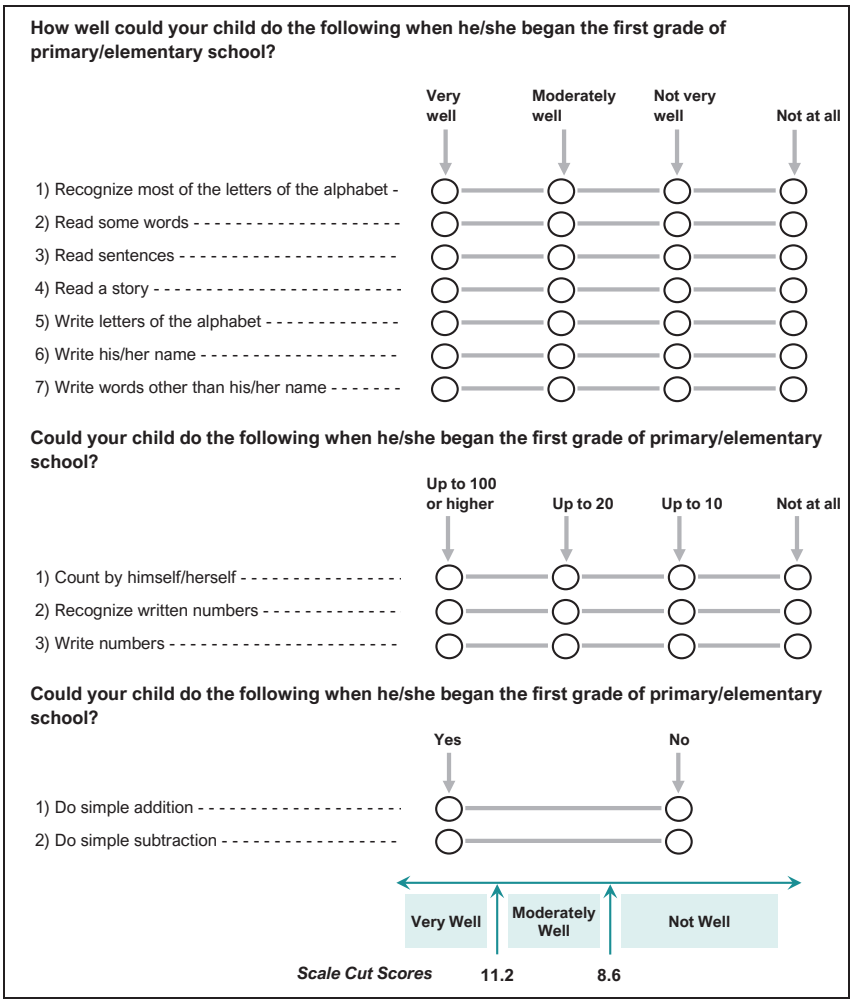
Parents' reports indicate that early preparation appears to have an effect on mathematics and science achievement through the fourth grade. Exhibit 5.19 shows that, on average across countries, 25 percent of students entered school able to perform early literacy and numeracy tasks "very well" according to their parents, and more than half (51%) entered school able to perform the tasks "moderately well." Parents' assessments of their children's early literacy and numeracy skills corresponded well with mathematics achievement at the fourth grade, with the children able to perform "very well" having higher achievement than those performing "moderately well" (532 vs. 498). The 24 percent of the students in the "not well" category had the lowest average achievement (468). Exhibit 5.20 provides a similar picture in relation to science achievement. Students in the "very well" category had the highest average science achievement (518) compared with students in the "moderately well" and "not well" categories (488 and 461, respectively).

Exhibit 5.18: Could Do Literacy and Numeracy Tasks When Beginning Primary School

Students' Results based on Parents' Reports

About the Scale

Students were scored according to their parents' reports regarding how well their children could do the twelve tasks on the *Early Literacy and Numeracy Tasks* scale when they began primary school. Cut scores divide the scale into three categories. Students who could do the tasks **Very Well** had a score at or above the cut score corresponding to their parents reporting the students could do all twelve tasks (five of the tasks at the highest level, five at the second highest level, and simple addition and simple subtraction), on average. Students who could do the tasks **Not Well** had a score at or below the cut score corresponding to their parents reporting the students could do the twelve tasks at a minimal level (five of the tasks at the second lowest level, five at the second highest level, and not simple addition or simple subtraction), on average. All other students could do the literacy and numeracy tasks **Moderately Well** when they began primary school.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 5.19: Could Do Literacy and Numeracy Tasks When Beginning Primary School

Students' Results based on Parents' Reports

Country		Very Well		Moderately Well		Not Well		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Ireland		55 (1.0)	572 (2.8)	39 (0.9)	529 (3.3)	5 (0.5)	497 (7.5)	11.7 (0.04)
Korea, Rep. of		54 (1.0)	618 (2.5)	43 (0.9)	583 (2.8)	3 (0.3)	538 (9.2)	12.0 (0.04)
Bahrain		51 (0.9)	493 (3.3)	42 (0.8)	471 (3.0)	8 (0.4)	459 (6.2)	11.3 (0.04)
Singapore		50 (1.3)	655 (3.5)	44 (1.1)	605 (3.9)	6 (0.4)	545 (7.4)	11.4 (0.06)
Albania		41 (1.4)	517 (3.6)	47 (1.2)	490 (3.9)	12 (1.2)	440 (8.9)	10.7 (0.07)
Oman		40 (0.9)	465 (4.1)	48 (0.7)	418 (4.0)	12 (0.6)	380 (7.3)	10.8 (0.04)
Spain		40 (1.2)	534 (2.6)	49 (1.1)	496 (2.9)	11 (0.5)	460 (4.3)	10.8 (0.04)
Latvia		38 (1.0)	576 (2.5)	54 (1.0)	534 (2.8)	8 (0.6)	492 (6.5)	10.9 (0.03)
Qatar	r	38 (1.1)	480 (3.8)	50 (1.0)	443 (4.3)	12 (0.7)	412 (6.2)	10.7 (0.05)
Kosovo		36 (1.0)	462 (3.5)	53 (0.9)	442 (3.5)	11 (0.8)	410 (5.7)	10.6 (0.05)
Hong Kong SAR		35 (1.1)	629 (3.6)	59 (1.0)	594 (3.2)	6 (0.6)	554 (8.0)	10.9 (0.05)
Poland		35 (0.8)	551 (2.9)	51 (0.9)	511 (3.1)	15 (0.6)	486 (5.0)	10.5 (0.03)
Croatia		34 (1.0)	538 (2.9)	53 (1.1)	500 (2.2)	13 (0.9)	478 (6.7)	10.6 (0.05)
Japan		33 (0.8)	622 (2.5)	57 (0.7)	587 (1.9)	11 (0.5)	545 (4.9)	10.7 (0.04)
Philippines		32 (1.5)	347 (6.7)	58 (1.2)	282 (6.3)	10 (0.8)	230 (8.1)	10.5 (0.06)
Chinese Taipei		31 (0.8)	621 (2.7)	60 (0.8)	593 (2.3)	9 (0.5)	563 (4.7)	10.7 (0.03)
Kazakhstan		31 (1.3)	530 (3.2)	57 (1.1)	506 (2.6)	12 (0.8)	496 (4.4)	10.5 (0.06)
Canada	s	30 (0.8)	552 (2.9)	51 (0.8)	519 (2.4)	19 (0.8)	490 (3.0)	10.3 (0.04)
Saudi Arabia		29 (0.9)	431 (3.9)	52 (0.9)	392 (4.5)	19 (1.0)	373 (6.9)	10.3 (0.05)
Finland		29 (0.9)	579 (2.8)	47 (0.8)	531 (2.6)	24 (0.8)	493 (3.5)	10.2 (0.05)
Sweden	r	29 (1.2)	561 (4.1)	52 (1.4)	523 (2.9)	19 (0.8)	487 (3.9)	10.3 (0.05)
Azerbaijan		27 (0.9)	543 (3.2)	50 (0.9)	521 (2.8)	23 (1.1)	497 (3.9)	10.0 (0.06)
Kuwait	r	27 (0.9)	429 (5.4)	55 (0.8)	385 (5.5)	18 (0.8)	330 (6.4)	10.2 (0.04)
North Macedonia		25 (1.1)	501 (6.7)	53 (1.2)	474 (5.5)	22 (1.2)	441 (7.6)	10.1 (0.06)
Lithuania	r	25 (1.1)	590 (3.5)	58 (1.1)	535 (2.8)	17 (0.8)	497 (5.6)	10.3 (0.04)
South Africa (5)		24 (0.7)	413 (4.1)	60 (0.8)	368 (3.6)	15 (0.5)	340 (5.3)	10.2 (0.03)
Russian Federation		24 (1.1)	599 (2.9)	53 (1.0)	565 (3.4)	23 (1.4)	540 (5.8)	10.0 (0.07)
Cyprus		24 (0.7)	566 (3.9)	54 (0.8)	531 (2.9)	22 (0.7)	509 (3.7)	10.0 (0.04)
Serbia		24 (0.9)	555 (4.0)	55 (1.1)	509 (2.9)	22 (1.0)	459 (5.9)	10.0 (0.04)
Bosnia and Herzegovina		23 (0.7)	480 (3.1)	56 (0.8)	451 (2.6)	21 (0.8)	425 (3.7)	10.0 (0.04)
Bulgaria		20 (0.9)	562 (3.6)	48 (1.5)	529 (3.5)	32 (2.0)	469 (9.1)	9.5 (0.10)
Turkey (5)		19 (1.3)	556 (5.2)	35 (1.2)	543 (5.5)	46 (2.0)	494 (6.1)	9.0 (0.12)
Morocco		19 (0.8)	443 (4.5)	45 (1.3)	385 (4.7)	36 (1.5)	352 (6.8)	9.2 (0.08)
Chile		19 (0.7)	486 (3.2)	54 (1.0)	445 (3.5)	27 (1.0)	408 (3.2)	9.7 (0.04)
Montenegro		18 (0.5)	489 (3.6)	55 (0.8)	456 (2.3)	27 (0.7)	427 (3.0)	9.7 (0.03)
Armenia		18 (0.7)	514 (3.5)	48 (1.2)	498 (2.8)	34 (1.4)	491 (3.4)	9.5 (0.05)
Iran, Islamic Rep. of		16 (1.0)	467 (5.8)	50 (1.2)	446 (4.4)	34 (1.2)	430 (5.7)	9.4 (0.06)
Malta	r	16 (0.8)	554 (3.2)	55 (0.8)	518 (1.9)	29 (0.8)	490 (2.7)	9.6 (0.04)
Pakistan	r	15 (2.6)	344 (15.9)	53 (4.0)	338 (15.1)	32 (3.4)	308 (13.6)	9.3 (0.16)
France		14 (0.7)	526 (4.8)	59 (0.8)	491 (3.3)	26 (0.9)	459 (4.3)	9.6 (0.03)
Georgia		13 (0.7)	506 (5.1)	52 (1.1)	483 (4.2)	35 (1.1)	474 (4.8)	9.3 (0.05)
Czech Republic	r	13 (0.7)	581 (4.8)	51 (0.9)	541 (2.6)	36 (1.0)	527 (3.4)	9.3 (0.04)
Portugal		12 (0.7)	553 (5.5)	55 (0.9)	534 (2.6)	33 (0.7)	508 (3.6)	9.3 (0.03)
Italy		11 (0.6)	547 (4.8)	50 (0.9)	516 (2.9)	39 (1.1)	508 (2.7)	9.2 (0.04)
Austria		10 (0.5)	556 (5.0)	49 (1.0)	544 (2.3)	41 (1.0)	534 (2.8)	9.2 (0.03)
Norway (5)	s	10 (0.6)	602 (6.0)	46 (1.2)	561 (3.3)	44 (1.2)	532 (3.4)	9.0 (0.03)
Hungary		7 (0.4)	569 (5.9)	31 (0.8)	536 (3.3)	62 (0.9)	515 (3.1)	8.4 (0.04)
Germany	s	7 (0.6)	558 (6.4)	48 (1.2)	536 (3.0)	45 (1.3)	525 (3.1)	9.0 (0.04)
Slovak Republic		7 (0.6)	552 (8.8)	43 (1.1)	518 (3.8)	50 (1.2)	499 (3.9)	8.7 (0.06)
Belgium (Flemish)		7 (0.4)	553 (5.8)	44 (1.1)	536 (2.5)	49 (1.2)	529 (2.1)	8.8 (0.04)
Denmark	s	6 (0.6)	587 (6.4)	55 (1.1)	547 (2.9)	39 (1.0)	520 (3.2)	9.1 (0.04)
Australia		- -	- -	- -	- -	- -	- -	- -
England		- -	- -	- -	- -	- -	- -	- -
Netherlands		- -	- -	- -	- -	- -	- -	- -
Northern Ireland		- -	- -	- -	- -	- -	- -	- -
United States		- -	- -	- -	- -	- -	- -	- -
United Arab Emirates	x	52 (0.6)	514 (2.3)	40 (0.5)	490 (2.8)	7 (0.3)	467 (4.4)	11.4 (0.02)
New Zealand	x	11 (0.9)	560 (6.9)	51 (1.3)	514 (4.3)	38 (1.2)	494 (3.9)	9.2 (0.04)
International Average		**25 (0.1)**	**532 (0.7)**	**51 (0.2)**	**498 (0.5)**	**24 (0.1)**	**468 (0.8)**	
Benchmarking Participants								
Dubai, UAE	s	51 (1.4)	568 (2.9)	41 (1.1)	547 (2.6)	7 (0.7)	540 (5.9)	11.3 (0.04)
Madrid, Spain		44 (1.5)	540 (2.6)	47 (1.3)	510 (2.6)	9 (0.6)	482 (5.5)	11.0 (0.05)
Ontario, Canada	s	38 (1.3)	555 (4.3)	48 (1.1)	513 (4.6)	14 (1.1)	470 (6.1)	10.8 (0.06)
Moscow City, Russian Fed.		34 (0.9)	618 (2.3)	54 (0.9)	587 (2.5)	12 (0.7)	547 (4.2)	10.6 (0.04)
Quebec, Canada	r	17 (1.0)	565 (4.8)	55 (1.4)	541 (2.7)	28 (1.3)	516 (3.7)	9.7 (0.04)
Abu Dhabi, UAE	y	- -	- -	- -	- -	- -	- -	- -

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit 5.20: Could Do Literacy and Numeracy Tasks When Beginning Primary School

Students' Results based on Parents' Reports

Country		Very Well		Moderately Well		Not Well		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Ireland		55 (1.0)	550 (3.1)	39 (0.9)	510 (4.1)	5 (0.5)	486 (7.5)	11.7 (0.04)
Korea, Rep. of		54 (1.0)	603 (2.1)	43 (0.9)	572 (2.8)	3 (0.3)	546 (8.4)	12.0 (0.04)
Bahrain		51 (0.9)	516 (3.8)	42 (0.8)	480 (3.8)	8 (0.4)	447 (7.7)	11.3 (0.04)
Singapore		50 (1.3)	622 (3.0)	44 (1.1)	575 (3.6)	6 (0.4)	521 (7.0)	11.4 (0.06)
Albania		41 (1.4)	507 (4.1)	47 (1.2)	488 (3.9)	12 (1.2)	440 (9.2)	10.7 (0.07)
Oman		40 (0.9)	481 (4.5)	48 (0.7)	419 (4.2)	12 (0.6)	359 (6.6)	10.8 (0.04)
Spain		40 (1.2)	538 (2.5)	49 (1.1)	505 (2.2)	11 (0.5)	478 (3.8)	10.8 (0.04)
Latvia		38 (1.0)	566 (1.9)	54 (1.0)	533 (2.7)	8 (0.6)	497 (5.5)	10.9 (0.03)
Qatar	r	38 (1.1)	488 (4.1)	50 (1.0)	442 (4.8)	12 (0.7)	408 (6.6)	10.7 (0.05)
Kosovo		36 (1.0)	429 (4.5)	53 (0.9)	412 (4.1)	11 (0.8)	374 (6.3)	10.6 (0.05)
Hong Kong SAR		35 (1.1)	557 (4.0)	59 (1.0)	523 (3.2)	6 (0.6)	484 (7.8)	10.9 (0.05)
Poland		35 (0.8)	556 (2.7)	51 (0.9)	523 (2.9)	15 (0.6)	506 (5.0)	10.5 (0.03)
Croatia		34 (1.0)	543 (3.2)	53 (1.1)	519 (2.1)	13 (0.9)	497 (6.8)	10.6 (0.05)
Japan		33 (0.8)	585 (2.3)	57 (0.7)	557 (2.0)	11 (0.5)	521 (4.6)	10.7 (0.04)
Philippines		32 (1.5)	300 (8.2)	58 (1.2)	233 (7.3)	10 (0.8)	189 (9.2)	10.5 (0.06)
Chinese Taipei		31 (0.8)	580 (2.4)	60 (0.8)	550 (2.2)	9 (0.5)	532 (5.0)	10.7 (0.03)
Kazakhstan		31 (1.3)	515 (4.3)	57 (1.1)	486 (3.4)	12 (0.8)	483 (4.6)	10.5 (0.06)
Canada	s	30 (0.8)	556 (2.8)	51 (0.8)	529 (2.3)	19 (0.8)	507 (2.7)	10.3 (0.04)
Saudi Arabia		29 (0.9)	438 (4.7)	52 (0.9)	397 (5.2)	19 (1.0)	371 (6.8)	10.3 (0.05)
Finland		29 (0.9)	587 (2.6)	47 (0.8)	553 (2.9)	24 (0.8)	531 (3.5)	10.2 (0.05)
Sweden	r	29 (1.2)	566 (4.5)	52 (1.4)	539 (3.3)	19 (0.8)	516 (4.2)	10.3 (0.05)
Azerbaijan		27 (0.9)	453 (4.0)	50 (0.9)	434 (3.2)	23 (1.1)	410 (4.3)	10.0 (0.06)
Kuwait	r	27 (0.9)	443 (6.8)	55 (0.8)	397 (6.4)	18 (0.8)	342 (8.3)	10.2 (0.04)
North Macedonia		25 (1.1)	452 (7.8)	53 (1.2)	429 (6.7)	22 (1.2)	394 (8.0)	10.1 (0.06)
Lithuania	r	25 (1.1)	578 (3.1)	58 (1.1)	534 (2.9)	17 (0.8)	494 (5.0)	10.3 (0.04)
South Africa (5)		24 (0.7)	372 (5.5)	60 (0.8)	317 (5.0)	15 (0.5)	281 (6.8)	10.2 (0.03)
Russian Federation		24 (1.1)	595 (3.3)	53 (1.0)	566 (3.1)	23 (1.4)	542 (4.9)	10.0 (0.07)
Cyprus		24 (0.7)	542 (3.9)	54 (0.8)	510 (3.1)	22 (0.7)	492 (4.1)	10.0 (0.04)
Serbia		24 (0.9)	557 (4.1)	55 (1.1)	520 (3.1)	22 (1.0)	471 (6.9)	10.0 (0.04)
Bosnia and Herzegovina		23 (0.7)	482 (3.6)	56 (0.8)	458 (3.1)	21 (0.8)	435 (3.9)	10.0 (0.04)
Bulgaria		20 (0.9)	575 (4.0)	48 (1.5)	541 (4.9)	32 (2.0)	463 (9.4)	9.5 (0.10)
Turkey (5)		19 (1.3)	558 (4.8)	35 (1.2)	546 (5.0)	46 (2.0)	497 (6.0)	9.0 (0.12)
Morocco		19 (0.8)	443 (5.7)	45 (1.3)	375 (6.0)	36 (1.5)	338 (9.4)	9.2 (0.08)
Chile		19 (0.7)	509 (2.9)	54 (1.0)	473 (3.0)	27 (1.0)	438 (3.5)	9.7 (0.04)
Montenegro		18 (0.5)	485 (3.2)	55 (0.8)	459 (2.8)	27 (0.7)	429 (3.9)	9.7 (0.03)
Armenia		18 (0.7)	484 (3.9)	48 (1.2)	467 (3.6)	34 (1.4)	457 (4.2)	9.5 (0.05)
Iran, Islamic Rep. of		16 (1.0)	460 (6.0)	50 (1.2)	444 (4.4)	34 (1.2)	429 (6.3)	9.4 (0.06)
Malta	r	16 (0.8)	535 (3.5)	55 (0.8)	504 (2.1)	29 (0.8)	480 (3.9)	9.6 (0.04)
Pakistan	r	15 (2.6)	311 (20.2)	53 (4.0)	299 (16.0)	32 (3.4)	270 (14.5)	9.3 (0.16)
France		14 (0.7)	513 (4.7)	59 (0.8)	495 (3.1)	26 (0.9)	468 (4.5)	9.6 (0.03)
Georgia		13 (0.7)	484 (5.7)	52 (1.1)	454 (4.6)	35 (1.1)	446 (5.8)	9.3 (0.05)
Czech Republic	r	13 (0.7)	569 (4.2)	51 (0.9)	541 (2.8)	36 (1.0)	531 (3.3)	9.3 (0.04)
Portugal		12 (0.7)	529 (5.3)	55 (0.9)	508 (2.5)	33 (0.7)	493 (3.2)	9.3 (0.03)
Italy		11 (0.6)	539 (5.6)	50 (0.9)	508 (3.3)	39 (1.1)	508 (3.3)	9.2 (0.04)
Austria		10 (0.5)	526 (6.0)	49 (1.0)	526 (3.2)	41 (1.0)	523 (3.4)	9.2 (0.03)
Norway (5)	s	10 (0.6)	583 (6.6)	46 (1.2)	555 (3.2)	44 (1.2)	532 (3.9)	9.0 (0.03)
Hungary		7 (0.4)	562 (6.1)	31 (0.8)	538 (3.7)	62 (0.9)	524 (2.9)	8.4 (0.04)
Germany	s	7 (0.6)	538 (7.9)	48 (1.2)	533 (2.9)	45 (1.3)	528 (3.2)	9.0 (0.04)
Slovak Republic		7 (0.6)	554 (10.5)	43 (1.1)	529 (3.8)	50 (1.2)	511 (4.4)	8.7 (0.06)
Belgium (Flemish)		7 (0.4)	513 (5.7)	44 (1.1)	501 (2.6)	49 (1.2)	503 (2.4)	8.8 (0.04)
Denmark	s	6 (0.6)	570 (7.9)	55 (1.1)	538 (3.1)	39 (1.0)	522 (3.3)	9.1 (0.04)
Australia		- -	- -	- -	- -	- -	- -	- -
England		- -	- -	- -	- -	- -	- -	- -
Netherlands		- -	- -	- -	- -	- -	- -	- -
Northern Ireland		- -	- -	- -	- -	- -	- -	- -
United States		- -	- -	- -	- -	- -	- -	- -
United Arab Emirates	x	52 (0.6)	513 (3.0)	40 (0.5)	485 (3.2)	7 (0.3)	458 (5.1)	11.4 (0.02)
New Zealand	x	11 (0.9)	553 (5.7)	51 (1.3)	527 (4.1)	38 (1.2)	515 (3.8)	9.2 (0.04)
International Average		**25 (0.1)**	**518 (0.8)**	**51 (0.2)**	**488 (0.6)**	**24 (0.1)**	**461 (0.8)**	
Benchmarking Participants								
Dubai, UAE	s	51 (1.4)	570 (2.9)	41 (1.1)	550 (2.8)	7 (0.7)	545 (6.6)	11.3 (0.04)
Madrid, Spain		44 (1.5)	542 (2.4)	47 (1.3)	516 (2.3)	9 (0.6)	490 (5.1)	11.0 (0.05)
Ontario, Canada	s	38 (1.3)	557 (4.1)	48 (1.1)	527 (4.2)	14 (1.1)	496 (5.6)	10.8 (0.06)
Moscow City, Russian Fed.		34 (0.9)	616 (2.5)	54 (0.9)	590 (2.6)	12 (0.7)	555 (4.5)	10.6 (0.04)
Quebec, Canada	r	17 (1.0)	548 (4.6)	55 (1.4)	528 (3.1)	28 (1.3)	514 (3.5)	9.7 (0.04)
Abu Dhabi, UAE	y	- -	- -	- -	- -	- -	- -	- -

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

School Composition and Resources

Socioeconomic Background of the Student Body

As shown in Exhibit 6.1, TIMSS characterizes schools in terms of socioeconomic composition based on principals' reports of the percentages of economically disadvantaged and economically affluent students in the school (see About the Scale). "More affluent" schools were defined as having more than 25 percent of students from economically affluent homes and not more than 25 percent from economically disadvantaged homes, while "more disadvantaged" schools had more than 25 percent of students from disadvantaged homes and not more than 25 percent from affluent homes. All other combinations were considered to be "neither more affluent nor more disadvantaged."

Exhibits 6.2 and 6.3 present the percentages of fourth grade students in each category in relation to mathematics achievement and science achievement, respectively. At fourth grade, 41 percent of students, on average, were in schools with relatively more affluent students than disadvantaged students, 34 percent were in schools where there was a balance, and 25 percent were in schools with relatively more disadvantaged than affluent students. Average achievement was highest for students in the "more affluent" schools for both mathematics (521) and science (512) and lowest in the "more disadvantaged" schools (479 and 467 for mathematics and science, respectively). Average achievement for students attending "neither more affluent nor more disadvantaged" schools was in the middle (499 for mathematics and 489 for science).

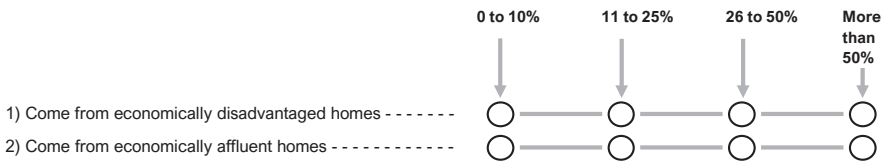
Exhibits 6.4 and 6.5 present the percentages of eighth grade students in each category in relation to mathematics achievement and science achievement, respectively. Compared with the fourth grade, the distribution of eighth grade students was more even across the school composition groups, with 35 percent in schools with relatively more affluent students than disadvantaged students, 33 percent in schools where there was a balance, and 32 percent in schools with relatively more disadvantaged students than affluent students. The relationship with achievement was similar to fourth grade, with average achievement highest for students in "more affluent" schools for both mathematics (518) and science (518) and lowest in the "more disadvantaged" schools (466 and 468 for mathematics and science, respectively). Average achievement for students attending "neither more affluent nor more disadvantaged" schools was in the middle (489 for mathematics and 490 for science).

Exhibit 6.1: School Composition by Socioeconomic Background of the Student Body

Students' Results based on Principals' Reports

About the Scale

Approximately what percentage of students in your school have the following backgrounds?



More Affluent: Schools where more than 25% of the student body comes from economically affluent homes and not more than 25% from economically disadvantaged homes

More Disadvantaged: Schools where more than 25% of the student body comes from economically disadvantaged homes and not more than 25% from economically affluent homes

Neither More Affluent Nor More Disadvantaged: All other possible response combinations

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 6.2: School Composition by Socioeconomic Background of the Student Body

Students' Results based on Principals' Reports

Country	More Affluent: Schools where more than 25% of the student body comes from economically affluent homes and not more than 25% from economically disadvantaged homes		Neither More Affluent Nor More Disadvantaged		More Disadvantaged: Schools where more than 25% of the student body comes from economically disadvantaged homes and not more than 25% from economically affluent homes	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Albania	36 (4.3)	516 (5.7)	22 (3.7)	481 (7.1)	42 (4.2)	478 (6.4)
Armenia	49 (4.8)	502 (4.2)	28 (3.9)	491 (4.4)	23 (4.2)	499 (5.1)
Australia r	34 (3.5)	542 (4.4)	38 (3.8)	512 (5.0)	28 (3.4)	485 (8.0)
Austria	30 (3.4)	554 (2.6)	40 (3.5)	545 (3.4)	29 (2.8)	515 (4.1)
Azerbaijan	14 (2.6)	510 (10.0)	30 (3.7)	505 (5.7)	56 (4.0)	521 (4.6)
Bahrain	38 (2.4)	475 (4.0)	36 (2.7)	488 (4.9)	26 (2.5)	474 (4.3)
Belgium (Flemish)	63 (3.7)	542 (2.6)	20 (3.8)	527 (5.0)	17 (2.9)	502 (6.3)
Bosnia and Herzegovina	44 (4.3)	460 (3.6)	34 (4.3)	451 (4.7)	22 (3.4)	451 (5.1)
Bulgaria	35 (3.3)	548 (4.1)	44 (4.2)	522 (9.2)	21 (3.1)	465 (10.7)
Canada	43 (2.5)	530 (3.0)	35 (2.5)	505 (2.8)	22 (2.2)	486 (4.1)
Chile	14 (2.0)	510 (5.8)	17 (3.5)	457 (7.2)	69 (3.7)	422 (3.8)
Chinese Taipei	25 (3.9)	607 (3.6)	71 (3.9)	599 (2.1)	4 (1.6)	566 (17.6)
Croatia	57 (4.2)	514 (3.1)	30 (3.7)	507 (4.4)	13 (2.7)	497 (5.3)
Cyprus	47 (4.6)	543 (4.5)	40 (4.7)	529 (4.8)	13 (2.9)	502 (7.3)
Czech Republic	55 (4.4)	542 (3.3)	37 (4.4)	526 (4.5)	8 (2.3)	502 (9.0)
Denmark r	56 (4.1)	530 (3.0)	33 (3.9)	522 (4.2)	10 (2.2)	508 (6.6)
England s	13 (3.5)	620 (13.7)	53 (5.6)	550 (4.0)	34 (5.3)	540 (5.6)
Finland	36 (4.0)	541 (3.1)	54 (4.1)	530 (3.4)	10 (2.3)	512 (7.1)
France	43 (3.9)	511 (3.6)	25 (3.8)	485 (6.2)	32 (3.5)	453 (5.0)
Georgia	39 (4.6)	488 (6.6)	40 (4.4)	478 (5.8)	21 (3.5)	479 (9.5)
Germany r	29 (3.2)	541 (3.9)	44 (2.9)	528 (3.4)	27 (2.6)	484 (5.6)
Hong Kong SAR	34 (3.6)	612 (5.1)	25 (4.0)	607 (6.3)	41 (4.3)	590 (5.8)
Hungary	35 (3.7)	557 (4.1)	38 (4.6)	517 (5.2)	27 (3.9)	484 (6.4)
Iran, Islamic Rep. of	24 (3.3)	486 (8.2)	32 (3.2)	452 (6.0)	44 (3.2)	415 (4.6)
Ireland	49 (4.4)	557 (4.0)	27 (4.0)	555 (5.5)	24 (3.0)	522 (4.9)
Italy	38 (3.7)	522 (3.7)	45 (4.3)	517 (3.9)	17 (3.3)	498 (4.9)
Japan	48 (4.3)	602 (2.6)	45 (4.3)	585 (2.4)	8 (2.4)	583 (3.5)
Kazakhstan	81 (3.2)	514 (3.1)	17 (3.0)	503 (5.5)	2 (1.1)	~ ~
Korea, Rep. of	26 (3.3)	620 (4.1)	57 (4.1)	594 (3.0)	17 (3.1)	583 (4.4)
Kosovo s	55 (6.0)	445 (5.2)	26 (4.7)	448 (9.1)	19 (4.4)	428 (8.7)
Kuwait r	37 (4.5)	388 (12.4)	42 (5.3)	376 (8.7)	21 (3.9)	377 (14.3)
Latvia r	54 (4.3)	552 (3.4)	41 (4.2)	538 (5.4)	5 (1.7)	539 (12.6)
Lithuania	73 (3.1)	552 (3.4)	19 (3.1)	525 (4.9)	8 (2.0)	492 (12.4)
Malta	48 (0.4)	519 (2.0)	45 (0.4)	505 (1.8)	7 (0.2)	472 (4.8)
Montenegro	43 (0.6)	459 (2.4)	34 (0.5)	448 (3.7)	23 (0.3)	443 (3.8)
Morocco r	4 (1.8)	451 (14.2)	26 (3.9)	393 (9.7)	70 (4.2)	372 (7.2)
Netherlands s	57 (5.3)	545 (3.1)	32 (5.2)	533 (3.5)	11 (3.6)	515 (6.2)
New Zealand	38 (3.2)	526 (4.1)	35 (3.5)	482 (4.7)	27 (2.7)	441 (4.6)
North Macedonia	66 (4.2)	489 (5.9)	10 (2.4)	459 (11.8)	24 (3.8)	445 (14.6)
Northern Ireland r	39 (4.3)	586 (5.9)	30 (4.9)	576 (4.6)	30 (3.9)	539 (5.1)
Norway (5) r	52 (4.9)	548 (3.6)	40 (4.6)	542 (3.5)	7 (2.2)	522 (7.6)
Oman	47 (3.9)	438 (6.9)	37 (3.7)	428 (6.1)	16 (2.3)	410 (10.5)
Pakistan r	12 (7.0)	372 (58.2)	30 (5.6)	297 (20.0)	58 (6.9)	338 (16.9)
Philippines	18 (2.8)	359 (14.1)	32 (4.6)	287 (10.3)	50 (4.4)	284 (8.0)
Poland	25 (4.0)	534 (5.7)	64 (4.3)	521 (3.3)	11 (3.1)	493 (7.9)
Portugal	27 (2.9)	541 (5.1)	39 (3.8)	524 (4.1)	33 (3.8)	513 (4.1)
Qatar	66 (3.8)	458 (5.7)	24 (3.5)	443 (10.0)	11 (2.6)	419 (8.2)
Russian Federation	80 (2.7)	572 (3.7)	16 (2.5)	551 (5.9)	4 (1.4)	544 (10.1)
Saudi Arabia s	38 (4.3)	425 (6.2)	38 (4.4)	393 (9.3)	24 (3.7)	371 (8.1)
Serbia	31 (4.1)	522 (5.1)	41 (4.2)	507 (4.5)	28 (3.7)	497 (6.9)
Singapore	53 (0.0)	635 (5.2)	37 (0.0)	623 (5.7)	10 (0.0)	584 (13.4)
Slovak Republic	45 (4.1)	530 (3.3)	41 (4.0)	510 (4.7)	13 (2.3)	445 (9.0)
South Africa (5) r	9 (1.9)	502 (14.5)	13 (2.6)	379 (17.5)	78 (3.0)	364 (4.7)
Spain	60 (3.7)	512 (3.9)	27 (3.5)	501 (4.5)	13 (2.7)	472 (9.8)
Sweden r	75 (3.7)	533 (3.1)	11 (2.7)	511 (8.0)	14 (2.9)	473 (8.8)
Turkey (5)	27 (3.7)	565 (6.2)	29 (3.6)	519 (11.0)	44 (4.2)	501 (6.9)
United Arab Emirates r	50 (1.8)	484 (2.4)	26 (1.6)	477 (3.3)	24 (1.2)	471 (4.6)
United States	23 (2.3)	574 (5.7)	19 (2.2)	550 (3.2)	58 (2.7)	516 (3.4)
International Average	**41 (0.5)**	**521 (1.3)**	**34 (0.5)**	**499 (0.9)**	**25 (0.4)**	**479 (1.1)**
Benchmarking Participants						
Ontario, Canada	40 (3.8)	535 (5.6)	35 (4.2)	510 (4.4)	26 (3.9)	478 (5.1)
Quebec, Canada	55 (4.6)	541 (2.8)	29 (4.0)	520 (4.2)	16 (3.4)	523 (6.3)
Moscow City, Russian Fed.	87 (3.1)	593 (2.5)	11 (2.9)	589 (6.0)	2 (1.2)	~ ~
Madrid, Spain	65 (3.9)	528 (2.1)	23 (3.3)	506 (4.9)	13 (2.9)	483 (8.0)
Abu Dhabi, UAE r	56 (1.2)	445 (2.9)	22 (1.3)	411 (4.4)	22 (1.5)	439 (8.4)
Dubai, UAE r	51 (0.3)	554 (2.1)	32 (0.3)	543 (3.7)	17 (0.3)	513 (3.4)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 6.3: School Composition by Socioeconomic Background of the Student Body

Students' Results based on Principals' Reports

Country	More Affluent: Schools where more than 25% of the student body comes from economically affluent homes and not more than 25% from economically disadvantaged homes		Neither More Affluent Nor More Disadvantaged		More Disadvantaged: Schools where more than 25% of the student body comes from economically disadvantaged homes and not more than 25% from economically affluent homes	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Albania	36 (4.3)	513 (6.4)	22 (3.7)	479 (7.6)	42 (4.2)	471 (6.7)
Armenia	49 (4.8)	469 (4.8)	28 (3.9)	459 (4.7)	23 (4.2)	470 (6.6)
Australia r	34 (3.5)	557 (3.8)	38 (3.8)	530 (4.1)	28 (3.4)	504 (6.6)
Austria	30 (3.4)	541 (2.8)	40 (3.5)	531 (3.9)	29 (2.8)	489 (5.6)
Azerbaijan	14 (2.6)	421 (12.0)	30 (3.7)	413 (6.9)	56 (4.0)	434 (5.1)
Bahrain	38 (2.4)	491 (5.9)	36 (2.7)	504 (6.4)	26 (2.5)	479 (6.9)
Belgium (Flemish)	63 (3.7)	512 (2.5)	20 (3.8)	496 (5.7)	17 (2.9)	466 (6.7)
Bosnia and Herzegovina	44 (4.3)	466 (4.1)	34 (4.3)	460 (5.1)	22 (3.4)	455 (5.4)
Bulgaria	35 (3.3)	565 (5.1)	44 (4.2)	534 (10.3)	21 (3.1)	452 (12.6)
Canada	43 (2.5)	534 (2.8)	35 (2.5)	523 (2.7)	22 (2.2)	502 (3.4)
Chile	14 (2.0)	534 (5.2)	17 (3.5)	484 (7.2)	69 (3.7)	452 (3.4)
Chinese Taipei	25 (3.9)	568 (3.4)	71 (3.9)	557 (2.0)	4 (1.6)	521 (15.5)
Croatia	57 (4.2)	528 (2.8)	30 (3.7)	523 (3.9)	13 (2.7)	512 (5.1)
Cyprus	47 (4.6)	520 (4.4)	40 (4.7)	509 (4.5)	13 (2.9)	481 (7.2)
Czech Republic	55 (4.4)	541 (3.3)	37 (4.4)	529 (4.0)	8 (2.3)	507 (8.2)
Denmark r	56 (4.1)	528 (3.3)	33 (3.9)	521 (3.9)	10 (2.2)	501 (5.5)
England s	13 (3.5)	590 (11.4)	53 (5.6)	532 (4.0)	34 (5.3)	521 (5.9)
Finland	36 (4.0)	559 (3.6)	54 (4.1)	554 (3.6)	10 (2.3)	537 (8.6)
France	43 (3.9)	513 (3.8)	25 (3.8)	489 (5.9)	32 (3.5)	456 (4.9)
Georgia	39 (4.6)	460 (7.1)	40 (4.4)	451 (5.9)	21 (3.5)	450 (9.6)
Germany r	29 (3.2)	538 (3.9)	44 (2.9)	527 (3.2)	27 (2.6)	478 (5.6)
Hong Kong SAR	34 (3.6)	546 (4.6)	25 (4.0)	532 (5.7)	41 (4.3)	520 (6.1)
Hungary	35 (3.7)	561 (3.5)	38 (4.6)	523 (4.7)	27 (3.9)	493 (6.6)
Iran, Islamic Rep. of	24 (3.3)	487 (7.4)	32 (3.2)	450 (6.1)	44 (3.2)	411 (5.0)
Ireland	49 (4.4)	536 (5.8)	27 (4.0)	533 (6.3)	24 (3.0)	505 (4.9)
Italy	38 (3.7)	517 (3.7)	45 (4.3)	513 (4.6)	17 (3.3)	489 (5.4)
Japan	48 (4.3)	570 (2.5)	45 (4.3)	554 (2.4)	8 (2.4)	553 (4.3)
Kazakhstan	81 (3.2)	498 (3.7)	17 (3.0)	476 (7.0)	2 (1.1)	~ ~
Korea, Rep. of	26 (3.3)	606 (3.7)	57 (4.1)	583 (2.6)	17 (3.1)	571 (4.1)
Kosovo s	55 (6.0)	413 (6.4)	26 (4.7)	417 (10.0)	19 (4.4)	394 (10.7)
Kuwait r	37 (4.5)	400 (14.0)	42 (5.3)	385 (10.2)	21 (3.9)	388 (16.9)
Latvia r	54 (4.3)	547 (3.0)	41 (4.2)	535 (5.3)	5 (1.7)	531 (13.0)
Lithuania	73 (3.1)	547 (3.2)	19 (3.1)	523 (4.4)	8 (2.0)	489 (12.8)
Malta	48 (0.4)	505 (1.8)	45 (0.4)	493 (1.8)	7 (0.2)	455 (5.3)
Montenegro	43 (0.6)	460 (2.9)	34 (0.5)	449 (4.2)	23 (0.3)	441 (4.3)
Morocco r	4 (1.8)	447 (23.7)	26 (3.9)	384 (11.7)	70 (4.2)	362 (8.8)
Netherlands s	57 (5.3)	529 (3.7)	32 (5.2)	512 (4.1)	11 (3.6)	488 (9.6)
New Zealand	38 (3.2)	537 (3.5)	35 (3.5)	499 (3.8)	27 (2.7)	459 (5.0)
North Macedonia	66 (4.2)	446 (7.4)	10 (2.4)	415 (13.4)	24 (3.8)	396 (15.3)
Northern Ireland r	39 (4.3)	532 (4.3)	30 (4.9)	524 (4.1)	30 (3.9)	500 (4.2)
Norway (5) r	52 (4.9)	545 (3.5)	40 (4.6)	538 (4.0)	7 (2.2)	517 (7.2)
Oman	47 (3.9)	447 (7.9)	37 (3.7)	432 (6.5)	16 (2.3)	407 (8.4)
Pakistan r	12 (7.0)	335 (56.9)	30 (5.6)	263 (22.6)	58 (6.9)	303 (20.1)
Philippines	18 (2.8)	327 (17.4)	32 (4.6)	234 (11.9)	50 (4.4)	235 (9.1)
Poland	25 (4.0)	545 (5.6)	64 (4.3)	531 (3.1)	11 (3.1)	504 (7.0)
Portugal	27 (2.9)	515 (4.6)	39 (3.8)	504 (3.8)	33 (3.8)	495 (3.6)
Qatar	66 (3.8)	457 (5.9)	24 (3.5)	447 (13.5)	11 (2.6)	424 (10.0)
Russian Federation	80 (2.7)	572 (3.2)	16 (2.5)	551 (6.1)	4 (1.4)	546 (9.8)
Saudi Arabia s	38 (4.3)	432 (7.5)	38 (4.4)	395 (10.2)	24 (3.7)	365 (10.0)
Serbia	31 (4.1)	532 (4.9)	41 (4.2)	516 (4.3)	28 (3.7)	504 (7.4)
Singapore	53 (0.0)	605 (4.6)	37 (0.0)	590 (5.1)	10 (0.0)	553 (11.9)
Slovak Republic	45 (4.1)	543 (3.3)	41 (4.0)	523 (4.5)	13 (2.3)	439 (12.0)
South Africa (5) r	9 (1.9)	501 (19.2)	13 (2.6)	334 (24.2)	78 (3.0)	311 (6.7)
Spain	60 (3.7)	520 (3.1)	27 (3.5)	511 (4.5)	13 (2.7)	483 (9.7)
Sweden r	75 (3.7)	551 (3.2)	11 (2.7)	526 (7.4)	14 (2.9)	480 (10.5)
Turkey (5)	27 (3.7)	562 (5.1)	29 (3.6)	522 (10.6)	44 (4.2)	507 (6.9)
United Arab Emirates r	50 (1.8)	474 (2.5)	26 (1.6)	468 (4.3)	24 (1.2)	468 (5.4)
United States	23 (2.3)	580 (6.0)	19 (2.2)	556 (3.2)	58 (2.7)	518 (3.7)
International Average	**41 (0.5)**	**512 (1.3)**	**34 (0.5)**	**489 (1.0)**	**25 (0.4)**	**467 (1.1)**
Benchmarking Participants						
Ontario, Canada	40 (3.8)	539 (5.3)	35 (4.2)	526 (4.2)	26 (3.9)	497 (4.6)
Quebec, Canada	55 (4.6)	530 (2.7)	29 (4.0)	514 (3.9)	16 (3.4)	510 (5.9)
Moscow City, Russian Fed.	87 (3.1)	595 (2.4)	11 (2.9)	594 (5.6)	2 (1.2)	~ ~
Madrid, Spain	65 (3.9)	530 (1.9)	23 (3.3)	515 (4.8)	13 (2.9)	493 (6.6)
Abu Dhabi, UAE r	56 (1.2)	422 (3.4)	22 (1.3)	379 (6.1)	22 (1.5)	427 (10.2)
Dubai, UAE r	51 (0.3)	554 (2.3)	32 (0.3)	544 (3.9)	17 (0.3)	517 (4.0)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 6.4: School Composition by Socioeconomic Background of the Student Body

Students' Results based on Principals' Reports

Country	More Affluent: Schools where more than 25% of the student body comes from economically affluent homes and not more than 25% from economically disadvantaged homes		Neither More Affluent Nor More Disadvantaged		More Disadvantaged: Schools where more than 25% of the student body comes from economically disadvantaged homes and not more than 25% from economically affluent homes	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia	39 (3.6)	558 (7.8)	34 (3.4)	511 (5.5)	27 (3.0)	474 (5.8)
Bahrain	28 (0.2)	492 (4.6)	50 (0.3)	479 (2.5)	22 (0.2)	472 (3.3)
Chile	16 (2.4)	502 (6.0)	11 (2.7)	453 (10.3)	72 (3.0)	424 (3.9)
Chinese Taipei	14 (2.7)	656 (9.2)	66 (3.5)	616 (3.4)	20 (2.4)	571 (6.6)
Cyprus s	54 (0.5)	519 (2.7)	32 (0.4)	490 (4.1)	14 (0.3)	466 (4.9)
Egypt	11 (2.8)	431 (13.6)	19 (3.5)	418 (14.2)	69 (4.3)	403 (6.4)
England s	37 (4.7)	562 (9.4)	30 (5.1)	500 (10.5)	33 (5.0)	489 (11.3)
Finland	30 (3.9)	513 (4.3)	60 (4.2)	509 (3.4)	10 (2.5)	494 (8.0)
France r	32 (4.2)	510 (4.9)	30 (3.9)	486 (4.1)	38 (4.4)	463 (4.1)
Georgia	39 (4.6)	465 (7.1)	37 (4.5)	466 (6.9)	24 (4.1)	456 (10.1)
Hong Kong SAR	27 (2.8)	622 (7.0)	34 (3.9)	581 (8.3)	39 (3.6)	553 (9.0)
Hungary	39 (4.1)	556 (6.8)	36 (4.4)	514 (6.1)	25 (3.5)	461 (6.6)
Iran, Islamic Rep. of	18 (2.7)	503 (11.8)	27 (3.6)	454 (5.9)	55 (3.7)	425 (5.5)
Ireland	30 (3.8)	545 (4.0)	44 (4.2)	531 (4.2)	26 (3.4)	500 (6.6)
Israel	29 (3.1)	563 (6.6)	30 (3.6)	531 (9.7)	41 (3.5)	483 (9.3)
Italy	38 (3.9)	509 (4.0)	43 (4.1)	504 (4.2)	19 (3.5)	464 (6.0)
Japan	52 (4.3)	602 (4.7)	36 (4.0)	588 (3.1)	12 (2.7)	573 (6.5)
Jordan r	16 (2.7)	450 (8.9)	27 (3.6)	413 (6.2)	57 (3.9)	413 (6.0)
Kazakhstan	82 (3.4)	492 (3.8)	17 (3.2)	469 (9.0)	1 (1.0)	~ ~
Korea, Rep. of	23 (3.4)	639 (6.1)	48 (3.8)	607 (3.3)	29 (3.3)	581 (4.8)
Kuwait r	26 (4.5)	417 (11.9)	56 (4.7)	403 (5.4)	19 (2.9)	403 (13.1)
Lebanon r	25 (3.4)	463 (5.0)	31 (4.4)	439 (6.3)	44 (5.3)	406 (5.0)
Lithuania	71 (3.3)	526 (3.6)	20 (3.5)	499 (5.1)	9 (2.4)	504 (8.3)
Malaysia	10 (1.6)	539 (10.6)	25 (3.2)	489 (8.7)	65 (3.3)	438 (4.6)
Morocco r	7 (2.1)	458 (18.2)	13 (2.8)	393 (6.4)	80 (3.4)	380 (2.9)
New Zealand r	38 (3.8)	516 (6.5)	43 (4.3)	484 (4.6)	19 (3.0)	434 (8.3)
Norway (9) r	56 (5.1)	511 (4.0)	34 (4.6)	500 (3.8)	10 (3.4)	487 (8.2)
Oman	35 (3.8)	428 (6.6)	42 (3.9)	406 (4.4)	23 (3.3)	389 (7.2)
Portugal	21 (3.0)	528 (5.8)	37 (4.1)	500 (6.0)	42 (4.1)	486 (4.3)
Qatar	55 (3.4)	458 (7.0)	32 (3.5)	429 (5.7)	13 (1.9)	429 (13.2)
Romania	29 (3.8)	501 (9.8)	32 (4.0)	475 (7.6)	39 (4.2)	467 (7.7)
Russian Federation	74 (3.3)	549 (5.4)	19 (2.8)	536 (8.7)	7 (1.8)	511 (11.9)
Saudi Arabia r	47 (4.1)	403 (5.0)	37 (4.3)	388 (5.4)	17 (3.1)	383 (7.2)
Singapore	43 (0.0)	640 (6.2)	46 (0.0)	611 (6.2)	10 (0.0)	539 (12.6)
South Africa (9) r	10 (1.6)	463 (16.0)	13 (2.1)	413 (10.2)	77 (2.4)	379 (3.4)
Sweden	69 (4.0)	511 (3.3)	22 (3.8)	490 (5.8)	8 (2.5)	479 (5.2)
Turkey	27 (3.0)	540 (8.2)	28 (3.6)	491 (9.1)	45 (4.0)	474 (5.7)
United Arab Emirates r	51 (1.3)	483 (2.3)	25 (1.3)	462 (2.7)	24 (0.9)	452 (5.3)
United States	22 (2.2)	581 (7.0)	23 (2.5)	530 (8.5)	55 (2.7)	488 (5.9)
International Average	**35 (0.5)**	**518 (1.3)**	**33 (0.6)**	**489 (1.1)**	**32 (0.5)**	**466 (1.2)**
Benchmarking Participants						
Ontario, Canada r	47 (4.7)	548 (8.3)	34 (4.4)	524 (5.4)	19 (3.4)	488 (11.1)
Quebec, Canada	57 (3.8)	553 (5.0)	29 (4.1)	541 (7.7)	15 (3.1)	532 (13.1)
Moscow City, Russian Fed.	84 (3.2)	579 (4.7)	14 (2.8)	551 (10.7)	3 (1.5)	595 (21.9)
Gauteng, RSA (9) r	17 (3.1)	481 (11.3)	14 (3.3)	467 (15.1)	69 (4.1)	402 (3.5)
Western Cape, RSA (9) r	17 (3.2)	558 (7.3)	6 (2.1)	497 (23.1)	77 (3.1)	418 (5.2)
Abu Dhabi, UAE r	56 (1.2)	445 (4.6)	24 (1.7)	402 (6.5)	20 (1.4)	440 (8.5)
Dubai, UAE r	53 (0.5)	553 (2.8)	27 (0.5)	546 (5.2)	20 (0.4)	471 (5.4)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 6.5: School Composition by Socioeconomic Background of the Student Body

Students' Results based on Principals' Reports

Country		More Affluent: Schools where more than 25% of the student body comes from economically affluent homes and not more than 25% from economically disadvantaged homes		Neither More Affluent Nor More Disadvantaged		More Disadvantaged: Schools where more than 25% of the student body comes from economically disadvantaged homes and not more than 25% from economically affluent homes	
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia		39 (3.6)	565 (6.0)	34 (3.4)	525 (4.3)	27 (3.0)	487 (5.6)
Bahrain		28 (0.2)	521 (3.8)	50 (0.3)	479 (2.7)	22 (0.2)	463 (3.4)
Chile		16 (2.4)	518 (5.5)	11 (2.7)	473 (9.8)	72 (3.0)	447 (3.9)
Chinese Taipei		14 (2.7)	605 (7.2)	66 (3.5)	577 (2.3)	20 (2.4)	544 (5.4)
Cyprus	s	54 (0.5)	501 (3.1)	32 (0.4)	472 (4.7)	14 (0.3)	449 (6.8)
Egypt		11 (2.8)	404 (12.6)	19 (3.5)	396 (15.2)	69 (4.3)	380 (7.2)
England	s	37 (4.7)	568 (8.2)	30 (5.1)	500 (9.7)	33 (5.0)	489 (10.8)
Finland		30 (3.9)	546 (5.1)	60 (4.2)	544 (4.1)	10 (2.5)	526 (10.0)
France	r	32 (4.2)	518 (5.2)	30 (3.9)	492 (4.4)	38 (4.4)	466 (4.6)
Georgia		39 (4.6)	449 (6.8)	37 (4.5)	448 (6.2)	24 (4.1)	447 (7.8)
Hong Kong SAR		27 (2.8)	547 (8.3)	34 (3.9)	493 (11.0)	39 (3.6)	489 (8.8)
Hungary		39 (4.1)	563 (5.7)	36 (4.4)	530 (5.3)	25 (3.5)	480 (6.0)
Iran, Islamic Rep. of		18 (2.7)	500 (10.6)	27 (3.6)	458 (5.7)	55 (3.7)	430 (5.4)
Ireland		30 (3.8)	547 (4.6)	44 (4.2)	529 (4.5)	26 (3.4)	498 (7.9)
Israel		29 (3.1)	550 (6.0)	30 (3.6)	525 (8.4)	41 (3.5)	482 (8.8)
Italy		38 (3.9)	512 (4.1)	43 (4.1)	505 (4.0)	19 (3.5)	470 (6.9)
Japan		52 (4.3)	575 (3.8)	36 (4.0)	565 (2.3)	12 (2.7)	556 (5.6)
Jordan	r	16 (2.7)	489 (10.8)	27 (3.6)	444 (7.8)	57 (3.9)	445 (7.4)
Kazakhstan		82 (3.4)	483 (3.5)	17 (3.2)	461 (9.7)	1 (1.0)	~ ~
Korea, Rep. of		23 (3.4)	585 (4.7)	48 (3.8)	559 (2.9)	29 (3.3)	544 (3.4)
Kuwait	r	26 (4.5)	451 (11.8)	56 (4.7)	446 (7.0)	19 (2.9)	443 (12.2)
Lebanon	r	25 (3.4)	429 (9.4)	31 (4.4)	394 (10.0)	44 (5.3)	342 (8.1)
Lithuania		71 (3.3)	539 (3.6)	20 (3.5)	513 (4.7)	9 (2.4)	518 (7.4)
Malaysia		10 (1.6)	536 (8.5)	25 (3.2)	482 (8.8)	65 (3.3)	440 (4.9)
Morocco	r	7 (2.1)	447 (22.0)	13 (2.8)	393 (9.8)	80 (3.4)	389 (3.8)
New Zealand	r	38 (3.8)	535 (5.7)	43 (4.3)	502 (4.6)	19 (3.0)	449 (9.3)
Norway (9)	r	56 (5.1)	504 (4.5)	34 (4.6)	494 (4.7)	10 (3.4)	473 (11.6)
Oman		35 (3.8)	471 (7.2)	42 (3.9)	455 (4.8)	23 (3.3)	434 (7.6)
Portugal		21 (3.0)	541 (5.4)	37 (4.1)	517 (5.4)	42 (4.1)	507 (4.1)
Qatar		55 (3.4)	486 (6.9)	32 (3.5)	464 (6.2)	13 (1.9)	463 (12.9)
Romania		29 (3.8)	492 (8.1)	32 (4.0)	468 (7.2)	39 (4.2)	461 (7.1)
Russian Federation		74 (3.3)	546 (5.2)	19 (2.8)	541 (7.5)	7 (1.8)	518 (12.3)
Saudi Arabia	r	47 (4.1)	437 (5.7)	37 (4.3)	429 (6.2)	17 (3.1)	423 (7.8)
Singapore		43 (0.0)	632 (6.0)	46 (0.0)	603 (5.9)	10 (0.0)	530 (12.4)
South Africa (9)	r	10 (1.6)	469 (21.3)	13 (2.1)	401 (14.2)	77 (2.4)	356 (4.5)
Sweden		69 (4.0)	534 (3.8)	22 (3.8)	505 (7.2)	8 (2.5)	487 (7.7)
Turkey		27 (3.0)	553 (7.3)	28 (3.6)	511 (8.1)	45 (4.0)	497 (5.1)
United Arab Emirates	r	51 (1.3)	482 (2.8)	25 (1.3)	459 (2.8)	24 (0.9)	456 (6.0)
United States		22 (2.2)	579 (5.6)	23 (2.5)	540 (7.4)	55 (2.7)	497 (6.4)
International Average		**35 (0.5)**	**518 (1.3)**	**33 (0.6)**	**490 (1.2)**	**32 (0.5)**	**468 (1.3)**
Benchmarking Participants							
Ontario, Canada	r	47 (4.7)	534 (4.7)	34 (4.4)	518 (5.1)	19 (3.4)	490 (8.5)
Quebec, Canada		57 (3.8)	545 (4.8)	29 (4.1)	538 (7.2)	15 (3.1)	524 (13.6)
Moscow City, Russian Fed.		84 (3.2)	569 (3.3)	14 (2.8)	550 (8.0)	3 (1.5)	571 (17.9)
Gauteng, RSA (9)	r	17 (3.1)	501 (13.5)	14 (3.3)	480 (18.4)	69 (4.1)	398 (4.8)
Western Cape, RSA (9)	r	17 (3.2)	584 (8.5)	6 (2.1)	516 (31.0)	77 (3.1)	410 (6.0)
Abu Dhabi, UAE	r	56 (1.2)	427 (5.5)	24 (1.7)	374 (9.3)	20 (1.4)	440 (10.6)
Dubai, UAE	r	53 (0.5)	564 (2.9)	27 (0.5)	561 (4.3)	20 (0.4)	479 (5.8)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Students' Native Language is the Language of the Test

Principals' categorizations of their schools according to the percentage of fourth grade students who spoke the language of the TIMSS 2019 assessment as their first language are shown in Exhibit 6.6, together with average mathematics achievement, and in Exhibit 6.7 together with science achievement. On average, 63 percent were in schools where most students (more than 90%) spoke the language of the TIMSS assessment as their first language, and another 18 percent were in schools where more than half of students (51–90%) spoke the language of the assessment as their first language. Both groups of students had higher average achievement than the 19 percent of students attending schools where only half of the students (or less) spoke the language of the assessment as their native language (506 and 501 vs. 486 for mathematics, and 498 and 493 vs. 471 for science).

As shown in Exhibit 6.8 for mathematics and in Exhibit 6.9 for science, the distribution of eighth grade students across the language composition groups was similar to fourth grade. Sixty-four percent of students were in schools where most students spoke the assessment language as their first language (more than 90%) and 17 percent and 18 percent were in schools where more than half of the students (51–90%) and only half of the students (or less) did so, respectively. There was little difference in average mathematics or science achievement among the groups, although average science achievement was lower in schools where only half of the students (or less) spoke the language of the assessment as their native language (483 vs. 484 and 487 for mathematics, and 479 vs. 491 and 490 for science).

Exhibit 6.6: Schools with Students Having the Language of the Test as Their Native Language

Students' Results based on Principals' Reports

Country	School has More than 90% of Students with Language of Test as Their Native Language		School has 51–90% of Students with Language of Test as Their Native Language		School has 50% or Less of Students with Language of Test as Their Native Language	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Albania	99 (1.0)	494 (3.5)	1 (0.7)	~ ~	1 (0.8)	~ ~
Armenia	95 (1.6)	498 (2.6)	4 (1.3)	493 (12.0)	1 (0.8)	~ ~
Australia	48 (3.5)	516 (4.4)	34 (3.8)	514 (5.2)	17 (3.0)	513 (13.4)
Austria	21 (2.3)	551 (4.1)	46 (3.5)	547 (3.3)	34 (3.2)	521 (3.8)
Azerbaijan r	97 (1.4)	510 (3.3)	3 (1.4)	518 (12.9)	0 (0.1)	~ ~
Bahrain	56 (1.8)	483 (3.4)	15 (1.7)	463 (7.8)	29 (1.6)	484 (3.3)
Belgium (Flemish)	37 (3.6)	545 (2.5)	39 (4.1)	535 (2.9)	24 (3.2)	510 (6.5)
Bosnia and Herzegovina	95 (1.8)	450 (2.4)	4 (1.7)	481 (5.2)	1 (0.8)	~ ~
Bulgaria	58 (4.0)	535 (6.4)	19 (2.9)	512 (6.7)	24 (3.1)	467 (8.7)
Canada	43 (2.3)	517 (3.0)	39 (2.8)	505 (3.2)	18 (2.1)	512 (4.6)
Chile	95 (1.8)	441 (3.1)	4 (1.8)	436 (13.1)	0 (0.2)	~ ~
Chinese Taipei	66 (3.3)	602 (2.0)	28 (3.5)	598 (3.1)	5 (1.7)	567 (15.2)
Croatia	92 (2.5)	510 (2.2)	6 (2.2)	512 (7.7)	2 (1.2)	~ ~
Cyprus	44 (4.0)	540 (4.2)	37 (4.0)	530 (4.6)	19 (2.5)	515 (7.5)
Czech Republic	91 (2.4)	531 (2.8)	9 (2.4)	549 (8.8)	0 (0.0)	~ ~
Denmark	52 (4.4)	528 (3.0)	42 (4.7)	524 (3.7)	6 (2.0)	509 (12.5)
England s	43 (5.4)	561 (5.4)	45 (5.6)	554 (6.5)	13 (3.5)	559 (16.7)
Finland	69 (3.2)	538 (2.4)	28 (3.0)	522 (4.0)	3 (1.4)	490 (16.8)
France	64 (3.6)	494 (3.7)	28 (3.9)	478 (6.1)	9 (1.8)	441 (13.8)
Georgia	86 (3.1)	485 (3.9)	12 (2.9)	460 (9.2)	2 (0.9)	~ ~
Germany	25 (2.9)	535 (3.5)	53 (3.6)	525 (3.3)	22 (2.7)	495 (6.4)
Hong Kong SAR	74 (3.6)	601 (3.7)	11 (4.0)	593 (19.7)	15 (3.7)	612 (11.9)
Hungary	96 (1.8)	522 (2.9)	4 (1.8)	535 (29.1)	0 (0.0)	~ ~
Iran, Islamic Rep. of	57 (3.4)	455 (4.2)	12 (2.5)	457 (10.2)	31 (3.3)	417 (8.7)
Ireland	59 (3.6)	555 (2.9)	30 (3.6)	540 (4.8)	11 (2.7)	534 (7.7)
Italy	62 (3.9)	515 (3.4)	38 (3.9)	516 (3.4)	1 (0.7)	~ ~
Japan	98 (1.4)	593 (1.8)	2 (1.2)	~ ~	1 (0.7)	~ ~
Kazakhstan	55 (2.5)	506 (3.0)	27 (3.2)	521 (6.3)	18 (2.9)	518 (7.9)
Korea, Rep. of	94 (2.0)	601 (2.4)	6 (2.0)	580 (10.7)	0 (0.0)	~ ~
Kosovo	96 (1.4)	445 (3.1)	3 (1.2)	428 (16.0)	1 (0.7)	~ ~
Kuwait	79 (2.4)	372 (5.0)	4 (2.3)	444 (23.5)	17 (2.0)	417 (12.9)
Latvia	51 (3.3)	544 (3.5)	21 (3.2)	540 (6.8)	28 (1.0)	556 (4.4)
Lithuania	87 (2.8)	540 (3.5)	10 (2.4)	564 (10.4)	3 (1.2)	534 (14.3)
Malta	6 (0.2)	516 (3.6)	10 (0.2)	534 (3.3)	84 (0.3)	506 (1.7)
Montenegro	69 (0.5)	457 (2.1)	23 (0.5)	451 (3.5)	8 (0.3)	424 (6.6)
Morocco	67 (3.1)	386 (6.4)	11 (2.2)	375 (10.5)	22 (2.6)	378 (5.8)
Netherlands s	53 (5.4)	546 (2.8)	37 (5.4)	531 (3.7)	10 (2.6)	518 (7.1)
New Zealand	52 (3.6)	480 (4.5)	29 (3.5)	504 (6.8)	20 (2.7)	482 (8.9)
North Macedonia	72 (3.2)	479 (6.6)	18 (3.3)	468 (10.4)	10 (2.7)	430 (11.4)
Northern Ireland r	66 (4.3)	566 (4.0)	24 (4.3)	573 (9.1)	10 (2.7)	558 (12.9)
Norway (5) r	54 (4.9)	544 (3.8)	40 (5.1)	545 (3.8)	6 (1.9)	531 (9.2)
Oman	78 (1.7)	429 (4.3)	7 (1.5)	392 (10.8)	15 (1.1)	458 (10.0)
Pakistan	5 (1.8)	334 (18.1)	4 (1.9)	266 (32.0)	91 (2.6)	333 (13.6)
Philippines	1 (0.7)	~ ~	2 (1.0)	~ ~	97 (1.1)	296 (6.6)
Poland	99 (1.0)	520 (2.7)	1 (1.0)	~ ~	0 (0.0)	~ ~
Portugal	86 (2.3)	527 (3.0)	11 (2.2)	519 (6.3)	4 (1.5)	505 (12.8)
Qatar	39 (2.8)	410 (4.6)	11 (2.2)	437 (11.9)	49 (2.3)	484 (5.5)
Russian Federation	75 (3.1)	567 (3.8)	15 (2.6)	569 (7.3)	10 (1.6)	564 (9.1)
Saudi Arabia	88 (2.3)	396 (3.6)	6 (1.9)	394 (14.0)	5 (1.3)	424 (17.6)
Serbia	91 (2.2)	512 (3.1)	8 (2.1)	468 (10.2)	1 (0.5)	~ ~
Singapore	0 (0.0)	~ ~	0 (0.0)	~ ~	100 (0.0)	625 (3.9)
Slovak Republic	90 (2.1)	519 (2.9)	5 (1.4)	442 (16.3)	5 (1.8)	419 (13.9)
South Africa (5)	10 (1.6)	411 (13.0)	10 (2.1)	494 (12.0)	80 (2.3)	359 (3.5)
Spain	58 (3.2)	509 (4.0)	28 (3.3)	496 (6.3)	14 (2.0)	490 (4.6)
Sweden	43 (4.3)	535 (3.8)	34 (4.6)	523 (4.4)	23 (4.1)	490 (7.1)
Turkey (5)	78 (3.1)	537 (4.9)	9 (2.0)	510 (6.8)	14 (2.4)	449 (13.6)
United Arab Emirates	26 (0.6)	475 (3.1)	5 (0.2)	555 (4.7)	69 (0.6)	475 (1.9)
United States	45 (3.0)	544 (4.2)	35 (3.0)	531 (5.4)	20 (2.5)	522 (6.2)
International Average	**63 (0.4)**	**506 (0.6)**	**18 (0.4)**	**501 (1.5)**	**19 (0.3)**	**486 (1.5)**
Benchmarking Participants						
Ontario, Canada	34 (3.5)	522 (6.6)	46 (4.7)	505 (4.7)	21 (3.4)	510 (5.9)
Quebec, Canada	60 (4.5)	530 (3.0)	25 (4.4)	533 (4.3)	15 (3.4)	539 (7.8)
Moscow City, Russian Fed.	75 (3.6)	595 (2.4)	24 (3.6)	587 (4.8)	1 (0.9)	~ ~
Madrid, Spain	74 (3.3)	526 (1.8)	24 (3.3)	495 (5.0)	2 (1.0)	~ ~
Abu Dhabi, UAE r	16 (0.6)	467 (7.9)	3 (0.2)	550 (10.0)	81 (0.6)	425 (2.4)
Dubai, UAE r	15 (0.3)	487 (4.3)	11 (0.2)	585 (2.5)	74 (0.3)	548 (2.0)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 6.7: Schools with Students Having the Language of the Test as Their Native Language

Students' Results based on Principals' Reports

Country	School has More than 90% of Students with Language of Test as Their Native Language		School has 51–90% of Students with Language of Test as Their Native Language		School has 50% or Less of Students with Language of Test as Their Native Language	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Albania	99 (1.0)	489 (3.6)	1 (0.7)	~ ~	1 (0.8)	~ ~
Armenia	95 (1.6)	467 (3.5)	4 (1.3)	458 (9.9)	1 (0.8)	~ ~
Australia	48 (3.5)	537 (4.1)	34 (3.8)	530 (4.5)	17 (3.0)	522 (11.0)
Austria	21 (2.3)	542 (3.5)	46 (3.5)	533 (4.1)	34 (3.2)	495 (4.9)
Azerbaijan r	97 (1.4)	419 (4.0)	3 (1.4)	428 (16.6)	0 (0.1)	~ ~
Bahrain	56 (1.8)	495 (4.9)	15 (1.7)	462 (11.2)	29 (1.6)	505 (4.5)
Belgium (Flemish)	37 (3.6)	515 (2.4)	39 (4.1)	504 (3.2)	24 (3.2)	475 (7.6)
Bosnia and Herzegovina	95 (1.8)	457 (2.9)	4 (1.7)	491 (7.4)	1 (0.8)	~ ~
Bulgaria	58 (4.0)	549 (7.4)	19 (2.9)	520 (8.8)	24 (3.1)	455 (10.7)
Canada	43 (2.3)	529 (3.0)	39 (2.8)	521 (3.0)	18 (2.1)	516 (3.7)
Chile	95 (1.8)	470 (2.8)	4 (1.8)	461 (13.2)	0 (0.2)	~ ~
Chinese Taipei	66 (3.3)	561 (2.1)	28 (3.5)	558 (2.6)	5 (1.7)	524 (12.7)
Croatia	92 (2.5)	525 (2.2)	6 (2.2)	528 (7.2)	2 (1.2)	~ ~
Cyprus	44 (4.0)	517 (4.6)	37 (4.0)	511 (3.6)	19 (2.5)	498 (7.8)
Czech Republic	91 (2.4)	532 (2.8)	9 (2.4)	547 (8.0)	0 (0.0)	~ ~
Denmark	52 (4.4)	527 (3.2)	42 (4.7)	520 (4.1)	6 (2.0)	505 (13.5)
England s	43 (5.4)	543 (5.2)	45 (5.6)	534 (5.5)	13 (3.5)	535 (14.6)
Finland	69 (3.2)	562 (2.6)	28 (3.0)	543 (4.1)	3 (1.4)	494 (10.8)
France	64 (3.6)	498 (3.6)	28 (3.9)	480 (6.1)	9 (1.8)	442 (12.5)
Georgia	86 (3.1)	457 (4.2)	12 (2.9)	432 (8.7)	2 (0.9)	~ ~
Germany	25 (2.9)	541 (3.2)	53 (3.6)	521 (3.1)	22 (2.7)	486 (6.6)
Hong Kong SAR	74 (3.6)	527 (3.7)	11 (4.0)	533 (24.5)	15 (3.7)	551 (10.9)
Hungary	96 (1.8)	528 (2.9)	4 (1.8)	537 (26.7)	0 (0.0)	~ ~
Iran, Islamic Rep. of	57 (3.4)	459 (4.2)	12 (2.5)	453 (9.8)	31 (3.3)	404 (9.2)
Ireland	59 (3.6)	534 (3.2)	30 (3.6)	519 (7.3)	11 (2.7)	516 (8.0)
Italy	62 (3.9)	511 (3.8)	38 (3.9)	509 (3.9)	1 (0.7)	~ ~
Japan	98 (1.4)	561 (1.8)	2 (1.2)	~ ~	1 (0.7)	~ ~
Kazakhstan	55 (2.5)	480 (3.7)	27 (3.2)	515 (7.7)	18 (2.9)	507 (9.8)
Korea, Rep. of	94 (2.0)	589 (2.2)	6 (2.0)	569 (9.9)	0 (0.0)	~ ~
Kosovo	96 (1.4)	414 (3.8)	3 (1.2)	390 (16.9)	1 (0.7)	~ ~
Kuwait	79 (2.4)	389 (6.9)	4 (2.3)	465 (20.2)	17 (2.0)	394 (14.8)
Latvia	51 (3.3)	540 (3.2)	21 (3.2)	533 (6.4)	28 (1.0)	552 (3.9)
Lithuania	87 (2.8)	536 (3.3)	10 (2.4)	554 (10.7)	3 (1.2)	532 (15.2)
Malta	6 (0.2)	504 (4.8)	10 (0.2)	530 (3.9)	84 (0.3)	491 (1.4)
Montenegro	69 (0.5)	458 (2.8)	23 (0.5)	452 (3.9)	8 (0.3)	419 (6.4)
Morocco	67 (3.1)	376 (7.8)	11 (2.2)	371 (12.0)	22 (2.6)	368 (9.3)
Netherlands s	53 (5.4)	532 (3.6)	37 (5.4)	509 (4.3)	10 (2.6)	484 (9.2)
New Zealand	52 (3.6)	499 (4.2)	29 (3.5)	517 (6.0)	20 (2.7)	492 (8.2)
North Macedonia	72 (3.2)	433 (7.6)	18 (3.3)	428 (11.0)	10 (2.7)	382 (13.0)
Northern Ireland r	66 (4.3)	518 (3.4)	24 (4.3)	523 (6.6)	10 (2.7)	513 (9.7)
Norway (5) r	54 (4.9)	542 (3.6)	40 (5.1)	540 (3.6)	6 (1.9)	519 (8.6)
Oman	78 (1.7)	435 (5.0)	7 (1.5)	393 (10.3)	15 (1.1)	452 (9.3)
Pakistan	5 (1.8)	306 (19.8)	4 (1.9)	244 (33.1)	91 (2.6)	295 (15.3)
Philippines	1 (0.7)	~ ~	2 (1.0)	~ ~	97 (1.1)	248 (7.7)
Poland	99 (1.0)	531 (2.6)	1 (1.0)	~ ~	0 (0.0)	~ ~
Portugal	86 (2.3)	505 (2.8)	11 (2.2)	502 (6.3)	4 (1.5)	488 (9.5)
Qatar	39 (2.8)	412 (5.8)	11 (2.2)	443 (13.5)	49 (2.3)	482 (6.8)
Russian Federation	75 (3.1)	569 (3.5)	15 (2.6)	568 (5.4)	10 (1.6)	553 (9.6)
Saudi Arabia	88 (2.3)	400 (4.3)	6 (1.9)	403 (14.9)	5 (1.3)	433 (20.1)
Serbia	91 (2.2)	521 (3.3)	8 (2.1)	477 (11.4)	1 (0.5)	~ ~
Singapore	0 (0.0)	~ ~	0 (0.0)	~ ~	100 (0.0)	595 (3.4)
Slovak Republic	90 (2.1)	532 (3.0)	5 (1.4)	451 (15.1)	5 (1.8)	402 (17.2)
South Africa (5)	10 (1.6)	387 (16.8)	10 (2.1)	492 (15.5)	80 (2.3)	303 (4.8)
Spain	58 (3.2)	518 (3.3)	28 (3.3)	506 (6.0)	14 (2.0)	494 (5.6)
Sweden	43 (4.3)	554 (4.0)	34 (4.6)	540 (4.2)	23 (4.1)	499 (8.2)
Turkey (5)	78 (3.1)	541 (4.6)	9 (2.0)	520 (6.2)	14 (2.4)	448 (13.8)
United Arab Emirates	26 (0.6)	482 (3.7)	5 (0.2)	552 (5.3)	69 (0.6)	461 (2.4)
United States	45 (3.0)	551 (4.3)	35 (3.0)	532 (5.8)	20 (2.5)	523 (6.0)
International Average	**63 (0.4)**	**498 (0.7)**	**18 (0.4)**	**493 (1.5)**	**19 (0.3)**	**471 (1.5)**
Benchmarking Participants						
Ontario, Canada	34 (3.5)	537 (6.0)	46 (4.7)	519 (4.2)	21 (3.4)	514 (5.1)
Quebec, Canada	60 (4.5)	523 (3.0)	25 (4.4)	522 (4.6)	15 (3.4)	520 (6.4)
Moscow City, Russian Fed.	75 (3.6)	596 (2.4)	24 (3.6)	591 (4.6)	1 (0.9)	~ ~
Madrid, Spain	74 (3.3)	530 (1.8)	24 (3.3)	504 (4.2)	2 (1.0)	~ ~
Abu Dhabi, UAE r	16 (0.6)	468 (9.4)	3 (0.2)	541 (9.4)	81 (0.6)	397 (2.9)
Dubai, UAE r	15 (0.3)	492 (5.0)	11 (0.2)	583 (2.8)	74 (0.3)	549 (2.2)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

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Downloaded from http://timss2019.org/download

Exhibit 6.8: Schools with Students Having the Language of the Test as Their Native Language

Students' Results based on Principals' Reports

Country		School has More than 90% of Students with Language of Test as Their Native Language		School has 51–90% of Students with Language of Test as Their Native Language		School has 50% or Less of Students with Language of Test as Their Native Language	
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia		56 (3.8)	506 (4.2)	31 (3.5)	530 (8.8)	13 (2.8)	548 (16.7)
Bahrain		64 (0.3)	480 (1.9)	14 (0.2)	480 (7.2)	21 (0.3)	485 (3.0)
Chile		94 (2.0)	442 (3.1)	6 (2.0)	416 (13.9)	0 (0.0)	~ ~
Chinese Taipei		62 (3.3)	624 (3.8)	28 (3.5)	604 (5.2)	11 (2.1)	568 (8.9)
Cyprus	r	36 (0.4)	500 (3.0)	43 (0.5)	487 (2.6)	21 (0.4)	538 (4.3)
Egypt		99 (0.8)	413 (5.4)	1 (0.8)	~ ~	0 (0.0)	~ ~
England	s	50 (5.3)	516 (8.8)	35 (4.5)	529 (14.7)	15 (3.5)	506 (9.5)
Finland		75 (2.8)	510 (2.8)	23 (2.7)	507 (5.3)	1 (1.0)	~ ~
France	r	71 (3.7)	494 (3.2)	24 (3.5)	469 (6.3)	4 (1.9)	431 (10.9)
Georgia		86 (3.1)	462 (4.7)	12 (2.9)	458 (10.5)	2 (1.2)	~ ~
Hong Kong SAR		46 (3.5)	567 (6.5)	8 (2.6)	585 (26.5)	46 (4.1)	590 (7.8)
Hungary		98 (1.1)	516 (3.1)	2 (1.1)	~ ~	0 (0.0)	~ ~
Iran, Islamic Rep. of		48 (3.1)	465 (6.3)	12 (2.4)	457 (10.5)	40 (3.4)	420 (6.9)
Ireland		70 (4.0)	533 (2.6)	28 (4.0)	510 (5.3)	2 (1.4)	~ ~
Israel		65 (3.0)	515 (5.0)	30 (3.0)	527 (10.0)	5 (1.8)	518 (25.6)
Italy		59 (4.0)	500 (3.5)	37 (4.0)	499 (4.7)	4 (1.5)	472 (19.8)
Japan		99 (0.9)	594 (2.7)	1 (0.6)	~ ~	1 (0.6)	~ ~
Jordan		98 (0.8)	420 (4.3)	2 (0.4)	~ ~	1 (0.7)	~ ~
Kazakhstan		57 (2.6)	486 (5.2)	27 (3.2)	486 (5.9)	16 (2.9)	496 (10.1)
Korea, Rep. of		97 (1.3)	608 (2.7)	2 (1.2)	~ ~	1 (0.6)	~ ~
Kuwait		83 (3.1)	394 (5.0)	3 (1.5)	395 (27.0)	14 (2.8)	453 (13.4)
Lebanon		6 (2.1)	424 (6.8)	6 (2.1)	462 (17.9)	87 (2.9)	427 (3.7)
Lithuania		91 (2.2)	518 (2.9)	7 (2.0)	535 (16.6)	2 (0.8)	~ ~
Malaysia		47 (3.4)	462 (5.1)	29 (3.4)	447 (7.7)	24 (3.7)	473 (7.8)
Morocco	r	67 (3.7)	391 (2.9)	14 (2.6)	390 (6.7)	19 (2.9)	377 (5.3)
New Zealand	r	48 (4.8)	491 (5.2)	49 (5.0)	484 (5.3)	2 (1.1)	~ ~
Norway (9)	r	55 (5.0)	509 (3.5)	39 (4.8)	500 (5.2)	6 (1.8)	492 (7.5)
Oman		85 (1.6)	403 (3.0)	4 (1.1)	384 (5.9)	12 (1.2)	472 (9.8)
Portugal		85 (2.8)	502 (3.6)	9 (2.2)	481 (10.8)	6 (2.2)	500 (11.3)
Qatar		51 (2.6)	404 (5.7)	8 (2.2)	456 (22.7)	41 (2.5)	490 (5.4)
Romania		91 (1.9)	482 (4.5)	5 (1.6)	481 (18.8)	3 (1.1)	413 (16.8)
Russian Federation		75 (3.6)	552 (4.7)	14 (2.5)	536 (8.8)	11 (2.6)	500 (16.9)
Saudi Arabia		92 (1.8)	392 (2.6)	5 (1.6)	393 (13.4)	3 (0.8)	463 (27.6)
Singapore		0 (0.0)	~ ~	0 (0.0)	~ ~	100 (0.0)	616 (4.0)
South Africa (9)		9 (1.3)	444 (8.7)	10 (1.5)	453 (6.8)	81 (1.8)	377 (2.7)
Sweden		31 (3.6)	514 (6.2)	54 (3.8)	504 (3.2)	15 (3.3)	478 (6.7)
Turkey		77 (3.4)	508 (5.0)	9 (2.3)	479 (11.5)	13 (2.5)	435 (12.1)
United Arab Emirates		35 (0.9)	445 (3.8)	3 (0.2)	544 (7.6)	62 (0.9)	482 (2.0)
United States		50 (3.0)	522 (7.3)	39 (2.9)	515 (6.2)	10 (1.7)	509 (12.2)
International Average		**64 (0.5)**	**487 (0.8)**	**17 (0.4)**	**484 (2.1)**	**18 (0.3)**	**483 (2.3)**
Benchmarking Participants							
Ontario, Canada	r	46 (4.3)	521 (9.4)	41 (4.8)	536 (4.7)	13 (2.8)	527 (6.9)
Quebec, Canada		53 (4.6)	538 (4.6)	33 (4.9)	556 (6.6)	14 (3.3)	557 (13.2)
Moscow City, Russian Fed.		75 (3.5)	583 (4.8)	24 (3.4)	551 (7.3)	1 (0.8)	~ ~
Gauteng, RSA (9)		10 (2.9)	469 (17.7)	18 (3.0)	459 (9.6)	72 (3.4)	407 (3.8)
Western Cape, RSA (9)		32 (4.2)	446 (9.1)	27 (3.7)	479 (11.6)	40 (4.1)	413 (6.4)
Abu Dhabi, UAE	r	21 (0.7)	457 (8.4)	3 (0.1)	524 (13.6)	75 (0.7)	423 (3.5)
Dubai, UAE	r	20 (0.3)	453 (5.1)	6 (0.2)	585 (5.6)	74 (0.4)	553 (2.7)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 6.9: Schools with Students Having the Language of the Test as Their Native Language

Students' Results based on Principals' Reports

Country		School has More than 90% of Students with Language of Test as Their Native Language		School has 51–90% of Students with Language of Test as Their Native Language		School has 50% or Less of Students with Language of Test as Their Native Language	
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia		56 (3.8)	525 (3.6)	31 (3.5)	536 (7.5)	13 (2.8)	540 (14.8)
Bahrain		64 (0.3)	474 (2.0)	14 (0.2)	498 (4.6)	21 (0.3)	515 (4.2)
Chile		94 (2.0)	464 (3.1)	6 (2.0)	434 (14.3)	0 (0.0)	~ ~
Chinese Taipei		62 (3.3)	583 (2.8)	28 (3.5)	569 (3.8)	11 (2.1)	539 (6.7)
Cyprus	r	36 (0.4)	481 (3.5)	43 (0.5)	473 (3.4)	21 (0.4)	514 (4.6)
Egypt		99 (0.8)	389 (5.6)	1 (0.8)	~ ~	0 (0.0)	~ ~
England	s	50 (5.3)	521 (8.4)	35 (4.5)	528 (13.5)	15 (3.5)	501 (10.9)
Finland		75 (2.8)	545 (3.2)	23 (2.7)	536 (7.0)	1 (1.0)	~ ~
France	r	71 (3.7)	500 (3.6)	24 (3.5)	473 (6.6)	4 (1.9)	434 (13.0)
Georgia		86 (3.1)	446 (4.1)	12 (2.9)	451 (9.0)	2 (1.2)	~ ~
Hong Kong SAR		46 (3.5)	494 (7.9)	8 (2.6)	540 (31.5)	46 (4.1)	507 (9.0)
Hungary		98 (1.1)	530 (2.8)	2 (1.1)	~ ~	0 (0.0)	~ ~
Iran, Islamic Rep. of		48 (3.1)	469 (5.8)	12 (2.4)	461 (9.7)	40 (3.4)	422 (6.7)
Ireland		70 (4.0)	532 (3.0)	28 (4.0)	509 (5.9)	2 (1.4)	~ ~
Israel		65 (3.0)	512 (5.1)	30 (3.0)	516 (9.2)	5 (1.8)	505 (25.3)
Italy		59 (4.0)	502 (3.4)	37 (4.0)	503 (4.7)	4 (1.5)	474 (24.1)
Japan		99 (0.9)	570 (2.2)	1 (0.6)	~ ~	1 (0.6)	~ ~
Jordan		98 (0.8)	451 (4.8)	2 (0.4)	~ ~	1 (0.7)	~ ~
Kazakhstan		57 (2.6)	467 (4.7)	27 (3.2)	491 (5.9)	16 (2.9)	495 (9.9)
Korea, Rep. of		97 (1.3)	561 (2.1)	2 (1.2)	~ ~	1 (0.6)	~ ~
Kuwait		83 (3.1)	439 (5.6)	3 (1.5)	442 (38.8)	14 (2.8)	472 (15.1)
Lebanon		6 (2.1)	362 (12.4)	6 (2.1)	424 (26.3)	87 (2.9)	376 (5.9)
Lithuania		91 (2.2)	531 (2.8)	7 (2.0)	544 (16.7)	2 (0.8)	~ ~
Malaysia		47 (3.4)	473 (5.1)	29 (3.4)	445 (8.6)	24 (3.7)	453 (8.2)
Morocco	r	67 (3.7)	409 (3.0)	14 (2.6)	407 (8.5)	19 (2.9)	392 (5.3)
New Zealand	r	48 (4.8)	512 (4.7)	49 (5.0)	498 (5.7)	2 (1.1)	~ ~
Norway (9)	r	55 (5.0)	504 (4.1)	39 (4.8)	491 (5.9)	6 (1.8)	468 (8.2)
Oman		85 (1.6)	453 (3.2)	4 (1.1)	432 (9.8)	12 (1.2)	496 (9.1)
Portugal		85 (2.8)	520 (3.2)	9 (2.2)	505 (10.1)	6 (2.2)	520 (11.3)
Qatar		51 (2.6)	449 (5.5)	8 (2.2)	487 (18.3)	41 (2.5)	504 (6.7)
Romania		91 (1.9)	473 (4.3)	5 (1.6)	473 (16.3)	3 (1.1)	402 (21.1)
Russian Federation		75 (3.6)	551 (3.7)	14 (2.5)	538 (8.3)	11 (2.6)	498 (16.5)
Saudi Arabia		92 (1.8)	430 (2.7)	5 (1.6)	432 (14.7)	3 (0.8)	495 (24.4)
Singapore		0 (0.0)	~ ~	0 (0.0)	~ ~	100 (0.0)	608 (3.9)
South Africa (9)		9 (1.3)	448 (11.6)	10 (1.5)	463 (8.2)	81 (1.8)	352 (3.7)
Sweden		31 (3.6)	536 (7.1)	54 (3.8)	524 (4.2)	15 (3.3)	486 (9.7)
Turkey		77 (3.4)	527 (4.4)	9 (2.3)	503 (10.1)	13 (2.5)	457 (10.6)
United Arab Emirates		35 (0.9)	450 (4.1)	3 (0.2)	544 (9.0)	62 (0.9)	478 (2.5)
United States		50 (3.0)	530 (7.4)	39 (2.9)	520 (5.7)	10 (1.7)	516 (12.1)
International Average		**64 (0.5)**	**490 (0.8)**	**17 (0.4)**	**491 (2.3)**	**18 (0.3)**	**479 (2.4)**
Benchmarking Participants							
Ontario, Canada	r	46 (4.3)	521 (6.0)	41 (4.8)	524 (4.2)	13 (2.8)	509 (6.4)
Quebec, Canada		53 (4.6)	534 (4.5)	33 (4.9)	550 (6.3)	14 (3.3)	542 (11.2)
Moscow City, Russian Fed.		75 (3.5)	572 (3.2)	24 (3.4)	549 (5.4)	1 (0.8)	~ ~
Gauteng, RSA (9)		10 (2.9)	485 (20.4)	18 (3.0)	474 (12.2)	72 (3.4)	404 (5.1)
Western Cape, RSA (9)		32 (4.2)	449 (10.8)	27 (3.7)	491 (13.6)	40 (4.1)	399 (8.4)
Abu Dhabi, UAE	r	21 (0.7)	465 (10.2)	3 (0.1)	523 (16.1)	75 (0.7)	399 (4.3)
Dubai, UAE	r	20 (0.3)	458 (5.5)	6 (0.2)	586 (5.8)	74 (0.4)	567 (2.5)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Students Enter Primary School with Literacy and Numeracy Skills

To collect information about the ability composition of the student intake into the primary grades, TIMSS asked school principals to estimate the percentage of students in the school who possess a range of literacy and numeracy skills when beginning primary school (see About the Scale in Exhibit 6.10).

Exhibits 6.11 and 6.12 present the percentages of students in each of three groups of schools categorized by their principals' reports, together with average mathematics and science achievement, respectively. There was considerable variation across countries in the percentage of students in the highest category—"more than 75% enter with skills"—from 89 percent in Ireland, where many students start preprimary school after their fourth birthday (as described in the *TIMSS 2019 Encyclopedia*), to 0 percent in the Czech Republic and Hungary. On average, 24 percent of students were in schools where "more than 75%" of the students entered school with literacy and numeracy skills, 56 percent were in schools where "25–75%" entered with such skills, and 20 percent in schools where "less than 25%" enter with literacy and numeracy skills.

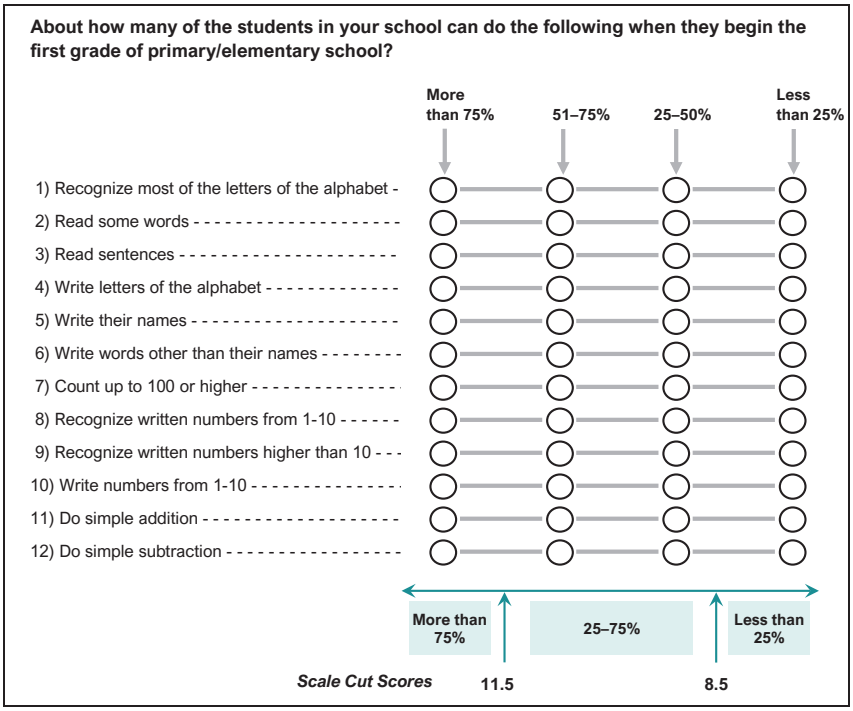
For both mathematics and science, average achievement was higher for students in schools with greater percentages of entering students having literacy and numeracy skills. Students attending schools where "more than 75% enter with skills" had the highest achievement, followed by schools where "25–75% enter with skills," and students in schools with "less than 25%" having the lowest average achievement (508, 499, and 480, respectively, for mathematics and 499, 490, and 471, respectively, for science).

Exhibit 6.10: Schools Where Students Enter the Primary Grades With Literacy and Numeracy Skills

Students' Results based on Principals' Reports

About the Scale

Students were scored according to their principals' reports regarding the percentage of students in the school who begin primary school with the twelve skills on the *Schools Where Students Enter the Primary Grades with Literacy and Numeracy Skills* scale. Cut scores divide the scale into three categories. Students in **Schools Where More than 75% Enter with Skills** had a score at or above the cut score corresponding to their principals reporting that "more than 75%" of the students have six of the twelve skills and "51–75%" of the students have the other six, on average. Students in **Schools Where Less than 25% Enter with Skills** had a score at or below the cut score corresponding to their principals reporting that "less than 25%" of the students have six of the twelve skills and "25–50%" of the students have the other six, on average. All other students attended **Schools Where 25–75% Enter with Skills**.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 6.11: Schools Where Students Enter the Primary Grades With Literacy and Numeracy Skills

Students' Results based on Principals' Reports

Country	Schools Where More than 75% Enter with Skills		Schools Where 25–75% Enter with Skills		Schools Where Less than 25% Enter with Skills		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Ireland	89 (2.6)	552 (2.6)	11 (2.6)	522 (9.8)	0 (0.4)	~ ~	12.7 (0.08)
Singapore	84 (0.0)	627 (4.5)	15 (0.0)	618 (9.0)	1 (0.0)	~ ~	12.7 (0.00)
Latvia	65 (4.1)	545 (3.5)	35 (4.1)	549 (3.5)	0 (0.0)	~ ~	11.8 (0.08)
Hong Kong SAR	65 (4.4)	607 (4.0)	35 (4.3)	593 (6.2)	1 (0.8)	~ ~	12.2 (0.13)
Korea, Rep. of	62 (4.0)	604 (2.8)	34 (4.1)	592 (4.1)	4 (1.9)	592 (18.9)	11.9 (0.15)
Spain	60 (2.9)	511 (2.5)	39 (2.8)	491 (3.5)	1 (0.8)	~ ~	11.8 (0.07)
United States	60 (3.1)	546 (3.4)	32 (3.1)	518 (6.0)	8 (1.6)	533 (7.2)	11.6 (0.12)
Chinese Taipei	59 (3.7)	599 (2.6)	39 (3.8)	601 (2.6)	2 (1.2)	~ ~	11.9 (0.13)
United Arab Emirates r	57 (1.1)	504 (2.3)	34 (1.2)	449 (2.9)	9 (0.4)	435 (5.4)	11.6 (0.04)
Qatar	52 (3.5)	465 (5.8)	38 (3.8)	432 (5.6)	10 (2.7)	435 (13.3)	11.4 (0.15)
England s	47 (5.1)	567 (8.0)	49 (5.1)	548 (4.4)	4 (1.9)	536 (21.5)	11.4 (0.16)
Bahrain	40 (2.6)	483 (3.9)	50 (2.9)	478 (3.8)	10 (1.8)	478 (5.3)	11.0 (0.10)
Philippines	39 (3.8)	310 (10.6)	55 (3.9)	288 (7.2)	6 (1.9)	287 (17.5)	11.1 (0.14)
Montenegro	37 (0.4)	451 (2.9)	61 (0.5)	454 (2.3)	2 (0.2)	~ ~	11.1 (0.01)
Kazakhstan	32 (3.6)	520 (4.8)	65 (3.6)	509 (3.6)	3 (1.2)	493 (17.8)	10.8 (0.11)
Sweden	31 (4.2)	531 (4.1)	62 (4.3)	516 (4.1)	6 (2.2)	504 (8.0)	11.0 (0.13)
Canada	30 (2.3)	522 (3.7)	64 (2.4)	510 (2.5)	6 (1.4)	491 (6.8)	10.8 (0.09)
Japan	28 (3.9)	598 (4.0)	69 (4.0)	591 (1.9)	3 (1.4)	588 (7.1)	10.9 (0.10)
Kuwait	27 (3.9)	403 (11.6)	50 (3.9)	385 (7.4)	24 (3.1)	353 (9.5)	10.2 (0.17)
Kosovo	25 (4.3)	449 (6.5)	64 (4.7)	443 (3.6)	11 (2.7)	438 (8.5)	10.4 (0.14)
Finland	24 (3.4)	540 (4.8)	74 (3.6)	531 (2.5)	3 (1.0)	496 (16.7)	10.8 (0.08)
Albania	21 (3.8)	506 (8.7)	75 (4.1)	490 (4.4)	4 (1.6)	509 (16.7)	10.6 (0.11)
Oman	21 (2.7)	447 (7.4)	68 (3.1)	430 (4.6)	12 (2.2)	406 (9.9)	10.3 (0.10)
Pakistan	20 (6.3)	365 (29.0)	45 (5.6)	306 (11.4)	35 (6.7)	336 (24.1)	9.4 (0.39)
Bulgaria	20 (3.2)	556 (4.7)	54 (4.5)	521 (6.5)	26 (3.5)	471 (9.3)	9.8 (0.14)
Saudi Arabia	20 (2.8)	415 (7.2)	54 (3.4)	402 (4.7)	27 (3.3)	381 (8.4)	9.8 (0.14)
Poland	18 (3.4)	523 (6.5)	77 (3.7)	520 (3.2)	5 (1.9)	505 (9.7)	10.5 (0.11)
Georgia	18 (3.6)	494 (7.6)	48 (4.2)	483 (5.2)	34 (4.0)	474 (7.5)	9.6 (0.21)
Lithuania	18 (2.6)	554 (7.6)	77 (2.8)	541 (3.3)	6 (1.4)	524 (8.8)	10.4 (0.10)
Azerbaijan	17 (2.7)	510 (7.2)	55 (3.5)	517 (3.8)	28 (3.4)	517 (5.3)	9.8 (0.13)
Russian Federation	15 (2.8)	576 (6.2)	68 (3.0)	570 (3.3)	17 (2.5)	549 (9.5)	10.0 (0.11)
Turkey (5)	14 (3.0)	540 (9.5)	36 (3.7)	536 (7.8)	49 (4.2)	507 (7.3)	9.1 (0.21)
Chile	13 (2.8)	481 (9.7)	60 (4.0)	438 (4.6)	27 (4.0)	430 (5.1)	9.7 (0.15)
Malta	13 (0.3)	519 (3.4)	68 (0.4)	512 (1.6)	19 (0.3)	490 (2.8)	9.8 (0.01)
France	13 (3.1)	503 (9.0)	83 (3.6)	483 (3.5)	4 (1.7)	455 (10.5)	10.3 (0.10)
Netherlands s	12 (3.8)	543 (7.2)	80 (5.1)	537 (2.7)	8 (3.7)	531 (11.5)	10.1 (0.13)
South Africa (5)	11 (1.9)	413 (18.4)	75 (3.3)	363 (4.1)	14 (2.8)	404 (12.9)	9.9 (0.11)
Portugal	10 (2.1)	536 (8.1)	68 (3.3)	526 (3.0)	22 (2.9)	521 (6.7)	9.4 (0.11)
Morocco	9 (2.1)	412 (15.6)	42 (3.5)	396 (8.0)	49 (3.1)	368 (6.8)	8.6 (0.13)
Australia	9 (2.1)	526 (9.3)	43 (3.4)	530 (4.8)	47 (3.3)	498 (4.6)	8.9 (0.13)
Armenia	8 (2.2)	492 (9.5)	56 (4.1)	504 (3.6)	36 (4.0)	491 (4.3)	9.1 (0.13)
Croatia	7 (2.3)	515 (15.0)	83 (3.2)	510 (2.3)	9 (2.4)	506 (5.7)	9.9 (0.10)
Iran, Islamic Rep. of	6 (2.0)	425 (9.9)	29 (3.9)	452 (8.1)	65 (3.9)	442 (5.9)	8.1 (0.15)
Cyprus	6 (2.0)	558 (9.6)	61 (4.2)	535 (3.7)	33 (3.9)	522 (5.7)	9.1 (0.12)
Denmark r	5 (2.1)	531 (12.5)	81 (3.7)	526 (2.5)	15 (3.2)	518 (5.0)	9.6 (0.09)
Bosnia and Herzegovina	5 (1.9)	469 (12.9)	67 (4.1)	451 (3.1)	28 (3.8)	450 (4.4)	9.3 (0.10)
Italy	4 (1.8)	506 (8.3)	67 (4.1)	517 (3.2)	28 (4.1)	513 (4.1)	9.2 (0.12)
Norway (5) r	4 (1.6)	556 (8.5)	75 (4.2)	548 (2.7)	21 (4.2)	527 (6.1)	9.3 (0.12)
North Macedonia	4 (1.3)	447 (31.3)	64 (4.5)	484 (5.5)	32 (4.4)	453 (9.5)	9.1 (0.13)
Serbia	4 (1.7)	531 (26.3)	77 (3.9)	512 (3.3)	19 (4.1)	486 (9.5)	9.5 (0.12)
New Zealand	3 (1.1)	528 (21.8)	48 (3.7)	505 (4.6)	49 (3.6)	468 (4.8)	8.4 (0.11)
Austria	3 (1.3)	527 (12.8)	53 (3.4)	545 (3.3)	44 (3.6)	534 (3.2)	8.8 (0.08)
Belgium (Flemish)	2 (1.3)	~ ~	79 (4.0)	535 (2.4)	18 (3.8)	521 (5.7)	9.3 (0.09)
Slovak Republic	1 (1.0)	~ ~	70 (3.2)	518 (2.9)	29 (3.1)	485 (8.2)	9.0 (0.09)
Germany	1 (0.6)	~ ~	68 (3.5)	527 (2.7)	31 (3.5)	508 (5.0)	8.9 (0.07)
Czech Republic	0 (0.0)	~ ~	60 (4.0)	539 (3.1)	40 (4.0)	525 (4.6)	8.7 (0.08)
Hungary	0 (0.0)	~ ~	32 (4.0)	534 (5.6)	68 (4.0)	517 (3.8)	7.8 (0.10)
Northern Ireland	- -	- -	- -	- -	- -	- -	- -
International Average	**24 (0.4)**	**508 (1.5)**	**56 (0.5)**	**499 (0.6)**	**20 (0.4)**	**480 (1.4)**	
Benchmarking Participants							
Dubai, UAE r	75 (0.3)	555 (2.0)	18 (0.2)	515 (3.2)	7 (0.3)	504 (4.8)	12.2 (0.01)
Madrid, Spain	72 (3.4)	521 (2.6)	28 (3.4)	513 (3.9)	0 (0.5)	~ ~	12.2 (0.09)
Abu Dhabi, UAE r	44 (1.7)	470 (3.4)	42 (1.8)	413 (3.6)	14 (0.9)	394 (11.0)	11.1 (0.06)
Moscow City, Russian Fed.	40 (4.3)	594 (3.4)	57 (4.4)	591 (2.8)	2 (1.3)	~ ~	11.2 (0.11)
Ontario, Canada	35 (4.1)	527 (6.2)	61 (4.3)	505 (4.4)	5 (2.0)	486 (7.4)	11.0 (0.16)
Quebec, Canada	21 (3.5)	538 (5.3)	72 (4.0)	531 (2.9)	7 (2.4)	527 (5.1)	10.6 (0.14)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 6.12: Schools Where Students Enter the Primary Grades With Literacy and Numeracy Skills

Students' Results based on Principals' Reports

Country		Schools Where More than 75% Enter with Skills		Schools Where 25–75% Enter with Skills		Schools Where Less than 25% Enter with Skills		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Ireland		89 (2.6)	531 (3.4)	11 (2.6)	505 (9.6)	0 (0.4)	~ ~	12.7 (0.08)
Singapore		84 (0.0)	596 (4.0)	15 (0.0)	586 (8.1)	1 (0.0)	~ ~	12.7 (0.00)
Latvia		65 (4.1)	541 (3.2)	35 (4.1)	544 (3.1)	0 (0.0)	~ ~	11.8 (0.08)
Hong Kong SAR		65 (4.4)	536 (4.0)	35 (4.3)	523 (5.8)	1 (0.8)	~ ~	12.2 (0.13)
Korea, Rep. of		62 (4.0)	592 (2.7)	34 (4.1)	581 (3.9)	4 (1.9)	583 (14.0)	11.9 (0.15)
Spain		60 (2.9)	520 (2.5)	39 (2.8)	499 (3.6)	1 (0.8)	~ ~	11.8 (0.07)
United States		60 (3.1)	549 (3.7)	32 (3.1)	521 (6.0)	8 (1.6)	539 (8.6)	11.6 (0.12)
Chinese Taipei		59 (3.7)	558 (2.5)	39 (3.8)	560 (2.4)	2 (1.2)	~ ~	11.9 (0.13)
United Arab Emirates	r	57 (1.1)	500 (2.7)	34 (1.2)	435 (4.0)	9 (0.4)	420 (6.9)	11.6 (0.04)
Qatar		52 (3.5)	466 (6.4)	38 (3.8)	430 (6.6)	10 (2.7)	441 (18.2)	11.4 (0.15)
England	s	47 (5.1)	547 (6.8)	49 (5.1)	529 (4.7)	4 (1.9)	521 (21.1)	11.4 (0.16)
Bahrain		40 (2.6)	502 (5.6)	50 (2.9)	490 (5.6)	10 (1.8)	477 (7.3)	11.0 (0.10)
Philippines		39 (3.8)	267 (12.6)	55 (3.9)	238 (8.4)	6 (1.9)	236 (17.3)	11.1 (0.14)
Montenegro		37 (0.4)	451 (3.6)	61 (0.5)	454 (2.8)	2 (0.2)	~ ~	11.1 (0.01)
Kazakhstan		32 (3.6)	500 (6.1)	65 (3.6)	492 (4.3)	3 (1.2)	476 (23.7)	10.8 (0.11)
Sweden		31 (4.2)	550 (4.5)	62 (4.3)	531 (4.8)	6 (2.2)	515 (9.7)	11.0 (0.13)
Canada		30 (2.3)	532 (3.4)	64 (2.4)	521 (2.2)	6 (1.4)	500 (5.0)	10.8 (0.09)
Japan		28 (3.9)	566 (4.2)	69 (4.0)	560 (1.8)	3 (1.4)	559 (7.4)	10.9 (0.10)
Kuwait		27 (3.9)	405 (14.6)	50 (3.9)	396 (8.4)	24 (3.1)	368 (11.0)	10.2 (0.17)
Kosovo		25 (4.3)	421 (7.5)	64 (4.7)	411 (4.6)	11 (2.7)	402 (10.6)	10.4 (0.14)
Finland		24 (3.4)	563 (4.6)	74 (3.6)	553 (2.8)	3 (1.0)	518 (19.2)	10.8 (0.08)
Albania		21 (3.8)	501 (7.6)	75 (4.1)	486 (4.9)	4 (1.6)	497 (16.0)	10.6 (0.11)
Oman		21 (2.7)	455 (7.6)	68 (3.1)	434 (5.2)	12 (2.2)	405 (12.1)	10.3 (0.10)
Pakistan		20 (6.3)	341 (25.5)	45 (5.6)	271 (13.9)	35 (6.7)	287 (27.7)	9.4 (0.39)
Bulgaria		20 (3.2)	574 (5.8)	54 (4.5)	532 (7.3)	26 (3.5)	459 (11.2)	9.8 (0.14)
Saudi Arabia		20 (2.8)	420 (7.9)	54 (3.4)	409 (5.4)	27 (3.3)	377 (9.7)	9.8 (0.14)
Poland		18 (3.4)	534 (5.5)	77 (3.7)	531 (3.1)	5 (1.9)	512 (8.5)	10.5 (0.11)
Georgia		18 (3.6)	470 (7.7)	48 (4.2)	456 (5.4)	34 (4.0)	444 (7.6)	9.6 (0.21)
Lithuania		18 (2.6)	549 (7.4)	77 (2.8)	537 (3.1)	6 (1.4)	518 (8.6)	10.4 (0.10)
Azerbaijan		17 (2.7)	420 (8.2)	55 (3.5)	429 (4.7)	28 (3.4)	426 (6.5)	9.8 (0.13)
Russian Federation		15 (2.8)	577 (5.9)	68 (3.0)	570 (3.0)	17 (2.5)	548 (9.2)	10.0 (0.11)
Turkey (5)		14 (3.0)	542 (8.3)	36 (3.7)	538 (6.9)	49 (4.2)	511 (7.1)	9.1 (0.21)
Chile		13 (2.8)	506 (8.8)	60 (4.0)	466 (4.3)	27 (4.0)	460 (4.7)	9.7 (0.15)
Malta		13 (0.3)	509 (3.5)	68 (0.4)	499 (1.3)	19 (0.3)	475 (2.8)	9.8 (0.01)
France		13 (3.1)	505 (9.7)	83 (3.6)	486 (3.3)	4 (1.7)	467 (16.7)	10.3 (0.10)
Netherlands	s	12 (3.8)	528 (10.3)	80 (5.1)	517 (3.4)	8 (3.7)	515 (13.2)	10.1 (0.13)
South Africa (5)		11 (1.9)	382 (24.9)	75 (3.3)	309 (5.7)	14 (2.8)	369 (17.5)	9.9 (0.11)
Portugal		10 (2.1)	513 (6.7)	68 (3.3)	505 (2.9)	22 (2.9)	500 (5.0)	9.4 (0.11)
Morocco		9 (2.1)	398 (21.3)	42 (3.5)	390 (9.3)	49 (3.1)	356 (7.9)	8.6 (0.13)
Australia		9 (2.1)	548 (7.0)	43 (3.4)	545 (4.3)	47 (3.3)	517 (4.0)	8.9 (0.13)
Armenia		8 (2.2)	460 (11.4)	56 (4.1)	472 (4.3)	36 (4.0)	459 (5.6)	9.1 (0.13)
Croatia		7 (2.3)	531 (9.8)	83 (3.2)	525 (2.3)	9 (2.4)	518 (6.4)	9.9 (0.10)
Iran, Islamic Rep. of		6 (2.0)	432 (7.8)	29 (3.9)	451 (8.1)	65 (3.9)	438 (6.0)	8.1 (0.15)
Cyprus		6 (2.0)	539 (12.0)	61 (4.2)	513 (3.8)	33 (3.9)	503 (5.5)	9.1 (0.12)
Denmark	r	5 (2.1)	523 (11.1)	81 (3.7)	523 (2.8)	15 (3.2)	515 (4.9)	9.6 (0.09)
Bosnia and Herzegovina		5 (1.9)	479 (14.0)	67 (4.1)	457 (3.7)	28 (3.8)	459 (4.7)	9.3 (0.10)
Italy		4 (1.8)	502 (6.6)	67 (4.1)	512 (3.7)	28 (4.1)	507 (4.6)	9.2 (0.12)
Norway (5)	r	4 (1.6)	548 (10.2)	75 (4.2)	545 (2.5)	21 (4.2)	522 (6.3)	9.3 (0.12)
North Macedonia		4 (1.3)	388 (35.7)	64 (4.5)	438 (6.9)	32 (4.4)	409 (10.5)	9.1 (0.13)
Serbia		4 (1.7)	541 (26.3)	77 (3.9)	522 (3.5)	19 (4.1)	494 (9.7)	9.5 (0.12)
New Zealand		3 (1.1)	538 (17.6)	48 (3.7)	519 (3.6)	49 (3.6)	485 (4.5)	8.4 (0.11)
Austria		3 (1.3)	513 (18.9)	53 (3.4)	531 (3.6)	44 (3.6)	512 (4.2)	8.8 (0.08)
Belgium (Flemish)		2 (1.3)	~ ~	79 (4.0)	504 (2.6)	18 (3.8)	487 (5.7)	9.3 (0.09)
Slovak Republic		1 (1.0)	~ ~	70 (3.2)	532 (2.9)	29 (3.1)	489 (9.8)	9.0 (0.09)
Germany		1 (0.6)	~ ~	68 (3.5)	525 (2.7)	31 (3.5)	503 (5.2)	8.9 (0.07)
Czech Republic		0 (0.0)	~ ~	60 (4.0)	538 (3.2)	40 (4.0)	527 (4.1)	8.7 (0.08)
Hungary		0 (0.0)	~ ~	32 (4.0)	537 (5.3)	68 (4.0)	525 (3.7)	7.8 (0.10)
Northern Ireland		- -	- -	- -	- -	- -	- -	- -
International Average		**24 (0.4)**	**499 (1.6)**	**56 (0.5)**	**490 (0.7)**	**20 (0.4)**	**471 (1.6)**	
Benchmarking Participants								
Dubai, UAE	r	75 (0.3)	556 (2.2)	18 (0.2)	513 (3.5)	7 (0.3)	515 (6.1)	12.2 (0.01)
Madrid, Spain		72 (3.4)	526 (2.4)	28 (3.4)	517 (3.5)	0 (0.5)	~ ~	12.2 (0.09)
Abu Dhabi, UAE	r	44 (1.7)	459 (3.6)	42 (1.8)	381 (5.1)	14 (0.9)	360 (14.2)	11.1 (0.06)
Moscow City, Russian Fed.		40 (4.3)	597 (3.3)	57 (4.4)	593 (2.8)	2 (1.3)	~ ~	11.2 (0.11)
Ontario, Canada		35 (4.1)	534 (5.9)	61 (4.3)	521 (3.8)	5 (2.0)	491 (7.6)	11.0 (0.16)
Quebec, Canada		21 (3.5)	525 (4.0)	72 (4.0)	523 (3.2)	7 (2.4)	509 (4.5)	10.6 (0.14)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Instruction Affected by Resource Shortages

Instruction Affected by Mathematics Resource Shortages

The *Instruction Affected by Mathematics Resource Shortages* scale, described in Exhibit 6.13, summarizes principals' reports about two kinds of resource shortages affecting instruction: general school resources and resources specific to mathematics instruction (see About the Scale). In Exhibit 6.14, countries are ordered (from most to least) according to the percentage of fourth grade students in schools "not affected" by resource shortages, from a high of 68 percent in Korea to a low of 0 percent in Kosovo. On average, 26 percent of fourth grade students attended schools "not affected" by resource shortages, and they had the highest average mathematics achievement (514). Sixty-eight percent of the students were in schools "somewhat affected" by resource shortages, and 6 percent were in schools "affected a lot." Average mathematics achievement for these two groups was 499 and 473, respectively.

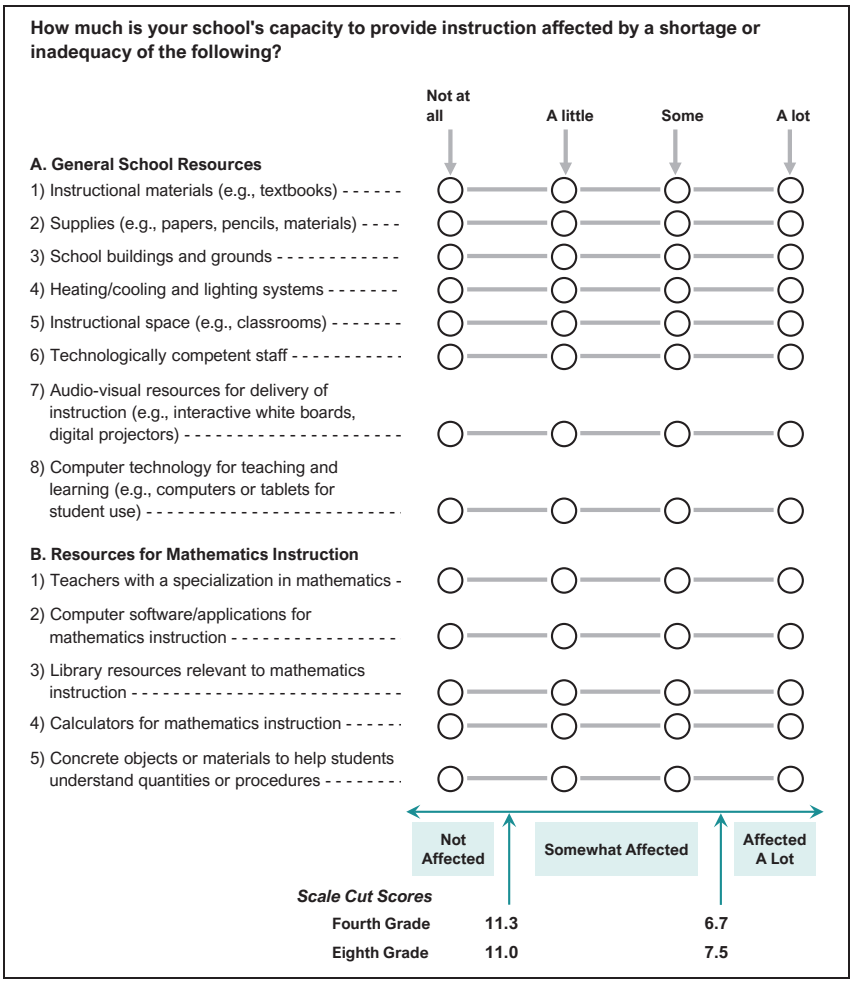
Exhibit 6.15 presents the results of the *Instruction Affected by Mathematics Resource Shortages* scale for eighth grade students. Similar to fourth grade, the percentage of students in schools "not affected" by resource shortages ranged from a high of 73 percent to a low of 2 percent, with an average of 30 percent. Sixty-three percent of the students were in schools "somewhat affected" by resource shortages, and 7 percent were in schools "affected a lot." As in fourth grade, average mathematics achievement was highest for students in schools "not affected" by resource shortages (509), next for students in "somewhat affected" schools (483), and lowest for students in schools that were "affected a lot" (476).

Exhibit 6.13: Instruction Affected by Mathematics Resource Shortages – Principals' Reports

Students' Results based on Principals' Reports

About the Scale

Students were scored according to their principals' responses regarding thirteen school and classroom resources on the *Instruction Affected by Mathematics Resource Shortages* scale. Cut scores divide the scale into three categories. Students in schools where instruction was **Not Affected** by resource shortages had a score at or above the cut score corresponding to their principals reporting that shortages affected instruction "not at all" for seven of the thirteen resources and "a little" for the other six, on average. Students in schools where instruction was **Affected A Lot** had a score at or below the cut score corresponding to their principals reporting that shortages affected instruction "a lot" for seven of the thirteen resources and "some" for the other six, on average. All other students attended schools where instruction was **Somewhat Affected** by resource shortages.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 6.14: Instruction Affected by Mathematics Resource Shortages – Principals' Reports

Students' Results based on Principals' Reports

Country	Not Affected		Somewhat Affected		Affected A Lot		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Korea, Rep. of	68 (4.0)	601 (2.8)	30 (3.9)	594 (4.0)	2 (0.7)	~ ~	12.3 (0.23)
Singapore	61 (0.0)	624 (5.2)	27 (0.0)	635 (6.8)	12 (0.0)	611 (10.0)	11.5 (0.00)
Norway (5) r	52 (5.3)	544 (4.0)	48 (5.3)	544 (3.5)	0 (0.0)	~ ~	11.3 (0.15)
Bulgaria	50 (4.1)	523 (4.4)	50 (4.1)	507 (7.1)	0 (0.0)	~ ~	11.4 (0.17)
United States	49 (2.9)	538 (4.4)	49 (2.8)	532 (4.5)	1 (0.7)	~ ~	11.4 (0.14)
Kazakhstan	45 (4.1)	513 (4.5)	49 (4.0)	509 (4.0)	6 (2.0)	526 (18.3)	11.2 (0.25)
Australia	44 (4.0)	523 (5.9)	53 (3.9)	509 (4.2)	3 (1.4)	485 (20.2)	11.3 (0.18)
Poland	43 (4.0)	526 (4.2)	57 (4.0)	516 (3.3)	0 (0.0)	~ ~	11.2 (0.16)
Canada	43 (2.4)	521 (2.9)	56 (2.4)	504 (2.5)	1 (0.6)	~ ~	11.1 (0.12)
Sweden	43 (4.7)	522 (4.0)	57 (4.7)	521 (3.7)	1 (0.8)	~ ~	10.8 (0.18)
Qatar	42 (3.7)	474 (6.3)	27 (3.5)	445 (7.1)	31 (3.2)	420 (5.6)	9.7 (0.34)
United Arab Emirates	40 (1.8)	509 (2.1)	44 (1.7)	454 (2.6)	16 (1.9)	474 (4.0)	10.2 (0.19)
Belgium (Flemish)	39 (4.2)	532 (3.7)	59 (4.3)	533 (2.6)	1 (0.8)	~ ~	11.0 (0.19)
Cyprus	39 (4.5)	539 (4.5)	57 (4.3)	526 (4.4)	4 (2.1)	539 (14.3)	10.7 (0.25)
Denmark r	38 (3.9)	530 (3.3)	59 (3.7)	522 (2.7)	2 (0.8)	~ ~	10.8 (0.17)
New Zealand	38 (3.9)	497 (6.4)	60 (4.1)	482 (4.2)	2 (1.1)	~ ~	11.0 (0.19)
Finland	38 (4.3)	532 (3.6)	62 (4.3)	532 (3.1)	0 (0.0)	~ ~	10.8 (0.13)
Armenia	37 (4.0)	505 (4.8)	62 (4.1)	495 (3.3)	1 (1.0)	~ ~	10.7 (0.15)
Latvia	35 (3.7)	536 (6.0)	65 (3.7)	551 (2.8)	0 (0.0)	~ ~	10.8 (0.13)
Netherlands s	35 (6.5)	541 (4.7)	65 (6.5)	536 (2.7)	0 (0.0)	~ ~	10.7 (0.19)
Spain	35 (3.3)	515 (3.0)	65 (3.3)	496 (3.2)	0 (0.3)	~ ~	10.8 (0.10)
Georgia	33 (4.1)	477 (7.3)	66 (4.2)	485 (4.5)	1 (0.7)	~ ~	10.7 (0.16)
Chile	31 (4.1)	463 (7.0)	65 (4.3)	430 (3.5)	4 (1.7)	443 (13.5)	10.4 (0.19)
Czech Republic	30 (4.0)	534 (4.3)	69 (4.1)	532 (3.6)	1 (0.8)	~ ~	10.8 (0.12)
Russian Federation	28 (3.1)	576 (6.8)	69 (3.3)	562 (3.3)	2 (1.1)	~ ~	10.3 (0.14)
Chinese Taipei	25 (3.4)	600 (4.3)	72 (3.5)	599 (2.3)	3 (1.3)	603 (9.1)	10.4 (0.15)
Bahrain	25 (2.4)	495 (4.6)	48 (2.6)	480 (2.8)	27 (2.2)	467 (6.2)	9.0 (0.18)
Hungary	25 (3.7)	520 (6.6)	73 (3.9)	523 (3.6)	2 (1.6)	~ ~	10.0 (0.17)
Japan	25 (3.5)	598 (4.1)	75 (3.6)	591 (2.0)	1 (0.7)	~ ~	10.4 (0.12)
Lithuania	23 (4.0)	542 (6.4)	76 (4.1)	542 (3.8)	1 (0.8)	~ ~	10.4 (0.17)
England s	23 (4.1)	566 (10.7)	77 (4.1)	555 (5.0)	0 (0.0)	~ ~	10.6 (0.16)
Malta	22 (0.4)	523 (2.4)	76 (0.4)	505 (1.6)	1 (0.1)	~ ~	10.3 (0.02)
Hong Kong SAR	22 (3.0)	602 (6.1)	72 (3.9)	600 (4.4)	6 (2.5)	628 (17.8)	9.8 (0.22)
Kuwait	21 (3.0)	398 (9.1)	59 (4.4)	374 (6.9)	21 (3.7)	394 (14.0)	8.7 (0.22)
Serbia	20 (3.5)	524 (6.8)	79 (3.5)	504 (3.6)	1 (0.9)	~ ~	9.9 (0.12)
Germany	19 (2.7)	524 (5.8)	81 (2.7)	521 (2.6)	0 (0.3)	~ ~	10.1 (0.10)
Northern Ireland r	18 (3.7)	571 (10.7)	82 (3.7)	566 (3.5)	0 (0.0)	~ ~	9.9 (0.14)
Austria	18 (2.8)	555 (5.7)	81 (2.9)	536 (2.1)	1 (0.7)	~ ~	10.2 (0.09)
Portugal	16 (2.7)	531 (5.9)	83 (2.8)	524 (3.1)	1 (0.7)	~ ~	9.9 (0.13)
Croatia	16 (2.8)	518 (6.6)	84 (2.8)	509 (2.3)	0 (0.0)	~ ~	10.1 (0.12)
Ireland	16 (3.4)	568 (6.8)	83 (3.5)	545 (2.7)	1 (0.7)	~ ~	10.2 (0.11)
Slovak Republic	15 (2.9)	524 (8.0)	79 (3.1)	506 (3.8)	6 (1.6)	529 (17.6)	9.4 (0.13)
Italy	15 (2.8)	525 (7.3)	83 (3.0)	514 (2.6)	2 (1.3)	~ ~	9.9 (0.12)
Oman	14 (2.0)	449 (7.9)	72 (2.8)	428 (5.0)	14 (2.2)	426 (11.8)	8.9 (0.13)
France	14 (2.8)	504 (7.9)	86 (2.8)	482 (3.4)	0 (0.0)	~ ~	9.8 (0.12)
Bosnia and Herzegovina	12 (2.7)	454 (4.9)	83 (3.3)	452 (2.8)	5 (1.7)	442 (18.1)	9.5 (0.14)
Montenegro	10 (0.2)	438 (8.8)	83 (0.3)	456 (2.0)	7 (0.2)	441 (4.0)	9.3 (0.02)
Saudi Arabia	9 (1.8)	409 (11.6)	72 (3.0)	393 (4.7)	19 (2.5)	416 (8.4)	8.6 (0.13)
Pakistan	8 (2.7)	288 (28.7)	89 (3.1)	329 (12.9)	3 (1.3)	388 (29.6)	9.1 (0.17)
Iran, Islamic Rep. of	8 (1.9)	470 (13.1)	84 (2.6)	443 (4.0)	8 (2.0)	414 (10.5)	8.6 (0.13)
South Africa (5)	8 (1.7)	454 (22.6)	87 (2.4)	368 (3.5)	6 (1.6)	376 (18.9)	9.1 (0.11)
North Macedonia	8 (2.3)	469 (20.1)	79 (3.7)	475 (6.1)	14 (3.0)	461 (15.0)	8.7 (0.17)
Albania	6 (1.7)	550 (16.5)	78 (3.1)	489 (4.1)	15 (2.8)	495 (8.3)	8.7 (0.15)
Morocco	6 (1.7)	362 (24.8)	90 (2.5)	379 (5.1)	4 (1.8)	508 (44.5)	9.5 (0.11)
Turkey (5)	5 (1.7)	556 (17.7)	72 (2.8)	524 (5.5)	23 (3.0)	513 (10.9)	8.1 (0.16)
Azerbaijan	2 (1.0)	~ ~	89 (2.1)	516 (2.9)	9 (1.9)	509 (8.8)	8.5 (0.09)
Philippines	1 (0.4)	~ ~	95 (1.4)	294 (6.7)	4 (1.4)	336 (16.6)	8.7 (0.09)
Kosovo	0 (0.0)	~ ~	72 (4.1)	445 (3.9)	28 (4.1)	443 (4.4)	7.5 (0.20)
International Average	**26 (0.4)**	**514 (1.3)**	**68 (0.5)**	**499 (0.6)**	**6 (0.2)**	**473 (3.2)**	
Benchmarking Participants							
Moscow City, Russian Fed.	65 (4.1)	591 (3.1)	35 (4.1)	596 (3.0)	0 (0.0)	~ ~	12.5 (0.25)
Dubai, UAE r	55 (0.3)	554 (2.5)	29 (0.3)	519 (2.3)	16 (0.2)	557 (4.6)	10.9 (0.02)
Madrid, Spain	50 (3.8)	520 (3.0)	50 (3.8)	516 (3.8)	0 (0.4)	~ ~	11.6 (0.16)
Quebec, Canada	49 (4.2)	535 (3.3)	49 (4.2)	529 (3.5)	3 (1.6)	539 (25.6)	11.2 (0.22)
Abu Dhabi, UAE r	36 (1.5)	469 (2.7)	51 (1.8)	411 (3.7)	13 (1.4)	436 (11.0)	10.2 (0.09)
Ontario, Canada	35 (4.4)	530 (6.5)	64 (4.4)	501 (3.8)	1 (0.6)	~ ~	10.9 (0.19)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 6.15: Instruction Affected by Mathematics Resource Shortages – Principals' Reports

Students' Results based on Principals' Reports

Country	Not Affected		Somewhat Affected		Affected A Lot		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Singapore	73 (0.0)	617 (4.7)	21 (0.0)	610 (9.2)	6 (0.0)	625 (20.1)	12.1 (0.00)
Australia	62 (3.5)	535 (5.7)	37 (3.5)	493 (4.8)	2 (1.2)	~ ~	11.4 (0.13)
Norway (9) r	59 (4.8)	507 (4.1)	41 (4.8)	502 (4.0)	0 (0.0)	~ ~	11.2 (0.10)
France r	57 (4.4)	493 (3.9)	42 (4.3)	474 (4.0)	1 (0.8)	~ ~	11.4 (0.14)
Korea, Rep. of	52 (4.1)	611 (4.0)	44 (4.3)	602 (4.6)	4 (1.9)	601 (6.9)	11.3 (0.16)
New Zealand	51 (4.7)	500 (6.3)	45 (4.9)	473 (5.0)	5 (4.0)	473 (66.4)	11.0 (0.30)
United States	49 (3.0)	533 (5.3)	49 (3.0)	504 (7.4)	2 (1.0)	~ ~	11.1 (0.12)
Qatar	44 (3.6)	476 (8.4)	29 (3.4)	430 (6.8)	27 (3.5)	404 (7.6)	9.8 (0.25)
Hong Kong SAR	44 (4.5)	593 (7.0)	50 (3.9)	562 (7.3)	7 (2.7)	610 (26.0)	10.5 (0.25)
Sweden	42 (3.8)	510 (4.5)	56 (3.7)	498 (3.3)	2 (1.1)	~ ~	10.9 (0.09)
United Arab Emirates	41 (1.8)	499 (2.7)	44 (1.8)	450 (2.8)	15 (0.7)	455 (4.9)	10.3 (0.06)
Cyprus r	41 (0.5)	509 (3.2)	54 (0.5)	494 (2.3)	5 (0.2)	532 (6.5)	10.8 (0.02)
Kazakhstan	39 (3.9)	492 (6.7)	54 (4.2)	483 (4.7)	7 (2.1)	497 (26.0)	10.8 (0.16)
Japan	39 (3.3)	606 (5.0)	61 (3.4)	587 (2.9)	1 (0.7)	~ ~	10.7 (0.08)
Finland	38 (4.1)	508 (4.9)	62 (4.2)	509 (2.9)	1 (0.7)	~ ~	10.8 (0.11)
Chile	35 (3.3)	466 (6.7)	62 (3.4)	427 (3.7)	3 (1.4)	426 (17.7)	10.4 (0.13)
England s	34 (5.0)	530 (12.7)	64 (4.8)	515 (7.4)	1 (1.4)	~ ~	10.6 (0.17)
Chinese Taipei	32 (3.4)	619 (5.2)	68 (3.4)	610 (3.6)	0 (0.0)	~ ~	10.7 (0.10)
Georgia	32 (3.4)	474 (9.4)	68 (3.5)	455 (5.2)	1 (1.0)	~ ~	10.5 (0.10)
Ireland	31 (3.5)	533 (5.2)	68 (3.6)	522 (2.9)	1 (0.6)	~ ~	10.6 (0.11)
Hungary	28 (4.1)	510 (8.7)	71 (4.1)	519 (4.9)	1 (1.0)	~ ~	10.3 (0.11)
Russian Federation	23 (3.4)	555 (8.7)	75 (3.5)	541 (5.0)	1 (0.7)	~ ~	10.1 (0.12)
Lebanon	21 (3.0)	469 (6.5)	66 (3.5)	418 (3.7)	13 (2.6)	419 (10.0)	9.5 (0.15)
Bahrain	21 (0.2)	499 (3.1)	52 (0.2)	472 (2.2)	27 (0.2)	485 (4.3)	9.2 (0.01)
Egypt	20 (3.3)	440 (10.9)	73 (3.6)	405 (6.2)	8 (2.4)	424 (10.8)	9.8 (0.15)
Israel	17 (3.5)	539 (10.8)	80 (3.7)	514 (5.3)	3 (1.1)	535 (35.2)	9.9 (0.12)
Oman	17 (2.7)	442 (8.6)	71 (3.4)	403 (3.5)	12 (2.5)	408 (8.4)	9.5 (0.13)
Kuwait	17 (3.6)	419 (12.7)	59 (4.3)	393 (5.5)	23 (3.6)	412 (9.9)	9.0 (0.18)
Lithuania	16 (3.1)	519 (7.1)	81 (3.5)	518 (3.7)	3 (1.7)	534 (19.9)	10.1 (0.10)
Portugal	15 (2.9)	520 (8.1)	82 (3.2)	496 (3.6)	3 (1.6)	506 (21.0)	10.0 (0.10)
Italy	14 (3.0)	507 (7.6)	86 (3.0)	497 (2.9)	0 (0.0)	~ ~	9.9 (0.07)
Saudi Arabia	11 (2.3)	401 (7.9)	67 (3.7)	388 (3.4)	22 (3.1)	410 (6.1)	8.8 (0.13)
Turkey	8 (2.3)	543 (20.7)	71 (3.4)	499 (5.4)	21 (3.0)	468 (12.1)	8.6 (0.13)
Romania	8 (2.1)	536 (16.4)	86 (2.7)	476 (4.6)	7 (2.0)	460 (17.2)	9.5 (0.12)
Jordan	7 (2.4)	406 (24.9)	82 (3.0)	417 (4.5)	11 (2.3)	451 (13.2)	9.0 (0.10)
South Africa (9)	6 (1.0)	477 (15.7)	88 (1.9)	383 (2.5)	6 (1.6)	386 (8.9)	9.3 (0.08)
Morocco	5 (1.7)	435 (17.9)	92 (1.6)	384 (2.2)	3 (0.9)	441 (13.4)	9.6 (0.07)
Iran, Islamic Rep. of	4 (1.4)	534 (15.9)	87 (2.6)	443 (3.6)	9 (2.3)	445 (17.6)	9.0 (0.10)
Malaysia	2 (0.7)	~ ~	79 (3.2)	452 (3.7)	18 (3.2)	489 (10.5)	8.3 (0.09)
International Average	**30 (0.5)**	**509 (1.6)**	**63 (0.6)**	**483 (0.7)**	**7 (0.3)**	**476 (4.1)**	
Benchmarking Participants							
Quebec, Canada	68 (4.6)	545 (3.8)	31 (4.6)	549 (8.0)	1 (1.1)	~ ~	11.7 (0.15)
Moscow City, Russian Fed.	63 (4.2)	574 (5.6)	37 (4.2)	578 (6.0)	0 (0.0)	~ ~	11.8 (0.16)
Dubai, UAE r	58 (0.5)	551 (3.4)	28 (0.4)	504 (3.9)	13 (0.3)	538 (3.8)	11.2 (0.02)
Ontario, Canada r	44 (4.5)	539 (8.5)	55 (4.5)	518 (5.1)	1 (1.1)	~ ~	11.0 (0.18)
Abu Dhabi, UAE r	38 (1.9)	461 (4.7)	40 (1.9)	418 (5.8)	21 (1.2)	414 (9.5)	10.0 (0.10)
Western Cape, RSA (9)	14 (2.3)	546 (11.3)	84 (2.6)	425 (4.6)	3 (1.3)	434 (36.7)	9.7 (0.10)
Gauteng, RSA (9)	10 (2.6)	500 (9.7)	86 (2.8)	409 (3.5)	4 (1.3)	449 (29.0)	9.4 (0.11)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Instruction Affected by Science Resource Shortages

The *Instruction Affected by Science Resource Shortages* scale, like its counterpart for mathematics, includes principals' reports about two kinds of resource shortages affecting instruction: general school resources and resources specific to science instruction (see About the Scale in Exhibit 6.16). On average, 24 percent of fourth grade students were in schools "not affected" by science resource shortages, 69 percent were in schools "somewhat affected," and 7 percent were in schools "affected a lot" (see Exhibit 6.17). Average science achievement ranged across the three categories from a high of 508 for students in schools "not affected" by resource shortages, to 488 for students in schools "somewhat affected," to a low of 472 for students in schools "affected a lot."

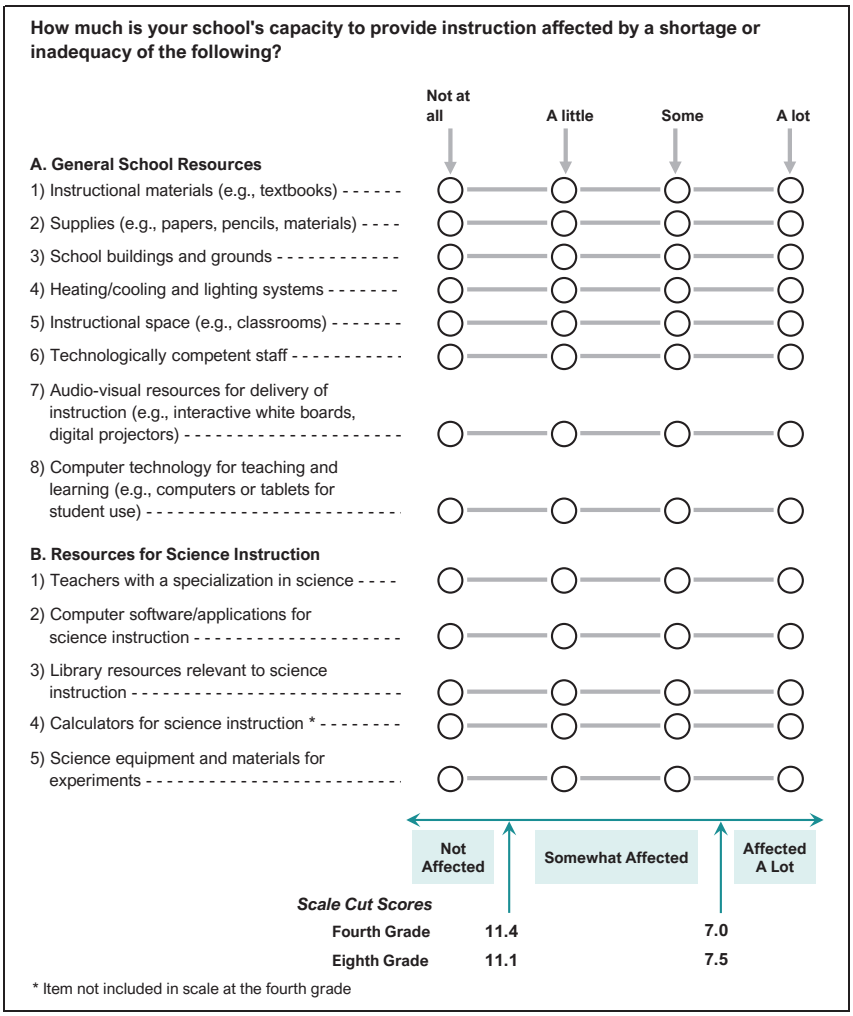
Eighth grade students' results for the *Instruction Affected by Science Resource Shortages* scale are shown in Exhibit 6.18. On average, 30 percent of students were in schools "not affected" by science resource shortages, 62 percent were in schools "somewhat affected," and 8 percent were in schools "affected a lot." Similar to the mathematics scale, there was a modest negative association between the degree students' schools were affected by resource shortages and average science achievement, with achievement highest for students in schools "not affected" by resource shortages (510), next highest in "somewhat affected" schools (484), and lowest in schools that were "affected a lot" (472).

Exhibit 6.16: Instruction Affected by Science Resource Shortages – Principals' Reports

Students' Results based on Principals' Reports

About the Scale

Students were scored according to their principals' responses regarding thirteen school and classroom resources on the *Instruction Affected by Science Resource Shortages* scale. Cut scores divide the scale into three categories. Students in schools where instruction was **Not Affected** by resource shortages had a score at or above the cut score corresponding to their principals reporting that shortages affected instruction "not at all" for seven of the thirteen resources and "a little" for the other six, on average. Students in schools where instruction was **Affected A Lot** had a score at or below the cut score corresponding to their principals reporting that shortages affected instruction "a lot" for seven of the thirteen resources and "some" for the other six, on average. All other students attended schools where instruction was **Somewhat Affected** by resource shortages.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 6.17: Instruction Affected by Science Resource Shortages – Principals' Reports

Students' Results based on Principals' Reports

Country	Not Affected		Somewhat Affected		Affected A Lot		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Korea, Rep. of	70 (4.0)	590 (2.7)	27 (3.9)	581 (3.8)	4 (1.2)	599 (12.5)	12.6 (0.24)
Singapore	63 (0.0)	595 (4.5)	25 (0.0)	601 (5.8)	12 (0.0)	582 (8.8)	11.6 (0.00)
Bulgaria	48 (4.1)	533 (5.4)	52 (4.1)	510 (8.0)	0 (0.0)	~ ~	11.4 (0.16)
Poland	48 (4.2)	532 (3.6)	51 (4.2)	529 (3.5)	1 (0.8)	~ ~	11.3 (0.16)
United States	45 (2.9)	544 (5.1)	54 (2.9)	535 (4.3)	2 (0.8)	~ ~	11.2 (0.14)
Qatar	43 (3.8)	473 (7.6)	24 (3.4)	444 (7.7)	33 (3.3)	423 (6.4)	9.6 (0.36)
Kazakhstan	43 (4.3)	493 (5.9)	49 (4.1)	497 (5.3)	8 (2.1)	485 (18.0)	11.3 (0.26)
United Arab Emirates	40 (1.8)	502 (2.5)	42 (1.7)	444 (3.0)	18 (1.8)	464 (4.0)	10.2 (0.19)
Norway (5) r	39 (5.3)	542 (3.6)	61 (5.3)	539 (3.5)	0 (0.0)	~ ~	10.9 (0.13)
Georgia	38 (4.1)	455 (6.9)	61 (4.2)	455 (5.0)	1 (0.8)	~ ~	10.9 (0.18)
Australia	37 (3.7)	538 (5.6)	61 (3.8)	530 (3.7)	2 (1.4)	~ ~	10.9 (0.16)
Belgium (Flemish)	35 (4.4)	502 (3.7)	64 (4.4)	500 (3.0)	1 (0.8)	~ ~	10.9 (0.17)
Sweden	35 (4.4)	536 (5.5)	64 (4.5)	538 (4.0)	1 (0.8)	~ ~	10.8 (0.16)
Cyprus	34 (4.8)	517 (4.7)	60 (4.6)	506 (3.6)	6 (2.6)	526 (15.1)	10.7 (0.25)
Canada	33 (2.1)	530 (3.3)	66 (2.1)	520 (2.1)	2 (0.7)	~ ~	10.8 (0.09)
Latvia	32 (3.3)	533 (6.2)	66 (3.5)	545 (2.6)	1 (0.9)	~ ~	10.8 (0.14)
Spain	31 (3.0)	523 (3.3)	68 (3.1)	506 (2.9)	1 (0.8)	~ ~	10.7 (0.10)
Armenia	30 (4.1)	474 (5.7)	69 (4.1)	464 (3.9)	1 (0.6)	~ ~	10.7 (0.16)
Denmark r	30 (3.6)	523 (4.0)	67 (3.4)	522 (3.0)	3 (1.1)	522 (8.4)	10.7 (0.16)
Finland	30 (3.7)	552 (3.9)	70 (3.7)	556 (3.3)	0 (0.0)	~ ~	10.7 (0.13)
Chinese Taipei	30 (3.4)	560 (3.4)	67 (3.3)	557 (2.2)	3 (1.3)	555 (10.2)	10.6 (0.17)
Czech Republic	29 (4.2)	531 (4.3)	70 (4.3)	535 (3.3)	1 (0.8)	~ ~	10.9 (0.13)
Chile	28 (3.8)	489 (6.8)	66 (4.1)	462 (3.4)	6 (2.1)	462 (12.2)	10.3 (0.18)
Russian Federation	27 (3.0)	574 (6.3)	69 (3.0)	564 (3.2)	4 (1.2)	575 (11.9)	10.3 (0.15)
New Zealand	27 (3.5)	516 (6.3)	71 (3.6)	498 (3.3)	3 (1.3)	485 (21.8)	10.5 (0.16)
Bahrain	24 (2.3)	521 (5.5)	43 (2.3)	488 (4.9)	33 (2.0)	478 (7.2)	9.0 (0.19)
Hungary	24 (3.6)	526 (7.0)	74 (4.0)	530 (3.5)	3 (1.8)	512 (40.0)	10.1 (0.17)
Japan	23 (3.6)	564 (3.9)	74 (3.6)	561 (2.0)	3 (1.0)	572 (6.4)	10.5 (0.13)
Lithuania	23 (3.7)	535 (6.3)	76 (3.8)	539 (3.5)	1 (0.8)	~ ~	10.4 (0.17)
Kuwait	22 (3.0)	408 (10.8)	51 (4.9)	382 (8.4)	27 (4.1)	401 (15.1)	8.6 (0.26)
England s	21 (3.9)	557 (7.9)	79 (3.9)	532 (4.8)	0 (0.0)	~ ~	10.5 (0.14)
Malta	21 (0.4)	513 (2.5)	76 (0.4)	491 (1.5)	3 (0.1)	501 (5.9)	10.3 (0.02)
Serbia	20 (3.5)	533 (7.0)	77 (3.6)	513 (4.0)	3 (1.2)	507 (15.5)	9.9 (0.12)
Croatia	18 (2.9)	527 (5.5)	82 (2.9)	524 (2.2)	0 (0.0)	~ ~	10.2 (0.14)
Germany	17 (2.6)	520 (7.1)	82 (2.6)	518 (2.5)	0 (0.3)	~ ~	10.2 (0.10)
Hong Kong SAR	17 (2.7)	540 (6.3)	74 (3.8)	528 (4.5)	8 (2.6)	541 (24.6)	9.7 (0.20)
Austria	16 (2.8)	545 (6.5)	83 (2.8)	518 (2.7)	1 (0.6)	~ ~	10.2 (0.09)
Bosnia and Herzegovina	16 (3.0)	464 (6.7)	80 (3.4)	458 (3.2)	5 (1.9)	452 (13.3)	9.6 (0.14)
Oman	15 (2.1)	452 (8.0)	62 (3.5)	431 (5.1)	23 (2.9)	432 (12.2)	8.9 (0.16)
Slovak Republic	15 (3.0)	537 (6.4)	78 (3.2)	519 (4.7)	7 (1.8)	514 (11.2)	9.5 (0.13)
Portugal	15 (2.9)	510 (5.6)	84 (3.0)	503 (2.8)	1 (0.7)	~ ~	9.9 (0.13)
Ireland	13 (2.9)	545 (8.0)	86 (3.1)	526 (3.5)	1 (0.7)	~ ~	10.0 (0.11)
Netherlands s	13 (3.8)	518 (9.1)	87 (3.8)	519 (3.5)	0 (0.0)	~ ~	10.1 (0.16)
Northern Ireland r	12 (3.1)	526 (6.8)	85 (3.4)	518 (2.9)	2 (1.5)	~ ~	9.5 (0.13)
Montenegro	11 (0.2)	435 (9.3)	82 (0.3)	457 (2.5)	7 (0.2)	437 (5.1)	9.4 (0.01)
France	10 (2.6)	507 (7.8)	89 (2.7)	487 (3.3)	1 (0.8)	~ ~	9.7 (0.12)
Pakistan	10 (2.7)	280 (35.8)	79 (6.2)	282 (14.7)	12 (6.1)	354 (30.1)	9.2 (0.21)
Saudi Arabia	9 (1.8)	424 (11.2)	69 (3.0)	394 (5.7)	21 (2.7)	422 (8.7)	8.6 (0.15)
Iran, Islamic Rep. of	9 (2.1)	476 (11.5)	77 (3.1)	439 (4.3)	14 (2.4)	425 (9.3)	8.7 (0.15)
North Macedonia	8 (2.3)	434 (19.7)	71 (4.2)	431 (6.7)	21 (3.7)	409 (13.5)	8.7 (0.17)
Albania	8 (2.1)	550 (10.5)	69 (3.3)	483 (4.6)	23 (3.0)	490 (5.8)	8.6 (0.16)
South Africa (5)	8 (1.9)	423 (32.2)	84 (3.0)	318 (5.4)	8 (2.2)	323 (25.8)	9.2 (0.11)
Morocco	7 (1.8)	340 (21.9)	89 (2.5)	371 (6.4)	4 (1.8)	492 (45.1)	9.6 (0.11)
Italy	7 (1.9)	518 (13.5)	92 (2.2)	510 (3.1)	2 (1.3)	~ ~	9.8 (0.11)
Turkey (5)	5 (1.7)	568 (10.7)	62 (3.3)	527 (5.1)	33 (3.5)	519 (9.0)	8.0 (0.18)
Azerbaijan	2 (1.0)	~ ~	87 (2.4)	428 (3.6)	11 (2.2)	420 (10.3)	8.6 (0.09)
Philippines	1 (0.5)	~ ~	95 (1.6)	245 (7.6)	5 (1.5)	291 (22.0)	8.8 (0.09)
Kosovo	0 (0.3)	~ ~	72 (4.2)	413 (4.6)	28 (4.2)	413 (5.6)	7.6 (0.20)
International Average	**24 (0.4)**	**508 (1.4)**	**69 (0.5)**	**488 (0.6)**	**7 (0.3)**	**472 (3.0)**	
Benchmarking Participants							
Moscow City, Russian Fed.	63 (4.3)	592 (3.1)	35 (4.3)	600 (3.2)	2 (1.1)	~ ~	12.5 (0.26)
Dubai, UAE r	54 (0.3)	552 (2.7)	30 (0.3)	526 (2.7)	16 (0.2)	566 (4.7)	10.9 (0.02)
Madrid, Spain	51 (3.8)	526 (2.2)	49 (3.8)	519 (3.5)	0 (0.4)	~ ~	11.6 (0.16)
Abu Dhabi, UAE r	36 (1.5)	454 (3.4)	48 (1.7)	384 (4.7)	16 (1.3)	405 (12.9)	10.3 (0.10)
Ontario, Canada	29 (3.9)	533 (6.6)	70 (3.9)	520 (3.3)	1 (1.0)	~ ~	10.7 (0.17)
Quebec, Canada	29 (3.7)	526 (3.4)	68 (4.0)	521 (3.3)	4 (1.8)	525 (12.1)	10.6 (0.16)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 6.18: Instruction Affected by Science Resource Shortages – Principals' Reports

Students' Results based on Principals' Reports

Country		Not Affected		Somewhat Affected		Affected A Lot		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Singapore		75 (0.0)	607 (4.5)	18 (0.0)	607 (8.6)	7 (0.0)	612 (20.3)	12.3 (0.00)
Australia		63 (3.4)	542 (4.6)	35 (3.4)	510 (4.6)	2 (1.2)	~ ~	11.7 (0.13)
France	r	56 (4.5)	501 (4.4)	43 (4.4)	478 (4.6)	1 (0.8)	~ ~	11.5 (0.15)
Norway (9)	r	55 (5.1)	499 (4.9)	45 (5.1)	495 (4.9)	0 (0.0)	~ ~	11.4 (0.11)
New Zealand		55 (4.9)	516 (5.6)	41 (5.0)	492 (5.8)	5 (4.0)	464 (66.9)	11.3 (0.33)
Korea, Rep. of		55 (3.9)	564 (3.2)	41 (4.2)	557 (3.4)	4 (1.8)	557 (7.4)	11.5 (0.17)
United States		48 (3.0)	540 (4.5)	50 (3.0)	514 (7.7)	1 (0.7)	~ ~	11.2 (0.12)
Hong Kong SAR		47 (4.6)	517 (7.3)	47 (4.0)	487 (9.1)	7 (2.7)	530 (34.8)	10.7 (0.27)
Qatar		46 (3.5)	499 (7.4)	25 (3.3)	462 (6.8)	28 (3.7)	445 (9.2)	9.9 (0.27)
Cyprus	r	44 (0.5)	489 (3.5)	51 (0.5)	478 (2.9)	5 (0.2)	497 (7.6)	10.9 (0.02)
Sweden		44 (3.7)	528 (5.5)	55 (3.8)	517 (4.6)	1 (0.8)	~ ~	11.0 (0.09)
United Arab Emirates		41 (1.8)	502 (3.2)	45 (1.8)	449 (3.3)	14 (0.7)	448 (6.2)	10.4 (0.07)
Kazakhstan		40 (4.1)	485 (6.2)	52 (4.2)	476 (5.1)	9 (1.8)	458 (18.5)	10.9 (0.17)
Finland		37 (4.1)	543 (5.8)	62 (4.1)	542 (3.8)	1 (0.9)	~ ~	10.9 (0.12)
England	s	37 (4.9)	533 (11.7)	62 (4.7)	516 (6.8)	1 (1.4)	~ ~	10.8 (0.19)
Chinese Taipei		36 (3.4)	578 (4.0)	64 (3.5)	573 (2.6)	0 (0.4)	~ ~	10.9 (0.11)
Japan		36 (3.4)	578 (4.6)	64 (3.5)	565 (2.1)	1 (0.7)	~ ~	10.8 (0.09)
Ireland		34 (3.2)	537 (5.2)	65 (3.3)	518 (3.7)	1 (0.6)	~ ~	10.8 (0.12)
Georgia		34 (3.3)	453 (7.5)	65 (3.4)	444 (4.9)	1 (1.0)	~ ~	10.7 (0.12)
Chile		33 (3.1)	491 (5.9)	63 (3.4)	449 (4.3)	4 (1.7)	453 (15.6)	10.4 (0.14)
Hungary		25 (3.9)	527 (7.1)	73 (3.9)	531 (4.3)	2 (1.1)	~ ~	10.3 (0.12)
Russian Federation		25 (3.5)	551 (7.4)	74 (3.6)	542 (4.0)	2 (0.9)	~ ~	10.1 (0.11)
Lebanon		21 (2.9)	439 (10.5)	64 (3.7)	357 (6.3)	15 (2.7)	370 (16.0)	9.5 (0.16)
Egypt		21 (3.4)	410 (10.0)	72 (3.6)	383 (6.9)	7 (2.3)	405 (12.5)	9.9 (0.16)
Bahrain		20 (0.2)	506 (3.0)	52 (0.2)	468 (2.1)	27 (0.2)	505 (4.3)	9.2 (0.01)
Oman		19 (2.9)	475 (8.7)	65 (3.9)	452 (4.1)	17 (2.9)	459 (6.2)	9.5 (0.14)
Kuwait		17 (3.6)	456 (12.1)	58 (4.2)	432 (6.6)	25 (3.6)	459 (9.4)	9.0 (0.18)
Portugal		15 (2.7)	536 (8.0)	82 (3.0)	515 (3.2)	2 (1.3)	~ ~	10.1 (0.11)
Lithuania		15 (3.1)	532 (8.0)	82 (3.6)	532 (3.6)	3 (1.8)	545 (17.8)	10.1 (0.10)
Israel		14 (3.2)	535 (13.5)	82 (3.6)	509 (4.7)	4 (1.7)	539 (23.5)	10.0 (0.12)
Italy		13 (2.7)	500 (9.3)	87 (2.7)	502 (2.6)	0 (0.0)	~ ~	10.0 (0.09)
Saudi Arabia		12 (2.4)	439 (9.7)	64 (3.7)	424 (3.9)	24 (3.2)	448 (6.0)	8.8 (0.14)
Jordan		9 (2.5)	447 (25.1)	77 (3.2)	449 (4.6)	15 (2.4)	471 (15.4)	8.9 (0.12)
Romania		9 (2.2)	507 (13.7)	85 (2.9)	468 (4.4)	6 (1.9)	456 (14.0)	9.5 (0.12)
Turkey		8 (2.4)	550 (18.4)	68 (3.6)	519 (4.7)	23 (3.2)	493 (9.7)	8.5 (0.14)
South Africa (9)		7 (1.1)	488 (22.0)	86 (2.1)	362 (3.4)	7 (1.8)	358 (10.7)	9.3 (0.08)
Iran, Islamic Rep. of		5 (1.4)	528 (18.3)	83 (2.8)	445 (3.5)	11 (2.4)	447 (14.5)	9.0 (0.11)
Morocco		4 (1.4)	457 (16.0)	93 (1.5)	390 (2.8)	3 (1.1)	438 (21.3)	9.6 (0.08)
Malaysia		2 (0.7)	~ ~	77 (3.3)	454 (3.9)	20 (3.3)	479 (8.7)	8.3 (0.10)
International Average		**30 (0.5)**	**510 (1.7)**	**62 (0.6)**	**484 (0.8)**	**8 (0.3)**	**472 (4.1)**	
Benchmarking Participants								
Quebec, Canada		71 (4.3)	538 (3.6)	28 (4.3)	545 (7.9)	2 (1.2)	~ ~	11.9 (0.16)
Moscow City, Russian Fed.		65 (4.1)	566 (4.0)	34 (4.1)	568 (4.4)	1 (0.5)	~ ~	11.9 (0.17)
Dubai, UAE	r	56 (0.6)	567 (3.4)	35 (0.6)	520 (3.4)	9 (0.3)	531 (6.8)	11.3 (0.02)
Abu Dhabi, UAE	r	38 (1.9)	450 (5.9)	40 (2.0)	388 (8.1)	22 (1.3)	413 (10.5)	10.1 (0.10)
Ontario, Canada	r	31 (5.6)	533 (7.2)	68 (5.6)	514 (4.0)	1 (1.1)	~ ~	10.7 (0.18)
Western Cape, RSA (9)		14 (2.4)	575 (11.4)	84 (2.7)	418 (5.7)	3 (1.4)	435 (37.4)	9.8 (0.11)
Gauteng, RSA (9)		11 (2.5)	528 (11.1)	85 (2.7)	406 (4.5)	4 (1.4)	458 (32.0)	9.5 (0.12)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Principals' Education and Years of Experience

Principals' Formal Education

The main education paths for becoming a school principal can vary across countries (as described in the *TIMSS 2019 Encyclopedia*). Some countries focus on formal education or completion of specialized training and certification, while others focus on years of teaching experience and gradual promotion into school leadership roles.

As shown in Exhibit 6.19, on average, more than half of fourth grade students (54%) had a school principal with a postgraduate university degree, 42 percent had a principal with a bachelor's degree, and 5 percent had a principal who had not completed a bachelor's degree. On average, 68 percent of fourth grade students had a principal with an educational leadership certificate or license, and 36 percent with a postgraduate leadership degree.

At the eighth grade (see Exhibit 6.20), the situation with regard to school principals' formal education was rather similar, with 55 percent of students having a school principal with a postgraduate university degree, 43 percent having a principal with a bachelor's degree, and 2 percent with a principal who had not completed a bachelor's degree. On average, 71 percent of eighth grade students had a principal with an educational leadership certificate or license, and 39 percent had a principal with a postgraduate leadership degree.

Exhibit 6.19: Principals' Formal Education*

Students' Results based on Principals' Reports

Country	Percent of Students by Principals' Education Level			Percent of Students by Principals' Educational Leadership Qualification or Credential***	
	Completed Postgraduate University Degree**	Completed Bachelor's Degree or Equivalent but Not a Postgraduate Degree	Did Not Complete Bachelor's Degree	Certificate or License	Postgraduate Degree
Albania	57 (4.2)	37 (3.9)	6 (2.1)	51 (4.5)	48 (3.9)
Armenia	77 (3.9)	22 (3.8)	1 (0.7)	92 (2.2)	29 (4.1)
Australia	r 40 (3.0)	59 (2.9)	1 (0.8)	- -	r 31 (2.7)
Austria	18 (2.7)	45 (3.8)	37 (3.5)	91 (2.3)	17 (2.5)
Azerbaijan	34 (3.0)	57 (3.1)	9 (2.1)	68 (3.7)	21 (3.3)
Bahrain	39 (2.0)	61 (2.1)	1 (0.5)	89 (1.7)	25 (2.0)
Belgium (Flemish)	6 (2.2)	94 (2.2)	0 (0.0)	88 (3.6)	6 (2.7)
Bosnia and Herzegovina	17 (3.2)	77 (3.3)	6 (1.6)	44 (4.0)	7 (1.9)
Bulgaria	93 (2.6)	5 (1.7)	2 (2.0)	59 (3.7)	28 (3.9)
Canada	64 (2.1)	36 (2.1)	0 (0.0)	60 (2.9)	45 (2.6)
Chile	67 (3.5)	32 (3.5)	0 (0.3)	73 (3.7)	57 (3.8)
Chinese Taipei	91 (2.5)	9 (2.5)	0 (0.0)	60 (3.8)	77 (3.7)
Croatia	96 (1.8)	2 (1.2)	2 (1.3)	10 (2.8)	41 (4.5)
Cyprus	72 (4.6)	26 (4.4)	2 (1.2)	42 (5.1)	42 (4.9)
Czech Republic	99 (0.6)	1 (0.6)	0 (0.0)	90 (2.8)	21 (3.6)
Denmark	r 22 (3.8)	73 (4.1)	4 (1.9)	r 93 (2.3)	r 18 (3.3)
England	s 22 (4.2)	78 (4.2)	0 (0.0)	s 61 (5.5)	s 17 (3.5)
Finland	98 (1.2)	2 (1.2)	0 (0.0)	89 (2.2)	35 (3.8)
France	32 (3.9)	49 (4.8)	20 (3.6)	23 (3.9)	3 (1.4)
Georgia	94 (2.0)	6 (2.0)	0 (0.0)	r 92 (2.9)	r 77 (4.1)
Germany	91 (2.1)	3 (1.5)	6 (1.6)	49 (3.8)	25 (3.2)
Hong Kong SAR	66 (4.7)	33 (4.7)	1 (0.6)	82 (4.4)	57 (4.4)
Hungary	42 (4.7)	58 (4.7)	0 (0.0)	97 (1.5)	- -
Iran, Islamic Rep. of	28 (3.4)	68 (3.6)	4 (1.7)	55 (3.5)	21 (3.0)
Ireland	53 (4.2)	45 (4.2)	2 (1.3)	31 (4.1)	25 (3.7)
Italy	87 (3.2)	12 (3.2)	1 (0.8)	- -	36 (4.1)
Japan	13 (2.9)	87 (2.9)	0 (0.0)	24 (3.5)	19 (3.5)
Kazakhstan	15 (3.1)	84 (3.2)	1 (1.1)	83 (3.0)	10 (2.4)
Korea, Rep. of	91 (2.4)	9 (2.4)	1 (0.6)	79 (3.4)	88 (2.8)
Kosovo	42 (4.1)	42 (4.3)	16 (3.0)	93 (3.2)	48 (4.5)
Kuwait	22 (2.5)	69 (3.3)	9 (2.4)	64 (4.7)	24 (2.6)
Latvia	91 (2.4)	9 (2.4)	0 (0.1)	54 (3.8)	38 (3.9)
Lithuania	82 (2.7)	18 (2.7)	0 (0.0)	67 (3.7)	63 (4.1)
Malta	77 (0.4)	23 (0.4)	0 (0.0)	67 (0.4)	49 (0.4)
Montenegro	24 (0.5)	74 (0.5)	2 (0.1)	79 (0.6)	15 (0.3)
Morocco	5 (1.4)	70 (3.1)	25 (2.9)	76 (3.7)	1 (0.7)
Netherlands	s 19 (4.9)	69 (5.4)	12 (4.3)	s 85 (4.1)	- -
New Zealand	47 (4.1)	36 (4.0)	17 (2.9)	- -	- -
North Macedonia	24 (3.4)	76 (3.4)	0 (0.3)	90 (2.8)	18 (3.2)
Northern Ireland	r 75 (4.7)	25 (4.7)	0 (0.0)	r 75 (4.4)	r 59 (4.8)
Norway (5)	r 34 (4.3)	64 (4.4)	2 (1.1)	r 77 (4.3)	r 28 (3.8)
Oman	27 (2.9)	58 (3.4)	14 (2.5)	67 (3.4)	22 (3.1)
Pakistan	66 (7.3)	17 (6.8)	17 (3.4)	53 (7.4)	53 (6.7)
Philippines	79 (3.2)	20 (3.2)	1 (0.7)	78 (3.2)	80 (3.1)
Poland	99 (0.8)	0 (0.0)	1 (0.8)	46 (4.6)	63 (4.4)
Portugal	36 (3.9)	62 (3.9)	1 (0.9)	- -	35 (4.1)
Qatar	51 (2.5)	49 (2.6)	1 (0.5)	77 (2.8)	47 (2.8)
Russian Federation	82 (2.6)	18 (2.6)	0 (0.2)	93 (2.1)	16 (2.3)
Saudi Arabia	13 (2.5)	77 (3.2)	11 (2.2)	20 (3.5)	9 (2.4)
Serbia	35 (4.0)	65 (4.0)	0 (0.0)	26 (3.7)	20 (3.5)
Singapore	63 (0.0)	36 (0.0)	1 (0.0)	97 (0.0)	44 (0.0)
Slovak Republic	100 (0.0)	0 (0.0)	0 (0.0)	94 (1.8)	56 (4.2)
South Africa (5)	11 (2.3)	65 (3.3)	24 (2.8)	65 (3.3)	10 (2.2)
Spain	56 (3.5)	43 (3.6)	1 (0.7)	74 (3.0)	18 (2.6)
Sweden	41 (4.2)	55 (4.3)	4 (1.8)	73 (4.2)	49 (4.6)
Turkey (5)	20 (3.2)	78 (3.3)	2 (1.1)	67 (3.9)	17 (3.1)
United Arab Emirates	r 63 (0.7)	36 (0.7)	1 (0.3)	r 76 (1.2)	r 54 (1.1)
United States	98 (0.9)	2 (0.9)	0 (0.0)	91 (1.6)	92 (1.6)
International Average	**54 (0.4)**	**42 (0.4)**	**5 (0.2)**	**68 (0.5)**	**36 (0.5)**
Benchmarking Participants					
Ontario, Canada	58 (4.2)	42 (4.2)	0 (0.0)	69 (5.4)	38 (5.1)
Quebec, Canada	63 (4.2)	37 (4.2)	0 (0.0)	44 (4.4)	39 (4.0)
Moscow City, Russian Fed.	95 (1.9)	5 (1.9)	0 (0.0)	97 (1.4)	39 (4.4)
Madrid, Spain	60 (3.9)	40 (3.9)	0 (0.0)	81 (2.8)	21 (3.4)
Abu Dhabi, UAE	r 65 (1.1)	35 (1.1)	0 (0.0)	r 77 (1.2)	r 59 (1.3)
Dubai, UAE	r 65 (0.3)	35 (0.3)	0 (0.0)	r 73 (0.3)	r 55 (0.3)

* Based on countries' categorizations according to UNESCO's International Standard Classification of Education (Operational Manual for ISCED-2011).
** For example, doctorate, master's, or other postgraduate degree.
*** Principals could indicate holding more than one qualification or credential.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 6.20: Principals' Formal Education*

Students' Results based on Principals' Reports

Country	Percent of Students by Principals' Education Level			Percent of Students by Principals' Educational Leadership Qualification or Credential***	
	Completed Postgraduate University Degree**	Completed Bachelor's Degree or Equivalent but Not a Postgraduate Degree	Did Not Complete Bachelor's Degree	Certificate or License	Postgraduate Degree
Australia	58 (2.9)	42 (2.9)	0 (0.0)	- -	50 (3.0)
Bahrain	39 (0.3)	60 (0.2)	1 (0.0)	89 (0.2)	21 (0.2)
Chile	72 (3.6)	27 (3.6)	0 (0.4)	76 (3.5)	64 (4.1)
Chinese Taipei	90 (2.2)	10 (2.2)	0 (0.0)	60 (3.4)	64 (3.3)
Cyprus	r 78 (0.4)	22 (0.4)	0 (0.0)	r 32 (0.5)	r 40 (0.5)
Egypt	3 (1.3)	90 (2.4)	7 (2.0)	86 (2.6)	4 (1.7)
England	s 51 (5.1)	49 (5.1)	0 (0.0)	s 65 (4.7)	s 43 (4.9)
Finland	99 (0.6)	1 (0.6)	0 (0.0)	97 (1.2)	48 (3.9)
France	r 72 (4.2)	27 (4.3)	1 (0.9)	r 27 (3.9)	r 30 (4.3)
Georgia	96 (1.8)	4 (1.8)	0 (0.0)	r 91 (3.0)	r 75 (4.1)
Hong Kong SAR	93 (2.2)	7 (2.2)	0 (0.0)	85 (3.4)	66 (4.3)
Hungary	50 (4.0)	49 (4.1)	1 (0.8)	98 (1.2)	- -
Iran, Islamic Rep. of	35 (3.1)	64 (3.3)	2 (0.8)	45 (3.3)	24 (3.3)
Ireland	77 (3.5)	23 (3.5)	0 (0.0)	60 (4.1)	58 (4.1)
Israel	98 (1.1)	2 (1.1)	0 (0.0)	88 (2.7)	83 (2.9)
Italy	93 (2.3)	7 (2.2)	1 (0.7)	- -	33 (3.5)
Japan	8 (2.2)	92 (2.2)	0 (0.0)	25 (3.6)	12 (2.7)
Jordan	53 (4.4)	45 (4.4)	2 (0.9)	89 (2.1)	37 (4.0)
Kazakhstan	16 (3.3)	83 (3.4)	2 (1.1)	80 (3.3)	10 (2.7)
Korea, Rep. of	86 (2.9)	14 (2.9)	0 (0.0)	80 (2.9)	83 (3.1)
Kuwait	19 (3.7)	70 (4.4)	11 (2.5)	63 (3.7)	14 (2.8)
Lebanon	56 (4.1)	35 (3.9)	9 (2.0)	62 (3.2)	34 (3.8)
Lithuania	80 (3.2)	19 (3.1)	1 (0.9)	69 (4.3)	48 (4.3)
Malaysia	37 (3.6)	62 (3.6)	0 (0.3)	67 (3.8)	43 (3.9)
Morocco	7 (1.9)	75 (3.0)	18 (3.1)	70 (2.9)	5 (1.5)
New Zealand	79 (4.0)	20 (4.0)	1 (1.0)	- -	- -
Norway (9)	r 42 (4.7)	57 (4.8)	1 (1.2)	r 69 (4.8)	r 34 (4.5)
Oman	29 (3.1)	62 (3.4)	9 (2.2)	64 (3.4)	23 (3.0)
Portugal	42 (3.9)	57 (3.9)	1 (0.9)	- -	34 (3.5)
Qatar	45 (2.3)	54 (2.6)	1 (1.1)	85 (2.1)	42 (2.2)
Romania	59 (3.8)	41 (3.8)	0 (0.0)	81 (2.9)	39 (3.6)
Russian Federation	83 (2.8)	17 (2.8)	0 (0.0)	93 (2.0)	14 (2.1)
Saudi Arabia	8 (2.1)	88 (2.7)	5 (1.6)	19 (2.9)	r 4 (1.5)
Singapore	67 (0.0)	33 (0.0)	0 (0.0)	95 (0.0)	44 (0.0)
South Africa (9)	13 (1.6)	80 (2.3)	7 (1.6)	57 (3.2)	13 (1.7)
Sweden	42 (4.2)	56 (4.3)	2 (1.2)	79 (3.4)	46 (4.4)
Turkey	22 (3.2)	76 (3.4)	2 (1.3)	67 (4.1)	18 (2.9)
United Arab Emirates	61 (1.0)	39 (1.0)	1 (0.2)	75 (1.2)	50 (1.4)
United States	98 (1.3)	2 (1.3)	0 (0.0)	95 (1.4)	95 (1.6)
International Average	**55 (0.5)**	**43 (0.5)**	**2 (0.2)**	**71 (0.5)**	**39 (0.5)**
Benchmarking Participants					
Ontario, Canada	r 52 (6.1)	48 (6.1)	0 (0.0)	r 83 (3.5)	r 42 (6.2)
Quebec, Canada	55 (5.0)	45 (5.0)	0 (0.2)	56 (5.4)	29 (4.8)
Moscow City, Russian Fed.	95 (1.7)	5 (1.7)	0 (0.0)	97 (1.5)	38 (4.4)
Gauteng, RSA (9)	18 (3.1)	74 (3.4)	8 (2.0)	53 (3.7)	20 (3.3)
Western Cape, RSA (9)	15 (3.2)	81 (3.5)	4 (1.8)	58 (4.0)	12 (2.9)
Abu Dhabi, UAE	r 63 (1.4)	36 (1.2)	1 (0.6)	r 74 (1.6)	r 55 (1.5)
Dubai, UAE	r 73 (0.4)	27 (0.4)	0 (0.0)	r 68 (0.4)	r 54 (0.5)

* Based on countries' categorizations according to UNESCO's International Standard Classification of Education (Operational Manual for ISCED-2011).
** For example, doctorate, master's, or other postgraduate degree.
*** Principals could indicate holding more than one qualification or credential.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Principals' Years of Experience

Exhibit 6.21 presents fourth grade students' school principals' reports about their years of experience. On average, fourth grade students' principals had 10 years of experience as a principal. Thirteen percent of the students had very experienced principals with 20 years or more of experience, 29 percent had principals with at least 10 years of experience, 27 percent had principals with at least 5 years of experience, and 31 percent had principals with less than 5 years of experience.

Exhibit 6.22 shows eighth grade students' school principals' reports about their years of experience. On average, principals of schools with eighth grade students had 9 years of experience as a principal. Eleven percent of the students had principals with 20 years or more of experience, 28 percent had principals with at least 10 years of experience, 28 percent had principals with at least 5 years of experience, and 34 percent had principals with less than 5 years of experience.

Exhibit 6.21: Principals' Years of Experience

Students' Results based on Principals' Reports

Country	Percent of Students by Principals' Years of Experience as a Principal				Average Years of Experience as a Principal
	20 Years or More	At Least 10 but Less than 20 Years	At Least 5 but Less than 10 Years	Less than 5 Years	
Albania	10 (2.7)	19 (3.2)	43 (4.3)	28 (4.1)	8 (0.6)
Armenia	25 (4.0)	24 (4.1)	27 (3.5)	24 (3.7)	12 (0.8)
Australia r	11 (2.2)	32 (3.0)	21 (3.9)	36 (3.9)	9 (0.5)
Austria	5 (1.5)	39 (3.3)	36 (3.7)	20 (2.9)	10 (0.4)
Azerbaijan	23 (3.2)	26 (3.2)	20 (3.3)	31 (3.7)	13 (0.8)
Bahrain	7 (1.3)	23 (2.1)	30 (2.6)	40 (2.7)	8 (0.4)
Belgium (Flemish)	12 (2.9)	34 (4.7)	26 (4.0)	28 (4.5)	10 (0.7)
Bosnia and Herzegovina	1 (1.0)	12 (2.5)	29 (4.2)	57 (4.2)	5 (0.3)
Bulgaria	30 (3.7)	31 (3.7)	17 (3.3)	22 (3.4)	14 (0.8)
Canada	6 (2.2)	31 (2.2)	30 (2.7)	33 (2.2)	8 (0.5)
Chile	15 (3.0)	25 (3.7)	21 (3.3)	39 (4.4)	10 (0.8)
Chinese Taipei	7 (2.1)	47 (4.3)	32 (4.0)	14 (2.9)	11 (0.5)
Croatia	8 (2.6)	28 (4.0)	25 (3.7)	38 (4.1)	8 (0.6)
Cyprus	5 (1.9)	12 (3.1)	73 (3.9)	10 (2.6)	9 (0.6)
Czech Republic	21 (3.4)	33 (3.8)	26 (3.9)	21 (3.8)	12 (0.7)
Denmark r	13 (3.4)	23 (3.8)	27 (4.5)	38 (4.6)	9 (0.7)
England s	10 (3.1)	36 (5.6)	32 (5.3)	22 (5.1)	10 (0.7)
Finland	24 (3.6)	35 (3.2)	20 (3.2)	21 (3.1)	13 (0.7)
France	25 (4.1)	31 (3.6)	23 (3.4)	22 (3.5)	12 (0.8)
Georgia	15 (3.2)	35 (4.1)	33 (4.1)	17 (3.4)	11 (0.7)
Germany	9 (2.0)	34 (3.7)	25 (3.1)	32 (3.8)	9 (0.6)
Hong Kong SAR	15 (2.9)	33 (4.6)	22 (3.3)	31 (4.3)	11 (0.7)
Hungary	11 (2.5)	33 (4.1)	25 (3.7)	32 (4.5)	9 (0.6)
Iran, Islamic Rep. of	16 (2.2)	37 (3.8)	27 (3.6)	20 (3.1)	11 (0.5)
Ireland	20 (3.6)	24 (3.9)	24 (3.8)	32 (4.2)	11 (0.8)
Italy	14 (3.1)	31 (3.8)	42 (3.8)	14 (3.3)	10 (0.6)
Japan	0 (0.0)	8 (2.3)	33 (4.0)	59 (3.9)	4 (0.2)
Kazakhstan	8 (2.3)	39 (4.2)	30 (3.7)	24 (3.6)	10 (0.6)
Korea, Rep. of	31 (3.9)	0 (0.5)	21 (3.4)	47 (4.3)	14 (1.3)
Kosovo	3 (2.1)	30 (3.8)	33 (4.3)	34 (4.6)	8 (0.6)
Kuwait	9 (1.9)	20 (3.6)	27 (3.8)	43 (4.3)	8 (0.5)
Latvia	37 (3.5)	31 (3.5)	10 (2.4)	22 (3.4)	15 (0.7)
Lithuania	33 (3.8)	31 (3.6)	13 (2.9)	24 (3.5)	14 (0.7)
Malta	7 (0.2)	35 (0.4)	30 (0.4)	29 (0.4)	9 (0.1)
Montenegro	6 (0.5)	24 (0.4)	26 (0.5)	44 (0.4)	7 (0.1)
Morocco	8 (2.1)	44 (4.0)	18 (2.8)	29 (3.4)	10 (0.5)
Netherlands s	18 (4.2)	34 (5.8)	19 (5.5)	28 (6.0)	11 (1.0)
New Zealand	23 (3.0)	38 (4.2)	18 (3.1)	21 (3.5)	13 (0.7)
North Macedonia	2 (1.3)	7 (2.3)	20 (3.6)	71 (4.0)	4 (0.4)
Northern Ireland r	14 (3.3)	31 (4.0)	29 (5.0)	27 (4.4)	10 (0.8)
Norway (5) r	8 (2.4)	26 (4.2)	28 (4.7)	38 (4.8)	8 (0.5)
Oman	20 (2.7)	28 (3.4)	18 (2.7)	35 (3.1)	11 (0.7)
Pakistan r	11 (4.1)	12 (2.8)	37 (5.9)	39 (6.6)	8 (1.1)
Philippines	7 (2.3)	35 (3.7)	30 (3.9)	27 (3.8)	9 (0.5)
Poland	18 (3.0)	37 (4.4)	20 (3.5)	25 (4.2)	12 (0.8)
Portugal	17 (3.0)	41 (3.9)	19 (3.2)	22 (3.0)	12 (0.6)
Qatar	12 (2.6)	28 (4.3)	30 (3.4)	29 (3.8)	10 (0.6)
Russian Federation	26 (3.4)	32 (4.1)	25 (3.4)	17 (3.2)	13 (0.8)
Saudi Arabia	6 (1.6)	34 (2.8)	26 (2.8)	34 (3.5)	9 (0.5)
Serbia	1 (0.7)	31 (3.9)	32 (4.3)	36 (4.5)	8 (0.4)
Singapore	4 (0.0)	43 (0.0)	36 (0.0)	18 (0.0)	10 (0.0)
Slovak Republic	12 (2.5)	36 (4.2)	25 (3.9)	27 (4.1)	10 (0.6)
South Africa (5)	14 (2.3)	23 (3.4)	31 (3.6)	32 (3.4)	9 (0.6)
Spain	5 (1.6)	23 (2.7)	34 (3.5)	39 (3.6)	7 (0.4)
Sweden	5 (2.4)	31 (4.9)	25 (4.2)	38 (4.6)	8 (0.6)
Turkey (5)	7 (2.1)	15 (2.3)	28 (3.5)	49 (4.1)	7 (0.5)
United Arab Emirates r	15 (1.1)	31 (1.6)	24 (1.6)	30 (2.0)	10 (0.3)
United States	5 (1.4)	28 (2.9)	32 (2.9)	35 (3.2)	8 (0.4)
International Average	**13 (0.4)**	**29 (0.5)**	**27 (0.5)**	**31 (0.5)**	**10 (0.1)**
Benchmarking Participants					
Ontario, Canada	8 (4.2)	27 (3.8)	30 (4.9)	36 (3.9)	8 (0.9)
Quebec, Canada	4 (1.9)	36 (4.4)	32 (4.3)	27 (4.3)	9 (0.5)
Moscow City, Russian Fed.	15 (3.1)	29 (4.1)	21 (3.1)	35 (4.1)	11 (0.8)
Madrid, Spain	5 (1.9)	31 (3.8)	31 (4.3)	33 (4.4)	8 (0.5)
Abu Dhabi, UAE r	14 (1.7)	33 (1.5)	20 (1.2)	33 (1.6)	10 (0.3)
Dubai, UAE r	6 (0.2)	29 (0.3)	33 (0.4)	31 (0.2)	8 (0.0)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 6.22: Principals' Years of Experience

Students' Results based on Principals' Reports

Country	Percent of Students by Principals' Years of Experience as a Principal				Average Years of Experience as a Principal
	20 Years or More	At Least 10 but Less than 20 Years	At Least 5 but Less than 10 Years	Less than 5 Years	
Australia	8 (1.9)	35 (4.5)	30 (4.1)	27 (3.2)	9 (0.5)
Bahrain	6 (0.2)	13 (0.2)	41 (0.2)	39 (0.2)	7 (0.0)
Chile	13 (2.9)	21 (3.5)	25 (3.5)	40 (4.4)	9 (0.9)
Chinese Taipei	5 (1.6)	36 (3.0)	35 (3.5)	23 (2.9)	9 (0.5)
Cyprus r	11 (0.4)	9 (0.3)	37 (0.5)	43 (0.5)	8 (0.1)
Egypt	3 (0.8)	15 (3.1)	26 (3.5)	56 (3.9)	6 (0.4)
England s	4 (2.0)	29 (4.9)	41 (5.6)	26 (4.8)	8 (0.6)
Finland	21 (3.5)	35 (3.9)	23 (3.6)	21 (3.3)	12 (0.8)
France r	6 (2.2)	23 (3.9)	34 (4.6)	37 (4.0)	7 (0.5)
Georgia	18 (3.7)	38 (4.0)	29 (4.3)	15 (3.3)	12 (0.8)
Hong Kong SAR	6 (1.6)	28 (4.4)	32 (4.3)	35 (4.3)	8 (0.5)
Hungary	13 (2.9)	39 (4.2)	22 (3.8)	26 (4.0)	10 (0.6)
Iran, Islamic Rep. of	19 (3.0)	28 (3.1)	26 (3.0)	27 (3.4)	11 (0.6)
Ireland	4 (1.5)	37 (3.9)	31 (4.1)	29 (3.5)	8 (0.5)
Israel	8 (2.2)	33 (3.8)	25 (3.8)	34 (4.0)	9 (0.7)
Italy	11 (2.8)	33 (3.9)	41 (3.7)	15 (3.0)	10 (0.6)
Japan	0 (0.0)	7 (2.1)	39 (4.2)	54 (4.4)	5 (0.2)
Jordan	6 (1.7)	39 (4.2)	31 (4.0)	24 (3.2)	9 (0.5)
Kazakhstan	7 (2.1)	40 (4.2)	26 (3.5)	27 (3.7)	9 (0.6)
Korea, Rep. of	23 (3.3)	1 (0.8)	17 (3.1)	59 (3.8)	11 (1.1)
Kuwait	11 (2.9)	19 (3.1)	22 (3.2)	48 (3.1)	8 (0.7)
Lebanon	19 (3.6)	32 (3.8)	24 (3.2)	24 (3.6)	12 (0.8)
Lithuania	32 (4.4)	34 (4.2)	9 (2.5)	24 (3.9)	15 (0.9)
Malaysia	5 (1.6)	15 (2.9)	21 (3.9)	60 (4.4)	6 (0.5)
Morocco	4 (1.2)	32 (3.1)	33 (3.3)	32 (3.4)	8 (0.4)
New Zealand	7 (2.6)	32 (4.8)	23 (4.0)	38 (5.0)	8 (0.6)
Norway (9) r	5 (2.3)	19 (3.6)	35 (4.9)	40 (5.0)	7 (0.5)
Oman	27 (2.9)	25 (3.5)	18 (2.7)	30 (3.2)	12 (0.6)
Portugal	16 (3.2)	38 (3.9)	19 (3.5)	27 (4.2)	11 (0.8)
Qatar	13 (2.0)	35 (4.0)	25 (2.7)	27 (2.9)	10 (0.5)
Romania	14 (2.9)	27 (3.4)	32 (3.3)	26 (3.9)	10 (0.7)
Russian Federation	19 (2.6)	31 (3.5)	27 (3.0)	22 (2.5)	12 (0.6)
Saudi Arabia	11 (2.7)	21 (3.0)	26 (3.5)	43 (3.3)	8 (0.6)
Singapore	5 (0.0)	39 (0.0)	31 (0.0)	24 (0.0)	9 (0.0)
South Africa (9)	14 (2.2)	27 (2.8)	22 (3.0)	36 (3.1)	9 (0.5)
Sweden	5 (1.7)	38 (3.8)	26 (3.9)	31 (3.5)	8 (0.4)
Turkey	7 (2.1)	15 (2.3)	29 (3.3)	48 (3.6)	7 (0.5)
United Arab Emirates r	19 (1.5)	33 (1.1)	17 (1.6)	31 (1.7)	11 (0.4)
United States	4 (1.4)	27 (2.7)	29 (3.4)	39 (3.4)	7 (0.4)
International Average	**11 (0.4)**	**28 (0.6)**	**28 (0.6)**	**34 (0.6)**	**9 (0.1)**
Benchmarking Participants					
Ontario, Canada r	4 (1.8)	33 (5.0)	21 (4.9)	42 (5.6)	8 (0.6)
Quebec, Canada	4 (2.2)	35 (5.0)	20 (3.7)	41 (5.6)	8 (0.7)
Moscow City, Russian Fed.	15 (3.0)	28 (3.8)	22 (3.4)	36 (4.2)	11 (0.7)
Gauteng, RSA (9)	10 (2.9)	26 (4.0)	22 (3.8)	42 (4.0)	8 (0.7)
Western Cape, RSA (9)	14 (2.5)	32 (4.2)	18 (3.3)	36 (4.5)	9 (0.6)
Abu Dhabi, UAE r	21 (1.7)	33 (1.6)	15 (1.8)	31 (2.2)	11 (0.3)
Dubai, UAE r	8 (0.2)	37 (0.5)	25 (0.6)	30 (0.4)	9 (0.0)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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School Climate

School Emphasis on Academic Success

The *School Emphasis on Academic Success* scale was administered to school principals of fourth and eighth grade students to collect information about the school's expectations toward academic achievement. As described in Exhibit 7.1, students were categorized on the scale according to their principals' responses to 11 items in the TIMSS 2019 School Questionnaire (see About the Scale). Consistent with previous TIMSS results, principals overall had positive attitudes about the degree of emphasis on academics in their schools, so the three regions were described as "very high," "high," and "medium."

Exhibits 7.2 and 7.3 present the results for fourth grade students. The two exhibits include the same results for the *School Emphasis on Academic Success* scale, but Exhibit 7.2 presents results in relation to mathematics achievement and Exhibit 7.3 in relation to science achievement. Countries are ordered according to the percentage of students in the "very high emphasis" category. Across countries, on average, 7 percent of fourth grade students attended schools where the principal reported a "very high emphasis" on academic success, 55 percent attended schools with a "high emphasis," and 37 percent attended schools with a "medium emphasis." Attending schools with a higher emphasis on academic success was related to higher average mathematics achievement. Students in the "very high emphasis" category had the highest average mathematics achievement (515), followed by the "high emphasis" category (508), and then students in the "medium emphasis" category (486). The results were similar in relation to science, with average science achievement for students in the three categories at 508, 499, and 474 points, respectively.

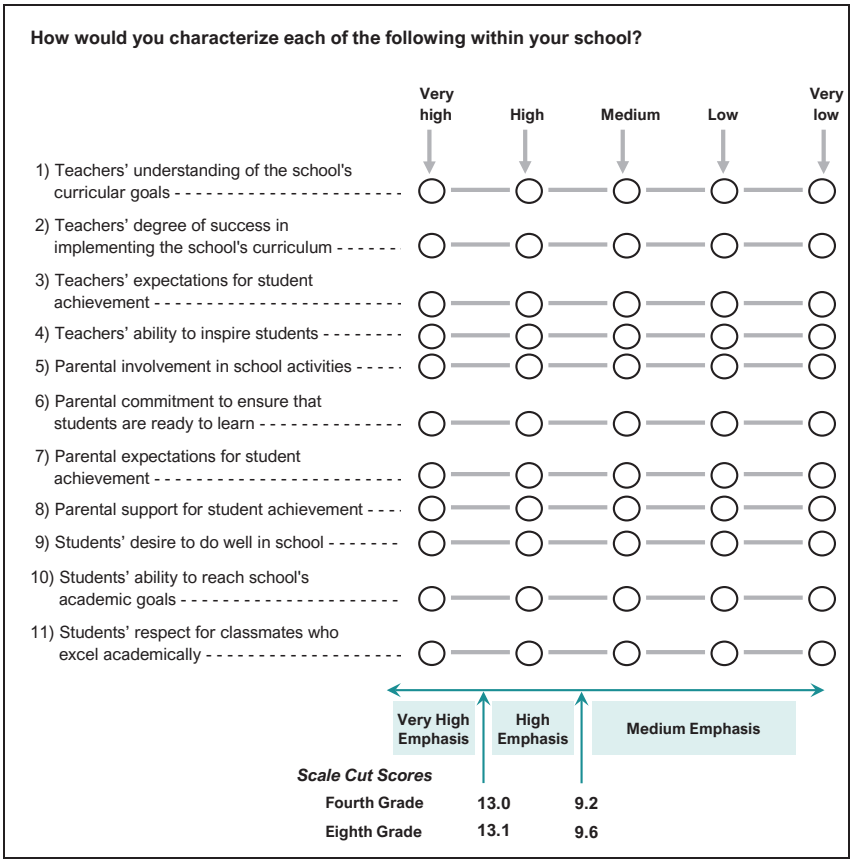
Exhibits 7.4 and 7.5 present the *School Emphasis on Academic Success* results for eighth grade students in relation to their mathematics achievement and science achievement, respectively. On average, the principals of eighth grade students reported a similar degree of emphasis on academic success compared with fourth grade—8 percent of eighth grade students attended schools with a "very high emphasis" on academic success, 49 percent attended schools with a "high emphasis," and 43 percent attended schools with a "medium emphasis." At the eighth grade, there was a greater achievement gap between the "very high emphasis" and "medium emphasis" categories than at the fourth grade (69 points vs. 29 points in mathematics, and 68 points vs. 34 points in science).

Exhibit 7.1: School Emphasis on Academic Success – Principals' Reports

Students' Results based on Principals' Reports

About the Scale

Students were scored according to their principals' responses characterizing eleven aspects on the *School Emphasis on Academic Success* scale. Cut scores divide the scale into three categories. Students in schools with a **Very High Emphasis** on academic success had a score at or above the cut score corresponding to their principals characterizing six of the eleven aspects as "very high" and the other five as "high," on average. Students in schools with a **Medium Emphasis** on academic success had a score at or below the cut score corresponding to their principals characterizing six of the eleven aspects as "medium" and the other five as "high," on average. All other students attended schools with a **High Emphasis** on academic success.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 7.2: School Emphasis on Academic Success – Principals' Reports

Students' Results based on Principals' Reports

Country	Very High Emphasis		High Emphasis		Medium Emphasis		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Korea, Rep. of	33 (4.1)	613 (4.8)	54 (4.4)	596 (2.7)	13 (3.0)	580 (5.2)	12.0 (0.20)
Bahrain	28 (2.3)	486 (5.0)	55 (3.0)	481 (2.6)	17 (2.3)	468 (6.3)	11.7 (0.13)
Qatar	25 (3.9)	457 (8.5)	63 (4.2)	448 (4.3)	13 (2.4)	441 (10.7)	11.8 (0.18)
Saudi Arabia	22 (3.0)	423 (7.9)	61 (3.8)	396 (4.7)	17 (2.5)	379 (12.1)	11.3 (0.15)
United Arab Emirates	22 (1.8)	522 (3.9)	54 (2.1)	488 (2.4)	25 (1.4)	422 (3.2)	11.2 (0.08)
Ireland	21 (3.4)	562 (5.3)	63 (3.7)	552 (3.4)	16 (3.0)	520 (6.3)	11.5 (0.17)
Kuwait	18 (3.6)	421 (12.0)	56 (3.9)	383 (7.0)	25 (3.6)	354 (9.9)	11.0 (0.22)
Northern Ireland r	15 (3.6)	590 (11.5)	68 (4.7)	569 (4.1)	17 (3.5)	537 (6.7)	11.1 (0.17)
Oman	15 (2.5)	458 (12.3)	69 (3.3)	429 (4.6)	15 (2.5)	408 (9.7)	11.1 (0.13)
Kazakhstan	14 (2.7)	525 (10.9)	71 (3.3)	510 (2.9)	15 (2.4)	514 (9.5)	11.2 (0.14)
England s	12 (3.1)	605 (19.0)	68 (5.6)	556 (4.4)	20 (4.9)	534 (7.8)	10.9 (0.19)
United States	11 (2.0)	574 (6.9)	51 (3.1)	544 (4.0)	38 (2.7)	511 (4.0)	10.1 (0.13)
Pakistan	11 (4.0)	349 (24.7)	52 (7.1)	341 (18.6)	37 (6.4)	303 (10.9)	10.2 (0.28)
Philippines	10 (2.4)	307 (16.3)	66 (3.7)	300 (8.5)	24 (3.4)	282 (11.3)	10.8 (0.15)
New Zealand	10 (2.4)	519 (11.9)	67 (3.6)	497 (3.7)	23 (3.2)	446 (5.5)	10.9 (0.13)
Malta	9 (0.2)	527 (3.9)	65 (0.4)	517 (1.6)	26 (0.4)	483 (2.8)	10.5 (0.01)
Chinese Taipei	9 (2.0)	609 (7.1)	73 (3.3)	601 (2.0)	18 (2.7)	588 (5.1)	10.8 (0.13)
Canada	9 (1.9)	537 (7.7)	59 (2.6)	514 (1.8)	32 (2.9)	501 (6.8)	10.2 (0.13)
Singapore	9 (0.0)	648 (12.8)	70 (0.0)	628 (4.5)	21 (0.0)	607 (7.6)	10.6 (0.00)
Australia	9 (1.9)	556 (8.6)	53 (3.2)	521 (4.1)	38 (3.4)	496 (5.4)	10.2 (0.17)
Georgia	9 (2.7)	499 (15.5)	51 (4.3)	483 (5.0)	40 (4.2)	476 (5.7)	10.0 (0.16)
Cyprus	8 (2.9)	553 (8.4)	47 (4.7)	539 (3.7)	45 (4.4)	520 (5.1)	10.0 (0.19)
Kosovo	7 (2.5)	473 (9.4)	55 (4.2)	447 (4.3)	38 (3.8)	436 (4.5)	10.1 (0.13)
Sweden	6 (2.2)	543 (9.6)	47 (4.5)	535 (3.9)	47 (4.6)	503 (4.3)	9.7 (0.19)
Albania	6 (2.0)	528 (17.2)	62 (4.3)	501 (4.2)	32 (4.1)	475 (6.4)	10.2 (0.14)
Iran, Islamic Rep. of	5 (1.6)	481 (20.0)	56 (3.3)	451 (5.6)	38 (3.3)	426 (6.4)	10.0 (0.14)
Denmark r	5 (1.6)	528 (6.7)	60 (4.5)	530 (3.2)	35 (4.1)	516 (3.8)	10.1 (0.16)
Hong Kong SAR	5 (2.4)	628 (21.1)	51 (4.5)	607 (4.3)	44 (3.9)	592 (5.5)	9.8 (0.19)
Bosnia and Herzegovina	5 (1.9)	447 (15.2)	51 (4.0)	458 (3.5)	44 (3.5)	444 (3.7)	9.8 (0.13)
Chile	5 (1.5)	481 (16.1)	39 (4.0)	456 (5.5)	56 (4.1)	428 (3.7)	8.9 (0.19)
Montenegro	5 (0.2)	464 (5.2)	73 (0.6)	454 (2.4)	22 (0.5)	448 (3.4)	10.3 (0.01)
Spain	5 (1.3)	519 (6.2)	67 (3.5)	510 (3.2)	28 (3.2)	483 (6.4)	10.1 (0.11)
Bulgaria	4 (1.7)	557 (15.7)	53 (4.3)	539 (3.7)	43 (3.9)	482 (8.9)	9.7 (0.16)
Austria	4 (1.4)	546 (10.6)	65 (3.5)	547 (2.5)	31 (3.1)	521 (3.9)	10.0 (0.10)
France	4 (1.7)	519 (13.1)	56 (4.0)	495 (3.5)	40 (3.6)	468 (5.2)	9.9 (0.12)
South Africa (5)	4 (1.2)	464 (29.1)	34 (3.3)	395 (8.1)	62 (3.5)	359 (3.4)	8.9 (0.15)
Finland	4 (1.4)	545 (9.6)	53 (4.1)	538 (3.2)	44 (4.4)	524 (3.7)	9.9 (0.14)
Poland	3 (1.7)	536 (7.1)	55 (4.0)	527 (3.7)	42 (4.3)	509 (3.8)	9.8 (0.14)
Turkey (5)	3 (1.3)	574 (10.7)	43 (3.9)	549 (7.7)	53 (3.8)	498 (5.4)	9.2 (0.13)
Morocco	3 (1.4)	417 (25.5)	34 (3.3)	409 (10.2)	63 (3.5)	368 (6.0)	8.9 (0.13)
Belgium (Flemish)	2 (1.4)	~ ~	52 (3.7)	537 (2.7)	45 (3.6)	526 (3.4)	9.5 (0.11)
Hungary	2 (1.3)	~ ~	32 (4.3)	541 (6.2)	66 (4.2)	512 (4.0)	8.9 (0.15)
Japan	2 (1.2)	~ ~	40 (3.9)	600 (2.7)	58 (4.1)	587 (2.2)	9.2 (0.14)
Czech Republic	2 (2.0)	~ ~	39 (4.3)	550 (4.1)	59 (4.5)	521 (3.8)	9.0 (0.15)
Armenia	2 (1.2)	~ ~	60 (4.3)	498 (3.2)	38 (4.0)	497 (4.3)	9.8 (0.12)
Italy	2 (1.1)	~ ~	42 (3.5)	515 (3.9)	56 (3.4)	515 (3.3)	9.3 (0.11)
Lithuania	2 (1.0)	~ ~	79 (3.0)	545 (3.4)	19 (2.8)	527 (7.9)	10.4 (0.12)
Germany	2 (1.1)	~ ~	57 (3.8)	534 (2.7)	42 (3.8)	503 (4.7)	9.6 (0.13)
North Macedonia	1 (0.8)	~ ~	54 (4.4)	486 (6.0)	45 (4.4)	456 (9.5)	9.3 (0.19)
Croatia	1 (0.8)	~ ~	68 (3.5)	512 (2.8)	30 (3.5)	505 (4.1)	10.0 (0.12)
Russian Federation	1 (0.5)	~ ~	54 (3.3)	578 (4.8)	46 (3.3)	555 (3.5)	9.5 (0.11)
Azerbaijan	0 (0.5)	~ ~	50 (3.6)	515 (4.6)	50 (3.5)	516 (3.9)	9.4 (0.12)
Portugal	0 (0.3)	~ ~	45 (3.7)	537 (3.9)	55 (3.7)	516 (3.3)	9.3 (0.12)
Latvia	0 (0.0)	~ ~	61 (4.0)	552 (3.0)	39 (4.0)	537 (4.6)	9.6 (0.08)
Netherlands s	0 (0.0)	~ ~	40 (5.7)	546 (3.7)	60 (5.7)	531 (2.9)	8.9 (0.13)
Norway (5) r	0 (0.0)	~ ~	57 (5.1)	549 (3.5)	43 (5.1)	536 (3.6)	9.7 (0.14)
Serbia	0 (0.0)	~ ~	59 (3.8)	518 (3.7)	41 (3.8)	492 (5.8)	9.6 (0.13)
Slovak Republic	0 (0.0)	~ ~	38 (3.6)	528 (4.5)	62 (3.6)	499 (4.4)	8.9 (0.12)
International Average	**7 (0.3)**	**515 (2.1)**	**55 (0.5)**	**508 (0.7)**	**37 (0.5)**	**486 (0.8)**	
Benchmarking Participants							
Dubai, UAE r	31 (0.3)	564 (2.6)	58 (0.3)	541 (2.3)	12 (0.1)	507 (4.1)	12.2 (0.01)
Abu Dhabi, UAE r	16 (1.5)	481 (8.1)	46 (1.8)	461 (3.2)	38 (0.9)	385 (3.7)	10.3 (0.07)
Ontario, Canada	8 (3.5)	542 (15.2)	52 (4.8)	513 (3.5)	40 (5.6)	504 (10.9)	9.8 (0.26)
Quebec, Canada	8 (2.3)	549 (9.2)	68 (4.6)	536 (2.4)	24 (4.5)	517 (5.0)	10.5 (0.16)
Madrid, Spain	7 (2.6)	542 (5.6)	64 (4.2)	525 (2.6)	29 (3.5)	498 (4.7)	10.4 (0.16)
Moscow City, Russian Fed.	4 (1.8)	592 (12.2)	80 (3.9)	594 (2.6)	16 (3.5)	587 (5.1)	10.6 (0.12)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 7.3: School Emphasis on Academic Success – Principals' Reports

Students' Results based on Principals' Reports

Country		Very High Emphasis		High Emphasis		Medium Emphasis		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Korea, Rep. of		33 (4.1)	599 (4.2)	54 (4.4)	585 (2.5)	13 (3.0)	571 (4.9)	12.0 (0.20)
Bahrain		28 (2.3)	507 (6.7)	55 (3.0)	494 (3.9)	17 (2.3)	461 (8.5)	11.7 (0.13)
Qatar		25 (3.9)	461 (10.3)	63 (4.2)	448 (4.7)	13 (2.4)	435 (10.3)	11.8 (0.18)
Saudi Arabia		22 (3.0)	434 (8.1)	61 (3.8)	399 (5.1)	17 (2.5)	375 (13.7)	11.3 (0.15)
United Arab Emirates		22 (1.8)	525 (4.2)	54 (2.1)	483 (2.6)	25 (1.4)	399 (3.8)	11.2 (0.08)
Ireland		21 (3.4)	539 (5.5)	63 (3.7)	532 (4.6)	16 (3.0)	501 (6.9)	11.5 (0.17)
Kuwait		18 (3.6)	437 (15.8)	56 (3.9)	391 (7.6)	25 (3.6)	363 (10.9)	11.0 (0.22)
Northern Ireland	r	15 (3.6)	534 (8.3)	68 (4.7)	521 (3.1)	17 (3.5)	497 (5.6)	11.1 (0.17)
Oman		15 (2.5)	467 (12.6)	69 (3.3)	434 (5.4)	15 (2.5)	401 (6.7)	11.1 (0.13)
Kazakhstan		14 (2.7)	511 (13.8)	71 (3.3)	490 (3.9)	15 (2.4)	500 (11.6)	11.2 (0.14)
England	s	12 (3.1)	583 (13.7)	68 (5.6)	536 (4.2)	20 (4.9)	515 (8.1)	10.9 (0.19)
United States		11 (2.0)	577 (6.8)	51 (3.1)	549 (4.3)	38 (2.7)	514 (4.4)	10.1 (0.13)
Pakistan		11 (4.0)	314 (32.1)	52 (7.1)	311 (18.2)	37 (6.4)	255 (14.5)	10.2 (0.28)
Philippines		10 (2.4)	259 (18.9)	66 (3.7)	255 (9.9)	24 (3.4)	229 (13.8)	10.8 (0.15)
New Zealand		10 (2.4)	530 (9.8)	67 (3.6)	512 (3.4)	23 (3.2)	464 (5.2)	10.9 (0.13)
Malta		9 (0.2)	518 (4.2)	65 (0.4)	505 (1.4)	26 (0.4)	464 (2.5)	10.5 (0.01)
Chinese Taipei		9 (2.0)	566 (6.7)	73 (3.3)	560 (2.0)	18 (2.7)	547 (5.1)	10.8 (0.13)
Canada		9 (1.9)	543 (6.0)	59 (2.6)	526 (1.8)	32 (2.9)	513 (5.2)	10.2 (0.13)
Singapore		9 (0.0)	617 (11.4)	70 (0.0)	598 (4.0)	21 (0.0)	575 (6.8)	10.6 (0.00)
Australia		9 (1.9)	568 (7.8)	53 (3.2)	537 (3.7)	38 (3.4)	516 (4.5)	10.2 (0.17)
Georgia		9 (2.7)	471 (15.9)	51 (4.3)	455 (5.4)	40 (4.2)	448 (5.3)	10.0 (0.16)
Cyprus		8 (2.9)	532 (10.7)	47 (4.7)	517 (3.5)	45 (4.4)	501 (4.7)	10.0 (0.19)
Kosovo		7 (2.5)	446 (13.7)	55 (4.2)	417 (5.2)	38 (3.8)	402 (5.0)	10.1 (0.13)
Sweden		6 (2.2)	563 (9.2)	47 (4.5)	552 (3.8)	47 (4.6)	517 (5.3)	9.7 (0.19)
Albania		6 (2.0)	515 (17.4)	62 (4.3)	498 (4.3)	32 (4.1)	468 (7.2)	10.2 (0.14)
Iran, Islamic Rep. of		5 (1.6)	476 (18.5)	56 (3.3)	451 (5.6)	38 (3.3)	420 (6.6)	10.0 (0.14)
Denmark	r	5 (1.6)	519 (7.2)	60 (4.5)	527 (3.3)	35 (4.1)	515 (3.5)	10.1 (0.16)
Hong Kong SAR		5 (2.4)	567 (27.8)	51 (4.5)	539 (4.4)	44 (3.9)	519 (5.7)	9.8 (0.19)
Bosnia and Herzegovina		5 (1.9)	455 (14.2)	51 (4.0)	466 (4.0)	44 (3.5)	451 (4.1)	9.8 (0.13)
Chile		5 (1.5)	509 (14.5)	39 (4.0)	482 (5.0)	56 (4.1)	457 (3.4)	8.9 (0.19)
Montenegro		5 (0.2)	469 (8.5)	73 (0.6)	454 (2.9)	22 (0.5)	448 (4.0)	10.3 (0.01)
Spain		5 (1.3)	526 (5.4)	67 (3.5)	518 (2.8)	28 (3.2)	494 (5.8)	10.1 (0.11)
Bulgaria		4 (1.7)	575 (19.3)	53 (4.3)	554 (4.7)	43 (3.9)	476 (10.1)	9.7 (0.16)
Austria		4 (1.4)	534 (10.1)	65 (3.5)	534 (3.2)	31 (3.1)	495 (5.1)	10.0 (0.10)
France		4 (1.7)	524 (12.6)	56 (4.0)	498 (3.5)	40 (3.6)	470 (5.0)	9.9 (0.12)
South Africa (5)		4 (1.2)	443 (41.9)	34 (3.3)	352 (11.0)	62 (3.5)	305 (5.0)	8.9 (0.15)
Finland		4 (1.4)	570 (9.5)	53 (4.1)	561 (3.1)	44 (4.4)	546 (4.1)	9.9 (0.14)
Poland		3 (1.7)	546 (8.6)	55 (4.0)	538 (3.6)	42 (4.3)	521 (3.5)	9.8 (0.14)
Turkey (5)		3 (1.3)	567 (10.5)	43 (3.9)	550 (7.4)	53 (3.8)	505 (5.2)	9.2 (0.13)
Morocco		3 (1.4)	417 (28.0)	34 (3.3)	402 (11.1)	63 (3.5)	357 (6.9)	8.9 (0.13)
Belgium (Flemish)		2 (1.4)	~ ~	52 (3.7)	505 (2.6)	45 (3.6)	495 (4.1)	9.5 (0.11)
Hungary		2 (1.3)	~ ~	32 (4.3)	546 (5.8)	66 (4.2)	519 (4.0)	8.9 (0.15)
Japan		2 (1.2)	~ ~	40 (3.9)	568 (2.7)	58 (4.1)	556 (2.2)	9.2 (0.14)
Czech Republic		2 (2.0)	~ ~	39 (4.3)	548 (4.2)	59 (4.5)	523 (3.5)	9.0 (0.15)
Armenia		2 (1.2)	~ ~	60 (4.3)	465 (4.2)	38 (4.0)	467 (5.0)	9.8 (0.12)
Italy		2 (1.1)	~ ~	42 (3.5)	510 (4.8)	56 (3.4)	509 (3.3)	9.3 (0.11)
Lithuania		2 (1.0)	~ ~	79 (3.0)	541 (3.2)	19 (2.8)	523 (7.2)	10.4 (0.12)
Germany		2 (1.1)	~ ~	57 (3.8)	532 (2.6)	42 (3.8)	498 (4.7)	9.6 (0.13)
North Macedonia		1 (0.8)	~ ~	54 (4.4)	443 (6.7)	45 (4.4)	408 (11.1)	9.3 (0.19)
Croatia		1 (0.8)	~ ~	68 (3.5)	526 (2.6)	30 (3.5)	519 (3.7)	10.0 (0.12)
Russian Federation		1 (0.5)	~ ~	54 (3.3)	576 (4.4)	46 (3.3)	557 (3.4)	9.5 (0.11)
Azerbaijan		0 (0.5)	~ ~	50 (3.6)	428 (5.6)	50 (3.5)	426 (4.7)	9.4 (0.12)
Portugal		0 (0.3)	~ ~	45 (3.7)	513 (3.3)	55 (3.7)	497 (3.0)	9.3 (0.12)
Latvia		0 (0.0)	~ ~	61 (4.0)	548 (2.8)	39 (4.0)	532 (4.2)	9.6 (0.08)
Netherlands	s	0 (0.0)	~ ~	40 (5.7)	530 (4.8)	60 (5.7)	510 (3.4)	8.9 (0.13)
Norway (5)	r	0 (0.0)	~ ~	57 (5.1)	546 (3.7)	43 (5.1)	533 (3.5)	9.7 (0.14)
Serbia		0 (0.0)	~ ~	59 (3.8)	527 (3.6)	41 (3.8)	501 (6.5)	9.6 (0.13)
Slovak Republic		0 (0.0)	~ ~	38 (3.6)	541 (4.5)	62 (3.6)	509 (5.0)	8.9 (0.12)
International Average		**7 (0.3)**	**508 (2.4)**	**55 (0.5)**	**499 (0.7)**	**37 (0.5)**	**474 (0.9)**	
Benchmarking Participants								
Dubai, UAE	r	31 (0.3)	567 (2.5)	58 (0.3)	542 (2.7)	12 (0.1)	508 (3.5)	12.2 (0.01)
Abu Dhabi, UAE	r	16 (1.5)	476 (9.2)	46 (1.8)	444 (3.9)	38 (0.9)	347 (4.2)	10.3 (0.07)
Ontario, Canada		8 (3.5)	542 (11.0)	52 (4.8)	527 (3.3)	40 (5.6)	517 (7.9)	9.8 (0.26)
Quebec, Canada		8 (2.3)	530 (7.0)	68 (4.6)	527 (2.5)	24 (4.5)	506 (4.3)	10.5 (0.16)
Madrid, Spain		7 (2.6)	542 (4.9)	64 (4.2)	528 (2.3)	29 (3.5)	507 (4.3)	10.4 (0.16)
Moscow City, Russian Fed.		4 (1.8)	592 (11.9)	80 (3.9)	596 (2.5)	16 (3.5)	589 (5.3)	10.6 (0.12)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 7.4: School Emphasis on Academic Success – Principals' Reports

Students' Results based on Principals' Reports

Country		Very High Emphasis		High Emphasis		Medium Emphasis		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Korea, Rep. of		26 (3.3)	631 (4.7)	56 (3.6)	597 (3.6)	19 (3.0)	604 (7.5)	11.8 (0.18)
United Arab Emirates		22 (1.8)	519 (4.4)	56 (2.0)	474 (2.9)	22 (1.3)	416 (3.5)	11.4 (0.08)
Singapore		18 (0.0)	681 (6.5)	52 (0.0)	612 (6.0)	30 (0.0)	582 (7.5)	10.9 (0.00)
England	s	18 (3.6)	602 (14.8)	61 (4.9)	504 (7.7)	21 (3.8)	500 (11.5)	11.3 (0.16)
Australia		17 (2.8)	587 (8.8)	46 (3.5)	525 (5.4)	37 (3.0)	480 (5.6)	10.8 (0.16)
Ireland		16 (3.2)	554 (5.6)	58 (4.3)	531 (3.1)	26 (3.5)	494 (5.0)	11.2 (0.16)
Qatar		15 (2.8)	502 (17.0)	66 (3.8)	438 (4.6)	19 (2.9)	414 (9.0)	11.4 (0.14)
Bahrain		15 (0.2)	493 (7.5)	48 (0.2)	490 (2.2)	38 (0.2)	465 (2.3)	10.7 (0.01)
New Zealand		15 (3.4)	535 (7.4)	61 (5.0)	487 (4.7)	24 (4.1)	456 (6.9)	11.1 (0.18)
Saudi Arabia		15 (2.7)	417 (5.3)	61 (4.0)	394 (3.3)	24 (3.3)	379 (6.3)	11.2 (0.17)
Kazakhstan		10 (2.6)	496 (18.3)	70 (3.7)	489 (4.4)	20 (3.2)	480 (7.0)	11.1 (0.13)
United States		10 (2.0)	559 (10.2)	53 (3.1)	539 (5.9)	38 (3.1)	482 (7.5)	10.3 (0.14)
Chile		9 (1.5)	482 (9.7)	31 (3.9)	472 (6.2)	60 (4.0)	418 (3.6)	9.5 (0.17)
Chinese Taipei		9 (2.2)	649 (12.1)	56 (3.2)	625 (3.6)	36 (2.7)	584 (5.2)	10.4 (0.12)
Kuwait		8 (2.2)	451 (16.6)	53 (4.8)	412 (5.8)	39 (4.1)	378 (6.4)	10.3 (0.16)
Malaysia		8 (2.2)	500 (16.5)	52 (3.6)	476 (5.1)	39 (3.8)	432 (5.1)	10.5 (0.14)
Sweden		8 (2.4)	543 (12.2)	46 (4.0)	513 (3.8)	46 (3.9)	486 (3.5)	10.2 (0.14)
Oman		8 (1.8)	453 (13.2)	67 (3.4)	415 (3.5)	25 (3.1)	385 (5.7)	10.9 (0.12)
Cyprus	r	7 (0.3)	532 (8.4)	58 (0.5)	512 (2.5)	35 (0.5)	482 (2.8)	10.4 (0.01)
Romania		7 (1.8)	535 (21.4)	46 (4.0)	493 (7.1)	47 (4.1)	459 (5.4)	10.1 (0.13)
Israel		6 (1.9)	544 (23.0)	63 (3.8)	530 (6.1)	31 (3.8)	492 (11.1)	10.5 (0.13)
Egypt		5 (1.8)	431 (6.4)	51 (4.5)	427 (5.6)	44 (4.3)	396 (9.1)	10.0 (0.14)
France	r	5 (1.6)	538 (17.9)	46 (4.6)	491 (4.4)	49 (4.5)	474 (3.9)	9.8 (0.13)
Lebanon		5 (1.8)	467 (14.1)	51 (3.3)	445 (3.9)	44 (3.4)	404 (4.6)	10.1 (0.12)
Hong Kong SAR		5 (2.5)	674 (19.2)	46 (4.1)	605 (6.6)	50 (3.4)	546 (7.2)	9.9 (0.15)
Jordan		4 (1.6)	472 (12.1)	45 (4.3)	436 (6.4)	50 (4.3)	402 (4.8)	9.8 (0.14)
Turkey		4 (1.7)	579 (29.7)	40 (3.4)	521 (7.8)	56 (3.3)	472 (5.6)	9.7 (0.13)
Japan		3 (1.6)	689 (34.0)	45 (4.6)	601 (3.9)	51 (4.5)	582 (2.6)	9.7 (0.16)
Iran, Islamic Rep. of		3 (1.2)	562 (29.3)	44 (3.6)	467 (5.0)	53 (3.5)	422 (4.5)	9.6 (0.13)
Georgia		3 (1.3)	475 (32.1)	47 (4.1)	472 (7.3)	50 (4.0)	451 (4.2)	9.9 (0.12)
Finland		3 (1.3)	526 (12.2)	45 (4.1)	516 (3.4)	52 (4.3)	502 (3.7)	9.8 (0.11)
Norway (9)	r	3 (1.3)	539 (22.2)	53 (5.1)	510 (3.8)	45 (5.0)	496 (4.2)	10.1 (0.13)
Hungary		2 (1.2)	~ ~	28 (3.5)	564 (8.0)	70 (3.4)	496 (4.0)	9.3 (0.12)
South Africa (9)		2 (0.6)	~ ~	29 (2.4)	403 (5.8)	69 (2.4)	380 (2.5)	8.9 (0.10)
Portugal		1 (0.8)	~ ~	27 (3.5)	525 (5.4)	71 (3.7)	489 (3.6)	9.0 (0.13)
Morocco		1 (0.8)	~ ~	23 (2.9)	411 (6.4)	76 (3.1)	381 (2.8)	8.5 (0.13)
Lithuania		1 (0.9)	~ ~	65 (4.1)	525 (3.8)	34 (4.1)	506 (5.6)	10.3 (0.11)
Italy		0 (0.0)	~ ~	38 (4.2)	504 (4.6)	62 (4.2)	495 (3.3)	9.3 (0.11)
Russian Federation		0 (0.0)	~ ~	36 (3.8)	562 (6.6)	64 (3.8)	533 (5.4)	9.3 (0.09)
International Average		**8 (0.3)**	**538 (3.0)**	**49 (0.6)**	**500 (0.8)**	**43 (0.6)**	**469 (0.9)**	
Benchmarking Participants								
Dubai, UAE	r	30 (0.5)	562 (2.6)	58 (0.5)	533 (3.5)	11 (0.2)	479 (7.7)	12.2 (0.02)
Abu Dhabi, UAE	r	15 (1.8)	489 (8.0)	59 (1.9)	444 (5.2)	26 (0.9)	377 (6.3)	11.0 (0.09)
Quebec, Canada		7 (2.6)	598 (18.1)	64 (4.6)	553 (4.3)	29 (4.4)	520 (7.0)	10.6 (0.17)
Ontario, Canada	r	6 (2.2)	563 (8.3)	56 (4.6)	540 (7.1)	38 (4.5)	506 (6.6)	10.2 (0.19)
Western Cape, RSA (9)		5 (1.9)	564 (14.8)	25 (3.0)	492 (11.6)	70 (3.1)	414 (4.8)	9.0 (0.15)
Gauteng, RSA (9)		5 (2.0)	449 (26.9)	32 (3.6)	437 (7.2)	62 (3.7)	409 (4.4)	9.2 (0.16)
Moscow City, Russian Fed.		2 (1.1)	~ ~	59 (4.3)	579 (5.8)	39 (4.1)	571 (5.9)	10.1 (0.10)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit 7.5: School Emphasis on Academic Success – Principals' Reports

Students' Results based on Principals' Reports

Country	Very High Emphasis		High Emphasis		Medium Emphasis		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Korea, Rep. of	26 (3.3)	578 (4.0)	56 (3.6)	553 (2.8)	19 (3.0)	561 (5.5)	11.8 (0.18)
United Arab Emirates	22 (1.8)	526 (5.0)	56 (2.0)	477 (3.5)	22 (1.3)	401 (4.5)	11.4 (0.08)
Singapore	18 (0.0)	671 (6.7)	52 (0.0)	604 (5.7)	30 (0.0)	576 (7.5)	10.9 (0.00)
England s	18 (3.6)	600 (13.3)	61 (4.9)	506 (7.5)	21 (3.8)	503 (11.0)	11.3 (0.16)
Australia	17 (2.8)	581 (8.7)	46 (3.5)	537 (4.5)	37 (3.0)	497 (5.0)	10.8 (0.16)
Ireland	16 (3.2)	556 (6.5)	58 (4.3)	531 (3.4)	26 (3.5)	492 (6.3)	11.2 (0.16)
Qatar	15 (2.8)	524 (17.5)	66 (3.8)	471 (4.7)	19 (2.9)	448 (8.0)	11.4 (0.14)
Bahrain	15 (0.2)	541 (7.1)	48 (0.2)	498 (2.1)	38 (0.2)	449 (2.5)	10.7 (0.01)
New Zealand	15 (3.4)	549 (6.3)	61 (5.0)	504 (4.8)	24 (4.1)	474 (7.9)	11.1 (0.18)
Saudi Arabia	15 (2.7)	462 (6.3)	61 (4.0)	433 (3.9)	24 (3.3)	410 (7.2)	11.2 (0.17)
Kazakhstan	10 (2.6)	483 (17.8)	70 (3.7)	478 (4.2)	20 (3.2)	475 (8.3)	11.1 (0.13)
United States	10 (2.0)	560 (9.5)	53 (3.1)	545 (5.1)	38 (3.1)	492 (8.1)	10.3 (0.14)
Chile	9 (1.5)	507 (8.5)	31 (3.9)	491 (5.8)	60 (4.0)	441 (3.5)	9.5 (0.17)
Chinese Taipei	9 (2.2)	600 (9.0)	56 (3.2)	583 (2.6)	36 (2.7)	554 (4.0)	10.4 (0.12)
Kuwait	8 (2.2)	506 (10.9)	53 (4.8)	455 (6.0)	39 (4.1)	414 (7.4)	10.3 (0.16)
Malaysia	8 (2.2)	511 (13.6)	52 (3.6)	474 (5.4)	39 (3.8)	431 (4.9)	10.5 (0.14)
Sweden	8 (2.4)	570 (14.1)	46 (4.0)	536 (4.7)	46 (3.9)	500 (4.5)	10.2 (0.14)
Oman	8 (1.8)	494 (13.8)	67 (3.4)	462 (3.7)	25 (3.1)	432 (6.7)	10.9 (0.12)
Cyprus r	7 (0.3)	505 (9.8)	58 (0.5)	494 (3.0)	35 (0.5)	465 (3.2)	10.4 (0.01)
Romania	7 (1.8)	515 (19.7)	46 (4.0)	483 (6.4)	47 (4.1)	452 (4.9)	10.1 (0.13)
Israel	6 (1.9)	542 (19.7)	63 (3.8)	525 (5.6)	31 (3.8)	484 (10.4)	10.5 (0.13)
Egypt	5 (1.8)	417 (12.4)	51 (4.5)	407 (5.9)	44 (4.3)	367 (10.0)	10.0 (0.14)
France r	5 (1.6)	543 (17.2)	46 (4.6)	499 (4.9)	49 (4.5)	477 (4.4)	9.8 (0.13)
Lebanon	5 (1.8)	420 (13.9)	51 (3.3)	405 (5.6)	44 (3.4)	336 (8.1)	10.1 (0.12)
Hong Kong SAR	5 (2.5)	620 (13.1)	46 (4.1)	522 (8.3)	50 (3.4)	477 (8.0)	9.9 (0.15)
Jordan	4 (1.6)	513 (13.5)	45 (4.3)	469 (6.9)	50 (4.3)	431 (5.9)	9.8 (0.14)
Turkey	4 (1.7)	580 (25.8)	40 (3.4)	537 (6.8)	56 (3.3)	495 (5.0)	9.7 (0.13)
Japan	3 (1.6)	642 (23.6)	45 (4.6)	574 (2.9)	51 (4.5)	561 (2.0)	9.7 (0.16)
Iran, Islamic Rep. of	3 (1.2)	558 (25.5)	44 (3.6)	470 (4.6)	53 (3.5)	426 (4.4)	9.6 (0.13)
Georgia	3 (1.3)	453 (25.5)	47 (4.1)	451 (6.3)	50 (4.0)	442 (4.1)	9.9 (0.12)
Finland	3 (1.3)	561 (13.9)	45 (4.1)	550 (4.1)	52 (4.3)	535 (4.6)	9.8 (0.11)
Norway (9) r	3 (1.3)	533 (21.9)	53 (5.1)	502 (4.6)	45 (5.0)	489 (5.3)	10.1 (0.13)
Hungary	2 (1.2)	~ ~	28 (3.5)	570 (6.6)	70 (3.4)	513 (3.8)	9.3 (0.12)
South Africa (9)	2 (0.6)	~ ~	29 (2.4)	388 (7.9)	69 (2.4)	358 (3.4)	8.9 (0.10)
Portugal	1 (0.8)	~ ~	27 (3.5)	539 (4.8)	71 (3.7)	510 (3.2)	9.0 (0.13)
Morocco	1 (0.8)	~ ~	23 (2.9)	417 (7.0)	76 (3.1)	388 (3.6)	8.5 (0.13)
Lithuania	1 (0.9)	~ ~	65 (4.1)	537 (3.6)	34 (4.1)	521 (5.2)	10.3 (0.11)
Italy	0 (0.0)	~ ~	38 (4.2)	508 (4.1)	62 (4.2)	498 (3.4)	9.3 (0.11)
Russian Federation	0 (0.0)	~ ~	36 (3.8)	557 (5.6)	64 (3.8)	535 (5.2)	9.3 (0.09)
International Average	**8 (0.3)**	**538 (2.6)**	**49 (0.6)**	**501 (0.8)**	**43 (0.6)**	**470 (1.0)**	
Benchmarking Participants							
Dubai, UAE r	30 (0.5)	571 (2.8)	58 (0.5)	545 (3.1)	11 (0.2)	488 (9.2)	12.2 (0.02)
Abu Dhabi, UAE r	15 (1.8)	491 (9.6)	59 (1.9)	434 (6.7)	26 (0.9)	334 (7.8)	11.0 (0.09)
Quebec, Canada	7 (2.6)	580 (17.1)	64 (4.6)	548 (4.2)	29 (4.4)	514 (6.9)	10.6 (0.17)
Ontario, Canada r	6 (2.2)	550 (9.9)	56 (4.6)	529 (4.3)	38 (4.5)	505 (5.1)	10.2 (0.19)
Western Cape, RSA (9)	5 (1.9)	590 (17.0)	25 (3.0)	503 (14.2)	70 (3.1)	405 (5.6)	9.0 (0.15)
Gauteng, RSA (9)	5 (2.0)	460 (33.6)	32 (3.6)	444 (9.2)	62 (3.7)	407 (5.6)	9.2 (0.16)
Moscow City, Russian Fed.	2 (1.1)	~ ~	59 (4.3)	570 (3.9)	39 (4.1)	562 (4.4)	10.1 (0.10)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Parents' Perceptions of the School

The TIMSS 2019 Early Learning Survey (or "Home Questionnaire") asked the parents of fourth grade students about the extent to which they are satisfied that their child's school promotes academic standards and fosters a positive school climate. Students were categorized on the *Parents' Perceptions of Their Child's School* scale according to their parents' responses to eight items listed in Exhibit 7.6 (see About the Scale).

Exhibit 7.7 presents the results for the *Parents' Perceptions of Their Child's School* in relationship to students' mathematics achievement. Overall, parents reported positive perceptions about their child's school. On average across countries, the majority of fourth grade students (64%) had parents who reported being "very satisfied," but these percentages ranged from 90 percent in Albania to 15 percent in Korea and 9 percent in Japan. On average, 31 percent of students attended schools with which their parents were "somewhat satisfied." Only 5 percent of students on average had parents who were "less than satisfied" with their child's school. Average mathematics achievement was similar across the three categories of the scale, with students in the "very satisfied" category having only slightly higher achievement than students in the "somewhat satisfied" and "less than satisfied" categories (504 vs. 497 and 495, respectively).

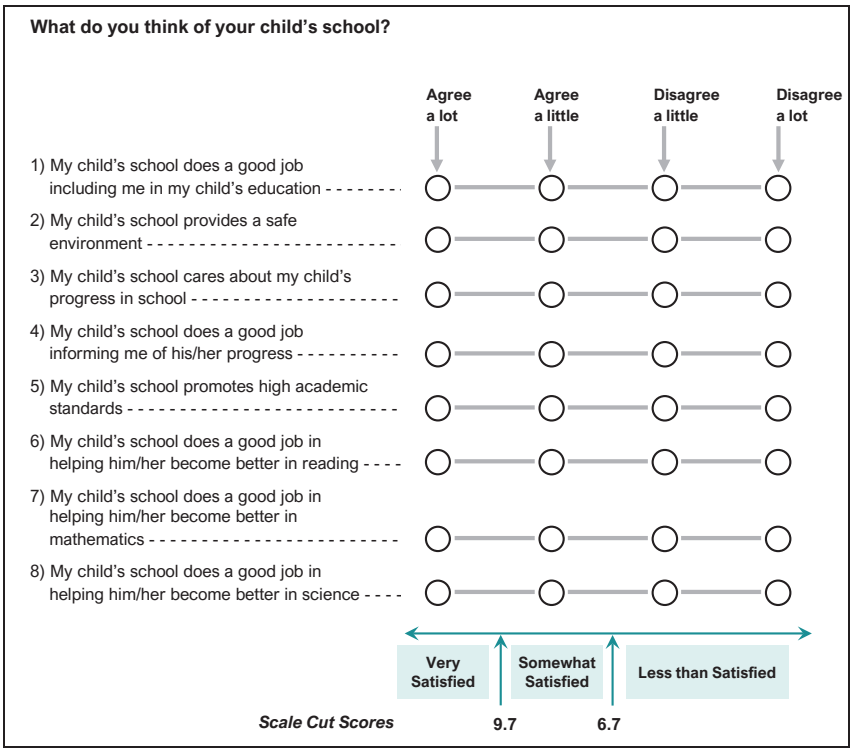
Exhibit 7.8 shows the same results for fourth grade students, but in relationship to science achievement. On average, students had very similar science achievement across the three scale categories (493, 487, and 491, respectively).

Exhibit 7.6: Parents' Perceptions of Their Child's School

Students' Results based on Parents' Reports

About the Scale

Students were scored according to their parents' responses to eight statements on the *Parents' Perceptions of Their Child's School* scale. Cut scores divide the scale into three categories. Students whose parents are **Very Satisfied** with their child's school had a score at or above the cut score corresponding to their parents "agreeing a lot" with four of the eight statements and "agreeing a little" with the other four, on average. Students whose parents are **Less than Satisfied** had a score at or below the cut score corresponding to their parents "disagreeing a little" with four of the eight statements and "agreeing a little" with the other four, on average. All other students had parents who are **Somewhat Satisfied**.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 7.7: Parents' Perceptions of Their Child's School

Students' Results based on Parents' Reports

Country		Very Satisfied		Somewhat Satisfied		Less than Satisfied		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania		90 (0.8)	497 (3.4)	9 (0.7)	484 (8.6)	2 (0.4)	~ ~	11.5 (0.05)
Armenia		88 (1.0)	500 (2.6)	11 (0.9)	486 (5.5)	1 (0.1)	~ ~	11.5 (0.05)
Kazakhstan		87 (1.0)	513 (2.6)	12 (0.9)	514 (5.0)	1 (0.2)	~ ~	11.5 (0.05)
Malta	r	85 (0.7)	516 (1.7)	14 (0.7)	515 (3.5)	1 (0.2)	~ ~	11.2 (0.03)
Kosovo		84 (0.8)	448 (3.0)	14 (0.6)	440 (5.2)	2 (0.3)	~ ~	11.1 (0.04)
Saudi Arabia		80 (0.9)	404 (3.7)	17 (0.7)	390 (6.1)	3 (0.3)	393 (10.8)	11.0 (0.05)
Northern Ireland	s	79 (1.2)	590 (3.9)	19 (1.1)	566 (5.5)	2 (0.3)	~ ~	11.0 (0.06)
Georgia		79 (1.1)	482 (3.8)	19 (1.0)	490 (4.8)	2 (0.2)	~ ~	10.9 (0.05)
North Macedonia		79 (1.1)	473 (5.9)	18 (0.9)	482 (7.7)	3 (0.5)	473 (10.9)	10.8 (0.05)
Azerbaijan		78 (1.1)	524 (2.8)	19 (1.0)	514 (4.3)	3 (0.3)	514 (8.0)	10.9 (0.06)
Bulgaria		78 (1.4)	513 (4.0)	19 (1.1)	529 (7.0)	4 (0.4)	526 (15.3)	10.9 (0.07)
Montenegro		77 (0.8)	455 (2.2)	20 (0.8)	454 (3.4)	3 (0.3)	455 (10.3)	10.9 (0.03)
Ireland		77 (1.1)	552 (2.4)	21 (1.0)	552 (4.4)	2 (0.4)	~ ~	10.8 (0.05)
Turkey (5)		77 (1.7)	522 (4.8)	20 (1.5)	523 (7.6)	3 (0.4)	551 (14.1)	10.9 (0.08)
Oman		76 (1.0)	442 (4.1)	21 (0.8)	407 (4.7)	3 (0.3)	370 (8.3)	10.8 (0.05)
South Africa (5)	r	76 (0.9)	384 (3.7)	21 (0.7)	353 (4.3)	3 (0.3)	336 (9.7)	10.8 (0.04)
Bosnia and Herzegovina		76 (1.2)	452 (2.5)	21 (1.0)	453 (3.8)	3 (0.3)	449 (8.7)	10.8 (0.06)
Pakistan	r	76 (2.7)	340 (13.9)	22 (2.6)	301 (12.3)	2 (0.5)	~ ~	10.9 (0.10)
Philippines		75 (1.3)	308 (6.5)	23 (1.2)	271 (7.1)	2 (0.2)	~ ~	10.9 (0.06)
Serbia		75 (1.3)	506 (3.6)	22 (1.1)	520 (3.9)	3 (0.4)	521 (8.4)	10.8 (0.06)
Qatar	r	72 (1.4)	457 (3.4)	24 (1.2)	446 (5.6)	4 (0.5)	417 (12.3)	10.7 (0.07)
Morocco		72 (1.7)	392 (4.5)	25 (1.5)	367 (6.9)	4 (0.5)	351 (14.5)	10.5 (0.07)
Portugal		71 (1.1)	531 (2.8)	25 (1.0)	519 (3.0)	4 (0.4)	519 (7.0)	10.5 (0.05)
Iran, Islamic Rep. of		70 (1.4)	447 (4.3)	26 (1.2)	439 (5.8)	4 (0.4)	420 (10.1)	10.4 (0.06)
Italy		68 (1.4)	518 (2.7)	28 (1.3)	512 (3.1)	4 (0.4)	513 (8.0)	10.4 (0.06)
Spain		68 (1.3)	508 (3.0)	27 (1.0)	509 (2.6)	5 (0.5)	482 (6.7)	10.4 (0.06)
Lithuania	r	67 (1.3)	546 (3.3)	29 (1.1)	536 (4.0)	4 (0.5)	543 (8.3)	10.3 (0.06)
Cyprus		67 (1.4)	537 (3.1)	29 (1.1)	533 (3.0)	5 (0.5)	519 (9.2)	10.3 (0.06)
Bahrain		64 (1.1)	486 (3.0)	31 (0.9)	474 (3.1)	5 (0.5)	462 (6.7)	10.3 (0.05)
Singapore		63 (0.8)	632 (4.1)	33 (0.7)	620 (4.0)	4 (0.3)	592 (7.1)	10.3 (0.03)
Kuwait	r	63 (1.2)	397 (5.2)	30 (1.0)	378 (6.0)	8 (0.5)	342 (8.7)	10.2 (0.05)
Slovak Republic		61 (1.1)	510 (4.3)	34 (0.9)	513 (3.5)	5 (0.4)	519 (5.8)	10.2 (0.05)
Austria		60 (1.4)	545 (2.5)	34 (1.1)	539 (2.8)	6 (0.5)	520 (5.7)	10.0 (0.06)
Hungary		58 (1.4)	525 (3.1)	35 (1.1)	528 (3.5)	6 (0.5)	519 (5.9)	10.0 (0.06)
Canada	s	58 (0.9)	525 (2.7)	36 (0.8)	524 (2.3)	6 (0.4)	503 (5.7)	10.1 (0.04)
Finland		55 (1.3)	539 (2.8)	41 (1.2)	533 (2.7)	4 (0.4)	511 (8.3)	9.9 (0.05)
Hong Kong SAR		54 (1.2)	610 (3.7)	40 (1.2)	599 (3.7)	5 (0.6)	579 (6.4)	9.9 (0.05)
Russian Federation		52 (1.4)	566 (4.1)	42 (1.2)	571 (3.2)	6 (0.6)	555 (5.3)	9.7 (0.06)
Denmark	s	51 (1.6)	544 (2.9)	37 (1.3)	538 (3.8)	12 (1.0)	522 (5.7)	9.5 (0.08)
Belgium (Flemish)		50 (1.1)	536 (2.6)	46 (1.0)	533 (2.2)	4 (0.4)	519 (6.4)	9.7 (0.04)
Latvia		48 (1.1)	548 (3.2)	44 (0.9)	548 (2.7)	7 (0.6)	535 (5.0)	9.6 (0.05)
Chinese Taipei		46 (1.2)	598 (2.2)	48 (1.1)	600 (2.5)	6 (0.5)	603 (5.3)	9.6 (0.05)
Germany	s	45 (1.6)	539 (3.2)	45 (1.4)	531 (2.9)	11 (0.9)	514 (5.3)	9.3 (0.07)
Sweden	r	44 (1.7)	530 (4.0)	48 (1.5)	528 (2.8)	8 (0.8)	511 (5.2)	9.4 (0.07)
Chile		44 (1.5)	444 (3.3)	49 (1.2)	442 (3.2)	8 (0.7)	436 (6.7)	9.4 (0.07)
Croatia		43 (1.1)	512 (2.9)	50 (1.0)	508 (2.4)	7 (0.5)	514 (6.2)	9.5 (0.05)
Poland		42 (1.3)	520 (4.1)	52 (1.1)	523 (2.4)	6 (0.5)	524 (5.1)	9.5 (0.06)
France		37 (1.1)	493 (4.1)	55 (1.1)	487 (3.3)	8 (0.7)	472 (6.4)	9.1 (0.05)
Czech Republic	r	36 (1.9)	541 (3.9)	51 (1.5)	541 (2.8)	13 (1.0)	542 (4.0)	9.0 (0.09)
Korea, Rep. of		15 (0.9)	603 (4.3)	70 (0.9)	600 (2.4)	14 (0.7)	599 (3.3)	8.2 (0.04)
Japan		9 (0.8)	598 (5.2)	68 (0.9)	595 (1.7)	24 (0.9)	590 (2.8)	7.8 (0.04)
Australia		- -	- -	- -	- -	- -	- -	- -
England		- -	- -	- -	- -	- -	- -	- -
Netherlands		- -	- -	- -	- -	- -	- -	- -
Norway (5)		- -	- -	- -	- -	- -	- -	- -
United States		- -	- -	- -	- -	- -	- -	- -
United Arab Emirates	x	71 (0.7)	507 (2.3)	25 (0.5)	491 (3.3)	5 (0.3)	472 (5.5)	10.6 (0.03)
New Zealand	x	64 (1.7)	513 (3.9)	31 (1.5)	511 (4.3)	5 (0.6)	490 (10.3)	10.3 (0.07)
International Average		**64 (0.2)**	**504 (0.6)**	**31 (0.2)**	**497 (0.6)**	**5 (0.1)**	**495 (1.2)**	
Benchmarking Participants								
Dubai, UAE	s	69 (1.2)	563 (2.2)	26 (1.2)	546 (3.6)	5 (0.3)	531 (7.0)	10.5 (0.05)
Madrid, Spain		66 (1.3)	523 (2.7)	28 (1.2)	519 (3.1)	6 (0.6)	505 (7.0)	10.3 (0.05)
Ontario, Canada	s	57 (1.5)	528 (5.4)	35 (1.3)	523 (3.6)	8 (0.7)	499 (8.3)	9.9 (0.07)
Quebec, Canada	r	51 (1.3)	540 (3.1)	45 (1.3)	537 (3.2)	4 (0.5)	528 (5.8)	9.8 (0.05)
Moscow City, Russian Fed.		38 (1.3)	589 (3.0)	49 (1.1)	597 (2.3)	13 (0.8)	588 (3.5)	9.1 (0.06)
Abu Dhabi, UAE	y	- -	- -	- -	- -	- -	- -	- -

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 7.8: Parents' Perceptions of Their Child's School

Students' Results based on Parents' Reports

Country		Very Satisfied		Somewhat Satisfied		Less than Satisfied		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania		90 (0.8)	492 (3.7)	9 (0.7)	480 (7.9)	2 (0.4)	~ ~	11.5 (0.05)
Armenia		88 (1.0)	468 (3.6)	11 (0.9)	457 (5.7)	1 (0.1)	~ ~	11.5 (0.05)
Kazakhstan		87 (1.0)	494 (3.2)	12 (0.9)	503 (5.9)	1 (0.2)	~ ~	11.5 (0.05)
Malta	r	85 (0.7)	501 (1.8)	14 (0.7)	509 (4.4)	1 (0.2)	~ ~	11.2 (0.03)
Kosovo		84 (0.8)	415 (4.0)	14 (0.6)	413 (5.7)	2 (0.3)	~ ~	11.1 (0.04)
Saudi Arabia		80 (0.9)	410 (4.6)	17 (0.7)	388 (6.8)	3 (0.3)	388 (10.9)	11.0 (0.05)
Northern Ireland	s	79 (1.2)	535 (2.9)	19 (1.1)	517 (5.1)	2 (0.3)	~ ~	11.0 (0.06)
Georgia		79 (1.1)	454 (4.2)	19 (1.0)	465 (5.3)	2 (0.2)	~ ~	10.9 (0.05)
North Macedonia		79 (1.1)	427 (7.0)	18 (0.9)	439 (8.6)	3 (0.5)	418 (12.6)	10.8 (0.05)
Azerbaijan		78 (1.1)	436 (3.3)	19 (1.0)	429 (5.2)	3 (0.3)	434 (10.3)	10.9 (0.06)
Bulgaria		78 (1.4)	518 (4.7)	19 (1.1)	541 (8.1)	4 (0.4)	544 (19.1)	10.9 (0.07)
Montenegro		77 (0.8)	456 (2.9)	20 (0.8)	456 (3.5)	3 (0.3)	464 (10.3)	10.9 (0.03)
Ireland		77 (1.1)	531 (2.8)	21 (1.0)	532 (5.0)	2 (0.4)	~ ~	10.8 (0.05)
Turkey (5)		77 (1.7)	524 (4.7)	20 (1.5)	529 (7.0)	3 (0.4)	551 (9.7)	10.9 (0.08)
Oman		76 (1.0)	447 (4.4)	21 (0.8)	411 (6.0)	3 (0.3)	363 (12.0)	10.8 (0.05)
South Africa (5)	r	76 (0.9)	336 (5.0)	21 (0.7)	297 (6.2)	3 (0.3)	284 (12.4)	10.8 (0.04)
Bosnia and Herzegovina		76 (1.2)	458 (3.2)	21 (1.0)	461 (3.8)	3 (0.3)	460 (8.3)	10.8 (0.06)
Pakistan	r	76 (2.7)	304 (14.8)	22 (2.6)	260 (12.8)	2 (0.5)	~ ~	10.9 (0.10)
Philippines		75 (1.3)	261 (7.8)	23 (1.2)	218 (9.0)	2 (0.2)	~ ~	10.9 (0.06)
Serbia		75 (1.3)	515 (4.0)	22 (1.1)	529 (3.9)	3 (0.4)	533 (8.6)	10.8 (0.06)
Qatar	r	72 (1.4)	462 (4.1)	24 (1.2)	441 (6.0)	4 (0.5)	413 (12.7)	10.7 (0.07)
Morocco		72 (1.7)	385 (5.9)	25 (1.5)	352 (9.4)	4 (0.5)	345 (17.9)	10.5 (0.07)
Portugal		71 (1.1)	507 (2.4)	25 (1.0)	503 (3.2)	4 (0.4)	487 (8.5)	10.5 (0.05)
Iran, Islamic Rep. of		70 (1.4)	443 (4.4)	26 (1.2)	439 (5.7)	4 (0.4)	426 (10.5)	10.4 (0.06)
Italy		68 (1.4)	514 (3.0)	28 (1.3)	507 (3.9)	4 (0.4)	506 (7.0)	10.4 (0.06)
Spain		68 (1.3)	516 (2.6)	27 (1.0)	516 (2.8)	5 (0.5)	497 (6.2)	10.4 (0.06)
Lithuania	r	67 (1.3)	541 (3.3)	29 (1.1)	533 (4.2)	4 (0.5)	535 (8.1)	10.3 (0.06)
Cyprus		67 (1.4)	515 (3.5)	29 (1.1)	513 (3.4)	5 (0.5)	504 (7.3)	10.3 (0.06)
Bahrain		64 (1.1)	506 (3.4)	31 (0.9)	483 (4.3)	5 (0.5)	458 (8.4)	10.3 (0.05)
Singapore		63 (0.8)	600 (3.5)	33 (0.7)	591 (3.7)	4 (0.3)	569 (7.0)	10.3 (0.03)
Kuwait	r	63 (1.2)	410 (6.3)	30 (1.0)	390 (7.3)	8 (0.5)	349 (10.1)	10.2 (0.05)
Slovak Republic		61 (1.1)	516 (4.7)	34 (0.9)	530 (3.2)	5 (0.4)	543 (7.0)	10.2 (0.05)
Austria		60 (1.4)	526 (3.3)	34 (1.1)	527 (3.2)	6 (0.5)	513 (5.0)	10.0 (0.06)
Hungary		58 (1.4)	530 (3.3)	35 (1.1)	534 (3.0)	6 (0.5)	530 (5.8)	10.0 (0.06)
Canada	s	58 (0.9)	533 (2.7)	36 (0.8)	532 (2.1)	6 (0.4)	528 (5.1)	10.1 (0.04)
Finland		55 (1.3)	560 (2.9)	41 (1.2)	557 (3.1)	4 (0.4)	537 (7.6)	9.9 (0.05)
Hong Kong SAR		54 (1.2)	540 (3.4)	40 (1.2)	524 (3.6)	5 (0.6)	514 (7.3)	9.9 (0.05)
Russian Federation		52 (1.4)	566 (3.6)	42 (1.2)	571 (3.3)	6 (0.6)	558 (4.6)	9.7 (0.06)
Denmark	s	51 (1.6)	537 (3.2)	37 (1.3)	534 (3.7)	12 (1.0)	523 (5.9)	9.5 (0.08)
Belgium (Flemish)		50 (1.1)	502 (2.6)	46 (1.0)	504 (2.7)	4 (0.4)	494 (6.1)	9.7 (0.04)
Latvia		48 (1.1)	543 (3.2)	44 (0.9)	544 (2.3)	7 (0.6)	531 (4.7)	9.6 (0.05)
Chinese Taipei		46 (1.2)	554 (2.1)	48 (1.1)	562 (2.4)	6 (0.5)	564 (5.2)	9.6 (0.05)
Germany	s	45 (1.6)	535 (3.6)	45 (1.4)	530 (2.9)	11 (0.9)	526 (5.3)	9.3 (0.07)
Sweden	r	44 (1.7)	542 (4.2)	48 (1.5)	544 (3.5)	8 (0.8)	534 (6.6)	9.4 (0.07)
Chile		44 (1.5)	470 (3.2)	49 (1.2)	470 (3.0)	8 (0.7)	470 (6.7)	9.4 (0.07)
Croatia		43 (1.1)	525 (2.8)	50 (1.0)	524 (2.5)	7 (0.5)	528 (5.8)	9.5 (0.05)
Poland		42 (1.3)	528 (4.0)	52 (1.1)	535 (2.4)	6 (0.5)	539 (5.5)	9.5 (0.06)
France		37 (1.1)	491 (4.1)	55 (1.1)	491 (3.6)	8 (0.7)	480 (6.4)	9.1 (0.05)
Czech Republic	r	36 (1.9)	538 (3.7)	51 (1.5)	543 (2.7)	13 (1.0)	540 (4.9)	9.0 (0.09)
Korea, Rep. of		15 (0.9)	587 (4.0)	70 (0.9)	588 (2.3)	14 (0.7)	590 (3.9)	8.2 (0.04)
Japan		9 (0.8)	571 (5.0)	68 (0.9)	564 (1.8)	24 (0.9)	557 (2.6)	7.8 (0.04)
Australia		- -	- -	- -	- -	- -	- -	- -
England		- -	- -	- -	- -	- -	- -	- -
Netherlands		- -	- -	- -	- -	- -	- -	- -
Norway (5)		- -	- -	- -	- -	- -	- -	- -
United States		- -	- -	- -	- -	- -	- -	- -
United Arab Emirates	x	71 (0.7)	505 (2.7)	25 (0.5)	485 (3.6)	5 (0.3)	465 (6.4)	10.6 (0.03)
New Zealand	x	64 (1.7)	527 (3.7)	31 (1.5)	525 (4.0)	5 (0.6)	516 (8.3)	10.3 (0.07)
International Average		**64 (0.2)**	**493 (0.6)**	**31 (0.2)**	**487 (0.7)**	**5 (0.1)**	**491 (1.3)**	
Benchmarking Participants								
Dubai, UAE	s	69 (1.2)	567 (2.5)	26 (1.2)	547 (3.8)	5 (0.3)	533 (8.0)	10.5 (0.05)
Madrid, Spain		66 (1.3)	526 (2.5)	28 (1.2)	521 (3.1)	6 (0.6)	518 (6.3)	10.3 (0.05)
Ontario, Canada	s	57 (1.5)	534 (4.8)	35 (1.3)	536 (3.2)	8 (0.7)	529 (7.0)	9.9 (0.07)
Quebec, Canada	r	51 (1.3)	528 (3.5)	45 (1.3)	528 (3.2)	4 (0.5)	525 (5.6)	9.8 (0.05)
Moscow City, Russian Fed.		38 (1.3)	589 (3.0)	49 (1.1)	600 (2.4)	13 (0.8)	593 (3.7)	9.1 (0.06)
Abu Dhabi, UAE	y	- -	- -	- -	- -	- -	- -	- -

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Students' Sense of School Belonging

The items forming the *Sense of School Belonging* scale asked students about their attitudes toward school, including the extent to which they like being in school, feel that they belong, and have good relationships with teachers. Both fourth and eighth grade students were asked how much they agreed or disagreed with the five statements listed in Exhibit 7.9 (see About the Scale).

The percentages of fourth grade students assigned to the three categories on the TIMSS 2019 *Sense of School Belonging* scale are shown in Exhibit 7.10 in relation to mathematics achievement and in Exhibit 7.11 in relation to science achievement. Overall, the majority of fourth grade students had positive attitudes toward school, and each successive category of increased school belonging was related to an increase in average achievement. More than half of students (58%) reported having a "high sense of school belonging," and these students had the highest average mathematics achievement (508) and average science achievement (497). On average, 34 percent of students had a "moderate sense of school belonging" with comparatively lower achievement (498 in mathematics and 487 in science). Only 8 percent of fourth grade students had "little sense of school belonging," and these students had the lowest average achievement (484 in mathematics and 476 in science).

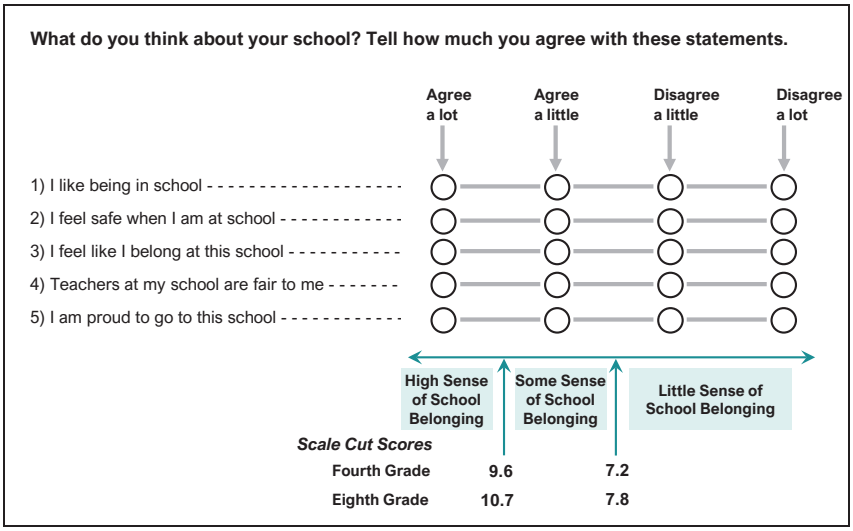
Exhibits 7.12 and 7.13 present the same results for eighth grade students in relation to mathematics achievement and science achievement, respectively. Compared with the fourth grade, smaller percentages of eighth grade students reported having a "high sense of school belonging," and larger percentages reported having a "moderate sense of school belonging." On average, across countries, 37 percent of eighth grade students reported a "high sense of school belonging," and 49 percent had a "moderate sense of school belonging." Like the fourth grade, there was a positive association between eighth grade students' sense of school belonging and their average achievement in mathematics and science. The 14 percent of students with "little sense of school belonging" had the lowest average achievement (470 in both mathematics and science). Students in the "high sense of school belonging" and "moderate sense of school belonging" categories had comparatively higher average achievement (500 and 489, respectively, in mathematics, and 502 and 490, respectively, in science).

Exhibit 7.9: Students' Sense of School Belonging

Students' Reports

About the Scale

Students were scored according to their responses to five statements on the *Sense of School Belonging* scale. Cut scores divide the scale into three categories. Students with a **High Sense of School Belonging** had a score at or above the cut score corresponding to "agreeing a lot" with three of the five statements and "agreeing a little" with the other two statements, on average. Students with **Little Sense of School Belonging** had a score at or below the cut score corresponding to "disagreeing a little" to three of the five statements and "agreeing a little" with the other two statements, on average. All other students had **Some Sense of School Belonging**.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 7.10: Students' Sense of School Belonging

Students' Reports

Country	High Sense of School Belonging		Some Sense of School Belonging		Little Sense of School Belonging		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	96 (0.4)	496 (3.5)	4 (0.4)	482 (9.5)	0 (0.1)	~ ~	12.3 (0.03)
Kosovo	94 (0.5)	448 (2.8)	6 (0.5)	424 (9.4)	0 (0.1)	~ ~	12.2 (0.03)
North Macedonia	82 (1.1)	481 (5.1)	16 (1.1)	463 (10.3)	2 (0.2)	~ ~	11.4 (0.05)
Montenegro	81 (0.7)	456 (2.0)	16 (0.6)	449 (4.1)	3 (0.2)	443 (11.4)	11.2 (0.04)
Morocco	80 (1.1)	391 (4.7)	18 (0.9)	362 (6.3)	3 (0.4)	331 (13.4)	11.3 (0.06)
Azerbaijan	78 (1.1)	526 (2.4)	19 (0.9)	514 (4.6)	3 (0.4)	497 (8.9)	11.1 (0.06)
Portugal	76 (1.3)	526 (2.7)	21 (1.1)	522 (3.6)	3 (0.4)	518 (8.9)	10.9 (0.06)
Georgia	74 (1.3)	481 (4.1)	24 (1.3)	484 (5.2)	2 (0.3)	~ ~	11.0 (0.05)
Pakistan	74 (3.0)	333 (13.0)	21 (2.5)	328 (14.8)	6 (1.1)	294 (13.2)	11.0 (0.16)
Bulgaria	72 (1.4)	512 (4.0)	23 (1.1)	528 (7.1)	4 (0.5)	530 (10.1)	10.7 (0.07)
Armenia	72 (1.2)	506 (2.6)	24 (0.9)	496 (3.8)	4 (0.6)	493 (7.3)	10.8 (0.08)
Turkey (5)	71 (1.1)	533 (4.4)	25 (0.9)	500 (6.0)	4 (0.4)	497 (12.7)	10.7 (0.05)
Kazakhstan	68 (1.3)	517 (2.8)	29 (1.1)	507 (3.1)	3 (0.4)	498 (7.7)	10.6 (0.06)
Bosnia and Herzegovina	68 (1.2)	455 (2.6)	26 (1.0)	452 (3.5)	6 (0.4)	436 (5.2)	10.5 (0.06)
Spain	67 (1.3)	508 (2.6)	27 (1.1)	498 (3.6)	6 (0.5)	474 (6.9)	10.4 (0.06)
Saudi Arabia	65 (1.1)	409 (3.7)	27 (1.0)	393 (4.2)	8 (0.5)	383 (6.7)	10.5 (0.06)
Oman	64 (1.3)	443 (4.3)	28 (1.0)	418 (4.4)	8 (0.6)	406 (6.8)	10.4 (0.07)
Norway (5)	64 (1.4)	549 (2.5)	31 (1.2)	540 (3.6)	5 (0.7)	517 (7.8)	10.2 (0.06)
Serbia	63 (1.4)	506 (4.0)	32 (1.1)	514 (3.5)	5 (0.7)	504 (5.9)	10.1 (0.06)
Bahrain	62 (1.3)	484 (3.0)	30 (1.0)	477 (2.8)	8 (0.6)	469 (6.2)	10.2 (0.07)
Ireland	61 (1.4)	556 (3.1)	32 (1.1)	543 (3.7)	7 (0.8)	519 (6.2)	10.0 (0.06)
Finland	60 (1.0)	538 (2.3)	34 (0.8)	528 (3.7)	6 (0.6)	506 (4.9)	10.0 (0.05)
Northern Ireland	60 (1.7)	576 (3.4)	33 (1.3)	557 (3.9)	8 (0.7)	529 (8.2)	10.0 (0.07)
Lithuania	60 (1.5)	544 (2.9)	35 (1.4)	542 (4.1)	5 (0.4)	529 (7.5)	10.0 (0.06)
Netherlands	59 (1.4)	542 (2.3)	33 (1.2)	535 (3.2)	7 (0.7)	515 (7.0)	10.0 (0.06)
United Arab Emirates	59 (0.6)	495 (2.0)	31 (0.5)	470 (2.0)	10 (0.3)	451 (3.6)	10.1 (0.03)
New Zealand	59 (1.2)	495 (3.0)	33 (0.9)	481 (3.2)	9 (0.6)	466 (5.0)	10.0 (0.06)
Austria	58 (1.2)	545 (2.4)	34 (0.9)	534 (2.5)	7 (0.6)	523 (4.8)	9.9 (0.05)
Malta	57 (0.8)	513 (1.8)	33 (0.8)	508 (2.4)	10 (0.4)	493 (4.4)	10.0 (0.04)
Kuwait	57 (1.5)	398 (5.6)	31 (1.2)	380 (5.3)	12 (0.7)	373 (7.9)	10.0 (0.08)
Chile	57 (1.2)	450 (2.9)	36 (1.0)	437 (3.1)	7 (0.7)	407 (6.3)	10.0 (0.06)
Cyprus	56 (1.5)	534 (2.7)	31 (0.9)	535 (4.1)	13 (0.9)	519 (5.0)	9.8 (0.08)
England	56 (1.7)	565 (4.6)	35 (1.4)	550 (3.3)	9 (0.8)	527 (7.5)	9.8 (0.08)
South Africa (5)	56 (1.2)	388 (3.9)	36 (1.0)	364 (4.1)	8 (0.5)	351 (5.6)	10.0 (0.06)
Denmark	55 (1.1)	534 (2.4)	36 (1.1)	518 (3.1)	9 (0.7)	503 (6.0)	9.8 (0.05)
Iran, Islamic Rep. of	55 (1.6)	439 (4.0)	38 (1.4)	455 (4.5)	8 (0.6)	439 (7.3)	10.0 (0.07)
Hungary	54 (1.4)	527 (3.1)	37 (1.2)	522 (3.5)	9 (0.8)	510 (5.4)	9.8 (0.06)
Australia	54 (1.2)	526 (3.2)	36 (0.9)	509 (3.3)	10 (0.6)	490 (6.4)	9.8 (0.06)
Belgium (Flemish)	54 (1.3)	539 (2.0)	38 (1.1)	529 (2.4)	8 (0.5)	506 (4.7)	9.8 (0.06)
Canada	53 (0.8)	515 (2.4)	37 (0.7)	510 (2.1)	10 (0.4)	495 (4.2)	9.7 (0.03)
Italy	52 (1.1)	521 (3.0)	39 (0.9)	511 (3.2)	8 (0.6)	497 (4.8)	9.6 (0.05)
United States	52 (1.1)	549 (2.7)	34 (0.8)	530 (3.0)	14 (0.6)	502 (5.1)	9.6 (0.05)
Sweden	51 (1.9)	529 (3.6)	40 (1.4)	517 (2.9)	9 (0.9)	501 (6.0)	9.6 (0.08)
Qatar	50 (1.2)	461 (3.9)	36 (0.9)	445 (4.6)	14 (0.8)	433 (6.1)	9.6 (0.06)
Slovak Republic	49 (1.5)	507 (4.1)	42 (1.1)	515 (3.6)	10 (0.8)	506 (6.1)	9.5 (0.07)
Germany	47 (1.4)	535 (2.8)	41 (1.1)	517 (2.7)	12 (0.8)	505 (4.5)	9.4 (0.06)
Russian Federation	47 (1.3)	570 (4.5)	43 (1.1)	567 (3.1)	10 (0.7)	556 (4.2)	9.4 (0.06)
Philippines	46 (2.0)	320 (7.6)	44 (1.5)	289 (6.6)	10 (0.7)	257 (7.5)	9.5 (0.09)
Singapore	45 (0.9)	633 (4.1)	44 (0.6)	624 (4.1)	11 (0.5)	602 (4.9)	9.4 (0.04)
Latvia	42 (1.4)	552 (3.0)	47 (1.1)	546 (3.2)	11 (0.7)	531 (4.1)	9.2 (0.05)
France	40 (1.2)	491 (3.8)	52 (1.1)	485 (3.5)	8 (0.5)	458 (6.1)	9.3 (0.05)
Korea, Rep. of	40 (1.4)	610 (2.8)	54 (1.2)	595 (2.7)	6 (0.5)	575 (8.0)	9.4 (0.06)
Czech Republic	40 (1.7)	534 (3.8)	49 (1.4)	537 (2.6)	11 (0.8)	517 (5.0)	9.2 (0.07)
Croatia	38 (1.3)	512 (3.3)	54 (1.3)	509 (2.7)	9 (0.6)	506 (5.6)	9.2 (0.06)
Chinese Taipei	34 (1.2)	603 (3.0)	51 (1.1)	601 (2.3)	14 (0.8)	584 (3.5)	8.9 (0.05)
Poland	34 (1.1)	518 (4.1)	49 (0.9)	526 (2.7)	16 (0.9)	514 (4.1)	8.9 (0.05)
Hong Kong SAR	34 (1.5)	612 (5.1)	45 (1.5)	602 (3.3)	21 (1.3)	586 (4.6)	8.8 (0.08)
Japan	32 (1.3)	603 (2.7)	55 (1.0)	592 (2.2)	13 (0.9)	576 (3.8)	9.0 (0.06)
International Average	**58 (0.2)**	**508 (0.5)**	**34 (0.1)**	**498 (0.6)**	**8 (0.1)**	**484 (0.9)**	
Benchmarking Participants							
Madrid, Spain	68 (1.5)	519 (2.5)	26 (1.2)	520 (3.2)	6 (0.6)	508 (6.9)	10.4 (0.06)
Dubai, UAE	66 (0.6)	549 (1.6)	27 (0.6)	537 (2.7)	6 (0.3)	523 (5.4)	10.4 (0.03)
Ontario, Canada	53 (1.4)	519 (4.2)	37 (1.1)	509 (3.5)	10 (0.7)	495 (6.8)	9.7 (0.06)
Abu Dhabi, UAE	50 (1.0)	450 (2.5)	35 (0.7)	438 (2.8)	15 (0.7)	423 (5.1)	9.6 (0.05)
Quebec, Canada	47 (1.5)	535 (2.8)	41 (1.3)	533 (3.2)	12 (1.0)	511 (4.7)	9.4 (0.07)
Moscow City, Russian Fed.	40 (1.3)	597 (2.7)	46 (1.0)	593 (2.4)	14 (0.8)	582 (4.1)	9.1 (0.06)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 7.11: Students' Sense of School Belonging

Students' Reports

Country	High Sense of School Belonging		Some Sense of School Belonging		Little Sense of School Belonging		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	96 (0.4)	492 (3.7)	4 (0.4)	473 (8.8)	0 (0.1)	~ ~	12.3 (0.03)
Kosovo	94 (0.5)	418 (3.6)	6 (0.5)	382 (11.8)	0 (0.1)	~ ~	12.2 (0.03)
North Macedonia	82 (1.1)	435 (6.2)	16 (1.1)	416 (10.3)	2 (0.2)	~ ~	11.4 (0.05)
Montenegro	81 (0.7)	456 (2.3)	16 (0.6)	454 (4.9)	3 (0.2)	454 (11.4)	11.2 (0.04)
Morocco	80 (1.1)	385 (6.4)	18 (0.9)	344 (7.6)	3 (0.4)	310 (15.1)	11.3 (0.06)
Azerbaijan	78 (1.1)	437 (2.9)	19 (0.9)	430 (5.5)	3 (0.4)	422 (11.3)	11.1 (0.06)
Portugal	76 (1.3)	505 (2.8)	21 (1.1)	502 (3.5)	3 (0.4)	497 (5.7)	10.9 (0.06)
Georgia	74 (1.3)	452 (4.4)	24 (1.3)	458 (5.8)	2 (0.3)	~ ~	11.0 (0.05)
Pakistan	74 (3.0)	294 (14.9)	21 (2.5)	294 (16.3)	6 (1.1)	261 (18.7)	11.0 (0.16)
Bulgaria	72 (1.4)	518 (4.9)	23 (1.1)	539 (7.6)	4 (0.5)	529 (12.7)	10.7 (0.07)
Armenia	72 (1.2)	476 (3.6)	24 (0.9)	462 (4.5)	4 (0.6)	447 (8.3)	10.8 (0.08)
Turkey (5)	71 (1.1)	536 (4.2)	25 (0.9)	507 (5.8)	4 (0.4)	509 (12.1)	10.7 (0.05)
Kazakhstan	68 (1.3)	501 (3.5)	29 (1.1)	484 (4.0)	3 (0.4)	479 (10.8)	10.6 (0.06)
Bosnia and Herzegovina	68 (1.2)	462 (3.4)	26 (1.0)	458 (3.6)	6 (0.4)	443 (5.7)	10.5 (0.06)
Spain	67 (1.3)	517 (2.0)	27 (1.1)	506 (3.5)	6 (0.5)	486 (6.7)	10.4 (0.06)
Saudi Arabia	65 (1.1)	416 (3.9)	27 (1.0)	395 (4.6)	8 (0.5)	381 (8.8)	10.5 (0.06)
Oman	64 (1.3)	450 (4.4)	28 (1.0)	421 (5.1)	8 (0.6)	407 (9.1)	10.4 (0.07)
Norway (5)	64 (1.4)	543 (2.6)	31 (1.2)	536 (3.4)	5 (0.7)	526 (6.9)	10.2 (0.06)
Serbia	63 (1.4)	514 (4.3)	32 (1.1)	525 (3.6)	5 (0.7)	513 (6.8)	10.1 (0.06)
Bahrain	62 (1.3)	502 (3.5)	30 (1.0)	484 (3.8)	8 (0.6)	470 (6.7)	10.2 (0.07)
Ireland	61 (1.4)	535 (4.0)	32 (1.1)	524 (3.7)	7 (0.8)	498 (6.7)	10.0 (0.06)
Finland	60 (1.0)	559 (2.5)	34 (0.8)	551 (3.5)	6 (0.6)	540 (5.6)	10.0 (0.05)
Northern Ireland	60 (1.7)	527 (2.7)	33 (1.3)	510 (3.1)	8 (0.7)	497 (6.1)	10.0 (0.07)
Lithuania	60 (1.5)	540 (2.8)	35 (1.4)	537 (3.5)	5 (0.4)	527 (7.6)	10.0 (0.06)
Netherlands	59 (1.4)	524 (2.9)	33 (1.2)	516 (3.4)	7 (0.7)	489 (8.3)	10.0 (0.06)
United Arab Emirates	59 (0.6)	490 (2.4)	31 (0.5)	459 (2.4)	10 (0.3)	431 (3.7)	10.1 (0.03)
New Zealand	59 (1.2)	510 (2.9)	33 (0.9)	496 (2.7)	9 (0.6)	485 (4.9)	10.0 (0.06)
Austria	58 (1.2)	528 (2.6)	34 (0.9)	517 (3.2)	7 (0.6)	507 (6.6)	9.9 (0.05)
Malta	57 (0.8)	498 (1.6)	33 (0.8)	498 (2.5)	10 (0.4)	482 (4.7)	10.0 (0.04)
Kuwait	57 (1.5)	412 (6.8)	31 (1.2)	388 (6.8)	12 (0.7)	367 (8.4)	10.0 (0.08)
Chile	57 (1.2)	477 (2.8)	36 (1.0)	467 (3.1)	7 (0.7)	436 (6.6)	10.0 (0.06)
Cyprus	56 (1.5)	514 (3.1)	31 (0.9)	512 (4.0)	13 (0.9)	498 (4.9)	9.8 (0.08)
England	56 (1.7)	544 (3.9)	35 (1.4)	533 (3.2)	9 (0.8)	517 (5.6)	9.8 (0.08)
South Africa (5)	56 (1.2)	343 (5.4)	36 (1.0)	313 (5.6)	8 (0.5)	293 (8.5)	10.0 (0.06)
Denmark	55 (1.1)	530 (2.8)	36 (1.1)	515 (3.3)	9 (0.7)	504 (5.6)	9.8 (0.05)
Iran, Islamic Rep. of	55 (1.6)	436 (4.3)	38 (1.4)	454 (4.8)	8 (0.6)	440 (7.5)	10.0 (0.07)
Hungary	54 (1.4)	532 (3.2)	37 (1.2)	529 (3.5)	9 (0.8)	518 (5.5)	9.8 (0.06)
Australia	54 (1.2)	541 (2.9)	36 (0.9)	528 (2.7)	10 (0.6)	510 (5.6)	9.8 (0.06)
Belgium (Flemish)	54 (1.3)	508 (2.2)	38 (1.1)	496 (2.6)	8 (0.5)	476 (5.1)	9.8 (0.06)
Canada	53 (0.8)	528 (2.3)	37 (0.7)	520 (2.2)	10 (0.4)	514 (3.4)	9.7 (0.03)
Italy	52 (1.1)	515 (3.3)	39 (0.9)	506 (3.7)	8 (0.6)	495 (5.1)	9.6 (0.05)
United States	52 (1.1)	551 (2.6)	34 (0.8)	536 (3.3)	14 (0.6)	509 (4.5)	9.6 (0.05)
Sweden	51 (1.9)	544 (4.1)	40 (1.4)	533 (3.6)	9 (0.9)	521 (6.3)	9.6 (0.08)
Qatar	50 (1.2)	467 (4.1)	36 (0.9)	443 (5.9)	14 (0.8)	422 (7.0)	9.6 (0.06)
Slovak Republic	49 (1.5)	514 (4.8)	42 (1.1)	529 (3.7)	10 (0.8)	525 (6.6)	9.5 (0.07)
Germany	47 (1.4)	533 (2.9)	41 (1.1)	514 (2.9)	12 (0.8)	507 (5.2)	9.4 (0.06)
Russian Federation	47 (1.3)	567 (4.2)	43 (1.1)	569 (2.7)	10 (0.7)	564 (3.9)	9.4 (0.06)
Philippines	46 (2.0)	272 (9.4)	44 (1.5)	242 (7.6)	10 (0.7)	205 (8.1)	9.5 (0.09)
Singapore	45 (0.9)	600 (3.7)	44 (0.6)	594 (3.5)	11 (0.5)	578 (4.9)	9.4 (0.04)
Latvia	42 (1.4)	546 (2.7)	47 (1.1)	542 (3.0)	11 (0.7)	529 (4.5)	9.2 (0.05)
France	40 (1.2)	494 (4.1)	52 (1.1)	487 (3.3)	8 (0.5)	462 (6.0)	9.3 (0.05)
Korea, Rep. of	40 (1.4)	596 (2.9)	54 (1.2)	584 (2.5)	6 (0.5)	568 (6.8)	9.4 (0.06)
Czech Republic	40 (1.7)	534 (3.3)	49 (1.4)	538 (3.0)	11 (0.8)	521 (4.9)	9.2 (0.07)
Croatia	38 (1.3)	529 (2.8)	54 (1.3)	522 (2.5)	9 (0.6)	514 (4.9)	9.2 (0.06)
Chinese Taipei	34 (1.2)	563 (2.4)	51 (1.1)	559 (2.1)	14 (0.8)	545 (4.2)	8.9 (0.05)
Poland	34 (1.1)	529 (3.7)	49 (0.9)	537 (2.4)	16 (0.9)	525 (4.4)	8.9 (0.05)
Hong Kong SAR	34 (1.5)	543 (4.3)	45 (1.5)	530 (3.6)	21 (1.3)	516 (5.9)	8.8 (0.08)
Japan	32 (1.3)	569 (2.5)	55 (1.0)	561 (2.4)	13 (0.9)	549 (3.5)	9.0 (0.06)
International Average	**58 (0.2)**	**497 (0.6)**	**34 (0.1)**	**487 (0.7)**	**8 (0.1)**	**476 (1.0)**	
Benchmarking Participants							
Madrid, Spain	68 (1.5)	524 (2.3)	26 (1.2)	524 (3.0)	6 (0.6)	511 (7.8)	10.4 (0.06)
Dubai, UAE	66 (0.6)	550 (1.8)	27 (0.6)	537 (2.5)	6 (0.3)	522 (5.2)	10.4 (0.03)
Ontario, Canada	53 (1.4)	530 (3.8)	37 (1.1)	521 (3.6)	10 (0.7)	518 (5.2)	9.7 (0.06)
Abu Dhabi, UAE	50 (1.0)	431 (3.5)	35 (0.7)	415 (3.2)	15 (0.7)	390 (5.6)	9.6 (0.05)
Quebec, Canada	47 (1.5)	525 (3.3)	41 (1.3)	522 (3.1)	12 (1.0)	509 (3.9)	9.4 (0.07)
Moscow City, Russian Fed.	40 (1.3)	596 (3.2)	46 (1.0)	596 (2.3)	14 (0.8)	588 (3.7)	9.1 (0.06)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 7.12: Students' Sense of School Belonging

Students' Reports

Country	High Sense of School Belonging		Some Sense of School Belonging		Little Sense of School Belonging		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Egypt	66 (1.3)	417 (5.3)	27 (0.9)	410 (6.1)	7 (0.7)	418 (8.6)	11.1 (0.06)
Jordan	62 (1.3)	424 (3.9)	30 (0.9)	422 (5.1)	9 (0.8)	411 (8.1)	10.9 (0.07)
Morocco	58 (1.2)	387 (3.0)	34 (1.0)	389 (2.3)	8 (0.6)	397 (6.5)	10.8 (0.05)
Romania	54 (1.3)	484 (4.8)	35 (1.0)	480 (5.7)	10 (0.8)	465 (7.5)	10.5 (0.06)
Turkey	54 (1.3)	500 (4.1)	37 (1.0)	490 (5.4)	9 (0.7)	494 (8.9)	10.5 (0.06)
Kazakhstan	51 (1.4)	491 (4.0)	44 (1.2)	485 (3.5)	5 (0.5)	489 (6.2)	10.6 (0.06)
South Africa (9)	48 (0.7)	391 (2.4)	43 (0.5)	390 (2.4)	9 (0.4)	392 (3.5)	10.3 (0.03)
Georgia	47 (1.4)	463 (5.2)	44 (1.2)	463 (4.6)	10 (0.7)	457 (8.3)	10.2 (0.06)
Lebanon	46 (1.4)	440 (3.5)	42 (1.1)	426 (3.8)	12 (0.8)	411 (5.6)	10.2 (0.06)
Saudi Arabia	45 (1.2)	398 (3.2)	43 (0.9)	394 (2.7)	12 (0.6)	387 (4.2)	10.2 (0.05)
Oman	44 (1.1)	425 (3.0)	44 (0.9)	406 (3.5)	11 (0.6)	392 (4.9)	10.1 (0.05)
Finland	43 (1.1)	523 (3.2)	48 (0.9)	505 (2.5)	9 (0.6)	471 (5.5)	10.2 (0.05)
Israel	42 (1.3)	520 (5.2)	43 (1.0)	527 (4.9)	14 (0.9)	504 (7.1)	10.0 (0.06)
Kuwait	42 (1.2)	414 (5.4)	41 (1.0)	403 (5.0)	17 (1.1)	382 (6.2)	9.9 (0.06)
United Arab Emirates	41 (0.8)	493 (3.0)	42 (0.7)	472 (1.8)	16 (0.4)	439 (3.5)	9.9 (0.04)
Norway (9)	41 (1.4)	514 (3.1)	47 (1.2)	504 (3.1)	12 (0.8)	470 (5.7)	10.0 (0.06)
Bahrain	38 (1.0)	491 (3.0)	46 (0.9)	480 (1.9)	16 (0.8)	462 (4.2)	9.8 (0.05)
Malaysia	37 (1.1)	461 (3.6)	58 (1.0)	461 (3.6)	5 (0.5)	462 (8.3)	10.0 (0.04)
Iran, Islamic Rep. of	36 (1.1)	455 (4.6)	50 (0.9)	440 (3.9)	14 (0.9)	448 (6.1)	9.9 (0.06)
New Zealand	33 (0.9)	503 (3.8)	53 (0.7)	482 (3.7)	14 (0.8)	439 (5.6)	9.7 (0.04)
Ireland	33 (1.2)	545 (3.1)	51 (1.1)	523 (2.9)	17 (1.0)	489 (4.5)	9.6 (0.05)
Portugal	32 (1.4)	508 (3.9)	53 (1.0)	499 (3.5)	15 (1.0)	490 (5.1)	9.6 (0.06)
Lithuania	31 (1.4)	528 (3.8)	57 (1.2)	521 (3.1)	12 (0.8)	504 (5.8)	9.7 (0.06)
United States	31 (0.9)	547 (5.6)	48 (0.8)	518 (4.9)	22 (0.9)	476 (4.5)	9.4 (0.04)
Qatar	31 (1.3)	456 (6.3)	48 (0.8)	450 (4.4)	22 (1.1)	414 (4.4)	9.4 (0.08)
Chile	30 (1.1)	447 (3.7)	57 (1.1)	441 (3.2)	13 (0.8)	428 (4.4)	9.6 (0.04)
Australia	30 (0.9)	548 (4.6)	50 (0.8)	516 (4.1)	20 (0.9)	476 (4.1)	9.4 (0.05)
Hungary	30 (1.2)	536 (5.4)	52 (1.0)	514 (3.3)	18 (1.1)	492 (4.7)	9.5 (0.06)
Singapore	28 (0.8)	636 (4.4)	58 (0.8)	614 (4.2)	14 (0.5)	581 (5.6)	9.5 (0.03)
Sweden	28 (1.2)	515 (3.8)	57 (0.9)	505 (2.7)	15 (0.9)	475 (4.6)	9.5 (0.05)
England	27 (1.3)	544 (6.0)	53 (1.0)	521 (5.4)	19 (1.0)	470 (6.9)	9.3 (0.06)
Italy	27 (1.3)	500 (4.0)	58 (0.9)	500 (2.8)	15 (0.8)	485 (4.4)	9.4 (0.05)
Russian Federation	25 (1.2)	551 (5.9)	59 (1.0)	544 (4.7)	16 (0.8)	533 (5.2)	9.4 (0.05)
Chinese Taipei	23 (1.0)	624 (5.5)	60 (0.9)	613 (2.5)	17 (0.8)	596 (4.5)	9.3 (0.04)
Cyprus	22 (0.9)	520 (3.6)	48 (1.0)	504 (2.2)	30 (1.2)	482 (2.7)	8.9 (0.05)
Korea, Rep. of	22 (0.9)	627 (4.5)	65 (0.9)	606 (2.9)	14 (0.7)	577 (5.6)	9.3 (0.04)
Japan	21 (1.1)	602 (3.9)	59 (0.8)	598 (3.1)	19 (0.9)	574 (4.1)	9.2 (0.05)
Hong Kong SAR	21 (0.9)	593 (6.8)	57 (1.0)	586 (3.7)	23 (1.1)	548 (6.3)	9.1 (0.05)
France	20 (0.9)	490 (3.9)	68 (0.8)	485 (2.7)	12 (0.7)	459 (4.4)	9.3 (0.04)
International Average	**37 (0.2)**	**500 (0.7)**	**49 (0.2)**	**489 (0.6)**	**14 (0.1)**	**470 (0.9)**	
Benchmarking Participants							
Western Cape, RSA (9)	46 (1.3)	442 (5.1)	44 (0.8)	443 (4.6)	10 (0.8)	439 (5.8)	10.2 (0.06)
Dubai, UAE	43 (1.1)	550 (2.8)	44 (1.1)	534 (3.3)	12 (0.5)	500 (4.6)	10.1 (0.04)
Gauteng, RSA (9)	41 (1.2)	420 (3.8)	47 (0.9)	422 (3.3)	13 (0.9)	428 (4.3)	10.0 (0.05)
Ontario, Canada	38 (1.5)	543 (5.1)	47 (1.3)	530 (5.0)	15 (1.1)	498 (4.6)	9.9 (0.07)
Abu Dhabi, UAE	33 (1.1)	463 (3.9)	46 (0.8)	434 (3.1)	21 (0.7)	410 (5.4)	9.5 (0.06)
Quebec, Canada	29 (1.4)	562 (4.0)	55 (1.1)	544 (3.6)	16 (1.1)	513 (6.3)	9.5 (0.06)
Moscow City, Russian Fed.	17 (0.9)	586 (6.5)	60 (0.9)	577 (4.3)	23 (1.0)	564 (5.1)	9.0 (0.05)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 7.13: Students' Sense of School Belonging

Students' Reports

Country	High Sense of School Belonging		Some Sense of School Belonging		Little Sense of School Belonging		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Egypt	66 (1.3)	398 (5.6)	27 (0.9)	384 (6.1)	7 (0.7)	388 (9.2)	11.1 (0.06)
Jordan	62 (1.3)	458 (4.3)	30 (0.9)	456 (6.1)	9 (0.8)	435 (8.5)	10.9 (0.07)
Morocco	58 (1.2)	396 (3.5)	34 (1.0)	392 (2.8)	8 (0.6)	393 (5.5)	10.8 (0.05)
Romania	54 (1.3)	474 (4.8)	35 (1.0)	472 (5.2)	10 (0.8)	456 (6.0)	10.5 (0.06)
Turkey	54 (1.3)	518 (3.6)	37 (1.0)	512 (4.8)	9 (0.7)	515 (8.0)	10.5 (0.06)
Kazakhstan	51 (1.4)	480 (3.7)	44 (1.2)	476 (3.5)	5 (0.5)	488 (7.4)	10.6 (0.06)
South Africa (9)	48 (0.7)	370 (3.4)	43 (0.5)	371 (3.2)	9 (0.4)	380 (4.4)	10.3 (0.03)
Georgia	47 (1.4)	449 (4.7)	44 (1.2)	450 (4.2)	10 (0.7)	438 (7.8)	10.2 (0.06)
Lebanon	46 (1.4)	394 (4.9)	42 (1.1)	371 (6.4)	12 (0.8)	349 (8.7)	10.2 (0.06)
Saudi Arabia	45 (1.2)	436 (3.2)	43 (0.9)	434 (2.9)	12 (0.6)	421 (4.8)	10.2 (0.05)
Oman	44 (1.1)	473 (2.9)	44 (0.9)	452 (3.8)	11 (0.6)	433 (5.5)	10.1 (0.05)
Finland	43 (1.1)	558 (3.9)	48 (0.9)	538 (2.8)	9 (0.6)	498 (7.1)	10.2 (0.05)
Israel	42 (1.3)	517 (4.7)	43 (1.0)	519 (5.1)	14 (0.9)	499 (6.9)	10.0 (0.06)
Kuwait	42 (1.2)	459 (6.1)	41 (1.0)	447 (5.2)	17 (1.1)	415 (8.3)	9.9 (0.06)
United Arab Emirates	41 (0.8)	498 (3.6)	42 (0.7)	470 (2.2)	16 (0.4)	431 (3.9)	9.9 (0.04)
Norway (9)	41 (1.4)	508 (3.5)	47 (1.2)	495 (3.9)	12 (0.8)	459 (6.5)	10.0 (0.06)
Bahrain	38 (1.0)	501 (2.8)	46 (0.9)	487 (2.5)	16 (0.8)	453 (5.0)	9.8 (0.05)
Malaysia	37 (1.1)	465 (3.8)	58 (1.0)	460 (3.9)	5 (0.5)	436 (9.9)	10.0 (0.04)
Iran, Islamic Rep. of	36 (1.1)	456 (4.5)	50 (0.9)	444 (4.1)	14 (0.9)	453 (5.6)	9.9 (0.06)
New Zealand	33 (0.9)	521 (4.3)	53 (0.7)	497 (3.9)	14 (0.8)	463 (5.5)	9.7 (0.04)
Ireland	33 (1.2)	545 (3.2)	51 (1.1)	522 (3.1)	17 (1.0)	486 (5.0)	9.6 (0.05)
Portugal	32 (1.4)	525 (3.8)	53 (1.0)	518 (3.2)	15 (1.0)	507 (4.8)	9.6 (0.06)
Lithuania	31 (1.4)	541 (3.9)	57 (1.2)	534 (3.2)	12 (0.8)	519 (5.7)	9.7 (0.06)
United States	31 (0.9)	548 (5.1)	48 (0.8)	527 (4.6)	22 (0.9)	488 (4.9)	9.4 (0.04)
Qatar	31 (1.3)	489 (6.9)	48 (0.8)	481 (4.4)	22 (1.1)	445 (5.2)	9.4 (0.08)
Chile	30 (1.1)	469 (3.9)	57 (1.1)	463 (3.2)	13 (0.8)	449 (5.0)	9.6 (0.04)
Australia	30 (0.9)	557 (4.2)	50 (0.8)	529 (3.5)	20 (0.9)	487 (3.1)	9.4 (0.05)
Hungary	30 (1.2)	544 (4.8)	52 (1.0)	528 (2.9)	18 (1.1)	512 (4.2)	9.5 (0.06)
Singapore	28 (0.8)	626 (4.3)	58 (0.8)	606 (4.2)	14 (0.5)	577 (5.4)	9.5 (0.03)
Sweden	28 (1.2)	537 (4.5)	57 (0.9)	525 (3.5)	15 (0.9)	490 (6.0)	9.5 (0.05)
England	27 (1.3)	551 (5.4)	53 (1.0)	522 (4.8)	19 (1.0)	466 (7.4)	9.3 (0.06)
Italy	27 (1.3)	501 (4.0)	58 (0.9)	503 (2.5)	15 (0.8)	492 (5.2)	9.4 (0.05)
Russian Federation	25 (1.2)	545 (5.4)	59 (1.0)	543 (4.4)	16 (0.8)	540 (4.8)	9.4 (0.05)
Chinese Taipei	23 (1.0)	582 (4.1)	60 (0.9)	574 (1.9)	17 (0.8)	563 (3.9)	9.3 (0.04)
Cyprus	22 (0.9)	501 (3.8)	48 (1.0)	488 (2.7)	30 (1.2)	464 (3.0)	8.9 (0.05)
Korea, Rep. of	22 (0.9)	577 (3.5)	65 (0.9)	560 (2.1)	14 (0.7)	537 (4.7)	9.3 (0.04)
Japan	21 (1.1)	573 (2.9)	59 (0.8)	572 (2.5)	19 (0.9)	558 (3.3)	9.2 (0.05)
Hong Kong SAR	21 (0.9)	519 (7.5)	57 (1.0)	509 (4.9)	23 (1.1)	477 (8.0)	9.1 (0.05)
France	20 (0.9)	499 (4.4)	68 (0.8)	490 (2.7)	12 (0.7)	462 (5.6)	9.3 (0.04)
International Average	**37 (0.2)**	**502 (0.7)**	**49 (0.2)**	**490 (0.6)**	**14 (0.1)**	**470 (1.0)**	
Benchmarking Participants							
Western Cape, RSA (9)	46 (1.3)	437 (6.2)	44 (0.8)	442 (5.5)	10 (0.8)	447 (6.1)	10.2 (0.06)
Dubai, UAE	43 (1.1)	563 (3.2)	44 (1.1)	544 (3.1)	12 (0.5)	508 (5.0)	10.1 (0.04)
Gauteng, RSA (9)	41 (1.2)	418 (5.0)	47 (0.9)	424 (4.0)	13 (0.9)	437 (5.1)	10.0 (0.05)
Ontario, Canada	38 (1.5)	536 (4.1)	47 (1.3)	521 (3.5)	15 (1.1)	492 (4.5)	9.9 (0.07)
Abu Dhabi, UAE	33 (1.1)	454 (4.8)	46 (0.8)	416 (4.1)	21 (0.7)	390 (6.9)	9.5 (0.06)
Quebec, Canada	29 (1.4)	553 (3.7)	55 (1.1)	537 (3.8)	16 (1.1)	509 (6.0)	9.5 (0.06)
Moscow City, Russian Fed.	17 (0.9)	572 (4.9)	60 (0.9)	567 (3.1)	23 (1.0)	561 (3.5)	9.0 (0.05)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

School Discipline and Safety

School Discipline

Continuing from previous TIMSS assessments, TIMSS 2019 asked school principals for their perceptions about the extent that discipline, disorder, and bullying behaviors are problems in their school. As described in Exhibit 8.1, fourth grade students were assigned scores on the *School Discipline* scale according to their principals' characterizations of 10 discipline and safety problems (see About the Scale). The eighth grade scale included one additional problem more suited to older students—"physical injury to teachers or staff." Since TIMSS first reported results on the *School Discipline* scale in 2011, data have shown that attending schools with fewer discipline and safety problems was associated with higher average achievement in mathematics and science.

Exhibit 8.2 presents the results for the *School Discipline* scale at the fourth grade in relation to mathematics achievement. Countries are ordered according to the percentage of students in schools where principals reported "hardly any problems" with discipline and safety. On average, the majority of fourth grade students (60%) attended schools with "hardly any problems," and 32 percent attended schools with "minor problems." Only 8 percent of students, on average, attended schools for which principals reported "moderate to severe problems" with discipline and safety. Consistent with previous TIMSS results, average mathematics achievement was higher for students in schools with "hardly any problems" than for students in schools with "minor problems" (508 vs. 494). At 466 points, on average, mathematics achievement for students in schools with "moderate to severe problems" with school discipline and safety was substantially lower (42 points) than for students in schools with "hardly any problems."

Exhibit 8.3 presents the same percentages of fourth grade students in the three categories of the scale, but in relation to science achievement. Similar to the results for mathematics, fewer discipline problems were related to higher average science achievement. Students in schools with "hardly any problems" with discipline and safety had the highest average science achievement (498), followed by students in schools with "minor problems" (483) and "moderate to severe problems" (457).

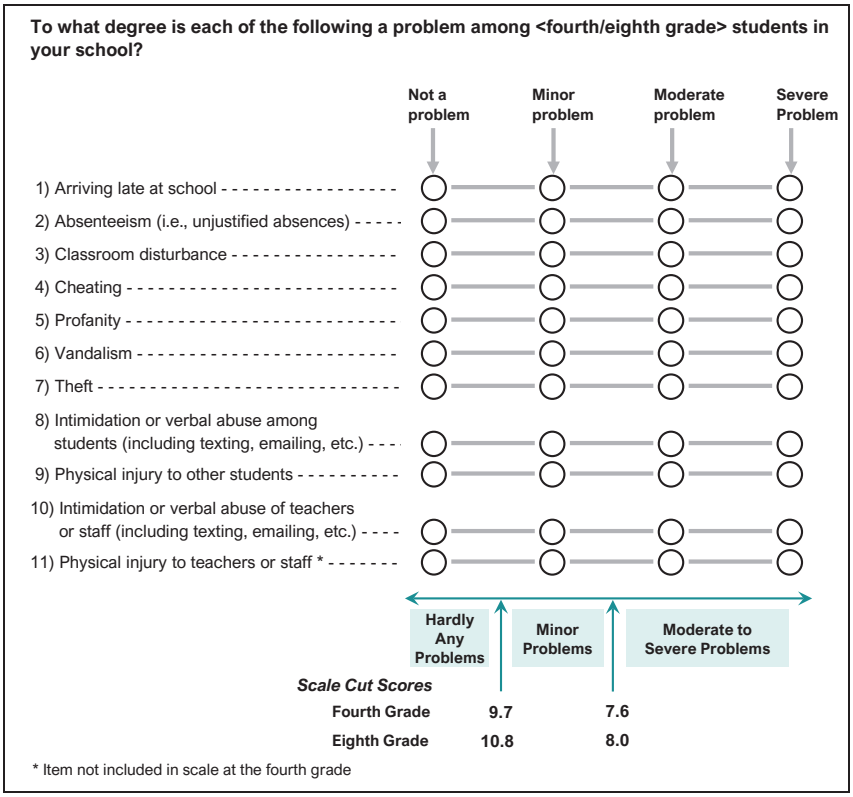
Exhibits 8.4 and 8.5 present the *School Discipline* results for eighth grade students in relation to mathematics achievement and science achievement, respectively. Compared with the fourth grade, fewer eighth grade students attended schools with "hardly any problems" (45% vs. 60%) and more eighth grade students attended schools with "minor problems" (43% vs. 32%). Similar to fourth grade results, the 11 percent of eighth grade students in the "moderate to severe problems" category had the lowest average achievement (448 and 452 in mathematics and science, respectively). However, eighth grade results showed a greater difference in average achievement between students in schools with "hardly any problems" and those in schools with "moderate to severe problems." There was a 55-point gap in average mathematics achievement between the two categories (503 vs. 448) and a 52-point gap in average science achievement (504 vs. 452).

Exhibit 8.1: School Discipline – Principals' Reports

Students' Results based on Principals' Reports

About the Scale

Students were scored according to their principals' reports regarding eleven potential problems on the *School Discipline* scale. Cut scores divide the scale into three categories. Students in schools with **Hardly Any Problems** had a score at or above the cut score corresponding to their principals reporting that six of the eleven issues are "not a problem" and the other five are a "minor problem," on average. Students in schools with **Moderate to Severe Problems** had a score at or below the cut score corresponding to their principals reporting that six of the eleven issues are a "moderate problem" and the other five are a "minor problem," on average. All other students were in schools with **Minor Problems**.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 8.2: School Discipline – Principals' Reports

Students' Results based on Principals' Reports

Country	Hardly Any Problems		Minor Problems		Moderate to Severe Problems		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	82 (3.4)	495 (3.8)	16 (3.2)	491 (9.3)	2 (1.1)	~ ~	10.9 (0.14)
Ireland	82 (3.2)	552 (3.1)	16 (3.1)	540 (5.5)	2 (1.2)	~ ~	10.8 (0.11)
Kazakhstan	82 (3.3)	514 (3.0)	7 (2.0)	500 (11.4)	12 (2.6)	506 (7.8)	10.9 (0.19)
Netherlands s	81 (5.0)	540 (2.8)	19 (5.0)	527 (4.6)	0 (0.0)	~ ~	10.9 (0.15)
Hong Kong SAR	77 (4.3)	607 (3.2)	23 (4.2)	583 (7.7)	1 (0.7)	~ ~	10.7 (0.14)
Singapore	76 (0.0)	628 (4.3)	24 (0.0)	616 (8.3)	0 (0.0)	~ ~	10.6 (0.00)
Armenia	76 (3.4)	501 (3.2)	13 (3.2)	484 (6.1)	11 (2.3)	498 (7.6)	10.4 (0.15)
Croatia	76 (3.6)	509 (2.6)	22 (3.5)	513 (5.4)	2 (1.3)	~ ~	10.5 (0.12)
Spain	75 (3.4)	508 (2.8)	22 (3.1)	486 (8.1)	3 (1.2)	493 (14.7)	10.6 (0.13)
Slovak Republic	73 (3.6)	517 (4.1)	20 (3.5)	504 (6.9)	6 (1.7)	447 (14.5)	10.3 (0.11)
Japan	73 (3.6)	595 (2.1)	23 (3.6)	588 (3.5)	4 (1.8)	584 (9.1)	10.4 (0.12)
Korea, Rep. of	73 (3.7)	602 (2.7)	16 (2.8)	595 (5.7)	12 (3.0)	588 (7.1)	10.6 (0.18)
Northern Ireland r	73 (3.8)	573 (4.2)	27 (3.9)	552 (6.2)	1 (0.8)	~ ~	10.4 (0.11)
Chinese Taipei	73 (3.2)	600 (2.2)	26 (3.2)	597 (3.7)	1 (1.0)	~ ~	10.8 (0.12)
Lithuania	72 (3.8)	537 (3.4)	28 (3.8)	556 (7.4)	0 (0.3)	~ ~	10.4 (0.11)
Latvia	72 (3.2)	548 (3.3)	27 (3.2)	541 (4.7)	1 (0.0)	~ ~	10.4 (0.09)
Czech Republic	71 (3.5)	538 (3.1)	26 (3.3)	525 (4.8)	3 (1.2)	494 (6.6)	10.3 (0.11)
Azerbaijan	71 (3.2)	514 (3.5)	17 (2.9)	529 (6.2)	12 (2.7)	508 (5.5)	10.0 (0.16)
United Arab Emirates r	70 (2.0)	494 (2.0)	26 (2.0)	444 (3.6)	4 (0.3)	446 (9.9)	10.5 (0.07)
Bulgaria	70 (4.1)	528 (4.1)	24 (3.9)	477 (11.9)	6 (2.0)	517 (17.7)	10.4 (0.17)
Malta	69 (0.4)	519 (1.4)	29 (0.4)	490 (3.0)	2 (0.1)	~ ~	10.4 (0.01)
North Macedonia	68 (3.7)	478 (5.8)	24 (4.2)	461 (11.1)	8 (2.7)	458 (24.9)	10.4 (0.16)
Qatar	68 (3.8)	455 (4.7)	24 (3.6)	439 (8.8)	8 (1.8)	434 (13.1)	10.2 (0.13)
Russian Federation	68 (3.6)	569 (4.5)	32 (3.5)	563 (4.1)	1 (0.6)	~ ~	10.2 (0.08)
England s	67 (5.1)	566 (5.5)	33 (5.1)	540 (7.6)	0 (0.0)	~ ~	10.1 (0.10)
Italy	66 (4.0)	517 (2.8)	29 (4.2)	510 (4.9)	5 (1.8)	509 (7.6)	10.0 (0.12)
Georgia	66 (4.4)	486 (4.6)	23 (3.8)	473 (6.0)	11 (2.9)	479 (11.6)	10.1 (0.19)
Bahrain	65 (2.8)	486 (2.7)	27 (2.8)	476 (5.0)	8 (0.7)	442 (7.8)	10.2 (0.09)
Saudi Arabia	64 (3.5)	404 (4.7)	23 (3.2)	394 (7.8)	14 (2.7)	385 (15.5)	10.0 (0.16)
Belgium (Flemish)	61 (4.5)	540 (2.7)	37 (4.6)	523 (3.8)	2 (1.4)	~ ~	10.1 (0.12)
Iran, Islamic Rep. of	59 (3.7)	450 (5.4)	33 (3.6)	436 (8.2)	8 (1.8)	423 (15.4)	10.1 (0.12)
New Zealand	59 (3.6)	504 (3.8)	38 (3.7)	466 (5.5)	3 (1.4)	438 (9.9)	10.1 (0.10)
Norway (5) r	58 (4.3)	547 (3.7)	33 (4.1)	540 (4.9)	9 (3.2)	533 (7.4)	9.7 (0.12)
France	57 (4.1)	494 (4.3)	39 (4.3)	476 (4.8)	4 (1.4)	445 (9.2)	9.9 (0.11)
Australia	57 (3.5)	529 (4.0)	40 (3.4)	500 (4.8)	3 (1.3)	442 (15.7)	9.9 (0.11)
Serbia	55 (4.3)	505 (4.4)	32 (3.7)	513 (5.8)	12 (2.8)	512 (8.9)	9.7 (0.16)
Bosnia and Herzegovina	55 (3.7)	453 (3.6)	29 (3.5)	453 (4.8)	16 (3.1)	447 (7.6)	9.6 (0.18)
United States	55 (2.6)	547 (3.9)	41 (2.6)	521 (4.4)	4 (1.1)	501 (18.4)	9.9 (0.08)
Finland	53 (3.8)	537 (3.4)	42 (3.8)	529 (3.1)	5 (1.9)	499 (11.9)	9.9 (0.10)
Canada	53 (2.9)	516 (2.4)	43 (3.0)	510 (4.7)	4 (1.0)	470 (9.4)	9.9 (0.09)
Montenegro	52 (0.5)	452 (2.3)	34 (0.4)	457 (3.6)	14 (0.3)	447 (3.8)	9.7 (0.02)
Pakistan	51 (6.5)	321 (16.7)	38 (6.4)	331 (20.2)	11 (2.7)	352 (17.7)	9.4 (0.19)
Hungary	50 (4.7)	532 (4.1)	42 (4.5)	520 (6.0)	8 (2.3)	474 (15.0)	9.7 (0.12)
Cyprus	49 (4.8)	540 (3.4)	45 (4.6)	527 (5.0)	6 (2.3)	502 (12.5)	9.8 (0.16)
Austria	49 (3.7)	548 (3.3)	41 (3.8)	535 (3.3)	10 (2.3)	515 (9.2)	9.6 (0.11)
Kosovo	47 (4.4)	439 (4.9)	26 (3.6)	447 (5.7)	27 (3.7)	451 (4.5)	8.9 (0.21)
Denmark r	47 (4.0)	534 (3.4)	52 (3.9)	517 (2.7)	1 (1.0)	~ ~	9.7 (0.11)
Portugal	46 (3.8)	533 (4.1)	45 (3.8)	521 (4.2)	9 (2.1)	511 (6.9)	9.6 (0.14)
Philippines	44 (4.1)	319 (9.5)	52 (3.9)	276 (8.3)	4 (1.6)	317 (13.7)	9.5 (0.11)
Kuwait	44 (3.9)	401 (7.1)	37 (4.1)	373 (8.5)	19 (3.2)	364 (11.6)	9.1 (0.15)
Chile	41 (4.1)	454 (5.8)	49 (4.4)	435 (4.0)	9 (2.5)	416 (11.8)	9.4 (0.13)
Oman	36 (3.2)	436 (5.6)	36 (3.1)	422 (5.2)	28 (3.3)	435 (11.1)	8.7 (0.18)
Poland	36 (4.1)	522 (4.9)	60 (4.2)	518 (3.2)	4 (1.6)	538 (7.6)	9.3 (0.10)
Germany	36 (3.2)	541 (2.9)	52 (3.5)	516 (3.3)	12 (2.0)	484 (9.2)	9.2 (0.09)
Turkey (5)	33 (3.4)	552 (6.1)	40 (3.7)	517 (7.5)	27 (3.3)	496 (9.4)	8.8 (0.16)
Sweden	30 (3.8)	529 (3.9)	65 (4.1)	518 (4.4)	5 (1.5)	491 (13.4)	9.2 (0.10)
Morocco	28 (2.8)	406 (12.9)	24 (2.7)	365 (10.8)	48 (3.5)	380 (7.4)	7.8 (0.18)
South Africa (5)	19 (2.6)	397 (12.0)	53 (3.8)	373 (5.9)	28 (3.7)	364 (7.3)	8.5 (0.09)
International Average	**60 (0.5)**	**508 (0.7)**	**32 (0.5)**	**494 (0.9)**	**8 (0.3)**	**466 (1.8)**	
Benchmarking Participants							
Dubai, UAE r	89 (0.1)	546 (1.8)	10 (0.1)	530 (4.8)	0 (0.0)	~ ~	11.1 (0.01)
Madrid, Spain	77 (3.8)	523 (2.1)	19 (3.6)	497 (7.4)	4 (1.4)	528 (9.3)	10.7 (0.14)
Moscow City, Russian Fed.	73 (4.2)	595 (2.6)	26 (4.3)	587 (4.1)	1 (0.6)	~ ~	10.4 (0.11)
Quebec, Canada	60 (4.4)	534 (3.2)	37 (4.4)	528 (3.6)	2 (0.8)	~ ~	10.1 (0.13)
Abu Dhabi, UAE r	59 (1.1)	452 (2.8)	38 (1.1)	414 (4.1)	3 (0.1)	392 (11.3)	10.1 (0.04)
Ontario, Canada	42 (5.3)	519 (5.5)	51 (5.5)	513 (7.8)	7 (2.0)	456 (9.9)	9.6 (0.14)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 8.3: School Discipline – Principals' Reports

Students' Results based on Principals' Reports

Country		Hardly Any Problems		Minor Problems		Moderate to Severe Problems		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania		82 (3.4)	490 (3.9)	16 (3.2)	483 (10.5)	2 (1.1)	~ ~	10.9 (0.14)
Ireland		82 (3.2)	530 (3.9)	16 (3.1)	524 (5.9)	2 (1.2)	~ ~	10.8 (0.11)
Kazakhstan		82 (3.3)	497 (3.5)	7 (2.0)	481 (15.6)	12 (2.6)	488 (10.3)	10.9 (0.19)
Netherlands	s	81 (5.0)	522 (3.6)	19 (5.0)	504 (6.4)	0 (0.0)	~ ~	10.9 (0.15)
Hong Kong SAR		77 (4.3)	538 (3.2)	23 (4.2)	510 (7.7)	1 (0.7)	~ ~	10.7 (0.14)
Singapore		76 (0.0)	597 (3.8)	24 (0.0)	585 (7.5)	0 (0.0)	~ ~	10.6 (0.00)
Armenia		76 (3.4)	469 (3.9)	13 (3.2)	448 (7.0)	11 (2.3)	468 (8.6)	10.4 (0.15)
Croatia		76 (3.6)	524 (2.6)	22 (3.5)	526 (4.4)	2 (1.3)	~ ~	10.5 (0.12)
Spain		75 (3.4)	517 (2.6)	22 (3.1)	495 (7.1)	3 (1.2)	498 (13.0)	10.6 (0.13)
Slovak Republic		73 (3.6)	529 (4.1)	20 (3.5)	519 (7.4)	6 (1.7)	429 (17.1)	10.3 (0.11)
Japan		73 (3.6)	564 (2.1)	23 (3.6)	557 (3.2)	4 (1.8)	554 (8.2)	10.4 (0.12)
Korea, Rep. of		73 (3.7)	590 (2.5)	16 (2.8)	582 (5.6)	12 (3.0)	579 (6.2)	10.6 (0.18)
Northern Ireland	r	73 (3.8)	524 (3.3)	27 (3.9)	508 (5.0)	1 (0.8)	~ ~	10.4 (0.11)
Chinese Taipei		73 (3.2)	558 (2.0)	26 (3.2)	557 (3.6)	1 (1.0)	~ ~	10.8 (0.12)
Lithuania		72 (3.8)	533 (3.2)	28 (3.8)	551 (6.8)	0 (0.3)	~ ~	10.4 (0.11)
Latvia		72 (3.2)	544 (3.1)	27 (3.2)	535 (4.1)	1 (0.0)	~ ~	10.4 (0.09)
Czech Republic		71 (3.5)	538 (3.1)	26 (3.3)	527 (4.4)	3 (1.2)	497 (7.5)	10.3 (0.11)
Azerbaijan		71 (3.2)	424 (4.2)	17 (2.9)	446 (7.8)	12 (2.7)	418 (6.5)	10.0 (0.16)
United Arab Emirates	r	70 (2.0)	489 (2.4)	26 (2.0)	428 (4.2)	4 (0.3)	433 (11.6)	10.5 (0.07)
Bulgaria		70 (4.1)	537 (5.5)	24 (3.9)	477 (13.1)	6 (2.0)	520 (25.5)	10.4 (0.17)
Malta		69 (0.4)	507 (1.5)	29 (0.4)	475 (2.9)	2 (0.1)	~ ~	10.4 (0.01)
North Macedonia		68 (3.7)	435 (6.5)	24 (4.2)	409 (13.8)	8 (2.7)	410 (23.9)	10.4 (0.16)
Qatar		68 (3.8)	456 (5.0)	24 (3.6)	439 (10.3)	8 (1.8)	430 (13.0)	10.2 (0.13)
Russian Federation		68 (3.6)	570 (4.1)	32 (3.5)	562 (3.8)	1 (0.6)	~ ~	10.2 (0.08)
England	s	67 (5.1)	545 (4.8)	33 (5.1)	521 (7.3)	0 (0.0)	~ ~	10.1 (0.10)
Italy		66 (4.0)	513 (3.1)	29 (4.2)	503 (5.8)	5 (1.8)	507 (9.8)	10.0 (0.12)
Georgia		66 (4.4)	458 (4.9)	23 (3.8)	446 (5.7)	11 (2.9)	449 (11.2)	10.1 (0.19)
Bahrain		65 (2.8)	505 (3.5)	27 (2.8)	483 (7.9)	8 (0.7)	431 (11.4)	10.2 (0.09)
Saudi Arabia		64 (3.5)	410 (5.2)	23 (3.2)	390 (9.8)	14 (2.7)	389 (16.9)	10.0 (0.16)
Belgium (Flemish)		61 (4.5)	508 (2.9)	37 (4.6)	491 (4.3)	2 (1.4)	~ ~	10.1 (0.12)
Iran, Islamic Rep. of		59 (3.7)	449 (5.7)	33 (3.6)	432 (8.7)	8 (1.8)	415 (11.1)	10.1 (0.12)
New Zealand		59 (3.6)	519 (3.3)	38 (3.7)	482 (4.9)	3 (1.4)	451 (10.7)	10.1 (0.10)
Norway (5)	r	58 (4.3)	543 (3.2)	33 (4.1)	539 (4.7)	9 (3.2)	525 (7.6)	9.7 (0.12)
France		57 (4.1)	497 (4.3)	39 (4.3)	480 (4.7)	4 (1.4)	442 (8.0)	9.9 (0.11)
Australia		57 (3.5)	545 (3.6)	40 (3.4)	519 (4.2)	3 (1.3)	467 (14.3)	9.9 (0.11)
Serbia		55 (4.3)	515 (4.6)	32 (3.7)	519 (6.1)	12 (2.8)	523 (8.8)	9.7 (0.16)
Bosnia and Herzegovina		55 (3.7)	462 (4.0)	29 (3.5)	459 (5.5)	16 (3.1)	447 (6.9)	9.6 (0.18)
United States		55 (2.6)	552 (4.2)	41 (2.6)	524 (4.4)	4 (1.1)	503 (16.7)	9.9 (0.08)
Finland		53 (3.8)	560 (3.6)	42 (3.8)	552 (2.9)	5 (1.9)	518 (13.4)	9.9 (0.10)
Canada		53 (2.9)	528 (2.3)	43 (3.0)	521 (3.6)	4 (1.0)	489 (9.6)	9.9 (0.09)
Montenegro		52 (0.5)	452 (3.0)	34 (0.4)	458 (4.0)	14 (0.3)	447 (4.2)	9.7 (0.02)
Pakistan		51 (6.5)	281 (19.4)	38 (6.4)	296 (20.1)	11 (2.7)	318 (23.7)	9.4 (0.19)
Hungary		50 (4.7)	538 (3.9)	42 (4.5)	526 (5.8)	8 (2.3)	485 (14.7)	9.7 (0.12)
Cyprus		49 (4.8)	518 (3.7)	45 (4.6)	508 (4.8)	6 (2.3)	483 (7.4)	9.8 (0.16)
Austria		49 (3.7)	533 (3.8)	41 (3.8)	517 (4.4)	10 (2.3)	488 (11.9)	9.6 (0.11)
Kosovo		47 (4.4)	406 (5.7)	26 (3.6)	417 (6.9)	27 (3.7)	423 (6.2)	8.9 (0.21)
Denmark	r	47 (4.0)	530 (3.8)	52 (3.9)	516 (3.0)	1 (1.0)	~ ~	9.7 (0.11)
Portugal		46 (3.8)	510 (3.5)	45 (3.8)	500 (3.6)	9 (2.1)	494 (5.9)	9.6 (0.14)
Philippines		44 (4.1)	275 (11.2)	52 (3.9)	225 (10.0)	4 (1.6)	268 (19.5)	9.5 (0.11)
Kuwait		44 (3.9)	419 (8.6)	37 (4.1)	377 (10.7)	19 (3.2)	366 (14.6)	9.1 (0.15)
Chile		41 (4.1)	481 (5.0)	49 (4.4)	465 (4.1)	9 (2.5)	443 (10.8)	9.4 (0.13)
Oman		36 (3.2)	437 (6.0)	36 (3.1)	429 (6.0)	28 (3.3)	438 (11.8)	8.7 (0.18)
Poland		36 (4.1)	533 (4.6)	60 (4.2)	528 (3.0)	4 (1.6)	549 (7.7)	9.3 (0.10)
Germany		36 (3.2)	541 (3.1)	52 (3.5)	514 (3.3)	12 (2.0)	473 (8.9)	9.2 (0.09)
Turkey (5)		33 (3.4)	553 (5.3)	40 (3.7)	521 (7.3)	27 (3.3)	502 (9.5)	8.8 (0.16)
Sweden		30 (3.8)	545 (3.9)	65 (4.1)	534 (5.1)	5 (1.5)	509 (15.9)	9.2 (0.10)
Morocco		28 (2.8)	396 (15.4)	24 (2.7)	356 (11.8)	48 (3.5)	371 (9.5)	7.8 (0.18)
South Africa (5)		19 (2.6)	355 (16.5)	53 (3.8)	323 (8.1)	28 (3.7)	313 (10.8)	8.5 (0.09)
International Average		**60 (0.5)**	**498 (0.8)**	**32 (0.5)**	**483 (1.0)**	**8 (0.3)**	**457 (1.9)**	
Benchmarking Participants								
Dubai, UAE	r	89 (0.1)	547 (2.0)	10 (0.1)	532 (6.1)	0 (0.0)	~ ~	11.1 (0.01)
Madrid, Spain		77 (3.8)	527 (2.0)	19 (3.6)	507 (5.9)	4 (1.4)	522 (8.7)	10.7 (0.14)
Moscow City, Russian Fed.		73 (4.2)	597 (2.6)	26 (4.3)	589 (4.1)	1 (0.6)	~ ~	10.4 (0.11)
Quebec, Canada		60 (4.4)	525 (2.8)	37 (4.4)	518 (4.0)	2 (0.8)	~ ~	10.1 (0.13)
Abu Dhabi, UAE	r	59 (1.1)	434 (3.6)	38 (1.1)	384 (4.8)	3 (0.1)	350 (12.3)	10.1 (0.04)
Ontario, Canada		42 (5.3)	529 (4.5)	51 (5.5)	525 (5.6)	7 (2.0)	480 (10.2)	9.6 (0.14)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 8.4: School Discipline – Principals' Reports

Students' Results based on Principals' Reports

Country		Hardly Any Problems		Minor Problems		Moderate to Severe Problems		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Kazakhstan		78 (3.7)	491 (3.9)	11 (2.6)	480 (9.6)	11 (2.6)	467 (18.0)	11.7 (0.21)
Hong Kong SAR		76 (3.6)	586 (4.9)	24 (3.6)	555 (13.3)	0 (0.0)	~ ~	11.7 (0.12)
United Arab Emirates		72 (1.5)	486 (2.2)	25 (1.5)	437 (4.0)	3 (0.2)	383 (8.4)	11.6 (0.05)
Singapore		70 (0.0)	624 (4.6)	30 (0.0)	597 (7.6)	0 (0.0)	~ ~	11.4 (0.00)
Chinese Taipei		68 (3.0)	619 (3.4)	32 (3.0)	600 (5.7)	0 (0.0)	~ ~	11.7 (0.11)
Japan		68 (3.5)	598 (3.6)	25 (3.3)	590 (5.1)	7 (2.2)	576 (8.0)	11.0 (0.14)
Ireland		60 (4.1)	534 (3.3)	36 (4.0)	515 (4.4)	3 (1.5)	467 (19.4)	10.9 (0.14)
Bahrain		59 (0.2)	487 (1.9)	28 (0.2)	470 (2.7)	13 (0.1)	476 (8.0)	10.7 (0.01)
Saudi Arabia		58 (3.6)	399 (3.2)	24 (2.8)	391 (4.8)	18 (2.8)	381 (5.5)	10.8 (0.21)
Qatar		53 (3.9)	451 (5.9)	39 (3.5)	439 (9.3)	8 (1.9)	415 (14.6)	10.8 (0.15)
Oman		51 (3.4)	420 (4.6)	27 (3.5)	412 (7.1)	22 (3.1)	388 (7.7)	10.3 (0.20)
Russian Federation		51 (4.0)	547 (5.4)	48 (3.9)	540 (6.4)	1 (0.6)	~ ~	10.7 (0.11)
Korea, Rep. of		50 (4.6)	608 (4.1)	40 (4.3)	605 (4.3)	9 (2.6)	610 (7.1)	10.8 (0.19)
Australia		50 (3.2)	549 (5.5)	44 (3.4)	491 (5.8)	6 (1.7)	467 (7.6)	10.7 (0.10)
Romania		49 (4.1)	497 (6.5)	43 (4.1)	464 (5.5)	8 (2.6)	454 (15.7)	10.6 (0.19)
Lithuania		49 (4.5)	521 (4.3)	50 (4.5)	517 (4.8)	1 (0.7)	~ ~	10.7 (0.12)
Iran, Islamic Rep. of		47 (3.8)	465 (6.4)	46 (3.9)	431 (5.3)	7 (1.9)	419 (12.8)	10.6 (0.13)
Georgia		46 (4.3)	466 (5.9)	41 (4.1)	468 (6.4)	13 (3.0)	425 (11.3)	10.3 (0.19)
Israel		46 (3.6)	541 (7.2)	49 (3.8)	504 (6.4)	5 (1.6)	464 (20.2)	10.5 (0.11)
Hungary		45 (4.0)	535 (6.7)	50 (4.2)	508 (4.7)	5 (1.7)	436 (20.1)	10.4 (0.14)
Malaysia		45 (4.1)	477 (5.5)	49 (4.0)	450 (5.1)	6 (2.0)	424 (14.1)	10.5 (0.15)
Cyprus	r	44 (0.5)	529 (2.8)	40 (0.5)	483 (2.4)	17 (0.4)	475 (5.5)	10.2 (0.02)
England	s	43 (5.2)	534 (10.0)	57 (5.2)	511 (9.1)	0 (0.0)	~ ~	10.8 (0.13)
Lebanon		41 (4.3)	436 (4.3)	35 (4.0)	420 (5.9)	24 (3.7)	428 (7.9)	9.6 (0.22)
United States		40 (3.0)	549 (6.3)	54 (2.9)	503 (6.4)	6 (1.7)	466 (15.2)	10.3 (0.10)
Chile		38 (3.9)	464 (5.5)	51 (3.9)	429 (5.0)	12 (2.4)	418 (8.4)	10.1 (0.14)
New Zealand		37 (4.8)	510 (6.3)	61 (4.6)	474 (4.6)	2 (1.3)	~ ~	10.4 (0.16)
France	r	37 (4.3)	502 (4.3)	56 (4.7)	481 (3.6)	7 (2.5)	427 (7.7)	10.1 (0.14)
Turkey		36 (3.6)	519 (6.6)	44 (4.0)	482 (6.7)	19 (3.2)	483 (14.0)	9.8 (0.18)
Norway (9)	r	36 (4.7)	511 (3.7)	60 (4.8)	501 (4.3)	4 (1.7)	497 (10.3)	10.2 (0.14)
Jordan		36 (3.6)	432 (9.0)	41 (3.6)	418 (6.5)	23 (3.1)	406 (5.3)	9.8 (0.20)
Italy		33 (4.1)	508 (4.9)	62 (4.2)	493 (3.6)	5 (1.7)	497 (10.8)	10.1 (0.13)
Portugal		32 (3.8)	511 (6.0)	60 (4.1)	497 (4.4)	8 (2.4)	485 (15.1)	10.0 (0.13)
Kuwait		28 (3.9)	421 (9.7)	45 (4.2)	401 (5.9)	28 (3.8)	384 (9.7)	9.3 (0.21)
Finland		26 (3.3)	519 (4.6)	71 (3.3)	506 (2.9)	3 (1.6)	468 (11.4)	10.0 (0.10)
Egypt		25 (3.7)	432 (8.9)	34 (3.9)	407 (8.6)	41 (4.0)	407 (7.9)	8.6 (0.19)
Morocco		17 (3.1)	400 (7.3)	31 (3.2)	380 (5.6)	52 (3.5)	390 (3.5)	8.1 (0.19)
Sweden		14 (3.1)	522 (8.4)	78 (3.8)	503 (2.8)	9 (2.4)	475 (6.4)	9.4 (0.09)
South Africa (9)		11 (1.9)	420 (13.0)	50 (3.0)	395 (3.7)	39 (2.7)	373 (2.9)	8.7 (0.09)
International Average		**45 (0.6)**	**503 (1.0)**	**43 (0.6)**	**481 (1.0)**	**11 (0.4)**	**448 (2.1)**	
Benchmarking Participants								
Dubai, UAE	r	87 (0.2)	543 (2.5)	12 (0.2)	486 (7.4)	0 (0.0)	~ ~	12.0 (0.01)
Abu Dhabi, UAE	r	64 (1.3)	447 (4.4)	31 (1.3)	417 (4.7)	5 (0.1)	361 (11.0)	11.3 (0.06)
Moscow City, Russian Fed.		56 (4.6)	579 (5.4)	44 (4.6)	570 (6.4)	0 (0.0)	~ ~	10.8 (0.09)
Quebec, Canada		46 (4.7)	555 (5.0)	49 (4.9)	540 (6.4)	5 (2.2)	538 (7.0)	10.5 (0.15)
Ontario, Canada	r	37 (5.1)	542 (5.9)	56 (5.5)	522 (8.1)	6 (2.3)	499 (15.6)	10.2 (0.15)
Western Cape, RSA (9)		13 (2.3)	559 (9.4)	43 (3.9)	445 (7.2)	43 (3.9)	402 (5.1)	8.7 (0.12)
Gauteng, RSA (9)		10 (2.1)	502 (13.2)	44 (4.3)	427 (5.5)	46 (3.9)	395 (3.9)	8.5 (0.10)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit 8.5: School Discipline – Principals' Reports

Students' Results based on Principals' Reports

Country	Hardly Any Problems		Minor Problems		Moderate to Severe Problems		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Kazakhstan	78 (3.7)	481 (3.7)	11 (2.6)	472 (10.9)	11 (2.6)	464 (18.0)	11.7 (0.21)
Hong Kong SAR	76 (3.6)	505 (6.2)	24 (3.6)	499 (13.2)	0 (0.0)	~ ~	11.7 (0.12)
United Arab Emirates	72 (1.5)	489 (2.7)	25 (1.5)	430 (5.0)	3 (0.2)	345 (7.6)	11.6 (0.05)
Singapore	70 (0.0)	615 (4.4)	30 (0.0)	590 (7.7)	0 (0.0)	~ ~	11.4 (0.00)
Chinese Taipei	68 (3.0)	579 (2.4)	32 (3.0)	564 (4.3)	0 (0.0)	~ ~	11.7 (0.11)
Japan	68 (3.5)	572 (2.7)	25 (3.3)	565 (4.0)	7 (2.2)	559 (6.6)	11.0 (0.14)
Ireland	60 (4.1)	535 (3.5)	36 (4.0)	513 (5.1)	3 (1.5)	469 (23.4)	10.9 (0.14)
Bahrain	59 (0.2)	496 (2.4)	28 (0.2)	465 (2.7)	13 (0.1)	485 (4.8)	10.7 (0.01)
Saudi Arabia	58 (3.6)	438 (3.7)	24 (2.8)	427 (5.9)	18 (2.8)	416 (5.6)	10.8 (0.21)
Qatar	53 (3.9)	479 (5.7)	39 (3.5)	470 (10.0)	8 (1.9)	462 (11.2)	10.8 (0.15)
Oman	51 (3.4)	466 (4.8)	27 (3.5)	456 (8.1)	22 (3.1)	437 (8.7)	10.3 (0.20)
Russian Federation	51 (4.0)	546 (4.8)	48 (3.9)	540 (5.7)	1 (0.6)	~ ~	10.7 (0.11)
Korea, Rep. of	50 (4.6)	561 (3.3)	40 (4.3)	560 (3.3)	9 (2.6)	560 (5.5)	10.8 (0.19)
Australia	50 (3.2)	556 (4.1)	44 (3.4)	506 (5.1)	6 (1.7)	482 (7.7)	10.7 (0.10)
Romania	49 (4.1)	486 (6.2)	43 (4.1)	457 (4.8)	8 (2.6)	445 (11.2)	10.6 (0.19)
Lithuania	49 (4.5)	534 (4.1)	50 (4.5)	531 (4.5)	1 (0.7)	~ ~	10.7 (0.12)
Iran, Islamic Rep. of	47 (3.8)	466 (6.1)	46 (3.9)	436 (5.3)	7 (1.9)	426 (12.6)	10.6 (0.13)
Georgia	46 (4.3)	451 (5.3)	41 (4.1)	451 (5.7)	13 (3.0)	420 (11.1)	10.3 (0.19)
Israel	46 (3.6)	533 (6.5)	49 (3.8)	499 (6.5)	5 (1.6)	472 (20.8)	10.5 (0.11)
Hungary	45 (4.0)	546 (5.7)	50 (4.2)	523 (4.3)	5 (1.7)	457 (18.5)	10.4 (0.14)
Malaysia	45 (4.1)	476 (5.7)	49 (4.0)	449 (5.5)	6 (2.0)	430 (16.0)	10.5 (0.15)
Cyprus r	44 (0.5)	509 (3.0)	40 (0.5)	466 (3.3)	17 (0.4)	461 (5.9)	10.2 (0.02)
England s	43 (5.2)	535 (9.7)	57 (5.2)	512 (8.3)	0 (0.0)	~ ~	10.8 (0.13)
Lebanon	41 (4.3)	390 (7.7)	35 (4.0)	362 (8.7)	24 (3.7)	374 (12.1)	9.6 (0.22)
United States	40 (3.0)	555 (5.0)	54 (2.9)	511 (6.6)	6 (1.7)	473 (14.6)	10.3 (0.10)
Chile	38 (3.9)	486 (5.1)	51 (3.9)	451 (4.9)	12 (2.4)	439 (8.7)	10.1 (0.14)
New Zealand	37 (4.8)	524 (7.6)	61 (4.6)	493 (4.7)	2 (1.3)	~ ~	10.4 (0.16)
France r	37 (4.3)	511 (4.3)	56 (4.7)	484 (3.9)	7 (2.5)	426 (8.3)	10.1 (0.14)
Turkey	36 (3.6)	535 (5.7)	44 (4.0)	504 (5.7)	19 (3.2)	505 (12.5)	9.8 (0.18)
Norway (9) r	36 (4.7)	506 (5.1)	60 (4.8)	492 (4.7)	4 (1.7)	488 (12.6)	10.2 (0.14)
Jordan	36 (3.6)	468 (10.2)	41 (3.6)	446 (7.0)	23 (3.1)	437 (7.4)	9.8 (0.20)
Italy	33 (4.1)	509 (4.5)	62 (4.2)	498 (3.6)	5 (1.7)	498 (11.1)	10.1 (0.13)
Portugal	32 (3.8)	527 (5.1)	60 (4.1)	516 (4.0)	8 (2.4)	506 (15.0)	10.0 (0.13)
Kuwait	28 (3.9)	468 (9.6)	45 (4.2)	440 (7.5)	28 (3.8)	423 (10.7)	9.3 (0.21)
Finland	26 (3.3)	555 (5.4)	71 (3.3)	540 (3.7)	3 (1.6)	491 (8.7)	10.0 (0.10)
Egypt	25 (3.7)	409 (8.8)	34 (3.9)	386 (9.9)	41 (4.0)	381 (8.3)	8.6 (0.19)
Morocco	17 (3.1)	406 (8.7)	31 (3.2)	384 (7.0)	52 (3.5)	396 (4.2)	8.1 (0.19)
Sweden	14 (3.1)	545 (9.6)	78 (3.8)	522 (3.5)	9 (2.4)	484 (10.2)	9.4 (0.09)
South Africa (9)	11 (1.9)	406 (18.4)	50 (3.0)	377 (5.0)	39 (2.7)	350 (4.3)	8.7 (0.09)
International Average	**45 (0.6)**	**504 (1.0)**	**43 (0.6)**	**482 (1.0)**	**11 (0.4)**	**452 (2.1)**	
Benchmarking Participants							
Dubai, UAE r	87 (0.2)	554 (2.3)	12 (0.2)	499 (7.6)	0 (0.0)	~ ~	12.0 (0.01)
Abu Dhabi, UAE r	64 (1.3)	436 (5.4)	31 (1.3)	395 (6.3)	5 (0.1)	305 (8.0)	11.3 (0.06)
Moscow City, Russian Fed.	56 (4.6)	568 (4.0)	44 (4.6)	565 (4.5)	0 (0.0)	~ ~	10.8 (0.09)
Quebec, Canada	46 (4.7)	547 (4.5)	49 (4.9)	535 (6.0)	5 (2.2)	531 (8.9)	10.5 (0.15)
Ontario, Canada r	37 (5.1)	531 (5.4)	56 (5.5)	516 (5.2)	6 (2.3)	494 (14.7)	10.2 (0.15)
Western Cape, RSA (9)	13 (2.3)	585 (11.5)	43 (3.9)	443 (8.9)	43 (3.9)	392 (6.2)	8.7 (0.12)
Gauteng, RSA (9)	10 (2.1)	524 (16.6)	44 (4.3)	432 (7.0)	46 (3.9)	388 (5.2)	8.5 (0.10)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Safe and Orderly School

In addition to principals' reports, previous TIMSS assessments have also asked teachers about their perceptions of school safety and found that a strong perception of safety and order in school was related to higher average achievement in mathematics and science. For TIMSS 2019, teachers of students in both the fourth and eighth grade assessments were asked the degree to which they agreed or disagreed with eight statements on the *Safe and Orderly School* scale (see About the Scale in Exhibit 8.6). Based on their teachers' responses, students were categorized as being in "very safe and orderly" schools, "somewhat safe and orderly" schools, and "less than safe and orderly" schools.

Exhibits 8.7 and 8.8 present the percentages of fourth grade students in the three categories in relation to average mathematics achievement and average science achievement, respectively. Across countries, on average, more than half the fourth grade students (61%) attended schools judged by their teachers to be "very safe and orderly," with almost all of the remaining students (36%) in schools perceived to be "somewhat safe and orderly." Internationally, on average, students attending "very safe and orderly" schools as reported by their teachers had the highest average mathematics achievement (507) and science achievement (497) compared with students in "somewhat safe and orderly" schools (495 in mathematics and 484 in science). Only small percentages of students (4%, on average) were in schools judged to be "less than safe and orderly."

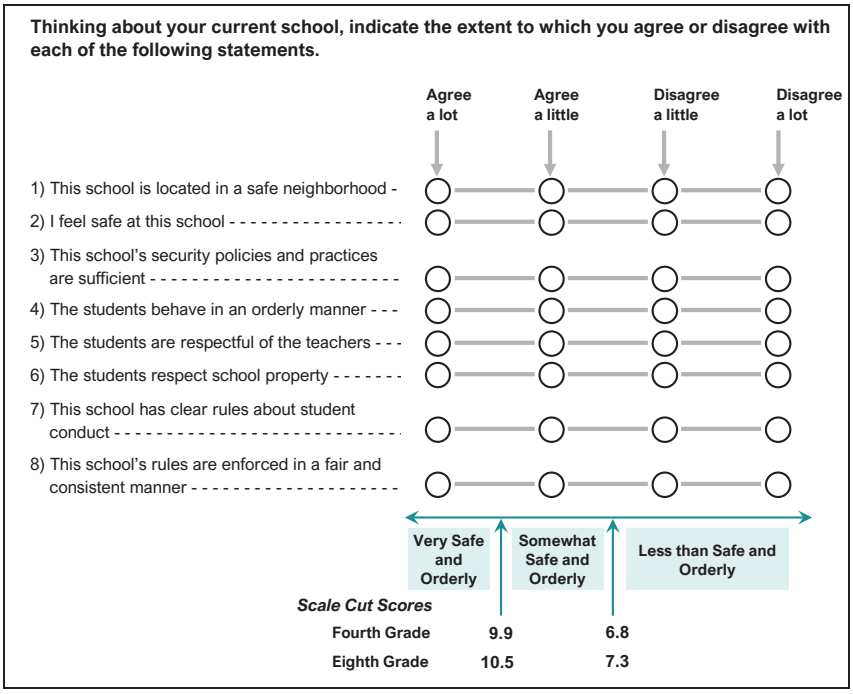
Exhibits 8.9 and 8.10 present the corresponding *Safe and Orderly School* scale results at the eighth grade in relation to mathematics achievement and science achievement, respectively. Similar to the fourth grade, almost all the eighth grade students (93% on average across countries) were in "very safe and orderly" or "somewhat safe and orderly" schools, but smaller percentages of eighth grade students were in the "very safe and orderly" category, and larger percentages of were in the "somewhat safe and orderly" category. On average, 48 percent of eighth grade students attended schools judged by their teachers to be "very safe and orderly," 45 percent were in "somewhat safe and orderly" schools, and 6 percent were in "less than safe and orderly" schools. There was a strong positive association between eighth grade students' average achievement and their teachers' reports about school safety, with students in "very safe and orderly" schools having average mathematics achievement 41 points higher than students in "less than safe and orderly" schools (501 vs. 460). Similarly, students in "very safe and orderly" schools had average science achievement 35 points higher than students in "less than safe and orderly" schools (501 vs. 466).

Exhibit 8.6: Safe and Orderly School – Teachers' Reports

Students' Results based on Teachers' Reports

About the Scale

Students were scored according to their teachers' responses to eight statements on the *Safe and Orderly School* scale. Cut scores divide the scale into three categories. Students in **Very Safe and Orderly** schools had a score at or above the cut score corresponding to their teachers "agreeing a lot" with four of the eight statements and "agreeing a little" with the other four, on average. Students in **Less than Safe and Orderly** schools had a score at or below the cut score corresponding to their teachers "disagreeing a little" with four of the eight statements and "agreeing a little" with the other four, on average. All other students were in **Somewhat Safe and Orderly** schools.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 8.7: Safe and Orderly School – Teachers' Reports

Students' Results based on Teachers' Reports

Country	Very Safe and Orderly		Somewhat Safe and Orderly		Less than Safe and Orderly		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	97 (1.3)	494 (3.5)	3 (1.3)	502 (17.7)	0 (0.0)	~ ~	12.6 (0.10)
Kosovo	91 (2.3)	445 (3.2)	9 (2.4)	432 (10.3)	0 (0.5)	~ ~	12.2 (0.12)
Azerbaijan	86 (2.8)	513 (2.9)	13 (2.6)	525 (9.0)	1 (0.8)	~ ~	11.5 (0.14)
Armenia	85 (3.0)	502 (2.8)	15 (3.0)	483 (6.4)	0 (0.2)	~ ~	11.4 (0.13)
Montenegro	85 (1.7)	453 (2.2)	14 (1.7)	452 (7.7)	0 (0.0)	~ ~	11.5 (0.07)
Kuwait	82 (2.9)	387 (5.4)	17 (2.8)	365 (13.2)	1 (0.7)	~ ~	11.3 (0.13)
Georgia	81 (3.3)	479 (3.9)	18 (3.3)	493 (7.7)	1 (0.5)	~ ~	11.2 (0.14)
Bosnia and Herzegovina	80 (2.8)	452 (3.1)	18 (2.7)	454 (5.2)	1 (0.7)	~ ~	11.3 (0.13)
Saudi Arabia	79 (3.1)	403 (4.6)	20 (3.0)	382 (8.0)	1 (0.7)	~ ~	11.3 (0.13)
Pakistan	79 (3.9)	343 (14.0)	19 (3.5)	293 (17.4)	2 (1.4)	~ ~	11.2 (0.27)
Ireland	78 (3.1)	553 (2.8)	19 (2.9)	535 (5.8)	3 (1.4)	511 (11.3)	11.5 (0.15)
North Macedonia	76 (3.4)	469 (6.3)	22 (3.4)	484 (10.1)	1 (0.7)	~ ~	11.2 (0.15)
Spain	76 (3.1)	508 (2.3)	22 (2.9)	489 (3.8)	2 (0.9)	~ ~	11.2 (0.14)
Northern Ireland	75 (3.6)	572 (3.4)	23 (3.4)	545 (6.1)	2 (1.5)	~ ~	11.6 (0.18)
United Arab Emirates r	75 (1.0)	496 (2.0)	22 (0.9)	441 (5.7)	3 (0.4)	393 (11.9)	11.4 (0.05)
Qatar	74 (2.5)	448 (4.6)	25 (2.5)	452 (8.1)	2 (0.9)	~ ~	11.2 (0.13)
Bulgaria	73 (3.1)	521 (5.6)	26 (2.9)	497 (7.3)	1 (0.8)	~ ~	10.8 (0.13)
Serbia	73 (4.2)	504 (3.9)	24 (4.0)	518 (6.2)	3 (1.4)	516 (10.9)	10.8 (0.15)
Kazakhstan	72 (3.4)	514 (3.1)	27 (3.3)	510 (5.2)	1 (0.6)	~ ~	11.2 (0.14)
Portugal	71 (2.9)	533 (2.8)	27 (2.9)	509 (5.1)	1 (0.4)	~ ~	10.7 (0.12)
Philippines	70 (3.8)	304 (7.4)	27 (3.8)	272 (10.7)	2 (1.2)	~ ~	10.8 (0.15)
Netherlands r	69 (3.6)	541 (3.3)	28 (3.6)	529 (3.4)	3 (1.5)	513 (7.3)	10.6 (0.17)
Singapore	68 (2.5)	627 (4.6)	30 (2.5)	624 (6.4)	3 (0.9)	594 (29.4)	10.9 (0.10)
Iran, Islamic Rep. of	67 (3.1)	445 (4.8)	30 (3.1)	439 (8.4)	2 (1.1)	~ ~	10.7 (0.13)
New Zealand	67 (2.8)	496 (3.4)	29 (2.5)	473 (5.6)	4 (1.3)	451 (20.6)	10.7 (0.13)
Oman	66 (3.4)	435 (5.3)	33 (3.4)	427 (7.5)	1 (0.5)	~ ~	10.7 (0.13)
Bahrain	65 (2.8)	481 (3.1)	33 (2.9)	480 (5.4)	2 (1.1)	~ ~	10.7 (0.11)
Australia	64 (3.5)	529 (3.7)	28 (3.0)	504 (7.4)	8 (2.3)	479 (9.0)	10.6 (0.16)
Lithuania	63 (3.6)	543 (3.8)	36 (3.5)	539 (3.3)	1 (0.6)	~ ~	10.4 (0.12)
Russian Federation	62 (3.5)	567 (4.4)	36 (3.4)	566 (4.5)	2 (1.0)	~ ~	10.3 (0.14)
Hong Kong SAR	61 (4.3)	612 (3.7)	38 (4.4)	585 (5.4)	0 (0.5)	~ ~	10.5 (0.16)
Austria	60 (2.7)	545 (2.4)	37 (2.8)	533 (3.5)	2 (0.9)	~ ~	10.2 (0.10)
Norway (5) r	59 (4.1)	549 (3.4)	38 (4.0)	540 (3.5)	3 (1.1)	535 (6.6)	10.2 (0.18)
Cyprus	59 (3.4)	534 (3.8)	37 (3.1)	532 (4.0)	4 (1.2)	539 (16.5)	10.4 (0.16)
Latvia	58 (3.6)	552 (2.8)	40 (3.4)	541 (4.1)	2 (1.3)	~ ~	10.0 (0.10)
Italy	57 (3.7)	518 (2.8)	41 (3.5)	512 (4.2)	2 (1.2)	~ ~	10.0 (0.12)
England s	55 (5.6)	564 (6.1)	41 (5.6)	553 (7.9)	4 (1.9)	537 (20.9)	10.4 (0.22)
Morocco	54 (3.5)	399 (5.4)	40 (3.3)	367 (6.4)	6 (1.8)	336 (9.4)	10.1 (0.16)
Slovak Republic	53 (3.0)	515 (4.2)	45 (3.0)	504 (4.7)	2 (0.9)	~ ~	9.8 (0.10)
Czech Republic	52 (4.1)	539 (3.6)	47 (4.1)	527 (4.3)	1 (0.5)	~ ~	10.0 (0.14)
Poland	51 (3.8)	520 (3.4)	47 (3.9)	520 (4.4)	2 (1.0)	~ ~	9.7 (0.12)
Turkey (5)	51 (3.8)	538 (5.5)	41 (3.9)	515 (7.6)	8 (2.0)	461 (12.4)	9.8 (0.16)
Canada	48 (2.9)	515 (4.4)	45 (2.9)	512 (3.6)	7 (1.3)	493 (7.8)	10.0 (0.13)
Germany	47 (3.8)	534 (3.1)	46 (4.0)	513 (3.9)	7 (1.8)	486 (10.4)	9.6 (0.14)
Denmark	47 (4.1)	531 (3.3)	44 (4.1)	520 (3.4)	9 (2.1)	513 (5.9)	9.7 (0.16)
United States	47 (2.7)	552 (3.3)	43 (2.6)	527 (3.8)	10 (1.3)	495 (6.1)	9.8 (0.13)
Croatia	47 (3.2)	508 (3.6)	52 (3.2)	510 (2.7)	1 (0.7)	~ ~	10.0 (0.12)
Hungary	45 (3.7)	532 (4.5)	48 (3.9)	524 (4.7)	7 (1.9)	476 (16.1)	9.5 (0.12)
Malta	45 (0.4)	517 (1.8)	48 (0.4)	505 (2.1)	8 (0.2)	491 (3.0)	9.7 (0.02)
Chinese Taipei	40 (3.7)	602 (2.7)	54 (3.6)	596 (2.7)	6 (1.9)	603 (5.9)	9.4 (0.15)
France	37 (3.2)	501 (4.7)	60 (3.2)	477 (4.0)	3 (1.0)	456 (13.3)	9.5 (0.11)
Sweden	37 (3.9)	538 (4.3)	59 (3.9)	514 (3.3)	4 (1.6)	497 (13.9)	9.3 (0.13)
South Africa (5)	35 (3.5)	387 (7.8)	51 (4.0)	366 (5.8)	14 (2.0)	366 (8.8)	9.0 (0.12)
Korea, Rep. of	33 (4.1)	610 (4.1)	61 (4.2)	594 (2.9)	6 (1.7)	599 (7.3)	9.5 (0.18)
Chile	31 (4.1)	453 (6.0)	59 (4.2)	438 (3.8)	10 (2.2)	420 (8.8)	9.0 (0.16)
Finland	31 (2.9)	542 (3.7)	63 (3.1)	528 (2.4)	6 (1.5)	516 (9.5)	9.2 (0.10)
Belgium (Flemish)	28 (3.0)	544 (3.1)	66 (3.0)	531 (2.3)	5 (1.5)	505 (8.8)	9.1 (0.11)
Japan	8 (1.8)	596 (3.8)	80 (2.9)	594 (2.1)	12 (2.6)	583 (3.3)	8.2 (0.09)
International Average	**61 (0.4)**	**507 (0.6)**	**36 (0.4)**	**495 (0.9)**	**4 (0.2)**	**495 (2.4)**	
Benchmarking Participants							
Dubai, UAE r	85 (1.6)	550 (2.2)	15 (1.7)	525 (8.7)	0 (0.4)	~ ~	11.9 (0.08)
Madrid, Spain	72 (3.8)	523 (2.1)	25 (3.9)	508 (5.1)	2 (1.5)	~ ~	11.1 (0.14)
Moscow City, Russian Fed.	60 (4.3)	595 (2.6)	39 (4.3)	588 (4.0)	1 (0.7)	~ ~	10.4 (0.16)
Abu Dhabi, UAE	57 (2.1)	470 (3.5)	36 (2.1)	406 (5.8)	6 (1.1)	388 (13.1)	10.5 (0.10)
Ontario, Canada r	49 (5.7)	522 (8.4)	43 (5.3)	506 (7.2)	9 (2.3)	484 (10.6)	10.0 (0.26)
Quebec, Canada	31 (4.1)	537 (3.9)	62 (4.4)	531 (3.1)	7 (2.3)	523 (7.4)	9.2 (0.12)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 8.8: Safe and Orderly School – Teachers' Reports

Students' Results based on Teachers' Reports

Country	Very Safe and Orderly		Somewhat Safe and Orderly		Less than Safe and Orderly		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	97 (1.2)	489 (3.7)	3 (1.2)	504 (18.3)	0 (0.0)	~ ~	12.6 (0.10)
Kosovo	91 (2.3)	414 (4.0)	9 (2.4)	396 (12.3)	0 (0.5)	~ ~	12.2 (0.12)
Armenia	88 (2.2)	468 (3.9)	12 (2.2)	466 (6.1)	0 (0.2)	~ ~	11.5 (0.12)
Azerbaijan	85 (2.8)	425 (3.4)	13 (2.6)	441 (9.4)	1 (0.8)	~ ~	11.5 (0.14)
Montenegro	85 (1.7)	453 (2.8)	14 (1.7)	455 (8.6)	0 (0.0)	~ ~	11.5 (0.07)
Pakistan	81 (3.4)	303 (15.5)	17 (3.0)	249 (17.2)	2 (1.4)	~ ~	11.2 (0.25)
Bosnia and Herzegovina	80 (2.8)	459 (3.7)	18 (2.7)	460 (5.7)	1 (0.7)	~ ~	11.3 (0.13)
Kuwait	78 (3.3)	401 (7.5)	22 (3.3)	360 (10.6)	0 (0.0)	~ ~	11.2 (0.15)
Georgia	78 (3.5)	453 (4.3)	21 (3.4)	458 (8.9)	1 (0.5)	~ ~	11.1 (0.13)
Ireland	78 (3.1)	533 (3.7)	19 (2.9)	512 (6.4)	3 (1.4)	491 (10.4)	11.5 (0.15)
Philippines	77 (3.3)	251 (8.4)	21 (3.3)	237 (15.4)	1 (0.9)	~ ~	11.2 (0.14)
North Macedonia	76 (3.4)	422 (7.3)	22 (3.4)	442 (10.8)	1 (0.7)	~ ~	11.2 (0.15)
Saudi Arabia	76 (3.6)	412 (4.4)	21 (3.5)	387 (10.7)	2 (1.4)	~ ~	11.3 (0.17)
Spain	76 (3.4)	514 (2.6)	23 (3.3)	502 (6.3)	2 (0.9)	~ ~	11.1 (0.14)
United Arab Emirates	75 (1.0)	490 (2.7)	22 (1.1)	419 (4.6)	2 (0.6)	~ ~	11.4 (0.05)
Northern Ireland	75 (3.6)	524 (2.6)	23 (3.4)	503 (4.4)	2 (1.5)	~ ~	11.6 (0.18)
Qatar	75 (2.9)	447 (5.1)	22 (2.8)	455 (12.0)	3 (1.4)	457 (18.4)	11.3 (0.15)
Kazakhstan	73 (3.4)	497 (4.0)	26 (3.3)	488 (6.6)	1 (0.6)	~ ~	11.3 (0.14)
Serbia	73 (4.2)	514 (4.2)	24 (4.0)	523 (6.3)	3 (1.4)	527 (10.2)	10.8 (0.15)
Bulgaria	72 (3.0)	531 (6.4)	25 (2.8)	498 (8.7)	3 (1.4)	466 (39.6)	10.6 (0.15)
Portugal	71 (2.9)	510 (2.6)	27 (2.9)	491 (4.6)	1 (0.4)	~ ~	10.7 (0.12)
Oman	70 (3.2)	436 (5.5)	29 (3.1)	438 (8.9)	2 (0.8)	~ ~	10.7 (0.13)
Netherlands r	69 (3.6)	525 (3.9)	28 (3.6)	507 (4.9)	3 (1.5)	487 (9.7)	10.6 (0.17)
Bahrain	68 (3.0)	500 (3.9)	28 (2.7)	480 (8.3)	4 (1.6)	450 (15.9)	10.6 (0.12)
Iran, Islamic Rep. of	67 (3.1)	444 (5.1)	30 (3.1)	435 (8.7)	2 (1.1)	~ ~	10.7 (0.13)
Singapore	67 (2.0)	594 (4.2)	31 (2.0)	597 (5.7)	2 (0.7)	~ ~	10.9 (0.08)
New Zealand	66 (2.8)	510 (3.0)	29 (2.5)	491 (5.1)	4 (1.3)	467 (16.6)	10.8 (0.13)
Australia	65 (3.5)	544 (3.0)	26 (2.9)	518 (6.1)	8 (2.3)	497 (5.8)	10.6 (0.17)
Lithuania	65 (3.6)	540 (3.3)	35 (3.5)	534 (3.0)	1 (0.6)	~ ~	10.4 (0.11)
Norway (5) s	62 (4.2)	541 (3.1)	34 (4.0)	539 (4.5)	4 (1.6)	531 (6.8)	10.3 (0.19)
Austria	62 (2.4)	532 (2.9)	36 (2.5)	509 (4.3)	2 (0.9)	~ ~	10.2 (0.10)
Russian Federation	61 (3.6)	565 (4.0)	37 (3.5)	570 (4.0)	2 (1.0)	~ ~	10.3 (0.13)
Cyprus	57 (3.9)	515 (4.1)	40 (3.9)	509 (3.9)	3 (1.3)	505 (15.7)	10.4 (0.17)
Italy	57 (3.7)	513 (3.6)	41 (3.5)	506 (4.3)	2 (1.2)	~ ~	10.0 (0.12)
Latvia	56 (4.0)	545 (2.7)	44 (3.9)	538 (4.3)	1 (0.5)	~ ~	10.0 (0.11)
Hong Kong SAR	55 (4.2)	536 (4.5)	42 (4.2)	528 (5.5)	2 (1.4)	~ ~	10.3 (0.17)
England s	55 (5.6)	542 (5.5)	41 (5.6)	535 (6.8)	4 (1.9)	515 (21.4)	10.4 (0.22)
Poland	55 (4.1)	529 (3.2)	42 (4.0)	536 (4.4)	3 (1.4)	528 (10.6)	9.8 (0.13)
Morocco	55 (3.3)	393 (9.1)	43 (3.6)	354 (6.5)	2 (1.1)	~ ~	10.2 (0.14)
Slovak Republic	54 (3.0)	528 (4.1)	43 (3.0)	512 (6.0)	3 (1.1)	510 (26.5)	9.9 (0.12)
Czech Republic	52 (3.9)	540 (3.2)	47 (3.9)	527 (3.9)	1 (0.5)	~ ~	9.9 (0.13)
Turkey (5)	52 (3.9)	538 (5.2)	41 (3.4)	519 (6.4)	7 (2.0)	481 (20.0)	9.9 (0.16)
Germany	50 (3.9)	530 (3.3)	44 (3.9)	509 (4.0)	6 (1.8)	484 (14.5)	9.7 (0.15)
Canada r	49 (2.5)	532 (2.6)	44 (2.5)	520 (2.9)	7 (1.3)	500 (4.5)	10.0 (0.11)
Hungary	49 (3.7)	534 (4.0)	46 (3.9)	529 (4.7)	5 (1.8)	487 (14.2)	9.7 (0.12)
Denmark	48 (3.6)	528 (3.5)	40 (3.9)	519 (3.8)	12 (2.1)	512 (4.6)	9.7 (0.14)
Croatia	47 (3.2)	523 (3.2)	52 (3.2)	524 (2.6)	1 (0.7)	~ ~	10.0 (0.12)
United States	46 (2.8)	556 (3.8)	44 (2.6)	531 (3.8)	10 (1.5)	493 (6.4)	9.8 (0.13)
Malta	45 (0.4)	504 (1.9)	47 (0.4)	490 (1.9)	8 (0.2)	481 (5.0)	9.7 (0.02)
Chinese Taipei	42 (3.5)	560 (2.6)	52 (3.7)	557 (2.5)	5 (1.8)	551 (7.4)	9.6 (0.15)
South Africa (5)	42 (3.5)	341 (9.1)	46 (3.8)	314 (7.8)	12 (2.1)	319 (12.2)	9.3 (0.15)
Sweden	38 (4.2)	552 (4.1)	56 (4.2)	534 (3.7)	6 (1.6)	511 (13.1)	9.3 (0.13)
France	37 (3.0)	501 (4.7)	60 (3.1)	482 (3.9)	3 (1.0)	452 (13.7)	9.5 (0.11)
Korea, Rep. of	35 (3.7)	595 (3.9)	59 (3.6)	584 (2.6)	6 (2.0)	582 (7.0)	9.5 (0.16)
Finland	32 (2.8)	562 (3.2)	62 (3.0)	552 (3.1)	7 (1.5)	538 (10.4)	9.2 (0.11)
Chile	28 (3.5)	483 (5.7)	60 (4.2)	465 (3.4)	12 (2.6)	446 (8.7)	8.9 (0.15)
Belgium (Flemish)	28 (2.9)	512 (3.3)	66 (2.9)	499 (2.5)	6 (1.6)	473 (10.2)	9.1 (0.11)
Japan	11 (2.8)	564 (6.3)	80 (3.4)	562 (2.1)	9 (2.2)	553 (4.2)	8.4 (0.11)
International Average	**61 (0.4)**	**497 (0.6)**	**35 (0.4)**	**484 (0.9)**	**4 (0.2)**	**493 (2.7)**	
Benchmarking Participants							
Dubai, UAE r	85 (1.4)	553 (2.4)	14 (1.4)	518 (7.3)	0 (0.0)	~ ~	12.1 (0.08)
Madrid, Spain	75 (3.8)	528 (2.1)	22 (3.4)	510 (3.6)	3 (1.7)	473 (18.1)	11.0 (0.18)
Abu Dhabi, UAE	63 (2.0)	449 (4.3)	32 (2.1)	370 (6.8)	6 (1.3)	357 (17.0)	10.5 (0.10)
Moscow City, Russian Fed.	60 (4.3)	596 (2.6)	39 (4.3)	593 (4.0)	1 (0.7)	~ ~	10.4 (0.16)
Ontario, Canada r	52 (4.7)	536 (4.9)	38 (4.7)	522 (5.5)	10 (2.5)	497 (7.2)	10.1 (0.21)
Quebec, Canada	30 (4.0)	527 (3.7)	64 (4.4)	522 (3.3)	6 (2.4)	508 (6.4)	9.1 (0.13)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 8.9: Safe and Orderly School – Teachers' Reports

Students' Results based on Teachers' Reports

Country	Very Safe and Orderly		Somewhat Safe and Orderly		Less than Safe and Orderly		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Kuwait	77 (3.3)	405 (5.2)	22 (3.3)	392 (10.5)	1 (0.5)	~ ~	11.5 (0.13)
Kazakhstan	74 (3.1)	486 (4.2)	26 (3.1)	487 (6.8)	0 (0.0)	~ ~	11.6 (0.12)
United Arab Emirates	72 (1.6)	491 (2.8)	25 (1.6)	432 (5.4)	2 (0.4)	~ ~	11.9 (0.06)
Romania	70 (3.4)	486 (5.6)	29 (3.5)	465 (8.3)	1 (0.6)	~ ~	11.5 (0.14)
Saudi Arabia	70 (3.5)	397 (2.9)	27 (3.4)	383 (4.7)	3 (1.5)	379 (19.7)	11.5 (0.16)
Georgia	65 (4.1)	465 (5.8)	34 (4.1)	456 (7.9)	0 (0.4)	~ ~	11.0 (0.12)
Qatar	64 (3.4)	451 (6.5)	32 (3.3)	429 (6.0)	4 (1.2)	441 (16.1)	11.2 (0.15)
Ireland	62 (2.8)	537 (3.6)	33 (2.6)	509 (4.2)	5 (1.3)	475 (19.2)	11.1 (0.13)
Egypt	61 (4.4)	421 (6.7)	36 (4.3)	405 (8.6)	3 (1.4)	356 (20.1)	10.9 (0.16)
Oman	61 (3.6)	417 (4.2)	39 (3.6)	403 (5.2)	0 (0.0)	~ ~	11.0 (0.12)
Iran, Islamic Rep. of	59 (2.9)	453 (5.2)	36 (2.7)	439 (8.0)	4 (1.4)	413 (18.6)	10.9 (0.13)
Australia	59 (3.0)	535 (5.9)	35 (2.9)	502 (6.4)	6 (1.7)	472 (19.9)	10.7 (0.14)
Singapore	58 (2.9)	621 (5.5)	38 (2.9)	610 (6.8)	5 (0.8)	599 (11.0)	11.1 (0.12)
England s	57 (5.6)	532 (9.4)	35 (5.4)	505 (14.7)	8 (3.1)	519 (24.0)	10.7 (0.22)
Lithuania	55 (3.6)	524 (4.8)	43 (3.5)	517 (4.5)	2 (0.8)	~ ~	10.6 (0.14)
Israel	55 (2.9)	533 (7.5)	37 (3.0)	516 (9.1)	8 (1.8)	442 (15.6)	10.7 (0.14)
Hong Kong SAR	54 (4.1)	587 (7.3)	44 (4.0)	568 (7.2)	3 (1.3)	522 (24.4)	10.6 (0.15)
Norway (9) r	53 (4.0)	511 (3.3)	43 (3.9)	498 (4.4)	4 (2.4)	493 (6.0)	10.4 (0.16)
Bahrain	53 (2.6)	486 (2.9)	44 (2.6)	477 (2.9)	4 (1.0)	455 (7.0)	10.8 (0.09)
Lebanon	48 (4.4)	444 (4.8)	48 (4.5)	419 (4.4)	4 (1.5)	372 (11.3)	10.4 (0.17)
Russian Federation	48 (3.1)	546 (5.8)	50 (3.0)	541 (5.2)	2 (0.9)	~ ~	10.5 (0.13)
Jordan	47 (4.4)	432 (7.3)	46 (4.4)	417 (5.6)	7 (2.3)	375 (11.3)	10.4 (0.17)
New Zealand	47 (3.5)	503 (5.2)	45 (3.1)	470 (6.1)	9 (2.0)	437 (9.7)	10.4 (0.15)
Morocco	45 (3.6)	398 (3.4)	42 (3.4)	381 (4.0)	12 (2.5)	382 (6.3)	9.9 (0.18)
Portugal	45 (3.7)	511 (4.9)	47 (4.0)	492 (5.3)	8 (2.5)	484 (12.7)	10.2 (0.17)
Hungary	43 (3.6)	533 (5.6)	52 (3.8)	504 (5.7)	5 (1.5)	465 (16.4)	10.2 (0.13)
Chinese Taipei	42 (3.5)	619 (4.5)	55 (3.6)	608 (3.9)	2 (1.1)	~ ~	10.2 (0.11)
Cyprus s	38 (3.4)	521 (5.7)	47 (3.6)	501 (5.3)	15 (2.7)	481 (6.6)	9.8 (0.13)
United States	38 (2.6)	532 (6.5)	52 (2.7)	517 (6.1)	11 (1.5)	459 (10.3)	10.0 (0.11)
Turkey	38 (3.7)	508 (8.8)	52 (3.4)	494 (6.5)	10 (2.3)	465 (13.2)	10.0 (0.19)
Chile	31 (3.3)	468 (5.8)	51 (3.9)	439 (4.4)	18 (3.2)	399 (6.3)	9.4 (0.16)
Malaysia	30 (3.1)	477 (6.8)	66 (3.2)	453 (4.7)	4 (1.3)	468 (12.2)	9.6 (0.11)
France r	29 (4.0)	496 (5.8)	54 (4.6)	483 (4.3)	16 (3.2)	454 (6.6)	9.5 (0.16)
Sweden	28 (2.7)	523 (5.0)	66 (3.1)	497 (3.2)	6 (2.0)	478 (12.2)	9.5 (0.08)
Korea, Rep. of	24 (2.9)	615 (6.1)	70 (3.3)	606 (3.4)	6 (2.0)	590 (8.9)	9.5 (0.15)
Finland	23 (2.6)	520 (4.2)	66 (2.6)	507 (3.1)	11 (2.0)	495 (6.7)	9.3 (0.12)
Italy	20 (3.3)	507 (5.7)	75 (3.5)	498 (3.3)	5 (1.7)	461 (9.6)	9.4 (0.12)
South Africa (9)	18 (2.0)	423 (7.7)	58 (2.9)	384 (3.1)	24 (2.6)	378 (4.5)	8.7 (0.12)
Japan	17 (2.6)	608 (8.1)	69 (3.2)	594 (3.3)	14 (2.5)	583 (4.5)	8.9 (0.11)
International Average	**48 (0.5)**	**501 (0.9)**	**45 (0.6)**	**482 (1.0)**	**6 (0.3)**	**460 (2.5)**	
Benchmarking Participants							
Dubai, UAE	75 (2.5)	547 (3.2)	23 (2.5)	509 (6.1)	2 (0.1)	~ ~	12.0 (0.12)
Abu Dhabi, UAE r	63 (2.1)	467 (4.8)	33 (2.2)	381 (5.6)	4 (1.1)	371 (17.0)	11.3 (0.11)
Ontario, Canada	57 (3.9)	544 (6.6)	37 (3.9)	520 (5.0)	6 (2.1)	491 (10.5)	10.7 (0.20)
Moscow City, Russian Fed.	46 (4.1)	587 (5.9)	51 (4.1)	566 (5.2)	3 (1.3)	563 (16.8)	10.3 (0.14)
Quebec, Canada	35 (4.1)	557 (6.3)	57 (4.2)	538 (5.8)	7 (2.4)	511 (11.3)	9.8 (0.16)
Gauteng, RSA (9)	19 (2.6)	468 (8.8)	52 (4.1)	419 (4.7)	29 (4.2)	391 (4.2)	8.6 (0.16)
Western Cape, RSA (9)	18 (3.0)	521 (14.9)	50 (4.4)	437 (6.7)	32 (3.8)	401 (5.6)	8.5 (0.15)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit 8.10: Safe and Orderly School – Teachers' Reports

Students' Results based on Teachers' Reports

Country	Very Safe and Orderly		Somewhat Safe and Orderly		Less than Safe and Orderly		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Romania	79 (2.4)	477 (4.8)	20 (2.3)	453 (6.0)	1 (0.7)	~ ~	11.9 (0.11)
Kuwait	75 (3.6)	446 (6.1)	25 (3.7)	439 (10.9)	0 (0.3)	~ ~	11.5 (0.15)
United Arab Emirates	73 (1.2)	493 (3.1)	24 (1.3)	429 (6.5)	3 (0.4)	338 (14.0)	11.7 (0.06)
Qatar	70 (4.1)	477 (5.9)	27 (4.1)	468 (8.5)	3 (1.2)	477 (18.3)	11.4 (0.16)
Saudi Arabia	69 (3.7)	440 (3.0)	28 (3.5)	415 (6.6)	3 (1.4)	406 (20.9)	11.3 (0.17)
Singapore	68 (2.7)	613 (4.5)	29 (2.8)	594 (7.9)	2 (0.7)	~ ~	11.4 (0.12)
Kazakhstan	68 (1.9)	482 (3.6)	32 (1.8)	470 (4.5)	1 (0.5)	~ ~	11.4 (0.09)
Georgia	67 (2.9)	450 (4.3)	32 (2.8)	441 (4.5)	1 (0.6)	~ ~	11.1 (0.10)
Egypt	64 (4.0)	396 (7.1)	33 (3.8)	383 (9.5)	2 (1.2)	~ ~	11.1 (0.17)
Ireland	62 (3.4)	539 (3.3)	30 (3.3)	516 (6.9)	8 (1.9)	485 (10.2)	11.1 (0.17)
Iran, Islamic Rep. of	62 (3.3)	457 (4.6)	31 (2.9)	443 (6.4)	7 (1.7)	413 (6.7)	10.9 (0.15)
Oman	60 (3.6)	469 (4.5)	37 (3.6)	442 (5.9)	2 (1.0)	~ ~	10.8 (0.10)
Norway (9) r	58 (3.6)	505 (3.7)	37 (3.5)	489 (5.2)	4 (2.4)	476 (14.4)	10.5 (0.15)
Hong Kong SAR	56 (4.2)	514 (8.3)	43 (4.1)	494 (8.6)	1 (0.8)	~ ~	11.0 (0.15)
Israel	56 (2.7)	520 (6.3)	39 (3.1)	514 (8.4)	5 (1.7)	455 (25.5)	10.6 (0.13)
Australia r	54 (3.4)	547 (5.4)	37 (3.2)	518 (4.6)	10 (2.0)	509 (10.6)	10.6 (0.15)
Russian Federation	53 (2.6)	548 (3.8)	44 (2.4)	538 (5.3)	3 (0.8)	533 (8.0)	10.6 (0.08)
Lithuania	52 (2.5)	538 (3.4)	45 (2.3)	528 (3.2)	4 (0.9)	522 (9.1)	10.5 (0.10)
Jordan	49 (3.9)	466 (4.7)	45 (4.2)	440 (8.2)	6 (1.7)	429 (18.9)	10.4 (0.16)
New Zealand	49 (3.6)	516 (6.0)	44 (3.3)	487 (4.9)	7 (1.8)	481 (13.9)	10.4 (0.17)
Bahrain	49 (3.1)	498 (4.0)	48 (3.3)	478 (3.9)	3 (1.5)	439 (19.8)	10.5 (0.10)
Lebanon	47 (3.4)	401 (6.5)	48 (3.4)	356 (6.2)	5 (1.3)	347 (15.7)	10.4 (0.14)
Turkey	47 (3.7)	534 (6.1)	45 (3.7)	504 (6.2)	8 (2.2)	471 (13.5)	10.3 (0.16)
Portugal	46 (3.0)	527 (3.5)	47 (2.9)	515 (3.8)	7 (1.6)	500 (8.6)	10.2 (0.12)
England s	45 (4.8)	532 (9.4)	49 (4.8)	518 (11.3)	7 (2.7)	512 (16.9)	10.5 (0.23)
Cyprus s	44 (2.0)	496 (3.4)	44 (2.5)	484 (3.3)	12 (1.6)	465 (6.9)	10.0 (0.09)
Chinese Taipei	43 (3.4)	583 (3.7)	50 (3.5)	566 (2.9)	6 (1.8)	581 (9.1)	10.2 (0.14)
Hungary	43 (2.6)	541 (3.7)	52 (2.4)	523 (3.5)	5 (1.1)	473 (11.3)	10.2 (0.10)
Morocco	42 (2.5)	400 (5.1)	45 (2.4)	390 (4.2)	13 (1.9)	398 (4.7)	9.9 (0.11)
United States	34 (2.3)	545 (6.4)	49 (2.6)	528 (7.8)	16 (2.1)	471 (10.4)	9.6 (0.12)
Korea, Rep. of	33 (3.6)	565 (3.7)	62 (3.9)	560 (2.5)	6 (1.9)	543 (10.8)	9.7 (0.16)
Malaysia	32 (3.0)	483 (7.2)	63 (3.0)	449 (5.1)	4 (1.6)	446 (27.3)	9.8 (0.12)
Sweden	29 (2.7)	545 (5.8)	64 (3.2)	513 (3.6)	7 (2.1)	500 (22.4)	9.6 (0.12)
France r	26 (2.8)	508 (4.1)	64 (2.8)	486 (3.2)	10 (1.7)	448 (7.2)	9.4 (0.13)
Chile	26 (3.3)	486 (5.8)	59 (4.1)	463 (4.2)	16 (2.9)	431 (7.2)	9.2 (0.14)
South Africa (9)	24 (2.8)	390 (10.7)	51 (2.9)	371 (5.1)	25 (2.1)	350 (4.7)	8.9 (0.12)
Italy	20 (3.4)	505 (4.6)	76 (3.4)	502 (3.2)	4 (1.2)	464 (10.2)	9.3 (0.12)
Finland	20 (2.0)	555 (4.9)	67 (2.2)	542 (2.9)	13 (1.7)	526 (7.2)	9.2 (0.09)
Japan	13 (2.7)	566 (3.9)	77 (3.4)	572 (2.7)	11 (2.3)	558 (4.8)	8.9 (0.11)
International Average	**49 (0.5)**	**501 (0.9)**	**45 (0.5)**	**483 (1.0)**	**6 (0.3)**	**466 (2.5)**	
Benchmarking Participants							
Dubai, UAE	79 (2.0)	556 (3.4)	20 (2.1)	530 (6.8)	1 (0.4)	~ ~	12.1 (0.09)
Abu Dhabi, UAE	61 (2.7)	452 (5.9)	33 (2.5)	375 (8.9)	6 (0.8)	302 (15.8)	11.2 (0.11)
Ontario, Canada s	50 (5.6)	537 (6.6)	42 (5.8)	507 (6.5)	9 (2.8)	505 (8.3)	10.6 (0.27)
Moscow City, Russian Fed.	45 (2.2)	571 (3.3)	51 (2.1)	564 (3.1)	4 (1.0)	546 (8.1)	10.3 (0.09)
Gauteng, RSA (9)	23 (3.6)	467 (12.5)	51 (4.7)	421 (6.5)	26 (3.7)	385 (6.3)	8.8 (0.16)
Western Cape, RSA (9)	20 (3.0)	558 (13.9)	47 (4.6)	431 (8.2)	33 (3.9)	382 (6.2)	8.4 (0.16)
Quebec, Canada y	- -	- -	- -	- -	- -	- -	- -

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Student Bullying

Since 2011, TIMSS has asked students about how often they experienced various bullying behaviors by their school peers, such as being teased, excluded from activities, or physically hurt. The TIMSS 2019 fourth grade *Student Bullying* scale is described in Exhibit 8.11 (see About the Scale). Students were assigned to one of three categories of the scale ("never or almost never," "about monthly," "about weekly") according to their reports of how often they experienced 11 bullying behaviors.

Exhibits 8.12 and 8.13 present the scale results in relation to mathematics achievement and science achievement, respectively. Internationally, the majority of fourth grade students (63%, on average) reported to be "never or almost never" bullied by school peers, 29 percent reported being bullied "about monthly," and only 8 percent were bullied "about weekly." Reports from fourth grade students' about being bullied were related to their average achievement in mathematics and science. Across countries, there was a negative association between fourth grade students' reports about the frequency of being bullied and average achievement, with students bullied "about weekly" having substantially lower average mathematics achievement (451) and lower average science achievement (437) than students bullied "about monthly" (495 and 486 in mathematics and science, respectively). Students in the "never or almost never" category had the highest achievement on average—512 in mathematics and 503 in science.

The eighth grade *Student Bullying* scale used in previous TIMSS assessments was revised in TIMSS 2019 to better reflect current trends related to social media and cyberbullying. As described in Exhibit 8.14, the scale in 2019 included 14 items with an emphasis on bullying experienced through digital devices (see About the Scale). Students were assigned to one of three scale categories ("never or almost never," "about monthly," "about weekly") according to their reports of how often they experienced these 14 behaviors.

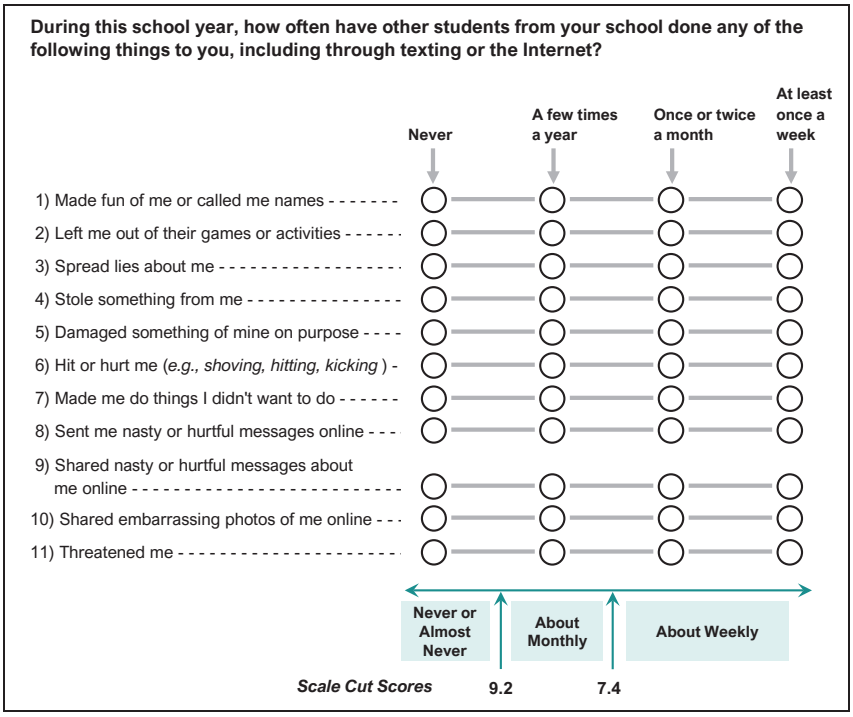
Exhibits 8.15 and 8.16 provide the results for the TIMSS 2019 eighth grade *Student Bullying* scale in relation to mathematics achievement and science achievement, respectively. On average, more than two-thirds of eighth grade students (71%) reported being bullied "never or almost never," and these students had the highest average achievement—496 in mathematics and 499 in science. With each reported increase in the frequency they experienced bullying, eighth grade students had progressively lower average achievement to the extent that there was a 68-point difference in mathematics achievement and a 78-point difference in science achievement between students in the "never or almost never" category and students in the "about weekly" category. Students bullied "about monthly" also had much higher achievement than students bullied "about weekly" (482 vs. 428 in mathematics and 482 vs. 421 in science).

Exhibit 8.11: Student Bullying

Students' Reports

About the Scale

Students were scored according to their reports regarding eleven bullying behaviors on the *Student Bullying* scale. Cut scores divide the scale into three categories. Students bullied **Never or Almost Never** had a score at or above the cut score corresponding to reporting that they "never" experienced six of the eleven bullying behaviors and experienced the other five "a few times a year," on average. Students bullied **About Weekly** had a score at or below the cut score corresponding to reporting that they experienced six of the eleven behaviors "once or twice a month" and the other five "a few times a year," on average. All other students were bullied **About Monthly**.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 8.12: Student Bullying

Students' Reports

Country	Never or Almost Never		About Monthly		About Weekly		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	85 (0.9)	500 (3.2)	12 (0.8)	480 (5.7)	3 (0.4)	404 (15.7)	11.3 (0.05)
Armenia	84 (0.9)	506 (2.5)	11 (0.7)	494 (4.5)	5 (0.5)	463 (7.1)	11.3 (0.05)
Serbia	83 (1.2)	513 (3.3)	15 (0.9)	497 (5.6)	3 (0.4)	443 (12.6)	11.1 (0.06)
Kosovo	82 (1.0)	453 (2.8)	13 (0.8)	435 (4.8)	5 (0.5)	368 (9.2)	11.1 (0.06)
Montenegro	81 (0.7)	461 (1.8)	15 (0.6)	438 (4.0)	4 (0.3)	391 (7.4)	11.1 (0.04)
Japan	81 (0.9)	595 (1.8)	18 (0.9)	585 (3.3)	1 (0.2)	~ ~	10.9 (0.05)
Georgia	80 (1.1)	486 (3.8)	16 (0.9)	470 (6.4)	4 (0.4)	418 (11.0)	10.9 (0.06)
Finland	79 (1.0)	538 (2.2)	19 (0.9)	519 (4.0)	2 (0.2)	~ ~	10.7 (0.04)
Azerbaijan	78 (1.1)	528 (2.3)	18 (0.9)	511 (4.6)	4 (0.4)	465 (9.6)	10.9 (0.06)
Bosnia and Herzegovina	78 (0.8)	458 (2.3)	17 (0.7)	446 (3.7)	5 (0.4)	402 (5.2)	10.8 (0.05)
Korea, Rep. of	77 (1.1)	601 (2.3)	21 (1.0)	596 (3.9)	2 (0.3)	~ ~	10.6 (0.05)
Ireland	76 (0.9)	555 (2.6)	21 (0.7)	536 (3.8)	3 (0.4)	497 (8.5)	10.5 (0.05)
France	74 (1.0)	494 (3.2)	22 (0.9)	463 (4.0)	3 (0.4)	430 (10.1)	10.5 (0.05)
Norway (5)	73 (1.2)	548 (2.3)	24 (1.1)	536 (3.1)	3 (0.4)	503 (15.9)	10.3 (0.05)
Croatia	73 (1.3)	513 (2.3)	22 (1.2)	506 (3.8)	5 (0.4)	476 (8.2)	10.4 (0.05)
Poland	73 (0.9)	527 (2.8)	22 (0.8)	513 (3.4)	5 (0.4)	470 (8.4)	10.4 (0.04)
Lithuania	72 (1.3)	548 (3.0)	25 (1.2)	534 (4.2)	3 (0.3)	475 (11.9)	10.3 (0.06)
Kazakhstan	69 (1.3)	517 (2.7)	25 (1.1)	507 (3.7)	6 (0.4)	486 (5.1)	10.5 (0.07)
Northern Ireland	68 (1.4)	574 (3.2)	28 (1.3)	556 (3.7)	4 (0.4)	501 (9.4)	10.1 (0.06)
North Macedonia	68 (2.3)	489 (4.7)	23 (2.0)	464 (7.8)	9 (0.8)	403 (10.4)	10.3 (0.09)
Chinese Taipei	67 (1.2)	604 (1.8)	28 (1.0)	593 (3.3)	5 (0.4)	576 (7.5)	10.3 (0.05)
Austria	67 (1.3)	547 (2.3)	28 (1.1)	530 (2.9)	5 (0.5)	499 (5.0)	10.2 (0.06)
Sweden	66 (1.5)	530 (2.8)	30 (1.5)	511 (3.4)	4 (0.4)	474 (9.4)	10.0 (0.06)
Czech Republic	66 (1.1)	542 (2.5)	28 (0.9)	526 (3.6)	6 (0.6)	470 (7.0)	10.2 (0.06)
Netherlands	66 (1.3)	541 (2.2)	30 (1.1)	535 (2.9)	4 (0.5)	512 (8.7)	10.0 (0.05)
Slovak Republic	66 (1.3)	519 (3.2)	29 (1.1)	500 (5.5)	6 (0.5)	461 (10.8)	10.2 (0.06)
United States	64 (0.8)	548 (2.7)	29 (0.8)	527 (3.1)	7 (0.4)	477 (5.7)	10.0 (0.03)
Hungary	63 (1.2)	530 (2.8)	32 (1.2)	516 (3.6)	4 (0.5)	492 (7.7)	9.9 (0.04)
Cyprus	63 (1.2)	541 (2.8)	30 (1.0)	523 (3.7)	7 (0.5)	493 (6.2)	10.0 (0.05)
Germany	62 (1.1)	535 (2.4)	32 (1.0)	512 (3.4)	6 (0.6)	466 (6.9)	9.8 (0.04)
Hong Kong SAR	62 (1.2)	608 (3.1)	32 (1.0)	595 (4.7)	6 (0.5)	576 (7.8)	9.9 (0.05)
Spain	61 (1.1)	512 (2.2)	31 (0.9)	495 (3.3)	7 (0.6)	460 (5.2)	9.9 (0.05)
Iran, Islamic Rep. of	61 (1.3)	450 (4.8)	32 (1.2)	443 (4.4)	7 (0.4)	405 (7.3)	10.0 (0.06)
Portugal	61 (0.9)	532 (2.8)	32 (0.9)	523 (3.0)	7 (0.5)	480 (6.2)	9.8 (0.04)
Denmark	61 (1.4)	532 (2.3)	35 (1.3)	519 (2.5)	4 (0.4)	481 (7.7)	9.7 (0.05)
England	60 (1.3)	566 (4.4)	34 (1.1)	546 (4.1)	6 (0.6)	513 (8.5)	9.8 (0.05)
Bulgaria	60 (1.9)	528 (3.5)	31 (1.3)	511 (4.3)	9 (1.0)	463 (10.4)	9.8 (0.08)
Chile	60 (1.2)	454 (2.3)	29 (0.9)	437 (3.6)	11 (0.7)	392 (5.9)	9.8 (0.05)
Turkey (5)	60 (1.3)	540 (4.3)	32 (1.1)	511 (5.8)	9 (0.6)	451 (9.0)	9.9 (0.06)
Singapore	59 (0.9)	638 (3.6)	34 (0.7)	616 (4.0)	7 (0.4)	569 (9.1)	9.7 (0.03)
Italy	58 (1.3)	522 (2.6)	36 (1.1)	510 (2.9)	7 (0.6)	482 (6.9)	9.7 (0.05)
Malta	57 (0.8)	519 (1.7)	35 (0.8)	504 (2.6)	8 (0.5)	469 (5.2)	9.7 (0.03)
Russian Federation	56 (1.2)	575 (3.2)	37 (1.0)	563 (4.0)	8 (0.5)	538 (6.3)	9.6 (0.05)
Canada	55 (0.7)	520 (2.2)	38 (0.7)	505 (2.2)	8 (0.3)	477 (4.4)	9.6 (0.03)
Australia	54 (1.3)	525 (3.1)	39 (1.0)	513 (3.4)	7 (0.6)	470 (6.2)	9.5 (0.04)
Belgium (Flemish)	53 (1.4)	538 (2.1)	41 (1.2)	529 (2.5)	5 (0.4)	506 (6.5)	9.5 (0.04)
Morocco	53 (1.6)	397 (4.4)	37 (1.3)	379 (5.6)	10 (0.8)	342 (8.0)	9.6 (0.07)
Latvia	52 (1.1)	556 (2.7)	38 (0.9)	541 (2.8)	10 (0.8)	514 (6.0)	9.4 (0.05)
United Arab Emirates	51 (0.8)	501 (1.9)	34 (0.6)	476 (2.1)	15 (0.4)	434 (3.2)	9.5 (0.04)
Saudi Arabia	50 (1.2)	421 (4.3)	33 (1.0)	399 (3.8)	17 (0.7)	349 (5.8)	9.6 (0.06)
New Zealand	48 (1.1)	503 (2.8)	40 (0.9)	486 (3.1)	12 (0.5)	438 (4.4)	9.3 (0.04)
Oman	47 (1.4)	451 (4.9)	38 (1.2)	429 (3.9)	15 (0.8)	385 (5.4)	9.3 (0.06)
Bahrain	46 (1.1)	491 (3.0)	37 (0.9)	481 (3.4)	17 (0.7)	452 (4.4)	9.3 (0.05)
Kuwait	45 (1.3)	406 (6.0)	34 (0.9)	392 (5.2)	21 (1.1)	344 (7.5)	9.2 (0.07)
Pakistan	45 (3.4)	344 (13.0)	36 (2.8)	326 (13.2)	19 (2.1)	301 (13.0)	9.3 (0.15)
Qatar	42 (1.3)	473 (4.1)	37 (1.3)	456 (4.0)	21 (1.2)	397 (3.8)	9.0 (0.06)
South Africa (5)	26 (1.1)	423 (5.5)	45 (1.1)	376 (3.3)	29 (1.4)	333 (4.0)	8.4 (0.05)
Philippines	11 (1.0)	351 (10.3)	44 (1.3)	314 (6.6)	45 (1.8)	269 (6.4)	7.7 (0.06)
International Average	**63 (0.2)**	**512 (0.5)**	**29 (0.1)**	**495 (0.6)**	**8 (0.1)**	**451 (1.1)**	
Benchmarking Participants							
Madrid, Spain	65 (1.3)	523 (2.2)	30 (1.1)	514 (2.7)	5 (0.5)	483 (5.4)	10.1 (0.06)
Dubai, UAE	58 (1.2)	552 (1.8)	32 (0.9)	538 (3.0)	10 (0.5)	514 (4.6)	9.8 (0.05)
Ontario, Canada	55 (1.3)	523 (3.9)	38 (1.2)	506 (3.5)	7 (0.5)	475 (7.8)	9.6 (0.04)
Quebec, Canada	54 (1.3)	539 (3.0)	39 (1.0)	526 (3.0)	7 (0.7)	499 (6.2)	9.5 (0.05)
Moscow City, Russian Fed.	54 (1.2)	602 (2.3)	37 (0.9)	587 (2.8)	9 (0.6)	563 (5.0)	9.5 (0.04)
Abu Dhabi, UAE	44 (1.0)	462 (2.7)	37 (0.8)	439 (3.0)	19 (0.7)	399 (4.0)	9.1 (0.05)

This TIMSS context questionnaire scale was established in 2019 based on the combined response distribution of all countries that participated in TIMSS 2019. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 8.13: Student Bullying

Students' Reports

Country	Never or Almost Never		About Monthly		About Weekly		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	85 (0.9)	495 (3.4)	12 (0.8)	481 (6.5)	3 (0.4)	398 (15.7)	11.3 (0.05)
Armenia	84 (0.9)	476 (3.3)	11 (0.7)	459 (5.5)	5 (0.5)	420 (7.5)	11.3 (0.05)
Serbia	83 (1.2)	522 (3.5)	15 (0.9)	505 (5.7)	3 (0.4)	451 (13.1)	11.1 (0.06)
Kosovo	82 (1.0)	424 (3.4)	13 (0.8)	396 (6.4)	5 (0.5)	326 (9.9)	11.1 (0.06)
Montenegro	81 (0.7)	460 (2.4)	15 (0.6)	444 (5.1)	4 (0.3)	390 (8.6)	11.1 (0.04)
Japan	81 (0.9)	564 (1.7)	18 (0.9)	553 (3.4)	1 (0.2)	~ ~	10.9 (0.05)
Georgia	80 (1.1)	459 (4.0)	16 (0.9)	444 (6.7)	4 (0.4)	376 (10.5)	10.9 (0.06)
Finland	79 (1.0)	560 (2.4)	19 (0.9)	542 (4.3)	2 (0.2)	~ ~	10.7 (0.04)
Azerbaijan	78 (1.1)	441 (2.7)	18 (0.9)	424 (5.2)	4 (0.4)	364 (13.4)	10.9 (0.06)
Bosnia and Herzegovina	78 (0.8)	465 (2.7)	17 (0.7)	455 (5.1)	5 (0.4)	410 (8.5)	10.8 (0.05)
Korea, Rep. of	77 (1.1)	589 (2.3)	21 (1.0)	585 (3.5)	2 (0.3)	~ ~	10.6 (0.05)
Ireland	76 (0.9)	534 (3.3)	21 (0.7)	517 (4.0)	3 (0.4)	471 (9.7)	10.5 (0.05)
France	74 (1.0)	496 (3.1)	22 (0.9)	470 (4.2)	3 (0.4)	435 (9.3)	10.5 (0.05)
Norway (5)	73 (1.2)	544 (2.4)	24 (1.1)	534 (3.0)	3 (0.4)	498 (12.8)	10.3 (0.05)
Croatia	73 (1.3)	527 (2.5)	22 (1.2)	521 (4.1)	5 (0.4)	500 (7.5)	10.4 (0.05)
Poland	73 (0.9)	538 (2.7)	22 (0.8)	523 (3.2)	5 (0.4)	481 (8.2)	10.4 (0.04)
Lithuania	72 (1.3)	544 (2.8)	25 (1.2)	529 (4.1)	3 (0.3)	469 (11.7)	10.3 (0.06)
Kazakhstan	69 (1.3)	500 (3.4)	25 (1.1)	490 (4.3)	6 (0.4)	468 (6.6)	10.5 (0.07)
Northern Ireland	68 (1.4)	526 (2.4)	28 (1.3)	511 (3.7)	4 (0.4)	458 (8.2)	10.1 (0.06)
North Macedonia	68 (2.3)	445 (5.5)	23 (2.0)	412 (10.0)	9 (0.8)	355 (11.2)	10.3 (0.09)
Chinese Taipei	67 (1.2)	564 (1.9)	28 (1.0)	550 (2.9)	5 (0.4)	526 (7.2)	10.3 (0.05)
Austria	67 (1.3)	532 (2.8)	28 (1.1)	509 (4.3)	5 (0.5)	473 (7.2)	10.2 (0.06)
Sweden	66 (1.5)	545 (3.3)	30 (1.5)	529 (4.1)	4 (0.4)	485 (10.3)	10.0 (0.06)
Czech Republic	66 (1.1)	541 (2.6)	28 (0.9)	528 (3.3)	6 (0.6)	478 (6.2)	10.2 (0.06)
Netherlands	66 (1.3)	523 (2.8)	30 (1.1)	515 (4.0)	4 (0.5)	479 (10.4)	10.0 (0.05)
Slovak Republic	66 (1.3)	531 (3.0)	29 (1.1)	508 (6.3)	6 (0.5)	467 (12.3)	10.2 (0.06)
United States	64 (0.8)	551 (2.8)	29 (0.8)	531 (3.3)	7 (0.4)	481 (5.6)	10.0 (0.03)
Hungary	63 (1.2)	536 (2.9)	32 (1.2)	521 (3.5)	4 (0.5)	500 (9.0)	9.9 (0.04)
Cyprus	63 (1.2)	520 (3.1)	30 (1.0)	505 (3.5)	7 (0.5)	473 (7.0)	10.0 (0.05)
Germany	62 (1.1)	533 (2.2)	32 (1.0)	511 (3.5)	6 (0.6)	459 (8.5)	9.8 (0.04)
Hong Kong SAR	62 (1.2)	536 (3.3)	32 (1.0)	526 (4.2)	6 (0.5)	508 (9.2)	9.9 (0.05)
Spain	61 (1.1)	521 (1.9)	31 (0.9)	506 (3.0)	7 (0.6)	465 (5.5)	9.9 (0.05)
Iran, Islamic Rep. of	61 (1.3)	446 (5.1)	32 (1.2)	444 (4.6)	7 (0.4)	402 (8.1)	10.0 (0.06)
Portugal	61 (0.9)	510 (2.8)	32 (0.9)	502 (3.2)	7 (0.5)	459 (5.5)	9.8 (0.04)
Denmark	61 (1.4)	528 (2.6)	35 (1.3)	517 (3.4)	4 (0.4)	490 (6.9)	9.7 (0.05)
England	60 (1.3)	545 (3.9)	34 (1.1)	531 (3.5)	6 (0.6)	505 (7.3)	9.8 (0.05)
Bulgaria	60 (1.9)	535 (4.3)	31 (1.3)	520 (5.5)	9 (1.0)	457 (11.6)	9.8 (0.08)
Chile	60 (1.2)	482 (2.3)	29 (0.9)	466 (3.5)	11 (0.7)	419 (4.6)	9.8 (0.05)
Turkey (5)	60 (1.3)	541 (3.9)	32 (1.1)	520 (6.0)	9 (0.6)	461 (10.1)	9.9 (0.06)
Singapore	59 (0.9)	606 (3.2)	34 (0.7)	586 (3.6)	7 (0.4)	542 (9.1)	9.7 (0.03)
Italy	58 (1.3)	517 (3.1)	36 (1.1)	507 (3.3)	7 (0.6)	473 (6.8)	9.7 (0.05)
Malta	57 (0.8)	505 (1.6)	35 (0.8)	492 (2.7)	8 (0.5)	450 (6.2)	9.7 (0.03)
Russian Federation	56 (1.2)	574 (3.0)	37 (1.0)	563 (3.2)	8 (0.5)	542 (6.8)	9.6 (0.05)
Canada	55 (0.7)	533 (2.2)	38 (0.7)	517 (2.2)	8 (0.3)	491 (4.3)	9.6 (0.03)
Australia	54 (1.3)	541 (2.9)	39 (1.0)	530 (2.9)	7 (0.6)	490 (6.1)	9.5 (0.04)
Belgium (Flemish)	53 (1.4)	508 (2.2)	41 (1.2)	496 (2.8)	5 (0.4)	474 (6.3)	9.5 (0.04)
Morocco	53 (1.6)	389 (5.7)	37 (1.3)	369 (7.8)	10 (0.8)	327 (10.9)	9.6 (0.07)
Latvia	52 (1.1)	553 (2.5)	38 (0.9)	536 (2.4)	10 (0.8)	508 (6.2)	9.4 (0.05)
United Arab Emirates	51 (0.8)	497 (2.2)	34 (0.6)	467 (2.4)	15 (0.4)	413 (3.7)	9.5 (0.04)
Saudi Arabia	50 (1.2)	432 (4.6)	33 (1.0)	404 (4.6)	17 (0.7)	335 (7.3)	9.6 (0.06)
New Zealand	48 (1.1)	519 (2.4)	40 (0.9)	500 (2.9)	12 (0.5)	456 (4.5)	9.3 (0.04)
Oman	47 (1.4)	458 (4.8)	38 (1.2)	437 (4.5)	15 (0.8)	380 (6.1)	9.3 (0.06)
Bahrain	46 (1.1)	515 (3.3)	37 (0.9)	493 (3.8)	17 (0.7)	440 (5.5)	9.3 (0.05)
Kuwait	45 (1.3)	421 (7.5)	34 (0.9)	398 (7.1)	21 (1.1)	347 (8.0)	9.2 (0.07)
Pakistan	45 (3.4)	313 (13.5)	36 (2.8)	282 (16.0)	19 (2.1)	260 (17.0)	9.3 (0.15)
Qatar	42 (1.3)	479 (4.2)	37 (1.3)	458 (4.2)	21 (1.2)	383 (5.2)	9.0 (0.06)
South Africa (5)	26 (1.1)	392 (7.9)	45 (1.1)	328 (4.8)	29 (1.4)	268 (5.3)	8.4 (0.05)
Philippines	11 (1.0)	318 (13.0)	44 (1.3)	270 (8.1)	45 (1.8)	214 (7.0)	7.7 (0.06)
International Average	**63 (0.2)**	**503 (0.5)**	**29 (0.1)**	**486 (0.7)**	**8 (0.1)**	**437 (1.2)**	
Benchmarking Participants							
Madrid, Spain	65 (1.3)	528 (2.1)	30 (1.1)	518 (2.8)	5 (0.5)	485 (5.9)	10.1 (0.06)
Dubai, UAE	58 (1.2)	553 (1.9)	32 (0.9)	540 (3.1)	10 (0.5)	507 (4.8)	9.8 (0.05)
Ontario, Canada	55 (1.3)	535 (3.5)	38 (1.2)	518 (3.8)	7 (0.5)	490 (7.0)	9.6 (0.04)
Quebec, Canada	54 (1.3)	530 (3.1)	39 (1.0)	515 (2.8)	7 (0.7)	494 (4.9)	9.5 (0.05)
Moscow City, Russian Fed.	54 (1.2)	604 (2.5)	37 (0.9)	590 (2.5)	9 (0.6)	563 (4.9)	9.5 (0.04)
Abu Dhabi, UAE	44 (1.0)	446 (3.4)	37 (0.8)	417 (3.8)	19 (0.7)	365 (5.3)	9.1 (0.05)

This TIMSS context questionnaire scale was established in 2019 based on the combined response distribution of all countries that participated in TIMSS 2019. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

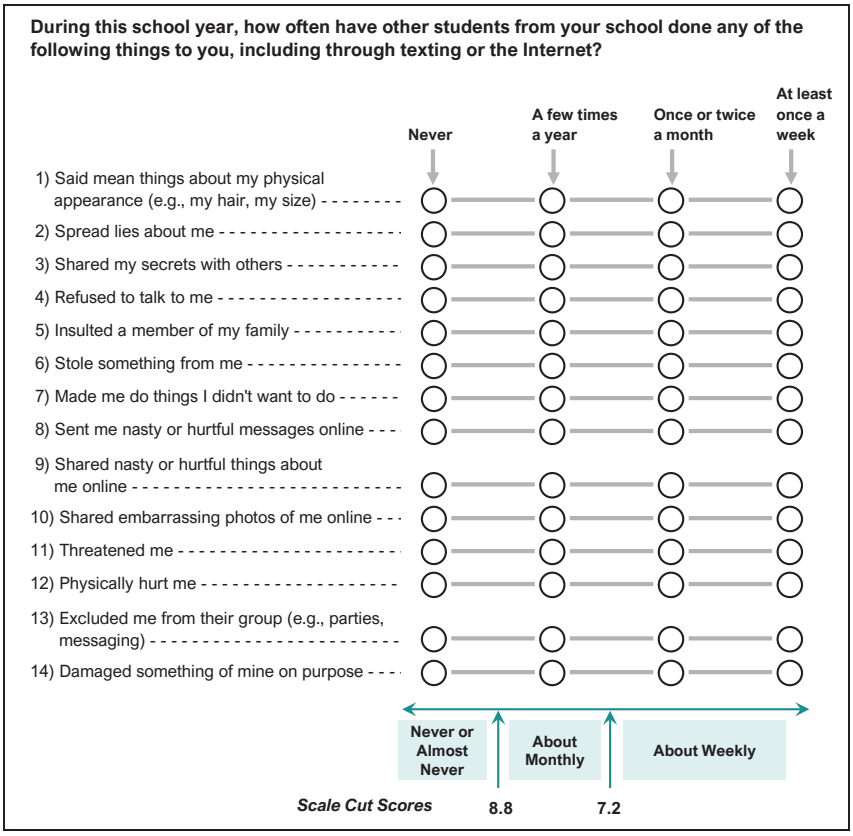
SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 8.14: Student Bullying

Students' Reports

About the Scale

Students were scored according to their reports regarding fourteen bullying behaviors on the *Student Bullying* scale. Cut scores divide the scale into three categories. Students bullied **Never or Almost Never** had a score at or above the cut score corresponding to reporting that they "never" experienced seven of the fourteen bullying behaviors and experienced the other seven "a few times a year," on average. Students bullied **About Weekly** had a score at or below the cut score corresponding to reporting that they experienced seven of the fourteen behaviors "once or twice a month" and the other seven "a few times a year," on average. All other students were bullied **About Monthly**.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 8.15: Student Bullying

Students' Reports

Country	Never or Almost Never		About Monthly		About Weekly		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Japan	93 (0.4)	595 (2.8)	6 (0.4)	591 (5.9)	0 (0.1)	~ ~	11.3 (0.04)
Georgia	89 (0.9)	464 (4.3)	9 (0.8)	453 (8.6)	2 (0.3)	~ ~	11.2 (0.06)
Chinese Taipei	88 (0.5)	614 (2.8)	11 (0.5)	608 (4.9)	1 (0.1)	~ ~	11.0 (0.04)
Korea, Rep. of	87 (0.7)	606 (2.9)	12 (0.6)	611 (5.5)	1 (0.1)	~ ~	11.0 (0.05)
Finland	86 (0.6)	512 (2.5)	12 (0.6)	498 (4.4)	2 (0.2)	~ ~	10.8 (0.04)
Kazakhstan	85 (0.8)	488 (3.3)	14 (0.7)	487 (5.5)	1 (0.2)	~ ~	10.4 (0.05)
Portugal	83 (0.9)	502 (3.3)	16 (0.8)	493 (5.3)	2 (0.3)	~ ~	10.5 (0.05)
Lithuania	81 (0.8)	523 (2.9)	17 (0.8)	516 (4.6)	2 (0.2)	~ ~	10.3 (0.04)
Russian Federation	80 (0.7)	545 (4.6)	17 (0.7)	542 (5.6)	3 (0.3)	519 (11.8)	10.3 (0.04)
Hungary	79 (1.0)	523 (3.0)	18 (0.9)	498 (4.6)	3 (0.4)	438 (12.4)	10.2 (0.04)
Norway (9)	79 (0.9)	507 (2.6)	19 (0.8)	498 (4.3)	2 (0.3)	~ ~	10.3 (0.04)
Sweden	78 (0.8)	508 (2.6)	18 (0.7)	493 (3.9)	3 (0.3)	456 (10.2)	10.3 (0.04)
Italy	78 (1.1)	501 (2.8)	20 (1.0)	491 (3.7)	2 (0.2)	~ ~	10.0 (0.05)
Cyprus	76 (0.9)	505 (1.9)	20 (0.8)	493 (3.4)	4 (0.3)	463 (10.3)	10.1 (0.04)
France	75 (0.8)	486 (2.6)	23 (0.7)	475 (3.3)	2 (0.3)	~ ~	10.1 (0.04)
Iran, Islamic Rep. of	74 (1.0)	456 (3.8)	21 (0.9)	426 (5.1)	5 (0.4)	386 (10.9)	10.2 (0.05)
Ireland	74 (1.0)	530 (2.6)	22 (0.9)	513 (3.4)	4 (0.3)	493 (7.6)	10.0 (0.05)
Chile	73 (0.9)	446 (3.0)	23 (0.8)	434 (3.8)	4 (0.4)	393 (8.6)	9.9 (0.04)
Jordan	72 (1.0)	433 (3.6)	18 (0.6)	409 (5.8)	9 (0.7)	362 (6.7)	10.2 (0.06)
Saudi Arabia	72 (1.1)	403 (2.5)	20 (0.8)	386 (3.7)	8 (0.6)	347 (5.3)	10.2 (0.05)
Turkey	72 (1.1)	503 (4.3)	24 (1.0)	485 (6.6)	4 (0.4)	445 (8.7)	9.9 (0.05)
Hong Kong SAR	69 (1.3)	580 (3.9)	24 (1.0)	586 (5.3)	7 (0.6)	539 (12.4)	9.9 (0.05)
United States	69 (0.7)	526 (4.9)	25 (0.6)	509 (4.3)	7 (0.4)	467 (7.8)	9.8 (0.03)
England	69 (0.9)	526 (5.3)	26 (0.8)	510 (6.5)	6 (0.5)	459 (9.3)	9.8 (0.05)
Kuwait	68 (0.9)	409 (5.0)	24 (0.7)	403 (6.2)	8 (0.7)	360 (7.6)	9.9 (0.05)
Romania	66 (1.4)	489 (4.1)	27 (1.1)	473 (6.3)	8 (0.7)	434 (7.4)	9.6 (0.07)
Singapore	65 (0.8)	625 (4.0)	30 (0.7)	604 (4.5)	5 (0.4)	570 (9.2)	9.5 (0.03)
New Zealand	64 (0.9)	490 (3.4)	28 (0.8)	479 (4.0)	7 (0.4)	441 (7.0)	9.6 (0.04)
Oman	64 (1.0)	427 (2.8)	27 (0.9)	400 (3.7)	9 (0.5)	350 (6.3)	9.6 (0.05)
Australia	64 (0.8)	529 (4.1)	28 (0.7)	505 (4.2)	8 (0.4)	478 (4.9)	9.5 (0.03)
Qatar	63 (1.5)	454 (5.0)	25 (1.0)	448 (4.4)	12 (0.9)	383 (6.8)	9.6 (0.07)
Lebanon	63 (1.6)	438 (3.3)	27 (1.2)	425 (3.9)	10 (0.9)	403 (4.9)	9.5 (0.07)
United Arab Emirates	63 (0.6)	492 (2.1)	25 (0.5)	470 (2.5)	12 (0.3)	398 (3.4)	9.6 (0.02)
Bahrain	62 (0.9)	489 (2.1)	28 (0.7)	474 (2.7)	10 (0.5)	449 (4.7)	9.6 (0.04)
Egypt	61 (1.3)	434 (5.2)	23 (0.8)	402 (5.7)	16 (1.0)	360 (7.2)	9.7 (0.08)
Morocco	57 (0.9)	395 (2.9)	34 (0.8)	384 (2.7)	9 (0.5)	366 (3.4)	9.3 (0.04)
Malaysia	35 (1.0)	474 (3.7)	49 (0.8)	456 (3.6)	16 (0.6)	445 (4.6)	8.6 (0.04)
South Africa (9)	35 (0.7)	413 (2.1)	47 (0.5)	389 (2.4)	18 (0.5)	353 (3.2)	8.4 (0.02)
Israel	- -	- -	- -	- -	- -	- -	- -
International Average	**71 (0.2)**	**496 (0.6)**	**23 (0.1)**	**482 (0.8)**	**6 (0.1)**	**428 (1.5)**	
Benchmarking Participants							
Quebec, Canada	78 (1.0)	549 (3.7)	20 (0.9)	531 (5.2)	3 (0.4)	501 (9.8)	10.2 (0.06)
Moscow City, Russian Fed.	77 (1.1)	580 (4.2)	20 (1.0)	566 (5.6)	3 (0.4)	525 (9.2)	10.0 (0.04)
Dubai, UAE	71 (1.0)	544 (2.2)	23 (0.7)	528 (3.7)	6 (0.5)	485 (7.7)	9.9 (0.05)
Ontario, Canada	65 (1.4)	536 (4.5)	28 (1.2)	524 (4.9)	7 (0.6)	510 (10.4)	9.6 (0.06)
Abu Dhabi, UAE	53 (1.0)	465 (3.3)	28 (0.7)	438 (4.0)	19 (0.7)	366 (4.3)	9.1 (0.04)
Western Cape, RSA (9)	52 (0.9)	458 (5.3)	36 (0.7)	434 (4.3)	12 (0.7)	395 (4.8)	9.0 (0.04)
Gauteng, RSA (9)	39 (1.0)	443 (3.7)	47 (0.8)	415 (2.8)	14 (0.5)	381 (4.0)	8.6 (0.03)

This TIMSS context questionnaire scale was established in 2019 based on the combined response distribution of all countries that participated in TIMSS 2019. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit 8.16: Student Bullying

Students' Reports

Country	Never or Almost Never		About Monthly		About Weekly		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Japan	93 (0.4)	570 (2.1)	6 (0.4)	566 (5.8)	0 (0.1)	~ ~	11.3 (0.04)
Georgia	89 (0.9)	450 (4.0)	9 (0.8)	437 (7.7)	2 (0.3)	~ ~	11.2 (0.06)
Chinese Taipei	88 (0.5)	576 (2.0)	11 (0.5)	566 (4.5)	1 (0.1)	~ ~	11.0 (0.04)
Korea, Rep. of	87 (0.7)	561 (2.2)	12 (0.6)	561 (4.6)	1 (0.1)	~ ~	11.0 (0.05)
Finland	86 (0.6)	547 (3.0)	12 (0.6)	529 (4.9)	2 (0.2)	~ ~	10.8 (0.04)
Kazakhstan	85 (0.8)	478 (3.0)	14 (0.7)	482 (6.3)	1 (0.2)	~ ~	10.4 (0.05)
Portugal	83 (0.9)	520 (3.0)	16 (0.8)	513 (4.8)	2 (0.3)	~ ~	10.5 (0.05)
Lithuania	81 (0.8)	536 (2.9)	17 (0.8)	530 (5.3)	2 (0.2)	~ ~	10.3 (0.04)
Russian Federation	80 (0.7)	544 (4.5)	17 (0.7)	544 (4.8)	3 (0.3)	516 (11.4)	10.3 (0.04)
Hungary	79 (1.0)	535 (2.7)	18 (0.9)	515 (4.3)	3 (0.4)	471 (10.5)	10.2 (0.04)
Norway (9)	79 (0.9)	499 (3.3)	19 (0.8)	491 (4.0)	2 (0.3)	~ ~	10.3 (0.04)
Sweden	78 (0.8)	528 (3.2)	18 (0.7)	513 (5.2)	3 (0.3)	456 (12.9)	10.3 (0.04)
Italy	78 (1.1)	505 (2.6)	20 (1.0)	491 (4.4)	2 (0.2)	~ ~	10.0 (0.05)
Cyprus	76 (0.9)	489 (2.3)	20 (0.8)	473 (3.6)	4 (0.3)	439 (9.2)	10.1 (0.04)
France	75 (0.8)	493 (2.7)	23 (0.7)	476 (4.3)	2 (0.3)	~ ~	10.1 (0.04)
Iran, Islamic Rep. of	74 (1.0)	460 (3.5)	21 (0.9)	427 (5.3)	5 (0.4)	379 (10.7)	10.2 (0.05)
Ireland	74 (1.0)	530 (2.9)	22 (0.9)	509 (4.1)	4 (0.3)	490 (9.3)	10.0 (0.05)
Chile	73 (0.9)	470 (2.8)	23 (0.8)	451 (4.0)	4 (0.4)	407 (7.6)	9.9 (0.04)
Jordan	72 (1.0)	471 (3.8)	18 (0.6)	436 (6.5)	9 (0.7)	364 (7.2)	10.2 (0.06)
Saudi Arabia	72 (1.1)	446 (2.6)	20 (0.8)	418 (3.5)	8 (0.6)	358 (6.2)	10.2 (0.05)
Turkey	72 (1.1)	523 (3.8)	24 (1.0)	503 (5.5)	4 (0.4)	463 (8.6)	9.9 (0.05)
Hong Kong SAR	69 (1.3)	506 (5.0)	24 (1.0)	509 (6.9)	7 (0.6)	464 (13.4)	9.9 (0.05)
United States	69 (0.7)	533 (4.8)	25 (0.6)	518 (4.2)	7 (0.4)	475 (7.5)	9.8 (0.03)
England	69 (0.9)	527 (5.0)	26 (0.8)	512 (6.2)	6 (0.5)	461 (10.6)	9.8 (0.05)
Kuwait	68 (0.9)	456 (5.3)	24 (0.7)	442 (6.7)	8 (0.7)	376 (10.0)	9.9 (0.05)
Romania	66 (1.4)	478 (4.3)	27 (1.1)	467 (5.4)	8 (0.7)	428 (7.1)	9.6 (0.07)
Singapore	65 (0.8)	616 (3.8)	30 (0.7)	598 (4.5)	5 (0.4)	564 (9.5)	9.5 (0.03)
New Zealand	64 (0.9)	509 (3.6)	28 (0.8)	493 (4.3)	7 (0.4)	457 (6.6)	9.6 (0.04)
Oman	64 (1.0)	478 (2.6)	27 (0.9)	444 (4.5)	9 (0.5)	378 (6.5)	9.6 (0.05)
Australia	64 (0.8)	540 (3.4)	28 (0.7)	517 (3.7)	8 (0.4)	487 (5.0)	9.5 (0.03)
Qatar	63 (1.5)	491 (4.9)	25 (1.0)	475 (5.4)	12 (0.9)	391 (8.1)	9.6 (0.07)
Lebanon	63 (1.6)	391 (4.9)	27 (1.2)	372 (6.8)	10 (0.9)	328 (7.3)	9.5 (0.07)
United Arab Emirates	63 (0.6)	501 (2.4)	25 (0.5)	468 (2.9)	12 (0.3)	362 (4.6)	9.6 (0.02)
Bahrain	62 (0.9)	503 (2.1)	28 (0.7)	479 (2.8)	10 (0.5)	406 (5.8)	9.6 (0.04)
Egypt	61 (1.3)	417 (5.1)	23 (0.8)	379 (5.8)	16 (1.0)	318 (7.8)	9.7 (0.08)
Morocco	57 (0.9)	406 (3.1)	34 (0.8)	384 (3.2)	9 (0.5)	364 (3.9)	9.3 (0.04)
Malaysia	35 (1.0)	476 (3.8)	49 (0.8)	457 (3.8)	16 (0.6)	439 (6.3)	8.6 (0.04)
South Africa (9)	35 (0.7)	407 (3.1)	47 (0.5)	369 (3.2)	18 (0.5)	311 (4.1)	8.4 (0.02)
Israel	- -	- -	- -	- -	- -	- -	- -
International Average	**71 (0.2)**	**499 (0.6)**	**23 (0.1)**	**482 (0.8)**	**6 (0.1)**	**421 (1.6)**	
Benchmarking Participants							
Quebec, Canada	78 (1.0)	541 (3.8)	20 (0.9)	524 (4.7)	3 (0.4)	509 (10.4)	10.2 (0.06)
Moscow City, Russian Fed.	77 (1.1)	570 (3.0)	20 (1.0)	558 (4.2)	3 (0.4)	533 (7.6)	10.0 (0.04)
Dubai, UAE	71 (1.0)	558 (2.2)	23 (0.7)	535 (3.4)	6 (0.5)	480 (9.1)	9.9 (0.05)
Ontario, Canada	65 (1.4)	528 (2.9)	28 (1.2)	513 (4.4)	7 (0.6)	507 (10.6)	9.6 (0.06)
Abu Dhabi, UAE	53 (1.0)	463 (4.2)	28 (0.7)	424 (4.9)	19 (0.7)	311 (6.0)	9.1 (0.04)
Western Cape, RSA (9)	52 (0.9)	464 (6.0)	36 (0.7)	429 (5.1)	12 (0.7)	371 (6.4)	9.0 (0.04)
Gauteng, RSA (9)	39 (1.0)	456 (4.5)	47 (0.8)	414 (3.7)	14 (0.5)	361 (5.6)	8.6 (0.03)

This TIMSS context questionnaire scale was established in 2019 based on the combined response distribution of all countries that participated in TIMSS 2019. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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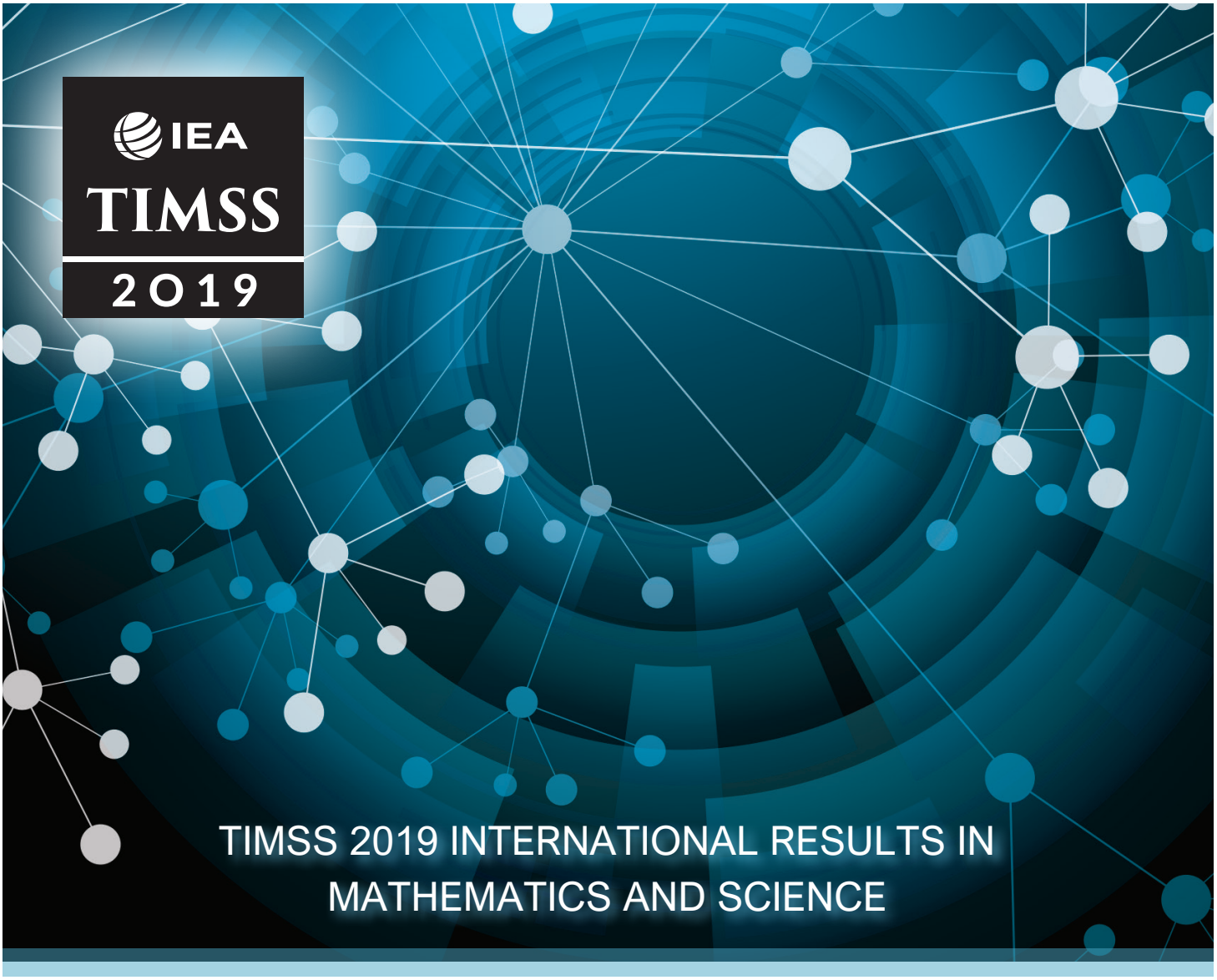

CLASSROOM CONTEXTS

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Teacher Preparation, Professional Development, and Job Satisfaction

Teachers' Formal Education

Exhibits 9.1, 9.2, 9.3, and 9.4 present teachers' reports about their highest level of formal education for fourth grade mathematics and science teachers and eighth grade mathematics and science teachers, respectively. Teachers' highest levels of formal education are reported by four categories: completed postgraduate university degree, completed a bachelor's degree or equivalent, completed post-secondary education but not a bachelor's degree, or completed upper-secondary education.

Internationally, on average, 28 percent of the fourth grade students had mathematics teachers with a postgraduate university degree, 56 percent had teachers with a bachelor's degree, 10 percent had teachers who had completed post-secondary education, and 5 percent had teachers who completed upper-secondary education (Exhibit 9.1). Similarly, on average, 29 percent of fourth grade students had science teachers with a postgraduate university degree, 56 percent had teachers with a bachelor's degree, 10 percent had teachers with some post-secondary education, and 5 percent had teachers who completed upper-secondary education (Exhibit 9.2).

Parallel results are shown for eighth grade students in Exhibit 9.3 (mathematics) and Exhibit 9.4 (science), although in both subjects, more eighth grade students than fourth grade students had teachers with bachelor's degrees and postgraduate university degrees, on average. Internationally, 35 percent of students had mathematics teachers with a postgraduate university degree, and 61 percent had mathematics teachers with a bachelor's degree. Also internationally, 38 percent of students had science teachers with a postgraduate university degree, and 58 percent had science teachers with a bachelor's degree.

In fourth and eighth grades and in both subjects, there was considerable variation across countries in teachers' education levels, reflecting countries' different education paths and requirements for teachers. The *TIMSS 2019 Encyclopedia* provides information about the main teacher preparation routes and current requirements for teachers in each country, based on information provided by National Research Coordinators in the TIMSS 2019 Curriculum Questionnaire.

Exhibit 9.1: Teachers' Formal Education*

Students' Results based on Teachers' Reports

Country	Percent of Students by Teacher Education Level			
	Completed Postgraduate University Degree**	Completed Bachelor's Degree or Equivalent but Not a Postgraduate Degree	Completed Post-Secondary Education but Not a Bachelor's Degree	No Further than Upper-Secondary Education
Albania r	59 (5.0)	19 (3.4)	3 (1.5)	19 (3.9)
Armenia	7 (1.9)	9 (1.9)	44 (3.7)	40 (4.0)
Australia	15 (2.4)	82 (2.5)	3 (1.1)	0 (0.0)
Austria	11 (1.8)	51 (3.4)	38 (3.2)	0 (0.0)
Azerbaijan	5 (1.8)	49 (3.5)	34 (3.6)	12 (2.5)
Bahrain	16 (3.3)	84 (3.4)	0 (0.2)	0 (0.0)
Belgium (Flemish)	3 (1.1)	97 (1.2)	0 (0.4)	0 (0.0)
Bosnia and Herzegovina	4 (1.1)	67 (3.3)	29 (3.4)	0 (0.3)
Bulgaria	73 (3.7)	21 (3.1)	6 (2.3)	0 (0.0)
Canada	19 (2.0)	80 (2.0)	0 (0.4)	0 (0.0)
Chile	12 (3.1)	86 (3.3)	2 (1.0)	0 (0.0)
Chinese Taipei	55 (4.0)	45 (3.9)	1 (0.6)	0 (0.0)
Croatia	50 (3.4)	13 (2.5)	37 (2.7)	0 (0.5)
Cyprus	63 (3.6)	35 (3.5)	2 (0.9)	0 (0.0)
Czech Republic	92 (1.9)	2 (1.1)	1 (0.9)	5 (1.4)
Denmark	8 (2.4)	82 (3.1)	2 (1.5)	7 (2.4)
England s	6 (2.7)	94 (2.7)	0 (0.0)	0 (0.0)
Finland	93 (1.8)	6 (1.6)	1 (0.6)	0 (0.4)
France r	49 (3.8)	37 (3.6)	10 (2.1)	4 (1.6)
Georgia	79 (3.2)	19 (3.1)	1 (0.6)	1 (0.9)
Germany	90 (2.5)	0 (0.0)	10 (2.5)	0 (0.0)
Hong Kong SAR	25 (4.4)	71 (4.6)	4 (1.8)	0 (0.0)
Hungary	9 (2.3)	90 (2.4)	1 (0.5)	0 (0.0)
Iran, Islamic Rep. of	12 (2.1)	75 (3.4)	11 (2.3)	2 (1.0)
Ireland	31 (3.5)	69 (3.5)	0 (0.4)	0 (0.2)
Italy	31 (3.6)	4 (1.6)	5 (1.8)	59 (3.6)
Japan	5 (1.3)	91 (1.6)	4 (1.4)	0 (0.0)
Kazakhstan	3 (1.4)	89 (2.5)	8 (2.1)	0 (0.2)
Korea, Rep. of	25 (3.3)	73 (3.3)	2 (1.2)	0 (0.0)
Kosovo	8 (2.1)	77 (3.5)	10 (2.5)	6 (1.8)
Kuwait	12 (3.2)	82 (3.2)	3 (1.3)	3 (1.4)
Latvia	51 (4.0)	48 (4.1)	0 (0.5)	1 (0.8)
Lithuania	29 (3.7)	67 (4.0)	4 (1.2)	0 (0.0)
Malta	18 (0.3)	70 (0.4)	6 (0.2)	7 (0.2)
Montenegro	3 (1.0)	75 (2.9)	22 (2.7)	0 (0.0)
Morocco r	8 (2.0)	44 (4.1)	6 (1.9)	43 (3.9)
Netherlands r	1 (0.7)	80 (3.6)	17 (3.4)	1 (1.1)
New Zealand	33 (2.9)	59 (3.2)	8 (1.5)	0 (0.0)
North Macedonia	6 (2.9)	76 (3.5)	11 (2.5)	7 (2.2)
Northern Ireland	15 (3.1)	78 (3.8)	2 (1.4)	4 (2.2)
Norway (5) r	35 (4.3)	65 (4.3)	0 (0.0)	0 (0.0)
Oman	6 (1.1)	87 (2.2)	5 (1.6)	2 (1.0)
Pakistan	29 (7.1)	5 (2.2)	30 (6.4)	36 (7.2)
Philippines	30 (3.7)	57 (4.1)	2 (1.1)	12 (2.8)
Poland	96 (1.1)	4 (1.1)	0 (0.0)	0 (0.0)
Portugal	10 (2.2)	84 (2.7)	5 (1.5)	0 (0.0)
Qatar	19 (3.5)	80 (3.5)	0 (0.3)	0 (0.0)
Russian Federation	44 (3.8)	31 (3.6)	18 (2.7)	6 (1.6)
Saudi Arabia	0 (0.2)	1 (0.4)	93 (1.7)	6 (1.7)
Serbia	15 (2.5)	62 (3.8)	23 (3.4)	1 (0.6)
Singapore	13 (1.8)	76 (2.2)	10 (1.5)	0 (0.3)
Slovak Republic	99 (0.7)	0 (0.0)	1 (0.7)	0 (0.0)
South Africa (5)	2 (1.2)	60 (3.8)	33 (3.0)	5 (1.5)
Spain	25 (2.8)	72 (3.2)	2 (1.2)	0 (0.0)
Sweden r	13 (3.6)	77 (4.1)	6 (2.1)	4 (1.4)
Turkey (5)	6 (1.6)	94 (1.6)	0 (0.0)	0 (0.0)
United Arab Emirates r	27 (2.0)	70 (2.1)	3 (0.7)	1 (0.3)
United States	49 (2.3)	51 (2.3)	0 (0.0)	0 (0.0)
International Average	**28 (0.4)**	**56 (0.4)**	**10 (0.3)**	**5 (0.2)**
Benchmarking Participants				
Ontario, Canada r	27 (3.8)	72 (3.8)	1 (0.9)	0 (0.0)
Quebec, Canada	9 (2.6)	91 (2.6)	0 (0.0)	0 (0.0)
Moscow City, Russian Fed.	56 (4.8)	39 (4.8)	3 (1.5)	2 (1.0)
Madrid, Spain	31 (3.7)	66 (3.6)	3 (0.9)	0 (0.0)
Abu Dhabi, UAE	26 (2.1)	70 (2.2)	3 (1.1)	1 (0.7)
Dubai, UAE r	30 (3.9)	68 (3.9)	1 (0.5)	0 (0.3)

* Based on countries' categorizations according to UNESCO's International Standard Classification of Education (Operational Manual for ISCED-2011)
** For example, doctorate, master's, or other postgraduate degree.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 9.2: Teachers' Formal Education*

Students' Results based on Teachers' Reports

Country	Percent of Students by Teacher Education Level			
	Completed Postgraduate University Degree**	Completed Bachelor's Degree or Equivalent but Not a Postgraduate Degree	Completed Post-Secondary Education but Not a Bachelor's Degree	No Further than Upper-Secondary Education
Albania r	61 (4.9)	19 (3.4)	2 (1.1)	18 (3.9)
Armenia	6 (1.6)	11 (2.4)	48 (3.9)	35 (4.0)
Australia	16 (2.0)	80 (2.3)	3 (1.2)	0 (0.0)
Austria	10 (1.8)	51 (3.5)	39 (3.5)	0 (0.0)
Azerbaijan	4 (1.0)	48 (3.6)	37 (3.6)	11 (2.3)
Bahrain	14 (2.2)	86 (2.2)	0 (0.2)	0 (0.0)
Belgium (Flemish)	3 (1.1)	97 (1.1)	0 (0.0)	0 (0.0)
Bosnia and Herzegovina	4 (1.1)	67 (3.3)	29 (3.4)	0 (0.3)
Bulgaria	70 (3.8)	22 (3.2)	7 (2.4)	0 (0.0)
Canada r	16 (2.5)	83 (2.5)	0 (0.4)	0 (0.0)
Chile	7 (2.4)	91 (2.6)	1 (0.9)	0 (0.0)
Chinese Taipei	49 (4.0)	51 (4.0)	0 (0.3)	0 (0.0)
Croatia	50 (3.4)	13 (2.5)	37 (2.7)	0 (0.5)
Cyprus	72 (4.3)	27 (4.1)	1 (0.8)	0 (0.0)
Czech Republic	92 (1.8)	3 (1.3)	0 (0.0)	5 (1.4)
Denmark	12 (2.7)	82 (3.1)	1 (0.6)	6 (2.1)
England s	6 (2.7)	94 (2.7)	0 (0.0)	0 (0.0)
Finland	93 (1.7)	6 (1.7)	1 (0.6)	0 (0.4)
France r	50 (3.9)	37 (3.6)	9 (2.0)	4 (1.5)
Georgia	81 (3.3)	18 (3.2)	1 (0.6)	0 (0.0)
Germany	93 (1.9)	1 (0.6)	6 (1.8)	0 (0.0)
Hong Kong SAR	25 (4.2)	70 (4.4)	5 (1.9)	0 (0.0)
Hungary	6 (1.4)	93 (1.5)	1 (0.6)	0 (0.5)
Iran, Islamic Rep. of	12 (2.1)	75 (3.4)	11 (2.3)	2 (1.0)
Ireland	31 (3.5)	69 (3.5)	0 (0.4)	0 (0.2)
Italy	31 (3.6)	4 (1.6)	5 (1.8)	59 (3.6)
Japan	4 (1.6)	93 (1.4)	2 (1.2)	0 (0.0)
Kazakhstan	3 (1.5)	89 (2.5)	8 (2.0)	0 (0.2)
Korea, Rep. of	26 (3.5)	73 (3.4)	1 (1.1)	0 (0.0)
Kosovo	8 (2.1)	77 (3.5)	10 (2.5)	6 (1.8)
Kuwait	14 (2.8)	77 (3.5)	6 (2.0)	3 (1.5)
Latvia	52 (3.8)	48 (3.8)	0 (0.0)	0 (0.0)
Lithuania	30 (3.8)	66 (4.0)	4 (1.2)	0 (0.0)
Malta	16 (0.3)	74 (0.3)	5 (0.2)	5 (0.1)
Montenegro	3 (1.0)	75 (2.9)	22 (2.7)	0 (0.0)
Morocco r	6 (2.1)	37 (4.3)	4 (1.7)	53 (4.5)
Netherlands r	1 (0.7)	80 (3.6)	17 (3.4)	1 (1.1)
New Zealand	34 (2.9)	58 (3.1)	8 (1.4)	0 (0.0)
North Macedonia	6 (2.9)	76 (3.5)	11 (2.5)	7 (2.2)
Northern Ireland	15 (3.1)	78 (3.8)	2 (1.4)	4 (2.2)
Norway (5) r	30 (4.0)	69 (4.0)	0 (0.3)	0 (0.0)
Oman	12 (2.0)	81 (2.4)	5 (1.8)	1 (0.6)
Pakistan	35 (6.4)	8 (2.5)	28 (6.1)	29 (5.0)
Philippines	33 (4.1)	51 (4.3)	0 (0.0)	16 (3.0)
Poland	99 (0.7)	1 (0.7)	0 (0.0)	0 (0.0)
Portugal	10 (2.2)	84 (2.7)	5 (1.5)	0 (0.0)
Qatar	27 (3.0)	72 (3.1)	1 (1.0)	0 (0.0)
Russian Federation	44 (3.8)	31 (3.6)	18 (2.7)	6 (1.6)
Saudi Arabia	0 (0.0)	8 (2.5)	89 (2.8)	4 (1.4)
Serbia	15 (2.5)	62 (3.8)	23 (3.4)	1 (0.6)
Singapore	17 (1.9)	74 (2.2)	9 (1.4)	1 (0.4)
Slovak Republic	98 (1.1)	1 (0.8)	1 (0.7)	0 (0.2)
South Africa (5)	1 (0.6)	57 (2.9)	37 (3.2)	6 (1.7)
Spain	26 (3.1)	73 (3.3)	2 (0.8)	0 (0.0)
Sweden r	17 (4.3)	70 (4.9)	7 (2.2)	6 (2.2)
Turkey (5)	9 (2.0)	91 (2.0)	0 (0.0)	0 (0.0)
United Arab Emirates	33 (1.6)	65 (1.6)	2 (0.5)	1 (0.4)
United States	52 (2.2)	48 (2.2)	0 (0.0)	0 (0.0)
International Average	**29 (0.4)**	**56 (0.4)**	**10 (0.3)**	**5 (0.2)**
Benchmarking Participants				
Ontario, Canada r	22 (5.0)	77 (5.0)	1 (1.0)	0 (0.0)
Quebec, Canada	8 (2.4)	92 (2.4)	0 (0.0)	0 (0.0)
Moscow City, Russian Fed.	56 (4.8)	38 (4.8)	3 (1.5)	2 (1.0)
Madrid, Spain	31 (2.9)	66 (2.8)	3 (1.4)	0 (0.0)
Abu Dhabi, UAE	35 (2.5)	61 (2.8)	2 (1.0)	2 (1.0)
Dubai, UAE r	40 (2.5)	59 (2.5)	0 (0.2)	0 (0.2)

* Based on countries' categorizations according to UNESCO's International Standard Classification of Education (Operational Manual for ISCED-2011)

** For example, doctorate, master's, or other postgraduate degree.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 9.3: Teachers' Formal Education*

Students' Results based on Teachers' Reports

Country		Percent of Students by Teacher Education Level			
		Completed Postgraduate University Degree**	Completed Bachelor's Degree or Equivalent but Not a Postgraduate Degree	Completed Post-Secondary Education but Not a Bachelor's Degree	No Further than Upper-Secondary Education
Australia		22 (3.3)	77 (3.2)	1 (0.8)	0 (0.0)
Bahrain		18 (1.7)	81 (1.8)	1 (0.6)	1 (0.4)
Chile		10 (2.7)	88 (2.8)	1 (1.0)	0 (0.0)
Chinese Taipei		60 (3.3)	40 (3.3)	0 (0.0)	0 (0.0)
Cyprus	r	62 (4.0)	38 (4.0)	0 (0.0)	0 (0.0)
Egypt		6 (2.3)	76 (4.3)	15 (3.3)	3 (1.4)
England	s	29 (5.2)	71 (5.2)	0 (0.0)	0 (0.0)
Finland		95 (1.1)	3 (0.8)	0 (0.1)	1 (0.7)
France	r	66 (4.1)	33 (4.0)	1 (1.0)	0 (0.0)
Georgia		87 (3.3)	10 (2.9)	0 (0.0)	3 (1.8)
Hong Kong SAR		45 (3.9)	55 (3.9)	0 (0.2)	0 (0.0)
Hungary		29 (3.4)	71 (3.5)	0 (0.4)	0 (0.0)
Iran, Islamic Rep. of		26 (3.1)	68 (3.5)	7 (1.8)	0 (0.0)
Ireland		44 (3.1)	55 (3.0)	0 (0.1)	0 (0.4)
Israel		50 (3.6)	46 (3.6)	3 (1.0)	1 (0.5)
Italy		100 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Japan		12 (2.4)	87 (2.4)	1 (0.4)	0 (0.0)
Jordan		6 (2.0)	76 (3.2)	13 (2.0)	5 (1.8)
Kazakhstan		16 (2.7)	81 (2.9)	2 (1.1)	1 (0.6)
Korea, Rep. of		35 (3.6)	65 (3.6)	0 (0.0)	0 (0.0)
Kuwait		12 (3.2)	88 (3.3)	0 (0.0)	1 (0.5)
Lebanon		37 (4.1)	51 (3.6)	7 (2.2)	4 (1.8)
Lithuania		51 (4.3)	47 (4.2)	1 (0.6)	0 (0.0)
Malaysia		7 (1.8)	89 (2.5)	3 (1.2)	1 (0.9)
Morocco	r	11 (2.8)	43 (4.1)	12 (2.8)	34 (3.7)
New Zealand		53 (3.3)	44 (3.1)	3 (1.1)	0 (0.0)
Norway (9)	r	41 (4.1)	57 (4.1)	2 (1.3)	0 (0.0)
Oman		9 (1.9)	89 (2.2)	1 (0.6)	1 (1.1)
Portugal		18 (2.8)	80 (3.0)	2 (1.4)	0 (0.0)
Qatar		26 (3.6)	73 (3.5)	1 (0.5)	0 (0.0)
Romania		30 (3.6)	59 (3.9)	10 (2.3)	0 (0.0)
Russian Federation		74 (3.7)	24 (3.8)	1 (0.7)	0 (0.0)
Saudi Arabia	r	1 (0.8)	99 (0.8)	0 (0.0)	0 (0.0)
Singapore		18 (2.2)	82 (2.3)	0 (0.4)	0 (0.0)
South Africa (9)		2 (0.8)	77 (2.4)	20 (2.2)	0 (0.3)
Sweden		40 (3.5)	52 (3.4)	4 (1.6)	5 (1.6)
Turkey		7 (1.8)	93 (1.8)	0 (0.0)	0 (0.0)
United Arab Emirates		33 (2.0)	65 (2.0)	1 (0.3)	1 (0.3)
United States		57 (3.2)	43 (3.2)	0 (0.0)	0 (0.0)
International Average		**35 (0.5)**	**61 (0.5)**	**3 (0.2)**	**2 (0.1)**
Benchmarking Participants					
Ontario, Canada		19 (3.6)	81 (3.6)	0 (0.0)	0 (0.0)
Quebec, Canada		12 (2.9)	88 (2.9)	0 (0.0)	0 (0.0)
Moscow City, Russian Fed.		88 (2.6)	11 (2.6)	0 (0.0)	1 (0.5)
Gauteng, RSA (9)		2 (1.3)	75 (3.8)	22 (3.6)	1 (0.8)
Western Cape, RSA (9)		2 (1.0)	80 (3.3)	17 (3.1)	1 (0.8)
Abu Dhabi, UAE	r	33 (2.3)	64 (2.2)	2 (0.9)	1 (0.7)
Dubai, UAE		41 (3.4)	59 (3.5)	0 (0.0)	0 (0.0)

* Based on countries' categorizations according to UNESCO's International Standard Classification of Education (Operational Manual for ISCED-2011)
** For example, doctorate, master's, or other postgraduate degree.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 9.4: Teachers' Formal Education*

Students' Results based on Teachers' Reports

Country		Percent of Students by Teacher Education Level			
		Completed Postgraduate University Degree**	Completed Bachelor's Degree or Equivalent but Not a Postgraduate Degree	Completed Post-Secondary Education but Not a Bachelor's Degree	No Further than Upper-Secondary Education
Australia		24 (2.6)	76 (2.6)	0 (0.2)	0 (0.0)
Bahrain		19 (3.0)	79 (3.1)	1 (0.7)	0 (0.0)
Chile		12 (2.5)	86 (2.7)	1 (1.0)	0 (0.1)
Chinese Taipei		67 (3.3)	33 (3.3)	0 (0.0)	0 (0.0)
Cyprus	s	59 (1.8)	41 (1.8)	0 (0.0)	0 (0.0)
Egypt		3 (1.5)	87 (3.1)	9 (2.6)	1 (0.8)
England	s	34 (5.1)	66 (5.1)	0 (0.0)	0 (0.0)
Finland		97 (0.7)	3 (0.7)	0 (0.1)	1 (0.4)
France	r	85 (2.3)	14 (2.3)	0 (0.0)	0 (0.4)
Georgia		90 (1.4)	9 (1.3)	0 (0.2)	1 (0.5)
Hong Kong SAR		48 (4.4)	50 (4.3)	2 (1.3)	0 (0.0)
Hungary		44 (2.6)	55 (2.6)	0 (0.2)	1 (0.3)
Iran, Islamic Rep. of		29 (3.3)	67 (3.4)	3 (1.5)	1 (0.7)
Ireland		35 (3.5)	61 (3.6)	1 (1.2)	2 (0.8)
Israel		53 (3.7)	43 (3.9)	2 (0.9)	2 (1.1)
Italy		100 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Japan		15 (2.9)	85 (2.9)	0 (0.0)	0 (0.0)
Jordan		13 (2.4)	78 (3.2)	0 (0.3)	9 (2.1)
Kazakhstan		15 (1.9)	84 (1.9)	1 (0.3)	1 (0.3)
Korea, Rep. of		40 (3.4)	60 (3.4)	0 (0.0)	0 (0.0)
Kuwait		14 (3.5)	86 (3.5)	0 (0.0)	0 (0.0)
Lebanon		49 (2.7)	44 (2.8)	3 (1.3)	3 (0.8)
Lithuania		54 (2.4)	44 (2.3)	1 (0.5)	0 (0.2)
Malaysia		5 (1.6)	92 (1.9)	1 (0.7)	1 (0.6)
Morocco	s	15 (1.9)	55 (2.8)	15 (2.1)	16 (2.0)
New Zealand		69 (3.2)	30 (3.3)	1 (1.1)	0 (0.0)
Norway (9)	r	51 (4.5)	48 (4.6)	2 (1.3)	0 (0.0)
Oman		11 (1.8)	87 (2.1)	2 (1.1)	0 (0.0)
Portugal		24 (2.6)	74 (2.4)	2 (0.8)	0 (0.0)
Qatar		37 (3.6)	62 (3.6)	1 (0.4)	0 (0.0)
Romania		33 (2.4)	55 (2.4)	11 (1.8)	1 (0.6)
Russian Federation		76 (2.0)	21 (1.8)	1 (0.6)	2 (0.4)
Saudi Arabia	r	5 (1.8)	93 (2.0)	1 (0.8)	0 (0.2)
Singapore		22 (2.4)	77 (2.4)	1 (0.6)	0 (0.0)
South Africa (9)		2 (0.7)	80 (2.3)	16 (2.4)	2 (1.3)
Sweden		43 (3.8)	49 (3.8)	1 (0.8)	6 (1.5)
Turkey		9 (2.4)	90 (2.4)	1 (0.0)	0 (0.0)
United Arab Emirates		39 (1.4)	60 (1.4)	0 (0.2)	1 (0.2)
United States		61 (2.7)	39 (2.7)	0 (0.0)	0 (0.0)
International Average		**38 (0.4)**	**58 (0.5)**	**2 (0.2)**	**1 (0.1)**
Benchmarking Participants					
Ontario, Canada	s	22 (4.1)	78 (4.1)	0 (0.0)	0 (0.0)
Moscow City, Russian Fed.		86 (1.4)	13 (1.3)	0 (0.2)	0 (0.3)
Gauteng, RSA (9)		1 (0.9)	86 (3.5)	13 (3.1)	1 (0.6)
Western Cape, RSA (9)		5 (1.7)	86 (2.8)	10 (2.4)	0 (0.0)
Abu Dhabi, UAE		36 (2.1)	64 (2.1)	0 (0.5)	0 (0.3)
Dubai, UAE		53 (3.1)	46 (3.2)	0 (0.0)	1 (0.6)
Quebec, Canada	y	- -	- -	- -	- -

* Based on countries' categorizations according to UNESCO's International Standard Classification of Education (Operational Manual for ISCED-2011)

** For example, doctorate, master's, or other postgraduate degree.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

Downloaded from http://timss2019.org/download

Teachers' Major

Exhibits 9.5 and 9.6 present fourth grade teachers' reports about their majors or specializations in primary education and/or mathematics and in primary education and/or science, respectively. Exhibits 9.7 and 9.8 present eighth grade teachers' reports about their majors or specializations in mathematics and/or mathematics education and in science and/or science education, respectively. For each category of teachers' major or specialization, average student achievement is also shown.

As shown in Exhibit 9.5, on average across countries, three-quarters of fourth grade students were taught by teachers with a major in primary education and a major or specialization in mathematics (32%) or by teachers with a major in primary education but no major or specialization in mathematics (43%), and just 11 percent were taught by teachers with a major in mathematics but not primary education. Another 8 percent were taught by teachers who had some other major, and 6 percent by teachers with no formal education beyond upper-secondary. The distribution of students by teachers' major was similar for science (shown in Exhibit 9.6), with 28 percent of fourth grade students taught by science teachers with a major in primary education and science, 44 percent by teachers with a major in primary education but not in science, 13 percent by teachers with a major in science but not primary education, and 9 and 5 percent by teachers with other majors or no education beyond upper-secondary, respectively. In both mathematics and science, there was considerable variation in the distribution of students by teachers' majors across countries, however, reflecting countries' different education pathways and requirements for primary school teachers.

On average across countries, mathematics achievement was highest for fourth grade students whose teachers had a major in primary education but no major in mathematics (503), followed by students with teachers with a major in both primary education and mathematics (497), and then by students with teachers who majored in mathematics but not primary education (487) and teachers who had other majors (490). Students whose teachers did not go beyond upper-secondary education had the lowest average mathematics achievement (457). Likewise, for science, students who had teachers with a major in primary education but no major in science and students who had teachers with a major in primary education and science had the highest average achievement (491 and 489, respectively), followed by students whose teachers majored in science but not primary education (480), and then by students who had teachers with other majors (478). Students whose teachers had no formal education beyond upper-secondary had the lowest average science achievement (442). However, within most countries, there was no clear relationship between teachers' major and average achievement in mathematics and science.

As shown in Exhibit 9.7, about three-quarters (78%) of eighth grade students were taught mathematics by teachers who had a major in mathematics and mathematics education (39%) or who majored in mathematics but not in mathematics education (39%). A further 11 percent were taught by teachers who majored in mathematics education only, and 10 percent by teachers with other majors. A slightly higher percentage (83%) of eighth grade students were taught science by teachers who majored in science and science education (33%) or in science but not in science education (50%), as shown

in Exhibit 9.8. A further 9 percent were taught by teachers who majored in science education but not science and 6 percent by teachers with other majors. Internationally, just 1 percent of eighth grade students were taught mathematics or science by teachers who had not completed formal education beyond upper-secondary.

In mathematics, eighth grade students with teachers who majored in mathematics and mathematics education or in mathematics education but not mathematics had higher average achievement than students with teachers who majored in mathematics and not mathematics education (averages scores of 492 and 494 compared with 488, respectively). That was not the case in all countries, however, and in many countries, there was no clear relationship between teachers' major and average mathematics achievement. In science, eighth grade students whose teachers majored in science and science education or in science but not science education had higher average scores than students whose teachers majored in science education but not science (494 and 491 compared with 482, respectively). However, within most countries, there was no clear relationship between teachers' major and average achievement science.

Exhibit 9.5: Teachers Majored in Education and Mathematics

Students' Results based on Teachers' Reports

Country		Major in Primary Education and Major (or Specialization) in Mathematics		Major in Primary Education but No Major (or Specialization) in Mathematics		Major in Mathematics but No Major in Primary Education		All Other Majors		No Formal Education Beyond Upper-Secondary*	
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Albania	r	15 (3.3)	512 (9.7)	65 (4.8)	491 (5.1)	1 (0.1)	~ ~	1 (1.1)	~ ~	17 (3.7)	498 (7.8)
Armenia		40 (4.0)	498 (4.5)	7 (2.2)	500 (6.7)	11 (2.7)	504 (6.2)	1 (0.7)	~ ~	42 (4.2)	495 (4.1)
Australia		16 (2.6)	522 (10.2)	80 (2.9)	518 (2.9)	0 (0.1)	~ ~	4 (1.2)	477 (13.1)	0 (0.0)	~ ~
Austria		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Azerbaijan	r	54 (4.1)	515 (4.0)	21 (3.4)	510 (6.3)	5 (1.7)	511 (19.1)	6 (2.0)	505 (14.1)	14 (2.9)	524 (6.9)
Bahrain		44 (3.3)	477 (4.0)	5 (1.2)	503 (15.0)	45 (3.2)	479 (3.8)	5 (1.6)	491 (7.7)	0 (0.0)	~ ~
Belgium (Flemish)		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Bosnia and Herzegovina		41 (3.4)	454 (4.1)	54 (3.4)	452 (4.0)	1 (0.8)	~ ~	2 (1.0)	~ ~	0 (0.3)	~ ~
Bulgaria	r	8 (2.2)	521 (16.1)	87 (3.5)	513 (4.3)	0 (0.3)	~ ~	5 (2.8)	476 (64.3)	0 (0.0)	~ ~
Canada	r	11 (1.4)	509 (5.5)	74 (1.9)	515 (2.4)	2 (0.9)	~ ~	13 (1.4)	504 (4.3)	0 (0.0)	~ ~
Chile		63 (3.7)	449 (3.2)	35 (3.6)	425 (5.6)	1 (0.9)	~ ~	1 (0.5)	~ ~	0 (0.0)	~ ~
Chinese Taipei		33 (3.6)	597 (3.5)	46 (4.0)	597 (2.7)	3 (1.4)	614 (4.5)	18 (3.0)	602 (4.6)	0 (0.0)	~ ~
Croatia		13 (2.6)	508 (6.8)	84 (2.7)	509 (2.4)	0 (0.0)	~ ~	2 (0.9)	~ ~	0 (0.5)	~ ~
Cyprus		24 (3.1)	543 (5.1)	73 (3.2)	530 (3.4)	1 (0.7)	~ ~	2 (1.1)	~ ~	0 (0.0)	~ ~
Czech Republic		2 (0.9)	~ ~	81 (2.3)	535 (2.9)	1 (0.5)	~ ~	11 (1.9)	528 (7.3)	5 (1.5)	523 (11.3)
Denmark	r	31 (4.4)	518 (3.9)	8 (2.4)	552 (7.6)	42 (4.5)	525 (3.3)	11 (2.5)	517 (6.4)	8 (2.5)	520 (7.6)
England	s	20 (4.6)	563 (9.9)	56 (5.1)	553 (6.6)	3 (2.1)	578 (14.5)	20 (4.2)	558 (11.8)	0 (0.0)	~ ~
Finland		9 (2.0)	541 (8.4)	84 (2.5)	532 (2.5)	0 (0.1)	~ ~	7 (1.7)	530 (7.4)	0 (0.4)	~ ~
France	r	12 (2.3)	470 (7.4)	31 (4.0)	492 (5.0)	21 (3.7)	484 (7.1)	31 (3.7)	484 (6.9)	5 (1.9)	491 (14.4)
Georgia	r	81 (3.6)	477 (4.6)	4 (2.0)	482 (9.2)	12 (3.1)	494 (12.3)	2 (0.9)	~ ~	1 (1.2)	~ ~
Germany	r	67 (3.3)	520 (3.3)	22 (3.1)	523 (6.7)	3 (1.5)	522 (12.0)	8 (2.1)	517 (10.0)	0 (0.0)	~ ~
Hong Kong SAR		53 (4.8)	602 (4.6)	20 (3.8)	605 (7.7)	20 (4.2)	596 (10.9)	8 (2.6)	621 (16.8)	0 (0.0)	~ ~
Hungary	r	4 (1.4)	528 (16.7)	95 (1.6)	522 (3.6)	0 (0.0)	~ ~	1 (0.7)	~ ~	0 (0.0)	~ ~
Iran, Islamic Rep. of		13 (2.7)	440 (9.0)	43 (3.3)	445 (7.0)	8 (2.2)	461 (14.1)	34 (3.8)	438 (7.7)	2 (1.1)	~ ~
Ireland		12 (2.5)	550 (5.0)	84 (2.8)	549 (3.0)	2 (1.0)	~ ~	3 (1.1)	535 (13.7)	0 (0.2)	~ ~
Italy		3 (1.2)	509 (12.5)	9 (2.9)	531 (6.7)	6 (1.9)	506 (7.8)	21 (3.2)	515 (4.6)	60 (3.6)	513 (2.8)
Japan		21 (3.3)	598 (3.8)	62 (3.8)	591 (2.3)	2 (0.8)	~ ~	15 (2.6)	591 (4.1)	0 (0.0)	~ ~
Kazakhstan		55 (3.9)	515 (3.3)	44 (3.8)	509 (4.4)	0 (0.0)	~ ~	1 (0.8)	~ ~	0 (0.2)	~ ~
Korea, Rep. of		19 (3.4)	600 (6.7)	78 (3.4)	599 (2.4)	0 (0.0)	~ ~	2 (1.0)	~ ~	0 (0.0)	~ ~
Kuwait		45 (4.7)	382 (7.0)	4 (1.5)	437 (25.9)	44 (4.7)	379 (9.6)	4 (1.7)	413 (24.0)	3 (1.4)	350 (27.7)
Latvia		42 (3.9)	550 (3.4)	53 (3.6)	546 (3.7)	3 (1.5)	511 (33.5)	1 (0.6)	~ ~	1 (0.9)	~ ~
Lithuania		15 (2.8)	529 (6.8)	80 (3.2)	543 (2.9)	1 (0.9)	~ ~	3 (1.3)	504 (22.0)	0 (0.0)	~ ~
Malta		24 (0.4)	503 (2.6)	48 (0.5)	511 (2.0)	4 (0.1)	505 (6.8)	18 (0.3)	514 (2.3)	7 (0.2)	506 (4.0)
Montenegro		46 (2.6)	449 (3.2)	53 (2.5)	453 (2.9)	2 (0.7)	~ ~	0 (0.2)	~ ~	0 (0.0)	~ ~
Morocco	s	3 (1.5)	317 (13.3)	6 (1.8)	359 (33.8)	14 (2.2)	434 (26.9)	29 (4.2)	377 (9.7)	48 (4.2)	377 (8.6)
New Zealand		13 (1.9)	500 (10.1)	79 (2.7)	483 (3.1)	1 (0.5)	~ ~	8 (1.8)	481 (13.7)	0 (0.0)	~ ~
North Macedonia	s	11 (3.7)	442 (29.4)	58 (5.6)	471 (7.6)	6 (2.6)	466 (20.7)	16 (4.3)	495 (14.6)	10 (3.0)	457 (15.0)
Northern Ireland	r	15 (3.1)	557 (8.2)	66 (4.7)	570 (4.6)	1 (1.2)	~ ~	13 (3.1)	553 (9.5)	5 (2.4)	552 (17.6)
Norway (5)	r	63 (4.2)	545 (2.7)	30 (3.8)	547 (5.4)	6 (2.1)	530 (12.2)	1 (0.5)	~ ~	0 (0.0)	~ ~
Oman		55 (3.2)	436 (5.6)	13 (2.2)	422 (11.7)	17 (2.4)	436 (9.7)	13 (2.6)	407 (12.9)	2 (1.1)	~ ~
Pakistan		23 (4.1)	318 (14.7)	7 (2.2)	304 (38.5)	22 (8.2)	344 (38.7)	12 (3.8)	299 (20.1)	35 (7.7)	344 (20.0)
Philippines		18 (3.5)	289 (10.8)	41 (4.0)	285 (9.5)	14 (2.5)	324 (11.9)	15 (2.9)	318 (20.2)	13 (3.0)	286 (15.2)
Poland		11 (2.4)	515 (6.3)	0 (0.0)	~ ~	89 (2.4)	521 (2.9)	0 (0.0)	~ ~	0 (0.0)	~ ~
Portugal		42 (3.3)	525 (4.2)	56 (3.4)	526 (3.5)	0 (0.3)	~ ~	1 (0.6)	~ ~	0 (0.0)	~ ~
Qatar		33 (4.0)	458 (5.7)	13 (2.4)	502 (10.7)	39 (4.1)	421 (6.1)	16 (3.0)	459 (10.4)	0 (0.0)	~ ~
Russian Federation		41 (3.2)	566 (4.8)	49 (3.3)	569 (4.7)	1 (0.6)	~ ~	2 (1.1)	~ ~	6 (1.6)	568 (12.2)
Saudi Arabia		31 (3.6)	391 (8.3)	2 (1.2)	~ ~	53 (3.5)	400 (5.4)	7 (1.8)	405 (15.7)	6 (1.6)	392 (17.8)
Serbia		43 (3.8)	506 (4.5)	55 (3.8)	511 (4.7)	0 (0.1)	~ ~	1 (0.5)	~ ~	1 (0.6)	~ ~
Singapore		66 (2.6)	624 (4.9)	11 (1.7)	643 (8.4)	14 (2.0)	618 (9.9)	9 (1.6)	629 (10.4)	0 (0.3)	~ ~
Slovak Republic		25 (3.0)	503 (7.8)	71 (3.3)	512 (4.1)	3 (1.2)	504 (21.7)	1 (0.8)	~ ~	0 (0.0)	~ ~
South Africa (5)		48 (4.3)	375 (6.3)	13 (2.4)	397 (15.2)	19 (2.9)	353 (7.9)	15 (3.1)	381 (11.8)	5 (1.5)	340 (11.7)
Spain		30 (3.4)	504 (6.1)	53 (3.6)	500 (3.8)	4 (1.3)	538 (9.4)	13 (2.7)	505 (5.3)	0 (0.0)	~ ~
Sweden		77 (3.8)	524 (3.6)	11 (3.0)	522 (5.9)	5 (1.7)	529 (8.7)	3 (1.8)	502 (13.9)	3 (1.3)	495 (10.3)
Turkey (5)		62 (3.7)	522 (5.8)	1 (0.7)	~ ~	35 (3.6)	532 (7.6)	1 (1.1)	~ ~	0 (0.0)	~ ~
United Arab Emirates	r	39 (2.2)	479 (4.5)	16 (0.8)	473 (6.0)	37 (2.0)	482 (3.8)	8 (0.8)	492 (8.7)	1 (0.3)	~ ~
United States		10 (1.5)	538 (6.9)	71 (2.5)	537 (3.0)	2 (0.8)	~ ~	17 (1.9)	525 (7.2)	0 (0.0)	~ ~
Kosovo	x	43 (6.7)	443 (7.0)	43 (7.1)	439 (9.0)	0 (0.0)	~ ~	0 (0.0)	~ ~	14 (4.1)	444 (13.1)
Netherlands	y	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
International Average		**32 (0.4)**	**497 (1.1)**	**43 (0.4)**	**503 (1.4)**	**11 (0.3)**	**487 (2.6)**	**8 (0.3)**	**490 (2.7)**	**6 (0.3)**	**457 (3.1)**
Benchmarking Participants											
Ontario, Canada	r	12 (2.7)	514 (8.9)	70 (3.3)	515 (4.8)	3 (1.8)	496 (7.7)	15 (2.6)	504 (6.0)	0 (0.0)	~ ~
Quebec, Canada		9 (1.9)	522 (6.8)	82 (2.7)	534 (2.6)	1 (0.8)	~ ~	8 (2.1)	535 (5.1)	0 (0.0)	~ ~
Moscow City, Russian Fed.		54 (4.3)	591 (3.0)	44 (4.3)	597 (3.4)	0 (0.0)	~ ~	0 (0.0)	~ ~	2 (1.0)	~ ~
Madrid, Spain		30 (3.4)	520 (3.5)	59 (3.8)	516 (3.2)	3 (1.4)	521 (10.1)	8 (2.0)	517 (8.5)	0 (0.0)	~ ~
Abu Dhabi, UAE	r	42 (2.6)	435 (5.3)	26 (2.2)	429 (6.5)	23 (2.5)	454 (8.3)	8 (1.5)	469 (15.5)	1 (0.7)	~ ~
Dubai, UAE	r	38 (3.5)	552 (4.0)	20 (2.2)	555 (5.3)	33 (3.4)	530 (4.8)	9 (1.4)	548 (9.6)	0 (0.3)	~ ~

* Countries have been increasing their certification requirements and providing professional development to teachers certified under earlier guidelines.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 9.6: Teachers Majored in Education and Science

Students' Results based on Teachers' Reports

Country		Major in Primary Education and Major (or Specialization) in Science		Major in Primary Education but No Major (or Specialization) in Science		Major in Science but No Major in Primary Education		All Other Majors		No Formal Education Beyond Upper-Secondary*	
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Albania	r	16 (3.2)	504 (11.0)	61 (4.6)	488 (5.4)	4 (1.1)	514 (14.6)	2 (1.2)	~ ~	17 (3.7)	491 (8.4)
Armenia		20 (2.7)	467 (6.2)	25 (3.4)	464 (5.6)	13 (2.9)	482 (7.2)	4 (1.5)	455 (13.6)	38 (4.2)	461 (5.4)
Australia		22 (3.5)	535 (6.6)	73 (3.5)	534 (3.0)	2 (1.0)	~ ~	3 (1.4)	506 (17.5)	0 (0.0)	~ ~
Austria		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Azerbaijan	r	41 (4.2)	431 (5.1)	33 (3.6)	421 (6.6)	3 (1.2)	420 (25.7)	10 (2.6)	412 (14.6)	13 (2.7)	436 (9.4)
Bahrain		39 (4.4)	499 (8.7)	3 (1.3)	546 (18.0)	54 (4.3)	484 (4.5)	3 (1.5)	497 (16.9)	0 (0.0)	~ ~
Belgium (Flemish)		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Bosnia and Herzegovina	r	39 (3.5)	459 (3.8)	57 (3.5)	460 (4.4)	1 (0.7)	~ ~	3 (1.1)	450 (13.2)	0 (0.3)	~ ~
Bulgaria	r	7 (2.3)	527 (19.8)	83 (3.5)	519 (5.4)	7 (3.1)	467 (44.2)	3 (1.4)	562 (14.3)	0 (0.0)	~ ~
Canada	r	13 (1.8)	530 (5.7)	69 (2.6)	525 (2.4)	6 (2.1)	526 (9.6)	12 (1.5)	520 (3.7)	0 (0.0)	~ ~
Chile		43 (4.3)	474 (4.5)	52 (4.4)	461 (4.2)	3 (1.7)	490 (24.8)	2 (1.0)	~ ~	0 (0.0)	~ ~
Chinese Taipei		31 (3.5)	561 (2.9)	36 (4.1)	554 (3.8)	16 (2.8)	559 (4.9)	17 (3.2)	561 (4.1)	0 (0.0)	~ ~
Croatia		22 (2.8)	525 (3.8)	76 (2.8)	523 (2.5)	1 (0.6)	~ ~	1 (0.7)	~ ~	0 (0.5)	~ ~
Cyprus		33 (4.3)	515 (4.8)	62 (4.3)	509 (3.4)	1 (0.6)	~ ~	4 (2.3)	536 (19.2)	0 (0.0)	~ ~
Czech Republic		3 (1.0)	535 (7.0)	69 (3.5)	536 (3.0)	12 (2.6)	528 (8.6)	11 (2.1)	532 (5.3)	5 (1.5)	529 (10.0)
Denmark	r	23 (3.4)	522 (5.6)	19 (3.8)	519 (6.1)	29 (4.4)	526 (4.7)	23 (3.7)	520 (5.3)	6 (2.3)	512 (8.5)
England	s	19 (4.0)	522 (4.7)	56 (5.4)	542 (5.8)	8 (2.7)	582 (15.6)	17 (3.8)	524 (7.2)	0 (0.0)	~ ~
Finland		8 (1.8)	544 (8.9)	83 (2.2)	556 (2.7)	1 (0.4)	~ ~	8 (1.8)	555 (6.8)	0 (0.4)	~ ~
France	r	14 (2.9)	475 (7.2)	25 (4.0)	497 (5.4)	32 (4.1)	489 (5.6)	25 (3.5)	488 (7.9)	4 (1.7)	500 (12.2)
Georgia	s	84 (3.8)	446 (5.1)	6 (2.7)	453 (12.8)	7 (2.4)	466 (9.3)	2 (1.3)	~ ~	0 (0.0)	~ ~
Germany		55 (3.9)	521 (3.2)	31 (3.6)	512 (5.7)	8 (2.2)	530 (8.0)	6 (1.9)	522 (9.5)	0 (0.0)	~ ~
Hong Kong SAR		27 (4.1)	526 (5.7)	52 (4.6)	532 (4.6)	4 (1.7)	531 (22.4)	17 (3.6)	541 (13.1)	0 (0.0)	~ ~
Hungary	r	8 (2.4)	514 (10.2)	90 (2.5)	531 (3.2)	0 (0.4)	~ ~	1 (0.6)	~ ~	1 (0.6)	~ ~
Iran, Islamic Rep. of		12 (2.8)	429 (15.3)	43 (3.7)	448 (5.6)	6 (1.8)	451 (18.1)	38 (3.5)	438 (7.6)	2 (1.1)	~ ~
Ireland		9 (2.0)	532 (8.4)	87 (2.5)	528 (3.7)	1 (0.5)	~ ~	3 (1.4)	511 (11.9)	0 (0.2)	~ ~
Italy		2 (0.9)	~ ~	11 (3.0)	518 (9.3)	5 (1.7)	505 (11.0)	22 (3.4)	508 (4.7)	61 (3.6)	508 (3.2)
Japan		23 (3.3)	562 (3.0)	61 (4.3)	561 (2.5)	3 (1.2)	553 (10.9)	13 (2.7)	567 (4.3)	0 (0.0)	~ ~
Kazakhstan		42 (4.2)	496 (6.9)	56 (4.2)	494 (4.8)	0 (0.2)	~ ~	2 (1.1)	~ ~	0 (0.2)	~ ~
Korea, Rep. of		16 (3.2)	589 (5.9)	80 (3.3)	588 (2.3)	2 (0.8)	~ ~	2 (0.9)	~ ~	0 (0.0)	~ ~
Kuwait		39 (4.6)	387 (10.4)	5 (1.7)	389 (22.0)	46 (4.8)	396 (8.8)	7 (2.4)	367 (30.5)	3 (1.4)	424 (46.5)
Latvia		40 (3.7)	542 (4.6)	51 (3.9)	543 (3.0)	8 (1.9)	550 (9.3)	2 (1.2)	~ ~	0 (0.0)	~ ~
Lithuania		17 (2.9)	531 (6.0)	79 (3.2)	540 (2.9)	1 (0.9)	~ ~	2 (1.1)	~ ~	0 (0.0)	~ ~
Malta		23 (0.4)	491 (2.7)	46 (0.4)	493 (2.0)	7 (0.2)	514 (4.8)	19 (0.3)	505 (2.3)	5 (0.1)	498 (5.6)
Montenegro		42 (2.4)	449 (4.0)	56 (2.3)	453 (3.5)	1 (0.7)	~ ~	1 (0.1)	~ ~	0 (0.0)	~ ~
Morocco	r	3 (1.4)	342 (16.7)	9 (2.6)	344 (19.1)	16 (2.6)	377 (13.8)	23 (4.1)	387 (18.7)	49 (4.3)	377 (8.8)
New Zealand		12 (2.0)	507 (9.0)	80 (2.9)	499 (3.2)	2 (0.9)	~ ~	7 (1.8)	497 (14.3)	0 (0.0)	~ ~
North Macedonia	s	12 (4.1)	391 (33.5)	54 (6.3)	433 (9.1)	5 (2.3)	377 (12.1)	17 (4.8)	462 (16.4)	11 (3.5)	408 (13.9)
Northern Ireland	r	13 (3.0)	516 (5.8)	67 (4.1)	522 (3.3)	2 (1.2)	~ ~	13 (3.1)	511 (7.6)	5 (2.4)	498 (12.7)
Norway (5)	r	44 (4.7)	548 (3.0)	46 (5.3)	535 (3.5)	5 (2.3)	535 (12.1)	5 (1.7)	519 (15.3)	0 (0.0)	~ ~
Oman		48 (3.5)	439 (6.8)	13 (2.5)	446 (9.0)	33 (3.4)	427 (6.6)	5 (1.7)	414 (22.1)	1 (0.7)	~ ~
Pakistan		31 (7.2)	326 (20.3)	7 (2.1)	235 (28.7)	27 (7.4)	300 (34.9)	7 (2.8)	289 (33.8)	29 (5.5)	268 (14.2)
Philippines	r	14 (3.2)	237 (24.4)	47 (4.3)	234 (8.8)	10 (2.7)	253 (20.6)	12 (2.8)	273 (27.1)	17 (3.2)	251 (15.0)
Poland		28 (3.9)	530 (4.8)	0 (0.0)	~ ~	72 (3.9)	532 (2.8)	0 (0.0)	~ ~	0 (0.0)	~ ~
Portugal		38 (3.1)	506 (4.0)	61 (3.2)	503 (3.2)	0 (0.3)	~ ~	1 (0.6)	~ ~	0 (0.0)	~ ~
Qatar		30 (4.1)	445 (7.0)	14 (2.7)	505 (11.3)	50 (4.2)	435 (6.9)	5 (1.7)	465 (20.2)	0 (0.0)	~ ~
Russian Federation		40 (3.2)	565 (4.4)	50 (3.2)	569 (4.2)	2 (1.1)	~ ~	2 (1.0)	~ ~	6 (1.6)	565 (10.9)
Saudi Arabia		30 (3.5)	383 (11.0)	1 (0.9)	~ ~	57 (4.0)	411 (5.9)	8 (2.1)	370 (16.2)	4 (1.3)	410 (18.8)
Serbia		40 (3.8)	515 (5.2)	58 (3.7)	521 (4.8)	1 (0.5)	~ ~	0 (0.2)	~ ~	1 (0.6)	~ ~
Singapore		57 (2.7)	591 (4.6)	10 (1.5)	598 (9.9)	25 (2.5)	603 (5.2)	8 (1.3)	588 (8.7)	1 (0.5)	~ ~
Slovak Republic		23 (2.9)	508 (10.2)	63 (3.4)	525 (4.7)	8 (2.2)	511 (11.9)	6 (1.9)	531 (10.1)	0 (0.2)	~ ~
South Africa (5)		34 (4.3)	316 (10.3)	22 (3.0)	344 (19.2)	19 (2.7)	321 (14.3)	19 (2.8)	311 (9.4)	6 (1.8)	288 (18.3)
Spain		28 (3.2)	508 (4.6)	55 (3.7)	512 (3.3)	5 (1.6)	517 (15.0)	11 (2.5)	517 (4.9)	0 (0.0)	~ ~
Sweden		70 (4.4)	544 (3.6)	18 (3.7)	536 (7.5)	4 (1.7)	540 (9.1)	3 (1.6)	470 (21.9)	5 (2.1)	528 (13.9)
Turkey (5)		52 (3.7)	528 (6.0)	0 (0.4)	~ ~	44 (3.8)	530 (6.9)	3 (1.4)	478 (23.9)	0 (0.0)	~ ~
United Arab Emirates	r	36 (2.1)	470 (3.7)	15 (1.0)	429 (6.7)	43 (2.3)	491 (3.9)	5 (0.8)	451 (13.2)	1 (0.4)	~ ~
United States		10 (1.4)	544 (8.0)	73 (2.4)	540 (3.1)	3 (1.3)	530 (21.4)	14 (1.8)	526 (6.9)	0 (0.0)	~ ~
Kosovo	y	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Netherlands	y	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
International Average		**28 (0.5)**	**489 (1.3)**	**44 (0.5)**	**491 (1.2)**	**13 (0.3)**	**480 (2.5)**	**9 (0.3)**	**478 (2.4)**	**5 (0.2)**	**442 (3.8)**
Benchmarking Participants											
Ontario, Canada	r	18 (3.7)	532 (8.3)	58 (4.6)	527 (5.2)	8 (4.3)	534 (14.4)	15 (2.9)	519 (5.4)	0 (0.0)	~ ~
Quebec, Canada		6 (1.4)	522 (6.1)	84 (3.1)	523 (2.8)	3 (1.7)	519 (12.5)	7 (2.2)	528 (7.3)	0 (0.0)	~ ~
Moscow City, Russian Fed.		50 (4.4)	593 (3.1)	47 (4.5)	598 (3.4)	0 (0.3)	~ ~	0 (0.0)	~ ~	2 (1.0)	~ ~
Madrid, Spain		31 (3.6)	522 (3.3)	58 (3.8)	524 (2.9)	4 (2.1)	519 (13.2)	7 (2.3)	516 (9.9)	0 (0.0)	~ ~
Abu Dhabi, UAE		34 (2.0)	405 (6.9)	27 (1.9)	381 (7.3)	30 (2.0)	468 (6.7)	7 (1.4)	400 (16.8)	2 (1.1)	~ ~
Dubai, UAE	r	33 (2.7)	543 (5.6)	14 (1.5)	560 (5.7)	49 (2.6)	552 (2.8)	4 (0.9)	528 (16.8)	0 (0.2)	~ ~

* Countries have been increasing their certification requirements and providing professional development to teachers certified under earlier guidelines.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 9.7: Teachers Majored in Education and Mathematics

Students' Results based on Teachers' Reports

Country	Major in Mathematics and Mathematics Education		Major in Mathematics but No Major in Mathematics Education		Major in Mathematics Education but No Major in Mathematics		All Other Majors		No Formal Education Beyond Upper-Secondary*	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia	46 (3.1)	531 (8.6)	14 (2.2)	523 (9.8)	17 (2.9)	511 (10.7)	23 (2.3)	501 (6.7)	0 (0.0)	~ ~
Bahrain	47 (2.6)	479 (2.6)	42 (3.1)	481 (3.4)	10 (1.8)	494 (6.9)	1 (0.3)	~ ~	1 (0.4)	~ ~
Chile	59 (3.8)	447 (4.9)	27 (3.2)	432 (5.6)	7 (2.1)	447 (14.8)	8 (1.9)	412 (11.0)	0 (0.0)	~ ~
Chinese Taipei	39 (3.6)	618 (5.0)	44 (3.8)	617 (4.7)	3 (1.0)	597 (17.3)	15 (2.4)	589 (9.4)	0 (0.0)	~ ~
Cyprus r	18 (3.0)	515 (9.6)	79 (2.7)	499 (2.7)	0 (0.0)	~ ~	2 (1.3)	~ ~	0 (0.0)	~ ~
Egypt	41 (3.8)	411 (8.6)	37 (3.4)	412 (9.0)	18 (3.6)	423 (12.9)	2 (0.8)	~ ~	3 (1.4)	389 (29.9)
England s	43 (5.1)	519 (10.6)	45 (5.1)	523 (12.3)	6 (2.7)	536 (35.0)	6 (2.3)	511 (34.1)	0 (0.0)	~ ~
Finland	18 (2.4)	523 (4.5)	55 (3.2)	512 (3.4)	0 (0.0)	~ ~	25 (2.6)	493 (5.3)	1 (0.7)	~ ~
France r	44 (4.3)	481 (4.1)	48 (4.3)	484 (4.2)	2 (1.2)	~ ~	7 (1.9)	474 (15.8)	0 (0.0)	~ ~
Georgia s	78 (5.1)	461 (7.5)	15 (4.2)	458 (14.8)	0 (0.0)	~ ~	2 (1.9)	~ ~	5 (2.9)	437 (19.3)
Hong Kong SAR	29 (3.7)	594 (8.5)	33 (3.9)	580 (8.7)	15 (2.8)	574 (13.3)	24 (3.7)	560 (12.0)	0 (0.0)	~ ~
Hungary	14 (2.3)	516 (9.4)	9 (2.0)	503 (14.6)	77 (2.8)	517 (3.8)	1 (0.5)	~ ~	0 (0.0)	~ ~
Iran, Islamic Rep. of	27 (3.4)	449 (7.3)	46 (3.9)	448 (6.7)	12 (2.7)	446 (15.2)	14 (2.4)	433 (12.0)	0 (0.0)	~ ~
Ireland	38 (2.7)	529 (4.7)	40 (2.9)	521 (5.7)	8 (1.5)	536 (8.8)	14 (1.7)	516 (6.4)	0 (0.4)	~ ~
Israel	67 (3.2)	528 (5.3)	20 (2.8)	487 (10.5)	8 (1.9)	530 (17.4)	4 (1.0)	506 (17.1)	1 (0.5)	~ ~
Italy	45 (3.7)	495 (4.3)	17 (3.0)	501 (6.8)	8 (2.2)	485 (11.4)	30 (3.5)	504 (4.1)	0 (0.0)	~ ~
Japan	44 (3.6)	594 (3.6)	36 (3.6)	597 (6.0)	8 (2.1)	584 (5.6)	12 (2.0)	593 (5.6)	0 (0.0)	~ ~
Jordan	12 (2.5)	397 (13.9)	74 (3.1)	424 (5.1)	4 (1.4)	438 (16.0)	6 (1.3)	432 (10.1)	5 (1.7)	401 (8.5)
Kazakhstan	40 (3.9)	494 (5.6)	57 (4.0)	479 (6.0)	1 (0.7)	~ ~	1 (0.7)	~ ~	1 (0.6)	~ ~
Korea, Rep. of	20 (2.6)	608 (7.1)	24 (3.3)	597 (5.8)	54 (3.5)	611 (3.9)	2 (1.0)	~ ~	0 (0.0)	~ ~
Kuwait	16 (3.7)	398 (12.6)	62 (4.4)	403 (5.3)	19 (3.4)	402 (11.6)	3 (1.4)	445 (29.8)	1 (0.5)	~ ~
Lebanon	19 (3.2)	433 (9.8)	49 (4.3)	425 (5.3)	4 (1.9)	498 (15.7)	23 (3.7)	419 (8.1)	4 (1.8)	438 (16.4)
Lithuania	49 (4.0)	531 (4.9)	39 (4.2)	515 (4.6)	8 (1.9)	496 (9.4)	3 (1.6)	485 (11.5)	0 (0.0)	~ ~
Malaysia	41 (3.8)	459 (6.2)	30 (2.9)	464 (6.6)	10 (2.4)	469 (19.6)	18 (2.8)	459 (9.7)	1 (0.9)	~ ~
Morocco	14 (2.8)	386 (10.8)	45 (3.8)	393 (4.2)	0 (0.1)	~ ~	14 (2.6)	388 (8.1)	26 (2.9)	382 (4.4)
New Zealand	25 (3.5)	484 (10.3)	28 (2.9)	488 (6.5)	10 (2.2)	490 (11.5)	37 (3.6)	476 (5.3)	0 (0.0)	~ ~
Norway (9) r	13 (3.1)	499 (9.6)	67 (4.2)	506 (3.2)	3 (1.2)	509 (11.5)	16 (3.1)	508 (4.8)	0 (0.0)	~ ~
Oman	35 (3.7)	410 (5.1)	48 (4.0)	406 (4.7)	13 (2.4)	413 (8.8)	1 (1.0)	~ ~	1 (1.0)	~ ~
Portugal	87 (2.6)	502 (3.5)	8 (2.2)	493 (8.1)	3 (1.4)	482 (18.5)	1 (1.2)	~ ~	0 (0.0)	~ ~
Qatar	49 (4.6)	445 (8.6)	43 (4.8)	439 (6.9)	3 (1.3)	472 (49.5)	5 (1.5)	447 (17.2)	0 (0.0)	~ ~
Romania r	23 (3.4)	474 (9.0)	75 (3.2)	486 (5.9)	2 (1.1)	~ ~	1 (0.6)	~ ~	0 (0.0)	~ ~
Russian Federation	68 (3.5)	545 (5.1)	31 (3.5)	543 (5.7)	1 (0.7)	~ ~	0 (0.0)	~ ~	0 (0.0)	~ ~
Saudi Arabia	18 (2.9)	391 (6.3)	69 (3.3)	393 (3.4)	12 (2.6)	398 (7.5)	0 (0.1)	~ ~	0 (0.0)	~ ~
Singapore	60 (2.5)	618 (5.3)	27 (2.0)	614 (7.7)	5 (1.2)	618 (17.9)	8 (1.6)	605 (16.1)	0 (0.0)	~ ~
South Africa (9)	32 (2.7)	395 (4.9)	51 (2.8)	388 (3.0)	7 (1.5)	385 (13.1)	9 (1.7)	387 (7.1)	0 (0.3)	~ ~
Sweden	48 (3.6)	509 (4.1)	20 (3.1)	493 (5.8)	12 (1.7)	490 (8.7)	16 (2.7)	509 (5.5)	4 (1.5)	492 (8.7)
Turkey	55 (4.1)	496 (6.3)	18 (3.1)	496 (15.4)	24 (3.9)	497 (10.2)	3 (1.4)	452 (34.1)	0 (0.0)	~ ~
United Arab Emirates	48 (2.0)	481 (4.3)	41 (2.1)	472 (4.1)	5 (0.8)	441 (13.6)	5 (0.7)	466 (12.3)	1 (0.3)	~ ~
United States	36 (2.9)	539 (6.4)	11 (1.8)	521 (10.4)	24 (2.1)	512 (6.2)	29 (2.3)	490 (10.1)	0 (0.0)	~ ~
International Average	**39 (0.6)**	**492 (1.2)**	**39 (0.5)**	**488 (1.2)**	**11 (0.3)**	**494 (2.9)**	**10 (0.3)**	**484 (2.8)**	**1 (0.1)**	**423 (6.9)**
Benchmarking Participants										
Ontario, Canada	9 (3.4)	569 (27.1)	5 (2.1)	524 (15.2)	9 (2.6)	532 (7.5)	77 (4.9)	529 (3.9)	0 (0.0)	~ ~
Quebec, Canada	49 (4.9)	545 (6.4)	7 (2.6)	529 (8.4)	23 (4.1)	548 (9.2)	21 (4.2)	535 (7.5)	0 (0.0)	~ ~
Moscow City, Russian Fed.	81 (2.9)	577 (4.6)	18 (2.8)	570 (7.8)	1 (0.6)	~ ~	0 (0.0)	~ ~	1 (0.6)	~ ~
Gauteng, RSA (9)	37 (4.2)	431 (7.0)	50 (4.1)	411 (5.2)	8 (2.5)	431 (17.1)	5 (1.9)	437 (22.3)	1 (0.7)	~ ~
Western Cape, RSA (9)	41 (4.5)	444 (8.1)	35 (4.4)	445 (9.4)	14 (2.8)	447 (15.0)	10 (2.3)	404 (9.7)	1 (0.7)	~ ~
Abu Dhabi, UAE r	44 (3.0)	425 (6.4)	40 (3.0)	453 (6.8)	5 (1.2)	405 (21.9)	9 (1.5)	425 (17.2)	1 (0.7)	~ ~
Dubai, UAE	55 (3.6)	542 (4.4)	35 (3.9)	527 (7.5)	4 (1.4)	523 (15.9)	5 (0.8)	570 (7.3)	0 (0.0)	~ ~

* Countries have been increasing their certification requirements and providing professional development to teachers certified under earlier guidelines.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit 9.8: Teachers Majored in Education and Science

Students' Results based on Teachers' Reports

Country	Major in Science and Science Education		Major in Science but No Major in Science Education		Major in Science Education but No Major in Science		All Other Majors		No Formal Education Beyond Upper-Secondary*	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia	65 (2.6)	534 (4.2)	19 (2.4)	540 (6.5)	7 (1.4)	522 (8.4)	9 (1.7)	512 (8.8)	0 (0.0)	~ ~
Bahrain	36 (3.3)	478 (4.9)	59 (3.4)	492 (3.5)	5 (1.0)	479 (12.5)	0 (0.0)	~ ~	0 (0.0)	~ ~
Chile	55 (3.3)	477 (4.4)	18 (3.0)	464 (5.5)	9 (1.9)	434 (8.3)	18 (3.0)	438 (7.9)	0 (0.1)	~ ~
Chinese Taipei	20 (3.0)	575 (5.5)	75 (3.4)	576 (2.1)	0 (0.3)	~ ~	5 (1.6)	548 (14.1)	0 (0.0)	~ ~
Cyprus s	12 (2.0)	506 (10.4)	85 (2.0)	483 (2.8)	0 (0.0)	~ ~	3 (0.2)	497 (7.6)	0 (0.0)	~ ~
Egypt	34 (4.2)	387 (9.9)	46 (4.2)	396 (7.2)	18 (3.2)	385 (14.3)	2 (1.1)	~ ~	1 (0.8)	~ ~
England s	44 (5.1)	513 (9.1)	54 (5.0)	532 (10.3)	0 (0.0)	~ ~	2 (1.4)	~ ~	0 (0.0)	~ ~
Finland	17 (1.8)	549 (6.4)	65 (2.5)	546 (3.4)	0 (0.2)	~ ~	17 (1.5)	524 (5.4)	1 (0.4)	~ ~
France r	44 (3.2)	485 (3.9)	53 (3.3)	491 (3.4)	2 (0.8)	~ ~	1 (0.6)	~ ~	0 (0.4)	~ ~
Georgia	30 (2.2)	448 (5.4)	64 (2.2)	445 (4.1)	2 (0.6)	~ ~	3 (0.9)	462 (10.6)	1 (0.5)	~ ~
Hong Kong SAR	41 (4.2)	516 (8.7)	42 (4.2)	499 (9.8)	10 (2.5)	474 (19.0)	8 (2.1)	508 (16.7)	0 (0.0)	~ ~
Hungary	20 (1.8)	527 (6.3)	7 (1.1)	514 (8.5)	69 (2.3)	534 (3.1)	3 (0.8)	474 (13.7)	1 (0.3)	~ ~
Iran, Islamic Rep. of	9 (2.1)	472 (15.4)	36 (3.7)	453 (9.1)	48 (3.5)	447 (5.1)	7 (1.8)	418 (14.5)	1 (0.7)	~ ~
Ireland	50 (3.2)	531 (3.8)	42 (3.0)	526 (5.3)	3 (1.0)	513 (4.5)	3 (1.2)	513 (16.1)	2 (0.8)	~ ~
Israel	62 (3.8)	522 (5.5)	28 (3.6)	503 (11.4)	4 (1.5)	496 (25.4)	5 (1.5)	514 (15.7)	2 (1.1)	~ ~
Italy	51 (3.7)	496 (4.0)	44 (3.6)	504 (3.2)	1 (0.8)	~ ~	4 (1.5)	499 (16.2)	0 (0.0)	~ ~
Japan	32 (3.7)	569 (3.9)	53 (3.9)	571 (3.1)	7 (2.2)	571 (5.7)	8 (2.0)	562 (6.4)	0 (0.0)	~ ~
Jordan	11 (2.6)	440 (16.3)	63 (4.1)	447 (5.8)	16 (3.3)	475 (8.5)	2 (1.0)	~ ~	8 (1.9)	448 (13.4)
Kazakhstan	23 (2.4)	491 (5.2)	73 (2.3)	473 (3.7)	0 (0.0)	~ ~	2 (0.7)	~ ~	1 (0.3)	~ ~
Korea, Rep. of	41 (3.4)	559 (3.2)	49 (3.5)	563 (3.3)	9 (2.2)	559 (6.2)	1 (0.4)	~ ~	0 (0.0)	~ ~
Kuwait	15 (3.7)	454 (17.8)	60 (4.0)	435 (6.9)	20 (2.7)	455 (7.0)	5 (1.9)	475 (15.6)	0 (0.0)	~ ~
Lebanon	15 (2.0)	383 (11.8)	71 (2.4)	373 (5.3)	2 (0.5)	~ ~	9 (1.3)	382 (12.5)	4 (0.8)	360 (13.3)
Lithuania	23 (1.8)	537 (3.5)	74 (1.9)	532 (3.0)	1 (0.5)	~ ~	1 (0.5)	~ ~	0 (0.2)	~ ~
Malaysia	34 (3.0)	457 (8.6)	38 (3.2)	469 (6.6)	15 (2.4)	453 (7.5)	12 (2.5)	433 (13.6)	1 (0.6)	~ ~
Morocco	8 (1.1)	395 (8.2)	80 (1.8)	392 (3.0)	0 (0.1)	~ ~	1 (0.5)	~ ~	11 (1.4)	409 (6.1)
New Zealand	47 (3.8)	502 (7.0)	40 (3.8)	502 (6.1)	3 (1.5)	464 (24.2)	10 (1.8)	505 (14.4)	0 (0.0)	~ ~
Norway (9) r	12 (2.9)	508 (7.4)	35 (4.7)	507 (5.7)	8 (2.0)	493 (9.1)	45 (4.8)	488 (4.8)	0 (0.0)	~ ~
Oman	28 (3.5)	463 (6.9)	69 (3.3)	453 (4.0)	2 (1.0)	~ ~	1 (0.5)	~ ~	0 (0.0)	~ ~
Portugal	66 (2.7)	521 (3.1)	34 (2.7)	517 (4.6)	0 (0.0)	~ ~	0 (0.2)	~ ~	0 (0.0)	~ ~
Qatar	41 (3.7)	493 (6.2)	53 (3.7)	460 (6.3)	3 (1.4)	507 (46.8)	2 (1.0)	~ ~	0 (0.0)	~ ~
Romania r	8 (1.4)	460 (12.6)	85 (1.9)	471 (4.7)	0 (0.3)	~ ~	5 (1.1)	481 (16.0)	1 (0.7)	~ ~
Russian Federation	49 (2.3)	545 (4.3)	49 (2.4)	542 (5.0)	0 (0.0)	~ ~	1 (0.3)	~ ~	2 (0.4)	~ ~
Saudi Arabia	19 (2.9)	421 (8.3)	75 (2.9)	433 (3.3)	5 (1.6)	446 (14.2)	1 (0.4)	~ ~	0 (0.2)	~ ~
Singapore	57 (2.7)	608 (5.5)	37 (2.7)	607 (6.8)	2 (0.9)	~ ~	4 (1.0)	609 (27.0)	0 (0.0)	~ ~
South Africa (9)	20 (2.3)	390 (9.7)	59 (3.1)	366 (4.0)	6 (1.6)	358 (14.3)	12 (2.0)	375 (12.3)	2 (1.2)	~ ~
Sweden	50 (3.2)	524 (5.5)	28 (3.3)	518 (6.0)	9 (2.1)	530 (8.5)	7 (1.9)	515 (8.0)	6 (1.4)	513 (7.5)
Turkey	38 (4.0)	517 (6.5)	16 (3.0)	539 (10.3)	42 (4.1)	507 (6.2)	4 (1.5)	495 (20.5)	0 (0.0)	~ ~
United Arab Emirates	45 (1.4)	478 (5.4)	46 (1.8)	472 (4.8)	6 (1.1)	435 (17.2)	3 (0.5)	485 (14.4)	1 (0.2)	~ ~
United States	30 (2.5)	534 (6.5)	27 (2.3)	530 (9.4)	15 (2.0)	536 (9.1)	28 (2.6)	503 (11.6)	0 (0.0)	~ ~
International Average	**33 (0.5)**	**494 (1.3)**	**50 (0.5)**	**491 (1.0)**	**9 (0.3)**	**482 (3.2)**	**6 (0.3)**	**489 (2.8)**	**1 (0.1)**	**432 (5.3)**
Benchmarking Participants										
Ontario, Canada s	27 (5.1)	523 (10.5)	10 (3.2)	501 (14.7)	6 (2.4)	532 (15.9)	57 (5.4)	524 (5.9)	0 (0.0)	~ ~
Moscow City, Russian Fed.	59 (2.0)	567 (3.4)	40 (2.0)	565 (3.3)	0 (0.1)	~ ~	0 (0.2)	~ ~	0 (0.3)	~ ~
Gauteng, RSA (9)	20 (3.6)	431 (14.6)	61 (4.3)	417 (5.9)	8 (2.3)	431 (13.7)	11 (2.8)	425 (15.2)	1 (0.6)	~ ~
Western Cape, RSA (9)	45 (4.6)	450 (10.7)	43 (4.2)	440 (8.9)	4 (1.7)	439 (46.1)	8 (1.7)	381 (13.8)	0 (0.0)	~ ~
Abu Dhabi, UAE	51 (2.6)	408 (9.3)	41 (2.8)	430 (9.8)	5 (1.0)	365 (22.0)	4 (0.7)	453 (14.2)	0 (0.3)	~ ~
Dubai, UAE	52 (3.3)	567 (4.8)	40 (3.6)	541 (8.4)	4 (0.4)	428 (16.1)	3 (1.5)	538 (18.6)	1 (0.6)	~ ~
Quebec, Canada y	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -

* Countries have been increasing their certification requirements and providing professional development to teachers certified under earlier guidelines.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Teachers' Years of Experience

Exhibits 9.9, 9.10, 9.11, and 9.12 present teachers' reports about their years of teaching experience, including the average years of experience in each country and the percentage of students and average achievement by four categories: 20 years or more, at least 10 but less than 20 years, at least 5 but less than 10 years, and less than 5 years.

There was considerable variation in teacher experience across countries in both grades and subjects. In some countries, two-thirds or more of the students were taught by very experienced teachers with more than 20 years of experience, while in others, about a quarter of students were taught by teachers with less than 5 years of experience.

On average across countries, fourth grade students' mathematics and science teachers had been teaching for 17 years. In mathematics, experience ranged from an average of 9 years in Turkey and 10 years in England to more than 25 years in Bulgaria (26 years), Latvia and Lithuania (27 years), and the Russian Federation (26 years). In science, experience ranged from 10 years in England and Pakistan to 25 years or more in Bulgaria, Hungary, and Latvia (25 years); the Russian Federation (26 years); and Lithuania (27 years). On average across countries, just over 40 percent of fourth grade students were taught by teachers with 20 years of experience (41% for mathematics and 40% for science); 29 and 28 percent by mathematics and science teachers, respectively, with at least 10 but less than 20 years; 15 percent by mathematics teachers and 17 percent by science teachers with at least 5 but less than 10 years of experience; and 14 percent by mathematics teachers and 15 percent by science teachers with less than 5 years of experience.

On average, eighth grade teachers were slightly less experienced than their fourth grade counterparts (16 years of experience for both subjects, compared with 17 years in fourth grade). In mathematics, experience ranged from an average of 10 years in Turkey to 29 years in Lithuania. In science, teachers' average years of experience ranged from 11 years in Jordan, Lebanon, and Qatar to 26 years in Georgia and Lithuania. In both subjects, just over one-third of eighth grade students had teachers with more than 20 years of experience (35% in mathematics and 34% in science); about one-third had at least 10 but less than 20 years of experience (33% in mathematics and 32% in science); 18 percent had teachers with at least 5 but less than 10 years; and 14 percent (mathematics) and 15 percent (science) had teachers with less than 5 years of experience.

Internationally, average mathematics and average science achievement were generally higher for students whose teachers had more experience. For example, in mathematics in fourth grade, average achievement rose from 494 among students of teachers with less than 5 years of experience to 500 to 504 for the other categories. Similarly, in science in fourth grade, the average achievement was 485 for the lowest category of experience and rose to 492 for each of the other three categories. The relationship between experience and average student achievement was also more pronounced in mathematics than in science, in both grades.

Policies for teacher assignment may play a role in the relationship between teacher experience and average student achievement, as sometimes, more experienced teachers are assigned to students of higher ability and with fewer discipline problems and, conversely, less experienced teachers are assigned to students of lower ability.

Exhibit 9.9: Teachers' Years of Experience

Students' Results based on Teachers' Reports

Country	20 Years or More		At Least 10 but Less than 20 Years		At Least 5 but Less than 10 Years		Less than 5 Years		Average Years of Experience
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	61 (3.8)	497 (4.1)	26 (3.7)	493 (9.0)	8 (2.6)	495 (6.8)	5 (1.9)	480 (13.2)	22 (0.9)
Armenia	63 (3.9)	498 (2.7)	12 (2.4)	517 (8.4)	18 (3.0)	488 (5.8)	6 (1.7)	487 (7.8)	23 (1.1)
Australia	31 (3.4)	526 (6.4)	20 (2.4)	526 (5.4)	25 (3.1)	510 (6.7)	24 (3.5)	508 (6.2)	13 (0.8)
Austria	53 (3.4)	538 (3.1)	17 (2.5)	546 (4.1)	16 (2.2)	539 (5.4)	14 (2.2)	535 (5.1)	19 (0.8)
Azerbaijan r	59 (4.1)	516 (3.9)	28 (3.8)	514 (6.4)	6 (1.5)	495 (13.5)	7 (2.0)	505 (9.6)	22 (0.9)
Bahrain	13 (2.3)	478 (7.8)	43 (2.9)	480 (4.5)	24 (2.7)	479 (4.6)	20 (2.6)	486 (4.5)	11 (0.5)
Belgium (Flemish)	32 (3.5)	542 (2.6)	37 (3.7)	532 (3.7)	16 (2.7)	527 (5.9)	15 (2.3)	528 (4.8)	16 (0.8)
Bosnia and Herzegovina	50 (2.7)	452 (3.6)	34 (3.2)	455 (4.2)	9 (1.7)	451 (7.2)	7 (1.4)	437 (11.7)	18 (0.5)
Bulgaria	77 (3.2)	517 (5.1)	8 (1.9)	501 (15.5)	7 (2.1)	528 (14.9)	8 (2.1)	500 (20.6)	26 (0.8)
Canada	31 (2.8)	513 (4.1)	39 (2.7)	513 (5.4)	17 (1.9)	513 (4.6)	13 (1.7)	508 (4.2)	15 (0.4)
Chile	32 (4.0)	455 (5.6)	35 (4.0)	440 (5.3)	20 (3.4)	435 (6.5)	13 (3.0)	415 (6.0)	16 (1.0)
Chinese Taipei	53 (4.1)	597 (2.7)	38 (4.1)	604 (3.4)	6 (1.8)	589 (8.1)	4 (1.6)	598 (6.4)	19 (0.5)
Croatia	63 (3.4)	508 (2.9)	25 (2.9)	510 (4.4)	5 (1.6)	512 (7.1)	6 (1.8)	508 (11.0)	22 (0.7)
Cyprus	51 (4.0)	537 (3.0)	35 (4.1)	533 (5.5)	5 (1.5)	524 (11.9)	9 (2.0)	518 (9.9)	18 (0.6)
Czech Republic	60 (3.3)	531 (3.4)	17 (2.5)	544 (6.4)	11 (2.0)	526 (6.1)	13 (2.3)	532 (7.7)	21 (0.8)
Denmark	27 (3.7)	525 (4.9)	43 (4.4)	524 (3.4)	12 (2.7)	526 (6.8)	18 (3.1)	523 (6.1)	15 (0.8)
England s	13 (4.0)	561 (16.5)	30 (5.1)	558 (11.2)	31 (4.8)	561 (6.9)	25 (4.8)	552 (4.5)	10 (0.8)
Finland	40 (3.4)	532 (3.6)	26 (2.6)	533 (4.2)	18 (2.6)	535 (4.7)	16 (2.3)	527 (5.8)	16 (0.7)
France	38 (3.6)	498 (5.4)	32 (3.3)	479 (5.4)	14 (2.3)	478 (6.1)	16 (2.8)	480 (6.7)	16 (0.8)
Georgia	68 (3.9)	478 (4.7)	23 (3.4)	490 (8.0)	5 (1.8)	486 (9.2)	4 (1.5)	492 (17.6)	24 (1.0)
Germany	43 (3.6)	526 (3.7)	29 (3.7)	519 (5.6)	17 (2.8)	514 (5.2)	11 (2.5)	512 (9.7)	18 (0.8)
Hong Kong SAR	30 (4.2)	611 (6.4)	27 (4.8)	605 (8.0)	22 (4.5)	585 (7.9)	21 (3.6)	601 (6.3)	13 (0.9)
Hungary	68 (3.7)	526 (3.6)	18 (3.0)	525 (6.9)	9 (1.9)	531 (10.3)	5 (1.7)	504 (13.0)	24 (0.9)
Iran, Islamic Rep. of	35 (3.2)	441 (7.1)	25 (3.1)	441 (9.2)	14 (2.4)	466 (11.4)	26 (2.9)	436 (6.9)	14 (0.7)
Ireland	24 (3.9)	550 (3.8)	37 (4.1)	549 (4.1)	18 (3.2)	560 (6.1)	21 (3.3)	536 (5.9)	14 (1.0)
Italy	64 (3.9)	516 (3.0)	24 (3.0)	515 (4.5)	6 (1.9)	509 (9.6)	6 (2.6)	516 (14.3)	23 (1.0)
Japan	35 (3.3)	590 (2.6)	23 (3.0)	593 (3.3)	16 (3.0)	596 (4.9)	26 (3.1)	594 (3.2)	15 (0.8)
Kazakhstan	55 (4.3)	515 (3.6)	19 (3.1)	505 (4.6)	14 (2.7)	521 (7.2)	11 (2.4)	498 (7.1)	20 (1.0)
Korea, Rep. of	25 (3.2)	605 (5.0)	37 (3.9)	604 (3.4)	23 (3.5)	593 (5.3)	15 (3.2)	590 (5.8)	14 (0.8)
Kosovo	38 (4.2)	443 (4.9)	28 (3.9)	456 (6.2)	17 (3.2)	434 (8.0)	18 (3.3)	444 (7.9)	16 (1.1)
Kuwait	9 (2.5)	387 (18.2)	50 (3.8)	381 (7.3)	27 (3.5)	389 (12.0)	13 (3.0)	378 (18.8)	12 (0.6)
Latvia	73 (3.4)	546 (2.9)	12 (2.3)	564 (6.7)	8 (1.9)	546 (7.6)	7 (1.9)	511 (16.0)	27 (1.1)
Lithuania	83 (2.7)	538 (3.1)	9 (2.2)	556 (8.2)	2 (1.2)	~ ~	5 (1.6)	557 (11.3)	27 (0.8)
Malta	24 (0.4)	504 (2.6)	21 (0.4)	521 (2.7)	24 (0.4)	512 (2.2)	31 (0.4)	503 (2.7)	12 (0.1)
Montenegro	56 (3.3)	451 (2.8)	28 (2.7)	456 (4.0)	10 (2.0)	457 (8.1)	6 (0.9)	446 (4.8)	20 (0.6)
Morocco	44 (3.3)	369 (7.6)	19 (2.8)	384 (10.5)	10 (2.2)	393 (16.2)	27 (3.1)	399 (13.8)	16 (0.7)
Netherlands r	30 (4.7)	537 (4.5)	32 (4.9)	539 (3.5)	20 (4.5)	536 (5.5)	18 (4.4)	533 (5.6)	15 (1.2)
New Zealand	25 (2.5)	491 (6.2)	32 (2.7)	490 (4.6)	21 (2.5)	492 (7.3)	23 (2.4)	479 (6.1)	13 (0.6)
North Macedonia r	52 (4.9)	478 (6.4)	29 (3.7)	463 (12.6)	10 (2.7)	504 (18.0)	9 (2.4)	460 (13.5)	19 (1.0)
Northern Ireland	33 (4.1)	571 (5.4)	38 (4.1)	560 (5.5)	21 (3.4)	562 (6.7)	8 (2.5)	575 (9.8)	15 (0.9)
Norway (5) r	30 (4.0)	542 (4.1)	36 (3.8)	551 (4.1)	10 (2.7)	541 (9.8)	23 (4.1)	542 (5.1)	14 (0.9)
Oman	9 (2.0)	442 (23.0)	57 (3.3)	435 (4.8)	25 (2.8)	425 (7.8)	8 (2.0)	405 (8.4)	12 (0.4)
Pakistan	25 (4.0)	293 (10.3)	14 (6.5)	370 (45.4)	22 (5.2)	328 (19.0)	40 (8.1)	337 (21.8)	11 (1.2)
Philippines	30 (3.8)	310 (12.5)	32 (3.6)	284 (10.1)	24 (3.3)	298 (13.6)	14 (2.6)	295 (13.4)	14 (0.7)
Poland	51 (4.0)	517 (3.4)	31 (4.0)	522 (4.6)	10 (2.3)	520 (9.2)	8 (1.9)	534 (10.1)	20 (0.8)
Portugal	67 (2.7)	523 (3.3)	30 (2.8)	534 (4.3)	2 (0.9)	~ ~	1 (0.7)	~ ~	24 (0.6)
Qatar	13 (3.1)	445 (14.5)	35 (3.6)	441 (6.5)	33 (3.6)	457 (7.1)	19 (2.9)	455 (11.8)	11 (0.6)
Russian Federation	74 (3.2)	565 (3.1)	11 (2.4)	590 (10.0)	8 (1.8)	568 (12.0)	6 (1.8)	550 (11.9)	26 (0.9)
Saudi Arabia	31 (3.4)	407 (6.8)	43 (3.2)	401 (5.5)	15 (2.8)	399 (9.5)	11 (2.0)	372 (9.3)	15 (0.6)
Serbia	74 (3.4)	509 (3.4)	18 (3.0)	510 (9.0)	8 (2.0)	501 (9.1)	1 (0.5)	~ ~	24 (0.7)
Singapore	22 (2.2)	630 (7.7)	37 (2.2)	632 (6.2)	27 (2.0)	615 (6.5)	14 (1.9)	621 (8.7)	13 (0.5)
Slovak Republic	64 (3.0)	511 (3.7)	20 (2.7)	509 (7.3)	9 (1.7)	501 (16.8)	7 (1.7)	506 (7.5)	23 (0.7)
South Africa (5)	45 (3.4)	379 (6.0)	24 (2.9)	353 (8.5)	14 (3.0)	388 (13.7)	18 (2.4)	378 (11.0)	17 (0.7)
Spain	45 (3.4)	506 (4.7)	34 (3.5)	499 (5.5)	8 (1.7)	490 (11.3)	13 (1.7)	501 (4.8)	19 (0.7)
Sweden	20 (3.5)	537 (6.8)	35 (4.5)	526 (4.8)	21 (3.4)	516 (6.7)	25 (3.6)	510 (5.9)	12 (0.7)
Turkey (5)	9 (2.3)	544 (10.3)	34 (3.4)	552 (7.0)	22 (3.3)	535 (8.5)	35 (3.4)	480 (7.7)	9 (0.6)
United Arab Emirates	14 (1.6)	486 (7.0)	33 (1.4)	469 (3.8)	31 (1.6)	483 (5.0)	21 (1.9)	492 (5.1)	11 (0.3)
United States	26 (2.3)	537 (4.6)	36 (2.6)	542 (3.7)	21 (2.1)	539 (6.3)	18 (1.9)	514 (6.2)	13 (0.4)
International Average	**41 (0.5)**	**503 (0.9)**	**29 (0.4)**	**504 (1.2)**	**15 (0.4)**	**500 (1.2)**	**14 (0.4)**	**494 (1.3)**	**17 (0.1)**
Benchmarking Participants									
Ontario, Canada r	26 (4.5)	508 (9.6)	42 (5.5)	512 (10.4)	20 (3.3)	519 (6.7)	11 (2.6)	508 (9.6)	15 (0.6)
Quebec, Canada	36 (4.6)	533 (2.8)	37 (4.5)	532 (3.8)	14 (3.1)	534 (5.6)	13 (3.0)	532 (6.9)	16 (0.8)
Moscow City, Russian Fed.	79 (3.3)	594 (2.3)	12 (2.3)	599 (4.8)	6 (1.8)	567 (12.6)	4 (1.6)	589 (11.9)	25 (0.8)
Madrid, Spain	36 (3.4)	522 (3.1)	38 (4.1)	510 (4.2)	8 (2.2)	533 (8.3)	18 (3.6)	519 (3.9)	16 (0.8)
Abu Dhabi, UAE	14 (1.9)	440 (9.6)	39 (2.6)	435 (5.9)	32 (2.6)	442 (5.9)	15 (1.8)	458 (9.9)	12 (0.5)
Dubai, UAE r	18 (3.6)	556 (8.3)	27 (2.8)	536 (5.7)	36 (3.6)	546 (4.9)	19 (3.0)	551 (6.3)	11 (0.7)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 9.10: Teachers' Years of Experience

Students' Results based on Teachers' Reports

Country	20 Years or More		At Least 10 but Less than 20 Years		At Least 5 but Less than 10 Years		Less than 5 Years		Average Years of Experience
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	59 (3.9)	492 (4.5)	26 (3.7)	489 (9.5)	9 (2.7)	488 (8.3)	6 (2.0)	493 (14.7)	21 (0.9)
Armenia	58 (3.8)	469 (4.5)	15 (2.7)	470 (7.5)	20 (3.4)	459 (5.5)	7 (1.8)	454 (10.6)	22 (1.1)
Australia	31 (3.2)	539 (6.1)	19 (2.5)	537 (4.2)	24 (3.0)	531 (5.9)	26 (3.2)	526 (5.5)	13 (0.7)
Austria	54 (3.2)	522 (3.7)	15 (2.4)	527 (5.3)	16 (2.1)	525 (6.2)	15 (2.1)	512 (5.9)	19 (0.7)
Azerbaijan r	55 (4.0)	428 (4.5)	31 (4.0)	422 (7.8)	6 (1.7)	396 (15.4)	8 (2.3)	425 (12.4)	21 (0.8)
Bahrain	15 (3.6)	483 (19.0)	35 (3.0)	508 (5.9)	28 (3.9)	481 (8.0)	22 (3.0)	491 (6.1)	11 (0.7)
Belgium (Flemish)	31 (3.5)	511 (2.6)	36 (3.7)	500 (4.2)	17 (2.8)	496 (6.3)	16 (2.5)	496 (4.9)	15 (0.8)
Bosnia and Herzegovina	50 (2.7)	461 (3.9)	34 (3.2)	460 (4.3)	9 (1.7)	456 (7.8)	7 (1.4)	437 (11.6)	18 (0.5)
Bulgaria	76 (3.4)	523 (6.0)	9 (2.2)	510 (18.7)	7 (2.1)	540 (20.8)	8 (2.1)	497 (23.8)	25 (0.8)
Canada r	26 (2.4)	522 (2.9)	39 (2.8)	525 (3.2)	19 (2.0)	526 (3.9)	16 (2.6)	526 (8.0)	14 (0.6)
Chile	28 (4.1)	473 (5.2)	34 (3.7)	469 (5.4)	23 (3.5)	467 (6.0)	15 (3.1)	456 (7.7)	15 (1.0)
Chinese Taipei	44 (3.9)	558 (3.0)	29 (3.3)	557 (3.8)	16 (3.0)	559 (5.5)	11 (2.6)	563 (4.8)	17 (0.7)
Croatia	63 (3.4)	523 (2.6)	25 (2.9)	524 (3.8)	5 (1.6)	524 (7.0)	6 (1.8)	524 (9.5)	22 (0.7)
Cyprus	33 (4.6)	517 (4.4)	43 (5.1)	509 (4.9)	18 (4.3)	511 (8.0)	6 (2.0)	504 (8.9)	16 (0.7)
Czech Republic	56 (3.4)	530 (3.5)	21 (3.1)	540 (5.0)	12 (2.2)	533 (7.3)	11 (2.2)	540 (6.3)	20 (0.8)
Denmark	22 (3.2)	527 (4.4)	45 (4.2)	522 (3.4)	16 (2.7)	515 (6.6)	17 (3.2)	525 (6.2)	14 (0.7)
England s	13 (4.0)	539 (13.9)	31 (5.1)	538 (9.6)	31 (5.1)	542 (6.7)	25 (4.8)	532 (4.6)	10 (0.8)
Finland	38 (3.3)	558 (3.8)	27 (2.8)	554 (4.4)	20 (2.8)	557 (4.8)	15 (2.4)	543 (6.3)	16 (0.7)
France	32 (3.4)	501 (5.6)	34 (3.6)	480 (5.2)	16 (2.4)	482 (6.1)	18 (3.0)	490 (6.5)	15 (0.7)
Georgia	62 (4.0)	447 (5.6)	27 (3.7)	466 (6.5)	8 (2.3)	457 (11.4)	4 (1.5)	460 (9.6)	24 (1.1)
Germany	39 (3.8)	521 (3.7)	26 (3.0)	513 (5.4)	18 (2.6)	520 (6.7)	17 (2.9)	518 (8.5)	17 (0.9)
Hong Kong SAR	25 (3.6)	534 (7.0)	22 (3.9)	538 (7.0)	20 (4.0)	531 (5.5)	32 (4.1)	528 (5.5)	11 (0.8)
Hungary	71 (3.3)	530 (3.3)	14 (2.5)	522 (8.5)	7 (1.6)	542 (7.3)	7 (1.8)	516 (10.0)	25 (0.8)
Iran, Islamic Rep. of	35 (3.2)	441 (7.2)	25 (3.1)	438 (9.8)	14 (2.4)	461 (11.3)	26 (2.9)	432 (7.3)	14 (0.7)
Ireland	24 (3.9)	532 (4.4)	37 (4.1)	530 (4.3)	18 (3.2)	536 (7.8)	21 (3.3)	511 (9.5)	14 (1.0)
Italy	64 (3.9)	510 (3.4)	24 (3.0)	510 (4.7)	6 (1.9)	504 (10.2)	6 (2.6)	514 (17.2)	23 (1.0)
Japan	37 (4.0)	559 (2.4)	25 (3.8)	564 (3.9)	12 (2.6)	561 (5.1)	26 (3.6)	563 (3.3)	16 (1.0)
Kazakhstan	53 (4.3)	499 (5.1)	20 (3.1)	487 (6.3)	14 (2.6)	497 (9.5)	13 (2.6)	479 (8.1)	20 (1.0)
Korea, Rep. of	26 (3.1)	591 (4.1)	40 (3.5)	588 (2.8)	21 (3.1)	586 (4.9)	13 (2.8)	581 (5.6)	15 (0.8)
Kosovo	38 (4.2)	412 (6.2)	28 (3.9)	427 (7.8)	17 (3.2)	403 (8.8)	18 (3.3)	411 (9.0)	16 (1.1)
Kuwait	6 (2.0)	363 (27.4)	53 (4.3)	406 (9.1)	28 (3.8)	395 (10.8)	13 (2.5)	354 (15.3)	11 (0.5)
Latvia	69 (3.3)	541 (3.2)	16 (2.7)	547 (5.7)	9 (2.0)	547 (6.6)	6 (1.5)	531 (13.1)	25 (0.9)
Lithuania	83 (2.6)	534 (2.8)	9 (2.2)	552 (7.8)	3 (1.2)	534 (12.4)	6 (1.7)	556 (9.2)	27 (0.8)
Malta	22 (0.3)	492 (2.8)	22 (0.4)	507 (2.8)	24 (0.4)	498 (2.8)	32 (0.4)	489 (2.2)	11 (0.1)
Montenegro	56 (3.3)	452 (3.3)	28 (2.7)	457 (4.8)	10 (2.0)	458 (10.2)	6 (0.9)	445 (6.3)	20 (0.6)
Morocco	43 (3.4)	356 (8.6)	22 (3.3)	382 (11.5)	12 (2.4)	385 (18.4)	23 (2.8)	390 (16.1)	17 (0.8)
Netherlands r	30 (4.7)	519 (5.6)	32 (4.9)	521 (4.5)	20 (4.5)	514 (7.5)	18 (4.4)	517 (6.4)	15 (1.2)
New Zealand	27 (2.6)	505 (5.1)	33 (2.5)	507 (3.7)	20 (2.5)	506 (6.4)	20 (2.1)	493 (6.5)	14 (0.6)
North Macedonia r	52 (4.9)	433 (8.3)	29 (3.7)	418 (13.4)	10 (2.7)	459 (17.4)	9 (2.4)	413 (16.2)	19 (1.0)
Northern Ireland	33 (4.1)	525 (4.3)	38 (4.1)	514 (3.9)	21 (3.4)	515 (5.1)	8 (2.5)	526 (7.5)	15 (0.9)
Norway (5) r	25 (3.9)	543 (5.0)	30 (3.5)	542 (4.4)	18 (3.9)	536 (6.3)	26 (4.4)	537 (5.0)	12 (0.8)
Oman	7 (1.8)	457 (23.8)	54 (3.7)	441 (5.7)	21 (3.2)	432 (11.3)	17 (2.9)	421 (8.1)	11 (0.5)
Pakistan	23 (4.9)	275 (15.0)	7 (2.6)	239 (41.9)	26 (6.7)	330 (20.6)	43 (6.7)	288 (21.5)	10 (1.3)
Philippines	25 (3.8)	234 (13.2)	34 (4.0)	251 (12.1)	21 (3.3)	249 (14.6)	20 (3.1)	260 (15.1)	13 (0.8)
Poland	67 (3.9)	530 (3.3)	23 (3.4)	532 (4.5)	4 (1.4)	538 (10.9)	6 (2.2)	545 (10.9)	24 (0.9)
Portugal	67 (2.7)	502 (3.1)	30 (2.8)	512 (3.4)	2 (0.9)	~ ~	1 (0.7)	~ ~	24 (0.6)
Qatar	15 (3.4)	453 (15.2)	38 (4.2)	442 (5.7)	32 (4.1)	452 (8.8)	15 (2.5)	462 (10.3)	11 (0.6)
Russian Federation	73 (3.5)	565 (3.1)	12 (2.5)	587 (8.6)	8 (1.8)	567 (10.1)	7 (2.0)	563 (10.0)	26 (0.9)
Saudi Arabia	31 (3.1)	394 (7.1)	31 (3.4)	405 (8.6)	25 (3.6)	417 (6.5)	13 (2.7)	388 (18.2)	14 (0.6)
Serbia	74 (3.4)	518 (3.8)	18 (3.0)	521 (9.3)	8 (2.0)	510 (10.5)	1 (0.5)	~ ~	24 (0.7)
Singapore	16 (2.0)	597 (8.5)	41 (2.8)	598 (5.8)	29 (2.5)	598 (5.7)	14 (1.9)	577 (8.3)	12 (0.4)
Slovak Republic	61 (3.1)	523 (4.6)	20 (2.7)	517 (6.5)	14 (2.5)	506 (14.6)	6 (1.5)	528 (7.8)	23 (0.8)
South Africa (5)	42 (3.8)	331 (11.4)	21 (2.6)	304 (11.9)	14 (3.0)	336 (19.5)	23 (2.8)	329 (15.6)	16 (0.8)
Spain	39 (2.8)	514 (4.0)	38 (3.4)	508 (4.6)	11 (2.6)	500 (9.2)	13 (2.1)	516 (5.3)	17 (0.7)
Sweden	23 (4.0)	550 (6.7)	29 (4.5)	542 (4.8)	23 (4.1)	535 (6.3)	25 (4.1)	527 (7.2)	13 (0.9)
Turkey (5)	18 (2.7)	558 (6.2)	28 (3.4)	548 (7.9)	29 (3.5)	527 (5.9)	25 (2.9)	478 (10.1)	11 (0.6)
United Arab Emirates	13 (1.1)	452 (7.6)	39 (1.6)	466 (4.4)	31 (1.7)	478 (4.9)	17 (1.5)	486 (6.3)	11 (0.2)
United States	27 (2.3)	543 (4.4)	35 (2.7)	546 (4.4)	21 (2.1)	538 (6.4)	18 (2.0)	518 (6.1)	14 (0.4)
International Average	**40 (0.5)**	**492 (1.1)**	**28 (0.4)**	**492 (1.2)**	**17 (0.4)**	**492 (1.3)**	**15 (0.4)**	**485 (1.4)**	**17 (0.1)**
Benchmarking Participants									
Ontario, Canada r	20 (3.3)	518 (6.7)	46 (5.8)	526 (4.8)	20 (3.4)	530 (6.9)	14 (5.1)	537 (20.6)	14 (0.9)
Quebec, Canada	33 (4.5)	524 (3.2)	32 (4.5)	521 (4.9)	19 (3.5)	530 (4.4)	17 (3.5)	517 (5.2)	14 (0.8)
Moscow City, Russian Fed.	79 (3.3)	596 (2.3)	12 (2.2)	600 (5.4)	6 (1.8)	570 (11.4)	4 (1.6)	597 (11.0)	25 (0.8)
Madrid, Spain	29 (4.2)	530 (3.8)	40 (4.3)	516 (3.8)	15 (2.7)	521 (3.5)	16 (2.6)	527 (4.8)	14 (0.8)
Abu Dhabi, UAE	13 (1.3)	368 (13.1)	40 (2.1)	418 (7.2)	31 (2.3)	426 (6.5)	15 (2.0)	440 (11.3)	11 (0.4)
Dubai, UAE r	12 (2.2)	560 (10.2)	32 (3.5)	544 (6.6)	38 (4.6)	543 (5.5)	18 (3.6)	561 (5.9)	10 (0.5)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 9.11: Teachers' Years of Experience

Students' Results based on Teachers' Reports

Country		20 Years or More		At Least 10 but Less than 20 Years		At Least 5 but Less than 10 Years		Less than 5 Years		Average Years of Experience
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Australia		31 (3.2)	527 (7.5)	26 (3.0)	518 (7.9)	19 (2.6)	514 (9.2)	25 (2.6)	515 (8.3)	14 (0.8)
Bahrain		28 (3.1)	471 (4.6)	41 (3.4)	486 (3.7)	21 (2.6)	486 (3.3)	10 (2.3)	479 (8.4)	14 (0.5)
Chile		29 (3.5)	444 (7.0)	24 (3.3)	454 (7.8)	28 (3.4)	435 (7.4)	20 (3.4)	427 (7.3)	15 (1.0)
Chinese Taipei		40 (3.5)	618 (4.8)	42 (3.3)	608 (4.5)	16 (2.5)	609 (8.0)	3 (1.1)	622 (32.6)	17 (0.5)
Cyprus	r	16 (3.7)	517 (11.7)	47 (4.4)	507 (5.1)	19 (4.0)	495 (8.9)	19 (3.5)	497 (5.3)	12 (0.7)
Egypt		45 (3.6)	423 (7.6)	29 (4.0)	410 (9.9)	18 (3.4)	396 (14.0)	7 (2.1)	406 (16.8)	18 (0.7)
England	s	26 (4.4)	546 (12.4)	40 (4.8)	517 (11.0)	16 (3.8)	528 (12.2)	19 (4.4)	491 (22.1)	14 (0.9)
Finland		29 (2.9)	514 (4.8)	38 (2.9)	508 (3.6)	14 (2.1)	511 (5.3)	19 (2.8)	501 (4.1)	14 (0.6)
France	r	29 (3.6)	488 (5.2)	38 (4.0)	479 (4.9)	18 (3.5)	470 (6.4)	14 (2.9)	492 (11.4)	15 (0.6)
Georgia		65 (4.3)	457 (6.0)	22 (3.9)	473 (9.0)	10 (2.7)	452 (11.3)	3 (1.6)	525 (40.8)	24 (1.0)
Hong Kong SAR		35 (4.2)	571 (9.4)	29 (3.9)	585 (11.0)	15 (2.7)	589 (11.0)	20 (3.3)	569 (13.5)	15 (0.8)
Hungary		70 (3.5)	513 (4.4)	19 (2.8)	525 (8.0)	7 (2.0)	514 (8.0)	4 (1.4)	509 (25.1)	26 (0.9)
Iran, Islamic Rep. of		42 (3.2)	462 (7.2)	36 (3.4)	432 (6.8)	8 (2.1)	456 (19.1)	14 (2.5)	430 (11.8)	17 (0.7)
Ireland		28 (3.0)	524 (5.0)	30 (2.7)	526 (5.5)	26 (2.7)	524 (6.1)	16 (2.5)	521 (6.1)	14 (0.7)
Israel		40 (3.4)	547 (8.6)	26 (2.8)	510 (9.8)	19 (2.2)	493 (9.2)	15 (1.9)	499 (12.8)	16 (0.6)
Italy		42 (3.5)	499 (3.9)	43 (3.7)	495 (4.2)	11 (2.3)	500 (8.9)	5 (1.8)	506 (8.8)	19 (0.8)
Japan		35 (3.9)	588 (4.1)	27 (3.6)	604 (7.4)	21 (3.2)	593 (5.1)	18 (3.0)	592 (4.9)	16 (0.8)
Jordan		16 (2.5)	432 (8.0)	34 (3.4)	424 (6.5)	24 (3.5)	426 (6.6)	25 (3.6)	403 (9.8)	11 (0.6)
Kazakhstan		51 (3.9)	490 (5.4)	22 (3.2)	497 (9.9)	18 (3.0)	467 (9.1)	9 (2.1)	472 (15.5)	20 (0.9)
Korea, Rep. of		34 (3.7)	607 (4.1)	32 (3.9)	611 (5.9)	17 (3.3)	610 (7.3)	17 (2.6)	595 (8.6)	15 (0.8)
Kuwait		19 (3.2)	398 (9.8)	50 (4.2)	401 (6.3)	26 (3.0)	403 (7.4)	6 (2.1)	397 (30.7)	13 (0.6)
Lebanon		26 (3.7)	452 (7.7)	30 (3.8)	430 (7.9)	26 (3.1)	418 (6.4)	18 (3.7)	419 (9.1)	13 (0.8)
Lithuania		78 (3.4)	519 (3.9)	18 (3.2)	527 (9.0)	3 (1.4)	536 (28.9)	1 (0.7)	~ ~	29 (0.7)
Malaysia		28 (2.7)	442 (7.4)	43 (3.8)	469 (5.4)	18 (2.9)	466 (10.7)	11 (2.2)	466 (17.9)	14 (0.5)
Morocco		30 (3.2)	391 (4.6)	10 (1.7)	407 (11.7)	18 (2.5)	406 (5.5)	42 (3.1)	374 (3.7)	13 (0.9)
New Zealand		34 (3.8)	475 (7.9)	34 (3.4)	480 (6.2)	17 (2.8)	491 (7.8)	16 (2.9)	494 (8.6)	16 (0.9)
Norway (9)	r	25 (3.8)	504 (5.3)	31 (4.0)	506 (5.5)	18 (3.1)	499 (5.7)	27 (4.0)	508 (4.1)	13 (0.9)
Oman		12 (1.8)	439 (9.1)	67 (3.2)	406 (3.8)	17 (2.6)	403 (8.1)	4 (1.3)	429 (16.5)	14 (0.3)
Portugal		65 (3.4)	501 (4.1)	30 (3.2)	502 (5.1)	5 (1.8)	482 (19.0)	0 (0.5)	~ ~	22 (0.6)
Qatar		20 (2.8)	418 (11.6)	36 (4.3)	433 (6.9)	30 (4.1)	474 (11.2)	14 (2.8)	443 (9.6)	13 (0.6)
Romania		67 (3.6)	486 (5.5)	24 (2.8)	465 (7.7)	4 (1.5)	477 (23.0)	4 (1.6)	453 (26.8)	24 (0.8)
Russian Federation		73 (3.7)	545 (4.8)	15 (3.4)	545 (8.1)	6 (1.8)	533 (17.8)	6 (1.8)	533 (27.0)	26 (1.0)
Saudi Arabia		18 (2.7)	408 (6.2)	34 (3.6)	397 (4.1)	25 (3.4)	395 (5.6)	23 (2.8)	378 (5.2)	11 (0.5)
Singapore		14 (1.8)	645 (13.6)	34 (2.8)	608 (6.5)	37 (2.7)	617 (7.0)	16 (2.4)	604 (8.2)	11 (0.4)
South Africa (9)		29 (2.8)	395 (4.9)	28 (2.9)	385 (5.3)	21 (2.7)	383 (6.8)	22 (2.3)	397 (5.4)	14 (0.5)
Sweden		35 (3.7)	506 (5.4)	38 (3.7)	500 (3.7)	15 (2.7)	500 (8.3)	12 (2.5)	507 (8.2)	16 (0.7)
Turkey		11 (2.0)	530 (9.3)	38 (4.0)	516 (8.3)	30 (3.8)	499 (9.0)	21 (2.5)	438 (9.4)	10 (0.5)
United Arab Emirates		22 (1.3)	445 (5.2)	43 (1.7)	475 (4.4)	23 (1.6)	495 (4.9)	12 (1.1)	481 (8.0)	14 (0.3)
United States		28 (2.4)	525 (9.8)	39 (2.8)	522 (6.3)	19 (2.3)	493 (9.9)	13 (1.6)	516 (9.8)	15 (0.5)
International Average		**35 (0.5)**	**494 (1.2)**	**33 (0.6)**	**491 (1.1)**	**18 (0.5)**	**488 (1.8)**	**14 (0.4)**	**483 (2.6)**	**16 (0.1)**
Benchmarking Participants										
Ontario, Canada		26 (4.8)	549 (12.1)	44 (4.2)	524 (5.3)	20 (4.2)	531 (7.8)	9 (2.7)	527 (5.8)	15 (0.8)
Quebec, Canada		35 (4.5)	558 (7.4)	46 (5.2)	535 (6.2)	10 (2.8)	529 (15.3)	9 (2.9)	532 (10.7)	17 (0.9)
Moscow City, Russian Fed.		66 (3.8)	579 (4.9)	18 (2.6)	577 (9.9)	9 (2.2)	544 (7.9)	7 (2.0)	575 (14.4)	24 (1.0)
Gauteng, RSA (9)		29 (4.1)	415 (7.7)	31 (4.0)	413 (7.0)	19 (3.4)	424 (8.2)	21 (3.7)	436 (10.6)	14 (1.0)
Western Cape, RSA (9)		39 (4.1)	445 (8.7)	18 (3.4)	452 (16.2)	19 (3.2)	425 (10.0)	23 (3.7)	439 (10.0)	15 (0.9)
Abu Dhabi, UAE	r	26 (1.9)	423 (7.1)	40 (2.6)	416 (7.0)	25 (2.2)	467 (8.0)	10 (1.7)	456 (23.0)	14 (0.4)
Dubai, UAE		12 (2.1)	505 (14.8)	53 (2.8)	542 (5.2)	21 (2.2)	551 (4.2)	14 (2.3)	526 (10.3)	12 (0.5)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 9.12: Teachers' Years of Experience

Students' Results based on Teachers' Reports

Country	20 Years or More		At Least 10 but Less than 20 Years		At Least 5 but Less than 10 Years		Less than 5 Years		Average Years of Experience
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Australia	28 (3.1)	535 (6.9)	22 (2.5)	533 (8.2)	21 (2.6)	535 (7.2)	28 (3.1)	526 (4.9)	13 (0.7)
Bahrain	24 (3.0)	464 (7.9)	37 (3.7)	499 (5.3)	23 (2.4)	500 (5.9)	15 (2.5)	479 (8.1)	13 (0.4)
Chile	21 (3.0)	454 (7.0)	34 (3.3)	475 (5.4)	27 (3.5)	464 (6.6)	18 (3.5)	455 (9.4)	13 (0.8)
Chinese Taipei	35 (3.2)	573 (3.5)	42 (4.0)	576 (4.1)	12 (2.3)	563 (6.3)	11 (2.6)	580 (5.6)	16 (0.6)
Cyprus s	20 (2.0)	490 (7.1)	42 (1.5)	483 (3.3)	25 (2.0)	489 (5.7)	13 (0.9)	490 (4.2)	13 (0.3)
Egypt	40 (3.8)	389 (8.5)	37 (4.2)	390 (9.6)	21 (3.1)	382 (14.7)	2 (1.1)	~ ~	17 (0.6)
England s	18 (4.4)	520 (18.5)	34 (4.9)	524 (8.6)	34 (5.3)	529 (15.8)	13 (3.5)	507 (16.3)	12 (0.8)
Finland	32 (2.2)	546 (3.9)	32 (2.3)	544 (4.3)	20 (1.6)	540 (4.1)	15 (1.4)	536 (6.1)	15 (0.4)
France r	29 (2.7)	497 (4.1)	36 (2.7)	490 (4.0)	13 (2.0)	489 (7.2)	22 (2.7)	475 (5.7)	14 (0.6)
Georgia	70 (2.2)	445 (4.3)	21 (1.9)	448 (5.3)	6 (1.0)	457 (5.4)	3 (0.7)	466 (18.7)	26 (0.6)
Hong Kong SAR	37 (3.6)	500 (10.5)	30 (4.0)	498 (12.3)	13 (3.0)	526 (17.1)	20 (3.2)	507 (11.1)	15 (0.8)
Hungary	66 (2.4)	527 (3.3)	20 (2.0)	538 (5.6)	7 (1.2)	528 (6.6)	6 (1.2)	514 (8.9)	24 (0.7)
Iran, Islamic Rep. of	45 (3.3)	464 (5.8)	30 (3.1)	441 (7.7)	9 (2.0)	422 (11.8)	15 (2.8)	440 (13.0)	17 (0.7)
Ireland	37 (3.8)	534 (4.3)	26 (3.2)	530 (6.0)	21 (2.8)	516 (6.4)	17 (2.2)	520 (8.7)	16 (0.8)
Israel	38 (3.5)	528 (7.1)	23 (3.0)	506 (9.9)	16 (2.9)	504 (13.1)	23 (3.5)	509 (11.5)	15 (0.9)
Italy	41 (3.8)	503 (3.9)	44 (4.0)	499 (4.7)	11 (2.4)	494 (8.4)	4 (1.5)	516 (7.6)	19 (0.8)
Japan	32 (3.7)	570 (4.4)	19 (3.3)	566 (3.3)	27 (3.8)	570 (3.7)	23 (3.7)	571 (6.0)	15 (1.0)
Jordan	13 (2.9)	449 (14.9)	33 (3.6)	459 (8.6)	33 (4.1)	451 (9.2)	21 (3.0)	441 (11.1)	11 (0.5)
Kazakhstan	45 (2.0)	484 (3.7)	27 (1.8)	469 (5.3)	16 (1.6)	468 (6.3)	12 (1.3)	484 (6.7)	18 (0.5)
Korea, Rep. of	38 (3.2)	561 (3.3)	28 (3.3)	562 (3.4)	14 (2.6)	565 (3.7)	20 (2.4)	555 (5.2)	16 (0.7)
Kuwait	19 (3.7)	454 (11.5)	42 (3.5)	442 (9.2)	25 (3.6)	439 (12.0)	13 (3.4)	446 (15.2)	12 (0.8)
Lebanon	16 (2.1)	381 (13.2)	36 (2.7)	366 (7.7)	24 (2.4)	385 (8.6)	24 (2.1)	387 (7.9)	11 (0.4)
Lithuania	76 (2.0)	531 (3.1)	18 (1.6)	539 (3.7)	4 (0.9)	552 (11.5)	2 (0.7)	~ ~	26 (0.5)
Malaysia	20 (2.9)	452 (8.7)	48 (4.0)	457 (6.1)	21 (3.0)	473 (9.9)	11 (2.6)	464 (15.2)	13 (0.5)
Morocco	27 (2.2)	405 (4.6)	19 (2.0)	403 (4.3)	20 (1.9)	396 (5.8)	33 (2.3)	378 (5.3)	13 (0.6)
New Zealand	32 (3.1)	494 (10.4)	32 (3.3)	508 (6.3)	16 (2.5)	507 (6.7)	20 (2.7)	495 (7.5)	15 (0.9)
Norway (9) r	26 (4.1)	503 (5.9)	27 (4.2)	491 (6.3)	16 (2.9)	487 (7.9)	31 (4.6)	504 (5.0)	12 (1.0)
Oman	13 (2.4)	459 (9.6)	70 (2.9)	460 (3.9)	12 (2.6)	453 (9.0)	5 (1.2)	449 (11.6)	14 (0.4)
Portugal	71 (2.6)	518 (3.3)	22 (2.7)	517 (5.6)	6 (1.9)	537 (7.5)	1 (0.3)	~ ~	23 (0.5)
Qatar	12 (2.2)	464 (10.9)	38 (3.9)	469 (7.4)	35 (2.5)	473 (8.7)	15 (2.9)	495 (11.2)	11 (0.5)
Romania	68 (2.4)	468 (5.0)	23 (2.2)	474 (6.0)	4 (0.9)	485 (15.3)	6 (1.5)	475 (11.5)	24 (0.5)
Russian Federation	66 (2.0)	544 (3.8)	16 (1.5)	540 (7.1)	8 (1.2)	541 (7.3)	10 (1.1)	541 (8.4)	23 (0.5)
Saudi Arabia	23 (2.9)	433 (6.6)	37 (3.8)	435 (4.3)	27 (3.5)	430 (7.5)	13 (2.6)	423 (7.6)	13 (0.5)
Singapore	15 (1.9)	617 (11.0)	30 (2.6)	606 (7.6)	36 (2.4)	606 (7.8)	19 (2.0)	605 (10.0)	12 (0.5)
South Africa (9)	33 (2.8)	376 (6.8)	31 (3.0)	368 (6.6)	12 (1.8)	376 (10.2)	24 (3.0)	363 (8.3)	15 (0.6)
Sweden	28 (3.2)	526 (5.8)	45 (3.4)	519 (4.4)	10 (2.2)	520 (6.3)	17 (2.8)	523 (8.5)	15 (0.6)
Turkey	23 (3.2)	542 (6.8)	32 (3.5)	529 (7.5)	24 (3.2)	503 (7.8)	21 (2.4)	480 (13.6)	12 (0.6)
United Arab Emirates	19 (1.5)	448 (8.4)	39 (1.5)	473 (5.8)	30 (1.7)	485 (6.6)	12 (1.0)	486 (10.3)	13 (0.4)
United States	26 (2.3)	535 (11.3)	36 (2.5)	532 (5.4)	17 (1.8)	526 (9.5)	20 (2.3)	497 (11.7)	14 (0.5)
International Average	**34 (0.5)**	**492 (1.3)**	**32 (0.5)**	**491 (1.0)**	**18 (0.4)**	**491 (1.5)**	**15 (0.4)**	**488 (1.7)**	**16 (0.1)**
Benchmarking Participants									
Ontario, Canada s	24 (4.9)	541 (9.8)	50 (5.7)	514 (5.5)	19 (3.9)	509 (9.1)	7 (1.6)	550 (20.0)	15 (0.7)
Moscow City, Russian Fed.	63 (2.0)	567 (2.9)	19 (2.0)	566 (3.9)	9 (1.4)	563 (7.1)	9 (1.2)	564 (4.7)	22 (0.5)
Gauteng, RSA (9)	27 (4.0)	418 (9.5)	38 (3.8)	419 (7.8)	13 (2.8)	420 (14.8)	22 (3.4)	432 (12.2)	14 (0.8)
Western Cape, RSA (9)	43 (4.5)	450 (9.2)	22 (3.6)	424 (12.6)	11 (2.3)	473 (24.5)	24 (3.9)	421 (11.8)	16 (1.1)
Abu Dhabi, UAE	19 (1.6)	390 (15.3)	39 (2.6)	425 (8.7)	31 (2.5)	416 (9.8)	11 (1.9)	445 (13.1)	13 (0.4)
Dubai, UAE	12 (1.9)	514 (11.5)	38 (3.5)	541 (8.5)	34 (3.4)	571 (8.4)	16 (2.3)	555 (6.3)	11 (0.4)
Quebec, Canada y	- -	- -	- -	- -	- -	- -	- -	- -	- -

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Teachers' Participation in Professional Development

Exhibits 9.13, 9.14, 9.15, and 9.16 present, for fourth grade mathematics and science and eighth grade mathematics and science, respectively, teachers' reports about their participation in professional development during the last two years. Mathematics teachers in both grades were asked whether they had participated in professional development in the following areas: mathematics content, mathematics pedagogy/instruction, mathematics curriculum, integrating technology into mathematics instruction, improving students' critical thinking or problem solving skills, mathematics assessment, and addressing individual students' needs. Science teachers in both grades were asked about the same areas, though specific to science instead of mathematics, including asking about professional development related to students' critical thinking and inquiry skills rather than problem solving skills. Teachers of fourth grade science were also asked about professional development related to integrating science with other subjects.

Although there was variation across countries, the most common areas of mathematics professional development for mathematics teachers of fourth grade students on average were mathematics content, mathematics pedagogy/instruction, and improving students' critical thinking or problem solving skills. As shown in Exhibit 9.13, on average across countries, between 44 and 46 percent of fourth grade students' teachers participated in professional development related to mathematics content (46%), mathematics pedagogy/instruction (45%), and improving students' critical thinking or problem solving skills (44%). Integrating technology into mathematics instruction and mathematics assessment were the least common areas, with teachers of 35 percent and 37 percent of students, respectively, reporting that they participated in professional development in these areas. In science in the fourth grade, improving students' critical thinking or inquiry skills in science, science content, and science curriculum were the three most common areas of professional development. However, participation in professional development related to science was on the whole less common than for mathematics in the fourth grade. As shown in Exhibit 9.14, just over one-third of students, on average, had science teachers who reported that they participated in professional development related to critical thinking or inquiry skills in science (36%), science content (35%), and science curriculum (34%). Integrating technology into the science curriculum and science assessment were two of the least common areas for professional development (32% and 28% of students, respectively), along with integrating science with other subjects (31% of students).

Teachers of eighth grade students reported somewhat higher levels of participation in professional development than teachers of fourth grade students. Eighth grade teachers of mathematics and science reported similar levels of participation. As shown in Exhibits 9.15 and 9.16, the three most common areas of professional development for both teachers of mathematics and science were pedagogy/instruction, content, and curriculum. More than 50 percent of students, on average, had teachers who reported that they participated in professional development related to pedagogy/instruction (60% in mathematics and 59% in science), content (57% in both), and curriculum (53% in mathematics and 52% in science). From 44 percent to 50 percent of eighth grade students were taught by teachers who had some professional development in the other four areas, with addressing individual students' needs being the least common area (44% of students for both subjects).

Exhibit 9.13: Teachers' Participation in Professional Development in Mathematics in the Past Two Years

Students' Results based on Teachers' Reports

Country	Percent of Students by Teachers' Participation in Professional Development*						
	Mathematics Content	Mathematics Pedagogy/ Instruction	Mathematics Curriculum	Integrating Technology into Mathematics Instruction	Improving Students' Critical Thinking or Problem Solving Skills	Mathematics Assessment	Addressing Individual Students' Needs
Albania	29 (3.6)	33 (3.3)	48 (4.0)	32 (4.0)	52 (3.9)	49 (4.0)	46 (3.9)
Armenia	46 (3.4)	48 (4.0)	55 (4.1)	48 (4.1)	40 (3.7)	44 (3.7)	47 (3.8)
Australia	56 (3.7)	54 (3.4)	53 (3.4)	30 (3.3)	55 (3.6)	43 (3.2)	52 (3.8)
Austria	50 (3.1)	41 (3.0)	16 (2.4)	13 (1.9)	34 (3.4)	22 (2.7)	51 (2.9)
Azerbaijan	49 (4.0)	39 (3.7)	61 (3.7)	33 (3.7)	43 (3.7)	57 (3.6)	39 (3.6)
Bahrain	51 (3.5)	68 (2.6)	45 (3.3)	72 (3.1)	69 (2.6)	52 (3.0)	61 (3.0)
Belgium (Flemish)	17 (2.7)	19 (2.9)	35 (3.8)	8 (1.9)	15 (3.0)	5 (1.7)	34 (3.5)
Bosnia and Herzegovina	15 (2.1)	10 (1.7)	19 (2.6)	12 (2.1)	20 (2.7)	15 (2.5)	21 (2.7)
Bulgaria	30 (3.3)	25 (3.1)	29 (3.9)	26 (3.5)	19 (3.1)	26 (3.4)	25 (3.5)
Canada	62 (2.1)	r 68 (1.8)	47 (2.8)	37 (3.0)	58 (2.1)	52 (2.9)	52 (2.1)
Chile	43 (4.3)	33 (4.3)	30 (3.9)	17 (3.4)	36 (4.4)	24 (3.8)	42 (3.6)
Chinese Taipei	53 (3.8)	46 (4.0)	59 (4.1)	41 (3.8)	45 (3.7)	44 (3.6)	54 (4.0)
Croatia	49 (3.4)	35 (4.0)	36 (3.1)	43 (3.3)	44 (3.4)	36 (3.4)	43 (3.6)
Cyprus	67 (3.8)	51 (4.5)	64 (3.8)	26 (3.0)	32 (3.7)	25 (2.5)	15 (2.6)
Czech Republic	32 (3.6)	43 (3.8)	14 (2.7)	31 (3.4)	47 (3.8)	28 (3.7)	51 (3.1)
Denmark	r 26 (3.5)	r 22 (3.2)	r 13 (2.7)	r 20 (3.1)	r 15 (2.9)	r 17 (2.7)	r 15 (3.2)
Finland	7 (1.9)	17 (2.6)	12 (2.0)	15 (2.3)	8 (2.0)	9 (1.9)	17 (2.6)
France	64 (3.5)	68 (3.5)	36 (3.7)	13 (2.4)	39 (3.2)	6 (1.6)	21 (2.6)
Georgia	48 (3.8)	57 (3.8)	59 (4.1)	57 (3.6)	50 (4.3)	46 (3.4)	48 (4.3)
Germany	37 (3.3)	28 (3.5)	27 (3.3)	8 (2.0)	20 (3.2)	18 (2.9)	29 (3.3)
Hong Kong SAR	72 (3.2)	72 (3.3)	72 (3.9)	77 (3.9)	58 (4.3)	40 (4.3)	56 (4.2)
Hungary	5 (1.4)	16 (2.4)	4 (1.4)	12 (2.0)	21 (2.4)	5 (1.3)	30 (3.2)
Iran, Islamic Rep. of	59 (3.7)	64 (3.6)	35 (3.8)	24 (3.5)	32 (3.0)	35 (3.8)	57 (3.8)
Ireland	36 (3.6)	33 (3.5)	23 (3.5)	23 (3.2)	34 (3.6)	19 (2.7)	31 (3.4)
Italy	33 (3.6)	47 (3.5)	30 (3.6)	33 (3.0)	27 (3.4)	25 (3.4)	42 (3.9)
Japan	55 (3.7)	58 (2.9)	23 (2.8)	11 (2.6)	29 (3.0)	21 (3.1)	33 (3.4)
Kazakhstan	54 (3.9)	60 (3.8)	63 (3.4)	62 (3.7)	69 (3.6)	65 (3.5)	58 (3.8)
Korea, Rep. of	30 (4.3)	28 (3.7)	39 (4.1)	15 (2.9)	38 (3.8)	38 (4.1)	49 (4.0)
Kosovo	24 (3.5)	20 (3.4)	15 (3.4)	16 (3.3)	39 (3.8)	31 (4.0)	24 (3.4)
Kuwait	78 (3.6)	75 (3.6)	74 (3.5)	70 (4.0)	66 (3.9)	67 (4.4)	69 (3.5)
Latvia	42 (3.7)	37 (3.5)	34 (3.7)	48 (3.7)	67 (3.6)	37 (3.4)	42 (3.6)
Lithuania	24 (3.0)	29 (3.5)	24 (3.6)	55 (3.5)	53 (3.6)	34 (3.7)	45 (4.2)
Malta	60 (0.4)	62 (0.4)	55 (0.5)	41 (0.4)	62 (0.4)	67 (0.4)	45 (0.4)
Montenegro	30 (2.4)	23 (1.9)	21 (2.2)	14 (1.9)	38 (2.4)	35 (2.7)	30 (2.5)
Morocco	30 (3.7)	35 (3.0)	33 (3.4)	18 (3.2)	32 (3.5)	48 (3.3)	37 (3.6)
Netherlands	r 39 (4.6)	r 34 (4.6)	r 24 (5.1)	r 4 (1.5)	r 26 (4.8)	r 22 (4.3)	r 46 (5.2)
New Zealand	59 (3.7)	61 (3.3)	50 (3.6)	26 (2.9)	58 (3.3)	36 (3.4)	46 (3.1)
North Macedonia	36 (4.3)	22 (3.6)	25 (3.7)	22 (3.8)	31 (4.4)	32 (4.3)	29 (4.3)
Northern Ireland	50 (4.2)	57 (3.9)	39 (4.2)	37 (4.2)	56 (4.2)	30 (4.2)	33 (4.2)
Norway (5)	r 23 (4.0)	r 25 (4.0)	r 8 (2.5)	r 18 (3.8)	r 19 (3.4)	r 12 (3.1)	r 14 (3.3)
Oman	66 (3.2)	65 (3.4)	64 (3.3)	42 (3.3)	56 (3.7)	73 (2.8)	50 (3.4)
Pakistan	72 (5.0)	63 (6.9)	63 (7.7)	42 (7.8)	79 (4.1)	75 (4.7)	75 (4.6)
Philippines	68 (3.5)	71 (3.9)	67 (3.7)	56 (4.2)	66 (3.8)	63 (3.8)	65 (3.7)
Poland	74 (3.5)	55 (3.6)	69 (3.7)	63 (3.6)	46 (4.0)	38 (4.2)	54 (3.6)
Portugal	41 (3.3)	37 (3.6)	30 (3.0)	25 (3.1)	33 (3.2)	14 (2.2)	37 (3.4)
Qatar	64 (3.7)	68 (3.0)	60 (3.2)	70 (3.5)	72 (3.3)	54 (3.0)	71 (2.9)
Russian Federation	37 (3.8)	43 (3.8)	50 (3.8)	55 (3.4)	51 (3.6)	55 (3.7)	51 (4.2)
Saudi Arabia	55 (3.7)	59 (3.9)	43 (3.7)	53 (3.4)	52 (4.1)	35 (3.5)	50 (4.1)
Serbia	42 (3.7)	30 (3.8)	29 (3.7)	27 (4.0)	44 (3.8)	29 (3.4)	47 (3.8)
Singapore	74 (2.4)	82 (2.6)	69 (2.4)	61 (2.3)	62 (2.7)	67 (2.6)	46 (2.6)
Slovak Republic	15 (2.4)	23 (2.7)	42 (2.6)	37 (3.0)	21 (2.4)	15 (2.3)	22 (2.7)
South Africa (5)	85 (2.1)	57 (3.9)	85 (2.7)	46 (3.9)	67 (3.2)	78 (2.9)	60 (3.3)
Spain	37 (3.1)	45 (3.1)	28 (3.4)	28 (3.3)	45 (3.5)	24 (2.8)	49 (3.7)
Sweden	22 (3.1)	23 (3.2)	23 (3.8)	29 (4.1)	17 (3.0)	24 (3.9)	33 (4.6)
Turkey (5)	22 (3.3)	27 (3.1)	32 (3.1)	32 (3.5)	17 (3.4)	15 (2.9)	14 (2.6)
United Arab Emirates	r 68 (1.5)	r 70 (1.3)	r 71 (1.8)	r 70 (1.3)	r 78 (1.2)	r 67 (1.3)	r 75 (1.6)
United States	66 (2.3)	65 (2.6)	70 (2.3)	47 (2.4)	59 (2.5)	48 (2.6)	56 (2.6)
England	x 66 (5.9)	x 63 (6.9)	x 57 (6.9)	x 17 (4.4)	x 63 (5.5)	x 47 (6.9)	x 42 (6.8)
International Average	**46 (0.5)**	**45 (0.5)**	**41 (0.5)**	**35 (0.4)**	**44 (0.5)**	**37 (0.4)**	**43 (0.5)**
Benchmarking Participants							
Ontario, Canada	r 81 (2.6)	r 81 (2.4)	r 66 (5.1)	r 49 (5.5)	r 76 (3.3)	r 61 (5.4)	r 68 (3.7)
Quebec, Canada	38 (4.0)	50 (4.5)	20 (3.3)	22 (4.0)	34 (4.4)	44 (4.2)	27 (3.9)
Moscow City, Russian Fed.	26 (3.6)	27 (3.9)	37 (4.1)	62 (4.2)	36 (4.4)	35 (4.4)	40 (4.0)
Madrid, Spain	39 (4.0)	44 (4.0)	23 (3.4)	33 (4.6)	41 (4.0)	22 (3.8)	50 (4.2)
Abu Dhabi, UAE	r 64 (2.2)	r 65 (2.1)	r 62 (2.5)	r 58 (2.7)	r 68 (2.3)	r 57 (2.4)	r 65 (2.5)
Dubai, UAE	r 69 (2.2)	r 69 (2.5)	r 73 (1.3)	r 77 (1.8)	r 84 (2.1)	r 69 (2.4)	r 81 (2.1)

* Teachers could indicate participating in more than one area of professional development.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "x" indicates data are available for less than 50% of the students—interpret with caution.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 9.14: Teachers' Participation in Professional Development in Science in the Past Two Years

Students' Results based on Teachers' Reports

Country	Percent of Students by Teachers' Participation in Professional Development*							
	Science Content	Science Pedagogy/ Instruction	Science Curriculum	Integrating Technology into Science Instruction	Improving Students' Critical Thinking or Inquiry Skills	Science Assessment	Addressing Individual Students' Needs	Integrating Science with Other Subjects
Albania	29 (3.9)	29 (3.9)	43 (3.7)	26 (3.9)	51 (3.9)	45 (3.8)	28 (3.6)	38 (4.3)
Armenia	35 (4.2)	39 (4.0)	r 44 (4.0)	41 (4.4)	r 43 (3.8)	r 40 (4.5)	r 43 (4.2)	r 57 (4.1)
Australia	35 (3.6)	31 (3.5)	35 (3.4)	34 (3.8)	43 (3.9)	18 (2.8)	30 (3.6)	30 (3.3)
Austria	40 (3.1)	19 (2.3)	15 (2.3)	9 (1.9)	24 (3.1)	6 (1.9)	15 (2.5)	14 (2.4)
Azerbaijan	25 (2.9)	16 (2.5)	38 (3.5)	30 (3.3)	36 (3.7)	38 (3.9)	39 (3.6)	45 (3.9)
Bahrain	42 (3.3)	69 (3.0)	47 (2.8)	80 (2.3)	78 (2.7)	61 (3.0)	57 (3.0)	70 (3.1)
Belgium (Flemish)	17 (3.0)	11 (2.5)	37 (3.4)	10 (2.3)	6 (1.8)	6 (1.9)	14 (2.7)	21 (3.4)
Bosnia and Herzegovina	13 (2.0)	12 (1.9)	16 (2.3)	10 (1.7)	17 (2.5)	12 (2.1)	16 (2.3)	12 (1.7)
Bulgaria	15 (2.4)	14 (2.8)	20 (2.8)	19 (2.8)	9 (2.2)	14 (2.7)	12 (2.7)	15 (2.7)
Canada	r 16 (1.7)	r 14 (1.8)	r 15 (1.5)	r 18 (1.7)	r 24 (2.4)	r 9 (1.7)	r 23 (2.2)	r 20 (2.0)
Chile	r 20 (3.5)	r 12 (2.8)	r 15 (3.2)	r 16 (3.2)	r 27 (4.4)	r 11 (3.0)	r 36 (4.8)	r 23 (3.9)
Chinese Taipei	61 (3.8)	41 (3.9)	61 (4.0)	53 (4.0)	44 (3.6)	29 (4.1)	50 (3.5)	45 (3.6)
Croatia	57 (3.6)	41 (3.6)	34 (3.4)	43 (4.1)	38 (3.4)	32 (3.2)	35 (3.4)	34 (3.0)
Cyprus	55 (5.1)	47 (4.7)	54 (4.9)	23 (4.2)	38 (4.1)	15 (3.5)	12 (3.3)	17 (3.6)
Czech Republic	22 (3.0)	14 (2.6)	6 (1.6)	14 (2.3)	26 (3.3)	10 (2.2)	35 (3.5)	20 (2.9)
Denmark	r 24 (3.8)	r 16 (3.3)	r 13 (3.2)	r 16 (3.9)	r 18 (3.5)	r 8 (2.3)	r 7 (2.2)	r 10 (2.8)
Finland	5 (1.6)	7 (2.0)	8 (1.6)	11 (2.1)	7 (1.9)	7 (1.7)	10 (1.8)	7 (1.8)
France	14 (2.4)	15 (2.5)	13 (2.8)	10 (2.5)	14 (2.5)	4 (1.4)	11 (2.3)	12 (2.7)
Georgia	41 (4.1)	48 (3.9)	48 (4.4)	50 (4.4)	55 (4.4)	42 (4.4)	49 (4.2)	44 (4.3)
Germany	33 (3.4)	22 (3.0)	21 (2.9)	13 (2.7)	14 (3.2)	12 (2.6)	19 (3.1)	13 (2.8)
Hong Kong SAR	53 (4.2)	47 (4.6)	54 (4.8)	66 (4.9)	61 (4.8)	34 (4.3)	48 (4.2)	58 (4.5)
Hungary	4 (1.4)	8 (1.9)	1 (0.7)	8 (2.5)	24 (2.6)	2 (1.1)	26 (3.4)	8 (1.8)
Iran, Islamic Rep. of	49 (3.6)	51 (3.2)	34 (3.1)	26 (2.9)	32 (3.5)	32 (3.7)	39 (3.7)	29 (3.0)
Ireland	25 (3.6)	22 (3.0)	21 (3.2)	22 (3.3)	29 (3.9)	12 (2.5)	19 (2.8)	28 (3.6)
Italy	13 (2.5)	18 (2.7)	18 (3.1)	19 (3.1)	22 (3.5)	18 (3.2)	28 (3.5)	20 (3.0)
Japan	40 (3.9)	37 (4.0)	18 (3.0)	11 (2.4)	12 (2.5)	13 (2.9)	14 (3.0)	4 (1.7)
Kazakhstan	51 (4.1)	56 (4.0)	54 (4.0)	57 (4.2)	66 (3.4)	61 (3.6)	63 (3.4)	56 (3.9)
Korea, Rep. of	31 (3.8)	35 (3.5)	46 (3.7)	27 (3.7)	32 (3.6)	33 (3.6)	33 (3.5)	35 (3.9)
Kosovo	16 (2.7)	16 (3.2)	10 (2.3)	9 (2.4)	28 (3.5)	24 (3.5)	18 (4.0)	19 (3.4)
Kuwait	78 (3.9)	80 (2.6)	82 (3.1)	75 (3.4)	78 (3.6)	76 (3.5)	70 (3.4)	71 (3.9)
Latvia	37 (3.9)	33 (3.7)	32 (3.8)	44 (3.9)	62 (4.0)	28 (3.5)	41 (4.3)	40 (3.7)
Lithuania	28 (3.7)	26 (3.2)	22 (3.4)	35 (3.5)	44 (3.9)	20 (2.7)	38 (3.8)	37 (3.9)
Malta	31 (0.4)	33 (0.4)	25 (0.4)	19 (0.3)	33 (0.4)	30 (0.4)	23 (0.3)	26 (0.4)
Montenegro	31 (2.2)	19 (1.8)	28 (2.4)	15 (1.9)	33 (2.3)	27 (1.8)	25 (2.2)	22 (2.5)
Morocco	24 (3.3)	33 (3.8)	30 (3.3)	23 (3.1)	28 (3.4)	39 (3.5)	38 (4.1)	25 (3.2)
Netherlands	r 8 (3.2)	r 9 (3.3)	r 8 (3.2)	r 16 (4.6)	r 24 (5.2)	r 8 (3.5)	r 17 (4.5)	r 15 (4.6)
New Zealand	29 (3.0)	30 (2.8)	28 (2.8)	20 (2.5)	34 (3.1)	13 (2.2)	21 (2.7)	25 (3.0)
North Macedonia	22 (3.5)	15 (3.0)	19 (3.5)	14 (2.8)	21 (3.2)	23 (3.7)	26 (3.6)	17 (2.9)
Northern Ireland	21 (3.3)	25 (3.5)	17 (3.6)	25 (3.7)	31 (4.3)	5 (2.1)	14 (3.2)	27 (3.8)
Norway (5)	s 11 (2.8)	s 8 (2.4)	s 5 (2.0)	s 8 (2.6)	s 7 (2.2)	s 5 (2.1)	s 9 (2.9)	s 9 (2.3)
Oman	63 (3.2)	59 (3.3)	55 (3.1)	37 (2.9)	50 (3.7)	65 (2.9)	49 (3.7)	50 (3.7)
Pakistan	r 66 (6.2)	r 72 (5.8)	r 73 (5.4)	r 56 (7.5)	r 75 (5.2)	r 70 (5.8)	r 72 (5.8)	r 54 (7.8)
Philippines	76 (3.6)	68 (3.6)	73 (3.6)	61 (4.4)	68 (3.7)	63 (4.0)	63 (4.0)	62 (3.8)
Poland	64 (4.0)	33 (4.0)	57 (4.3)	56 (3.8)	45 (3.9)	34 (3.9)	52 (4.3)	28 (3.8)
Portugal	24 (2.6)	26 (2.9)	15 (2.5)	15 (2.4)	24 (3.1)	9 (1.9)	24 (3.1)	17 (2.5)
Qatar	59 (4.1)	62 (3.2)	46 (4.0)	65 (3.4)	69 (3.3)	54 (3.2)	67 (3.2)	60 (3.7)
Russian Federation	33 (3.4)	36 (3.5)	48 (3.9)	50 (3.6)	46 (3.4)	48 (3.6)	47 (3.9)	50 (3.5)
Saudi Arabia	49 (3.6)	47 (3.6)	52 (3.8)	r 51 (3.6)	r 39 (4.5)	r 39 (4.5)	r 56 (4.0)	r 44 (4.4)
Serbia	28 (3.5)	17 (2.9)	21 (3.5)	26 (3.6)	35 (3.8)	19 (3.3)	36 (3.9)	34 (4.1)
Singapore	67 (2.7)	81 (2.1)	63 (2.6)	58 (2.5)	49 (2.6)	71 (2.6)	36 (2.7)	30 (2.6)
Slovak Republic	24 (3.1)	25 (3.2)	45 (3.7)	35 (2.7)	19 (2.6)	12 (2.4)	17 (2.7)	20 (2.8)
South Africa (5)	68 (3.8)	46 (4.5)	76 (3.2)	59 (3.5)	60 (4.3)	63 (4.1)	55 (4.2)	61 (3.8)
Spain	16 (2.5)	25 (3.2)	16 (2.5)	29 (3.3)	33 (3.1)	19 (2.7)	40 (3.1)	23 (3.5)
Sweden	17 (3.4)	13 (2.8)	10 (2.4)	19 (3.4)	10 (2.6)	15 (3.2)	19 (3.6)	17 (3.4)
Turkey (5)	28 (3.4)	28 (3.7)	36 (3.6)	31 (3.8)	20 (3.0)	25 (3.5)	19 (3.2)	20 (3.0)
United Arab Emirates	r 70 (2.1)	r 67 (2.1)	r 72 (2.3)	r 69 (2.2)	r 77 (1.8)	r 68 (2.3)	r 73 (2.1)	r 70 (2.1)
United States	40 (2.3)	34 (2.2)	43 (2.4)	29 (2.2)	37 (2.2)	21 (1.7)	29 (2.3)	26 (2.0)
England	y - -	y - -	y - -	y - -	y - -	y - -	y - -	y - -
International Average	**35 (0.4)**	**33 (0.4)**	**34 (0.4)**	**32 (0.4)**	**36 (0.5)**	**28 (0.4)**	**33 (0.5)**	**31 (0.5)**
Benchmarking Participants								
Ontario, Canada	r 10 (2.7)	r 9 (2.4)	r 19 (3.1)	r 21 (3.3)	r 35 (4.9)	r 9 (3.2)	r 34 (4.4)	r 23 (3.6)
Quebec, Canada	r 19 (3.4)	r 17 (3.6)	r 3 (1.6)	r 12 (3.0)	r 5 (1.7)	r 7 (2.4)	r 5 (1.6)	r 9 (2.8)
Moscow City, Russian Fed.	18 (3.2)	21 (3.4)	38 (4.3)	50 (4.5)	35 (4.5)	28 (3.7)	31 (4.2)	42 (4.3)
Madrid, Spain	22 (3.0)	28 (3.8)	19 (3.0)	34 (4.4)	36 (3.7)	15 (2.5)	45 (4.0)	22 (3.5)
Abu Dhabi, UAE	r 65 (2.7)	r 61 (2.6)	r 65 (2.5)	r 55 (2.7)	r 70 (2.5)	r 59 (2.4)	r 64 (2.4)	r 61 (2.3)
Dubai, UAE	r 71 (2.0)	r 67 (2.3)	r 74 (1.9)	r 78 (2.0)	r 82 (2.0)	r 75 (2.0)	r 81 (2.1)	r 75 (1.5)

* Teachers could indicate participating in more than one area of professional development.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 9.15: Teachers' Participation in Professional Development in Mathematics in the Past Two Years

Students' Results based on Teachers' Reports

Country	Percent of Students by Teachers' Participation in Professional Development*						
	Mathematics Content	Mathematics Pedagogy/ Instruction	Mathematics Curriculum	Integrating Technology into Mathematics Instruction	Improving Students' Critical Thinking or Problem Solving Skills	Mathematics Assessment	Addressing Individual Students' Needs
Australia	58 (3.0)	63 (3.2)	63 (2.9)	55 (3.0)	58 (3.7)	52 (3.0)	60 (3.2)
Bahrain	52 (3.3)	70 (2.8)	45 (3.0)	79 (2.8)	75 (3.1)	57 (3.8)	59 (3.3)
Chile	50 (4.5)	40 (4.3)	33 (4.0)	28 (3.6)	38 (3.7)	23 (3.3)	36 (3.8)
Chinese Taipei	80 (2.9)	67 (3.2)	77 (3.1)	63 (3.5)	45 (3.0)	52 (3.4)	49 (3.2)
Cyprus	s 68 (3.5)	s 56 (4.0)	s 73 (3.9)	s 38 (4.9)	s 36 (3.8)	s 48 (4.4)	s 38 (4.6)
Egypt	67 (3.9)	69 (3.7)	58 (4.0)	52 (4.1)	66 (4.3)	55 (4.0)	61 (4.3)
England	s 72 (5.6)	s 67 (5.2)	s 75 (5.0)	s 22 (5.4)	s 47 (5.6)	s 45 (5.9)	s 42 (5.9)
Finland	15 (2.3)	29 (2.9)	35 (3.2)	45 (3.4)	15 (2.1)	28 (2.7)	16 (2.4)
France	r 43 (4.3)	r 46 (4.2)	r 47 (4.4)	r 55 (4.5)	r 15 (3.3)	r 33 (4.2)	r 22 (3.3)
Georgia	69 (4.4)	83 (3.5)	69 (3.5)	71 (4.0)	76 (4.3)	68 (4.3)	67 (4.2)
Hong Kong SAR	60 (3.8)	63 (4.3)	54 (4.0)	66 (4.2)	36 (3.8)	35 (4.2)	45 (4.5)
Hungary	17 (3.0)	32 (3.3)	9 (2.4)	28 (3.3)	20 (2.9)	18 (2.9)	24 (3.1)
Iran, Islamic Rep. of	60 (3.1)	65 (3.6)	44 (3.9)	46 (3.1)	36 (3.6)	41 (3.8)	43 (3.4)
Ireland	83 (1.9)	72 (2.6)	86 (2.2)	38 (3.0)	55 (3.0)	48 (2.9)	32 (2.4)
Israel	68 (2.9)	69 (3.0)	48 (3.2)	59 (3.2)	46 (3.2)	42 (2.9)	43 (2.8)
Italy	35 (3.2)	60 (3.9)	35 (3.8)	58 (3.4)	28 (3.4)	32 (3.6)	55 (3.8)
Japan	67 (3.8)	71 (3.6)	35 (3.8)	18 (2.5)	40 (3.6)	28 (3.2)	28 (3.3)
Jordan	39 (3.7)	44 (4.0)	50 (4.2)	48 (3.6)	53 (4.2)	48 (4.6)	46 (4.1)
Kazakhstan	75 (3.3)	80 (3.1)	74 (3.7)	65 (3.9)	68 (3.6)	71 (3.5)	54 (4.2)
Korea, Rep. of	52 (3.8)	65 (3.5)	60 (3.4)	32 (3.6)	40 (3.8)	60 (3.6)	40 (3.6)
Kuwait	84 (2.8)	79 (3.8)	71 (5.1)	65 (4.3)	66 (4.1)	65 (4.6)	60 (4.2)
Lebanon	61 (4.2)	56 (3.9)	54 (4.5)	59 (4.0)	65 (4.1)	58 (3.8)	56 (3.9)
Lithuania	54 (4.1)	59 (3.7)	32 (4.0)	63 (3.6)	51 (3.8)	57 (4.5)	58 (4.1)
Malaysia	74 (2.5)	61 (3.3)	74 (2.8)	46 (3.3)	47 (3.2)	56 (3.7)	32 (3.1)
Morocco	49 (3.8)	48 (3.5)	40 (3.4)	40 (3.4)	43 (3.4)	62 (3.2)	42 (3.4)
New Zealand	61 (2.7)	66 (2.9)	54 (3.4)	58 (3.2)	54 (3.2)	40 (3.5)	51 (3.1)
Norway (9)	s 21 (3.7)	s 23 (3.6)	s 15 (2.6)	s 30 (4.1)	s 16 (3.5)	s 21 (4.0)	s 10 (2.5)
Oman	58 (3.6)	62 (3.4)	52 (3.8)	42 (3.5)	37 (3.5)	57 (3.8)	32 (3.6)
Portugal	57 (4.2)	58 (4.1)	43 (4.3)	61 (3.8)	18 (3.2)	26 (3.6)	30 (3.6)
Qatar	70 (3.5)	77 (3.2)	68 (3.9)	75 (3.9)	70 (3.4)	63 (3.7)	71 (3.6)
Romania	38 (3.2)	35 (3.8)	28 (2.8)	31 (3.8)	22 (3.3)	33 (3.1)	33 (3.1)
Russian Federation	68 (3.4)	74 (3.8)	70 (3.3)	69 (3.4)	47 (3.4)	56 (3.7)	51 (3.6)
Saudi Arabia	46 (3.8)	64 (4.0)	38 (4.1)	59 (3.6)	62 (4.1)	35 (3.8)	47 (4.0)
Singapore	60 (2.7)	82 (2.3)	62 (2.7)	57 (2.6)	57 (2.6)	60 (2.6)	43 (2.7)
South Africa (9)	84 (2.3)	58 (3.0)	74 (2.4)	46 (3.1)	56 (2.8)	70 (2.5)	50 (3.0)
Sweden	34 (3.3)	41 (4.0)	29 (3.2)	51 (3.8)	23 (3.2)	29 (3.7)	40 (3.5)
Turkey	26 (3.0)	27 (3.4)	33 (3.5)	34 (3.8)	22 (2.9)	24 (3.8)	19 (3.1)
United Arab Emirates	76 (1.7)	75 (1.6)	r 71 (2.0)	r 79 (1.3)	r 83 (1.1)	74 (1.4)	r 77 (1.4)
United States	74 (2.3)	73 (2.7)	77 (2.7)	67 (2.9)	60 (2.9)	56 (2.8)	61 (3.0)
International Average	**57 (0.6)**	**60 (0.6)**	**53 (0.6)**	**51 (0.6)**	**46 (0.6)**	**47 (0.6)**	**44 (0.6)**
Benchmarking Participants							
Ontario, Canada	71 (3.9)	83 (2.7)	56 (4.6)	55 (3.8)	75 (3.9)	60 (4.9)	62 (4.2)
Quebec, Canada	32 (3.9)	54 (4.6)	17 (3.3)	67 (4.1)	25 (3.6)	36 (4.0)	36 (4.5)
Moscow City, Russian Fed.	61 (3.5)	59 (3.6)	57 (3.8)	78 (3.8)	39 (3.9)	47 (4.1)	42 (3.8)
Gauteng, RSA (9)	90 (2.7)	64 (4.1)	79 (3.3)	60 (3.9)	61 (4.4)	77 (3.7)	52 (4.8)
Western Cape, RSA (9)	85 (2.8)	58 (4.4)	79 (3.2)	58 (4.5)	47 (4.1)	62 (4.3)	40 (4.2)
Abu Dhabi, UAE	r 76 (3.1)	r 74 (2.3)	r 73 (2.7)	r 77 (2.4)	r 78 (2.1)	r 71 (2.6)	r 71 (2.7)
Dubai, UAE	r 73 (2.0)	r 75 (1.9)	r 73 (3.2)	r 81 (1.6)	r 86 (1.6)	r 77 (2.1)	r 82 (1.9)

* Teachers could indicate participating in more than one area of professional development.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit 9.16: Teachers' Participation in Professional Development in Science in the Past Two Years

Students' Results based on Teachers' Reports

Country	Percent of Students by Teachers' Participation in Professional Development*						
	Science Content	Science Pedagogy/ Instruction	Science Curriculum	Integrating Technology into Science Instruction	Improving Students' Critical Thinking or Inquiry Skills	Science Assessment	Addressing Individual Students' Needs
Australia	r 50 (3.5)	r 54 (3.5)	r 62 (2.9)	r 49 (3.1)	r 55 (3.6)	r 44 (3.2)	r 66 (2.8)
Bahrain	39 (2.6)	59 (2.8)	36 (2.8)	78 (2.0)	69 (2.8)	58 (2.2)	60 (3.0)
Chile	34 (3.9)	34 (4.0)	23 (3.4)	21 (3.1)	31 (4.1)	22 (3.4)	26 (3.5)
Chinese Taipei	76 (3.5)	69 (3.6)	74 (3.6)	71 (3.3)	43 (3.3)	49 (3.4)	39 (3.4)
Cyprus	s 62 (1.8)	s 65 (1.6)	s 67 (2.1)	s 43 (1.7)	s 52 (2.2)	s 59 (2.0)	s 36 (2.0)
Egypt	71 (3.6)	76 (3.8)	59 (4.0)	57 (4.1)	52 (4.0)	49 (4.4)	43 (4.4)
England	s 72 (5.3)	s 56 (6.3)	s 72 (5.0)	s 23 (5.2)	s 35 (5.3)	s 60 (5.7)	s 50 (5.8)
Finland	20 (1.7)	27 (2.0)	32 (2.0)	38 (2.4)	10 (1.4)	25 (1.9)	17 (1.8)
France	r 47 (3.2)	r 57 (3.5)	r 60 (3.1)	r 47 (3.2)	r 22 (2.9)	r 37 (3.2)	r 34 (3.2)
Georgia	72 (2.2)	83 (2.1)	74 (2.2)	67 (2.9)	74 (2.7)	76 (2.1)	70 (2.4)
Hong Kong SAR	72 (4.0)	69 (4.1)	64 (3.9)	65 (4.0)	37 (4.6)	46 (4.1)	48 (4.4)
Hungary	17 (1.8)	26 (2.4)	7 (1.1)	21 (2.0)	19 (2.0)	10 (1.2)	25 (2.1)
Iran, Islamic Rep. of	63 (3.6)	65 (3.3)	42 (3.9)	44 (3.7)	42 (3.8)	47 (3.4)	49 (3.3)
Ireland	87 (2.1)	76 (2.9)	95 (1.5)	39 (3.1)	51 (3.7)	74 (3.1)	34 (3.5)
Israel	75 (3.0)	79 (2.9)	53 (4.0)	56 (3.7)	49 (3.6)	41 (4.2)	43 (3.6)
Italy	28 (3.5)	39 (4.0)	25 (3.6)	44 (3.5)	22 (3.0)	17 (2.7)	44 (3.8)
Japan	76 (3.3)	72 (3.6)	39 (3.7)	27 (3.3)	26 (3.9)	26 (3.9)	26 (3.7)
Jordan	43 (3.9)	62 (4.2)	46 (4.3)	52 (3.7)	57 (3.7)	39 (3.4)	44 (4.2)
Kazakhstan	76 (1.9)	78 (2.1)	75 (2.3)	67 (2.3)	67 (2.2)	72 (2.0)	58 (2.3)
Korea, Rep. of	60 (3.1)	69 (3.5)	54 (3.1)	41 (3.7)	46 (3.8)	55 (3.3)	37 (3.4)
Kuwait	87 (2.8)	82 (3.8)	79 (3.2)	71 (3.3)	78 (3.8)	66 (4.0)	63 (3.8)
Lebanon	65 (2.5)	60 (2.9)	64 (2.6)	52 (2.5)	58 (2.8)	63 (2.6)	53 (2.8)
Lithuania	60 (2.0)	48 (2.3)	41 (1.9)	58 (2.4)	56 (2.8)	51 (2.2)	53 (2.1)
Malaysia	69 (3.5)	62 (3.8)	73 (3.0)	47 (3.8)	46 (3.6)	65 (3.1)	29 (3.5)
Morocco	49 (2.3)	52 (2.5)	38 (2.1)	44 (2.4)	40 (2.2)	58 (2.5)	33 (2.0)
New Zealand	52 (3.3)	56 (3.6)	46 (4.3)	54 (3.7)	44 (3.3)	42 (3.5)	51 (3.9)
Norway (9)	s 11 (2.8)	s 11 (2.8)	s 7 (2.3)	s 5 (1.6)	s 8 (2.6)	s 11 (2.7)	s 9 (3.1)
Oman	56 (3.7)	65 (3.3)	57 (3.5)	48 (3.3)	42 (3.9)	52 (4.1)	37 (3.6)
Portugal	57 (3.3)	52 (3.1)	30 (2.8)	58 (3.1)	24 (2.4)	22 (2.6)	32 (3.0)
Qatar	62 (4.3)	83 (2.7)	53 (3.5)	78 (3.3)	78 (4.0)	65 (3.5)	67 (4.3)
Romania	37 (3.2)	36 (3.1)	26 (2.5)	38 (2.8)	29 (2.9)	30 (2.2)	34 (2.6)
Russian Federation	78 (1.9)	75 (1.5)	69 (1.9)	69 (1.9)	51 (2.5)	56 (1.9)	53 (2.0)
Saudi Arabia	53 (3.5)	67 (3.8)	41 (3.9)	65 (3.9)	62 (4.4)	33 (3.9)	51 (3.6)
Singapore	58 (3.1)	88 (1.9)	61 (2.7)	69 (2.9)	61 (2.7)	67 (2.3)	44 (2.5)
South Africa (9)	67 (3.3)	44 (2.7)	68 (2.9)	38 (3.2)	43 (3.0)	57 (3.2)	40 (3.3)
Sweden	32 (3.6)	24 (3.2)	20 (2.9)	33 (3.3)	15 (2.6)	28 (3.4)	45 (3.4)
Turkey	29 (3.3)	37 (3.7)	46 (3.5)	42 (3.9)	21 (3.6)	22 (3.0)	19 (3.2)
United Arab Emirates	r 72 (1.7)	r 75 (1.3)	r 72 (1.2)	r 79 (1.5)	r 83 (1.1)	r 69 (1.8)	r 79 (1.1)
United States	r 72 (2.2)	r 61 (2.6)	r 74 (2.4)	r 64 (2.9)	r 66 (2.8)	r 51 (2.9)	r 64 (2.8)
International Average	**57 (0.5)**	**59 (0.5)**	**52 (0.5)**	**50 (0.5)**	**45 (0.5)**	**46 (0.5)**	**44 (0.5)**
Benchmarking Participants							
Ontario, Canada	s 21 (4.7)	s 26 (4.2)	s 19 (3.8)	s 34 (5.7)	s 44 (5.3)	s 19 (4.5)	s 45 (5.6)
Moscow City, Russian Fed.	66 (2.1)	57 (2.2)	49 (2.3)	76 (2.0)	42 (2.2)	40 (2.5)	42 (2.4)
Gauteng, RSA (9)	78 (3.7)	50 (4.6)	73 (3.8)	51 (4.4)	50 (3.6)	65 (3.7)	44 (4.8)
Western Cape, RSA (9)	74 (3.4)	57 (3.6)	72 (3.3)	52 (4.4)	42 (4.3)	62 (3.6)	38 (4.3)
Abu Dhabi, UAE	r 72 (2.6)	r 75 (2.2)	r 72 (1.9)	r 77 (2.1)	r 79 (1.9)	r 64 (2.5)	r 72 (2.1)
Dubai, UAE	r 63 (2.6)	r 71 (1.6)	r 68 (2.3)	r 78 (2.5)	r 82 (2.0)	r 71 (2.6)	r 84 (1.1)
Quebec, Canada	y - -	y - -	y - -	y - -	y - -	y - -	y - -

* Teachers could indicate participating in more than one area of professional development.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Teachers' Professional Development Needs

Along with being asked about participation in professional development in the last two years (Exhibits 9.13 through 9.16), teachers were asked about their *need* for future professional development in the same areas. Teachers' reports on their professional development needs are presented in Exhibits 9.17, 9.18, 9.19, and 9.20, for fourth grade mathematics and science and eighth grade mathematics and science, respectively.

On average across countries, professional development related to integrating technology into instruction and improving students' critical thinking skills were the two areas of need most commonly reported by mathematics and science teachers in the fourth and eighth grades. In both grades and both subjects, 68 to 72 percent of students had teachers who identified integrating technology into instruction as a need (72% in fourth grade mathematics, 68% in fourth grade science, 71% in eighth grade mathematics, and 70% in eighth grade science); 65 to 69 percent of students had teachers who identified improving critical thinking or problem solving/inquiry skills as a need (69% in fourth and eighth grade mathematics, 65% in fourth grade science, and 68% in eighth grade science). Addressing individual students' needs was the third most commonly reported area of need for teachers of mathematics in both grades and teachers of science in eighth grade; 64 to 66 percent of students had teachers who identified addressing individual students' needs as a professional development need (64% for fourth grade mathematics, 65% for eighth grade mathematics, and 66% for eighth grade science). In fourth grade science, the third area of greatest need was integrating science into other subjects (62%).

It is perhaps not surprising that integrating technology into instruction was a common need given the growing role of technology in instruction and, in fourth grade, it was one of the less common areas of teachers' reported participation. Addressing individual students' needs was also one of the less commonly reported areas of professional development participation for eighth grade mathematics teachers and science teachers in both grades (see Exhibits 9.13 through 9.16).

Exhibit 9.17: Teachers' Needs for Future Professional Development in Mathematics

Students' Results based on Teachers' Reports

Country	Percent of Students by Teachers Indicating a Need for Future Professional Development*													
	Mathematics Content		Mathematics Pedagogy/ Instruction		Mathematics Curriculum		Integrating Technology into Mathematics Instruction		Improving Students' Critical Thinking or Problem Solving Skills		Mathematics Assessment		Addressing Individual Students' Needs	
Albania		53 (3.7)		65 (3.2)		57 (3.9)		78 (3.3)		60 (4.2)		52 (4.2)		59 (4.3)
Armenia	r	47 (3.9)	r	48 (4.5)	r	61 (4.4)	r	80 (3.7)	r	65 (4.4)	r	50 (4.2)	r	68 (4.1)
Australia		43 (3.7)		54 (3.7)		40 (3.5)		78 (2.8)		76 (3.1)		63 (3.2)		63 (3.8)
Austria		17 (2.4)		20 (2.8)		11 (1.9)		43 (3.2)		52 (3.0)		41 (3.0)		52 (3.1)
Azerbaijan	r	56 (3.7)	r	56 (4.3)	r	59 (4.2)	r	63 (3.9)	r	61 (3.8)	r	57 (3.8)	r	54 (4.1)
Bahrain		56 (3.5)		71 (2.9)		54 (3.3)		78 (3.2)		76 (2.9)		70 (3.3)		74 (2.8)
Belgium (Flemish)		14 (2.6)		27 (3.2)		29 (2.8)		66 (3.8)		52 (4.1)		20 (2.9)		46 (3.5)
Bosnia and Herzegovina		29 (3.1)		30 (3.0)		28 (2.8)		72 (3.5)		63 (3.4)		36 (3.4)		54 (3.6)
Bulgaria		21 (3.8)		28 (4.2)		12 (3.1)		65 (4.3)		69 (3.8)		25 (3.7)		50 (4.5)
Canada	r	32 (2.4)	r	50 (3.0)	r	32 (2.3)	r	75 (2.4)	r	64 (2.4)	r	50 (3.0)	r	56 (2.5)
Chile		61 (4.3)		66 (3.8)		63 (4.0)		85 (2.8)		83 (3.2)		77 (3.9)		78 (3.4)
Chinese Taipei		79 (3.2)		80 (3.1)		77 (3.1)		86 (2.8)		91 (2.2)		79 (3.2)		83 (3.1)
Croatia		63 (3.3)		59 (3.6)		58 (3.5)		90 (2.7)		87 (2.6)		77 (3.3)		83 (2.7)
Cyprus		33 (4.0)		46 (3.9)		33 (3.5)		76 (3.3)		65 (3.6)		50 (4.1)		67 (3.9)
Czech Republic		28 (3.7)		44 (3.5)		28 (3.3)		62 (3.4)		58 (3.5)		40 (3.5)		47 (3.7)
Denmark	r	27 (3.6)	r	31 (4.0)	r	19 (3.8)	r	49 (4.7)	r	56 (4.2)	r	31 (4.3)	r	44 (4.0)
Finland		22 (2.5)		54 (3.0)		24 (2.8)		70 (3.0)		65 (2.6)		44 (2.6)		56 (3.3)
France		25 (3.2)		56 (3.2)		20 (2.5)		76 (3.0)		63 (3.6)		40 (3.7)		68 (3.3)
Georgia	r	52 (4.5)	r	68 (4.7)	r	62 (5.0)	r	75 (4.0)	r	77 (3.6)	r	72 (4.0)	r	75 (3.7)
Germany	r	24 (3.5)	r	34 (3.9)	r	16 (3.2)	r	57 (4.5)	r	60 (3.8)	r	34 (3.7)	r	46 (3.7)
Hong Kong SAR		73 (4.5)		82 (4.5)		71 (4.3)		86 (3.4)		82 (4.4)		73 (4.4)		75 (3.6)
Hungary		20 (3.5)		47 (3.7)		18 (3.0)		56 (3.3)		65 (3.3)		36 (3.7)		53 (4.1)
Iran, Islamic Rep. of		66 (3.7)		63 (3.4)		51 (3.7)		81 (2.9)		71 (3.9)		58 (3.9)		63 (3.9)
Ireland		37 (3.8)		54 (3.7)		37 (3.9)		81 (3.1)		75 (3.5)		49 (3.9)		58 (3.8)
Italy		41 (3.7)		59 (3.6)		40 (3.7)		81 (2.7)		64 (3.7)		52 (3.9)		63 (3.6)
Japan		74 (3.2)		88 (2.3)		60 (3.6)		69 (3.7)		84 (2.8)		68 (3.0)		86 (2.2)
Kazakhstan	r	46 (4.0)		55 (3.9)		55 (4.0)	r	66 (3.8)	r	61 (3.8)		55 (3.4)	r	56 (3.8)
Korea, Rep. of		58 (4.3)		78 (2.8)		60 (4.4)		76 (3.2)		83 (3.0)		67 (4.0)		78 (3.4)
Kosovo	r	74 (5.3)	r	74 (5.0)	r	84 (3.0)	s	84 (3.6)	r	83 (3.6)	r	83 (3.6)	r	80 (3.5)
Kuwait	r	60 (4.0)	r	60 (4.0)	r	50 (4.2)	r	70 (4.0)	r	65 (4.1)	r	57 (5.1)	r	67 (3.9)
Latvia		44 (4.1)		47 (3.6)		35 (3.1)		73 (3.3)		58 (3.5)		49 (3.8)		59 (3.8)
Lithuania		47 (3.7)		51 (3.5)		45 (3.4)		73 (3.4)		67 (3.3)		51 (3.5)		59 (3.8)
Malta		51 (0.4)		64 (0.4)		55 (0.4)		82 (0.3)		78 (0.4)		64 (0.4)		73 (0.4)
Montenegro		50 (2.4)		49 (2.1)		57 (2.8)		81 (2.4)		66 (2.5)		50 (2.8)		63 (2.7)
Morocco		57 (4.0)		65 (3.8)		61 (3.9)		81 (3.3)		73 (3.2)		65 (3.3)		76 (3.3)
Netherlands	r	29 (4.4)	r	38 (5.6)	r	14 (3.8)	r	52 (5.1)	r	48 (6.2)	r	33 (5.5)	r	47 (6.0)
New Zealand		48 (3.3)		57 (3.0)		37 (2.8)		74 (2.8)		75 (2.6)		52 (3.0)		59 (3.0)
North Macedonia		42 (4.4)		43 (4.4)		43 (4.8)		63 (4.2)		54 (4.4)		42 (4.4)		55 (3.8)
Northern Ireland		33 (4.1)		41 (4.1)		33 (4.1)		71 (4.0)		67 (4.3)		46 (4.4)		54 (4.7)
Norway (5)	r	41 (4.8)	r	56 (4.7)	r	38 (4.6)	r	76 (3.6)	r	61 (4.6)	r	54 (4.5)	r	60 (4.8)
Oman		63 (3.2)		56 (3.4)		58 (3.6)		75 (3.2)		66 (3.4)		60 (3.7)		67 (4.2)
Pakistan	r	74 (7.2)	r	66 (7.2)	r	57 (7.7)	r	73 (5.6)	r	78 (5.2)	r	70 (7.9)	r	75 (7.2)
Philippines		93 (1.6)		92 (1.9)		89 (2.5)		96 (1.5)		96 (1.5)		92 (1.7)		93 (2.0)
Poland		32 (3.6)		40 (4.1)		20 (3.2)		53 (3.4)		63 (3.4)		32 (3.8)		49 (4.2)
Portugal		34 (3.0)		57 (3.5)		37 (3.0)		79 (2.8)		68 (3.2)		46 (3.4)		55 (3.3)
Qatar		44 (3.9)		53 (4.1)		48 (4.1)		63 (3.3)		63 (3.0)		50 (3.6)		58 (3.9)
Russian Federation		68 (3.3)		69 (3.5)		72 (2.9)		82 (3.3)		82 (3.0)		73 (3.5)		83 (2.6)
Saudi Arabia	r	31 (3.8)	r	37 (3.7)	r	27 (3.3)	r	61 (3.5)	r	47 (4.2)	r	38 (3.7)	r	53 (4.1)
Serbia		24 (3.3)		30 (3.5)		27 (3.5)		64 (4.0)		56 (4.2)		36 (4.0)		49 (3.6)
Singapore		44 (2.9)		64 (2.5)		45 (2.7)		75 (2.2)		79 (2.1)		63 (2.4)		75 (2.1)
Slovak Republic		30 (2.5)		45 (3.2)		31 (3.1)		62 (3.3)		68 (3.0)		40 (3.2)		56 (2.8)
South Africa (5)		70 (3.7)		78 (3.3)		68 (4.1)		83 (3.3)		84 (3.0)		73 (3.8)		83 (3.8)
Spain		39 (3.4)		65 (4.1)		31 (3.3)		79 (3.3)		70 (3.6)		56 (3.5)		69 (3.6)
Sweden	r	35 (4.0)	r	49 (4.3)	r	26 (3.4)	r	68 (4.1)	r	61 (4.5)	r	58 (4.5)	r	60 (4.6)
Turkey (5)		48 (4.0)		62 (3.7)		64 (3.5)		86 (2.8)		87 (2.8)		64 (3.7)		74 (3.4)
United Arab Emirates	r	50 (1.8)	r	56 (1.5)	r	52 (1.9)	r	66 (1.5)	r	66 (1.5)	r	55 (1.8)	r	59 (1.6)
United States		38 (2.5)		45 (2.3)		41 (2.6)		66 (2.5)		64 (2.6)		45 (3.0)		58 (2.6)
England	x	31 (6.7)	y	- -	x	31 (6.4)	y	- -	y	- -	y	- -	y	- -
International Average		**45 (0.5)**		**55 (0.5)**		**44 (0.5)**		**72 (0.5)**		**69 (0.5)**		**54 (0.5)**		**64 (0.5)**
Benchmarking Participants														
Ontario, Canada	r	38 (4.2)	r	49 (5.9)	r	38 (4.0)	r	79 (3.7)	r	61 (4.4)	r	55 (5.6)	r	56 (4.6)
Quebec, Canada		15 (2.7)		45 (4.1)		12 (2.8)		72 (4.0)		56 (4.6)		34 (3.9)		48 (4.2)
Moscow City, Russian Fed.		59 (4.2)		66 (4.2)		73 (4.0)		85 (3.2)		90 (2.4)		75 (3.9)		85 (3.3)
Madrid, Spain		52 (4.8)		79 (3.6)		44 (4.6)		89 (2.6)		86 (3.0)		62 (3.9)		81 (3.7)
Abu Dhabi, UAE	r	44 (2.8)	r	52 (2.8)	r	47 (2.6)	r	64 (2.5)	r	66 (2.8)	r	53 (3.0)	r	60 (3.0)
Dubai, UAE	r	58 (2.2)	r	65 (2.4)	r	58 (2.3)	r	73 (2.4)	r	74 (2.2)	r	63 (2.5)	r	65 (2.4)

* Teachers could indicate needing professional development in more than one area.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit 9.18: Teachers' Needs for Future Professional Development in Science

Students' Results based on Teachers' Reports

Country	Science Content	Science Pedagogy/ Instruction	Science Curriculum	Integrating Technology into Science Instruction	Improving Students' Critical Thinking or Inquiry Skills	Science Assessment	Addressing Individual Students' Needs	Integrating Science with Other Subjects
	Percent of Students by Teachers Indicating a Need for Future Professional Development*							
Albania	55 (4.1)	60 (4.1)	59 (4.2)	75 (3.8)	66 (4.4)	53 (4.7)	63 (4.3)	67 (4.1)
Armenia	r 66 (3.9)	r 65 (3.7)	r 67 (4.1)	r 76 (3.9)	r 63 (4.4)	r 52 (4.3)	r 64 (4.8)	r 68 (4.5)
Australia	54 (3.9)	59 (3.7)	54 (3.7)	74 (3.3)	68 (4.0)	66 (4.3)	61 (4.4)	67 (3.7)
Austria	39 (2.8)	32 (2.8)	21 (2.1)	37 (3.7)	45 (3.4)	29 (3.0)	30 (2.8)	43 (3.6)
Azerbaijan	r 59 (4.0)	r 59 (3.8)	r 58 (3.7)	r 51 (3.8)	r 57 (4.5)	r 55 (3.7)	r 53 (3.9)	r 53 (4.1)
Bahrain	52 (3.4)	r 53 (3.3)	r 53 (3.5)	r 63 (3.3)	r 56 (3.6)	r 54 (3.2)	r 59 (3.1)	r 53 (3.7)
Belgium (Flemish)	25 (3.9)	28 (3.3)	25 (3.0)	55 (3.4)	36 (3.4)	32 (3.2)	36 (3.8)	50 (4.2)
Bosnia and Herzegovina	34 (3.3)	34 (3.0)	31 (3.0)	73 (3.6)	60 (3.5)	31 (3.1)	50 (3.5)	61 (3.9)
Bulgaria	24 (4.0)	26 (3.6)	12 (3.2)	65 (3.9)	65 (3.9)	32 (4.2)	44 (4.8)	47 (3.7)
Canada	r 50 (2.5)	r 56 (2.9)	r 41 (2.4)	r 70 (2.0)	r 62 (2.8)	r 50 (2.4)	r 48 (3.2)	r 62 (2.2)
Chile	r 70 (4.1)	r 70 (4.5)	r 62 (4.4)	r 81 (3.6)	r 82 (3.5)	r 72 (3.7)	r 70 (4.1)	r 77 (4.1)
Chinese Taipei	82 (3.2)	76 (3.6)	82 (3.1)	88 (2.6)	85 (2.9)	77 (3.2)	78 (3.2)	85 (2.9)
Croatia	71 (2.6)	61 (3.5)	58 (3.4)	88 (2.6)	85 (2.8)	79 (2.8)	80 (2.7)	79 (3.1)
Cyprus	45 (4.8)	50 (5.3)	40 (4.6)	77 (4.3)	60 (5.0)	64 (4.3)	67 (5.1)	62 (4.9)
Czech Republic	27 (3.6)	33 (3.8)	20 (3.3)	51 (3.7)	46 (3.2)	26 (3.3)	25 (2.9)	37 (3.5)
Denmark	r 44 (4.0)	r 37 (4.0)	r 22 (3.5)	r 37 (3.7)	r 46 (4.7)	r 30 (4.2)	r 31 (3.7)	r 36 (4.3)
Finland	32 (2.9)	46 (2.9)	29 (2.9)	61 (3.0)	53 (3.0)	40 (3.0)	45 (3.4)	51 (2.8)
France	46 (3.9)	65 (3.7)	35 (3.5)	74 (3.0)	56 (3.0)	40 (4.0)	50 (3.5)	63 (3.6)
Georgia	r 63 (4.7)	r 68 (4.9)	r 60 (5.1)	r 80 (3.8)	r 72 (4.0)	r 65 (4.4)	r 69 (4.0)	r 74 (3.9)
Germany	r 43 (3.9)	r 43 (3.5)	r 18 (3.0)	r 54 (4.1)	r 45 (4.2)	r 27 (3.7)	r 33 (4.2)	r 41 (3.5)
Hong Kong SAR	r 69 (4.0)	75 (4.5)	68 (3.9)	75 (4.0)	79 (4.1)	r 66 (4.0)	70 (4.1)	80 (3.8)
Hungary	28 (3.0)	39 (3.4)	17 (3.0)	42 (4.0)	54 (3.7)	25 (3.4)	47 (4.0)	37 (3.7)
Iran, Islamic Rep. of	58 (3.7)	60 (3.6)	50 (3.4)	74 (3.2)	68 (3.7)	54 (3.6)	60 (3.7)	69 (3.5)
Ireland	47 (3.7)	58 (3.9)	42 (3.7)	78 (3.1)	73 (3.6)	62 (4.1)	54 (3.6)	67 (3.3)
Italy	48 (4.2)	66 (3.7)	39 (3.9)	77 (3.1)	66 (3.8)	47 (4.1)	64 (4.1)	72 (3.8)
Japan	72 (3.7)	89 (2.8)	63 (3.9)	69 (4.1)	80 (3.4)	71 (3.7)	80 (3.0)	53 (4.1)
Kazakhstan	r 57 (3.9)	r 55 (4.1)	r 56 (4.3)	r 65 (4.2)	r 66 (4.2)	r 60 (4.2)	r 57 (4.4)	r 57 (4.1)
Korea, Rep. of	62 (3.8)	66 (3.9)	59 (4.1)	75 (3.7)	79 (3.2)	58 (4.4)	66 (3.7)	74 (3.4)
Kosovo	r 80 (3.7)	r 77 (4.2)	r 84 (4.0)	r 88 (3.0)	r 84 (3.5)	r 82 (3.7)	r 87 (2.9)	r 86 (3.3)
Kuwait	60 (4.5)	57 (4.6)	56 (4.6)	66 (3.8)	67 (3.9)	59 (4.5)	68 (4.3)	60 (4.4)
Latvia	46 (3.9)	45 (3.6)	38 (3.8)	65 (3.3)	54 (3.9)	54 (3.6)	45 (3.9)	66 (3.8)
Lithuania	49 (3.6)	51 (3.5)	44 (3.9)	73 (3.1)	57 (3.1)	56 (3.5)	54 (3.6)	55 (3.6)
Malta	69 (0.4)	72 (0.4)	74 (0.4)	86 (0.3)	81 (0.3)	79 (0.3)	73 (0.3)	74 (0.3)
Montenegro	59 (2.8)	56 (2.8)	59 (2.4)	81 (2.3)	66 (2.3)	50 (2.6)	65 (2.6)	63 (3.1)
Morocco	66 (3.7)	77 (3.4)	72 (3.8)	85 (2.4)	79 (3.3)	71 (3.9)	76 (3.3)	77 (3.6)
Netherlands	r 29 (4.1)	r 27 (4.3)	r 26 (3.4)	r 43 (3.7)	r 43 (3.9)	r 18 (2.6)	r 26 (4.6)	r 50 (4.8)
New Zealand	69 (2.8)	70 (2.9)	60 (3.3)	76 (2.7)	71 (2.5)	64 (2.9)	62 (2.8)	72 (2.6)
North Macedonia	45 (4.2)	47 (4.3)	43 (4.7)	60 (4.2)	64 (4.3)	48 (4.7)	52 (4.5)	53 (4.7)
Northern Ireland	62 (4.4)	63 (4.8)	61 (4.5)	r 74 (4.1)	r 66 (4.3)	59 (4.3)	r 55 (4.4)	64 (4.2)
Norway (5)	s 65 (4.3)	s 68 (4.5)	s 53 (4.9)	s 73 (4.5)	s 62 (5.1)	s 53 (4.7)	s 52 (5.5)	s 61 (4.6)
Oman	62 (3.0)	58 (3.7)	59 (3.3)	67 (3.3)	70 (3.3)	63 (3.3)	59 (3.5)	66 (4.0)
Pakistan	s 70 (8.7)	s 79 (5.2)	s 67 (8.8)	s 58 (8.3)	s 78 (5.5)	s 70 (9.0)	s 70 (8.7)	s 68 (9.0)
Philippines	s 81 (3.9)	s 77 (4.2)	s 78 (4.2)	s 76 (3.8)	s 78 (4.2)	s 77 (4.1)	s 78 (3.9)	s 75 (4.2)
Poland	25 (4.2)	23 (3.5)	17 (3.4)	47 (4.6)	46 (4.0)	r 29 (4.3)	r 35 (4.0)	33 (4.1)
Portugal	38 (3.4)	59 (3.2)	37 (3.5)	77 (2.9)	58 (3.2)	43 (3.6)	48 (3.1)	72 (2.7)
Qatar	50 (3.4)	54 (4.0)	48 (3.2)	64 (2.8)	64 (2.9)	54 (3.6)	60 (4.1)	58 (3.9)
Russian Federation	67 (4.2)	68 (3.8)	68 (3.8)	78 (3.2)	79 (3.3)	68 (3.6)	72 (3.4)	72 (3.9)
Saudi Arabia	63 (3.6)	55 (3.4)	42 (3.7)	42 (3.7)	r 40 (4.0)	r 56 (4.2)	r 38 (4.2)	r 44 (3.9)
Serbia	30 (3.5)	38 (4.0)	32 (2.8)	61 (3.9)	54 (4.4)	36 (3.3)	44 (3.5)	54 (4.3)
Singapore	53 (2.3)	71 (2.1)	56 (2.6)	78 (2.2)	81 (2.4)	68 (2.4)	70 (2.5)	66 (2.6)
Slovak Republic	46 (3.7)	46 (3.0)	31 (2.9)	55 (3.5)	61 (2.6)	35 (2.8)	46 (3.3)	43 (3.3)
South Africa (5)	78 (3.5)	75 (3.6)	74 (3.7)	78 (3.5)	81 (3.4)	74 (3.8)	79 (3.4)	79 (3.4)
Spain	48 (3.7)	72 (3.0)	42 (3.9)	82 (2.8)	68 (3.4)	55 (3.5)	63 (3.0)	73 (2.7)
Sweden	r 55 (4.7)	r 46 (4.7)	r 33 (4.3)	r 68 (4.5)	r 65 (4.5)	r 55 (4.9)	r 52 (4.6)	r 57 (4.5)
Turkey (5)	61 (3.8)	74 (3.3)	69 (3.8)	84 (2.6)	84 (2.9)	76 (3.3)	78 (3.6)	83 (3.0)
United Arab Emirates	r 48 (1.9)	r 54 (1.7)	r 49 (2.0)	r 64 (1.7)	r 62 (1.8)	r 51 (1.6)	r 55 (1.9)	r 57 (1.9)
United States	61 (2.5)	58 (2.2)	60 (2.6)	70 (2.5)	67 (2.6)	57 (2.7)	56 (2.4)	65 (2.5)
England	y - -	y - -	y - -	y - -	y - -	y - -	y - -	y - -
International Average	**54 (0.5)**	**57 (0.5)**	**49 (0.5)**	**68 (0.5)**	**65 (0.5)**	**54 (0.5)**	**57 (0.5)**	**62 (0.5)**
Benchmarking Participants								
Ontario, Canada	r 49 (4.7)	r 58 (5.9)	r 38 (4.3)	r 76 (2.9)	r 63 (5.4)	r 50 (4.6)	r 50 (6.3)	r 63 (4.3)
Quebec, Canada	r 52 (4.8)	r 59 (4.4)	r 39 (4.5)	r 66 (4.3)	r 57 (4.5)	r 53 (5.0)	r 45 (4.9)	r 61 (4.6)
Moscow City, Russian Fed.	61 (4.2)	61 (4.3)	65 (3.9)	84 (2.9)	82 (3.4)	72 (3.5)	79 (3.5)	85 (3.2)
Madrid, Spain	54 (4.9)	71 (4.0)	40 (4.8)	77 (3.4)	70 (3.9)	53 (4.1)	66 (4.5)	72 (3.5)
Abu Dhabi, UAE	r 49 (3.0)	r 53 (2.4)	r 49 (2.7)	r 67 (2.5)	r 60 (2.8)	r 51 (2.8)	r 55 (3.0)	r 55 (2.6)
Dubai, UAE	r 50 (3.4)	r 62 (3.4)	r 54 (2.9)	r 65 (3.3)	s 68 (3.4)	r 58 (3.4)	r 61 (3.5)	r 63 (3.7)

* Teachers could indicate needing professional development in more than one area.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 9.19: Teachers' Needs for Future Professional Development in Mathematics

Students' Results based on Teachers' Reports

Country	Percent of Students by Teacher Indicating a Need for Future Professional Development*						
	Mathematics Content	Mathematics Pedagogy/ Instruction	Mathematics Curriculum	Integrating Technology into Mathematics Instruction	Improving Students' Critical Thinking or Problem Solving Skills	Mathematics Assessment	Addressing Individual Students' Needs
Australia	58 (3.3)	70 (2.9)	61 (3.7)	81 (2.7)	84 (2.2)	71 (3.1)	77 (3.2)
Bahrain	48 (3.8)	r 59 (4.0)	45 (4.1)	r 79 (3.4)	74 (3.7)	r 56 (3.4)	64 (3.5)
Chile	40 (3.8)	48 (3.7)	44 (3.8)	75 (3.5)	70 (3.7)	65 (3.5)	68 (3.7)
Chinese Taipei	76 (2.8)	80 (3.1)	76 (3.2)	87 (2.4)	82 (2.5)	73 (2.8)	79 (2.9)
Cyprus	s 24 (3.2)	s 41 (4.6)	s 21 (2.9)	s 67 (4.4)	s 68 (4.9)	s 44 (5.0)	s 61 (4.7)
Egypt	r 46 (4.4)	r 51 (4.5)	r 49 (4.9)	r 69 (4.1)	r 59 (4.3)	r 53 (4.7)	r 53 (4.7)
England	s 28 (5.2)	s 44 (6.2)	s 36 (5.4)	s 57 (6.0)	s 61 (6.4)	s 38 (5.3)	s 38 (5.4)
Finland	25 (2.9)	48 (3.4)	31 (2.5)	70 (3.2)	50 (3.0)	46 (2.8)	57 (3.1)
France	r 28 (3.6)	r 61 (4.3)	r 39 (4.0)	r 61 (4.3)	r 60 (4.3)	r 49 (4.2)	r 71 (3.7)
Georgia	r 44 (4.3)	r 68 (4.8)	r 48 (4.7)	r 82 (3.1)	r 72 (3.9)	r 60 (4.7)	r 65 (4.6)
Hong Kong SAR	r 60 (4.7)	r 76 (3.9)	r 60 (4.6)	r 73 (4.3)	r 80 (3.4)	r 54 (4.3)	r 77 (3.5)
Hungary	21 (2.4)	44 (3.7)	14 (2.0)	53 (3.8)	58 (3.8)	34 (3.6)	57 (3.6)
Iran, Islamic Rep. of	67 (3.6)	59 (3.8)	64 (3.7)	81 (3.5)	76 (3.4)	68 (3.5)	72 (3.6)
Ireland	54 (3.2)	61 (2.8)	67 (2.9)	79 (2.9)	84 (1.8)	66 (2.9)	71 (3.0)
Israel	47 (3.2)	51 (3.2)	43 (3.1)	74 (3.0)	68 (2.9)	52 (3.0)	56 (3.4)
Italy	24 (2.8)	60 (4.0)	37 (3.6)	65 (3.7)	60 (3.7)	38 (4.1)	60 (3.6)
Japan	80 (2.8)	86 (2.3)	64 (3.5)	75 (3.1)	86 (2.7)	72 (3.0)	79 (3.1)
Jordan	50 (4.5)	44 (3.8)	38 (3.9)	48 (4.1)	44 (3.7)	47 (4.4)	52 (4.0)
Kazakhstan	47 (4.2)	50 (4.2)	46 (3.6)	63 (4.2)	61 (4.2)	56 (4.4)	57 (3.8)
Korea, Rep. of	66 (4.1)	82 (3.3)	65 (3.7)	84 (2.7)	83 (2.6)	86 (2.5)	76 (3.3)
Kuwait	65 (3.9)	71 (3.7)	60 (3.8)	78 (3.6)	73 (4.1)	66 (3.6)	71 (3.1)
Lebanon	r 51 (4.1)	r 58 (3.8)	r 59 (3.9)	r 61 (4.0)	r 61 (4.0)	r 53 (4.1)	r 62 (4.9)
Lithuania	48 (4.2)	61 (3.9)	47 (4.0)	77 (3.0)	83 (2.8)	67 (4.1)	69 (4.2)
Malaysia	60 (3.4)	70 (3.3)	60 (3.4)	77 (3.1)	77 (3.3)	67 (3.2)	72 (3.1)
Morocco	50 (3.8)	70 (3.4)	55 (3.1)	82 (2.6)	73 (3.5)	63 (3.4)	73 (3.6)
New Zealand	r 53 (3.0)	r 63 (3.5)	r 54 (3.6)	72 (2.9)	80 (2.8)	60 (3.2)	71 (3.2)
Norway (9)	s 25 (4.1)	s 52 (4.7)	s 36 (4.1)	s 60 (4.1)	s 56 (4.5)	s 42 (4.4)	s 59 (4.5)
Oman	57 (3.8)	55 (4.0)	60 (3.6)	74 (3.5)	63 (3.9)	56 (4.5)	57 (4.2)
Portugal	25 (3.3)	50 (4.2)	39 (3.7)	60 (4.2)	65 (4.0)	50 (4.5)	67 (3.4)
Qatar	38 (4.8)	57 (5.0)	44 (4.1)	63 (4.2)	62 (4.6)	45 (4.8)	57 (5.1)
Romania	29 (3.0)	39 (3.6)	37 (3.4)	59 (3.6)	59 (4.0)	37 (3.8)	54 (3.8)
Russian Federation	68 (3.8)	73 (3.3)	75 (2.9)	77 (3.7)	79 (2.9)	73 (3.3)	79 (2.8)
Saudi Arabia	r 40 (4.1)	r 46 (3.8)	r 37 (4.0)	r 62 (4.0)	r 52 (4.5)	r 51 (4.4)	r 51 (4.2)
Singapore	49 (2.9)	69 (2.3)	58 (2.9)	78 (2.1)	82 (2.2)	69 (2.6)	68 (2.9)
South Africa (9)	77 (2.4)	81 (2.3)	71 (2.6)	88 (2.0)	89 (1.7)	77 (2.0)	86 (2.0)
Sweden	38 (3.7)	59 (4.3)	27 (3.3)	79 (2.9)	64 (3.3)	51 (3.8)	67 (3.5)
Turkey	42 (4.0)	61 (4.2)	61 (4.1)	81 (2.9)	81 (3.1)	61 (3.9)	67 (3.8)
United Arab Emirates	r 44 (2.0)	r 55 (1.9)	r 47 (1.9)	r 64 (2.2)	r 62 (1.6)	r 47 (1.8)	r 54 (1.7)
United States	36 (2.9)	49 (2.6)	43 (2.8)	72 (2.1)	71 (2.2)	50 (3.0)	63 (2.6)
International Average	**47 (0.6)**	**60 (0.6)**	**49 (0.6)**	**71 (0.6)**	**69 (0.6)**	**57 (0.6)**	**65 (0.6)**
Benchmarking Participants							
Ontario, Canada	39 (3.9)	55 (4.2)	35 (4.8)	70 (4.5)	70 (4.2)	60 (4.1)	55 (4.9)
Quebec, Canada	25 (4.4)	52 (4.8)	23 (4.1)	78 (4.0)	58 (5.1)	47 (5.0)	59 (4.9)
Moscow City, Russian Fed.	72 (3.2)	76 (3.3)	72 (3.4)	76 (3.3)	81 (2.9)	73 (3.2)	84 (2.5)
Gauteng, RSA (9)	r 60 (4.7)	r 72 (4.1)	r 63 (4.3)	r 83 (3.8)	r 88 (3.2)	r 68 (4.5)	r 82 (3.5)
Western Cape, RSA (9)	53 (3.9)	62 (3.8)	r 46 (4.2)	80 (3.5)	80 (3.5)	r 50 (4.4)	75 (3.9)
Abu Dhabi, UAE	r 49 (3.3)	r 57 (2.9)	r 53 (3.3)	r 71 (2.5)	r 66 (2.9)	r 51 (3.1)	r 60 (2.6)
Dubai, UAE	r 49 (3.1)	r 63 (2.8)	r 54 (3.0)	r 72 (2.5)	r 71 (2.3)	r 57 (3.0)	r 58 (3.0)

* Teachers could indicate needing professional development in more than one area.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit 9.20: Teachers' Needs for Future Professional Development in Science

Students' Results based on Teachers' Reports

Country	Percent of Students by Teachers Indicating a Need for Future Professional Development*													
	Science Content		Science Pedagogy/ Instruction		Science Curriculum		Integrating Technology into Science Instruction		Improving Students' Critical Thinking or Inquiry Skills		Science Assessment		Addressing Individual Students' Needs	
Australia	r	52 (3.1)	r	65 (3.0)	r	51 (3.1)	r	77 (2.6)	r	81 (2.3)	r	59 (2.9)	r	71 (3.0)
Bahrain		52 (3.5)		53 (3.1)		48 (3.1)		61 (3.1)		62 (3.0)		58 (3.3)		56 (3.1)
Chile		44 (4.1)		54 (3.9)		53 (4.0)		83 (2.8)		68 (3.3)		67 (3.5)		80 (3.0)
Chinese Taipei		75 (3.1)		75 (3.0)		75 (3.0)		84 (2.6)		82 (3.0)		69 (3.7)		71 (3.6)
Cyprus	s	33 (1.6)	s	45 (2.2)	s	26 (2.1)	s	65 (2.5)	s	57 (1.6)	s	44 (2.8)	s	60 (2.6)
Egypt	r	47 (4.7)	r	49 (5.0)	r	49 (4.4)	r	64 (4.7)	r	60 (4.6)	r	54 (4.6)	r	64 (5.0)
England	s	34 (5.6)	s	44 (5.5)	s	35 (6.1)	s	55 (6.4)	s	56 (5.4)	s	44 (6.1)	s	41 (5.3)
Finland		32 (1.8)		51 (1.9)		34 (1.9)		69 (1.8)		56 (2.2)		54 (2.2)		63 (1.9)
France	r	58 (3.4)	r	65 (2.8)	r	53 (2.9)	r	67 (3.0)	r	62 (3.1)	r	56 (2.9)	r	70 (2.8)
Georgia	s	48 (3.1)	s	55 (3.2)	s	54 (3.1)	r	80 (2.4)	r	68 (2.8)	s	54 (2.9)	s	63 (3.2)
Hong Kong SAR	r	65 (4.2)	r	77 (3.4)	r	65 (4.3)	r	80 (4.0)	r	74 (3.8)	r	66 (4.6)	r	76 (3.9)
Hungary		29 (2.0)		47 (2.2)		26 (1.8)		54 (1.9)		59 (2.2)		40 (2.4)		51 (2.5)
Iran, Islamic Rep. of		69 (3.4)		63 (3.6)		60 (3.9)		80 (3.2)		77 (3.6)		62 (3.5)		68 (3.6)
Ireland		56 (3.6)		58 (3.1)		63 (3.8)		76 (2.9)		79 (2.6)		59 (3.1)		71 (3.6)
Israel		48 (4.0)		49 (4.4)		41 (3.9)		63 (3.6)		60 (4.1)		45 (3.6)		57 (3.8)
Italy		26 (3.3)		54 (3.5)		32 (3.5)		59 (3.6)		58 (3.8)		33 (3.4)		54 (3.6)
Japan		89 (2.6)		90 (2.5)		67 (3.7)		83 (2.9)		84 (3.0)		75 (3.7)		76 (3.5)
Jordan		47 (4.2)		48 (4.3)		42 (4.1)		62 (4.0)		50 (3.8)		52 (3.5)		49 (4.0)
Kazakhstan		46 (2.6)		54 (2.6)		48 (2.7)		62 (2.8)		62 (2.4)		57 (2.4)		63 (2.1)
Korea, Rep. of		68 (3.3)		86 (2.6)		70 (3.1)		83 (2.4)		85 (2.6)		77 (2.5)		78 (2.7)
Kuwait		62 (4.5)		58 (4.7)		55 (4.2)		79 (3.8)		68 (3.7)		63 (4.4)		70 (4.2)
Lebanon		56 (2.8)	r	65 (3.1)	r	57 (2.4)	r	74 (2.3)	r	69 (2.6)	r	58 (2.7)	r	65 (3.1)
Lithuania		58 (2.0)		64 (2.3)		59 (2.2)		74 (2.2)		73 (1.9)		68 (1.8)		69 (2.2)
Malaysia		56 (4.1)		67 (3.7)		58 (3.6)		80 (2.7)		79 (2.9)		68 (3.3)		71 (3.4)
Morocco		58 (2.5)		68 (2.2)		63 (2.4)		73 (2.5)		78 (2.4)		65 (2.5)		78 (2.4)
New Zealand		46 (4.1)		62 (3.6)		54 (3.9)		75 (3.2)		77 (3.6)		59 (3.3)		71 (3.7)
Norway (9)	s	46 (4.5)	s	53 (4.9)	s	35 (4.8)	s	51 (5.1)	s	55 (5.0)	s	45 (5.2)	s	52 (4.8)
Oman		70 (3.6)		64 (3.5)		62 (3.8)		80 (3.1)		66 (3.7)		55 (4.1)		65 (4.0)
Portugal		36 (2.9)		49 (2.8)		35 (2.8)		68 (2.6)		69 (3.2)		54 (2.6)		64 (3.1)
Qatar		38 (4.2)		41 (4.4)		37 (4.2)		48 (3.7)		51 (4.7)		45 (5.0)		49 (4.5)
Romania		36 (2.5)		48 (3.1)		45 (2.7)		54 (2.9)		56 (3.2)		46 (2.9)		59 (2.9)
Russian Federation		79 (1.6)		79 (1.9)		79 (1.4)		82 (1.7)		83 (1.3)		81 (1.4)		84 (1.4)
Saudi Arabia	r	48 (4.5)	r	50 (4.3)	r	48 (4.7)	r	64 (3.7)	r	57 (4.2)	r	54 (4.4)	r	55 (4.5)
Singapore		48 (2.7)		75 (2.7)		56 (2.7)		80 (2.0)		83 (2.2)		70 (2.3)		78 (2.4)
South Africa (9)		72 (2.7)		76 (2.4)		69 (2.5)		81 (2.2)		85 (2.0)		76 (2.6)		81 (2.5)
Sweden		51 (3.7)		58 (3.9)		33 (3.3)		69 (3.4)		66 (3.4)		51 (3.5)		61 (3.0)
Turkey		55 (3.6)		67 (3.8)		65 (3.3)		83 (3.0)		84 (3.0)		72 (3.0)		79 (2.8)
United Arab Emirates	r	43 (1.8)	r	49 (1.7)	r	49 (1.8)	r	62 (2.0)	r	62 (1.7)	r	50 (1.8)	r	59 (1.5)
United States	r	48 (3.0)	r	51 (3.3)	r	56 (3.0)	r	64 (3.1)	r	65 (2.9)	r	57 (3.1)	r	62 (2.9)
International Average		**52 (0.5)**		**60 (0.5)**		**51 (0.5)**		**70 (0.5)**		**68 (0.5)**		**58 (0.5)**		**66 (0.5)**
Benchmarking Participants														
Ontario, Canada	s	45 (6.3)	s	49 (5.8)	s	43 (6.0)	s	63 (5.9)	s	60 (6.0)	s	54 (5.8)	s	52 (5.7)
Moscow City, Russian Fed.		72 (2.3)		74 (2.0)		72 (2.0)		76 (2.0)		78 (1.8)		69 (2.4)		79 (1.9)
Gauteng, RSA (9)		59 (4.9)	r	64 (4.9)	r	58 (4.7)		79 (4.1)		80 (3.9)		67 (4.5)		74 (4.0)
Western Cape, RSA (9)		47 (4.5)		59 (4.2)		46 (4.8)		72 (3.9)		78 (3.5)	r	62 (4.1)		73 (4.1)
Abu Dhabi, UAE	r	44 (2.6)	r	51 (2.7)	r	49 (3.1)	r	62 (2.9)	r	67 (2.8)	r	53 (2.8)	r	65 (2.4)
Dubai, UAE	r	46 (3.1)	r	55 (1.6)	r	52 (2.6)	r	70 (2.8)	r	67 (2.0)	r	56 (2.7)	r	59 (3.0)
Quebec, Canada	y	- -	y	- -	y	- -	y	- -	y	- -	y	- -	y	- -

* Teachers could indicate needing professional development in more than one area.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Teachers' Job Satisfaction

Teachers who are satisfied with their profession are more motivated, may be more likely to continue teaching into the future, and may experience greater overall well-being. The TIMSS 2019 *Teachers' Job Satisfaction* scale, based on teachers' responses to five statements about how they feel about being a teacher, is described in Exhibit 9.21 (see About the Scale). Exhibits 9.22, 9.23, 9.24, and 9.25 present teachers' reports of their job satisfaction, including the percentage and average achievement of students with teachers who reported they were "very satisfied," "somewhat satisfied," and "less than satisfied," and the average scale score on the *Teachers' Job Satisfaction* scale, for each country. Countries are ordered by the percent "very satisfied."

Across the TIMSS 2019 countries, almost all students in fourth and eighth grades were taught mathematics and science by teachers who were "very satisfied" or "somewhat satisfied" with being a teacher, with job satisfaction somewhat higher among fourth grade teachers than eighth grade teachers. In fourth grade, 61 percent of students were taught mathematics and science by teachers who reported they were "very satisfied," and 34 percent were taught by teachers who reported they were "somewhat satisfied." Only 5 percent of students had mathematics or science teachers who reported they were "less than satisfied." In eighth grade, 54 percent of students had mathematics teachers and 53 percent of students had science teachers who said they were "very satisfied," 39 percent of students had mathematics and science teachers who said they were "somewhat satisfied," and 7 and 8 percent of students had mathematics and science teachers, respectively, who reported they were "less than satisfied."

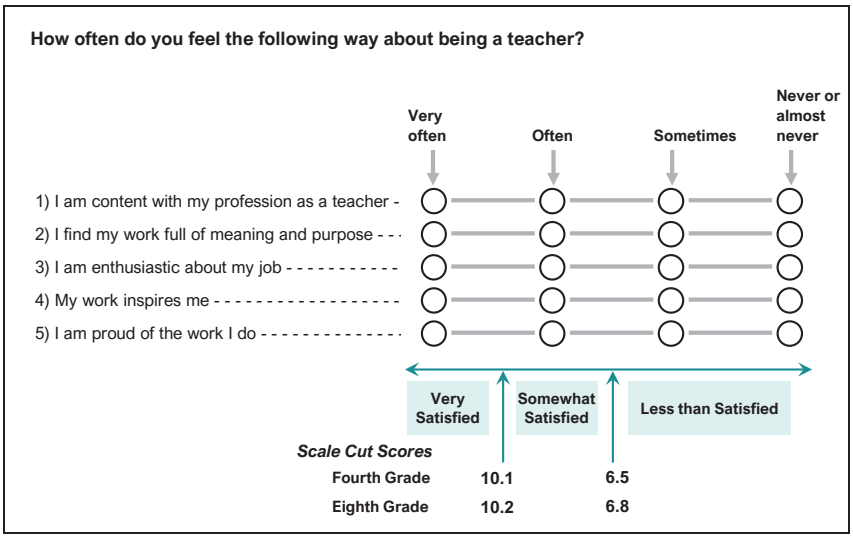
In fourth grade, average achievement was somewhat higher for students of "very satisfied" teachers compared with "somewhat satisfied" teachers (503 vs. 499 in mathematics and 493 vs. 490 in science). Counterintuitively, in both subjects, average achievement was highest for students with "less than satisfied" teachers (515 for mathematics and 508 for science), though there were few students in this category, and in some countries, there were so few that average achievement could not be estimated. In the eighth grade, average achievement was also higher for students with "very satisfied" compared with "somewhat satisfied" teachers (493 vs. 486 for mathematics and 494 vs. 486 for science). In both subjects, for the few students with "less than satisfied" teachers, average achievement was close to that of students with "somewhat satisfied" teachers (490 in mathematics and 488 in science).

Exhibit 9.21: Teachers' Job Satisfaction

Students' Results based on Teachers' Reports

About the Scale

Students were scored according to their teachers' responses to five statements on the *Teachers' Job Satisfaction* scale. Cut scores divide the scale into three categories. Students with **Very Satisfied** teachers had a score at or above the cut score corresponding to their teachers responding "very often" to three of the five statements and "often" to the other two, on average. Students with **Less than Satisfied** teachers had a score at or below the cut score corresponding to their teachers responding "sometimes" to three of the five statements and "often" to the other two, on average. All other students had **Somewhat Satisfied** teachers.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 9.22: Teachers' Job Satisfaction

Students' Results based on Teachers' Reports

Country	Very Satisfied		Somewhat Satisfied		Less than Satisfied		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Kosovo	94 (1.9)	446 (3.0)	6 (1.9)	425 (12.0)	0 (0.0)	~ ~	11.2 (0.06)
Albania	91 (2.5)	494 (3.6)	9 (2.5)	496 (13.0)	0 (0.0)	~ ~	11.2 (0.07)
Iran, Islamic Rep. of	87 (2.4)	444 (4.0)	11 (2.3)	441 (9.6)	2 (0.9)	~ ~	11.0 (0.09)
Oman	87 (2.3)	431 (4.5)	13 (2.3)	431 (10.7)	0 (0.3)	~ ~	11.0 (0.08)
Philippines	87 (2.7)	294 (6.8)	12 (2.6)	304 (15.3)	1 (0.8)	~ ~	11.1 (0.10)
Armenia	83 (3.1)	498 (2.9)	16 (3.1)	499 (5.3)	1 (0.5)	~ ~	10.9 (0.08)
Kuwait	83 (3.1)	384 (5.5)	17 (3.0)	377 (14.0)	1 (0.6)	~ ~	11.0 (0.10)
North Macedonia	80 (3.7)	470 (6.1)	20 (3.7)	478 (9.3)	0 (0.0)	~ ~	10.8 (0.11)
Pakistan	79 (5.4)	333 (14.8)	21 (5.3)	318 (20.2)	1 (0.7)	~ ~	10.7 (0.14)
Qatar	78 (2.7)	447 (4.6)	19 (2.2)	460 (9.7)	3 (1.1)	442 (19.5)	10.9 (0.10)
Bahrain	78 (2.9)	481 (2.9)	21 (3.0)	479 (5.7)	1 (0.8)	~ ~	10.8 (0.10)
Saudi Arabia	78 (2.9)	405 (4.6)	21 (2.9)	375 (7.5)	1 (0.7)	~ ~	10.9 (0.08)
Bosnia and Herzegovina	78 (2.7)	453 (2.6)	20 (2.5)	449 (6.2)	2 (0.9)	~ ~	10.7 (0.09)
United Arab Emirates r	78 (1.1)	486 (2.5)	19 (1.1)	473 (5.4)	3 (0.3)	398 (10.5)	10.7 (0.04)
Georgia	77 (3.3)	480 (4.7)	23 (3.3)	488 (6.2)	0 (0.0)	~ ~	10.8 (0.09)
Chile	77 (3.7)	442 (3.6)	23 (3.7)	436 (5.7)	0 (0.4)	~ ~	10.8 (0.12)
Azerbaijan	77 (2.7)	517 (3.2)	22 (2.6)	512 (5.9)	1 (0.5)	~ ~	10.8 (0.08)
Spain	73 (3.5)	503 (2.6)	25 (3.5)	499 (4.8)	2 (0.8)	~ ~	10.6 (0.11)
Italy	71 (3.5)	515 (2.8)	28 (3.5)	515 (4.7)	1 (0.7)	~ ~	10.5 (0.11)
Serbia	70 (3.2)	507 (4.2)	27 (3.0)	507 (4.4)	3 (1.3)	530 (6.5)	10.5 (0.11)
Montenegro	70 (2.6)	450 (2.7)	30 (2.5)	459 (3.4)	0 (0.4)	~ ~	10.4 (0.07)
Kazakhstan	68 (2.8)	512 (3.1)	32 (2.8)	513 (4.3)	0 (0.4)	~ ~	10.4 (0.09)
Austria	68 (3.2)	541 (2.4)	31 (3.2)	535 (4.2)	2 (0.8)	~ ~	10.4 (0.11)
Morocco	67 (3.3)	395 (6.0)	28 (3.3)	360 (6.5)	5 (1.3)	348 (10.8)	10.2 (0.13)
Australia	65 (3.4)	519 (3.9)	29 (2.9)	516 (7.0)	6 (1.6)	517 (14.3)	10.3 (0.14)
South Africa (5)	64 (3.4)	367 (5.0)	31 (3.4)	385 (9.1)	5 (1.5)	390 (36.6)	10.4 (0.11)
Turkey (5)	64 (3.6)	526 (5.3)	31 (3.3)	522 (10.4)	5 (1.8)	489 (18.1)	10.3 (0.15)
Netherlands r	64 (5.0)	535 (3.1)	33 (4.9)	541 (3.7)	3 (1.6)	530 (15.4)	10.3 (0.15)
Croatia	62 (3.8)	510 (2.7)	36 (3.9)	509 (3.8)	2 (0.7)	~ ~	10.3 (0.10)
Canada	59 (2.5)	509 (2.8)	36 (2.2)	516 (2.3)	5 (1.2)	518 (9.4)	10.0 (0.10)
Lithuania	58 (3.7)	548 (4.1)	38 (3.6)	531 (4.5)	5 (1.6)	539 (3.9)	10.0 (0.13)
United States	56 (2.3)	538 (3.4)	33 (2.3)	531 (4.4)	11 (1.6)	535 (6.0)	9.8 (0.11)
Russian Federation	55 (3.8)	564 (4.6)	43 (3.7)	571 (4.2)	2 (1.1)	~ ~	10.0 (0.13)
Bulgaria	53 (4.0)	526 (5.1)	43 (3.9)	505 (9.0)	4 (1.4)	478 (20.2)	9.7 (0.14)
Ireland	52 (3.9)	549 (3.8)	40 (3.6)	551 (3.2)	8 (2.3)	533 (6.5)	9.7 (0.15)
Malta	52 (0.4)	516 (1.7)	34 (0.4)	502 (2.2)	14 (0.3)	500 (3.4)	9.5 (0.02)
Portugal	52 (3.3)	528 (3.2)	41 (3.4)	525 (3.9)	7 (1.6)	511 (7.1)	9.8 (0.12)
Northern Ireland	50 (4.3)	566 (4.1)	39 (4.1)	568 (6.1)	11 (3.0)	561 (8.3)	9.6 (0.19)
Hong Kong SAR	50 (4.4)	609 (5.6)	40 (4.3)	599 (4.5)	10 (2.5)	576 (7.8)	9.6 (0.17)
Cyprus	49 (3.7)	536 (4.1)	45 (3.8)	531 (3.7)	6 (2.0)	529 (4.6)	9.7 (0.14)
Norway (5) r	48 (3.9)	547 (3.3)	48 (4.0)	542 (3.4)	4 (1.7)	549 (14.2)	9.7 (0.13)
Latvia	48 (3.6)	547 (3.5)	50 (3.6)	545 (4.2)	2 (0.5)	~ ~	9.9 (0.12)
Singapore	47 (2.3)	631 (5.6)	44 (2.5)	618 (5.1)	9 (1.4)	637 (10.7)	9.6 (0.09)
Slovak Republic	46 (3.6)	516 (4.6)	43 (3.4)	507 (5.9)	11 (2.2)	494 (10.8)	9.4 (0.14)
New Zealand	46 (3.2)	493 (4.7)	44 (3.1)	485 (4.8)	10 (1.8)	467 (10.1)	9.5 (0.13)
Hungary	44 (4.2)	523 (5.4)	50 (4.0)	527 (4.7)	6 (1.6)	510 (15.8)	9.5 (0.15)
Sweden	43 (4.3)	525 (5.3)	50 (4.2)	519 (3.8)	6 (1.9)	516 (6.6)	9.7 (0.15)
Chinese Taipei	42 (3.8)	600 (2.5)	48 (4.2)	598 (2.8)	10 (2.4)	602 (6.3)	9.4 (0.15)
England s	41 (6.1)	566 (7.4)	57 (5.9)	553 (6.6)	1 (1.2)	~ ~	9.8 (0.19)
Denmark	41 (4.2)	524 (3.5)	47 (3.9)	525 (3.6)	12 (2.6)	523 (5.7)	9.2 (0.17)
Belgium (Flemish)	40 (3.4)	535 (2.8)	51 (3.4)	532 (2.9)	9 (2.2)	538 (7.3)	9.3 (0.13)
Finland	39 (3.0)	534 (3.7)	52 (3.3)	531 (3.0)	9 (1.6)	531 (5.1)	9.3 (0.09)
Korea, Rep. of	38 (3.6)	601 (4.2)	49 (3.7)	602 (3.4)	13 (2.5)	587 (5.0)	9.1 (0.16)
Germany	38 (3.7)	519 (4.7)	57 (3.9)	523 (3.9)	5 (1.7)	513 (11.1)	9.5 (0.13)
Czech Republic	36 (3.9)	536 (5.0)	54 (4.2)	533 (3.6)	10 (1.9)	522 (6.9)	9.1 (0.14)
France	35 (3.2)	484 (5.5)	55 (3.1)	487 (3.5)	10 (2.6)	483 (10.2)	9.0 (0.13)
Poland	32 (3.4)	523 (4.4)	49 (3.2)	518 (3.4)	18 (2.8)	520 (6.3)	8.6 (0.15)
Japan	31 (3.3)	591 (2.8)	58 (3.5)	592 (2.3)	11 (2.3)	602 (6.0)	8.9 (0.14)
International Average	**61 (0.5)**	**503 (0.6)**	**34 (0.4)**	**499 (0.9)**	**5 (0.2)**	**515 (2.1)**	
Benchmarking Participants							
Dubai, UAE r	79 (1.7)	546 (2.4)	18 (1.7)	545 (7.0)	2 (0.3)	~ ~	10.9 (0.05)
Madrid, Spain	78 (3.4)	519 (2.1)	19 (3.4)	519 (5.6)	3 (1.3)	473 (26.3)	10.6 (0.12)
Abu Dhabi, UAE r	67 (2.3)	453 (4.1)	27 (2.3)	430 (7.4)	7 (0.8)	366 (10.1)	10.3 (0.08)
Ontario, Canada r	65 (4.2)	512 (5.0)	30 (3.8)	510 (4.3)	5 (1.7)	518 (18.2)	10.2 (0.17)
Moscow City, Russian Fed.	59 (4.1)	596 (2.6)	38 (4.1)	587 (3.9)	3 (1.3)	604 (23.9)	10.1 (0.14)
Quebec, Canada	40 (4.6)	530 (4.0)	52 (4.4)	534 (2.5)	8 (2.7)	530 (10.2)	9.3 (0.19)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 9.23: Teachers' Job Satisfaction

Students' Results based on Teachers' Reports

Country	Very Satisfied		Somewhat Satisfied		Less than Satisfied		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Kosovo	94 (1.9)	414 (3.8)	6 (1.9)	392 (13.6)	0 (0.0)	~ ~	11.2 (0.06)
Albania	90 (2.4)	488 (3.8)	10 (2.4)	499 (13.6)	0 (0.0)	~ ~	11.2 (0.07)
Iran, Islamic Rep. of	87 (2.4)	442 (4.2)	11 (2.3)	436 (10.0)	2 (0.9)	~ ~	11.0 (0.09)
Philippines	87 (2.9)	246 (7.8)	11 (2.9)	265 (19.2)	2 (1.2)	~ ~	11.1 (0.10)
Kuwait	82 (3.3)	394 (7.1)	17 (3.4)	390 (15.3)	1 (0.6)	~ ~	11.0 (0.10)
Oman	81 (2.6)	434 (4.8)	17 (2.6)	450 (10.9)	2 (0.8)	~ ~	10.8 (0.08)
Qatar	81 (2.6)	449 (5.0)	16 (2.4)	456 (12.8)	3 (1.1)	437 (16.7)	10.9 (0.10)
Armenia	81 (3.2)	468 (3.9)	19 (3.2)	460 (5.9)	0 (0.2)	~ ~	10.9 (0.09)
North Macedonia	80 (3.7)	424 (7.0)	20 (3.7)	436 (11.3)	0 (0.0)	~ ~	10.8 (0.11)
Pakistan	80 (4.6)	294 (16.1)	19 (4.5)	287 (18.3)	1 (0.8)	~ ~	10.6 (0.17)
Saudi Arabia	79 (3.2)	406 (4.4)	20 (3.2)	379 (12.2)	1 (0.8)	~ ~	10.9 (0.09)
Georgia	78 (3.4)	455 (4.9)	22 (3.4)	454 (6.2)	0 (0.0)	~ ~	10.8 (0.09)
Bosnia and Herzegovina	78 (2.7)	461 (2.9)	20 (2.5)	453 (7.1)	2 (0.9)	~ ~	10.7 (0.09)
Chile	77 (3.6)	466 (3.3)	22 (3.6)	474 (5.5)	0 (0.4)	~ ~	10.8 (0.11)
Bahrain	77 (2.7)	493 (3.7)	18 (2.7)	496 (10.4)	5 (1.1)	473 (7.7)	10.5 (0.09)
Azerbaijan	76 (2.9)	428 (3.7)	23 (2.9)	425 (6.8)	1 (0.5)	~ ~	10.7 (0.08)
United Arab Emirates r	75 (1.3)	481 (2.5)	21 (1.3)	456 (5.8)	4 (0.5)	389 (12.2)	10.6 (0.05)
Italy	71 (3.5)	509 (3.3)	28 (3.5)	511 (4.8)	1 (0.7)	~ ~	10.5 (0.11)
Spain	71 (3.6)	512 (2.4)	27 (3.5)	507 (4.4)	2 (1.1)	~ ~	10.5 (0.11)
Turkey (5)	70 (3.4)	531 (4.5)	27 (3.4)	514 (9.7)	3 (1.2)	537 (21.5)	10.6 (0.12)
Serbia	70 (3.2)	517 (4.5)	27 (3.0)	514 (4.9)	3 (1.3)	543 (6.5)	10.5 (0.11)
Montenegro	70 (2.6)	450 (3.2)	30 (2.5)	462 (4.2)	0 (0.4)	~ ~	10.4 (0.07)
Kazakhstan	68 (2.8)	494 (4.0)	31 (2.8)	495 (5.3)	0 (0.4)	~ ~	10.4 (0.09)
South Africa (5)	68 (3.5)	318 (6.6)	27 (3.1)	339 (12.0)	5 (1.4)	321 (35.2)	10.3 (0.15)
Austria	68 (3.1)	524 (2.9)	30 (3.1)	518 (5.5)	2 (0.8)	~ ~	10.3 (0.10)
Morocco	64 (3.4)	393 (7.9)	32 (3.4)	343 (8.0)	4 (1.3)	331 (17.4)	10.3 (0.13)
Netherlands r	64 (5.0)	517 (4.0)	33 (4.9)	521 (4.4)	3 (1.6)	507 (21.8)	10.3 (0.15)
Croatia	62 (3.8)	525 (2.7)	36 (3.9)	522 (3.0)	2 (0.7)	~ ~	10.3 (0.10)
Australia	61 (3.7)	533 (3.3)	34 (3.3)	533 (4.8)	6 (1.4)	542 (11.1)	10.2 (0.14)
Canada r	58 (2.6)	526 (2.7)	36 (2.4)	523 (2.3)	6 (1.3)	521 (6.4)	10.0 (0.10)
Lithuania	58 (3.7)	544 (3.7)	38 (3.6)	526 (4.5)	5 (1.6)	537 (3.8)	10.0 (0.13)
Chinese Taipei	57 (3.3)	558 (2.5)	39 (3.2)	559 (2.6)	4 (1.5)	552 (7.4)	10.0 (0.13)
United States	56 (2.4)	541 (3.6)	33 (2.3)	534 (4.4)	11 (1.5)	541 (6.0)	9.8 (0.11)
Russian Federation	54 (3.8)	565 (3.8)	42 (3.7)	570 (3.9)	3 (1.2)	579 (8.8)	10.0 (0.13)
Malta	53 (0.5)	504 (1.9)	32 (0.4)	487 (2.1)	15 (0.3)	485 (3.4)	9.5 (0.02)
Cyprus	53 (4.4)	517 (4.7)	40 (4.5)	507 (3.6)	7 (2.2)	508 (9.0)	9.7 (0.18)
Ireland	52 (3.9)	528 (5.0)	40 (3.6)	532 (3.4)	8 (2.3)	511 (8.1)	9.7 (0.15)
Bulgaria	52 (4.0)	537 (6.8)	42 (4.0)	509 (9.7)	6 (1.7)	475 (26.0)	9.7 (0.16)
Portugal	52 (3.3)	507 (3.1)	41 (3.4)	504 (3.5)	7 (1.6)	490 (6.8)	9.8 (0.12)
Northern Ireland	50 (4.3)	518 (3.3)	39 (4.1)	520 (4.6)	11 (3.0)	515 (6.5)	9.6 (0.19)
Norway (5) s	49 (4.3)	540 (4.0)	48 (4.4)	540 (3.1)	3 (1.7)	532 (19.5)	9.6 (0.15)
Latvia	48 (3.7)	543 (3.2)	48 (3.7)	542 (3.2)	4 (1.7)	532 (27.8)	9.8 (0.13)
Sweden	48 (4.3)	540 (4.7)	46 (4.4)	538 (4.6)	5 (1.8)	548 (7.4)	9.8 (0.15)
Hong Kong SAR	47 (4.3)	535 (5.1)	44 (4.1)	533 (4.7)	8 (2.1)	511 (8.6)	9.6 (0.16)
Hungary	47 (3.8)	528 (4.2)	46 (3.7)	532 (4.1)	6 (1.9)	519 (15.3)	9.6 (0.15)
Slovak Republic	46 (3.4)	517 (5.8)	45 (3.5)	526 (5.8)	9 (2.0)	505 (16.7)	9.4 (0.12)
New Zealand	45 (3.4)	507 (4.2)	46 (3.2)	501 (3.8)	10 (1.7)	486 (10.1)	9.4 (0.14)
Singapore	43 (2.6)	593 (4.8)	47 (2.7)	593 (4.9)	9 (1.5)	611 (10.4)	9.4 (0.11)
Germany	42 (4.3)	518 (3.8)	50 (4.4)	519 (4.1)	8 (2.3)	516 (8.5)	9.5 (0.15)
Belgium (Flemish)	42 (3.4)	503 (2.9)	50 (3.4)	499 (3.4)	9 (2.2)	506 (7.1)	9.4 (0.13)
England s	41 (6.1)	544 (6.3)	56 (5.9)	536 (5.9)	2 (1.7)	~ ~	9.7 (0.20)
Korea, Rep. of	41 (3.4)	589 (3.3)	45 (3.5)	588 (3.1)	14 (2.4)	581 (6.1)	9.1 (0.15)
Finland	39 (3.1)	557 (3.6)	51 (3.3)	554 (3.3)	10 (1.6)	550 (5.9)	9.3 (0.10)
Denmark	39 (3.8)	524 (3.7)	52 (4.1)	524 (3.9)	9 (2.1)	508 (5.3)	9.3 (0.13)
France	35 (3.4)	489 (5.0)	53 (3.2)	490 (3.7)	12 (3.0)	481 (10.2)	9.0 (0.14)
Czech Republic	35 (3.6)	538 (4.3)	53 (3.9)	532 (3.6)	12 (2.3)	529 (5.7)	9.0 (0.15)
Poland	32 (4.0)	531 (4.9)	46 (4.6)	531 (4.0)	22 (3.7)	533 (4.2)	8.6 (0.18)
Japan	30 (3.8)	559 (3.0)	59 (4.2)	563 (2.5)	11 (2.3)	562 (4.5)	8.9 (0.14)
International Average	**61 (0.5)**	**493 (0.6)**	**34 (0.5)**	**490 (1.0)**	**5 (0.2)**	**508 (2.2)**	
Benchmarking Participants							
Dubai, UAE r	79 (2.0)	552 (2.7)	18 (1.9)	539 (6.6)	3 (0.7)	510 (12.6)	10.8 (0.06)
Madrid, Spain	71 (3.6)	527 (2.0)	27 (3.3)	515 (3.8)	2 (1.4)	~ ~	10.5 (0.12)
Abu Dhabi, UAE	66 (2.3)	432 (4.1)	28 (2.3)	406 (8.3)	7 (1.0)	342 (10.0)	10.2 (0.09)
Ontario, Canada r	65 (4.6)	527 (5.0)	29 (4.2)	526 (4.3)	6 (1.8)	529 (11.3)	10.2 (0.18)
Moscow City, Russian Fed.	59 (4.1)	598 (2.6)	39 (4.1)	589 (3.9)	3 (1.3)	610 (25.0)	10.1 (0.14)
Quebec, Canada	40 (4.6)	523 (3.4)	51 (4.4)	523 (3.1)	9 (2.9)	518 (8.9)	9.3 (0.19)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 9.24: Teachers' Job Satisfaction

Students' Results based on Teachers' Reports

Country		Very Satisfied		Somewhat Satisfied		Less than Satisfied		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Saudi Arabia		86 (2.3)	391 (2.7)	12 (2.4)	398 (9.0)	2 (1.2)	~ ~	11.0 (0.09)
Kuwait		86 (2.2)	400 (5.2)	14 (2.2)	415 (13.1)	0 (0.0)	~ ~	11.1 (0.07)
Bahrain		78 (3.0)	483 (2.2)	21 (3.0)	474 (4.8)	1 (0.7)	~ ~	10.8 (0.08)
United Arab Emirates		77 (1.2)	483 (2.8)	20 (1.1)	448 (6.4)	3 (0.4)	419 (13.7)	10.8 (0.04)
Qatar		74 (4.0)	448 (5.8)	24 (3.7)	426 (8.4)	2 (0.9)	~ ~	10.8 (0.12)
Egypt		72 (3.9)	422 (6.4)	25 (3.6)	398 (7.9)	3 (1.4)	341 (21.2)	10.4 (0.13)
Chile		72 (3.8)	439 (3.9)	27 (3.9)	445 (5.8)	1 (0.8)	~ ~	10.6 (0.12)
Lebanon		70 (3.6)	432 (4.2)	29 (3.6)	425 (8.0)	1 (0.7)	~ ~	10.5 (0.11)
Israel		68 (2.8)	524 (6.5)	26 (2.8)	506 (10.5)	6 (1.7)	524 (18.1)	10.4 (0.10)
South Africa (9)		64 (2.9)	388 (3.3)	31 (2.7)	395 (5.0)	5 (1.4)	379 (8.3)	10.3 (0.10)
Morocco		63 (3.5)	393 (3.5)	31 (3.5)	382 (4.2)	6 (1.6)	378 (9.2)	10.1 (0.12)
Oman		63 (3.3)	415 (4.0)	28 (3.2)	405 (6.3)	10 (2.3)	394 (8.2)	10.1 (0.13)
Iran, Islamic Rep. of		63 (3.4)	448 (4.9)	29 (3.3)	445 (8.9)	8 (1.8)	436 (13.5)	10.2 (0.12)
Kazakhstan		62 (3.7)	480 (4.5)	36 (3.8)	495 (5.7)	2 (1.2)	~ ~	10.3 (0.13)
Georgia		62 (4.3)	461 (5.2)	37 (4.4)	462 (8.4)	1 (0.8)	~ ~	10.3 (0.11)
Jordan		58 (4.1)	422 (5.8)	31 (3.9)	422 (7.5)	11 (2.5)	406 (8.1)	10.0 (0.15)
Romania		57 (3.6)	486 (6.2)	37 (3.3)	469 (6.9)	5 (1.7)	482 (15.5)	10.1 (0.13)
Ireland		57 (2.9)	531 (3.6)	35 (2.5)	519 (5.4)	8 (1.7)	504 (12.2)	9.9 (0.12)
Turkey		55 (4.4)	501 (8.3)	38 (4.0)	487 (8.3)	7 (2.1)	512 (20.7)	10.1 (0.16)
Cyprus	r	51 (3.7)	511 (3.6)	35 (4.0)	496 (5.1)	14 (3.4)	503 (7.2)	9.7 (0.17)
Malaysia		49 (3.4)	456 (5.9)	48 (3.4)	463 (6.3)	3 (1.4)	487 (24.4)	10.0 (0.12)
United States		49 (2.9)	521 (7.0)	40 (2.8)	512 (6.1)	11 (1.9)	513 (11.9)	9.7 (0.12)
New Zealand		48 (3.8)	481 (6.9)	39 (3.5)	481 (5.3)	14 (2.8)	488 (8.8)	9.5 (0.16)
Chinese Taipei		47 (3.5)	618 (4.3)	43 (3.3)	608 (4.2)	10 (2.0)	608 (12.4)	9.7 (0.12)
Norway (9)	r	45 (4.2)	510 (4.0)	53 (4.3)	501 (3.6)	2 (1.0)	~ ~	9.9 (0.13)
Australia		45 (3.4)	529 (5.6)	46 (3.5)	515 (6.0)	9 (1.9)	492 (12.1)	9.6 (0.12)
Italy		43 (4.1)	495 (4.4)	50 (3.8)	501 (3.8)	7 (2.1)	492 (10.7)	9.7 (0.15)
Sweden		41 (3.6)	508 (4.1)	53 (3.8)	501 (3.7)	6 (1.5)	488 (12.8)	9.6 (0.12)
Singapore		40 (2.6)	627 (7.2)	49 (2.5)	609 (5.4)	11 (1.5)	604 (11.0)	9.4 (0.11)
Russian Federation		39 (3.1)	542 (6.7)	53 (3.2)	545 (5.6)	8 (1.7)	539 (13.5)	9.5 (0.11)
Hong Kong SAR		39 (4.1)	579 (9.4)	49 (4.1)	580 (6.2)	13 (2.5)	562 (13.3)	9.3 (0.15)
Portugal		37 (4.1)	505 (5.5)	49 (4.3)	498 (5.0)	14 (2.9)	496 (7.2)	9.2 (0.15)
Hungary		37 (3.3)	532 (6.0)	54 (3.5)	507 (5.1)	9 (1.9)	490 (14.6)	9.3 (0.12)
Korea, Rep. of		37 (3.3)	608 (4.8)	52 (3.6)	603 (3.8)	11 (2.3)	622 (8.6)	9.1 (0.14)
England	s	37 (4.9)	533 (11.3)	58 (4.6)	522 (10.6)	6 (2.5)	440 (23.7)	9.4 (0.18)
Lithuania		36 (3.8)	526 (6.0)	52 (3.8)	517 (4.9)	11 (3.0)	522 (9.4)	9.3 (0.14)
France	r	32 (4.1)	485 (6.4)	53 (4.5)	482 (3.9)	15 (3.3)	479 (7.1)	9.1 (0.15)
Finland		30 (2.3)	512 (4.1)	56 (2.7)	508 (3.1)	14 (2.1)	508 (6.3)	9.0 (0.10)
Japan		27 (3.1)	603 (5.2)	58 (3.3)	591 (3.6)	15 (2.3)	592 (6.9)	8.9 (0.12)
International Average		**54 (0.6)**	**493 (0.9)**	**39 (0.6)**	**486 (1.1)**	**7 (0.3)**	**490 (2.4)**	
Benchmarking Participants								
Dubai, UAE		77 (1.5)	542 (3.3)	21 (1.7)	523 (7.9)	2 (0.6)	~ ~	10.8 (0.05)
Abu Dhabi, UAE	r	72 (2.4)	448 (5.0)	25 (2.4)	405 (9.6)	3 (0.9)	370 (17.6)	10.6 (0.08)
Ontario, Canada		67 (4.3)	531 (4.3)	29 (4.3)	535 (10.9)	3 (1.4)	525 (15.9)	10.4 (0.14)
Gauteng, RSA (9)		65 (4.2)	420 (5.1)	31 (4.0)	423 (7.3)	4 (1.3)	408 (20.0)	10.3 (0.14)
Moscow City, Russian Fed.		50 (3.8)	586 (6.2)	46 (3.7)	565 (5.4)	3 (1.4)	554 (18.2)	9.8 (0.13)
Quebec, Canada		49 (5.2)	547 (5.7)	45 (5.2)	540 (6.3)	6 (2.3)	523 (16.4)	9.8 (0.17)
Western Cape, RSA (9)		47 (4.1)	439 (8.6)	46 (3.8)	444 (7.8)	7 (2.2)	449 (15.5)	9.6 (0.14)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit 9.25: Teachers' Job Satisfaction

Students' Results based on Teachers' Reports

Country		Very Satisfied		Somewhat Satisfied		Less than Satisfied		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Kuwait		85 (3.0)	450 (6.0)	15 (3.0)	419 (16.0)	0 (0.0)	~ ~	11.1 (0.10)
Saudi Arabia		81 (3.1)	437 (3.0)	15 (2.7)	403 (9.1)	3 (1.6)	421 (15.4)	11.0 (0.11)
United Arab Emirates	r	76 (1.4)	481 (3.2)	20 (1.4)	449 (8.1)	4 (0.5)	438 (15.6)	10.7 (0.05)
Qatar		75 (3.5)	475 (5.4)	22 (3.1)	474 (7.9)	3 (1.5)	478 (17.4)	10.8 (0.11)
Egypt		73 (3.2)	395 (6.0)	25 (3.4)	376 (9.9)	2 (1.3)	~ ~	10.5 (0.11)
Bahrain		72 (2.9)	492 (2.4)	24 (3.0)	475 (6.0)	4 (1.3)	456 (13.3)	10.6 (0.11)
Oman		70 (3.1)	463 (3.6)	22 (2.9)	445 (9.1)	8 (2.2)	438 (9.0)	10.3 (0.13)
Chile		69 (3.4)	468 (3.2)	29 (3.4)	452 (6.9)	2 (1.1)	~ ~	10.6 (0.11)
Turkey		68 (3.3)	522 (4.5)	28 (3.1)	504 (5.8)	4 (1.6)	485 (17.0)	10.5 (0.11)
Morocco		65 (2.4)	393 (3.5)	30 (2.4)	398 (3.3)	5 (1.2)	392 (7.7)	10.3 (0.08)
Iran, Islamic Rep. of		63 (3.3)	449 (4.5)	32 (3.3)	455 (8.0)	5 (1.5)	421 (10.9)	10.2 (0.13)
Lebanon		63 (3.2)	385 (6.0)	35 (3.1)	362 (8.1)	2 (0.6)	~ ~	10.3 (0.09)
Georgia		62 (2.7)	450 (4.1)	36 (2.5)	441 (4.6)	1 (0.5)	~ ~	10.3 (0.07)
Israel		60 (3.4)	516 (6.4)	34 (3.7)	513 (7.2)	7 (1.9)	499 (18.7)	10.1 (0.12)
Kazakhstan		59 (1.9)	473 (3.7)	39 (1.9)	485 (4.7)	2 (0.5)	~ ~	10.2 (0.06)
South Africa (9)		57 (2.9)	366 (4.3)	35 (2.7)	374 (6.0)	8 (1.7)	379 (10.9)	10.0 (0.11)
Ireland		55 (3.6)	532 (3.5)	38 (3.4)	527 (4.4)	7 (2.1)	501 (14.2)	9.8 (0.13)
Jordan		55 (3.9)	467 (4.9)	37 (3.9)	440 (8.6)	8 (1.7)	405 (17.3)	9.9 (0.13)
Australia	r	55 (3.0)	535 (4.2)	34 (3.0)	531 (6.3)	11 (2.0)	520 (8.9)	9.9 (0.11)
Romania		54 (2.4)	477 (5.5)	41 (2.3)	466 (5.2)	5 (1.2)	447 (10.2)	10.0 (0.09)
Cyprus	s	53 (2.5)	487 (3.2)	37 (2.3)	489 (4.7)	9 (1.3)	476 (7.5)	9.8 (0.09)
Chinese Taipei		49 (3.6)	576 (3.0)	34 (3.0)	571 (3.8)	17 (2.4)	575 (6.4)	9.5 (0.15)
United States		49 (2.6)	532 (5.5)	39 (2.6)	515 (8.8)	12 (1.9)	522 (11.3)	9.7 (0.10)
Malaysia		48 (3.7)	470 (5.5)	49 (3.9)	448 (6.8)	3 (1.0)	487 (20.3)	9.9 (0.12)
Singapore		48 (2.8)	612 (6.2)	41 (2.8)	604 (6.6)	11 (1.7)	598 (12.4)	9.7 (0.11)
Sweden		44 (3.6)	524 (4.9)	47 (3.7)	522 (4.7)	9 (2.3)	505 (10.2)	9.6 (0.13)
Italy		43 (3.8)	497 (4.7)	49 (3.5)	504 (3.4)	8 (2.3)	500 (9.3)	9.6 (0.15)
Norway (9)	r	41 (4.2)	496 (4.3)	57 (4.2)	499 (4.8)	2 (1.4)	~ ~	9.6 (0.13)
Korea, Rep. of		40 (3.6)	566 (3.1)	46 (3.4)	560 (3.4)	14 (2.7)	549 (5.5)	9.3 (0.16)
England	s	39 (5.0)	526 (10.4)	46 (5.5)	528 (8.4)	15 (3.9)	496 (23.5)	9.3 (0.22)
Hong Kong SAR		39 (3.8)	504 (9.8)	48 (4.2)	511 (8.4)	14 (3.2)	482 (18.5)	9.3 (0.15)
Russian Federation		38 (1.8)	545 (4.3)	55 (2.0)	543 (4.6)	7 (1.1)	529 (7.7)	9.4 (0.07)
New Zealand		37 (3.4)	504 (5.3)	51 (4.1)	501 (6.9)	12 (2.4)	494 (12.5)	9.4 (0.12)
Lithuania		34 (2.2)	538 (4.0)	53 (2.0)	533 (3.3)	13 (1.6)	520 (4.4)	9.2 (0.09)
Finland		32 (2.0)	546 (4.5)	55 (2.1)	542 (3.3)	13 (1.6)	539 (5.5)	9.0 (0.09)
Portugal		31 (2.8)	524 (5.3)	46 (2.6)	519 (3.7)	22 (2.4)	513 (4.5)	8.7 (0.13)
Hungary		31 (2.2)	533 (4.7)	58 (2.4)	531 (3.4)	11 (1.5)	504 (7.4)	9.1 (0.09)
France	r	26 (2.6)	493 (4.5)	54 (3.3)	489 (3.6)	20 (2.9)	480 (5.6)	8.7 (0.12)
Japan		22 (3.5)	568 (3.5)	63 (3.9)	571 (3.0)	16 (2.7)	565 (4.2)	8.6 (0.14)
International Average		**53 (0.5)**	**494 (0.8)**	**39 (0.5)**	**486 (1.1)**	**8 (0.3)**	**488 (2.2)**	
Benchmarking Participants								
Dubai, UAE	r	77 (2.4)	554 (3.8)	19 (2.4)	533 (9.5)	5 (1.0)	565 (15.1)	10.8 (0.07)
Abu Dhabi, UAE		69 (2.4)	433 (6.2)	24 (2.3)	384 (10.3)	6 (1.2)	364 (15.3)	10.5 (0.09)
Ontario, Canada	s	68 (5.2)	524 (5.8)	26 (4.6)	514 (7.7)	6 (2.6)	521 (9.9)	10.4 (0.20)
Gauteng, RSA (9)		53 (4.2)	416 (6.9)	38 (4.1)	424 (8.8)	9 (2.6)	441 (18.5)	9.9 (0.16)
Moscow City, Russian Fed.		46 (2.3)	567 (3.4)	49 (2.1)	567 (3.3)	5 (0.9)	557 (6.9)	9.8 (0.08)
Western Cape, RSA (9)		45 (4.5)	458 (11.1)	45 (4.3)	434 (8.5)	11 (2.4)	392 (10.7)	9.6 (0.15)
Quebec, Canada	y	- -	- -	- -	- -	- -	- -	- -

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Challenges to Teaching and Learning

Student Absenteeism

Exhibits 10.1, 10.2, 10.3, and 10.4 present students' reports about the frequency they are absent from school—"never or almost never," "once every two months," "once a month," "once every two weeks," and "once a week," with the percentage of students and average achievement reported for each category. Countries are sorted by the percentage of students reporting they are "never or almost never" absent. In fourth grade (Exhibits 10.1 and 10.2), 61 percent of students, on average, reported they are "never or almost never" absent, 13 percent that they are absent "once every two months," 10 percent that they are absent "once a month," 5 percent that they are absent "once every two weeks," and 11 percent that they are absent "once a week." Just over half (55%) of eighth grade students said they are absent "never or almost never," 16 percent that they are absent "once every two months," 14 percent "once a month," 7 percent "once every two weeks," and 8 percent "once a week" (Exhibits 10.3 and 10.4). In both grades, students in Korea reported the lowest rate of absenteeism, with 88 percent of fourth grade students and 94 percent of eighth grade students reporting that they are "never or almost never" absent, and just 1 percent or less saying that they are absent "once a week." In contrast, in some countries, more than one-fifth or more of students miss school "once a week."

Because coming to school is the foundation for having an opportunity to learn, it is not surprising that an increase in frequency of being absent is highly related to a decrease in average achievement, especially for students absent "once every two weeks" or more. For example, the average mathematics score in eighth grade decreased from 502 for students "never or almost never" absent to 495 for students absent "once every two months," to 475 for students absent "once a month," to 452 for students absent "once every two weeks," and to 412 for students absent "once a week"—a 90-point difference between regular attendance and missing school very often. Frequently missing school may indicate that a student has other challenges, which can cause or compound the problem of missed instruction.

Exhibit 10.1: Frequency of Student Absences

Students' Reports

Country	Never or Almost Never		Once Every Two Months		Once a Month		Once Every Two Weeks		Once a Week	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Korea, Rep. of	88 (0.7)	604 (2.2)	7 (0.6)	585 (5.8)	3 (0.3)	575 (11.3)	1 (0.2)	~ ~	1 (0.2)	~ ~
France	82 (0.9)	491 (3.0)	6 (0.5)	494 (6.3)	5 (0.4)	474 (6.2)	2 (0.3)	~ ~	5 (0.5)	406 (7.0)
Portugal	82 (0.8)	530 (2.7)	6 (0.5)	531 (6.2)	5 (0.4)	520 (6.0)	2 (0.2)	~ ~	5 (0.4)	469 (5.4)
Chinese Taipei	81 (0.8)	604 (1.8)	11 (0.7)	598 (4.1)	3 (0.3)	589 (7.8)	1 (0.2)	~ ~	3 (0.3)	519 (6.6)
Japan	79 (0.7)	602 (1.7)	12 (0.5)	582 (3.8)	5 (0.4)	557 (5.4)	1 (0.2)	~ ~	3 (0.3)	506 (6.8)
Spain	79 (0.9)	509 (2.3)	6 (0.5)	510 (6.1)	6 (0.4)	491 (5.0)	3 (0.3)	468 (8.9)	7 (0.5)	448 (6.6)
Belgium (Flemish)	79 (0.8)	538 (1.8)	11 (0.6)	529 (3.6)	5 (0.3)	511 (5.6)	2 (0.3)	~ ~	3 (0.3)	480 (6.8)
Austria	78 (0.8)	543 (2.1)	10 (0.5)	548 (3.6)	6 (0.5)	535 (5.5)	2 (0.2)	~ ~	4 (0.4)	482 (5.7)
Germany	77 (0.8)	529 (2.4)	9 (0.6)	529 (4.8)	6 (0.4)	518 (5.3)	2 (0.3)	~ ~	5 (0.4)	471 (6.9)
Lithuania	76 (1.0)	546 (2.8)	10 (0.6)	548 (5.2)	6 (0.5)	552 (7.9)	3 (0.3)	515 (10.5)	4 (0.4)	482 (6.6)
Hong Kong SAR	74 (1.2)	610 (3.5)	14 (0.8)	591 (4.4)	5 (0.5)	590 (7.7)	3 (0.3)	557 (8.9)	4 (0.6)	537 (7.0)
Singapore	74 (0.8)	638 (3.5)	13 (0.5)	623 (4.0)	6 (0.3)	596 (6.6)	2 (0.2)	~ ~	5 (0.5)	516 (7.6)
Cyprus	74 (0.9)	540 (2.7)	11 (0.7)	526 (4.8)	8 (0.4)	519 (5.6)	3 (0.3)	485 (8.7)	4 (0.4)	475 (7.9)
Montenegro	72 (0.7)	464 (2.0)	5 (0.4)	463 (6.3)	7 (0.4)	451 (4.4)	4 (0.3)	437 (8.1)	12 (0.5)	405 (4.3)
Netherlands	71 (1.1)	543 (1.9)	15 (0.8)	539 (3.4)	8 (0.6)	525 (5.7)	2 (0.3)	~ ~	4 (0.4)	496 (7.9)
Russian Federation	71 (1.2)	570 (3.5)	12 (0.7)	573 (4.4)	8 (0.5)	565 (5.2)	3 (0.4)	539 (10.2)	6 (0.4)	535 (6.8)
Albania	69 (1.5)	502 (3.4)	11 (0.9)	513 (5.9)	6 (0.6)	499 (7.5)	3 (0.3)	451 (12.7)	10 (0.7)	449 (5.4)
England	68 (1.0)	565 (3.4)	17 (0.7)	554 (5.3)	8 (0.6)	547 (6.3)	3 (0.3)	524 (14.0)	4 (0.4)	472 (9.0)
Serbia	68 (1.5)	518 (3.3)	9 (1.0)	525 (6.7)	10 (0.9)	504 (7.9)	5 (0.4)	488 (6.8)	9 (0.7)	440 (7.7)
Latvia	67 (1.0)	550 (3.1)	11 (0.5)	551 (4.3)	10 (0.5)	548 (4.7)	4 (0.4)	530 (5.5)	8 (0.5)	518 (6.1)
Northern Ireland	67 (1.0)	580 (2.9)	18 (0.9)	563 (4.6)	9 (0.6)	541 (6.0)	3 (0.4)	514 (10.9)	4 (0.4)	450 (9.3)
Italy	66 (0.9)	519 (2.4)	8 (0.5)	523 (5.3)	10 (0.5)	519 (5.6)	6 (0.4)	502 (6.3)	10 (0.7)	480 (4.4)
Kosovo	66 (1.0)	457 (2.9)	11 (0.9)	452 (6.1)	5 (0.4)	439 (5.5)	3 (0.3)	421 (11.4)	15 (0.8)	403 (5.8)
Malta	66 (0.8)	517 (1.7)	14 (0.6)	514 (4.0)	9 (0.5)	501 (4.4)	4 (0.3)	478 (8.5)	6 (0.4)	458 (5.0)
Norway (5)	66 (1.2)	549 (2.5)	15 (0.9)	557 (3.7)	11 (0.6)	533 (4.5)	4 (0.5)	504 (9.0)	5 (0.4)	495 (7.0)
Morocco	64 (1.2)	394 (4.5)	11 (0.8)	400 (10.4)	9 (0.5)	372 (12.8)	4 (0.4)	334 (12.0)	12 (0.7)	353 (7.1)
United States	63 (0.9)	547 (2.5)	15 (0.6)	548 (3.4)	9 (0.4)	536 (4.5)	5 (0.3)	507 (7.4)	8 (0.4)	457 (4.7)
Bulgaria	62 (1.5)	527 (3.4)	14 (0.9)	538 (4.9)	9 (0.6)	505 (6.5)	5 (0.6)	484 (8.4)	11 (1.3)	445 (11.0)
Chile	61 (0.9)	451 (2.6)	7 (0.4)	460 (6.1)	8 (0.4)	447 (5.7)	6 (0.4)	432 (6.6)	18 (0.9)	409 (4.4)
Bosnia and Herzegovina	61 (1.0)	462 (2.7)	13 (0.7)	463 (3.4)	9 (0.4)	456 (4.4)	4 (0.4)	415 (6.9)	13 (0.7)	410 (4.1)
Poland	60 (0.9)	531 (2.7)	15 (0.6)	527 (4.4)	11 (0.6)	523 (4.9)	5 (0.4)	490 (6.5)	9 (0.5)	458 (4.3)
Canada	60 (0.9)	519 (2.3)	16 (0.6)	517 (3.1)	12 (0.5)	506 (3.1)	5 (0.3)	487 (6.0)	6 (0.4)	455 (4.8)
Ireland	60 (0.9)	559 (2.5)	20 (0.7)	552 (4.1)	11 (0.7)	535 (5.2)	4 (0.3)	515 (7.7)	4 (0.5)	472 (7.8)
Turkey (5)	60 (1.1)	542 (4.4)	14 (0.7)	534 (5.5)	11 (0.6)	511 (5.6)	5 (0.3)	485 (12.1)	10 (0.6)	440 (5.8)
Sweden	60 (1.1)	526 (3.2)	16 (0.7)	534 (4.9)	14 (0.8)	514 (5.1)	5 (0.5)	511 (6.9)	5 (0.4)	472 (7.1)
Bahrain	59 (0.8)	491 (2.8)	8 (0.4)	485 (6.5)	8 (0.4)	484 (4.3)	5 (0.4)	467 (6.5)	19 (0.8)	451 (3.5)
United Arab Emirates	58 (0.5)	497 (1.9)	10 (0.3)	500 (2.8)	9 (0.3)	481 (3.5)	6 (0.2)	445 (3.5)	17 (0.3)	439 (2.8)
Croatia	57 (1.1)	517 (2.9)	22 (0.9)	514 (3.6)	12 (0.7)	496 (4.8)	3 (0.3)	498 (8.0)	7 (0.7)	459 (5.8)
Denmark	57 (1.1)	532 (2.3)	17 (0.7)	533 (3.4)	13 (0.7)	524 (4.1)	5 (0.4)	514 (6.8)	9 (0.6)	477 (5.7)
Australia	57 (0.9)	525 (3.2)	18 (0.8)	531 (4.1)	13 (0.6)	513 (4.2)	6 (0.4)	489 (7.2)	7 (0.5)	435 (7.5)
Oman	55 (0.9)	452 (4.2)	10 (0.8)	438 (6.5)	9 (0.5)	409 (5.0)	5 (0.3)	382 (7.4)	21 (1.0)	401 (5.3)
New Zealand	55 (0.9)	499 (2.9)	18 (0.6)	506 (4.1)	12 (0.6)	484 (5.1)	5 (0.4)	456 (6.6)	9 (0.4)	407 (4.8)
North Macedonia	54 (1.9)	494 (5.7)	13 (1.1)	488 (8.3)	9 (0.7)	468 (7.6)	4 (0.4)	429 (12.8)	20 (1.2)	433 (7.3)
Iran, Islamic Rep. of	53 (1.3)	461 (3.8)	16 (0.8)	456 (6.8)	9 (0.5)	433 (5.3)	7 (1.0)	405 (9.7)	15 (0.8)	397 (5.9)
Kazakhstan	53 (1.5)	523 (3.1)	12 (0.7)	519 (4.4)	10 (0.5)	512 (5.0)	3 (0.3)	494 (6.6)	21 (1.1)	483 (4.0)
Qatar	53 (1.0)	472 (4.3)	11 (0.5)	474 (5.3)	9 (0.5)	441 (7.2)	6 (0.5)	416 (7.7)	21 (0.8)	403 (4.5)
Azerbaijan	50 (1.4)	535 (2.9)	18 (0.9)	525 (4.2)	12 (0.7)	510 (4.5)	5 (0.4)	504 (6.8)	15 (0.9)	486 (4.4)
South Africa (5)	49 (1.2)	401 (4.0)	8 (0.4)	379 (6.1)	11 (0.6)	357 (5.9)	7 (0.5)	318 (4.7)	24 (0.7)	348 (3.8)
Armenia	49 (1.1)	511 (2.7)	11 (0.6)	503 (4.0)	12 (0.6)	499 (4.5)	6 (0.5)	487 (5.3)	22 (0.9)	474 (3.3)
Kuwait	47 (1.6)	410 (5.4)	7 (0.5)	407 (9.8)	11 (0.7)	379 (7.9)	8 (0.5)	350 (9.0)	28 (1.2)	354 (5.4)
Hungary	42 (1.0)	541 (3.3)	27 (0.9)	529 (3.2)	16 (0.6)	517 (4.3)	6 (0.4)	497 (5.6)	9 (0.7)	458 (5.0)
Saudi Arabia	42 (1.2)	419 (4.4)	10 (0.6)	420 (5.1)	11 (0.6)	408 (6.4)	9 (0.5)	376 (6.5)	28 (0.9)	367 (4.2)
Czech Republic	41 (1.0)	540 (3.3)	29 (0.8)	539 (2.9)	16 (0.7)	541 (4.7)	7 (0.4)	518 (6.1)	8 (0.5)	484 (6.3)
Finland	39 (1.0)	537 (3.0)	36 (0.8)	537 (2.6)	17 (0.7)	529 (3.9)	5 (0.3)	515 (6.7)	4 (0.4)	477 (8.1)
Georgia	38 (1.2)	495 (4.1)	17 (1.0)	496 (6.9)	14 (0.9)	489 (4.8)	9 (0.7)	464 (7.1)	21 (1.2)	446 (6.3)
Slovak Republic	35 (1.0)	527 (3.3)	25 (0.9)	522 (4.0)	19 (0.9)	515 (4.8)	8 (0.5)	487 (8.0)	13 (1.0)	451 (7.2)
Philippines	32 (1.5)	329 (7.3)	9 (0.5)	294 (7.6)	14 (0.8)	265 (8.1)	13 (0.8)	263 (7.3)	32 (1.1)	301 (6.5)
Pakistan	30 (3.6)	337 (18.2)	11 (0.8)	323 (13.7)	23 (2.3)	335 (16.3)	10 (1.4)	318 (12.4)	26 (2.4)	320 (11.3)
International Average	**61 (0.2)**	**512 (0.5)**	**13 (0.1)**	**509 (0.7)**	**10 (0.1)**	**495 (0.8)**	**5 (0.1)**	**462 (1.2)**	**11 (0.1)**	**448 (0.8)**
Benchmarking Participants										
Madrid, Spain	81 (0.8)	522 (2.1)	6 (0.4)	530 (5.1)	6 (0.5)	511 (5.2)	2 (0.2)	~ ~	5 (0.5)	465 (7.2)
Quebec, Canada r	71 (0.9)	534 (2.8)	13 (0.6)	539 (4.6)	10 (0.6)	525 (4.7)	3 (0.3)	513 (13.5)	4 (0.5)	484 (8.3)
Moscow City, Russian Fed.	67 (1.0)	594 (2.4)	13 (0.6)	604 (3.5)	11 (0.6)	595 (4.0)	5 (0.3)	583 (6.3)	5 (0.4)	549 (6.3)
Dubai, UAE	60 (0.9)	551 (1.7)	12 (0.6)	551 (3.8)	11 (0.5)	545 (4.3)	5 (0.3)	528 (8.1)	13 (0.5)	511 (3.9)
Ontario, Canada	55 (1.7)	521 (4.2)	18 (1.1)	519 (4.5)	14 (0.9)	507 (5.2)	6 (0.5)	493 (8.6)	7 (0.6)	455 (7.5)
Abu Dhabi, UAE	54 (0.9)	460 (2.3)	9 (0.5)	464 (3.9)	9 (0.4)	439 (5.6)	7 (0.3)	403 (5.0)	20 (0.6)	397 (3.4)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 10.2: Frequency of Student Absences

Students' Reports

Country	Never or Almost Never		Once Every Two Months		Once a Month		Once Every Two Weeks		Once a Week	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Korea, Rep. of	88 (0.7)	591 (2.1)	7 (0.6)	577 (5.4)	3 (0.3)	569 (10.4)	1 (0.2)	~ ~	1 (0.2)	~ ~
France	82 (0.9)	494 (3.0)	6 (0.5)	495 (6.2)	5 (0.4)	473 (6.9)	2 (0.3)	~ ~	5 (0.5)	411 (7.6)
Portugal	82 (0.8)	507 (2.6)	6 (0.5)	512 (6.7)	5 (0.4)	506 (6.4)	2 (0.2)	~ ~	5 (0.4)	454 (4.7)
Chinese Taipei	81 (0.8)	563 (1.9)	11 (0.7)	556 (3.7)	3 (0.3)	544 (6.5)	1 (0.2)	~ ~	3 (0.3)	481 (7.6)
Japan	79 (0.7)	568 (1.8)	12 (0.5)	562 (3.8)	5 (0.4)	537 (5.5)	1 (0.2)	~ ~	3 (0.3)	473 (7.2)
Spain	79 (0.9)	518 (2.0)	6 (0.5)	511 (6.0)	6 (0.4)	503 (5.6)	3 (0.3)	478 (8.5)	7 (0.5)	454 (5.9)
Belgium (Flemish)	79 (0.8)	506 (2.1)	11 (0.6)	500 (3.8)	5 (0.3)	473 (7.2)	2 (0.3)	~ ~	3 (0.3)	450 (8.8)
Austria	78 (0.8)	528 (2.8)	10 (0.5)	522 (4.5)	6 (0.5)	509 (6.5)	2 (0.2)	~ ~	4 (0.4)	441 (7.5)
Germany	77 (0.8)	527 (2.4)	9 (0.6)	527 (5.6)	6 (0.4)	517 (6.8)	2 (0.3)	~ ~	5 (0.4)	463 (7.5)
Lithuania	76 (1.0)	541 (2.6)	10 (0.6)	547 (4.7)	6 (0.5)	548 (6.8)	3 (0.3)	510 (11.1)	4 (0.4)	485 (6.4)
Hong Kong SAR	74 (1.2)	539 (3.5)	14 (0.8)	526 (5.6)	5 (0.5)	518 (9.3)	3 (0.3)	493 (9.6)	4 (0.6)	455 (7.2)
Singapore	74 (0.8)	608 (3.0)	13 (0.5)	592 (3.9)	6 (0.3)	561 (6.4)	2 (0.2)	~ ~	5 (0.5)	483 (7.6)
Cyprus	74 (0.9)	520 (3.1)	11 (0.7)	504 (4.5)	8 (0.4)	498 (6.1)	3 (0.3)	468 (8.7)	4 (0.4)	454 (8.3)
Montenegro	72 (0.7)	466 (2.7)	5 (0.4)	464 (5.7)	7 (0.4)	452 (6.1)	4 (0.3)	437 (10.2)	12 (0.5)	402 (4.6)
Netherlands	71 (1.1)	525 (2.6)	15 (0.8)	519 (4.6)	8 (0.6)	504 (5.9)	2 (0.3)	~ ~	4 (0.4)	466 (8.4)
Russian Federation	71 (1.2)	570 (3.1)	12 (0.7)	577 (4.1)	8 (0.5)	559 (6.4)	3 (0.4)	539 (10.4)	6 (0.4)	543 (6.3)
Albania	69 (1.5)	499 (3.6)	11 (0.9)	499 (5.7)	6 (0.6)	495 (10.2)	3 (0.3)	457 (13.0)	10 (0.7)	442 (7.0)
England	68 (1.0)	544 (3.2)	17 (0.7)	542 (4.9)	8 (0.6)	528 (5.0)	3 (0.3)	515 (13.1)	4 (0.4)	461 (9.2)
Serbia	68 (1.5)	527 (3.4)	9 (1.0)	531 (7.2)	10 (0.9)	507 (7.6)	5 (0.4)	503 (8.2)	9 (0.7)	458 (10.0)
Latvia	67 (1.0)	545 (2.8)	11 (0.5)	544 (4.7)	10 (0.5)	546 (5.2)	4 (0.4)	535 (4.7)	8 (0.5)	516 (5.3)
Northern Ireland	67 (1.0)	528 (2.4)	18 (0.9)	520 (4.0)	9 (0.6)	498 (4.8)	3 (0.4)	488 (8.6)	4 (0.4)	435 (7.7)
Italy	66 (0.9)	517 (3.0)	8 (0.5)	509 (4.6)	10 (0.5)	508 (7.5)	6 (0.4)	494 (6.1)	10 (0.7)	473 (5.6)
Kosovo	66 (1.0)	427 (3.8)	11 (0.9)	414 (6.5)	5 (0.4)	394 (8.0)	3 (0.3)	380 (11.4)	15 (0.8)	379 (5.9)
Malta	66 (0.8)	505 (1.6)	14 (0.6)	502 (3.9)	9 (0.5)	482 (4.6)	4 (0.3)	460 (8.5)	6 (0.4)	436 (6.1)
Norway (5)	66 (1.2)	543 (2.6)	15 (0.9)	552 (3.6)	11 (0.6)	536 (5.3)	4 (0.5)	522 (8.2)	5 (0.4)	498 (8.0)
Morocco	64 (1.2)	388 (6.0)	11 (0.8)	384 (11.3)	9 (0.5)	356 (15.0)	4 (0.4)	332 (13.4)	12 (0.7)	337 (8.9)
United States	63 (0.9)	549 (2.7)	15 (0.6)	557 (3.7)	9 (0.4)	537 (4.9)	5 (0.3)	510 (7.3)	8 (0.4)	461 (5.3)
Bulgaria	62 (1.5)	536 (4.3)	14 (0.9)	551 (6.0)	9 (0.6)	512 (7.8)	5 (0.6)	480 (9.5)	11 (1.3)	435 (10.1)
Chile	61 (0.9)	480 (2.6)	7 (0.4)	480 (6.9)	8 (0.4)	478 (5.4)	6 (0.4)	457 (5.9)	18 (0.9)	438 (4.0)
Bosnia and Herzegovina	61 (1.0)	468 (3.3)	13 (0.7)	474 (4.0)	9 (0.4)	463 (5.9)	4 (0.4)	430 (7.2)	13 (0.7)	414 (4.6)
Poland	60 (0.9)	541 (2.6)	15 (0.6)	536 (3.9)	11 (0.6)	535 (4.4)	5 (0.4)	507 (7.9)	9 (0.5)	474 (5.6)
Canada	60 (0.9)	529 (2.1)	16 (0.6)	530 (3.1)	12 (0.5)	521 (3.0)	5 (0.3)	510 (5.4)	6 (0.4)	471 (5.4)
Ireland	60 (0.9)	537 (2.8)	20 (0.7)	532 (4.5)	11 (0.7)	517 (5.8)	4 (0.3)	509 (7.6)	4 (0.5)	447 (9.5)
Turkey (5)	60 (1.1)	543 (3.9)	14 (0.7)	536 (5.6)	11 (0.6)	520 (5.1)	5 (0.3)	490 (12.4)	10 (0.6)	456 (6.1)
Sweden	60 (1.1)	542 (3.6)	16 (0.7)	552 (5.0)	14 (0.8)	534 (4.4)	5 (0.5)	520 (6.2)	5 (0.4)	479 (7.9)
Bahrain	59 (0.8)	512 (3.0)	8 (0.4)	496 (8.3)	8 (0.4)	491 (5.2)	5 (0.4)	467 (9.0)	19 (0.8)	446 (4.7)
United Arab Emirates	58 (0.5)	492 (2.3)	10 (0.3)	489 (3.3)	9 (0.3)	471 (4.3)	6 (0.2)	426 (4.7)	17 (0.3)	425 (3.0)
Croatia	57 (1.1)	532 (3.0)	22 (0.9)	525 (2.7)	12 (0.7)	512 (4.6)	3 (0.3)	509 (9.0)	7 (0.7)	479 (4.6)
Denmark	57 (1.1)	527 (2.6)	17 (0.7)	533 (3.5)	13 (0.7)	527 (4.4)	5 (0.4)	508 (6.1)	9 (0.6)	481 (5.1)
Australia	57 (0.9)	538 (2.5)	18 (0.8)	549 (4.4)	13 (0.6)	536 (4.2)	6 (0.4)	508 (7.2)	7 (0.5)	460 (6.8)
Oman	55 (0.9)	463 (4.6)	10 (0.8)	432 (7.6)	9 (0.5)	405 (5.2)	5 (0.3)	379 (8.8)	21 (1.0)	402 (5.4)
New Zealand	55 (0.9)	514 (2.6)	18 (0.6)	519 (3.5)	12 (0.6)	502 (4.4)	5 (0.4)	472 (6.0)	9 (0.4)	424 (5.1)
North Macedonia	54 (1.9)	448 (7.3)	13 (1.1)	442 (9.8)	9 (0.7)	427 (9.2)	4 (0.4)	388 (11.8)	20 (1.2)	384 (8.1)
Iran, Islamic Rep. of	53 (1.3)	459 (4.4)	16 (0.8)	448 (6.6)	9 (0.5)	427 (6.4)	7 (1.0)	410 (8.5)	15 (0.8)	398 (5.8)
Kazakhstan	53 (1.5)	510 (3.8)	12 (0.7)	498 (5.1)	10 (0.5)	493 (5.3)	3 (0.3)	486 (8.3)	21 (1.1)	456 (4.4)
Qatar	53 (1.0)	477 (4.9)	11 (0.5)	471 (6.6)	9 (0.5)	441 (7.6)	6 (0.5)	402 (9.1)	21 (0.8)	399 (4.6)
Azerbaijan	50 (1.4)	446 (3.7)	18 (0.9)	438 (5.2)	12 (0.7)	422 (5.9)	5 (0.4)	422 (8.1)	15 (0.9)	396 (5.0)
South Africa (5)	49 (1.2)	360 (5.3)	8 (0.4)	333 (9.7)	11 (0.6)	307 (7.5)	7 (0.5)	251 (7.1)	24 (0.7)	290 (5.6)
Armenia	49 (1.1)	482 (3.2)	11 (0.6)	472 (5.5)	12 (0.6)	465 (5.4)	6 (0.5)	451 (7.3)	22 (0.9)	441 (4.9)
Kuwait	47 (1.6)	422 (6.6)	7 (0.5)	407 (12.5)	11 (0.7)	387 (10.1)	8 (0.5)	353 (10.8)	28 (1.2)	363 (6.6)
Hungary	42 (1.0)	547 (3.1)	27 (0.9)	533 (3.2)	16 (0.6)	523 (4.5)	6 (0.4)	504 (6.1)	9 (0.7)	469 (5.9)
Saudi Arabia	42 (1.2)	422 (5.0)	10 (0.6)	424 (7.2)	11 (0.6)	411 (6.4)	9 (0.5)	383 (7.7)	28 (0.9)	375 (4.9)
Czech Republic	41 (1.0)	540 (3.0)	29 (0.8)	541 (4.0)	16 (0.7)	543 (3.6)	7 (0.4)	515 (5.5)	8 (0.5)	484 (6.5)
Finland	39 (1.0)	556 (3.4)	36 (0.8)	561 (2.7)	17 (0.7)	554 (4.2)	5 (0.3)	542 (6.2)	4 (0.4)	499 (7.6)
Georgia	38 (1.2)	469 (4.7)	17 (1.0)	466 (6.2)	14 (0.9)	457 (5.8)	9 (0.7)	443 (7.1)	21 (1.2)	420 (7.3)
Slovak Republic	35 (1.0)	541 (3.4)	25 (0.9)	536 (3.7)	19 (0.9)	520 (6.3)	8 (0.5)	498 (7.9)	13 (1.0)	457 (7.6)
Philippines	32 (1.5)	287 (8.9)	9 (0.5)	249 (10.5)	14 (0.8)	219 (8.9)	13 (0.8)	220 (9.8)	32 (1.1)	244 (7.6)
Pakistan	30 (3.6)	303 (22.8)	11 (0.8)	300 (16.3)	23 (2.3)	290 (17.7)	10 (1.4)	279 (16.4)	26 (2.4)	279 (13.0)
International Average	**61 (0.2)**	**503 (0.6)**	**13 (0.1)**	**498 (0.8)**	**10 (0.1)**	**484 (0.9)**	**5 (0.1)**	**455 (1.3)**	**11 (0.1)**	**437 (0.9)**
Benchmarking Participants										
Madrid, Spain	81 (0.8)	527 (2.1)	6 (0.4)	527 (5.2)	6 (0.5)	518 (4.5)	2 (0.2)	~ ~	5 (0.5)	471 (6.1)
Quebec, Canada r	71 (0.9)	524 (2.8)	13 (0.6)	527 (4.6)	10 (0.6)	516 (5.8)	3 (0.3)	510 (8.8)	4 (0.5)	477 (9.7)
Moscow City, Russian Fed.	67 (1.0)	596 (2.7)	13 (0.6)	605 (3.9)	11 (0.6)	601 (4.0)	5 (0.3)	590 (7.4)	5 (0.4)	549 (8.1)
Dubai, UAE	60 (0.9)	552 (1.6)	12 (0.6)	549 (3.8)	11 (0.5)	544 (4.6)	5 (0.3)	529 (8.5)	13 (0.5)	513 (4.8)
Ontario, Canada	55 (1.7)	533 (3.3)	18 (1.1)	530 (5.3)	14 (0.9)	522 (4.4)	6 (0.5)	513 (8.1)	7 (0.6)	468 (8.0)
Abu Dhabi, UAE	54 (0.9)	442 (3.1)	9 (0.5)	442 (4.9)	9 (0.4)	417 (6.0)	7 (0.3)	369 (7.2)	20 (0.6)	369 (3.9)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students.

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Downloaded from http://timss2019.org/download

Exhibit 10.3: Frequency of Student Absences

Students' Reports

Country	Never or Almost Never		Once Every Two Months		Once a Month		Once Every Two Weeks		Once a Week	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Korea, Rep. of	94 (0.4)	612 (2.8)	3 (0.3)	558 (10.5)	2 (0.2)	~ ~	1 (0.1)	~ ~	0 (0.1)	~ ~
Japan	84 (0.7)	600 (2.7)	9 (0.4)	583 (5.0)	4 (0.3)	554 (7.4)	2 (0.2)	~ ~	2 (0.2)	~ ~
Chinese Taipei	83 (0.8)	620 (2.8)	9 (0.5)	607 (5.0)	4 (0.3)	568 (8.1)	2 (0.2)	~ ~	2 (0.3)	~ ~
Hong Kong SAR	81 (0.9)	584 (3.9)	11 (0.7)	584 (6.3)	5 (0.4)	550 (10.7)	1 (0.2)	~ ~	2 (0.4)	~ ~
Portugal	79 (0.9)	504 (3.2)	10 (0.6)	505 (6.0)	7 (0.5)	485 (5.6)	2 (0.4)	~ ~	2 (0.3)	~ ~
Singapore	75 (0.8)	629 (3.3)	13 (0.5)	607 (5.6)	7 (0.4)	569 (7.5)	3 (0.3)	538 (9.2)	2 (0.3)	~ ~
Iran, Islamic Rep. of	65 (1.0)	456 (3.8)	18 (0.7)	450 (6.0)	10 (0.5)	427 (6.2)	3 (0.2)	415 (7.8)	5 (0.4)	367 (7.9)
Morocco	63 (1.0)	396 (2.7)	11 (0.5)	392 (3.6)	10 (0.5)	380 (3.6)	4 (0.3)	369 (5.0)	12 (0.6)	359 (3.6)
France	63 (1.0)	494 (2.8)	16 (0.7)	484 (3.6)	13 (0.7)	466 (3.6)	5 (0.5)	448 (6.3)	4 (0.5)	416 (7.6)
South Africa (9)	62 (0.8)	399 (2.3)	9 (0.3)	418 (3.8)	10 (0.4)	384 (2.7)	4 (0.2)	377 (4.7)	15 (0.5)	345 (2.7)
Lebanon	62 (1.3)	438 (3.6)	15 (0.7)	436 (4.5)	11 (0.6)	422 (5.3)	4 (0.3)	413 (6.5)	9 (0.7)	384 (4.3)
Cyprus	60 (1.1)	514 (2.4)	20 (0.8)	499 (3.6)	14 (0.7)	474 (4.6)	4 (0.3)	478 (7.1)	2 (0.3)	~ ~
Romania	60 (1.4)	494 (4.8)	12 (0.7)	482 (7.7)	12 (0.8)	469 (6.0)	7 (0.6)	457 (6.4)	10 (0.7)	422 (7.7)
Turkey	59 (1.0)	523 (4.1)	16 (0.6)	489 (5.6)	13 (0.7)	459 (5.5)	5 (0.4)	436 (10.0)	5 (0.5)	383 (8.5)
Oman	59 (0.9)	429 (2.5)	15 (0.5)	416 (3.8)	10 (0.4)	397 (5.6)	5 (0.4)	375 (6.4)	11 (0.5)	344 (5.7)
England	59 (1.1)	529 (5.5)	23 (0.9)	517 (5.9)	11 (0.7)	496 (7.7)	4 (0.4)	473 (9.1)	3 (0.3)	447 (15.4)
Lithuania	57 (1.1)	523 (3.3)	14 (0.7)	529 (5.0)	18 (0.8)	525 (3.8)	7 (0.5)	512 (6.3)	3 (0.3)	457 (9.1)
Chile	57 (0.9)	445 (3.1)	11 (0.6)	460 (4.5)	15 (0.6)	448 (3.8)	8 (0.5)	435 (6.0)	9 (0.6)	392 (4.4)
Norway (9)	57 (1.0)	510 (2.7)	19 (0.8)	511 (3.8)	16 (0.7)	503 (4.7)	6 (0.4)	479 (5.7)	3 (0.3)	448 (11.8)
Kazakhstan	54 (1.2)	499 (3.6)	20 (0.9)	486 (4.3)	12 (0.6)	477 (5.4)	4 (0.4)	460 (7.4)	9 (0.7)	454 (5.4)
Russian Federation	54 (1.1)	545 (4.6)	15 (0.6)	551 (5.5)	16 (0.7)	546 (6.2)	9 (0.5)	540 (6.5)	6 (0.5)	515 (8.5)
Sweden	54 (1.0)	511 (3.0)	16 (0.6)	508 (4.2)	15 (0.7)	504 (3.8)	8 (0.4)	489 (4.9)	6 (0.5)	454 (5.1)
United Arab Emirates	52 (0.5)	495 (2.0)	16 (0.5)	495 (3.3)	14 (0.3)	462 (2.6)	8 (0.3)	428 (3.8)	10 (0.3)	395 (3.3)
United States	51 (0.7)	524 (6.0)	22 (0.6)	528 (4.5)	15 (0.5)	515 (4.4)	8 (0.4)	493 (6.2)	4 (0.3)	424 (8.3)
Bahrain	48 (0.9)	491 (2.9)	14 (0.6)	492 (4.4)	17 (0.6)	481 (4.3)	9 (0.5)	471 (5.1)	12 (0.5)	435 (3.9)
Ireland	46 (1.0)	534 (2.9)	23 (0.7)	535 (3.5)	18 (0.7)	519 (3.6)	9 (0.6)	490 (4.5)	4 (0.4)	461 (9.9)
Jordan	46 (1.0)	438 (3.7)	18 (0.6)	428 (5.0)	16 (0.7)	411 (5.2)	9 (0.5)	398 (6.4)	11 (0.8)	379 (10.6)
Italy	46 (1.1)	504 (2.9)	16 (0.8)	514 (3.8)	21 (0.8)	503 (3.5)	12 (0.7)	477 (4.7)	5 (0.5)	428 (6.5)
Australia	46 (1.1)	535 (4.2)	23 (0.7)	524 (4.9)	17 (0.6)	509 (4.6)	8 (0.4)	477 (4.8)	5 (0.4)	439 (6.8)
New Zealand	44 (1.1)	492 (4.3)	22 (0.6)	506 (4.2)	18 (0.6)	480 (3.6)	10 (0.6)	462 (4.9)	7 (0.4)	405 (6.5)
Qatar	43 (1.5)	476 (4.7)	18 (0.8)	449 (5.4)	17 (0.9)	431 (5.5)	10 (0.6)	411 (4.2)	12 (0.8)	360 (4.7)
Kuwait	43 (1.5)	427 (4.9)	10 (0.6)	423 (6.6)	15 (0.6)	395 (5.5)	13 (0.6)	386 (5.9)	20 (1.0)	362 (6.8)
Malaysia	40 (1.4)	495 (3.3)	18 (0.7)	475 (4.2)	14 (0.7)	450 (4.2)	10 (0.6)	428 (4.6)	17 (1.1)	394 (4.4)
Israel	40 (1.1)	534 (5.0)	18 (0.7)	541 (5.6)	20 (0.6)	522 (5.5)	11 (0.6)	508 (6.3)	11 (0.7)	452 (6.3)
Egypt	38 (1.1)	427 (5.5)	9 (0.6)	413 (8.0)	9 (0.6)	407 (7.9)	10 (0.4)	404 (6.7)	34 (1.3)	408 (6.2)
Finland	33 (0.8)	520 (3.0)	32 (0.8)	516 (3.2)	22 (0.6)	505 (3.0)	9 (0.4)	492 (5.0)	4 (0.4)	461 (6.2)
Hungary	32 (0.9)	532 (4.2)	36 (0.9)	523 (3.7)	22 (0.7)	508 (3.9)	7 (0.6)	485 (7.0)	3 (0.4)	409 (10.8)
Saudi Arabia	27 (1.0)	419 (3.5)	14 (0.5)	407 (4.4)	20 (0.7)	398 (3.9)	18 (0.6)	388 (3.3)	22 (0.8)	358 (3.3)
Georgia	25 (1.1)	477 (5.4)	17 (0.8)	472 (5.5)	26 (1.0)	464 (5.2)	16 (0.8)	465 (6.3)	16 (0.9)	418 (6.6)
International Average	**55 (0.2)**	**502 (0.6)**	**16 (0.1)**	**495 (0.8)**	**14 (0.1)**	**475 (0.9)**	**7 (0.1)**	**452 (1.1)**	**8 (0.1)**	**412 (1.3)**
Benchmarking Participants										
Gauteng, RSA (9)	62 (1.0)	431 (3.2)	12 (0.5)	443 (4.8)	11 (0.5)	405 (4.2)	3 (0.3)	406 (9.0)	11 (0.5)	365 (4.0)
Western Cape, RSA (9)	60 (1.0)	449 (4.9)	12 (0.5)	480 (6.1)	11 (0.5)	435 (6.0)	5 (0.4)	436 (7.7)	12 (0.6)	375 (3.6)
Quebec, Canada	60 (1.3)	548 (4.0)	18 (0.9)	556 (4.4)	13 (0.7)	538 (4.3)	6 (0.6)	520 (5.8)	4 (0.5)	492 (12.3)
Dubai, UAE	55 (1.0)	547 (2.2)	19 (0.6)	551 (2.9)	13 (0.5)	528 (3.8)	7 (0.5)	498 (6.4)	6 (0.5)	458 (7.2)
Abu Dhabi, UAE	45 (0.8)	468 (3.3)	17 (0.6)	458 (3.7)	15 (0.5)	423 (4.5)	10 (0.4)	389 (5.1)	13 (0.6)	365 (4.6)
Moscow City, Russian Fed.	44 (1.1)	578 (4.4)	17 (0.7)	585 (4.7)	21 (0.7)	577 (4.9)	11 (0.6)	572 (7.0)	7 (0.5)	535 (8.5)
Ontario, Canada	39 (1.3)	540 (4.8)	24 (0.9)	538 (5.5)	21 (0.8)	528 (5.1)	12 (0.8)	508 (5.4)	4 (0.4)	470 (9.7)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 10.4: Frequency of Student Absences

Students' Reports

Country	Never or Almost Never		Once Every Two Months		Once a Month		Once Every Two Weeks		Once a Week	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Korea, Rep. of	94 (0.4)	565 (2.1)	3 (0.3)	515 (9.4)	2 (0.2)	~ ~	1 (0.1)	~ ~	0 (0.1)	~ ~
Japan	84 (0.7)	574 (2.1)	9 (0.4)	560 (5.0)	4 (0.3)	548 (7.0)	2 (0.2)	~ ~	2 (0.2)	~ ~
Chinese Taipei	83 (0.8)	581 (1.9)	9 (0.5)	569 (4.2)	4 (0.3)	542 (6.2)	2 (0.2)	~ ~	2 (0.3)	~ ~
Hong Kong SAR	81 (0.9)	508 (5.2)	11 (0.7)	508 (8.1)	5 (0.4)	487 (10.6)	1 (0.2)	~ ~	2 (0.4)	~ ~
Portugal	79 (0.9)	521 (2.9)	10 (0.6)	524 (5.0)	7 (0.5)	516 (6.8)	2 (0.4)	~ ~	2 (0.3)	~ ~
Singapore	75 (0.8)	620 (3.2)	13 (0.5)	598 (5.7)	7 (0.4)	563 (7.7)	3 (0.3)	536 (9.3)	2 (0.3)	~ ~
Iran, Islamic Rep. of	65 (1.0)	459 (3.6)	18 (0.7)	452 (5.6)	10 (0.5)	430 (5.8)	3 (0.2)	421 (8.9)	5 (0.4)	371 (8.7)
Morocco	63 (1.0)	406 (3.0)	11 (0.5)	390 (4.6)	10 (0.5)	380 (3.3)	4 (0.3)	370 (6.7)	12 (0.6)	360 (4.2)
France	63 (1.0)	500 (2.7)	16 (0.7)	492 (4.2)	13 (0.7)	471 (4.4)	5 (0.5)	451 (6.6)	4 (0.5)	407 (7.6)
South Africa (9)	62 (0.8)	383 (3.1)	9 (0.3)	402 (5.0)	10 (0.4)	365 (4.3)	4 (0.2)	352 (6.8)	15 (0.5)	313 (3.6)
Lebanon	62 (1.3)	389 (5.4)	15 (0.7)	385 (7.4)	11 (0.6)	365 (8.2)	4 (0.3)	361 (11.1)	9 (0.7)	317 (7.0)
Cyprus	60 (1.1)	498 (2.6)	20 (0.8)	482 (3.9)	14 (0.7)	456 (4.8)	4 (0.3)	460 (7.9)	2 (0.3)	~ ~
Romania	60 (1.4)	486 (4.8)	12 (0.7)	473 (7.2)	12 (0.8)	455 (6.5)	7 (0.6)	455 (6.5)	10 (0.7)	410 (8.3)
Turkey	59 (1.0)	539 (3.7)	16 (0.6)	509 (4.8)	13 (0.7)	488 (5.2)	5 (0.4)	465 (8.8)	5 (0.5)	405 (6.9)
Oman	59 (0.9)	478 (2.5)	15 (0.5)	466 (4.0)	10 (0.4)	438 (6.0)	5 (0.4)	407 (7.0)	11 (0.5)	387 (6.4)
England	59 (1.1)	531 (5.1)	23 (0.9)	520 (5.2)	11 (0.7)	496 (8.5)	4 (0.4)	467 (10.4)	3 (0.3)	439 (17.2)
Lithuania	57 (1.1)	535 (3.2)	14 (0.7)	543 (4.5)	18 (0.8)	539 (3.7)	7 (0.5)	529 (6.3)	3 (0.3)	482 (9.1)
Chile	57 (0.9)	467 (3.2)	11 (0.6)	484 (5.1)	15 (0.6)	467 (4.2)	8 (0.5)	458 (4.8)	9 (0.6)	412 (4.8)
Norway (9)	57 (1.0)	501 (3.3)	19 (0.8)	505 (4.0)	16 (0.7)	495 (4.6)	6 (0.4)	476 (7.4)	3 (0.3)	446 (14.6)
Kazakhstan	54 (1.2)	492 (3.3)	20 (0.9)	476 (3.9)	12 (0.6)	460 (5.5)	4 (0.4)	459 (10.3)	9 (0.7)	436 (6.2)
Russian Federation	54 (1.1)	546 (4.2)	15 (0.6)	546 (5.7)	16 (0.7)	544 (5.7)	9 (0.5)	537 (6.5)	6 (0.5)	512 (7.9)
Sweden	54 (1.0)	535 (3.6)	16 (0.6)	529 (5.0)	15 (0.7)	519 (4.7)	8 (0.4)	504 (5.8)	6 (0.5)	457 (8.0)
United Arab Emirates	52 (0.5)	502 (2.5)	16 (0.5)	500 (4.2)	14 (0.3)	459 (3.1)	8 (0.3)	414 (4.8)	10 (0.3)	367 (4.5)
United States	51 (0.7)	529 (5.9)	22 (0.6)	537 (4.3)	15 (0.5)	524 (4.1)	8 (0.4)	506 (5.8)	4 (0.3)	422 (9.5)
Bahrain	48 (0.9)	503 (3.0)	14 (0.6)	515 (4.2)	17 (0.6)	485 (4.1)	9 (0.5)	457 (5.4)	12 (0.5)	410 (5.9)
Ireland	46 (1.0)	534 (3.3)	23 (0.7)	533 (3.7)	18 (0.7)	519 (4.1)	9 (0.6)	491 (5.1)	4 (0.4)	449 (12.5)
Jordan	46 (1.0)	476 (4.3)	18 (0.6)	458 (5.5)	16 (0.7)	442 (5.8)	9 (0.5)	439 (8.7)	11 (0.8)	389 (8.1)
Italy	46 (1.1)	510 (2.6)	16 (0.8)	516 (4.3)	21 (0.8)	501 (3.7)	12 (0.7)	479 (4.6)	5 (0.5)	428 (9.2)
Australia	46 (1.1)	543 (3.6)	23 (0.7)	537 (4.4)	17 (0.6)	524 (4.1)	8 (0.4)	494 (5.1)	5 (0.4)	454 (8.0)
New Zealand	44 (1.1)	509 (4.3)	22 (0.6)	523 (4.4)	18 (0.6)	501 (4.3)	10 (0.6)	479 (5.1)	7 (0.4)	415 (6.6)
Qatar	43 (1.5)	507 (5.3)	18 (0.8)	483 (5.6)	17 (0.9)	465 (6.3)	10 (0.6)	438 (6.4)	12 (0.8)	388 (5.2)
Kuwait	43 (1.5)	475 (5.3)	10 (0.6)	463 (7.9)	15 (0.6)	436 (6.6)	13 (0.6)	425 (6.7)	20 (1.0)	391 (7.0)
Malaysia	40 (1.4)	492 (3.7)	18 (0.7)	475 (3.9)	14 (0.7)	460 (4.7)	10 (0.6)	434 (5.6)	17 (1.1)	386 (5.4)
Israel	40 (1.1)	528 (4.8)	18 (0.7)	532 (5.1)	20 (0.6)	517 (5.9)	11 (0.6)	500 (5.9)	11 (0.7)	455 (7.0)
Egypt	38 (1.1)	407 (6.0)	9 (0.6)	388 (8.0)	9 (0.6)	382 (7.9)	10 (0.4)	385 (7.4)	34 (1.3)	383 (6.8)
Finland	33 (0.8)	558 (3.7)	32 (0.8)	550 (3.6)	22 (0.6)	537 (3.3)	9 (0.4)	520 (5.5)	4 (0.4)	492 (8.5)
Hungary	32 (0.9)	548 (3.5)	36 (0.9)	536 (3.3)	22 (0.7)	518 (3.5)	7 (0.6)	495 (6.5)	3 (0.4)	427 (10.1)
Saudi Arabia	27 (1.0)	449 (3.9)	14 (0.5)	443 (4.2)	20 (0.7)	439 (4.9)	18 (0.6)	434 (4.1)	22 (0.8)	397 (3.6)
Georgia	25 (1.1)	464 (5.4)	17 (0.8)	463 (5.2)	26 (1.0)	449 (4.4)	16 (0.8)	444 (5.8)	16 (0.9)	405 (5.9)
International Average	**55 (0.2)**	**504 (0.6)**	**16 (0.1)**	**497 (0.8)**	**14 (0.1)**	**479 (0.9)**	**7 (0.1)**	**457 (1.2)**	**8 (0.1)**	**413 (1.4)**
Benchmarking Participants										
Gauteng, RSA (9)	62 (1.0)	436 (3.9)	12 (0.5)	446 (6.0)	11 (0.5)	402 (6.5)	3 (0.3)	399 (11.8)	11 (0.5)	352 (4.6)
Western Cape, RSA (9)	60 (1.0)	450 (5.6)	12 (0.5)	480 (7.1)	11 (0.5)	433 (7.0)	5 (0.4)	435 (9.7)	12 (0.6)	359 (5.4)
Quebec, Canada	60 (1.3)	540 (4.0)	18 (0.9)	544 (4.3)	13 (0.7)	535 (4.7)	6 (0.6)	517 (6.1)	4 (0.5)	495 (10.6)
Dubai, UAE	55 (1.0)	561 (2.3)	19 (0.6)	563 (3.7)	13 (0.5)	539 (3.9)	7 (0.5)	498 (6.5)	6 (0.5)	455 (9.0)
Abu Dhabi, UAE	45 (0.8)	465 (4.1)	17 (0.6)	449 (5.1)	15 (0.5)	404 (5.4)	10 (0.4)	357 (7.4)	13 (0.6)	319 (6.1)
Moscow City, Russian Fed.	44 (1.1)	570 (3.3)	17 (0.7)	576 (3.6)	21 (0.7)	565 (3.9)	11 (0.6)	561 (5.6)	7 (0.5)	537 (7.2)
Ontario, Canada	39 (1.3)	530 (3.5)	24 (0.9)	527 (4.6)	21 (0.8)	524 (4.5)	12 (0.8)	502 (5.6)	4 (0.4)	471 (10.4)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Students Feel Tired or Hungry

Exhibits 10.5, 10.6, 10.7, and 10.8 contain students' reports about the frequency with which they arrive at school feeling tired or hungry, along with average achievement by frequency. Lack of adequate sleep or nutrition can have serious implications for a student's ability to focus on learning and also may be indicative of other challenges that students face.

On average across countries, just over one-third (35%) of fourth grade students and 45 percent of eighth grade students reported that they arrive at school feeling tired "every day or almost every day." Only 19 percent of fourth grade students and 8 percent of eighth grade students reported "never" arriving at school feeling tired, and nearly half (47%) of students in both grades reported "sometimes" arriving feeling tired. On average, achievement was lowest for fourth grade students who reported feeling tired "every day or almost every day," though it was highest for students "sometimes" arriving at school feeling tired compared with "never" doing so. In eighth grade, average mathematics achievement was 488 for "never" arriving at school feeling tired and 487 for doing so "every day or almost every day," while it was 493 for "sometimes" arriving at school feeling tired (Exhibit 10.7). Average science achievement was lowest for the 8 percent of eighth grade students reporting they "never" arrived at school feeling tired (Exhibit 10.8).

More than one-quarter (28%) of fourth grade students reported that they arrived at school hungry "every day or almost every day," and 41 percent said they "sometimes" did. Just under one-third (31%) reported that they "never" arrived at school hungry. Frequent hunger was a somewhat bigger problem in eighth grade, with 33 percent of students reporting that they arrived at school hungry "every day or almost every day" and another 42 percent of reporting that they did so "sometimes." Only 25 percent said they "never" arrived at school hungry. There was a direct relationship between the frequency of arriving at school hungry and average achievement in both grades and subjects. For example, in fourth grade science (Exhibit 10.6), students arriving at school hungry "every day or almost day" had an average score of 478, compared with 497 for students who did so "sometimes" and 504 for students who "never" did.

Exhibit 10.5: Students Report Arriving at School Feeling Tired or Hungry

Students' Reports

Country	Students Feel Tired						Students Feel Hungry					
	Never		Sometimes		Every Day or Almost Every Day		Never		Sometimes		Every Day or Almost Every Day	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Albania	41 (1.9)	500 (3.5)	46 (1.6)	502 (4.1)	13 (1.0)	467 (7.3)	44 (2.0)	504 (3.9)	34 (2.0)	504 (4.3)	22 (1.4)	479 (4.8)
Armenia	38 (1.4)	505 (3.1)	37 (1.1)	509 (3.2)	26 (1.1)	486 (3.5)	r 41 (1.2)	512 (2.6)	32 (1.1)	503 (3.6)	27 (1.0)	489 (3.6)
Australia	13 (0.7)	519 (5.3)	53 (1.0)	528 (3.3)	34 (1.1)	499 (3.1)	30 (1.1)	541 (4.2)	43 (0.9)	522 (3.0)	28 (1.0)	486 (3.5)
Austria	9 (0.5)	534 (4.9)	47 (1.0)	546 (2.2)	44 (1.1)	534 (2.6)	30 (0.9)	552 (2.9)	43 (0.8)	541 (2.4)	26 (0.9)	528 (2.8)
Azerbaijan	29 (1.2)	529 (3.5)	49 (1.1)	524 (2.7)	22 (0.9)	516 (4.3)	42 (1.4)	531 (2.8)	44 (1.2)	525 (3.3)	13 (0.8)	504 (5.5)
Bahrain	24 (0.8)	481 (4.1)	41 (0.8)	487 (3.2)	35 (1.0)	474 (3.6)	27 (0.9)	490 (3.5)	36 (0.9)	480 (2.8)	37 (0.9)	477 (3.4)
Belgium (Flemish)	12 (0.5)	537 (4.2)	57 (0.8)	536 (2.1)	31 (0.8)	525 (2.5)	34 (1.2)	544 (2.5)	41 (1.0)	533 (2.4)	25 (1.0)	519 (2.6)
Bosnia and Herzegovina	17 (0.8)	452 (3.9)	51 (1.0)	461 (2.4)	32 (1.1)	444 (3.4)	29 (1.0)	464 (3.5)	41 (0.7)	457 (2.6)	30 (1.0)	447 (3.1)
Bulgaria	17 (1.3)	504 (9.5)	44 (1.6)	525 (4.6)	38 (2.0)	513 (5.5)	36 (2.1)	530 (5.1)	34 (1.3)	523 (3.8)	30 (2.0)	501 (7.5)
Canada	10 (0.3)	514 (5.0)	47 (0.6)	523 (2.0)	43 (0.7)	500 (2.2)	25 (0.7)	526 (3.9)	42 (0.6)	516 (2.2)	33 (1.0)	499 (2.6)
Chile	17 (0.8)	439 (4.2)	36 (0.7)	457 (2.9)	47 (1.0)	434 (3.4)	20 (0.8)	458 (3.9)	36 (0.9)	444 (3.5)	44 (0.9)	440 (3.2)
Chinese Taipei	17 (0.7)	588 (4.0)	59 (0.9)	605 (2.1)	24 (0.8)	596 (2.8)	17 (0.7)	599 (3.9)	56 (0.8)	603 (2.1)	27 (0.9)	593 (2.9)
Croatia	13 (0.9)	518 (5.4)	57 (1.5)	512 (2.7)	30 (1.2)	504 (2.7)	20 (1.2)	521 (5.0)	53 (1.2)	511 (2.8)	28 (1.2)	501 (3.0)
Cyprus	23 (0.8)	537 (3.5)	40 (0.9)	542 (2.8)	37 (1.1)	521 (4.0)	44 (1.1)	547 (3.3)	32 (0.8)	532 (3.5)	24 (0.9)	512 (3.9)
Czech Republic	7 (0.5)	534 (6.6)	42 (1.1)	546 (2.9)	51 (1.1)	523 (3.0)	25 (1.1)	551 (3.2)	45 (1.1)	536 (2.7)	30 (0.8)	520 (4.2)
Denmark	7 (0.5)	525 (5.6)	51 (1.1)	531 (2.6)	42 (1.1)	518 (2.4)	27 (1.1)	541 (3.4)	46 (1.1)	524 (2.6)	27 (1.1)	514 (3.0)
England	9 (0.6)	554 (6.8)	48 (1.3)	568 (4.6)	43 (1.5)	545 (3.3)	27 (1.2)	575 (5.3)	42 (1.1)	565 (4.0)	30 (1.2)	531 (3.7)
Finland	8 (0.5)	531 (5.2)	59 (0.9)	540 (2.3)	33 (0.9)	519 (3.3)	29 (1.0)	540 (3.3)	52 (0.9)	537 (2.5)	20 (0.7)	511 (4.0)
France	16 (0.7)	481 (4.7)	50 (1.0)	493 (3.3)	34 (1.1)	478 (4.1)	32 (1.2)	503 (3.0)	37 (1.0)	487 (3.8)	31 (1.3)	469 (4.1)
Georgia	27 (1.3)	497 (4.3)	46 (1.6)	482 (4.2)	27 (1.3)	467 (5.6)	41 (1.6)	486 (4.5)	39 (1.4)	489 (4.6)	21 (1.3)	472 (5.6)
Germany	r 8 (0.6)	519 (6.4)	40 (1.1)	536 (3.1)	52 (1.0)	517 (2.4)	r 29 (1.0)	537 (3.4)	43 (0.9)	531 (2.6)	28 (1.0)	507 (3.4)
Hong Kong SAR	16 (0.8)	610 (5.2)	51 (1.2)	607 (3.4)	33 (1.3)	589 (4.2)	26 (0.8)	612 (4.8)	46 (1.1)	606 (3.2)	28 (1.2)	586 (4.6)
Hungary	6 (0.5)	515 (7.3)	41 (1.0)	528 (3.1)	53 (1.1)	522 (2.8)	29 (0.8)	536 (3.6)	47 (0.8)	525 (2.9)	24 (0.8)	515 (4.3)
Iran, Islamic Rep. of	39 (1.4)	442 (4.5)	41 (1.3)	453 (4.4)	20 (0.9)	434 (6.0)	38 (1.0)	458 (4.6)	41 (1.2)	447 (4.5)	21 (0.8)	427 (4.8)
Ireland	11 (0.8)	544 (5.3)	55 (1.1)	558 (2.8)	34 (1.0)	537 (3.1)	36 (1.0)	567 (3.2)	44 (1.0)	549 (3.1)	20 (0.9)	529 (4.3)
Italy	13 (0.8)	514 (4.6)	43 (1.1)	523 (2.9)	45 (1.3)	508 (2.7)	28 (1.0)	529 (3.2)	36 (0.9)	519 (2.7)	36 (0.9)	504 (2.9)
Japan	26 (1.0)	601 (2.5)	51 (0.9)	596 (2.2)	23 (0.9)	579 (3.1)	44 (1.1)	607 (2.3)	37 (0.7)	593 (2.4)	19 (0.7)	568 (2.8)
Kazakhstan	32 (1.4)	515 (3.5)	47 (1.2)	516 (2.7)	21 (1.0)	502 (3.9)	36 (1.5)	521 (3.4)	47 (1.2)	512 (2.8)	17 (0.8)	508 (5.2)
Korea, Rep. of	15 (0.8)	610 (4.6)	49 (1.2)	605 (2.4)	36 (1.2)	590 (3.3)	21 (0.8)	613 (3.3)	46 (1.1)	602 (2.6)	34 (1.2)	591 (3.0)
Kosovo	38 (1.3)	452 (3.3)	46 (1.1)	453 (3.0)	17 (0.9)	423 (5.2)	35 (1.3)	459 (3.9)	40 (1.2)	452 (3.4)	25 (1.0)	433 (4.0)
Kuwait	25 (1.3)	390 (5.8)	40 (1.2)	404 (5.2)	35 (1.5)	373 (6.0)	24 (1.1)	407 (6.5)	39 (1.1)	404 (4.9)	37 (1.2)	377 (6.1)
Latvia	7 (0.4)	546 (5.8)	49 (1.0)	555 (2.6)	44 (1.1)	538 (3.4)	22 (1.0)	555 (3.4)	44 (1.0)	552 (3.1)	34 (1.1)	537 (3.1)
Lithuania	25 (1.2)	543 (4.3)	54 (1.0)	545 (3.0)	21 (0.9)	537 (4.8)	49 (1.3)	545 (3.3)	39 (1.0)	546 (3.3)	12 (0.8)	530 (5.6)
Malta	15 (0.6)	504 (4.3)	42 (0.7)	517 (2.2)	43 (0.8)	505 (2.2)	22 (0.6)	521 (3.5)	36 (0.8)	517 (2.0)	42 (0.8)	498 (2.4)
Montenegro	26 (0.8)	458 (2.8)	50 (0.8)	461 (2.6)	24 (0.6)	441 (3.1)	37 (1.0)	467 (2.4)	36 (0.8)	459 (2.7)	27 (0.9)	438 (2.8)
Morocco	39 (1.5)	388 (4.2)	40 (1.5)	395 (5.7)	21 (1.1)	362 (6.6)	31 (1.2)	393 (5.1)	39 (1.2)	392 (5.0)	30 (1.4)	377 (7.7)
Netherlands	8 (0.5)	533 (4.5)	50 (1.5)	543 (2.4)	42 (1.5)	534 (2.7)	32 (0.9)	548 (2.4)	45 (1.0)	540 (3.0)	23 (1.1)	523 (3.4)
New Zealand	11 (0.6)	484 (5.6)	50 (0.9)	501 (3.1)	39 (0.9)	475 (2.9)	29 (0.9)	510 (3.7)	42 (1.0)	497 (3.4)	29 (0.9)	462 (3.1)
North Macedonia	28 (1.5)	475 (7.2)	46 (1.4)	491 (5.6)	26 (1.2)	451 (7.7)	29 (1.3)	484 (5.9)	40 (1.9)	488 (6.0)	31 (2.0)	465 (6.9)
Northern Ireland	7 (0.5)	567 (8.1)	49 (1.2)	581 (3.4)	43 (1.2)	552 (3.6)	33 (0.9)	586 (4.1)	41 (0.8)	566 (3.5)	26 (1.0)	550 (4.6)
Norway (5)	8 (0.7)	537 (6.3)	47 (1.2)	551 (2.9)	46 (1.3)	539 (3.0)	27 (1.0)	557 (3.6)	51 (0.8)	547 (2.7)	22 (1.0)	527 (3.5)
Oman	24 (1.2)	433 (5.2)	46 (1.1)	446 (4.8)	30 (1.2)	418 (4.5)	25 (1.2)	446 (5.0)	38 (0.8)	437 (4.6)	37 (1.3)	428 (4.5)
Pakistan	43 (3.4)	329 (15.0)	31 (2.5)	348 (15.8)	25 (2.8)	309 (10.2)	r 33 (2.6)	322 (13.6)	29 (2.6)	349 (14.5)	38 (2.4)	334 (12.9)
Philippines	24 (1.1)	306 (6.8)	42 (1.4)	337 (6.5)	33 (1.5)	259 (6.3)	27 (1.4)	313 (7.4)	44 (1.4)	327 (5.8)	29 (1.1)	273 (8.1)
Poland	17 (0.7)	528 (4.4)	46 (1.1)	529 (2.8)	37 (1.3)	510 (3.4)	45 (1.1)	536 (3.0)	38 (0.9)	520 (3.0)	18 (0.7)	500 (4.2)
Portugal	23 (0.7)	532 (3.8)	46 (0.8)	532 (2.8)	31 (0.8)	513 (3.2)	47 (1.0)	538 (3.4)	32 (0.7)	530 (3.3)	22 (0.9)	503 (3.7)
Qatar	17 (0.8)	452 (4.9)	40 (0.9)	462 (4.1)	43 (1.1)	445 (4.1)	20 (0.8)	468 (5.4)	37 (0.9)	460 (4.4)	43 (0.9)	442 (3.7)
Russian Federation	20 (1.1)	571 (5.9)	51 (0.9)	573 (3.4)	29 (1.3)	556 (4.0)	42 (1.3)	572 (4.8)	39 (1.0)	569 (3.6)	19 (0.9)	560 (3.7)
Saudi Arabia	26 (0.9)	409 (5.0)	45 (1.0)	412 (4.1)	29 (1.0)	379 (4.5)	24 (1.1)	417 (5.3)	39 (1.1)	412 (4.4)	36 (1.2)	393 (3.6)
Serbia	13 (0.9)	507 (5.2)	56 (1.1)	516 (3.8)	31 (1.1)	497 (4.4)	29 (1.5)	519 (3.8)	41 (1.2)	519 (3.8)	30 (1.5)	489 (5.3)
Singapore	12 (0.5)	633 (5.1)	45 (0.7)	637 (3.9)	44 (0.8)	612 (4.4)	34 (0.8)	647 (3.6)	40 (0.7)	628 (4.3)	26 (0.8)	596 (4.3)
Slovak Republic	8 (0.6)	508 (6.8)	38 (1.0)	518 (5.0)	54 (1.2)	506 (2.8)	30 (1.0)	523 (3.9)	43 (1.2)	513 (4.3)	27 (1.2)	496 (3.9)
South Africa (5)	27 (1.0)	378 (4.6)	45 (0.9)	393 (3.6)	28 (1.0)	352 (4.5)	31 (1.0)	391 (4.5)	38 (0.7)	388 (3.8)	31 (1.0)	358 (4.8)
Spain	17 (0.8)	503 (5.5)	47 (1.1)	513 (2.1)	36 (1.1)	492 (2.8)	40 (1.0)	515 (2.6)	36 (0.8)	509 (3.1)	24 (1.0)	482 (3.1)
Sweden	7 (0.6)	511 (7.1)	51 (1.2)	528 (3.3)	42 (1.3)	517 (3.0)	33 (1.3)	534 (3.9)	44 (1.3)	523 (2.8)	24 (1.3)	506 (4.1)
Turkey (5)	17 (0.7)	523 (5.7)	51 (1.0)	533 (4.7)	32 (1.0)	513 (5.6)	15 (0.7)	528 (5.2)	44 (1.0)	532 (5.3)	40 (1.1)	521 (5.0)
United Arab Emirates	23 (0.5)	489 (2.5)	42 (0.4)	491 (2.1)	34 (0.5)	471 (2.1)	26 (0.5)	498 (2.2)	40 (0.4)	490 (1.8)	34 (0.5)	469 (2.2)
United States	8 (0.4)	539 (5.7)	36 (0.7)	554 (2.6)	56 (0.8)	528 (2.7)	23 (0.7)	556 (3.5)	40 (0.5)	545 (2.6)	38 (0.8)	523 (2.9)
International Average	**19 (0.1)**	**503 (0.7)**	**47 (0.1)**	**511 (0.5)**	**35 (0.2)**	**490 (0.6)**	**31 (0.2)**	**515 (0.6)**	**41 (0.1)**	**507 (0.5)**	**28 (0.1)**	**488 (0.6)**
Benchmarking Participants												
Ontario, Canada	10 (0.6)	517 (8.2)	46 (1.2)	525 (3.3)	44 (1.2)	500 (3.8)	27 (1.3)	528 (6.5)	41 (1.1)	518 (3.9)	32 (1.9)	496 (4.7)
Quebec, Canada	r 9 (0.7)	527 (5.6)	53 (1.2)	537 (2.8)	38 (1.4)	525 (2.6)	r 19 (1.0)	548 (3.6)	44 (1.2)	534 (3.1)	37 (1.1)	523 (3.0)
Moscow City, Russian Fed.	16 (0.9)	603 (3.4)	48 (1.0)	599 (2.5)	36 (1.1)	582 (3.1)	33 (1.3)	602 (2.6)	40 (1.0)	595 (2.7)	26 (1.0)	581 (3.1)
Madrid, Spain	14 (0.7)	515 (4.2)	48 (0.9)	525 (2.3)	37 (0.9)	512 (2.6)	42 (1.1)	528 (2.3)	37 (1.0)	520 (2.7)	21 (0.9)	500 (3.8)
Abu Dhabi, UAE	18 (0.7)	438 (4.7)	41 (0.7)	450 (2.7)	42 (0.7)	437 (3.2)	21 (0.7)	454 (4.2)	39 (0.8)	452 (2.8)	39 (0.8)	432 (2.6)
Dubai, UAE	23 (0.6)	543 (2.8)	45 (0.8)	551 (2.1)	32 (0.7)	536 (2.5)	30 (0.7)	549 (2.7)	40 (0.7)	549 (1.9)	30 (0.6)	533 (3.2)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
An "r" indicates data are available for at least 70% but less than 85% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 10.6: Students Report Arriving at School Feeling Tired or Hungry

Students' Reports

Country	Students Feel Tired						Students Feel Hungry					
	Never		Sometimes		Every Day or Almost Every Day		Never		Sometimes		Every Day or Almost Every Day	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Albania	41 (1.9)	495 (3.6)	46 (1.6)	496 (4.3)	13 (1.0)	469 (7.1)	44 (2.0)	498 (4.5)	34 (2.0)	500 (4.1)	22 (1.4)	476 (4.8)
Armenia	38 (1.4)	473 (4.0)	37 (1.1)	481 (3.9)	26 (1.1)	453 (4.5)	r 41 (1.2)	480 (3.5)	32 (1.1)	476 (4.3)	27 (1.0)	455 (5.4)
Australia	13 (0.7)	527 (5.7)	53 (1.0)	542 (3.0)	34 (1.1)	522 (2.9)	30 (1.1)	551 (3.6)	43 (0.9)	539 (2.6)	28 (1.0)	508 (3.3)
Austria	9 (0.5)	518 (5.9)	47 (1.0)	528 (3.0)	44 (1.1)	518 (3.3)	30 (0.9)	539 (3.2)	43 (0.8)	523 (3.4)	26 (0.9)	507 (3.2)
Azerbaijan	29 (1.2)	437 (4.2)	49 (1.1)	439 (3.3)	22 (0.9)	429 (5.2)	42 (1.4)	441 (3.4)	44 (1.2)	440 (3.6)	13 (0.8)	415 (7.0)
Bahrain	24 (0.8)	500 (3.8)	41 (0.8)	504 (3.9)	35 (1.0)	481 (4.4)	27 (0.9)	513 (4.1)	36 (0.9)	495 (3.7)	37 (0.9)	486 (4.0)
Belgium (Flemish)	12 (0.5)	497 (4.4)	57 (0.8)	505 (2.3)	31 (0.8)	497 (2.7)	34 (1.2)	512 (2.8)	41 (1.0)	502 (2.8)	25 (1.0)	487 (3.5)
Bosnia and Herzegovina	17 (0.8)	461 (4.8)	51 (1.0)	468 (2.9)	32 (1.1)	450 (3.6)	29 (1.0)	468 (3.9)	41 (0.7)	465 (3.1)	30 (1.0)	454 (3.4)
Bulgaria	17 (1.3)	498 (11.7)	44 (1.6)	535 (5.7)	38 (2.0)	521 (6.4)	36 (2.1)	539 (6.7)	34 (1.3)	528 (4.6)	30 (2.0)	508 (8.4)
Canada	10 (0.3)	522 (4.6)	47 (0.6)	531 (2.4)	43 (0.7)	518 (2.2)	25 (0.7)	536 (3.4)	42 (0.6)	529 (2.2)	33 (1.0)	512 (2.3)
Chile	17 (0.8)	462 (4.0)	36 (0.7)	484 (3.1)	47 (1.0)	464 (3.2)	20 (0.8)	486 (4.0)	36 (0.9)	470 (3.0)	44 (0.9)	469 (2.9)
Chinese Taipei	17 (0.7)	544 (3.5)	59 (0.9)	565 (2.2)	24 (0.8)	555 (2.6)	17 (0.7)	561 (3.9)	56 (0.8)	561 (2.1)	27 (0.9)	552 (2.8)
Croatia	13 (0.9)	527 (4.1)	57 (1.5)	526 (2.6)	30 (1.2)	520 (2.9)	20 (1.2)	534 (4.6)	53 (1.2)	526 (2.6)	28 (1.2)	515 (3.3)
Cyprus	23 (0.8)	518 (4.3)	40 (0.9)	520 (3.0)	37 (1.1)	500 (3.7)	44 (1.1)	525 (3.8)	32 (0.8)	512 (3.4)	24 (0.9)	493 (3.9)
Czech Republic	7 (0.5)	537 (6.0)	42 (1.1)	542 (3.0)	51 (1.1)	527 (2.8)	25 (1.1)	550 (3.4)	45 (1.1)	537 (2.8)	30 (0.8)	520 (3.7)
Denmark	7 (0.5)	518 (6.1)	51 (1.1)	524 (2.7)	42 (1.1)	521 (2.9)	27 (1.1)	535 (3.2)	46 (1.1)	521 (3.2)	27 (1.1)	515 (3.1)
England	9 (0.6)	527 (6.6)	48 (1.3)	548 (3.8)	43 (1.5)	530 (3.2)	27 (1.2)	552 (4.7)	42 (1.1)	543 (3.6)	30 (1.2)	520 (3.7)
Finland	8 (0.5)	547 (5.3)	59 (0.9)	562 (2.8)	33 (0.9)	544 (3.4)	29 (1.0)	564 (3.0)	52 (0.9)	556 (3.1)	20 (0.7)	540 (4.0)
France	16 (0.7)	478 (4.3)	50 (1.0)	495 (3.1)	34 (1.1)	484 (4.1)	32 (1.2)	503 (3.3)	37 (1.0)	490 (3.9)	31 (1.3)	473 (4.1)
Georgia	27 (1.3)	464 (4.8)	46 (1.6)	458 (4.4)	27 (1.3)	438 (5.6)	41 (1.6)	456 (5.2)	39 (1.4)	463 (4.9)	21 (1.3)	445 (6.0)
Germany	r 8 (0.6)	501 (7.8)	40 (1.1)	531 (3.0)	52 (1.0)	519 (2.6)	r 29 (1.0)	532 (3.6)	43 (0.9)	531 (3.1)	28 (1.0)	507 (3.7)
Hong Kong SAR	16 (0.8)	532 (4.6)	51 (1.2)	538 (3.3)	33 (1.3)	520 (4.7)	26 (0.8)	544 (3.9)	46 (1.1)	535 (3.8)	28 (1.2)	515 (5.2)
Hungary	6 (0.5)	514 (7.2)	41 (1.0)	534 (3.6)	53 (1.1)	529 (3.0)	29 (0.8)	539 (3.7)	47 (0.8)	533 (3.0)	24 (0.8)	521 (3.4)
Iran, Islamic Rep. of	39 (1.4)	441 (5.3)	41 (1.3)	449 (4.8)	20 (0.9)	433 (5.5)	38 (1.0)	456 (5.0)	41 (1.2)	446 (4.5)	21 (0.8)	423 (4.9)
Ireland	11 (0.8)	519 (5.6)	55 (1.1)	537 (3.3)	34 (1.0)	518 (4.1)	36 (1.0)	546 (3.5)	44 (1.0)	528 (3.8)	20 (0.9)	508 (4.7)
Italy	13 (0.8)	508 (3.7)	43 (1.1)	514 (3.2)	45 (1.3)	507 (3.8)	28 (1.0)	521 (3.2)	36 (0.9)	515 (3.6)	36 (0.9)	499 (3.3)
Japan	26 (1.0)	565 (2.6)	51 (0.9)	565 (2.3)	23 (0.9)	553 (3.2)	44 (1.1)	573 (2.4)	37 (0.7)	561 (2.4)	19 (0.7)	542 (3.0)
Kazakhstan	32 (1.4)	495 (4.6)	47 (1.2)	500 (3.4)	21 (1.0)	484 (4.4)	36 (1.5)	504 (4.9)	47 (1.2)	492 (3.3)	17 (0.8)	496 (6.2)
Korea, Rep. of	15 (0.8)	591 (4.7)	49 (1.2)	593 (2.1)	36 (1.2)	581 (3.1)	21 (0.8)	596 (3.1)	46 (1.1)	591 (2.3)	34 (1.2)	580 (3.2)
Kosovo	38 (1.3)	424 (3.9)	46 (1.1)	423 (4.0)	17 (0.9)	383 (5.2)	35 (1.3)	432 (4.2)	40 (1.2)	423 (4.8)	25 (1.0)	394 (4.6)
Kuwait	25 (1.3)	409 (7.4)	40 (1.2)	412 (6.7)	35 (1.5)	377 (6.6)	24 (1.1)	425 (8.4)	39 (1.1)	414 (6.1)	37 (1.2)	382 (6.9)
Latvia	7 (0.4)	540 (5.2)	49 (1.0)	550 (2.4)	44 (1.1)	535 (3.4)	22 (1.0)	552 (3.3)	44 (1.0)	546 (2.7)	34 (1.1)	534 (2.8)
Lithuania	25 (1.2)	541 (4.0)	54 (1.0)	540 (2.7)	21 (0.9)	531 (4.5)	49 (1.3)	542 (3.0)	39 (1.0)	543 (2.9)	12 (0.8)	520 (5.4)
Malta	15 (0.6)	479 (4.6)	42 (0.7)	503 (2.6)	43 (0.8)	496 (2.7)	22 (0.6)	504 (3.6)	36 (0.8)	504 (2.4)	42 (0.8)	486 (2.4)
Montenegro	26 (0.8)	453 (3.5)	50 (0.8)	465 (2.8)	24 (0.6)	442 (3.4)	37 (1.0)	468 (2.7)	36 (0.8)	460 (3.0)	27 (0.9)	439 (3.8)
Morocco	39 (1.5)	381 (5.6)	40 (1.5)	388 (6.6)	21 (1.1)	348 (10.2)	31 (1.2)	387 (6.4)	39 (1.2)	380 (6.4)	30 (1.4)	369 (10.8)
Netherlands	8 (0.5)	505 (4.8)	50 (1.5)	524 (3.5)	42 (1.5)	516 (4.0)	32 (0.9)	530 (3.3)	45 (1.0)	520 (3.5)	23 (1.1)	507 (4.3)
New Zealand	11 (0.6)	495 (6.0)	50 (0.9)	514 (2.8)	39 (0.9)	495 (2.3)	29 (0.9)	523 (3.1)	42 (1.0)	513 (2.9)	29 (0.9)	475 (2.9)
North Macedonia	28 (1.5)	437 (8.4)	46 (1.4)	441 (6.7)	26 (1.2)	406 (8.0)	29 (1.3)	441 (7.2)	40 (1.9)	444 (6.4)	31 (2.0)	416 (8.9)
Northern Ireland	7 (0.5)	519 (6.4)	49 (1.2)	528 (2.4)	43 (1.2)	510 (3.1)	33 (0.9)	535 (3.4)	41 (0.8)	518 (2.9)	26 (1.0)	507 (3.8)
Norway (5)	8 (0.7)	523 (7.2)	47 (1.2)	546 (2.8)	46 (1.3)	537 (3.2)	27 (1.0)	550 (3.4)	51 (0.8)	544 (2.9)	22 (1.0)	525 (3.7)
Oman	24 (1.2)	436 (5.8)	46 (1.1)	453 (4.7)	30 (1.2)	422 (5.2)	25 (1.2)	450 (6.0)	38 (0.8)	443 (4.6)	37 (1.3)	435 (5.4)
Pakistan	43 (3.4)	297 (16.3)	31 (2.5)	309 (17.7)	25 (2.8)	264 (13.2)	r 33 (2.6)	285 (16.6)	29 (2.6)	317 (14.9)	38 (2.4)	294 (15.6)
Philippines	24 (1.1)	255 (8.3)	42 (1.4)	292 (8.6)	33 (1.5)	212 (7.0)	27 (1.4)	264 (8.5)	44 (1.4)	280 (7.5)	29 (1.1)	225 (10.2)
Poland	17 (0.7)	536 (4.7)	46 (1.1)	537 (2.8)	37 (1.3)	525 (3.1)	45 (1.1)	544 (3.3)	38 (0.9)	532 (2.9)	18 (0.7)	512 (4.0)
Portugal	23 (0.7)	508 (3.5)	46 (0.8)	509 (3.1)	31 (0.8)	496 (2.7)	47 (1.0)	515 (3.3)	32 (0.7)	507 (2.7)	22 (0.9)	486 (3.8)
Qatar	17 (0.8)	454 (6.1)	40 (0.9)	469 (4.7)	43 (1.1)	439 (4.4)	20 (0.8)	469 (6.2)	37 (0.9)	462 (4.5)	43 (0.9)	442 (4.7)
Russian Federation	20 (1.1)	569 (5.6)	51 (0.9)	571 (3.0)	29 (1.3)	561 (3.5)	42 (1.3)	571 (4.4)	39 (1.0)	569 (3.2)	19 (0.9)	563 (3.4)
Saudi Arabia	26 (0.9)	418 (4.8)	45 (1.0)	417 (4.3)	29 (1.0)	379 (5.7)	24 (1.1)	429 (5.4)	39 (1.1)	417 (4.5)	36 (1.2)	396 (5.0)
Serbia	13 (0.9)	520 (5.5)	56 (1.1)	524 (3.8)	31 (1.1)	505 (4.8)	29 (1.5)	533 (4.0)	41 (1.2)	524 (3.9)	30 (1.5)	498 (5.1)
Singapore	12 (0.5)	600 (4.8)	45 (0.7)	604 (3.4)	44 (0.8)	584 (3.9)	34 (0.8)	615 (3.2)	40 (0.7)	596 (3.8)	26 (0.8)	568 (3.8)
Slovak Republic	8 (0.6)	512 (7.9)	38 (1.0)	526 (5.3)	54 (1.2)	520 (3.2)	30 (1.0)	533 (4.3)	43 (1.2)	524 (4.2)	27 (1.2)	508 (5.0)
South Africa (5)	27 (1.0)	330 (6.3)	45 (0.9)	349 (5.1)	28 (1.0)	296 (6.4)	31 (1.0)	353 (6.0)	38 (0.7)	340 (5.2)	31 (1.0)	301 (6.4)
Spain	17 (0.8)	511 (3.7)	47 (1.1)	521 (1.9)	36 (1.1)	502 (3.0)	40 (1.0)	525 (2.5)	36 (0.8)	515 (2.5)	24 (1.0)	490 (3.5)
Sweden	7 (0.6)	512 (7.2)	51 (1.2)	542 (3.5)	42 (1.3)	537 (3.7)	33 (1.3)	547 (4.5)	44 (1.3)	540 (3.1)	24 (1.3)	523 (4.7)
Turkey (5)	17 (0.7)	525 (5.3)	51 (1.0)	535 (4.4)	32 (1.0)	519 (5.5)	15 (0.7)	532 (5.2)	44 (1.0)	534 (4.9)	40 (1.1)	526 (5.1)
United Arab Emirates	23 (0.5)	483 (3.2)	42 (0.4)	484 (2.3)	34 (0.5)	460 (2.6)	26 (0.5)	493 (2.9)	40 (0.4)	484 (2.3)	34 (0.5)	458 (2.5)
United States	8 (0.4)	538 (5.7)	36 (0.7)	553 (2.7)	56 (0.8)	534 (3.1)	23 (0.7)	561 (3.8)	40 (0.5)	549 (2.6)	38 (0.8)	525 (3.2)
International Average	**19 (0.1)**	**490 (0.8)**	**47 (0.1)**	**501 (0.6)**	**35 (0.2)**	**481 (0.6)**	**31 (0.2)**	**504 (0.6)**	**41 (0.1)**	**497 (0.6)**	**28 (0.1)**	**478 (0.7)**
Benchmarking Participants												
Ontario, Canada	10 (0.6)	522 (7.2)	46 (1.2)	534 (3.7)	44 (1.2)	518 (3.5)	27 (1.3)	537 (5.4)	41 (1.1)	532 (3.3)	32 (1.9)	510 (4.1)
Quebec, Canada	r 9 (0.7)	515 (5.3)	53 (1.2)	526 (3.1)	38 (1.4)	518 (3.0)	r 19 (1.0)	535 (4.2)	44 (1.2)	524 (3.3)	37 (1.1)	514 (3.4)
Moscow City, Russian Fed.	16 (0.9)	605 (4.0)	48 (1.0)	597 (2.7)	36 (1.1)	589 (3.0)	33 (1.3)	602 (2.5)	40 (1.0)	597 (2.9)	26 (1.0)	586 (3.0)
Madrid, Spain	14 (0.7)	517 (3.8)	48 (0.9)	529 (2.2)	37 (0.9)	518 (2.6)	42 (1.1)	535 (2.3)	37 (1.0)	522 (2.4)	21 (0.9)	503 (3.6)
Abu Dhabi, UAE	18 (0.7)	416 (5.5)	41 (0.7)	429 (3.2)	42 (0.7)	415 (3.8)	21 (0.7)	436 (5.6)	39 (0.8)	431 (3.5)	39 (0.8)	409 (3.2)
Dubai, UAE	23 (0.6)	543 (2.8)	45 (0.8)	551 (1.9)	32 (0.7)	537 (3.0)	30 (0.7)	549 (2.6)	40 (0.7)	550 (1.9)	30 (0.6)	532 (3.6)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
An "r" indicates data are available for at least 70% but less than 85% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 10.7: Students Report Arriving at School Feeling Tired or Hungry

Students' Reports

Country	Students Feel Tired						Students Feel Hungry					
	Never		Sometimes		Every Day or Almost Every Day		Never		Sometimes		Every Day or Almost Every Day	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia	4 (0.2)	523 (9.4)	47 (0.9)	526 (4.6)	49 (0.9)	510 (3.5)	28 (0.8)	540 (5.8)	45 (0.6)	521 (4.0)	27 (0.8)	493 (3.6)
Bahrain	8 (0.7)	489 (6.0)	39 (1.0)	493 (2.6)	53 (0.8)	472 (1.7)	21 (0.7)	497 (3.6)	36 (0.8)	485 (2.6)	43 (0.9)	472 (2.6)
Chile	6 (0.5)	434 (7.4)	46 (1.1)	442 (3.2)	48 (1.1)	442 (3.2)	14 (0.7)	459 (5.1)	34 (1.0)	443 (3.4)	53 (1.0)	437 (2.7)
Chinese Taipei	4 (0.3)	596 (10.2)	50 (1.0)	616 (3.3)	46 (1.0)	610 (3.1)	8 (0.4)	607 (6.2)	49 (0.9)	616 (3.0)	44 (1.0)	611 (3.6)
Cyprus	8 (0.6)	507 (7.5)	42 (0.9)	505 (2.2)	50 (1.0)	498 (2.5)	37 (1.0)	516 (3.1)	38 (1.0)	499 (2.8)	25 (0.9)	487 (3.3)
Egypt	15 (0.9)	424 (7.2)	58 (1.0)	420 (5.3)	27 (1.0)	403 (5.9)	20 (0.9)	427 (7.0)	41 (1.1)	418 (5.3)	39 (1.2)	415 (5.4)
England	4 (0.4)	510 (14.0)	39 (1.1)	525 (5.7)	57 (1.2)	513 (5.7)	30 (1.3)	533 (6.7)	45 (1.1)	521 (5.1)	26 (1.1)	497 (6.4)
Finland	2 (0.2)	~ ~	52 (1.2)	518 (2.7)	46 (1.2)	500 (3.1)	19 (0.7)	534 (3.7)	50 (0.8)	511 (2.8)	31 (0.8)	493 (3.2)
France	4 (0.4)	479 (7.2)	41 (0.9)	488 (2.7)	54 (1.0)	480 (2.9)	18 (0.7)	499 (4.0)	33 (0.9)	486 (3.5)	49 (1.1)	476 (2.6)
Georgia	11 (0.9)	471 (7.4)	47 (1.2)	459 (4.5)	42 (1.4)	463 (5.3)	30 (1.4)	469 (5.2)	44 (1.4)	464 (5.3)	26 (1.4)	457 (4.9)
Hong Kong SAR	5 (0.5)	577 (9.1)	45 (1.1)	585 (4.2)	49 (1.1)	575 (4.6)	14 (1.1)	600 (8.3)	46 (1.3)	584 (4.5)	40 (1.0)	569 (4.7)
Hungary	2 (0.2)	~ ~	33 (1.1)	513 (4.4)	65 (1.1)	518 (3.0)	28 (1.0)	535 (4.8)	43 (0.8)	516 (3.6)	29 (1.1)	502 (4.0)
Iran, Islamic Rep. of	21 (1.0)	445 (5.6)	60 (1.1)	450 (3.8)	19 (0.8)	439 (5.5)	42 (0.9)	458 (4.3)	42 (0.9)	446 (3.8)	17 (0.6)	429 (5.2)
Ireland	3 (0.3)	528 (8.8)	41 (1.0)	529 (3.3)	56 (1.0)	522 (2.7)	35 (1.0)	542 (3.5)	43 (0.9)	524 (3.0)	22 (0.9)	507 (3.8)
Israel	8 (0.4)	519 (9.3)	42 (1.1)	520 (5.3)	51 (1.1)	522 (4.4)	28 (0.9)	530 (5.9)	45 (0.9)	526 (4.8)	27 (1.0)	507 (4.7)
Italy	3 (0.3)	505 (7.9)	43 (1.2)	502 (3.4)	54 (1.3)	494 (3.0)	23 (1.0)	514 (4.0)	34 (0.9)	500 (3.3)	43 (1.1)	488 (3.0)
Japan	11 (0.6)	600 (4.6)	47 (0.9)	601 (3.4)	41 (1.2)	585 (3.3)	34 (1.1)	608 (3.1)	43 (0.9)	592 (3.3)	24 (0.7)	579 (3.7)
Jordan	14 (0.6)	439 (5.2)	51 (1.0)	423 (3.8)	35 (1.0)	416 (5.7)	23 (0.9)	443 (4.5)	39 (1.0)	419 (4.7)	38 (1.2)	419 (4.8)
Kazakhstan	14 (0.8)	485 (5.7)	66 (0.9)	488 (3.2)	19 (0.8)	492 (4.5)	31 (0.9)	488 (4.0)	53 (0.9)	488 (3.6)	17 (0.6)	490 (4.7)
Korea, Rep. of	5 (0.3)	626 (8.9)	35 (0.9)	619 (3.4)	60 (1.0)	599 (3.3)	12 (0.5)	623 (5.4)	38 (0.8)	611 (3.3)	51 (0.8)	602 (3.3)
Kuwait	10 (0.6)	412 (8.2)	51 (0.9)	408 (5.2)	38 (1.1)	398 (5.8)	26 (0.9)	420 (5.7)	43 (1.0)	408 (4.8)	30 (1.0)	392 (6.4)
Lebanon	13 (1.0)	420 (5.7)	52 (1.3)	429 (3.6)	35 (1.2)	437 (3.5)	25 (1.1)	435 (4.3)	38 (0.9)	431 (3.9)	37 (1.2)	429 (3.6)
Lithuania	9 (0.6)	515 (6.0)	53 (0.9)	517 (3.3)	38 (1.0)	529 (3.9)	46 (1.1)	524 (3.4)	40 (0.9)	522 (3.7)	14 (0.8)	517 (4.7)
Malaysia	8 (0.5)	452 (6.1)	55 (0.9)	459 (3.4)	37 (1.0)	467 (3.6)	9 (0.5)	460 (6.5)	45 (0.9)	460 (4.0)	47 (1.0)	463 (3.1)
Morocco	13 (0.6)	397 (4.7)	59 (0.9)	388 (2.5)	28 (0.9)	387 (3.2)	17 (0.6)	392 (3.9)	47 (0.7)	391 (2.7)	36 (1.0)	385 (2.8)
New Zealand	5 (0.4)	467 (10.0)	46 (1.1)	491 (4.1)	50 (1.2)	477 (3.4)	29 (0.7)	502 (3.7)	45 (0.8)	485 (3.4)	25 (0.9)	459 (5.2)
Norway (9)	4 (0.5)	492 (8.0)	39 (1.1)	510 (3.0)	57 (1.1)	501 (2.9)	31 (0.9)	517 (3.1)	45 (1.0)	505 (2.9)	24 (0.9)	487 (3.8)
Oman	12 (0.5)	424 (5.2)	55 (0.8)	416 (2.8)	33 (1.0)	404 (4.2)	23 (0.8)	433 (3.7)	45 (0.9)	415 (2.9)	32 (1.1)	400 (3.6)
Portugal	12 (0.6)	500 (5.4)	50 (1.1)	504 (3.3)	39 (1.2)	496 (4.1)	48 (1.2)	514 (3.4)	31 (0.9)	495 (3.8)	21 (1.1)	482 (5.2)
Qatar	7 (0.5)	445 (8.8)	41 (1.3)	452 (5.4)	52 (1.4)	438 (4.5)	20 (0.8)	475 (7.0)	38 (1.0)	451 (5.0)	42 (1.1)	427 (3.6)
Romania	4 (0.4)	475 (10.2)	47 (1.3)	477 (4.6)	49 (1.4)	484 (5.4)	14 (0.9)	502 (7.5)	33 (1.1)	487 (4.3)	53 (1.4)	473 (5.2)
Russian Federation	10 (0.7)	542 (7.3)	52 (1.1)	541 (5.5)	38 (1.2)	548 (3.8)	33 (1.1)	544 (4.9)	43 (0.9)	545 (5.1)	24 (0.9)	546 (5.0)
Saudi Arabia	14 (0.7)	400 (4.4)	53 (0.8)	397 (2.8)	32 (0.9)	390 (3.2)	30 (0.9)	403 (2.8)	43 (0.7)	396 (3.0)	28 (0.8)	394 (3.2)
Singapore	3 (0.3)	619 (9.5)	34 (0.8)	620 (4.6)	63 (0.8)	614 (4.2)	20 (0.7)	647 (4.1)	43 (0.8)	620 (4.3)	36 (0.8)	593 (4.7)
South Africa (9)	20 (0.6)	380 (3.1)	59 (0.7)	390 (2.2)	21 (0.5)	402 (3.4)	22 (0.4)	404 (3.3)	46 (0.5)	389 (2.3)	33 (0.7)	387 (2.6)
Sweden	2 (0.3)	~ ~	39 (1.1)	508 (3.3)	59 (1.2)	502 (2.7)	24 (1.0)	522 (4.1)	43 (1.0)	505 (3.0)	33 (1.0)	489 (3.5)
Turkey	6 (0.5)	468 (9.9)	56 (1.1)	497 (4.4)	37 (1.1)	502 (4.8)	11 (0.7)	484 (8.2)	42 (1.1)	494 (5.8)	46 (1.2)	507 (4.2)
United Arab Emirates	11 (0.4)	493 (4.6)	43 (0.6)	485 (2.2)	46 (0.5)	463 (2.0)	23 (0.6)	505 (2.8)	39 (0.5)	483 (2.3)	38 (0.6)	455 (2.3)
United States	3 (0.3)	503 (12.6)	34 (0.8)	526 (5.3)	62 (0.8)	514 (4.6)	26 (0.8)	538 (6.8)	41 (0.7)	524 (4.5)	33 (0.8)	495 (4.5)
International Average	**8 (0.1)**	**488 (1.3)**	**47 (0.2)**	**493 (0.6)**	**45 (0.2)**	**487 (0.6)**	**25 (0.1)**	**504 (0.8)**	**42 (0.1)**	**492 (0.6)**	**33 (0.2)**	**480 (0.7)**
Benchmarking Participants												
Ontario, Canada	3 (0.4)	542 (10.1)	41 (1.0)	536 (4.4)	56 (1.1)	526 (4.7)	31 (0.9)	545 (5.7)	45 (0.9)	531 (4.8)	24 (0.8)	515 (4.7)
Quebec, Canada	3 (0.4)	538 (11.2)	45 (1.3)	548 (3.9)	52 (1.4)	540 (4.4)	24 (1.2)	563 (4.5)	42 (1.0)	546 (4.0)	34 (1.1)	528 (4.2)
Moscow City, Russian Fed.	5 (0.4)	589 (9.3)	41 (1.2)	577 (4.7)	54 (1.2)	574 (4.2)	26 (1.0)	585 (6.2)	42 (0.9)	575 (4.5)	32 (1.1)	570 (4.2)
Gauteng, RSA (9)	15 (0.6)	406 (4.0)	58 (0.9)	419 (2.9)	27 (1.0)	438 (4.4)	21 (0.7)	441 (5.0)	42 (0.8)	421 (3.2)	37 (0.9)	413 (3.1)
Western Cape, RSA (9)	12 (0.6)	410 (4.0)	59 (0.9)	435 (4.3)	29 (1.0)	472 (6.2)	23 (0.9)	468 (6.7)	44 (0.8)	442 (4.4)	33 (1.1)	426 (4.3)
Abu Dhabi, UAE	9 (0.4)	446 (6.6)	40 (0.9)	450 (3.4)	52 (0.9)	432 (3.5)	20 (0.7)	470 (4.5)	38 (0.7)	450 (3.4)	43 (0.8)	421 (3.9)
Dubai, UAE	11 (0.9)	558 (6.0)	45 (1.1)	542 (2.6)	44 (0.9)	526 (2.7)	27 (1.0)	564 (3.4)	39 (0.9)	539 (3.0)	34 (1.2)	512 (3.0)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 10.8: Students Report Arriving at School Feeling Tired or Hungry

Students' Reports

Country	Students Feel Tired						Students Feel Hungry					
	Never		Sometimes		Every Day or Almost Every Day		Never		Sometimes		Every Day or Almost Every Day	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia	4 (0.2)	526 (9.3)	47 (0.9)	536 (3.8)	49 (0.9)	523 (3.1)	28 (0.8)	553 (5.1)	45 (0.6)	532 (3.2)	27 (0.8)	502 (3.4)
Bahrain	8 (0.7)	502 (7.2)	39 (1.0)	501 (2.6)	53 (0.8)	476 (2.7)	21 (0.7)	510 (3.4)	36 (0.8)	498 (2.8)	43 (0.9)	470 (2.8)
Chile	6 (0.5)	455 (8.5)	46 (1.1)	466 (3.2)	48 (1.1)	463 (3.8)	14 (0.7)	483 (4.9)	34 (1.0)	467 (3.7)	53 (1.0)	458 (2.9)
Chinese Taipei	4 (0.3)	551 (9.2)	50 (1.0)	576 (2.4)	46 (1.0)	575 (2.2)	8 (0.4)	571 (5.3)	49 (0.9)	577 (2.4)	44 (1.0)	573 (2.5)
Cyprus	8 (0.6)	492 (7.6)	42 (0.9)	488 (2.6)	50 (1.0)	480 (2.7)	37 (1.0)	501 (3.2)	38 (1.0)	482 (3.3)	25 (0.9)	466 (3.3)
Egypt	15 (0.9)	410 (8.0)	58 (1.0)	399 (5.3)	27 (1.0)	373 (6.5)	20 (0.9)	412 (7.1)	41 (1.1)	397 (5.3)	39 (1.2)	389 (5.6)
England	4 (0.4)	505 (15.5)	39 (1.1)	527 (5.3)	57 (1.2)	515 (5.4)	30 (1.3)	536 (6.4)	45 (1.1)	520 (5.0)	26 (1.1)	501 (5.9)
Finland	2 (0.2)	~ ~	52 (1.2)	552 (3.2)	46 (1.2)	534 (3.6)	19 (0.7)	571 (4.5)	50 (0.8)	546 (3.6)	31 (0.8)	525 (4.1)
France	4 (0.4)	482 (8.3)	41 (0.9)	494 (3.4)	54 (1.0)	485 (2.9)	18 (0.7)	509 (4.6)	33 (0.9)	489 (3.7)	49 (1.1)	483 (2.9)
Georgia	11 (0.9)	450 (6.7)	47 (1.2)	450 (4.3)	42 (1.4)	444 (4.7)	30 (1.4)	456 (4.7)	44 (1.4)	446 (4.5)	26 (1.4)	447 (5.9)
Hong Kong SAR	5 (0.5)	501 (9.7)	45 (1.1)	510 (5.5)	49 (1.1)	500 (5.6)	14 (1.1)	534 (10.4)	46 (1.3)	506 (5.4)	40 (1.0)	493 (5.5)
Hungary	2 (0.2)	~ ~	33 (1.1)	528 (4.0)	65 (1.1)	530 (2.6)	28 (1.0)	550 (4.2)	43 (0.8)	529 (3.1)	29 (1.1)	515 (4.0)
Iran, Islamic Rep. of	21 (1.0)	446 (5.4)	60 (1.1)	453 (3.8)	19 (0.8)	443 (5.2)	42 (0.9)	460 (4.1)	42 (0.9)	450 (3.7)	17 (0.6)	432 (5.0)
Ireland	3 (0.3)	522 (10.1)	41 (1.0)	526 (3.5)	56 (1.0)	523 (3.1)	35 (1.0)	544 (3.7)	43 (0.9)	521 (3.4)	22 (0.9)	504 (4.2)
Israel	8 (0.4)	516 (7.9)	42 (1.1)	517 (5.0)	51 (1.1)	515 (4.4)	28 (0.9)	524 (5.7)	45 (0.9)	520 (4.6)	27 (1.0)	504 (5.0)
Italy	3 (0.3)	504 (8.2)	43 (1.2)	503 (3.2)	54 (1.3)	499 (2.9)	23 (1.0)	521 (3.7)	34 (0.9)	501 (3.5)	43 (1.1)	491 (3.0)
Japan	11 (0.6)	580 (4.1)	47 (0.9)	574 (2.5)	41 (1.2)	561 (2.7)	34 (1.1)	585 (2.6)	43 (0.9)	569 (2.7)	24 (0.7)	551 (3.0)
Jordan	14 (0.6)	476 (5.4)	51 (1.0)	457 (4.6)	35 (1.0)	444 (6.0)	23 (0.9)	477 (5.1)	39 (1.0)	453 (5.2)	38 (1.2)	452 (4.7)
Kazakhstan	14 (0.8)	473 (5.7)	66 (0.9)	478 (3.1)	19 (0.8)	486 (5.0)	31 (0.9)	479 (3.7)	53 (0.9)	477 (3.4)	17 (0.6)	485 (5.3)
Korea, Rep. of	5 (0.3)	575 (8.5)	35 (0.9)	569 (3.2)	60 (1.0)	555 (2.6)	12 (0.5)	579 (5.0)	38 (0.8)	565 (2.8)	51 (0.8)	555 (2.7)
Kuwait	10 (0.6)	449 (10.2)	51 (0.9)	453 (5.6)	38 (1.1)	438 (6.1)	26 (0.9)	466 (6.9)	43 (1.0)	451 (5.3)	30 (1.0)	432 (7.2)
Lebanon	13 (1.0)	356 (9.0)	52 (1.3)	377 (5.2)	35 (1.2)	389 (5.9)	25 (1.1)	380 (6.3)	38 (0.9)	380 (6.4)	37 (1.2)	380 (5.0)
Lithuania	9 (0.6)	528 (5.2)	53 (0.9)	532 (3.3)	38 (1.0)	540 (4.0)	46 (1.1)	539 (3.4)	40 (0.9)	534 (3.7)	14 (0.8)	529 (4.7)
Malaysia	8 (0.5)	453 (6.3)	55 (0.9)	461 (3.7)	37 (1.0)	463 (4.0)	9 (0.5)	452 (7.5)	45 (0.9)	463 (4.1)	47 (1.0)	462 (3.7)
Morocco	13 (0.6)	409 (6.0)	59 (0.9)	395 (2.9)	28 (0.9)	388 (3.4)	17 (0.6)	402 (4.7)	47 (0.7)	399 (3.0)	36 (1.0)	387 (3.1)
New Zealand	5 (0.4)	471 (9.3)	46 (1.1)	506 (4.1)	50 (1.2)	498 (3.6)	29 (0.7)	523 (3.5)	45 (0.8)	500 (3.6)	25 (0.9)	474 (5.0)
Norway (9)	4 (0.5)	457 (12.1)	39 (1.1)	502 (3.7)	57 (1.1)	495 (3.4)	31 (0.9)	509 (4.5)	45 (1.0)	497 (3.4)	24 (0.9)	480 (5.1)
Oman	12 (0.5)	471 (5.3)	55 (0.8)	463 (2.9)	33 (1.0)	450 (4.5)	23 (0.8)	480 (3.8)	45 (0.9)	464 (2.8)	32 (1.1)	446 (4.0)
Portugal	12 (0.6)	515 (4.9)	50 (1.1)	522 (2.9)	39 (1.2)	516 (3.9)	48 (1.2)	532 (2.9)	31 (0.9)	515 (3.7)	21 (1.1)	499 (4.7)
Qatar	7 (0.5)	476 (10.0)	41 (1.3)	485 (5.8)	52 (1.4)	468 (4.7)	20 (0.8)	506 (7.1)	38 (1.0)	481 (5.8)	42 (1.1)	461 (4.4)
Romania	4 (0.4)	475 (8.8)	47 (1.3)	470 (4.4)	49 (1.4)	473 (5.1)	14 (0.9)	491 (6.9)	33 (1.1)	476 (4.9)	53 (1.4)	465 (4.8)
Russian Federation	10 (0.7)	541 (6.2)	52 (1.1)	540 (5.2)	38 (1.2)	548 (3.7)	33 (1.1)	545 (4.5)	43 (0.9)	543 (4.7)	24 (0.9)	544 (5.0)
Saudi Arabia	14 (0.7)	438 (5.2)	53 (0.8)	434 (2.8)	32 (0.9)	429 (3.9)	30 (0.9)	444 (3.6)	43 (0.7)	433 (3.5)	28 (0.8)	433 (3.3)
Singapore	3 (0.3)	615 (9.1)	34 (0.8)	609 (4.4)	63 (0.8)	607 (4.1)	20 (0.7)	641 (3.5)	43 (0.8)	611 (4.2)	36 (0.8)	585 (4.7)
South Africa (9)	20 (0.6)	359 (3.8)	59 (0.7)	370 (3.3)	21 (0.5)	388 (4.5)	22 (0.4)	389 (4.0)	46 (0.5)	368 (3.4)	33 (0.7)	370 (3.2)
Sweden	2 (0.3)	~ ~	39 (1.1)	524 (4.4)	59 (1.2)	524 (3.3)	24 (1.0)	547 (5.3)	43 (1.0)	524 (3.9)	33 (1.0)	507 (3.7)
Turkey	6 (0.5)	476 (8.5)	56 (1.1)	518 (3.8)	37 (1.1)	522 (4.2)	11 (0.7)	506 (6.6)	42 (1.1)	513 (5.2)	46 (1.2)	526 (3.8)
United Arab Emirates	11 (0.4)	497 (5.3)	43 (0.6)	489 (2.8)	46 (0.5)	461 (2.3)	23 (0.6)	513 (3.4)	39 (0.5)	485 (2.6)	38 (0.6)	450 (2.8)
United States	3 (0.3)	499 (14.4)	34 (0.8)	528 (5.1)	62 (0.8)	524 (4.4)	26 (0.8)	542 (6.4)	41 (0.7)	530 (4.2)	33 (0.8)	506 (4.9)
International Average	**8 (0.1)**	**485 (1.4)**	**47 (0.2)**	**494 (0.6)**	**45 (0.2)**	**488 (0.7)**	**25 (0.1)**	**507 (0.8)**	**42 (0.1)**	**493 (0.6)**	**33 (0.2)**	**480 (0.7)**
Benchmarking Participants												
Ontario, Canada	3 (0.4)	529 (10.0)	41 (1.0)	525 (3.6)	56 (1.1)	520 (3.3)	31 (0.9)	539 (4.5)	45 (0.9)	520 (3.4)	24 (0.8)	508 (3.9)
Quebec, Canada	3 (0.4)	530 (10.9)	45 (1.3)	540 (3.7)	52 (1.4)	534 (4.4)	24 (1.2)	560 (4.7)	42 (1.0)	538 (4.2)	34 (1.1)	520 (4.0)
Moscow City, Russian Fed.	5 (0.4)	573 (7.7)	41 (1.2)	567 (3.7)	54 (1.2)	566 (2.9)	26 (1.0)	575 (4.3)	42 (0.9)	566 (3.3)	32 (1.1)	562 (3.2)
Gauteng, RSA (9)	15 (0.6)	405 (5.4)	58 (0.9)	419 (4.1)	27 (1.0)	445 (5.6)	21 (0.7)	449 (6.0)	42 (0.8)	420 (4.2)	37 (0.9)	414 (4.0)
Western Cape, RSA (9)	12 (0.6)	399 (4.8)	59 (0.9)	431 (5.0)	29 (1.0)	481 (7.1)	23 (0.9)	475 (7.7)	44 (0.8)	438 (5.5)	33 (1.1)	422 (5.1)
Abu Dhabi, UAE	9 (0.4)	435 (8.2)	40 (0.9)	439 (4.4)	52 (0.9)	415 (4.3)	20 (0.7)	467 (5.8)	38 (0.7)	440 (4.2)	43 (0.8)	399 (4.9)
Dubai, UAE	11 (0.9)	571 (6.3)	45 (1.1)	555 (3.0)	44 (0.9)	535 (2.7)	27 (1.0)	576 (3.5)	39 (0.9)	551 (3.2)	34 (1.2)	522 (3.7)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Classroom Teaching Limited by Students Not Ready for Instruction

Exhibits 10.10, 10.11, 10.12, and 10.13 present teachers' reports about the extent to which their fourth and eighth grade classroom teaching is limited by students not ready to learn (i.e., lacking prerequisite knowledge or skills, lacking basic nutrition, being sleep deprived, absent, disruptive, or uninterested, or having learning impairments or difficulties understanding the language of instruction), along with student achievement. The results are summarized on the *Classroom Teaching Limited by Students Not Ready for Instruction* scale described in Exhibit 10.9 (see About the Scale), with three categories that describe how much classroom teaching is limited: "very little," "some," and "a lot." A higher score on the scale indicates that classroom instruction was limited less by these student attributes or behavior, and a lower score indicates it was limited more. Countries are sorted by the percentage "very little."

On average, across countries, just over one-third of the fourth grade students (36% for mathematics and 37% for science) had classroom teachers who reported that their teaching was limited "very little" by students not ready for instruction. Most of the rest of the students (59% in mathematics and 58% in science) had teachers who reported that instruction was limited "some." Unfortunately, 6 percent of students were in classrooms where teachers reported instruction was limited "a lot." The picture was even less positive in eighth grade, where only about one-quarter of students (24% in mathematics and 26% in science) had teachers who reported that classroom instruction was limited "very little," and about two-thirds (67% for mathematics and 66% for science) had teachers who reported that classroom instruction was limited "some" by students not ready for instruction. The remaining 8–9 percent of students (9% in mathematics and 8% in science) had teachers reporting instruction was limited "a lot."

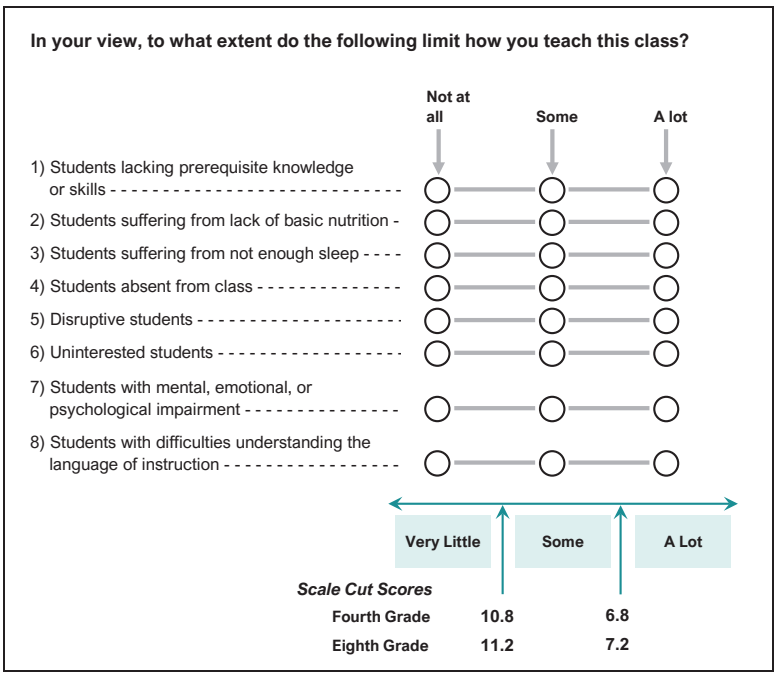
In both subjects and both grades, there was a direct relationship between the degree that instruction was limited by students not ready for instruction and students' average achievement, with successively lower achievement for each category of increased impact on teaching. For example, in eighth grade science (Exhibit 10.13), average achievement was 515 for students where instruction was limited "very little," 484 for students where instruction was limited "some," and 457 for students where instruction was limited "a lot."

Exhibit 10.9: Classroom Teaching Limited by Students Not Ready for Instruction – Teachers' Reports

Students' Results based on Teachers' Reports

About the Scale

Students were scored according to their teachers' reports regarding eight student attributes on the *Classroom Teaching Limited by Students Not Ready for Instruction* scale. Cut scores divide the scale into three categories. Students with teachers who felt their teaching was limited **Very Little** had a score at or above the cut score corresponding to their teachers reporting they were "not at all" limited by four of the eight student attributes and were limited "some" by the other four, on average. Students with teachers who felt their teaching was limited **A Lot** had a score at or below the cut score corresponding to their teachers reporting they were limited "a lot" by four of the eight attributes and were limited "some" by the other four, on average. All other students had teachers who felt their teaching was limited **Some**.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit 10.10: Classroom Teaching Limited by Students Not Ready for Instruction – Teachers' Reports

Students' Results based on Teachers' Reports

Country		Very Little		Some		A Lot		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Japan		79 (3.0)	593 (2.1)	20 (2.9)	591 (3.4)	1 (0.6)	~ ~	12.1 (0.14)
Albania		71 (3.8)	499 (4.0)	24 (3.3)	490 (8.7)	4 (2.2)	441 (14.9)	11.3 (0.17)
Kosovo		63 (3.8)	448 (3.7)	37 (3.8)	438 (5.0)	0 (0.0)	~ ~	11.1 (0.12)
Czech Republic		61 (3.6)	543 (2.8)	39 (3.6)	517 (4.5)	0 (0.0)	~ ~	11.0 (0.12)
North Macedonia		60 (3.9)	482 (5.5)	40 (3.9)	456 (9.7)	0 (0.0)	~ ~	11.1 (0.12)
Azerbaijan		53 (3.8)	516 (4.0)	45 (3.8)	515 (4.1)	3 (1.1)	500 (17.2)	10.6 (0.11)
Singapore		52 (2.8)	656 (3.9)	45 (2.9)	591 (5.0)	3 (0.9)	613 (23.1)	10.8 (0.11)
Serbia		49 (4.1)	508 (3.9)	47 (4.1)	507 (5.6)	4 (1.6)	517 (8.1)	10.6 (0.15)
Croatia		49 (3.4)	507 (3.1)	50 (3.5)	511 (3.4)	2 (0.8)	~ ~	10.8 (0.14)
Latvia		49 (3.9)	553 (3.3)	49 (3.9)	541 (4.0)	2 (1.1)	~ ~	10.6 (0.14)
Slovak Republic		48 (3.5)	521 (3.5)	45 (3.4)	503 (5.8)	7 (1.9)	472 (12.7)	10.4 (0.16)
Hong Kong SAR		47 (3.8)	614 (5.6)	53 (3.8)	590 (4.1)	0 (0.0)	~ ~	10.7 (0.13)
Netherlands	r	47 (4.2)	546 (3.6)	51 (4.3)	529 (2.8)	2 (1.2)	~ ~	10.6 (0.14)
Austria		46 (3.2)	552 (2.7)	51 (3.3)	530 (3.1)	2 (0.9)	~ ~	10.5 (0.09)
Montenegro		46 (2.7)	458 (2.5)	51 (2.6)	450 (3.1)	3 (1.0)	410 (9.0)	10.4 (0.10)
Spain		46 (3.7)	514 (3.6)	50 (3.9)	492 (3.7)	4 (1.3)	479 (9.7)	10.4 (0.12)
Bosnia and Herzegovina		45 (3.2)	454 (4.2)	49 (3.2)	451 (3.1)	6 (1.7)	443 (10.6)	10.4 (0.14)
Bulgaria		44 (3.8)	540 (4.2)	52 (3.7)	495 (6.4)	3 (1.2)	497 (37.0)	10.4 (0.14)
Georgia		42 (3.8)	482 (5.8)	57 (3.9)	482 (4.4)	1 (0.7)	~ ~	10.4 (0.12)
Russian Federation		41 (3.1)	569 (4.9)	47 (3.7)	562 (4.6)	12 (2.2)	574 (8.4)	10.1 (0.16)
Germany		40 (3.8)	538 (3.1)	55 (3.8)	514 (3.0)	4 (1.3)	450 (17.2)	10.0 (0.13)
Finland		40 (2.9)	542 (3.2)	58 (3.1)	527 (3.0)	1 (0.5)	~ ~	10.4 (0.09)
Ireland		40 (3.7)	557 (4.6)	59 (3.7)	542 (2.9)	1 (0.4)	~ ~	10.3 (0.14)
Poland		39 (3.6)	533 (4.5)	59 (3.7)	513 (3.1)	2 (0.9)	~ ~	10.4 (0.12)
United Arab Emirates	r	39 (1.9)	515 (3.1)	57 (2.0)	464 (2.7)	4 (0.5)	415 (7.9)	10.1 (0.05)
Sweden		37 (3.8)	530 (5.1)	61 (3.8)	517 (3.6)	2 (1.0)	~ ~	10.3 (0.13)
Belgium (Flemish)		37 (3.4)	546 (2.3)	59 (3.5)	527 (2.4)	4 (1.1)	521 (11.7)	10.2 (0.11)
Italy		36 (4.1)	518 (3.9)	57 (4.0)	513 (3.2)	7 (2.0)	514 (7.3)	9.9 (0.16)
France		35 (3.2)	506 (4.1)	58 (3.2)	476 (3.8)	7 (1.4)	456 (10.3)	9.8 (0.11)
Portugal		33 (3.3)	540 (3.8)	56 (3.4)	519 (3.7)	11 (2.1)	516 (8.1)	9.6 (0.16)
Denmark	r	33 (4.4)	531 (4.7)	63 (4.5)	522 (2.3)	4 (1.6)	506 (10.2)	9.9 (0.14)
Hungary		33 (3.4)	543 (3.8)	63 (3.6)	516 (4.3)	4 (1.4)	507 (18.7)	10.1 (0.14)
Armenia		32 (3.8)	505 (4.7)	63 (3.9)	494 (3.1)	5 (1.5)	507 (11.5)	9.7 (0.13)
Korea, Rep. of		32 (3.8)	608 (4.6)	52 (3.7)	597 (3.1)	16 (2.9)	590 (6.3)	9.5 (0.20)
Qatar		30 (3.5)	464 (7.5)	66 (3.4)	443 (5.2)	4 (1.5)	465 (23.1)	9.8 (0.15)
Kazakhstan		30 (3.3)	517 (4.2)	49 (3.8)	512 (4.7)	21 (2.9)	507 (6.9)	9.3 (0.15)
Bahrain		28 (3.3)	489 (4.3)	64 (3.1)	477 (3.1)	8 (2.1)	478 (9.2)	9.7 (0.13)
Malta		28 (0.4)	532 (2.1)	63 (0.4)	499 (1.8)	10 (0.2)	507 (3.1)	9.4 (0.02)
Chinese Taipei		26 (3.7)	602 (3.0)	64 (4.0)	599 (2.6)	10 (2.4)	595 (6.4)	9.5 (0.16)
Northern Ireland		26 (3.9)	583 (6.6)	72 (4.1)	560 (3.7)	2 (1.3)	~ ~	9.9 (0.12)
Norway (5)	r	25 (4.4)	560 (4.8)	70 (4.1)	541 (2.8)	5 (1.7)	518 (12.3)	9.7 (0.22)
Australia		24 (3.8)	545 (6.9)	69 (4.0)	514 (3.4)	6 (1.7)	458 (11.0)	9.6 (0.13)
New Zealand		24 (2.4)	515 (5.0)	71 (2.6)	481 (3.3)	5 (1.3)	446 (17.3)	9.6 (0.09)
Oman		24 (2.9)	450 (7.5)	54 (3.5)	418 (4.6)	22 (2.9)	441 (11.5)	9.0 (0.14)
Cyprus		23 (3.3)	547 (5.0)	68 (3.4)	533 (3.0)	9 (1.7)	507 (6.7)	9.4 (0.13)
Iran, Islamic Rep. of		22 (2.9)	465 (9.2)	63 (3.4)	436 (4.9)	14 (2.7)	439 (8.5)	9.1 (0.15)
Canada		22 (1.9)	537 (4.7)	71 (2.2)	507 (2.4)	6 (1.3)	484 (7.9)	9.4 (0.09)
England	s	22 (3.9)	576 (12.2)	71 (4.5)	551 (5.2)	7 (2.9)	552 (5.4)	9.5 (0.17)
Pakistan		19 (4.1)	353 (23.2)	79 (4.2)	324 (14.5)	2 (1.3)	~ ~	9.7 (0.13)
Turkey (5)		19 (3.2)	568 (9.0)	67 (3.7)	520 (5.0)	14 (2.6)	478 (17.1)	9.0 (0.14)
Philippines		18 (3.1)	326 (15.1)	79 (3.1)	290 (6.1)	3 (1.4)	259 (19.2)	9.3 (0.12)
Kuwait		18 (3.2)	420 (12.2)	79 (3.5)	376 (5.3)	3 (1.3)	345 (28.8)	9.4 (0.12)
Lithuania		18 (2.8)	565 (6.9)	63 (3.9)	536 (3.9)	19 (3.0)	534 (6.0)	8.9 (0.15)
Saudi Arabia		18 (2.8)	419 (7.4)	76 (3.5)	393 (4.9)	6 (1.9)	385 (15.8)	9.3 (0.13)
United States		15 (1.6)	568 (4.5)	77 (1.9)	533 (2.9)	7 (1.3)	491 (7.8)	9.1 (0.09)
Morocco		13 (2.5)	418 (15.6)	79 (3.2)	378 (5.9)	8 (2.1)	375 (9.6)	8.8 (0.11)
Chile		12 (2.5)	477 (9.9)	74 (4.0)	437 (3.2)	13 (3.2)	425 (8.8)	8.7 (0.15)
South Africa (5)		12 (2.0)	409 (15.4)	81 (2.6)	369 (4.1)	7 (1.6)	370 (14.0)	9.0 (0.10)
International Average		**36 (0.4)**	**517 (0.9)**	**59 (0.5)**	**495 (0.6)**	**6 (0.2)**	**476 (2.2)**	
Benchmarking Participants								
Dubai, UAE	r	57 (2.4)	563 (3.3)	41 (2.4)	525 (4.0)	1 (0.3)	~ ~	10.8 (0.07)
Madrid, Spain		51 (4.2)	524 (2.7)	46 (4.4)	512 (3.3)	4 (1.7)	495 (31.3)	10.6 (0.13)
Moscow City, Russian Fed.		46 (4.2)	599 (3.1)	46 (3.8)	587 (3.2)	8 (2.3)	590 (6.5)	10.3 (0.20)
Ontario, Canada	r	26 (3.7)	541 (8.7)	65 (4.1)	504 (4.3)	9 (2.5)	487 (9.9)	9.4 (0.16)
Abu Dhabi, UAE	r	26 (2.3)	487 (7.7)	66 (2.4)	431 (3.9)	8 (1.2)	394 (10.7)	9.5 (0.09)
Quebec, Canada		20 (2.9)	545 (4.2)	77 (3.2)	530 (2.6)	3 (1.2)	519 (12.8)	9.5 (0.11)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 10.11: Classroom Teaching Limited by Students Not Ready for Instruction – Teachers' Reports

Students' Results based on Teachers' Reports

Country	Very Little		Some		A Lot		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Japan	78 (3.3)	561 (2.2)	22 (3.3)	562 (3.5)	0 (0.0)	~ ~	12.2 (0.16)
Albania	71 (3.9)	494 (4.3)	25 (3.3)	484 (8.5)	4 (2.2)	444 (20.2)	11.3 (0.17)
Kosovo	63 (3.8)	417 (4.6)	37 (3.8)	406 (5.8)	0 (0.0)	~ ~	11.1 (0.12)
Czech Republic	61 (3.5)	542 (2.8)	39 (3.5)	520 (4.2)	0 (0.0)	~ ~	11.0 (0.10)
North Macedonia	60 (3.9)	438 (6.1)	40 (3.9)	408 (11.4)	0 (0.0)	~ ~	11.1 (0.12)
Slovak Republic	54 (3.5)	537 (3.2)	38 (3.4)	509 (7.0)	8 (2.0)	468 (15.3)	10.6 (0.17)
Azerbaijan	52 (4.3)	427 (5.1)	46 (4.3)	425 (5.4)	2 (0.9)	~ ~	10.5 (0.12)
Singapore	52 (3.2)	620 (3.7)	46 (3.1)	568 (4.6)	2 (0.7)	~ ~	10.8 (0.11)
Latvia	51 (3.9)	544 (3.2)	47 (4.0)	538 (3.8)	2 (1.0)	~ ~	10.8 (0.14)
Serbia	49 (4.1)	518 (4.1)	47 (4.1)	515 (6.0)	4 (1.6)	523 (10.1)	10.6 (0.15)
Croatia	49 (3.4)	522 (2.9)	50 (3.5)	525 (3.0)	2 (0.8)	~ ~	10.8 (0.14)
Netherlands r	47 (4.2)	530 (4.6)	51 (4.3)	509 (3.5)	2 (1.2)	~ ~	10.6 (0.14)
Austria	47 (3.4)	537 (3.5)	51 (3.4)	511 (4.0)	2 (0.9)	~ ~	10.5 (0.11)
Montenegro	46 (2.7)	458 (2.8)	51 (2.6)	451 (3.8)	3 (1.0)	406 (10.4)	10.4 (0.10)
Poland	46 (3.4)	539 (4.3)	52 (3.3)	526 (2.9)	2 (0.9)	~ ~	10.6 (0.12)
Spain	46 (4.1)	520 (3.7)	51 (4.2)	503 (4.0)	3 (1.1)	486 (9.6)	10.4 (0.12)
Hong Kong SAR	45 (3.7)	550 (4.7)	54 (3.8)	518 (4.7)	1 (0.7)	~ ~	10.7 (0.16)
Georgia	45 (4.1)	457 (6.4)	55 (4.2)	452 (4.7)	0 (0.5)	~ ~	10.5 (0.12)
Bosnia and Herzegovina	45 (3.2)	460 (4.6)	49 (3.2)	458 (3.7)	6 (1.7)	452 (9.8)	10.4 (0.14)
Bulgaria	45 (3.7)	553 (5.5)	53 (3.6)	495 (7.6)	2 (1.0)	~ ~	10.4 (0.14)
Germany	43 (3.9)	534 (3.3)	54 (4.0)	510 (3.4)	3 (1.0)	445 (20.1)	10.2 (0.14)
Ireland	40 (3.7)	534 (6.7)	59 (3.7)	523 (3.2)	1 (0.4)	~ ~	10.3 (0.14)
Russian Federation	40 (3.1)	570 (4.2)	49 (3.5)	564 (4.2)	11 (2.2)	571 (7.2)	10.1 (0.16)
United Arab Emirates r	40 (1.8)	510 (3.4)	55 (2.0)	452 (3.9)	5 (0.8)	427 (16.8)	10.2 (0.07)
Finland	40 (2.9)	565 (3.3)	59 (3.1)	549 (3.1)	1 (0.5)	~ ~	10.3 (0.09)
Chinese Taipei	39 (3.7)	561 (2.8)	54 (3.8)	557 (2.4)	7 (2.1)	548 (8.2)	10.0 (0.14)
Denmark r	38 (4.2)	528 (3.9)	60 (4.3)	519 (3.2)	2 (0.9)	~ ~	10.2 (0.12)
Sweden	37 (4.0)	549 (4.1)	61 (4.1)	533 (4.3)	1 (1.0)	~ ~	10.2 (0.13)
France	36 (3.4)	507 (4.3)	57 (3.3)	480 (3.9)	7 (1.5)	456 (8.7)	9.8 (0.12)
Belgium (Flemish)	36 (3.3)	516 (2.5)	61 (3.4)	495 (2.5)	3 (1.1)	480 (11.2)	10.2 (0.11)
Italy	36 (4.1)	513 (4.7)	57 (4.0)	508 (3.4)	7 (2.0)	508 (7.6)	9.9 (0.16)
Armenia	35 (4.2)	470 (5.9)	60 (4.1)	464 (4.0)	5 (1.7)	479 (11.1)	10.0 (0.15)
Hungary	35 (3.4)	544 (4.3)	61 (3.4)	523 (4.1)	4 (1.5)	507 (11.1)	10.1 (0.14)
Portugal	33 (3.3)	515 (3.0)	56 (3.4)	499 (3.4)	11 (2.1)	498 (6.1)	9.6 (0.16)
Qatar	31 (3.2)	467 (7.9)	65 (3.2)	441 (5.8)	4 (1.6)	462 (21.5)	9.9 (0.14)
Kazakhstan	30 (3.2)	498 (5.6)	49 (4.0)	495 (6.0)	21 (2.9)	488 (9.1)	9.3 (0.15)
Korea, Rep. of	30 (3.7)	599 (3.7)	57 (3.5)	584 (2.8)	13 (2.7)	577 (6.3)	9.4 (0.18)
Bahrain	30 (2.6)	512 (5.9)	67 (2.8)	486 (4.5)	3 (1.0)	451 (15.3)	9.8 (0.10)
Norway (5) s	28 (4.6)	552 (4.8)	66 (4.5)	535 (3.4)	5 (1.8)	524 (14.6)	9.8 (0.21)
Malta	27 (0.4)	523 (2.4)	63 (0.4)	484 (1.8)	10 (0.3)	497 (4.2)	9.4 (0.02)
Kuwait	26 (4.2)	419 (13.9)	70 (4.5)	382 (7.4)	4 (1.5)	396 (19.4)	9.7 (0.15)
New Zealand	26 (2.6)	528 (4.2)	69 (2.7)	496 (3.1)	5 (1.4)	468 (15.0)	9.7 (0.09)
Northern Ireland	26 (3.9)	530 (4.7)	72 (4.1)	515 (3.0)	2 (1.3)	~ ~	9.9 (0.12)
Australia	26 (3.8)	559 (5.0)	69 (4.0)	528 (3.1)	6 (1.6)	481 (10.4)	9.7 (0.13)
Canada r	24 (2.1)	543 (3.4)	70 (2.5)	521 (2.2)	6 (1.2)	499 (7.0)	9.5 (0.09)
Pakistan	23 (6.4)	301 (35.9)	73 (6.5)	286 (15.7)	3 (1.9)	327 (48.1)	9.8 (0.16)
Oman	23 (3.0)	456 (9.0)	55 (3.2)	425 (5.9)	23 (2.9)	441 (10.0)	9.0 (0.16)
Iran, Islamic Rep. of	22 (2.9)	461 (9.2)	63 (3.4)	434 (5.1)	14 (2.7)	440 (7.7)	9.1 (0.15)
England s	22 (3.9)	557 (9.9)	71 (4.5)	531 (4.7)	7 (2.9)	534 (5.7)	9.5 (0.17)
Turkey (5)	22 (2.9)	559 (7.9)	71 (3.3)	519 (5.4)	8 (1.9)	503 (12.6)	9.4 (0.14)
Saudi Arabia	20 (3.0)	409 (9.7)	78 (3.2)	397 (5.0)	2 (1.2)	~ ~	9.5 (0.09)
Cyprus	19 (3.7)	530 (5.5)	74 (4.0)	508 (3.2)	7 (2.5)	508 (14.5)	9.3 (0.17)
Chile	18 (3.3)	498 (6.9)	69 (3.9)	463 (3.1)	13 (3.1)	450 (8.0)	8.9 (0.16)
Lithuania	18 (2.8)	561 (6.6)	63 (4.0)	533 (3.5)	19 (3.0)	527 (5.7)	8.9 (0.15)
Philippines	17 (2.7)	303 (16.9)	76 (3.0)	239 (8.0)	7 (2.2)	213 (27.4)	9.3 (0.13)
Morocco	15 (2.6)	399 (15.0)	77 (3.3)	370 (6.9)	8 (2.2)	378 (26.3)	9.1 (0.11)
United States	15 (1.9)	572 (4.9)	78 (2.0)	537 (3.1)	7 (1.2)	490 (8.4)	9.1 (0.10)
South Africa (5)	12 (2.3)	360 (24.2)	78 (2.9)	319 (6.2)	9 (1.9)	322 (17.5)	8.9 (0.11)
International Average	**37 (0.5)**	**506 (1.1)**	**58 (0.5)**	**484 (0.7)**	**6 (0.2)**	**465 (2.5)**	
Benchmarking Participants							
Dubai, UAE r	60 (2.7)	565 (3.3)	38 (2.7)	526 (4.1)	2 (0.3)	~ ~	11.1 (0.09)
Madrid, Spain	48 (4.4)	531 (2.3)	49 (4.3)	517 (2.8)	3 (1.6)	473 (18.9)	10.7 (0.16)
Moscow City, Russian Fed.	46 (4.2)	602 (3.2)	46 (3.8)	589 (3.2)	8 (2.3)	592 (6.5)	10.3 (0.20)
Abu Dhabi, UAE r	29 (2.5)	464 (6.9)	63 (2.6)	405 (5.5)	8 (1.7)	377 (22.2)	9.6 (0.12)
Ontario, Canada r	27 (4.3)	545 (6.1)	65 (4.7)	523 (4.3)	8 (2.4)	498 (9.8)	9.6 (0.19)
Quebec, Canada	23 (3.5)	534 (4.1)	74 (3.9)	520 (2.8)	4 (1.6)	511 (10.9)	9.5 (0.12)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

Downloaded from http://timss2019.org/download

Exhibit 10.12: Classroom Teaching Limited by Students Not Ready for Instruction – Teachers' Reports

Students' Results based on Teachers' Reports

Country	Very Little		Some		A Lot		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Japan	71 (3.5)	596 (3.6)	29 (3.5)	590 (5.0)	1 (0.4)	~ ~	12.3 (0.17)
Hungary	41 (3.2)	546 (5.8)	58 (3.3)	495 (4.9)	2 (0.9)	~ ~	10.6 (0.12)
Singapore	40 (2.8)	655 (4.9)	55 (2.8)	592 (5.7)	5 (1.2)	554 (20.3)	10.6 (0.10)
Kazakhstan	39 (3.8)	493 (6.3)	53 (4.1)	481 (5.4)	8 (2.2)	498 (17.4)	10.3 (0.15)
Italy	38 (3.7)	503 (4.6)	58 (3.8)	494 (3.6)	5 (1.3)	500 (10.3)	10.4 (0.15)
United Arab Emirates r	38 (1.8)	520 (3.8)	56 (2.1)	453 (3.3)	6 (0.9)	401 (9.8)	10.4 (0.07)
Ireland	35 (2.6)	548 (4.7)	59 (2.7)	517 (3.5)	6 (1.1)	457 (11.1)	10.4 (0.09)
England s	35 (5.0)	564 (11.8)	61 (5.0)	503 (9.8)	4 (2.3)	453 (37.6)	10.4 (0.19)
Hong Kong SAR	32 (3.7)	625 (7.3)	66 (3.9)	558 (6.2)	2 (1.1)	~ ~	10.5 (0.13)
Romania	31 (3.5)	520 (8.9)	66 (3.7)	461 (5.1)	3 (1.2)	481 (20.8)	10.3 (0.13)
Finland	30 (2.4)	529 (3.6)	66 (2.5)	503 (3.2)	4 (1.1)	465 (14.8)	10.3 (0.10)
New Zealand	29 (2.8)	532 (5.4)	63 (3.3)	470 (4.0)	8 (1.9)	438 (8.5)	10.0 (0.10)
Russian Federation	28 (2.9)	563 (6.9)	59 (3.0)	539 (5.4)	13 (2.8)	525 (16.1)	9.8 (0.17)
Australia	27 (2.8)	580 (8.5)	64 (2.9)	502 (3.2)	9 (2.1)	449 (9.0)	9.8 (0.12)
Chinese Taipei	26 (3.0)	636 (5.8)	63 (3.5)	604 (3.4)	10 (2.2)	605 (12.9)	9.6 (0.14)
Sweden	25 (3.0)	521 (6.0)	72 (3.3)	500 (3.0)	3 (1.3)	442 (9.6)	10.3 (0.12)
France r	23 (3.7)	504 (6.5)	71 (3.6)	477 (3.1)	5 (1.5)	453 (9.9)	9.8 (0.14)
Turkey	21 (3.1)	554 (8.9)	63 (3.7)	483 (4.4)	15 (2.7)	470 (15.8)	9.3 (0.16)
United States	21 (2.0)	582 (7.9)	72 (2.2)	503 (4.9)	8 (1.4)	458 (9.9)	9.7 (0.09)
Norway (9) s	21 (3.1)	522 (5.7)	73 (3.2)	503 (3.0)	6 (2.2)	476 (16.1)	9.9 (0.15)
Lithuania	20 (2.7)	548 (8.5)	59 (3.6)	519 (3.5)	20 (3.0)	501 (6.2)	9.3 (0.14)
Saudi Arabia	20 (3.2)	407 (6.9)	72 (3.6)	390 (3.1)	8 (2.0)	393 (7.9)	9.5 (0.13)
Cyprus s	20 (3.8)	530 (8.7)	66 (4.3)	499 (3.8)	15 (2.5)	498 (5.6)	9.5 (0.15)
Qatar	20 (2.3)	480 (10.7)	75 (2.4)	434 (5.5)	6 (1.5)	445 (14.5)	9.8 (0.12)
Israel	18 (2.5)	582 (9.9)	57 (3.4)	517 (6.6)	25 (2.7)	481 (9.2)	9.0 (0.14)
Malaysia	18 (1.9)	524 (7.6)	68 (2.8)	453 (3.9)	14 (2.5)	420 (10.7)	9.3 (0.12)
Bahrain	17 (2.7)	485 (5.1)	79 (3.1)	480 (2.2)	4 (1.5)	488 (21.7)	9.9 (0.10)
Lebanon	17 (3.1)	442 (8.9)	78 (3.5)	426 (3.7)	6 (1.9)	421 (17.6)	9.5 (0.12)
Georgia	16 (2.8)	460 (8.8)	78 (3.5)	461 (5.2)	6 (2.2)	464 (15.1)	9.8 (0.12)
Kuwait	15 (2.5)	440 (10.0)	80 (3.0)	395 (5.0)	5 (1.8)	375 (20.6)	9.7 (0.11)
Portugal	14 (2.7)	526 (7.9)	78 (3.4)	497 (4.0)	8 (2.1)	485 (8.1)	9.5 (0.12)
Jordan	14 (3.0)	454 (9.7)	78 (3.8)	418 (4.3)	8 (2.2)	391 (13.9)	9.3 (0.11)
Oman	12 (2.1)	443 (9.8)	72 (3.2)	409 (3.7)	16 (2.8)	394 (7.9)	9.1 (0.12)
Korea, Rep. of	11 (2.0)	615 (6.9)	71 (3.2)	604 (3.3)	17 (2.9)	613 (9.1)	9.1 (0.14)
Iran, Islamic Rep. of	11 (2.3)	486 (22.3)	73 (3.1)	442 (3.7)	16 (2.7)	436 (9.9)	8.9 (0.13)
Chile	11 (2.2)	467 (14.1)	73 (3.7)	445 (3.5)	16 (3.1)	405 (8.9)	9.2 (0.13)
Egypt	9 (2.3)	418 (13.9)	82 (3.4)	416 (5.8)	9 (2.3)	383 (19.3)	9.4 (0.11)
Morocco	8 (1.9)	433 (14.3)	80 (2.6)	385 (2.3)	11 (2.1)	375 (7.6)	9.2 (0.11)
South Africa (9)	8 (1.6)	433 (16.4)	78 (2.3)	387 (2.5)	14 (2.0)	379 (6.6)	8.9 (0.09)
International Average	**24 (0.5)**	**520 (1.5)**	**67 (0.5)**	**482 (0.7)**	**9 (0.3)**	**458 (2.4)**	
Benchmarking Participants							
Dubai, UAE	48 (3.3)	570 (4.4)	50 (3.3)	507 (5.0)	3 (0.7)	520 (6.7)	11.0 (0.12)
Quebec, Canada	34 (3.8)	571 (6.2)	60 (3.9)	530 (4.9)	6 (1.8)	512 (17.2)	10.5 (0.15)
Moscow City, Russian Fed.	33 (3.8)	597 (7.2)	50 (3.9)	562 (5.6)	17 (3.2)	573 (9.0)	9.9 (0.21)
Abu Dhabi, UAE r	26 (3.1)	493 (7.5)	64 (3.7)	422 (5.4)	10 (1.9)	371 (14.3)	9.8 (0.11)
Ontario, Canada	19 (4.3)	575 (12.0)	74 (4.8)	524 (3.5)	6 (2.2)	496 (12.2)	9.7 (0.16)
Western Cape, RSA (9)	9 (2.4)	538 (20.0)	77 (3.2)	440 (4.3)	14 (2.8)	385 (5.6)	8.9 (0.16)
Gauteng, RSA (9)	8 (1.9)	497 (10.5)	74 (3.5)	415 (3.7)	18 (3.4)	407 (10.0)	8.9 (0.13)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

Downloaded from http://timss2019.org/download

Exhibit 10.13: Classroom Teaching Limited by Students Not Ready for Instruction – Teachers' Reports

Students' Results based on Teachers' Reports

Country		Very Little		Some		A Lot		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Japan		74 (3.3)	573 (2.6)	26 (3.3)	560 (3.6)	0 (0.0)	~ ~	12.4 (0.14)
Singapore		48 (2.7)	631 (4.9)	50 (2.8)	587 (6.4)	2 (0.8)	~ ~	11.0 (0.10)
Kazakhstan		39 (2.4)	479 (4.2)	54 (2.6)	474 (4.2)	7 (1.3)	501 (10.4)	10.4 (0.11)
England	s	38 (4.6)	550 (10.9)	58 (4.8)	512 (7.6)	4 (2.5)	434 (51.6)	10.3 (0.19)
Hungary		37 (2.2)	552 (3.7)	59 (2.3)	519 (3.4)	4 (0.9)	458 (13.4)	10.5 (0.08)
Romania		37 (2.9)	491 (6.1)	59 (3.2)	459 (4.4)	4 (1.1)	460 (17.9)	10.4 (0.11)
Russian Federation		37 (2.0)	554 (4.6)	52 (1.8)	538 (4.0)	11 (1.3)	529 (10.8)	10.2 (0.12)
United Arab Emirates	r	37 (1.8)	532 (4.4)	58 (1.9)	446 (4.1)	5 (0.5)	384 (13.3)	10.4 (0.06)
Sweden		35 (3.3)	539 (5.1)	65 (3.3)	512 (4.3)	1 (0.4)	~ ~	10.5 (0.12)
Finland		34 (2.0)	565 (3.6)	64 (1.9)	533 (3.6)	3 (0.6)	495 (10.9)	10.5 (0.08)
Hong Kong SAR		32 (4.3)	535 (11.9)	67 (4.2)	487 (6.7)	1 (0.8)	~ ~	10.4 (0.13)
Italy		32 (3.6)	508 (4.2)	61 (3.8)	495 (3.4)	7 (1.7)	510 (10.6)	10.4 (0.16)
France	r	30 (2.8)	510 (3.7)	66 (3.0)	479 (2.7)	5 (1.3)	472 (13.8)	10.0 (0.11)
Portugal		29 (3.1)	543 (4.4)	62 (3.1)	510 (3.2)	9 (1.8)	512 (6.3)	9.9 (0.13)
Ireland		27 (3.2)	546 (5.0)	64 (3.5)	527 (2.9)	9 (2.4)	479 (13.0)	10.1 (0.12)
Chinese Taipei		27 (3.3)	586 (4.2)	61 (3.7)	569 (2.8)	13 (2.4)	574 (7.4)	9.8 (0.16)
Cyprus	s	26 (2.5)	504 (5.6)	63 (2.5)	481 (3.4)	11 (0.9)	477 (5.1)	9.8 (0.08)
Qatar		25 (3.8)	500 (8.8)	70 (4.1)	468 (5.7)	4 (1.9)	450 (15.0)	10.1 (0.15)
New Zealand		25 (2.8)	542 (5.8)	70 (2.9)	493 (4.6)	5 (1.3)	422 (10.4)	9.9 (0.11)
Malaysia		24 (2.8)	512 (8.3)	67 (3.5)	449 (4.6)	9 (2.1)	404 (16.8)	9.9 (0.13)
Australia	r	23 (2.8)	579 (7.2)	72 (3.0)	521 (3.6)	5 (1.3)	481 (17.3)	10.0 (0.10)
Norway (9)	s	23 (3.5)	520 (6.7)	75 (3.8)	492 (3.9)	2 (1.5)	~ ~	10.2 (0.13)
Lithuania		23 (2.0)	552 (5.0)	62 (2.6)	528 (3.0)	15 (1.7)	525 (5.8)	9.5 (0.10)
Georgia		22 (2.2)	462 (6.2)	76 (2.1)	444 (3.8)	2 (0.6)	~ ~	10.1 (0.07)
Bahrain		22 (3.5)	526 (5.6)	71 (4.0)	478 (3.5)	8 (2.0)	471 (13.2)	10.0 (0.11)
Israel		20 (3.0)	572 (8.8)	59 (3.9)	508 (6.4)	21 (3.2)	476 (11.2)	9.2 (0.16)
Turkey		20 (2.7)	554 (9.1)	68 (3.3)	510 (5.2)	13 (2.5)	485 (15.0)	9.5 (0.15)
Saudi Arabia		19 (2.8)	459 (6.0)	71 (3.6)	426 (3.5)	9 (2.5)	415 (9.1)	9.6 (0.14)
Korea, Rep. of		19 (2.9)	569 (4.2)	70 (3.3)	561 (2.6)	11 (2.1)	546 (5.3)	9.5 (0.13)
Chile		18 (2.7)	488 (8.2)	65 (3.5)	464 (4.1)	16 (3.1)	437 (6.6)	9.5 (0.17)
Kuwait		18 (3.5)	454 (10.7)	80 (3.6)	442 (6.3)	2 (1.1)	~ ~	9.9 (0.12)
Oman		17 (2.6)	468 (7.4)	64 (3.6)	459 (4.1)	18 (3.0)	442 (8.7)	9.3 (0.13)
Lebanon		17 (2.0)	393 (12.7)	76 (2.1)	376 (5.4)	7 (1.4)	350 (16.1)	9.6 (0.11)
Jordan		14 (2.9)	490 (11.4)	75 (3.3)	453 (5.3)	11 (2.0)	401 (18.6)	9.4 (0.13)
Egypt		12 (2.9)	402 (16.6)	82 (3.5)	386 (5.7)	7 (1.9)	408 (20.2)	9.4 (0.11)
Morocco		11 (1.4)	431 (8.5)	78 (1.9)	392 (3.1)	11 (1.4)	374 (6.2)	9.2 (0.07)
Iran, Islamic Rep. of		11 (2.4)	459 (13.2)	76 (3.2)	449 (4.4)	13 (2.4)	443 (12.3)	9.1 (0.10)
United States	r	11 (1.8)	545 (13.6)	78 (2.8)	533 (4.0)	11 (2.1)	462 (18.6)	9.3 (0.10)
South Africa (9)		8 (1.3)	413 (12.0)	77 (2.6)	367 (3.6)	15 (2.3)	360 (5.9)	9.0 (0.08)
International Average		**26 (0.5)**	**515 (1.3)**	**66 (0.5)**	**484 (0.7)**	**8 (0.3)**	**457 (2.7)**	
Benchmarking Participants								
Dubai, UAE	r	51 (3.0)	583 (4.7)	47 (3.1)	522 (5.4)	3 (0.6)	488 (13.9)	11.0 (0.08)
Moscow City, Russian Fed.		42 (2.5)	579 (3.3)	49 (2.3)	559 (3.7)	9 (1.4)	553 (4.7)	10.5 (0.13)
Abu Dhabi, UAE	r	26 (2.6)	502 (9.5)	67 (3.0)	391 (5.6)	7 (1.3)	349 (18.5)	9.9 (0.10)
Ontario, Canada	s	23 (5.2)	556 (10.4)	72 (5.5)	512 (4.5)	6 (2.5)	503 (7.0)	9.9 (0.23)
Western Cape, RSA (9)		13 (3.2)	506 (31.8)	62 (4.3)	447 (6.7)	25 (3.3)	389 (7.0)	8.8 (0.17)
Gauteng, RSA (9)		10 (2.3)	452 (19.9)	75 (3.5)	424 (5.0)	15 (2.9)	389 (10.7)	9.2 (0.11)
Quebec, Canada	y	- -	- -	- -	- -	- -	- -	- -

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Students' Attitudes

Students Like Learning Mathematics and Science

Exhibit 11.1 presents the *Students Like Learning Mathematics* scale administered to fourth and eighth grade students. In TIMSS 2019, the scale had nine items covering students' attitudes toward mathematics and studying mathematics (see Mathematics—About the Scale). In each TIMSS cycle since 1995, there has been a positive relationship between students liking mathematics and higher mathematics achievement. Since the inception of an item response theory (IRT) scale in 2011 to measure attitudes more broadly and reliably, the *Students Like Learning Mathematics* scale has had a very strong relationship with achievement in mathematics, and TIMSS 2019 was no exception. At both fourth and eighth grades, students who reported they "very much" like learning mathematics had substantially higher average achievement than students who reported they "do not like" learning mathematics.

Exhibit 11.2 presents the results for fourth grade according to the percentage of students who reported they like to learn mathematics "very much" (from highest to lowest). In general, fourth grade students were positive about learning mathematics—45 percent, on average, responded they like it "very much," and another 35 percent reported that they "somewhat" like it. However, even at the fourth grade, 20 percent, on average, responded negatively that they "do not like" learning mathematics.

Exhibit 11.3 shows that at the eighth grade, the percentage of students responding negatively increased substantially. At the eighth grade, only 20 percent responded that they like learning mathematics "very much." Thirty-nine percent responded "somewhat," and 41 percent (double compared with fourth grade) responded that they "do not like" learning mathematics. The difference in average achievement between eighth grade students who like learning mathematics "very much" and those who "do not like" learning mathematics was 62 scale score points.

Exhibit 11.4 presents the *Students Like Learning Science* scale (parallel to the mathematics scale) which was administered to fourth and eighth grade students (see Science—About the Scale). At both grades, the *Students Like Learning Science* scale was related to higher average achievement in science.

Exhibit 11.5 shows the science scale results at fourth grade. Compared with mathematics, a greater percentage of fourth grade students were positive about learning science, with 52 percent responding that they like it "very much," and another 36 percent that they "somewhat" like it. A smaller percentage were negative about learning science—12 percent reported they "do not like" it.

Exhibit 11.6 contains the eighth grade results for the *Students Like Learning Science* scale. The first panel is for the 26 countries that taught science as an integrated subject, then there are separate panels for the countries with courses for biology, chemistry, physics, and Earth science. The eighth grade students generally were positive about their integrated science courses, with 35 percent of students

responding that they like to learn science "very much," another 44 percent liking it "somewhat," and only 20 percent of students in the "do not like" category. Similar to the relationship with mathematics achievement, the difference in average science achievement between eighth grade students who like learning science "very much" and those who "do not like" learning science was 64 scale score points.

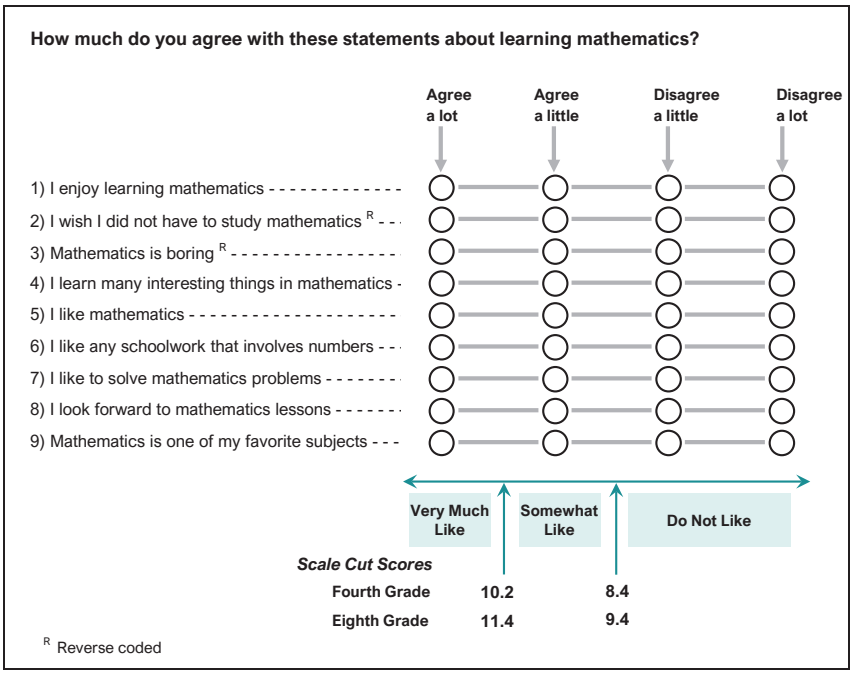
In countries where science is taught as separate subjects, students were positive about learning biology, with only 22 percent of students in the "do not like" learning biology category. Students were less positive about their separate courses in chemistry, physics, and Earth science, with 28 percent, 31 percent, and 26 percent of students in the "do not like" category of the three respective subjects, but not as negative as they were about eighth grade mathematics. The difference in average achievement between eighth grade students in the "very much like" and "do not like" categories was smaller for students taking separate subject courses and varied across the four subjects—30 points for biology, 45 points for chemistry, 46 points for physics, and 22 points for Earth science.

Exhibit 11.1: Students Like Learning Mathematics

Students' Reports

About the Scale

Students were scored according to their responses to nine statements on the *Students Like Learning Mathematics* scale. Cut scores divide the scale into three categories. Students who **Very Much Like Learning Mathematics** had a score at or above the cut score corresponding to "agreeing a lot" with five of the nine statements and "agreeing a little" with the other four, on average. Students who **Do Not Like Learning Mathematics** had a score at or below the cut score corresponding to "disagreeing a little" with five of the nine statements and "agreeing a little" with the other four, on average. All other students **Somewhat Like Learning Mathematics**.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 11.2: Students Like Learning Mathematics

Students' Reports

Country	Very Much Like Learning Mathematics		Somewhat Like Learning Mathematics		Do Not Like Learning Mathematics		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	83 (1.2)	504 (3.2)	15 (1.0)	455 (7.6)	2 (0.4)	~ ~	11.8 (0.05)
Kosovo	78 (0.9)	459 (2.7)	20 (0.8)	404 (4.7)	2 (0.3)	~ ~	11.4 (0.04)
Georgia	74 (1.5)	489 (3.7)	22 (1.1)	459 (6.6)	4 (0.6)	446 (11.3)	11.4 (0.06)
Armenia	72 (1.1)	511 (2.6)	23 (1.0)	481 (4.0)	5 (0.4)	465 (5.6)	11.4 (0.05)
Morocco	70 (1.2)	402 (4.1)	25 (1.1)	344 (6.4)	5 (0.4)	326 (10.2)	11.3 (0.05)
Azerbaijan	68 (1.2)	536 (2.3)	27 (1.1)	495 (3.6)	5 (0.4)	477 (7.5)	10.9 (0.05)
Kazakhstan	68 (1.0)	518 (2.6)	28 (1.0)	504 (3.6)	5 (0.5)	494 (6.3)	11.1 (0.05)
Turkey (5)	66 (1.2)	540 (4.1)	25 (0.9)	491 (6.1)	9 (0.6)	495 (7.0)	10.9 (0.05)
North Macedonia	66 (1.3)	495 (5.3)	29 (1.1)	436 (6.8)	5 (0.6)	448 (12.0)	11.0 (0.06)
Montenegro	64 (1.0)	467 (1.9)	25 (0.8)	433 (3.5)	10 (0.6)	427 (5.0)	10.9 (0.04)
Oman	59 (1.2)	455 (4.5)	34 (1.1)	401 (4.7)	7 (0.5)	394 (5.7)	10.8 (0.05)
Iran, Islamic Rep. of	59 (1.4)	457 (3.6)	30 (0.9)	421 (5.2)	11 (0.7)	437 (7.3)	10.8 (0.06)
Saudi Arabia	59 (1.2)	424 (3.6)	30 (1.0)	371 (4.1)	11 (0.8)	370 (8.7)	10.8 (0.05)
Cyprus	56 (1.5)	547 (2.8)	28 (0.9)	522 (3.9)	16 (1.1)	497 (4.9)	10.5 (0.07)
Bahrain	56 (1.4)	494 (2.6)	31 (0.9)	465 (3.2)	13 (0.8)	458 (4.4)	10.6 (0.07)
Bulgaria	54 (1.5)	526 (3.9)	30 (1.1)	508 (5.4)	17 (1.3)	496 (10.1)	10.4 (0.08)
United Arab Emirates	54 (0.7)	503 (1.8)	33 (0.5)	461 (2.3)	13 (0.4)	455 (2.8)	10.5 (0.03)
Portugal	49 (1.3)	542 (2.9)	36 (1.0)	513 (3.1)	15 (0.9)	499 (4.4)	10.3 (0.05)
France	49 (1.0)	499 (3.6)	36 (0.9)	479 (3.9)	15 (0.8)	454 (4.8)	10.2 (0.04)
Bosnia and Herzegovina	49 (1.0)	466 (2.8)	32 (0.6)	443 (3.3)	20 (1.0)	437 (3.4)	10.1 (0.06)
Malta	48 (0.7)	522 (1.7)	34 (0.7)	502 (2.2)	18 (0.7)	488 (3.2)	10.1 (0.03)
Lithuania	47 (1.3)	553 (3.2)	39 (0.9)	538 (3.3)	14 (0.9)	521 (5.7)	10.1 (0.05)
Kuwait	46 (1.6)	416 (6.0)	37 (1.1)	372 (5.5)	17 (1.1)	352 (5.4)	10.2 (0.08)
South Africa (5)	46 (1.5)	415 (3.3)	43 (1.1)	345 (3.7)	12 (0.6)	334 (5.4)	10.3 (0.05)
Italy	45 (1.3)	525 (2.9)	34 (1.1)	511 (3.2)	20 (1.1)	502 (3.5)	10.0 (0.06)
England	44 (1.6)	576 (4.4)	34 (1.1)	549 (4.4)	23 (1.1)	530 (3.8)	9.9 (0.07)
Qatar	43 (1.4)	474 (3.8)	38 (0.9)	434 (4.8)	20 (0.9)	436 (4.9)	10.0 (0.07)
Chile	43 (1.2)	458 (3.2)	39 (0.9)	437 (3.4)	19 (1.0)	418 (4.1)	10.0 (0.05)
Russian Federation	42 (1.1)	579 (4.0)	41 (0.8)	563 (3.5)	17 (0.9)	547 (4.3)	10.0 (0.05)
Austria	40 (1.0)	552 (2.5)	34 (0.8)	538 (2.7)	25 (0.9)	522 (2.9)	9.8 (0.05)
New Zealand	40 (0.9)	503 (3.2)	35 (0.8)	485 (3.6)	25 (0.9)	469 (3.3)	9.8 (0.04)
Australia	40 (1.0)	536 (3.6)	34 (0.9)	516 (3.4)	26 (1.2)	487 (3.6)	9.7 (0.05)
Hungary	38 (1.2)	543 (3.3)	37 (0.9)	517 (3.4)	25 (1.3)	504 (3.4)	9.7 (0.06)
United States	38 (0.9)	559 (2.8)	35 (0.7)	530 (3.7)	27 (0.8)	515 (3.1)	9.7 (0.04)
Canada	38 (0.9)	531 (2.9)	38 (0.8)	508 (2.1)	25 (0.6)	485 (2.5)	9.7 (0.04)
Spain	37 (1.0)	519 (3.5)	39 (0.9)	500 (2.9)	23 (1.1)	484 (2.9)	9.7 (0.04)
Singapore	37 (0.9)	654 (3.5)	40 (0.7)	618 (4.4)	23 (0.8)	594 (4.1)	9.7 (0.04)
Slovak Republic	37 (1.5)	520 (4.4)	39 (1.1)	506 (4.5)	24 (1.0)	500 (3.8)	9.7 (0.06)
Ireland	35 (1.1)	566 (2.9)	37 (1.0)	549 (3.2)	28 (1.1)	529 (3.3)	9.5 (0.05)
Pakistan	35 (3.6)	354 (14.7)	52 (3.2)	318 (11.5)	13 (1.3)	307 (11.5)	9.9 (0.09)
Serbia	35 (1.3)	526 (4.4)	40 (1.1)	505 (3.3)	26 (1.4)	490 (5.1)	9.6 (0.07)
Sweden	34 (1.6)	530 (4.5)	37 (1.1)	523 (3.3)	29 (1.6)	511 (3.2)	9.5 (0.08)
Germany	33 (1.0)	544 (3.1)	38 (1.0)	522 (2.8)	29 (1.2)	503 (3.1)	9.5 (0.05)
Belgium (Flemish)	33 (1.0)	547 (2.8)	39 (0.9)	531 (2.3)	28 (1.0)	518 (2.8)	9.4 (0.04)
Czech Republic	32 (1.2)	553 (3.6)	39 (1.1)	532 (3.2)	28 (1.2)	514 (3.2)	9.4 (0.05)
Latvia	32 (1.2)	565 (3.5)	40 (1.1)	549 (2.7)	28 (1.3)	521 (3.7)	9.5 (0.05)
Norway (5)	32 (1.4)	558 (3.4)	39 (1.1)	541 (3.4)	29 (1.3)	533 (3.4)	9.4 (0.07)
Philippines	32 (1.8)	362 (6.7)	53 (1.3)	278 (6.0)	16 (0.9)	242 (6.8)	9.8 (0.07)
Northern Ireland	31 (1.2)	589 (4.0)	39 (1.1)	572 (3.6)	30 (1.2)	535 (3.8)	9.4 (0.05)
Hong Kong SAR	30 (1.3)	626 (4.9)	38 (1.2)	596 (3.9)	32 (1.4)	585 (3.9)	9.3 (0.06)
Netherlands	30 (1.3)	553 (2.9)	39 (0.8)	538 (2.6)	32 (1.2)	524 (3.2)	9.3 (0.06)
Poland	28 (1.0)	544 (3.4)	41 (0.8)	517 (3.1)	31 (1.2)	505 (3.4)	9.2 (0.05)
Japan	28 (1.0)	622 (2.4)	45 (0.9)	591 (2.2)	27 (1.2)	568 (2.8)	9.4 (0.05)
Denmark	28 (1.2)	543 (3.3)	41 (1.1)	525 (2.9)	31 (1.1)	510 (3.0)	9.2 (0.05)
Finland	28 (0.9)	546 (3.8)	41 (0.7)	535 (2.8)	31 (0.9)	518 (3.2)	9.2 (0.04)
Croatia	25 (1.6)	534 (2.9)	40 (1.4)	506 (3.1)	35 (1.5)	497 (3.1)	9.1 (0.07)
Korea, Rep. of	22 (0.9)	631 (3.2)	38 (1.1)	607 (3.0)	40 (1.1)	576 (2.9)	8.9 (0.04)
Chinese Taipei	22 (0.9)	624 (3.4)	38 (0.9)	603 (2.8)	41 (1.1)	582 (2.2)	8.9 (0.05)
International Average	**45 (0.2)**	**520 (0.5)**	**35 (0.1)**	**491 (0.6)**	**20 (0.1)**	**479 (0.7)**	
Benchmarking Participants							
Dubai, UAE	61 (0.7)	553 (1.8)	27 (0.5)	533 (2.5)	11 (0.5)	526 (4.1)	10.7 (0.04)
Abu Dhabi, UAE	44 (1.1)	462 (2.8)	38 (0.8)	427 (3.1)	18 (0.7)	423 (3.7)	10.1 (0.05)
Quebec, Canada	43 (1.3)	548 (3.1)	37 (1.1)	527 (3.3)	20 (1.0)	502 (3.8)	9.9 (0.05)
Moscow City, Russian Fed.	41 (1.1)	610 (2.6)	39 (0.9)	586 (2.8)	20 (0.9)	572 (3.0)	9.9 (0.04)
Madrid, Spain	37 (1.3)	531 (3.1)	42 (0.9)	516 (2.8)	22 (1.0)	503 (3.2)	9.7 (0.05)
Ontario, Canada	36 (1.6)	532 (5.5)	39 (1.4)	511 (3.4)	25 (1.1)	488 (4.4)	9.6 (0.06)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 11.3: Students Like Learning Mathematics

Students' Reports

Country	Very Much Like Learning Mathematics		Somewhat Like Learning Mathematics		Do Not Like Learning Mathematics		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Egypt	42 (1.3)	437 (5.4)	41 (0.9)	396 (5.6)	17 (0.9)	405 (6.4)	11.1 (0.06)
Morocco	38 (1.1)	409 (3.0)	40 (0.7)	380 (2.9)	22 (0.9)	368 (2.7)	10.8 (0.05)
Jordan	37 (1.3)	441 (4.2)	39 (0.8)	413 (4.8)	24 (1.0)	408 (5.6)	10.8 (0.06)
South Africa (9)	36 (0.7)	403 (2.5)	44 (0.5)	382 (2.6)	19 (0.5)	385 (3.0)	10.8 (0.03)
Iran, Islamic Rep. of	34 (0.9)	478 (5.1)	39 (0.8)	438 (4.6)	27 (1.1)	418 (4.5)	10.6 (0.05)
Oman	31 (0.9)	455 (3.4)	46 (0.7)	396 (3.0)	23 (1.0)	390 (4.1)	10.6 (0.04)
Turkey	29 (1.0)	539 (5.8)	41 (0.8)	485 (4.9)	30 (1.1)	470 (4.8)	10.3 (0.05)
Lebanon	28 (1.3)	456 (3.6)	44 (1.1)	425 (3.9)	28 (1.1)	413 (3.7)	10.4 (0.06)
Saudi Arabia	27 (1.1)	413 (4.0)	36 (0.7)	391 (3.2)	37 (1.0)	386 (3.0)	10.1 (0.05)
Kazakhstan	26 (1.2)	509 (4.9)	54 (1.1)	484 (4.0)	20 (1.1)	472 (5.0)	10.6 (0.05)
United Arab Emirates	26 (0.6)	512 (3.0)	41 (0.6)	471 (2.4)	33 (0.6)	451 (1.9)	10.2 (0.03)
Georgia	25 (1.4)	493 (6.1)	43 (1.1)	461 (4.9)	32 (1.3)	438 (5.3)	10.2 (0.06)
Bahrain	24 (0.8)	510 (3.4)	36 (0.8)	483 (2.4)	40 (1.2)	462 (2.9)	9.9 (0.06)
Singapore	22 (0.7)	653 (4.0)	43 (0.7)	624 (3.9)	35 (0.8)	582 (5.0)	10.1 (0.03)
Malaysia	20 (0.8)	498 (5.2)	57 (0.8)	455 (3.3)	23 (1.0)	442 (4.2)	10.3 (0.04)
Kuwait	20 (0.9)	429 (7.0)	34 (1.0)	406 (6.3)	45 (1.3)	392 (4.4)	9.7 (0.05)
Israel	19 (1.0)	544 (6.3)	36 (1.0)	527 (5.3)	45 (1.4)	505 (4.1)	9.6 (0.06)
Cyprus	19 (0.8)	549 (3.8)	35 (0.8)	513 (2.8)	46 (1.0)	473 (2.4)	9.6 (0.04)
Portugal	19 (0.9)	548 (4.7)	34 (1.0)	508 (3.9)	48 (1.3)	477 (3.3)	9.6 (0.06)
Russian Federation	17 (0.7)	583 (6.3)	46 (0.9)	549 (4.7)	37 (1.1)	519 (5.0)	9.9 (0.04)
United States	17 (0.8)	561 (6.2)	37 (0.6)	528 (5.0)	45 (1.0)	493 (4.7)	9.6 (0.05)
Italy	16 (0.9)	537 (4.3)	34 (1.1)	513 (3.3)	49 (1.3)	474 (2.9)	9.4 (0.06)
Romania	16 (1.0)	537 (6.0)	39 (1.1)	486 (5.6)	44 (1.6)	454 (4.8)	9.7 (0.06)
Qatar	16 (0.8)	486 (5.6)	39 (1.1)	449 (5.9)	45 (1.4)	424 (3.5)	9.6 (0.06)
Ireland	14 (0.7)	567 (4.4)	35 (1.1)	537 (3.1)	50 (1.3)	504 (2.7)	9.4 (0.05)
Chile	14 (0.7)	468 (5.7)	40 (1.2)	449 (3.4)	46 (1.5)	426 (2.9)	9.6 (0.05)
New Zealand	14 (0.6)	528 (5.4)	39 (1.1)	495 (4.1)	47 (1.2)	460 (3.6)	9.5 (0.04)
Australia	13 (0.7)	576 (5.1)	37 (0.8)	536 (4.5)	50 (1.2)	489 (3.4)	9.4 (0.05)
Hong Kong SAR	13 (0.7)	622 (5.8)	39 (1.0)	595 (4.9)	48 (1.4)	554 (4.4)	9.4 (0.05)
Sweden	13 (0.7)	545 (4.7)	34 (0.9)	522 (3.4)	53 (1.2)	482 (2.5)	9.3 (0.05)
England	12 (0.8)	552 (8.5)	38 (1.1)	530 (6.6)	50 (1.2)	500 (5.0)	9.4 (0.04)
Norway (9)	12 (0.8)	558 (4.8)	34 (0.9)	524 (2.5)	54 (1.1)	479 (2.7)	9.2 (0.04)
Lithuania	12 (0.8)	563 (6.3)	43 (1.2)	531 (3.7)	44 (1.3)	500 (3.0)	9.6 (0.04)
Chinese Taipei	12 (0.6)	685 (5.2)	33 (0.7)	643 (3.0)	56 (0.9)	579 (2.7)	9.2 (0.04)
France	11 (0.7)	524 (4.8)	43 (1.2)	498 (3.1)	46 (1.3)	459 (2.5)	9.5 (0.04)
Hungary	11 (0.6)	590 (7.0)	32 (0.9)	538 (4.2)	57 (1.1)	491 (2.9)	9.2 (0.04)
Japan	10 (0.6)	658 (5.3)	34 (0.9)	618 (3.2)	56 (1.1)	569 (2.8)	9.3 (0.04)
Finland	9 (0.6)	572 (4.3)	34 (1.0)	533 (3.3)	57 (1.2)	485 (2.3)	9.1 (0.05)
Korea, Rep. of	8 (0.5)	685 (5.3)	32 (0.9)	638 (3.8)	61 (0.9)	581 (2.8)	9.0 (0.03)
International Average	**20 (0.1)**	**530 (0.8)**	**39 (0.1)**	**496 (0.7)**	**41 (0.2)**	**468 (0.6)**	
Benchmarking Participants							
Gauteng, RSA (9)	33 (1.1)	432 (4.1)	44 (0.7)	415 (3.4)	23 (0.9)	417 (4.0)	10.6 (0.05)
Dubai, UAE	28 (1.1)	569 (4.1)	42 (1.3)	537 (2.6)	29 (0.8)	505 (2.7)	10.4 (0.04)
Western Cape, RSA (9)	27 (1.0)	457 (4.7)	44 (0.8)	434 (5.2)	29 (1.0)	440 (4.8)	10.3 (0.04)
Ontario, Canada	24 (1.1)	569 (3.9)	39 (1.0)	540 (4.8)	37 (1.0)	495 (4.8)	10.0 (0.05)
Abu Dhabi, UAE	21 (0.9)	489 (4.2)	43 (0.9)	425 (3.5)	36 (0.9)	422 (3.5)	10.0 (0.05)
Moscow City, Russian Fed.	19 (0.9)	625 (5.3)	44 (1.1)	586 (4.7)	37 (1.4)	538 (3.8)	9.9 (0.05)
Quebec, Canada	13 (1.0)	586 (4.9)	38 (1.0)	556 (3.3)	48 (1.6)	522 (4.5)	9.5 (0.07)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

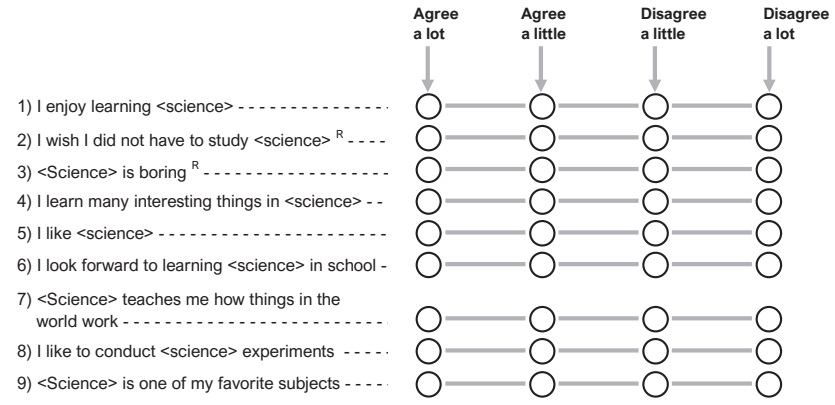
Exhibit 11.4: Students Like Learning Science

Students' Reports

About the Scale

Students were scored according to their responses to nine statements on the *Students Like Learning Science* scale. Cut scores divide the scale into three categories. Students who **Very Much Like Learning Science** had a score at or above the cut score corresponding to "agreeing a lot" with five of the nine statements and "agreeing a little" with the other four, on average. Students who **Do Not Like Learning Science** had a score at or below the cut score corresponding to "disagreeing a little" with five of the nine statements and "agreeing a little" with the other four, on average. All other students **Somewhat Like Learning Science**. At the eighth grade, a comparable approach was used for biology, chemistry, physics, and Earth science in countries where these were taught as separate subjects.

How much do you agree with these statements about learning <science / biology / chemistry / physics / earth science>?



Scale Cut Scores		
Fourth Grade	**9.7**	**7.6**
Eighth Grade		
General/Integrated Science	**10.6**	**8.3**
Biology	**11.0**	**8.5**
Chemistry	**11.1**	**8.8**
Physics	**11.3**	**9.0**
Earth Science	**11.2**	**8.8**

R Reverse coded

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit 11.5: Students Like Learning Science

Students' Reports

Country	Very Much Like Learning Science		Somewhat Like Learning Science		Do Not Like Learning Science		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	83 (1.1)	498 (3.3)	15 (1.0)	457 (7.8)	1 (0.2)	~ ~	11.6 (0.06)
Portugal	74 (1.0)	513 (2.6)	21 (0.9)	480 (3.7)	4 (0.4)	477 (6.9)	11.2 (0.05)
Kosovo	72 (1.5)	429 (3.9)	25 (1.3)	383 (5.0)	3 (0.4)	364 (14.2)	10.9 (0.06)
Iran, Islamic Rep. of	70 (1.1)	459 (3.4)	24 (1.0)	402 (6.6)	5 (0.5)	402 (9.1)	11.0 (0.06)
Bulgaria	69 (1.6)	533 (4.5)	25 (1.2)	504 (6.8)	6 (0.9)	486 (18.3)	10.8 (0.08)
Morocco	69 (1.3)	401 (5.8)	26 (1.1)	322 (7.6)	5 (0.4)	294 (12.9)	11.0 (0.06)
Turkey (5)	69 (1.6)	544 (3.4)	25 (1.2)	493 (6.5)	6 (0.7)	473 (10.0)	10.9 (0.07)
Bahrain	68 (1.2)	514 (2.9)	24 (0.9)	454 (4.9)	7 (0.6)	445 (7.4)	11.0 (0.06)
Oman	68 (1.3)	464 (4.7)	27 (1.2)	387 (5.4)	5 (0.5)	360 (9.2)	10.9 (0.07)
Armenia	66 (1.3)	483 (3.2)	27 (1.2)	450 (5.3)	8 (0.6)	439 (6.7)	10.8 (0.07)
United Arab Emirates	64 (0.6)	500 (2.2)	28 (0.5)	435 (2.6)	8 (0.3)	410 (4.4)	10.8 (0.03)
Georgia	62 (1.6)	459 (4.1)	32 (1.4)	442 (6.0)	6 (0.6)	459 (9.1)	10.6 (0.07)
Saudi Arabia	61 (1.2)	438 (3.5)	29 (1.0)	356 (5.7)	9 (0.6)	369 (8.2)	10.7 (0.06)
Montenegro	61 (1.2)	467 (2.6)	32 (0.9)	440 (3.3)	7 (0.5)	434 (7.8)	10.5 (0.05)
Azerbaijan	61 (1.4)	448 (2.8)	33 (1.3)	414 (4.2)	6 (0.5)	409 (8.6)	10.3 (0.06)
Kazakhstan	59 (1.3)	503 (3.8)	36 (1.2)	484 (3.4)	5 (0.5)	488 (7.4)	10.4 (0.06)
North Macedonia	59 (1.7)	455 (4.9)	36 (1.7)	397 (8.2)	6 (0.7)	383 (12.5)	10.5 (0.07)
Kuwait	58 (1.4)	430 (6.4)	33 (1.1)	360 (7.7)	9 (0.7)	333 (10.0)	10.5 (0.07)
Malta	58 (0.8)	509 (1.6)	29 (0.6)	484 (3.0)	13 (0.6)	466 (4.0)	10.3 (0.04)
Qatar	56 (1.6)	485 (3.5)	34 (1.3)	415 (5.4)	10 (0.6)	396 (7.4)	10.4 (0.07)
Ireland	56 (1.3)	537 (3.3)	33 (1.0)	523 (4.0)	12 (0.7)	507 (5.2)	10.2 (0.06)
Northern Ireland	56 (1.1)	530 (2.4)	33 (1.0)	510 (3.4)	11 (0.7)	487 (4.5)	10.2 (0.05)
Italy	55 (1.1)	514 (3.5)	35 (0.8)	509 (3.4)	10 (0.7)	495 (4.8)	10.2 (0.05)
Lithuania	53 (1.7)	541 (3.0)	38 (1.3)	538 (3.5)	9 (0.8)	524 (5.0)	9.9 (0.07)
Japan	52 (1.2)	569 (2.1)	39 (1.0)	554 (2.3)	9 (0.6)	551 (4.0)	10.1 (0.06)
United States	52 (1.0)	551 (2.6)	34 (0.8)	533 (3.6)	14 (0.7)	523 (4.8)	10.1 (0.05)
New Zealand	52 (1.1)	513 (3.0)	34 (0.9)	500 (2.8)	14 (0.8)	479 (3.5)	10.0 (0.05)
Chinese Taipei	51 (1.5)	566 (2.0)	37 (1.1)	554 (2.6)	12 (0.9)	537 (4.3)	10.1 (0.07)
Australia	50 (1.4)	539 (3.1)	34 (0.9)	533 (2.9)	16 (1.0)	515 (4.6)	9.9 (0.07)
Singapore	49 (1.0)	605 (3.6)	39 (0.7)	588 (3.9)	12 (0.5)	574 (4.7)	10.0 (0.04)
Bosnia and Herzegovina	49 (1.1)	467 (3.5)	35 (0.8)	453 (3.6)	16 (0.8)	454 (4.6)	9.8 (0.06)
Hong Kong SAR	49 (1.5)	547 (3.5)	37 (1.2)	519 (4.8)	15 (1.0)	509 (6.7)	10.0 (0.08)
Austria	49 (1.1)	533 (2.8)	38 (0.9)	517 (3.5)	13 (0.7)	501 (5.3)	9.9 (0.05)
Canada	49 (1.0)	528 (2.2)	36 (0.8)	524 (2.2)	15 (0.6)	511 (2.8)	9.9 (0.05)
Spain	48 (1.4)	520 (2.7)	40 (1.0)	506 (2.5)	13 (0.8)	503 (6.7)	9.8 (0.06)
Germany r	47 (1.4)	535 (2.6)	38 (1.0)	517 (3.7)	15 (0.9)	498 (4.4)	9.8 (0.07)
Norway (5)	47 (1.4)	546 (2.6)	41 (1.0)	540 (2.7)	12 (0.8)	524 (5.2)	9.9 (0.06)
England	46 (1.6)	542 (3.7)	37 (1.2)	540 (3.6)	16 (1.1)	528 (4.8)	9.8 (0.09)
Hungary	46 (1.3)	538 (2.5)	38 (1.0)	523 (3.6)	15 (1.0)	520 (5.0)	9.7 (0.06)
Cyprus	46 (1.7)	525 (3.5)	32 (1.1)	504 (3.2)	22 (1.4)	496 (4.4)	9.6 (0.10)
France	45 (1.2)	496 (3.8)	38 (0.9)	487 (3.4)	17 (1.0)	467 (5.1)	9.7 (0.06)
Russian Federation	44 (1.3)	570 (3.8)	42 (0.9)	565 (3.1)	14 (0.9)	567 (4.2)	9.5 (0.06)
Chile	44 (1.1)	486 (3.2)	44 (0.9)	462 (3.2)	12 (0.8)	450 (5.9)	9.7 (0.06)
South Africa (5)	43 (1.2)	390 (5.2)	45 (0.9)	284 (5.1)	11 (0.5)	264 (6.3)	9.8 (0.05)
Pakistan	42 (3.2)	323 (15.0)	49 (2.5)	269 (15.2)	9 (1.5)	258 (16.1)	9.8 (0.16)
Netherlands	41 (1.3)	530 (3.1)	40 (0.9)	516 (3.6)	19 (0.9)	504 (4.6)	9.5 (0.06)
Belgium (Flemish)	41 (1.4)	507 (2.9)	41 (0.9)	502 (2.8)	19 (1.0)	486 (3.0)	9.5 (0.07)
Latvia	39 (1.3)	546 (3.0)	47 (1.2)	542 (2.7)	14 (0.8)	534 (4.5)	9.4 (0.05)
Sweden	39 (1.5)	538 (4.5)	41 (1.2)	543 (3.4)	20 (1.3)	527 (4.5)	9.4 (0.08)
Serbia	39 (1.5)	522 (4.2)	46 (1.1)	512 (4.3)	15 (1.1)	527 (4.3)	9.5 (0.07)
Slovak Republic	38 (1.6)	525 (4.1)	43 (0.9)	522 (4.7)	19 (1.1)	512 (5.5)	9.4 (0.08)
Poland	38 (1.3)	541 (3.3)	44 (1.0)	527 (2.8)	18 (0.9)	528 (3.7)	9.3 (0.06)
Korea, Rep. of	37 (1.3)	602 (2.7)	47 (0.9)	581 (2.8)	16 (1.0)	572 (3.6)	9.5 (0.06)
Denmark	35 (1.4)	534 (3.1)	43 (1.1)	521 (3.0)	22 (1.3)	509 (3.3)	9.2 (0.07)
Croatia	34 (1.3)	531 (3.2)	50 (1.0)	521 (2.4)	16 (0.9)	518 (4.1)	9.3 (0.06)
Czech Republic	34 (1.4)	541 (4.0)	44 (1.0)	534 (2.9)	22 (1.1)	527 (2.9)	9.2 (0.07)
Philippines	32 (1.8)	334 (7.5)	53 (1.4)	221 (7.1)	15 (0.9)	180 (7.3)	9.3 (0.07)
Finland	26 (1.0)	554 (3.2)	45 (0.9)	556 (3.1)	29 (1.1)	554 (3.1)	8.7 (0.05)
International Average	**52 (0.2)**	**506 (0.5)**	**36 (0.1)**	**478 (0.6)**	**12 (0.1)**	**467 (0.9)**	
Benchmarking Participants							
Dubai, UAE	72 (0.7)	552 (1.6)	23 (0.6)	525 (3.3)	5 (0.4)	523 (6.4)	11.2 (0.04)
Abu Dhabi, UAE	52 (1.1)	455 (3.5)	35 (0.8)	386 (3.7)	14 (0.6)	373 (5.1)	10.2 (0.06)
Quebec, Canada r	48 (1.3)	526 (3.1)	34 (1.0)	523 (3.4)	17 (1.0)	507 (3.7)	9.8 (0.07)
Ontario, Canada	46 (1.7)	529 (3.9)	38 (1.3)	527 (3.6)	15 (1.0)	513 (4.3)	9.8 (0.09)
Madrid, Spain	43 (1.5)	530 (2.7)	43 (1.3)	519 (2.3)	13 (0.8)	514 (4.5)	9.7 (0.06)
Moscow City, Russian Fed.	40 (1.2)	597 (2.8)	43 (1.1)	594 (2.8)	17 (1.0)	593 (3.3)	9.4 (0.05)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 11.6: Students Like Learning Science

Students' Reports

The general/integrated science panel summarizes responses for countries where students are enrolled in science as a single subject. The following panels for biology, chemistry, physics, and Earth science summarize responses for countries where students are taught science as separate subjects.

Students Like Learning General/Integrated Science

General/Integrated Science	Very Much Like Learning Science		Somewhat Like Learning Science		Do Not Like Learning Science		Average Scale Score
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Jordan	56 (1.6)	479 (3.8)	36 (1.4)	426 (6.1)	8 (0.5)	424 (7.0)	11.1 (0.06)
Egypt	54 (1.6)	426 (5.0)	38 (1.3)	358 (6.5)	8 (0.7)	345 (8.6)	11.0 (0.06)
Turkey	54 (1.4)	536 (3.3)	37 (0.9)	494 (5.0)	10 (0.8)	481 (8.4)	10.8 (0.06)
Iran, Islamic Rep. of	53 (1.3)	469 (3.9)	37 (1.0)	428 (4.4)	11 (0.6)	429 (5.9)	10.8 (0.06)
Kuwait	46 (1.7)	468 (5.5)	39 (1.1)	435 (6.4)	15 (1.1)	414 (7.2)	10.5 (0.07)
Malaysia	46 (1.1)	484 (3.3)	46 (0.8)	450 (3.9)	8 (0.7)	388 (8.0)	10.6 (0.05)
Saudi Arabia	46 (1.3)	454 (3.1)	40 (0.8)	417 (3.3)	14 (0.9)	417 (4.1)	10.6 (0.06)
Oman	46 (1.0)	495 (3.0)	44 (0.8)	438 (3.7)	10 (0.6)	412 (7.0)	10.6 (0.05)
United Arab Emirates	44 (0.6)	523 (2.7)	41 (0.6)	445 (2.6)	15 (0.4)	412 (3.8)	10.5 (0.03)
Bahrain	44 (1.2)	516 (2.4)	40 (0.9)	474 (3.2)	16 (0.7)	448 (4.6)	10.5 (0.06)
South Africa (9)	42 (0.9)	398 (3.4)	45 (0.6)	352 (3.3)	13 (0.5)	353 (4.2)	10.4 (0.04)
Qatar	38 (1.4)	509 (5.0)	45 (1.2)	459 (4.8)	17 (0.9)	441 (5.7)	10.2 (0.06)
Singapore	37 (0.9)	635 (3.8)	49 (0.8)	601 (3.8)	14 (0.6)	558 (6.0)	10.2 (0.04)
United States	31 (0.9)	550 (5.0)	46 (0.7)	522 (4.9)	23 (0.7)	499 (5.7)	9.8 (0.05)
Italy	29 (1.2)	519 (3.4)	50 (1.0)	499 (2.8)	20 (0.9)	481 (3.8)	9.8 (0.05)
Ireland	27 (1.2)	558 (3.5)	42 (1.0)	532 (2.8)	30 (1.3)	493 (4.3)	9.5 (0.06)
Australia	27 (1.1)	569 (4.1)	45 (0.8)	526 (3.5)	28 (1.3)	499 (3.6)	9.6 (0.06)
Israel	27 (1.2)	547 (4.8)	42 (0.8)	512 (5.0)	31 (1.1)	496 (5.2)	9.4 (0.06)
Chile	26 (1.2)	482 (4.7)	53 (1.0)	460 (3.4)	22 (1.2)	450 (3.9)	9.6 (0.06)
New Zealand	25 (1.1)	532 (4.8)	49 (0.9)	499 (4.2)	25 (1.2)	471 (4.6)	9.6 (0.06)
Norway (9)	25 (1.1)	530 (4.5)	51 (1.0)	495 (3.3)	25 (1.0)	467 (4.3)	9.6 (0.05)
England	24 (1.3)	556 (5.9)	45 (1.1)	524 (5.0)	30 (1.3)	485 (5.7)	9.4 (0.06)
Hong Kong SAR	23 (1.0)	541 (6.1)	55 (1.1)	501 (6.1)	22 (1.1)	472 (7.5)	9.6 (0.05)
Chinese Taipei	20 (0.8)	616 (3.2)	51 (0.9)	576 (2.5)	30 (1.0)	544 (2.6)	9.3 (0.04)
Japan	16 (0.8)	605 (4.2)	49 (1.1)	577 (2.4)	35 (1.4)	544 (2.6)	9.1 (0.05)
Korea, Rep. of	12 (0.5)	625 (4.6)	41 (1.0)	577 (3.0)	47 (1.2)	531 (2.4)	8.7 (0.04)
International Average	**35 (0.2)**	**524 (0.8)**	**44 (0.2)**	**484 (0.8)**	**20 (0.2)**	**460 (1.1)**	
Benchmarking Participants							
Dubai, UAE	50 (1.0)	574 (2.7)	38 (0.9)	528 (3.3)	12 (0.6)	498 (5.2)	10.8 (0.05)
Gauteng, RSA (9)	45 (1.2)	438 (4.0)	42 (0.8)	409 (4.9)	13 (0.8)	418 (6.1)	10.5 (0.05)
Abu Dhabi, UAE	35 (1.1)	498 (4.0)	45 (0.8)	389 (4.5)	20 (0.9)	364 (6.4)	10.1 (0.06)
Western Cape, RSA (9)	35 (1.1)	463 (5.8)	48 (0.7)	426 (5.5)	18 (1.0)	439 (6.9)	10.0 (0.05)
Ontario, Canada	33 (1.2)	542 (4.1)	44 (1.2)	518 (3.6)	23 (1.1)	500 (4.5)	9.9 (0.06)
Quebec, Canada	27 (1.5)	556 (4.3)	49 (1.2)	539 (3.8)	24 (1.6)	510 (5.5)	9.6 (0.08)

Separate Science Results

Students Like Learning Biology

Biology	Very Much Like Learning Biology		Somewhat Like Learning Biology		Do Not Like Learning Biology		Average Scale Score
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Morocco	46 (1.1)	414 (3.4)	43 (0.8)	382 (2.9)	11 (0.7)	372 (4.9)	10.9 (0.05)
Georgia	43 (1.9)	461 (4.3)	43 (1.6)	442 (4.2)	14 (1.2)	437 (7.6)	10.6 (0.08)
Portugal	38 (1.7)	534 (3.2)	47 (1.2)	515 (3.3)	15 (1.1)	505 (4.2)	10.5 (0.08)
Kazakhstan	36 (1.3)	486 (4.0)	56 (1.2)	475 (3.5)	8 (0.6)	471 (7.6)	10.5 (0.05)
Lebanon	36 (1.4)	415 (5.6)	46 (1.0)	361 (5.7)	18 (1.1)	350 (7.2)	10.3 (0.07)
Cyprus	30 (1.1)	511 (3.1)	42 (0.9)	479 (2.8)	28 (1.1)	467 (3.1)	9.8 (0.06)
Romania	29 (1.4)	486 (5.0)	49 (1.2)	464 (4.8)	21 (1.4)	472 (6.3)	10.0 (0.08)
Russian Federation	26 (1.2)	550 (4.8)	52 (1.1)	540 (4.5)	21 (1.1)	541 (5.3)	9.9 (0.06)
Lithuania	26 (1.3)	548 (3.7)	50 (1.1)	531 (3.6)	24 (1.3)	527 (4.7)	9.8 (0.06)
Hungary	23 (1.3)	544 (4.7)	45 (0.9)	526 (3.2)	32 (1.5)	526 (4.0)	9.5 (0.08)
Sweden	20 (1.1)	549 (5.0)	49 (1.2)	529 (3.9)	30 (1.3)	510 (4.2)	9.5 (0.05)
France	19 (1.0)	509 (4.5)	53 (1.1)	491 (3.0)	28 (1.4)	472 (3.7)	9.5 (0.06)
Finland	16 (0.9)	574 (4.2)	48 (0.9)	549 (3.9)	36 (1.2)	531 (3.5)	9.2 (0.05)
International Average	**30 (0.4)**	**506 (1.2)**	**48 (0.3)**	**483 (1.1)**	**22 (0.3)**	**476 (1.5)**	
Benchmarking Participants							
Moscow City, Russian Fed.	22 (1.2)	571 (3.6)	49 (1.0)	566 (3.3)	29 (1.4)	566 (4.2)	9.6 (0.07)

This TIMSS context questionnaire scale for general/integrated science was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011 where science is taught as a single subject. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution. The separate scales for biology, chemistry, physics, and Earth science were each established in 2019 using a comparable approach.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 11.6: Students Like Learning Science

Students' Reports

Separate Science Results (Continued)

Students Like Learning Chemistry

Chemistry	Very Much Like Learning Chemistry		Somewhat Like Learning Chemistry		Do Not Like Learning Chemistry		Average Scale Score
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Morocco	42 (1.1)	419 (3.7)	45 (0.8)	379 (2.9)	13 (0.8)	376 (4.0)	10.9 (0.06)
Cyprus	42 (1.1)	506 (2.8)	40 (1.1)	480 (2.5)	18 (0.9)	460 (3.7)	10.7 (0.05)
Lebanon	37 (1.7)	415 (5.2)	46 (1.3)	357 (5.8)	16 (1.1)	362 (8.7)	10.6 (0.08)
Georgia	35 (1.5)	472 (4.8)	41 (1.2)	441 (4.5)	23 (1.4)	431 (5.3)	10.4 (0.07)
Kazakhstan	31 (1.3)	496 (4.1)	53 (1.1)	474 (3.5)	16 (1.0)	461 (6.1)	10.4 (0.05)
Portugal	29 (1.4)	545 (3.8)	45 (1.2)	514 (3.4)	26 (1.7)	500 (4.2)	10.1 (0.08)
Russian Federation	27 (1.1)	562 (4.8)	47 (1.1)	541 (4.2)	26 (1.1)	530 (5.7)	10.1 (0.05)
Lithuania	26 (1.3)	559 (4.3)	44 (0.9)	533 (3.4)	30 (1.6)	516 (3.6)	9.9 (0.07)
Romania	24 (1.4)	501 (5.7)	46 (1.2)	465 (4.6)	30 (1.6)	460 (5.9)	9.7 (0.08)
Sweden	18 (1.1)	561 (5.1)	45 (1.1)	525 (4.3)	37 (1.3)	510 (3.7)	9.5 (0.06)
Finland	17 (0.9)	600 (3.4)	42 (0.9)	550 (3.6)	41 (1.3)	521 (3.3)	9.4 (0.06)
Hungary	14 (0.9)	557 (5.7)	38 (1.1)	526 (3.8)	47 (1.5)	525 (2.8)	9.1 (0.06)
France	14 (1.0)	520 (5.5)	47 (1.0)	493 (3.3)	39 (1.4)	473 (3.0)	9.3 (0.06)
International Average	**27 (0.3)**	**516 (1.3)**	**45 (0.3)**	**483 (1.1)**	**28 (0.4)**	**471 (1.4)**	
Benchmarking Participants							
Moscow City, Russian Fed.	24 (1.2)	586 (3.0)	43 (1.0)	566 (3.4)	33 (1.5)	554 (3.7)	9.8 (0.07)

Students Like Learning Physics

Physics	Very Much Like Learning Physics		Somewhat Like Learning Physics		Do Not Like Learning Physics		Average Scale Score
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Morocco	43 (1.1)	420 (3.5)	44 (0.9)	380 (2.9)	13 (0.7)	374 (3.7)	11.1 (0.05)
Lebanon	32 (1.4)	413 (5.4)	48 (1.2)	362 (5.5)	20 (1.0)	369 (8.1)	10.5 (0.07)
Kazakhstan	30 (1.1)	496 (3.9)	56 (1.1)	475 (3.7)	14 (0.8)	460 (5.2)	10.6 (0.04)
Georgia	30 (1.6)	474 (4.8)	46 (1.3)	439 (4.5)	25 (1.6)	438 (5.5)	10.3 (0.08)
Portugal	29 (1.4)	545 (3.8)	45 (1.2)	514 (3.4)	26 (1.7)	500 (4.2)	10.3 (0.08)
Cyprus	29 (1.1)	518 (3.0)	40 (1.0)	481 (2.7)	31 (1.2)	467 (3.5)	10.1 (0.06)
Russian Federation	29 (1.0)	560 (4.3)	50 (1.0)	541 (4.3)	22 (1.1)	528 (6.0)	10.3 (0.05)
Romania	17 (1.1)	509 (5.7)	48 (1.1)	465 (4.5)	34 (1.4)	465 (5.2)	9.7 (0.07)
Lithuania	16 (1.2)	561 (5.2)	42 (1.2)	534 (3.4)	42 (1.8)	525 (3.8)	9.4 (0.08)
Hungary	16 (1.1)	560 (5.3)	38 (1.0)	533 (3.2)	46 (1.7)	517 (3.1)	9.4 (0.07)
Sweden	16 (0.9)	573 (5.4)	43 (1.0)	530 (4.1)	42 (1.2)	510 (3.9)	9.5 (0.05)
France	14 (1.0)	520 (5.5)	47 (1.0)	493 (3.3)	39 (1.4)	473 (3.0)	9.5 (0.06)
Finland	13 (0.7)	600 (4.5)	38 (0.9)	549 (3.8)	49 (1.3)	525 (3.6)	9.2 (0.05)
International Average	**24 (0.3)**	**519 (1.3)**	**45 (0.3)**	**484 (1.1)**	**31 (0.4)**	**473 (1.3)**	
Benchmarking Participants							
Moscow City, Russian Fed.	24 (1.0)	585 (3.9)	47 (1.1)	567 (3.3)	29 (1.4)	551 (3.1)	10.1 (0.06)

Students Like Learning Earth Science

Earth Science	Very Much Like Learning Earth Science		Somewhat Like Learning Earth Science		Do Not Like Learning Earth Science		Average Scale Score
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Morocco	40 (0.9)	415 (3.3)	46 (0.6)	384 (2.9)	14 (0.9)	385 (4.7)	10.9 (0.05)
Portugal	38 (1.7)	534 (3.2)	47 (1.2)	515 (3.3)	15 (1.1)	505 (4.2)	10.7 (0.08)
Georgia	33 (1.7)	460 (5.3)	49 (1.3)	446 (3.9)	18 (1.2)	444 (8.1)	10.4 (0.07)
Kazakhstan	30 (1.3)	485 (4.5)	58 (1.2)	475 (3.7)	12 (0.8)	477 (7.2)	10.5 (0.05)
Romania r	29 (1.8)	492 (6.2)	52 (1.5)	462 (5.9)	19 (1.4)	473 (8.4)	10.3 (0.08)
Lithuania	23 (1.4)	544 (3.8)	48 (1.1)	532 (3.4)	29 (1.6)	532 (4.0)	9.8 (0.07)
Russian Federation	22 (1.0)	548 (5.2)	52 (1.0)	542 (4.1)	26 (0.9)	544 (5.8)	9.9 (0.05)
France	19 (1.0)	509 (4.5)	53 (1.1)	491 (3.0)	28 (1.4)	472 (3.7)	9.7 (0.06)
Cyprus	19 (0.8)	502 (4.0)	37 (1.1)	489 (3.4)	45 (1.1)	480 (2.8)	9.2 (0.05)
Finland	17 (0.8)	573 (3.7)	50 (0.9)	547 (3.9)	34 (1.1)	529 (3.3)	9.5 (0.05)
Hungary	16 (1.1)	544 (5.3)	39 (1.1)	525 (3.7)	45 (1.8)	529 (3.1)	9.2 (0.08)
Lebanon	- -	- -	- -	- -	- -	- -	- -
Sweden	- -	- -	- -	- -	- -	- -	- -
International Average	**26 (0.4)**	**510 (1.4)**	**48 (0.3)**	**492 (1.2)**	**26 (0.4)**	**488 (1.6)**	
Benchmarking Participants							
Moscow City, Russian Fed.	17 (1.1)	570 (4.7)	47 (1.3)	568 (3.5)	36 (1.8)	565 (3.4)	9.5 (0.08)

A dash (-) indicates comparable data not available.
An "r" indicates data are available for at least 70% but less than 85% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Students Confident in Mathematics and Science

Exhibit 11.7 presents the *Students Confident in Mathematics* scale, which contains nine statements about how well students think they can do mathematics (see Mathematics—About the Scale). Both fourth grade and eighth grade students responded to the scale and appear to have a good idea about their relative abilities. At both grades, students expressing confidence had substantially higher average achievement than those not expressing confidence.

Exhibit 11.8 presents the fourth grade results for the *Students Confident in Mathematics* scale. Thirty-two percent of the fourth grade students reported being "very confident," 44 percent "somewhat confident," and 23 percent "not confident." Exhibit 11.9 presents the eighth grade results. At the eighth grade, students' confidence had eroded, with only 15 percent reporting they are "very confident," 42 percent "somewhat confident," and 44 percent "not confident." The gap in average achievement between the "very confident" and "not confident" eighth grade students was more than 100 scale score points (562 vs. 456).

Exhibit 11.10 contains the corresponding confidence scale for science (see Science—About the Scale). Both fourth and eighth grade students responded, with the results at the fourth grade being similar to but slightly more positive than those in mathematics. As shown in Exhibit 11.11, 38 percent of the fourth grade students reported being "very confident," 43 percent "somewhat confident," and 19 percent "not confident."

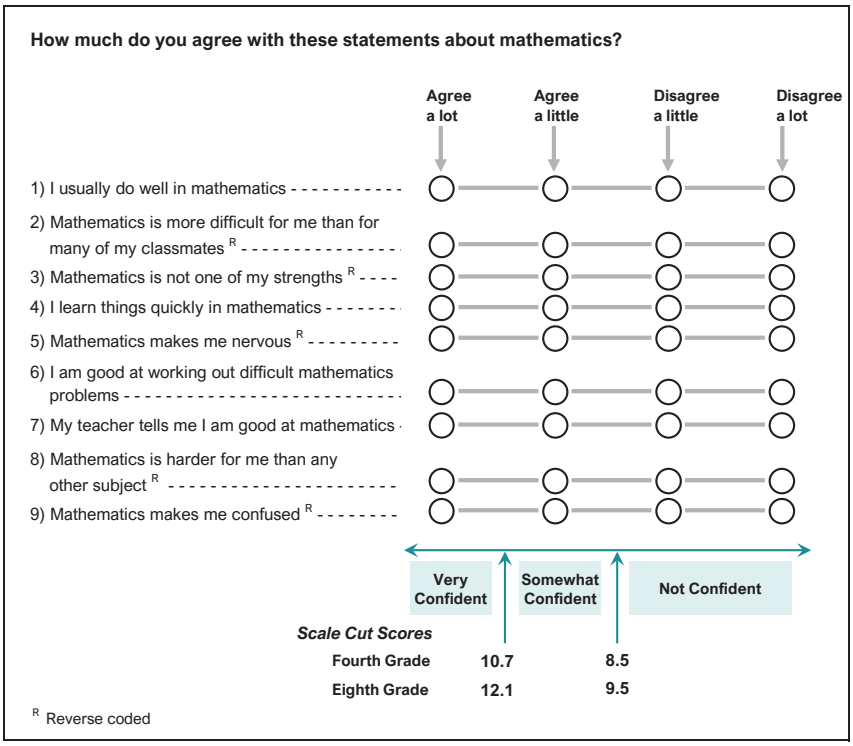
Exhibit 11.12 presents the eighth grade results for the *Students Confident in Science* scale. The first panel shows the results for countries that have science as an integrated subject, followed by the results for biology, chemistry, physics, and Earth science as separate courses. Eighth grade students did not report being as confident in doing science as did fourth grade students. However, relatively speaking, the eighth grade students expressed the most confidence in biology and Earth science, with 22–23 percent "very confident," 46 percent "somewhat confident," and 31–32 percent "not confident." Although less positive, the results also were similar for integrated science and chemistry—20–23 percent "very confident," 39 percent "somewhat confident," and 38–41 percent "not confident." Eighth grade students' confidence in physics was the lowest of the science results (and similar to mathematics). Only 17 percent reported "very confident," 38 percent "somewhat confident," and 44 percent "not confident."

Exhibit 11.7: Students Confident in Mathematics

Students' Reports

About the Scale

Students were scored according to their responses to nine statements on the *Students Confident in Mathematics* scale. Cut scores divide the scale into three categories. Students **Very Confident in Mathematics** had a score at or above the cut score corresponding to "agreeing a lot" with five of the nine statements and "agreeing a little" with the other four, on average. Students who were **Not Confident in Mathematics** had a score at or below the cut score corresponding to "disagreeing a little" with five of the nine statements and "agreeing a little" with the other four, on average. All other students were **Somewhat Confident in Mathematics**.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 11.8: Students Confident in Mathematics

Students' Reports

Country	Very Confident in Mathematics		Somewhat Confident in Mathematics		Not Confident in Mathematics		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Montenegro	52 (0.9)	485 (2.2)	35 (0.9)	431 (2.6)	14 (0.5)	394 (4.7)	11.1 (0.04)
Albania	52 (1.4)	524 (3.1)	37 (1.1)	476 (4.0)	12 (0.8)	426 (6.9)	11.0 (0.07)
Kosovo	51 (1.0)	473 (3.1)	38 (1.1)	430 (3.4)	11 (0.7)	381 (7.1)	11.0 (0.04)
North Macedonia	49 (1.5)	513 (5.1)	36 (1.3)	455 (6.0)	15 (0.9)	401 (7.7)	10.9 (0.06)
Cyprus	48 (1.2)	568 (2.7)	37 (0.9)	512 (2.8)	14 (0.8)	468 (4.6)	10.8 (0.06)
Azerbaijan	44 (1.3)	553 (2.8)	41 (1.1)	504 (3.2)	15 (0.8)	480 (3.9)	10.7 (0.05)
Bulgaria	44 (1.2)	553 (3.7)	37 (1.0)	506 (4.0)	19 (1.4)	455 (8.1)	10.5 (0.09)
Saudi Arabia	44 (1.2)	440 (3.6)	39 (0.9)	385 (3.7)	17 (0.8)	342 (6.1)	10.6 (0.05)
Armenia	43 (1.1)	528 (2.9)	40 (0.8)	492 (3.0)	17 (0.7)	459 (4.3)	10.6 (0.05)
Bosnia and Herzegovina	42 (0.9)	486 (2.6)	37 (0.7)	441 (3.0)	21 (0.8)	410 (3.0)	10.5 (0.05)
Bahrain	42 (1.4)	504 (3.1)	40 (1.0)	471 (2.8)	18 (1.0)	446 (3.3)	10.5 (0.07)
Kazakhstan	41 (1.4)	532 (2.8)	47 (1.2)	503 (2.9)	12 (0.7)	487 (4.8)	10.6 (0.06)
Georgia	40 (1.3)	511 (4.0)	44 (1.2)	472 (4.1)	16 (0.9)	431 (6.3)	10.4 (0.06)
Austria	39 (0.9)	573 (2.0)	40 (0.9)	531 (2.4)	20 (0.8)	493 (3.5)	10.3 (0.04)
Netherlands	38 (1.0)	574 (2.7)	41 (1.1)	529 (2.3)	21 (0.9)	488 (2.8)	10.3 (0.05)
Morocco	37 (1.2)	425 (4.3)	48 (1.1)	370 (5.7)	16 (0.8)	336 (6.7)	10.4 (0.05)
Norway (5)	37 (1.1)	581 (3.1)	46 (1.2)	534 (2.6)	18 (0.8)	496 (4.3)	10.3 (0.05)
Sweden	37 (1.3)	551 (3.6)	48 (1.1)	513 (3.2)	15 (0.8)	479 (4.1)	10.2 (0.06)
Hungary	36 (1.0)	571 (2.6)	42 (0.9)	512 (2.9)	22 (0.9)	468 (3.8)	10.2 (0.05)
Oman	36 (1.2)	479 (5.2)	46 (0.9)	418 (4.1)	18 (0.9)	378 (4.2)	10.3 (0.05)
Turkey (5)	34 (1.0)	575 (4.2)	42 (0.7)	513 (4.7)	23 (0.9)	468 (5.9)	10.1 (0.05)
Italy	34 (1.1)	537 (3.4)	46 (1.1)	513 (2.8)	20 (1.0)	483 (3.4)	10.2 (0.05)
Serbia	34 (1.2)	555 (3.4)	45 (1.2)	500 (3.7)	21 (1.2)	450 (4.5)	10.1 (0.07)
Iran, Islamic Rep. of	34 (1.1)	480 (4.7)	46 (1.1)	435 (4.1)	20 (1.2)	406 (6.1)	10.2 (0.06)
Germany	33 (0.9)	565 (2.7)	43 (1.0)	518 (2.4)	23 (1.1)	477 (3.1)	10.0 (0.04)
United Arab Emirates	33 (0.6)	514 (1.9)	44 (0.5)	478 (2.0)	22 (0.5)	448 (2.7)	10.2 (0.03)
Malta	33 (0.7)	547 (2.0)	41 (0.9)	504 (2.1)	26 (0.7)	468 (2.5)	10.0 (0.03)
France	33 (0.9)	524 (3.5)	46 (1.0)	483 (3.5)	21 (0.8)	428 (3.9)	10.0 (0.04)
Ireland	33 (0.7)	585 (3.0)	45 (1.0)	545 (3.0)	22 (0.9)	503 (3.3)	10.0 (0.03)
United States	32 (0.8)	587 (2.6)	42 (0.6)	533 (2.4)	26 (0.7)	482 (3.3)	10.0 (0.04)
Finland	32 (0.9)	573 (2.5)	50 (0.9)	524 (2.7)	17 (0.7)	481 (3.4)	10.1 (0.03)
Canada	32 (0.5)	555 (2.4)	45 (0.6)	506 (2.3)	24 (0.6)	464 (2.2)	10.0 (0.03)
England	31 (1.2)	607 (4.5)	45 (1.0)	549 (3.7)	24 (1.0)	506 (4.2)	9.9 (0.05)
Kuwait	31 (1.5)	432 (5.4)	44 (1.2)	383 (5.4)	25 (1.1)	347 (5.6)	10.0 (0.06)
Slovak Republic	31 (1.1)	550 (3.4)	47 (1.1)	506 (3.7)	22 (0.9)	463 (4.5)	9.9 (0.05)
Belgium (Flemish)	30 (0.7)	573 (2.3)	45 (0.9)	529 (2.3)	25 (0.8)	489 (2.7)	9.9 (0.03)
Croatia	30 (1.4)	550 (2.7)	50 (1.1)	503 (2.6)	20 (1.0)	467 (3.7)	10.0 (0.06)
Lithuania	29 (1.0)	590 (3.6)	51 (1.0)	535 (3.0)	20 (0.9)	492 (4.0)	9.9 (0.04)
Northern Ireland	29 (1.0)	613 (3.8)	45 (1.0)	569 (3.2)	26 (0.8)	510 (3.8)	9.8 (0.04)
Denmark	29 (0.9)	569 (2.8)	49 (1.1)	521 (2.6)	23 (0.8)	478 (2.8)	9.8 (0.03)
Australia	29 (0.8)	568 (3.4)	46 (0.8)	513 (3.2)	25 (0.9)	465 (3.2)	9.9 (0.04)
Qatar	28 (1.2)	491 (4.3)	43 (0.9)	447 (4.4)	28 (0.9)	418 (4.2)	9.9 (0.05)
Spain	27 (0.7)	550 (2.5)	43 (0.7)	502 (2.5)	30 (0.7)	463 (2.8)	9.7 (0.03)
Russian Federation	24 (0.9)	603 (3.4)	46 (1.1)	571 (3.1)	30 (1.1)	533 (4.4)	9.6 (0.04)
Latvia	23 (0.9)	595 (3.0)	45 (0.9)	551 (2.6)	31 (0.9)	503 (3.5)	9.5 (0.04)
Poland	23 (0.8)	571 (3.5)	47 (0.9)	526 (2.7)	30 (1.0)	476 (2.8)	9.5 (0.04)
Czech Republic	23 (1.0)	577 (3.5)	49 (0.8)	539 (2.6)	29 (1.0)	492 (3.2)	9.5 (0.04)
Portugal	22 (0.9)	580 (2.8)	43 (1.0)	532 (3.1)	36 (1.2)	485 (2.7)	9.5 (0.05)
Chile	22 (0.8)	495 (3.3)	46 (0.9)	441 (2.9)	33 (0.9)	411 (3.4)	9.5 (0.04)
Singapore	21 (0.9)	683 (2.9)	42 (0.8)	637 (3.9)	37 (1.2)	579 (3.4)	9.3 (0.05)
New Zealand	20 (0.6)	546 (3.6)	49 (0.9)	492 (2.6)	31 (0.9)	446 (3.2)	9.4 (0.03)
Hong Kong SAR	18 (0.8)	652 (4.2)	43 (1.1)	606 (3.6)	39 (1.2)	573 (3.7)	9.2 (0.05)
Pakistan	18 (3.1)	374 (19.2)	56 (2.2)	328 (10.5)	26 (2.3)	302 (12.6)	9.7 (0.17)
South Africa (5)	17 (0.7)	456 (4.9)	53 (0.5)	371 (3.6)	31 (0.9)	340 (3.7)	9.4 (0.03)
Japan	16 (0.6)	646 (3.3)	53 (0.9)	601 (2.0)	32 (0.9)	554 (2.3)	9.2 (0.03)
Chinese Taipei	15 (0.7)	650 (3.5)	41 (1.0)	610 (2.6)	44 (1.0)	572 (2.4)	9.0 (0.03)
Korea, Rep. of	15 (0.7)	651 (2.6)	49 (1.1)	614 (2.5)	36 (0.9)	559 (2.7)	9.2 (0.03)
Philippines	8 (0.7)	403 (9.9)	56 (1.0)	306 (6.0)	36 (1.2)	269 (6.7)	9.0 (0.04)
International Average	**32 (0.1)**	**545 (0.6)**	**44 (0.1)**	**497 (0.5)**	**23 (0.1)**	**456 (0.6)**	
Benchmarking Participants							
Quebec, Canada	39 (1.1)	568 (2.8)	44 (1.2)	521 (2.7)	17 (0.9)	476 (3.4)	10.3 (0.05)
Dubai, UAE	32 (0.9)	565 (2.5)	46 (0.9)	541 (2.3)	21 (0.8)	519 (3.0)	10.1 (0.04)
Ontario, Canada	29 (0.8)	558 (4.4)	45 (1.0)	509 (4.0)	26 (0.9)	470 (3.6)	9.8 (0.04)
Abu Dhabi, UAE	29 (0.9)	481 (2.7)	45 (0.7)	437 (2.6)	26 (0.6)	408 (3.5)	9.9 (0.04)
Madrid, Spain	28 (0.8)	562 (2.7)	45 (0.9)	516 (2.4)	27 (0.9)	477 (2.9)	9.8 (0.04)
Moscow City, Russian Fed.	27 (0.8)	630 (2.5)	46 (0.8)	596 (2.5)	27 (0.8)	550 (2.9)	9.7 (0.03)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 11.9: Students Confident in Mathematics

Students' Reports

Country	Very Confident in Mathematics		Somewhat Confident in Mathematics		Not Confident in Mathematics		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Israel	25 (1.1)	582 (5.4)	43 (0.9)	515 (4.4)	32 (1.2)	482 (4.1)	10.7 (0.07)
Egypt	23 (1.0)	459 (4.8)	49 (0.8)	413 (5.6)	28 (1.0)	385 (5.8)	10.8 (0.05)
Norway (9)	21 (0.8)	580 (2.9)	39 (1.1)	513 (2.8)	40 (1.0)	456 (2.7)	10.3 (0.05)
Lebanon	21 (1.0)	479 (4.2)	45 (1.1)	429 (3.0)	34 (1.3)	405 (4.0)	10.5 (0.06)
Cyprus	20 (0.7)	569 (3.1)	37 (0.9)	513 (2.8)	43 (0.9)	460 (3.0)	10.1 (0.04)
Jordan	20 (1.0)	478 (4.1)	47 (0.7)	420 (4.2)	32 (1.1)	392 (5.0)	10.6 (0.05)
United States	20 (0.8)	578 (5.0)	40 (0.7)	537 (4.5)	40 (1.0)	471 (4.2)	10.3 (0.05)
Iran, Islamic Rep. of	20 (0.7)	517 (5.9)	43 (1.0)	447 (4.6)	37 (1.0)	408 (3.8)	10.4 (0.04)
Bahrain	20 (0.7)	533 (3.6)	44 (0.8)	482 (2.5)	36 (0.9)	452 (2.8)	10.4 (0.04)
Saudi Arabia	19 (0.8)	444 (4.0)	49 (0.7)	395 (3.1)	32 (0.9)	366 (2.6)	10.5 (0.05)
United Arab Emirates	18 (0.5)	536 (2.9)	45 (0.4)	478 (2.2)	37 (0.4)	442 (2.3)	10.4 (0.02)
Italy	18 (0.7)	554 (3.9)	37 (1.0)	514 (2.9)	45 (1.2)	462 (2.9)	9.9 (0.06)
Oman	17 (0.7)	486 (4.5)	50 (0.8)	411 (3.2)	33 (0.8)	380 (2.9)	10.5 (0.04)
Hungary	16 (0.6)	609 (4.1)	39 (0.8)	530 (3.5)	45 (1.0)	471 (3.1)	10.0 (0.05)
Sweden	16 (0.8)	578 (3.1)	43 (0.9)	516 (2.8)	41 (1.1)	461 (2.9)	10.1 (0.05)
Turkey	15 (0.7)	600 (5.6)	35 (0.9)	513 (5.2)	50 (1.0)	453 (4.0)	9.8 (0.05)
Georgia	15 (0.9)	537 (6.1)	44 (1.2)	473 (4.3)	41 (1.4)	422 (4.8)	10.2 (0.06)
Ireland	15 (0.7)	584 (3.6)	44 (1.1)	533 (3.1)	41 (1.3)	495 (2.2)	10.0 (0.05)
Finland	15 (0.7)	586 (3.3)	40 (0.7)	523 (2.9)	45 (1.0)	473 (2.4)	10.0 (0.04)
Morocco	15 (0.6)	440 (3.6)	47 (0.6)	390 (2.6)	39 (0.9)	368 (2.1)	10.2 (0.04)
England	14 (0.9)	588 (6.6)	49 (1.0)	528 (5.7)	38 (1.3)	480 (5.2)	10.1 (0.05)
Australia	14 (0.6)	594 (5.1)	42 (0.8)	540 (4.3)	44 (1.0)	474 (3.3)	9.9 (0.05)
France	13 (0.7)	556 (3.8)	42 (0.9)	498 (3.0)	45 (1.1)	446 (2.4)	9.8 (0.05)
Lithuania	13 (0.7)	604 (4.1)	42 (0.9)	535 (4.1)	45 (1.2)	484 (2.9)	9.9 (0.05)
Qatar	13 (0.9)	516 (7.5)	44 (1.1)	455 (4.5)	43 (1.2)	413 (3.9)	10.0 (0.06)
Kazakhstan	13 (0.7)	539 (4.5)	54 (1.2)	494 (3.7)	34 (1.3)	459 (3.6)	10.3 (0.05)
Singapore	12 (0.5)	679 (3.5)	40 (0.8)	637 (3.6)	48 (0.9)	582 (5.0)	9.7 (0.04)
Kuwait	12 (0.6)	466 (7.6)	43 (0.8)	408 (5.5)	45 (0.9)	385 (4.5)	9.9 (0.04)
Russian Federation	12 (0.7)	609 (5.3)	44 (0.9)	563 (4.3)	45 (0.9)	508 (5.1)	9.9 (0.04)
Portugal	11 (0.7)	580 (5.6)	34 (1.1)	525 (3.3)	55 (1.2)	469 (3.4)	9.5 (0.05)
Romania	10 (0.7)	579 (5.9)	31 (1.0)	510 (5.6)	58 (1.2)	446 (4.2)	9.4 (0.05)
New Zealand	10 (0.6)	569 (4.6)	44 (0.9)	502 (3.8)	45 (0.7)	445 (3.6)	9.8 (0.04)
Chile	10 (0.6)	509 (5.1)	41 (1.1)	452 (3.2)	49 (1.3)	418 (2.9)	9.7 (0.04)
Chinese Taipei	9 (0.4)	706 (5.4)	31 (0.7)	656 (3.2)	59 (0.8)	575 (2.6)	9.2 (0.04)
Hong Kong SAR	9 (0.7)	646 (7.3)	37 (1.0)	600 (4.5)	54 (1.1)	554 (4.3)	9.4 (0.05)
Korea, Rep. of	8 (0.5)	695 (4.8)	38 (0.8)	644 (3.8)	54 (0.9)	567 (2.7)	9.5 (0.03)
South Africa (9)	7 (0.3)	468 (4.2)	40 (0.5)	396 (2.6)	53 (0.6)	376 (2.1)	9.6 (0.02)
Japan	6 (0.4)	688 (5.8)	33 (0.8)	629 (3.1)	61 (0.9)	567 (2.9)	9.1 (0.04)
Malaysia	3 (0.3)	584 (10.5)	33 (0.8)	478 (4.6)	64 (0.9)	448 (2.7)	9.2 (0.03)
International Average	**15 (0.1)**	**562 (0.8)**	**42 (0.1)**	**502 (0.6)**	**44 (0.2)**	**456 (0.6)**	
Benchmarking Participants							
Ontario, Canada	27 (1.0)	587 (3.8)	43 (1.1)	536 (5.8)	30 (1.1)	472 (4.0)	10.8 (0.06)
Quebec, Canada	25 (1.4)	592 (3.4)	41 (1.3)	548 (4.2)	34 (1.5)	503 (4.2)	10.6 (0.08)
Dubai, UAE	21 (0.9)	591 (4.2)	46 (0.8)	539 (2.5)	33 (0.7)	500 (2.6)	10.5 (0.04)
Moscow City, Russian Fed.	14 (0.6)	640 (4.7)	45 (1.1)	599 (4.4)	40 (1.2)	526 (3.7)	10.0 (0.05)
Abu Dhabi, UAE	14 (0.6)	516 (4.0)	45 (0.7)	441 (3.6)	41 (0.8)	407 (3.3)	10.2 (0.04)
Western Cape, RSA (9)	9 (0.7)	536 (7.6)	36 (1.0)	459 (5.3)	55 (1.4)	416 (3.8)	9.5 (0.06)
Gauteng, RSA (9)	8 (0.7)	501 (7.3)	38 (0.9)	430 (3.0)	54 (1.1)	403 (3.0)	9.5 (0.05)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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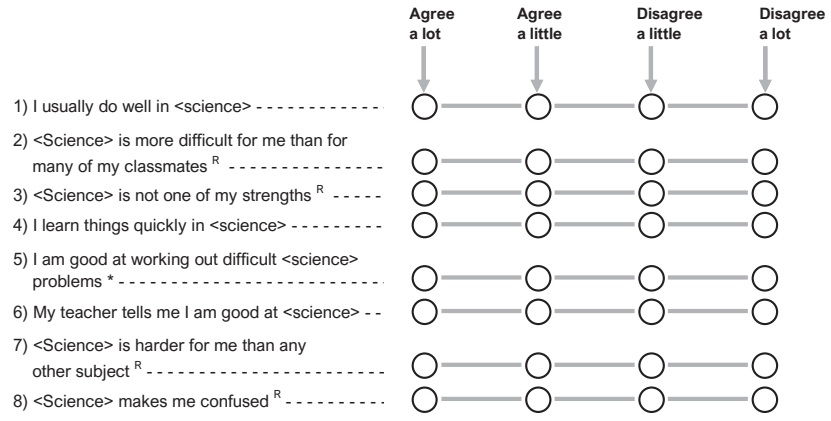
Exhibit 11.10: Students Confident in Science

Students' Reports

About the Scale

Students were scored according to their responses to eight statements on the *Students Confident in Science* scale. Cut scores divide the scale into three categories. Students **Very Confident in Science** had a score at or above the cut score corresponding to "agreeing a lot" with four of the eight statements and "agreeing a little" with the other four, on average. Students who were **Not Confident in Science** had a score at or below the cut score corresponding to "disagreeing a little" with four of the eight statements and "agreeing a little" with the other four, on average. All other students were **Somewhat Confident in Science**. At the eighth grade, a comparable approach was used for biology, chemistry, physics, and Earth science in countries where these were taught as separate subjects.

How much do you agree with these statements about <science / biology / chemistry / physics / earth science>?



Scale Cut Scores		
Fourth Grade	**10.2**	**8.2**
Eighth Grade		
General/Integrated Science	**11.3**	**9.2**
Biology	**11.3**	**8.8**
Chemistry	**11.5**	**9.3**
Physics	**11.7**	**9.5**
Earth Science	**11.4**	**8.9**

R Reverse coded

* Item not included in scale at the fourth grade

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit 11.11: Students Confident in Science

Students' Reports

Country	Very Confident in Science		Somewhat Confident in Science		Not Confident in Science		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	60 (1.6)	509 (3.7)	30 (1.4)	474 (5.0)	9 (0.7)	428 (9.0)	10.9 (0.07)
Bulgaria	58 (1.8)	555 (3.9)	30 (1.1)	499 (6.5)	12 (1.1)	443 (8.3)	10.7 (0.08)
Iran, Islamic Rep. of	57 (1.4)	472 (4.2)	30 (1.0)	416 (5.5)	13 (1.0)	374 (7.5)	10.7 (0.06)
Bahrain	57 (1.3)	521 (3.2)	30 (0.9)	473 (4.0)	13 (0.7)	430 (6.3)	10.8 (0.06)
Montenegro	53 (1.1)	482 (2.8)	30 (0.8)	443 (3.2)	17 (0.7)	403 (4.5)	10.5 (0.04)
Saudi Arabia	51 (1.2)	444 (3.7)	32 (1.0)	386 (5.6)	16 (0.9)	341 (7.7)	10.5 (0.06)
Turkey (5)	50 (1.4)	556 (3.8)	36 (1.0)	510 (4.6)	14 (0.9)	470 (7.0)	10.4 (0.06)
Oman	50 (1.4)	480 (5.2)	35 (1.1)	412 (4.4)	15 (0.8)	363 (6.3)	10.5 (0.06)
Austria	49 (1.1)	544 (2.7)	37 (1.0)	511 (3.0)	13 (0.7)	474 (4.8)	10.4 (0.04)
North Macedonia	49 (2.0)	471 (5.1)	35 (1.7)	403 (7.1)	16 (0.9)	365 (8.2)	10.4 (0.08)
Azerbaijan	48 (1.4)	457 (3.2)	36 (1.2)	422 (3.8)	16 (0.8)	395 (6.0)	10.3 (0.06)
Armenia	47 (1.3)	490 (3.3)	36 (1.1)	462 (4.2)	17 (0.8)	436 (5.8)	10.3 (0.06)
Kosovo	47 (1.2)	444 (3.9)	37 (1.0)	404 (4.2)	16 (0.9)	361 (7.0)	10.3 (0.05)
United Arab Emirates	46 (0.6)	505 (2.5)	36 (0.5)	465 (2.5)	17 (0.4)	417 (3.2)	10.3 (0.03)
Kuwait	46 (1.4)	435 (6.7)	36 (0.9)	384 (6.7)	18 (0.9)	338 (9.0)	10.3 (0.06)
Bosnia and Herzegovina	46 (0.9)	482 (3.3)	36 (0.7)	451 (3.5)	19 (0.7)	425 (4.3)	10.2 (0.04)
Morocco	46 (1.2)	416 (4.9)	39 (0.8)	355 (7.9)	15 (0.8)	305 (9.0)	10.3 (0.05)
Hungary	45 (1.2)	553 (2.6)	39 (0.8)	520 (3.2)	16 (0.8)	484 (5.1)	10.2 (0.05)
Georgia	44 (1.4)	472 (4.3)	38 (1.1)	448 (5.3)	19 (1.1)	423 (6.1)	10.1 (0.06)
Kazakhstan	43 (1.4)	511 (3.9)	46 (1.1)	485 (3.4)	11 (0.7)	479 (5.4)	10.2 (0.06)
Portugal	43 (1.2)	522 (2.8)	44 (1.0)	499 (2.8)	13 (0.6)	463 (4.0)	10.1 (0.04)
Qatar	42 (1.4)	488 (3.9)	38 (1.0)	441 (6.2)	20 (1.0)	395 (5.6)	10.1 (0.06)
Malta	42 (0.9)	521 (2.1)	38 (0.8)	488 (2.4)	20 (0.7)	457 (3.0)	9.9 (0.03)
Norway (5)	41 (1.1)	557 (2.4)	46 (1.1)	535 (3.0)	12 (0.8)	511 (5.0)	10.0 (0.04)
Germany r	40 (1.1)	551 (2.8)	44 (0.8)	517 (3.1)	17 (0.9)	471 (4.6)	9.9 (0.04)
Cyprus	39 (1.5)	535 (3.1)	37 (1.1)	504 (2.9)	23 (1.1)	485 (4.6)	9.9 (0.07)
Italy	39 (1.0)	522 (3.8)	46 (0.9)	509 (3.1)	15 (0.9)	483 (4.5)	10.0 (0.04)
Croatia	39 (1.2)	541 (2.5)	49 (1.2)	518 (2.4)	12 (0.9)	496 (4.9)	10.0 (0.05)
United States	38 (0.9)	565 (2.7)	42 (0.7)	540 (2.9)	20 (0.7)	500 (4.4)	9.8 (0.04)
Belgium (Flemish)	37 (1.1)	521 (2.5)	45 (0.9)	498 (2.5)	18 (0.8)	467 (3.5)	9.8 (0.05)
Serbia	37 (1.4)	540 (4.0)	47 (1.2)	515 (4.1)	17 (1.0)	476 (6.7)	9.9 (0.06)
Sweden	36 (1.5)	552 (4.0)	49 (1.1)	538 (3.2)	14 (0.9)	504 (6.5)	9.8 (0.06)
Spain	35 (1.1)	535 (2.7)	41 (1.0)	508 (2.2)	23 (1.0)	486 (3.4)	9.8 (0.05)
Canada	35 (0.7)	540 (2.4)	46 (0.7)	523 (2.1)	19 (0.7)	498 (2.5)	9.7 (0.03)
Ireland	35 (0.9)	542 (4.0)	48 (0.9)	529 (3.9)	18 (0.9)	502 (4.4)	9.7 (0.04)
Slovak Republic	33 (1.2)	546 (3.4)	46 (1.0)	519 (4.1)	21 (0.9)	487 (6.9)	9.6 (0.05)
Netherlands	32 (1.1)	541 (3.7)	48 (1.0)	519 (3.1)	19 (1.0)	486 (3.8)	9.6 (0.05)
Australia	32 (1.1)	553 (3.0)	47 (0.9)	532 (2.8)	21 (0.9)	508 (4.1)	9.6 (0.04)
Poland	32 (1.2)	553 (3.3)	49 (0.9)	531 (2.8)	19 (0.8)	503 (3.6)	9.6 (0.05)
Chinese Taipei	31 (1.0)	583 (2.2)	51 (0.9)	556 (2.1)	18 (1.0)	522 (3.4)	9.6 (0.04)
Latvia	31 (1.1)	559 (2.8)	51 (1.1)	540 (2.8)	18 (1.0)	520 (3.7)	9.6 (0.04)
Russian Federation	29 (1.0)	583 (3.1)	46 (1.1)	567 (3.5)	24 (0.9)	550 (3.5)	9.5 (0.05)
Lithuania	29 (1.2)	564 (3.0)	52 (1.0)	533 (3.1)	19 (1.0)	516 (4.3)	9.6 (0.05)
Northern Ireland	29 (1.0)	536 (3.1)	49 (0.9)	523 (2.9)	22 (0.8)	487 (4.1)	9.4 (0.04)
Denmark	29 (1.2)	545 (3.3)	50 (1.1)	522 (2.6)	21 (1.0)	493 (3.2)	9.5 (0.05)
England	28 (1.0)	559 (4.2)	47 (1.0)	538 (3.2)	25 (1.2)	516 (3.9)	9.4 (0.05)
Finland	27 (0.8)	573 (3.4)	57 (0.9)	555 (2.6)	16 (0.7)	525 (4.0)	9.5 (0.03)
France	27 (0.9)	517 (3.8)	48 (1.0)	492 (3.3)	25 (1.0)	451 (4.1)	9.4 (0.04)
Japan	27 (0.9)	582 (2.7)	59 (0.8)	558 (1.9)	14 (0.7)	540 (3.7)	9.5 (0.03)
Czech Republic	25 (1.0)	560 (3.9)	50 (1.0)	535 (3.3)	25 (1.2)	507 (2.9)	9.3 (0.05)
South Africa (5)	23 (0.8)	421 (6.3)	47 (0.7)	317 (5.4)	30 (0.7)	274 (5.2)	9.3 (0.03)
Singapore	23 (0.6)	626 (3.6)	44 (0.7)	599 (3.6)	33 (0.7)	567 (3.9)	9.1 (0.03)
Pakistan	23 (3.2)	333 (19.9)	49 (2.3)	289 (14.4)	28 (3.5)	262 (14.1)	9.4 (0.16)
Chile	23 (1.0)	508 (3.8)	48 (0.8)	473 (2.8)	30 (0.9)	439 (3.6)	9.2 (0.04)
Hong Kong SAR	23 (0.9)	562 (3.9)	49 (1.1)	532 (3.5)	29 (1.2)	506 (4.9)	9.2 (0.05)
New Zealand	21 (0.7)	529 (3.3)	53 (0.9)	508 (2.7)	26 (0.8)	476 (3.3)	9.2 (0.03)
Korea, Rep. of	17 (0.8)	620 (3.1)	59 (1.1)	587 (2.6)	23 (1.0)	564 (3.2)	9.1 (0.03)
Philippines	10 (0.9)	372 (10.6)	52 (0.9)	258 (7.2)	38 (1.2)	212 (7.4)	8.8 (0.04)
International Average	**38 (0.2)**	**520 (0.6)**	**43 (0.1)**	**486 (0.6)**	**19 (0.1)**	**453 (0.7)**	
Benchmarking Participants							
Dubai, UAE	48 (0.9)	559 (2.0)	38 (0.9)	537 (2.9)	13 (0.5)	516 (4.3)	10.3 (0.03)
Abu Dhabi, UAE	37 (1.0)	462 (4.1)	39 (0.7)	412 (3.4)	24 (0.8)	369 (4.3)	9.9 (0.04)
Quebec, Canada r	36 (1.1)	537 (3.4)	47 (1.2)	519 (3.0)	17 (1.0)	496 (3.5)	9.8 (0.05)
Madrid, Spain	34 (1.1)	546 (2.5)	41 (1.0)	521 (2.7)	25 (0.9)	496 (3.1)	9.6 (0.05)
Moscow City, Russian Fed.	33 (1.2)	606 (3.2)	45 (0.9)	599 (2.6)	22 (1.0)	571 (3.7)	9.6 (0.04)
Ontario, Canada	32 (1.1)	541 (4.6)	46 (1.1)	527 (3.2)	22 (1.1)	501 (4.0)	9.6 (0.05)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

An "r" indicates data are available for at least 70% but less than 85% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 11.12: Students Confident in Science

Students' Reports

The general/integrated science panel summarizes responses for countries where students are enrolled in science as a single subject. The following panels for biology, chemistry, physics, and Earth science summarize responses for countries where students are taught science as separate subjects.

Students Confident in General/Integrated Science

General/Integrated Science	Very Confident in Science		Somewhat Confident in Science		Not Confident in Science		Average Scale Score
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Iran, Islamic Rep. of	38 (1.1)	490 (3.9)	40 (0.9)	434 (4.3)	22 (0.9)	407 (4.0)	11.0 (0.06)
Turkey	38 (1.2)	569 (3.5)	37 (0.8)	502 (4.2)	25 (1.0)	455 (4.5)	10.9 (0.06)
Jordan	37 (1.4)	502 (3.6)	38 (0.6)	448 (4.5)	25 (1.3)	400 (5.8)	11.0 (0.07)
Bahrain	36 (1.3)	531 (2.4)	38 (0.7)	487 (3.8)	26 (1.0)	432 (4.1)	10.8 (0.06)
Egypt	35 (1.1)	445 (5.1)	38 (0.7)	384 (5.7)	27 (1.1)	343 (6.8)	10.8 (0.06)
Saudi Arabia	33 (1.0)	474 (3.4)	42 (0.8)	425 (3.1)	25 (1.0)	399 (3.7)	10.7 (0.05)
Israel	31 (1.2)	568 (4.4)	37 (0.9)	513 (4.3)	32 (1.2)	471 (5.0)	10.5 (0.06)
Kuwait	31 (1.3)	490 (5.1)	42 (0.7)	440 (5.6)	27 (1.2)	410 (7.6)	10.6 (0.06)
Oman	29 (1.0)	516 (4.1)	46 (0.8)	457 (3.5)	26 (0.7)	408 (4.3)	10.6 (0.04)
United Arab Emirates	29 (0.6)	541 (2.6)	41 (0.6)	476 (2.7)	30 (0.5)	413 (2.9)	10.5 (0.03)
Qatar	28 (1.3)	527 (4.7)	39 (1.1)	480 (4.6)	33 (1.2)	427 (5.2)	10.4 (0.06)
United States	26 (0.9)	570 (5.4)	41 (0.7)	528 (4.9)	33 (0.9)	487 (4.5)	10.2 (0.04)
Norway (9)	24 (0.9)	548 (4.1)	43 (0.8)	503 (3.0)	34 (1.1)	454 (4.2)	10.1 (0.04)
Italy	23 (1.0)	536 (3.6)	50 (1.1)	501 (2.5)	27 (1.1)	471 (3.6)	10.2 (0.04)
Ireland	19 (0.9)	581 (3.7)	36 (1.1)	543 (3.1)	45 (1.3)	492 (3.3)	9.6 (0.06)
South Africa (9)	18 (0.6)	425 (4.0)	45 (0.5)	370 (3.5)	37 (0.8)	349 (3.1)	9.9 (0.03)
Singapore	17 (0.6)	652 (3.9)	37 (0.8)	621 (4.2)	46 (1.0)	581 (4.1)	9.6 (0.04)
Australia	16 (0.7)	586 (4.2)	39 (0.8)	543 (3.3)	45 (1.1)	499 (3.6)	9.6 (0.05)
England	15 (1.0)	581 (6.9)	38 (1.2)	539 (4.6)	48 (1.7)	488 (5.5)	9.4 (0.07)
New Zealand	12 (0.7)	567 (5.5)	40 (1.0)	517 (4.5)	47 (1.2)	470 (4.0)	9.5 (0.04)
Chile	12 (0.8)	511 (5.4)	45 (1.1)	469 (3.2)	43 (1.4)	445 (3.2)	9.6 (0.04)
Hong Kong SAR	11 (0.6)	566 (6.2)	38 (1.1)	527 (5.8)	50 (1.2)	472 (6.3)	9.4 (0.05)
Chinese Taipei	10 (0.5)	645 (3.5)	27 (0.7)	609 (2.7)	63 (0.9)	548 (2.1)	8.9 (0.04)
Korea, Rep. of	9 (0.5)	639 (4.9)	25 (0.9)	602 (2.9)	65 (1.1)	533 (2.2)	8.9 (0.04)
Malaysia	8 (0.4)	523 (5.0)	47 (0.9)	469 (3.7)	45 (1.1)	441 (4.0)	9.5 (0.03)
Japan	6 (0.4)	636 (3.9)	28 (0.8)	601 (2.8)	66 (0.9)	550 (2.3)	8.7 (0.04)
International Average	**23 (0.2)**	**547 (0.9)**	**39 (0.2)**	**500 (0.8)**	**38 (0.2)**	**456 (0.9)**	
Benchmarking Participants							
Dubai, UAE	32 (1.5)	588 (3.8)	44 (1.4)	546 (2.9)	25 (0.7)	500 (3.5)	10.7 (0.06)
Quebec, Canada	25 (1.1)	570 (4.2)	46 (1.1)	542 (3.7)	29 (1.5)	503 (4.9)	10.2 (0.07)
Abu Dhabi, UAE	22 (0.8)	524 (4.2)	39 (0.6)	423 (4.5)	38 (0.9)	363 (4.7)	10.2 (0.04)
Gauteng, RSA (9)	22 (1.0)	463 (5.3)	44 (0.7)	421 (4.0)	34 (1.2)	401 (5.2)	10.1 (0.05)
Ontario, Canada	21 (1.2)	561 (4.6)	43 (1.3)	527 (3.3)	36 (1.3)	493 (3.5)	10.0 (0.06)
Western Cape, RSA (9)	16 (0.8)	494 (7.3)	42 (0.9)	443 (5.5)	42 (1.2)	421 (5.1)	9.7 (0.05)

Separate Science Results

Students Confident in Biology

Biology	Very Confident in Biology		Somewhat Confident in Biology		Not Confident in Biology		Average Scale Score
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Georgia	30 (1.4)	481 (4.9)	41 (1.2)	444 (4.2)	28 (1.4)	423 (5.4)	10.4 (0.07)
Hungary	28 (1.3)	560 (3.6)	45 (1.0)	527 (3.1)	26 (1.3)	504 (4.3)	10.3 (0.07)
Cyprus	27 (1.0)	529 (2.7)	35 (1.0)	487 (3.0)	38 (1.2)	455 (2.9)	9.9 (0.06)
Lebanon	27 (1.3)	436 (7.0)	40 (1.0)	372 (5.9)	33 (1.3)	344 (5.7)	10.2 (0.07)
Romania	24 (1.2)	506 (4.7)	46 (1.1)	467 (4.6)	30 (1.4)	453 (5.5)	10.1 (0.07)
Morocco	24 (1.0)	442 (4.0)	44 (0.8)	390 (3.1)	32 (0.9)	370 (3.0)	10.1 (0.05)
Kazakhstan	24 (1.1)	502 (4.6)	55 (1.0)	476 (3.3)	21 (1.1)	458 (4.7)	10.3 (0.05)
Portugal	22 (1.1)	559 (4.1)	50 (1.1)	522 (2.8)	28 (1.3)	487 (4.1)	10.0 (0.06)
Russian Federation	21 (1.0)	559 (5.8)	51 (0.8)	546 (4.3)	28 (1.1)	526 (4.6)	10.0 (0.06)
Lithuania	19 (1.0)	567 (3.4)	49 (1.2)	533 (3.2)	32 (1.6)	517 (4.8)	9.8 (0.07)
Sweden	18 (0.9)	579 (4.9)	51 (1.0)	532 (3.7)	31 (1.2)	491 (4.4)	9.8 (0.05)
Finland	17 (0.9)	593 (3.4)	51 (0.8)	553 (3.4)	31 (1.0)	508 (4.1)	9.8 (0.05)
France	13 (0.6)	539 (4.7)	46 (1.3)	498 (3.1)	41 (1.5)	462 (3.1)	9.3 (0.06)
International Average	**23 (0.3)**	**527 (1.3)**	**46 (0.3)**	**488 (1.0)**	**31 (0.4)**	**461 (1.2)**	
Benchmarking Participants							
Moscow City, Russian Fed.	21 (1.2)	580 (3.9)	48 (1.1)	567 (3.3)	31 (1.3)	559 (4.2)	9.9 (0.06)

This TIMSS context questionnaire scale for general/integrated science was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011 where science is taught as a single subject. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution. The separate scales for biology, chemistry, physics, and Earth science were each established in 2019 using a comparable approach.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 11.12: Students Confident in Science

Students' Reports

Separate Science Results (Continued)

Students Confident in Chemistry

Chemistry	Very Confident in Chemistry		Somewhat Confident in Chemistry		Not Confident in Chemistry		Average Scale Score
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Cyprus	38 (1.2)	518 (2.9)	36 (1.1)	484 (2.9)	25 (1.0)	446 (3.0)	11.0 (0.05)
Lebanon	31 (1.5)	428 (5.8)	40 (1.1)	368 (5.5)	30 (1.3)	346 (7.0)	10.7 (0.07)
Georgia	25 (1.3)	493 (4.7)	35 (1.1)	451 (4.7)	40 (1.5)	422 (4.4)	10.2 (0.07)
Morocco	23 (0.9)	444 (4.1)	44 (0.7)	390 (3.2)	34 (0.9)	371 (2.7)	10.4 (0.04)
Kazakhstan	20 (0.9)	511 (4.2)	46 (1.0)	479 (3.5)	34 (1.3)	460 (4.5)	10.2 (0.05)
Lithuania	18 (1.0)	579 (4.1)	40 (1.0)	538 (3.9)	42 (1.6)	513 (3.5)	9.8 (0.07)
Portugal	17 (1.0)	571 (4.6)	38 (1.3)	526 (3.2)	45 (1.8)	495 (3.3)	9.8 (0.07)
Sweden	17 (0.9)	581 (6.3)	42 (1.1)	537 (3.9)	41 (1.3)	493 (3.8)	9.9 (0.05)
Russian Federation	17 (0.8)	577 (5.1)	36 (0.9)	550 (4.7)	48 (1.1)	527 (4.4)	9.7 (0.05)
Romania	16 (1.0)	521 (5.7)	33 (1.1)	478 (5.0)	51 (1.5)	454 (4.7)	9.6 (0.06)
Finland	15 (0.9)	613 (3.1)	36 (0.9)	562 (3.5)	48 (1.2)	515 (3.2)	9.6 (0.05)
Hungary	14 (0.8)	575 (5.5)	35 (1.1)	530 (3.0)	51 (1.5)	518 (3.4)	9.5 (0.07)
France	12 (0.8)	549 (4.4)	38 (1.1)	501 (3.6)	49 (1.6)	465 (2.9)	9.5 (0.06)
International Average	**20 (0.3)**	**535 (1.3)**	**39 (0.3)**	**492 (1.1)**	**41 (0.4)**	**463 (1.1)**	
Benchmarking Participants							
Moscow City, Russian Fed.	15 (0.9)	598 (4.3)	34 (0.9)	575 (3.1)	50 (1.3)	552 (3.3)	9.5 (0.06)

Students Confident in Physics

Physics	Very Confident in Physics		Somewhat Confident in Physics		Not Confident in Physics		Average Scale Score
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Lebanon	25 (1.3)	435 (5.9)	38 (0.9)	372 (5.7)	36 (1.4)	352 (6.0)	10.6 (0.07)
Cyprus	24 (1.0)	533 (3.3)	31 (1.0)	491 (2.8)	45 (1.2)	460 (3.0)	10.1 (0.06)
Morocco	23 (0.9)	443 (4.1)	44 (0.7)	390 (2.9)	33 (0.9)	374 (3.1)	10.6 (0.04)
Kazakhstan	19 (0.9)	512 (5.2)	49 (1.0)	478 (3.3)	32 (1.2)	461 (4.1)	10.3 (0.05)
Hungary	18 (1.0)	582 (4.5)	37 (1.0)	534 (3.2)	45 (1.5)	506 (3.3)	10.0 (0.06)
Georgia	18 (1.1)	497 (5.3)	36 (1.1)	456 (5.0)	46 (1.4)	427 (4.0)	10.0 (0.06)
Portugal	17 (1.0)	571 (4.6)	38 (1.3)	526 (3.2)	45 (1.8)	495 (3.3)	10.0 (0.08)
Russian Federation	17 (0.8)	572 (6.2)	45 (1.0)	548 (3.7)	38 (1.1)	526 (4.9)	10.2 (0.04)
Sweden	16 (0.9)	592 (5.3)	43 (0.9)	541 (3.6)	42 (1.1)	491 (3.9)	10.0 (0.04)
Finland	13 (0.7)	613 (3.6)	35 (1.0)	560 (3.9)	52 (1.3)	516 (3.7)	9.6 (0.05)
France	12 (0.8)	549 (4.4)	38 (1.1)	501 (3.6)	50 (1.6)	465 (2.9)	9.6 (0.06)
Romania	12 (0.7)	529 (6.2)	34 (1.1)	476 (5.2)	54 (1.3)	458 (4.3)	9.6 (0.05)
Lithuania	11 (0.7)	589 (4.8)	32 (1.1)	543 (3.5)	57 (1.5)	520 (3.5)	9.4 (0.06)
International Average	**17 (0.3)**	**540 (1.4)**	**38 (0.3)**	**494 (1.1)**	**44 (0.4)**	**465 (1.1)**	
Benchmarking Participants							
Moscow City, Russian Fed.	17 (0.9)	601 (4.2)	41 (0.9)	573 (3.4)	42 (1.2)	547 (3.1)	10.0 (0.05)

Students Confident in Earth Science

Earth Science	Very Confident in Earth Science		Somewhat Confident in Earth Science		Not Confident in Earth Science		Average Scale Score
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Cyprus	30 (1.0)	522 (2.8)	37 (1.1)	489 (2.9)	33 (1.1)	456 (3.3)	10.2 (0.05)
Georgia	25 (1.5)	493 (4.5)	42 (1.3)	451 (4.4)	33 (1.7)	418 (5.3)	10.1 (0.07)
Hungary	25 (1.2)	563 (4.1)	42 (1.0)	526 (3.0)	33 (1.4)	510 (3.5)	10.0 (0.08)
Romania r	24 (1.6)	509 (6.4)	46 (1.2)	470 (5.9)	31 (1.8)	450 (6.8)	10.2 (0.08)
Russian Federation	23 (0.8)	560 (5.1)	51 (0.9)	546 (3.9)	26 (0.9)	524 (5.2)	10.2 (0.04)
Kazakhstan	23 (1.0)	505 (4.7)	54 (1.0)	477 (3.5)	22 (1.0)	454 (4.9)	10.2 (0.05)
Portugal	22 (1.1)	559 (4.1)	50 (1.1)	522 (2.8)	28 (1.3)	487 (4.1)	10.0 (0.06)
Lithuania	21 (1.1)	564 (3.6)	45 (1.1)	534 (3.2)	34 (1.5)	516 (4.1)	9.9 (0.07)
Morocco	21 (0.9)	440 (4.2)	43 (0.7)	393 (3.2)	35 (0.8)	376 (2.8)	10.0 (0.05)
Finland	18 (0.8)	588 (3.5)	50 (0.9)	554 (3.2)	31 (1.1)	508 (4.0)	9.9 (0.04)
France	13 (0.6)	539 (4.6)	46 (1.3)	498 (3.1)	41 (1.5)	462 (3.1)	9.4 (0.06)
Lebanon	- -	- -	- -	- -	- -	- -	- -
Sweden	- -	- -	- -	- -	- -	- -	- -
International Average	**22 (0.3)**	**531 (1.3)**	**46 (0.3)**	**496 (1.1)**	**32 (0.4)**	**469 (1.3)**	
Benchmarking Participants							
Moscow City, Russian Fed.	24 (1.2)	584 (4.5)	49 (1.0)	568 (3.0)	27 (1.2)	551 (4.2)	10.1 (0.06)

A dash (-) indicates comparable data not available.
An "r" indicates data are available for at least 70% but less than 85% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Students Value Mathematics and Science

Exhibits 11.13 and 11.15 present the two parallel scales: *Students Value Mathematics* and *Students Value Science*, respectively (see About the Scale). The TIMSS 2019 context questionnaire framework cites research showing that if students understand the value of learning these subjects, it may ameliorate some of their other negative attitudes.

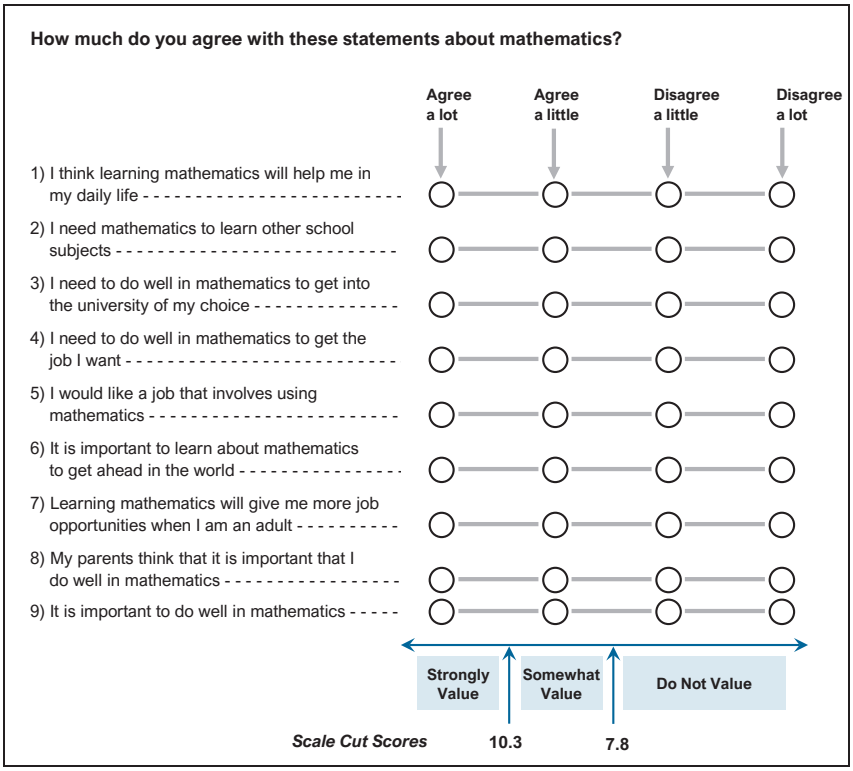
Exhibit 11.14 shows that eighth grade students generally value mathematics. Thirty-seven percent responded that they "strongly value" mathematics, 47 percent responded "somewhat value," and only 16 percent responded "do not value." The results were similar, but slightly less positive for science, shown in Exhibit 11.16—36 percent "strongly value," 42 percent "somewhat value," and 22 percent "do not value" science. There was a strong positive relationship between valuing mathematics and science and average achievement in each of the respective curriculum areas. However, the relationship between higher achievement and valuing the subjects was less pronounced than between higher achievement and attitudes toward liking the subjects or having confidence in your ability to do well in the subjects.

Exhibit 11.13: Students Value Mathematics

Students' Reports

About the Scale

Students were scored according to their responses to nine statements on the *Students Value Mathematics* scale. Cut scores divide the scale into three categories. Students who **Strongly Value Mathematics** had a score at or above the cut score corresponding to "agreeing a lot" with five of the nine statements and "agreeing a little" with the other four, on average. Students who **Do Not Value Mathematics** had a score at or below the cut score corresponding to "disagreeing a little" with five of the nine statements and "agreeing a little" with the other four, on average. All other students **Somewhat Value Mathematics**.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 11.14: Students Value Mathematics

Students' Reports

Country	Strongly Value Mathematics		Somewhat Value Mathematics		Do Not Value Mathematics		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
South Africa (9)	68 (0.6)	399 (2.2)	27 (0.6)	377 (2.7)	5 (0.2)	357 (4.1)	10.9 (0.03)
Egypt	63 (1.2)	425 (5.3)	31 (0.9)	403 (5.5)	6 (0.5)	381 (9.3)	10.9 (0.06)
Jordan	62 (1.2)	433 (3.6)	31 (1.0)	411 (5.4)	7 (0.5)	384 (8.8)	10.8 (0.05)
Morocco	60 (0.9)	400 (2.7)	32 (0.7)	374 (2.4)	8 (0.4)	368 (3.8)	10.7 (0.04)
Israel	54 (1.2)	529 (4.9)	37 (1.0)	514 (4.6)	9 (0.5)	501 (6.5)	10.4 (0.05)
Oman	53 (0.9)	432 (3.0)	39 (0.8)	397 (3.5)	8 (0.4)	375 (5.8)	10.3 (0.04)
Iran, Islamic Rep. of	49 (1.2)	457 (4.4)	40 (1.0)	440 (3.9)	11 (0.6)	426 (6.2)	10.2 (0.05)
Turkey	48 (1.2)	520 (4.9)	40 (0.8)	480 (4.7)	12 (0.8)	454 (6.4)	10.1 (0.06)
Georgia	47 (1.3)	474 (4.8)	43 (1.2)	455 (4.8)	10 (0.8)	436 (9.3)	10.1 (0.06)
United Arab Emirates	47 (0.6)	492 (2.7)	41 (0.6)	468 (1.8)	12 (0.3)	431 (3.4)	10.1 (0.03)
Saudi Arabia	46 (1.1)	403 (3.3)	42 (0.8)	391 (2.7)	12 (0.6)	380 (4.5)	10.1 (0.05)
Lebanon	45 (1.3)	447 (3.0)	43 (1.0)	422 (4.0)	12 (0.8)	409 (5.5)	10.0 (0.06)
Kuwait	41 (1.2)	416 (5.8)	43 (0.9)	401 (5.0)	16 (0.7)	384 (5.8)	9.7 (0.05)
Bahrain	40 (0.9)	493 (2.6)	44 (0.6)	479 (2.4)	16 (0.8)	459 (3.2)	9.7 (0.04)
United States	40 (0.8)	532 (5.0)	48 (0.7)	516 (4.7)	12 (0.5)	484 (6.1)	9.8 (0.04)
Qatar	38 (1.1)	456 (5.7)	44 (1.1)	449 (4.5)	18 (1.1)	409 (4.8)	9.6 (0.06)
Australia	38 (0.9)	539 (4.5)	48 (0.8)	514 (3.8)	14 (0.6)	479 (4.8)	9.7 (0.04)
England	38 (1.2)	528 (6.1)	51 (0.9)	515 (5.6)	10 (0.7)	500 (7.3)	9.8 (0.05)
New Zealand	37 (1.0)	494 (4.2)	50 (0.9)	481 (3.6)	14 (0.7)	461 (5.1)	9.6 (0.05)
Cyprus	37 (1.0)	523 (2.8)	46 (0.9)	499 (2.2)	17 (0.7)	467 (3.9)	9.6 (0.04)
Ireland	35 (1.0)	538 (3.5)	49 (0.9)	525 (2.6)	16 (0.7)	496 (4.3)	9.5 (0.04)
Chile	35 (1.0)	446 (3.5)	53 (1.0)	442 (3.1)	12 (0.6)	425 (5.2)	9.7 (0.04)
Romania	35 (1.3)	502 (5.6)	43 (1.0)	472 (4.8)	22 (1.3)	461 (4.9)	9.4 (0.07)
Norway (9)	35 (1.0)	524 (3.4)	51 (0.9)	503 (2.4)	15 (0.7)	467 (4.4)	9.6 (0.05)
Malaysia	34 (1.0)	486 (3.3)	56 (0.9)	453 (3.7)	10 (0.8)	421 (5.6)	9.6 (0.04)
Portugal	34 (1.1)	525 (4.8)	48 (1.3)	493 (3.1)	17 (1.0)	473 (4.0)	9.5 (0.05)
Singapore	34 (0.8)	628 (4.8)	56 (0.8)	614 (4.1)	10 (0.4)	584 (6.3)	9.6 (0.03)
Kazakhstan	31 (1.0)	493 (4.6)	53 (0.9)	487 (3.6)	15 (0.8)	482 (5.1)	9.5 (0.05)
France	27 (0.9)	493 (3.8)	57 (1.0)	485 (2.7)	16 (0.7)	458 (3.8)	9.3 (0.04)
Russian Federation	26 (1.0)	560 (6.1)	53 (0.9)	543 (4.5)	21 (1.0)	526 (5.0)	9.2 (0.05)
Lithuania	26 (1.2)	533 (4.7)	56 (1.1)	520 (3.2)	19 (0.9)	508 (4.3)	9.2 (0.04)
Hungary	25 (0.9)	543 (5.5)	53 (0.9)	516 (3.4)	22 (0.8)	489 (3.8)	9.1 (0.04)
Italy	25 (0.8)	511 (4.0)	54 (0.9)	498 (2.9)	21 (0.8)	482 (3.6)	9.1 (0.04)
Finland	24 (0.9)	535 (3.3)	54 (0.8)	513 (2.5)	22 (0.9)	473 (3.7)	9.0 (0.04)
Sweden	24 (0.9)	515 (4.1)	58 (0.8)	505 (2.7)	18 (0.7)	487 (3.5)	9.2 (0.04)
Hong Kong SAR	18 (1.0)	605 (6.3)	54 (1.0)	586 (4.3)	28 (0.9)	547 (5.2)	8.7 (0.05)
Korea, Rep. of	14 (0.6)	668 (5.0)	56 (0.9)	620 (2.9)	30 (1.1)	554 (3.1)	8.5 (0.04)
Japan	14 (0.7)	629 (5.7)	59 (0.8)	598 (2.7)	27 (0.8)	568 (3.7)	8.6 (0.03)
Chinese Taipei	12 (0.5)	659 (5.8)	48 (0.8)	634 (3.1)	40 (1.0)	573 (3.0)	8.2 (0.04)
International Average	**37 (0.2)**	**507 (0.7)**	**47 (0.1)**	**487 (0.6)**	**16 (0.1)**	**462 (0.8)**	
Benchmarking Participants							
Gauteng, RSA (9)	69 (1.1)	423 (3.0)	27 (0.9)	416 (3.9)	4 (0.4)	423 (7.6)	10.9 (0.04)
Western Cape, RSA (9)	63 (1.0)	444 (4.6)	31 (0.8)	441 (5.2)	5 (0.5)	438 (8.7)	10.7 (0.04)
Ontario, Canada	51 (1.4)	545 (5.4)	42 (1.2)	521 (4.3)	8 (0.6)	487 (6.6)	10.3 (0.05)
Dubai, UAE	47 (1.1)	549 (3.0)	43 (1.0)	531 (2.4)	10 (0.4)	499 (3.8)	10.1 (0.04)
Abu Dhabi, UAE	42 (0.8)	462 (3.6)	44 (0.7)	429 (3.3)	14 (0.6)	394 (4.9)	9.8 (0.05)
Quebec, Canada	37 (1.3)	556 (3.9)	52 (1.1)	541 (3.9)	11 (0.8)	513 (6.6)	9.7 (0.05)
Moscow City, Russian Fed.	25 (0.9)	606 (5.7)	50 (0.9)	575 (4.3)	25 (1.0)	546 (4.4)	9.1 (0.04)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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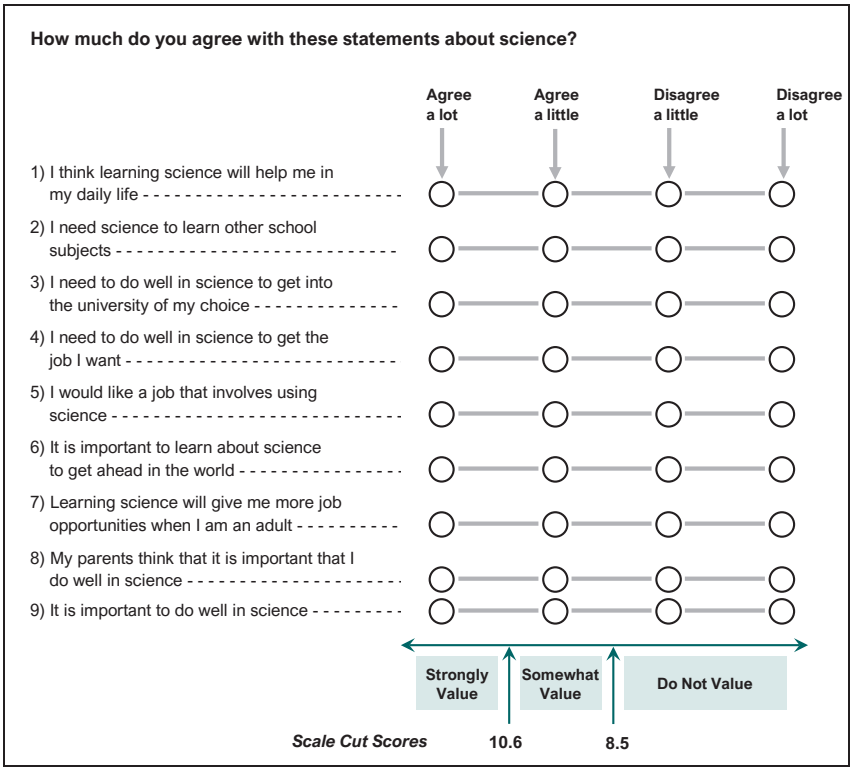
Exhibit 11.15: Students Value Science

Students' Reports

About the Scale

Students were scored according to their responses to nine statements on the *Students Value Science* scale. Cut scores divide the scale into three categories. Students who **Strongly Value Science** had a score at or above the cut score corresponding to "agreeing a lot" with five of the nine statements and "agreeing a little" with the other four, on average. Students who **Do Not Value Science** had a score at or below the cut score corresponding to "disagreeing a little" with five of the nine statements and "agreeing a little" with the other four, on average. All other students **Somewhat Value Science**.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 11.16: Students Value Science

Students' Reports

Country	Strongly Value Science		Somewhat Value Science		Do Not Value Science		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Egypt	67 (1.1)	412 (5.2)	26 (0.9)	362 (6.7)	7 (0.5)	344 (7.8)	11.3 (0.05)
Jordan	64 (1.2)	468 (4.4)	29 (0.9)	438 (4.8)	7 (0.5)	418 (8.6)	11.2 (0.05)
Oman	57 (0.9)	483 (3.0)	35 (0.8)	440 (3.7)	8 (0.6)	409 (7.9)	10.8 (0.04)
Iran, Islamic Rep. of	57 (1.2)	462 (4.3)	33 (1.0)	434 (3.8)	11 (0.6)	436 (7.3)	10.8 (0.05)
United Arab Emirates	55 (0.7)	501 (2.6)	34 (0.6)	453 (2.8)	11 (0.3)	417 (4.4)	10.7 (0.02)
Saudi Arabia	55 (1.3)	442 (3.3)	34 (0.9)	427 (3.4)	11 (0.7)	414 (4.5)	10.7 (0.06)
Kuwait	54 (1.2)	460 (5.5)	34 (1.1)	439 (5.9)	12 (0.7)	419 (7.3)	10.7 (0.05)
South Africa (9)	54 (0.7)	380 (3.5)	34 (0.5)	353 (3.1)	12 (0.4)	387 (4.4)	10.6 (0.03)
Bahrain	51 (0.9)	507 (1.8)	36 (0.7)	479 (3.5)	13 (0.6)	445 (5.9)	10.5 (0.04)
Morocco	49 (0.9)	409 (2.7)	39 (0.7)	383 (3.2)	12 (0.6)	386 (4.0)	10.5 (0.03)
Qatar	49 (1.0)	495 (5.4)	37 (0.8)	467 (5.0)	15 (0.9)	436 (5.8)	10.4 (0.05)
Lebanon	49 (1.1)	404 (5.3)	39 (0.9)	360 (5.0)	12 (0.6)	350 (9.2)	10.5 (0.04)
Turkey	46 (1.2)	529 (4.1)	38 (0.8)	506 (4.4)	15 (0.9)	499 (5.8)	10.3 (0.05)
Malaysia	45 (1.2)	492 (3.0)	46 (0.9)	445 (4.2)	9 (0.7)	384 (6.9)	10.4 (0.04)
Georgia	43 (1.2)	457 (4.2)	43 (1.1)	445 (4.3)	14 (0.9)	430 (5.6)	10.3 (0.05)
Singapore	42 (1.0)	632 (3.5)	48 (0.8)	598 (4.1)	11 (0.6)	557 (6.3)	10.3 (0.03)
United States	36 (0.9)	540 (5.9)	43 (0.7)	526 (4.7)	21 (0.6)	503 (4.3)	9.9 (0.03)
Israel	36 (1.3)	531 (5.2)	36 (0.9)	518 (4.7)	29 (1.2)	498 (5.6)	9.7 (0.06)
England	33 (1.1)	540 (5.3)	45 (1.1)	523 (5.6)	22 (1.0)	491 (5.5)	9.8 (0.05)
Cyprus	33 (1.0)	510 (2.9)	43 (1.2)	485 (2.5)	24 (0.9)	458 (3.4)	9.7 (0.04)
Russian Federation	32 (1.0)	548 (4.8)	50 (0.8)	540 (4.7)	18 (0.9)	545 (4.5)	9.9 (0.04)
Romania	31 (1.3)	487 (5.3)	41 (1.1)	468 (4.6)	28 (1.2)	462 (4.5)	9.6 (0.06)
Kazakhstan	30 (1.0)	487 (4.0)	51 (0.9)	477 (3.4)	19 (0.8)	471 (5.1)	9.9 (0.04)
Australia	28 (0.9)	561 (4.1)	42 (0.6)	530 (3.5)	29 (0.8)	501 (3.1)	9.5 (0.04)
Portugal	27 (1.1)	542 (4.2)	44 (1.1)	517 (3.4)	28 (1.1)	503 (3.0)	9.6 (0.05)
Lithuania	27 (1.0)	549 (4.3)	51 (1.1)	531 (3.4)	21 (0.8)	526 (4.0)	9.7 (0.03)
New Zealand	26 (0.9)	520 (5.0)	47 (0.8)	503 (3.9)	28 (1.0)	479 (4.2)	9.5 (0.04)
Chile	25 (0.9)	471 (3.8)	48 (0.8)	462 (3.4)	27 (1.0)	459 (3.9)	9.5 (0.04)
Ireland	25 (1.0)	555 (3.9)	42 (1.1)	534 (2.8)	33 (1.1)	500 (3.7)	9.3 (0.05)
Hong Kong SAR	23 (0.9)	526 (7.6)	49 (1.1)	509 (5.5)	29 (1.1)	478 (6.4)	9.4 (0.05)
Norway (9)	21 (0.9)	516 (5.4)	48 (0.9)	501 (3.1)	31 (1.1)	478 (4.4)	9.3 (0.04)
Hungary	21 (1.1)	553 (4.8)	47 (0.9)	527 (3.5)	33 (1.1)	519 (3.0)	9.3 (0.05)
Sweden	20 (0.9)	541 (5.7)	48 (1.1)	527 (3.9)	32 (1.0)	510 (3.6)	9.3 (0.03)
Italy	19 (0.8)	515 (4.0)	45 (1.0)	506 (2.9)	35 (1.1)	487 (2.9)	9.2 (0.04)
France	19 (0.8)	516 (4.5)	47 (0.9)	496 (3.2)	34 (1.1)	465 (2.7)	9.2 (0.04)
Finland	18 (0.9)	586 (4.3)	48 (0.9)	550 (3.2)	35 (1.1)	514 (3.0)	9.1 (0.04)
Korea, Rep. of	16 (0.7)	611 (4.2)	50 (0.9)	573 (2.6)	34 (1.1)	519 (2.7)	9.1 (0.04)
Chinese Taipei	14 (0.7)	609 (4.4)	41 (0.8)	589 (2.5)	45 (1.0)	551 (2.4)	8.9 (0.04)
Japan	11 (0.6)	598 (4.9)	48 (1.0)	581 (2.5)	41 (1.1)	550 (2.5)	8.8 (0.04)
International Average	**36 (0.2)**	**511 (0.7)**	**42 (0.1)**	**487 (0.6)**	**22 (0.1)**	**467 (0.8)**	
Benchmarking Participants							
Dubai, UAE	56 (1.0)	563 (2.6)	34 (0.9)	535 (3.2)	10 (0.5)	505 (6.1)	10.8 (0.04)
Gauteng, RSA (9)	53 (1.2)	424 (4.1)	31 (0.7)	411 (4.6)	15 (0.8)	448 (6.3)	10.5 (0.05)
Abu Dhabi, UAE	49 (1.1)	461 (4.1)	38 (0.9)	396 (4.4)	13 (0.7)	358 (7.3)	10.5 (0.05)
Western Cape, RSA (9)	42 (1.2)	446 (6.4)	38 (0.8)	432 (5.7)	19 (0.9)	456 (5.7)	10.1 (0.05)
Ontario, Canada	38 (1.0)	540 (4.5)	43 (1.0)	519 (3.3)	19 (1.1)	495 (4.9)	10.0 (0.04)
Quebec, Canada	32 (1.3)	558 (4.0)	45 (1.0)	538 (3.6)	24 (1.3)	508 (4.9)	9.7 (0.06)
Moscow City, Russian Fed.	24 (1.0)	570 (3.7)	46 (0.9)	565 (3.7)	30 (1.1)	567 (3.6)	9.4 (0.05)

This TIMSS context questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Mathematics Curriculum and Instruction

Instructional Time in Mathematics

Though many factors influence the relationship between amount of instructional time and student achievement—primarily, the quality of the instruction and the students' readiness to learn—instructional time remains a crucial component in considering students' opportunity to learn. Instructional time was calculated using principals' reports on the number of school days per year and the number of instructional hours per day and teachers' reports on the weekly number of hours of mathematics instruction, as explained in Exhibit 12.1 (see About the Scale). Exhibits 12.2 and 12.3 present principals' and teachers' reports about the instructional hours per year overall spent on mathematics instruction in fourth grade and eighth grade, respectively. Countries are ordered by the number of hours per year for mathematics instruction.

On average, the fourth grade students across the TIMSS 2019 countries received 895 hours per year of instruction across all subjects, and 154 hours, or about 17 percent of the total, were devoted to mathematics instruction. The number of hours devoted to mathematics instruction ranged from a high of 250 hours in Portugal to 101 in Korea. The amount of mathematics instructional time relative to total instructional time varied considerably across countries, reflecting different approaches to organizing and addressing the mathematics curriculum. As might be anticipated, within-country estimates of instructional time can vary somewhat from the levels of instructional time established by policy (see *TIMSS 2019 Encyclopedia*).

The eighth grade students across the TIMSS 2019 countries received an average of 1,023 hours of instruction across all subjects, and 137 hours, or 13 percent of the total, were devoted to mathematics instruction. The number of hours for mathematics instruction ranged from 200 in Chile to 102 in Cyprus. Of the countries that participated in TIMSS at the fourth and eighth grades, in most countries, the number of annual hours devoted to mathematics instruction decreased between fourth and eighth grades, likely because by eighth grade, the school curriculum covers many more subjects than in fourth grade.

Exhibit 12.1: Instructional Time Spent on Mathematics

Students' Results based on Principals' and Teachers' Reports

About the Scale

Total Instructional Hours Per Year = Principal Reports of School Days per Year × Principal Reports of Instructional Hours per Day

Hours per Year for Mathematics Instruction = $\frac{\text{Teacher Reports of Weekly Mathematics Instructional Hours}}{\text{Principal Reports of School Days per Week}}$ × Principal Reports of School Days per Year

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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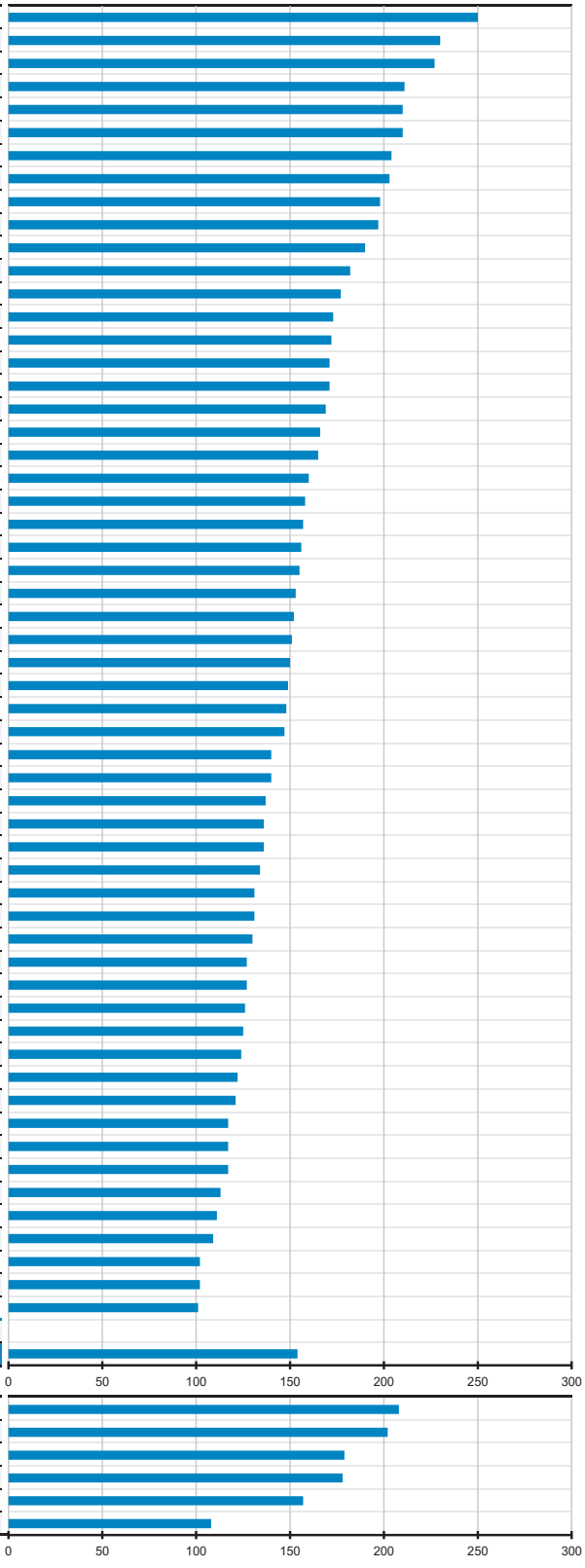
Exhibit 12.2: Instructional Time Spent on Mathematics

Students' Results based on Principals' and Teachers' Reports

Country	Total Instructional Hours per Year	Hours per Year for Mathematics Instruction
Portugal	887 (14.8)	250 (5.3)
Italy	1098 (15.0)	230 (5.3)
South Africa (5)	r 1205 (12.1)	r 227 (4.5)
Singapore	1009 (0.0)	211 (2.7)
United States	1106 (8.4)	210 (3.9)
Belgium (Flemish)	r 951 (14.6)	r 210 (2.9)
Chile	r 1186 (22.3)	r 204 (6.9)
Northern Ireland	r 947 (7.1)	r 203 (3.9)
Canada	951 (3.9)	r 198 (2.7)
Netherlands	s 1049 (10.3)	s 197 (6.4)
Australia	r 1015 (11.8)	r 190 (5.2)
France	r 820 (7.4)	r 182 (2.5)
Bahrain	1012 (8.2)	177 (2.5)
Philippines	1225 (12.6)	173 (3.6)
Qatar	1011 (11.8)	172 (4.7)
Cyprus	849 (10.6)	r 171 (3.1)
Morocco	1081 (20.4)	171 (3.9)
United Arab Emirates	r 1034 (3.9)	s 169 (1.7)
Malta	930 (1.4)	166 (0.4)
Ireland	925 (5.0)	165 (2.6)
New Zealand	917 (5.7)	160 (2.7)
Oman	r 1016 (13.9)	r 158 (3.1)
Pakistan	1218 (22.3)	r 157 (11.2)
Spain	869 (7.1)	156 (2.5)
Denmark	r 1043 (10.4)	s 155 (2.7)
Germany	r 833 (10.1)	r 153 (2.2)
Hong Kong SAR	r 1022 (14.3)	r 152 (3.3)
Japan	904 (4.9)	151 (1.0)
Kosovo	777 (32.0)	r 150 (4.4)
Czech Republic	763 (8.9)	149 (1.5)
Serbia	794 (19.2)	148 (2.5)
Chinese Taipei	953 (8.9)	147 (8.5)
Turkey (5)	1001 (24.2)	140 (5.1)
Hungary	842 (13.8)	140 (2.8)
Sweden	r 854 (10.7)	r 137 (2.7)
Saudi Arabia	1056 (18.0)	r 136 (4.7)
Kuwait	r 899 (24.3)	s 136 (4.3)
Kazakhstan	732 (14.0)	134 (4.6)
North Macedonia	818 (22.0)	131 (2.7)
Georgia	750 (18.7)	131 (2.6)
Austria	759 (3.1)	130 (1.0)
Slovak Republic	784 (9.9)	127 (2.0)
Norway (5)	r 868 (14.4)	s 127 (4.1)
Armenia	752 (6.4)	126 (0.7)
Lithuania	725 (10.0)	125 (2.1)
Azerbaijan	731 (19.4)	124 (1.9)
Bosnia and Herzegovina	851 (35.9)	122 (2.4)
Croatia	859 (26.2)	121 (3.0)
Finland	746 (9.9)	117 (2.0)
Montenegro	653 (1.6)	117 (1.2)
Latvia	689 (8.9)	117 (1.7)
Albania	729 (10.3)	113 (1.4)
Poland	r 737 (10.1)	r 111 (1.4)
Iran, Islamic Rep. of	627 (6.0)	109 (1.6)
Russian Federation	663 (6.8)	102 (1.6)
Bulgaria	700 (14.9)	102 (1.3)
Korea, Rep. of	694 (8.7)	101 (1.9)
England	s 989 (11.2)	y - -
International Average	**895 (1.9)**	**154 (0.5)**
Benchmarking Participants		
Ontario, Canada	954 (7.5)	r 208 (3.9)
Quebec, Canada	922 (8.2)	r 202 (6.2)
Madrid, Spain	909 (12.5)	179 (2.6)
Abu Dhabi, UAE	r 1075 (3.2)	s 178 (2.3)
Dubai, UAE	r 1038 (0.6)	s 157 (2.2)
Moscow City, Russian Fed.	645 (9.6)	108 (2.1)



( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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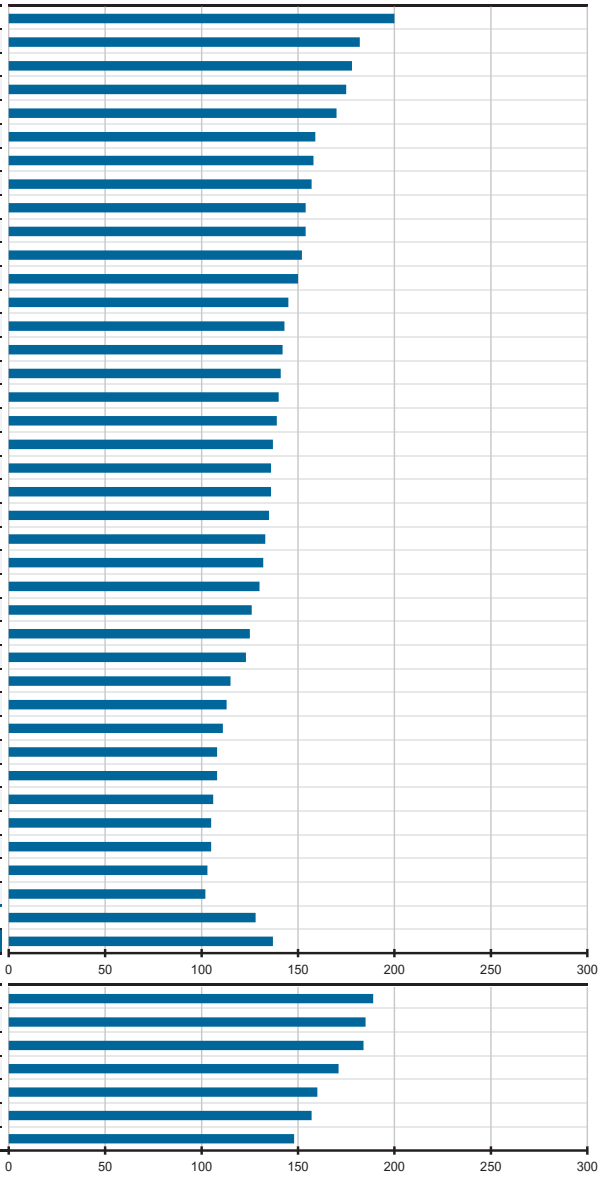
Exhibit 12.3: Instructional Time Spent on Mathematics

Students' Results based on Principals' and Teachers' Reports

Country		Total Instructional Hours per Year		Hours per Year for Mathematics Instruction
Chile		1221 (20.5)	r	200 (6.1)
South Africa (9)	s	1212 (13.5)	s	182 (2.7)
Oman	r	1056 (18.9)	r	178 (4.1)
United Arab Emirates	r	1094 (2.7)	s	175 (1.9)
Lebanon		960 (7.3)		170 (3.8)
Bahrain		1115 (0.6)		159 (1.6)
Israel		1118 (13.6)	r	158 (3.2)
Chinese Taipei		1137 (12.3)		157 (1.7)
United States		1148 (9.9)	r	154 (3.3)
Qatar		1090 (9.9)	r	154 (5.8)
Morocco	r	1341 (30.8)	r	152 (3.4)
Turkey		1009 (27.5)		150 (6.4)
Italy		1065 (11.2)		145 (2.8)
Hong Kong SAR		999 (12.6)		143 (4.7)
Russian Federation		868 (13.3)		142 (3.6)
Australia		1013 (6.8)	r	141 (2.4)
Jordan		1020 (13.0)		140 (3.6)
Kuwait	r	982 (21.2)	r	139 (4.1)
New Zealand	r	967 (10.2)	r	137 (2.5)
Egypt	s	1110 (34.6)	s	136 (3.3)
Saudi Arabia	r	1069 (18.9)	r	136 (6.9)
Singapore		1053 (0.0)		135 (2.6)
Romania		926 (19.8)		133 (4.3)
Portugal		1138 (31.4)		132 (3.5)
Malaysia		1165 (18.7)		130 (2.5)
Lithuania		918 (12.6)		126 (2.2)
France	r	1112 (19.3)	s	125 (3.2)
Kazakhstan		886 (15.7)		123 (3.1)
Hungary		899 (11.5)		115 (2.3)
Georgia		850 (14.5)		113 (2.1)
Finland		912 (9.4)		111 (1.9)
Norway (9)	r	949 (8.2)	s	108 (2.2)
Ireland		973 (4.7)	r	108 (1.3)
Korea, Rep. of		933 (10.7)		106 (2.6)
Sweden	r	926 (11.4)		105 (1.6)
Japan		1018 (3.0)		105 (1.0)
Iran, Islamic Rep. of		768 (8.1)		103 (2.6)
Cyprus	r	882 (1.0)	s	102 (2.3)
England	s	995 (13.3)	x	128 (4.9)
International Average		**1023 (2.5)**		**137 (0.6)**
Benchmarking Participants				
Ontario, Canada	r	966 (8.2)	s	189 (3.6)
Gauteng, RSA (9)	s	1193 (21.1)	s	185 (6.5)
Abu Dhabi, UAE	r	1138 (3.5)	s	184 (4.5)
Western Cape, RSA (9)	r	1190 (11.6)	s	171 (3.7)
Dubai, UAE	r	1066 (1.0)	s	160 (3.4)
Moscow City, Russian Fed.		825 (8.2)		157 (3.3)
Quebec, Canada	r	936 (16.4)	r	148 (3.3)



( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Students Taught the TIMSS Mathematics Topics

The mathematics content domains and underlying topic areas assessed in TIMSS 2019 are documented in the TIMSS 2019 Mathematics Framework, which was developed in collaboration with the participating countries. The mathematics topics included in the TIMSS assessments do not represent the intersection of the topics that are universally taught but rather are a forward looking conception of mathematics teaching and learning.

Exhibit 12.4 shows the TIMSS mathematics content domains—number, measurement and geometry, and data—and the 17 underlying topics in the TIMSS fourth grade mathematics assessment (see About the Scale). There were 7 topics in number, 7 in measurement and geometry, and 3 in data. Exhibit 12.6 shows the same information for the eighth grade mathematics assessment, with its four content domains—number, algebra, geometry, and data and probability and the 22 underlying topics. There were 3 topics in number, 7 in algebra, 6 in geometry, and 6 in data and probability. Teachers were asked to indicate, for each topic, whether it had been "mostly taught before this year" to students in the assessed class or "mostly taught this year," or had been "not taught or just introduced" to students. This information serves as an indicator of the "implemented curriculum." It also can be examined together with information provided by TIMSS National Research Coordinators about whether each of the TIMSS 2019 mathematics topics was included in their countries' intended curriculum through the fourth or eighth grade and, if so, whether the topics were intended to be taught to "all or almost all students" or "only the more able students." This information about the intended curriculum is reported in the *TIMSS 2019 Encyclopedia*.

Exhibit 12.5 presents fourth grade teachers' reports about the TIMSS mathematics topics that had been taught to students in fourth grade classrooms either prior to or during the year of the assessment. The exhibit shows, for each country and the international average, the percentage of students whose teachers reported that the students had been taught each of the topics (before or during the year), averaged across all topics in each mathematics content domain, and also across all topics in all mathematics domains. Exhibit 12.7 presents parallel information for the eighth grade, reported by teachers about the TIMSS mathematics topics in the eighth grade assessment.

In the fourth grade, according to their teachers, 80 percent of students, on average, had been taught the TIMSS mathematics topics overall. This finding ranged from 97 percent in Azerbaijan and Portugal to 62 percent in Morocco. On average, 86 percent of students had been taught the TIMSS number topics, and 76 percent and 78 percent had been taught the measurement and geometry and data topics, respectively. There was, however, considerable variation from content domain to content domain and from country to country, reflecting differing mathematics curricular emphases.

In the eighth grade, on average, 72 percent of students had been taught the TIMSS mathematics topics overall, according to their teachers. Teachers' reports about the degree of implementation ranged from 95 percent of students in Malaysia to 49 percent in Finland. Almost all of the students (98%), on average, had been taught the number topics by the end of eighth grade, according to their teachers, with 100 percent of students in a number of countries. The coverage of algebra and geometry

was lower, with 68 percent of the students having been taught the algebra topics and 76 percent having been taught the geometry topics, on average. The least instructional attention was given to the topics in data and probability, with 60 percent of students having been taught the topics in this domain, on average. There was considerable variation across countries, particularly in the percentages of students taught the data and probability topics.

Exhibit 12.4: Percentages of Students Taught the TIMSS Mathematics Topics

Students' Results based on Teachers' Reports

About the Scale

Exhibit 12.5 reports the percentage of students whose teachers responded "mostly taught before this year" or "mostly taught this year," averaged across topics.

Choose the response that best describes when students in this class have been taught each topic.

	Mostly taught before this year	Mostly taught this year	Not yet taught or just introduced
A. Number			
1) Concepts of whole numbers, including place value and ordering	○	○	○
2) Adding, subtracting, multiplying, and dividing with whole numbers	○	○	○
3) Concepts of multiples and factors; odd and even numbers	○	○	○
4) Number sentences (finding the missing number, representing problem situations with number sentences)	○	○	○
5) Number patterns (extending number patterns and finding missing terms)	○	○	○
6) Concepts of fractions, including representing, comparing and ordering, adding and subtracting simple fractions	○	○	○
7) Concepts of decimals, including place value and ordering, adding and subtracting with decimals	○	○	○
B. Measurement and Geometry			
1) Solving problems involving length, including measuring and estimating	○	○	○
2) Solving problems involving mass, volume, and time	○	○	○
3) Finding and estimating perimeter, area, and volume	○	○	○
4) Parallel and perpendicular lines	○	○	○
5) Comparing and drawing angles	○	○	○
6) Elementary properties of common geometric shapes	○	○	○
7) Three-dimensional shapes, including relationships with their two-dimensional representations	○	○	○
C. Data			
1) Reading and interpreting data from tables, pictographs, bar graphs, line graphs, and pie charts	○	○	○
2) Organizing and representing data to help answer questions	○	○	○
3) Drawing conclusions from data displays	○	○	○

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 12.5: Percentages of Students Taught the TIMSS Mathematics Topics

Students' Results based on Teachers' Reports

The exhibit reports the percentage of students whose teachers responded "mostly taught before this year" or "mostly taught this year," averaged across topics.

Country	All Mathematics (17 Topics)	Number (7 Topics)	Measurement and Geometry (7 Topics)	Data (3 Topics)
Albania	84 (1.0)	87 (0.6)	86 (1.4)	73 (2.9)
Armenia	81 (1.3)	83 (0.8)	78 (1.8)	82 (2.9)
Australia	89 (0.9)	93 (0.9)	84 (1.4)	92 (1.5)
Austria	78 (0.9)	79 (1.0)	75 (1.4)	84 (2.0)
Azerbaijan	97 (0.4)	97 (0.5)	96 (0.6)	98 (0.8)
Bahrain	89 (0.6)	90 (0.7)	87 (0.7)	90 (1.2)
Belgium (Flemish)	78 (1.0)	93 (0.9)	63 (1.3)	76 (2.4)
Bosnia and Herzegovina	65 (0.9)	70 (0.9)	66 (1.2)	51 (3.0)
Bulgaria	67 (0.8)	71 (0.4)	66 (1.1)	60 (3.2)
Canada	r 82 (0.8)	r 86 (0.9)	r 76 (1.0)	r 89 (1.3)
Chile	81 (1.1)	88 (1.0)	78 (1.8)	73 (3.4)
Chinese Taipei	84 (1.0)	83 (1.1)	84 (1.3)	88 (1.9)
Croatia	71 (1.1)	71 (0.8)	81 (1.4)	46 (3.5)
Cyprus	89 (1.1)	92 (0.8)	86 (1.8)	87 (1.9)
Czech Republic	71 (0.9)	79 (0.6)	67 (1.0)	60 (3.0)
Denmark	r 77 (1.1)	r 84 (1.3)	r 75 (1.5)	r 62 (2.8)
Finland	77 (1.0)	93 (0.8)	69 (1.5)	58 (2.5)
France	79 (1.0)	81 (0.9)	78 (1.2)	74 (2.7)
Georgia	74 (1.3)	75 (1.2)	65 (2.1)	92 (1.9)
Germany	77 (1.0)	75 (1.1)	75 (1.3)	86 (2.2)
Hong Kong SAR	89 (0.8)	95 (0.8)	84 (1.3)	89 (2.6)
Hungary	81 (1.0)	82 (0.6)	82 (1.4)	79 (2.7)
Iran, Islamic Rep. of	80 (1.1)	94 (0.8)	74 (1.5)	61 (3.1)
Ireland	88 (0.8)	94 (0.9)	81 (1.4)	92 (1.9)
Italy	79 (0.9)	89 (0.9)	63 (1.3)	90 (1.8)
Japan	80 (1.2)	82 (1.0)	81 (1.4)	71 (2.9)
Kazakhstan	86 (1.0)	85 (1.2)	92 (0.9)	71 (2.9)
Korea, Rep. of	77 (1.0)	84 (1.3)	70 (1.1)	77 (2.8)
Kosovo	80 (1.0)	75 (1.4)	94 (0.8)	58 (4.0)
Kuwait	90 (1.0)	95 (0.8)	84 (1.7)	92 (1.6)
Latvia	79 (0.9)	86 (0.8)	75 (1.3)	73 (2.5)
Lithuania	89 (0.8)	93 (0.8)	82 (1.3)	96 (1.3)
Malta	78 (0.1)	92 (0.1)	61 (0.2)	82 (0.3)
Montenegro	74 (0.7)	69 (0.5)	75 (0.8)	86 (1.6)
Morocco	62 (1.2)	66 (1.3)	67 (1.4)	39 (3.2)
Netherlands	r 63 (1.3)	r 79 (1.3)	r 40 (2.0)	r 79 (2.8)
New Zealand	83 (0.9)	89 (0.7)	74 (1.4)	89 (1.6)
North Macedonia	90 (0.9)	95 (0.8)	85 (1.4)	90 (2.1)
Northern Ireland	94 (0.8)	98 (0.5)	94 (1.1)	87 (2.4)
Norway (5)	r 70 (1.5)	r 77 (1.7)	r 60 (2.2)	r 78 (3.7)
Oman	92 (0.6)	94 (0.9)	90 (0.8)	92 (1.4)
Pakistan	83 (2.2)	94 (1.3)	78 (3.6)	66 (4.2)
Philippines	93 (0.9)	99 (0.7)	93 (1.0)	78 (3.0)
Poland	68 (1.5)	75 (1.6)	73 (1.7)	40 (3.7)
Portugal	97 (0.3)	98 (0.3)	95 (0.7)	99 (0.5)
Qatar	74 (1.5)	91 (0.9)	60 (2.5)	68 (3.2)
Russian Federation	77 (0.9)	75 (0.9)	76 (1.2)	85 (2.0)
Saudi Arabia	89 (1.0)	r 91 (1.0)	r 85 (1.3)	91 (1.6)
Serbia	83 (1.1)	81 (0.7)	88 (1.3)	75 (3.3)
Singapore	93 (0.3)	99 (0.2)	87 (0.7)	95 (0.7)
Slovak Republic	65 (0.8)	75 (0.6)	50 (1.2)	78 (2.0)
South Africa (5)	88 (1.1)	94 (1.0)	79 (1.6)	96 (1.2)
Spain	76 (1.4)	88 (1.1)	61 (2.3)	80 (2.6)
Sweden	65 (1.5)	72 (1.4)	57 (2.4)	68 (3.7)
Turkey (5)	70 (1.4)	80 (1.7)	61 (1.9)	68 (3.2)
United Arab Emirates	r 84 (0.7)	r 94 (0.8)	r 74 (1.0)	r 84 (1.2)
United States	85 (0.9)	95 (0.5)	76 (1.6)	82 (1.8)
England	x 88 (1.7)	x 94 (1.3)	x 83 (2.9)	x 84 (3.7)
International Average	**80 (0.1)**	**86 (0.1)**	**76 (0.2)**	**78 (0.3)**
Benchmarking Participants				
Ontario, Canada	r 86 (1.1)	r 84 (1.6)	r 81 (1.6)	r 98 (0.8)
Quebec, Canada	89 (1.1)	91 (1.0)	88 (1.2)	84 (3.3)
Moscow City, Russian Fed.	77 (1.0)	76 (1.1)	73 (1.3)	91 (1.9)
Madrid, Spain	76 (1.2)	93 (0.9)	60 (2.4)	72 (3.3)
Abu Dhabi, UAE	r 80 (1.0)	r 94 (0.6)	r 69 (1.7)	r 75 (2.1)
Dubai, UAE	r 89 (0.7)	r 93 (0.6)	r 84 (1.2)	r 93 (0.9)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
An "r" indicates data are available for at least 70% but less than 85% of the students.
An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 12.6: Percentages of Students Taught the TIMSS Mathematics Topics

Students' Results based on Teachers' Reports

About the Scale

Exhibit 12.7 reports the percentage of students whose teachers responded "mostly taught before this year" or "mostly taught this year," averaged across topics.

Choose the response that best describes when students in this class have been taught each topic.

	Mostly taught before this year	Mostly taught this year	Not yet taught or just introduced
A. Number			
1) Computing with negative numbers	○	○	○
2) Concepts of fractions and decimals	○	○	○
3) Solving problems involving proportions and percents	○	○	○
B. Algebra			
1) Simplifying and evaluating algebraic expressions	○	○	○
2) Simple linear equations	○	○	○
3) Simple linear inequalities	○	○	○
4) Simultaneous (two variables) equations	○	○	○
5) Representation of linear and quadratic functions in tables, graphs, words, or equations	○	○	○
6) Properties of functions (slopes, intercepts, etc.)	○	○	○
7) Numeric, algebraic, and geometric patterns or sequences (extension, missing terms, generalization of patterns)	○	○	○
C. Geometry			
1) Geometric properties of angles, pairs of lines, and geometric shapes (triangles, quadrilaterals, and other common polygons)	○	○	○
2) Solving problems involving perimeters, circumferences, and areas	○	○	○
3) Solving problems involving the Pythagorean Theorem	○	○	○
4) Translation, reflection, and rotation	○	○	○
5) Congruent figures and similar triangles	○	○	○
6) Solving problems with three-dimensional shapes	○	○	○
D. Data and Probability			
1) Reading and interpreting data from one or more sources to solve problems (interpolating, extrapolating, drawing conclusions)	○	○	○
2) Identifying appropriate procedures for collecting data	○	○	○
3) Organizing and representing data to help answer questions	○	○	○
4) Calculating and interpreting statistics summarizing data distributions	○	○	○
5) Theoretical and empirical probability of simple events	○	○	○
6) Theoretical and empirical probability of compound events	○	○	○

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 12.7: Percentages of Students Taught the TIMSS Mathematics Topics

Students' Results based on Teachers' Reports

The exhibit reports the percentage of students whose teachers responded "mostly taught before this year" or "mostly taught this year," averaged across topics.

Country	All Mathematics (22 Topics)	Number (3 Topics)	Algebra (7 Topics)	Geometry (6 Topics)	Data and Probability (6 Topics)
Australia	72 (1.2)	97 (0.7)	60 (1.5)	72 (1.3)	72 (2.1)
Bahrain	88 (0.4)	100 (0.0)	80 (0.8)	95 (0.3)	86 (0.8)
Chile	71 (1.4)	98 (0.7)	69 (1.7)	76 (2.3)	53 (2.7)
Chinese Taipei	62 (0.7)	99 (0.2)	85 (0.9)	72 (1.2)	7 (1.3)
Cyprus	s 62 (0.9)	s 97 (0.8)	s 67 (1.0)	s 60 (0.8)	s 40 (2.2)
Egypt	80 (0.8)	97 (1.0)	63 (1.4)	90 (0.9)	82 (1.4)
England	s 76 (1.8)	s 97 (1.1)	s 70 (2.3)	s 75 (2.7)	s 72 (3.0)
Finland	49 (0.9)	94 (0.9)	46 (1.1)	65 (1.5)	13 (2.0)
France	r 57 (0.8)	r 98 (0.7)	r 22 (1.0)	r 76 (1.4)	r 57 (2.0)
Georgia	65 (1.0)	100 (0.0)	66 (1.2)	66 (1.3)	47 (2.4)
Hong Kong SAR	70 (0.9)	100 (0.3)	65 (1.3)	82 (1.1)	49 (2.0)
Hungary	83 (0.9)	100 (0.0)	79 (0.9)	96 (0.8)	66 (2.4)
Iran, Islamic Rep. of	66 (1.0)	98 (0.6)	38 (1.3)	84 (1.2)	62 (2.5)
Ireland	68 (1.1)	99 (0.3)	73 (1.3)	49 (2.3)	66 (2.2)
Israel	80 (0.8)	98 (0.4)	88 (0.8)	76 (1.1)	65 (2.2)
Italy	65 (1.0)	99 (0.4)	34 (1.4)	89 (1.1)	60 (2.4)
Japan	79 (0.8)	100 (0.3)	80 (1.1)	73 (0.9)	72 (2.2)
Jordan	82 (1.0)	100 (0.4)	83 (1.2)	81 (1.5)	75 (2.1)
Kazakhstan	77 (1.1)	100 (0.0)	91 (1.1)	71 (1.6)	56 (2.2)
Korea, Rep. of	78 (0.6)	100 (0.2)	87 (0.8)	71 (0.9)	63 (1.7)
Kuwait	82 (0.7)	100 (0.0)	60 (1.4)	94 (0.8)	86 (1.2)
Lebanon	56 (1.1)	92 (1.0)	50 (1.4)	64 (1.3)	39 (2.8)
Lithuania	58 (0.8)	100 (0.3)	52 (1.3)	62 (1.2)	41 (2.1)
Malaysia	95 (0.7)	100 (0.0)	97 (0.7)	97 (0.8)	89 (1.9)
Morocco	56 (0.9)	97 (0.7)	50 (1.2)	57 (1.1)	41 (1.9)
New Zealand	60 (1.4)	94 (1.1)	52 (2.1)	52 (2.0)	59 (2.8)
Norway (9)	s 54 (1.3)	s 92 (1.5)	s 43 (2.2)	s 54 (1.7)	s 49 (2.8)
Oman	75 (0.7)	100 (0.3)	63 (1.0)	77 (1.1)	76 (1.4)
Portugal	70 (0.9)	100 (0.3)	60 (1.6)	90 (0.9)	46 (2.2)
Qatar	73 (1.4)	100 (0.1)	69 (1.8)	74 (2.2)	65 (2.6)
Romania	86 (0.9)	100 (0.0)	82 (1.1)	90 (0.8)	78 (2.1)
Russian Federation	65 (1.0)	100 (0.3)	78 (1.1)	71 (0.9)	28 (2.6)
Saudi Arabia	89 (0.7)	99 (0.7)	79 (1.4)	96 (0.8)	88 (1.3)
Singapore	85 (0.5)	99 (0.3)	93 (0.8)	85 (0.6)	70 (1.3)
South Africa (9)	76 (1.2)	97 (0.6)	78 (1.1)	86 (1.2)	54 (3.0)
Sweden	53 (1.2)	88 (1.5)	51 (1.8)	53 (1.4)	36 (2.6)
Turkey	81 (0.9)	100 (0.0)	79 (1.5)	63 (1.9)	91 (1.0)
United Arab Emirates	r 82 (0.5)	r 99 (0.2)	r 80 (0.7)	r 87 (0.4)	r 72 (1.1)
United States	83 (0.9)	100 (0.1)	87 (0.9)	84 (1.7)	68 (1.9)
International Average	**72 (0.2)**	**98 (0.1)**	**68 (0.2)**	**76 (0.2)**	**60 (0.3)**
Benchmarking Participants					
Ontario, Canada	r 76 (1.1)	r 92 (1.4)	r 62 (2.0)	r 86 (1.5)	r 75 (2.3)
Quebec, Canada	61 (1.2)	100 (0.3)	44 (1.5)	72 (1.3)	52 (3.4)
Moscow City, Russian Fed.	67 (0.9)	100 (0.0)	76 (1.1)	65 (1.1)	41 (2.6)
Gauteng, RSA (9)	79 (1.5)	98 (0.7)	79 (1.6)	88 (1.5)	59 (3.7)
Western Cape, RSA (9)	74 (1.5)	99 (0.6)	78 (1.5)	80 (1.6)	51 (3.8)
Abu Dhabi, UAE	r 82 (0.8)	r 99 (0.4)	r 81 (0.9)	r 89 (0.7)	r 66 (1.9)
Dubai, UAE	80 (0.8)	99 (0.1)	76 (1.5)	82 (0.7)	r 73 (1.4)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Instructional Clarity in Mathematics Lessons

The clarity with which teachers convey the curriculum to students has significant implications for student learning. Students were asked about aspects of teachers' mathematics instruction during their mathematics lessons: whether they know what their teacher expects them to do, and whether their teacher is easy to understand, has clear answers to their questions, is good at explaining mathematics, does a variety of things to help the students learn, links new lessons to previous knowledge (eighth grade only), and explains a topic again when the students do not understand. Responses were combined into the TIMSS *Instructional Clarity in Mathematics Lessons* scale, as described in Exhibit 12.8 (see About the Scale). Exhibits 12.9 and 12.10 present students' reports about the clarity of their mathematics lessons, for fourth grade and eighth grade, respectively. Countries are ordered by percentage reporting "high clarity of instruction."

On average, about three-quarters (74%) of fourth grade students reported that their mathematics instruction had "high clarity," 21 percent reported "moderate clarity," and just 5 percent characterized their instruction as having "low clarity." There was a range in views across countries with, interestingly, lower percentages of students characterizing their instruction as having "high clarity" in some of the higher performing countries, such as Korea and Japan. On average, internationally and within most countries, however, more clarity was associated with higher average achievement. Across countries, average achievement was 508 among students reporting that their instruction had "high clarity," 488 among students reporting "moderate clarity," and 466 among students reporting "low clarity," a remarkable 42-point difference between "high clarity" and "low clarity."

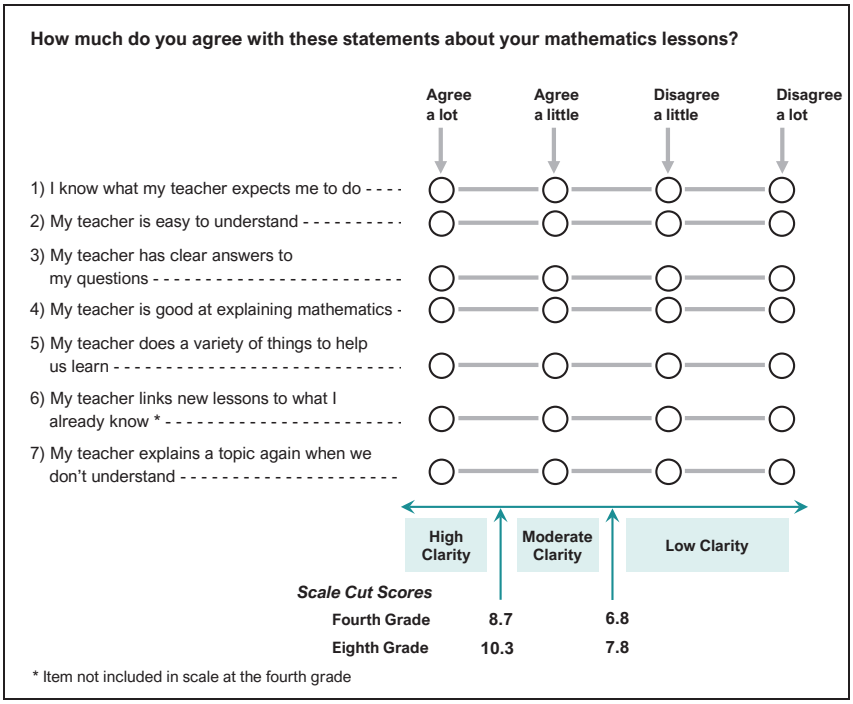
Eighth grade students were less positive about the clarity of their mathematics instruction, with less than half (46%) internationally reporting that their instruction had "high clarity," 41 percent reporting "moderate clarity," and 13 percent reporting "low clarity." As in fourth grade, some of the higher performing countries had the lowest percentages of students reporting that their instruction had "high clarity," including Korea, Japan, and Hong Kong SAR. Also as seen in fourth grade, clarity of instruction was positively associated with achievement. On average, students reporting "high clarity" of instruction had an average score of 504, followed by an average of 482 for "moderate clarity," and 467 for those reporting "low clarity."

Exhibit 12.8: Instructional Clarity in Mathematics Lessons – Students' Reports

Students' Reports

About the Scale

Students were scored according to their responses to seven statements on the *Instructional Clarity in Mathematics Lessons* scale. Cut scores divide the scale into three categories. Students who reported **High Clarity of Instruction** in their mathematics lessons had a score at or above the cut score corresponding to "agreeing a lot" with four of the seven statements and "agreeing a little" with the other three, on average. Students who reported **Low Clarity of Instruction** in their mathematics lessons had a score at or below the cut score corresponding to "disagreeing a little" with four of the seven statements and "agreeing a little" with the other three, on average. All other students reported **Moderate Clarity of Instruction** in their mathematics lessons.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 12.9: Instructional Clarity in Mathematics Lessons – Students' Reports

Students' Reports

Country	High Clarity of Instruction		Moderate Clarity of Instruction		Low Clarity of Instruction		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	98 (0.2)	497 (3.4)	2 (0.2)	~ ~	0 (0.1)	~ ~	11.7 (0.04)
Kosovo	95 (0.5)	449 (2.8)	3 (0.4)	402 (11.1)	1 (0.2)	~ ~	11.3 (0.05)
North Macedonia	93 (0.6)	480 (5.1)	6 (0.6)	421 (11.0)	1 (0.2)	~ ~	11.3 (0.05)
Montenegro	90 (0.6)	458 (2.0)	8 (0.5)	432 (5.1)	2 (0.2)	~ ~	11.1 (0.03)
Azerbaijan	88 (0.7)	527 (2.4)	9 (0.6)	493 (5.0)	2 (0.3)	~ ~	10.8 (0.05)
Iran, Islamic Rep. of	88 (0.9)	450 (3.5)	9 (0.7)	416 (8.8)	4 (0.5)	380 (9.6)	10.8 (0.06)
Georgia	88 (1.0)	483 (4.1)	11 (0.9)	473 (6.5)	1 (0.3)	~ ~	10.8 (0.06)
Bosnia and Herzegovina	87 (0.7)	458 (2.2)	10 (0.6)	429 (4.6)	3 (0.3)	385 (7.8)	10.8 (0.04)
Bulgaria	87 (1.1)	520 (3.6)	11 (0.9)	499 (9.4)	2 (0.3)	~ ~	10.7 (0.06)
Armenia	85 (0.6)	505 (2.6)	12 (0.6)	483 (4.2)	3 (0.4)	471 (7.7)	10.8 (0.05)
Portugal	85 (0.9)	528 (2.7)	13 (0.8)	514 (4.6)	2 (0.2)	~ ~	10.4 (0.05)
Malta	82 (0.7)	513 (1.4)	16 (0.7)	495 (3.6)	3 (0.3)	469 (9.8)	10.3 (0.03)
Lithuania	82 (1.1)	543 (2.9)	17 (1.0)	539 (5.2)	1 (0.2)	~ ~	10.2 (0.06)
Cyprus	81 (1.3)	536 (2.8)	15 (1.0)	521 (4.9)	4 (0.4)	504 (7.7)	10.4 (0.07)
Morocco	81 (1.3)	391 (4.6)	15 (1.0)	363 (6.3)	3 (0.3)	310 (12.5)	10.3 (0.07)
Spain	80 (1.1)	508 (2.4)	16 (0.9)	490 (4.2)	4 (0.4)	472 (8.1)	10.2 (0.05)
Northern Ireland	80 (1.2)	571 (2.9)	17 (1.0)	552 (5.3)	3 (0.4)	527 (9.8)	10.2 (0.05)
Oman	78 (1.0)	443 (4.0)	17 (0.8)	404 (4.6)	5 (0.4)	377 (7.0)	10.1 (0.05)
Serbia	78 (1.3)	513 (3.5)	20 (1.1)	493 (6.6)	2 (0.4)	~ ~	10.2 (0.07)
Hungary	77 (1.1)	530 (2.8)	19 (0.9)	503 (4.2)	4 (0.5)	493 (8.0)	10.2 (0.06)
Turkey (5)	77 (1.2)	538 (3.9)	18 (0.9)	485 (7.3)	5 (0.4)	448 (9.0)	10.1 (0.06)
United Arab Emirates	77 (0.6)	493 (1.9)	17 (0.4)	460 (2.7)	6 (0.2)	420 (4.7)	10.2 (0.03)
Ireland	77 (1.2)	551 (2.5)	20 (0.9)	544 (3.9)	3 (0.5)	528 (8.9)	10.1 (0.06)
Bahrain	77 (1.2)	487 (2.6)	18 (0.8)	462 (4.3)	5 (0.6)	450 (5.0)	10.1 (0.07)
Kazakhstan	77 (1.1)	516 (2.7)	22 (1.1)	502 (3.3)	1 (0.2)	~ ~	10.1 (0.06)
Austria	77 (1.2)	542 (2.1)	20 (1.0)	535 (3.1)	3 (0.3)	512 (6.6)	10.0 (0.05)
United States	76 (0.9)	543 (2.6)	19 (0.7)	524 (4.0)	4 (0.3)	488 (6.4)	10.1 (0.04)
Belgium (Flemish)	76 (1.0)	534 (2.0)	22 (0.9)	529 (2.8)	2 (0.3)	~ ~	9.8 (0.04)
England	76 (1.1)	561 (3.6)	21 (0.9)	548 (4.5)	4 (0.5)	524 (9.4)	10.0 (0.05)
Canada	75 (0.8)	514 (2.1)	21 (0.7)	505 (3.0)	4 (0.3)	481 (4.8)	10.0 (0.04)
Slovak Republic	75 (1.2)	511 (3.7)	21 (0.9)	512 (4.8)	4 (0.4)	491 (8.8)	9.9 (0.06)
Australia	74 (1.2)	522 (2.9)	21 (0.9)	505 (3.4)	5 (0.5)	473 (7.6)	9.9 (0.06)
Saudi Arabia	74 (1.0)	413 (3.7)	19 (0.8)	374 (5.0)	7 (0.5)	355 (7.9)	10.1 (0.06)
Pakistan	74 (2.9)	342 (12.1)	18 (2.2)	285 (12.4)	8 (1.3)	310 (13.3)	10.2 (0.14)
Russian Federation	74 (1.1)	570 (3.8)	24 (0.9)	563 (3.5)	3 (0.4)	540 (8.0)	9.8 (0.05)
Netherlands	73 (1.1)	540 (2.2)	23 (1.0)	536 (3.1)	4 (0.4)	506 (8.9)	9.8 (0.05)
Czech Republic	71 (1.2)	536 (3.0)	24 (0.9)	533 (3.0)	5 (0.5)	504 (8.0)	9.8 (0.05)
Germany	71 (1.1)	528 (2.3)	24 (0.9)	517 (3.7)	5 (0.5)	500 (8.2)	9.7 (0.05)
Qatar	71 (1.2)	465 (3.4)	21 (0.9)	427 (6.0)	8 (0.5)	401 (6.9)	9.8 (0.06)
Norway (5)	70 (1.3)	547 (2.6)	25 (1.1)	540 (3.5)	5 (0.7)	523 (9.5)	9.6 (0.06)
Italy	70 (1.1)	519 (2.6)	26 (0.8)	508 (3.3)	3 (0.5)	478 (7.5)	9.6 (0.05)
Kuwait	70 (1.3)	402 (5.5)	22 (1.0)	368 (5.8)	8 (0.7)	337 (8.1)	9.9 (0.08)
New Zealand	70 (1.3)	491 (2.7)	25 (1.0)	487 (3.7)	5 (0.5)	465 (7.9)	9.7 (0.05)
South Africa (5)	70 (1.4)	396 (3.6)	21 (1.0)	344 (4.1)	10 (0.6)	306 (4.1)	9.8 (0.07)
Latvia	68 (1.2)	551 (2.7)	27 (1.0)	541 (3.6)	5 (0.5)	520 (5.8)	9.5 (0.05)
Singapore	66 (1.0)	637 (3.7)	28 (0.8)	608 (4.6)	6 (0.4)	582 (6.4)	9.6 (0.05)
Chile	66 (1.1)	450 (2.9)	27 (1.0)	436 (3.4)	7 (0.5)	397 (7.4)	9.6 (0.05)
Croatia	65 (1.2)	513 (2.1)	32 (1.2)	503 (4.0)	3 (0.3)	506 (8.5)	9.6 (0.05)
Finland	65 (1.1)	538 (2.4)	30 (1.0)	526 (3.6)	5 (0.4)	506 (5.8)	9.5 (0.05)
Sweden	64 (1.6)	524 (3.5)	31 (1.3)	522 (3.3)	5 (0.6)	491 (7.7)	9.5 (0.06)
France	62 (1.1)	486 (3.5)	34 (0.9)	487 (3.8)	4 (0.5)	459 (8.7)	9.4 (0.04)
Chinese Taipei	62 (1.2)	608 (2.2)	30 (0.9)	590 (2.3)	8 (0.7)	564 (5.9)	9.4 (0.05)
Poland	60 (1.1)	527 (3.0)	32 (0.9)	517 (3.1)	8 (0.5)	498 (4.9)	9.2 (0.05)
Denmark	58 (1.4)	533 (2.3)	35 (1.2)	520 (3.2)	7 (0.6)	492 (5.5)	9.1 (0.06)
Hong Kong SAR	55 (1.5)	613 (3.9)	33 (1.0)	592 (3.5)	12 (1.0)	573 (7.6)	9.2 (0.07)
Philippines	48 (2.0)	333 (7.2)	37 (1.3)	280 (6.6)	15 (1.0)	245 (5.9)	8.8 (0.09)
Japan	43 (1.3)	597 (2.4)	47 (1.0)	591 (2.1)	10 (0.7)	587 (4.9)	8.5 (0.05)
Korea, Rep. of	43 (1.4)	614 (2.5)	50 (1.1)	592 (2.6)	7 (0.7)	570 (5.8)	8.5 (0.05)
International Average	**74 (0.2)**	**508 (0.5)**	**21 (0.1)**	**488 (0.7)**	**5 (0.1)**	**466 (1.2)**	
Benchmarking Participants							
Madrid, Spain	83 (0.9)	521 (2.2)	15 (0.8)	508 (3.7)	2 (0.3)	~ ~	10.3 (0.04)
Dubai, UAE	82 (0.7)	548 (1.8)	15 (0.7)	532 (3.2)	3 (0.3)	504 (9.5)	10.4 (0.04)
Ontario, Canada	75 (1.1)	517 (3.7)	21 (0.9)	502 (4.5)	4 (0.4)	482 (8.0)	10.0 (0.05)
Quebec, Canada	74 (1.5)	533 (2.7)	22 (1.3)	530 (4.7)	4 (0.5)	496 (8.2)	9.9 (0.07)
Abu Dhabi, UAE	71 (0.9)	454 (2.5)	21 (0.6)	425 (3.4)	9 (0.5)	391 (5.9)	9.8 (0.05)
Moscow City, Russian Fed.	69 (1.3)	597 (2.4)	27 (1.1)	588 (2.8)	5 (0.4)	565 (7.3)	9.6 (0.05)

This TIMSS context questionnaire scale was established in 2019 based on the combined response distribution of all countries that participated in TIMSS 2019. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 12.10: Instructional Clarity in Mathematics Lessons – Students' Reports

Students' Reports

Country	High Clarity of Instruction		Moderate Clarity of Instruction		Low Clarity of Instruction		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Jordan	70 (1.5)	431 (3.5)	24 (1.1)	404 (7.1)	6 (0.6)	395 (9.4)	11.0 (0.07)
Turkey	68 (1.4)	510 (4.4)	26 (1.0)	469 (5.5)	6 (0.7)	452 (10.2)	10.9 (0.07)
Egypt	66 (1.2)	424 (5.2)	27 (0.8)	401 (6.0)	6 (0.6)	391 (8.5)	10.8 (0.06)
Georgia	63 (1.8)	470 (4.6)	30 (1.4)	447 (5.1)	6 (0.8)	449 (10.0)	10.8 (0.08)
Lebanon	61 (1.9)	441 (3.2)	32 (1.6)	416 (4.3)	7 (0.6)	403 (6.4)	10.7 (0.07)
Saudi Arabia	60 (1.2)	404 (2.8)	32 (1.0)	382 (3.1)	8 (0.5)	374 (5.4)	10.6 (0.05)
Romania	60 (1.6)	491 (4.9)	27 (1.1)	468 (5.7)	12 (1.3)	457 (6.6)	10.5 (0.08)
Iran, Islamic Rep. of	60 (1.2)	457 (4.1)	30 (0.8)	432 (4.5)	10 (0.8)	424 (6.4)	10.6 (0.06)
Oman	56 (1.4)	433 (3.0)	35 (0.9)	390 (3.6)	9 (0.9)	380 (8.3)	10.3 (0.06)
United States	55 (1.4)	531 (4.7)	33 (0.9)	510 (5.0)	12 (1.0)	491 (6.1)	10.4 (0.07)
United Arab Emirates	55 (0.7)	494 (2.1)	33 (0.5)	460 (2.4)	12 (0.4)	429 (3.6)	10.3 (0.03)
Morocco	52 (1.5)	396 (3.1)	34 (0.9)	380 (2.2)	14 (0.9)	382 (3.8)	10.1 (0.07)
South Africa (9)	52 (0.9)	395 (2.2)	38 (0.7)	386 (2.8)	10 (0.5)	387 (4.3)	10.2 (0.04)
Bahrain	52 (1.4)	493 (2.5)	35 (0.8)	473 (2.6)	13 (0.9)	457 (4.0)	10.2 (0.07)
Kuwait	51 (1.5)	413 (5.8)	35 (0.9)	398 (5.2)	14 (1.1)	386 (5.9)	10.1 (0.07)
Israel	50 (1.6)	529 (5.6)	36 (1.0)	516 (4.6)	14 (1.0)	505 (6.7)	10.1 (0.07)
Malaysia	47 (1.5)	470 (3.6)	46 (1.2)	455 (3.8)	7 (0.8)	439 (6.3)	10.1 (0.06)
Portugal	46 (2.2)	509 (4.1)	39 (1.3)	495 (3.6)	15 (1.8)	488 (7.5)	9.9 (0.11)
England	45 (1.7)	528 (5.5)	40 (1.3)	512 (7.1)	15 (1.1)	507 (6.8)	9.9 (0.08)
Qatar	45 (1.6)	456 (4.7)	39 (1.2)	445 (5.4)	17 (1.3)	413 (5.6)	9.8 (0.08)
Cyprus	45 (1.5)	519 (2.7)	38 (1.2)	494 (2.6)	18 (1.1)	475 (3.3)	9.8 (0.07)
Ireland	44 (1.4)	527 (3.1)	38 (1.1)	523 (3.3)	18 (1.2)	522 (5.1)	9.8 (0.07)
Kazakhstan	44 (1.3)	502 (4.1)	52 (1.2)	477 (3.7)	4 (0.6)	474 (11.1)	10.1 (0.05)
Finland	42 (1.3)	526 (3.0)	45 (1.0)	502 (2.8)	13 (1.0)	481 (4.3)	9.9 (0.06)
Russian Federation	42 (1.3)	557 (5.7)	49 (1.0)	536 (4.3)	9 (0.8)	526 (6.5)	9.9 (0.05)
Italy	42 (1.7)	504 (3.7)	46 (1.3)	495 (2.9)	12 (1.2)	486 (4.7)	9.8 (0.07)
Lithuania	41 (1.8)	538 (4.7)	47 (1.1)	511 (3.0)	12 (1.2)	502 (5.1)	9.8 (0.08)
Singapore	40 (1.2)	632 (4.0)	48 (0.9)	609 (4.4)	11 (0.8)	586 (7.6)	9.9 (0.05)
Norway (9)	40 (1.7)	521 (3.2)	45 (1.1)	501 (2.5)	15 (1.0)	468 (5.6)	9.8 (0.07)
Australia	40 (1.5)	540 (4.3)	42 (1.0)	511 (3.8)	18 (1.3)	487 (4.4)	9.7 (0.08)
New Zealand	39 (1.4)	495 (3.6)	43 (0.9)	480 (3.7)	18 (1.3)	464 (6.5)	9.7 (0.07)
Hungary	38 (1.6)	539 (3.8)	42 (1.0)	508 (3.4)	20 (1.5)	492 (5.8)	9.6 (0.08)
Chinese Taipei	38 (1.2)	639 (3.4)	50 (1.0)	604 (3.2)	12 (0.8)	565 (5.7)	9.8 (0.06)
Sweden	35 (1.7)	511 (3.2)	48 (1.2)	503 (3.5)	17 (1.4)	490 (4.4)	9.5 (0.08)
Chile	33 (1.3)	451 (3.7)	54 (1.0)	440 (3.4)	13 (1.2)	424 (4.7)	9.6 (0.06)
France	32 (1.8)	491 (3.9)	55 (1.5)	483 (2.7)	14 (1.3)	464 (4.1)	9.5 (0.08)
Hong Kong SAR	28 (1.6)	601 (5.3)	51 (1.4)	578 (5.3)	21 (1.5)	554 (6.5)	9.2 (0.08)
Japan	18 (1.0)	618 (3.8)	60 (1.1)	596 (3.4)	22 (1.5)	573 (3.3)	8.8 (0.06)
Korea, Rep. of	18 (1.0)	650 (3.8)	63 (1.1)	608 (3.2)	19 (1.1)	564 (4.8)	8.8 (0.05)
International Average	**46 (0.2)**	**504 (0.6)**	**41 (0.2)**	**482 (0.7)**	**13 (0.2)**	**467 (1.0)**	
Benchmarking Participants							
Dubai, UAE	61 (0.9)	549 (2.5)	31 (0.9)	522 (2.9)	8 (0.5)	501 (4.5)	10.6 (0.04)
Ontario, Canada	59 (2.2)	542 (5.0)	33 (1.5)	516 (4.1)	8 (1.0)	507 (7.2)	10.6 (0.10)
Western Cape, RSA (9)	54 (1.7)	441 (5.0)	36 (1.1)	441 (4.8)	10 (0.9)	450 (8.7)	10.3 (0.07)
Gauteng, RSA (9)	50 (1.7)	425 (3.6)	38 (1.1)	416 (3.3)	13 (1.3)	424 (5.2)	10.1 (0.08)
Abu Dhabi, UAE	47 (1.1)	464 (3.4)	37 (0.8)	422 (3.2)	15 (0.8)	396 (5.5)	10.0 (0.06)
Quebec, Canada	46 (2.1)	551 (3.8)	43 (1.4)	542 (4.1)	11 (1.1)	521 (8.5)	10.1 (0.09)
Moscow City, Russian Fed.	41 (1.7)	588 (4.9)	49 (1.4)	569 (4.5)	10 (1.0)	555 (7.7)	9.8 (0.07)

This TIMSS context questionnaire scale was established in 2019 based on the combined response distribution of all countries that participated in TIMSS 2019. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Disorderly Behavior During Mathematics Lessons

Good classroom management and having students who pay attention and focus on the lessons help create a classroom environment conducive to student learning. Students were asked about the frequency of disorderly behavior during mathematics lessons, including whether students do not listen to what the teacher says, there is disruptive noise, it is too disorderly for students to work well, the teacher has to wait a long time for students to quiet down, students interrupt the teacher, and the teacher has to keep telling students to follow the classroom rules. These responses were combined into the *Disorderly Behavior During Mathematics Lessons* scale, described in Exhibit 12.11 (see About the Scale). Exhibits 12.12 and 12.13 present students' reports about disorderly behavior for fourth and eighth grades, respectively. Countries are ordered by the percentage reporting disorderly behavior in "few or no lessons."

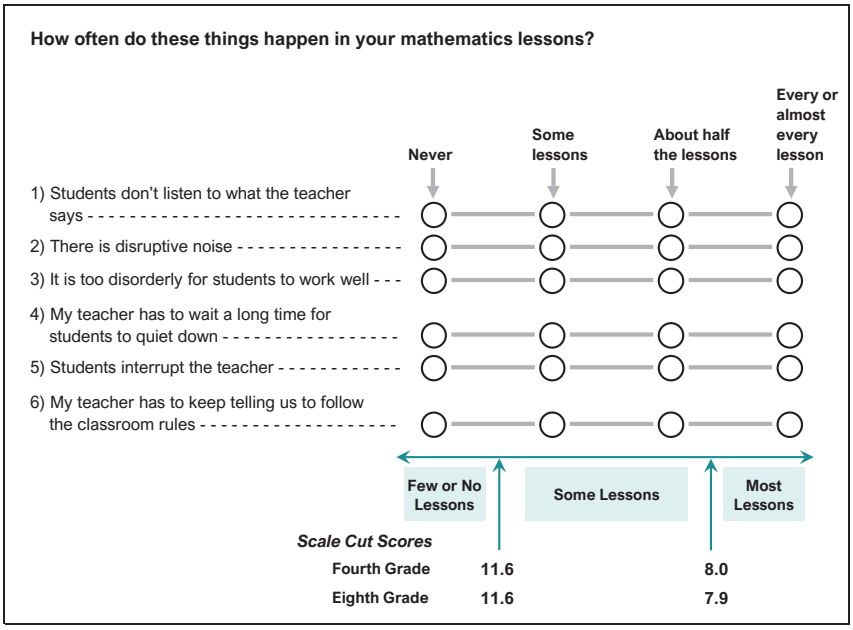
In fourth and eighth grades, about two-third of students (68% in fourth grade and 65% in eighth grade) reported disorderly behavior in "some lessons," on average, and about one-fifth (18% in fourth grade and 21% in eighth grade) reported it in "few or no lessons." Fourteen percent of fourth grade students and 13 percent of eighth grade students reported disorderly behavior in "most lessons." Internationally and in most countries, there was a clear negative association between the frequency of disorderly behavior and average student achievement, with average achievement decreasing with higher frequencies of disorderly behavior. For example, in eighth grade, students reporting disorderly behavior in "few or no lessons" had an average score of 502, followed by 485 for students reporting it in "some lessons," and 466 for students reporting it in "most lessons."

Exhibit 12.11: Disorderly Behavior During Mathematics Lessons

Students' Reports

About the Scale

Students were scored according to their responses to six statements on the *Disorderly Behavior During Mathematics Lessons* scale. Cut scores divide the scale into three categories. Students who reported disorderly behavior in **Few or No Lessons** had a score at or above the cut score corresponding to reporting that three of the six situations "never" happened in their mathematics lessons and the other three happened in "some lessons," on average. Students who reported disorderly behavior in **Most Lessons** had a score at or below the cut score corresponding to reporting that three of the six situations happened in "every or almost every lesson" and the other three happened in "about half the lessons," on average. All other students reported disorderly behavior in **Some Lessons**.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 12.12: Disorderly Behavior During Mathematics Lessons

Students' Reports

Country	Few or No Lessons		Some Lessons		Most Lessons		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Japan	41 (1.8)	598 (2.4)	54 (1.6)	592 (2.3)	5 (0.5)	570 (6.9)	11.3 (0.09)
Armenia	37 (1.7)	504 (3.5)	52 (1.4)	505 (2.7)	11 (0.7)	479 (4.4)	11.0 (0.10)
Albania	35 (2.5)	503 (5.4)	59 (2.4)	496 (3.7)	6 (1.0)	446 (11.3)	10.9 (0.12)
Kazakhstan	33 (1.9)	524 (3.7)	60 (1.6)	509 (2.7)	7 (0.7)	492 (5.0)	10.8 (0.10)
Georgia	33 (1.8)	490 (5.2)	57 (1.6)	481 (4.1)	9 (1.0)	451 (7.8)	10.8 (0.10)
Kosovo	32 (1.5)	447 (3.8)	58 (1.4)	454 (3.1)	9 (0.8)	400 (7.1)	10.7 (0.07)
Bulgaria	30 (2.1)	532 (4.3)	60 (1.5)	519 (3.3)	10 (1.8)	461 (16.2)	10.6 (0.14)
North Macedonia	29 (2.1)	488 (6.8)	59 (2.1)	480 (5.6)	12 (0.9)	424 (8.8)	10.5 (0.09)
Azerbaijan	29 (1.9)	522 (3.5)	62 (1.7)	524 (3.0)	9 (0.7)	510 (5.9)	10.6 (0.08)
Saudi Arabia	27 (1.3)	418 (5.4)	62 (1.2)	398 (3.8)	11 (0.6)	367 (5.3)	10.4 (0.07)
Lithuania	26 (2.0)	551 (4.1)	67 (1.7)	542 (3.1)	7 (0.7)	516 (7.4)	10.6 (0.09)
Montenegro	26 (1.0)	457 (2.7)	62 (0.9)	459 (2.2)	12 (0.8)	424 (6.0)	10.4 (0.05)
Morocco	25 (2.2)	384 (8.2)	65 (2.1)	389 (4.6)	10 (0.8)	357 (6.6)	10.4 (0.11)
Serbia	24 (1.6)	511 (5.4)	65 (1.5)	512 (3.7)	11 (1.1)	485 (6.0)	10.3 (0.08)
United Arab Emirates	24 (0.9)	498 (2.6)	61 (0.8)	482 (1.9)	15 (0.4)	463 (3.3)	10.2 (0.05)
Russian Federation	24 (1.8)	576 (5.3)	60 (1.4)	570 (3.6)	16 (1.2)	546 (4.4)	10.1 (0.11)
Oman	23 (1.6)	449 (6.4)	64 (1.5)	431 (4.1)	13 (0.7)	413 (7.1)	10.2 (0.09)
Pakistan	23 (3.6)	356 (16.5)	67 (2.7)	326 (11.7)	10 (1.6)	292 (12.3)	10.3 (0.24)
Iran, Islamic Rep. of	22 (1.6)	430 (9.0)	61 (1.5)	450 (4.3)	17 (1.0)	443 (4.6)	10.1 (0.08)
Hong Kong SAR	21 (1.3)	607 (4.1)	67 (1.4)	602 (3.6)	12 (1.1)	591 (8.0)	10.2 (0.08)
Bosnia and Herzegovina	20 (1.4)	456 (3.8)	62 (1.2)	458 (2.6)	18 (1.1)	432 (3.8)	9.9 (0.08)
Turkey (5)	20 (1.3)	540 (6.3)	67 (1.0)	523 (4.6)	13 (0.9)	505 (7.5)	10.1 (0.07)
Hungary	19 (1.3)	537 (3.9)	70 (1.1)	524 (2.8)	11 (0.9)	498 (5.6)	10.2 (0.07)
Korea, Rep. of	19 (1.6)	601 (4.3)	73 (1.3)	600 (2.3)	8 (0.8)	596 (5.0)	10.3 (0.08)
Bahrain	19 (1.3)	491 (4.4)	65 (1.1)	480 (2.7)	16 (0.8)	467 (4.0)	10.0 (0.07)
Austria	18 (1.4)	556 (3.2)	65 (1.1)	541 (2.2)	16 (1.1)	516 (4.6)	9.9 (0.09)
Ireland	18 (1.3)	565 (4.1)	74 (1.3)	549 (2.5)	8 (0.7)	515 (6.9)	10.2 (0.06)
Chinese Taipei	18 (1.3)	602 (3.6)	72 (1.1)	599 (2.3)	10 (0.8)	598 (3.9)	10.1 (0.07)
Slovak Republic	17 (1.6)	523 (6.5)	66 (1.7)	512 (3.5)	17 (1.4)	489 (5.9)	9.8 (0.09)
Croatia	17 (1.3)	516 (4.3)	68 (1.5)	511 (2.3)	15 (1.6)	496 (4.9)	9.9 (0.09)
Qatar	17 (1.2)	460 (4.7)	66 (1.2)	455 (3.8)	17 (0.9)	429 (4.8)	9.8 (0.07)
Czech Republic	16 (1.7)	552 (5.1)	67 (1.6)	535 (2.6)	17 (1.2)	508 (4.8)	9.9 (0.09)
Latvia	15 (1.3)	561 (3.3)	72 (1.0)	547 (2.8)	12 (0.9)	526 (5.5)	10.0 (0.08)
Finland	15 (1.1)	538 (4.0)	77 (1.0)	532 (2.6)	8 (0.7)	525 (5.1)	10.2 (0.05)
Northern Ireland	14 (1.2)	592 (5.4)	77 (1.2)	566 (2.8)	9 (0.9)	527 (7.2)	10.0 (0.06)
Kuwait	14 (1.5)	393 (8.0)	68 (1.6)	393 (5.1)	18 (0.9)	375 (6.6)	9.6 (0.07)
Poland	13 (1.1)	527 (5.3)	67 (1.1)	525 (2.7)	19 (1.2)	505 (4.1)	9.6 (0.08)
England	11 (1.1)	587 (8.2)	74 (1.1)	558 (3.3)	14 (1.1)	530 (5.1)	9.8 (0.07)
Cyprus	11 (0.8)	552 (4.8)	73 (1.0)	535 (3.0)	15 (1.2)	507 (4.0)	9.7 (0.06)
Belgium (Flemish)	11 (1.2)	547 (4.3)	80 (1.2)	533 (1.9)	9 (0.7)	514 (5.3)	9.9 (0.06)
Norway (5)	11 (1.0)	549 (6.2)	79 (0.9)	545 (2.3)	10 (0.8)	532 (6.1)	10.0 (0.06)
Portugal	11 (0.8)	533 (4.9)	72 (0.9)	529 (2.5)	17 (1.0)	503 (4.9)	9.7 (0.05)
France	10 (0.9)	509 (6.1)	74 (1.2)	488 (3.1)	16 (1.1)	455 (5.1)	9.6 (0.06)
Sweden	10 (1.3)	537 (5.9)	75 (1.3)	523 (2.8)	15 (1.3)	507 (4.6)	9.7 (0.09)
United States	9 (0.6)	558 (5.3)	70 (0.7)	542 (2.7)	21 (0.8)	511 (3.2)	9.4 (0.04)
South Africa (5)	9 (0.7)	387 (7.7)	68 (0.8)	374 (3.7)	23 (0.7)	378 (4.5)	9.2 (0.05)
Netherlands	8 (0.9)	539 (4.9)	80 (1.0)	539 (2.2)	11 (1.0)	530 (4.9)	9.7 (0.06)
Canada	7 (0.5)	531 (6.0)	77 (0.6)	514 (2.0)	16 (0.6)	491 (3.3)	9.5 (0.03)
Malta	7 (0.4)	511 (4.3)	73 (0.7)	513 (1.6)	19 (0.6)	493 (3.0)	9.4 (0.02)
Germany	7 (0.7)	534 (6.1)	72 (1.1)	527 (2.4)	20 (1.1)	512 (4.0)	9.3 (0.06)
Australia	7 (0.8)	542 (6.4)	76 (0.9)	522 (2.6)	17 (1.1)	479 (5.5)	9.5 (0.06)
Denmark	7 (1.0)	533 (6.6)	80 (1.2)	527 (1.9)	13 (1.0)	512 (5.6)	9.7 (0.06)
Spain	7 (0.6)	513 (6.5)	77 (1.0)	508 (2.0)	16 (1.0)	478 (4.2)	9.4 (0.05)
Italy	7 (0.8)	518 (4.8)	72 (1.1)	518 (2.7)	22 (1.1)	506 (3.8)	9.2 (0.05)
New Zealand	6 (0.5)	525 (6.6)	73 (1.1)	495 (2.9)	21 (1.0)	455 (4.0)	9.3 (0.05)
Philippines	6 (0.9)	309 (8.9)	78 (1.4)	305 (6.5)	16 (1.4)	274 (8.5)	9.3 (0.07)
Chile	5 (0.5)	449 (6.4)	61 (1.1)	448 (2.9)	34 (1.3)	433 (3.7)	8.7 (0.05)
Singapore	- -	- -	- -	- -	- -	- -	- -
International Average	**18 (0.2)**	**511 (0.8)**	**68 (0.2)**	**502 (0.5)**	**14 (0.1)**	**478 (0.8)**	
Benchmarking Participants							
Dubai, UAE	24 (1.4)	549 (3.2)	62 (1.3)	545 (2.1)	14 (0.9)	531 (4.0)	10.3 (0.09)
Abu Dhabi, UAE	18 (1.1)	456 (5.5)	65 (1.1)	444 (2.4)	17 (0.7)	420 (3.9)	9.9 (0.06)
Moscow City, Russian Fed.	18 (1.3)	613 (2.9)	65 (1.2)	593 (2.4)	17 (1.2)	573 (3.6)	9.9 (0.08)
Quebec, Canada	10 (1.2)	546 (5.2)	76 (1.1)	532 (2.7)	14 (1.0)	517 (3.9)	9.7 (0.07)
Madrid, Spain	7 (0.9)	524 (6.5)	79 (1.1)	523 (1.9)	14 (1.0)	494 (5.0)	9.5 (0.07)
Ontario, Canada	6 (0.7)	539 (13.5)	77 (1.0)	515 (3.4)	17 (1.0)	493 (5.1)	9.4 (0.05)

This TIMSS context questionnaire scale was established in 2019 based on the combined response distribution of all countries that participated in TIMSS 2019. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 12.13: Disorderly Behavior During Mathematics Lessons

Students' Reports

Country	Few or No Lessons		Some Lessons		Most Lessons		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Japan	60 (1.8)	599 (3.0)	38 (1.7)	588 (3.3)	2 (0.3)	~ ~	11.8 (0.09)
Kazakhstan	42 (1.4)	499 (4.1)	55 (1.3)	480 (3.7)	3 (0.4)	476 (12.2)	11.2 (0.05)
Ireland	35 (1.4)	548 (2.9)	55 (1.3)	516 (3.1)	10 (0.8)	490 (5.5)	10.6 (0.06)
Russian Federation	33 (1.8)	556 (5.8)	58 (1.5)	540 (4.8)	9 (0.8)	521 (6.2)	10.6 (0.09)
Chinese Taipei	32 (1.5)	615 (3.4)	60 (1.2)	612 (3.1)	9 (0.8)	607 (6.5)	10.6 (0.08)
Romania	31 (1.8)	506 (6.5)	60 (1.5)	473 (4.3)	9 (0.8)	438 (7.8)	10.5 (0.08)
Oman	26 (1.1)	423 (3.8)	66 (0.9)	411 (3.2)	8 (0.6)	400 (6.9)	10.3 (0.06)
United Arab Emirates	25 (0.9)	501 (3.5)	62 (0.7)	472 (1.8)	13 (0.5)	440 (3.7)	10.2 (0.04)
Lithuania	25 (1.5)	534 (4.0)	65 (1.3)	518 (3.2)	10 (1.0)	508 (7.1)	10.4 (0.08)
Turkey	25 (1.7)	513 (6.4)	64 (1.2)	490 (4.8)	11 (0.9)	490 (7.6)	10.3 (0.09)
France	25 (2.0)	489 (3.9)	64 (1.6)	482 (2.8)	11 (1.1)	475 (5.4)	10.2 (0.10)
Iran, Islamic Rep. of	25 (1.1)	461 (5.4)	65 (0.9)	443 (3.5)	11 (0.7)	429 (6.5)	10.2 (0.06)
Korea, Rep. of	25 (1.8)	600 (4.7)	66 (1.4)	608 (3.3)	9 (0.9)	620 (5.2)	10.3 (0.09)
Israel	24 (1.3)	548 (6.5)	63 (1.3)	519 (4.6)	12 (0.7)	483 (6.5)	10.2 (0.06)
Georgia	23 (1.6)	474 (6.9)	68 (1.6)	460 (4.2)	9 (0.8)	446 (10.8)	10.2 (0.08)
Hungary	23 (1.5)	533 (5.0)	66 (1.3)	516 (3.2)	11 (0.9)	488 (6.4)	10.2 (0.08)
United States	23 (1.2)	555 (5.3)	63 (1.0)	514 (4.8)	14 (0.8)	482 (5.3)	10.0 (0.07)
Jordan	22 (1.1)	437 (6.0)	65 (1.1)	424 (3.8)	12 (0.8)	391 (6.1)	10.0 (0.06)
Saudi Arabia	21 (0.9)	403 (4.6)	66 (1.0)	395 (2.7)	12 (0.7)	382 (4.6)	10.0 (0.05)
Finland	21 (1.4)	509 (3.6)	69 (1.2)	511 (2.8)	10 (0.8)	499 (4.9)	10.1 (0.07)
Hong Kong SAR	21 (1.5)	577 (5.6)	64 (1.2)	583 (4.0)	16 (1.1)	563 (7.8)	9.9 (0.09)
Lebanon	21 (1.3)	438 (4.3)	64 (1.4)	429 (3.2)	15 (1.2)	426 (7.0)	9.9 (0.07)
Egypt	18 (1.0)	427 (7.0)	69 (1.0)	418 (4.8)	13 (0.7)	389 (8.9)	9.8 (0.05)
England	18 (1.5)	554 (6.9)	63 (1.2)	519 (5.6)	19 (1.2)	481 (7.1)	9.7 (0.08)
Norway (9)	17 (1.4)	509 (4.4)	72 (1.4)	504 (2.7)	10 (0.9)	496 (6.1)	10.1 (0.07)
Qatar	16 (1.1)	465 (8.6)	67 (1.1)	446 (4.1)	16 (0.9)	415 (5.7)	9.7 (0.07)
Bahrain	16 (0.8)	494 (5.9)	68 (0.8)	480 (2.5)	16 (0.9)	473 (4.4)	9.6 (0.05)
Italy	15 (1.6)	513 (4.5)	67 (1.5)	497 (3.1)	18 (1.5)	487 (4.3)	9.5 (0.09)
Kuwait	15 (0.9)	407 (7.0)	69 (0.9)	408 (4.9)	16 (1.1)	387 (5.3)	9.6 (0.07)
Cyprus	14 (1.3)	524 (5.6)	69 (1.2)	500 (1.9)	17 (1.2)	491 (6.0)	9.6 (0.08)
Morocco	12 (0.7)	405 (5.6)	73 (0.8)	388 (2.3)	15 (0.8)	382 (3.1)	9.5 (0.05)
Sweden	11 (0.9)	506 (5.7)	72 (1.1)	505 (2.7)	17 (1.3)	495 (4.5)	9.5 (0.07)
Australia	11 (0.9)	565 (7.5)	65 (1.1)	520 (3.9)	24 (1.1)	493 (4.2)	9.2 (0.06)
Portugal	11 (1.5)	510 (6.5)	64 (1.7)	499 (3.8)	25 (1.8)	499 (5.2)	9.2 (0.10)
South Africa (9)	9 (0.5)	421 (5.0)	71 (0.5)	388 (2.3)	19 (0.5)	384 (3.0)	9.2 (0.04)
New Zealand	9 (0.9)	514 (7.4)	69 (1.6)	485 (3.2)	23 (1.8)	464 (6.5)	9.2 (0.09)
Chile	8 (0.9)	452 (6.6)	72 (1.2)	442 (3.1)	20 (1.3)	435 (3.8)	9.3 (0.07)
Malaysia	7 (0.5)	507 (6.0)	85 (0.5)	460 (3.1)	8 (0.5)	428 (6.4)	9.6 (0.04)
Singapore	- -	- -	- -	- -	- -	- -	- -
International Average	**21 (0.2)**	**502 (0.9)**	**65 (0.2)**	**485 (0.6)**	**13 (0.2)**	**466 (1.0)**	
Benchmarking Participants							
Moscow City, Russian Fed.	29 (1.6)	586 (5.0)	62 (1.4)	574 (4.6)	10 (0.8)	553 (7.8)	10.4 (0.08)
Dubai, UAE	28 (1.3)	558 (3.5)	63 (1.2)	533 (2.4)	10 (0.6)	500 (5.1)	10.4 (0.06)
Abu Dhabi, UAE	19 (1.0)	472 (5.6)	64 (0.9)	434 (3.4)	17 (0.8)	414 (4.6)	9.8 (0.06)
Quebec, Canada	17 (1.7)	554 (4.7)	68 (1.6)	546 (3.9)	15 (1.3)	525 (7.4)	9.7 (0.10)
Ontario, Canada	17 (1.6)	553 (6.2)	66 (1.8)	531 (4.2)	17 (1.9)	504 (8.5)	9.7 (0.10)
Western Cape, RSA (9)	13 (1.5)	495 (8.7)	65 (1.4)	442 (4.5)	22 (1.5)	413 (5.1)	9.3 (0.09)
Gauteng, RSA (9)	11 (1.0)	464 (7.9)	68 (1.1)	420 (3.0)	20 (1.1)	403 (4.3)	9.3 (0.07)

This TIMSS context questionnaire scale was established in 2019 based on the combined response distribution of all countries that participated in TIMSS 2019. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Science Curriculum and Instruction

Instructional Time in Science

Though many factors influence the relationship between amount of instructional time and student achievement—primarily, the quality of the instruction and the students' readiness to learn—instructional time remains a crucial component in considering students' opportunity to learn. Instructional time was calculated using principals' reports on the number of school days per year and the number of instructional hours per day and teachers' reports on the weekly number of hours of science instruction, as explained in Exhibit 13.1 (see About the Scale). Exhibits 13.2 and 13.3 present principals' and teachers' reports about the instructional hours overall per year and hours spent on science instruction in fourth grade and eighth grade, respectively. For countries teaching science as separate subjects in the eighth grade, the instructional time included the amount of time spent on each individual science subject. Countries are ordered by the number of hours per year for science instruction.

On average, the fourth grade students across the TIMSS 2019 countries received 895 hours per year of instruction across all subjects; 73 hours, or about 8 percent of the total, were devoted to science instruction. The number of hours devoted to science instruction ranged from a high of 158 hours in the Philippines to just 34 hours in Ireland. The amount of science instructional time relative to total instructional time also varied across countries, reflecting different approaches to organizing and addressing the science curriculum. It is notable, though, that there is much less science instructional time for fourth grade students across countries compared with mathematics. As shown in Exhibit 12.2, fourth grade students had an average of 154 hours of mathematics instruction, more than twice that for science (Exhibit 13.2). As might be anticipated, within-country of estimates instructional time can vary somewhat from the levels of instructional time established by policy.

The eighth grade students across the TIMSS 2019 countries received an average of 1,023 hours of instruction across all subjects; 137 hours, or about 13 percent of the total, were devoted to science instruction. The number of hours for science instruction ranged from 243 in Lebanon, where science is taught as separate subjects, to 70 in Italy. In nearly all of the countries that participated in TIMSS at the fourth and eighth grades, the number of hours devoted to science instruction increased between fourth and eighth grades—sometimes by three or more times the average hours in fourth grade—reflecting the increased emphasis on science in the curriculum by the eighth grade.

Exhibit 13.3 also includes, for countries teaching separate science subjects, the average number of hours for biology, chemistry, physics, and Earth science. In this subset of countries, students had an estimated 181 hours of science instruction. On average, the highest number of annual hours were devoted to instruction in physics (52 hours), followed by chemistry (51 hours), biology (45 hours), and Earth science (40 hours).

Exhibit 13.1: Instructional Time Spent on Science

Students' Results based on Principals' and Teachers' Reports

About the Scale

Total Instructional Hours Per Year = Principal Reports of School Days per Year × Principal Reports of Instructional Hours per Day

Hours per Year for Science Instruction = $\frac{\text{Teacher Reports of Weekly Science Instructional Hours}}{\text{Principal Reports of School Days per Week}}$ × Principal Reports of School Days per Year

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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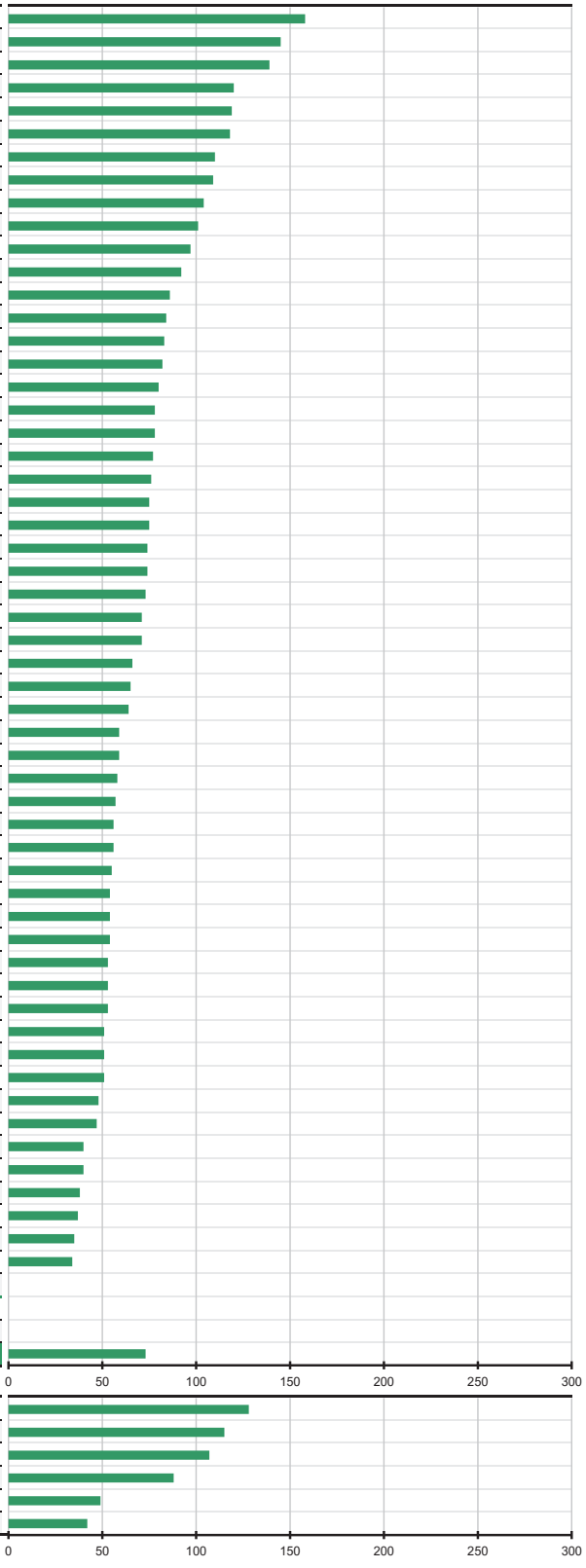
Exhibit 13.2: Instructional Time Spent on Science

Students' Results based on Principals' and Teachers' Reports

Country	Total Instructional Hours per Year	Hours per Year for Science Instruction
Philippines	1225 (12.6)	158 (3.4)
South Africa (5)	r 1205 (12.1)	r 145 (4.4)
Pakistan	1218 (22.3)	s 139 (10.1)
Oman	r 1016 (13.9)	r 120 (1.9)
United Arab Emirates	r 1034 (3.9)	s 119 (1.7)
Bahrain	1012 (8.2)	118 (2.8)
Spain	869 (7.1)	110 (3.3)
Turkey (5)	1001 (24.2)	109 (4.7)
Portugal	887 (14.8)	104 (3.1)
Qatar	1011 (11.8)	101 (3.8)
Chile	r 1186 (22.3)	r 97 (3.0)
Japan	904 (4.9)	92 (0.6)
Chinese Taipei	953 (8.9)	86 (0.9)
Singapore	1009 (0.0)	84 (0.9)
United States	1106 (8.4)	83 (2.4)
Croatia	859 (26.2)	82 (1.6)
Canada	951 (3.9)	r 80 (2.0)
Iran, Islamic Rep. of	627 (6.0)	78 (1.1)
Kuwait	r 899 (24.3)	r 78 (4.2)
Serbia	794 (19.2)	77 (4.9)
Austria	759 (3.1)	r 76 (2.0)
Montenegro	653 (1.6)	75 (2.5)
Sweden	r 854 (10.7)	s 75 (2.2)
Denmark	r 1043 (10.4)	r 74 (1.5)
Bosnia and Herzegovina	851 (35.9)	74 (2.6)
Italy	1098 (15.0)	73 (1.5)
Finland	746 (9.9)	71 (1.6)
Korea, Rep. of	694 (8.7)	71 (1.5)
Saudi Arabia	1056 (18.0)	r 66 (3.9)
Norway (5)	r 868 (14.4)	s 65 (1.8)
Slovak Republic	784 (9.9)	64 (1.5)
Lithuania	725 (10.0)	59 (1.4)
Kosovo	777 (32.0)	59 (2.3)
North Macedonia	818 (22.0)	58 (2.0)
Georgia	750 (18.7)	57 (1.8)
Germany	r 833 (10.1)	s 56 (3.9)
Hungary	842 (13.8)	56 (2.9)
Poland	r 737 (10.1)	s 55 (0.9)
Albania	729 (10.3)	54 (0.7)
Morocco	1081 (20.4)	54 (1.5)
Armenia	752 (6.4)	54 (1.0)
Australia	r 1015 (11.8)	s 53 (2.0)
Azerbaijan	731 (19.4)	53 (0.8)
Latvia	689 (8.9)	53 (1.4)
Czech Republic	763 (8.9)	51 (1.5)
Malta	930 (1.4)	51 (0.2)
Cyprus	849 (10.6)	51 (1.8)
Russian Federation	663 (6.8)	48 (1.0)
France	r 820 (7.4)	r 47 (1.8)
New Zealand	917 (5.7)	r 40 (2.9)
Kazakhstan	732 (14.0)	r 40 (3.3)
Northern Ireland	r 947 (7.1)	r 38 (2.8)
Bulgaria	700 (14.9)	37 (0.7)
Netherlands	s 1049 (10.3)	s 35 (3.2)
Ireland	925 (5.0)	34 (0.9)
Belgium (Flemish)	r 951 (14.6)	- -
England	s 989 (11.2)	y - -
Hong Kong SAR	r 1022 (14.3)	y - -
International Average	**895 (1.9)**	**73 (0.4)**
Benchmarking Participants		
Abu Dhabi, UAE	r 1075 (3.2)	s 128 (2.9)
Madrid, Spain	909 (12.5)	115 (3.5)
Dubai, UAE	r 1038 (0.6)	s 107 (2.6)
Ontario, Canada	954 (7.5)	s 88 (3.8)
Moscow City, Russian Fed.	645 (9.6)	49 (1.1)
Quebec, Canada	922 (8.2)	r 42 (1.9)



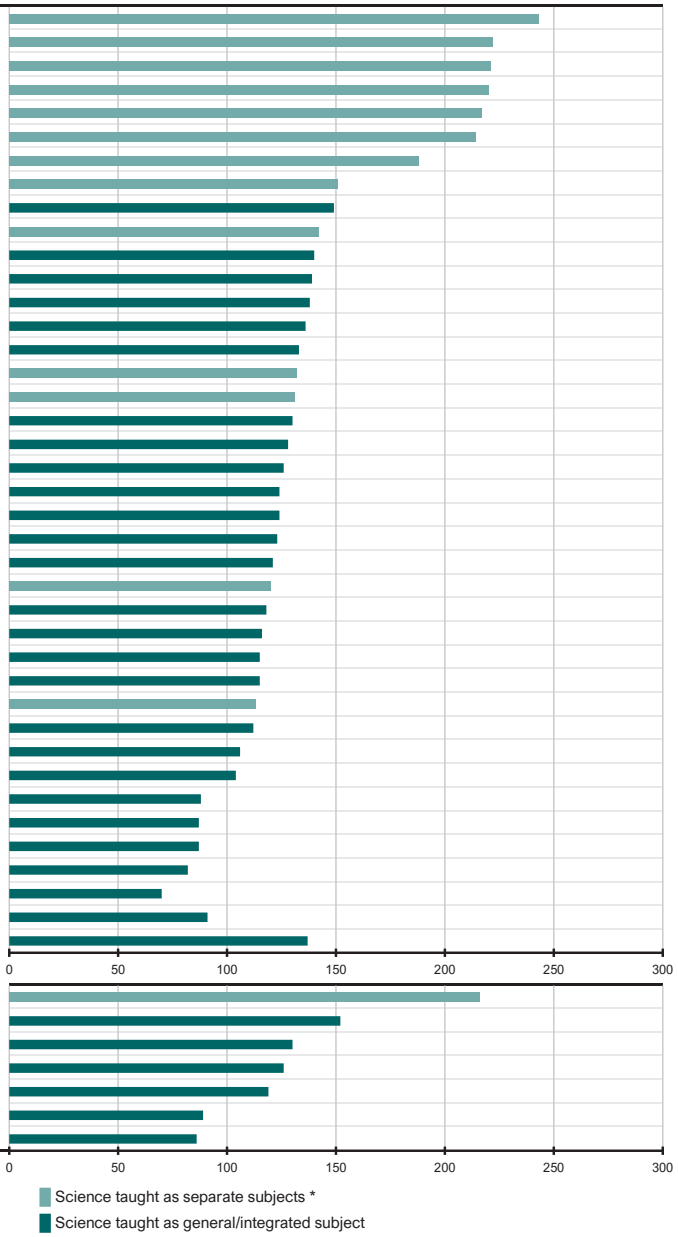
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 13.3: Instructional Time Spent on Science

Students' Results based on Principals' and Teachers' Reports

Country	Total Instructional Hours per Year	Hours per Year for Science Instruction *
Lebanon *	960 (7.3)	243 (8.8)
Georgia *	850 (14.5)	222 (6.6)
Kazakhstan *	886 (15.7)	221 (5.5)
Russian Federation *	868 (13.3)	220 (6.7)
Lithuania *	918 (12.6)	217 (4.5)
Hungary *	899 (11.5)	r 214 (5.4)
Romania *	926 (19.8)	188 (10.4)
Morocco *	r 1341 (30.8)	r 151 (2.1)
Oman	r 1056 (18.9)	s 149 (3.6)
Finland *	912 (9.4)	142 (3.0)
United States	1148 (9.9)	s 140 (3.6)
United Arab Emirates	r 1094 (2.7)	s 139 (1.5)
Bahrain	1115 (0.6)	138 (4.1)
Chinese Taipei	1137 (12.3)	136 (2.1)
Japan	1018 (3.0)	133 (0.8)
Portugal *	1138 (31.4)	132 (2.9)
Sweden *	r 926 (11.4)	131 (6.5)
Malaysia	1165 (18.7)	130 (3.3)
South Africa (9)	s 1212 (13.5)	s 128 (3.6)
Israel	1118 (13.6)	r 126 (2.8)
New Zealand	r 967 (10.2)	r 124 (2.7)
Australia	1013 (6.8)	r 124 (1.8)
Qatar	1090 (9.9)	123 (3.8)
Turkey	1009 (27.5)	121 (4.6)
Cyprus *	r 882 (1.0)	s 120 (1.4)
Kuwait	r 982 (21.2)	r 118 (3.5)
Saudi Arabia	r 1069 (18.9)	r 116 (4.6)
Chile	1221 (20.5)	r 115 (4.1)
Jordan	1020 (13.0)	115 (2.2)
France *	r 1112 (19.3)	s 113 (1.4)
Singapore	1053 (0.0)	112 (1.9)
Egypt	s 1110 (34.6)	s 106 (3.1)
Hong Kong SAR	999 (12.6)	r 104 (3.3)
Norway (9)	r 949 (8.2)	s 88 (2.2)
Korea, Rep. of	933 (10.7)	87 (3.0)
Ireland	973 (4.7)	r 87 (1.4)
Iran, Islamic Rep. of	768 (8.1)	82 (2.7)
Italy	1065 (11.2)	70 (1.6)
England	s 995 (13.3)	x 91 (7.7)
International Average	**1023 (2.5)**	**137 (0.7)**
Benchmarking Participants		
Moscow City, Russian Fed. *	825 (8.2)	216 (3.6)
Abu Dhabi, UAE	r 1138 (3.5)	s 152 (2.6)
Dubai, UAE	r 1066 (1.0)	s 130 (2.8)
Gauteng, RSA (9)	s 1193 (21.1)	s 126 (4.1)
Western Cape, RSA (9)	r 1190 (11.6)	s 119 (3.3)
Ontario, Canada	r 966 (8.2)	x 89 (4.3)
Quebec, Canada	r 936 (16.4)	x 86 (9.5)



* For countries teaching science as separate subjects, hours per year for science instruction is based on total hours across subjects.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 13.3: Instructional Time Spent on Science

Students' Results based on Principals' and Teachers' Reports

(Continued)

Separate Science Results

Country	Hours per Year for Instruction									
	All Science Subjects		Biology		Chemistry		Physics		Earth Science	
Lebanon		243 (8.8)		83 (4.7)		78 (3.3)	r	82 (3.8)		- -
Georgia		222 (6.6)		53 (2.7)		55 (2.7)		58 (2.1)	r	55 (2.8)
Kazakhstan		221 (5.5)		56 (2.0)		57 (2.3)		55 (1.4)		53 (1.9)
Russian Federation		220 (6.7)		54 (2.4)		54 (1.7)		60 (3.0)		53 (1.4)
Lithuania		217 (4.5)		36 (1.9)		62 (1.7)		63 (1.7)		57 (1.6)
Hungary	r	214 (5.4)	r	52 (1.9)	r	60 (2.3)	r	50 (2.5)	r	54 (1.7)
Romania		188 (10.4)		41 (3.7)	r	75 (5.3)		72 (4.7)		- -
Morocco	r	151 (2.1)	r	38 (0.6)	r	38 (0.7)	r	38 (0.7)	r	38 (0.6)
Finland		142 (3.0)		33 (1.1)		38 (0.9)		38 (0.9)		33 (1.1)
Portugal		132 (2.9)		37 (0.7)		44 (1.2)		44 (1.2)		6 (0.1)
Sweden		131 (6.5)		44 (2.6)		42 (2.2)		45 (2.5)		- -
Cyprus	s	120 (1.4)	s	25 (0.3)	s	26 (0.6)	r	40 (0.5)	r	28 (0.8)
France	s	113 (1.4)		- -		- -		- -		- -
International Average		**181 (1.5)**		**45 (0.6)**		**51 (0.6)**		**52 (0.6)**		**40 (0.5)**
Benchmarking Participants										
Moscow City, Russian Fed.		216 (3.6)		52 (1.3)		54 (1.4)		57 (2.1)		53 (2.3)

France teaches the science subjects in two courses: one for biology and Earth science and one for chemistry and physics.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Students Taught the TIMSS Science Topics

The science content domains and underlying topic areas assessed in TIMSS 2019 are documented in the TIMSS 2019 Science Framework, which was developed in collaboration with the participating countries. The science topics included in the TIMSS assessments do not represent the intersection of the topics that are universally taught but rather are a forward looking conception of science teaching and learning.

Exhibit 13.4 (see About the Scale) shows the science content domains—life science, physical science, and Earth science—and the 26 underlying topics in the TIMSS fourth grade science assessment. There were 7 topics in life science, 12 in physical science, and 7 in Earth science. Exhibit 13.6 (see About the Scale) shows the same information for the eighth grade science assessment, with its four content domains—biology, chemistry, physics, and Earth science, and the 26 underlying topics. There were 7 topics in biology, 8 in chemistry, 7 in physics, and 4 in Earth science. Teachers were asked to indicate, for each topic, whether it had been "mostly taught before this year" to students in the assessed class or "mostly taught this year," or had been "not taught or just introduced" to students. This information serves as an indicator of the "implemented curriculum." It can be examined together with information provided by TIMSS National Research Coordinators about whether each of the TIMSS 2019 science topics was included in their countries' intended curriculum through the fourth or eighth grade and, if so, whether the topics were intended to be taught to "all or almost all students" or "only the more able students." This information about the intended curriculum is reported in the *TIMSS 2019 Encyclopedia*.

Exhibit 13.5 presents fourth grade teachers' reports about the TIMSS science topics that had been taught to students in fourth grade classrooms either prior to or during the year of the TIMSS assessment. The exhibit shows, for each country and the international average, the percentage of students whose teachers reported that the students had been taught each of the topics (before or during the school year), averaged across all topics in each science content domain, and also across all topics in all science domains. Exhibit 13.7 presents parallel information for the eighth grade, reported by teachers about the TIMSS science topics in the eighth grade assessment.

In the fourth grade, according to their teachers, 62 percent of students, on average, had been taught the TIMSS science topics overall. On average, 73 percent of students had been taught the TIMSS life science topics, and 58 percent and 60 percent had been taught the TIMSS physical science and Earth science topics, respectively. There was, however, considerable variation from content domain to content domain and from country to country, reflecting differing science curricular emphases.

In the eighth grade, on average, 72 percent of students had been taught the TIMSS science topics overall, according to their teachers. Close to three-quarters, on average, had been taught the TIMSS biology topics (74%) and chemistry topics (74%) by the eighth grade, according to their teachers, with slightly less having been taught the Earth science (71%) and physics (68%) topics. There was considerable variation across countries with respect to topic coverage by content domain.

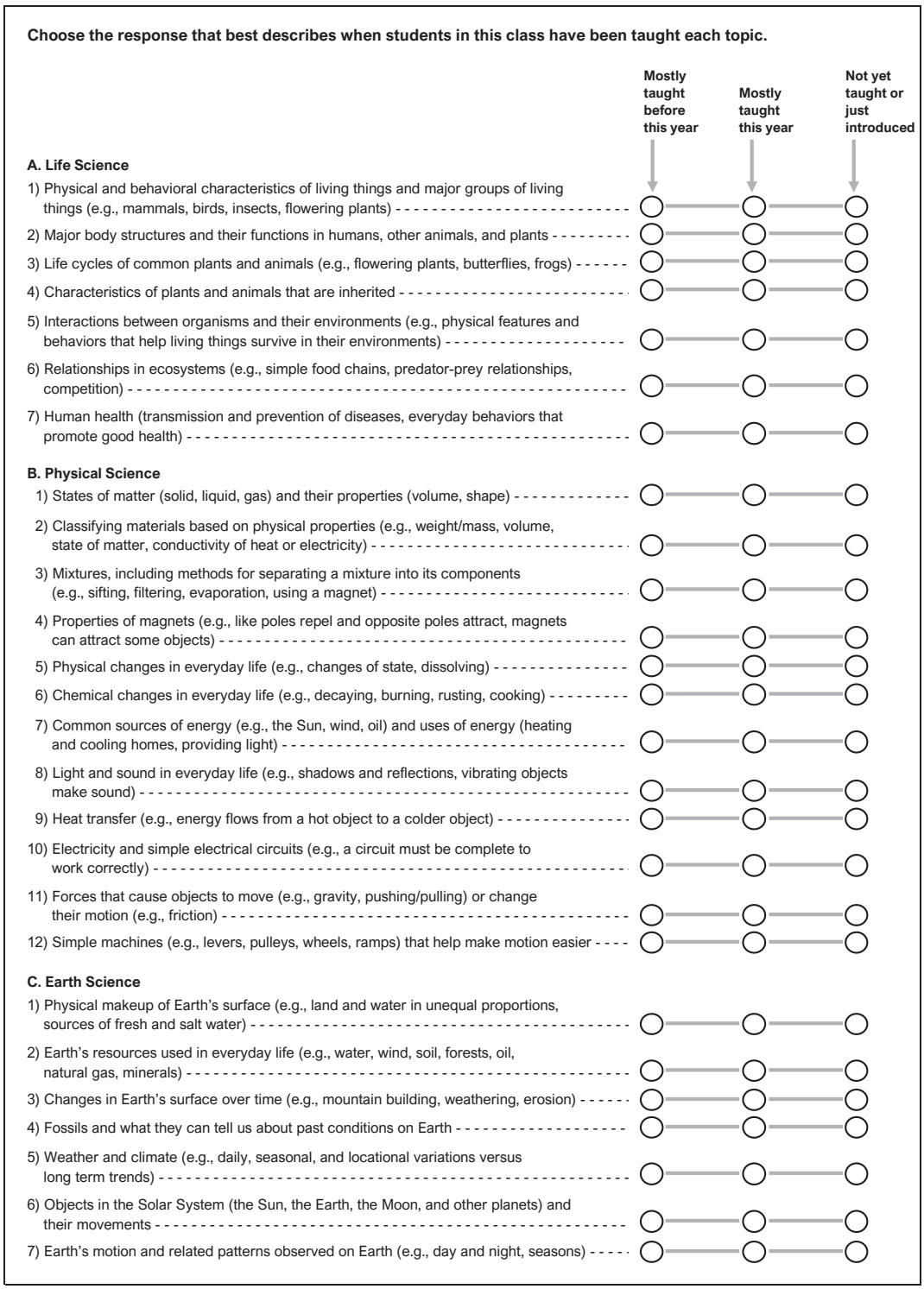
Exhibit 13.4: Percentages of Students Taught the TIMSS Science Topics

Students' Results based on Teachers' Reports

About the Scale

Exhibit 13.5 reports the percentage of students whose teachers responded "mostly taught before this year" or "mostly taught this year," averaged across topics.

Choose the response that best describes when students in this class have been taught each topic.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit 13.5: Percentages of Students Taught the TIMSS Science Topics

Students' Results based on Teachers' Reports

The exhibit reports the percentage of students whose teachers responded "mostly taught before this year" or "mostly taught this year," averaged across topics.

Country	All Science (26 Topics)	Life Science (7 Topics)	Physical Science (12 Topics)	Earth Science (7 Topics)
Albania	66 (1.7)	81 (1.7)	68 (1.9)	46 (3.2)
Armenia	r 60 (2.1)	r 67 (2.7)	r 46 (2.5)	77 (1.9)
Australia	65 (1.6)	70 (1.9)	63 (2.0)	r 65 (2.1)
Austria	58 (1.3)	70 (1.5)	47 (1.5)	65 (1.9)
Azerbaijan	58 (2.3)	65 (2.6)	r 42 (3.0)	77 (2.0)
Bahrain	77 (1.1)	75 (1.3)	76 (1.4)	80 (1.3)
Belgium (Flemish)	44 (1.4)	54 (2.2)	36 (1.9)	49 (1.9)
Bosnia and Herzegovina	40 (1.3)	53 (2.0)	34 (1.4)	39 (1.5)
Bulgaria	73 (1.1)	89 (0.9)	67 (1.6)	69 (1.4)
Canada	r 56 (1.2)	r 68 (1.6)	r 50 (1.3)	r 53 (1.7)
Chile	r 69 (1.6)	r 81 (2.1)	r 63 (2.4)	r 67 (2.7)
Chinese Taipei	50 (1.5)	64 (2.1)	51 (1.6)	35 (1.8)
Croatia	48 (1.3)	53 (2.2)	39 (1.3)	58 (1.9)
Cyprus	62 (1.4)	85 (1.5)	55 (2.1)	51 (2.3)
Czech Republic	50 (1.2)	71 (1.4)	30 (1.3)	66 (1.9)
Denmark	r 57 (1.7)	r 67 (2.1)	r 45 (2.0)	r 67 (2.0)
Finland	54 (1.3)	70 (1.3)	46 (1.8)	54 (1.5)
France	54 (1.0)	70 (1.3)	44 (1.2)	55 (1.7)
Georgia	63 (1.8)	70 (2.1)	60 (2.2)	60 (2.2)
Germany	57 (1.3)	63 (1.8)	53 (1.5)	59 (2.1)
Hong Kong SAR	54 (1.5)	67 (2.6)	51 (1.6)	46 (2.2)
Hungary	57 (1.1)	75 (1.3)	44 (1.5)	61 (1.7)
Iran, Islamic Rep. of	72 (1.1)	72 (1.5)	79 (1.1)	61 (1.8)
Ireland	71 (1.3)	76 (1.6)	68 (1.6)	72 (1.5)
Italy	53 (1.1)	66 (1.5)	41 (1.5)	60 (2.2)
Japan	39 (1.3)	41 (1.6)	45 (1.6)	26 (1.5)
Kazakhstan	73 (1.6)	89 (1.2)	58 (2.5)	83 (1.8)
Korea, Rep. of	48 (1.4)	55 (1.9)	46 (1.5)	46 (2.2)
Kosovo	71 (1.6)	73 (2.1)	71 (1.9)	70 (1.9)
Kuwait	86 (1.0)	93 (0.8)	84 (1.4)	83 (1.4)
Latvia	74 (1.4)	75 (2.0)	74 (1.7)	74 (1.5)
Lithuania	76 (1.6)	90 (1.2)	69 (2.1)	72 (1.8)
Malta	63 (0.2)	73 (0.2)	60 (0.2)	60 (0.3)
Montenegro	51 (0.9)	76 (1.3)	42 (1.0)	42 (0.9)
Morocco	45 (1.0)	65 (1.5)	52 (1.1)	13 (1.3)
Netherlands	r 45 (2.0)	r 53 (2.0)	r 37 (2.7)	r 51 (2.3)
New Zealand	60 (1.6)	70 (1.8)	53 (1.8)	59 (2.2)
North Macedonia	76 (2.2)	74 (2.7)	85 (1.8)	60 (3.3)
Northern Ireland	62 (2.0)	75 (2.3)	55 (2.7)	60 (2.4)
Norway (5)	s 48 (1.9)	s 57 (2.4)	s 34 (2.0)	s 61 (3.1)
Oman	65 (1.5)	77 (1.6)	70 (1.4)	44 (2.7)
Pakistan	r 77 (2.6)	r 87 (3.2)	r 80 (3.2)	r 62 (5.7)
Philippines	87 (1.2)	95 (1.0)	90 (1.2)	73 (2.4)
Poland	35 (1.2)	61 (1.5)	21 (1.4)	35 (1.9)
Portugal	85 (0.9)	97 (0.5)	77 (1.6)	88 (1.0)
Qatar	59 (1.3)	73 (2.0)	59 (1.5)	45 (1.9)
Russian Federation	66 (1.1)	89 (0.9)	40 (2.0)	87 (1.2)
Saudi Arabia	86 (1.2)	84 (1.4)	88 (1.1)	84 (1.9)
Serbia	78 (1.4)	76 (2.1)	91 (1.2)	57 (2.3)
Singapore	39 (0.4)	51 (0.8)	54 (0.5)	2 (0.4)
Slovak Republic	77 (1.3)	84 (1.2)	80 (1.4)	67 (2.0)
South Africa (5)	80 (1.4)	88 (1.1)	76 (2.0)	78 (1.6)
Spain	67 (1.0)	86 (1.2)	48 (1.6)	79 (1.3)
Sweden	r 49 (1.4)	r 60 (2.0)	39 (1.7)	r 56 (2.4)
Turkey (5)	62 (1.5)	66 (1.7)	62 (1.4)	58 (2.2)
United Arab Emirates	r 78 (0.8)	r 86 (0.7)	r 78 (0.9)	r 70 (1.3)
United States	70 (1.2)	74 (1.4)	66 (1.5)	74 (1.5)
England	y - -	y - -	y - -	y - -
International Average	**62 (0.2)**	**73 (0.2)**	**58 (0.2)**	**60 (0.3)**
Benchmarking Participants				
Ontario, Canada	r 57 (2.0)	r 70 (2.6)	r 52 (2.4)	r 52 (2.8)
Quebec, Canada	r 55 (1.8)	r 68 (2.6)	r 45 (2.0)	r 60 (2.6)
Moscow City, Russian Fed.	65 (1.3)	88 (1.0)	40 (2.0)	83 (1.4)
Madrid, Spain	66 (1.6)	82 (1.7)	48 (2.3)	81 (1.9)
Abu Dhabi, UAE	r 76 (0.9)	r 86 (0.8)	r 77 (1.1)	r 63 (1.7)
Dubai, UAE	r 83 (0.6)	r 86 (0.8)	r 84 (0.6)	r 80 (1.2)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 13.6: Percentages of Students Taught the TIMSS Science Topics

Students' Results based on Teachers' Reports

About the Scale

Exhibit 13.7 reports the percentage of students whose teachers responded "mostly taught before this year" or "mostly taught this year," averaged across topics.

Choose the response that best describes when students in this class have been taught each topic.

	Mostly taught before this year	Mostly taught this year	Not yet taught or just introduced
A. Biology			
1) Differences among major taxonomic groups of organisms (plants, animals, fungi, mammals, birds, reptiles, fish, amphibians, insects)	○	○	○
2) Major organs and organ systems in humans and other organisms (structure/function, life processes)	○	○	○
3) Cells, their structure and functions, including respiration and photosynthesis as cellular processes	○	○	○
4) Life cycles, sexual reproduction, and heredity (inherited versus acquired/learned characteristics)	○	○	○
5) Role of variation and adaptation in survival/extinction of species (including fossil evidence)	○	○	○
6) Interdependence of populations of organisms in an ecosystem (e.g., carbon and water cycles, energy flow, food webs, competition, predation, human impacts on ecosystems)	○	○	○
7) Human health (e.g., causes, transmission, and prevention of common infectious diseases, immunity) and the importance of diet, exercise, and other lifestyle choices in maintaining health	○	○	○
B. Chemistry			
1) Particulate structure, classification, and composition of matter (protons, neutrons, electrons, atoms, molecules, elements, compounds, mixtures)	○	○	○
2) The periodic table as an organizing principle for the known elements	○	○	○
3) Physical and chemical properties of matter	○	○	○
4) Mixtures and solutions (e.g., solvent, solute, concentration/dilution)	○	○	○
5) Properties of common acids and bases (e.g., acids have pH less than 7, reactions with indicators produce color changes, acids and bases neutralize each other)	○	○	○
6) Characteristics of chemical reactions (e.g., transformation of reactants, evidence of chemical change)	○	○	○
7) Matter and energy in chemical reactions (conservation of matter, familiar exothermic and endothermic reactions, factors affecting reaction rates)	○	○	○
8) The role of electrons in chemical bonds	○	○	○
C. Physics			
1) Physical states and changes in matter (explanations of properties in terms of movement and distance between particles; phase change, changes in volume and/or pressure, physical changes)	○	○	○
2) Energy transformation and transfer (e.g., forms of energy, energy conservation, heat, temperature, equilibrium)	○	○	○
3) Basic properties/behaviors of light (reflection, refraction, color, shadows, simple ray diagrams)	○	○	○
4) Basic properties/behaviors of sound (vibrations that produce sound, transmission through media, loudness, pitch)	○	○	○
5) Electric circuits (e.g., electrical conductors/insulators and the flow of electricity in series/parallel circuits)	○	○	○
6) Properties and uses of permanent magnets and electromagnets	○	○	○
7) Motion and forces (e.g., basic description of motion, common mechanical forces, properties of forces, effects of forces, simple machines, buoyancy, effects of density and pressure)	○	○	○
D. Earth Science			
1) Earth's structure and physical features (e.g., Earth's crust, mantle, and core; composition and relative distribution of water; composition of Earth's atmosphere)	○	○	○
2) Earth's processes, cycles, and history (e.g., rock cycle, major geological events, formation of fossils and fossil fuels, water cycle, weather versus climate)	○	○	○
3) Earth's resources, their use, and conservation (e.g., renewable/nonrenewable resources, human use of land and water resources)	○	○	○
4) Earth in the Solar System and the universe (phenomena on Earth: seasons, eclipses, tides, phases of moon; members of the Solar System; physical features of Earth)	○	○	○

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 13.7: Percentages of Students Taught the TIMSS Science Topics

Students' Results based on Teachers' Reports

The exhibit reports the percentage of students whose teachers responded "mostly taught before this year" or "mostly taught this year," averaged across topics.

Country	All Science (26 Topics)	Biology (7 Topics)	Chemistry (8 Topics)	Physics (7 Topics)	Earth Science (4 Topics)
Australia	r 63 (1.2)	r 61 (1.7)	r 64 (1.5)	r 56 (1.4)	r 79 (1.9)
Bahrain	81 (1.1)	92 (0.7)	74 (1.7)	72 (2.0)	93 (1.0)
Chile	71 (1.4)	77 (1.8)	60 (2.1)	69 (2.0)	85 (2.4)
Chinese Taipei	70 (0.6)	92 (2.2)	92 (0.5)	61 (1.0)	7 (1.5)
Cyprus	r 49 (0.7)	s 63 (1.1)	s 47 (1.2)	r 34 (1.5)	r 54 (1.1)
Egypt	82 (1.1)	78 (1.5)	78 (1.3)	84 (1.4)	91 (1.5)
England	s 71 (2.3)	s 71 (3.0)	s 79 (2.2)	s 72 (3.4)	x 54 (5.3)
Finland	72 (0.6)	51 (1.0)	91 (1.0)	63 (1.0)	87 (1.3)
France	r 59 (0.9)	r 70 (1.6)	r 54 (1.5)	r 46 (1.7)	r 69 (2.5)
Georgia	67 (0.8)	55 (1.4)	66 (1.6)	61 (1.3)	99 (0.5)
Hong Kong SAR	53 (1.8)	64 (2.3)	43 (2.2)	64 (2.0)	33 (3.0)
Hungary	91 (0.6)	85 (0.9)	97 (0.6)	88 (1.1)	91 (1.8)
Iran, Islamic Rep. of	70 (0.9)	61 (1.3)	78 (1.1)	70 (1.4)	71 (1.5)
Ireland	63 (0.8)	66 (1.2)	77 (1.1)	48 (1.4)	54 (2.5)
Israel	65 (1.2)	64 (1.6)	82 (1.1)	62 (1.6)	39 (3.1)
Italy	69 (1.2)	81 (1.2)	81 (2.0)	48 (2.1)	60 (2.5)
Japan	65 (0.6)	56 (1.0)	73 (0.9)	77 (1.1)	41 (1.7)
Jordan	80 (1.3)	87 (1.3)	76 (1.4)	80 (1.9)	78 (2.2)
Kazakhstan	87 (0.5)	83 (1.3)	94 (0.8)	80 (1.1)	97 (0.7)
Korea, Rep. of	57 (1.0)	50 (1.5)	49 (1.4)	68 (0.9)	67 (1.4)
Kuwait	87 (0.9)	91 (0.9)	94 (1.1)	83 (1.2)	75 (2.2)
Lebanon	76 (0.8)	76 (1.9)	80 (1.3)	71 (1.5)	- -
Lithuania	73 (1.0)	78 (1.7)	62 (2.3)	69 (1.7)	93 (1.2)
Malaysia	88 (0.8)	93 (0.9)	82 (1.3)	93 (1.2)	82 (1.9)
Morocco	57 (0.6)	69 (1.1)	45 (1.0)	48 (0.8)	74 (1.7)
New Zealand	48 (1.2)	48 (1.7)	55 (1.8)	48 (1.7)	37 (2.7)
Norway (9)	s 55 (1.2)	s 51 (2.2)	s 71 (1.5)	s 35 (2.1)	s 68 (2.9)
Oman	73 (0.9)	82 (0.8)	54 (1.5)	79 (1.4)	89 (1.5)
Portugal	63 (0.7)	63 (1.4)	73 (1.0)	40 (1.2)	80 (1.5)
Qatar	77 (1.0)	80 (1.5)	76 (1.3)	75 (1.4)	76 (1.9)
Romania	95 (0.5)	93 (1.0)	95 (0.8)	98 (0.5)	- -
Russian Federation	79 (0.6)	68 (1.6)	82 (1.4)	75 (1.0)	97 (0.8)
Saudi Arabia	84 (1.0)	89 (1.0)	82 (1.6)	77 (1.6)	95 (0.8)
Singapore	65 (0.8)	71 (1.2)	73 (1.2)	75 (1.2)	20 (1.5)
South Africa (9)	76 (1.2)	83 (1.3)	84 (1.2)	72 (1.5)	55 (3.0)
Sweden	71 (0.8)	72 (1.4)	68 (1.3)	74 (1.7)	- -
Turkey	93 (0.5)	94 (0.7)	95 (0.6)	88 (1.1)	92 (1.5)
United Arab Emirates	r 86 (0.5)	r 85 (0.6)	r 85 (0.6)	r 86 (0.8)	r 86 (0.9)
United States	r 84 (1.1)	r 89 (1.2)	r 82 (1.8)	r 76 (1.7)	r 91 (1.5)
International Average	**72 (0.2)**	**74 (0.2)**	**74 (0.2)**	**68 (0.2)**	**71 (0.3)**
Benchmarking Participants					
Ontario, Canada	s 65 (1.7)	s 81 (1.9)	s 41 (2.5)	s 69 (2.7)	s 79 (3.0)
Moscow City, Russian Fed.	74 (0.7)	62 (1.6)	76 (1.3)	70 (0.9)	98 (0.5)
Gauteng, RSA (9)	76 (1.6)	85 (1.8)	82 (1.7)	70 (2.3)	57 (3.4)
Western Cape, RSA (9)	75 (1.3)	80 (1.7)	83 (1.3)	72 (2.1)	56 (3.4)
Abu Dhabi, UAE	r 86 (0.8)	r 85 (1.0)	r 86 (1.0)	r 88 (1.2)	r 83 (1.4)
Dubai, UAE	r 85 (0.9)	r 84 (0.9)	r 84 (0.8)	r 84 (1.5)	r 89 (1.5)
Quebec, Canada	y - -	y - -	y - -	y - -	y - -

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Instructional Clarity in Science Lessons

The clarity with which teachers convey the curriculum to students has significant implications for student learning. Students were asked about aspects of teachers' instruction during their science lessons: whether they know what their teacher expects them to do, and whether their teacher is easy to understand, has clear answers to their questions, is good at explaining science, does a variety of things to help the students learn, links new lessons to previous knowledge (eighth grade only), and explains a topic again when the students do not understand. Responses were combined into the TIMSS 2019 *Instructional Clarity in Science Lessons* scale, as described in Exhibit 13.8 (see About the Scale). Exhibits 13.9 and 13.10 present students' reports about the clarity of their science lessons, for fourth grade and eighth grade, respectively. Countries are reported by percentage of students reporting "high clarity of instruction."

On average, slightly less than three-quarters (72%) of fourth grade students reported "high clarity" of instruction in their science lessons, 22 percent reported "moderate clarity," and just 6 percent characterized their lessons as having "low clarity." There was a range in views across countries with, interestingly, lower percentages of students characterizing their lessons as having "high clarity" in some of the higher performing countries, such as Korea and Japan. On average, internationally and within most countries, however, higher clarity was associated with higher average achievement. Across countries, average achievement was 498 among students reporting "high clarity" of instruction, 480 among students reporting "moderate clarity" of instruction, and 466 among students reporting "low clarity" of instruction.

Eighth grade students' reports are presented separately for countries in which science is taught as an integrated subject in eighth grade (first panel of the exhibit) and for countries in which science is taught as separate subjects (following four panels). Eighth grade students were, on average, less positive about the clarity of their science instruction compared with fourth grade students. Similar percentages of students reported "high," "moderate," and "low clarity of instruction" for integrated science, biology, chemistry, physics, and Earth science. For all science subjects, 44 to 49 percent of eighth grade students, on average, characterized instruction as having "high clarity," 38 to 41 percent reported "moderate clarity," and 12 to 16 percent reported "low clarity." As seen in fourth grade, clarity of instruction was positively associated with science achievement. In countries teaching science as an integrated subject and for each of the separate science subjects, average achievement increased with each successively higher level of students' reports of instructional clarity.

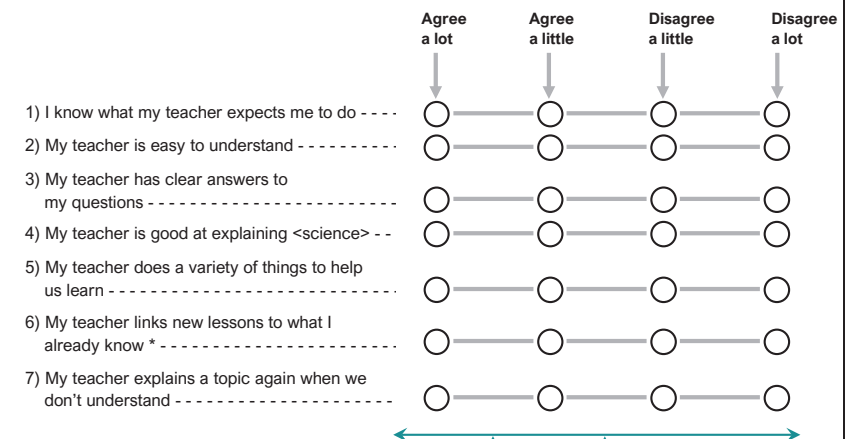
Exhibit 13.8: Instructional Clarity in Science Lessons – Students' Reports

Students' Reports

About the Scale

Students were scored according to their responses to seven statements on the *Instructional Clarity in Science Lessons* scale. Cut scores divide the scale into three categories. Students who reported **High Clarity of Instruction** in their science lessons had a score at or above the cut score corresponding to "agreeing a lot" with four of the seven statements and "agreeing a little" with the other three, on average. Students who reported **Low Clarity of Instruction** in their science lessons had a score at or below the cut score corresponding to "disagreeing a little" with four of the seven statements and "agreeing a little" with the other three, on average. All other students reported **Moderate Clarity of Instruction** in their science lessons. At the eighth grade, a comparable approach was used for biology, chemistry, physics, and Earth science in countries where these were taught as separate subjects.

How much do you agree with these statements about your <science / biology / chemistry / physics / earth science> lessons?



Scale Cut Scores		
Fourth Grade	**8.8**	**6.9**
Eighth Grade		
General/Integrated Science	**10.3**	**7.8**
Biology	**10.3**	**7.7**
Chemistry	**10.5**	**7.9**
Physics	**10.5**	**8.0**
Earth Science	**10.5**	**7.8**

* Item not included in scale at the fourth grade

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit 13.9: Instructional Clarity in Science Lessons – Students' Reports

Students' Reports

Country	High Clarity of Instruction		Moderate Clarity of Instruction		Low Clarity of Instruction		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Albania	97 (0.3)	493 (3.5)	2 (0.3)	~ ~	1 (0.1)	~ ~	11.6 (0.04)
Kosovo	95 (0.6)	420 (3.4)	4 (0.4)	355 (11.0)	1 (0.2)	~ ~	11.2 (0.04)
North Macedonia	92 (0.7)	436 (6.2)	6 (0.6)	372 (11.8)	1 (0.2)	~ ~	11.2 (0.05)
Montenegro	90 (0.6)	460 (2.5)	8 (0.5)	431 (6.5)	2 (0.2)	~ ~	11.1 (0.04)
Iran, Islamic Rep. of	88 (0.9)	449 (3.7)	9 (0.7)	407 (8.3)	3 (0.4)	369 (13.0)	10.9 (0.05)
Bosnia and Herzegovina	86 (0.8)	465 (3.0)	11 (0.7)	435 (6.1)	2 (0.2)	~ ~	10.8 (0.04)
Bulgaria	86 (1.1)	527 (4.3)	11 (0.9)	505 (11.2)	3 (0.4)	480 (24.3)	10.8 (0.06)
Armenia	86 (0.8)	475 (3.3)	11 (0.6)	449 (5.1)	3 (0.4)	427 (11.8)	10.8 (0.06)
Georgia	85 (1.2)	456 (4.0)	12 (1.0)	448 (9.8)	3 (0.5)	411 (18.0)	10.7 (0.06)
Azerbaijan	85 (1.0)	438 (3.0)	11 (0.8)	421 (6.3)	4 (0.4)	389 (11.7)	10.6 (0.06)
Portugal	82 (0.9)	507 (2.6)	15 (0.8)	494 (4.0)	3 (0.3)	489 (9.8)	10.4 (0.04)
Oman	80 (1.0)	451 (4.4)	15 (0.7)	397 (6.0)	4 (0.4)	356 (8.6)	10.4 (0.06)
Lithuania	80 (1.2)	539 (2.6)	18 (1.1)	537 (4.2)	2 (0.3)	~ ~	10.2 (0.06)
Morocco	80 (1.2)	386 (5.9)	16 (0.9)	346 (9.8)	4 (0.5)	292 (10.2)	10.3 (0.07)
Bahrain	79 (1.1)	504 (2.9)	17 (0.8)	468 (6.2)	5 (0.4)	438 (8.2)	10.3 (0.06)
Spain	78 (1.2)	517 (2.3)	18 (1.0)	500 (4.1)	4 (0.4)	485 (8.9)	10.1 (0.06)
United Arab Emirates	78 (0.5)	488 (2.2)	16 (0.3)	440 (3.0)	6 (0.3)	400 (5.6)	10.3 (0.03)
Serbia	77 (1.3)	521 (3.2)	20 (1.0)	510 (7.7)	3 (0.5)	502 (10.8)	10.3 (0.06)
Turkey (5)	77 (1.2)	540 (3.8)	18 (0.9)	497 (6.6)	5 (0.5)	451 (10.6)	10.2 (0.05)
Hungary	77 (1.2)	533 (2.6)	19 (0.9)	520 (4.6)	4 (0.5)	511 (8.3)	10.3 (0.06)
Kuwait	76 (1.2)	413 (6.1)	17 (0.9)	364 (9.0)	7 (0.6)	324 (9.9)	10.2 (0.07)
Russian Federation	76 (1.0)	568 (3.3)	21 (0.9)	569 (3.6)	3 (0.3)	552 (8.7)	10.0 (0.04)
Malta	76 (0.6)	498 (1.6)	19 (0.5)	491 (3.5)	5 (0.3)	486 (7.0)	10.1 (0.03)
Austria	75 (1.0)	525 (2.5)	21 (0.9)	514 (4.7)	4 (0.5)	513 (8.3)	10.1 (0.05)
United States	74 (0.8)	546 (2.6)	20 (0.7)	536 (3.9)	6 (0.4)	502 (6.2)	10.1 (0.04)
Kazakhstan	74 (1.1)	502 (3.5)	25 (1.0)	479 (4.3)	2 (0.2)	~ ~	10.0 (0.06)
Saudi Arabia	73 (1.0)	424 (4.0)	19 (0.7)	372 (5.5)	7 (0.6)	349 (11.6)	10.1 (0.06)
Belgium (Flemish)	73 (0.9)	502 (2.3)	24 (0.9)	500 (3.5)	3 (0.2)	481 (6.1)	9.9 (0.04)
Northern Ireland	73 (1.2)	519 (2.4)	22 (1.0)	521 (4.2)	5 (0.5)	511 (6.9)	9.9 (0.05)
Ireland	73 (1.3)	530 (3.3)	21 (1.0)	525 (4.4)	6 (0.5)	529 (5.7)	9.9 (0.06)
Slovak Republic	73 (1.3)	521 (3.9)	23 (1.0)	524 (4.7)	4 (0.6)	510 (12.0)	10.0 (0.06)
Canada	72 (0.9)	526 (2.0)	23 (0.8)	521 (2.5)	5 (0.3)	512 (5.0)	10.0 (0.04)
Qatar	72 (1.2)	469 (3.4)	20 (1.0)	419 (7.1)	8 (0.5)	383 (8.2)	10.0 (0.06)
Pakistan	71 (2.3)	302 (13.5)	21 (1.6)	267 (21.1)	8 (1.1)	260 (19.5)	10.0 (0.11)
Cyprus	71 (1.6)	516 (3.1)	20 (0.8)	505 (4.0)	9 (1.1)	500 (5.8)	9.8 (0.09)
Czech Republic	70 (1.3)	535 (2.9)	24 (1.0)	538 (3.1)	5 (0.6)	514 (5.9)	9.9 (0.06)
Norway (5)	70 (1.2)	540 (2.5)	25 (1.0)	543 (3.7)	5 (0.6)	544 (7.2)	9.8 (0.05)
Italy	70 (1.1)	514 (3.2)	25 (0.9)	501 (4.0)	4 (0.4)	495 (7.7)	9.7 (0.04)
Germany r	70 (1.3)	526 (2.3)	24 (0.8)	517 (3.3)	6 (0.7)	501 (8.3)	9.7 (0.05)
England	70 (1.4)	539 (3.2)	25 (1.1)	538 (3.9)	6 (0.6)	540 (6.6)	9.9 (0.06)
Australia	68 (1.2)	533 (2.8)	24 (0.9)	538 (3.6)	8 (0.8)	519 (7.0)	9.8 (0.06)
Netherlands	67 (1.3)	520 (2.9)	28 (1.0)	523 (4.1)	5 (0.5)	488 (9.5)	9.7 (0.06)
Croatia	67 (1.1)	527 (2.2)	30 (1.2)	518 (3.3)	3 (0.4)	510 (11.4)	9.9 (0.04)
Chile	67 (1.2)	478 (2.8)	27 (1.0)	463 (3.7)	6 (0.5)	433 (7.0)	9.8 (0.05)
Latvia	66 (1.2)	543 (2.7)	29 (1.0)	544 (3.0)	6 (0.6)	533 (6.0)	9.6 (0.05)
South Africa (5)	65 (1.1)	355 (5.2)	23 (0.8)	288 (5.8)	12 (0.6)	258 (6.1)	9.7 (0.06)
Sweden	65 (1.5)	536 (4.0)	30 (1.2)	546 (3.7)	6 (0.6)	520 (7.6)	9.5 (0.06)
Chinese Taipei	64 (1.5)	562 (2.1)	28 (1.2)	556 (3.0)	8 (0.7)	532 (5.7)	9.7 (0.07)
New Zealand	64 (1.2)	503 (2.8)	27 (0.9)	508 (3.3)	9 (0.6)	500 (4.9)	9.5 (0.05)
Singapore	63 (1.0)	601 (3.3)	29 (0.7)	587 (4.1)	8 (0.5)	569 (6.6)	9.6 (0.04)
Finland	61 (1.2)	559 (2.7)	32 (1.1)	552 (3.3)	7 (0.6)	539 (5.5)	9.4 (0.05)
Poland	60 (1.3)	535 (2.8)	31 (0.9)	533 (3.1)	9 (0.7)	517 (6.0)	9.5 (0.06)
France	56 (1.2)	488 (3.7)	37 (0.9)	491 (3.5)	7 (0.6)	477 (6.5)	9.3 (0.05)
Hong Kong SAR	55 (1.4)	543 (3.3)	30 (1.0)	523 (3.6)	15 (1.0)	505 (7.3)	9.2 (0.07)
Denmark	49 (1.7)	526 (3.0)	37 (1.3)	520 (3.3)	13 (1.2)	517 (4.6)	8.8 (0.07)
Philippines	48 (1.9)	288 (8.9)	36 (1.2)	227 (7.1)	16 (1.0)	196 (7.2)	8.9 (0.08)
Japan	44 (1.6)	561 (2.4)	44 (1.1)	564 (2.3)	13 (1.0)	558 (3.4)	8.6 (0.06)
Korea, Rep. of	42 (1.4)	596 (2.8)	48 (1.3)	584 (2.3)	11 (1.0)	573 (5.5)	8.5 (0.05)
International Average	**72 (0.2)**	**498 (0.5)**	**22 (0.1)**	**480 (0.8)**	**6 (0.1)**	**466 (1.3)**	
Benchmarking Participants							
Dubai, UAE	82 (0.6)	548 (1.6)	14 (0.5)	532 (3.4)	4 (0.3)	510 (8.7)	10.4 (0.03)
Madrid, Spain	77 (1.1)	526 (2.3)	19 (0.9)	519 (2.5)	4 (0.4)	501 (9.2)	10.1 (0.06)
Ontario, Canada	72 (1.4)	528 (3.4)	23 (1.2)	521 (4.0)	5 (0.5)	516 (7.8)	9.9 (0.06)
Moscow City, Russian Fed.	70 (1.2)	597 (2.5)	25 (0.9)	594 (2.9)	5 (0.5)	576 (6.0)	9.7 (0.05)
Abu Dhabi, UAE	69 (0.9)	438 (3.0)	21 (0.7)	388 (4.4)	10 (0.6)	365 (7.7)	9.8 (0.05)
Quebec, Canada r	68 (1.5)	523 (3.1)	26 (1.1)	521 (3.5)	6 (0.7)	508 (7.1)	9.8 (0.07)

This TIMSS context questionnaire scale was established in 2019 based on the combined response distribution of all countries that participated in TIMSS 2019. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 13.10: Instructional Clarity in Science Lessons – Students' Reports

Students' Reports

The general/integrated science panel summarizes responses for countries where students are enrolled in science as a single subject. The following panels for biology, chemistry, physics, and Earth science summarize responses for countries where students are taught science as separate subjects.

Instructional Clarity in General/Integrated Science Lessons

General/Integrated Science	High Clarity of Instruction		Moderate Clarity of Instruction		Low Clarity of Instruction		Average Scale Score
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Jordan	72 (1.3)	467 (4.5)	22 (1.0)	431 (5.7)	6 (0.5)	410 (7.7)	11.0 (0.05)
Turkey	69 (1.7)	524 (3.4)	22 (1.0)	498 (6.4)	8 (0.9)	496 (8.0)	10.8 (0.08)
Egypt	68 (1.2)	413 (5.0)	26 (1.0)	359 (6.8)	6 (0.5)	340 (9.0)	10.8 (0.05)
Iran, Islamic Rep. of	67 (1.2)	458 (3.5)	27 (1.1)	433 (5.3)	6 (0.6)	436 (6.8)	10.8 (0.05)
Saudi Arabia	66 (1.4)	445 (2.9)	27 (0.9)	416 (3.5)	7 (0.7)	410 (6.1)	10.7 (0.06)
Kuwait	61 (1.5)	459 (5.5)	28 (1.0)	434 (5.8)	11 (0.8)	419 (8.1)	10.4 (0.07)
Oman	61 (1.0)	480 (2.8)	31 (0.9)	437 (4.2)	8 (0.6)	413 (8.7)	10.4 (0.04)
Bahrain	59 (1.5)	504 (2.0)	31 (1.1)	473 (3.5)	10 (0.8)	446 (7.6)	10.4 (0.07)
United Arab Emirates	57 (0.7)	497 (2.7)	32 (0.6)	454 (3.0)	11 (0.4)	420 (5.9)	10.4 (0.03)
South Africa (9)	53 (1.1)	379 (3.8)	37 (0.8)	361 (3.4)	9 (0.6)	375 (6.5)	10.2 (0.05)
United States	53 (1.3)	532 (5.2)	33 (0.8)	522 (4.7)	14 (0.8)	515 (5.2)	10.2 (0.06)
Qatar	53 (1.5)	487 (5.0)	33 (1.0)	470 (5.3)	14 (1.1)	451 (6.5)	10.1 (0.07)
Malaysia	51 (1.3)	476 (3.4)	42 (1.0)	452 (4.6)	7 (0.9)	405 (9.6)	10.1 (0.05)
Israel	48 (1.7)	522 (4.4)	33 (1.0)	511 (5.1)	19 (1.2)	509 (7.2)	9.8 (0.08)
New Zealand	43 (1.4)	511 (3.9)	42 (0.9)	499 (4.2)	15 (1.1)	476 (6.1)	9.8 (0.07)
Italy	42 (1.6)	505 (3.4)	45 (1.3)	500 (2.6)	13 (1.2)	490 (4.1)	9.7 (0.07)
England	42 (1.6)	534 (5.0)	41 (1.2)	521 (6.0)	17 (1.2)	487 (7.1)	9.7 (0.07)
Singapore	42 (1.1)	617 (4.2)	48 (0.8)	607 (3.9)	10 (0.7)	574 (7.5)	9.8 (0.04)
Ireland	41 (1.7)	537 (3.2)	38 (1.1)	525 (3.5)	21 (1.5)	515 (5.4)	9.6 (0.09)
Australia	41 (1.4)	548 (3.4)	40 (0.8)	523 (3.5)	18 (1.3)	507 (5.2)	9.7 (0.07)
Norway (9)	40 (1.6)	511 (3.7)	44 (1.1)	495 (3.4)	16 (1.0)	466 (6.2)	9.7 (0.07)
Chinese Taipei	37 (1.3)	593 (3.1)	51 (1.1)	570 (2.2)	13 (0.9)	538 (5.1)	9.7 (0.06)
Chile	34 (1.4)	468 (4.0)	50 (1.0)	462 (3.5)	17 (1.2)	457 (5.4)	9.5 (0.07)
Hong Kong SAR	32 (1.4)	516 (5.9)	51 (1.5)	502 (6.1)	17 (1.3)	489 (8.9)	9.4 (0.07)
Japan	17 (1.2)	591 (3.6)	57 (1.2)	572 (2.6)	25 (1.6)	550 (3.1)	8.7 (0.06)
Korea, Rep. of	17 (0.9)	600 (3.9)	59 (1.1)	565 (2.4)	24 (1.5)	524 (3.6)	8.7 (0.05)
International Average	**49 (0.3)**	**507 (0.8)**	**38 (0.2)**	**484 (0.9)**	**13 (0.2)**	**466 (1.3)**	
Benchmarking Participants							
Dubai, UAE	59 (1.2)	557 (2.2)	33 (1.0)	539 (3.3)	9 (0.7)	524 (6.3)	10.5 (0.05)
Western Cape, RSA (9)	53 (1.5)	438 (5.2)	36 (1.2)	445 (6.8)	10 (0.9)	448 (9.0)	10.2 (0.06)
Gauteng, RSA (9)	53 (1.2)	427 (3.9)	36 (0.8)	415 (4.7)	11 (0.9)	430 (9.1)	10.1 (0.06)
Ontario, Canada	50 (2.4)	528 (4.1)	36 (1.5)	518 (3.8)	14 (1.3)	513 (6.4)	10.1 (0.11)
Abu Dhabi, UAE	50 (1.1)	460 (4.0)	35 (1.0)	394 (5.4)	15 (0.9)	364 (8.2)	10.0 (0.06)
Quebec, Canada	42 (2.2)	546 (3.8)	43 (1.2)	535 (4.2)	15 (1.7)	520 (8.2)	9.7 (0.10)

Separate Science Results

Instructional Clarity in Biology Lessons

Biology	High Clarity of Instruction		Moderate Clarity of Instruction		Low Clarity of Instruction		Average Scale Score
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Georgia	70 (1.6)	454 (4.1)	25 (1.4)	438 (5.6)	5 (0.5)	438 (12.2)	11.0 (0.07)
Romania	64 (2.0)	472 (4.4)	25 (1.2)	468 (6.1)	11 (1.3)	479 (8.8)	10.6 (0.10)
Lebanon	58 (1.7)	394 (5.1)	33 (1.4)	359 (6.0)	9 (0.7)	354 (8.5)	10.5 (0.07)
Morocco	56 (1.2)	404 (3.5)	34 (0.8)	385 (3.1)	10 (0.8)	385 (6.7)	10.3 (0.06)
Portugal	51 (1.9)	525 (3.0)	40 (1.5)	518 (3.8)	9 (1.2)	505 (6.7)	10.2 (0.09)
Kazakhstan	46 (1.3)	490 (3.9)	50 (1.2)	471 (3.3)	4 (0.4)	438 (10.0)	10.1 (0.05)
Hungary	45 (1.9)	536 (3.5)	40 (1.1)	523 (3.3)	15 (1.5)	532 (7.2)	9.9 (0.10)
Cyprus	44 (1.5)	500 (3.1)	37 (1.0)	480 (3.1)	19 (1.3)	467 (4.4)	9.7 (0.08)
Russian Federation	43 (1.4)	548 (5.3)	47 (1.3)	539 (4.4)	10 (0.8)	542 (4.7)	9.9 (0.05)
Finland	40 (1.5)	563 (3.6)	48 (1.1)	538 (3.6)	12 (1.0)	520 (7.9)	9.7 (0.07)
Lithuania	37 (1.7)	538 (3.2)	48 (1.2)	531 (3.7)	15 (1.6)	537 (6.3)	9.6 (0.08)
Sweden	31 (1.5)	536 (4.8)	51 (1.2)	526 (3.5)	18 (1.3)	515 (5.8)	9.3 (0.07)
France	29 (1.3)	491 (4.0)	53 (1.3)	490 (3.4)	18 (1.8)	481 (4.1)	9.2 (0.08)
International Average	**47 (0.4)**	**496 (1.1)**	**41 (0.3)**	**482 (1.2)**	**12 (0.3)**	**476 (2.1)**	
Benchmarking Participants							
Moscow City, Russian Fed.	38 (1.8)	570 (3.4)	47 (1.2)	565 (3.4)	14 (1.2)	564 (5.5)	9.6 (0.08)

This TIMSS context questionnaire scale for general/integrated science was established in 2019 based on the combined response distribution of all countries that participated in TIMSS 2019 where science is taught as a single subject. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution. The separate scales for biology, chemistry, physics, and Earth science were each established in 2019 using a comparable approach.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 13.10: Instructional Clarity in Science Lessons – Students' Reports

Students' Reports

Separate Science Results (Continued)

Instructional Clarity in Chemistry Lessons

Chemistry	High Clarity of Instruction		Moderate Clarity of Instruction		Low Clarity of Instruction		Average Scale Score
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Georgia	60 (1.7)	459 (4.0)	30 (1.3)	437 (4.9)	10 (1.1)	428 (7.8)	10.6 (0.07)
Lebanon	60 (1.6)	396 (5.0)	30 (1.3)	356 (6.7)	10 (0.9)	355 (8.9)	10.6 (0.07)
Romania	58 (1.6)	479 (4.3)	29 (0.9)	465 (5.5)	14 (1.3)	461 (8.1)	10.4 (0.08)
Cyprus	55 (1.3)	498 (2.4)	33 (1.3)	482 (2.7)	12 (1.0)	453 (4.8)	10.4 (0.06)
Morocco	54 (1.2)	409 (3.3)	35 (0.8)	379 (3.3)	11 (0.8)	383 (5.0)	10.4 (0.06)
Russian Federation	45 (1.3)	554 (4.6)	43 (0.9)	536 (4.4)	12 (1.0)	532 (5.9)	10.1 (0.06)
Portugal	43 (2.1)	527 (3.9)	41 (1.4)	516 (3.4)	15 (1.5)	508 (5.6)	9.9 (0.09)
Lithuania	43 (1.7)	544 (3.8)	42 (1.2)	530 (3.4)	15 (1.4)	522 (4.5)	9.9 (0.08)
Kazakhstan	42 (1.2)	497 (4.0)	49 (1.0)	466 (3.3)	8 (0.9)	459 (9.1)	10.1 (0.06)
Finland	37 (1.4)	571 (2.9)	46 (1.0)	541 (3.2)	17 (1.1)	511 (5.5)	9.7 (0.06)
Sweden	32 (1.7)	540 (4.9)	48 (1.2)	522 (4.0)	19 (1.6)	514 (5.1)	9.5 (0.08)
Hungary	32 (1.5)	534 (4.7)	43 (1.1)	529 (3.1)	25 (1.6)	528 (4.3)	9.4 (0.08)
France	24 (1.4)	494 (4.3)	50 (1.5)	491 (3.0)	26 (1.8)	482 (4.5)	9.1 (0.08)
International Average	**45 (0.4)**	**500 (1.1)**	**40 (0.3)**	**481 (1.1)**	**15 (0.4)**	**472 (1.7)**	
Benchmarking Participants							
Moscow City, Russian Fed.	39 (1.6)	575 (3.0)	43 (1.1)	564 (3.6)	18 (1.3)	559 (4.5)	9.7 (0.07)

Instructional Clarity in Physics Lessons

Physics	High Clarity of Instruction		Moderate Clarity of Instruction		Low Clarity of Instruction		Average Scale Score
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Georgia	61 (1.8)	457 (4.0)	30 (1.4)	439 (5.1)	9 (1.1)	432 (8.9)	10.7 (0.08)
Lebanon	58 (1.6)	395 (4.8)	32 (1.2)	357 (5.6)	10 (0.8)	364 (11.1)	10.6 (0.07)
Romania	55 (1.7)	479 (4.5)	30 (1.0)	465 (5.3)	15 (1.4)	464 (6.1)	10.4 (0.08)
Morocco	54 (1.1)	409 (3.3)	35 (0.7)	381 (3.0)	10 (0.8)	385 (4.5)	10.4 (0.06)
Cyprus	51 (1.4)	502 (2.5)	32 (1.0)	480 (3.0)	18 (1.1)	461 (4.9)	10.1 (0.07)
Russian Federation	46 (1.2)	549 (4.3)	43 (1.0)	540 (4.5)	11 (0.9)	537 (7.8)	10.2 (0.06)
Portugal	43 (2.1)	527 (3.9)	41 (1.4)	516 (3.4)	15 (1.5)	508 (5.6)	10.0 (0.09)
Kazakhstan	43 (1.2)	494 (4.1)	50 (1.1)	470 (3.6)	7 (0.6)	456 (5.9)	10.2 (0.04)
Finland	35 (1.5)	568 (3.7)	45 (1.1)	538 (3.5)	20 (1.3)	513 (6.2)	9.7 (0.07)
Hungary	34 (1.6)	543 (3.9)	42 (1.2)	526 (3.5)	24 (1.7)	520 (4.4)	9.5 (0.09)
Lithuania	33 (1.9)	539 (4.4)	44 (1.3)	533 (3.1)	22 (2.1)	532 (5.7)	9.5 (0.10)
Sweden	32 (1.4)	544 (4.5)	51 (1.1)	526 (3.8)	18 (1.1)	510 (6.1)	9.6 (0.06)
France	24 (1.4)	494 (4.3)	50 (1.5)	490 (3.0)	26 (1.8)	482 (4.5)	9.1 (0.08)
International Average	**44 (0.4)**	**500 (1.1)**	**40 (0.3)**	**482 (1.1)**	**16 (0.4)**	**474 (1.8)**	
Benchmarking Participants							
Moscow City, Russian Fed.	42 (1.6)	575 (3.6)	42 (1.0)	563 (3.2)	16 (1.3)	556 (4.1)	9.9 (0.08)

Instructional Clarity in Earth Science Lessons

Earth Science	High Clarity of Instruction		Moderate Clarity of Instruction		Low Clarity of Instruction		Average Scale Score
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Romania r	65 (1.8)	479 (5.7)	28 (1.4)	462 (6.3)	7 (0.9)	461 (13.5)	10.8 (0.07)
Georgia	62 (1.9)	456 (4.1)	30 (1.5)	436 (5.3)	7 (0.9)	455 (12.1)	10.7 (0.08)
Morocco	54 (1.1)	407 (3.5)	35 (0.7)	385 (3.0)	11 (0.8)	388 (5.8)	10.3 (0.05)
Portugal	51 (1.9)	525 (3.0)	40 (1.5)	518 (3.8)	9 (1.2)	505 (6.7)	10.3 (0.08)
Russian Federation	45 (1.1)	546 (4.5)	45 (1.0)	541 (4.2)	10 (0.8)	547 (7.8)	10.1 (0.05)
Kazakhstan	43 (1.3)	489 (4.3)	50 (1.1)	471 (3.6)	7 (0.6)	465 (8.1)	10.1 (0.05)
Lithuania	41 (1.8)	538 (3.7)	43 (1.2)	532 (3.6)	16 (1.5)	532 (5.0)	9.8 (0.09)
Cyprus	40 (1.2)	498 (3.0)	35 (1.0)	484 (2.9)	25 (1.1)	474 (3.5)	9.5 (0.07)
Finland	39 (1.4)	562 (3.2)	48 (0.9)	538 (3.4)	13 (1.0)	523 (7.1)	9.8 (0.06)
Hungary	38 (1.6)	536 (4.1)	43 (1.1)	523 (3.6)	19 (1.6)	533 (4.0)	9.6 (0.08)
France	29 (1.3)	491 (4.0)	53 (1.3)	490 (3.4)	18 (1.8)	481 (4.1)	9.3 (0.08)
Lebanon	- -	- -	- -	- -	- -	- -	- -
Sweden	- -	- -	- -	- -	- -	- -	- -
International Average	**46 (0.5)**	**503 (1.2)**	**41 (0.4)**	**489 (1.2)**	**13 (0.4)**	**488 (2.3)**	
Benchmarking Participants							
Moscow City, Russian Fed.	39 (1.7)	572 (3.8)	44 (1.0)	565 (3.3)	17 (1.3)	563 (4.3)	9.7 (0.08)

A dash (-) indicates comparable data not available.
An "r" indicates data are available for at least 70% but less than 85% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Teachers' Emphasis on Science Investigation

Science practices, and in particular scientific inquiry and investigation knowledge and skills, are important components of many science curricula. Teachers were asked the frequency with which they have their students engage in various instructional activities related to science investigations and experiments. Responses were combined into the TIMSS *Teachers' Emphasis on Science Investigation* scale, described in Exhibit 13.11 (see About the Scale), to report two categories: "about half the lessons or more" and "less than half the lessons." Results of teachers' reports are presented in Exhibits 13.12 and 13.13 for fourth and eighth grades, respectively, together with students' average achievement. Countries are ordered by the percentage of students in "about half the lessons or more."

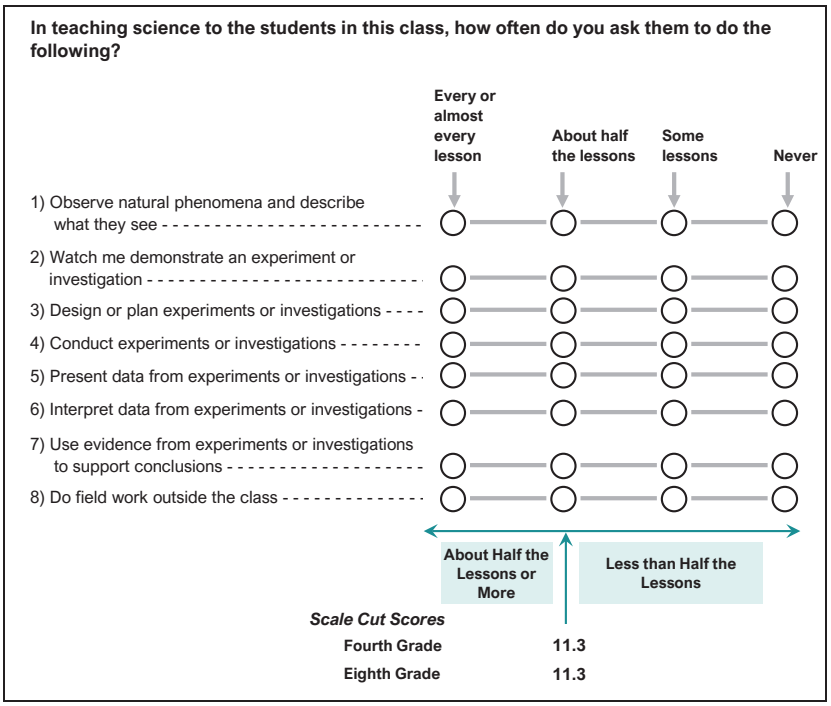
On average, 31 percent of fourth grade students had teachers who reported an emphasis on science investigation in "about half the lessons or more," and 69 percent had teachers who reported an emphasis on science investigation in "less than half the lessons." Average achievement was similar for students in both categories of emphasis. Just 27 percent of eighth grade students were taught by teachers reporting an emphasis on science investigation in "about half the lessons or more," and 73 percent had teachers who reported an emphasis on science investigation in "less than half the lessons." In eighth grade, average achievement for students in the "about half the lessons or more" category was 492, and was 490 for those in the "less than half the lessons" category.

Exhibit 13.11: Teachers' Emphasis on Science Investigation

Students' Results Based on Teachers' Reports

About the Scale

Students were scored according to their teachers' reports regarding how often they asked students to do eight instructional activities on the *Emphasis on Science Investigation* scale. Cut scores divide the scale into two categories. Students with teachers reporting they emphasize science investigation in **About Half the Lessons or More** had a score at or above the cut score corresponding to their teachers reporting they do all eight activities in "about half the lessons," on average. All other students had teachers reporting they emphasize science investigation in **Less than Half the Lessons**.



SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 13.12: Teachers' Emphasis on Science Investigation

Students' Results Based on Teachers' Reports

Country		About Half the Lessons or More		Less than Half the Lessons		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Oman		82 (2.4)	431 (5.0)	18 (2.4)	457 (11.0)	12.5 (0.11)
Iran, Islamic Rep. of		78 (3.1)	444 (5.4)	22 (3.1)	428 (8.2)	12.5 (0.15)
Philippines		75 (3.8)	248 (8.8)	25 (3.8)	249 (12.4)	12.3 (0.20)
Cyprus		72 (3.9)	513 (3.8)	28 (3.9)	510 (4.2)	12.0 (0.12)
Turkey (5)		69 (3.6)	522 (6.1)	31 (3.6)	536 (5.2)	12.2 (0.22)
Pakistan	r	66 (7.0)	303 (22.1)	34 (7.0)	278 (15.8)	12.0 (0.30)
Korea, Rep. of		66 (4.1)	590 (2.9)	34 (4.1)	583 (3.0)	11.6 (0.14)
Kuwait		61 (3.5)	392 (7.7)	39 (3.5)	394 (10.0)	11.6 (0.19)
United Arab Emirates	r	58 (2.2)	486 (3.3)	42 (2.2)	458 (4.5)	11.5 (0.10)
Albania		57 (3.6)	493 (5.7)	43 (3.6)	485 (5.6)	11.5 (0.20)
Qatar		54 (2.9)	441 (7.1)	46 (2.9)	460 (4.8)	11.3 (0.13)
Japan		53 (4.4)	561 (2.0)	47 (4.4)	563 (3.0)	11.3 (0.14)
Bahrain		51 (4.0)	496 (6.6)	49 (4.0)	488 (6.3)	11.0 (0.13)
North Macedonia		48 (4.4)	429 (8.3)	52 (4.4)	424 (8.8)	11.3 (0.21)
Kosovo		46 (4.3)	419 (4.8)	54 (4.3)	408 (4.8)	11.2 (0.19)
Morocco		43 (4.1)	373 (8.4)	57 (4.1)	376 (8.2)	10.9 (0.17)
South Africa (5)		43 (4.2)	316 (8.8)	57 (4.2)	332 (7.2)	10.9 (0.22)
Kazakhstan		43 (3.8)	499 (6.7)	57 (3.8)	489 (4.3)	11.0 (0.20)
Saudi Arabia		43 (3.4)	416 (6.6)	57 (3.4)	391 (6.3)	10.9 (0.13)
Australia		35 (3.3)	531 (4.7)	65 (3.3)	535 (3.6)	10.0 (0.15)
Azerbaijan		33 (3.4)	423 (5.8)	67 (3.4)	429 (4.2)	10.3 (0.16)
Italy		32 (3.4)	511 (5.1)	68 (3.4)	509 (3.3)	10.0 (0.19)
Chile	r	31 (4.1)	473 (5.9)	69 (4.1)	466 (3.9)	10.2 (0.18)
Serbia		30 (3.9)	522 (4.8)	70 (3.9)	515 (4.4)	10.0 (0.20)
Singapore		30 (2.7)	602 (5.5)	70 (2.7)	591 (4.3)	10.4 (0.08)
Portugal		29 (3.1)	501 (4.3)	71 (3.1)	505 (2.8)	9.9 (0.16)
Croatia		28 (3.5)	524 (4.6)	72 (3.5)	523 (2.4)	9.8 (0.20)
Chinese Taipei		27 (3.2)	559 (3.0)	73 (3.2)	558 (2.1)	10.2 (0.14)
Montenegro		26 (2.2)	448 (4.8)	74 (2.2)	455 (2.8)	9.6 (0.11)
Slovak Republic		25 (3.0)	532 (6.2)	75 (3.0)	518 (4.0)	9.8 (0.17)
United States		24 (2.3)	545 (5.4)	76 (2.3)	537 (3.2)	9.7 (0.13)
Malta		24 (0.3)	498 (2.2)	76 (0.3)	495 (1.5)	9.6 (0.02)
Bosnia and Herzegovina		20 (2.3)	454 (6.8)	80 (2.3)	460 (3.0)	9.4 (0.14)
Ireland		19 (2.9)	524 (6.9)	81 (2.9)	529 (3.1)	9.4 (0.15)
Spain		19 (3.3)	504 (6.3)	81 (3.3)	512 (2.8)	9.2 (0.16)
Bulgaria		19 (3.1)	540 (11.8)	81 (3.1)	517 (5.3)	9.4 (0.15)
France		18 (2.6)	491 (6.0)	82 (2.6)	488 (3.5)	9.3 (0.15)
Canada	r	17 (1.7)	519 (3.9)	83 (1.7)	526 (2.2)	9.6 (0.09)
Georgia		16 (2.6)	450 (13.0)	84 (2.6)	456 (3.9)	9.5 (0.16)
Russian Federation		15 (2.6)	563 (6.9)	85 (2.6)	568 (3.2)	8.8 (0.16)
New Zealand		15 (2.1)	500 (7.0)	85 (2.1)	503 (2.9)	9.1 (0.13)
Armenia		15 (2.9)	470 (8.0)	85 (2.9)	467 (3.9)	9.2 (0.15)
Northern Ireland		14 (3.3)	528 (6.2)	86 (3.3)	517 (2.6)	8.5 (0.18)
Latvia		13 (2.7)	542 (5.3)	87 (2.7)	542 (2.7)	9.4 (0.16)
Lithuania		12 (2.5)	534 (10.0)	88 (2.5)	537 (2.7)	8.8 (0.14)
Denmark	r	8 (2.5)	517 (9.2)	92 (2.5)	522 (2.8)	8.6 (0.16)
Hong Kong SAR		8 (2.8)	543 (20.8)	92 (2.8)	531 (3.6)	8.7 (0.22)
Sweden		7 (2.4)	533 (12.3)	93 (2.4)	540 (3.3)	8.4 (0.18)
Germany		7 (1.9)	509 (13.1)	93 (1.9)	519 (2.3)	8.5 (0.14)
Hungary		6 (1.6)	525 (8.9)	94 (1.6)	529 (2.9)	8.4 (0.13)
Poland		6 (1.8)	527 (8.4)	94 (1.8)	532 (2.7)	8.5 (0.14)
Finland		6 (1.4)	559 (7.7)	94 (1.4)	555 (2.6)	8.2 (0.10)
Netherlands	r	6 (2.7)	528 (13.2)	94 (2.7)	517 (3.2)	7.8 (0.16)
Austria		5 (1.3)	519 (10.3)	95 (1.3)	522 (2.6)	8.2 (0.12)
Czech Republic		4 (1.1)	544 (11.1)	96 (1.1)	533 (2.6)	8.3 (0.12)
Belgium (Flemish)		3 (1.2)	509 (10.2)	97 (1.2)	502 (2.1)	7.6 (0.13)
Norway (5)	s	2 (1.0)	~ ~	98 (1.0)	540 (2.8)	7.7 (0.14)
England	x	12 (4.0)	538 (9.9)	88 (4.0)	538 (5.2)	9.8 (0.19)
International Average		**31 (0.4)**	**491 (1.1)**	**69 (0.4)**	**490 (0.7)**	
Benchmarking Participants						
Dubai, UAE	r	67 (2.2)	554 (2.5)	33 (2.2)	541 (4.8)	12.2 (0.12)
Abu Dhabi, UAE	r	46 (3.0)	430 (7.3)	54 (3.0)	405 (6.0)	11.0 (0.15)
Ontario, Canada	r	16 (3.1)	519 (8.4)	84 (3.1)	528 (3.9)	9.6 (0.14)
Madrid, Spain		16 (3.5)	530 (7.6)	84 (3.5)	521 (1.9)	9.2 (0.16)
Quebec, Canada	r	15 (3.0)	523 (4.9)	85 (3.0)	522 (2.7)	9.3 (0.17)
Moscow City, Russian Fed.		10 (3.1)	599 (8.3)	90 (3.1)	594 (2.3)	8.6 (0.17)

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 13.13: Teachers' Emphasis on Science Investigation

Students' Results Based on Teachers' Reports

Country		About Half the Lessons or More		Less than Half the Lessons		Average Scale Score
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Oman		75 (2.8)	458 (3.7)	25 (2.8)	456 (7.5)	12.1 (0.11)
Iran, Islamic Rep. of		61 (3.4)	452 (5.3)	39 (3.4)	445 (6.2)	11.6 (0.14)
Kuwait		55 (4.8)	435 (6.2)	45 (4.8)	455 (9.6)	11.5 (0.17)
Morocco		49 (2.8)	395 (3.3)	51 (2.8)	393 (3.7)	11.0 (0.10)
Turkey		48 (4.2)	521 (7.6)	52 (4.2)	510 (4.2)	11.1 (0.22)
United Arab Emirates	r	48 (1.7)	489 (4.4)	52 (1.7)	461 (4.5)	10.9 (0.07)
Bahrain		46 (2.3)	481 (3.6)	54 (2.3)	490 (3.1)	10.9 (0.13)
Qatar		45 (4.6)	477 (8.0)	55 (4.6)	473 (6.0)	10.8 (0.14)
Saudi Arabia		44 (3.9)	438 (4.3)	56 (3.9)	426 (4.1)	10.9 (0.17)
Egypt		43 (4.2)	401 (8.5)	57 (4.2)	382 (6.2)	10.9 (0.19)
Jordan		43 (4.0)	455 (7.3)	57 (4.0)	449 (5.5)	10.9 (0.15)
Malaysia		41 (3.6)	472 (7.7)	59 (3.6)	451 (5.4)	10.7 (0.15)
Lebanon		37 (2.7)	377 (6.6)	63 (2.7)	377 (6.7)	10.6 (0.11)
Kazakhstan		36 (2.0)	481 (4.4)	64 (2.0)	476 (3.6)	10.3 (0.12)
Chile		27 (3.6)	456 (6.5)	73 (3.6)	465 (3.3)	9.9 (0.15)
France	r	25 (3.1)	494 (5.2)	75 (3.1)	486 (2.9)	10.1 (0.12)
South Africa (9)		25 (2.4)	360 (6.8)	75 (2.4)	374 (4.0)	9.6 (0.13)
United States	r	25 (2.2)	531 (7.5)	75 (2.2)	525 (5.4)	9.8 (0.11)
Cyprus	s	24 (2.2)	481 (6.2)	76 (2.2)	488 (2.9)	9.8 (0.10)
Korea, Rep. of		23 (3.6)	563 (4.1)	77 (3.6)	560 (2.3)	9.8 (0.16)
Finland		23 (1.5)	549 (4.1)	77 (1.5)	541 (3.2)	9.4 (0.06)
Japan		21 (3.4)	574 (6.3)	79 (3.4)	568 (2.4)	10.1 (0.12)
Romania		20 (2.1)	473 (7.5)	80 (2.1)	471 (4.3)	9.6 (0.10)
Israel		20 (3.1)	506 (11.2)	80 (3.1)	515 (4.8)	9.4 (0.15)
Hong Kong SAR		18 (3.5)	526 (16.0)	82 (3.5)	499 (6.2)	9.3 (0.16)
Georgia		16 (1.5)	441 (6.5)	84 (1.5)	448 (3.8)	9.3 (0.08)
Ireland		14 (1.9)	520 (7.9)	86 (1.9)	529 (2.7)	9.8 (0.10)
Russian Federation		14 (1.2)	550 (6.6)	86 (1.2)	542 (4.2)	9.0 (0.09)
Australia	r	14 (2.3)	542 (10.8)	86 (2.3)	532 (3.8)	9.5 (0.09)
England	s	13 (3.9)	505 (18.9)	87 (3.9)	525 (7.6)	9.6 (0.16)
Italy		11 (2.0)	494 (7.9)	89 (2.0)	502 (2.6)	9.0 (0.12)
New Zealand		10 (2.2)	513 (15.2)	90 (2.2)	500 (3.9)	9.2 (0.12)
Hungary		8 (1.3)	544 (6.3)	92 (1.3)	527 (2.8)	8.7 (0.08)
Portugal		8 (1.2)	514 (6.2)	92 (1.2)	520 (2.9)	8.8 (0.10)
Chinese Taipei		8 (2.0)	587 (8.8)	92 (2.0)	573 (2.0)	8.6 (0.13)
Lithuania		7 (1.0)	529 (5.5)	93 (1.0)	533 (2.9)	8.3 (0.08)
Sweden		6 (1.3)	530 (13.9)	94 (1.3)	521 (3.3)	8.2 (0.14)
Singapore		3 (1.0)	597 (27.0)	97 (1.0)	607 (4.1)	8.5 (0.08)
Norway (9)	s	1 (0.7)	~ ~	99 (0.7)	498 (3.6)	7.8 (0.12)
International Average		**27 (0.5)**	**492 (1.5)**	**73 (0.5)**	**490 (0.7)**	
Benchmarking Participants						
Dubai, UAE	r	53 (3.3)	553 (5.6)	47 (3.3)	549 (5.0)	11.3 (0.10)
Abu Dhabi, UAE	r	42 (2.3)	448 (9.4)	58 (2.3)	395 (7.2)	10.6 (0.11)
Gauteng, RSA (9)		31 (3.5)	412 (7.8)	69 (3.5)	427 (5.3)	10.0 (0.20)
Western Cape, RSA (9)		21 (3.4)	418 (11.2)	79 (3.4)	446 (6.6)	9.2 (0.18)
Moscow City, Russian Fed.		12 (1.3)	571 (4.9)	88 (1.3)	566 (3.0)	8.8 (0.08)
Ontario, Canada	s	11 (3.3)	522 (11.6)	89 (3.3)	521 (4.9)	8.7 (0.21)
Quebec, Canada	y	- -	- -	- -	- -	- -

This TIMSS context questionnaire scale was established in 2015 based on the combined response distribution of all countries that participated in TIMSS 2015. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

School Resources for Science Experiments

Undertaking hands-on science investigations is an important component of science curricula in many countries. Exhibits 13.14 (fourth grade) and 13.15 (eighth grade) present principals' reports on whether their schools have two resources for facilitating hands-on science experiments—a science laboratory and assistance for teachers when students are conducting experiments—along with student achievement. Countries are ordered by the percentage of students in schools with a science laboratory.

On average across countries, 36 percent of fourth grade students were in schools with a science laboratory, and their average achievement was higher than that of the 64 percent of students who were in schools without a laboratory (496 vs. 486). Of course, the availability of a laboratory in the school could be related to other economic factors that are related to achievement. On average, 35 percent of fourth grade students were in schools in which assistance is available to teachers when students are conducting experiments. This finding also ranged considerably across countries, and there are countries in which many schools have a science laboratory, but assistance is not available to teachers when students conduct experiments.

A much higher percentage of eighth grade students (85%) were in schools with a science laboratory. Average achievement for these students was substantially higher than for students in schools without this resource (494 compared with 457). Still, only about half (54%) of students were in schools in which assistance was available to teachers when students are conducting experiments, and this finding was likewise associated with higher average science achievement (494 compared with 483).

Exhibit 13.14: School Resources for Conducting Science Experiments

Students' Results based on Principals' Reports

Country	Schools Have a Science Laboratory				Teachers Have Assistance Available when Students are Conducting Experiments			
	Yes		No		Yes		No	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Japan	100 (0.0)	562 (1.8)	0 (0.0)	~ ~	36 (4.3)	559 (3.0)	64 (4.3)	563 (2.0)
Korea, Rep. of	99 (0.9)	588 (2.2)	1 (0.9)	~ ~	74 (4.0)	590 (2.4)	26 (4.0)	581 (4.3)
Singapore	98 (0.0)	595 (3.4)	2 (0.0)	~ ~	67 (0.0)	597 (4.3)	33 (0.0)	590 (5.1)
Kuwait	95 (1.5)	392 (6.5)	5 (1.5)	400 (28.9)	78 (3.3)	393 (7.2)	22 (3.3)	388 (15.8)
Chinese Taipei	93 (1.9)	557 (1.8)	7 (1.9)	567 (5.1)	90 (2.5)	558 (1.9)	10 (2.5)	558 (5.2)
United Arab Emirates	85 (1.2)	468 (2.5)	15 (1.2)	488 (6.2)	83 (1.1)	474 (2.5)	17 (1.1)	455 (3.5)
Bahrain	85 (2.0)	490 (4.0)	15 (2.0)	507 (6.4)	74 (2.7)	489 (4.0)	26 (2.7)	501 (6.2)
Denmark	r 84 (3.2)	522 (2.8)	16 (3.2)	526 (4.8)	r 7 (1.9)	532 (5.6)	93 (1.9)	522 (2.7)
Qatar	83 (3.0)	440 (4.6)	17 (3.0)	497 (11.2)	86 (2.0)	442 (4.5)	14 (2.0)	495 (9.1)
Saudi Arabia	80 (2.9)	405 (4.9)	20 (2.9)	391 (13.6)	71 (3.5)	398 (5.3)	29 (3.5)	416 (7.1)
Poland	66 (3.2)	535 (3.1)	34 (3.2)	524 (4.8)	50 (4.5)	532 (3.7)	50 (4.5)	529 (3.8)
Cyprus	66 (4.5)	514 (3.8)	34 (4.5)	504 (4.8)	20 (3.8)	519 (7.2)	80 (3.8)	508 (3.4)
Turkey (5)	62 (4.3)	534 (5.2)	38 (4.3)	514 (8.4)	13 (2.7)	536 (13.1)	87 (2.7)	525 (4.8)
Chile	57 (3.9)	478 (3.7)	43 (3.9)	458 (5.0)	39 (4.5)	473 (3.9)	61 (4.5)	467 (4.1)
Georgia	50 (3.8)	454 (5.1)	50 (3.8)	455 (5.6)	8 (2.5)	470 (10.2)	92 (2.5)	453 (4.2)
Lithuania	48 (4.8)	537 (4.2)	52 (4.8)	539 (4.8)	12 (2.8)	542 (10.9)	88 (2.8)	538 (2.9)
Armenia	45 (4.3)	464 (4.3)	55 (4.3)	468 (4.7)	89 (2.5)	465 (3.4)	11 (2.5)	476 (8.8)
Iran, Islamic Rep. of	42 (3.1)	458 (6.8)	58 (3.1)	429 (5.5)	18 (3.1)	455 (9.5)	82 (3.1)	438 (4.8)
Hong Kong SAR	42 (4.8)	543 (5.5)	58 (4.8)	523 (5.6)	62 (3.9)	534 (3.8)	38 (3.9)	528 (6.4)
Portugal	41 (3.7)	504 (3.9)	59 (3.7)	504 (3.1)	39 (4.0)	500 (3.3)	61 (4.0)	506 (3.1)
Kazakhstan	38 (3.8)	494 (6.4)	62 (3.8)	495 (4.5)	61 (3.9)	494 (4.5)	39 (3.9)	492 (6.0)
Italy	36 (3.9)	505 (4.9)	64 (3.9)	513 (3.4)	13 (2.8)	508 (7.7)	87 (2.8)	510 (3.1)
Pakistan	36 (8.2)	297 (29.4)	64 (8.2)	287 (11.8)	55 (6.4)	300 (20.4)	45 (6.4)	279 (14.1)
Latvia	36 (3.7)	542 (4.3)	64 (3.7)	542 (2.8)	71 (3.5)	541 (3.1)	29 (3.5)	543 (3.8)
Czech Republic	35 (3.9)	521 (4.2)	65 (3.9)	541 (3.0)	8 (2.3)	535 (12.6)	92 (2.3)	534 (2.6)
Russian Federation	33 (3.0)	572 (5.2)	67 (3.0)	565 (3.9)	30 (3.0)	566 (4.0)	70 (3.0)	568 (4.0)
Spain	32 (2.9)	524 (3.4)	68 (2.9)	505 (2.8)	20 (2.9)	515 (7.9)	80 (2.9)	510 (2.6)
Sweden	31 (4.1)	529 (6.7)	69 (4.1)	540 (3.7)	17 (3.7)	533 (6.9)	83 (3.7)	537 (4.1)
Oman	30 (2.3)	418 (7.2)	70 (2.3)	441 (5.4)	29 (2.7)	423 (7.7)	71 (2.7)	437 (5.3)
Norway (5)	r 28 (4.7)	545 (4.5)	72 (4.7)	538 (3.0)	r 24 (4.1)	539 (6.4)	76 (4.1)	540 (2.7)
England	s 24 (4.6)	543 (11.3)	76 (4.6)	536 (4.3)	s 37 (5.3)	537 (8.3)	63 (5.3)	538 (4.7)
Slovak Republic	22 (3.4)	531 (5.4)	78 (3.4)	518 (4.8)	13 (2.4)	516 (9.6)	87 (2.4)	522 (4.3)
United States	21 (2.5)	547 (6.1)	79 (2.5)	537 (3.5)	19 (2.4)	539 (7.8)	81 (2.4)	538 (3.5)
Australia	21 (2.9)	537 (6.3)	79 (2.9)	531 (3.5)	15 (2.7)	537 (6.6)	85 (2.7)	531 (3.2)
Montenegro	21 (0.3)	453 (5.9)	79 (0.3)	453 (2.6)	27 (0.6)	456 (3.8)	73 (0.6)	452 (2.6)
Kosovo	20 (3.9)	419 (8.5)	80 (3.9)	412 (4.4)	12 (3.1)	410 (8.6)	88 (3.1)	413 (3.9)
Albania	18 (2.3)	525 (5.5)	82 (2.3)	482 (3.9)	15 (2.8)	519 (8.7)	85 (2.8)	485 (3.9)
Malta	16 (0.3)	518 (2.7)	84 (0.3)	492 (1.5)	47 (0.4)	496 (1.7)	53 (0.4)	496 (1.8)
Philippines	16 (2.8)	294 (18.7)	84 (2.8)	241 (8.7)	65 (4.2)	240 (8.3)	35 (4.2)	266 (11.8)
Bosnia and Herzegovina	14 (2.8)	462 (7.6)	86 (2.8)	458 (3.0)	25 (3.4)	457 (6.1)	75 (3.4)	459 (3.0)
Azerbaijan	13 (2.7)	425 (9.9)	87 (2.7)	427 (3.4)	48 (3.8)	425 (4.9)	52 (3.8)	429 (5.0)
Finland	13 (3.0)	556 (6.9)	87 (3.0)	554 (2.7)	32 (3.4)	556 (4.8)	68 (3.4)	554 (2.7)
Germany	13 (2.1)	512 (7.1)	87 (2.1)	519 (2.6)	6 (1.6)	526 (9.3)	94 (1.6)	518 (2.4)
South Africa (5)	13 (2.4)	401 (21.9)	87 (2.4)	314 (5.0)	20 (3.3)	302 (11.5)	80 (3.3)	332 (5.9)
Serbia	11 (2.4)	506 (8.1)	89 (2.4)	518 (3.7)	33 (4.3)	522 (5.1)	67 (4.3)	514 (4.2)
Canada	11 (1.1)	537 (7.1)	89 (1.1)	522 (1.9)	20 (2.4)	528 (5.7)	80 (2.4)	522 (2.2)
Morocco	10 (2.5)	450 (24.1)	90 (2.5)	365 (6.6)	50 (3.1)	392 (7.9)	50 (3.1)	359 (8.1)
Hungary	9 (2.5)	546 (9.9)	91 (2.5)	527 (3.0)	17 (3.3)	537 (9.1)	83 (3.3)	527 (3.3)
Croatia	6 (2.2)	530 (10.5)	94 (2.2)	524 (2.2)	15 (3.0)	532 (6.5)	85 (3.0)	523 (2.0)
North Macedonia	6 (2.0)	400 (17.4)	94 (2.0)	428 (6.4)	34 (4.1)	437 (9.3)	66 (4.1)	420 (8.5)
New Zealand	6 (1.5)	539 (13.4)	94 (1.5)	500 (2.5)	18 (3.1)	484 (9.0)	82 (3.1)	507 (3.0)
Bulgaria	5 (1.8)	554 (14.9)	95 (1.8)	519 (5.3)	1 (1.0)	~ ~	99 (1.0)	521 (5.1)
Netherlands	s 3 (1.9)	525 (16.8)	97 (1.9)	518 (3.3)	s 21 (4.6)	517 (6.9)	79 (4.6)	519 (3.6)
Austria	2 (1.1)	~ ~	98 (1.1)	522 (2.6)	5 (1.6)	505 (15.3)	95 (1.6)	523 (2.7)
Ireland	2 (1.0)	~ ~	98 (1.0)	528 (3.2)	9 (2.5)	519 (24.0)	91 (2.5)	529 (2.6)
France	2 (1.1)	~ ~	98 (1.1)	488 (3.0)	5 (1.8)	494 (16.5)	95 (1.8)	488 (3.0)
Belgium (Flemish)	1 (0.8)	~ ~	99 (0.8)	501 (2.2)	61 (4.1)	497 (3.0)	39 (4.1)	508 (3.0)
Northern Ireland	r 0 (0.0)	~ ~	100 (0.0)	520 (2.7)	r 19 (3.7)	517 (7.4)	81 (3.7)	521 (2.7)
International Average	**36 (0.4)**	**496 (1.3)**	**64 (0.4)**	**486 (0.9)**	**35 (0.4)**	**491 (1.1)**	**65 (0.4)**	**491 (0.7)**
Benchmarking Participants								
Abu Dhabi, UAE	r 87 (1.0)	407 (3.6)	13 (1.0)	447 (7.3)	r 79 (0.7)	414 (3.4)	21 (0.7)	405 (4.7)
Dubai, UAE	r 77 (0.3)	541 (2.3)	23 (0.3)	560 (2.9)	r 81 (0.2)	543 (2.2)	19 (0.2)	556 (3.1)
Moscow City, Russian Fed.	64 (4.2)	595 (2.8)	36 (4.2)	595 (3.5)	17 (3.2)	600 (5.2)	83 (3.2)	594 (2.4)
Madrid, Spain	44 (3.5)	529 (2.6)	56 (3.5)	518 (3.1)	16 (2.7)	526 (4.8)	84 (2.7)	523 (2.3)
Ontario, Canada	8 (1.4)	562 (14.7)	92 (1.4)	521 (3.0)	9 (4.0)	534 (28.5)	91 (4.0)	523 (3.2)
Quebec, Canada	7 (2.1)	510 (9.1)	93 (2.1)	523 (2.7)	33 (4.2)	524 (4.1)	67 (4.2)	521 (3.0)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 13.15: School Resources for Conducting Science Experiments

Students' Results based on Principals' Reports

Country	Schools Have a Science Laboratory					Teachers Have Assistance Available when Students are Conducting Experiments				
	Yes		No			Yes		No		
	Percent of Students	Average Achievement	Percent of Students	Average Achievement		Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Australia	100 (0.0)	530 (3.3)	0 (0.0)	~ ~		66 (3.4)	532 (3.5)	34 (3.4)	526 (7.6)	
Ireland	100 (0.0)	525 (2.8)	0 (0.0)	~ ~		14 (2.9)	535 (8.2)	86 (2.9)	523 (3.1)	
Korea, Rep. of	100 (0.0)	561 (2.1)	0 (0.0)	~ ~		46 (3.6)	565 (3.7)	54 (3.6)	557 (2.9)	
Singapore	100 (0.0)	608 (3.9)	0 (0.0)	~ ~		99 (0.0)	609 (4.0)	1 (0.0)	~ ~	
Sweden	100 (0.0)	522 (3.2)	0 (0.0)	~ ~		15 (3.2)	501 (12.3)	85 (3.2)	526 (3.6)	
Oman	100 (0.3)	457 (3.0)	0 (0.3)	~ ~		82 (3.0)	459 (3.4)	18 (3.0)	452 (7.3)	
Bahrain	100 (0.1)	486 (1.9)	0 (0.1)	~ ~		92 (0.1)	487 (2.0)	8 (0.1)	476 (5.6)	
Hong Kong SAR	99 (0.7)	504 (5.3)	1 (0.7)	~ ~		98 (1.3)	504 (5.4)	2 (1.3)	~ ~	
Japan	99 (0.9)	570 (2.2)	1 (0.9)	~ ~		35 (4.0)	570 (4.2)	65 (4.0)	569 (2.9)	
Kuwait	99 (0.6)	443 (5.4)	1 (0.6)	~ ~		83 (3.3)	443 (6.2)	17 (3.3)	445 (13.1)	
New Zealand	99 (0.9)	505 (3.6)	1 (0.9)	~ ~		53 (5.1)	500 (5.1)	47 (5.1)	507 (5.7)	
England	s 99 (1.0)	521 (5.7)	1 (1.0)	~ ~		s 71 (4.6)	518 (7.2)	29 (4.6)	526 (12.8)	
Malaysia	99 (0.3)	460 (3.6)	1 (0.3)	~ ~		91 (2.1)	461 (4.0)	9 (2.1)	449 (10.1)	
Cyprus	r 99 (0.0)	483 (2.2)	1 (0.0)	~ ~		r 36 (0.4)	494 (3.6)	64 (0.4)	477 (2.6)	
Chinese Taipei	99 (0.8)	575 (2.0)	1 (0.8)	~ ~		92 (1.6)	577 (2.0)	8 (1.6)	544 (8.4)	
Qatar	99 (1.0)	475 (4.3)	1 (1.0)	~ ~		94 (1.7)	473 (4.5)	6 (1.7)	502 (21.0)	
Portugal	98 (1.3)	519 (2.9)	2 (1.3)	~ ~		46 (4.8)	524 (4.7)	54 (4.8)	514 (4.2)	
United Arab Emirates	97 (0.7)	472 (2.4)	3 (0.7)	430 (6.1)		91 (1.0)	471 (2.4)	9 (1.0)	462 (5.6)	
Egypt	95 (1.8)	390 (5.6)	5 (1.8)	374 (22.8)		94 (1.8)	391 (6.0)	6 (1.8)	373 (24.7)	
Norway (9)	r 93 (2.4)	497 (3.6)	7 (2.4)	490 (12.6)		r 34 (4.6)	494 (5.8)	66 (4.6)	498 (4.3)	
Saudi Arabia	92 (1.8)	433 (2.8)	8 (1.8)	420 (14.3)		82 (3.4)	433 (3.2)	18 (3.4)	434 (8.4)	
Jordan	92 (1.9)	458 (4.5)	8 (1.9)	390 (13.1)		89 (2.0)	456 (5.2)	11 (2.0)	420 (8.9)	
Israel	90 (2.7)	514 (4.7)	10 (2.7)	509 (15.8)		85 (2.8)	513 (4.6)	15 (2.8)	516 (10.9)	
Lebanon	89 (2.5)	378 (5.2)	11 (2.5)	368 (12.8)		65 (3.2)	388 (6.4)	35 (3.2)	355 (9.9)	
Finland	87 (3.2)	544 (3.3)	13 (3.2)	535 (9.5)		19 (3.2)	542 (6.0)	81 (3.2)	543 (3.7)	
Morocco	83 (2.4)	395 (3.3)	17 (2.4)	393 (7.5)		43 (3.7)	400 (4.7)	57 (3.7)	390 (4.3)	
Kazakhstan	81 (2.8)	480 (3.7)	19 (2.8)	467 (7.0)		92 (1.5)	478 (3.4)	8 (1.5)	476 (8.8)	
United States	80 (2.8)	531 (3.9)	20 (2.8)	510 (15.1)		34 (3.4)	519 (7.2)	66 (3.4)	530 (6.1)	
Russian Federation	79 (3.1)	545 (4.0)	21 (3.1)	535 (9.0)		46 (3.6)	540 (6.3)	54 (3.6)	545 (4.0)	
France	r 75 (4.1)	493 (3.6)	25 (4.1)	482 (6.6)		r 13 (2.8)	510 (10.5)	87 (2.8)	488 (3.4)	
Italy	75 (3.7)	501 (2.9)	25 (3.7)	504 (5.7)		13 (2.9)	492 (11.3)	87 (2.9)	503 (2.5)	
Georgia	70 (3.7)	446 (4.6)	30 (3.7)	450 (5.8)		6 (2.2)	488 (24.7)	94 (2.2)	444 (3.8)	
Chile	68 (3.1)	473 (3.8)	32 (3.1)	439 (6.1)		32 (3.5)	474 (6.5)	68 (3.5)	457 (4.1)	
Iran, Islamic Rep. of	67 (3.5)	461 (4.9)	33 (3.5)	424 (6.0)		27 (3.1)	465 (8.0)	73 (3.1)	444 (4.4)	
Turkey	63 (3.7)	525 (5.1)	37 (3.7)	500 (5.7)		14 (2.6)	542 (13.5)	86 (2.6)	511 (4.2)	
Romania	62 (3.3)	485 (6.3)	38 (3.3)	447 (4.9)		38 (3.3)	491 (7.2)	62 (3.3)	458 (4.7)	
South Africa (9)	46 (2.5)	406 (5.6)	54 (2.5)	339 (3.6)		35 (2.7)	371 (6.7)	65 (2.7)	370 (3.8)	
Lithuania	27 (3.8)	547 (5.2)	73 (3.8)	526 (3.9)		7 (2.3)	519 (6.7)	93 (2.3)	533 (3.0)	
Hungary	26 (3.8)	553 (8.0)	74 (3.8)	522 (3.3)		17 (3.1)	560 (10.6)	83 (3.1)	524 (3.7)	
International Average	**85 (0.4)**	**494 (0.7)**	**15 (0.4)**	**457 (2.2)**		**54 (0.5)**	**494 (1.2)**	**46 (0.5)**	**483 (1.4)**	
Benchmarking Participants										
Quebec, Canada	100 (0.0)	540 (3.5)	0 (0.0)	~ ~		98 (1.3)	540 (3.6)	2 (1.3)	~ ~	
Dubai, UAE	r 98 (0.0)	546 (2.3)	2 (0.0)	~ ~		r 92 (0.2)	546 (2.4)	8 (0.2)	555 (6.0)	
Abu Dhabi, UAE	r 98 (0.1)	418 (4.3)	2 (0.1)	~ ~		r 91 (0.9)	416 (4.6)	9 (0.9)	430 (8.5)	
Moscow City, Russian Fed.	97 (1.3)	567 (3.0)	3 (1.3)	567 (16.1)		28 (3.6)	573 (6.0)	72 (3.6)	564 (3.3)	
Western Cape, RSA (9)	73 (3.8)	452 (7.3)	27 (3.8)	408 (9.1)		22 (3.9)	476 (20.3)	78 (3.9)	431 (6.7)	
Gauteng, RSA (9)	65 (3.9)	434 (5.3)	35 (3.9)	400 (8.7)		42 (4.5)	429 (8.0)	58 (4.5)	416 (6.2)	
Ontario, Canada	r 44 (4.7)	532 (4.3)	56 (4.7)	512 (4.3)		r 18 (4.6)	530 (12.7)	82 (4.6)	519 (3.4)	

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Experiments in Science Lessons

Students were asked about the frequency with which they conduct science experiments in their science lessons. Their reports are presented in Exhibits 13.16 (fourth grade) and 13.17 (eighth grade).

In fourth grade, 31 percent of students, on average, reported that they conducted experiments "at least once a week," 26 percent "once or twice a month," 24 percent "a few times a year," and 18 percent "never." Across countries, students reporting that they do experiments "once or twice a month" or "a few times a year" had higher average achievement than students who said they do them "at least once a week" or "never."

In the eighth grade, the frequency with which students conduct science experiments varied by science subject. In countries teaching science as an integrated subject, 28 percent of students reported that they do them "at least once a week," 37 percent said "once or twice a month," 24 percent said "a few times a year," and 11 percent said they "never" do them, on average. In countries teaching science as separate subjects, frequencies were similar to those for integrated science in chemistry and physics lessons, but much less frequent in biology and Earth science lessons. As in fourth grade, across countries, students reporting that they do experiments "once or twice a month" or "a few times a year" had higher average achievement than students doing them "at least once a week" or "never."

Exhibit 13.16: Frequency Students Conduct Experiments in Science Lessons

Students' Reports

Country	At Least Once a Week		Once or Twice a Month		A Few Times a Year		Never	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Albania	54 (2.2)	490 (4.4)	26 (2.3)	498 (4.7)	13 (2.0)	502 (11.0)	7 (0.8)	472 (9.0)
Armenia	40 (1.3)	462 (3.6)	24 (1.4)	481 (4.7)	16 (1.2)	473 (6.0)	21 (1.3)	465 (4.5)
Australia	26 (1.4)	516 (4.5)	30 (1.4)	542 (3.2)	31 (1.6)	547 (3.8)	13 (1.0)	515 (4.2)
Austria	16 (0.8)	480 (4.8)	19 (0.8)	516 (4.1)	26 (1.0)	543 (3.6)	39 (1.3)	530 (2.8)
Azerbaijan	48 (1.9)	433 (3.9)	18 (1.3)	432 (5.0)	16 (1.5)	431 (5.2)	17 (1.2)	439 (5.6)
Bahrain	45 (1.2)	490 (3.4)	26 (1.1)	504 (4.4)	17 (0.8)	507 (5.5)	12 (0.9)	480 (6.1)
Belgium (Flemish)	17 (1.1)	482 (4.3)	40 (1.7)	507 (2.8)	32 (1.6)	510 (3.1)	10 (0.8)	483 (4.7)
Bosnia and Herzegovina	24 (1.1)	438 (4.2)	16 (0.9)	459 (4.7)	29 (1.3)	485 (3.6)	31 (1.7)	458 (3.0)
Bulgaria	21 (1.5)	502 (7.1)	21 (1.7)	521 (7.1)	32 (2.1)	538 (7.8)	27 (1.5)	527 (7.3)
Canada	20 (0.8)	495 (3.2)	35 (1.1)	530 (2.4)	30 (1.1)	538 (3.3)	14 (0.8)	520 (3.4)
Chile	27 (1.3)	448 (4.1)	25 (1.1)	483 (3.8)	27 (1.3)	493 (3.5)	20 (1.4)	459 (4.0)
Chinese Taipei	58 (1.8)	562 (2.0)	31 (1.5)	558 (2.8)	6 (0.5)	546 (5.8)	5 (0.4)	529 (5.9)
Croatia	18 (1.3)	496 (4.3)	23 (1.2)	526 (3.1)	45 (1.7)	538 (2.3)	15 (1.4)	515 (4.0)
Cyprus	43 (2.6)	512 (3.9)	32 (1.5)	523 (3.8)	16 (1.2)	512 (4.6)	10 (1.3)	479 (5.8)
Czech Republic	13 (0.7)	487 (6.0)	18 (0.9)	525 (4.2)	23 (1.3)	555 (4.3)	46 (1.5)	539 (2.5)
Denmark	24 (1.9)	500 (4.3)	38 (1.4)	528 (3.0)	28 (1.5)	537 (3.6)	10 (1.2)	521 (5.9)
England	26 (1.3)	526 (5.7)	41 (1.2)	550 (3.4)	24 (1.3)	539 (4.7)	9 (0.8)	520 (5.7)
Finland	7 (0.6)	505 (7.8)	30 (1.1)	554 (2.8)	43 (1.1)	567 (3.0)	20 (0.9)	553 (3.9)
France	16 (1.0)	462 (5.4)	16 (1.0)	495 (4.6)	40 (1.4)	500 (3.8)	28 (1.8)	483 (4.0)
Georgia	38 (1.7)	446 (5.0)	30 (1.7)	461 (5.3)	15 (1.1)	474 (7.8)	16 (1.4)	448 (7.0)
Germany r	27 (1.2)	493 (3.5)	31 (1.2)	532 (3.2)	31 (1.3)	547 (3.4)	11 (1.0)	514 (6.0)
Hong Kong SAR	13 (1.1)	512 (6.2)	28 (1.3)	535 (4.3)	36 (1.7)	546 (3.2)	22 (1.6)	515 (5.7)
Hungary	14 (0.8)	478 (4.3)	16 (0.8)	539 (3.9)	26 (1.1)	547 (3.3)	43 (1.3)	534 (3.2)
Iran, Islamic Rep. of	54 (1.8)	439 (4.6)	26 (1.3)	451 (6.7)	13 (0.8)	453 (6.4)	8 (1.0)	414 (10.6)
Ireland	13 (1.0)	494 (4.7)	32 (1.4)	533 (4.1)	42 (1.3)	538 (3.7)	13 (1.0)	523 (5.2)
Italy	24 (0.9)	488 (4.0)	23 (0.9)	519 (3.7)	32 (1.0)	524 (3.8)	21 (0.9)	504 (3.6)
Japan	64 (1.5)	561 (2.0)	32 (1.5)	572 (2.6)	3 (0.3)	505 (9.6)	1 (0.1)	~ ~
Kazakhstan	42 (1.3)	485 (4.2)	22 (1.0)	504 (4.0)	14 (0.8)	514 (4.9)	22 (1.1)	491 (4.7)
Korea, Rep. of	72 (1.8)	587 (2.2)	25 (1.5)	591 (3.6)	3 (0.5)	585 (8.2)	1 (0.1)	~ ~
Kosovo	45 (1.4)	414 (4.0)	16 (1.1)	421 (4.5)	17 (1.5)	428 (5.3)	22 (1.3)	414 (6.1)
Kuwait	52 (1.5)	402 (6.4)	20 (1.1)	398 (8.7)	13 (0.8)	396 (10.3)	16 (1.1)	379 (8.9)
Latvia	23 (1.5)	523 (4.4)	36 (1.2)	549 (2.9)	29 (1.3)	553 (2.6)	11 (0.9)	535 (6.3)
Lithuania	16 (1.2)	507 (5.2)	30 (1.6)	541 (3.7)	36 (1.5)	553 (3.7)	18 (1.3)	533 (4.7)
Malta	29 (0.8)	474 (2.7)	32 (0.7)	512 (2.6)	27 (0.6)	507 (2.4)	12 (0.5)	486 (5.6)
Montenegro	28 (1.1)	440 (4.1)	18 (1.0)	469 (3.8)	17 (1.2)	470 (4.0)	37 (1.6)	461 (3.4)
Morocco	45 (1.8)	376 (7.1)	24 (1.5)	378 (8.4)	16 (1.4)	382 (8.1)	15 (1.6)	371 (18.4)
Netherlands	11 (0.8)	494 (7.1)	22 (1.1)	517 (3.2)	38 (1.2)	533 (3.7)	30 (1.3)	514 (3.9)
New Zealand	16 (1.0)	471 (4.7)	21 (1.0)	508 (4.2)	36 (1.4)	520 (3.5)	27 (1.5)	499 (3.6)
North Macedonia	40 (2.0)	409 (6.8)	31 (1.5)	454 (7.5)	22 (2.4)	447 (12.5)	7 (0.7)	406 (8.9)
Northern Ireland	10 (0.9)	488 (5.5)	24 (1.5)	521 (3.3)	41 (1.7)	533 (3.1)	24 (1.8)	507 (4.1)
Norway (5)	26 (1.8)	523 (4.1)	35 (1.5)	547 (3.0)	33 (1.8)	553 (3.2)	6 (0.8)	516 (6.5)
Oman	47 (1.6)	437 (5.3)	22 (1.1)	441 (5.1)	22 (1.2)	448 (6.6)	9 (0.7)	423 (7.1)
Pakistan	43 (2.9)	305 (15.5)	22 (2.5)	291 (21.2)	13 (2.0)	297 (20.1)	22 (3.0)	261 (20.0)
Philippines	43 (1.4)	263 (7.8)	27 (0.9)	256 (9.5)	16 (0.7)	252 (8.2)	14 (1.0)	221 (8.0)
Poland	12 (0.8)	492 (4.8)	18 (0.7)	535 (3.3)	32 (1.2)	548 (3.3)	38 (1.1)	531 (3.0)
Portugal	36 (1.2)	490 (3.5)	25 (1.2)	515 (2.8)	26 (1.2)	521 (3.1)	13 (0.9)	491 (5.5)
Qatar	45 (1.2)	437 (4.4)	24 (1.1)	475 (5.8)	18 (1.0)	480 (6.1)	13 (0.7)	428 (7.7)
Russian Federation	14 (1.1)	535 (4.8)	22 (1.5)	572 (5.7)	33 (1.6)	575 (2.8)	32 (1.4)	570 (3.1)
Saudi Arabia	47 (1.5)	407 (4.4)	18 (0.7)	413 (6.6)	12 (0.7)	425 (6.0)	23 (1.4)	390 (7.2)
Serbia	31 (1.6)	507 (4.2)	24 (1.5)	532 (4.8)	28 (1.7)	529 (4.7)	17 (1.4)	504 (7.3)
Singapore	39 (0.7)	588 (4.0)	40 (0.7)	605 (3.7)	17 (0.6)	595 (4.3)	4 (0.3)	558 (7.0)
Slovak Republic	17 (1.1)	477 (6.8)	23 (1.2)	522 (4.9)	34 (1.4)	544 (3.4)	27 (1.3)	519 (6.2)
South Africa (5)	38 (0.9)	327 (5.0)	22 (0.8)	320 (6.1)	22 (0.9)	347 (8.2)	19 (1.0)	310 (6.5)
Spain	16 (0.8)	472 (4.6)	17 (0.9)	515 (3.3)	28 (1.0)	528 (2.2)	39 (1.5)	518 (2.5)
Sweden	24 (1.9)	526 (5.7)	36 (1.7)	548 (3.7)	26 (1.8)	548 (4.0)	15 (1.6)	517 (6.4)
Turkey (5)	38 (1.7)	515 (5.0)	38 (1.4)	552 (4.2)	11 (0.7)	538 (6.9)	13 (0.9)	489 (7.9)
United Arab Emirates	43 (0.7)	467 (2.3)	29 (0.7)	494 (3.0)	18 (0.7)	484 (3.0)	10 (0.3)	444 (4.3)
United States	22 (1.0)	510 (4.7)	27 (0.9)	554 (2.9)	31 (0.8)	557 (3.3)	20 (0.9)	532 (3.7)
International Average	**31 (0.2)**	**475 (0.7)**	**26 (0.2)**	**499 (0.7)**	**24 (0.2)**	**503 (0.8)**	**18 (0.2)**	**478 (0.9)**
Benchmarking Participants								
Ontario, Canada	21 (1.3)	491 (5.2)	32 (1.8)	533 (4.2)	31 (2.0)	541 (5.7)	16 (0.9)	525 (4.7)
Quebec, Canada r	16 (1.3)	493 (5.0)	39 (2.0)	524 (2.9)	33 (1.8)	536 (3.2)	12 (2.2)	514 (5.9)
Moscow City, Russian Fed.	11 (0.6)	562 (4.8)	14 (0.8)	596 (5.1)	27 (0.9)	607 (3.1)	48 (1.6)	596 (2.6)
Madrid, Spain	14 (1.2)	485 (4.7)	19 (1.3)	526 (3.4)	29 (1.6)	540 (2.2)	38 (1.8)	524 (2.6)
Abu Dhabi, UAE	41 (1.1)	406 (3.7)	27 (0.9)	437 (4.8)	20 (0.8)	441 (4.3)	13 (0.7)	406 (7.1)
Dubai, UAE	40 (0.9)	535 (2.6)	35 (0.8)	555 (2.2)	18 (0.7)	551 (3.0)	6 (0.3)	527 (5.1)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 13.17: Frequency Students Conduct Experiments in Science Lessons

Students' Reports

The general/integrated science panel summarizes responses for countries where students are enrolled in science as a single subject. The following panels for biology, chemistry, physics, and Earth science summarize responses for countries where students are taught science as separate subjects.

Frequency Students Conduct Experiments in General/Integrated Science Lessons

General/Integrated Science	At Least Once a Week		Once or Twice a Month		A Few Times a Year		Never	
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia	39 (1.6)	534 (4.1)	42 (1.2)	541 (3.6)	14 (1.0)	516 (3.8)	5 (0.7)	443 (10.1)
Bahrain	20 (0.7)	465 (4.6)	29 (0.9)	493 (3.4)	34 (0.8)	508 (2.7)	17 (0.8)	470 (4.8)
Chile	11 (0.9)	407 (6.5)	33 (1.7)	468 (3.5)	44 (1.5)	477 (3.2)	12 (1.4)	452 (5.9)
Chinese Taipei	13 (1.5)	558 (5.5)	53 (2.1)	579 (2.3)	25 (1.9)	586 (3.8)	9 (1.5)	542 (6.1)
Egypt	49 (1.5)	395 (5.7)	24 (1.2)	406 (6.0)	13 (1.1)	404 (8.6)	15 (1.1)	363 (8.1)
England	32 (2.0)	512 (7.2)	49 (1.6)	537 (5.2)	14 (1.1)	505 (6.8)	4 (0.6)	453 (12.6)
Hong Kong SAR	57 (2.2)	510 (5.8)	37 (2.1)	504 (7.0)	4 (0.7)	460 (10.8)	2 (0.3)	~ ~
Iran, Islamic Rep. of	32 (1.3)	433 (4.1)	36 (1.0)	458 (4.0)	21 (0.9)	471 (6.1)	11 (0.7)	432 (6.0)
Ireland	35 (2.1)	521 (4.2)	45 (1.7)	538 (3.0)	15 (1.2)	528 (5.1)	5 (0.8)	460 (16.0)
Israel	16 (1.1)	490 (6.0)	35 (1.1)	519 (5.0)	33 (1.2)	535 (5.1)	16 (1.0)	496 (6.5)
Italy	3 (0.5)	430 (8.0)	18 (1.2)	494 (5.0)	45 (1.3)	512 (2.8)	33 (1.7)	497 (3.3)
Japan	35 (2.3)	575 (3.5)	60 (2.2)	569 (2.5)	5 (0.9)	546 (5.5)	0 (0.2)	~ ~
Jordan	41 (1.1)	439 (4.8)	29 (0.9)	475 (4.9)	15 (0.8)	482 (5.3)	16 (1.0)	434 (7.0)
Korea, Rep. of	6 (0.7)	547 (8.6)	49 (1.9)	559 (2.7)	39 (1.9)	571 (2.8)	6 (1.1)	522 (7.2)
Kuwait	45 (1.5)	444 (6.2)	27 (0.8)	448 (6.9)	17 (1.4)	466 (6.0)	11 (0.8)	425 (9.5)
Malaysia	29 (1.3)	450 (5.5)	41 (1.2)	474 (3.4)	26 (0.8)	461 (3.9)	5 (0.6)	411 (11.7)
New Zealand	37 (2.2)	507 (5.5)	42 (1.3)	509 (3.5)	14 (1.3)	488 (6.2)	6 (0.9)	437 (9.1)
Norway (9)	14 (1.9)	491 (7.2)	42 (1.9)	503 (3.3)	39 (2.1)	500 (3.9)	4 (0.7)	429 (13.0)
Oman	47 (1.1)	462 (3.1)	31 (0.8)	466 (3.6)	17 (0.6)	467 (4.8)	6 (0.5)	409 (7.2)
Qatar	33 (1.7)	460 (6.6)	37 (1.3)	493 (4.9)	20 (1.2)	493 (7.5)	10 (0.8)	430 (9.3)
Saudi Arabia	27 (1.0)	407 (4.2)	25 (0.7)	448 (3.6)	26 (0.9)	459 (3.3)	21 (1.1)	418 (5.0)
Singapore	12 (0.6)	612 (8.2)	42 (0.8)	617 (3.7)	43 (0.8)	602 (4.6)	3 (0.3)	541 (11.1)
South Africa (9)	42 (0.8)	335 (3.9)	22 (0.6)	401 (3.9)	22 (0.6)	409 (4.0)	15 (1.1)	370 (5.4)
Turkey	15 (1.1)	475 (8.4)	40 (1.7)	523 (4.5)	26 (1.4)	541 (4.9)	19 (1.2)	498 (6.8)
United Arab Emirates	28 (0.7)	452 (4.5)	37 (0.5)	492 (2.3)	24 (0.6)	498 (3.4)	11 (0.4)	436 (6.2)
United States	20 (1.1)	526 (6.2)	45 (1.2)	535 (6.4)	26 (0.9)	530 (4.1)	10 (0.8)	466 (5.1)
International Average	**28 (0.3)**	**478 (1.2)**	**37 (0.3)**	**502 (0.9)**	**24 (0.2)**	**501 (1.0)**	**11 (0.2)**	**451 (1.8)**
Benchmarking Participants								
Ontario, Canada	12 (1.2)	519 (4.9)	49 (2.0)	530 (3.5)	32 (1.8)	520 (4.0)	8 (1.2)	491 (8.9)
Quebec, Canada	14 (1.7)	530 (5.4)	58 (1.9)	541 (4.1)	24 (2.0)	539 (4.6)	3 (0.6)	474 (13.6)
Gauteng, RSA (9)	32 (1.0)	367 (4.2)	27 (0.9)	441 (4.0)	26 (0.9)	465 (5.7)	15 (0.9)	431 (5.2)
Western Cape, RSA (9)	30 (1.2)	375 (4.6)	26 (0.9)	465 (6.3)	28 (1.2)	491 (7.9)	16 (1.1)	437 (6.7)
Abu Dhabi, UAE	27 (0.8)	387 (6.7)	34 (0.8)	441 (3.8)	25 (0.7)	458 (4.7)	14 (0.8)	394 (9.1)
Dubai, UAE	25 (1.4)	535 (5.5)	44 (1.1)	556 (2.8)	25 (1.3)	555 (6.0)	6 (0.7)	518 (10.3)

Separate Science Results

Frequency Students Conduct Experiments in Biology Lessons

Biology	At Least Once a Week		Once or Twice a Month		A Few Times a Year		Never	
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Cyprus	6 (0.5)	434 (7.8)	28 (1.0)	480 (3.5)	45 (1.1)	498 (2.2)	21 (1.1)	481 (4.2)
Finland	4 (0.4)	493 (10.8)	32 (1.2)	534 (3.6)	50 (1.1)	559 (3.2)	13 (1.1)	549 (6.9)
France	15 (1.2)	463 (5.4)	38 (1.5)	492 (3.9)	36 (1.7)	500 (3.7)	11 (1.4)	478 (6.1)
Georgia	20 (1.4)	432 (7.8)	29 (1.7)	454 (4.8)	21 (1.4)	462 (5.2)	30 (1.9)	447 (6.0)
Hungary	4 (0.4)	458 (11.0)	11 (1.0)	525 (7.4)	30 (1.1)	543 (3.7)	55 (1.8)	530 (3.0)
Kazakhstan	37 (1.4)	460 (4.4)	33 (0.9)	490 (3.6)	20 (1.0)	499 (4.6)	11 (0.8)	469 (6.5)
Lebanon	29 (1.6)	364 (5.7)	23 (1.5)	377 (8.1)	25 (1.2)	405 (6.8)	22 (2.2)	367 (8.7)
Lithuania	3 (0.5)	465 (11.3)	23 (1.4)	522 (4.6)	56 (1.7)	543 (3.4)	18 (1.6)	533 (5.4)
Morocco	38 (0.9)	376 (3.4)	23 (0.7)	400 (3.6)	22 (0.7)	424 (4.5)	18 (0.8)	395 (3.4)
Portugal	10 (1.4)	497 (6.5)	35 (1.8)	518 (3.6)	40 (1.7)	528 (3.3)	15 (1.9)	523 (6.1)
Romania	10 (1.1)	429 (8.3)	15 (1.0)	466 (5.6)	37 (1.4)	487 (4.6)	38 (2.1)	471 (5.7)
Russian Federation	6 (0.6)	503 (8.8)	29 (1.5)	547 (5.2)	39 (1.1)	552 (4.1)	26 (1.5)	535 (5.3)
Sweden	19 (1.4)	508 (7.0)	39 (1.4)	532 (3.9)	32 (1.4)	543 (3.7)	10 (1.0)	501 (7.6)
International Average	**16 (0.3)**	**452 (2.2)**	**28 (0.4)**	**488 (1.4)**	**35 (0.4)**	**503 (1.2)**	**22 (0.4)**	**483 (1.7)**
Benchmarking Participants								
Moscow City, Russian Fed.	3 (0.4)	535 (9.1)	23 (1.6)	569 (4.5)	46 (1.6)	573 (3.2)	28 (1.9)	559 (4.2)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 13.17: Frequency Students Conduct Experiments in Science Lessons

Students' Reports

Separate Science Results

(Continued)

Frequency Students Conduct Experiments in Chemistry Lessons

Chemistry	At Least Once a Week		Once or Twice a Month		A Few Times a Year		Never	
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Cyprus	23 (0.9)	460 (4.0)	54 (1.2)	494 (2.4)	19 (1.0)	502 (3.7)	4 (0.7)	473 (10.8)
Finland	47 (1.7)	562 (3.5)	39 (1.3)	544 (3.4)	13 (0.8)	515 (5.3)	1 (0.2)	~ ~
France	32 (1.7)	469 (3.8)	45 (1.4)	503 (3.3)	18 (1.2)	494 (4.6)	6 (1.1)	474 (10.5)
Georgia	26 (1.7)	436 (6.6)	35 (1.6)	455 (4.7)	19 (1.3)	464 (6.3)	20 (1.9)	442 (6.4)
Hungary	18 (1.3)	518 (6.9)	34 (1.3)	540 (3.3)	26 (1.2)	542 (4.2)	22 (1.3)	511 (4.6)
Kazakhstan	43 (1.6)	467 (4.1)	35 (1.2)	490 (4.5)	15 (1.0)	499 (5.2)	8 (0.7)	453 (8.2)
Lebanon	33 (1.7)	363 (6.3)	27 (1.5)	386 (7.6)	24 (1.2)	412 (7.5)	16 (1.50)	353 (9.4)
Lithuania	6 (0.8)	481 (10.2)	40 (1.8)	533 (4.1)	45 (1.7)	547 (3.4)	9 (1.10)	516 (5.9)
Morocco	44 (1.0)	383 (3.2)	24 (0.8)	403 (4.3)	18 (0.8)	414 (4.4)	14 (0.90)	398 (4.4)
Portugal	18 (1.9)	505 (5.8)	48 (1.8)	519 (2.9)	30 (1.9)	529 (3.6)	4 (0.80)	526 (13.9)
Romania	17 (1.5)	443 (7.0)	28 (1.5)	478 (5.5)	36 (1.9)	487 (5.3)	19 (2.00)	462 (6.6)
Russian Federation	20 (1.6)	531 (6.1)	52 (1.6)	547 (4.3)	21 (1.4)	551 (4.6)	7 (0.80)	530 (9.2)
Sweden	37 (1.6)	527 (4.9)	40 (1.0)	533 (3.7)	19 (1.5)	524 (5.9)	4 (0.60)	482 (14.3)
International Average	**28 (0.4)**	**473 (1.6)**	**38 (0.4)**	**494 (1.2)**	**23 (0.4)**	**499 (1.4)**	**10 (0.3)**	**468 (2.7)**
Benchmarking Participants								
Moscow City, Russian Fed.	13 (1.1)	551 (5.8)	54 (1.9)	570 (3.2)	25 (1.5)	574 (3.7)	8 (1.30)	553 (7.3)

Frequency Students Conduct Experiments in Physics Lessons

Physics	At Least Once a Week		Once or Twice a Month		A Few Times a Year		Never	
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Cyprus	33 (1.0)	478 (3.2)	40 (1.0)	492 (2.9)	20 (0.9)	505 (4.4)	7 (0.6)	462 (7.4)
Finland	36 (1.8)	557 (4.2)	42 (1.4)	546 (3.9)	20 (1.0)	525 (4.6)	3 (0.3)	497 (12.0)
France	32 (1.7)	469 (3.8)	45 (1.4)	503 (3.3)	18 (1.2)	494 (4.6)	6 (1.1)	474 (10.5)
Georgia	28 (1.9)	440 (6.3)	33 (1.7)	456 (5.5)	19 (1.3)	463 (6.8)	20 (2.1)	436 (5.5)
Hungary	17 (1.1)	519 (6.7)	33 (1.2)	538 (3.8)	26 (1.0)	542 (3.8)	24 (1.5)	513 (4.3)
Kazakhstan	46 (1.6)	467 (3.7)	35 (1.1)	496 (4.4)	12 (0.8)	492 (6.4)	7 (0.6)	450 (7.7)
Lebanon	32 (1.5)	365 (5.7)	24 (1.2)	382 (7.1)	22 (1.0)	411 (7.0)	22 (1.8)	366 (9.0)
Lithuania	8 (0.7)	495 (6.6)	40 (1.7)	533 (3.8)	43 (1.8)	546 (4.2)	10 (1.1)	520 (6.0)
Morocco	46 (1.0)	384 (3.2)	24 (0.8)	404 (3.9)	17 (0.7)	417 (5.3)	13 (0.8)	397 (4.2)
Portugal	18 (1.9)	505 (5.8)	48 (1.8)	519 (2.9)	30 (1.9)	529 (3.6)	4 (0.8)	526 (13.9)
Romania	15 (1.2)	434 (8.9)	27 (1.6)	477 (5.2)	36 (1.8)	491 (4.9)	21 (1.9)	461 (6.1)
Russian Federation	26 (1.4)	534 (5.0)	52 (1.2)	552 (3.9)	17 (1.2)	543 (6.7)	6 (0.7)	519 (9.1)
Sweden	30 (1.5)	524 (5.3)	39 (1.1)	535 (3.8)	25 (1.5)	536 (5.0)	6 (0.6)	495 (11.2)
International Average	**28 (0.4)**	**475 (1.5)**	**37 (0.4)**	**495 (1.2)**	**24 (0.4)**	**500 (1.5)**	**11 (0.3)**	**470 (2.4)**
Benchmarking Participants								
Moscow City, Russian Fed.	17 (1.2)	554 (5.2)	59 (1.5)	571 (3.0)	19 (1.4)	574 (4.9)	5 (0.9)	545 (7.3)

Frequency Students Conduct Experiments in Earth Science Lessons

Earth Science	At Least Once a Week		Once or Twice a Month		A Few Times a Year		Never	
Country	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Cyprus	5 (0.5)	435 (9.5)	7 (0.6)	459 (6.0)	17 (0.7)	483 (4.7)	70 (1.1)	495 (2.3)
Finland	5 (0.4)	477 (9.0)	27 (1.0)	528 (3.5)	44 (0.9)	552 (3.1)	24 (1.0)	570 (4.1)
France	15 (1.2)	463 (5.4)	38 (1.5)	492 (3.9)	36 (1.7)	500 (3.7)	11 (1.4)	478 (6.1)
Georgia	15 (1.0)	420 (9.1)	22 (1.6)	443 (6.2)	19 (1.3)	459 (5.5)	45 (1.9)	460 (4.9)
Hungary	7 (0.6)	479 (8.7)	12 (0.8)	510 (5.4)	22 (0.8)	542 (4.3)	59 (1.4)	536 (2.8)
Kazakhstan	33 (1.5)	456 (4.3)	28 (1.0)	484 (4.5)	19 (1.1)	504 (4.9)	21 (1.1)	483 (5.0)
Lebanon	- -	- -	- -	- -	- -	- -	- -	- -
Lithuania	2 (0.4)	~ ~	11 (0.9)	514 (5.5)	32 (1.6)	533 (3.5)	54 (2.1)	544 (3.7)
Morocco	38 (0.8)	378 (3.3)	23 (0.6)	399 (3.4)	21 (0.7)	425 (4.9)	18 (0.9)	401 (3.6)
Portugal	10 (1.4)	497 (6.5)	35 (1.8)	518 (3.6)	40 (1.7)	528 (3.3)	15 (1.9)	523 (6.1)
Romania r	12 (1.6)	427 (9.0)	14 (1.1)	470 (7.8)	32 (2.1)	488 (6.4)	42 (2.3)	476 (8.1)
Russian Federation	6 (0.5)	519 (8.2)	15 (1.0)	538 (7.1)	27 (1.2)	548 (4.5)	53 (1.6)	546 (4.3)
Sweden	- -	- -	- -	- -	- -	- -	- -	- -
International Average	**13 (0.3)**	**455 (2.4)**	**21 (0.3)**	**487 (1.6)**	**28 (0.4)**	**506 (1.4)**	**37 (0.5)**	**501 (1.5)**
Benchmarking Participants								
Moscow City, Russian Fed.	4 (0.8)	533 (7.8)	9 (0.7)	558 (5.3)	20 (1.1)	567 (3.5)	66 (1.7)	570 (3.1)

A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Technology in Instruction

Computer Access for Instruction

Information about students' access to computers as part of their mathematics and science lessons is provided in Exhibits 14.1 (fourth grade mathematics), 14.2 (fourth grade science), 14.3 (eighth grade mathematics), and 14.4 (eighth grade science). Each exhibit presents teachers' reports on whether computers are available for students to use during lessons as well as the types of access they have: whether each student in the class has a computer, the class has computers that students can share, and/or the school has computers that the class can sometimes share (teachers could indicate more than one type of access to computers). Average student achievement is also reported for each category. Countries are ordered by the percent of students having access to computers.

In fourth grade, computers are available for students to use during mathematics lessons for 39 percent of students, on average (Exhibit 14.1), and during science lessons for 45 percent of students, on average (Exhibit 14.2). Availability of computers during mathematics and science lessons was similar for eighth grade students: 37 percent had mathematics teachers who said computers were available (Exhibit 14.3) and 48 percent had science teachers who said computers were available (Exhibit 14.4). There was wide variation across countries in computer availability, with 80 percent or more of students having access in some countries and as few as 5 or 6 percent in others. Having computers available for instruction was associated with higher achievement, on average, in both mathematics and science and at both grades. Of course, access to computers is likely associated with access to other resources that are associated with higher achievement. There was also quite a bit of variation across countries in the types of access to computers, though the most frequent type of access was that the school has computers that the class can sometimes use (28–29% of students in mathematics lessons and 36–39% of students in science lessons).

Exhibit 14.1: Access to Computers for Mathematics Lessons

Students' Results based on Teachers' Reports

Country	Computers Available for Students to Use During Mathematics Lessons				Percent of Students by Computer Access*		
	Yes		No		Each Student has a Computer	The Class has Computers that Students can Share	The School has Computers that the Class can Sometimes Use
	Percent of Students	Average Achievement	Percent of Students	Average Achievement			
Malta	95 (0.2)	508 (1.4)	5 (0.2)	518 (5.0)	63 (0.4)	16 (0.3)	34 (0.4)
New Zealand	92 (1.8)	487 (2.9)	8 (1.8)	491 (12.6)	33 (3.3)	67 (3.3)	39 (3.2)
Denmark	r 87 (3.1)	523 (2.3)	13 (3.1)	533 (7.2)	r 63 (4.7)	r 8 (2.4)	r 34 (4.7)
Sweden	85 (2.4)	522 (2.8)	15 (2.4)	519 (10.8)	50 (4.3)	19 (3.1)	34 (4.1)
Hong Kong SAR	81 (4.6)	602 (3.9)	19 (4.6)	599 (12.2)	38 (4.3)	23 (3.8)	67 (4.8)
Norway (5)	r 76 (3.8)	546 (2.6)	24 (3.8)	539 (5.7)	r 39 (4.2)	r 29 (4.2)	r 50 (4.6)
United States	76 (2.5)	536 (2.9)	24 (2.5)	534 (5.8)	51 (3.0)	36 (2.1)	41 (2.1)
Australia	71 (3.5)	521 (3.9)	29 (3.5)	511 (7.0)	32 (3.2)	39 (3.8)	44 (4.0)
Netherlands	r 71 (5.1)	534 (2.8)	29 (5.1)	542 (4.5)	r 35 (4.7)	r 46 (5.9)	r 34 (4.8)
Georgia	70 (3.8)	481 (4.5)	30 (3.8)	483 (6.5)	s 75 (4.0)	s 38 (4.8)	s 90 (2.8)
Northern Ireland	69 (4.0)	564 (4.3)	31 (4.0)	568 (5.9)	3 (1.2)	48 (4.3)	58 (4.2)
Finland	65 (3.6)	531 (2.9)	35 (3.6)	535 (3.3)	15 (2.5)	17 (2.4)	57 (3.5)
Kazakhstan	61 (3.5)	511 (3.1)	39 (3.5)	514 (4.9)	10 (2.2)	17 (2.9)	52 (3.6)
Japan	59 (3.9)	591 (2.4)	41 (3.9)	595 (2.8)	5 (1.6)	19 (2.7)	57 (3.9)
Belgium (Flemish)	52 (3.9)	531 (2.8)	48 (3.9)	536 (2.7)	3 (1.2)	34 (4.0)	43 (3.7)
Canada	51 (2.9)	506 (3.0)	49 (2.9)	520 (4.2)	13 (2.1)	32 (2.7)	r 43 (2.8)
Lithuania	51 (3.8)	541 (4.5)	49 (3.8)	541 (3.9)	8 (2.0)	16 (3.1)	48 (3.9)
Germany	48 (3.7)	519 (3.9)	52 (3.7)	523 (3.4)	0 (0.3)	32 (3.6)	37 (3.4)
North Macedonia	47 (4.5)	472 (7.7)	53 (4.5)	471 (7.3)	14 (2.9)	26 (4.3)	29 (4.5)
Singapore	46 (2.6)	626 (5.4)	54 (2.6)	625 (4.7)	18 (1.9)	18 (2.0)	44 (2.5)
United Arab Emirates	r 45 (1.8)	512 (2.5)	55 (1.8)	457 (3.0)	r 23 (1.6)	r 25 (1.8)	r 39 (1.8)
Austria	44 (3.3)	549 (3.1)	56 (3.3)	532 (2.8)	1 (0.4)	39 (3.2)	21 (2.7)
Ireland	43 (4.0)	548 (4.7)	57 (4.0)	548 (2.8)	5 (2.0)	19 (2.9)	36 (4.1)
Russian Federation	42 (3.5)	568 (4.5)	58 (3.5)	566 (4.1)	7 (1.7)	28 (3.3)	41 (3.5)
Qatar	37 (3.5)	449 (7.5)	63 (3.5)	450 (5.0)	18 (2.8)	11 (2.3)	33 (3.3)
Chile	34 (3.9)	441 (5.4)	66 (3.9)	442 (4.0)	16 (3.2)	16 (2.9)	33 (3.8)
Korea, Rep. of	34 (3.8)	595 (4.2)	66 (3.8)	602 (2.7)	6 (2.1)	6 (2.1)	32 (3.8)
Latvia	34 (3.1)	539 (5.0)	66 (3.1)	550 (3.0)	6 (2.0)	10 (2.5)	32 (3.3)
Spain	33 (2.6)	503 (3.7)	67 (2.6)	501 (3.4)	7 (1.4)	11 (2.1)	31 (2.6)
Bahrain	32 (2.9)	489 (4.1)	68 (2.9)	475 (3.1)	6 (1.6)	9 (1.8)	28 (2.8)
Saudi Arabia	31 (3.3)	411 (6.4)	69 (3.3)	393 (4.8)	4 (1.3)	9 (2.0)	26 (3.2)
Hungary	31 (3.6)	522 (5.3)	69 (3.6)	525 (4.1)	2 (1.0)	7 (1.8)	29 (3.5)
Cyprus	30 (2.5)	538 (4.1)	70 (2.5)	532 (3.3)	0 (0.2)	14 (2.2)	26 (2.8)
Poland	29 (3.4)	514 (4.6)	71 (3.4)	522 (3.0)	6 (1.8)	4 (1.4)	27 (3.2)
Czech Republic	29 (3.4)	540 (5.6)	71 (3.4)	530 (3.0)	7 (1.9)	12 (2.2)	28 (3.4)
Iran, Islamic Rep. of	25 (2.8)	463 (9.7)	75 (2.8)	436 (4.5)	2 (1.0)	3 (1.4)	18 (2.6)
Kuwait	24 (3.3)	391 (11.5)	76 (3.3)	381 (5.4)	6 (2.0)	5 (1.8)	19 (3.1)
Chinese Taipei	23 (3.4)	600 (3.9)	77 (3.4)	599 (2.1)	3 (1.4)	14 (2.6)	16 (2.7)
Italy	23 (3.3)	515 (4.8)	77 (3.3)	515 (2.7)	2 (1.0)	14 (2.5)	20 (3.1)
Philippines	23 (3.3)	315 (13.2)	77 (3.3)	290 (6.9)	0 (0.2)	12 (2.3)	22 (3.2)
France	21 (3.4)	471 (6.0)	79 (3.4)	489 (3.2)	1 (0.7)	10 (2.2)	16 (3.2)
Bulgaria	19 (3.1)	516 (7.9)	81 (3.1)	515 (5.3)	2 (0.9)	8 (2.4)	18 (3.2)
Azerbaijan	18 (2.9)	508 (6.5)	82 (2.9)	517 (3.0)	4 (1.4)	6 (1.7)	15 (2.6)
Oman	17 (2.3)	437 (6.8)	83 (2.3)	429 (4.5)	3 (1.0)	4 (1.3)	14 (2.5)
Turkey (5)	16 (3.1)	533 (10.2)	84 (3.1)	521 (5.1)	2 (1.3)	8 (2.3)	13 (2.8)
Armenia	14 (2.9)	505 (6.5)	86 (2.9)	497 (2.8)	3 (1.3)	3 (1.2)	13 (2.8)
Slovak Republic	14 (2.1)	523 (8.9)	86 (2.1)	508 (3.6)	3 (1.0)	5 (1.0)	11 (2.0)
Serbia	13 (2.6)	512 (8.9)	87 (2.6)	507 (3.4)	0 (0.3)	9 (2.2)	10 (2.5)
Bosnia and Herzegovina	13 (2.2)	477 (6.3)	87 (2.2)	448 (2.5)	4 (1.3)	7 (1.8)	10 (2.3)
Portugal	13 (2.0)	524 (6.1)	87 (2.0)	526 (2.9)	2 (0.9)	7 (1.4)	12 (2.0)
Montenegro	11 (1.1)	455 (5.7)	89 (1.1)	453 (2.2)	1 (0.0)	6 (0.7)	10 (1.1)
Albania	9 (2.7)	530 (17.2)	91 (2.7)	491 (3.5)	2 (1.2)	8 (2.6)	8 (2.6)
South Africa (5)	8 (1.6)	430 (15.2)	92 (1.6)	368 (3.8)	1 (0.5)	2 (0.7)	6 (1.5)
Kosovo	6 (2.0)	451 (7.9)	94 (2.0)	443 (3.3)	s 0 (0.0)	s 7 (3.1)	s 9 (3.2)
Croatia	6 (2.0)	503 (11.4)	94 (2.0)	509 (2.3)	1 (0.8)	4 (1.7)	6 (2.0)
Pakistan	6 (1.4)	303 (54.2)	94 (1.4)	329 (12.8)	2 (1.5)	3 (0.6)	4 (1.0)
Morocco	5 (1.9)	430 (28.6)	95 (1.9)	379 (4.8)	0 (0.3)	2 (1.2)	4 (1.6)
England	x 32 (4.4)	566 (5.6)	68 (4.4)	554 (6.5)	x 7 (2.3)	x 20 (4.4)	x 24 (4.9)
International Average	**39 (0.4)**	**506 (1.4)**	**61 (0.4)**	**500 (0.7)**	**13 (0.3)**	**17 (0.4)**	**29 (0.4)**
Benchmarking Participants							
Dubai, UAE	r 78 (1.3)	555 (2.4)	22 (1.3)	514 (5.1)	r 50 (2.3)	r 40 (1.8)	r 65 (1.8)
Ontario, Canada	r 59 (5.5)	509 (4.9)	41 (5.5)	518 (10.5)	r 13 (4.1)	r 42 (5.5)	r 49 (5.3)
Moscow City, Russian Fed.	53 (4.5)	600 (2.9)	47 (4.5)	585 (3.1)	10 (2.4)	27 (3.6)	49 (4.6)
Madrid, Spain	39 (4.5)	516 (4.4)	61 (4.5)	519 (2.5)	10 (2.8)	9 (2.8)	33 (4.6)
Abu Dhabi, UAE	r 33 (2.4)	476 (5.4)	67 (2.4)	426 (3.9)	r 15 (1.5)	r 18 (2.5)	r 28 (2.4)
Quebec, Canada	32 (4.1)	528 (3.7)	68 (4.1)	535 (2.8)	8 (2.1)	17 (3.7)	28 (4.2)

* Teachers could indicate the class having more than one type of computer access.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

Downloaded from http://timss2019.org/download

Exhibit 14.2: Access to Computers for Science Lessons

Students' Results based on Teachers' Reports

Country	Computers Available for Students to Use During Science Lessons				Percent of Students by Computer Access*		
	Yes		No		Each Student has a Computer	The Class has Computers that Students can Share	The School has Computers that the Class can Sometimes Use
	Percent of Students	Average Achievement	Percent of Students	Average Achievement			
Denmark	r 93 (2.4)	522 (2.8)	7 (2.4)	519 (5.8)	r 63 (4.4)	r 8 (2.4)	r 48 (4.6)
New Zealand	91 (1.5)	503 (2.5)	9 (1.5)	500 (8.3)	30 (3.3)	69 (3.0)	41 (2.8)
Belgium (Flemish)	90 (2.2)	502 (2.3)	10 (2.2)	500 (6.3)	8 (1.7)	58 (4.0)	76 (3.0)
Sweden	89 (2.2)	540 (3.4)	11 (2.2)	534 (11.9)	r 54 (4.5)	r 26 (3.6)	35 (4.5)
Malta	87 (0.3)	497 (1.3)	13 (0.3)	491 (3.4)	62 (0.4)	19 (0.3)	32 (0.4)
Finland	83 (2.5)	554 (2.8)	17 (2.5)	557 (4.8)	18 (2.7)	25 (2.7)	76 (2.8)
Georgia	82 (3.3)	450 (4.6)	18 (3.3)	471 (8.6)	r 76 (3.6)	r 34 (4.2)	r 90 (2.6)
Northern Ireland	80 (3.5)	518 (2.8)	20 (3.5)	518 (5.9)	7 (2.1)	60 (4.4)	71 (4.2)
United States	79 (2.6)	541 (3.1)	21 (2.6)	534 (6.3)	53 (3.0)	38 (2.5)	42 (2.5)
Australia	78 (2.8)	535 (3.1)	22 (2.8)	529 (6.5)	33 (3.4)	41 (3.7)	49 (4.3)
Norway (5)	s 75 (4.2)	537 (3.3)	25 (4.2)	547 (5.1)	s 43 (5.0)	s 31 (4.9)	s 42 (5.0)
Netherlands	r 72 (4.8)	519 (4.0)	28 (4.8)	515 (4.4)	r 34 (5.3)	r 49 (5.7)	r 40 (5.6)
North Macedonia	71 (4.2)	422 (7.3)	29 (4.2)	436 (11.5)	19 (3.4)	43 (4.5)	44 (4.4)
Japan	70 (3.7)	560 (2.2)	30 (3.7)	565 (2.9)	10 (2.1)	24 (3.7)	66 (4.1)
Hong Kong SAR	70 (4.4)	533 (4.5)	30 (4.4)	532 (8.4)	45 (5.0)	28 (4.4)	59 (4.6)
Canada	r 64 (3.0)	524 (2.3)	36 (3.0)	525 (4.1)	r 16 (2.0)	r 40 (3.1)	r 52 (3.1)
Kazakhstan	63 (4.1)	488 (4.6)	37 (4.1)	499 (6.2)	16 (2.8)	24 (3.5)	52 (4.4)
Singapore	60 (2.6)	594 (4.4)	40 (2.6)	595 (4.6)	25 (2.4)	29 (2.2)	57 (2.8)
Germany	59 (3.8)	519 (3.1)	41 (3.8)	518 (4.5)	2 (1.1)	39 (3.8)	50 (3.9)
Lithuania	51 (3.6)	537 (4.2)	49 (3.6)	537 (4.0)	8 (2.0)	19 (2.9)	46 (3.8)
Chinese Taipei	50 (3.9)	557 (2.4)	50 (3.9)	559 (2.6)	6 (1.7)	26 (3.4)	39 (3.8)
Qatar	50 (4.3)	447 (5.6)	50 (4.3)	453 (7.0)	19 (3.4)	23 (3.2)	46 (4.0)
Korea, Rep. of	49 (3.8)	587 (3.6)	51 (3.8)	588 (2.3)	15 (2.6)	12 (2.8)	45 (4.0)
United Arab Emirates	r 48 (1.9)	507 (3.1)	52 (1.9)	445 (3.8)	r 25 (1.8)	r 30 (1.4)	r 42 (1.7)
Russian Federation	47 (3.7)	569 (3.9)	53 (3.7)	566 (4.0)	7 (1.6)	30 (3.7)	44 (3.9)
Spain	47 (2.9)	513 (3.0)	53 (2.9)	509 (3.3)	8 (1.7)	16 (2.2)	43 (2.9)
Latvia	45 (3.1)	535 (4.4)	55 (3.1)	547 (2.6)	5 (1.8)	17 (3.1)	42 (3.1)
Ireland	45 (3.8)	526 (5.6)	55 (3.8)	530 (3.5)	7 (2.2)	20 (3.2)	36 (3.8)
Austria	45 (3.2)	525 (3.5)	55 (3.2)	520 (3.6)	1 (0.7)	41 (3.0)	26 (3.3)
Kuwait	42 (4.0)	398 (10.6)	58 (4.0)	389 (8.3)	8 (2.1)	13 (2.7)	36 (3.6)
Cyprus	40 (4.7)	515 (5.0)	60 (4.7)	511 (3.8)	0 (0.5)	18 (3.7)	36 (4.8)
Chile	r 40 (3.6)	468 (4.6)	60 (3.6)	468 (4.2)	r 19 (3.2)	r 25 (4.0)	r 40 (3.6)
Bahrain	40 (2.9)	511 (4.8)	60 (2.9)	480 (4.7)	7 (1.5)	10 (2.0)	36 (2.7)
Saudi Arabia	37 (3.3)	413 (6.5)	63 (3.3)	394 (5.9)	3 (0.7)	16 (2.9)	31 (3.3)
Hungary	34 (3.3)	522 (4.8)	66 (3.3)	533 (3.7)	5 (1.5)	9 (2.1)	32 (3.2)
Italy	32 (3.4)	507 (4.6)	68 (3.4)	511 (3.6)	2 (0.9)	18 (2.8)	27 (3.2)
Slovak Republic	30 (3.3)	526 (7.1)	70 (3.3)	518 (4.1)	8 (1.8)	10 (1.8)	25 (3.1)
Iran, Islamic Rep. of	29 (3.2)	461 (8.1)	71 (3.2)	432 (5.1)	1 (0.7)	7 (2.0)	23 (3.2)
Philippines	29 (3.4)	255 (13.5)	71 (3.4)	245 (9.4)	x 3 (2.3)	x 32 (5.0)	x 55 (5.9)
Czech Republic	29 (3.0)	537 (4.7)	71 (3.0)	532 (3.0)	6 (1.8)	13 (2.1)	26 (2.8)
Oman	28 (3.2)	445 (9.3)	72 (3.2)	431 (4.8)	4 (1.2)	10 (2.0)	23 (2.9)
Armenia	25 (3.4)	476 (6.9)	75 (3.4)	464 (3.9)	9 (2.3)	6 (2.1)	23 (3.2)
France	23 (3.7)	482 (4.9)	77 (3.7)	490 (3.5)	0 (0.4)	12 (2.4)	19 (3.5)
Bulgaria	23 (3.3)	515 (12.2)	77 (3.3)	523 (6.2)	0 (0.3)	9 (2.5)	22 (3.3)
Poland	20 (2.9)	522 (5.7)	80 (2.9)	534 (2.8)	2 (1.2)	5 (1.8)	18 (2.7)
Turkey (5)	20 (3.2)	539 (6.0)	80 (3.2)	523 (5.4)	2 (0.9)	15 (2.9)	16 (3.0)
Serbia	19 (3.1)	520 (7.6)	81 (3.1)	516 (4.0)	0 (0.0)	13 (2.7)	16 (3.3)
Bosnia and Herzegovina	18 (2.4)	472 (6.0)	82 (2.4)	456 (3.0)	5 (1.4)	10 (2.1)	16 (2.6)
Portugal	18 (2.3)	507 (4.5)	82 (2.3)	503 (2.8)	3 (1.1)	10 (2.0)	18 (2.2)
Montenegro	18 (1.4)	442 (6.3)	82 (1.4)	456 (2.6)	1 (0.0)	10 (1.2)	15 (1.1)
Azerbaijan	17 (2.2)	433 (6.3)	83 (2.2)	425 (3.9)	5 (1.7)	9 (1.6)	13 (1.9)
Kosovo	12 (3.1)	416 (7.1)	88 (3.1)	413 (4.1)	s 0 (0.0)	s 10 (3.6)	s 17 (5.3)
Croatia	11 (2.4)	518 (8.6)	89 (2.4)	524 (2.2)	3 (1.2)	6 (2.5)	11 (2.3)
Albania	11 (2.6)	523 (12.2)	89 (2.6)	485 (3.9)	2 (1.2)	8 (2.3)	9 (2.5)
Morocco	11 (2.3)	412 (21.0)	89 (2.3)	370 (6.6)	0 (0.4)	4 (1.5)	8 (2.1)
Pakistan	r 8 (2.4)	297 (27.3)	92 (2.4)	292 (17.0)	r 0 (0.2)	r 4 (1.5)	r 4 (1.7)
South Africa (5)	7 (1.6)	422 (18.5)	93 (1.6)	319 (5.0)	1 (0.6)	2 (0.7)	6 (1.5)
England	x 36 (4.9)	550 (7.0)	64 (4.9)	533 (5.9)	x 4 (2.0)	x 24 (5.1)	x 27 (5.2)
International Average	**45 (0.4)**	**496 (1.0)**	**55 (0.4)**	**490 (0.8)**	**14 (0.3)**	**22 (0.4)**	**36 (0.5)**
Benchmarking Participants							
Dubai, UAE	r 80 (0.9)	554 (3.0)	20 (0.9)	531 (5.5)	r 47 (2.0)	r 50 (2.8)	r 69 (1.7)
Ontario, Canada	r 75 (5.9)	525 (3.7)	25 (5.9)	533 (11.9)	r 15 (4.3)	r 52 (6.0)	r 61 (6.2)
Moscow City, Russian Fed.	60 (4.3)	600 (2.7)	40 (4.3)	587 (3.4)	12 (2.6)	31 (3.6)	58 (4.5)
Madrid, Spain	53 (4.4)	524 (2.4)	47 (4.4)	521 (3.5)	16 (3.1)	13 (3.2)	49 (4.2)
Abu Dhabi, UAE	r 40 (2.3)	449 (6.0)	60 (2.3)	395 (5.9)	r 16 (1.9)	r 21 (2.3)	r 34 (2.6)
Quebec, Canada	38 (4.4)	522 (4.1)	62 (4.4)	523 (2.6)	10 (2.1)	20 (3.9)	32 (4.4)

* Teachers could indicate the class having more than one type of computer access.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

Downloaded from http://timss2019.org/download

Exhibit 14.3: Access to Computers for Mathematics Lessons

Students' Results based on Teachers' Reports

Country	Computers Available for Students to Use During Mathematics Lessons				Percent of Students by Computer Access*					
	Yes		No		Each Student has a Computer		The Class has Computers that Students can Share		The School has Computers that the Class can Sometimes Use	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement						
Sweden	89 (2.6)	502 (2.7)	11 (2.6)	515 (8.2)		80 (3.1)		2 (1.1)		15 (3.0)
Norway (9)	s 82 (3.5)	506 (3.3)	18 (3.5)	501 (5.1)	s	73 (3.9)	s	13 (3.6)	s	20 (3.6)
New Zealand	81 (3.5)	488 (3.8)	19 (3.5)	460 (12.3)		61 (4.3)		24 (3.2)		55 (4.2)
Australia	76 (2.9)	529 (4.9)	24 (2.9)	488 (8.2)		62 (2.9)		10 (2.1)		40 (3.3)
United States	72 (2.8)	510 (4.7)	28 (2.8)	533 (9.2)		58 (3.0)		27 (2.2)		35 (2.4)
United Arab Emirates	r 56 (1.7)	480 (3.1)	44 (1.7)	468 (4.3)	r	32 (1.4)	r	24 (1.4)	r	43 (1.8)
Finland	55 (3.1)	508 (3.5)	45 (3.1)	510 (2.9)		24 (3.0)		13 (1.8)		47 (3.2)
Japan	54 (3.8)	595 (4.9)	46 (3.8)	594 (2.9)		8 (2.0)		19 (3.0)		52 (4.0)
Kazakhstan	46 (3.7)	484 (5.4)	54 (3.7)	490 (5.3)		15 (2.9)		30 (3.5)		36 (3.8)
Jordan	44 (3.6)	429 (6.5)	56 (3.6)	414 (6.1)		9 (2.7)		10 (1.8)		43 (3.7)
Chile	43 (4.1)	440 (5.0)	57 (4.1)	441 (4.9)		23 (3.6)		19 (3.2)		41 (4.1)
Hungary	42 (3.6)	514 (6.6)	58 (3.6)	515 (5.6)		6 (1.6)		7 (1.6)		39 (3.7)
Georgia	41 (4.0)	467 (7.2)	59 (4.0)	459 (5.5)	x	25 (6.4)	y	- -	x	84 (5.1)
Lithuania	41 (3.9)	514 (4.9)	59 (3.9)	526 (4.3)		10 (2.0)		12 (2.4)		40 (3.9)
Egypt	39 (4.3)	424 (8.7)	61 (4.3)	407 (6.7)		2 (1.1)		11 (2.8)		38 (4.3)
Qatar	38 (3.3)	440 (8.8)	62 (3.3)	446 (4.6)		17 (2.3)		8 (2.3)		33 (3.3)
Hong Kong SAR	37 (4.0)	584 (7.9)	63 (4.0)	572 (6.5)		22 (3.4)		7 (2.1)		29 (4.0)
Singapore	35 (2.7)	615 (8.1)	65 (2.7)	616 (5.0)		19 (1.7)		11 (1.5)		30 (2.7)
Chinese Taipei	35 (3.4)	608 (5.4)	65 (3.4)	615 (3.2)		2 (1.0)		26 (3.1)		26 (3.1)
Romania	33 (3.7)	488 (8.9)	67 (3.7)	476 (5.4)	r	8 (2.1)	r	7 (2.2)	r	31 (3.8)
Bahrain	33 (2.7)	481 (3.8)	67 (2.7)	481 (2.5)		5 (0.7)		8 (1.6)		32 (2.8)
Israel	33 (3.2)	516 (10.7)	67 (3.2)	521 (6.0)		9 (2.2)		7 (1.3)		30 (3.0)
Russian Federation	31 (3.5)	558 (7.0)	69 (3.5)	537 (6.1)		7 (1.9)		16 (3.1)		30 (3.4)
Ireland	31 (3.2)	521 (5.5)	69 (3.2)	526 (3.1)		14 (2.3)		3 (1.2)		22 (2.6)
Korea, Rep. of	29 (3.5)	607 (4.6)	71 (3.5)	607 (3.6)		3 (1.1)		14 (2.6)		22 (3.2)
Saudi Arabia	29 (3.5)	401 (4.8)	71 (3.5)	389 (3.0)		5 (1.6)		14 (3.1)		23 (3.0)
Kuwait	28 (3.5)	426 (10.0)	72 (3.5)	392 (4.8)		6 (1.2)		5 (1.8)		25 (3.8)
Iran, Islamic Rep. of	25 (3.2)	465 (8.9)	75 (3.2)	440 (4.0)		0 (0.1)		3 (1.2)		22 (3.3)
England	s 24 (4.8)	521 (15.8)	76 (4.8)	522 (9.9)	s	13 (3.9)	s	4 (2.1)	s	17 (4.3)
Italy	23 (3.4)	484 (5.3)	77 (3.4)	502 (3.2)	r	6 (1.8)	r	15 (2.8)	r	24 (3.6)
France	r 19 (3.6)	483 (5.7)	81 (3.6)	482 (3.1)	r	6 (2.0)	r	5 (2.1)	r	16 (3.5)
Lebanon	16 (3.4)	447 (10.4)	84 (3.4)	426 (3.4)		2 (1.0)		6 (2.1)		14 (3.3)
Turkey	15 (2.8)	512 (12.1)	85 (2.8)	493 (4.9)		1 (0.9)		9 (2.3)		12 (2.5)
Oman	13 (2.6)	434 (10.1)	87 (2.6)	407 (3.2)		2 (0.7)		4 (1.3)		12 (2.5)
Malaysia	13 (2.1)	477 (9.8)	87 (2.1)	458 (3.7)		4 (1.3)		5 (1.5)		12 (2.2)
South Africa (9)	9 (1.3)	417 (11.5)	91 (1.3)	388 (2.8)		2 (0.4)		1 (0.4)		4 (0.7)
Portugal	9 (2.5)	503 (14.0)	91 (2.5)	500 (3.3)		3 (1.5)		1 (1.0)		8 (2.4)
Cyprus	s 9 (1.9)	517 (8.6)	91 (1.9)	504 (2.5)	s	0 (0.0)	s	2 (0.6)	s	6 (1.4)
Morocco	5 (1.6)	416 (15.5)	95 (1.6)	386 (2.4)		0 (0.0)		1 (0.7)		4 (1.3)
International Average	**37 (0.5)**	**495 (1.3)**	**63 (0.5)**	**487 (0.9)**		**17 (0.4)**		**11 (0.4)**		**28 (0.5)**
Benchmarking Participants										
Dubai, UAE	74 (2.3)	548 (3.2)	26 (2.3)	507 (6.8)		36 (2.8)		35 (2.2)		62 (3.1)
Ontario, Canada	70 (4.5)	539 (5.7)	30 (4.5)	516 (5.0)	r	21 (4.6)	r	50 (5.3)	r	57 (5.3)
Abu Dhabi, UAE	r 59 (1.8)	421 (5.0)	41 (1.8)	454 (4.6)	r	48 (1.9)	r	21 (2.5)	r	38 (2.5)
Moscow City, Russian Fed.	37 (4.1)	587 (7.0)	63 (4.1)	568 (4.8)		7 (2.2)		11 (2.5)		35 (4.0)
Quebec, Canada	29 (4.3)	557 (7.2)	71 (4.3)	537 (4.7)		14 (2.6)		6 (2.5)		17 (3.7)
Western Cape, RSA (9)	23 (3.6)	462 (14.2)	77 (3.6)	434 (5.7)		5 (1.6)		2 (1.0)		16 (3.8)
Gauteng, RSA (9)	15 (3.2)	434 (14.8)	85 (3.2)	418 (4.0)		5 (1.5)		1 (0.5)		7 (2.2)

* Teachers could indicate the class having more than one type of computer access.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 14.4: Access to Computers for Science Lessons

Students' Results based on Teachers' Reports

Country	Computers Available for Students to Use During Science Lessons				Percent of Students by Computer Access*							
	Yes		No		Each Student has a Computer		The Class has Computers that Students can Share		The School has Computers that the Class can Sometimes Use	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement						
Sweden	96 (1.7)	521 (3.1)	4 (1.7)	528 (31.8)		87 (2.8)		4 (1.2)		19 (3.0)
New Zealand	90 (2.6)	506 (4.2)	10 (2.6)	464 (22.8)		55 (4.1)		24 (3.5)		67 (4.1)
Australia	r 87 (1.6)	537 (3.8)	13 (1.6)	505 (10.6)	r	67 (2.8)	r	18 (2.4)	r	51 (2.7)
Norway (9)	s 85 (3.3)	497 (3.9)	15 (3.3)	500 (7.9)	s	77 (3.8)	s	16 (3.6)	s	21 (3.9)
United States	r 82 (2.3)	530 (4.2)	18 (2.3)	511 (14.3)	r	58 (2.9)	r	35 (3.1)	r	50 (2.9)
Finland	78 (1.9)	542 (3.3)	22 (1.9)	545 (4.9)		27 (3.0)		18 (1.8)		70 (2.3)
Japan	67 (3.8)	568 (2.8)	33 (3.8)	572 (3.9)		17 (3.2)		29 (3.5)		62 (4.0)
Chile	65 (3.9)	468 (4.2)	35 (3.9)	454 (5.7)		40 (4.0)		39 (3.8)		63 (3.8)
Kazakhstan	64 (2.9)	477 (4.2)	36 (2.9)	480 (5.7)		19 (2.2)		37 (2.8)		56 (3.0)
United Arab Emirates	r 59 (1.4)	483 (2.8)	41 (1.4)	462 (4.2)	r	39 (1.3)	r	27 (1.6)	r	47 (1.6)
Egypt	58 (3.7)	399 (7.8)	42 (3.7)	379 (8.0)		3 (1.4)		14 (2.9)		56 (3.6)
Hong Kong SAR	57 (4.0)	512 (7.5)	43 (4.0)	494 (8.9)		30 (3.8)		20 (3.6)		45 (4.3)
Singapore	56 (2.2)	605 (6.0)	44 (2.2)	611 (5.8)		29 (1.9)		21 (2.1)		53 (2.4)
Israel	56 (4.3)	510 (5.8)	44 (4.3)	519 (6.4)		10 (2.5)		22 (3.1)		53 (4.1)
Iran, Islamic Rep. of	54 (3.8)	465 (5.4)	46 (3.8)	431 (5.8)		2 (1.2)		6 (1.9)		49 (3.8)
Jordan	54 (3.6)	468 (5.1)	46 (3.6)	434 (7.8)		13 (2.6)		11 (2.1)		50 (3.8)
Chinese Taipei	54 (3.6)	572 (2.6)	46 (3.6)	576 (3.7)		5 (1.4)		37 (3.5)		40 (3.6)
Lithuania	53 (2.3)	529 (3.6)	47 (2.3)	538 (2.9)		16 (1.7)		20 (1.7)		48 (2.1)
Qatar	50 (4.5)	477 (5.7)	50 (4.5)	472 (7.5)		24 (2.7)		19 (2.7)		46 (4.1)
Georgia	49 (2.4)	445 (4.4)	51 (2.4)	449 (4.2)	x	26 (3.5)	x	27 (3.4)	s	87 (2.2)
Korea, Rep. of	49 (4.2)	560 (3.3)	51 (4.2)	561 (2.6)		7 (1.9)		27 (3.1)		39 (4.1)
Kuwait	48 (4.6)	457 (7.4)	52 (4.6)	432 (6.9)		8 (2.3)		10 (2.6)		42 (4.8)
Hungary	46 (2.6)	529 (3.5)	54 (2.6)	528 (3.7)		3 (0.7)		10 (1.4)		43 (2.7)
Russian Federation	46 (2.5)	548 (4.2)	54 (2.5)	539 (5.8)		8 (1.5)		28 (2.2)		44 (2.5)
Ireland	45 (3.7)	527 (3.9)	55 (3.7)	528 (4.3)		17 (2.7)		10 (2.0)		33 (3.2)
Bahrain	44 (2.8)	483 (3.8)	56 (2.8)	488 (3.5)		6 (1.1)		11 (2.5)		39 (2.7)
Romania	40 (2.9)	481 (5.7)	60 (2.9)	464 (4.9)	r	12 (2.0)	r	12 (2.2)	r	41 (3.3)
Italy	36 (3.8)	493 (4.7)	64 (3.8)	506 (3.3)		6 (1.8)		25 (3.6)		32 (3.7)
France	r 35 (3.5)	487 (4.4)	65 (3.5)	489 (3.9)	r	4 (1.5)	r	19 (2.6)	r	31 (3.2)
England	s 32 (4.8)	524 (14.2)	68 (4.8)	522 (8.2)	s	14 (3.6)	s	7 (2.9)	s	29 (5.1)
Saudi Arabia	30 (3.8)	441 (6.9)	70 (3.8)	428 (3.4)		5 (1.6)		11 (2.3)		26 (3.3)
Malaysia	20 (3.3)	452 (10.9)	80 (3.3)	462 (4.5)		4 (1.3)		7 (1.7)		17 (3.0)
Lebanon	19 (2.6)	409 (11.4)	81 (2.6)	370 (5.2)		1 (0.7)		6 (1.9)		14 (2.3)
Oman	18 (2.4)	475 (8.2)	82 (2.4)	453 (3.2)		3 (1.0)		8 (1.6)		16 (2.3)
Turkey	18 (3.2)	536 (11.2)	82 (3.2)	511 (4.8)		3 (1.5)		10 (2.5)		14 (2.9)
Portugal	17 (3.1)	536 (5.4)	83 (3.1)	516 (3.0)		3 (1.2)		8 (1.9)		17 (3.0)
Morocco	15 (1.9)	411 (7.3)	85 (1.9)	391 (3.2)		0 (0.0)		5 (1.1)		12 (1.7)
South Africa (9)	10 (1.8)	404 (16.9)	90 (1.8)	366 (3.2)		3 (0.9)		2 (0.8)		6 (1.4)
Cyprus	s 7 (1.0)	494 (6.7)	93 (1.0)	486 (2.5)	s	1 (0.0)	s	3 (0.6)	s	4 (0.8)
International Average	**48 (0.5)**	**496 (1.1)**	**52 (0.5)**	**486 (1.4)**		**19 (0.4)**		**17 (0.4)**		**39 (0.5)**
Benchmarking Participants										
Ontario, Canada	s 88 (3.4)	522 (5.0)	12 (3.4)	516 (9.4)	s	29 (4.9)	s	66 (5.6)	s	72 (5.4)
Dubai, UAE	r 81 (1.4)	565 (2.6)	19 (1.4)	494 (8.1)	r	52 (1.7)	r	38 (1.9)	r	65 (2.6)
Abu Dhabi, UAE	r 62 (2.5)	397 (6.2)	38 (2.5)	451 (7.8)	r	50 (1.6)	r	22 (2.5)	r	44 (2.7)
Moscow City, Russian Fed.	40 (2.6)	571 (3.7)	60 (2.6)	563 (3.2)		9 (1.6)		17 (1.9)		37 (2.5)
Western Cape, RSA (9)	21 (3.5)	472 (17.8)	79 (3.5)	432 (6.6)		8 (2.1)		5 (1.9)		17 (3.2)
Gauteng, RSA (9)	8 (1.9)	517 (18.8)	92 (1.9)	415 (4.6)		5 (1.9)		0 (0.0)		3 (0.5)
Quebec, Canada	y - -	- -	- -	- -	y	- -	y	- -	y	- -

* Teachers could indicate the class having more than one type of computer access.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution. A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Technology to Support Learning

Exhibits 14.5, 14.6, 14.7, and 14.8 presents teachers' reports on the frequency they do activities on computers to support learning during mathematics and science lessons, together with average achievement by frequency. Across both grades and subjects, 5 to 9 percent of students on average are in classes in which their teacher reported doing computer activities to support learning "every day or almost every day," 10 to 14 percent had teachers who reported "once or twice a week," 13 to 21 percent "once or twice a month," and 56 to 68 percent "never or almost never."

Teachers reported doing computer activities more frequently in science lessons than in mathematics lessons. Although 60 percent of fourth grade students (Exhibit 14.6) and 56 percent of eighth grade students (Exhibit 14.8) had science teachers who said they "never or almost never" did computer activities to support learning, 67 percent of fourth grade students (Exhibit 14.5) and 68 percent of eighth grade students (Exhibit 14.7) had mathematics teachers who reported "never or almost never" doing computer activities to support learning. Though few students are in classes where computers are used on a frequent basis, there was a substantial range across countries. For example, in fourth grade mathematics, on average only 7 percent of students' mathematics teachers said they use computers to support learning "every day or almost every day," on average, but more than 25 percent did so in Denmark, the Netherlands, New Zealand, and the United States.

Students in classes where teachers "never or almost never" used computers to support learning had the lowest achievement, on average. At both the fourth and the eighth grades, there was a 10-point difference in average mathematics achievement as well as average science achievement between students in the two lowest categories. Beyond that, the relationship with achievement varied across grades and subjects. In fourth grade mathematics (Exhibit 14.5) and eighth grade science (Exhibit 14.8), students with teachers who did computer activities "every day or almost every day" had the highest average achievement compared to students in the other three categories (515 vs. 509, 510, and 500 for fourth grade mathematics; 509 vs. 495, 497, and 487 for eighth grade science), while in fourth grade science (Exhibit 14.6), average achievement was similar for students in the "every day or almost every day," "once or twice a week," and "once or twice a month" categories (498, 498, and 500, respectively). In eighth grade mathematics (Exhibit 14.7), students in the two highest frequency categories had the same average achievement (505), which was higher than for students in the "once or twice a month" (497) and "never or almost never" (487) categories.

Exhibit 14.5: Teachers Do Computer Activities to Support Learning in Mathematics Lessons

Students' Results based on Teachers' Reports

Country	Every or Almost Every Day		Once or Twice a Week		Once or Twice a Month		Never or Almost Never	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Albania	1 (0.6)	~ ~	1 (0.7)	~ ~	7 (2.5)	532 (21.0)	91 (2.6)	491 (3.5)
Armenia	1 (0.9)	~ ~	5 (2.0)	494 (14.1)	5 (1.7)	519 (7.9)	89 (2.6)	497 (2.7)
Australia	14 (2.2)	528 (8.0)	37 (3.3)	518 (5.3)	11 (2.4)	531 (13.5)	38 (3.8)	511 (5.5)
Austria	1 (0.8)	~ ~	10 (2.0)	549 (6.2)	10 (1.8)	552 (5.1)	78 (2.6)	536 (2.4)
Azerbaijan	2 (0.8)	~ ~	10 (2.5)	515 (8.1)	3 (1.3)	485 (18.9)	85 (2.8)	517 (3.0)
Bahrain	7 (1.7)	498 (8.2)	8 (1.7)	495 (8.4)	13 (2.1)	486 (6.3)	71 (2.7)	475 (3.0)
Belgium (Flemish)	3 (1.3)	536 (23.2)	10 (2.1)	535 (5.2)	17 (3.0)	527 (4.3)	71 (3.8)	535 (2.2)
Bosnia and Herzegovina	1 (0.5)	~ ~	2 (0.8)	~ ~	9 (2.0)	484 (6.7)	88 (2.1)	448 (2.5)
Bulgaria	3 (1.5)	528 (14.1)	5 (1.6)	520 (18.5)	8 (2.6)	514 (15.3)	83 (2.7)	514 (5.1)
Canada	6 (1.0)	503 (6.2)	24 (2.0)	503 (3.9)	19 (2.5)	511 (6.1)	52 (3.0)	519 (4.0)
Chile	0 (0.0)	~ ~	7 (2.3)	446 (14.0)	18 (3.1)	429 (7.3)	76 (3.6)	443 (3.3)
Chinese Taipei	5 (1.5)	611 (8.5)	10 (2.4)	604 (5.8)	7 (2.0)	588 (8.3)	78 (3.3)	599 (2.1)
Croatia	0 (0.0)	~ ~	1 (0.7)	~ ~	5 (1.8)	501 (14.3)	94 (2.0)	509 (2.3)
Cyprus	12 (1.8)	540 (5.7)	10 (2.1)	536 (7.4)	7 (1.5)	539 (9.0)	71 (2.5)	532 (3.2)
Czech Republic	2 (1.3)	~ ~	9 (2.0)	543 (9.1)	16 (2.4)	540 (7.0)	73 (3.3)	531 (2.9)
Denmark r	26 (3.6)	522 (4.5)	39 (4.0)	522 (3.7)	21 (3.3)	528 (6.0)	14 (3.2)	532 (6.5)
Finland	3 (0.8)	529 (10.2)	19 (2.5)	523 (5.4)	36 (3.4)	536 (3.6)	43 (3.8)	534 (3.7)
France	1 (0.4)	~ ~	5 (2.1)	488 (8.2)	3 (1.2)	437 (15.4)	91 (2.4)	487 (3.2)
Georgia s	7 (1.6)	491 (33.1)	44 (4.3)	475 (6.5)	46 (4.3)	485 (4.7)	3 (1.2)	466 (23.2)
Germany	1 (0.7)	~ ~	7 (2.1)	508 (7.2)	17 (2.6)	518 (6.6)	75 (3.3)	524 (2.9)
Hong Kong SAR	12 (3.2)	587 (10.5)	15 (3.3)	597 (10.6)	42 (4.2)	609 (4.6)	30 (4.8)	600 (8.5)
Hungary	7 (1.7)	524 (8.8)	10 (2.1)	517 (9.1)	10 (2.6)	520 (8.8)	72 (3.4)	526 (3.9)
Iran, Islamic Rep. of	6 (1.8)	486 (18.1)	9 (2.2)	440 (16.6)	7 (1.8)	460 (11.0)	78 (2.9)	438 (4.5)
Ireland	3 (1.2)	519 (18.3)	15 (3.1)	543 (7.4)	15 (2.9)	559 (6.9)	66 (3.5)	548 (2.6)
Italy	7 (1.8)	504 (6.5)	8 (2.0)	519 (9.1)	8 (2.0)	519 (9.4)	78 (3.2)	515 (2.7)
Japan	10 (2.4)	582 (5.9)	9 (2.0)	593 (4.3)	10 (2.1)	589 (4.4)	71 (3.4)	595 (2.1)
Kazakhstan	9 (2.1)	508 (7.3)	23 (3.3)	508 (5.1)	13 (2.6)	504 (5.5)	55 (4.0)	516 (4.2)
Korea, Rep. of	0 (0.0)	~ ~	0 (0.4)	~ ~	10 (2.5)	590 (7.0)	90 (2.6)	600 (2.4)
Kosovo s	0 (0.0)	~ ~	5 (2.2)	438 (15.5)	7 (3.3)	455 (8.1)	88 (3.8)	443 (4.6)
Kuwait	6 (1.6)	401 (24.2)	9 (2.5)	377 (20.5)	7 (1.9)	402 (20.5)	78 (3.5)	381 (5.5)
Latvia	1 (0.8)	~ ~	4 (1.6)	535 (14.1)	16 (2.8)	543 (5.4)	78 (3.3)	548 (3.1)
Lithuania	3 (1.2)	543 (14.4)	20 (3.2)	546 (9.6)	26 (3.6)	536 (5.8)	52 (3.8)	542 (3.6)
Malta	20 (0.3)	500 (2.1)	43 (0.4)	509 (1.8)	21 (0.4)	515 (3.0)	16 (0.3)	515 (3.3)
Montenegro	1 (0.0)	~ ~	2 (0.1)	~ ~	7 (1.1)	466 (6.4)	90 (1.1)	453 (2.2)
Morocco	1 (0.8)	~ ~	1 (0.6)	~ ~	3 (1.5)	408 (40.1)	95 (1.8)	379 (4.8)
Netherlands r	43 (5.0)	536 (3.9)	19 (4.2)	533 (4.7)	2 (1.0)	~ ~	37 (4.4)	539 (4.4)
New Zealand	32 (3.5)	481 (5.5)	40 (3.2)	492 (5.2)	10 (1.9)	489 (7.9)	18 (2.3)	486 (5.9)
North Macedonia	1 (0.6)	~ ~	24 (3.9)	468 (10.9)	21 (3.8)	476 (11.2)	53 (4.5)	471 (7.2)
Northern Ireland	12 (2.9)	566 (11.9)	19 (3.0)	565 (6.7)	31 (3.8)	563 (6.0)	38 (3.9)	567 (5.2)
Norway (5) r	9 (2.8)	548 (8.9)	40 (4.5)	545 (3.0)	23 (4.1)	550 (6.2)	29 (4.2)	538 (5.2)
Oman	2 (0.7)	~ ~	9 (2.0)	441 (12.3)	5 (1.5)	459 (20.1)	85 (2.4)	430 (4.5)
Pakistan	1 (0.9)	~ ~	2 (1.5)	~ ~	1 (0.5)	~ ~	96 (1.0)	329 (12.7)
Philippines	3 (1.4)	321 (32.5)	9 (1.9)	284 (20.8)	11 (2.6)	341 (16.3)	77 (3.3)	290 (6.9)
Poland	1 (0.8)	~ ~	5 (1.5)	513 (12.0)	17 (2.7)	511 (5.9)	76 (3.2)	523 (3.0)
Portugal	1 (0.5)	~ ~	5 (1.0)	527 (10.9)	4 (1.3)	523 (12.3)	90 (1.6)	526 (2.8)
Qatar	7 (2.1)	457 (16.6)	12 (2.3)	455 (8.6)	14 (2.4)	431 (13.9)	66 (3.5)	451 (4.7)
Russian Federation	3 (1.5)	545 (16.3)	12 (2.2)	574 (10.3)	24 (3.1)	567 (4.9)	61 (3.5)	567 (3.9)
Saudi Arabia	14 (3.0)	409 (8.9)	11 (2.0)	420 (11.3)	5 (1.6)	398 (23.3)	70 (3.3)	393 (4.7)
Serbia	4 (1.6)	522 (12.2)	4 (1.6)	517 (20.3)	4 (1.5)	496 (9.8)	88 (2.4)	507 (3.4)
Singapore	0 (0.3)	~ ~	11 (1.7)	626 (10.8)	30 (2.4)	629 (7.2)	59 (2.6)	623 (4.4)
Slovak Republic	3 (1.3)	534 (20.6)	5 (1.3)	518 (12.9)	5 (1.4)	524 (11.6)	87 (1.9)	507 (3.6)
South Africa (5)	0 (0.0)	~ ~	4 (1.0)	449 (26.5)	2 (0.6)	~ ~	95 (1.1)	370 (3.6)
Spain	3 (0.7)	504 (12.6)	13 (2.6)	502 (6.3)	13 (2.2)	500 (7.3)	71 (2.9)	502 (3.2)
Sweden	6 (1.9)	515 (10.5)	45 (4.5)	521 (3.8)	27 (3.9)	522 (6.6)	22 (3.0)	522 (8.5)
Turkey (5)	5 (2.0)	531 (17.9)	6 (1.9)	516 (15.9)	2 (1.1)	~ ~	86 (2.8)	521 (4.9)
United Arab Emirates r	15 (1.1)	509 (5.2)	24 (1.7)	508 (4.1)	6 (0.7)	531 (8.1)	55 (1.8)	458 (3.0)
United States	36 (2.5)	537 (4.4)	27 (2.4)	531 (4.7)	9 (1.3)	537 (7.6)	28 (2.6)	536 (5.3)
England x	5 (1.5)	587 (10.0)	10 (3.4)	578 (17.0)	13 (4.0)	557 (6.0)	72 (4.3)	553 (6.2)
International Average	**7 (0.2)**	**515 (2.4)**	**14 (0.3)**	**509 (1.6)**	**13 (0.3)**	**510 (1.6)**	**67 (0.4)**	**500 (0.7)**
Benchmarking Participants								
Ontario, Canada r	6 (1.8)	509 (8.6)	23 (3.5)	505 (6.7)	25 (5.1)	514 (9.5)	47 (5.7)	516 (9.6)
Quebec, Canada	3 (1.3)	526 (13.0)	15 (3.2)	531 (4.3)	14 (3.4)	525 (6.6)	68 (4.1)	535 (2.8)
Moscow City, Russian Fed.	1 (1.3)	~ ~	21 (3.1)	605 (5.1)	26 (4.1)	597 (4.1)	52 (4.5)	585 (2.8)
Madrid, Spain	7 (2.0)	518 (6.2)	9 (2.4)	511 (6.6)	17 (3.3)	518 (8.4)	68 (4.2)	520 (2.5)
Abu Dhabi, UAE r	13 (2.0)	490 (11.5)	14 (1.9)	468 (9.6)	5 (1.3)	468 (20.0)	68 (2.4)	426 (3.9)
Dubai, UAE r	23 (2.2)	542 (6.5)	38 (2.4)	561 (3.1)	15 (2.3)	561 (6.8)	24 (1.5)	516 (5.1)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 14.6: Teachers Do Computer Activities to Support Learning in Science Lessons

Students' Results based on Teachers' Reports

Country		Every or Almost Every Day		Once or Twice a Week		Once or Twice a Month		Never or Almost Never	
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Albania		1 (0.6)	~ ~	3 (1.2)	491 (13.8)	6 (2.1)	522 (20.5)	91 (2.4)	486 (3.9)
Armenia		4 (1.8)	468 (26.8)	8 (2.3)	488 (9.6)	10 (2.2)	465 (10.6)	78 (3.2)	465 (3.9)
Australia		7 (1.4)	547 (6.5)	28 (3.9)	532 (5.5)	30 (3.9)	531 (5.5)	35 (3.1)	534 (5.0)
Austria		1 (0.4)	~ ~	11 (2.0)	527 (7.1)	22 (2.4)	523 (5.3)	66 (3.1)	521 (3.3)
Azerbaijan		2 (0.9)	~ ~	9 (1.9)	420 (9.2)	5 (1.3)	454 (8.4)	84 (2.2)	425 (3.8)
Bahrain		17 (2.5)	511 (10.1)	8 (1.9)	511 (11.4)	11 (2.0)	514 (9.0)	64 (2.9)	481 (4.5)
Belgium (Flemish)		4 (1.7)	501 (14.8)	12 (2.8)	511 (5.2)	50 (3.3)	500 (3.2)	33 (3.9)	501 (3.5)
Bosnia and Herzegovina		2 (1.0)	~ ~	3 (1.0)	479 (12.9)	12 (2.2)	471 (8.0)	84 (2.6)	456 (2.9)
Bulgaria		5 (1.7)	546 (15.1)	4 (1.6)	554 (32.6)	14 (3.1)	495 (15.4)	78 (3.3)	523 (6.0)
Canada	r	5 (1.2)	526 (9.8)	18 (2.1)	521 (3.8)	32 (2.4)	524 (3.3)	45 (2.6)	526 (2.9)
Chile	r	4 (1.7)	477 (15.8)	7 (2.5)	451 (6.2)	24 (3.0)	464 (5.8)	65 (3.2)	471 (3.9)
Chinese Taipei		15 (2.8)	555 (4.4)	20 (3.2)	552 (4.3)	12 (2.2)	565 (6.3)	53 (4.0)	560 (2.3)
Croatia		2 (1.1)	~ ~	2 (1.1)	~ ~	6 (1.5)	518 (11.6)	90 (2.4)	524 (2.2)
Cyprus		11 (2.5)	511 (7.5)	9 (2.5)	516 (11.2)	18 (3.9)	519 (7.6)	62 (4.5)	510 (3.8)
Czech Republic		2 (1.0)	~ ~	4 (1.2)	514 (9.6)	21 (2.8)	544 (5.5)	73 (2.9)	532 (3.0)
Denmark	r	28 (3.8)	510 (4.5)	31 (3.9)	521 (3.8)	30 (4.1)	534 (4.4)	10 (2.3)	522 (5.7)
Finland		4 (1.2)	544 (8.7)	19 (2.7)	554 (4.3)	51 (3.3)	557 (3.2)	25 (2.8)	552 (5.0)
France		0 (0.3)	~ ~	0 (0.3)	~ ~	9 (2.8)	490 (8.2)	90 (2.8)	488 (3.2)
Georgia	r	6 (2.0)	458 (23.8)	35 (4.5)	449 (7.1)	56 (4.9)	453 (4.8)	4 (2.0)	437 (15.5)
Germany		1 (0.5)	~ ~	7 (1.9)	522 (8.1)	33 (3.5)	522 (4.7)	60 (3.7)	516 (3.4)
Hong Kong SAR		10 (2.6)	534 (11.3)	16 (3.3)	540 (8.7)	39 (4.0)	529 (4.5)	36 (4.1)	532 (6.5)
Hungary		5 (1.6)	516 (17.6)	15 (2.4)	522 (7.3)	10 (2.2)	520 (10.5)	70 (3.1)	533 (3.5)
Iran, Islamic Rep. of		5 (1.7)	484 (13.7)	13 (2.5)	452 (16.2)	9 (1.7)	455 (6.9)	72 (3.1)	434 (4.9)
Ireland		1 (0.8)	~ ~	8 (2.0)	510 (12.8)	21 (3.0)	532 (7.4)	69 (3.5)	530 (3.0)
Italy		6 (1.9)	511 (9.8)	11 (2.1)	503 (6.5)	11 (2.3)	500 (6.1)	73 (3.6)	512 (3.4)
Japan		8 (2.1)	548 (5.2)	10 (2.6)	564 (6.2)	29 (3.7)	562 (3.3)	53 (4.2)	563 (2.5)
Kazakhstan		8 (1.7)	507 (15.4)	25 (3.3)	486 (8.8)	16 (2.8)	481 (7.6)	51 (4.3)	496 (5.3)
Korea, Rep. of		2 (1.1)	~ ~	3 (1.5)	568 (16.7)	28 (3.6)	586 (4.2)	66 (3.3)	589 (2.2)
Kosovo	s	1 (0.8)	~ ~	14 (5.2)	411 (10.5)	5 (1.9)	424 (14.3)	80 (5.5)	413 (5.8)
Kuwait		18 (2.9)	390 (14.3)	12 (2.8)	418 (19.9)	12 (2.8)	390 (17.6)	59 (4.0)	389 (8.3)
Latvia		4 (1.8)	517 (19.3)	7 (2.2)	540 (11.3)	25 (3.1)	536 (6.1)	64 (3.1)	546 (2.4)
Lithuania		6 (1.9)	535 (7.9)	19 (2.8)	538 (8.0)	21 (3.3)	540 (6.5)	53 (3.6)	536 (3.9)
Malta		11 (0.2)	490 (3.2)	30 (0.4)	489 (2.5)	29 (0.4)	496 (2.5)	29 (0.4)	503 (2.4)
Montenegro		1 (0.6)	~ ~	3 (1.1)	431 (18.4)	11 (1.0)	432 (10.1)	84 (1.1)	456 (2.6)
Morocco		1 (0.8)	~ ~	1 (0.5)	~ ~	5 (1.9)	427 (29.4)	93 (2.0)	370 (6.6)
Netherlands	r	9 (2.2)	513 (11.1)	19 (2.7)	521 (8.3)	28 (5.1)	517 (6.9)	44 (5.1)	518 (3.3)
New Zealand		13 (2.4)	502 (8.0)	27 (2.6)	502 (6.4)	34 (2.9)	504 (4.7)	27 (2.9)	501 (4.5)
North Macedonia		4 (1.6)	415 (15.6)	25 (4.1)	405 (14.4)	33 (4.1)	442 (9.4)	37 (4.4)	427 (9.7)
Northern Ireland		5 (1.6)	514 (13.3)	14 (3.1)	529 (7.9)	42 (3.9)	520 (3.6)	40 (4.4)	513 (4.1)
Norway (5)	s	9 (2.9)	534 (10.6)	23 (3.7)	546 (5.0)	36 (4.6)	528 (4.8)	32 (4.6)	548 (4.3)
Oman		3 (0.7)	461 (20.4)	12 (2.3)	445 (14.6)	8 (1.8)	429 (15.1)	77 (2.8)	430 (4.6)
Pakistan	r	0 (0.3)	~ ~	5 (1.9)	310 (33.7)	1 (1.0)	~ ~	94 (2.2)	292 (17.0)
Poland		2 (1.0)	~ ~	5 (1.8)	527 (8.0)	6 (1.6)	510 (7.8)	86 (2.4)	533 (2.8)
Portugal		2 (0.8)	~ ~	7 (1.4)	503 (6.3)	9 (1.9)	512 (6.8)	82 (2.2)	503 (2.8)
Qatar		12 (2.2)	438 (15.9)	16 (2.6)	444 (8.9)	16 (2.2)	436 (11.4)	55 (3.9)	458 (6.7)
Russian Federation		2 (0.9)	~ ~	13 (2.9)	584 (8.2)	27 (3.7)	563 (4.3)	59 (3.8)	567 (3.7)
Saudi Arabia		16 (2.9)	417 (11.5)	13 (2.5)	420 (10.6)	6 (1.9)	390 (30.3)	65 (3.4)	394 (5.9)
Serbia		4 (1.5)	533 (14.0)	8 (2.0)	523 (10.8)	7 (2.2)	509 (11.4)	81 (3.1)	516 (3.9)
Singapore		1 (0.5)	~ ~	9 (1.3)	592 (13.0)	40 (2.8)	595 (5.8)	50 (2.7)	595 (4.1)
Slovak Republic		1 (0.6)	~ ~	8 (1.9)	526 (12.2)	20 (2.9)	528 (8.9)	70 (3.3)	518 (4.0)
South Africa (5)		0 (0.2)	~ ~	2 (0.7)	~ ~	2 (1.2)	~ ~	95 (1.3)	320 (5.2)
Spain		3 (1.1)	498 (17.7)	18 (2.3)	510 (4.6)	21 (2.9)	514 (4.4)	58 (3.0)	510 (3.0)
Sweden		7 (2.4)	512 (15.2)	33 (4.5)	540 (5.0)	37 (4.6)	543 (4.8)	23 (3.9)	540 (7.1)
Turkey (5)		12 (2.6)	544 (7.4)	5 (1.6)	526 (10.8)	3 (1.4)	539 (18.9)	80 (3.2)	523 (5.4)
United Arab Emirates	r	18 (1.2)	508 (6.4)	24 (1.6)	508 (5.0)	5 (0.6)	504 (12.4)	54 (1.9)	446 (3.9)
United States		14 (1.5)	532 (6.8)	30 (2.2)	546 (4.3)	24 (2.4)	543 (5.4)	33 (2.6)	533 (4.8)
England	x	5 (1.9)	566 (13.5)	10 (3.0)	556 (17.5)	18 (4.5)	543 (11.2)	68 (4.8)	533 (5.7)
Philippines	x	12 (3.8)	253 (34.6)	28 (5.8)	253 (20.2)	19 (4.7)	256 (25.7)	41 (6.2)	251 (14.9)
International Average		**6 (0.2)**	**498 (2.3)**	**13 (0.3)**	**498 (1.6)**	**20 (0.4)**	**500 (1.5)**	**60 (0.4)**	**490 (0.7)**
Benchmarking Participants									
Ontario, Canada	r	6 (2.3)	529 (15.9)	28 (4.4)	522 (5.0)	33 (4.3)	524 (5.7)	32 (4.3)	535 (7.4)
Quebec, Canada		2 (0.5)	~ ~	4 (1.5)	504 (11.2)	22 (3.7)	522 (4.9)	72 (3.9)	524 (2.7)
Moscow City, Russian Fed.		2 (1.5)	~ ~	10 (2.6)	602 (7.3)	42 (4.4)	600 (3.4)	45 (4.4)	588 (3.0)
Madrid, Spain		6 (1.7)	518 (7.8)	11 (2.9)	518 (5.5)	23 (3.3)	527 (3.4)	60 (4.5)	522 (3.0)
Abu Dhabi, UAE	r	14 (2.3)	461 (15.3)	18 (2.5)	442 (9.9)	6 (0.8)	444 (18.6)	62 (2.4)	398 (6.0)
Dubai, UAE	r	30 (2.3)	549 (6.5)	41 (2.3)	555 (3.5)	8 (1.4)	576 (8.0)	22 (1.1)	531 (5.3)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 14.7: Teachers Do Computer Activities to Support Learning in Mathematics Lessons

Students' Results based on Teachers' Reports

Country		Every or Almost Every Day		Once or Twice a Week		Once or Twice a Month		Never or Almost Never	
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia		25 (3.1)	520 (7.2)	27 (3.8)	525 (8.1)	18 (2.6)	535 (10.2)	30 (3.2)	502 (8.7)
Bahrain		13 (1.8)	488 (6.4)	10 (1.9)	484 (7.8)	9 (1.1)	473 (5.3)	68 (2.8)	481 (2.5)
Chile		1 (0.7)	~ ~	5 (1.8)	444 (13.7)	23 (3.6)	441 (6.6)	71 (3.9)	441 (4.2)
Chinese Taipei		5 (1.6)	583 (8.3)	3 (1.0)	603 (17.1)	15 (2.6)	600 (8.5)	77 (3.0)	617 (2.8)
Cyprus	s	3 (1.0)	487 (9.5)	3 (0.7)	556 (7.2)	1 (0.1)	~ ~	93 (1.3)	504 (2.5)
Egypt		2 (1.0)	~ ~	19 (3.5)	433 (10.8)	16 (3.4)	416 (14.5)	62 (4.3)	407 (6.6)
England	s	6 (2.9)	555 (22.7)	7 (2.9)	509 (26.3)	7 (2.5)	490 (31.5)	80 (4.7)	523 (9.5)
Finland		2 (1.0)	~ ~	9 (1.8)	513 (7.3)	33 (2.8)	506 (4.4)	55 (3.1)	510 (3.0)
France	r	0 (0.0)	~ ~	3 (1.6)	457 (24.9)	12 (3.1)	490 (9.8)	85 (3.2)	482 (3.0)
Hong Kong SAR		4 (1.4)	646 (23.6)	5 (2.1)	610 (16.5)	21 (3.5)	574 (11.7)	70 (3.9)	571 (5.8)
Hungary		1 (0.5)	~ ~	13 (2.7)	530 (11.9)	21 (2.6)	507 (8.3)	65 (3.4)	513 (4.7)
Iran, Islamic Rep. of		6 (2.0)	490 (15.0)	7 (1.9)	444 (11.4)	10 (2.2)	472 (15.9)	77 (3.1)	440 (3.9)
Ireland		4 (1.5)	516 (6.4)	5 (1.3)	514 (18.7)	12 (1.8)	530 (7.0)	79 (2.6)	525 (3.0)
Israel		0 (0.2)	~ ~	6 (1.5)	464 (26.9)	20 (2.6)	519 (11.9)	74 (2.9)	525 (5.3)
Italy	r	3 (1.3)	471 (10.6)	9 (2.3)	486 (7.3)	12 (2.6)	489 (10.0)	76 (3.7)	500 (3.3)
Japan		5 (1.6)	565 (8.5)	4 (1.5)	602 (9.0)	8 (2.2)	600 (11.0)	83 (2.8)	595 (2.9)
Jordan		3 (1.4)	461 (36.6)	6 (1.8)	448 (16.3)	30 (3.7)	428 (8.3)	61 (3.8)	412 (5.7)
Kazakhstan		6 (1.8)	486 (12.2)	22 (3.0)	482 (8.6)	16 (2.9)	478 (11.3)	56 (3.8)	491 (5.2)
Korea, Rep. of		3 (1.4)	594 (8.7)	3 (1.2)	596 (13.8)	10 (2.2)	614 (11.2)	84 (2.7)	607 (3.0)
Kuwait		7 (2.0)	392 (12.3)	12 (3.7)	452 (15.5)	7 (2.2)	418 (21.0)	74 (3.7)	392 (4.9)
Lebanon		1 (0.7)	~ ~	5 (1.8)	438 (26.5)	7 (2.4)	457 (13.3)	88 (3.0)	426 (3.1)
Lithuania		0 (0.2)	~ ~	8 (1.9)	503 (7.4)	23 (3.4)	510 (6.9)	69 (3.6)	527 (4.2)
Malaysia		1 (0.6)	~ ~	2 (1.0)	~ ~	7 (1.6)	494 (11.9)	90 (2.1)	456 (3.7)
Morocco		0 (0.4)	~ ~	1 (0.8)	~ ~	2 (1.2)	~ ~	96 (1.4)	386 (2.4)
New Zealand		21 (4.3)	500 (8.6)	41 (3.9)	481 (5.7)	16 (2.3)	495 (5.5)	22 (3.7)	461 (10.7)
Norway (9)	s	5 (1.5)	513 (11.7)	30 (3.9)	515 (5.2)	38 (3.9)	495 (4.9)	26 (4.2)	506 (4.5)
Oman		2 (1.1)	~ ~	2 (0.7)	~ ~	6 (1.9)	404 (11.4)	90 (2.3)	408 (3.1)
Portugal		2 (1.1)	~ ~	2 (1.2)	~ ~	4 (1.7)	473 (17.6)	93 (2.4)	500 (3.3)
Qatar		6 (1.9)	480 (27.6)	7 (1.5)	445 (15.2)	22 (3.4)	424 (12.2)	65 (3.4)	446 (4.5)
Romania	r	1 (0.7)	~ ~	3 (1.2)	557 (42.3)	21 (3.4)	490 (10.1)	75 (3.3)	478 (5.1)
Russian Federation		1 (0.8)	~ ~	6 (1.8)	563 (11.8)	16 (3.1)	548 (9.1)	77 (3.5)	541 (5.5)
Saudi Arabia		8 (2.3)	413 (9.0)	11 (2.2)	408 (7.3)	6 (2.0)	374 (11.1)	75 (3.4)	390 (2.9)
Singapore		0 (0.0)	~ ~	7 (1.0)	604 (18.3)	21 (2.3)	616 (9.9)	72 (2.3)	617 (4.7)
South Africa (9)		1 (0.4)	~ ~	2 (0.5)	~ ~	2 (0.5)	~ ~	96 (0.8)	388 (2.6)
Sweden		7 (2.4)	481 (10.2)	17 (3.0)	507 (6.7)	43 (4.2)	507 (4.8)	33 (3.8)	503 (4.2)
Turkey		5 (1.8)	522 (18.4)	7 (2.0)	496 (18.0)	2 (1.2)	~ ~	86 (2.8)	493 (4.9)
United Arab Emirates	r	23 (1.0)	440 (5.6)	25 (1.6)	501 (4.8)	7 (0.9)	538 (7.4)	45 (1.7)	468 (4.3)
United States		19 (2.2)	505 (9.0)	30 (2.6)	511 (6.5)	17 (2.0)	514 (8.0)	33 (2.7)	529 (8.7)
Georgia	x	0 (0.4)	~ ~	18 (4.5)	486 (17.9)	64 (5.6)	463 (9.0)	17 (3.6)	450 (15.7)
International Average		**5 (0.3)**	**505 (3.2)**	**10 (0.4)**	**505 (2.8)**	**16 (0.4)**	**497 (2.0)**	**68 (0.5)**	**487 (0.9)**
Benchmarking Participants									
Ontario, Canada	r	12 (3.8)	559 (23.1)	26 (3.8)	518 (6.2)	20 (4.1)	545 (7.2)	42 (4.5)	527 (5.4)
Quebec, Canada		2 (1.1)	~ ~	10 (2.9)	574 (13.7)	12 (2.9)	560 (9.8)	76 (3.6)	535 (4.6)
Moscow City, Russian Fed.		2 (1.3)	~ ~	5 (1.9)	582 (15.4)	13 (2.7)	584 (12.0)	80 (3.5)	573 (4.5)
Gauteng, RSA (9)		1 (0.7)	~ ~	4 (1.6)	467 (34.1)	2 (1.3)	~ ~	93 (2.2)	417 (3.6)
Western Cape, RSA (9)		2 (1.0)	~ ~	5 (2.9)	409 (29.5)	7 (2.2)	459 (22.4)	86 (2.9)	438 (5.4)
Abu Dhabi, UAE	r	41 (2.0)	399 (7.9)	14 (1.8)	460 (11.9)	4 (1.1)	483 (10.2)	42 (1.9)	456 (4.6)
Dubai, UAE		17 (1.8)	533 (9.8)	42 (2.7)	550 (4.7)	15 (1.7)	562 (6.9)	26 (2.3)	507 (6.8)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 14.8: Teachers Do Computer Activities to Support Learning in Science Lessons

Students' Results based on Teachers' Reports

Country		Every or Almost Every Day		Once or Twice a Week		Once or Twice a Month		Never or Almost Never	
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia	r	30 (2.9)	547 (6.1)	40 (2.9)	540 (4.9)	17 (2.7)	511 (9.4)	14 (1.6)	507 (10.9)
Bahrain		17 (2.3)	479 (6.9)	11 (1.9)	455 (7.4)	12 (2.5)	503 (14.6)	60 (2.6)	489 (3.5)
Chile		1 (0.4)	~ ~	6 (1.9)	448 (16.7)	42 (3.8)	466 (4.9)	51 (3.9)	462 (4.6)
Chinese Taipei		12 (2.2)	565 (7.8)	13 (2.2)	579 (6.1)	20 (3.2)	576 (4.4)	55 (3.6)	574 (3.2)
Cyprus	s	2 (0.4)	~ ~	1 (0.3)	~ ~	4 (0.8)	505 (10.9)	93 (1.0)	486 (2.5)
Egypt		3 (1.3)	363 (17.9)	20 (3.4)	409 (13.4)	30 (3.7)	397 (11.3)	47 (3.7)	380 (7.3)
England	s	3 (2.3)	560 (16.9)	3 (2.0)	532 (52.2)	18 (4.7)	515 (24.8)	75 (4.0)	523 (7.8)
Finland		11 (1.7)	545 (7.6)	15 (1.6)	539 (6.9)	45 (2.5)	542 (3.8)	29 (2.1)	545 (4.0)
France	r	1 (0.5)	~ ~	2 (1.0)	~ ~	17 (2.6)	489 (5.6)	80 (3.0)	488 (3.2)
Georgia	s	4 (1.2)	477 (11.2)	17 (2.1)	450 (8.7)	62 (3.1)	441 (4.8)	16 (2.3)	440 (6.8)
Hong Kong SAR		9 (2.1)	536 (12.8)	11 (3.1)	477 (23.4)	31 (4.2)	519 (12.9)	49 (4.1)	497 (8.3)
Hungary		9 (1.5)	528 (7.9)	12 (1.5)	531 (5.6)	18 (1.7)	528 (5.3)	61 (2.5)	529 (3.7)
Iran, Islamic Rep. of		6 (2.0)	474 (12.0)	10 (2.3)	483 (14.3)	33 (3.6)	460 (6.7)	51 (3.7)	433 (5.6)
Ireland		5 (1.3)	529 (8.9)	10 (2.1)	525 (10.5)	20 (2.6)	528 (4.9)	65 (3.4)	528 (3.7)
Israel		4 (1.6)	498 (30.2)	18 (2.8)	490 (9.9)	33 (3.7)	524 (7.2)	45 (4.2)	518 (6.4)
Italy		7 (2.2)	497 (11.3)	8 (1.8)	481 (12.9)	17 (2.9)	495 (5.8)	68 (3.7)	506 (3.1)
Japan		10 (2.5)	565 (4.4)	8 (2.0)	570 (5.4)	21 (3.6)	565 (5.4)	61 (4.2)	572 (3.1)
Jordan		3 (1.2)	521 (24.6)	14 (2.5)	471 (9.9)	32 (3.1)	464 (6.9)	51 (3.4)	435 (7.4)
Kazakhstan		8 (1.5)	481 (9.1)	33 (2.4)	467 (6.0)	20 (2.2)	490 (6.3)	39 (2.9)	480 (5.2)
Korea, Rep. of		12 (2.5)	570 (8.0)	10 (2.1)	564 (8.1)	16 (2.5)	550 (4.5)	62 (3.8)	561 (2.3)
Kuwait		23 (3.4)	453 (10.1)	16 (4.5)	453 (14.1)	8 (2.5)	479 (16.6)	53 (4.6)	432 (6.9)
Lebanon		2 (1.3)	~ ~	5 (1.4)	389 (29.9)	11 (2.0)	417 (14.4)	83 (2.6)	369 (5.1)
Lithuania		6 (1.1)	535 (8.7)	6 (0.9)	525 (8.6)	30 (2.2)	526 (3.6)	58 (2.2)	537 (2.9)
Malaysia		2 (0.9)	~ ~	4 (1.7)	409 (22.1)	12 (2.6)	457 (12.2)	82 (3.2)	462 (4.3)
Morocco		5 (1.1)	416 (13.6)	4 (1.2)	411 (15.2)	5 (1.1)	400 (14.7)	86 (1.9)	391 (3.2)
New Zealand		26 (3.3)	516 (7.4)	41 (3.8)	505 (5.5)	20 (3.5)	492 (12.8)	13 (3.0)	475 (18.4)
Norway (9)	s	12 (3.3)	493 (9.6)	28 (4.3)	499 (5.5)	41 (4.2)	497 (5.5)	19 (3.6)	499 (6.4)
Oman		3 (1.1)	496 (25.9)	8 (1.5)	468 (14.8)	6 (1.8)	471 (11.3)	84 (2.2)	453 (3.2)
Portugal		3 (1.1)	530 (11.9)	3 (1.1)	530 (11.5)	8 (1.9)	541 (7.3)	86 (2.8)	517 (2.8)
Qatar		13 (2.8)	508 (15.0)	11 (2.2)	454 (10.0)	23 (2.9)	471 (7.9)	53 (4.2)	473 (7.3)
Romania		3 (0.6)	483 (10.8)	8 (1.4)	501 (11.2)	32 (3.4)	477 (6.2)	57 (3.4)	470 (5.1)
Russian Federation		1 (0.3)	~ ~	10 (1.3)	544 (6.4)	27 (2.2)	548 (4.6)	63 (2.6)	540 (5.3)
Saudi Arabia		11 (2.6)	460 (9.6)	12 (2.6)	428 (12.2)	5 (1.8)	428 (12.8)	71 (3.8)	428 (3.4)
Singapore		3 (0.7)	618 (16.7)	7 (1.1)	618 (14.8)	32 (2.2)	606 (7.7)	58 (2.1)	606 (5.1)
South Africa (9)		1 (0.5)	~ ~	1 (0.4)	~ ~	4 (1.1)	418 (28.1)	94 (1.2)	366 (3.3)
Sweden		29 (3.2)	517 (5.8)	28 (3.2)	517 (5.5)	30 (3.2)	527 (5.8)	13 (2.5)	525 (11.9)
Turkey		9 (2.5)	544 (17.7)	7 (2.1)	523 (18.2)	1 (0.7)	~ ~	82 (3.2)	511 (4.8)
United Arab Emirates	r	28 (1.0)	460 (5.2)	24 (1.3)	493 (6.7)	7 (1.1)	537 (10.4)	41 (1.4)	463 (4.2)
United States	r	25 (2.7)	526 (7.2)	41 (3.2)	530 (6.3)	14 (1.8)	539 (10.5)	20 (2.4)	509 (13.8)
International Average		**9 (0.3)**	**509 (2.4)**	**13 (0.4)**	**495 (2.5)**	**21 (0.4)**	**497 (1.7)**	**56 (0.5)**	**487 (1.0)**
Benchmarking Participants									
Ontario, Canada	s	17 (4.7)	543 (15.5)	33 (4.7)	511 (8.1)	32 (5.3)	521 (6.0)	18 (4.4)	519 (6.5)
Moscow City, Russian Fed.		2 (0.7)	~ ~	6 (1.3)	563 (6.8)	19 (1.9)	574 (5.1)	73 (2.2)	565 (3.1)
Gauteng, RSA (9)		2 (1.2)	~ ~	0 (0.5)	~ ~	3 (1.1)	537 (37.1)	94 (1.7)	417 (4.6)
Western Cape, RSA (9)		1 (0.9)	~ ~	6 (2.0)	514 (37.7)	8 (2.3)	475 (30.6)	84 (3.1)	430 (6.2)
Abu Dhabi, UAE	r	38 (2.2)	371 (8.0)	18 (1.8)	422 (13.5)	5 (1.1)	501 (19.9)	39 (2.5)	451 (7.7)
Dubai, UAE	r	32 (1.5)	585 (4.1)	37 (2.2)	547 (4.8)	11 (1.2)	565 (4.5)	19 (1.4)	497 (7.9)
Quebec, Canada	y	- -	- -	- -	- -	- -	- -	- -	- -

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Tests Delivered on Digital Devices

Exhibits 14.9, 14.10, 14.11, and 14.12 present teachers' reports on the frequency with which students take mathematics and science tests on computers or tablets. On average, 61 to 69 percent of fourth and eighth grade students "never" take mathematics and science tests on computers or tablets according to their teachers, 14 to 21 percent do so "once or twice a year," and 17 to 20 percent do so "once a month or more." At the fourth grade, taking tests on digital devices was slightly less common in science compared to mathematics, with 69 percent of students "never" taking them and just 14 percent taking them "once a month or more," compared to 64 percent and 18 percent in mathematics, respectively. There is tremendous variation across countries, however, with a number of countries at both grades having 90 percent or more of students "never" taking mathematics and science tests on digital devices, and some countries having about half or more of students doing so "once a month or more."

The relationship between the frequency of taking tests on digital devices and average achievement varied across grades and subjects. At the eighth grade (Exhibits 14.11 and 14.12), although taking mathematics tests on computers "once a month or more" was associated with lower average achievement than "once or twice a year" and "never" (482 vs. 494 and 491, respectively), average achievement was similar across the three categories for taking science tests (492, 496, and 491, respectively). Average achievement was also similar across the three categories at the fourth grade (Exhibits 14.9 and 14.10), for both mathematics tests (502, 504, and 501, respectively) and science tests (489, 491, and 491, respectively).

Exhibit 14.9: Students Take Mathematics Tests on Computers or Tablets

Students' Results based on Teachers' Reports

Country		Once a Month or More		Once or Twice a Year		Never	
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Albania		6 (2.1)	515 (12.1)	11 (2.5)	513 (10.8)	83 (3.3)	490 (3.6)
Armenia		16 (2.8)	501 (7.3)	16 (3.2)	500 (6.3)	68 (3.5)	498 (3.3)
Australia		21 (2.6)	528 (8.0)	56 (4.0)	521 (4.2)	23 (3.0)	503 (7.2)
Austria		4 (1.4)	553 (16.3)	2 (0.8)	~ ~	94 (1.7)	539 (2.0)
Azerbaijan		28 (3.5)	513 (4.3)	6 (1.8)	509 (9.0)	66 (3.8)	518 (3.5)
Bahrain		10 (2.0)	500 (5.8)	28 (2.9)	484 (5.2)	63 (3.2)	476 (3.2)
Belgium (Flemish)		4 (1.2)	532 (9.3)	11 (2.6)	543 (4.9)	85 (2.9)	532 (2.2)
Bosnia and Herzegovina		5 (1.5)	464 (12.0)	4 (1.6)	480 (8.0)	91 (2.0)	450 (2.5)
Bulgaria		16 (3.0)	517 (9.2)	9 (2.5)	512 (12.0)	75 (3.3)	515 (5.7)
Canada		13 (1.5)	500 (7.5)	9 (1.1)	508 (7.2)	79 (1.9)	515 (2.3)
Chile		11 (2.7)	437 (8.5)	22 (3.5)	426 (7.0)	67 (4.0)	446 (3.5)
Chinese Taipei		13 (2.6)	599 (5.0)	11 (2.1)	589 (9.8)	75 (3.0)	601 (2.1)
Croatia		7 (1.9)	498 (9.7)	5 (1.4)	506 (6.3)	88 (2.4)	510 (2.4)
Cyprus		13 (2.6)	530 (7.2)	8 (1.8)	548 (8.8)	78 (3.0)	533 (2.9)
Czech Republic		17 (2.7)	529 (7.2)	26 (3.3)	542 (4.4)	57 (3.9)	529 (3.7)
Denmark	r	18 (3.2)	524 (5.8)	64 (4.4)	526 (2.7)	18 (3.4)	518 (6.2)
Finland		14 (2.2)	538 (5.5)	26 (3.1)	531 (4.4)	60 (3.3)	531 (2.5)
France		2 (0.9)	~ ~	4 (1.2)	483 (11.3)	94 (1.5)	486 (3.3)
Georgia		55 (3.7)	475 (5.5)	19 (2.8)	489 (5.9)	26 (3.5)	491 (7.4)
Germany		8 (2.2)	522 (11.1)	4 (1.4)	506 (11.4)	88 (2.5)	521 (2.4)
Hong Kong SAR		30 (4.5)	601 (6.1)	25 (3.6)	593 (5.9)	45 (4.9)	607 (6.4)
Hungary		3 (1.1)	530 (7.1)	20 (3.2)	517 (7.3)	78 (3.3)	526 (3.8)
Iran, Islamic Rep. of		14 (2.0)	446 (9.8)	10 (2.4)	447 (14.2)	76 (2.8)	442 (5.0)
Ireland		8 (2.5)	554 (6.6)	10 (2.8)	546 (12.9)	82 (3.5)	548 (2.5)
Italy		21 (3.1)	516 (4.6)	18 (3.2)	506 (6.3)	61 (3.6)	517 (3.0)
Japan		3 (1.1)	586 (14.8)	5 (1.9)	589 (7.5)	92 (2.2)	593 (1.9)
Kazakhstan		48 (4.1)	510 (4.2)	15 (2.7)	497 (6.9)	37 (3.9)	520 (5.7)
Korea, Rep. of		2 (0.9)	~ ~	6 (1.8)	592 (11.3)	93 (2.1)	600 (2.4)
Kosovo		19 (3.1)	444 (7.9)	12 (3.0)	437 (10.3)	69 (3.8)	445 (3.7)
Kuwait		25 (3.4)	379 (9.0)	13 (2.6)	385 (12.4)	62 (3.8)	385 (7.6)
Latvia		22 (3.2)	551 (6.0)	30 (3.7)	540 (5.5)	47 (3.5)	549 (3.5)
Lithuania		19 (2.8)	537 (8.3)	29 (3.3)	535 (5.5)	52 (3.7)	546 (4.3)
Malta		50 (0.4)	505 (1.9)	21 (0.3)	497 (2.7)	30 (0.4)	525 (2.5)
Montenegro		5 (0.6)	446 (9.2)	6 (1.1)	464 (4.9)	90 (1.2)	452 (2.1)
Morocco		3 (1.4)	419 (41.7)	1 (0.8)	~ ~	96 (1.6)	381 (4.4)
Netherlands	r	30 (4.8)	539 (3.4)	2 (1.3)	~ ~	68 (4.8)	535 (3.3)
New Zealand		14 (2.4)	496 (9.4)	45 (4.0)	494 (5.6)	41 (4.0)	478 (6.1)
North Macedonia		22 (3.4)	465 (9.6)	23 (3.6)	451 (13.0)	55 (4.3)	483 (6.9)
Northern Ireland		8 (2.4)	567 (8.0)	70 (3.9)	564 (3.7)	23 (3.6)	568 (6.3)
Norway (5)	r	8 (1.7)	534 (11.1)	74 (3.7)	546 (2.6)	18 (3.5)	540 (8.0)
Oman		8 (2.0)	447 (20.5)	17 (2.6)	444 (12.3)	74 (2.9)	425 (3.7)
Pakistan		24 (4.9)	306 (18.0)	5 (3.1)	277 (12.5)	71 (5.8)	340 (15.5)
Philippines		15 (2.8)	314 (13.8)	6 (2.0)	294 (21.1)	79 (2.9)	293 (7.9)
Poland		9 (2.0)	510 (8.7)	20 (3.0)	518 (6.6)	71 (3.6)	522 (3.1)
Portugal		6 (1.5)	539 (7.9)	3 (0.9)	527 (11.4)	91 (1.8)	525 (2.8)
Qatar		43 (4.2)	427 (5.1)	19 (3.2)	464 (10.7)	38 (3.5)	469 (6.7)
Russian Federation		35 (3.7)	569 (5.4)	25 (3.0)	561 (4.7)	40 (4.1)	569 (5.5)
Saudi Arabia		38 (3.3)	421 (7.1)	9 (2.1)	394 (15.4)	53 (3.5)	381 (6.6)
Serbia		6 (1.9)	515 (13.5)	5 (1.9)	508 (10.0)	89 (2.1)	507 (3.4)
Singapore		14 (1.5)	625 (8.7)	31 (2.5)	626 (6.5)	54 (2.4)	625 (5.5)
Slovak Republic		15 (2.0)	515 (9.6)	27 (2.8)	510 (5.7)	58 (2.9)	508 (4.2)
South Africa (5)		10 (1.9)	372 (14.3)	2 (0.8)	~ ~	88 (2.0)	373 (4.2)
Spain		12 (2.4)	498 (8.2)	10 (1.7)	512 (6.5)	78 (2.8)	501 (2.7)
Sweden		20 (3.5)	521 (5.5)	9 (2.3)	517 (7.2)	71 (4.2)	522 (4.0)
Turkey (5)		4 (1.7)	572 (11.9)	4 (1.7)	547 (14.9)	92 (2.1)	520 (4.8)
United Arab Emirates	r	45 (1.9)	499 (2.6)	35 (2.1)	474 (3.4)	20 (1.6)	456 (5.5)
United States		50 (2.7)	530 (3.5)	38 (2.8)	539 (3.9)	12 (1.6)	549 (9.0)
England	x	11 (3.9)	545 (5.5)	27 (5.2)	564 (11.5)	62 (5.6)	559 (6.1)
International Average		**17 (0.4)**	**502 (1.4)**	**18 (0.4)**	**504 (1.2)**	**64 (0.4)**	**501 (0.7)**
Benchmarking Participants							
Ontario, Canada	r	14 (2.9)	494 (10.4)	8 (1.6)	521 (11.9)	78 (3.3)	514 (4.2)
Quebec, Canada		10 (2.6)	533 (5.8)	5 (2.1)	527 (9.1)	85 (3.2)	533 (2.4)
Moscow City, Russian Fed.		49 (4.2)	594 (3.1)	29 (4.1)	594 (4.3)	22 (3.2)	589 (4.3)
Madrid, Spain		13 (3.1)	519 (5.9)	5 (2.6)	527 (7.4)	82 (3.9)	517 (2.6)
Abu Dhabi, UAE	r	38 (2.7)	461 (4.9)	40 (2.7)	429 (4.7)	23 (2.4)	436 (10.3)
Dubai, UAE	r	67 (1.6)	547 (2.8)	30 (1.7)	548 (3.1)	4 (0.9)	532 (12.6)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students.
An "x" indicates data are available for at least 40% but less than 50% of the students—interpret with caution.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 14.10: Students Take Science Tests on Computers or Tablets

Students' Results based on Teachers' Reports

Country		Once a Month or More		Once or Twice a Year		Never	
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Albania		3 (1.6)	503 (9.6)	12 (2.6)	512 (10.6)	85 (3.0)	486 (4.0)
Armenia		16 (2.9)	483 (8.6)	17 (3.0)	461 (7.0)	67 (3.8)	464 (4.3)
Australia		7 (2.3)	545 (12.5)	21 (3.0)	540 (6.9)	73 (3.8)	531 (3.1)
Austria		4 (1.3)	524 (13.3)	3 (0.8)	530 (11.7)	93 (1.6)	522 (2.8)
Azerbaijan		31 (3.0)	424 (5.4)	7 (2.0)	408 (15.7)	62 (3.6)	432 (4.4)
Bahrain		18 (2.0)	494 (8.2)	25 (2.5)	493 (7.2)	58 (2.7)	490 (4.4)
Belgium (Flemish)		11 (2.4)	501 (6.1)	12 (2.6)	512 (5.1)	77 (3.3)	500 (2.5)
Bosnia and Herzegovina		5 (1.2)	450 (12.4)	6 (1.7)	485 (6.8)	89 (2.1)	457 (3.1)
Bulgaria		27 (3.3)	535 (8.0)	11 (2.7)	513 (15.7)	62 (3.7)	516 (7.7)
Canada	r	11 (1.5)	520 (4.3)	10 (1.5)	536 (5.3)	79 (2.1)	524 (2.3)
Chile	r	13 (3.2)	469 (6.5)	19 (3.6)	462 (8.5)	69 (4.1)	469 (3.8)
Chinese Taipei		17 (2.8)	555 (3.6)	11 (2.4)	560 (7.0)	72 (3.6)	558 (2.2)
Croatia		14 (2.8)	518 (6.1)	5 (1.3)	520 (6.9)	81 (3.2)	525 (2.3)
Cyprus		10 (2.9)	520 (11.0)	13 (2.7)	494 (7.3)	77 (3.6)	514 (3.3)
Czech Republic		10 (2.2)	531 (7.6)	19 (2.6)	536 (5.8)	71 (3.1)	533 (2.9)
Denmark	r	11 (2.7)	521 (7.8)	25 (3.7)	518 (5.7)	64 (4.3)	523 (3.2)
Finland		21 (2.4)	550 (5.8)	35 (3.3)	560 (3.0)	45 (3.3)	553 (3.2)
France		1 (0.5)	~ ~	5 (2.1)	478 (14.9)	94 (2.1)	489 (3.2)
Georgia		56 (3.9)	453 (6.0)	21 (3.4)	451 (6.8)	23 (2.9)	463 (7.3)
Germany		6 (1.9)	518 (7.2)	9 (2.3)	530 (8.1)	86 (2.7)	517 (2.6)
Hong Kong SAR		31 (4.2)	529 (6.2)	26 (3.1)	527 (5.7)	43 (4.7)	538 (5.3)
Hungary		3 (1.3)	483 (27.1)	17 (2.8)	507 (6.1)	80 (2.9)	534 (3.3)
Iran, Islamic Rep. of		18 (2.7)	452 (8.1)	9 (2.3)	448 (14.6)	73 (3.4)	437 (5.3)
Ireland		2 (0.9)	~ ~	5 (1.6)	521 (19.1)	93 (1.8)	528 (2.8)
Italy		25 (3.0)	506 (5.3)	19 (3.2)	510 (4.8)	56 (3.5)	511 (3.9)
Japan		3 (1.5)	576 (13.8)	2 (1.2)	~ ~	94 (1.9)	561 (1.8)
Kazakhstan		58 (4.1)	490 (4.3)	10 (2.5)	488 (9.9)	32 (3.7)	501 (6.9)
Korea, Rep. of		9 (2.3)	584 (8.2)	9 (2.3)	585 (7.3)	82 (3.2)	588 (2.1)
Kosovo		16 (2.8)	411 (9.7)	13 (2.8)	407 (10.3)	71 (3.6)	413 (4.5)
Kuwait		34 (3.9)	385 (12.2)	17 (3.4)	414 (11.5)	49 (4.0)	387 (9.1)
Latvia		10 (2.4)	531 (8.6)	35 (3.4)	538 (5.6)	55 (3.2)	546 (2.8)
Lithuania		23 (2.6)	527 (7.1)	27 (3.6)	537 (5.9)	50 (3.4)	542 (4.1)
Malta		22 (0.3)	480 (2.8)	24 (0.4)	488 (2.3)	54 (0.4)	505 (1.8)
Montenegro		9 (1.6)	450 (8.4)	4 (0.2)	460 (12.7)	88 (1.6)	452 (2.7)
Morocco		2 (1.0)	~ ~	2 (1.3)	~ ~	96 (1.7)	373 (5.5)
Netherlands	r	16 (4.5)	516 (5.6)	4 (1.7)	483 (15.6)	80 (4.7)	520 (3.5)
New Zealand		2 (0.8)	~ ~	14 (2.5)	504 (7.7)	85 (2.6)	503 (2.8)
North Macedonia		28 (3.8)	422 (11.3)	20 (3.9)	410 (14.7)	52 (4.8)	435 (7.7)
Northern Ireland		0 (0.0)	~ ~	1 (0.8)	~ ~	99 (0.8)	519 (2.5)
Norway (5)	s	9 (2.9)	528 (12.7)	27 (3.7)	535 (5.5)	64 (4.4)	543 (3.3)
Oman		7 (1.8)	430 (12.5)	15 (2.3)	462 (17.3)	78 (2.8)	431 (4.3)
Pakistan	r	21 (8.1)	256 (29.3)	3 (1.9)	234 (28.7)	76 (8.2)	306 (17.2)
Philippines		20 (2.8)	244 (14.1)	8 (2.4)	217 (17.2)	71 (3.2)	253 (10.1)
Poland		5 (1.5)	556 (8.7)	20 (3.4)	524 (5.4)	76 (3.7)	532 (3.0)
Portugal		5 (1.4)	518 (7.4)	4 (1.1)	497 (8.0)	91 (1.8)	504 (2.7)
Qatar		45 (3.3)	428 (5.2)	11 (2.5)	443 (11.6)	44 (3.0)	474 (8.0)
Russian Federation		34 (3.3)	566 (4.6)	26 (3.5)	572 (5.0)	40 (4.4)	566 (4.9)
Saudi Arabia		37 (3.4)	418 (6.6)	9 (2.0)	394 (14.1)	54 (3.5)	394 (6.7)
Serbia		15 (2.5)	518 (8.2)	8 (2.4)	521 (7.3)	78 (3.2)	516 (3.8)
Singapore		9 (1.3)	573 (12.0)	27 (2.1)	597 (5.6)	64 (2.3)	596 (4.5)
Slovak Republic		17 (2.6)	514 (7.8)	24 (2.8)	530 (5.4)	60 (3.4)	519 (5.1)
South Africa (5)		8 (1.8)	345 (30.2)	0 (0.2)	~ ~	92 (1.8)	324 (5.6)
Spain		19 (3.0)	503 (7.8)	9 (1.8)	510 (6.0)	73 (3.2)	513 (2.5)
Sweden		19 (3.7)	535 (7.3)	19 (3.8)	535 (7.1)	63 (4.3)	542 (4.1)
Turkey (5)		6 (2.0)	498 (18.4)	4 (1.5)	538 (23.6)	90 (2.6)	528 (4.8)
United Arab Emirates	r	43 (2.1)	500 (3.8)	34 (1.8)	468 (4.5)	24 (2.3)	434 (5.0)
United States		22 (1.8)	540 (4.9)	18 (1.9)	546 (4.4)	61 (2.2)	536 (3.8)
England	y	- -	- -	- -	- -	- -	- -
International Average		**17 (0.4)**	**489 (1.5)**	**14 (0.3)**	**491 (1.5)**	**69 (0.4)**	**491 (0.7)**
Benchmarking Participants							
Ontario, Canada	r	8 (2.0)	520 (7.5)	9 (2.5)	537 (11.6)	83 (3.2)	527 (4.2)
Quebec, Canada	r	14 (2.9)	516 (6.2)	7 (2.0)	523 (8.1)	79 (3.5)	524 (2.8)
Moscow City, Russian Fed.		45 (4.0)	594 (3.6)	29 (3.6)	598 (3.0)	25 (3.7)	590 (3.7)
Madrid, Spain		14 (3.3)	532 (3.3)	7 (2.0)	530 (4.5)	78 (3.6)	520 (2.4)
Abu Dhabi, UAE	r	37 (2.5)	451 (7.1)	34 (2.5)	402 (9.2)	29 (2.4)	391 (7.8)
Dubai, UAE	r	60 (2.4)	553 (3.4)	32 (2.4)	547 (3.8)	7 (1.1)	518 (7.8)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit 14.11: Students Take Mathematics Tests on Computers or Tablets

Students' Results based on Teachers' Reports

Country		Once a Month or More		Once or Twice a Year		Never	
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia		25 (3.0)	515 (8.6)	32 (2.8)	518 (5.8)	43 (3.1)	522 (6.8)
Bahrain		19 (2.4)	489 (5.4)	27 (2.7)	478 (3.6)	53 (2.4)	481 (2.8)
Chile		11 (2.7)	434 (9.4)	29 (3.9)	434 (6.3)	60 (4.3)	444 (4.7)
Chinese Taipei		7 (1.6)	579 (10.2)	25 (3.3)	607 (6.1)	68 (3.6)	617 (3.3)
Cyprus	s	6 (2.3)	531 (11.1)	1 (0.6)	~ ~	94 (2.2)	503 (2.2)
Egypt		24 (3.7)	438 (10.1)	7 (2.2)	404 (20.3)	69 (3.6)	406 (6.0)
England	s	11 (3.9)	501 (17.7)	18 (3.9)	521 (11.0)	71 (5.4)	523 (10.4)
Finland		15 (2.2)	506 (6.1)	31 (3.0)	510 (4.4)	55 (3.2)	509 (3.3)
France	r	22 (3.8)	479 (4.8)	47 (4.3)	481 (4.3)	30 (4.4)	487 (6.3)
Georgia		29 (3.3)	479 (8.9)	27 (3.4)	449 (7.1)	44 (3.8)	460 (6.9)
Hong Kong SAR		11 (2.6)	551 (17.3)	24 (4.0)	576 (12.5)	65 (4.3)	582 (6.4)
Hungary		11 (2.1)	518 (12.2)	21 (3.1)	497 (10.3)	67 (3.4)	520 (4.6)
Iran, Islamic Rep. of		7 (2.1)	454 (21.2)	18 (2.9)	453 (13.4)	75 (3.2)	444 (4.0)
Ireland		7 (1.5)	511 (9.4)	9 (1.7)	531 (5.4)	84 (2.3)	525 (3.0)
Israel		15 (2.1)	479 (13.7)	14 (2.3)	523 (15.9)	70 (3.1)	527 (5.5)
Italy		23 (3.3)	486 (6.2)	28 (2.8)	496 (4.9)	49 (3.8)	504 (3.6)
Japan		2 (0.9)	~ ~	1 (0.8)	~ ~	97 (1.2)	595 (2.8)
Jordan		10 (2.5)	401 (17.9)	20 (3.6)	426 (11.9)	70 (4.0)	420 (4.8)
Kazakhstan		71 (3.9)	482 (4.5)	9 (2.2)	517 (12.9)	20 (3.4)	480 (9.5)
Korea, Rep. of		1 (0.7)	~ ~	5 (1.5)	605 (13.3)	94 (1.7)	607 (3.0)
Kuwait		25 (3.4)	405 (8.8)	27 (3.7)	407 (8.1)	47 (3.8)	399 (7.7)
Lebanon		11 (2.3)	431 (15.0)	13 (2.9)	425 (10.6)	76 (3.4)	429 (3.7)
Lithuania		23 (4.1)	525 (9.7)	43 (4.4)	517 (4.8)	35 (4.2)	524 (5.5)
Malaysia		24 (3.1)	466 (7.9)	39 (3.4)	453 (6.0)	38 (3.3)	465 (7.4)
Morocco		2 (1.0)	~ ~	2 (0.9)	~ ~	96 (1.2)	387 (2.7)
New Zealand		25 (3.8)	477 (6.2)	43 (4.3)	477 (6.9)	32 (3.8)	494 (6.0)
Norway (9)	s	15 (3.3)	517 (4.5)	66 (4.3)	504 (3.9)	19 (3.6)	500 (5.0)
Oman		9 (2.0)	409 (11.9)	10 (2.0)	439 (10.3)	82 (2.4)	408 (3.1)
Portugal		2 (1.1)	~ ~	4 (1.5)	501 (18.2)	95 (1.9)	500 (3.3)
Qatar		39 (4.6)	417 (7.2)	19 (3.7)	452 (13.3)	42 (4.4)	465 (9.5)
Romania		6 (1.9)	500 (25.9)	10 (2.5)	477 (17.0)	84 (3.3)	477 (4.7)
Russian Federation		25 (2.7)	551 (7.4)	28 (3.8)	557 (7.8)	47 (3.6)	531 (7.7)
Saudi Arabia		42 (3.9)	400 (4.0)	5 (1.7)	403 (13.8)	53 (3.9)	391 (3.5)
Singapore		11 (1.6)	595 (15.2)	36 (2.7)	617 (6.8)	53 (2.6)	620 (5.0)
South Africa (9)		8 (1.3)	409 (10.5)	2 (1.0)	~ ~	90 (1.7)	388 (2.5)
Sweden		13 (2.6)	493 (7.9)	13 (2.5)	502 (5.6)	74 (3.3)	506 (3.1)
Turkey		2 (0.9)	~ ~	4 (1.5)	521 (42.8)	95 (1.7)	496 (5.1)
United Arab Emirates	r	54 (1.8)	462 (3.4)	28 (1.9)	495 (5.6)	18 (1.8)	481 (5.1)
United States		49 (2.6)	502 (5.6)	34 (2.4)	529 (7.0)	17 (2.2)	533 (9.9)
International Average		**18 (0.4)**	**482 (2.0)**	**21 (0.5)**	**494 (2.1)**	**61 (0.5)**	**491 (0.9)**
Benchmarking Participants							
Ontario, Canada		15 (3.4)	528 (11.3)	19 (4.2)	545 (14.8)	66 (5.0)	530 (4.5)
Quebec, Canada		14 (3.0)	560 (7.1)	15 (3.6)	559 (11.7)	71 (4.3)	536 (5.3)
Moscow City, Russian Fed.		19 (3.2)	574 (9.2)	35 (4.1)	581 (6.3)	46 (4.1)	572 (6.7)
Gauteng, RSA (9)		14 (2.8)	427 (10.2)	2 (1.1)	~ ~	84 (2.9)	420 (3.6)
Western Cape, RSA (9)		3 (1.3)	503 (37.0)	4 (1.3)	458 (24.4)	93 (1.7)	438 (5.1)
Abu Dhabi, UAE	r	60 (2.6)	426 (5.5)	25 (2.4)	445 (7.9)	15 (1.8)	451 (8.3)
Dubai, UAE		56 (1.7)	525 (3.9)	34 (2.0)	553 (6.6)	10 (1.9)	554 (14.7)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit 14.12: Students Take Science Tests on Computers or Tablets

Students' Results based on Teachers' Reports

Country		Once a Month or More		Once or Twice a Year		Never	
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia	r	16 (2.8)	539 (11.5)	32 (3.0)	534 (6.5)	53 (3.3)	530 (5.0)
Bahrain		29 (2.6)	471 (4.6)	31 (2.6)	485 (4.8)	41 (2.5)	498 (4.7)
Chile		11 (2.5)	452 (8.3)	25 (3.0)	473 (5.9)	63 (3.3)	461 (3.8)
Chinese Taipei		10 (2.0)	555 (5.6)	10 (2.4)	571 (8.7)	80 (3.0)	577 (2.4)
Cyprus	s	3 (0.7)	483 (7.1)	8 (0.6)	502 (6.8)	89 (0.9)	485 (2.6)
Egypt		23 (3.8)	402 (12.7)	5 (2.1)	437 (17.0)	72 (4.1)	384 (6.0)
England	s	5 (2.6)	546 (22.5)	13 (3.5)	487 (13.8)	82 (4.3)	527 (7.4)
Finland		24 (1.9)	546 (5.1)	41 (1.9)	538 (3.4)	35 (2.1)	546 (4.1)
France	r	10 (1.8)	495 (6.5)	35 (3.1)	491 (4.2)	55 (3.1)	486 (3.7)
Georgia		34 (2.2)	446 (5.4)	30 (2.3)	444 (4.5)	37 (2.6)	449 (4.9)
Hong Kong SAR		14 (2.8)	486 (15.6)	25 (4.2)	510 (13.9)	61 (4.8)	506 (7.1)
Hungary		7 (1.1)	514 (9.0)	16 (1.8)	528 (7.2)	77 (2.0)	531 (3.1)
Iran, Islamic Rep. of		18 (2.5)	476 (12.2)	13 (2.3)	453 (10.5)	69 (3.4)	442 (3.7)
Ireland		10 (1.8)	520 (5.8)	12 (2.4)	516 (8.4)	78 (2.7)	530 (3.0)
Israel		17 (2.8)	500 (11.0)	35 (3.4)	521 (7.5)	48 (2.9)	513 (6.0)
Italy		16 (2.9)	493 (7.6)	18 (3.0)	489 (7.7)	66 (3.9)	506 (2.7)
Japan		4 (1.5)	568 (3.8)	4 (1.7)	564 (6.1)	92 (2.3)	570 (2.3)
Jordan		13 (2.4)	462 (12.8)	18 (2.9)	464 (8.7)	70 (3.7)	447 (6.1)
Kazakhstan		81 (2.4)	469 (3.8)	6 (1.3)	478 (6.3)	13 (2.2)	488 (8.1)
Korea, Rep. of		7 (1.6)	552 (7.8)	10 (1.9)	558 (6.6)	83 (2.3)	562 (2.2)
Kuwait		38 (3.8)	452 (7.4)	24 (4.1)	435 (10.1)	38 (3.7)	442 (9.4)
Lebanon		16 (2.1)	379 (10.1)	11 (2.0)	381 (18.8)	73 (2.5)	376 (5.3)
Lithuania		21 (1.8)	525 (4.3)	46 (2.6)	535 (3.6)	33 (2.5)	536 (3.5)
Malaysia		25 (2.8)	463 (7.6)	35 (3.4)	453 (8.5)	40 (3.8)	464 (7.2)
Morocco		1 (0.5)	~ ~	3 (1.1)	417 (13.1)	96 (1.2)	393 (2.9)
New Zealand		22 (3.1)	503 (7.1)	28 (3.4)	503 (7.5)	50 (4.0)	500 (7.0)
Norway (9)	s	8 (2.5)	499 (9.0)	59 (5.3)	498 (4.3)	33 (5.0)	496 (6.9)
Oman		7 (1.4)	447 (18.4)	7 (1.8)	463 (13.2)	87 (2.3)	458 (3.1)
Portugal		3 (1.1)	507 (13.2)	5 (1.3)	529 (9.1)	92 (1.8)	519 (2.8)
Qatar		46 (3.3)	461 (5.8)	12 (2.5)	461 (15.5)	41 (3.0)	493 (7.6)
Romania		6 (1.3)	469 (12.0)	24 (3.1)	481 (9.0)	70 (2.9)	468 (4.5)
Russian Federation		32 (1.9)	546 (4.9)	21 (2.3)	542 (5.9)	47 (2.7)	541 (5.2)
Saudi Arabia		41 (4.0)	439 (5.0)	7 (2.0)	419 (13.5)	52 (4.1)	428 (4.4)
Singapore		5 (1.1)	596 (21.4)	21 (2.2)	601 (8.7)	74 (2.4)	610 (4.7)
South Africa (9)		7 (1.7)	381 (19.1)	2 (0.7)	~ ~	90 (1.8)	370 (3.5)
Sweden		26 (3.5)	519 (6.5)	22 (2.5)	526 (6.1)	52 (3.9)	521 (5.6)
Turkey		5 (1.8)	555 (28.1)	6 (1.8)	531 (24.7)	90 (2.5)	512 (4.0)
United Arab Emirates	r	52 (1.7)	469 (3.9)	25 (1.7)	478 (6.0)	23 (1.5)	486 (5.5)
United States	r	52 (3.0)	524 (4.8)	18 (2.1)	551 (8.3)	30 (2.5)	516 (11.1)
International Average		**20 (0.4)**	**492 (1.8)**	**20 (0.4)**	**496 (1.6)**	**61 (0.5)**	**491 (0.9)**
Benchmarking Participants							
Ontario, Canada	s	23 (4.8)	514 (6.0)	18 (4.1)	504 (10.1)	59 (5.2)	530 (6.1)
Moscow City, Russian Fed.		27 (2.1)	563 (4.1)	22 (1.8)	571 (4.5)	51 (2.2)	566 (3.3)
Gauteng, RSA (9)		4 (1.6)	512 (23.7)	4 (2.0)	451 (57.9)	93 (2.5)	417 (4.7)
Western Cape, RSA (9)		7 (3.0)	430 (34.0)	7 (2.1)	511 (34.7)	86 (3.4)	435 (6.2)
Abu Dhabi, UAE	r	59 (2.3)	399 (5.9)	20 (1.8)	419 (9.9)	21 (1.8)	469 (8.8)
Dubai, UAE	r	55 (3.3)	558 (4.2)	29 (3.4)	541 (7.2)	16 (2.0)	555 (8.2)
Quebec, Canada	y	- -	- -	- -	- -	- -	- -

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.
A "y" indicates data are available for less than 40% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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APPENDIX A

Country Participation in TIMSS 2019 and in Earlier TIMSS Assessments

Appendix A.1: Country Participation in TIMSS 2019 and in Earlier TIMSS Assessments

Country	Grade 4						Grade 8						
	2019	2015	2011	2007	2003	1995	2019	2015	2011	2007	2003	1999	1995
Albania	●												
Armenia	●	●	●	○	●			●	●	○	●		
Australia	●	●	●	●	●	●	●	●	●	●	●	○	●
Austria	●		●	●		●							●
Azerbaijan	●		●										
Bahrain	●	●	●				●	●	●	●	●		
Belgium (Flemish)	●	●	●		●						●	●	●
Bosnia and Herzegovina	●									●			
Bulgaria	●	●								●	●	●	●
Canada	●	●				○		○				●	●
Chile	●	●	●				●	●	●		●	●	
Chinese Taipei	●	●	●	●	●		●	●	●	●	●	●	
Croatia	●	●	●										
Cyprus	●	●			●	●	●			●	●	●	●
Czech Republic	●	●	●	●		●				●		●	●
Denmark	●	●	●	●									●
Egypt							●	●		●	●		
England	●	●	●	●	●	●	●	●	●	●	●	●	●
Finland	●	●	●				●		●			○	
France	●	●					●						●
Georgia	●	●	●	●			●	●	●	●			
Germany	●	●	●	●									●
Hong Kong SAR	●	●	●	●	●	●	●	●	●	●	●	●	●
Hungary	●	●	●	●	●	●	●	●	●	●	●	●	●
Iran, Islamic Rep. of	●	●	●	●	●	●	●	●	●	●	●	●	●
Ireland	●	●	●			●	●	●					●
Israel						○	●	●	●	○	○	○	○
Italy	●	●	●	●	●	○	●	●	●	●	●	●	○
Japan	●	●	●	●	●	●	●	●	●	●	●	●	●
Jordan		●					●	●	●	●	●	●	
Kazakhstan	●	○	●	○			●	○	●				
Korea, Rep. of	●	●	●			●	●	●	●	●	●	●	●
Kosovo	●												
Kuwait	●	●	○	○		○	●	●		○			○
Latvia	●			○	●	○					●	○	○
Lebanon							●	●	●	●	●		
Lithuania	●	●	●	●	●		●	●	●	●	●	●	●
Malaysia							●	●	●	●	●	●	
Malta	●		●					●		●			
Montenegro	●												
Morocco	●	●	●	○	○		●	●	●	○	○	○	
Netherlands	●	●	●	●	●	●					●	●	●
New Zealand	●	●	●	●	●	●	●	●	●		●	●	●
North Macedonia	●								●		●	●	
Northern Ireland	●	●	●										
Norway	●	●	○	○	○	○	●	●	○	○	○		○
Oman	●	●	●				●	●	●	●			
Pakistan	●												
Philippines	●				●						●	●	○
Poland	●	●	○										
Portugal	●	●	●			●	●						●
Qatar	●	●	●	○			●	●	●	○			
Romania			●				●		●	●	●	●	●
Russian Federation	●	●	●	●	●		●	●	●	●	●	●	●
Saudi Arabia	●	●	●				●	●	●	○	○		
Serbia	●	●	●							●	●		
Singapore	●	●	●	●	●	●	●	●	●	●	●	●	●
Slovak Republic	●	●	●	●							●	●	●
South Africa	●	●					●	●	●		○	○	○
Spain	●	●	●										●
Sweden	●	●	●	●			●	●	●	●	●		●
Turkey	●	○	○				●	●	●	○		○	
United Arab Emirates	●	●	●				●	●	●				
United States	●	●	●	●	●	●	●	●	●	●	●	●	●

● Indicates participation in that testing cycle

○ Indicates participation but data not comparable for measuring trends to 2019, primarily due to countries improving translations or to differences in population coverage.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix A.1: Country Participation in TIMSS 2019 and in Earlier TIMSS Assessments

(Continued)

Country	Grade 4						Grade 8						
	2019	2015	2011	2007	2003	1995	2019	2015	2011	2007	2003	1999	1995
Benchmarking Participants													
Ontario, Canada	●	●	●	●	●	●	●	●	●	●	●	●	●
Quebec, Canada	●	●	●	●	●	●	●	●	●	●	●	●	●
Moscow City, Russian Fed.	●						●						
Gauteng, RSA							●						
Western Cape, RSA							●						
Madrid, Spain	●												
Abu Dhabi, UAE	●	●	●				●	●	●				
Dubai, UAE	●	●	●	●			●	●	●	●			

● Indicates participation in that testing cycle

○ Indicates participation but data not comparable for measuring trends to 2019, primarily due to countries improving translations or to differences in population coverage.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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IEA TIMSS 2019

APPENDIX B

Population Coverage and Sample Participation Rates

Appendix B.1: Information About the Students Assessed in TIMSS 2019

The TIMSS target populations are the grades that represent four years and eight years of schooling counting from the first year of ISCED Level 1. However, IEA has a policy that students do not fall under the minimum average age of 9.5 years old (Grade 4) or 13.5 years old (Grade 8) at the time of testing, so England, Malta, and New Zealand assessed students in their fifth or ninth year of formal schooling. Norway chose to assess students in the fifth and ninth years of schooling, so students would be compared with similar age students in Sweden, Denmark, and Finland.

Average age at the time of testing can vary across countries by just over a year (e.g., at the fourth grade from 9.7 to 10.9 years) depending on a country's policy on age of entry to school. For information on age of entry policy and practice, see Exhibit 2 of the *TIMSS 2019 Encyclopedia*.

Country	Grade 4		Grade 8	
	Country's Name for Fourth Year of Schooling *	Average Age at Time of Testing	Country's Name for Eighth Year of Schooling *	Average Age at Time of Testing
Albania	Grade 4	10.0		
Armenia	Grade 4	9.9		
Australia	Year 4	10.1	Year 8	14.1
Austria	Grade 4	10.4		
Azerbaijan	Grade 4	10.3		
Bahrain	Grade 4	9.8	Grade 8	13.8
Belgium (Flemish)	Grade 4	10.0		
Bosnia and Herzegovina	Grade 4	10.1		
Bulgaria	Grade 4	10.7		
Canada	Grade 4	9.9		
Chile	Grade 4	10.1	Grade 8	14.2
Chinese Taipei	Grade 4	10.2	Grade 8	14.3
Croatia	Grade 4	10.5		
Cyprus	Grade 4	9.8	Grade 8	13.8
Czech Republic	Grade 4	10.4		
Denmark	Grade 4	10.9		
Egypt			Grade 8	13.9
England	Year 5	10.2	Year 9	14.0
Finland	Grade 4	10.8	Grade 8	14.8
France	Third Cycle Year 1 (CM1)	9.9	Fourth Cycle Year 2 (4e)	13.9
Georgia	Grade 4	10.1	Grade 8	13.8
Germany	Grade 4	10.4		
Hong Kong SAR	Primary 4	10.1	Secondary 2	14.1
Hungary	Grade 4	10.5	Grade 8	14.6
Iran, Islamic Rep. of	Grade 4	10.2	Grade 8	14.1
Ireland	Fourth Class	10.4	Second Year	14.4
Israel			Grade 8	14.0
Italy	Primary Grade 4	9.6	Lower Secondary Grade 3	13.7
Japan	Grade 4	10.4	Grade 8	14.4
Jordan			Grade 8	13.9
Kazakhstan	Grade 4	10.4	Grade 8	14.3
Korea, Rep. of	Elementary School Grade 4	10.5	Middle School Grade 2	14.5
Kosovo	Grade 4	9.9		
Kuwait	Grade 4	9.7	Grade 8	13.8
Latvia	Grade 4	10.8		
Lebanon			Grade 8	14.0
Lithuania	Grade 4	10.7	Grade 8	14.7
Malaysia			Grade 8	14.3
Malta	Year 5	9.8		
Montenegro	Grade 4	9.8		
Morocco	Grade 4	10.1	Secondary School Year 2	14.5
Netherlands	Group 6	10.1		
New Zealand	Year 5	10.0	Year 9	13.9
North Macedonia	Grade 4	9.8		
Northern Ireland	Year 6	10.4		
Norway	Grade 5	10.7	Grade 9	14.7
Oman	Grade 4	9.7	Grade 8	13.9
Pakistan	Grade 4	10.6		
Philippines	Grade 4	10.1		
Poland	Grade 4	10.3		
Portugal	Grade 4	10.0	Grade 8	14.0
Qatar	Grade 4	9.9	Grade 8	14.0
Romania			Grade 8	14.8
Russian Federation	Grade 4	10.8	Grade 8	14.8
Saudi Arabia	Grade 4	9.9	Grade 8	13.9
Serbia	Grade 4	10.6		
Singapore	Primary 4	10.4	Secondary 2	14.3
Slovak Republic	Grade 4	10.4		
South Africa	Grade 5	11.5	Grade 9	15.5

* Countries' names for the fourth year and eighth year of formal schooling were reported by National Research Coordinators.
An empty cell indicates country did not participate at that grade.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix B.1: Information About the Students Assessed in TIMSS 2019

(Continued)

Country	Grade 4		Grade 8	
	Country's Name for Fourth Year of Schooling *	Average Age at Time of Testing	Country's Name for Eighth Year of Schooling *	Average Age at Time of Testing
Spain	Grade 4	9.9		
Sweden	Grade 4	10.8	Grade 8	14.8
Turkey	Grade 5	10.6	Grade 8	13.9
United Arab Emirates	Grade 4	9.7	Grade 8	13.7
United States	Grade 4	10.2	Grade 8	14.2
Benchmarking Participants				
Ontario, Canada	Grade 4	9.8	Grade 8	13.8
Quebec, Canada	Grade 4	10.1	Secondary 2	14.2
Moscow City, Russian Fed.	Grade 4	10.8	Grade 8	14.8
Madrid, Spain	Grade 4	9.9		
Gauteng, RSA			Grade 9	15.3
Western Cape, RSA			Grade 9	15.5
Abu Dhabi, UAE	Grade 4	9.7	Grade 8	13.7
Dubai, UAE	Grade 4 or Year 5	9.9	Grade 8 or Year 9	13.9

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix B.2: Coverage of TIMSS 2019 Target Population

Country	International Target Population		Exclusions from National Target Population		
	Coverage	Notes on Coverage	School-Level Exclusions	Within-Sample Exclusions	Overall Exclusions
Albania	100%		2.6%	1.6%	4.2%
Armenia	100%		0.9%	0.4%	1.2%
Australia	100%		1.9%	2.9%	4.8%
Austria	100%		0.9%	4.5%	5.4%
Azerbaijan	100%		2.3%	0.3%	2.6%
Bahrain	100%		0.4%	0.4%	0.8%
Belgium (Flemish)	100%		0.8%	2.2%	3.0%
Bosnia and Herzegovina	100%		0.6%	1.4%	2.0%
Bulgaria	100%		0.8%	2.6%	3.4%
1 2 Canada	79%	Students from the provinces of Alberta, Manitoba, Newfoundland, Ontario, and Quebec	3.1%	3.9%	7.0%
Chile	100%		1.2%	2.6%	3.8%
Chinese Taipei	100%		0.3%	1.6%	2.0%
Croatia	100%		1.1%	3.1%	4.2%
Cyprus	100%		1.1%	3.4%	4.6%
Czech Republic	100%		2.5%	2.2%	4.7%
Denmark	100%		1.6%	1.5%	3.1%
2 England	100%		2.2%	3.6%	5.8%
Finland	100%		1.8%	1.5%	3.3%
France	100%		2.5%	1.9%	4.4%
1 Georgia	92%	Students taught in Georgian	2.8%	1.8%	4.7%
Germany	100%		1.7%	2.2%	3.9%
Hong Kong SAR	100%		1.1%	2.4%	3.5%
Hungary	100%		2.1%	2.0%	4.1%
Iran, Islamic Rep. of	100%		3.0%	1.2%	4.2%
Ireland	100%		1.9%	1.1%	3.0%
Italy	100%		0.9%	4.1%	4.9%
Japan	100%		0.6%	1.5%	2.2%
2 Kazakhstan	100%		2.7%	3.0%	5.8%
Korea, Rep. of	100%		0.9%	1.5%	2.3%
2 Kosovo	100%		5.3%	3.3%	8.6%
Kuwait	100%		1.0%	0.7%	1.7%
2 Latvia	100%		3.9%	3.0%	6.9%
2 Lithuania	100%		2.6%	4.1%	6.7%
Malta	100%		1.4%	3.1%	4.5%
Montenegro	100%		1.3%	3.3%	4.6%
Morocco	100%		1.8%	0.0%	1.8%
Netherlands	100%		2.6%	0.9%	3.5%
2 New Zealand	100%		2.6%	4.2%	6.9%
North Macedonia	100%		1.2%	2.5%	3.8%
Northern Ireland	100%		2.2%	0.6%	2.8%
Norway (5)	100%		1.4%	3.3%	4.7%
Oman	100%		1.4%	0.8%	2.2%
2 Pakistan	100%		7.5%	0.0%	7.5%
2 Philippines	100%		6.1%	1.6%	7.7%
Poland	100%		1.1%	2.0%	3.1%
2 Portugal	100%		0.9%	6.9%	7.8%
Qatar	100%		1.2%	1.0%	2.2%
2 Russian Federation	100%		2.4%	3.9%	6.3%
2 Saudi Arabia	100%		10.1%	0.4%	10.5%
2 Serbia	100%		4.0%	4.2%	8.2%
3 Singapore	100%		12.5%	0.4%	12.8%
2 Slovak Republic	100%		3.6%	1.9%	5.5%
South Africa (5)	100%		1.1%	0.0%	1.1%
Spain	100%		1.6%	3.8%	5.4%
Sweden	100%		1.6%	3.8%	5.4%
2 Turkey (5)	100%		1.0%	5.9%	7.0%
United Arab Emirates	100%		1.1%	2.0%	3.2%
2 United States	100%		0.0%	7.2%	7.2%
Benchmarking Participants					
2 Ontario, Canada	100%		2.3%	4.7%	7.0%
Quebec, Canada	100%		3.3%	1.2%	4.4%
Moscow City, Russian Fed.	100%		0.7%	1.4%	2.1%
Madrid, Spain	100%		0.5%	3.1%	3.6%
Abu Dhabi, UAE	100%		1.1%	2.5%	3.6%
2 Dubai, UAE	100%		2.6%	3.0%	5.6%

1 National Target Population does not include all of the International Target Population.
2 National Defined Population covers 90% to 95% of National Target Population.
3 National Defined Population covers less than 90% of National Target Population (but at least 77%).

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix B.3: School Sample Sizes

Country	Number of Schools in Original Sample	Number of Eligible Schools in Original Sample	Number of Schools in Original Sample that Participated	Number of Replacement Schools that Participated	Total Number of Schools that Participated
Albania	180	169	167	0	167
Armenia	150	150	150	0	150
Australia	290	288	285	2	287
Austria	197	194	193	0	193
Azerbaijan	200	199	186	8	194
Bahrain	185	185	185	0	185
Belgium (Flemish)	160	156	101	46	147
Bosnia and Herzegovina	178	178	178	0	178
Bulgaria	151	151	146	5	151
Canada	788	777	669	35	704
Chile	174	172	151	18	169
Chinese Taipei	163	163	155	7	162
Croatia	159	158	150	3	153
Cyprus	152	151	150	1	151
Czech Republic	156	152	151	1	152
Denmark	175	174	123	43	166
England	150	150	129	10	139
Finland	159	158	157	1	158
France	156	155	155	0	155
Georgia	158	157	151	3	154
Germany	206	203	198	5	203
Hong Kong SAR	159	159	109	30	139
Hungary	151	150	139	10	149
Iran, Islamic Rep. of	224	224	224	0	224
Ireland	151	150	150	0	150
Italy	162	162	153	9	162
Japan	150	150	126	21	147
Kazakhstan	169	168	168	0	168
Korea, Rep. of	152	152	151	0	151
Kosovo	150	145	145	0	145
Kuwait	170	167	163	1	164
Latvia	156	156	142	12	154
Lithuania	208	207	207	0	207
Malta	99	98	98	0	98
Montenegro	140	140	140	0	140
Morocco	265	264	264	0	264
Netherlands	151	149	71	41	112
New Zealand	164	161	138	22	160
North Macedonia	150	150	146	4	150
Northern Ireland	156	156	95	39	134
Norway (5)	167	167	119	31	150
Oman	228	228	226	2	228
Pakistan	150	142	121	18	139
Philippines	184	180	180	0	180
Poland	150	149	143	6	149
Portugal	182	181	158	23	181
Qatar	242	242	242	0	242
Russian Federation	202	202	200	0	200
Saudi Arabia	222	221	215	5	220
Serbia	170	165	159	6	165
Singapore	187	187	187	0	187
Slovak Republic	159	158	153	4	157
South Africa (5)	300	298	286	11	297
Spain	502	502	494	7	501
Sweden	150	145	144	1	145
Turkey (5)	181	180	179	1	180
United Arab Emirates	697	688	688	0	688
United States	329	325	249	38	287
Benchmarking Participants					
Ontario, Canada	171	170	160	3	163
Quebec, Canada	172	172	140	8	148
Moscow City, Russian Fed.	152	151	148	2	150
Madrid, Spain	167	167	167	0	167
Abu Dhabi, UAE	249	247	247	0	247
Dubai, UAE	205	199	199	0	199

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix B.4: Student Sample Sizes

Country	Within-School Student Participation (Weighted Percentage)	Number of Students Sampled in Participating Schools	Number of Students Withdrawn from Class/School	Number of Students Excluded	Number of Students Eligible	Number of Students Absent	Number of Students Assessed
Albania	99%	4,548	31	25	4,492	66	4,426
Armenia	97%	5,612	32	0	5,580	181	5,399
Australia	94%	6,517	110	128	6,279	389	5,890
Austria	97%	4,901	33	256	4,612	148	4,464
Azerbaijan	95%	5,600	17	19	5,564	319	5,245
Bahrain	98%	5,903	25	22	5,856	94	5,762
Belgium (Flemish)	93%	5,113	26	114	4,973	318	4,655
Bosnia and Herzegovina	96%	6,048	61	74	5,913	285	5,628
Bulgaria	95%	4,632	70	88	4,474	206	4,268
Canada	95%	15,164	199	429	14,536	883	13,653
Chile	96%	4,578	77	112	4,389	215	4,174
Chinese Taipei	99%	3,958	65	65	3,828	63	3,765
Croatia	91%	4,395	8	148	4,239	454	3,785
Cyprus	97%	4,353	14	150	4,189	127	4,062
Czech Republic	96%	5,054	48	53	4,953	261	4,692
Denmark	87%	3,881	67	48	3,766	539	3,227
England	96%	3,759	78	127	3,554	158	3,396
Finland	97%	4,987	37	45	4,905	175	4,730
France	98%	4,456	35	104	4,317	131	4,186
Georgia	97%	4,019	28	83	3,908	121	3,787
Germany	97%	3,706	51	89	3,566	129	3,437
Hong Kong SAR	90%	3,461	18	101	3,342	374	2,968
Hungary	97%	4,867	34	89	4,744	173	4,571
Iran, Islamic Rep. of	99%	6,194	46	76	6,072	62	6,010
Ireland	91%	5,126	22	52	5,052	470	4,582
Italy	97%	4,109	22	199	3,888	147	3,741
Japan	97%	4,358	15	34	4,309	113	4,196
Kazakhstan	99%	4,932	37	38	4,857	66	4,791
Korea, Rep. of	98%	4,105	50	63	3,992	99	3,893
Kosovo	97%	4,757	43	95	4,619	123	4,496
Kuwait	96%	4,731	83	14	4,634	197	4,437
Latvia	94%	4,886	15	68	4,803	322	4,481
Lithuania	94%	4,198	12	186	4,000	259	3,741
Malta	96%	3,914	17	115	3,782	152	3,630
Montenegro	98%	5,248	49	37	5,162	86	5,076
Morocco	99%	8,051	217	0	7,834	111	7,723
Netherlands	97%	3,562	69	27	3,466	111	3,355
New Zealand	94%	5,611	100	164	5,347	328	5,019
North Macedonia	95%	3,531	32	44	3,455	185	3,270
Northern Ireland	91%	3,877	21	23	3,833	336	3,497
Norway (5)	94%	4,410	27	149	4,234	283	3,951
Oman	98%	7,079	94	57	6,928	114	6,814
Pakistan	98%	4,453	315	0	4,138	158	3,980
Philippines	98%	5,693	89	0	5,604	89	5,515
Poland	93%	5,427	44	100	5,283	401	4,882
Portugal	94%	5,015	35	366	4,614	314	4,300
Qatar	97%	5,251	127	60	5,064	131	4,933
Russian Federation	98%	4,282	8	144	4,130	108	4,022
Saudi Arabia	99%	5,585	23	25	5,537	84	5,453
Serbia	97%	4,667	53	93	4,521	141	4,380
Singapore	97%	6,209	22	0	6,187	201	5,986
Slovak Republic	97%	4,477	26	24	4,427	180	4,247
South Africa (5)	98%	12,289	107	0	12,182	291	11,891
Spain	95%	10,497	48	421	10,028	473	9,555
Sweden	95%	4,407	31	160	4,216	251	3,965
Turkey (5)	99%	4,554	142	319	4,093	65	4,028
United Arab Emirates	96%	28,029	414	564	27,051	1,217	25,834
United States	96%	9,955	152	601	9,202	426	8,776
Benchmarking Participants							
Ontario, Canada	95%	4,251	83	95	4,073	243	3,830
Quebec, Canada	96%	4,047	9	37	4,001	164	3,837
Moscow City, Russian Fed.	98%	3,992	11	35	3,946	103	3,843
Madrid, Spain	96%	3,666	17	123	3,526	136	3,390
Abu Dhabi, UAE	95%	9,822	38	239	9,545	508	9,037
Dubai, UAE	97%	8,125	362	213	7,550	285	7,265

Students attending a sampled class at the time the sample was chosen but leaving the class before the assessment was administered were classified as "withdrawn."
Students with a disability or language barrier that prevented them from participating in the assessment were classified as "excluded."
Students not present when the assessment was administered, and not subsequently assessed in a make-up session, were classified as "absent."

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix B.5: Participation Rates (Weighted)

Country	School Participation		Class Participation	Student Participation	Overall Participation	
	Before Replacement	After Replacement			Before Replacement	After Replacement
Albania	99%	99%	100%	99%	98%	98%
Armenia	100%	100%	100%	97%	97%	97%
Australia	99%	100%	100%	94%	93%	94%
Austria	99%	99%	100%	97%	97%	97%
Azerbaijan	94%	98%	100%	95%	89%	92%
Bahrain	100%	100%	100%	98%	98%	98%
† Belgium (Flemish)	66%	95%	100%	93%	62%	89%
Bosnia and Herzegovina	100%	100%	99%	96%	95%	95%
Bulgaria	97%	100%	100%	95%	92%	95%
Canada	86%	90%	100%	95%	82%	86%
Chile	89%	99%	100%	96%	86%	95%
Chinese Taipei	95%	99%	100%	99%	94%	98%
Croatia	95%	97%	99%	91%	85%	87%
Cyprus	99%	100%	100%	97%	96%	97%
Czech Republic	99%	100%	100%	96%	95%	96%
† Denmark	70%	95%	99%	87%	61%	83%
England	86%	93%	100%	96%	82%	89%
Finland	99%	100%	100%	97%	96%	97%
France	100%	100%	100%	98%	98%	98%
Georgia	97%	99%	100%	97%	94%	96%
Germany	97%	100%	100%	97%	94%	97%
† Hong Kong SAR	67%	88%	100%	90%	60%	79%
Hungary	93%	99%	100%	97%	90%	96%
Iran, Islamic Rep. of	100%	100%	100%	99%	99%	99%
Ireland	100%	100%	100%	91%	91%	91%
Italy	96%	100%	100%	97%	92%	97%
Japan	84%	98%	100%	97%	82%	95%
Kazakhstan	100%	100%	100%	99%	99%	99%
Korea, Rep. of	99%	99%	100%	98%	97%	97%
Kosovo	100%	100%	100%	97%	97%	97%
Kuwait	97%	98%	100%	96%	93%	94%
Latvia	92%	99%	100%	94%	87%	93%
Lithuania	100%	100%	100%	94%	94%	94%
Malta	100%	100%	100%	96%	96%	96%
Montenegro	100%	100%	100%	98%	98%	98%
Morocco	100%	100%	100%	99%	99%	99%
≡ Netherlands	46%	75%	100%	97%	45%	73%
New Zealand	87%	99%	100%	94%	81%	93%
North Macedonia	98%	100%	100%	95%	94%	95%
† Northern Ireland	60%	86%	100%	91%	55%	78%
† Norway (5)	70%	90%	100%	94%	66%	84%
Oman	99%	100%	100%	98%	98%	98%
Pakistan	77%	99%	100%	98%	75%	96%
Philippines	100%	100%	100%	98%	98%	98%
Poland	96%	100%	100%	93%	89%	93%
Portugal	87%	100%	99%	94%	81%	94%
Qatar	100%	100%	100%	97%	97%	97%
Russian Federation	99%	99%	100%	98%	97%	97%
Saudi Arabia	98%	99%	100%	99%	97%	98%
Serbia	97%	100%	100%	97%	95%	97%
Singapore	100%	100%	100%	97%	97%	97%
Slovak Republic	97%	99%	100%	97%	93%	96%
South Africa (5)	96%	99%	100%	98%	94%	97%
Spain	97%	99%	100%	95%	92%	95%
Sweden	100%	100%	100%	95%	95%	95%
Turkey (5)	99%	100%	100%	99%	98%	99%
United Arab Emirates	100%	100%	100%	96%	96%	96%
† United States	76%	88%	100%	96%	73%	84%
Benchmarking Participants						
Ontario, Canada	93%	95%	100%	95%	88%	90%
Quebec, Canada	82%	86%	100%	96%	79%	83%
Moscow City, Russian Fed.	99%	100%	100%	98%	97%	97%
Madrid, Spain	100%	100%	100%	96%	96%	96%
Abu Dhabi, UAE	100%	100%	100%	95%	95%	95%
Dubai, UAE	100%	100%	100%	97%	97%	97%

TIMSS guidelines for sampling participation: The minimum acceptable participation rates were 85 percent of both schools and students, or a combined rate (the product of school and student participation) of 75 percent.
Participants not meeting these guidelines were annotated as follows:
† Met guidelines for sample participation rates only after replacement schools were included
‡ Nearly satisfied guidelines for sample participation rates after replacement schools were included
≡ Did not satisfy guidelines for sample participation rates

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix B.6: Trends in Student Populations

Country	Years of Formal Schooling*	Average Age at Time of Testing	Overall Exclusion Rates	Overall Participation Rates (After Replacement)
Armenia				
2019	4	9.9	1.2%	97%
⧖ 2015	4	9.9	1.0%	96%
2011	4	10.0	2.0%	98%
2003	4	10.9	2.9%	90%
Australia				
2019	4	10.1	4.8%	94%
2015	4	10.0	4.2%	94%
2011	4	10.0	4.4%	93%
2007	4	9.9	4.0%	95%
† 2003	4	9.9	2.7%	85%
≡ 1995	4 or 5	10.2	1.8%	66%
Austria				
2019	4	10.4	5.4%	97%
2011	4	10.3	5.1%	98%
2007	4	10.3	5.0%	97%
≡ 1995	4	10.5	2.8%	69%
Azerbaijan				
2019	4	10.3	2.6%	92%
2 2011	4	10.2	7.2%	100%
Bahrain				
2019	4	9.8	0.8%	98%
2 2015	4	9.9	5.6%	99%
⧖ 2011	4	10.4	1.1%	90%
Belgium (Flemish)				
† 2019	4	10.0	3.0%	89%
† 2015	4	10.1	1.4%	95%
2011	4	10.0	5.0%	92%
2 2003	4	10.0	6.3%	97%
Bulgaria				
2019	4	10.7	3.4%	95%
2015	4	10.8	2.9%	93%
Canada				
1 2 2019	4	9.9	7.0%	86%
1 2 † 2015	4	9.9	6.1%	80%
Chile				
2019	4	10.1	3.8%	95%
2015	4	10.2	3.7%	88%
2011	4	10.1	3.7%	95%
Chinese Taipei				
2019	4	10.2	2.0%	98%
2015	4	10.2	2.4%	99%
2011	4	10.2	1.4%	99%
2007	4	10.2	2.8%	100%
2003	4	10.2	3.1%	99%
Croatia				
2019	4	10.5	4.2%	87%
2015	4	10.6	4.4%	94%
2 2011	4	10.7	7.9%	95%
Cyprus				
2019	4	9.8	4.6%	97%
2015	4	9.8	4.6%	98%
2003	4	9.9	2.9%	97%
1995	4	9.8	3.2%	83%
Czech Republic				
2019	4	10.4	4.7%	96%
2015	4	10.4	4.2%	95%
2011	4	10.4	5.1%	94%
2007	4	10.3	4.9%	92%
1995	4	10.4	4.1%	86%
Denmark				
† 2019	4	10.9	3.1%	83%
2 † 2015	4	10.9	7.5%	86%
2 2011	4	11.0	6.3%	87%
2 2007	4	11.0	4.1%	85%

* Represents years of schooling counting from the first year of ISCED Level 1.
Data are included only for assessment years with comparable results for each country.
See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
⧖ Tested the same cohort of students as other countries, but later in the assessment year.
Armenia began testing younger students in 2011 due to educational reforms.
Bahrain in 2015 administered both TIMSS and TIMSS Numeracy assessments to fourth grade students. Results for 2015 in mathematics are based on the average of both.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix B.6: Trends in Student Populations

(Continued)

Country	Years of Formal Schooling*	Average Age at Time of Testing	Overall Exclusion Rates	Overall Participation Rates (After Replacement)
England				
[2] 2019	5	10.2	5.8%	89%
2015	5	10.1	2.3%	96%
2011	5	10.2	2.0%	78%
2007	5	10.2	2.1%	84%
† 2003	5	10.3	1.9%	76%
[3] † 1995	5	10.0	12.1%	83%
Finland				
2019	4	10.8	3.3%	97%
2015	4	10.8	2.0%	97%
2011	4	10.8	3.1%	96%
France				
2019	4	9.9	4.4%	98%
2015	4	9.9	5.3%	97%
Georgia				
[1] 2019	4	10.1	4.7%	96%
[1] 2015	4	9.7	4.9%	98%
[1] 2011	4	10.0	4.9%	96%
[1] 2007	4	10.1	4.8%	98%
Germany				
2019	4	10.4	3.9%	97%
2015	4	10.4	2.7%	95%
2011	4	10.4	1.9%	95%
2007	4	10.4	1.3%	96%
Hong Kong SAR				
† 2019	4	10.1	3.5%	79%
† 2015	4	10.1	2.2%	76%
[2] 2011	4	10.1	8.5%	82%
2007	4	10.2	5.4%	81%
† 2003	4	10.2	3.8%	83%
1995	4	10.1	2.7%	83%
Hungary				
2019	4	10.5	4.1%	96%
2015	4	10.7	4.8%	96%
2011	4	10.7	4.2%	96%
2007	4	10.7	4.4%	96%
[2] 2003	4	10.5	8.1%	93%
1995	4	10.4	3.8%	92%
Iran, Islamic Rep. of				
2019	4	10.2	4.2%	99%
2015	4	10.2	4.0%	99%
2011	4	10.2	4.5%	99%
2007	4	10.2	3.0%	99%
[2] 2003	4	10.4	5.7%	98%
1995	4	10.5	1.3%	97%
Ireland				
2019	4	10.4	3.0%	91%
2015	4	10.4	2.7%	96%
2011	4	10.3	2.5%	95%
[2] 1995	4	10.3	6.9%	90%
Italy				
2019	4	9.6	4.9%	97%
[2] 2015	4	9.7	6.2%	94%
2011	4	9.7	3.7%	95%
2007	4	9.8	5.3%	97%
2003	4	9.8	4.2%	97%
Japan				
2019	4	10.4	2.2%	95%
2015	4	10.5	2.9%	97%
2011	4	10.5	3.2%	96%
2007	4	10.5	1.1%	95%
2003	4	10.4	0.8%	97%
1995	4	10.4	3.0%	92%

* Represents years of schooling counting from the first year of ISCED Level 1.
Data are included only for assessment years with comparable results for each country.
See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
Georgia in 2011 excluded schools in South Ossetia and Abkhazia due to lack of access and absence of official statistics. Abkhazia refugee schools in other territories of Georgia were included in the sample frame.
Iran in 2015 administered both TIMSS and TIMSS Numeracy assessments to fourth grade students. Results for 2015 in mathematics are based on the average of both.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Appendix B.6: Trends in Student Populations

(Continued)

Country	Years of Formal Schooling*	Average Age at Time of Testing	Overall Exclusion Rates	Overall Participation Rates (After Replacement)
Kazakhstan				
2 2019	4	10.4	5.8%	99%
2 2011	4	10.4	6.3%	99%
Korea, Rep. of				
2019	4	10.5	2.3%	97%
2015	4	10.5	2.5%	97%
2011	4	10.4	2.5%	98%
2 1995	4	10.3	6.6%	95%
Kuwait				
2019	4	9.7	1.7%	94%
2015	4	9.7	3.0%	90%
Latvia				
2 2019	4	10.8	6.9%	93%
2003	4	11.1	4.4%	88%
Lithuania				
2 2019	4	10.7	6.7%	94%
2 2015	4	10.7	6.1%	94%
1 2 2011	4	10.7	5.6%	94%
1 2007	4	10.8	5.4%	94%
1 2003	4	10.9	4.6%	87%
Malta				
2019	4	9.8	4.5%	96%
2011	5	9.8	3.6%	95%
Morocco				
2019	4	10.1	1.8%	99%
2015	4	10.3	1.5%	99%
2011	4	10.5	2.0%	96%
Netherlands				
≡ 2019	4	10.1	3.5%	73%
† 2015	4	10.0	3.2%	83%
† 2011	4	10.2	4.0%	79%
‡ 2007	4	10.2	4.8%	91%
† 2003	4	10.2	5.2%	84%
≡ 1995	4	10.3	4.4%	59%
New Zealand				
2 2019	4.5 - 5.5	10.0	6.9%	93%
2015	4.5 - 5.5	10.0	4.8%	90%
2011	4.5 - 5.5	9.9	4.9%	90%
2007	4.5 - 5.5	10.0	5.4%	96%
2003	4.5 - 5.5	10.0	4.0%	93%
1995	4.5 - 5.5	10.0	1.3%	95%
Northern Ireland				
† 2019	4	10.4	2.8%	78%
‡ 2015	4	10.4	2.7%	71%
† 2011	4	10.4	3.5%	79%
Norway (5)				
† 2019	5	10.7	4.7%	84%
2015	5	10.7	4.7%	89%
Norway (4)				
2015	4	9.7	5.0%	89%
‡ 2011	4	9.7	4.3%	70%
2007	4	9.8	5.1%	92%
2003	3	9.8	4.4%	88%
1995	3	9.9	3.0%	91%
Oman				
2019	4	9.7	2.2%	98%
2015	4	9.6	0.8%	97%
2011	4	9.9	1.5%	96%
Philippines				
2 2019	4	10.1	7.7%	98%
2003	4	10.8	4.5%	81%

* Represents years of schooling counting from the first year of ISCED Level 1.
Data are included only for assessment years with comparable results for each country.
See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
Results for Lithuania before 2015 do not include students taught in Polish or Russian.
Morocco and the Philippines in 2019 administered the less difficult fourth grade mathematics assessment.
Kuwait and Morocco in 2015 administered both TIMSS and TIMSS Numeracy assessments to fourth grade students. Results for 2015 in mathematics are based on the average of both.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Appendix B.6: Trends in Student Populations

(Continued)

Country	Years of Formal Schooling*	Average Age at Time of Testing	Overall Exclusion Rates	Overall Participation Rates (After Replacement)
Poland				
2019	4	10.3	3.1%	93%
2015	4	10.7	4.0%	92%
Portugal				
2 2019	4	10.0	7.8%	94%
2 2015	4	9.9	6.5%	92%
2011	4	10.0	2.5%	92%
2 1995	4	10.4	7.3%	92%
Qatar				
2019	4	9.9	2.2%	97%
2015	4	10.1	3.8%	99%
2 2011	4	10.0	6.2%	99%
Russian Federation				
2 2019	4	10.8	6.3%	97%
2015	4	10.8	4.0%	98%
2011	4	10.8	5.3%	98%
2007	4	10.8	3.6%	98%
2 2003	3 or 4	10.6	6.8%	97%
Saudi Arabia				
2 2019	4	9.9	10.5%	98%
2015	4	10.0	1.9%	93%
2011	4	10.0	1.6%	99%
Serbia				
2 2019	4	10.6	8.2%	97%
3 2015	4	10.7	11.3%	96%
2 2011	4	10.8	9.4%	97%
Singapore				
3 2019	4	10.4	12.8%	97%
2 2015	4	10.4	10.1%	96%
2 2011	4	10.4	6.3%	96%
2007	4	10.4	1.5%	96%
2003	4	10.3	0.0%	98%
1995	4	10.3	0.0%	98%
Slovak Republic				
2 2019	4	10.4	5.5%	96%
2015	4	10.4	4.2%	97%
2011	4	10.4	4.6%	96%
2007	4	10.4	3.3%	97%
South Africa (5)				
2019	5	11.5	1.1%	97%
⧖ 2015	5	11.5	2.2%	98%
Spain				
2019	4	9.9	5.4%	95%
2 2015	4	9.9	5.6%	95%
2011	4	9.8	5.3%	97%
Sweden				
2019	4	10.8	5.4%	95%
2 2015	4	10.8	5.7%	95%
2011	4	10.7	4.1%	91%
2007	4	10.8	3.1%	97%
United Arab Emirates				
2019	4	9.7	3.2%	96%
2015	4	9.8	4.7%	97%
2011	4	9.8	3.3%	97%
United States				
2 † 2019	4	10.2	7.2%	84%
2 † 2015	4	10.2	6.8%	81%
2 2011	4	10.2	7.0%	80%
2 † 2007	4	10.3	9.2%	84%
† 2003	4	10.2	5.1%	78%
1995	4	10.2	4.7%	80%

* Represents years of schooling counting from the first year of ISCED Level 1.
Data are included only for assessment years with comparable results for each country.
See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
⧖ Tested the same cohort of students as other countries, but later in the assessment year.
Saudi Arabia and South Africa in 2019 administered the less difficult fourth grade mathematics assessment. South Africa in 2015 participated in only TIMSS Numeracy at the fifth grade.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix B.6: Trends in Student Populations

(Continued)

Country	Years of Formal Schooling*	Average Age at Time of Testing	Overall Exclusion Rates	Overall Participation Rates (After Replacement)
Benchmarking Participants				
Ontario, Canada				
2 2019	4	9.8	7.0%	90%
2015	4	9.8	3.4%	90%
2011	4	9.8	5.3%	94%
2 2007	4	9.8	6.3%	92%
2003	4	9.8	4.8%	90%
2 1995	4	9.8	-	92%
Quebec, Canada				
2019	4	10.1	4.4%	83%
≡ 2015	4	10.1	5.4%	59%
2011	4	10.1	3.7%	91%
2 2007	4	10.1	6.4%	84%
2003	4	10.1	3.6%	91%
1995	4	10.3	-	81%
Abu Dhabi, UAE				
2019	4	9.7	3.6%	95%
2 2015	4	9.8	5.8%	97%
2011	4	9.7	2.7%	97%
Dubai, UAE				
2 2019	4	9.9	5.6%	97%
2015	4	9.8	5.3%	97%
2011	4	9.8	5.1%	96%
⧗ ‡ 2007	4	10.0	5.4%	67%

* Represents years of schooling counting from the first year of ISCED Level 1.
Data are included only for assessment years with comparable results for each country.
See Appendix B.2 for population coverage notes 1, 2, and 3. See Appendix B.5 for sampling guidelines and sampling participation notes †, ‡, and ≡.
⧗ Tested the same cohort of students as other countries, but later in the assessment year.
Ontario and Quebec in 1995 participated as part of Canada. A dash (-) indicates comparable data not available.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix B.7: Coverage of TIMSS 2019 Target Population

Country	International Target Population		Exclusions from National Target Population		
	Coverage	Notes on Coverage	School-Level Exclusions	Within-Sample Exclusions	Overall Exclusions
Australia	100%		1.7%	2.1%	3.8%
Bahrain	100%		0.3%	0.2%	0.6%
Chile	100%		0.3%	1.9%	2.2%
Chinese Taipei	100%		0.1%	1.3%	1.5%
Cyprus	100%		0.5%	2.3%	2.8%
[2] Egypt	100%		7.6%	1.5%	9.1%
England	100%		2.9%	2.0%	4.8%
Finland	100%		1.5%	1.5%	3.1%
France	100%		2.8%	1.0%	3.8%
[1] Georgia	91%	Students taught in Georgian	2.2%	2.1%	4.3%
Hong Kong SAR	100%		1.2%	2.1%	3.3%
Hungary	100%		2.5%	1.9%	4.4%
Iran, Islamic Rep. of	100%		0.4%	0.5%	0.9%
Ireland	100%		0.0%	0.9%	1.0%
[3] Israel	100%		19.5%	3.8%	23.2%
Italy	100%		0.8%	3.6%	4.3%
Japan	100%		0.9%	1.0%	1.8%
Jordan	100%		0.0%	0.2%	0.2%
[2] Kazakhstan	100%		2.9%	2.9%	5.8%
Korea, Rep. of	100%		0.7%	0.9%	1.6%
Kuwait	100%		1.0%	1.0%	2.0%
Lebanon	100%		1.2%	0.0%	1.2%
Lithuania	100%		3.2%	2.0%	5.3%
Malaysia	100%		1.9%	1.3%	3.2%
Morocco	100%		0.0%	0.0%	0.0%
New Zealand	100%		1.5%	2.7%	4.2%
Norway (9)	100%		1.4%	2.5%	4.0%
Oman	100%		0.5%	1.6%	2.2%
Portugal	100%		1.0%	4.5%	5.5%
Qatar	100%		1.3%	0.9%	2.2%
Romania	100%		2.7%	0.5%	3.2%
[2] Russian Federation	100%		2.8%	2.9%	5.7%
[2] Saudi Arabia	100%		9.1%	0.9%	10.0%
[2] Singapore	100%		10.1%	0.2%	10.3%
South Africa (9)	100%		1.0%	0.1%	1.1%
[2] Sweden	100%		1.7%	4.6%	6.3%
Turkey	100%		1.1%	2.4%	3.4%
United Arab Emirates	100%		1.1%	1.3%	2.4%
United States	100%		0.0%	3.9%	3.9%
Benchmarking Participants					
Ontario, Canada	100%		2.1%	3.4%	5.5%
Quebec, Canada	100%		3.3%	0.9%	4.2%
Moscow City, Russian Fed.	100%		0.7%	0.8%	1.5%
Gauteng, RSA (9)	100%		1.8%	0.2%	2.1%
Western Cape, RSA (9)	100%		0.8%	0.3%	1.1%
Abu Dhabi, UAE	100%		0.9%	0.8%	1.7%
[2] Dubai, UAE	100%		3.0%	2.5%	5.5%

1 National Target Population does not include all of the International Target Population.
2 National Defined Population covers 90% to 95% of National Target Population.
3 National Defined Population covers less than 90% of National Target Population (but at least 77%).

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Appendix B.8: School Sample Sizes

Country	Number of Schools in Original Sample	Number of Eligible Schools in Original Sample	Number of Schools in Original Sample that Participated	Number of Replacement Schools that Participated	Total Number of Schools that Participated
Australia	289	284	282	2	284
Bahrain	112	112	112	0	112
Chile	169	167	147	17	164
Chinese Taipei	206	205	200	3	203
Cyprus	99	98	98	0	98
Egypt	174	169	168	1	169
England	151	151	125	11	136
Finland	158	154	154	0	154
France	150	150	150	0	150
Georgia	158	157	142	3	145
Hong Kong SAR	158	158	112	24	136
Hungary	155	155	146	8	154
Iran, Islamic Rep. of	220	220	220	0	220
Ireland	152	152	147	2	149
Israel	161	161	152	5	157
Italy	158	158	153	5	158
Japan	150	150	125	17	142
Jordan	248	235	235	0	235
Kazakhstan	169	168	168	0	168
Korea, Rep. of	168	168	168	0	168
Kuwait	178	172	171	0	171
Lebanon	218	216	189	15	204
Lithuania	195	195	194	0	194
Malaysia	178	177	175	2	177
Morocco	253	251	251	0	251
New Zealand	154	151	115	19	134
Norway (9)	166	165	132	25	157
Oman	230	228	223	5	228
Portugal	158	158	149	7	156
Qatar	152	152	152	0	152
Romania	198	198	189	9	198
Russian Federation	204	204	203	1	204
Saudi Arabia	212	209	208	1	209
Singapore	153	153	153	0	153
South Africa (9)	524	520	516	3	519
Sweden	153	151	149	1	150
Turkey	181	181	180	1	181
United Arab Emirates	631	623	623	0	623
United States	325	321	231	42	273
Benchmarking Participants					
Ontario, Canada	172	170	157	1	158
Quebec, Canada	166	161	119	5	124
Moscow City, Russian Fed.	152	151	147	3	150
Gauteng, RSA (9)	150	150	148	2	150
Western Cape, RSA (9)	150	149	148	1	149
Abu Dhabi, UAE	230	230	230	0	230
Dubai, UAE	171	163	163	0	163

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Appendix B.9: Student Sample Sizes

Country	Within-School Student Participation (Weighted Percentage)	Number of Students Sampled in Participating Schools	Number of Students Withdrawn from Class/School	Number of Students Excluded	Number of Students Eligible	Number of Students Absent	Number of Students Assessed
Australia	91%	10,383	213	161	10,009	949	9,060
Bahrain	97%	5,947	44	12	5,891	166	5,725
Chile	96%	4,469	68	76	4,325	210	4,115
Chinese Taipei	98%	5,185	106	42	5,037	122	4,915
Cyprus	96%	3,800	23	94	3,683	162	3,521
Egypt	97%	7,700	214	0	7,486	276	7,210
England	95%	3,785	140	70	3,575	210	3,365
Finland	96%	5,252	62	62	5,128	254	4,874
France	97%	4,122	53	49	4,020	146	3,874
Georgia	97%	3,540	37	73	3,430	115	3,315
Hong Kong SAR	94%	3,612	12	73	3,527	262	3,265
Hungary	97%	4,862	23	86	4,753	184	4,569
Iran, Islamic Rep. of	98%	6,242	110	35	6,097	117	5,980
Ireland	88%	4,763	46	39	4,678	560	4,118
Israel	93%	4,154	36	51	4,067	336	3,731
Italy	97%	3,919	22	153	3,744	125	3,619
Japan	94%	4,763	3	17	4,743	297	4,446
Jordan	98%	7,856	484	13	7,359	183	7,176
Kazakhstan	99%	4,587	34	28	4,525	72	4,453
Korea, Rep. of	98%	4,025	18	37	3,970	109	3,861
Kuwait	97%	4,818	92	0	4,726	152	4,574
Lebanon	95%	5,117	151	0	4,966	236	4,730
Lithuania	93%	4,262	19	98	4,145	319	3,826
Malaysia	98%	7,323	120	0	7,203	138	7,065
Morocco	98%	9,081	395	0	8,686	228	8,458
New Zealand	91%	6,775	119	79	6,577	526	6,051
Norway (9)	89%	5,335	41	141	5,153	578	4,575
Oman	99%	7,024	132	37	6,855	104	6,751
Portugal	96%	3,752	32	152	3,568	191	3,377
Qatar	97%	4,196	138	32	4,026	142	3,884
Romania	94%	4,803	13	15	4,775	281	4,494
Russian Federation	97%	4,125	28	76	4,021	120	3,901
Saudi Arabia	99%	5,762	19	13	5,730	50	5,680
Singapore	96%	5,074	19	0	5,055	202	4,853
South Africa (9)	96%	22,658	921	0	21,737	908	20,829
Sweden	92%	4,683	64	213	4,406	410	3,996
Turkey	99%	4,377	111	123	4,143	66	4,077
United Arab Emirates	96%	23,974	251	315	23,408	1,074	22,334
United States	94%	9,924	307	242	9,375	677	8,698
Benchmarking Participants							
Ontario, Canada	94%	4,194	63	75	4,056	280	3,776
Quebec, Canada	95%	3,411	28	7	3,376	198	3,178
Moscow City, Russian Fed.	97%	3,963	21	19	3,923	140	3,783
Gauteng, RSA (9)	97%	6,025	188	0	5,837	204	5,633
Western Cape, RSA (9)	95%	5,901	284	0	5,617	266	5,351
Abu Dhabi, UAE	96%	8,770	41	86	8,643	439	8,204
Dubai, UAE	96%	6,308	199	141	5,968	240	5,728

Students attending a sampled class at the time the sample was chosen but leaving the class before the assessment was administered were classified as “withdrawn.”
Students with a disability or language barrier that prevented them from participating in the assessment were classified as “excluded.”
Students not present when the assessment was administered, and not subsequently assessed in a make-up session, were classified as “absent.”

SOURCE: IEA’s Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Appendix B.10: Participation Rates (Weighted)

Country	School Participation		Class Participation	Student Participation	Overall Participation	
	Before Replacement	After Replacement			Before Replacement	After Replacement
Australia	98%	100%	100%	91%	89%	91%
Bahrain	100%	100%	100%	97%	97%	97%
Chile	90%	99%	100%	96%	86%	95%
Chinese Taipei	98%	99%	100%	98%	96%	97%
Cyprus	100%	100%	100%	96%	96%	96%
Egypt	99%	100%	100%	97%	96%	97%
England	83%	90%	100%	95%	79%	85%
Finland	100%	100%	100%	96%	95%	95%
France	100%	100%	100%	97%	97%	97%
Georgia	90%	92%	100%	97%	88%	89%
† Hong Kong SAR	70%	86%	100%	94%	66%	81%
Hungary	95%	99%	100%	97%	92%	96%
Iran, Islamic Rep. of	100%	100%	100%	98%	98%	98%
Ireland	97%	98%	100%	88%	85%	86%
Israel	95%	98%	100%	93%	88%	91%
Italy	97%	100%	100%	97%	94%	97%
Japan	83%	94%	100%	94%	77%	88%
Jordan	100%	100%	100%	98%	98%	98%
Kazakhstan	100%	100%	100%	99%	99%	99%
Korea, Rep. of	100%	100%	100%	98%	98%	98%
Kuwait	99%	99%	100%	97%	96%	96%
Lebanon	82%	93%	100%	95%	78%	88%
Lithuania	99%	99%	100%	93%	92%	92%
Malaysia	99%	100%	100%	98%	97%	98%
Morocco	100%	100%	100%	98%	98%	98%
† New Zealand	77%	89%	100%	91%	70%	81%
† Norway (9)	79%	95%	99%	89%	70%	84%
Oman	99%	100%	100%	99%	97%	99%
Portugal	95%	99%	99%	96%	90%	94%
Qatar	100%	100%	100%	97%	97%	97%
Romania	95%	100%	100%	94%	89%	94%
Russian Federation	99%	100%	100%	97%	97%	97%
Saudi Arabia	100%	100%	100%	99%	99%	99%
Singapore	100%	100%	100%	96%	96%	96%
South Africa (9)	99%	100%	100%	96%	95%	96%
Sweden	98%	99%	100%	92%	90%	91%
Turkey	100%	100%	100%	99%	98%	99%
United Arab Emirates	100%	100%	100%	96%	96%	96%
† United States	72%	85%	100%	94%	67%	79%
Benchmarking Participants						
Ontario, Canada	93%	93%	100%	94%	87%	88%
‡ Quebec, Canada	74%	77%	99%	95%	70%	73%
Moscow City, Russian Fed.	99%	100%	100%	97%	96%	97%
Gauteng, RSA (9)	99%	100%	100%	97%	95%	97%
Western Cape, RSA (9)	99%	100%	100%	95%	95%	95%
Abu Dhabi, UAE	100%	100%	100%	96%	96%	96%
Dubai, UAE	100%	100%	100%	96%	96%	96%

TIMSS guidelines for sampling participation: The minimum acceptable participation rates were 85 percent of both schools and students, or a combined rate (the product of school and student participation) of 75 percent.

Participants not meeting these guidelines were annotated as follows:

† Met guidelines for sample participation rates only after replacement schools were included

‡ Nearly satisfied guidelines for sample participation rates after replacement schools were included

≡ Did not satisfy guidelines for sample participation rates

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix B.11: Trends in Student Populations

Country	Years of Formal Schooling*	Average Age at Time of Testing	Overall Exclusion Rates	Overall Participation Rates (After Replacement)
Australia				
2019	8	14.1	3.8%	91%
2015	8	14.0	3.5%	90%
2011	8	14.0	3.2%	88%
2007	8	13.9	1.9%	93%
2003	8	13.9	1.3%	83%
‡ 1995	8 or 9	14.2	0.8%	70%
Bahrain				
2019	8	13.8	0.6%	97%
2015	8	14.0	3.8%	97%
⧖ 2011	8	14.4	1.6%	97%
2007	8	14.1	1.5%	97%
2003	8	14.1	0.0%	98%
Chile				
2019	8	14.2	2.2%	95%
2015	8	14.3	1.9%	85%
2011	8	14.2	2.8%	95%
2003	8	14.2	2.2%	99%
1999	8	14.4	2.8%	96%
Chinese Taipei				
2019	8	14.3	1.5%	97%
2015	8	14.3	1.7%	98%
2011	8	14.2	1.3%	99%
2007	8	14.2	3.3%	99%
2003	8	14.2	4.8%	99%
1999	8	14.2	1.6%	99%
Cyprus				
2019	8	13.8	2.8%	96%
2007	8	13.8	2.5%	96%
2003	8	13.8	2.5%	96%
1999	8	13.8	0.8%	97%
1995	8	13.7	0.0%	97%
Egypt				
2 2019	8	13.9	9.1%	97%
2015	8	14.1	0.1%	91%
2007	8	14.1	0.5%	98%
2003	8	14.4	3.4%	97%
England				
2019	9	14.0	4.8%	85%
2015	9	14.1	2.3%	92%
‡ 2011	9	14.2	2.2%	70%
† 2007	9	14.2	2.3%	75%
≡ 2003	9	14.3	2.1%	46%
† 1999	9	14.2	5.0%	77%
3 † 1995	9	14.0	11.3%	77%
Finland				
2019	8	14.8	3.1%	95%
2011	8	14.8	3.4%	93%
France				
2019	8	13.9	3.8%	97%
1995	8	14.3	2.0%	82%
Georgia				
1 2019	8	13.8	4.3%	89%
1 2 2015	8	13.7	6.0%	98%
1 2011	8	14.2	4.5%	97%
1 2007	8	14.2	3.9%	97%
Hong Kong SAR				
† 2019	8	14.1	3.3%	81%
2015	8	14.2	1.6%	81%
2011	8	14.2	5.3%	75%
† 2007	8	14.4	3.8%	75%
† 2003	8	14.4	3.4%	80%
† 1999	8	14.2	0.8%	74%
1995	8	14.2	2.0%	81%

* Represents years of schooling counting from the first year of ISCED Level 1.
Data are included only for assessment years with comparable results for each country.
See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
⧖ Tested the same cohort of students as other countries, but later in the assessment year.
Egypt's 2015 exclusion rate may be underestimated.
Georgia in 2011 excluded schools in South Ossetia and Abkhazia due to lack of access and absence of official statistics. Abkhazia refugee schools in other territories of Georgia were included in the sample frame.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Appendix B.11: Trends in Student Populations

(Continued)

Country	Years of Formal Schooling*	Average Age at Time of Testing	Overall Exclusion Rates	Overall Participation Rates (After Replacement)
Hungary				
2019	8	14.6	4.4%	96%
2015	8	14.7	5.4%	96%
2011	8	14.7	4.4%	95%
2007	8	14.6	3.9%	96%
[2] 2003	8	14.5	8.5%	94%
1999	8	14.4	4.3%	93%
1995	8	14.3	3.8%	87%
Iran, Islamic Rep. of				
2019	8	14.1	0.9%	98%
2015	8	14.2	2.2%	98%
2011	8	14.3	2.2%	99%
2007	8	14.2	0.5%	98%
[2] 2003	8	14.4	6.5%	98%
1999	8	14.6	4.4%	98%
1995	8	14.6	0.3%	98%
Ireland				
2019	8	14.4	1.0%	86%
2015	8	14.4	1.2%	91%
1995	8	14.4	0.4%	81%
Israel				
[3] 2019	8	14.0	23.2%	91%
[3] 2015	8	14.0	22.8%	93%
[3] 2011	8	14.0	22.6%	92%
Italy				
2019	8	13.7	4.3%	97%
[2] 2015	8	13.8	6.1%	93%
2011	8	13.8	4.7%	93%
2007	8	13.9	5.0%	96%
2003	8	13.9	3.6%	97%
[2] 1999	8	14.0	6.7%	97%
Japan				
2019	8	14.4	1.8%	88%
2015	8	14.5	2.3%	93%
2011	8	14.5	2.8%	87%
2007	8	14.5	3.5%	91%
2003	8	14.4	0.6%	93%
1999	8	14.4	1.3%	89%
1995	8	14.4	0.6%	90%
Jordan				
2019	8	13.9	0.2%	98%
2015	8	13.8	1.0%	96%
2011	8	13.9	0.4%	96%
2007	8	14.0	2.0%	96%
2003	8	13.9	1.3%	96%
1999	8	14.0	3.0%	99%
Kazakhstan				
[2] 2019	8	14.3	5.8%	99%
2011	8	14.6	5.1%	98%
Korea, Rep. of				
2019	8	14.5	1.6%	98%
2015	8	14.4	2.1%	98%
2011	8	14.3	1.9%	99%
2007	8	14.3	1.6%	99%
⧗ 2003	8	14.6	4.9%	98%
1999	8	14.4	4.0%	100%
1995	8	14.2	3.8%	95%
Kuwait				
2019	8	13.8	2.0%	96%
2015	8	13.7	3.3%	85%
Lebanon				
2019	8	14.0	1.2%	88%
2015	8	14.2	1.3%	88%
2011	8	14.3	1.4%	94%
2007	8	14.4	1.4%	85%
2003	8	14.6	1.4%	91%

* Represents years of schooling counting from the first year of ISCED Level 1.
Data are included only for assessment years with comparable results for each country.
See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
⧗ Tested the same cohort of students as other countries, but later in the assessment year.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Appendix B.11: Trends in Student Populations

(Continued)

Country	Years of Formal Schooling*	Average Age at Time of Testing	Overall Exclusion Rates	Overall Participation Rates (After Replacement)
Lithuania				
2019	8	14.7	5.3%	92%
2 2015	8	14.7	7.0%	93%
1 2011	8	14.7	4.8%	92%
1 2007	8	14.9	4.2%	90%
1 2003	8	14.9	2.6%	84%
1 ⧖ 1999	8	15.2	4.5%	89%
1 2 1995	8	14.3	6.6%	83%
Malaysia				
2019	8	14.3	3.2%	98%
2015	8	14.3	4.3%	98%
2011	8	14.4	0.1%	98%
2007	8	14.3	3.3%	98%
2003	8	14.3	4.0%	98%
1999	8	14.4	4.6%	99%
Morocco				
2019	8	14.5	0.0%	98%
2015	8	14.5	0.0%	95%
2011	8	14.7	0.1%	94%
New Zealand				
† 2019	8.5 - 9.5	13.9	4.2%	81%
† 2015	8.5 - 9.5	14.1	3.1%	81%
2011	8.5 - 9.5	14.1	3.2%	88%
2003	8.5 - 9.5	14.1	4.4%	90%
1999	8.5 - 9.5	14.0	2.4%	91%
1995	8.5 - 9.5	14.0	1.7%	94%
Norway (9)				
† 2019	9	14.7	4.0%	84%
2015	9	14.7	3.7%	87%
Norway (8)				
2015	8	13.7	4.1%	87%
2011	8	13.7	1.9%	84%
2007	8	13.8	2.6%	86%
2003	7	13.8	2.3%	85%
1995	7	13.9	2.2%	93%
Oman				
2019	8	13.9	2.2%	99%
2015	8	14.0	0.4%	96%
2011	8	14.1	1.2%	97%
2007	8	14.3	1.2%	99%
Portugal				
2019	8	14.0	5.5%	94%
1995	8	14.5	0.3%	92%
Qatar				
2019	8	14.0	2.2%	97%
2015	8	14.1	3.2%	96%
2011	8	14.0	4.5%	99%
Romania				
2019	8	14.8	3.2%	94%
2011	8	14.9	1.3%	99%
2007	8	15.0	1.8%	97%
2003	8	15.0	0.5%	98%
1999	8	14.8	3.7%	97%
1995	8	14.6	2.8%	89%
Russian Federation				
2 2019	8	14.8	5.7%	97%
2015	8	14.7	3.7%	97%
2 2011	8	14.7	6.0%	98%
2007	7 or 8	14.6	2.3%	97%
2003	7 or 8	14.2	5.5%	96%
1999	7 or 8	14.1	1.7%	97%
2 1995	7 or 8	14.0	6.3%	95%
Saudi Arabia				
2 2019	8	13.9	10.0%	99%
2015	8	14.1	2.1%	97%
2011	8	14.1	1.2%	98%

* Represents years of schooling counting from the first year of ISCED Level 1.
Data are included only for assessment years with comparable results for each country.
See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
⧖ Tested the same cohort of students as other countries, but later in the assessment year.
Results for Lithuania before 2015 do not include students taught in Polish or Russian. Lithuania in 1999 tested the same cohort of students as other countries, but later in the assessment year.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix B.11: Trends in Student Populations

(Continued)

Country	Years of Formal Schooling*	Average Age at Time of Testing	Overall Exclusion Rates	Overall Participation Rates (After Replacement)
Singapore				
2 2019	8	14.3	10.3%	96%
2 2015	8	14.4	7.0%	97%
2 2011	8	14.4	6.0%	95%
2007	8	14.4	1.8%	95%
2003	8	14.3	0.0%	97%
1999	8	14.4	0.0%	98%
1995	8	14.5	4.6%	95%
South Africa (9)				
2019	9	15.5	1.1%	96%
⧖ 2015	9	15.7	1.5%	96%
2011	9	16.0	1.4%	95%
Sweden				
2 2019	8	14.8	6.3%	91%
2015	8	14.7	5.4%	94%
2011	8	14.8	5.1%	92%
2007	8	14.8	3.6%	94%
2003	8	14.9	2.8%	87%
1995	7	14.9	0.9%	90%
Turkey				
2019	8	13.9	3.4%	99%
2015	8	13.9	1.3%	98%
2011	8	14.0	1.5%	97%
United Arab Emirates				
2019	8	13.7	2.4%	96%
2015	8	13.9	3.6%	97%
2011	8	13.9	2.8%	97%
United States				
† 2019	8	14.2	3.9%	79%
† 2015	8	14.2	5.1%	78%
2 2011	8	14.2	7.2%	81%
2 † 2007	8	14.3	7.9%	77%
‡ 2003	8	14.2	4.9%	73%
1999	8	14.2	3.9%	85%
† 1995	8	14.2	2.1%	78%
Benchmarking Participants				
Ontario, Canada				
2019	8	13.8	5.5%	88%
2015	8	13.8	2.5%	87%
2 2011	8	13.8	5.6%	93%
2 2007	8	13.8	6.2%	89%
2 2003	8	13.8	6.0%	89%
1999	8	13.9	5.1%	93%
1995	8	14.0	-	90%
Quebec, Canada				
‡ 2019	8	14.2	4.2%	73%
≡ 2015	8	14.3	5.3%	58%
2011	8	14.2	4.9%	88%
3 2007	8	14.2	13.6%	77%
2003	8	14.2	4.8%	85%
1999	8	14.3	1.3%	92%
1995	8	14.5	-	89%
Abu Dhabi, UAE				
2019	8	13.7	1.7%	96%
2015	8	13.9	4.1%	98%
2011	8	13.8	1.7%	96%
Dubai, UAE				
2 2019	8	13.9	5.5%	96%
2015	8	13.9	5.2%	97%
2011	8	13.9	4.0%	95%
⧖ ‡ 2007	8	14.2	5.0%	69%

* Represents years of schooling counting from the first year of ISCED Level 1.
Data are included only for assessment years with comparable results for each country.
See Appendix B.7 for population coverage notes 1, 2, and 3. See Appendix B.10 for sampling guidelines and sampling participation notes †, ‡, and ≡.
⧖ Tested the same cohort of students as other countries, but later in the assessment year.
Ontario and Quebec in 1995 and 1999 participated as part of Canada. A dash (-) indicates comparable data not available.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

APPENDIX C

The Test-Curriculum Matching Analysis

TIMSS went to great lengths to ensure that comparisons of student achievement across countries are as fair and equitable as possible. The *TIMSS 2019 Assessment Frameworks* were designed to specify the important aspects of mathematics and science that participating countries agreed should be the focus of an international assessment of mathematics and science achievement. The assessment items were developed through a collaborative process with national representatives to reflect the assessment specifications articulated in the frameworks and all items were field tested extensively in participating countries. Finalizing the TIMSS 2019 assessments involved a series of reviews by representatives of the participating countries, experts in mathematics and science, and measurement specialists. At the end of this process, the National Research Coordinators (NRCs) from each participating country formally approved the TIMSS 2019 assessments, thus accepting the assessments as sufficiently fair to compare their students' mathematics and science achievement with that of students from other countries.

Although the assessments were developed to represent agreed-upon frameworks and were intended to have as much in common across countries as possible, it was unavoidable that the match between the TIMSS 2019 assessments (or tests) and countries' mathematics and science curricula would not be the same for all countries. To restrict test items to just those topics included in the curricula and covered in the same sequence in all participating countries would severely limit test coverage and restrict the research questions that the study is designed to address. The tests, therefore, inevitably have some items measuring topics unfamiliar to some students in some countries.

The Test-Curriculum Matching Analysis (TCMA) was conducted to investigate the extent to which the TIMSS 2019 assessments matched each country's mathematics and science curricula.[1] The TCMA also investigates the impact on a country's performance of including only achievement items that were judged to be relevant to its own curriculum.

To gather data about the extent to which the TIMSS 2019 assessments matched the curricula of the TIMSS countries and benchmarking participants, NRCs were asked to examine each TIMSS achievement item and indicate whether the particular knowledge and skills assessed by the item was in their country's intended curriculum at the grade tested (fourth or eighth grade). The NRCs were asked to choose persons very familiar with the curriculum at these grades to make this determination.

In some countries, the curriculum was prescribed for a range of grades and was not explicit about what was to be covered by the end of the fourth or eighth grades. For example, in France the curriculum specifies the curricular goals to be achieved by the end of primary school Cycle 2 (Grades

1 It should be noted that because there may be content areas covered by the curricula in some countries that are not covered by the TIMSS 2019 tests, the TCMA may not provide complete information about how well the tests cover the curricula of the countries.

1–3), Cycle 3 (Grades 4–6), and Cycle 4 (Grades 7–9), rather than a grade-by-grade specification (see *TIMSS 2019 Encyclopedia*). In such situations, coordinators were asked to make the best judgment possible. Because an item might be in the curriculum for some but not all students in a country, NRCs were asked to consider an item included if it was in the intended curriculum for more than 50 percent of the students.

Match Between TIMSS Tests and Countries' Mathematics and Science Curricula

Exhibits C.1 through C.4 present the TCMA results for the TIMSS 2019 mathematics test and science test at the fourth and eighth grades, respectively. The bottom row of each exhibit shows the number of items, with the corresponding number of score points in parentheses, identified by each country as appropriate according to its curriculum.

In mathematics at the fourth grade (Exhibit C.1), countries' average mathematics achievement was based on students' performance on 171 items yielding 183 score points, which is the maximum number of items and score points a country could identify.[2] Generally, the proportion of mathematics items judged appropriate was fairly high. Reading along the bottom row, it can be seen that 4 of the 47 countries included in the analysis judged 100 percent of the items to be included in their curricula as did 2 of the 6 benchmarking participants. A further 36 countries and 4 benchmarking participants judged 75 percent or more (138 score points for eTIMSS, 136 score points for paperTIMSS) to be appropriate. All but 1 of the participants at the fourth grade agreed that more than half of the mathematics items were included in their curricula.

The last page of Exhibit C.1 presents the TCMA results for the 11 countries that administered the less difficult version of the fourth grade mathematics assessment, which included 177 items yielding 190 score points.[3] Two of the 11 countries judged 100 percent of the items to be included in their mathematics curricula, and an additional 7 countries judged 75 percent or more (143 score points) to be appropriate. All 11 countries identified more than half of the items as being appropriate for their students.

In fourth grade science (Exhibit C.2), the maximum number of score points in the assessment was 174 for eTIMSS countries and 173 for paperTIMSS countries. Similar to mathematics, the proportion of science items judged appropriate by the countries at the fourth grade was fairly high overall, but with more variation than for mathematics. A number of high performing countries, notably Singapore, Korea, the Russian Federation, Japan, and Chinese Taipei, chose relatively few fourth grade science items as appropriate for their students. Of the 58 countries and 6 benchmarking participants at the fourth grade, 7 countries and 2 benchmarking participants judged 100 percent of the science items to be included in their curricula. An additional 25 countries and 1 benchmarking participant judged 75 percent or more (131 score points for eTIMSS and 130 for paperTIMSS).

2 TIMSS 2019 fourth grade mathematics achievement scores were estimated based on 171 items and 183 score points for eTIMSS countries and 169 items and 181 score points for paperTIMSS countries. See Chapter 10 of *Methods and Procedures: TIMSS 2019 Technical Report* for details about items deleted or recoded for scaling.

3 About one-third of the items in the less difficult mathematics assessment are shared with the regular mathematics assessment.

At the eighth grade, the proportions of mathematics and science items judged appropriate were somewhat higher compared with the fourth grade. In mathematics (Exhibit C.3), 7 of the 39 participating countries and 2 of the 7 benchmarking participants judged 100 percent of the mathematics items to be included in their curricula, including all 206 items yielding 217 score points. Additionally, 31 countries and the remaining 5 benchmarking participants judged 75 percent or more (163 score points) to be appropriate. In science (Exhibit C.4), 4 of the 39 countries and 2 of the 7 benchmarking participants judged 100 percent of the science items to be appropriate (all 233 score points). A further 26 countries and 4 of the 5 benchmarking participants judged 75 percent or more (175 score points) to be appropriate. All but 2 countries agreed that more than half of the science items were included in their curricula at the eighth grade.

Impact of Item Selection on Average Scale Scores

The first columns in Exhibits C.1 through C.4 show, for each grade and subject, the average scale score and its standard error, for each country on the assessment as a whole, based on all test items as reported in Exhibits 1.1, 2.1, 3.1, and 4.1 of this report. Countries are presented in descending order according to this overall achievement score. Subsequent columns show the average performance of the countries based only on those items judged appropriate by the participant listed at the head of the column. To interpret these exhibits, choosing a country at the top of the exhibit and reading down its column provides the average scale score and standard error for the country in each row, based only on the items selected as appropriate for that country's students.[4] For example, in Exhibit C.1, looking down the column for Singapore shows that Singapore had an average fourth grade mathematics scale score of 629 based on its own set of items, while Hong Kong SAR had an average scale score of 602 based on Singapore's items, Korea had an average scale score of 599 based on Singapore's items, and so forth.

The shaded diagonal element in these exhibits shows how each country performed on the set of items that it selected based on its own curriculum. In general, countries performed better on their own item sets than on the items overall, although not by much. Comparing the diagonal element for a country with the overall average scale score shows the difference between performance on the set of items chosen as appropriate for that country and performance on the test as a whole. To illustrate, Singapore's average scale score based on all fourth grade mathematics items was 625, as shown in the first column. Singapore's diagonal element in Exhibit C.1 (629) shows that students from Singapore performed slightly better on the set of items selected by Singapore than they did on the assessment as a whole, although this 4-point difference was within the margin of sampling error. In fourth grade mathematics, most participants had a difference of no more than 1 or 2 scale score points between the two scores. The largest differences occurred in the Russian Federation (16 points), Bulgaria (11 points), Croatia (11 points), and Bosnia and Herzegovina (10 points).

4 Standard errors provide a margin of error for comparing average scale scores across countries. Differences in one country's average scale scores across exhibit columns should be interpreted with caution.

Compared with mathematics at the fourth grade, the differences between countries' performance based on their chosen set of items (the diagonal element) and their overall performance based on all items were somewhat larger in science (Exhibit C.2). Although most participants had a difference of 1 or 2 scale score points or fewer, the largest difference was observed in Singapore (80 points), followed by Japan and Chinese Taipei (24–30 points). Of the 58 countries and 6 benchmarking participants included in the analysis, Singapore and Japan had the smallest proportions of science test items identified as appropriate for their students (25–27%).

The differences between countries' average scale scores based on all items and based on their item subsets were smaller at the eighth grade. In mathematics (Exhibit C.3), 27 of the 39 countries and 5 of the 7 benchmarking participants had differences of 1 scale score point or fewer. Lebanon had the largest difference in mathematics performance between the average score based on its own item selections and the average score based on all items (10 points). The results were similar in science (Exhibit C.4), with Lebanon again having the largest difference between performance estimates (17 points). Japan, Singapore, and Cyprus had the next largest differences (12–14 points).

The TCMA results show that the selection of items does not have a major effect on the relative performance of countries. Participants that had relatively high or low mathematics or science achievement based on all the items also had relatively high or low achievement based on each of the various sets of items selected for the TCMA. Although there are some changes in the ordering of countries based on the items selected for the TCMA, most of these differences are within the boundaries of sampling error.[5]

Even when countries performed better on the items identified as being appropriate for their curriculum than they did overall, their performance relative to other participants changed very little. As an example, consider the 64 items (65 score points) selected by Korea in science at the fourth grade (Exhibit C.2). The students in Korea had higher average achievement based on these items (604) than on the test as a whole (588). However, most other countries also had higher achievement based on this subset of items selected by Korea. For example, Singapore and Japan also had higher achievement based on Korea's selected items compared with their average achievement based on all items.

The TCMA results provide evidence that the TIMSS 2019 assessment provides a sound basis for comparing achievement of the participating countries and benchmarking entities. This result is not unexpected, given that making the assessment as fair as possible was a major consideration in test development and reporting. The fact that the majority of countries indicated that most items were appropriate for their students means that the different average scale scores were based on many of the same items. Insofar as countries rejected items that would be difficult for their students, these items tended to be difficult for students in other countries as well. The analysis shows that omitting such items tends to improve the results for that country, but also tends to improve the results for all other countries, so that the overall pattern of relative performance is largely unaffected.

5 Small differences in average scale scores between adjacent countries shown in the exhibits usually are not statistically significant with 95 percent confidence.

Exhibit C.1: Average Scale Scores for the Mathematics Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

Read down the column under a country name to compare achievement scores based on the items identified by that country. Scores on the diagonal are countries' achievement scores based on the test items they identified.

Country	Average Mathematics Scale Score based on All Items	Singapore	Hong Kong SAR	Korea, Rep. of	Chinese Taipei	Japan	Russian Federation	Northern Ireland	England	Ireland	Latvia
Singapore	625 (3.9)	629 (3.9)	624 (4.0)	625 (3.9)	626 (3.9)	624 (3.9)	623 (4.0)	626 (3.8)	625 (3.9)	627 (3.9)	619 (3.8)
Hong Kong SAR	602 (3.3)	602 (3.4)	601 (3.4)	601 (3.3)	601 (3.4)	601 (3.3)	598 (3.7)	602 (3.3)	601 (3.3)	602 (3.3)	600 (3.3)
Korea, Rep. of	600 (2.2)	599 (2.2)	599 (2.3)	606 (2.3)	598 (2.3)	604 (2.3)	592 (2.3)	600 (2.2)	599 (2.2)	600 (2.2)	596 (2.2)
Chinese Taipei	599 (1.9)	601 (2.0)	599 (2.0)	601 (1.9)	601 (2.0)	604 (2.0)	593 (2.1)	600 (2.0)	600 (1.9)	600 (1.9)	592 (2.0)
Japan	593 (1.8)	591 (1.8)	591 (1.8)	598 (1.7)	591 (1.7)	601 (1.7)	586 (1.8)	593 (1.8)	594 (1.7)	593 (1.8)	591 (1.7)
Russian Federation	567 (3.3)	565 (3.3)	568 (3.4)	566 (3.3)	567 (3.3)	567 (3.3)	583 (3.5)	566 (3.3)	567 (3.3)	567 (3.3)	572 (3.4)
Northern Ireland	566 (2.7)	569 (2.8)	567 (2.9)	566 (2.8)	567 (2.8)	564 (2.8)	566 (3.0)	566 (2.8)	566 (2.7)	566 (2.7)	565 (2.7)
England	556 (3.0)	559 (3.1)	554 (3.1)	556 (3.0)	556 (3.1)	553 (3.0)	549 (3.3)	557 (3.0)	556 (3.0)	556 (3.0)	554 (3.0)
Ireland	548 (2.5)	550 (2.5)	549 (2.5)	548 (2.5)	549 (2.5)	547 (2.5)	545 (2.5)	549 (2.5)	549 (2.5)	549 (2.5)	546 (2.4)
Latvia	546 (2.6)	545 (2.5)	547 (2.7)	545 (2.5)	546 (2.6)	546 (2.6)	557 (2.9)	546 (2.6)	546 (2.6)	546 (2.6)	552 (2.7)
Norway (5)	543 (2.2)	543 (2.2)	542 (2.2)	542 (2.2)	542 (2.2)	540 (2.2)	536 (2.2)	544 (2.2)	542 (2.2)	543 (2.2)	542 (2.2)
Lithuania	542 (2.8)	539 (2.8)	541 (2.9)	541 (2.7)	540 (2.8)	543 (2.7)	545 (3.0)	541 (2.8)	541 (2.7)	542 (2.8)	546 (2.9)
Austria	539 (2.0)	540 (2.0)	540 (2.0)	538 (2.0)	540 (2.0)	539 (2.1)	543 (2.0)	539 (2.0)	539 (2.0)	539 (2.0)	539 (2.1)
Netherlands	538 (2.2)	536 (2.2)	532 (2.2)	538 (2.2)	536 (2.2)	536 (2.3)	532 (2.3)	538 (2.2)	537 (2.2)	537 (2.2)	540 (2.3)
United States	535 (2.5)	536 (2.6)	536 (2.6)	534 (2.5)	536 (2.6)	534 (2.5)	534 (2.5)	535 (2.5)	534 (2.6)	535 (2.5)	534 (2.5)
Czech Republic	533 (2.5)	532 (2.5)	535 (2.6)	532 (2.6)	533 (2.5)	532 (2.5)	535 (2.6)	532 (2.5)	533 (2.5)	533 (2.5)	532 (2.6)
Belgium (Flemish)	532 (1.9)	533 (2.0)	531 (2.0)	533 (1.9)	532 (2.0)	532 (1.9)	523 (1.9)	533 (1.9)	533 (1.9)	533 (1.9)	527 (1.9)
Cyprus	532 (2.9)	534 (2.9)	532 (2.9)	531 (2.9)	531 (2.8)	531 (2.8)	529 (2.8)	532 (2.9)	532 (2.9)	532 (2.8)	531 (2.8)
Finland	532 (2.3)	529 (2.4)	528 (2.4)	530 (2.4)	530 (2.3)	529 (2.4)	521 (2.4)	532 (2.3)	531 (2.4)	532 (2.3)	530 (2.3)
Denmark	525 (1.9)	524 (2.0)	522 (2.0)	524 (1.9)	523 (2.0)	520 (2.0)	516 (2.1)	525 (1.9)	524 (1.9)	525 (1.9)	524 (1.9)
Portugal	525 (2.6)	528 (2.7)	526 (2.7)	525 (2.6)	526 (2.7)	524 (2.7)	521 (2.8)	526 (2.6)	526 (2.6)	525 (2.6)	524 (2.6)
Hungary	523 (2.6)	524 (2.6)	525 (2.6)	523 (2.6)	523 (2.6)	522 (2.6)	531 (2.6)	523 (2.6)	523 (2.6)	523 (2.6)	524 (2.7)
Turkey (5)	523 (4.4)	526 (4.5)	525 (4.4)	525 (4.4)	525 (4.4)	525 (4.4)	525 (4.4)	523 (4.4)	523 (4.5)	523 (4.4)	519 (4.4)
Germany	521 (2.3)	521 (2.2)	520 (2.3)	521 (2.3)	520 (2.3)	520 (2.3)	524 (2.4)	521 (2.3)	521 (2.3)	521 (2.3)	521 (2.3)
Sweden	521 (2.8)	520 (2.8)	519 (2.9)	521 (2.8)	519 (2.8)	516 (2.8)	519 (2.9)	522 (2.8)	520 (2.8)	521 (2.8)	524 (2.8)
Poland	520 (2.7)	520 (2.7)	520 (2.7)	520 (2.7)	520 (2.7)	520 (2.7)	518 (2.7)	520 (2.7)	520 (2.7)	520 (2.7)	521 (2.7)
Australia	516 (2.8)	514 (2.8)	514 (2.7)	514 (2.8)	514 (2.8)	512 (2.8)	508 (2.8)	516 (2.8)	515 (2.8)	516 (2.8)	517 (2.8)
Azerbaijan	515 (2.7)	516 (2.7)	518 (2.8)	516 (2.7)	516 (2.7)	517 (2.7)	530 (3.0)	515 (2.7)	515 (2.7)	516 (2.7)	520 (2.8)
Bulgaria	515 (4.3)	516 (4.1)	521 (4.1)	515 (4.3)	518 (4.0)	519 (4.2)	535 (4.5)	514 (4.3)	515 (4.2)	515 (4.3)	519 (4.5)
Italy	515 (2.4)	518 (2.5)	517 (2.4)	517 (2.4)	517 (2.4)	518 (2.4)	516 (2.5)	516 (2.4)	515 (2.4)	516 (2.4)	514 (2.4)
Canada	512 (1.9)	511 (1.9)	511 (1.9)	511 (1.9)	509 (1.9)	509 (1.9)	505 (1.9)	512 (1.9)	511 (1.9)	512 (1.9)	512 (1.8)
Kazakhstan	512 (2.5)	512 (2.5)	515 (2.5)	512 (2.5)	514 (2.5)	514 (2.5)	526 (2.7)	511 (2.5)	512 (2.5)	513 (2.5)	514 (2.5)
Slovak Republic	510 (3.5)	509 (3.4)	511 (3.4)	509 (3.5)	509 (3.4)	507 (3.5)	513 (3.6)	509 (3.4)	509 (3.5)	510 (3.5)	511 (3.5)
Croatia	509 (2.2)	510 (2.1)	512 (2.2)	511 (2.1)	511 (2.1)	510 (2.2)	519 (2.2)	509 (2.2)	509 (2.2)	509 (2.2)	509 (2.2)
Malta	509 (1.4)	512 (1.5)	511 (1.5)	508 (1.5)	509 (1.4)	506 (1.5)	506 (1.6)	510 (1.4)	510 (1.4)	509 (1.4)	509 (1.5)
Serbia	508 (3.2)	509 (3.1)	512 (3.2)	510 (3.1)	510 (3.0)	510 (3.1)	524 (3.3)	507 (3.2)	508 (3.2)	508 (3.2)	511 (3.3)
Spain	502 (2.1)	505 (2.2)	504 (2.2)	505 (2.2)	504 (2.2)	505 (2.2)	502 (2.3)	503 (2.1)	503 (2.1)	503 (2.1)	502 (2.1)
Armenia	498 (2.5)	502 (2.5)	503 (2.4)	500 (2.5)	503 (2.5)	500 (2.5)	513 (2.4)	498 (2.5)	498 (2.6)	499 (2.5)	498 (2.6)
New Zealand	487 (2.6)	485 (2.7)	483 (2.7)	485 (2.7)	485 (2.6)	483 (2.6)	480 (2.7)	487 (2.6)	487 (2.6)	487 (2.6)	489 (2.6)
France	485 (3.0)	486 (3.0)	487 (3.0)	487 (3.0)	486 (3.0)	486 (3.0)	481 (3.0)	485 (3.0)	485 (3.0)	485 (3.0)	483 (3.0)
Georgia	482 (3.7)	483 (3.6)	487 (3.5)	485 (3.6)	485 (3.6)	486 (3.7)	496 (3.7)	481 (3.6)	482 (3.7)	482 (3.7)	483 (3.7)
United Arab Emirates	481 (1.7)	483 (1.7)	482 (1.7)	482 (1.7)	481 (1.7)	481 (1.7)	480 (1.7)	482 (1.7)	481 (1.7)	482 (1.7)	481 (1.7)
Bahrain	480 (2.6)	484 (2.6)	480 (2.6)	482 (2.5)	481 (2.5)	481 (2.5)	477 (2.7)	481 (2.6)	480 (2.6)	480 (2.6)	478 (2.6)
Qatar	449 (3.4)	452 (3.4)	449 (3.4)	451 (3.4)	451 (3.3)	451 (3.3)	448 (3.4)	450 (3.4)	450 (3.4)	450 (3.4)	449 (3.4)
Iran, Islamic Rep. of	443 (3.9)	447 (3.8)	446 (3.9)	445 (3.8)	447 (3.8)	448 (3.8)	442 (3.9)	443 (3.8)	445 (3.8)	444 (3.8)	441 (3.8)
Chile	441 (2.7)	440 (2.8)	439 (2.8)	440 (2.7)	439 (2.7)	438 (2.7)	437 (2.8)	442 (2.7)	440 (2.7)	442 (2.7)	444 (2.7)
Oman	431 (3.7)	433 (3.7)	434 (3.6)	431 (3.6)	430 (3.8)	431 (3.7)	428 (3.7)	431 (3.7)	431 (3.7)	431 (3.7)	431 (3.6)
International Average	523 (0.4)	524 (0.4)	524 (0.4)	524 (0.4)	523 (0.4)	523 (0.4)	524 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)
Benchmarking Participants											
Moscow City, Russian Fed.	593 (2.2)	590 (2.3)	595 (2.3)	593 (2.2)	591 (2.2)	593 (2.2)	611 (2.6)	592 (2.2)	592 (2.2)	592 (2.2)	602 (2.4)
Dubai, UAE	544 (1.6)	546 (1.7)	544 (1.6)	544 (1.7)	544 (1.7)	543 (1.7)	541 (1.7)	545 (1.7)	544 (1.6)	545 (1.6)	543 (1.6)
Quebec, Canada	532 (2.3)	533 (2.3)	532 (2.3)	532 (2.3)	531 (2.3)	531 (2.3)	524 (2.4)	533 (2.3)	532 (2.3)	532 (2.3)	530 (2.3)
Madrid, Spain	518 (2.2)	521 (2.2)	521 (2.3)	522 (2.2)	521 (2.2)	522 (2.2)	518 (2.2)	519 (2.1)	519 (2.2)	519 (2.2)	517 (2.1)
Ontario, Canada	512 (3.3)	510 (3.4)	512 (3.4)	511 (3.3)	509 (3.4)	509 (3.2)	504 (3.4)	513 (3.3)	511 (3.3)	512 (3.3)	512 (3.3)
Abu Dhabi, UAE	441 (2.2)	442 (2.2)	441 (2.2)	442 (2.2)	440 (2.2)	441 (2.2)	440 (2.3)	441 (2.2)	440 (2.2)	441 (2.2)	441 (2.2)
Number of Items (Score Points)*	171 (183)	137 (146)	129 (138)	132 (142)	144 (154)	127 (135)	100 (108)	164 (176)	161 (173)	166 (177)	148 (160)

* The number of items and score points are based on the number of items included in scaling the fourth grade mathematics achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit C.1: Average Scale Scores for the Mathematics Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Mathematics Scale Score based on All Items	Norway (5)	Lithuania	Austria	Netherlands	United States	Czech Republic	Belgium (Flemish)	Cyprus	Finland	Denmark
Singapore	625 (3.9)	625 (3.9)	619 (3.8)	620 (3.8)	617 (3.8)	625 (3.9)	618 (3.8)	624 (3.9)	624 (3.9)	625 (3.9)	624 (3.8)
Hong Kong SAR	602 (3.3)	602 (3.3)	601 (3.3)	600 (3.3)	598 (3.5)	602 (3.4)	598 (3.3)	600 (3.3)	602 (3.4)	601 (3.3)	601 (3.3)
Korea, Rep. of	600 (2.2)	599 (2.2)	599 (2.2)	598 (2.2)	592 (2.2)	599 (2.2)	594 (2.2)	603 (2.3)	596 (2.2)	601 (2.2)	601 (2.2)
Chinese Taipei	599 (1.9)	598 (1.9)	596 (1.9)	597 (2.0)	593 (2.0)	599 (1.9)	595 (2.0)	599 (2.0)	594 (2.0)	601 (2.0)	599 (1.9)
Japan	593 (1.8)	590 (1.8)	595 (1.7)	593 (1.8)	590 (1.7)	592 (1.8)	591 (1.7)	594 (1.7)	587 (1.8)	596 (1.8)	594 (1.8)
Russian Federation	567 (3.3)	566 (3.4)	571 (3.4)	570 (3.4)	569 (3.3)	567 (3.4)	571 (3.4)	566 (3.3)	567 (3.4)	566 (3.3)	567 (3.4)
Northern Ireland	566 (2.7)	567 (2.8)	564 (2.7)	564 (2.7)	567 (2.8)	566 (2.8)	565 (2.8)	566 (2.7)	567 (2.8)	565 (2.8)	565 (2.7)
England	556 (3.0)	556 (3.0)	553 (3.0)	554 (2.9)	555 (3.0)	556 (3.0)	552 (3.0)	556 (3.0)	555 (3.1)	555 (3.0)	556 (3.0)
Ireland	548 (2.5)	549 (2.5)	545 (2.4)	546 (2.4)	547 (2.5)	549 (2.5)	546 (2.5)	549 (2.5)	549 (2.5)	548 (2.5)	548 (2.5)
Latvia	546 (2.6)	546 (2.6)	551 (2.7)	548 (2.6)	552 (2.6)	546 (2.6)	550 (2.6)	546 (2.6)	548 (2.7)	545 (2.6)	546 (2.6)
Norway (5)	543 (2.2)	543 (2.2)	542 (2.2)	542 (2.2)	544 (2.2)	542 (2.2)	541 (2.2)	543 (2.2)	543 (2.2)	542 (2.2)	544 (2.2)
Lithuania	542 (2.8)	542 (2.8)	547 (2.8)	543 (2.8)	545 (2.9)	542 (2.8)	545 (2.8)	541 (2.7)	543 (2.8)	542 (2.8)	542 (2.8)
Austria	539 (2.0)	540 (2.0)	536 (2.1)	543 (2.1)	541 (2.1)	538 (2.0)	542 (2.1)	539 (2.0)	539 (2.0)	538 (2.1)	540 (2.0)
Netherlands	538 (2.2)	537 (2.2)	541 (2.2)	539 (2.3)	544 (2.3)	537 (2.2)	538 (2.3)	537 (2.2)	537 (2.3)	539 (2.1)	539 (2.2)
United States	535 (2.5)	535 (2.5)	532 (2.5)	533 (2.5)	533 (2.5)	535 (2.5)	533 (2.5)	535 (2.5)	536 (2.5)	535 (2.5)	534 (2.5)
Czech Republic	533 (2.5)	532 (2.6)	533 (2.5)	536 (2.6)	532 (2.6)	533 (2.5)	537 (2.6)	533 (2.5)	533 (2.5)	532 (2.5)	533 (2.6)
Belgium (Flemish)	532 (1.9)	531 (1.9)	529 (1.9)	529 (1.9)	528 (1.9)	532 (1.9)	529 (1.9)	533 (1.9)	531 (1.9)	532 (1.9)	533 (1.9)
Cyprus	532 (2.9)	533 (2.9)	530 (2.8)	529 (2.8)	530 (2.9)	532 (2.9)	530 (2.8)	531 (2.9)	535 (2.9)	531 (2.9)	532 (2.9)
Finland	532 (2.3)	532 (2.4)	531 (2.3)	530 (2.3)	533 (2.3)	531 (2.3)	530 (2.3)	531 (2.4)	532 (2.3)	532 (2.4)	532 (2.3)
Denmark	525 (1.9)	525 (2.0)	524 (1.9)	525 (1.9)	527 (1.9)	524 (1.9)	522 (2.0)	524 (1.9)	524 (1.9)	525 (1.9)	526 (1.9)
Portugal	525 (2.6)	526 (2.6)	523 (2.6)	524 (2.6)	523 (2.6)	525 (2.6)	523 (2.7)	525 (2.6)	524 (2.7)	525 (2.6)	526 (2.6)
Hungary	523 (2.6)	523 (2.6)	524 (2.6)	525 (2.7)	523 (2.6)	524 (2.6)	527 (2.7)	524 (2.6)	525 (2.6)	522 (2.6)	524 (2.6)
Turkey (5)	523 (4.4)	524 (4.5)	521 (4.4)	520 (4.4)	518 (4.4)	523 (4.4)	519 (4.5)	523 (4.4)	521 (4.4)	524 (4.4)	522 (4.4)
Germany	521 (2.3)	521 (2.3)	521 (2.3)	523 (2.4)	523 (2.3)	520 (2.3)	523 (2.3)	521 (2.3)	522 (2.3)	520 (2.3)	522 (2.3)
Sweden	521 (2.8)	522 (2.8)	523 (2.8)	522 (2.8)	524 (2.8)	521 (2.8)	521 (2.8)	521 (2.8)	523 (2.8)	520 (2.8)	522 (2.8)
Poland	520 (2.7)	520 (2.7)	521 (2.7)	521 (2.7)	521 (2.7)	520 (2.7)	523 (2.7)	521 (2.7)	521 (2.7)	521 (2.7)	520 (2.7)
Australia	516 (2.8)	517 (2.8)	516 (2.7)	516 (2.8)	518 (2.8)	516 (2.8)	515 (2.7)	515 (2.8)	517 (2.8)	516 (2.8)	516 (2.8)
Azerbaijan	515 (2.7)	515 (2.7)	517 (2.8)	519 (2.8)	519 (2.8)	516 (2.7)	521 (2.8)	515 (2.7)	517 (2.8)	513 (2.7)	515 (2.7)
Bulgaria	515 (4.3)	514 (4.3)	517 (4.4)	514 (4.6)	514 (4.4)	516 (4.3)	518 (4.6)	516 (4.2)	516 (4.2)	513 (4.2)	515 (4.3)
Italy	515 (2.4)	516 (2.5)	513 (2.5)	514 (2.5)	513 (2.5)	514 (2.4)	513 (2.5)	516 (2.4)	514 (2.4)	515 (2.4)	516 (2.4)
Canada	512 (1.9)	512 (1.9)	511 (1.8)	512 (1.9)	512 (1.9)	511 (1.9)	509 (1.9)	511 (1.9)	512 (1.9)	512 (1.9)	513 (1.9)
Kazakhstan	512 (2.5)	511 (2.5)	514 (2.5)	513 (2.6)	514 (2.5)	512 (2.5)	515 (2.6)	511 (2.5)	512 (2.5)	511 (2.5)	511 (2.5)
Slovak Republic	510 (3.5)	510 (3.5)	511 (3.5)	512 (3.5)	512 (3.5)	510 (3.5)	513 (3.6)	510 (3.5)	511 (3.5)	508 (3.5)	510 (3.4)
Croatia	509 (2.2)	508 (2.2)	509 (2.2)	510 (2.2)	504 (2.1)	510 (2.2)	511 (2.1)	509 (2.1)	509 (2.1)	509 (2.1)	509 (2.2)
Malta	509 (1.4)	511 (1.5)	508 (1.5)	508 (1.5)	511 (1.5)	509 (1.5)	509 (1.5)	509 (1.5)	510 (1.5)	508 (1.5)	510 (1.4)
Serbia	508 (3.2)	507 (3.2)	510 (3.2)	510 (3.3)	510 (3.2)	509 (3.2)	513 (3.2)	508 (3.1)	509 (3.2)	507 (3.2)	507 (3.2)
Spain	502 (2.1)	502 (2.2)	502 (2.2)	502 (2.1)	500 (2.1)	502 (2.1)	501 (2.2)	504 (2.2)	501 (2.2)	504 (2.2)	503 (2.2)
Armenia	498 (2.5)	498 (2.5)	497 (2.6)	498 (2.6)	500 (2.6)	499 (2.5)	500 (2.6)	497 (2.5)	499 (2.5)	495 (2.6)	498 (2.5)
New Zealand	487 (2.6)	487 (2.6)	488 (2.6)	487 (2.6)	489 (2.8)	487 (2.6)	486 (2.6)	487 (2.6)	487 (2.6)	488 (2.6)	487 (2.6)
France	485 (3.0)	484 (3.0)	483 (3.0)	484 (3.0)	481 (3.0)	484 (3.0)	483 (3.0)	485 (3.0)	483 (3.0)	485 (3.0)	485 (3.0)
Georgia	482 (3.7)	481 (3.6)	483 (3.7)	483 (3.7)	483 (3.7)	482 (3.7)	485 (3.7)	481 (3.7)	485 (3.6)	480 (3.7)	481 (3.7)
United Arab Emirates	481 (1.7)	482 (1.7)	480 (1.7)	481 (1.7)	480 (1.7)	482 (1.7)	479 (1.7)	482 (1.7)	481 (1.7)	481 (1.7)	481 (1.7)
Bahrain	480 (2.6)	480 (2.6)	477 (2.7)	480 (2.6)	478 (2.6)	481 (2.6)	477 (2.6)	479 (2.6)	479 (2.7)	480 (2.6)	480 (2.6)
Qatar	449 (3.4)	449 (3.4)	447 (3.4)	449 (3.4)	449 (3.5)	450 (3.4)	447 (3.4)	450 (3.4)	450 (3.4)	449 (3.4)	449 (3.4)
Iran, Islamic Rep. of	443 (3.9)	444 (3.9)	441 (3.8)	440 (3.9)	441 (3.9)	444 (3.8)	442 (3.9)	445 (3.8)	443 (3.9)	445 (3.8)	442 (3.8)
Chile	441 (2.7)	442 (2.7)	443 (2.7)	441 (2.7)	444 (2.7)	440 (2.7)	440 (2.8)	440 (2.7)	442 (2.7)	442 (2.7)	441 (2.7)
Oman	431 (3.7)	431 (3.8)	431 (3.7)	430 (3.7)	430 (3.6)	432 (3.7)	429 (3.6)	431 (3.6)	432 (3.7)	431 (3.7)	431 (3.7)
International Average	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)
Benchmarking Participants											
Moscow City, Russian Fed.	593 (2.2)	592 (2.2)	599 (2.3)	598 (2.3)	597 (2.3)	594 (2.2)	600 (2.4)	592 (2.2)	595 (2.3)	591 (2.2)	593 (2.2)
Dubai, UAE	544 (1.6)	545 (1.7)	542 (1.6)	543 (1.6)	542 (1.7)	544 (1.7)	541 (1.6)	544 (1.6)	543 (1.7)	544 (1.6)	544 (1.7)
Quebec, Canada	532 (2.3)	532 (2.3)	530 (2.3)	531 (2.3)	530 (2.4)	532 (2.3)	528 (2.4)	532 (2.3)	531 (2.3)	532 (2.3)	533 (2.3)
Madrid, Spain	518 (2.2)	518 (2.1)	517 (2.1)	517 (2.1)	516 (2.1)	518 (2.2)	517 (2.1)	521 (2.2)	516 (2.2)	519 (2.2)	519 (2.1)
Ontario, Canada	512 (3.3)	513 (3.3)	512 (3.3)	512 (3.4)	512 (3.3)	512 (3.3)	510 (3.4)	511 (3.3)	513 (3.3)	512 (3.3)	513 (3.3)
Abu Dhabi, UAE	441 (2.2)	441 (2.3)	440 (2.2)	440 (2.2)	441 (2.3)	441 (2.2)	438 (2.2)	441 (2.2)	441 (2.2)	440 (2.3)	440 (2.2)
Number of Items (Score Points)*	171 (183)	157 (168)	152 (164)	148 (160)	124 (135)	164 (176)	137 (145)	151 (160)	151 (162)	163 (175)	164 (176)

* The number of items and score points are based on the number of items included in scaling the fourth grade mathematics achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit C.1: Average Scale Scores for the Mathematics Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Mathematics Scale Score based on All Items	Portugal	Hungary	Turkey (5)	Germany	Sweden	Poland	Australia	Azerbaijan	Bulgaria	Italy
Singapore	625 (3.9)	625 (3.9)	621 (3.8)	626 (3.9)	616 (3.8)	616 (3.8)	627 (3.9)	624 (4.1)	626 (3.9)	620 (3.9)	623 (3.8)
Hong Kong SAR	602 (3.3)	602 (3.3)	600 (3.3)	602 (3.4)	598 (3.3)	598 (3.4)	601 (3.3)	600 (3.8)	601 (3.3)	600 (3.4)	601 (3.3)
Korea, Rep. of	600 (2.2)	600 (2.2)	597 (2.2)	598 (2.3)	597 (2.2)	595 (2.2)	600 (2.2)	601 (2.2)	600 (2.2)	594 (2.2)	601 (2.2)
Chinese Taipei	599 (1.9)	599 (1.9)	595 (1.9)	601 (2.0)	594 (2.0)	591 (2.0)	600 (1.9)	592 (2.4)	599 (1.9)	592 (2.0)	598 (1.9)
Japan	593 (1.8)	593 (1.8)	592 (1.7)	590 (1.7)	589 (1.7)	588 (1.7)	594 (1.8)	590 (2.0)	593 (1.8)	589 (1.7)	595 (1.7)
Russian Federation	567 (3.3)	567 (3.3)	570 (3.4)	566 (3.3)	571 (3.4)	569 (3.4)	566 (3.3)	566 (3.6)	567 (3.3)	577 (3.4)	568 (3.3)
Northern Ireland	566 (2.7)	566 (2.7)	565 (2.7)	568 (2.8)	563 (2.8)	565 (2.8)	565 (2.7)	567 (3.2)	566 (2.8)	564 (2.7)	565 (2.7)
England	556 (3.0)	556 (3.0)	554 (3.0)	556 (3.1)	552 (2.9)	553 (2.9)	556 (3.0)	552 (3.3)	556 (3.0)	553 (3.0)	555 (2.9)
Ireland	548 (2.5)	548 (2.5)	547 (2.5)	550 (2.5)	544 (2.5)	546 (2.5)	548 (2.5)	544 (2.5)	549 (2.5)	544 (2.5)	547 (2.5)
Latvia	546 (2.6)	546 (2.6)	549 (2.7)	545 (2.6)	550 (2.7)	550 (2.6)	546 (2.6)	554 (2.8)	546 (2.6)	555 (2.8)	547 (2.6)
Norway (5)	543 (2.2)	543 (2.2)	542 (2.2)	541 (2.2)	541 (2.2)	544 (2.2)	543 (2.2)	547 (2.2)	543 (2.2)	540 (2.2)	543 (2.2)
Lithuania	542 (2.8)	542 (2.8)	544 (2.8)	540 (2.8)	544 (2.8)	544 (2.8)	542 (2.7)	542 (3.0)	542 (2.8)	548 (2.9)	542 (2.7)
Austria	539 (2.0)	539 (2.0)	539 (2.1)	540 (2.0)	545 (2.0)	542 (2.1)	538 (2.0)	539 (2.0)	539 (2.0)	541 (2.1)	540 (2.0)
Netherlands	538 (2.2)	538 (2.2)	537 (2.2)	535 (2.2)	538 (2.3)	540 (2.4)	538 (2.2)	540 (2.6)	537 (2.2)	539 (2.3)	538 (2.2)
United States	535 (2.5)	535 (2.5)	534 (2.5)	536 (2.6)	530 (2.5)	531 (2.5)	535 (2.5)	530 (2.4)	535 (2.5)	531 (2.5)	533 (2.5)
Czech Republic	533 (2.5)	533 (2.5)	535 (2.6)	532 (2.5)	537 (2.6)	536 (2.6)	532 (2.5)	532 (2.6)	533 (2.5)	534 (2.6)	533 (2.6)
Belgium (Flemish)	532 (1.9)	532 (1.9)	529 (1.9)	532 (2.0)	529 (1.9)	529 (1.9)	533 (1.9)	539 (1.9)	532 (1.9)	527 (1.9)	532 (1.9)
Cyprus	532 (2.9)	532 (2.9)	531 (2.8)	533 (2.9)	528 (2.8)	531 (2.9)	532 (2.9)	533 (2.8)	532 (2.9)	528 (2.8)	531 (2.9)
Finland	532 (2.3)	532 (2.3)	529 (2.3)	529 (2.4)	528 (2.3)	532 (2.4)	532 (2.3)	533 (2.3)	532 (2.3)	527 (2.3)	532 (2.3)
Denmark	525 (1.9)	525 (1.9)	523 (1.9)	523 (2.0)	523 (1.9)	526 (1.9)	525 (1.9)	529 (2.1)	524 (1.9)	522 (1.9)	525 (1.9)
Portugal	525 (2.6)	525 (2.6)	523 (2.6)	527 (2.7)	524 (2.6)	522 (2.6)	525 (2.6)	519 (2.7)	525 (2.6)	522 (2.6)	525 (2.6)
Hungary	523 (2.6)	523 (2.6)	526 (2.7)	523 (2.6)	527 (2.7)	526 (2.7)	523 (2.6)	528 (2.8)	523 (2.6)	527 (2.7)	524 (2.7)
Turkey (5)	523 (4.4)	523 (4.4)	523 (4.4)	525 (4.5)	520 (4.4)	517 (4.4)	524 (4.4)	523 (4.2)	523 (4.4)	521 (4.4)	522 (4.4)
Germany	521 (2.3)	521 (2.3)	521 (2.3)	520 (2.3)	528 (2.4)	525 (2.4)	521 (2.3)	528 (2.3)	521 (2.3)	524 (2.4)	522 (2.3)
Sweden	521 (2.8)	521 (2.8)	522 (2.8)	518 (2.8)	522 (2.9)	525 (2.8)	521 (2.8)	528 (2.9)	521 (2.8)	524 (2.8)	522 (2.8)
Poland	520 (2.7)	520 (2.7)	520 (2.7)	520 (2.7)	522 (2.7)	523 (2.7)	521 (2.7)	522 (2.8)	520 (2.7)	521 (2.7)	521 (2.7)
Australia	516 (2.8)	516 (2.8)	516 (2.8)	514 (2.8)	514 (2.8)	517 (2.8)	516 (2.8)	521 (2.8)	516 (2.8)	515 (2.8)	516 (2.8)
Azerbaijan	515 (2.7)	515 (2.7)	519 (2.8)	516 (2.7)	521 (2.8)	518 (2.8)	515 (2.7)	514 (2.9)	516 (2.7)	524 (2.9)	515 (2.8)
Bulgaria	515 (4.3)	515 (4.3)	518 (4.5)	518 (4.2)	518 (4.7)	515 (4.6)	514 (4.3)	524 (4.1)	515 (4.3)	526 (4.6)	515 (4.4)
Italy	515 (2.4)	515 (2.4)	513 (2.4)	517 (2.4)	514 (2.5)	513 (2.5)	515 (2.4)	517 (2.6)	515 (2.4)	513 (2.5)	515 (2.4)
Canada	512 (1.9)	512 (1.9)	512 (1.9)	510 (1.9)	510 (1.9)	512 (1.9)	512 (1.9)	512 (1.9)	512 (1.9)	509 (1.9)	512 (1.9)
Kazakhstan	512 (2.5)	512 (2.5)	512 (2.6)	513 (2.5)	515 (2.6)	512 (2.6)	512 (2.5)	516 (2.7)	512 (2.5)	517 (2.6)	511 (2.5)
Slovak Republic	510 (3.5)	510 (3.5)	511 (3.5)	508 (3.4)	513 (3.6)	514 (3.6)	509 (3.5)	511 (3.8)	510 (3.5)	513 (3.6)	510 (3.5)
Croatia	509 (2.2)	509 (2.2)	511 (2.2)	509 (2.1)	513 (2.2)	509 (2.1)	509 (2.2)	509 (2.2)	509 (2.2)	514 (2.2)	510 (2.2)
Malta	509 (1.4)	509 (1.4)	508 (1.5)	511 (1.4)	510 (1.4)	510 (1.5)	508 (1.5)	506 (1.7)	509 (1.5)	508 (1.5)	509 (1.4)
Serbia	508 (3.2)	508 (3.2)	510 (3.3)	509 (3.1)	514 (3.3)	510 (3.3)	508 (3.2)	512 (3.3)	508 (3.2)	515 (3.3)	508 (3.2)
Spain	502 (2.1)	502 (2.1)	502 (2.1)	504 (2.2)	501 (2.2)	500 (2.2)	503 (2.1)	498 (2.5)	503 (2.1)	501 (2.2)	503 (2.2)
Armenia	498 (2.5)	498 (2.5)	498 (2.6)	501 (2.5)	501 (2.6)	498 (2.6)	497 (2.6)	500 (2.4)	498 (2.5)	501 (2.6)	497 (2.6)
New Zealand	487 (2.6)	487 (2.6)	488 (2.6)	485 (2.6)	484 (2.7)	489 (2.7)	487 (2.6)	489 (2.9)	487 (2.6)	487 (2.6)	488 (2.6)
France	485 (3.0)	485 (3.0)	484 (3.0)	486 (3.0)	485 (3.0)	483 (3.0)	485 (3.0)	487 (3.0)	485 (3.0)	482 (3.0)	485 (3.0)
Georgia	482 (3.7)	482 (3.7)	483 (3.7)	484 (3.6)	486 (3.7)	483 (3.6)	482 (3.6)	484 (3.5)	482 (3.7)	486 (3.8)	481 (3.7)
United Arab Emirates	481 (1.7)	481 (1.7)	481 (1.7)	481 (1.7)	478 (1.7)	480 (1.7)	482 (1.7)	482 (1.8)	482 (1.7)	480 (1.7)	480 (1.7)
Bahrain	480 (2.6)	480 (2.6)	479 (2.6)	481 (2.6)	478 (2.6)	478 (2.6)	480 (2.7)	476 (2.7)	480 (2.6)	476 (2.6)	479 (2.6)
Qatar	449 (3.4)	449 (3.4)	449 (3.4)	450 (3.4)	446 (3.4)	448 (3.3)	450 (3.4)	444 (3.4)	450 (3.4)	447 (3.4)	448 (3.4)
Iran, Islamic Rep. of	443 (3.9)	443 (3.9)	442 (3.9)	448 (3.8)	437 (3.9)	440 (3.8)	444 (3.8)	450 (3.8)	443 (3.8)	440 (3.8)	443 (3.8)
Chile	441 (2.7)	441 (2.7)	442 (2.7)	437 (2.8)	439 (2.7)	443 (2.7)	441 (2.7)	448 (2.7)	442 (2.7)	441 (2.7)	441 (2.7)
Oman	431 (3.7)	431 (3.7)	431 (3.7)	433 (3.7)	429 (3.6)	431 (3.7)	430 (3.7)	437 (3.6)	431 (3.7)	430 (3.6)	430 (3.7)
International Average	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	524 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)
Benchmarking Participants											
Moscow City, Russian Fed.	593 (2.2)	593 (2.2)	599 (2.3)	591 (2.2)	599 (2.3)	599 (2.4)	592 (2.2)	598 (2.6)	592 (2.2)	608 (2.5)	595 (2.3)
Dubai, UAE	544 (1.6)	544 (1.6)	543 (1.6)	544 (1.6)	540 (1.6)	541 (1.6)	544 (1.7)	541 (1.8)	544 (1.6)	541 (1.6)	543 (1.7)
Quebec, Canada	532 (2.3)	532 (2.3)	531 (2.3)	531 (2.3)	529 (2.3)	530 (2.4)	532 (2.3)	532 (2.7)	532 (2.3)	526 (2.4)	533 (2.3)
Madrid, Spain	518 (2.2)	518 (2.2)	517 (2.1)	521 (2.2)	517 (2.1)	516 (2.1)	519 (2.2)	511 (2.3)	518 (2.2)	516 (2.1)	519 (2.1)
Ontario, Canada	512 (3.3)	512 (3.3)	513 (3.4)	510 (3.4)	511 (3.3)	513 (3.4)	512 (3.3)	513 (3.2)	512 (3.3)	509 (3.3)	512 (3.3)
Abu Dhabi, UAE	441 (2.2)	441 (2.2)	440 (2.2)	440 (2.2)	438 (2.3)	440 (2.2)	441 (2.2)	444 (2.4)	441 (2.2)	440 (2.2)	440 (2.2)
Number of Items (Score Points)*	171 (183)	171 (183)	155 (167)	145 (153)	132 (143)	131 (142)	163 (174)	59 (65)	169 (181)	133 (143)	162 (174)

* The number of items and score points are based on the number of items included in scaling the fourth grade mathematics achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

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Exhibit C.1: Average Scale Scores for the Mathematics Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Mathematics Scale Score based on All Items	Canada	Kazakhstan	Slovak Republic	Croatia	Malta	Serbia	Spain	Armenia	New Zealand	France
Singapore	625 (3.9)	618 (3.8)	626 (4.0)	613 (3.8)	621 (3.9)	623 (3.9)	626 (3.9)	622 (3.9)	625 (3.9)	622 (3.7)	623 (3.9)
Hong Kong SAR	602 (3.3)	603 (3.4)	601 (3.4)	596 (3.4)	598 (3.4)	602 (3.4)	601 (3.5)	600 (3.3)	601 (3.4)	601 (3.5)	600 (3.3)
Korea, Rep. of	600 (2.2)	600 (2.2)	597 (2.2)	593 (2.2)	596 (2.2)	596 (2.2)	596 (2.3)	603 (2.2)	599 (2.2)	599 (2.1)	601 (2.2)
Chinese Taipei	599 (1.9)	595 (2.0)	596 (2.0)	589 (2.0)	598 (2.0)	595 (2.0)	597 (2.0)	599 (1.9)	597 (1.9)	596 (2.1)	599 (1.9)
Japan	593 (1.8)	593 (1.7)	589 (1.8)	587 (1.7)	590 (1.8)	588 (1.8)	589 (1.7)	596 (1.7)	592 (1.8)	590 (1.8)	595 (1.7)
Russian Federation	567 (3.3)	565 (3.3)	569 (3.4)	574 (3.3)	576 (3.4)	569 (3.3)	571 (3.4)	566 (3.3)	568 (3.4)	566 (3.4)	569 (3.4)
Northern Ireland	566 (2.7)	567 (2.7)	566 (2.9)	565 (2.8)	562 (2.9)	568 (2.8)	565 (2.8)	565 (2.7)	566 (2.7)	567 (2.8)	564 (2.7)
England	556 (3.0)	556 (3.0)	553 (3.1)	552 (2.9)	549 (3.1)	556 (3.0)	554 (3.0)	554 (3.0)	556 (3.0)	557 (3.0)	554 (2.9)
Ireland	548 (2.5)	548 (2.5)	549 (2.5)	544 (2.5)	544 (2.5)	548 (2.5)	547 (2.5)	548 (2.5)	548 (2.5)	547 (2.5)	547 (2.5)
Latvia	546 (2.6)	546 (2.6)	548 (2.7)	554 (2.7)	552 (2.7)	550 (2.6)	549 (2.7)	546 (2.6)	547 (2.6)	547 (2.6)	548 (2.6)
Norway (5)	543 (2.2)	547 (2.2)	541 (2.2)	542 (2.3)	540 (2.2)	543 (2.2)	540 (2.2)	541 (2.2)	543 (2.2)	544 (2.2)	543 (2.2)
Lithuania	542 (2.8)	542 (2.8)	542 (2.8)	547 (2.9)	544 (2.9)	545 (2.8)	542 (2.8)	542 (2.7)	542 (2.8)	541 (2.7)	543 (2.8)
Austria	539 (2.0)	539 (2.0)	541 (2.0)	542 (2.1)	544 (2.0)	540 (2.0)	543 (2.0)	537 (2.0)	539 (2.1)	540 (2.1)	540 (2.1)
Netherlands	538 (2.2)	542 (2.3)	535 (2.2)	543 (2.4)	534 (2.3)	539 (2.2)	536 (2.2)	538 (2.2)	537 (2.2)	537 (2.2)	538 (2.2)
United States	535 (2.5)	534 (2.5)	535 (2.6)	529 (2.4)	530 (2.6)	535 (2.5)	536 (2.5)	533 (2.5)	536 (2.5)	534 (2.5)	533 (2.5)
Czech Republic	533 (2.5)	533 (2.6)	535 (2.5)	537 (2.6)	542 (2.6)	533 (2.6)	535 (2.5)	533 (2.5)	533 (2.5)	532 (2.6)	536 (2.6)
Belgium (Flemish)	532 (1.9)	530 (2.0)	530 (1.9)	527 (1.9)	531 (1.9)	530 (1.9)	531 (1.9)	532 (1.9)	531 (1.9)	532 (1.9)	533 (1.9)
Cyprus	532 (2.9)	530 (3.0)	533 (2.8)	528 (2.9)	530 (2.8)	532 (2.9)	532 (2.8)	531 (2.9)	532 (2.9)	531 (2.8)	531 (2.8)
Finland	532 (2.3)	534 (2.4)	530 (2.3)	531 (2.3)	528 (2.3)	532 (2.3)	529 (2.3)	531 (2.4)	531 (2.3)	532 (2.4)	532 (2.3)
Denmark	525 (1.9)	529 (2.0)	522 (2.0)	523 (1.9)	522 (2.0)	524 (1.9)	520 (2.0)	523 (1.9)	524 (1.9)	527 (2.0)	525 (2.0)
Portugal	525 (2.6)	524 (2.5)	523 (2.6)	521 (2.6)	522 (2.7)	525 (2.6)	524 (2.7)	524 (2.6)	525 (2.6)	527 (2.6)	525 (2.6)
Hungary	523 (2.6)	521 (2.7)	526 (2.6)	528 (2.7)	532 (2.6)	524 (2.6)	527 (2.6)	523 (2.6)	524 (2.7)	523 (2.6)	526 (2.7)
Turkey (5)	523 (4.4)	517 (4.5)	524 (4.4)	516 (4.4)	525 (4.3)	520 (4.4)	526 (4.4)	523 (4.4)	523 (4.4)	523 (4.4)	522 (4.5)
Germany	521 (2.3)	522 (2.3)	521 (2.3)	528 (2.4)	528 (2.3)	522 (2.3)	524 (2.3)	521 (2.3)	521 (2.3)	522 (2.4)	523 (2.3)
Sweden	521 (2.8)	524 (2.8)	520 (2.8)	527 (2.9)	521 (2.9)	523 (2.8)	520 (2.8)	519 (2.8)	522 (2.8)	522 (2.8)	522 (2.8)
Poland	520 (2.7)	521 (2.7)	521 (2.7)	524 (2.7)	520 (2.7)	521 (2.7)	520 (2.7)	521 (2.7)	520 (2.7)	521 (2.7)	521 (2.7)
Australia	516 (2.8)	519 (2.8)	515 (2.8)	516 (2.8)	508 (2.8)	517 (2.8)	513 (2.8)	515 (2.8)	516 (2.8)	518 (2.8)	515 (2.8)
Azerbaijan	515 (2.7)	511 (2.8)	519 (2.8)	522 (2.9)	525 (2.9)	518 (2.8)	521 (2.9)	514 (2.7)	517 (2.8)	515 (2.8)	517 (2.8)
Bulgaria	515 (4.3)	507 (4.5)	519 (4.2)	519 (4.5)	528 (4.3)	517 (4.2)	522 (4.3)	514 (4.3)	516 (4.4)	515 (4.4)	518 (4.4)
Italy	515 (2.4)	511 (2.5)	515 (2.4)	509 (2.5)	515 (2.5)	514 (2.4)	516 (2.5)	514 (2.4)	515 (2.4)	518 (2.5)	516 (2.5)
Canada	512 (1.9)	514 (1.9)	510 (1.9)	510 (1.9)	506 (1.9)	511 (1.9)	509 (1.9)	511 (1.9)	512 (1.9)	513 (1.9)	511 (1.9)
Kazakhstan	512 (2.5)	508 (2.6)	515 (2.5)	516 (2.6)	523 (2.6)	512 (2.5)	516 (2.6)	512 (2.5)	512 (2.5)	509 (2.6)	513 (2.6)
Slovak Republic	510 (3.5)	511 (3.5)	510 (3.5)	518 (3.6)	516 (3.5)	511 (3.5)	512 (3.5)	509 (3.5)	510 (3.5)	509 (3.6)	512 (3.5)
Croatia	509 (2.2)	502 (2.3)	511 (2.1)	511 (2.2)	520 (2.2)	508 (2.1)	514 (2.2)	510 (2.2)	509 (2.2)	508 (2.2)	512 (2.2)
Malta	509 (1.4)	510 (1.5)	508 (1.5)	510 (1.5)	506 (1.5)	512 (1.5)	508 (1.5)	508 (1.5)	509 (1.5)	511 (1.5)	509 (1.4)
Serbia	508 (3.2)	504 (3.2)	511 (3.2)	515 (3.3)	518 (3.2)	509 (3.2)	514 (3.3)	508 (3.2)	508 (3.2)	507 (3.2)	510 (3.2)
Spain	502 (2.1)	500 (2.2)	501 (2.2)	497 (2.2)	500 (2.3)	502 (2.2)	503 (2.2)	504 (2.2)	503 (2.1)	505 (2.2)	504 (2.2)
Armenia	498 (2.5)	491 (2.6)	503 (2.5)	500 (2.5)	509 (2.4)	499 (2.5)	505 (2.4)	495 (2.6)	498 (2.6)	496 (2.6)	499 (2.6)
New Zealand	487 (2.6)	491 (2.7)	485 (2.6)	488 (2.7)	479 (2.7)	489 (2.6)	483 (2.7)	487 (2.6)	488 (2.6)	489 (2.6)	486 (2.6)
France	485 (3.0)	484 (3.0)	484 (3.0)	481 (3.0)	485 (3.0)	484 (3.0)	483 (3.0)	486 (3.0)	485 (3.0)	487 (3.0)	486 (3.0)
Georgia	482 (3.7)	477 (3.7)	487 (3.5)	487 (3.7)	493 (3.6)	483 (3.6)	488 (3.7)	481 (3.7)	482 (3.7)	479 (3.6)	482 (3.7)
United Arab Emirates	481 (1.7)	480 (1.7)	482 (1.7)	478 (1.7)	479 (1.7)	481 (1.7)	482 (1.7)	480 (1.7)	482 (1.7)	482 (1.7)	480 (1.7)
Bahrain	480 (2.6)	480 (2.6)	479 (2.6)	475 (2.6)	476 (2.6)	478 (2.7)	480 (2.6)	479 (2.6)	480 (2.6)	479 (2.7)	477 (2.6)
Qatar	449 (3.4)	449 (3.5)	449 (3.4)	446 (3.4)	445 (3.3)	449 (3.4)	451 (3.3)	447 (3.4)	450 (3.4)	452 (3.4)	448 (3.4)
Iran, Islamic Rep. of	443 (3.9)	444 (3.9)	445 (3.9)	436 (3.8)	440 (3.9)	442 (3.8)	443 (3.9)	443 (3.8)	442 (3.8)	446 (3.8)	442 (3.8)
Chile	441 (2.7)	444 (2.7)	442 (2.7)	441 (2.7)	439 (2.7)	443 (2.7)	438 (2.7)	441 (2.7)	442 (2.7)	446 (2.7)	441 (2.7)
Oman	431 (3.7)	432 (3.6)	430 (3.8)	430 (3.5)	428 (3.7)	431 (3.7)	429 (3.7)	431 (3.7)	431 (3.7)	432 (3.6)	430 (3.6)
International Average	523 (0.4)	522 (0.4)	523 (0.4)	523 (0.4)	524 (0.4)	523 (0.4)	524 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)
Benchmarking Participants											
Moscow City, Russian Fed.	593 (2.2)	593 (2.3)	595 (2.3)	604 (2.4)	601 (2.4)	597 (2.3)	599 (2.4)	592 (2.2)	595 (2.3)	593 (2.3)	597 (2.3)
Dubai, UAE	544 (1.6)	543 (1.7)	544 (1.6)	539 (1.6)	540 (1.7)	543 (1.7)	543 (1.7)	542 (1.6)	544 (1.6)	544 (1.7)	543 (1.6)
Quebec, Canada	532 (2.3)	533 (2.3)	529 (2.4)	527 (2.4)	527 (2.4)	530 (2.3)	530 (2.4)	533 (2.3)	532 (2.3)	533 (2.4)	532 (2.3)
Madrid, Spain	518 (2.2)	516 (2.2)	516 (2.2)	513 (2.1)	516 (2.2)	517 (2.2)	519 (2.1)	520 (2.2)	518 (2.1)	521 (2.2)	519 (2.2)
Ontario, Canada	512 (3.3)	515 (3.4)	512 (3.3)	510 (3.3)	505 (3.4)	512 (3.3)	509 (3.4)	511 (3.3)	513 (3.3)	513 (3.3)	511 (3.3)
Abu Dhabi, UAE	441 (2.2)	439 (2.3)	441 (2.3)	439 (2.3)	439 (2.3)	441 (2.2)	441 (2.3)	439 (2.3)	441 (2.2)	442 (2.2)	440 (2.2)
Number of Items (Score Points)*	171 (183)	125 (137)	142 (153)	119 (130)	127 (136)	147 (157)	132 (141)	154 (166)	164 (176)	119 (127)	161 (172)

* The number of items and score points are based on the number of items included in scaling the fourth grade mathematics achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit C.1: Average Scale Scores for the Mathematics Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Mathematics Scale Score based on All Items	Georgia	United Arab Emirates	Bahrain	Qatar	Iran, Islamic Rep. of	Chile	Oman
Singapore	625 (3.9)	619 (3.9)	625 (3.9)	626 (3.9)	629 (3.9)	626 (3.9)	626 (3.9)	624 (3.9)
Hong Kong SAR	602 (3.3)	601 (3.4)	602 (3.3)	601 (3.3)	602 (3.3)	602 (3.4)	602 (3.4)	603 (3.5)
Korea, Rep. of	600 (2.2)	596 (2.2)	600 (2.2)	600 (2.2)	600 (2.2)	600 (2.2)	600 (2.2)	596 (2.3)
Chinese Taipei	599 (1.9)	595 (2.0)	599 (1.9)	599 (1.9)	601 (2.0)	601 (1.9)	597 (2.0)	594 (2.1)
Japan	593 (1.8)	590 (1.7)	593 (1.8)	593 (1.8)	591 (1.8)	594 (1.8)	591 (1.7)	587 (1.8)
Russian Federation	567 (3.3)	573 (3.4)	567 (3.3)	567 (3.3)	566 (3.3)	567 (3.3)	567 (3.3)	565 (3.4)
Northern Ireland	566 (2.7)	566 (2.8)	566 (2.7)	566 (2.7)	568 (2.8)	565 (2.8)	566 (2.7)	569 (2.7)
England	556 (3.0)	553 (3.0)	556 (3.0)	556 (3.0)	558 (3.0)	555 (3.0)	557 (3.0)	557 (3.0)
Ireland	548 (2.5)	546 (2.5)	548 (2.5)	548 (2.5)	550 (2.5)	548 (2.5)	548 (2.5)	548 (2.5)
Latvia	546 (2.6)	551 (2.7)	546 (2.6)	546 (2.6)	546 (2.6)	546 (2.6)	547 (2.6)	548 (2.6)
Norway (5)	543 (2.2)	541 (2.2)	543 (2.2)	543 (2.2)	543 (2.3)	542 (2.2)	545 (2.2)	545 (2.2)
Lithuania	542 (2.8)	546 (2.8)	542 (2.8)	542 (2.8)	541 (2.7)	542 (2.8)	542 (2.8)	542 (2.9)
Austria	539 (2.0)	543 (2.1)	539 (2.0)	539 (2.0)	539 (2.1)	538 (2.1)	539 (2.0)	540 (2.1)
Netherlands	538 (2.2)	539 (2.3)	538 (2.2)	537 (2.2)	536 (2.2)	537 (2.2)	541 (2.2)	542 (2.4)
United States	535 (2.5)	534 (2.5)	535 (2.5)	535 (2.5)	536 (2.6)	536 (2.5)	535 (2.5)	534 (2.5)
Czech Republic	533 (2.5)	534 (2.5)	533 (2.5)	533 (2.5)	532 (2.6)	532 (2.5)	531 (2.5)	531 (2.5)
Belgium (Flemish)	532 (1.9)	529 (1.9)	532 (1.9)	532 (1.9)	532 (2.0)	531 (1.9)	533 (1.9)	532 (1.9)
Cyprus	532 (2.9)	530 (2.8)	532 (2.9)	532 (2.9)	533 (2.9)	531 (2.9)	532 (2.9)	533 (2.9)
Finland	532 (2.3)	529 (2.3)	532 (2.3)	532 (2.3)	531 (2.4)	530 (2.4)	534 (2.4)	535 (2.4)
Denmark	525 (1.9)	522 (2.0)	525 (1.9)	524 (1.9)	524 (1.9)	524 (1.9)	526 (1.9)	527 (1.9)
Portugal	525 (2.6)	523 (2.7)	525 (2.6)	525 (2.6)	527 (2.6)	524 (2.7)	525 (2.6)	524 (2.7)
Hungary	523 (2.6)	527 (2.7)	523 (2.6)	523 (2.6)	523 (2.6)	523 (2.6)	523 (2.7)	522 (2.6)
Turkey (5)	523 (4.4)	520 (4.4)	523 (4.4)	523 (4.4)	524 (4.4)	525 (4.4)	521 (4.4)	519 (4.4)
Germany	521 (2.3)	524 (2.4)	521 (2.3)	521 (2.3)	520 (2.3)	519 (2.3)	521 (2.3)	523 (2.3)
Sweden	521 (2.8)	522 (2.9)	521 (2.8)	521 (2.8)	521 (2.8)	520 (2.8)	523 (2.8)	524 (2.7)
Poland	520 (2.7)	520 (2.8)	520 (2.7)	520 (2.7)	520 (2.6)	520 (2.7)	520 (2.7)	522 (2.7)
Australia	516 (2.8)	515 (2.8)	516 (2.8)	516 (2.8)	515 (2.8)	515 (2.8)	518 (2.8)	521 (2.8)
Azerbaijan	515 (2.7)	522 (2.8)	515 (2.7)	515 (2.7)	517 (2.7)	515 (2.8)	515 (2.8)	515 (2.8)
Bulgaria	515 (4.3)	522 (4.3)	515 (4.3)	515 (4.3)	516 (4.2)	514 (4.3)	514 (4.3)	512 (4.3)
Italy	515 (2.4)	514 (2.5)	515 (2.4)	515 (2.4)	515 (2.4)	514 (2.5)	514 (2.4)	512 (2.5)
Canada	512 (1.9)	510 (1.9)	512 (1.9)	512 (1.9)	511 (1.9)	512 (1.9)	512 (1.9)	513 (1.8)
Kazakhstan	512 (2.5)	515 (2.6)	512 (2.5)	512 (2.5)	512 (2.5)	513 (2.5)	510 (2.5)	507 (2.6)
Slovak Republic	510 (3.5)	512 (3.6)	510 (3.5)	510 (3.5)	509 (3.5)	508 (3.5)	510 (3.5)	511 (3.5)
Croatia	509 (2.2)	512 (2.1)	509 (2.2)	509 (2.2)	509 (2.1)	509 (2.2)	506 (2.2)	503 (2.3)
Malta	509 (1.4)	508 (1.5)	509 (1.4)	509 (1.4)	512 (1.5)	507 (1.5)	510 (1.5)	514 (1.5)
Serbia	508 (3.2)	513 (3.2)	508 (3.2)	508 (3.2)	509 (3.2)	508 (3.2)	505 (3.2)	504 (3.3)
Spain	502 (2.1)	502 (2.2)	502 (2.1)	503 (2.1)	504 (2.2)	503 (2.1)	501 (2.2)	498 (2.2)
Armenia	498 (2.5)	501 (2.5)	498 (2.5)	498 (2.5)	500 (2.5)	497 (2.6)	497 (2.5)	495 (2.6)
New Zealand	487 (2.6)	486 (2.7)	487 (2.6)	487 (2.6)	486 (2.7)	487 (2.6)	489 (2.6)	492 (2.7)
France	485 (3.0)	483 (3.0)	485 (3.0)	485 (3.0)	485 (3.0)	485 (3.0)	484 (3.0)	482 (3.0)
Georgia	482 (3.7)	486 (3.8)	482 (3.7)	482 (3.7)	481 (3.7)	482 (3.7)	480 (3.7)	478 (3.7)
United Arab Emirates	481 (1.7)	479 (1.7)	481 (1.7)	482 (1.7)	482 (1.7)	482 (1.7)	482 (1.7)	481 (1.7)
Bahrain	480 (2.6)	477 (2.6)	480 (2.6)	480 (2.6)	481 (2.6)	480 (2.6)	480 (2.6)	479 (2.7)
Qatar	449 (3.4)	447 (3.5)	449 (3.4)	450 (3.4)	451 (3.4)	450 (3.4)	449 (3.4)	449 (3.5)
Iran, Islamic Rep. of	443 (3.9)	440 (3.8)	443 (3.9)	443 (3.9)	445 (3.9)	445 (3.9)	443 (3.8)	444 (3.9)
Chile	441 (2.7)	441 (2.7)	441 (2.7)	442 (2.7)	438 (2.8)	442 (2.7)	442 (2.7)	441 (2.8)
Oman	431 (3.7)	429 (3.6)	431 (3.7)	431 (3.7)	433 (3.7)	432 (3.7)	431 (3.7)	434 (3.6)
International Average	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)
Benchmarking Participants								
Moscow City, Russian Fed.	593 (2.2)	603 (2.4)	593 (2.2)	592 (2.2)	592 (2.3)	593 (2.2)	593 (2.3)	594 (2.4)
Dubai, UAE	544 (1.6)	542 (1.6)	544 (1.6)	544 (1.6)	545 (1.7)	544 (1.6)	544 (1.7)	543 (1.7)
Quebec, Canada	532 (2.3)	529 (2.4)	532 (2.3)	532 (2.3)	533 (2.3)	532 (2.3)	532 (2.3)	530 (2.4)
Madrid, Spain	518 (2.2)	517 (2.2)	518 (2.2)	519 (2.1)	521 (2.2)	519 (2.1)	517 (2.1)	515 (2.2)
Ontario, Canada	512 (3.3)	511 (3.3)	512 (3.3)	512 (3.3)	511 (3.4)	512 (3.3)	512 (3.3)	515 (3.2)
Abu Dhabi, UAE	441 (2.2)	439 (2.3)	441 (2.2)	441 (2.2)	441 (2.2)	441 (2.2)	441 (2.2)	440 (2.3)
Number of Items (Score Points)*	171 (183)	132 (141)	171 (183)	169 (181)	145 (155)	153 (163)	151 (162)	123 (133)

* The number of items and score points are based on the number of items included in scaling the fourth grade mathematics achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit C.1: Average Scale Scores for the Mathematics Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Mathematics Scale Score based on All Items	Benchmarking Participants	Moscow City, Russian Fed.	Dubai, UAE	Quebec, Canada	Madrid, Spain	Ontario, Canada	Abu Dhabi, UAE
Singapore	625 (3.9)		623 (3.9)	625 (3.9)	623 (3.9)	622 (3.9)	620 (3.8)	625 (3.9)
Hong Kong SAR	602 (3.3)		601 (3.4)	602 (3.3)	601 (3.3)	600 (3.3)	602 (3.3)	602 (3.3)
Korea, Rep. of	600 (2.2)		594 (2.2)	600 (2.2)	602 (2.2)	603 (2.2)	599 (2.2)	600 (2.2)
Chinese Taipei	599 (1.9)		596 (2.0)	599 (1.9)	598 (2.0)	599 (1.9)	596 (2.0)	599 (1.9)
Japan	593 (1.8)		588 (1.7)	593 (1.8)	593 (1.8)	596 (1.7)	593 (1.7)	593 (1.8)
Russian Federation	567 (3.3)		571 (3.3)	567 (3.3)	566 (3.3)	566 (3.3)	566 (3.3)	567 (3.3)
Northern Ireland	566 (2.7)		568 (2.8)	566 (2.7)	566 (2.7)	565 (2.7)	566 (2.7)	566 (2.7)
England	556 (3.0)		556 (3.0)	556 (3.0)	557 (2.9)	554 (3.0)	555 (3.0)	556 (3.0)
Ireland	548 (2.5)		550 (2.5)	548 (2.5)	548 (2.5)	548 (2.5)	548 (2.5)	548 (2.5)
Latvia	546 (2.6)		550 (2.6)	546 (2.6)	546 (2.6)	546 (2.6)	546 (2.6)	546 (2.6)
Norway (5)	543 (2.2)		541 (2.2)	543 (2.2)	545 (2.2)	541 (2.2)	545 (2.2)	543 (2.2)
Lithuania	542 (2.8)		544 (2.8)	542 (2.8)	540 (2.7)	542 (2.7)	543 (2.8)	542 (2.8)
Austria	539 (2.0)		541 (2.1)	539 (2.0)	539 (2.0)	537 (2.0)	539 (2.0)	539 (2.0)
Netherlands	538 (2.2)		537 (2.2)	538 (2.2)	537 (2.2)	538 (2.2)	542 (2.3)	538 (2.2)
United States	535 (2.5)		535 (2.6)	535 (2.5)	534 (2.5)	533 (2.5)	533 (2.5)	535 (2.5)
Czech Republic	533 (2.5)		532 (2.6)	533 (2.5)	532 (2.6)	533 (2.5)	534 (2.5)	533 (2.5)
Belgium (Flemish)	532 (1.9)		528 (1.9)	532 (1.9)	533 (1.9)	532 (1.9)	531 (1.9)	532 (1.9)
Cyprus	532 (2.9)		532 (2.9)	532 (2.9)	532 (2.9)	531 (2.9)	530 (2.9)	532 (2.9)
Finland	532 (2.3)		530 (2.3)	532 (2.3)	532 (2.4)	531 (2.4)	534 (2.4)	532 (2.3)
Denmark	525 (1.9)		523 (1.9)	525 (1.9)	526 (1.9)	523 (1.9)	528 (2.0)	525 (1.9)
Portugal	525 (2.6)		525 (2.7)	525 (2.6)	526 (2.6)	524 (2.6)	523 (2.6)	525 (2.6)
Hungary	523 (2.6)		525 (2.6)	523 (2.6)	523 (2.7)	523 (2.6)	521 (2.7)	523 (2.6)
Turkey (5)	523 (4.4)		521 (4.5)	523 (4.4)	522 (4.4)	523 (4.4)	518 (4.5)	523 (4.4)
Germany	521 (2.3)		522 (2.3)	521 (2.3)	521 (2.3)	521 (2.3)	522 (2.3)	521 (2.3)
Sweden	521 (2.8)		522 (2.8)	521 (2.8)	522 (2.8)	519 (2.8)	523 (2.8)	521 (2.8)
Poland	520 (2.7)		519 (2.7)	520 (2.7)	520 (2.7)	521 (2.7)	522 (2.6)	520 (2.7)
Australia	516 (2.8)		515 (2.7)	516 (2.8)	517 (2.8)	515 (2.8)	518 (2.8)	516 (2.8)
Azerbaijan	515 (2.7)		519 (2.8)	515 (2.7)	513 (2.8)	514 (2.7)	514 (2.8)	515 (2.7)
Bulgaria	515 (4.3)		520 (4.3)	515 (4.3)	513 (4.3)	514 (4.3)	510 (4.5)	515 (4.3)
Italy	515 (2.4)		515 (2.4)	515 (2.4)	515 (2.4)	514 (2.4)	511 (2.5)	515 (2.4)
Canada	512 (1.9)		511 (1.9)	512 (1.9)	514 (1.9)	511 (1.9)	512 (1.9)	512 (1.9)
Kazakhstan	512 (2.5)		514 (2.6)	512 (2.5)	509 (2.5)	512 (2.5)	510 (2.5)	512 (2.5)
Slovak Republic	510 (3.5)		511 (3.5)	510 (3.5)	509 (3.5)	509 (3.5)	511 (3.5)	510 (3.5)
Croatia	509 (2.2)		509 (2.1)	509 (2.2)	508 (2.2)	510 (2.2)	503 (2.3)	509 (2.2)
Malta	509 (1.4)		510 (1.5)	509 (1.4)	512 (1.4)	508 (1.5)	510 (1.5)	509 (1.4)
Serbia	508 (3.2)		512 (3.2)	508 (3.2)	505 (3.2)	508 (3.2)	506 (3.2)	508 (3.2)
Spain	502 (2.1)		503 (2.1)	502 (2.1)	503 (2.2)	504 (2.2)	500 (2.2)	502 (2.1)
Armenia	498 (2.5)		501 (2.5)	498 (2.5)	495 (2.6)	495 (2.6)	494 (2.6)	498 (2.5)
New Zealand	487 (2.6)		487 (2.6)	487 (2.6)	487 (2.6)	487 (2.6)	490 (2.7)	487 (2.6)
France	485 (3.0)		483 (3.0)	485 (3.0)	486 (3.0)	486 (3.0)	484 (3.0)	485 (3.0)
Georgia	482 (3.7)		484 (3.8)	482 (3.7)	479 (3.7)	481 (3.7)	479 (3.7)	482 (3.7)
United Arab Emirates	481 (1.7)		481 (1.7)	481 (1.7)	481 (1.7)	480 (1.7)	480 (1.8)	481 (1.7)
Bahrain	480 (2.6)		480 (2.7)	480 (2.6)	480 (2.6)	479 (2.6)	480 (2.6)	480 (2.6)
Qatar	449 (3.4)		449 (3.4)	449 (3.4)	450 (3.4)	447 (3.4)	448 (3.4)	449 (3.4)
Iran, Islamic Rep. of	443 (3.9)		443 (3.8)	443 (3.9)	442 (3.9)	443 (3.8)	445 (3.9)	443 (3.9)
Chile	441 (2.7)		441 (2.7)	441 (2.7)	442 (2.7)	441 (2.7)	443 (2.7)	441 (2.7)
Oman	431 (3.7)		431 (3.7)	431 (3.7)	433 (3.6)	431 (3.7)	431 (3.7)	431 (3.7)
International Average	523 (0.4)		523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)	523 (0.4)
Benchmarking Participants								
Moscow City, Russian Fed.	593 (2.2)		599 (2.3)	593 (2.2)	592 (2.3)	592 (2.2)	593 (2.2)	593 (2.2)
Dubai, UAE	544 (1.6)		543 (1.6)	544 (1.6)	544 (1.7)	542 (1.6)	543 (1.7)	544 (1.6)
Quebec, Canada	532 (2.3)		530 (2.3)	532 (2.3)	535 (2.3)	533 (2.3)	531 (2.3)	532 (2.3)
Madrid, Spain	518 (2.2)		519 (2.1)	518 (2.2)	519 (2.2)	520 (2.2)	516 (2.1)	518 (2.2)
Ontario, Canada	512 (3.3)		511 (3.4)	512 (3.3)	514 (3.4)	511 (3.3)	513 (3.4)	512 (3.3)
Abu Dhabi, UAE	441 (2.2)		440 (2.2)	441 (2.2)	441 (2.2)	439 (2.3)	439 (2.3)	441 (2.2)
Number of Items (Score Points)*	171 (183)		142 (152)	171 (183)	147 (159)	154 (166)	135 (147)	171 (183)

* The number of items and score points are based on the number of items included in scaling the fourth grade mathematics achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit C.1: Average Scale Scores for the Mathematics Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

Less Difficult Mathematics (Continued)

Country	Average Mathematics Scale Score based on All Items	Albania	North Macedonia	Montenegro	Bosnia and Herzegovina	Kosovo	Saudi Arabia	Kuwait	Morocco	South Africa (5)	Pakistan	Philippines
Albania	494 (3.4)	495 (3.4)	494 (3.4)	492 (3.4)	492 (3.4)	494 (3.4)	494 (3.4)	494 (3.4)	492 (3.4)	494 (3.4)	494 (3.4)	494 (3.4)
North Macedonia	472 (5.3)	472 (5.3)	472 (5.3)	472 (5.2)	471 (5.1)	471 (5.2)	471 (5.3)	472 (5.3)	471 (5.1)	472 (5.3)	472 (5.3)	472 (5.3)
Montenegro	453 (2.0)	453 (2.0)	453 (2.0)	458 (2.0)	463 (2.0)	456 (2.0)	453 (2.0)	453 (1.9)	461 (1.9)	453 (2.0)	453 (1.9)	453 (2.0)
Bosnia and Herzegovina	452 (2.4)	451 (2.4)	452 (2.4)	455 (2.4)	462 (2.4)	453 (2.4)	451 (2.4)	452 (2.4)	463 (2.4)	451 (2.4)	454 (2.4)	452 (2.4)
Kosovo	444 (3.0)	444 (3.0)	444 (3.0)	445 (2.9)	446 (2.9)	445 (3.0)	443 (3.0)	445 (3.0)	447 (2.9)	444 (3.0)	445 (3.0)	444 (3.0)
Saudi Arabia	398 (3.6)	398 (3.5)	398 (3.6)	397 (3.5)	395 (3.5)	397 (3.6)	399 (3.5)	398 (3.5)	393 (3.5)	398 (3.5)	397 (3.5)	398 (3.6)
Kuwait	383 (4.7)	383 (4.7)	383 (4.7)	383 (4.6)	384 (4.5)	383 (4.7)	384 (4.7)	383 (4.7)	384 (4.6)	383 (4.7)	382 (4.7)	383 (4.7)
Morocco	383 (4.3)	383 (4.3)	383 (4.3)	382 (4.3)	384 (4.2)	384 (4.3)	383 (4.3)	383 (4.3)	388 (4.1)	383 (4.2)	382 (4.3)	383 (4.3)
South Africa (5)	374 (3.6)	373 (3.6)	374 (3.6)	373 (3.6)	368 (3.6)	373 (3.6)	373 (3.6)	373 (3.6)	367 (3.6)	375 (3.6)	371 (3.6)	374 (3.6)
Pakistan	328 (12.0)	327 (11.9)	328 (12.0)	329 (11.8)	337 (11.6)	328 (11.8)	330 (12.1)	328 (12.0)	337 (11.7)	328 (11.9)	333 (12.1)	328 (12.0)
Philippines	297 (6.4)	297 (6.3)	297 (6.4)	298 (6.3)	297 (6.1)	297 (6.3)	297 (6.4)	296 (6.4)	296 (6.2)	297 (6.3)	298 (6.2)	297 (6.4)
International Average	407 (1.6)	407 (1.6)	407 (1.6)	408 (1.6)	409 (1.5)	407 (1.6)	407 (1.6)	407 (1.6)	409 (1.6)	407 (1.6)	407 (1.6)	407 (1.6)
Number of Items (Score Points)**	177 (190)	173 (186)	177 (190)	140 (151)	123 (130)	160 (172)	156 (166)	172 (184)	129 (134)	155 (167)	150 (158)	177 (190)

** The number of items and score points are based on the number of items included in scaling the fourth grade less difficult mathematics achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Exhibit C.2: Average Scale Scores for the Science Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

Read down the column under a country name to compare achievement scores based on the items identified by that country. Scores on the diagonal are countries' achievement scores based on the test items they identified.

Country	Average Science Scale Score based on All Items	Singapore	Korea, Rep. of	Russian Federation	Japan	Chinese Taipei	Finland	Latvia	Norway (5)	United States	Lithuania
Singapore	595 (3.4)	675 (4.1)	601 (3.4)	595 (3.7)	619 (3.6)	608 (3.6)	591 (3.5)	598 (3.4)	594 (3.4)	598 (3.4)	594 (3.4)
Korea, Rep. of	588 (2.1)	577 (2.4)	604 (2.2)	576 (2.4)	595 (2.4)	599 (2.3)	578 (2.2)	588 (2.1)	589 (2.1)	588 (2.1)	587 (2.1)
Russian Federation	567 (3.0)	569 (3.2)	563 (3.2)	562 (3.1)	564 (3.0)	565 (3.1)	561 (3.0)	567 (3.0)	567 (3.0)	568 (3.0)	567 (3.0)
Japan	562 (1.8)	578 (2.3)	578 (1.8)	552 (2.2)	592 (2.2)	578 (2.0)	556 (1.9)	564 (1.7)	560 (1.8)	562 (1.7)	561 (1.8)
Chinese Taipei	558 (1.8)	547 (2.0)	558 (1.8)	542 (1.9)	571 (1.9)	582 (2.0)	551 (1.8)	556 (1.8)	555 (1.8)	559 (1.7)	559 (1.7)
Finland	555 (2.6)	540 (3.2)	549 (2.9)	552 (3.0)	538 (3.2)	549 (3.0)	555 (2.6)	554 (2.6)	555 (2.6)	555 (2.6)	554 (2.6)
Latvia	542 (2.4)	551 (2.5)	542 (2.4)	546 (2.6)	548 (2.5)	549 (2.4)	540 (2.5)	542 (2.4)	541 (2.4)	541 (2.3)	541 (2.4)
Norway (5)	539 (2.2)	526 (2.6)	534 (2.3)	537 (2.5)	516 (2.6)	528 (2.3)	536 (2.2)	539 (2.2)	541 (2.2)	540 (2.2)	540 (2.2)
United States	539 (2.7)	527 (3.0)	534 (2.9)	536 (3.0)	529 (3.1)	534 (3.0)	538 (2.9)	537 (2.8)	539 (2.7)	541 (2.8)	539 (2.7)
Lithuania	538 (2.5)	534 (2.8)	532 (2.4)	535 (2.8)	544 (2.7)	540 (2.6)	536 (2.6)	539 (2.5)	537 (2.4)	540 (2.5)	537 (2.5)
England	537 (2.7)	535 (3.2)	534 (2.7)	535 (3.0)	532 (3.2)	536 (3.0)	538 (2.7)	535 (2.7)	537 (2.7)	537 (2.7)	536 (2.7)
Sweden	537 (3.3)	525 (3.6)	531 (3.5)	543 (3.8)	527 (3.6)	531 (3.4)	538 (3.5)	537 (3.3)	538 (3.3)	537 (3.4)	537 (3.3)
Czech Republic	534 (2.6)	520 (3.9)	532 (3.2)	535 (3.5)	529 (3.8)	529 (3.5)	532 (2.9)	534 (2.6)	534 (2.6)	535 (2.6)	533 (2.6)
Australia	533 (2.4)	532 (2.2)	527 (2.3)	531 (2.3)	522 (2.3)	534 (2.4)	535 (2.4)	530 (2.4)	533 (2.4)	533 (2.4)	533 (2.4)
Hong Kong SAR	531 (3.3)	539 (4.0)	529 (3.7)	536 (3.9)	527 (4.2)	523 (3.9)	530 (3.4)	530 (3.4)	528 (3.3)	530 (3.4)	530 (3.4)
Poland	531 (2.6)	523 (3.4)	534 (2.8)	536 (3.1)	522 (3.2)	522 (3.0)	531 (2.7)	532 (2.6)	531 (2.6)	530 (2.6)	532 (2.6)
Hungary	529 (2.7)	525 (3.3)	531 (2.9)	529 (3.1)	526 (3.2)	523 (3.0)	529 (2.9)	529 (2.7)	531 (2.7)	531 (2.7)	529 (2.7)
Ireland	528 (3.2)	524 (3.0)	528 (3.4)	528 (3.3)	516 (3.0)	526 (2.9)	529 (3.1)	527 (3.2)	528 (3.2)	528 (3.3)	529 (3.2)
Turkey (5)	526 (4.2)	540 (4.6)	528 (4.4)	528 (4.3)	540 (4.7)	540 (4.6)	529 (4.3)	525 (4.3)	527 (4.2)	527 (4.2)	527 (4.3)
Croatia	524 (2.2)	526 (3.0)	527 (2.6)	525 (2.8)	535 (2.9)	525 (2.7)	521 (2.4)	525 (2.2)	524 (2.2)	525 (2.2)	525 (2.2)
Canada	523 (1.9)	514 (1.8)	518 (1.9)	519 (1.9)	508 (1.9)	519 (1.9)	522 (1.8)	522 (1.9)	524 (1.9)	524 (1.9)	523 (1.9)
Austria	522 (2.6)	512 (2.9)	522 (2.9)	513 (2.8)	516 (3.0)	521 (2.9)	516 (2.6)	522 (2.6)	523 (2.6)	524 (2.6)	523 (2.6)
Denmark	522 (2.4)	503 (2.8)	517 (2.7)	518 (2.8)	499 (2.8)	513 (2.5)	520 (2.4)	521 (2.4)	523 (2.4)	521 (2.4)	522 (2.4)
Bulgaria	521 (4.9)	516 (4.9)	518 (4.6)	521 (4.9)	516 (5.4)	511 (5.1)	525 (4.7)	521 (4.8)	521 (4.8)	519 (5.0)	522 (4.9)
Slovak Republic	521 (3.7)	519 (4.0)	517 (3.8)	516 (3.9)	520 (4.1)	523 (4.0)	517 (3.7)	520 (3.6)	521 (3.7)	519 (3.7)	520 (3.7)
Germany	518 (2.2)	508 (2.4)	513 (2.4)	515 (2.3)	512 (2.5)	522 (2.5)	515 (2.2)	518 (2.2)	518 (2.1)	519 (2.2)	520 (2.2)
Netherlands	518 (2.9)	504 (3.6)	511 (3.3)	504 (3.6)	502 (3.4)	519 (3.2)	514 (3.1)	516 (2.9)	518 (2.9)	519 (2.9)	520 (2.9)
Northern Ireland	518 (2.3)	512 (3.1)	513 (2.6)	518 (3.0)	501 (3.1)	509 (2.9)	520 (2.6)	517 (2.3)	519 (2.3)	519 (2.3)	517 (2.3)
Serbia	517 (3.5)	527 (3.7)	523 (3.6)	513 (3.7)	524 (3.9)	511 (3.6)	515 (3.5)	520 (3.6)	517 (3.5)	519 (3.5)	517 (3.5)
Cyprus	511 (3.0)	515 (3.3)	514 (3.0)	510 (3.2)	519 (3.5)	521 (3.4)	512 (3.0)	512 (3.0)	512 (3.0)	512 (3.0)	513 (3.0)
Spain	511 (2.0)	498 (2.3)	508 (2.1)	511 (2.1)	502 (2.3)	501 (2.1)	512 (2.1)	513 (2.0)	511 (2.0)	510 (2.0)	511 (2.0)
Italy	510 (3.0)	498 (3.4)	511 (3.3)	510 (3.5)	505 (3.8)	497 (3.6)	511 (3.2)	510 (3.0)	509 (3.0)	510 (3.1)	508 (3.0)
Portugal	504 (2.6)	496 (3.4)	502 (3.0)	511 (3.2)	505 (3.4)	503 (3.1)	505 (2.8)	505 (2.6)	504 (2.6)	504 (2.6)	506 (2.6)
New Zealand	503 (2.3)	494 (2.5)	498 (2.4)	504 (2.5)	491 (2.5)	501 (2.4)	505 (2.3)	502 (2.3)	503 (2.3)	503 (2.3)	502 (2.3)
Belgium (Flemish)	501 (2.1)	491 (2.5)	498 (2.3)	491 (2.6)	494 (2.5)	504 (2.3)	498 (2.2)	499 (2.1)	499 (2.1)	501 (2.1)	503 (2.1)
Malta	496 (1.3)	498 (1.5)	492 (1.3)	497 (1.3)	493 (1.4)	502 (1.3)	498 (1.3)	496 (1.3)	495 (1.3)	494 (1.3)	496 (1.3)
Kazakhstan	494 (3.1)	503 (3.4)	492 (3.3)	489 (3.4)	508 (3.3)	500 (3.3)	490 (3.0)	493 (3.1)	494 (3.1)	496 (3.1)	493 (3.1)
Bahrain	493 (3.4)	505 (3.8)	490 (3.6)	494 (3.8)	497 (3.6)	497 (3.8)	491 (3.5)	492 (3.4)	493 (3.5)	490 (3.5)	493 (3.5)
Albania	489 (3.5)	502 (3.7)	494 (3.4)	487 (3.5)	496 (3.5)	494 (3.6)	486 (3.4)	491 (3.5)	490 (3.5)	488 (3.5)	488 (3.5)
France	488 (3.0)	470 (3.1)	480 (3.0)	484 (3.1)	473 (3.1)	476 (3.2)	490 (3.0)	488 (3.0)	487 (2.9)	487 (2.9)	488 (3.0)
United Arab Emirates	473 (2.1)	485 (2.2)	469 (2.2)	472 (2.2)	480 (2.3)	469 (2.3)	471 (2.1)	472 (2.1)	471 (2.1)	470 (2.1)	473 (2.0)
Chile	469 (2.6)	464 (2.8)	470 (2.5)	467 (2.6)	464 (2.8)	460 (2.7)	470 (2.5)	469 (2.5)	472 (2.6)	470 (2.6)	468 (2.6)
Armenia	466 (3.4)	477 (3.7)	467 (3.6)	474 (3.6)	461 (4.0)	455 (3.8)	470 (3.5)	466 (3.5)	471 (3.4)	466 (3.4)	466 (3.5)
Bosnia and Herzegovina	459 (2.9)	463 (3.0)	465 (3.0)	470 (2.7)	454 (2.9)	453 (2.9)	464 (2.8)	462 (2.9)	460 (3.0)	462 (2.9)	459 (3.0)
Georgia	454 (3.9)	448 (4.3)	451 (4.2)	453 (4.3)	448 (4.7)	450 (4.1)	456 (4.2)	454 (4.0)	455 (4.0)	456 (3.9)	454 (4.0)
Montenegro	453 (2.5)	461 (3.4)	462 (2.9)	462 (3.2)	457 (3.4)	446 (3.2)	462 (2.6)	456 (2.5)	455 (2.5)	456 (2.5)	454 (2.5)
Qatar	449 (3.9)	459 (4.0)	447 (4.1)	455 (4.3)	452 (3.9)	449 (4.3)	451 (3.9)	450 (3.9)	449 (4.0)	449 (3.9)	450 (3.9)
Iran, Islamic Rep. of	441 (4.1)	448 (4.4)	441 (4.2)	440 (4.1)	442 (4.6)	446 (4.5)	437 (4.0)	441 (4.1)	441 (4.2)	440 (4.1)	440 (4.1)
Oman	435 (4.1)	452 (4.0)	434 (3.9)	440 (3.9)	450 (4.0)	441 (4.2)	434 (4.0)	437 (4.0)	433 (4.1)	433 (4.1)	435 (4.1)
Azerbaijan	427 (3.3)	445 (3.2)	432 (3.3)	444 (3.2)	427 (3.4)	424 (3.3)	434 (3.2)	428 (3.3)	428 (3.3)	427 (3.3)	427 (3.3)
North Macedonia	426 (6.2)	434 (6.8)	433 (6.0)	423 (6.0)	439 (6.3)	432 (6.7)	423 (6.0)	426 (6.1)	426 (6.3)	426 (6.2)	425 (6.3)
Kosovo	413 (3.7)	414 (4.4)	412 (4.0)	414 (4.1)	415 (4.3)	416 (4.1)	408 (3.9)	413 (3.7)	413 (3.7)	414 (3.7)	412 (3.7)
Saudi Arabia	402 (4.1)	406 (4.5)	402 (4.3)	395 (4.3)	405 (4.4)	405 (4.4)	402 (4.1)	400 (4.1)	402 (4.1)	401 (4.0)	402 (4.0)
Kuwait	392 (6.1)	387 (6.7)	389 (6.1)	393 (6.4)	397 (6.4)	389 (6.5)	396 (6.3)	391 (6.1)	389 (6.2)	392 (6.1)	392 (6.0)
Morocco	374 (5.8)	384 (5.6)	369 (6.0)	372 (5.6)	383 (6.1)	368 (6.2)	369 (5.8)	377 (5.8)	371 (5.9)	373 (5.9)	374 (5.9)
South Africa (5)	324 (4.9)	323 (4.9)	316 (5.0)	329 (5.0)	325 (4.7)	324 (4.9)	333 (4.8)	325 (4.9)	319 (5.0)	319 (5.0)	322 (5.0)
Pakistan	290 (13.4)	311 (13.6)	299 (12.4)	297 (13.3)	303 (13.6)	290 (14.7)	296 (13.7)	291 (13.3)	289 (13.2)	284 (13.1)	291 (13.6)
Philippines	249 (7.5)	267 (7.9)	244 (7.6)	242 (8.0)	269 (7.7)	247 (7.9)	252 (7.7)	253 (7.4)	237 (7.8)	242 (7.6)	246 (7.6)
International Average	491 (0.5)	492 (0.5)	490 (0.5)	490 (0.5)	490 (0.5)	490 (0.5)	490 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)
Benchmarking Participants											
Moscow City, Russian Fed.	595 (2.2)	595 (3.2)	588 (2.7)	593 (2.8)	590 (3.1)	587 (2.7)	590 (2.5)	594 (2.3)	595 (2.3)	595 (2.3)	594 (2.2)
Dubai, UAE	545 (1.7)	557 (1.9)	542 (1.9)	542 (1.9)	550 (1.9)	548 (2.0)	542 (1.7)	543 (1.7)	543 (1.8)	542 (1.8)	544 (1.7)
Ontario, Canada	524 (3.2)	516 (3.0)	520 (3.1)	521 (3.2)	507 (3.0)	520 (3.3)	524 (3.1)	522 (3.1)	525 (3.1)	526 (3.1)	524 (3.2)
Madrid, Spain	523 (2.0)	512 (2.5)	519 (2.1)	521 (2.4)	512 (2.4)	512 (2.2)	523 (2.1)	524 (2.0)	522 (2.0)	522 (2.0)	522 (2.0)
Quebec, Canada	522 (2.5)	508 (3.2)	511 (2.9)	515 (3.0)	506 (3.2)	515 (2.9)	519 (2.6)	521 (2.6)	523 (2.6)	523 (2.6)	522 (2.6)
Abu Dhabi, UAE	418 (2.8)	432 (3.3)	414 (3.1)	417 (3.2)	428 (3.3)	411 (3.2)	418 (2.9)	417 (2.8)	416 (2.8)	415 (2.8)	419 (2.7)
Number of Items (Score Points)*	169 (174)	42 (43)	64 (65)	52 (53)	46 (46)	64 (64)	97 (99)	153 (158)	143 (146)	144 (149)	154 (158)

* The number of items and score points are based on the number of items included in scaling the fourth grade science achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

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Exhibit C.2: Average Scale Scores for the Science Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Science Scale Score based on All Items	England	Sweden	Czech Republic	Australia	Hong Kong SAR	Poland	Hungary	Ireland	Turkey (5)	Croatia
Singapore	595 (3.4)	595 (3.4)	598 (3.4)	591 (3.6)	608 (3.4)	604 (3.7)	598 (3.7)	595 (3.4)	596 (3.4)	599 (3.6)	591 (3.7)
Korea, Rep. of	588 (2.1)	588 (2.1)	588 (2.1)	584 (2.2)	581 (2.2)	589 (2.3)	583 (2.2)	586 (2.1)	586 (2.1)	589 (2.2)	589 (2.2)
Russian Federation	567 (3.0)	567 (3.0)	566 (3.1)	566 (3.0)	569 (3.0)	566 (3.2)	568 (2.9)	568 (3.0)	567 (3.0)	567 (3.0)	562 (2.9)
Japan	562 (1.8)	562 (1.8)	563 (1.8)	554 (1.9)	567 (1.9)	559 (1.9)	559 (1.9)	562 (1.8)	561 (1.8)	559 (1.8)	559 (2.0)
Chinese Taipei	558 (1.8)	558 (1.8)	559 (1.8)	554 (1.8)	557 (1.8)	547 (1.8)	551 (1.8)	557 (1.7)	558 (1.8)	560 (1.9)	557 (1.8)
Finland	555 (2.6)	555 (2.6)	555 (2.6)	556 (2.7)	553 (2.8)	555 (2.7)	556 (2.7)	555 (2.6)	554 (2.6)	552 (2.7)	558 (2.7)
Latvia	542 (2.4)	542 (2.4)	544 (2.3)	535 (2.4)	541 (2.3)	535 (2.5)	538 (2.5)	542 (2.3)	542 (2.3)	542 (2.4)	537 (2.5)
Norway (5)	539 (2.2)	539 (2.2)	538 (2.2)	541 (2.2)	540 (2.3)	542 (2.2)	537 (2.3)	540 (2.2)	536 (2.2)	536 (2.2)	540 (2.2)
United States	539 (2.7)	539 (2.7)	538 (2.8)	541 (2.8)	540 (2.9)	536 (2.9)	539 (2.8)	539 (2.8)	537 (2.8)	537 (2.8)	536 (2.9)
Lithuania	538 (2.5)	538 (2.5)	537 (2.5)	535 (2.5)	539 (2.4)	529 (2.6)	536 (2.6)	538 (2.5)	538 (2.5)	538 (2.5)	536 (2.6)
England	537 (2.7)	537 (2.7)	538 (2.8)	537 (2.8)	538 (2.9)	534 (2.9)	538 (2.8)	538 (2.7)	537 (2.8)	536 (2.9)	537 (2.8)
Sweden	537 (3.3)	537 (3.3)	539 (3.3)	542 (3.5)	539 (3.4)	537 (3.6)	539 (3.5)	537 (3.3)	535 (3.3)	536 (3.4)	542 (3.5)
Czech Republic	534 (2.6)	534 (2.6)	533 (2.8)	536 (2.9)	537 (2.9)	530 (3.1)	532 (3.0)	534 (2.6)	534 (2.7)	533 (2.8)	530 (3.1)
Australia	533 (2.4)	533 (2.4)	534 (2.5)	533 (2.4)	533 (2.5)	532 (2.4)	533 (2.4)	533 (2.4)	533 (2.5)	530 (2.4)	533 (2.5)
Hong Kong SAR	531 (3.3)	531 (3.4)	536 (3.4)	531 (3.5)	528 (3.7)	537 (3.8)	527 (3.7)	530 (3.3)	530 (3.4)	526 (3.5)	531 (3.6)
Poland	531 (2.6)	531 (2.6)	530 (2.7)	535 (2.7)	533 (2.8)	533 (2.9)	535 (2.8)	531 (2.6)	531 (2.6)	532 (2.7)	529 (2.8)
Hungary	529 (2.7)	529 (2.7)	530 (2.7)	536 (2.7)	530 (2.8)	530 (2.7)	534 (2.8)	532 (2.7)	528 (2.7)	530 (2.8)	533 (2.8)
Ireland	528 (3.2)	528 (3.2)	526 (3.1)	527 (3.3)	526 (3.0)	526 (3.1)	526 (3.2)	528 (3.2)	527 (3.2)	528 (3.1)	529 (3.1)
Turkey (5)	526 (4.2)	526 (4.2)	530 (4.3)	524 (4.2)	533 (4.2)	530 (4.3)	527 (4.3)	526 (4.2)	525 (4.2)	539 (4.4)	526 (4.3)
Croatia	524 (2.2)	524 (2.2)	524 (2.3)	526 (2.3)	523 (2.4)	525 (2.5)	527 (2.4)	523 (2.2)	526 (2.2)	525 (2.3)	525 (2.5)
Canada	523 (1.9)	523 (1.9)	523 (1.9)	525 (1.9)	525 (1.9)	521 (1.9)	526 (1.9)	523 (1.9)	522 (1.9)	523 (1.9)	524 (1.9)
Austria	522 (2.6)	522 (2.6)	522 (2.7)	523 (2.7)	523 (2.7)	519 (2.7)	519 (2.7)	524 (2.6)	524 (2.6)	521 (2.7)	515 (2.7)
Denmark	522 (2.4)	522 (2.4)	521 (2.4)	526 (2.5)	517 (2.6)	520 (2.5)	520 (2.5)	523 (2.4)	521 (2.4)	519 (2.4)	521 (2.5)
Bulgaria	521 (4.9)	521 (4.9)	522 (4.8)	525 (4.9)	521 (4.9)	524 (4.8)	526 (4.8)	521 (4.8)	525 (5.0)	522 (5.1)	523 (4.5)
Slovak Republic	521 (3.7)	521 (3.7)	521 (3.6)	519 (3.6)	525 (3.7)	514 (3.5)	515 (3.7)	522 (3.7)	522 (3.8)	523 (3.8)	513 (3.6)
Germany	518 (2.2)	518 (2.2)	521 (2.2)	521 (2.2)	517 (2.2)	522 (2.2)	521 (2.2)	519 (2.2)	522 (2.2)	516 (2.2)	523 (2.2)
Netherlands	518 (2.9)	518 (2.9)	519 (3.0)	512 (3.0)	517 (3.1)	514 (3.1)	516 (3.2)	518 (2.9)	520 (3.0)	515 (3.0)	516 (3.2)
Northern Ireland	518 (2.3)	518 (2.3)	517 (2.4)	518 (2.5)	516 (2.6)	517 (2.7)	517 (2.6)	519 (2.3)	518 (2.4)	515 (2.5)	518 (2.7)
Serbia	517 (3.5)	517 (3.5)	516 (3.4)	519 (3.6)	520 (3.5)	521 (3.6)	521 (3.5)	519 (3.5)	521 (3.6)	518 (3.5)	515 (3.6)
Cyprus	511 (3.0)	511 (3.0)	514 (3.1)	513 (3.1)	512 (3.1)	508 (3.1)	517 (3.0)	513 (3.1)	511 (3.1)	517 (3.1)	515 (3.0)
Spain	511 (2.0)	511 (2.0)	510 (2.0)	515 (2.0)	509 (2.2)	512 (2.1)	512 (2.0)	511 (2.0)	509 (2.0)	513 (2.1)	511 (2.1)
Italy	510 (3.0)	510 (3.0)	511 (3.1)	519 (3.2)	509 (3.2)	512 (3.2)	516 (3.2)	509 (3.0)	510 (3.1)	511 (3.1)	517 (3.2)
Portugal	504 (2.6)	504 (2.6)	504 (2.6)	511 (2.7)	501 (2.9)	504 (2.9)	507 (2.8)	504 (2.6)	506 (2.6)	507 (2.7)	508 (2.8)
New Zealand	503 (2.3)	503 (2.3)	501 (2.3)	503 (2.3)	500 (2.4)	503 (2.3)	501 (2.3)	503 (2.3)	501 (2.3)	501 (2.3)	503 (2.4)
Belgium (Flemish)	501 (2.1)	501 (2.1)	500 (2.2)	495 (2.3)	500 (2.2)	498 (2.4)	497 (2.3)	501 (2.1)	503 (2.1)	498 (2.2)	499 (2.3)
Malta	496 (1.3)	496 (1.3)	498 (1.2)	496 (1.3)	494 (1.2)	497 (1.2)	496 (1.3)	496 (1.3)	494 (1.3)	497 (1.3)	496 (1.2)
Kazakhstan	494 (3.1)	494 (3.1)	492 (3.1)	484 (3.2)	499 (3.1)	491 (3.2)	489 (3.1)	494 (3.1)	493 (3.0)	494 (3.1)	484 (3.2)
Bahrain	493 (3.4)	493 (3.4)	494 (3.5)	493 (3.5)	493 (3.5)	496 (3.6)	495 (3.5)	492 (3.5)	491 (3.5)	499 (3.6)	492 (3.6)
Albania	489 (3.5)	489 (3.5)	489 (3.5)	489 (3.4)	488 (3.6)	492 (3.4)	489 (3.4)	490 (3.5)	487 (3.4)	490 (3.5)	493 (3.5)
France	488 (3.0)	488 (3.0)	486 (3.0)	492 (3.0)	483 (3.1)	490 (2.9)	491 (2.9)	486 (2.9)	486 (3.0)	488 (3.0)	489 (3.0)
United Arab Emirates	473 (2.1)	473 (2.1)	476 (2.1)	470 (2.1)	476 (2.1)	472 (2.2)	469 (2.1)	470 (2.1)	472 (2.1)	474 (2.1)	468 (2.1)
Chile	469 (2.6)	469 (2.6)	470 (2.6)	477 (2.5)	471 (2.6)	467 (2.4)	472 (2.6)	471 (2.6)	467 (2.5)	470 (2.6)	473 (2.5)
Armenia	466 (3.4)	466 (3.4)	467 (3.5)	468 (3.6)	473 (3.6)	470 (3.6)	475 (3.6)	467 (3.5)	466 (3.4)	465 (3.5)	474 (3.7)
Bosnia and Herzegovina	459 (2.9)	459 (2.9)	457 (3.0)	464 (2.9)	461 (3.0)	467 (2.8)	468 (2.9)	460 (2.9)	461 (3.0)	460 (2.9)	465 (2.9)
Georgia	454 (3.9)	454 (3.9)	454 (3.9)	456 (4.0)	455 (4.1)	456 (4.2)	457 (4.2)	453 (3.9)	453 (4.0)	458 (4.1)	456 (4.2)
Montenegro	453 (2.5)	453 (2.5)	456 (2.6)	462 (2.6)	455 (2.8)	465 (2.9)	463 (2.8)	455 (2.5)	456 (2.5)	453 (2.6)	459 (2.9)
Qatar	449 (3.9)	449 (3.9)	451 (3.9)	450 (3.9)	451 (3.9)	456 (4.0)	451 (3.9)	447 (4.0)	449 (3.8)	451 (4.1)	449 (4.0)
Iran, Islamic Rep. of	441 (4.1)	441 (4.1)	442 (4.1)	437 (4.0)	438 (4.0)	442 (3.9)	438 (3.9)	440 (4.1)	445 (4.1)	441 (4.2)	442 (3.9)
Oman	435 (4.1)	435 (4.1)	437 (4.1)	434 (4.0)	442 (4.0)	434 (4.0)	434 (3.9)	434 (4.0)	435 (4.1)	438 (4.1)	432 (3.9)
Azerbaijan	427 (3.3)	427 (3.3)	431 (3.3)	429 (3.3)	429 (3.2)	435 (3.2)	426 (3.4)	429 (3.3)	429 (3.3)	431 (3.3)	431 (3.3)
North Macedonia	426 (6.2)	426 (6.2)	425 (6.2)	422 (5.9)	426 (6.4)	421 (6.1)	423 (5.9)	428 (6.2)	427 (6.1)	429 (6.5)	422 (6.0)
Kosovo	413 (3.7)	413 (3.7)	412 (3.8)	406 (3.9)	412 (3.9)	414 (3.9)	408 (3.9)	413 (3.8)	413 (3.7)	410 (3.9)	411 (3.9)
Saudi Arabia	402 (4.1)	402 (4.1)	401 (4.1)	401 (4.1)	402 (4.1)	400 (4.3)	398 (4.0)	402 (4.1)	401 (4.1)	408 (4.2)	393 (4.2)
Kuwait	392 (6.1)	392 (6.1)	391 (6.2)	394 (6.1)	391 (6.3)	394 (6.3)	393 (6.1)	389 (6.1)	392 (6.0)	390 (6.3)	392 (6.1)
Morocco	374 (5.8)	374 (5.8)	377 (5.8)	374 (5.8)	382 (5.9)	375 (5.9)	375 (5.7)	373 (5.9)	376 (5.8)	374 (5.9)	372 (5.7)
South Africa (5)	324 (4.9)	324 (4.9)	326 (4.8)	325 (4.9)	326 (4.9)	333 (4.9)	333 (4.7)	321 (5.0)	321 (4.8)	321 (5.0)	339 (4.6)
Pakistan	290 (13.4)	290 (13.4)	297 (13.3)	288 (12.9)	297 (13.2)	293 (13.6)	294 (13.7)	291 (13.2)	291 (13.2)	286 (14.1)	294 (13.0)
Philippines	249 (7.5)	249 (7.5)	255 (7.4)	248 (7.6)	254 (7.5)	241 (7.9)	256 (7.4)	243 (7.7)	252 (7.5)	241 (8.0)	259 (7.3)
International Average	491 (0.5)	491 (0.5)	492 (0.5)	491 (0.5)	492 (0.5)	491 (0.5)	492 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)
Benchmarking Participants											
Moscow City, Russian Fed.	595 (2.2)	595 (2.2)	593 (2.3)	593 (2.4)	599 (2.5)	590 (2.6)	592 (2.4)	595 (2.3)	594 (2.3)	596 (2.4)	589 (2.4)
Dubai, UAE	545 (1.7)	544 (1.7)	548 (1.8)	540 (1.7)	547 (1.8)	544 (1.8)	539 (1.8)	542 (1.7)	543 (1.7)	548 (1.8)	538 (1.8)
Ontario, Canada	524 (3.2)	524 (3.2)	524 (3.2)	527 (3.2)	527 (3.2)	523 (3.2)	529 (3.2)	525 (3.1)	524 (3.2)	523 (3.3)	525 (3.2)
Madrid, Spain	523 (2.0)	523 (2.0)	522 (2.0)	525 (2.0)	521 (2.2)	521 (2.2)	523 (2.1)	523 (2.0)	520 (2.0)	526 (2.0)	521 (2.2)
Quebec, Canada	522 (2.5)	522 (2.5)	521 (2.6)	523 (2.7)	522 (2.8)	518 (2.8)	524 (2.7)	521 (2.6)	520 (2.6)	523 (2.6)	523 (2.8)
Abu Dhabi, UAE	418 (2.8)	418 (2.7)	421 (2.8)	416 (2.8)	423 (2.9)	415 (3.0)	416 (2.9)	416 (2.7)	417 (2.7)	416 (2.9)	415 (3.0)
Number of Items (Score Points)*	169 (174)	169 (174)	128 (131)	99 (103)	91 (92)	73 (76)	85 (88)	146 (149)	136 (139)	106 (110)	79 (81)

* The number of items and score points are based on the number of items included in scaling the fourth grade science achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit C.2: Average Scale Scores for the Science Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Science Scale Score based on All Items	Canada	Austria	Denmark	Bulgaria	Slovak Republic	Germany	Netherlands	Northern Ireland	Serbia	Cyprus
Singapore	595 (3.4)	593 (3.4)	596 (3.4)	591 (3.4)	594 (3.5)	595 (3.4)	594 (3.4)	601 (3.4)	596 (3.4)	599 (3.5)	598 (3.4)
Korea, Rep. of	588 (2.1)	589 (2.2)	588 (2.1)	588 (2.2)	584 (2.2)	588 (2.1)	587 (2.1)	583 (2.1)	581 (2.1)	588 (2.2)	581 (2.2)
Russian Federation	567 (3.0)	565 (3.0)	567 (3.0)	566 (3.0)	568 (3.0)	566 (3.0)	566 (3.0)	569 (3.0)	566 (2.9)	571 (2.9)	566 (2.9)
Japan	562 (1.8)	560 (1.9)	562 (1.7)	563 (1.8)	557 (1.8)	561 (1.8)	566 (1.7)	564 (1.8)	558 (1.8)	562 (1.8)	561 (1.9)
Chinese Taipei	558 (1.8)	561 (1.9)	558 (1.7)	559 (1.8)	555 (1.8)	559 (1.8)	558 (1.7)	557 (1.8)	560 (1.8)	557 (1.8)	555 (1.9)
Finland	555 (2.6)	555 (2.8)	554 (2.6)	554 (2.6)	554 (2.6)	554 (2.5)	555 (2.6)	552 (2.6)	554 (2.6)	551 (2.6)	551 (2.7)
Latvia	542 (2.4)	544 (2.3)	541 (2.3)	541 (2.4)	541 (2.4)	543 (2.4)	543 (2.4)	542 (2.4)	539 (2.4)	543 (2.4)	546 (2.4)
Norway (5)	539 (2.2)	536 (2.3)	539 (2.2)	541 (2.2)	541 (2.2)	539 (2.2)	539 (2.2)	536 (2.3)	536 (2.2)	536 (2.3)	531 (2.2)
United States	539 (2.7)	538 (2.8)	539 (2.8)	539 (2.7)	539 (2.8)	538 (2.8)	538 (2.8)	537 (2.8)	541 (2.8)	536 (2.8)	534 (2.8)
Lithuania	538 (2.5)	542 (2.5)	538 (2.5)	536 (2.5)	537 (2.5)	538 (2.5)	540 (2.5)	542 (2.6)	539 (2.5)	541 (2.5)	539 (2.5)
England	537 (2.7)	537 (2.8)	538 (2.7)	537 (2.7)	537 (2.7)	538 (2.7)	537 (2.7)	535 (2.8)	539 (2.7)	535 (2.8)	535 (2.8)
Sweden	537 (3.3)	537 (3.5)	537 (3.3)	537 (3.3)	536 (3.3)	537 (3.3)	539 (3.3)	536 (3.4)	536 (3.4)	535 (3.4)	537 (3.5)
Czech Republic	534 (2.6)	536 (2.9)	534 (2.6)	535 (2.6)	534 (2.6)	532 (2.6)	535 (2.6)	535 (2.7)	534 (2.7)	535 (2.7)	535 (2.7)
Australia	533 (2.4)	533 (2.5)	534 (2.5)	532 (2.4)	533 (2.4)	534 (2.4)	532 (2.4)	531 (2.4)	535 (2.5)	530 (2.5)	531 (2.4)
Hong Kong SAR	531 (3.3)	529 (3.4)	531 (3.4)	530 (3.3)	529 (3.4)	531 (3.3)	532 (3.3)	530 (3.4)	531 (3.4)	528 (3.4)	530 (3.4)
Poland	531 (2.6)	530 (2.7)	530 (2.6)	532 (2.6)	533 (2.6)	530 (2.6)	532 (2.6)	532 (2.7)	532 (2.7)	531 (2.7)	530 (2.7)
Hungary	529 (2.7)	532 (2.8)	529 (2.7)	530 (2.7)	531 (2.6)	528 (2.7)	530 (2.7)	531 (2.7)	528 (2.7)	528 (2.7)	528 (2.8)
Ireland	528 (3.2)	526 (3.4)	528 (3.2)	528 (3.2)	527 (3.2)	528 (3.1)	529 (3.2)	526 (3.2)	528 (3.2)	525 (3.2)	524 (3.3)
Turkey (5)	526 (4.2)	528 (4.3)	526 (4.2)	525 (4.2)	525 (4.3)	527 (4.2)	525 (4.3)	524 (4.3)	526 (4.3)	529 (4.2)	527 (4.4)
Croatia	524 (2.2)	525 (2.4)	525 (2.2)	523 (2.2)	526 (2.2)	523 (2.2)	525 (2.2)	527 (2.2)	525 (2.3)	524 (2.2)	523 (2.3)
Canada	523 (1.9)	524 (1.9)	523 (1.9)	523 (1.9)	524 (1.9)	522 (1.9)	523 (1.9)	522 (1.9)	524 (1.9)	522 (2.0)	518 (1.9)
Austria	522 (2.6)	517 (2.6)	523 (2.6)	523 (2.6)	523 (2.6)	521 (2.6)	523 (2.6)	522 (2.7)	521 (2.6)	521 (2.6)	518 (2.7)
Denmark	522 (2.4)	520 (2.5)	522 (2.3)	524 (2.4)	521 (2.4)	521 (2.4)	522 (2.4)	518 (2.5)	519 (2.4)	519 (2.4)	518 (2.5)
Bulgaria	521 (4.9)	526 (4.9)	521 (5.0)	520 (4.8)	528 (5.1)	521 (5.0)	521 (4.8)	523 (4.9)	524 (5.1)	522 (5.1)	523 (4.9)
Slovak Republic	521 (3.7)	523 (3.7)	520 (3.7)	522 (3.7)	523 (3.7)	520 (3.7)	520 (3.7)	521 (3.7)	520 (3.7)	519 (3.6)	521 (3.7)
Germany	518 (2.2)	515 (2.3)	521 (2.3)	518 (2.2)	519 (2.2)	519 (2.2)	519 (2.2)	519 (2.2)	521 (2.2)	520 (2.3)	518 (2.2)
Netherlands	518 (2.9)	514 (3.0)	519 (2.9)	521 (2.9)	517 (2.9)	518 (2.9)	518 (3.0)	515 (3.0)	518 (2.9)	518 (2.9)	513 (2.9)
Northern Ireland	518 (2.3)	518 (2.5)	519 (2.3)	518 (2.3)	520 (2.4)	519 (2.4)	519 (2.3)	516 (2.4)	521 (2.4)	516 (2.4)	515 (2.5)
Serbia	517 (3.5)	521 (3.4)	519 (3.5)	515 (3.5)	520 (3.6)	517 (3.5)	519 (3.5)	525 (3.5)	520 (3.6)	522 (3.6)	521 (3.6)
Cyprus	511 (3.0)	515 (3.2)	511 (3.0)	512 (3.0)	511 (3.1)	511 (3.1)	511 (3.0)	511 (3.2)	513 (3.1)	512 (3.1)	513 (3.2)
Spain	511 (2.0)	511 (2.0)	510 (2.0)	511 (2.0)	512 (2.0)	511 (2.0)	511 (2.0)	511 (2.1)	511 (2.0)	510 (2.0)	511 (2.1)
Italy	510 (3.0)	514 (3.3)	511 (3.0)	508 (3.0)	514 (3.1)	511 (3.0)	509 (3.0)	512 (3.1)	511 (3.1)	512 (3.1)	512 (3.1)
Portugal	504 (2.6)	508 (2.7)	503 (2.6)	505 (2.6)	506 (2.6)	505 (2.6)	505 (2.6)	507 (2.7)	505 (2.7)	504 (2.6)	505 (2.7)
New Zealand	503 (2.3)	504 (2.4)	503 (2.3)	503 (2.3)	504 (2.3)	502 (2.3)	503 (2.3)	500 (2.4)	504 (2.3)	500 (2.3)	499 (2.4)
Belgium (Flemish)	501 (2.1)	499 (2.2)	502 (2.1)	503 (2.1)	501 (2.1)	500 (2.1)	502 (2.1)	499 (2.2)	501 (2.2)	501 (2.2)	497 (2.2)
Malta	496 (1.3)	495 (1.3)	496 (1.3)	496 (1.2)	495 (1.3)	497 (1.3)	496 (1.3)	494 (1.3)	497 (1.3)	495 (1.3)	493 (1.3)
Kazakhstan	494 (3.1)	490 (3.0)	493 (3.1)	492 (3.1)	493 (3.1)	495 (3.1)	493 (3.1)	494 (3.2)	492 (3.0)	497 (3.1)	495 (3.2)
Bahrain	493 (3.4)	493 (3.5)	492 (3.4)	491 (3.4)	494 (3.5)	494 (3.4)	490 (3.4)	494 (3.5)	494 (3.5)	496 (3.5)	494 (3.6)
Albania	489 (3.5)	491 (3.6)	490 (3.5)	489 (3.5)	489 (3.4)	490 (3.5)	489 (3.5)	491 (3.4)	486 (3.4)	490 (3.4)	491 (3.6)
France	488 (3.0)	486 (3.0)	488 (3.0)	487 (3.0)	489 (2.9)	487 (2.9)	490 (2.9)	487 (2.9)	489 (3.0)	486 (2.9)	480 (3.0)
United Arab Emirates	473 (2.1)	468 (2.1)	471 (2.1)	470 (2.1)	473 (2.1)	474 (2.0)	470 (2.1)	472 (2.1)	473 (2.1)	472 (2.1)	472 (2.1)
Chile	469 (2.6)	469 (2.7)	469 (2.6)	470 (2.5)	471 (2.5)	469 (2.6)	468 (2.5)	469 (2.5)	469 (2.6)	467 (2.6)	470 (2.6)
Armenia	466 (3.4)	471 (3.4)	465 (3.4)	466 (3.4)	467 (3.5)	467 (3.4)	466 (3.4)	467 (3.5)	462 (3.5)	467 (3.5)	467 (3.5)
Bosnia and Herzegovina	459 (2.9)	464 (2.8)	460 (2.9)	459 (2.9)	462 (3.0)	457 (3.0)	460 (2.9)	464 (2.9)	460 (2.9)	462 (2.9)	459 (2.9)
Georgia	454 (3.9)	456 (4.0)	455 (3.9)	456 (3.9)	455 (4.0)	454 (3.9)	454 (3.9)	454 (4.0)	455 (4.0)	455 (4.0)	452 (3.9)
Montenegro	453 (2.5)	459 (2.6)	455 (2.5)	453 (2.5)	457 (2.6)	454 (2.5)	455 (2.5)	460 (2.6)	457 (2.6)	455 (2.6)	457 (2.6)
Qatar	449 (3.9)	445 (4.0)	449 (3.9)	448 (4.0)	450 (3.9)	451 (3.9)	448 (3.9)	450 (3.8)	451 (3.9)	450 (3.8)	447 (3.9)
Iran, Islamic Rep. of	441 (4.1)	440 (4.2)	441 (4.1)	437 (4.1)	440 (4.1)	442 (4.2)	443 (4.1)	445 (4.2)	441 (4.2)	443 (4.2)	444 (4.2)
Oman	435 (4.1)	438 (4.0)	435 (4.1)	435 (4.0)	434 (4.2)	436 (4.1)	434 (4.1)	438 (4.0)	437 (4.2)	437 (4.1)	439 (4.1)
Azerbaijan	427 (3.3)	434 (3.2)	427 (3.2)	426 (3.3)	428 (3.3)	428 (3.3)	429 (3.3)	429 (3.3)	428 (3.3)	429 (3.3)	431 (3.3)
North Macedonia	426 (6.2)	430 (6.0)	426 (6.2)	426 (6.2)	425 (6.3)	426 (6.3)	427 (6.1)	430 (6.2)	424 (6.1)	427 (6.2)	429 (6.3)
Kosovo	413 (3.7)	408 (3.8)	413 (3.7)	412 (3.7)	413 (3.7)	414 (3.7)	413 (3.7)	413 (3.8)	411 (3.7)	413 (3.7)	408 (3.9)
Saudi Arabia	402 (4.1)	399 (4.1)	402 (4.1)	400 (4.1)	403 (4.1)	403 (4.1)	398 (4.1)	400 (4.1)	404 (4.1)	403 (4.1)	404 (4.2)
Kuwait	392 (6.1)	392 (6.1)	392 (6.1)	392 (6.0)	393 (6.1)	393 (6.2)	389 (6.1)	394 (6.0)	394 (6.1)	392 (6.1)	396 (6.2)
Morocco	374 (5.8)	373 (5.7)	374 (5.8)	372 (5.8)	374 (5.9)	376 (5.8)	375 (5.8)	375 (5.8)	375 (5.8)	377 (5.9)	375 (5.9)
South Africa (5)	324 (4.9)	322 (4.8)	324 (4.9)	321 (4.9)	323 (5.0)	326 (4.9)	324 (4.9)	326 (4.9)	325 (5.0)	325 (4.9)	320 (4.9)
Pakistan	290 (13.4)	295 (13.0)	289 (13.4)	289 (13.4)	287 (13.6)	293 (13.5)	291 (13.1)	291 (13.2)	286 (13.3)	289 (13.6)	292 (13.3)
Philippines	249 (7.5)	249 (7.6)	249 (7.5)	245 (7.6)	249 (7.6)	252 (7.6)	248 (7.5)	256 (7.4)	250 (7.5)	247 (7.6)	254 (7.6)
International Average	491 (0.5)	491 (0.5)	491 (0.5)	490 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)	490 (0.5)
Benchmarking Participants											
Moscow City, Russian Fed.	595 (2.2)	595 (2.4)	593 (2.3)	594 (2.2)	596 (2.3)	593 (2.3)	595 (2.3)	597 (2.4)	592 (2.3)	597 (2.3)	595 (2.4)
Dubai, UAE	545 (1.7)	540 (1.8)	543 (1.7)	542 (1.7)	545 (1.7)	545 (1.7)	542 (1.7)	543 (1.8)	545 (1.8)	543 (1.8)	543 (1.8)
Ontario, Canada	524 (3.2)	526 (3.2)	525 (3.2)	524 (3.1)	525 (3.2)	523 (3.2)	523 (3.1)	523 (3.1)	526 (3.2)	524 (3.3)	519 (3.2)
Madrid, Spain	523 (2.0)	522 (2.0)	521 (2.0)	523 (2.0)	523 (2.0)	523 (2.0)	522 (1.9)	522 (2.1)	521 (2.0)	521 (2.0)	522 (2.1)
Quebec, Canada	522 (2.5)	521 (2.7)	522 (2.6)	522 (2.5)	523 (2.6)	521 (2.6)	522 (2.5)	521 (2.6)	522 (2.5)	520 (2.6)	516 (2.7)
Abu Dhabi, UAE	418 (2.8)	413 (2.9)	417 (2.8)	415 (2.8)	418 (2.8)	419 (2.7)	417 (2.8)	418 (2.8)	418 (2.8)	417 (2.8)	417 (2.8)
Number of Items (Score Points)*	169 (174)	102 (104)	159 (164)	155 (159)	140 (145)	159 (163)	157 (161)	128 (133)	135 (139)	125 (130)	111 (113)

* The number of items and score points are based on the number of items included in scaling the fourth grade science achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit C.2: Average Scale Scores for the Science Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Science Scale Score based on All Items	Spain	Italy	Portugal	New Zealand	Belgium (Flemish)	Malta	Kazakhstan	Bahrain	Albania	France
Singapore	595 (3.4)	589 (3.5)	595 (3.4)	595 (3.4)	600 (3.5)	597 (3.6)	600 (3.4)	597 (3.5)	595 (3.4)	599 (3.5)	595 (3.4)
Korea, Rep. of	588 (2.1)	584 (2.1)	586 (2.2)	588 (2.1)	586 (2.2)	583 (2.3)	576 (2.2)	587 (2.2)	588 (2.1)	587 (2.1)	581 (2.1)
Russian Federation	567 (3.0)	567 (3.0)	568 (3.0)	567 (3.0)	568 (2.9)	569 (3.0)	569 (3.0)	569 (3.0)	567 (3.0)	569 (3.0)	566 (3.0)
Japan	562 (1.8)	553 (1.8)	561 (1.8)	562 (1.8)	564 (1.8)	561 (2.0)	560 (1.8)	557 (1.9)	562 (1.8)	560 (1.8)	558 (1.9)
Chinese Taipei	558 (1.8)	554 (1.8)	554 (1.8)	558 (1.8)	556 (1.8)	549 (1.9)	553 (1.9)	554 (1.8)	558 (1.8)	557 (1.8)	555 (1.7)
Finland	555 (2.6)	555 (2.6)	555 (2.6)	555 (2.6)	552 (2.8)	559 (2.8)	552 (2.7)	556 (2.6)	555 (2.6)	554 (2.6)	556 (2.6)
Latvia	542 (2.4)	540 (2.5)	539 (2.4)	542 (2.4)	545 (2.5)	541 (2.4)	547 (2.5)	539 (2.4)	542 (2.4)	541 (2.4)	542 (2.4)
Norway (5)	539 (2.2)	540 (2.2)	540 (2.2)	539 (2.2)	536 (2.2)	539 (2.3)	539 (2.3)	540 (2.2)	539 (2.2)	539 (2.2)	536 (2.2)
United States	539 (2.7)	541 (2.8)	539 (2.8)	539 (2.7)	539 (2.9)	538 (2.9)	539 (2.8)	540 (2.8)	539 (2.7)	538 (2.8)	536 (2.8)
Lithuania	538 (2.5)	536 (2.5)	535 (2.4)	538 (2.5)	537 (2.5)	541 (2.5)	542 (2.6)	537 (2.5)	538 (2.5)	538 (2.5)	541 (2.5)
England	537 (2.7)	539 (2.7)	537 (2.7)	537 (2.7)	535 (2.8)	533 (2.8)	540 (2.7)	538 (2.8)	537 (2.7)	537 (2.7)	537 (2.7)
Sweden	537 (3.3)	540 (3.4)	538 (3.4)	537 (3.3)	534 (3.4)	537 (3.4)	539 (3.6)	542 (3.3)	537 (3.3)	535 (3.3)	540 (3.3)
Czech Republic	534 (2.6)	535 (2.7)	536 (2.7)	534 (2.6)	534 (2.8)	532 (3.1)	539 (2.9)	535 (2.7)	534 (2.6)	532 (2.6)	534 (2.7)
Australia	533 (2.4)	536 (2.4)	532 (2.4)	533 (2.4)	533 (2.5)	534 (2.3)	532 (2.4)	535 (2.4)	533 (2.4)	533 (2.4)	533 (2.4)
Hong Kong SAR	531 (3.3)	531 (3.4)	529 (3.4)	531 (3.3)	524 (3.4)	528 (3.8)	530 (3.5)	530 (3.5)	531 (3.3)	529 (3.4)	530 (3.4)
Poland	531 (2.6)	534 (2.6)	534 (2.6)	531 (2.6)	529 (2.7)	533 (2.8)	535 (2.8)	531 (2.7)	531 (2.6)	532 (2.6)	531 (2.6)
Hungary	529 (2.7)	533 (2.7)	532 (2.7)	529 (2.7)	528 (2.7)	537 (2.9)	526 (2.8)	531 (2.7)	529 (2.7)	530 (2.6)	531 (2.7)
Ireland	528 (3.2)	529 (3.3)	528 (3.3)	528 (3.2)	527 (3.3)	527 (3.4)	528 (3.1)	528 (3.2)	528 (3.2)	527 (3.2)	526 (3.1)
Turkey (5)	526 (4.2)	525 (4.2)	523 (4.2)	526 (4.2)	527 (4.4)	523 (4.3)	526 (4.5)	522 (4.2)	526 (4.2)	525 (4.2)	524 (4.3)
Croatia	524 (2.2)	523 (2.3)	526 (2.2)	524 (2.2)	526 (2.4)	529 (2.4)	520 (2.5)	524 (2.3)	524 (2.2)	525 (2.2)	523 (2.3)
Canada	523 (1.9)	526 (1.8)	524 (1.9)	523 (1.9)	523 (1.9)	523 (1.8)	525 (1.9)	525 (1.8)	523 (1.9)	524 (1.9)	523 (1.9)
Austria	522 (2.6)	522 (2.6)	523 (2.6)	522 (2.6)	519 (2.7)	521 (2.7)	520 (2.6)	520 (2.6)	522 (2.6)	522 (2.6)	521 (2.6)
Denmark	522 (2.4)	523 (2.4)	523 (2.4)	522 (2.4)	519 (2.5)	521 (2.6)	519 (2.5)	524 (2.4)	522 (2.4)	521 (2.4)	522 (2.4)
Bulgaria	521 (4.9)	523 (5.0)	525 (4.8)	521 (4.9)	519 (4.9)	531 (4.7)	521 (5.1)	521 (4.7)	521 (4.9)	522 (5.0)	524 (4.9)
Slovak Republic	521 (3.7)	521 (3.8)	521 (3.7)	521 (3.7)	522 (3.7)	520 (3.7)	527 (3.8)	519 (3.7)	521 (3.7)	520 (3.6)	518 (3.7)
Germany	518 (2.2)	518 (2.2)	520 (2.2)	518 (2.2)	518 (2.2)	522 (2.4)	517 (2.3)	520 (2.2)	518 (2.2)	522 (2.2)	521 (2.2)
Netherlands	518 (2.9)	517 (2.9)	516 (2.9)	518 (2.9)	516 (3.0)	512 (3.2)	519 (2.9)	513 (2.9)	518 (2.9)	518 (2.9)	517 (3.0)
Northern Ireland	518 (2.3)	522 (2.4)	519 (2.3)	518 (2.3)	517 (2.5)	521 (2.6)	519 (2.5)	519 (2.4)	518 (2.3)	519 (2.3)	518 (2.4)
Serbia	517 (3.5)	514 (3.4)	522 (3.6)	517 (3.5)	520 (3.7)	523 (3.4)	520 (3.6)	517 (3.5)	517 (3.5)	521 (3.6)	519 (3.5)
Cyprus	511 (3.0)	511 (3.0)	510 (3.1)	511 (3.0)	514 (3.2)	514 (3.2)	508 (3.3)	511 (3.1)	511 (3.0)	512 (3.1)	511 (3.1)
Spain	511 (2.0)	514 (2.0)	511 (2.0)	511 (2.0)	508 (2.1)	507 (2.1)	511 (2.0)	512 (2.0)	511 (2.0)	510 (2.0)	515 (2.0)
Italy	510 (3.0)	514 (3.1)	513 (3.0)	510 (3.0)	508 (3.1)	515 (3.2)	510 (3.2)	514 (3.1)	510 (3.0)	512 (3.0)	514 (3.0)
Portugal	504 (2.6)	506 (2.6)	504 (2.6)	504 (2.6)	505 (2.7)	509 (2.8)	505 (2.8)	508 (2.6)	504 (2.6)	504 (2.6)	507 (2.6)
New Zealand	503 (2.3)	506 (2.3)	503 (2.3)	503 (2.3)	502 (2.4)	505 (2.3)	505 (2.4)	506 (2.3)	503 (2.3)	502 (2.3)	503 (2.3)
Belgium (Flemish)	501 (2.1)	500 (2.2)	500 (2.1)	501 (2.1)	499 (2.2)	498 (2.3)	502 (2.2)	496 (2.2)	501 (2.1)	501 (2.1)	500 (2.1)
Malta	496 (1.3)	496 (1.3)	494 (1.3)	496 (1.3)	495 (1.3)	493 (1.2)	500 (1.3)	495 (1.3)	496 (1.3)	496 (1.3)	496 (1.3)
Kazakhstan	494 (3.1)	489 (3.1)	492 (3.1)	494 (3.1)	497 (3.1)	492 (3.2)	495 (3.0)	492 (3.2)	494 (3.1)	492 (3.1)	493 (3.1)
Bahrain	493 (3.4)	492 (3.4)	491 (3.5)	493 (3.4)	494 (3.6)	493 (3.5)	494 (3.6)	492 (3.4)	493 (3.4)	493 (3.4)	493 (3.4)
Albania	489 (3.5)	487 (3.4)	492 (3.4)	489 (3.5)	490 (3.4)	491 (3.4)	490 (3.5)	492 (3.4)	489 (3.5)	489 (3.4)	491 (3.5)
France	488 (3.0)	491 (3.0)	486 (2.9)	488 (3.0)	482 (2.9)	486 (3.0)	486 (3.0)	489 (3.0)	488 (3.0)	488 (2.9)	492 (3.0)
United Arab Emirates	473 (2.1)	471 (2.0)	471 (2.1)	473 (2.1)	469 (2.1)	470 (2.1)	472 (2.1)	471 (2.1)	473 (2.1)	471 (2.1)	472 (2.0)
Chile	469 (2.6)	475 (2.6)	473 (2.5)	469 (2.6)	468 (2.6)	475 (2.5)	472 (2.5)	475 (2.5)	469 (2.6)	469 (2.6)	471 (2.6)
Armenia	466 (3.4)	467 (3.5)	467 (3.5)	466 (3.4)	466 (3.6)	474 (3.6)	465 (3.6)	473 (3.5)	466 (3.4)	466 (3.5)	468 (3.6)
Bosnia and Herzegovina	459 (2.9)	462 (2.8)	463 (2.9)	459 (2.9)	460 (3.0)	466 (2.9)	460 (3.0)	465 (2.9)	459 (2.9)	461 (2.9)	461 (2.9)
Georgia	454 (3.9)	458 (4.0)	454 (4.0)	454 (3.9)	453 (4.0)	459 (4.2)	450 (4.1)	457 (4.0)	454 (3.9)	455 (3.9)	455 (4.0)
Montenegro	453 (2.5)	458 (2.5)	459 (2.6)	453 (2.5)	458 (2.6)	465 (2.9)	450 (2.8)	460 (2.5)	453 (2.5)	457 (2.5)	460 (2.5)
Qatar	449 (3.9)	451 (4.0)	450 (3.9)	449 (3.9)	447 (4.0)	446 (3.9)	449 (3.9)	449 (4.1)	449 (3.9)	449 (3.9)	449 (3.8)
Iran, Islamic Rep. of	441 (4.1)	437 (4.0)	439 (4.0)	441 (4.1)	441 (4.3)	435 (4.1)	442 (4.2)	439 (4.0)	441 (4.1)	442 (4.1)	440 (4.1)
Oman	435 (4.1)	432 (4.0)	435 (4.0)	435 (4.1)	437 (4.0)	433 (4.0)	437 (4.1)	432 (4.0)	435 (4.1)	436 (4.1)	435 (4.0)
Azerbaijan	427 (3.3)	429 (3.3)	429 (3.3)	427 (3.3)	431 (3.2)	433 (3.4)	430 (3.4)	431 (3.2)	427 (3.3)	426 (3.3)	428 (3.3)
North Macedonia	426 (6.2)	423 (6.1)	425 (6.0)	426 (6.2)	428 (6.5)	431 (5.7)	427 (6.5)	423 (6.0)	426 (6.2)	427 (6.2)	426 (6.2)
Kosovo	413 (3.7)	412 (3.7)	411 (3.7)	413 (3.7)	416 (3.9)	415 (4.0)	408 (4.0)	413 (3.8)	413 (3.7)	412 (3.7)	414 (3.8)
Saudi Arabia	402 (4.1)	404 (4.0)	402 (4.0)	402 (4.1)	401 (4.1)	404 (4.1)	401 (4.2)	401 (4.1)	402 (4.1)	402 (4.1)	399 (4.1)
Kuwait	392 (6.1)	394 (6.1)	391 (6.0)	392 (6.1)	391 (6.2)	389 (6.3)	393 (6.1)	392 (6.1)	392 (6.1)	392 (6.0)	392 (6.2)
Morocco	374 (5.8)	370 (5.8)	372 (5.9)	374 (5.8)	375 (6.0)	375 (6.0)	367 (5.7)	369 (5.8)	374 (5.8)	375 (5.9)	376 (5.8)
South Africa (5)	324 (4.9)	325 (5.0)	322 (4.9)	324 (4.9)	320 (5.1)	321 (5.0)	324 (5.0)	327 (5.0)	324 (4.9)	325 (4.9)	330 (4.9)
Pakistan	290 (13.4)	289 (13.4)	288 (12.9)	290 (13.4)	287 (13.3)	288 (13.9)	286 (13.8)	291 (13.3)	290 (13.4)	289 (13.5)	291 (13.3)
Philippines	249 (7.5)	246 (7.7)	250 (7.5)	249 (7.5)	243 (7.6)	251 (7.5)	258 (7.6)	252 (7.5)	249 (7.5)	250 (7.5)	257 (7.4)
International Average	491 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)	490 (0.5)	492 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)
Benchmarking Participants											
Moscow City, Russian Fed.	595 (2.2)	595 (2.3)	593 (2.3)	595 (2.2)	595 (2.5)	592 (2.6)	600 (2.5)	595 (2.4)	595 (2.2)	595 (2.3)	594 (2.3)
Dubai, UAE	545 (1.7)	542 (1.7)	542 (1.7)	545 (1.7)	542 (1.8)	538 (1.8)	547 (1.8)	542 (1.7)	544 (1.7)	543 (1.7)	542 (1.7)
Ontario, Canada	524 (3.2)	528 (3.0)	526 (3.2)	524 (3.2)	524 (3.2)	524 (3.0)	526 (3.1)	526 (3.0)	524 (3.2)	525 (3.2)	522 (3.1)
Madrid, Spain	523 (2.0)	525 (2.0)	522 (2.0)	523 (2.0)	520 (2.2)	517 (2.2)	524 (2.1)	523 (2.0)	523 (2.0)	521 (2.0)	526 (2.0)
Quebec, Canada	522 (2.5)	524 (2.6)	521 (2.6)	522 (2.5)	520 (2.7)	521 (2.8)	523 (2.7)	523 (2.6)	522 (2.5)	522 (2.6)	524 (2.5)
Abu Dhabi, UAE	418 (2.8)	417 (2.8)	417 (2.8)	418 (2.8)	414 (2.9)	416 (3.0)	417 (2.9)	417 (2.8)	418 (2.7)	417 (2.8)	418 (2.8)
Number of Items (Score Points)*	169 (174)	136 (140)	131 (135)	169 (174)	105 (109)	69 (72)	100 (104)	120 (124)	168 (173)	146 (151)	135 (139)

* The number of items and score points are based on the number of items included in scaling the fourth grade science achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit C.2: Average Scale Scores for the Science Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Science Scale Score based on All Items	United Arab Emirates	Chile	Armenia	Bosnia and Herzegovina	Georgia	Montenegro	Qatar	Iran, Islamic Rep. of	Oman	Azerbaijan
Singapore	595 (3.4)	595 (3.4)	597 (3.4)	597 (3.4)	591 (3.5)	599 (3.4)	595 (3.4)	618 (3.5)	601 (3.4)	607 (3.5)	590 (3.5)
Korea, Rep. of	588 (2.1)	588 (2.1)	586 (2.2)	588 (2.1)	581 (2.2)	588 (2.1)	584 (2.2)	582 (2.2)	583 (2.2)	587 (2.1)	578 (2.2)
Russian Federation	567 (3.0)	567 (3.0)	568 (3.0)	568 (3.0)	570 (3.0)	567 (3.0)	568 (3.0)	568 (3.1)	569 (3.1)	568 (3.0)	564 (3.0)
Japan	562 (1.8)	562 (1.8)	560 (1.8)	562 (1.8)	554 (1.9)	566 (1.8)	556 (1.8)	567 (1.8)	560 (1.9)	567 (1.7)	553 (1.9)
Chinese Taipei	558 (1.8)	558 (1.8)	556 (1.8)	557 (1.8)	549 (1.8)	559 (1.8)	553 (1.8)	543 (1.8)	558 (1.8)	554 (1.8)	551 (1.8)
Finland	555 (2.6)	555 (2.6)	555 (2.6)	554 (2.6)	558 (2.7)	554 (2.7)	557 (2.6)	555 (2.7)	552 (2.7)	552 (2.6)	558 (2.7)
Latvia	542 (2.4)	542 (2.4)	543 (2.4)	542 (2.4)	538 (2.5)	543 (2.3)	539 (2.5)	547 (2.5)	544 (2.4)	543 (2.4)	539 (2.5)
Norway (5)	539 (2.2)	539 (2.2)	539 (2.2)	539 (2.2)	544 (2.2)	542 (2.3)	539 (2.2)	541 (2.3)	533 (2.3)	536 (2.2)	544 (2.3)
United States	539 (2.7)	539 (2.7)	540 (2.7)	540 (2.7)	542 (2.8)	538 (2.8)	538 (2.8)	541 (2.8)	536 (2.9)	536 (2.7)	543 (2.8)
Lithuania	538 (2.5)	538 (2.5)	537 (2.5)	537 (2.5)	534 (2.5)	538 (2.5)	537 (2.5)	535 (2.5)	540 (2.7)	540 (2.6)	535 (2.5)
England	537 (2.7)	537 (2.7)	541 (2.7)	538 (2.7)	536 (2.8)	536 (2.8)	535 (2.7)	539 (2.8)	535 (2.8)	537 (2.7)	538 (2.7)
Sweden	537 (3.3)	537 (3.3)	538 (3.3)	538 (3.3)	538 (3.5)	538 (3.4)	539 (3.3)	536 (3.4)	536 (3.5)	534 (3.3)	544 (3.5)
Czech Republic	534 (2.6)	534 (2.6)	536 (2.6)	534 (2.6)	538 (2.8)	534 (2.9)	533 (2.7)	528 (3.0)	533 (2.8)	531 (2.7)	534 (2.9)
Australia	533 (2.4)	533 (2.4)	535 (2.4)	533 (2.4)	533 (2.3)	535 (2.5)	534 (2.4)	538 (2.4)	531 (2.4)	533 (2.4)	537 (2.4)
Hong Kong SAR	531 (3.3)	531 (3.3)	530 (3.4)	532 (3.4)	527 (3.5)	535 (3.5)	532 (3.4)	532 (3.6)	531 (3.4)	525 (3.6)	534 (3.4)
Poland	531 (2.6)	531 (2.6)	533 (2.6)	532 (2.6)	535 (2.6)	529 (2.7)	531 (2.7)	532 (2.9)	530 (2.7)	529 (2.7)	532 (2.6)
Hungary	529 (2.7)	529 (2.7)	531 (2.7)	531 (2.7)	534 (2.8)	532 (2.7)	532 (2.7)	529 (2.8)	529 (2.8)	528 (2.7)	532 (2.8)
Ireland	528 (3.2)	528 (3.2)	529 (3.2)	528 (3.1)	529 (3.2)	527 (3.3)	527 (3.2)	531 (3.2)	525 (3.1)	527 (3.1)	530 (3.3)
Turkey (5)	526 (4.2)	526 (4.2)	525 (4.2)	527 (4.2)	525 (4.3)	529 (4.4)	524 (4.2)	528 (4.3)	534 (4.4)	531 (4.3)	522 (4.2)
Croatia	524 (2.2)	524 (2.2)	523 (2.2)	524 (2.2)	524 (2.4)	528 (2.2)	525 (2.3)	525 (2.4)	521 (2.4)	524 (2.2)	521 (2.4)
Canada	523 (1.9)	523 (1.9)	524 (1.9)	524 (1.9)	526 (1.8)	521 (1.8)	523 (1.8)	525 (1.8)	520 (1.9)	522 (1.9)	526 (1.9)
Austria	522 (2.6)	522 (2.6)	522 (2.6)	522 (2.6)	521 (2.6)	522 (2.7)	521 (2.6)	522 (2.7)	518 (2.7)	521 (2.6)	522 (2.6)
Denmark	522 (2.4)	522 (2.4)	522 (2.4)	522 (2.4)	527 (2.5)	521 (2.5)	523 (2.4)	520 (2.6)	518 (2.5)	518 (2.4)	527 (2.5)
Bulgaria	521 (4.9)	521 (4.9)	521 (4.8)	520 (4.9)	525 (4.6)	519 (4.7)	522 (4.8)	518 (4.8)	520 (5.0)	517 (5.0)	524 (4.8)
Slovak Republic	521 (3.7)	521 (3.7)	524 (3.7)	521 (3.7)	521 (3.7)	522 (3.7)	517 (3.7)	515 (3.6)	522 (3.7)	520 (3.7)	519 (3.7)
Germany	518 (2.2)	518 (2.2)	519 (2.2)	518 (2.2)	518 (2.2)	520 (2.3)	521 (2.2)	518 (2.2)	517 (2.4)	521 (2.2)	520 (2.2)
Netherlands	518 (2.9)	518 (2.9)	516 (2.9)	517 (2.9)	518 (3.1)	517 (3.0)	514 (3.0)	518 (3.1)	514 (3.0)	516 (2.9)	515 (3.0)
Northern Ireland	518 (2.3)	518 (2.3)	520 (2.3)	519 (2.3)	517 (2.5)	517 (2.5)	519 (2.4)	521 (2.5)	514 (2.5)	517 (2.4)	522 (2.5)
Serbia	517 (3.5)	517 (3.5)	517 (3.5)	517 (3.5)	516 (3.5)	519 (3.5)	521 (3.6)	519 (3.5)	514 (3.6)	519 (3.6)	515 (3.5)
Cyprus	511 (3.0)	511 (3.0)	511 (3.0)	512 (3.1)	513 (3.1)	512 (3.0)	512 (3.0)	514 (3.0)	512 (3.2)	515 (3.1)	512 (3.1)
Spain	511 (2.0)	511 (2.0)	511 (2.0)	512 (2.0)	512 (2.0)	511 (2.0)	511 (2.0)	508 (2.0)	511 (2.1)	506 (2.0)	516 (2.0)
Italy	510 (3.0)	510 (3.0)	511 (3.0)	509 (3.0)	510 (3.2)	510 (3.2)	512 (3.1)	507 (3.2)	507 (3.1)	509 (3.1)	514 (3.2)
Portugal	504 (2.6)	504 (2.6)	503 (2.6)	503 (2.6)	508 (2.7)	509 (2.8)	505 (2.6)	504 (2.8)	505 (2.7)	503 (2.6)	508 (2.8)
New Zealand	503 (2.3)	503 (2.3)	505 (2.3)	503 (2.3)	506 (2.3)	503 (2.4)	504 (2.3)	505 (2.3)	499 (2.4)	503 (2.3)	507 (2.3)
Belgium (Flemish)	501 (2.1)	501 (2.1)	498 (2.1)	499 (2.1)	499 (2.2)	502 (2.2)	498 (2.2)	501 (2.2)	498 (2.2)	501 (2.2)	499 (2.2)
Malta	496 (1.3)	496 (1.3)	496 (1.2)	496 (1.3)	497 (1.3)	495 (1.3)	495 (1.3)	500 (1.3)	497 (1.3)	498 (1.3)	498 (1.2)
Kazakhstan	494 (3.1)	494 (3.1)	493 (3.1)	493 (3.1)	492 (3.1)	497 (3.1)	491 (3.1)	492 (3.1)	497 (3.2)	496 (3.1)	486 (3.1)
Bahrain	493 (3.4)	493 (3.4)	493 (3.5)	494 (3.4)	493 (3.6)	493 (3.5)	493 (3.5)	494 (3.6)	499 (3.5)	493 (3.6)	492 (3.5)
Albania	489 (3.5)	489 (3.5)	489 (3.5)	490 (3.5)	490 (3.4)	490 (3.4)	492 (3.4)	490 (3.5)	489 (3.5)	491 (3.4)	487 (3.5)
France	488 (3.0)	488 (3.0)	486 (3.0)	488 (2.9)	490 (3.0)	486 (3.0)	490 (2.9)	486 (2.9)	479 (3.0)	487 (2.9)	491 (3.0)
United Arab Emirates	473 (2.1)	473 (2.1)	471 (2.1)	473 (2.0)	471 (2.1)	471 (2.1)	471 (2.0)	472 (2.1)	477 (2.0)	471 (2.2)	472 (2.0)
Chile	469 (2.6)	469 (2.6)	472 (2.6)	470 (2.6)	474 (2.5)	471 (2.5)	472 (2.5)	472 (2.6)	469 (2.6)	467 (2.6)	474 (2.5)
Armenia	466 (3.4)	466 (3.4)	467 (3.4)	465 (3.5)	473 (3.5)	469 (3.6)	472 (3.5)	472 (3.5)	466 (3.5)	467 (3.5)	472 (3.5)
Bosnia and Herzegovina	459 (2.9)	459 (2.9)	462 (2.9)	459 (2.9)	465 (2.8)	462 (2.9)	464 (2.9)	465 (3.0)	457 (2.9)	461 (3.0)	464 (2.9)
Georgia	454 (3.9)	454 (3.9)	453 (3.9)	455 (4.0)	457 (4.1)	459 (4.0)	456 (4.0)	452 (4.0)	452 (4.0)	456 (4.0)	455 (4.0)
Montenegro	453 (2.5)	453 (2.5)	453 (2.5)	454 (2.5)	461 (2.7)	458 (2.7)	462 (2.6)	459 (2.8)	452 (2.6)	456 (2.6)	459 (2.6)
Qatar	449 (3.9)	449 (3.9)	449 (3.9)	450 (4.0)	449 (4.1)	449 (4.1)	451 (3.9)	453 (4.0)	452 (3.9)	450 (4.0)	451 (4.0)
Iran, Islamic Rep. of	441 (4.1)	441 (4.1)	439 (4.1)	441 (4.1)	438 (4.0)	444 (4.1)	439 (4.0)	438 (4.1)	446 (4.3)	441 (4.3)	433 (3.9)
Oman	435 (4.1)	435 (4.1)	434 (4.1)	435 (4.0)	435 (3.9)	437 (4.0)	434 (4.0)	436 (3.9)	442 (4.1)	435 (4.0)	435 (3.9)
Azerbaijan	427 (3.3)	427 (3.3)	428 (3.3)	426 (3.3)	432 (3.3)	436 (3.3)	432 (3.3)	432 (3.3)	428 (3.3)	430 (3.3)	428 (3.2)
North Macedonia	426 (6.2)	426 (6.2)	427 (6.2)	425 (6.2)	421 (6.0)	428 (6.1)	424 (5.9)	427 (6.1)	425 (6.5)	429 (6.2)	423 (5.9)
Kosovo	413 (3.7)	413 (3.7)	411 (3.8)	413 (3.7)	411 (3.8)	417 (3.8)	414 (3.7)	411 (3.9)	411 (3.8)	414 (3.9)	408 (3.9)
Saudi Arabia	402 (4.1)	402 (4.1)	403 (4.1)	402 (4.1)	401 (4.1)	398 (4.2)	399 (4.1)	396 (4.1)	405 (4.1)	404 (4.1)	398 (4.1)
Kuwait	392 (6.1)	392 (6.1)	391 (6.1)	392 (6.1)	395 (6.1)	389 (6.2)	392 (6.1)	388 (6.2)	397 (6.1)	388 (6.2)	396 (6.1)
Morocco	374 (5.8)	374 (5.8)	371 (5.8)	374 (5.8)	370 (5.8)	368 (6.0)	373 (5.7)	369 (5.7)	377 (5.9)	372 (5.9)	370 (5.7)
South Africa (5)	324 (4.9)	324 (4.9)	322 (5.0)	325 (4.9)	326 (5.0)	319 (5.1)	329 (4.9)	323 (5.1)	326 (5.0)	321 (5.1)	328 (4.9)
Pakistan	290 (13.4)	290 (13.4)	292 (13.4)	289 (13.4)	291 (13.5)	293 (12.7)	292 (13.2)	289 (13.8)	291 (13.7)	286 (14.1)	293 (13.1)
Philippines	249 (7.5)	249 (7.5)	249 (7.6)	251 (7.5)	246 (7.6)	241 (7.8)	254 (7.4)	247 (7.8)	258 (7.7)	246 (7.6)	250 (7.6)
International Average	491 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)	492 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)
Benchmarking Participants											
Moscow City, Russian Fed.	595 (2.2)	595 (2.2)	596 (2.3)	596 (2.3)	595 (2.4)	592 (2.4)	593 (2.3)	594 (2.6)	601 (2.4)	594 (2.3)	593 (2.4)
Dubai, UAE	545 (1.7)	545 (1.7)	544 (1.7)	545 (1.7)	541 (1.7)	544 (1.7)	541 (1.7)	544 (1.8)	548 (1.8)	546 (1.8)	541 (1.7)
Ontario, Canada	524 (3.2)	524 (3.2)	526 (3.1)	526 (3.1)	529 (3.1)	522 (3.0)	525 (3.0)	527 (3.0)	521 (3.2)	522 (3.1)	528 (3.1)
Madrid, Spain	523 (2.0)	523 (2.0)	524 (2.0)	524 (2.0)	523 (2.0)	523 (2.1)	522 (2.0)	520 (2.2)	523 (2.1)	518 (2.0)	527 (2.1)
Quebec, Canada	522 (2.5)	522 (2.5)	521 (2.5)	522 (2.5)	522 (2.6)	521 (2.6)	521 (2.6)	520 (2.7)	517 (2.6)	521 (2.6)	526 (2.6)
Abu Dhabi, UAE	418 (2.8)	418 (2.8)	417 (2.8)	418 (2.8)	417 (2.9)	415 (2.9)	418 (2.8)	418 (2.9)	423 (2.8)	414 (2.9)	419 (2.8)
Number of Items (Score Points)*	169 (174)	169 (174)	147 (151)	157 (162)	100 (104)	99 (102)	124 (128)	91 (94)	118 (122)	129 (133)	105 (109)

* The number of items and score points are based on the number of items included in scaling the fourth grade science achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit C.2: Average Scale Scores for the Science Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Science Scale Score based on All Items	North Macedonia	Kosovo	Saudi Arabia	Kuwait	Morocco	South Africa (5)	Pakistan	Philippines
Singapore	595 (3.4)	595 (3.4)	595 (3.4)	595 (3.4)	598 (3.5)	602 (3.5)	591 (3.4)	598 (3.4)	595 (3.4)
Korea, Rep. of	588 (2.1)	588 (2.1)	588 (2.1)	587 (2.1)	589 (2.2)	581 (2.1)	584 (2.2)	589 (2.1)	588 (2.1)
Russian Federation	567 (3.0)	567 (3.0)	567 (3.0)	565 (3.1)	567 (3.1)	567 (3.0)	565 (3.1)	567 (3.1)	567 (3.0)
Japan	562 (1.8)	562 (1.8)	562 (1.8)	558 (1.8)	559 (1.9)	561 (1.8)	560 (1.9)	564 (1.8)	562 (1.8)
Chinese Taipei	558 (1.8)	558 (1.8)	558 (1.8)	556 (1.8)	560 (1.8)	549 (1.8)	553 (1.8)	558 (1.8)	558 (1.8)
Finland	555 (2.6)	555 (2.6)	555 (2.6)	550 (2.6)	553 (2.7)	554 (2.7)	553 (2.7)	554 (2.7)	555 (2.6)
Latvia	542 (2.4)	542 (2.4)	542 (2.4)	541 (2.3)	540 (2.4)	539 (2.3)	537 (2.4)	545 (2.3)	542 (2.4)
Norway (5)	539 (2.2)	539 (2.2)	539 (2.2)	535 (2.1)	537 (2.3)	536 (2.2)	536 (2.3)	538 (2.2)	539 (2.2)
United States	539 (2.7)	539 (2.7)	539 (2.7)	538 (2.8)	540 (2.7)	541 (2.8)	539 (2.8)	536 (2.7)	539 (2.7)
Lithuania	538 (2.5)	538 (2.5)	538 (2.5)	536 (2.5)	537 (2.6)	539 (2.5)	541 (2.6)	538 (2.5)	538 (2.5)
England	537 (2.7)	537 (2.7)	537 (2.7)	538 (2.7)	533 (2.7)	536 (2.7)	531 (2.9)	537 (2.7)	537 (2.7)
Sweden	537 (3.3)	537 (3.3)	537 (3.3)	533 (3.3)	538 (3.4)	537 (3.4)	540 (3.5)	536 (3.3)	537 (3.3)
Czech Republic	534 (2.6)	534 (2.6)	534 (2.6)	534 (2.7)	534 (2.7)	534 (2.8)	537 (2.8)	532 (2.6)	534 (2.6)
Australia	533 (2.4)	533 (2.4)	533 (2.4)	533 (2.4)	534 (2.4)	536 (2.4)	530 (2.4)	532 (2.4)	533 (2.4)
Hong Kong SAR	531 (3.3)	531 (3.3)	531 (3.3)	530 (3.4)	530 (3.5)	529 (3.5)	532 (3.5)	530 (3.4)	531 (3.3)
Poland	531 (2.6)	531 (2.6)	531 (2.6)	531 (2.7)	532 (2.7)	533 (2.7)	533 (2.7)	529 (2.6)	531 (2.6)
Hungary	529 (2.7)	529 (2.7)	529 (2.7)	526 (2.7)	527 (2.7)	528 (2.7)	527 (2.8)	530 (2.7)	529 (2.7)
Ireland	528 (3.2)	528 (3.2)	528 (3.2)	526 (3.1)	528 (3.2)	523 (3.2)	523 (3.1)	529 (3.1)	528 (3.2)
Turkey (5)	526 (4.2)	526 (4.2)	526 (4.2)	526 (4.3)	526 (4.3)	525 (4.4)	526 (4.3)	531 (4.3)	526 (4.2)
Croatia	524 (2.2)	524 (2.2)	524 (2.2)	524 (2.3)	522 (2.3)	526 (2.3)	527 (2.4)	526 (2.2)	524 (2.2)
Canada	523 (1.9)	523 (1.9)	523 (1.9)	521 (1.9)	522 (1.9)	524 (1.8)	521 (1.8)	522 (1.9)	523 (1.9)
Austria	522 (2.6)	522 (2.6)	522 (2.6)	521 (2.6)	520 (2.6)	523 (2.6)	519 (2.7)	522 (2.6)	522 (2.6)
Denmark	522 (2.4)	522 (2.4)	522 (2.4)	519 (2.4)	521 (2.4)	520 (2.4)	520 (2.5)	520 (2.4)	522 (2.4)
Bulgaria	521 (4.9)	521 (4.9)	521 (4.9)	523 (5.0)	520 (5.1)	525 (5.0)	529 (5.0)	519 (5.0)	521 (4.9)
Slovak Republic	521 (3.7)	521 (3.7)	521 (3.7)	522 (3.7)	519 (3.7)	518 (3.8)	519 (3.8)	520 (3.7)	521 (3.7)
Germany	518 (2.2)	518 (2.2)	518 (2.2)	517 (2.2)	518 (2.3)	522 (2.2)	517 (2.2)	518 (2.2)	518 (2.2)
Netherlands	518 (2.9)	518 (2.9)	518 (2.9)	516 (2.9)	518 (2.9)	513 (3.0)	510 (3.0)	519 (2.9)	518 (2.9)
Northern Ireland	518 (2.3)	518 (2.3)	518 (2.3)	517 (2.4)	518 (2.4)	516 (2.4)	512 (2.5)	518 (2.3)	518 (2.3)
Serbia	517 (3.5)	517 (3.5)	517 (3.5)	516 (3.6)	516 (3.5)	523 (3.7)	521 (3.5)	518 (3.5)	517 (3.5)
Cyprus	511 (3.0)	511 (3.0)	511 (3.0)	512 (3.2)	511 (3.1)	516 (3.1)	510 (3.3)	512 (3.0)	511 (3.0)
Spain	511 (2.0)	511 (2.0)	511 (2.0)	510 (2.0)	514 (2.0)	513 (2.0)	515 (2.1)	511 (2.0)	511 (2.0)
Italy	510 (3.0)	510 (3.0)	510 (3.0)	512 (3.1)	510 (3.1)	511 (3.2)	514 (3.1)	508 (3.0)	510 (3.0)
Portugal	504 (2.6)	504 (2.6)	504 (2.6)	503 (2.7)	505 (2.7)	508 (2.7)	511 (2.7)	503 (2.6)	504 (2.6)
New Zealand	503 (2.3)	503 (2.3)	503 (2.3)	502 (2.3)	502 (2.3)	503 (2.3)	500 (2.4)	502 (2.3)	503 (2.3)
Belgium (Flemish)	501 (2.1)	501 (2.1)	501 (2.1)	499 (2.1)	500 (2.2)	498 (2.2)	491 (2.3)	501 (2.1)	501 (2.1)
Malta	496 (1.3)	496 (1.3)	496 (1.3)	496 (1.3)	496 (1.3)	498 (1.3)	496 (1.2)	496 (1.3)	496 (1.3)
Kazakhstan	494 (3.1)	494 (3.1)	494 (3.1)	494 (3.1)	490 (3.1)	495 (3.1)	499 (3.1)	497 (3.1)	494 (3.1)
Bahrain	493 (3.4)	493 (3.4)	493 (3.4)	495 (3.4)	496 (3.4)	493 (3.5)	500 (3.4)	491 (3.5)	493 (3.4)
Albania	489 (3.5)	489 (3.5)	489 (3.5)	490 (3.5)	490 (3.6)	488 (3.3)	496 (3.5)	490 (3.5)	489 (3.5)
France	488 (3.0)	488 (3.0)	488 (3.0)	487 (3.0)	486 (3.0)	493 (2.9)	490 (3.0)	487 (2.9)	488 (3.0)
United Arab Emirates	473 (2.1)	473 (2.1)	473 (2.1)	475 (2.1)	475 (2.0)	471 (2.1)	480 (2.0)	472 (2.1)	473 (2.1)
Chile	469 (2.6)	469 (2.6)	469 (2.6)	469 (2.6)	472 (2.5)	472 (2.5)	473 (2.5)	466 (2.6)	469 (2.6)
Armenia	466 (3.4)	466 (3.4)	466 (3.4)	463 (3.5)	463 (3.4)	470 (3.5)	474 (3.6)	467 (3.5)	466 (3.4)
Bosnia and Herzegovina	459 (2.9)	459 (2.9)	459 (2.9)	458 (3.0)	459 (2.9)	465 (2.9)	462 (3.0)	459 (3.0)	459 (2.9)
Georgia	454 (3.9)	454 (3.9)	454 (3.9)	453 (4.0)	453 (3.9)	458 (4.1)	455 (4.1)	455 (3.9)	454 (3.9)
Montenegro	453 (2.5)	453 (2.5)	453 (2.5)	455 (2.6)	455 (2.6)	465 (2.7)	464 (2.7)	454 (2.5)	453 (2.5)
Qatar	449 (3.9)	449 (3.9)	449 (3.9)	451 (4.0)	452 (3.9)	450 (3.9)	455 (3.7)	450 (4.1)	449 (3.9)
Iran, Islamic Rep. of	441 (4.1)	441 (4.1)	441 (4.1)	440 (4.2)	440 (4.1)	440 (4.2)	447 (4.0)	442 (4.2)	441 (4.1)
Oman	435 (4.1)	435 (4.1)	435 (4.1)	438 (4.2)	439 (4.0)	437 (4.0)	446 (4.1)	434 (4.0)	435 (4.1)
Azerbaijan	427 (3.3)	427 (3.3)	427 (3.3)	428 (3.2)	425 (3.3)	429 (3.3)	432 (3.2)	429 (3.3)	427 (3.3)
North Macedonia	426 (6.2)	426 (6.2)	426 (6.2)	427 (6.4)	423 (6.2)	427 (5.9)	429 (6.1)	427 (6.2)	426 (6.2)
Kosovo	413 (3.7)	413 (3.7)	413 (3.7)	413 (3.8)	408 (3.8)	411 (3.9)	413 (4.0)	415 (3.7)	413 (3.7)
Saudi Arabia	402 (4.1)	402 (4.1)	402 (4.1)	405 (4.2)	406 (4.1)	401 (4.2)	407 (4.3)	400 (4.1)	402 (4.1)
Kuwait	392 (6.1)	392 (6.1)	392 (6.1)	394 (6.2)	397 (6.1)	393 (6.2)	402 (6.3)	390 (6.2)	392 (6.1)
Morocco	374 (5.8)	374 (5.8)	374 (5.8)	373 (6.0)	371 (5.8)	379 (5.9)	383 (5.8)	371 (5.9)	374 (5.8)
South Africa (5)	324 (4.9)	324 (4.9)	324 (4.9)	323 (5.0)	325 (5.0)	325 (5.0)	332 (4.9)	318 (5.0)	324 (4.9)
Pakistan	290 (13.4)	290 (13.4)	290 (13.4)	290 (13.5)	288 (13.4)	290 (13.3)	295 (13.8)	291 (13.2)	290 (13.4)
Philippines	249 (7.5)	249 (7.5)	249 (7.5)	249 (7.6)	251 (7.6)	250 (7.8)	262 (7.5)	244 (7.6)	249 (7.5)
International Average	491 (0.5)	491 (0.5)	491 (0.5)	490 (0.5)	491 (0.5)	492 (0.5)	493 (0.5)	491 (0.5)	491 (0.5)
Benchmarking Participants									
Moscow City, Russian Fed.	595 (2.2)	595 (2.2)	595 (2.2)	593 (2.3)	595 (2.3)	593 (2.5)	597 (2.4)	592 (2.3)	595 (2.2)
Dubai, UAE	545 (1.7)	545 (1.7)	545 (1.7)	549 (1.8)	546 (1.7)	541 (1.8)	548 (1.7)	546 (1.7)	545 (1.7)
Ontario, Canada	524 (3.2)	524 (3.2)	524 (3.2)	522 (3.2)	523 (3.1)	525 (3.0)	521 (3.1)	522 (3.1)	524 (3.2)
Madrid, Spain	523 (2.0)	523 (2.0)	523 (2.0)	520 (2.0)	524 (2.0)	522 (2.1)	523 (2.1)	523 (2.0)	523 (2.0)
Quebec, Canada	522 (2.5)	522 (2.5)	522 (2.5)	520 (2.6)	519 (2.6)	524 (2.6)	521 (2.7)	521 (2.5)	522 (2.5)
Abu Dhabi, UAE	418 (2.8)	418 (2.8)	418 (2.8)	418 (2.8)	421 (2.8)	418 (2.8)	427 (2.9)	416 (2.8)	418 (2.8)
Number of Items (Score Points)*	169 (174)	168 (173)	168 (173)	132 (136)	126 (131)	107 (110)	105 (108)	150 (154)	168 (173)

* The number of items and score points are based on the number of items included in scaling the fourth grade science achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit C.2: Average Scale Scores for the Science Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Science Scale Score based on All Items	Benchmarking Participants	Moscow City, Russian Fed.	Dubai, UAE	Ontario, Canada	Madrid, Spain	Quebec, Canada	Abu Dhabi, UAE
Singapore	595 (3.4)		590 (3.5)	595 (3.4)	593 (3.4)	589 (3.5)	591 (3.4)	595 (3.4)
Korea, Rep. of	588 (2.1)		584 (2.2)	588 (2.1)	589 (2.2)	584 (2.1)	585 (2.2)	588 (2.1)
Russian Federation	567 (3.0)		567 (3.0)	567 (3.0)	565 (3.0)	567 (3.0)	567 (3.0)	567 (3.0)
Japan	562 (1.8)		556 (1.9)	562 (1.8)	559 (1.8)	553 (1.8)	561 (1.9)	562 (1.8)
Chinese Taipei	558 (1.8)		556 (1.8)	558 (1.8)	559 (1.9)	554 (1.8)	556 (1.8)	558 (1.8)
Finland	555 (2.6)		557 (2.7)	555 (2.6)	556 (2.7)	555 (2.6)	553 (2.7)	555 (2.6)
Latvia	542 (2.4)		540 (2.4)	542 (2.4)	542 (2.4)	540 (2.5)	544 (2.3)	542 (2.4)
Norway (5)	539 (2.2)		541 (2.2)	539 (2.2)	539 (2.2)	540 (2.2)	536 (2.3)	539 (2.2)
United States	539 (2.7)		541 (2.8)	539 (2.7)	542 (2.8)	541 (2.8)	535 (2.8)	539 (2.7)
Lithuania	538 (2.5)		532 (2.5)	538 (2.5)	538 (2.5)	536 (2.5)	540 (2.5)	538 (2.5)
England	537 (2.7)		540 (2.8)	537 (2.7)	538 (2.7)	539 (2.7)	537 (2.8)	537 (2.7)
Sweden	537 (3.3)		542 (3.4)	537 (3.3)	537 (3.4)	540 (3.4)	539 (3.4)	537 (3.3)
Czech Republic	534 (2.6)		535 (2.8)	534 (2.6)	535 (2.8)	535 (2.7)	539 (2.8)	534 (2.6)
Australia	533 (2.4)		535 (2.4)	533 (2.4)	534 (2.4)	536 (2.4)	531 (2.4)	533 (2.4)
Hong Kong SAR	531 (3.3)		533 (3.4)	531 (3.3)	531 (3.4)	531 (3.4)	530 (3.5)	531 (3.3)
Poland	531 (2.6)		535 (2.7)	531 (2.6)	532 (2.7)	534 (2.6)	533 (2.7)	531 (2.6)
Hungary	529 (2.7)		533 (2.7)	529 (2.7)	530 (2.8)	533 (2.7)	535 (2.8)	529 (2.7)
Ireland	528 (3.2)		528 (3.2)	528 (3.2)	529 (3.3)	529 (3.3)	524 (3.2)	528 (3.2)
Turkey (5)	526 (4.2)		524 (4.2)	526 (4.2)	526 (4.2)	525 (4.2)	531 (4.3)	526 (4.2)
Croatia	524 (2.2)		523 (2.2)	524 (2.2)	523 (2.3)	523 (2.3)	524 (2.4)	524 (2.2)
Canada	523 (1.9)		525 (1.9)	523 (1.9)	525 (1.9)	526 (1.8)	523 (1.9)	523 (1.9)
Austria	522 (2.6)		521 (2.6)	522 (2.6)	520 (2.6)	522 (2.6)	519 (2.6)	522 (2.6)
Denmark	522 (2.4)		525 (2.4)	522 (2.4)	524 (2.4)	523 (2.4)	519 (2.5)	522 (2.4)
Bulgaria	521 (4.9)		524 (4.7)	521 (4.9)	524 (5.0)	523 (5.0)	523 (4.9)	521 (4.9)
Slovak Republic	521 (3.7)		521 (3.6)	521 (3.7)	521 (3.7)	521 (3.8)	525 (3.7)	521 (3.7)
Germany	518 (2.2)		519 (2.2)	518 (2.2)	515 (2.2)	518 (2.2)	516 (2.3)	518 (2.2)
Netherlands	518 (2.9)		514 (3.0)	518 (2.9)	516 (2.9)	517 (2.9)	514 (3.1)	518 (2.9)
Northern Ireland	518 (2.3)		520 (2.4)	518 (2.3)	520 (2.4)	522 (2.4)	515 (2.5)	518 (2.3)
Serbia	517 (3.5)		515 (3.5)	517 (3.5)	517 (3.5)	514 (3.4)	520 (3.4)	517 (3.5)
Cyprus	511 (3.0)		511 (3.0)	511 (3.0)	516 (3.1)	511 (3.0)	511 (3.0)	511 (3.0)
Spain	511 (2.0)		514 (2.0)	511 (2.0)	511 (2.0)	514 (2.0)	511 (2.0)	511 (2.0)
Italy	510 (3.0)		513 (3.1)	510 (3.0)	512 (3.1)	514 (3.1)	513 (3.2)	510 (3.0)
Portugal	504 (2.6)		507 (2.7)	504 (2.6)	505 (2.7)	506 (2.6)	506 (2.7)	504 (2.6)
New Zealand	503 (2.3)		505 (2.3)	503 (2.3)	505 (2.3)	506 (2.3)	501 (2.4)	503 (2.3)
Belgium (Flemish)	501 (2.1)		497 (2.2)	501 (2.1)	500 (2.2)	500 (2.2)	499 (2.2)	501 (2.1)
Malta	496 (1.3)		496 (1.2)	496 (1.3)	497 (1.3)	496 (1.3)	492 (1.3)	496 (1.3)
Kazakhstan	494 (3.1)		489 (3.1)	494 (3.1)	489 (3.1)	489 (3.1)	495 (3.0)	494 (3.1)
Bahrain	493 (3.4)		492 (3.5)	493 (3.4)	492 (3.5)	492 (3.4)	493 (3.5)	493 (3.4)
Albania	489 (3.5)		488 (3.5)	489 (3.5)	488 (3.6)	487 (3.4)	490 (3.5)	489 (3.5)
France	488 (3.0)		490 (3.0)	488 (3.0)	488 (3.0)	491 (3.0)	484 (3.0)	488 (3.0)
United Arab Emirates	473 (2.1)		473 (2.0)	473 (2.1)	472 (2.1)	471 (2.0)	469 (2.1)	473 (2.1)
Chile	469 (2.6)		474 (2.5)	469 (2.6)	472 (2.6)	475 (2.6)	470 (2.6)	469 (2.6)
Armenia	466 (3.4)		471 (3.4)	466 (3.4)	467 (3.4)	467 (3.5)	476 (3.4)	466 (3.4)
Bosnia and Herzegovina	459 (2.9)		461 (2.9)	459 (2.9)	461 (2.9)	462 (2.8)	463 (2.9)	459 (2.9)
Georgia	454 (3.9)		454 (4.0)	454 (3.9)	453 (4.0)	458 (4.0)	460 (4.0)	454 (3.9)
Montenegro	453 (2.5)		456 (2.6)	453 (2.5)	456 (2.6)	458 (2.5)	457 (2.6)	453 (2.5)
Qatar	449 (3.9)		450 (4.0)	449 (3.9)	450 (3.9)	451 (4.0)	445 (4.0)	449 (3.9)
Iran, Islamic Rep. of	441 (4.1)		435 (3.9)	441 (4.1)	437 (4.1)	437 (4.0)	442 (4.2)	441 (4.1)
Oman	435 (4.1)		435 (4.0)	435 (4.1)	437 (4.0)	432 (4.0)	436 (4.0)	435 (4.1)
Azerbaijan	427 (3.3)		429 (3.2)	427 (3.3)	428 (3.2)	429 (3.3)	436 (3.3)	427 (3.3)
North Macedonia	426 (6.2)		424 (6.0)	426 (6.2)	427 (6.1)	423 (6.1)	428 (5.9)	426 (6.2)
Kosovo	413 (3.7)		408 (3.8)	413 (3.7)	409 (3.8)	412 (3.7)	410 (3.8)	413 (3.7)
Saudi Arabia	402 (4.1)		401 (4.0)	402 (4.1)	405 (4.1)	404 (4.0)	398 (4.1)	402 (4.1)
Kuwait	392 (6.1)		395 (6.1)	392 (6.1)	396 (6.1)	394 (6.1)	389 (6.1)	392 (6.1)
Morocco	374 (5.8)		374 (5.7)	374 (5.8)	371 (5.7)	370 (5.8)	375 (5.6)	374 (5.8)
South Africa (5)	324 (4.9)		327 (4.9)	324 (4.9)	326 (4.9)	325 (5.0)	323 (4.9)	324 (4.9)
Pakistan	290 (13.4)		295 (12.9)	290 (13.4)	291 (13.4)	289 (13.4)	296 (13.0)	290 (13.4)
Philippines	249 (7.5)		256 (7.5)	249 (7.5)	249 (7.5)	246 (7.7)	252 (7.7)	249 (7.5)
International Average	491 (0.5)		491 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)	491 (0.5)
Benchmarking Participants								
Moscow City, Russian Fed.	595 (2.2)		594 (2.4)	595 (2.2)	594 (2.3)	595 (2.3)	597 (2.4)	595 (2.2)
Dubai, UAE	545 (1.7)		543 (1.7)	545 (1.7)	543 (1.8)	542 (1.7)	540 (1.8)	545 (1.7)
Ontario, Canada	524 (3.2)		526 (3.1)	524 (3.2)	528 (3.2)	528 (3.0)	524 (3.2)	524 (3.2)
Madrid, Spain	523 (2.0)		526 (2.0)	523 (2.0)	521 (2.0)	525 (2.0)	523 (2.0)	523 (2.0)
Quebec, Canada	522 (2.5)		523 (2.6)	522 (2.5)	520 (2.7)	524 (2.6)	522 (2.6)	522 (2.5)
Abu Dhabi, UAE	418 (2.8)		420 (2.8)	418 (2.8)	417 (2.8)	417 (2.8)	414 (2.9)	418 (2.8)
Number of Items (Score Points)*	169 (174)		125 (129)	169 (174)	126 (129)	136 (140)	107 (110)	169 (174)

* The number of items and score points are based on the number of items included in scaling the fourth grade science achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit C.3: Average Scale Scores for the Mathematics Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

Read down the column under a country name to compare achievement scores based on the items identified by that country. Scores on the diagonal are countries' achievement scores based on the test items they identified.

Country	Average Mathematics Scale Score based on All Items	Singapore	Chinese Taipei	Korea, Rep. of	Japan	Hong Kong SAR	Russian Federation	Ireland	Lithuania	Israel	Australia
Singapore	616 (4.0)	617 (4.0)	616 (4.0)	615 (3.9)	615 (3.9)	617 (4.0)	617 (4.0)	616 (4.0)	616 (4.0)	616 (4.0)	616 (4.0)
Chinese Taipei	612 (2.7)	613 (2.7)	617 (2.8)	613 (2.7)	611 (2.7)	615 (2.8)	615 (2.8)	613 (2.7)	615 (2.8)	613 (2.7)	612 (2.7)
Korea, Rep. of	607 (2.8)	608 (2.8)	606 (2.8)	610 (2.8)	607 (2.8)	606 (2.8)	607 (2.8)	605 (2.8)	603 (2.8)	607 (2.8)	605 (2.8)
Japan	594 (2.7)	593 (2.7)	593 (2.7)	595 (2.7)	599 (2.8)	593 (2.7)	592 (2.7)	595 (2.8)	591 (2.7)	594 (2.7)	594 (2.8)
Hong Kong SAR	578 (4.1)	578 (4.0)	581 (4.1)	578 (4.0)	577 (4.0)	583 (4.1)	579 (4.0)	578 (4.1)	580 (4.1)	578 (4.0)	578 (4.1)
Russian Federation	543 (4.5)	544 (4.5)	546 (4.5)	543 (4.5)	540 (4.5)	546 (4.5)	548 (4.6)	543 (4.5)	545 (4.5)	544 (4.5)	542 (4.5)
Ireland	524 (2.6)	524 (2.6)	523 (2.7)	526 (2.6)	526 (2.6)	524 (2.7)	525 (2.7)	524 (2.7)	524 (2.7)	524 (2.6)	525 (2.7)
Lithuania	520 (2.9)	520 (2.9)	522 (3.0)	520 (2.9)	521 (2.9)	522 (3.0)	522 (3.0)	521 (3.0)	523 (3.0)	520 (2.9)	521 (3.0)
Israel	519 (4.3)	520 (4.3)	519 (4.3)	520 (4.2)	520 (4.2)	519 (4.2)	520 (4.3)	519 (4.2)	518 (4.3)	520 (4.3)	519 (4.2)
Australia	517 (3.8)	516 (3.8)	515 (3.8)	517 (3.7)	519 (3.7)	516 (3.8)	515 (3.8)	518 (3.8)	517 (3.8)	517 (3.8)	518 (3.8)
Hungary	517 (2.9)	515 (2.9)	517 (3.0)	516 (2.9)	518 (2.9)	517 (2.9)	517 (3.0)	517 (2.9)	518 (3.0)	516 (2.9)	517 (2.9)
England	515 (5.3)	514 (5.3)	512 (5.3)	515 (5.2)	518 (5.2)	515 (5.3)	513 (5.3)	516 (5.3)	515 (5.3)	515 (5.3)	516 (5.3)
United States	515 (4.8)	515 (4.7)	514 (4.7)	515 (4.7)	515 (4.7)	514 (4.6)	515 (4.9)	515 (4.8)	514 (4.7)	516 (4.8)	515 (4.8)
Finland	509 (2.6)	509 (2.6)	509 (2.6)	510 (2.6)	511 (2.6)	510 (2.6)	509 (2.6)	509 (2.6)	509 (2.6)	509 (2.6)	509 (2.6)
Norway (9)	503 (2.4)	503 (2.4)	501 (2.4)	504 (2.4)	506 (2.4)	503 (2.4)	502 (2.4)	503 (2.4)	502 (2.5)	503 (2.4)	504 (2.4)
Sweden	503 (2.5)	503 (2.5)	502 (2.5)	504 (2.6)	506 (2.6)	504 (2.6)	502 (2.5)	503 (2.6)	502 (2.5)	503 (2.6)	504 (2.6)
Cyprus	501 (1.6)	501 (1.6)	501 (1.6)	500 (1.6)	501 (1.6)	501 (1.6)	503 (1.6)	502 (1.6)	501 (1.6)	501 (1.6)	502 (1.6)
Portugal	500 (3.2)	500 (3.2)	501 (3.2)	500 (3.2)	500 (3.1)	502 (3.2)	500 (3.2)	500 (3.2)	501 (3.2)	500 (3.2)	500 (3.2)
Italy	497 (2.7)	498 (2.7)	498 (2.7)	496 (2.7)	497 (2.7)	498 (2.8)	497 (2.8)	498 (2.7)	498 (2.8)	497 (2.7)	498 (2.7)
Turkey	496 (4.3)	496 (4.3)	495 (4.3)	496 (4.2)	495 (4.3)	495 (4.3)	495 (4.3)	496 (4.3)	494 (4.3)	496 (4.3)	496 (4.3)
Kazakhstan	488 (3.3)	488 (3.3)	491 (3.4)	487 (3.2)	485 (3.3)	490 (3.3)	491 (3.4)	487 (3.3)	489 (3.3)	488 (3.3)	486 (3.2)
France	483 (2.5)	481 (2.5)	482 (2.5)	482 (2.5)	484 (2.4)	483 (2.5)	480 (2.5)	483 (2.5)	481 (2.5)	483 (2.5)	482 (2.5)
New Zealand	482 (3.4)	480 (3.4)	480 (3.4)	481 (3.4)	484 (3.4)	480 (3.4)	479 (3.4)	482 (3.4)	481 (3.4)	482 (3.4)	482 (3.4)
Bahrain	481 (1.7)	479 (1.8)	479 (1.7)	480 (1.7)	482 (1.7)	481 (1.7)	478 (1.7)	481 (1.7)	480 (1.7)	481 (1.7)	480 (1.7)
Romania	479 (4.3)	480 (4.3)	482 (4.3)	479 (4.2)	477 (4.1)	481 (4.3)	482 (4.3)	479 (4.2)	479 (4.3)	479 (4.3)	478 (4.2)
United Arab Emirates	473 (1.9)	474 (1.9)	474 (1.9)	473 (1.8)	473 (1.8)	474 (1.9)	474 (1.9)	474 (1.8)	473 (1.9)	474 (1.9)	473 (1.8)
Georgia	461 (4.3)	462 (4.3)	465 (4.3)	463 (4.3)	460 (4.3)	464 (4.3)	466 (4.3)	462 (4.3)	463 (4.3)	462 (4.4)	461 (4.3)
Malaysia	461 (3.2)	461 (3.1)	461 (3.2)	461 (3.1)	462 (3.1)	461 (3.1)	461 (3.2)	461 (3.2)	461 (3.2)	460 (3.2)	461 (3.2)
Iran, Islamic Rep. of	446 (3.7)	445 (3.7)	446 (3.8)	445 (3.7)	446 (3.7)	446 (3.8)	446 (3.7)	447 (3.7)	446 (3.8)	447 (3.7)	447 (3.8)
Qatar	443 (4.0)	445 (3.9)	443 (3.9)	443 (4.0)	443 (4.1)	445 (3.9)	443 (4.0)	443 (4.0)	443 (4.0)	443 (4.1)	443 (4.0)
Chile	441 (2.8)	441 (2.8)	441 (2.9)	440 (2.8)	442 (2.8)	442 (2.8)	440 (2.9)	441 (2.8)	441 (2.9)	441 (2.8)	442 (2.8)
Lebanon	429 (2.9)	430 (2.9)	434 (2.9)	430 (2.9)	428 (2.9)	434 (2.9)	434 (2.9)	429 (2.9)	431 (2.9)	428 (3.0)	428 (2.9)
Jordan	420 (4.3)	421 (4.3)	422 (4.3)	419 (4.2)	417 (4.2)	420 (4.2)	421 (4.3)	421 (4.2)	420 (4.2)	420 (4.3)	420 (4.2)
Egypt	413 (5.2)	414 (5.2)	414 (5.2)	414 (5.2)	411 (5.1)	415 (5.1)	414 (5.2)	412 (5.2)	412 (5.2)	414 (5.2)	412 (5.2)
Oman	411 (2.8)	410 (2.8)	412 (2.8)	410 (2.7)	410 (2.7)	411 (2.8)	409 (2.8)	410 (2.7)	410 (2.8)	410 (2.7)	409 (2.8)
Kuwait	403 (5.0)	402 (5.0)	400 (5.1)	400 (5.0)	402 (4.9)	401 (5.0)	400 (5.0)	402 (4.9)	402 (5.0)	403 (5.0)	402 (5.0)
Saudi Arabia	394 (2.5)	395 (2.5)	390 (2.6)	393 (2.6)	395 (2.6)	391 (2.6)	392 (2.6)	394 (2.5)	391 (2.6)	395 (2.5)	392 (2.6)
South Africa (9)	389 (2.3)	391 (2.3)	391 (2.3)	391 (2.2)	390 (2.2)	392 (2.2)	391 (2.3)	389 (2.3)	391 (2.3)	390 (2.3)	389 (2.3)
Morocco	388 (2.3)	387 (2.3)	390 (2.3)	390 (2.2)	388 (2.3)	391 (2.3)	387 (2.4)	387 (2.3)	389 (2.3)	387 (2.3)	387 (2.3)
International Average	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.5)	489 (0.5)	490 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)
Benchmarking Participants											
Moscow City, Russian Fed.	575 (4.2)	576 (4.2)	577 (4.2)	574 (4.1)	572 (4.1)	576 (4.2)	580 (4.3)	575 (4.1)	577 (4.1)	575 (4.2)	574 (4.1)
Quebec, Canada	543 (3.7)	543 (3.6)	542 (3.7)	544 (3.7)	545 (3.7)	544 (3.7)	542 (3.7)	543 (3.7)	543 (3.7)	543 (3.7)	544 (3.7)
Dubai, UAE	537 (2.0)	537 (2.0)	536 (2.0)	536 (2.0)	536 (2.1)	536 (2.1)	536 (2.1)	537 (2.0)	536 (2.1)	537 (2.0)	536 (2.0)
Ontario, Canada	530 (4.3)	529 (4.3)	528 (4.3)	528 (4.2)	532 (4.2)	529 (4.3)	526 (4.3)	530 (4.3)	530 (4.3)	530 (4.2)	531 (4.2)
Western Cape, RSA (9)	441 (4.4)	442 (4.4)	443 (4.4)	442 (4.4)	441 (4.4)	443 (4.4)	442 (4.5)	441 (4.4)	443 (4.4)	441 (4.4)	441 (4.4)
Abu Dhabi, UAE	436 (2.9)	437 (2.9)	436 (2.9)	436 (2.9)	436 (2.9)	437 (2.9)	436 (2.9)	436 (2.9)	435 (2.9)	436 (2.9)	436 (2.9)
Gauteng, RSA (9)	421 (3.0)	421 (3.0)	422 (3.0)	421 (2.9)	421 (2.9)	422 (3.0)	421 (3.0)	420 (3.0)	422 (3.0)	421 (3.0)	421 (3.0)
Number of Items (Score Points)*	206 (217)	198 (209)	185 (195)	185 (194)	177 (186)	177 (187)	170 (180)	200 (211)	183 (194)	200 (211)	188 (198)

* The number of items and score points are based on the number of items included in scaling the eighth grade mathematics achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit C.3: Average Scale Scores for the Mathematics Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Mathematics Scale Score based on All Items	Hungary	England	United States	Finland	Norway (9)	Sweden	Cyprus	Portugal	Italy	Turkey
Singapore	616 (4.0)	616 (4.0)	616 (4.0)	616 (4.0)	616 (4.0)	614 (3.9)	614 (4.0)	618 (4.0)	616 (4.0)	616 (4.0)	616 (4.0)
Chinese Taipei	612 (2.7)	612 (2.7)	612 (2.7)	612 (2.7)	612 (2.7)	611 (2.7)	611 (2.7)	613 (2.8)	614 (2.8)	611 (2.7)	612 (2.7)
Korea, Rep. of	607 (2.8)	607 (2.8)	606 (2.8)	607 (2.8)	607 (2.8)	605 (2.8)	604 (2.8)	609 (2.8)	605 (2.8)	605 (2.8)	606 (2.8)
Japan	594 (2.7)	594 (2.7)	593 (2.7)	594 (2.7)	593 (2.7)	592 (2.7)	592 (2.8)	591 (2.8)	593 (2.7)	593 (2.7)	593 (2.7)
Hong Kong SAR	578 (4.1)	578 (4.1)	578 (4.1)	578 (4.1)	578 (4.1)	577 (4.1)	578 (4.1)	577 (4.1)	580 (4.1)	579 (4.1)	578 (4.1)
Russian Federation	543 (4.5)	543 (4.5)	543 (4.5)	544 (4.6)	543 (4.6)	541 (4.5)	541 (4.4)	544 (4.6)	545 (4.5)	543 (4.5)	543 (4.6)
Ireland	524 (2.6)	524 (2.6)	524 (2.7)	524 (2.6)	524 (2.7)	525 (2.7)	525 (2.7)	525 (2.7)	523 (2.7)	525 (2.7)	524 (2.7)
Lithuania	520 (2.9)	520 (2.9)	521 (2.9)	520 (2.9)	521 (2.9)	521 (3.0)	522 (3.0)	519 (3.0)	522 (3.0)	521 (3.0)	521 (3.0)
Israel	519 (4.3)	519 (4.3)	519 (4.3)	519 (4.3)	520 (4.3)	519 (4.3)	518 (4.2)	523 (4.3)	518 (4.2)	518 (4.2)	520 (4.3)
Australia	517 (3.8)	517 (3.8)	518 (3.8)	517 (3.8)	518 (3.8)	519 (3.8)	519 (3.8)	517 (3.8)	516 (3.8)	518 (3.8)	518 (3.8)
Hungary	517 (2.9)	517 (2.9)	517 (2.9)	517 (2.9)	517 (2.9)	517 (2.9)	516 (2.9)	515 (3.0)	518 (3.0)	518 (2.9)	517 (2.9)
England	515 (5.3)	515 (5.3)	515 (5.3)	515 (5.3)	515 (5.3)	516 (5.3)	515 (5.3)	515 (5.2)	514 (5.3)	516 (5.3)	516 (5.2)
United States	515 (4.8)	515 (4.8)	515 (4.8)	515 (4.8)	516 (4.8)	516 (4.8)	514 (4.7)	516 (4.8)	514 (4.7)	515 (4.8)	515 (4.7)
Finland	509 (2.6)	509 (2.6)	509 (2.6)	509 (2.6)	509 (2.6)	510 (2.6)	510 (2.6)	509 (2.6)	509 (2.6)	509 (2.6)	509 (2.6)
Norway (9)	503 (2.4)	503 (2.4)	503 (2.4)	503 (2.4)	504 (2.5)	504 (2.5)	504 (2.4)	502 (2.4)	503 (2.4)	504 (2.4)	504 (2.4)
Sweden	503 (2.5)	503 (2.5)	502 (2.6)	503 (2.6)	503 (2.6)	504 (2.6)	504 (2.6)	503 (2.6)	503 (2.6)	503 (2.6)	503 (2.6)
Cyprus	501 (1.6)	501 (1.6)	501 (1.6)	501 (1.6)	501 (1.7)	501 (1.6)	500 (1.6)	507 (1.6)	501 (1.6)	501 (1.6)	501 (1.6)
Portugal	500 (3.2)	500 (3.2)	500 (3.2)	500 (3.2)	500 (3.2)	500 (3.2)	500 (3.2)	497 (3.3)	501 (3.2)	501 (3.2)	501 (3.2)
Italy	497 (2.7)	497 (2.7)	498 (2.7)	498 (2.7)	498 (2.8)	498 (2.7)	496 (2.8)	500 (2.8)	498 (2.8)	498 (2.8)	498 (2.8)
Turkey	496 (4.3)	496 (4.3)	496 (4.3)	496 (4.3)	496 (4.3)	495 (4.3)	494 (4.3)	498 (4.4)	494 (4.3)	494 (4.3)	496 (4.3)
Kazakhstan	488 (3.3)	488 (3.3)	488 (3.3)	488 (3.3)	487 (3.3)	486 (3.3)	486 (3.2)	488 (3.4)	490 (3.3)	487 (3.3)	488 (3.3)
France	483 (2.5)	483 (2.5)	483 (2.5)	483 (2.5)	483 (2.5)	483 (2.5)	484 (2.5)	478 (2.5)	482 (2.5)	483 (2.5)	483 (2.5)
New Zealand	482 (3.4)	482 (3.4)	481 (3.4)	482 (3.4)	482 (3.4)	483 (3.4)	483 (3.4)	480 (3.4)	480 (3.4)	482 (3.4)	481 (3.4)
Bahrain	481 (1.7)	481 (1.7)	482 (1.7)	481 (1.7)	481 (1.7)	481 (1.7)	480 (1.7)	480 (1.6)	482 (1.7)	481 (1.7)	481 (1.7)
Romania	479 (4.3)	479 (4.3)	479 (4.2)	479 (4.3)	478 (4.3)	478 (4.2)	476 (4.2)	483 (4.3)	480 (4.3)	477 (4.2)	479 (4.3)
United Arab Emirates	473 (1.9)	473 (1.9)	473 (1.8)	473 (1.9)	473 (1.8)	473 (1.8)	472 (1.8)	475 (1.9)	474 (1.9)	472 (1.9)	473 (1.9)
Georgia	461 (4.3)	461 (4.3)	461 (4.3)	461 (4.3)	461 (4.4)	461 (4.3)	460 (4.3)	468 (4.3)	463 (4.4)	461 (4.3)	461 (4.3)
Malaysia	461 (3.2)	461 (3.2)	461 (3.2)	461 (3.2)	461 (3.2)	461 (3.2)	462 (3.2)	460 (3.2)	461 (3.2)	461 (3.2)	461 (3.2)
Iran, Islamic Rep. of	446 (3.7)	446 (3.7)	446 (3.7)	446 (3.7)	447 (3.8)	447 (3.7)	447 (3.8)	447 (3.7)	446 (3.8)	447 (3.8)	447 (3.8)
Qatar	443 (4.0)	443 (4.0)	443 (4.0)	443 (4.0)	443 (4.0)	443 (4.0)	443 (4.0)	445 (4.1)	443 (4.0)	442 (4.0)	444 (4.0)
Chile	441 (2.8)	441 (2.8)	441 (2.8)	441 (2.8)	441 (2.8)	441 (2.8)	441 (2.8)	442 (2.9)	440 (2.9)	441 (2.8)	441 (2.8)
Lebanon	429 (2.9)	429 (2.9)	430 (2.9)	429 (2.9)	429 (2.9)	428 (2.9)	426 (2.9)	433 (3.0)	433 (2.9)	430 (2.9)	430 (2.9)
Jordan	420 (4.3)	420 (4.3)	419 (4.3)	420 (4.3)	420 (4.2)	420 (4.2)	419 (4.1)	419 (4.2)	421 (4.3)	419 (4.2)	419 (4.3)
Egypt	413 (5.2)	413 (5.2)	413 (5.2)	413 (5.2)	412 (5.2)	412 (5.2)	411 (5.2)	417 (5.3)	414 (5.2)	412 (5.2)	412 (5.2)
Oman	411 (2.8)	411 (2.8)	411 (2.8)	411 (2.8)	410 (2.8)	410 (2.8)	410 (2.8)	410 (2.9)	412 (2.8)	410 (2.8)	411 (2.8)
Kuwait	403 (5.0)	403 (5.0)	403 (5.0)	403 (5.0)	403 (5.0)	403 (5.0)	403 (4.9)	399 (5.2)	403 (5.0)	402 (5.0)	402 (5.0)
Saudi Arabia	394 (2.5)	394 (2.5)	393 (2.6)	394 (2.5)	393 (2.5)	394 (2.6)	394 (2.6)	393 (2.7)	393 (2.6)	391 (2.6)	393 (2.5)
South Africa (9)	389 (2.3)	389 (2.3)	389 (2.3)	389 (2.3)	389 (2.3)	389 (2.3)	389 (2.2)	389 (2.4)	391 (2.3)	389 (2.3)	390 (2.3)
Morocco	388 (2.3)	388 (2.3)	388 (2.3)	388 (2.3)	388 (2.3)	387 (2.2)	389 (2.3)	385 (2.3)	390 (2.3)	388 (2.3)	388 (2.3)
International Average	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)
Benchmarking Participants											
Moscow City, Russian Fed.	575 (4.2)	575 (4.2)	575 (4.1)	575 (4.2)	575 (4.2)	574 (4.1)	574 (4.1)	576 (4.3)	576 (4.2)	575 (4.1)	575 (4.2)
Quebec, Canada	543 (3.7)	543 (3.7)	544 (3.7)	543 (3.7)	544 (3.7)	544 (3.7)	545 (3.8)	542 (3.7)	543 (3.8)	545 (3.7)	544 (3.7)
Dubai, UAE	537 (2.0)	537 (2.0)	536 (2.0)	537 (2.0)	537 (2.0)	536 (2.0)	535 (2.0)	538 (2.1)	536 (2.0)	536 (2.0)	536 (2.0)
Ontario, Canada	530 (4.3)	530 (4.3)	530 (4.3)	530 (4.3)	530 (4.2)	531 (4.3)	531 (4.2)	526 (4.3)	530 (4.3)	531 (4.3)	530 (4.3)
Western Cape, RSA (9)	441 (4.4)	441 (4.4)	441 (4.4)	441 (4.4)	441 (4.4)	441 (4.4)	441 (4.4)	442 (4.6)	442 (4.4)	441 (4.4)	442 (4.4)
Abu Dhabi, UAE	436 (2.9)	436 (2.9)	436 (2.9)	436 (2.9)	436 (2.9)	436 (2.9)	435 (2.9)	439 (3.0)	436 (2.9)	435 (2.9)	436 (2.9)
Gauteng, RSA (9)	421 (3.0)	421 (3.0)	421 (3.0)	421 (3.0)	421 (3.0)	421 (3.0)	420 (2.9)	422 (3.0)	422 (3.0)	420 (3.0)	421 (3.0)
Number of Items (Score Points)*	206 (217)	206 (217)	202 (213)	206 (217)	198 (209)	193 (204)	177 (187)	140 (148)	187 (198)	194 (204)	197 (208)

* The number of items and score points are based on the number of items included in scaling the eighth grade mathematics achievement data.

See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

Downloaded from http://timss2019.org/download

Exhibit C.3: Average Scale Scores for the Mathematics Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Mathematics Scale Score based on All Items	Kazakhstan	France	New Zealand	Bahrain	Romania	United Arab Emirates	Georgia	Malaysia	Iran, Islamic Rep. of	Qatar
Singapore	616 (4.0)	616 (4.0)	616 (4.0)	613 (3.9)	616 (4.0)	616 (4.0)	616 (4.0)	616 (4.0)	616 (4.0)	616 (4.0)	617 (4.0)
Chinese Taipei	612 (2.7)	612 (2.7)	613 (2.7)	611 (2.7)	612 (2.7)	612 (2.7)	612 (2.7)	615 (2.8)	613 (2.7)	615 (2.8)	613 (2.8)
Korea, Rep. of	607 (2.8)	607 (2.8)	604 (2.8)	603 (2.8)	607 (2.8)	607 (2.8)	607 (2.8)	607 (2.8)	607 (2.8)	604 (2.7)	607 (2.8)
Japan	594 (2.7)	594 (2.7)	593 (2.8)	592 (2.8)	594 (2.7)	594 (2.7)	594 (2.7)	594 (2.8)	594 (2.7)	591 (2.7)	593 (2.8)
Hong Kong SAR	578 (4.1)	578 (4.1)	579 (4.1)	575 (4.1)	578 (4.1)	578 (4.1)	578 (4.1)	578 (4.0)	578 (4.1)	580 (4.2)	579 (4.1)
Russian Federation	543 (4.5)	543 (4.5)	543 (4.5)	540 (4.4)	543 (4.5)	543 (4.5)	543 (4.5)	545 (4.5)	543 (4.5)	544 (4.4)	545 (4.6)
Ireland	524 (2.6)	524 (2.6)	524 (2.7)	526 (2.7)	524 (2.6)	524 (2.6)	524 (2.6)	525 (2.7)	524 (2.6)	525 (2.7)	526 (2.7)
Lithuania	520 (2.9)	520 (2.9)	521 (3.0)	521 (3.0)	520 (2.9)	520 (2.9)	520 (2.9)	521 (3.0)	520 (2.9)	522 (3.0)	522 (3.0)
Israel	519 (4.3)	519 (4.3)	518 (4.2)	517 (4.2)	519 (4.3)	519 (4.3)	519 (4.3)	519 (4.3)	519 (4.3)	518 (4.2)	519 (4.3)
Australia	517 (3.8)	517 (3.8)	518 (3.8)	520 (3.8)	517 (3.8)	517 (3.8)	517 (3.8)	517 (3.8)	517 (3.8)	518 (3.8)	518 (3.8)
Hungary	517 (2.9)	517 (2.9)	517 (2.9)	517 (2.9)	517 (2.9)	517 (2.9)	517 (2.9)	518 (2.9)	517 (2.9)	516 (2.9)	518 (2.9)
England	515 (5.3)	515 (5.3)	515 (5.2)	517 (5.3)	515 (5.3)	515 (5.3)	515 (5.3)	514 (5.2)	515 (5.3)	515 (5.3)	516 (5.2)
United States	515 (4.8)	515 (4.8)	514 (4.7)	514 (4.8)	515 (4.8)	515 (4.8)	515 (4.8)	516 (4.8)	515 (4.8)	513 (4.7)	517 (4.8)
Finland	509 (2.6)	509 (2.6)	509 (2.6)	510 (2.6)	509 (2.6)	509 (2.6)	509 (2.6)	510 (2.6)	509 (2.6)	509 (2.6)	510 (2.6)
Norway (9)	503 (2.4)	503 (2.4)	503 (2.4)	505 (2.4)	503 (2.4)	503 (2.4)	503 (2.4)	503 (2.4)	503 (2.4)	503 (2.4)	504 (2.4)
Sweden	503 (2.5)	503 (2.5)	503 (2.5)	504 (2.6)	503 (2.5)	503 (2.5)	503 (2.5)	502 (2.5)	503 (2.5)	504 (2.5)	502 (2.5)
Cyprus	501 (1.6)	501 (1.6)	502 (1.6)	499 (1.7)	501 (1.6)	501 (1.6)	501 (1.6)	502 (1.6)	501 (1.6)	502 (1.6)	502 (1.6)
Portugal	500 (3.2)	500 (3.2)	501 (3.2)	501 (3.2)	500 (3.2)	500 (3.2)	500 (3.2)	501 (3.2)	500 (3.2)	501 (3.2)	500 (3.2)
Italy	497 (2.7)	497 (2.7)	498 (2.7)	498 (2.8)	497 (2.7)	497 (2.7)	497 (2.7)	497 (2.7)	498 (2.7)	499 (2.8)	498 (2.8)
Turkey	496 (4.3)	496 (4.3)	496 (4.3)	496 (4.3)	496 (4.3)	496 (4.3)	496 (4.3)	496 (4.3)	496 (4.3)	496 (4.3)	495 (4.3)
Kazakhstan	488 (3.3)	488 (3.3)	487 (3.3)	484 (3.3)	488 (3.3)	488 (3.3)	488 (3.3)	490 (3.4)	488 (3.3)	486 (3.3)	488 (3.3)
France	483 (2.5)	483 (2.5)	483 (2.5)	483 (2.5)	483 (2.5)	483 (2.5)	483 (2.5)	482 (2.5)	483 (2.5)	483 (2.5)	483 (2.5)
New Zealand	482 (3.4)	482 (3.4)	482 (3.4)	484 (3.4)	482 (3.4)	482 (3.4)	482 (3.4)	481 (3.4)	482 (3.4)	482 (3.3)	481 (3.4)
Bahrain	481 (1.7)	481 (1.7)	481 (1.7)	481 (1.6)	481 (1.7)	481 (1.7)	481 (1.7)	479 (1.7)	481 (1.7)	480 (1.7)	480 (1.7)
Romania	479 (4.3)	479 (4.3)	479 (4.3)	476 (4.2)	479 (4.3)	479 (4.3)	479 (4.3)	481 (4.3)	479 (4.3)	479 (4.2)	480 (4.3)
United Arab Emirates	473 (1.9)	473 (1.9)	473 (1.9)	472 (1.8)	473 (1.9)	473 (1.9)	473 (1.9)	474 (1.8)	473 (1.9)	473 (1.9)	474 (1.8)
Georgia	461 (4.3)	461 (4.3)	462 (4.3)	460 (4.3)	461 (4.3)	461 (4.3)	461 (4.3)	463 (4.3)	461 (4.3)	463 (4.3)	462 (4.4)
Malaysia	461 (3.2)	461 (3.2)	461 (3.2)	462 (3.2)	461 (3.2)	461 (3.2)	461 (3.2)	462 (3.1)	461 (3.2)	461 (3.2)	461 (3.2)
Iran, Islamic Rep. of	446 (3.7)	446 (3.7)	447 (3.8)	448 (3.8)	446 (3.7)	446 (3.7)	446 (3.7)	443 (3.7)	446 (3.7)	448 (3.8)	441 (3.8)
Qatar	443 (4.0)	443 (4.0)	444 (4.0)	443 (4.0)	443 (4.0)	443 (4.0)	443 (4.0)	443 (3.9)	443 (4.0)	443 (4.0)	443 (4.0)
Chile	441 (2.8)	441 (2.8)	441 (2.8)	442 (2.8)	441 (2.8)	441 (2.8)	441 (2.8)	440 (2.9)	441 (2.8)	442 (2.8)	440 (2.9)
Lebanon	429 (2.9)	429 (2.9)	430 (2.9)	423 (3.0)	429 (2.9)	429 (2.9)	429 (2.9)	431 (2.9)	429 (2.9)	431 (2.9)	432 (2.9)
Jordan	420 (4.3)	420 (4.3)	420 (4.2)	418 (4.1)	420 (4.3)	420 (4.3)	420 (4.3)	419 (4.3)	420 (4.3)	419 (4.2)	417 (4.2)
Egypt	413 (5.2)	413 (5.2)	413 (5.2)	409 (5.2)	413 (5.2)	413 (5.2)	413 (5.2)	414 (5.2)	413 (5.2)	412 (5.2)	414 (5.2)
Oman	411 (2.8)	411 (2.8)	410 (2.7)	410 (2.8)	411 (2.8)	411 (2.8)	411 (2.8)	410 (2.8)	411 (2.8)	410 (2.8)	411 (2.8)
Kuwait	403 (5.0)	403 (5.0)	402 (5.0)	402 (4.9)	403 (5.0)	403 (5.0)	403 (5.0)	402 (5.0)	403 (5.0)	400 (5.0)	403 (5.1)
Saudi Arabia	394 (2.5)	394 (2.5)	394 (2.6)	394 (2.5)	394 (2.5)	394 (2.5)	394 (2.5)	393 (2.5)	394 (2.5)	391 (2.6)	395 (2.5)
South Africa (9)	389 (2.3)	389 (2.3)	389 (2.3)	389 (2.3)	389 (2.3)	389 (2.3)	389 (2.3)	390 (2.3)	389 (2.3)	388 (2.3)	387 (2.3)
Morocco	388 (2.3)	388 (2.3)	388 (2.3)	387 (2.3)	388 (2.3)	388 (2.3)	388 (2.3)	389 (2.3)	388 (2.3)	389 (2.3)	390 (2.3)
International Average	489 (0.6)	489 (0.6)	489 (0.6)	488 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)
Benchmarking Participants											
Moscow City, Russian Fed.	575 (4.2)	575 (4.2)	576 (4.1)	573 (4.1)	575 (4.2)	575 (4.2)	575 (4.2)	577 (4.2)	575 (4.2)	575 (4.1)	577 (4.2)
Quebec, Canada	543 (3.7)	543 (3.7)	544 (3.7)	545 (3.8)	543 (3.7)	543 (3.7)	543 (3.7)	542 (3.6)	543 (3.7)	545 (3.7)	545 (3.7)
Dubai, UAE	537 (2.0)	537 (2.0)	536 (2.0)	536 (2.1)	537 (2.0)	537 (2.0)	537 (2.0)	536 (2.0)	536 (2.0)	536 (2.0)	537 (2.0)
Ontario, Canada	530 (4.3)	530 (4.3)	530 (4.3)	533 (4.3)	530 (4.3)	530 (4.3)	530 (4.3)	528 (4.2)	530 (4.3)	530 (4.3)	529 (4.3)
Western Cape, RSA (9)	441 (4.4)	441 (4.4)	441 (4.4)	442 (4.4)	441 (4.4)	441 (4.4)	441 (4.4)	442 (4.4)	441 (4.4)	441 (4.4)	439 (4.5)
Abu Dhabi, UAE	436 (2.9)	436 (2.9)	436 (2.9)	434 (2.9)	436 (2.9)	436 (2.9)	436 (2.9)	437 (2.9)	436 (2.9)	435 (2.9)	437 (2.9)
Gauteng, RSA (9)	421 (3.0)	421 (3.0)	420 (3.0)	421 (3.0)	421 (3.0)	421 (3.0)	421 (3.0)	421 (3.0)	421 (3.0)	420 (3.0)	419 (3.0)
Number of Items (Score Points)*	206 (217)	206 (217)	196 (207)	177 (187)	206 (217)	206 (217)	206 (217)	186 (195)	205 (216)	184 (194)	186 (197)

* The number of items and score points are based on the number of items included in scaling the eighth grade mathematics achievement data.

See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit C.3: Average Scale Scores for the Mathematics Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Mathematics Scale Score based on All Items	Chile	Lebanon	Jordan	Egypt	Oman	Kuwait	Saudi Arabia	South Africa (9)	Morocco
Singapore	616 (4.0)	618 (4.0)	618 (4.0)	616 (4.0)	616 (4.0)	616 (4.0)	616 (4.0)	616 (4.0)	616 (4.0)	617 (4.0)
Chinese Taipei	612 (2.7)	613 (2.8)	617 (2.8)	613 (2.7)	613 (2.7)	614 (2.8)	614 (2.8)	612 (2.7)	613 (2.7)	618 (2.8)
Korea, Rep. of	607 (2.8)	604 (2.7)	608 (2.8)	607 (2.8)	607 (2.8)	606 (2.8)	606 (2.8)	607 (2.8)	605 (2.8)	609 (2.8)
Japan	594 (2.7)	594 (2.7)	590 (2.7)	594 (2.7)	594 (2.7)	592 (2.7)	591 (2.7)	594 (2.7)	592 (2.7)	593 (2.7)
Hong Kong SAR	578 (4.1)	580 (4.1)	582 (4.1)	579 (4.1)	578 (4.1)	580 (4.1)	580 (4.2)	578 (4.1)	579 (4.1)	582 (4.0)
Russian Federation	543 (4.5)	544 (4.5)	549 (4.6)	544 (4.6)	543 (4.6)	544 (4.5)	543 (4.6)	543 (4.5)	543 (4.5)	548 (4.6)
Ireland	524 (2.6)	525 (2.7)	525 (2.7)	524 (2.7)	524 (2.7)	523 (2.7)	526 (2.7)	524 (2.6)	524 (2.7)	523 (2.7)
Lithuania	520 (2.9)	522 (3.0)	523 (3.0)	520 (2.9)	520 (2.9)	521 (3.0)	522 (3.0)	521 (2.9)	521 (3.0)	522 (3.0)
Israel	519 (4.3)	520 (4.2)	519 (4.2)	519 (4.3)	519 (4.2)	518 (4.2)	518 (4.2)	519 (4.3)	519 (4.2)	520 (4.2)
Australia	517 (3.8)	517 (3.8)	515 (3.8)	517 (3.8)	517 (3.8)	517 (3.8)	518 (3.7)	518 (3.8)	518 (3.8)	515 (3.8)
Hungary	517 (2.9)	518 (3.0)	518 (3.0)	517 (2.9)	517 (2.9)	517 (2.9)	517 (2.9)	517 (2.9)	516 (3.0)	518 (3.0)
England	515 (5.3)	515 (5.3)	514 (5.2)	515 (5.3)	515 (5.2)	515 (5.3)	515 (5.2)	515 (5.2)	515 (5.3)	514 (5.2)
United States	515 (4.8)	515 (4.8)	516 (4.7)	515 (4.8)	515 (4.8)	514 (4.7)	515 (4.7)	516 (4.8)	514 (4.7)	516 (4.7)
Finland	509 (2.6)	509 (2.6)	511 (2.6)	509 (2.6)	509 (2.6)	509 (2.6)	510 (2.6)	509 (2.6)	509 (2.6)	510 (2.6)
Norway (9)	503 (2.4)	504 (2.5)	503 (2.3)	503 (2.4)	503 (2.4)	503 (2.4)	504 (2.4)	503 (2.4)	504 (2.4)	503 (2.4)
Sweden	503 (2.5)	503 (2.5)	502 (2.5)	503 (2.6)	503 (2.5)	502 (2.6)	502 (2.6)	502 (2.6)	503 (2.6)	501 (2.5)
Cyprus	501 (1.6)	501 (1.6)	502 (1.6)	501 (1.6)	501 (1.6)	501 (1.6)	502 (1.6)	501 (1.6)	501 (1.6)	502 (1.6)
Portugal	500 (3.2)	501 (3.2)	500 (3.3)	500 (3.2)	500 (3.2)	501 (3.2)	500 (3.2)	500 (3.2)	500 (3.2)	500 (3.2)
Italy	497 (2.7)	497 (2.8)	499 (2.8)	497 (2.7)	497 (2.7)	498 (2.7)	499 (2.8)	497 (2.7)	498 (2.8)	498 (2.8)
Turkey	496 (4.3)	494 (4.4)	494 (4.4)	495 (4.3)	496 (4.3)	495 (4.3)	497 (4.3)	496 (4.3)	496 (4.3)	495 (4.3)
Kazakhstan	488 (3.3)	487 (3.3)	492 (3.4)	488 (3.3)	488 (3.3)	488 (3.3)	488 (3.2)	487 (3.3)	487 (3.3)	491 (3.4)
France	483 (2.5)	482 (2.5)	481 (2.6)	483 (2.5)	483 (2.5)	483 (2.5)	483 (2.5)	483 (2.5)	482 (2.5)	480 (2.5)
New Zealand	482 (3.4)	481 (3.5)	478 (3.5)	482 (3.4)	482 (3.4)	482 (3.4)	481 (3.4)	482 (3.4)	482 (3.4)	478 (3.4)
Bahrain	481 (1.7)	480 (1.7)	480 (1.6)	481 (1.7)	481 (1.7)	481 (1.7)	480 (1.7)	481 (1.7)	481 (1.7)	483 (1.7)
Romania	479 (4.3)	478 (4.2)	483 (4.3)	479 (4.3)	479 (4.3)	479 (4.3)	481 (4.3)	479 (4.3)	478 (4.2)	482 (4.3)
United Arab Emirates	473 (1.9)	474 (1.9)	474 (1.9)	473 (1.9)	474 (1.9)	473 (1.8)	473 (1.8)	474 (1.9)	473 (1.8)	476 (1.8)
Georgia	461 (4.3)	461 (4.4)	466 (4.4)	461 (4.3)	461 (4.3)	461 (4.3)	462 (4.3)	461 (4.3)	461 (4.3)	467 (4.4)
Malaysia	461 (3.2)	464 (3.2)	462 (3.2)	461 (3.2)	461 (3.2)	461 (3.2)	460 (3.2)	461 (3.2)	461 (3.2)	462 (3.1)
Iran, Islamic Rep. of	446 (3.7)	448 (3.8)	441 (4.0)	446 (3.7)	446 (3.7)	446 (3.8)	443 (3.9)	446 (3.7)	447 (3.8)	443 (3.9)
Qatar	443 (4.0)	445 (4.0)	444 (3.9)	443 (4.0)	444 (4.0)	444 (4.0)	444 (4.0)	443 (4.0)	443 (4.0)	445 (3.9)
Chile	441 (2.8)	440 (2.9)	440 (2.9)	441 (2.8)	441 (2.8)	441 (2.8)	440 (2.9)	441 (2.8)	440 (2.8)	441 (2.9)
Lebanon	429 (2.9)	433 (2.9)	439 (2.9)	429 (2.9)	429 (2.9)	430 (2.9)	431 (2.9)	428 (2.9)	428 (2.9)	436 (2.9)
Jordan	420 (4.3)	419 (4.2)	418 (4.2)	420 (4.3)	420 (4.3)	420 (4.2)	417 (4.2)	420 (4.3)	419 (4.2)	420 (4.3)
Egypt	413 (5.2)	413 (5.1)	418 (5.1)	413 (5.2)	413 (5.2)	412 (5.2)	414 (5.1)	412 (5.2)	413 (5.2)	417 (5.2)
Oman	411 (2.8)	410 (2.8)	411 (2.8)	411 (2.8)	411 (2.7)	411 (2.8)	410 (2.8)	410 (2.8)	410 (2.8)	413 (2.7)
Kuwait	403 (5.0)	403 (4.9)	402 (5.1)	403 (5.0)	403 (5.0)	403 (5.0)	403 (5.0)	403 (5.0)	403 (5.0)	403 (5.1)
Saudi Arabia	394 (2.5)	392 (2.5)	391 (2.6)	394 (2.5)	394 (2.5)	393 (2.5)	394 (2.6)	393 (2.6)	394 (2.5)	392 (2.6)
South Africa (9)	389 (2.3)	392 (2.3)	388 (2.3)	389 (2.3)	389 (2.3)	390 (2.3)	386 (2.3)	390 (2.3)	390 (2.3)	389 (2.3)
Morocco	388 (2.3)	388 (2.3)	392 (2.3)	388 (2.3)	388 (2.3)	389 (2.3)	389 (2.3)	388 (2.3)	388 (2.3)	390 (2.3)
International Average	489 (0.6)	489 (0.6)	490 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	490 (0.6)
Benchmarking Participants										
Moscow City, Russian Fed.	575 (4.2)	575 (4.2)	580 (4.2)	576 (4.2)	575 (4.2)	576 (4.1)	577 (4.1)	575 (4.2)	575 (4.1)	578 (4.2)
Quebec, Canada	543 (3.7)	544 (3.7)	545 (3.7)	543 (3.7)	543 (3.7)	544 (3.7)	546 (3.7)	544 (3.7)	544 (3.7)	543 (3.6)
Dubai, UAE	537 (2.0)	536 (2.1)	536 (2.1)	537 (2.0)	537 (2.0)	536 (2.0)	536 (2.0)	537 (2.0)	536 (2.0)	537 (2.0)
Ontario, Canada	530 (4.3)	531 (4.2)	527 (4.3)	530 (4.3)	530 (4.3)	530 (4.3)	529 (4.3)	530 (4.3)	530 (4.3)	528 (4.2)
Western Cape, RSA (9)	441 (4.4)	443 (4.4)	440 (4.5)	441 (4.4)	441 (4.4)	442 (4.4)	438 (4.5)	441 (4.4)	441 (4.4)	440 (4.5)
Abu Dhabi, UAE	436 (2.9)	436 (2.9)	438 (2.8)	436 (2.9)	436 (2.9)	436 (2.9)	436 (2.9)	436 (2.9)	436 (2.9)	439 (2.8)
Gauteng, RSA (9)	421 (3.0)	422 (3.0)	420 (3.0)	421 (3.0)	421 (3.0)	421 (3.0)	418 (3.0)	421 (3.0)	420 (3.0)	420 (3.0)
Number of Items (Score Points)*	206 (217)	174 (185)	162 (172)	205 (216)	206 (217)	198 (209)	186 (197)	201 (211)	194 (205)	169 (179)

* The number of items and score points are based on the number of items included in scaling the eighth grade mathematics achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit C.3: Average Scale Scores for the Mathematics Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Mathematics Scale Score based on All Items	Benchmarking Participants	Moscow City, Russian Fed.	Quebec, Canada	Dubai, UAE	Ontario, Canada	Western Cape, RSA (9)	Abu Dhabi, UAE	Gauteng, RSA (9)
Singapore	616 (4.0)		617 (4.0)	615 (4.0)	616 (4.0)	615 (4.0)	616 (4.0)	616 (4.0)	616 (4.0)
Chinese Taipei	612 (2.7)		613 (2.7)	613 (2.7)	612 (2.7)	613 (2.7)	613 (2.7)	612 (2.7)	613 (2.7)
Korea, Rep. of	607 (2.8)		607 (2.8)	606 (2.8)	607 (2.8)	605 (2.7)	605 (2.8)	607 (2.8)	605 (2.8)
Japan	594 (2.7)		594 (2.7)	593 (2.7)	594 (2.7)	592 (2.7)	592 (2.7)	594 (2.7)	592 (2.7)
Hong Kong SAR	578 (4.1)		578 (4.0)	579 (4.1)	578 (4.1)	579 (4.2)	579 (4.1)	578 (4.1)	579 (4.1)
Russian Federation	543 (4.5)		545 (4.6)	543 (4.5)	543 (4.5)	542 (4.5)	543 (4.5)	543 (4.5)	543 (4.5)
Ireland	524 (2.6)		524 (2.6)	525 (2.7)	524 (2.6)	525 (2.7)	524 (2.7)	524 (2.6)	524 (2.7)
Lithuania	520 (2.9)		520 (3.0)	522 (2.9)	520 (2.9)	521 (3.0)	521 (3.0)	520 (2.9)	521 (3.0)
Israel	519 (4.3)		520 (4.3)	519 (4.2)	519 (4.3)	518 (4.2)	519 (4.2)	519 (4.3)	519 (4.2)
Australia	517 (3.8)		516 (3.8)	518 (3.8)	517 (3.8)	518 (3.8)	518 (3.8)	517 (3.8)	518 (3.8)
Hungary	517 (2.9)		517 (2.9)	518 (2.9)	517 (2.9)	516 (2.9)	516 (3.0)	517 (2.9)	516 (3.0)
England	515 (5.3)		514 (5.3)	516 (5.2)	515 (5.3)	516 (5.3)	515 (5.3)	515 (5.3)	515 (5.3)
United States	515 (4.8)		515 (4.8)	514 (4.7)	515 (4.8)	514 (4.7)	514 (4.7)	515 (4.8)	514 (4.7)
Finland	509 (2.6)		509 (2.6)	511 (2.6)	509 (2.6)	510 (2.6)	509 (2.6)	509 (2.6)	509 (2.6)
Norway (9)	503 (2.4)		502 (2.4)	505 (2.4)	503 (2.4)	504 (2.4)	504 (2.4)	503 (2.4)	504 (2.4)
Sweden	503 (2.5)		503 (2.5)	505 (2.6)	503 (2.5)	503 (2.6)	503 (2.6)	503 (2.5)	503 (2.6)
Cyprus	501 (1.6)		501 (1.6)	501 (1.6)	501 (1.6)	500 (1.6)	501 (1.6)	501 (1.6)	501 (1.6)
Portugal	500 (3.2)		500 (3.2)	501 (3.2)	500 (3.2)	501 (3.2)	500 (3.2)	500 (3.2)	500 (3.2)
Italy	497 (2.7)		498 (2.7)	498 (2.7)	497 (2.7)	498 (2.8)	498 (2.8)	497 (2.7)	498 (2.8)
Turkey	496 (4.3)		495 (4.3)	495 (4.3)	496 (4.3)	496 (4.3)	496 (4.3)	496 (4.3)	496 (4.3)
Kazakhstan	488 (3.3)		489 (3.3)	486 (3.2)	488 (3.3)	486 (3.2)	487 (3.3)	488 (3.3)	487 (3.3)
France	483 (2.5)		482 (2.5)	484 (2.5)	483 (2.5)	483 (2.5)	482 (2.5)	483 (2.5)	482 (2.5)
New Zealand	482 (3.4)		481 (3.4)	482 (3.4)	482 (3.4)	483 (3.4)	482 (3.4)	482 (3.4)	482 (3.4)
Bahrain	481 (1.7)		480 (1.7)	480 (1.7)	481 (1.7)	481 (1.7)	481 (1.7)	481 (1.7)	481 (1.7)
Romania	479 (4.3)		480 (4.3)	477 (4.2)	479 (4.3)	478 (4.2)	478 (4.2)	479 (4.3)	478 (4.2)
United Arab Emirates	473 (1.9)		474 (1.9)	473 (1.8)	473 (1.9)	473 (1.9)	473 (1.8)	473 (1.9)	473 (1.8)
Georgia	461 (4.3)		462 (4.3)	461 (4.3)	461 (4.3)	461 (4.3)	461 (4.3)	461 (4.3)	461 (4.3)
Malaysia	461 (3.2)		461 (3.2)	461 (3.1)	461 (3.2)	461 (3.2)	461 (3.2)	461 (3.2)	461 (3.2)
Iran, Islamic Rep. of	446 (3.7)		446 (3.7)	447 (3.8)	446 (3.7)	447 (3.8)	447 (3.8)	446 (3.7)	447 (3.8)
Qatar	443 (4.0)		444 (4.0)	445 (4.0)	443 (4.0)	443 (4.0)	443 (4.0)	443 (4.0)	443 (4.0)
Chile	441 (2.8)		440 (2.9)	442 (2.8)	441 (2.8)	441 (2.8)	440 (2.8)	441 (2.8)	440 (2.8)
Lebanon	429 (2.9)		431 (2.9)	430 (2.9)	429 (2.9)	427 (2.9)	428 (2.9)	429 (2.9)	428 (2.9)
Jordan	420 (4.3)		421 (4.3)	419 (4.1)	420 (4.3)	420 (4.2)	419 (4.2)	420 (4.3)	419 (4.2)
Egypt	413 (5.2)		414 (5.2)	414 (5.1)	413 (5.2)	412 (5.2)	413 (5.2)	413 (5.2)	413 (5.2)
Oman	411 (2.8)		410 (2.8)	411 (2.8)	411 (2.8)	410 (2.8)	410 (2.8)	411 (2.8)	410 (2.8)
Kuwait	403 (5.0)		402 (5.0)	401 (5.0)	403 (5.0)	403 (5.0)	403 (5.0)	403 (5.0)	403 (5.0)
Saudi Arabia	394 (2.5)		394 (2.5)	391 (2.6)	394 (2.5)	394 (2.5)	394 (2.5)	394 (2.5)	394 (2.5)
South Africa (9)	389 (2.3)		390 (2.3)	388 (2.3)	389 (2.3)	389 (2.3)	390 (2.3)	389 (2.3)	390 (2.3)
Morocco	388 (2.3)		388 (2.3)	389 (2.3)	388 (2.3)	388 (2.3)	388 (2.3)	388 (2.3)	388 (2.3)
International Average	489 (0.6)		489 (0.6)	489 (0.5)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)	489 (0.6)
Benchmarking Participants									
Moscow City, Russian Fed.	575 (4.2)		577 (4.2)	575 (4.1)	575 (4.2)	574 (4.1)	575 (4.1)	575 (4.2)	575 (4.1)
Quebec, Canada	543 (3.7)		543 (3.7)	546 (3.7)	543 (3.7)	544 (3.7)	544 (3.7)	543 (3.7)	544 (3.7)
Dubai, UAE	537 (2.0)		537 (2.0)	536 (2.1)	537 (2.0)	536 (2.0)	536 (2.0)	537 (2.0)	536 (2.0)
Ontario, Canada	530 (4.3)		529 (4.2)	530 (4.2)	530 (4.3)	531 (4.3)	530 (4.3)	530 (4.3)	530 (4.3)
Western Cape, RSA (9)	441 (4.4)		442 (4.4)	440 (4.4)	441 (4.4)	441 (4.4)	441 (4.4)	441 (4.4)	441 (4.4)
Abu Dhabi, UAE	436 (2.9)		436 (2.9)	437 (2.8)	436 (2.9)	435 (2.9)	436 (2.9)	436 (2.9)	436 (2.9)
Gauteng, RSA (9)	421 (3.0)		421 (3.0)	419 (3.0)	421 (3.0)	420 (3.0)	420 (3.0)	421 (3.0)	420 (3.0)
Number of Items (Score Points)*	206 (217)		195 (206)	177 (186)	206 (217)	191 (202)	194 (205)	206 (217)	194 (205)

* The number of items and score points are based on the number of items included in scaling the eighth grade mathematics achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit C.4: Average Scale Scores for the Science Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

Read down the column under a country name to compare achievement scores based on the items identified by that country. Scores on the diagonal are countries' achievement scores based on the test items they identified.

Country	Average Science Scale Score based on All Items	Singapore	Chinese Taipei	Japan	Korea, Rep. of	Finland	Russian Federation	Lithuania	Hungary	Australia	Ireland
Singapore	608 (3.9)	621 (4.1)	612 (4.0)	614 (4.0)	613 (4.0)	607 (3.9)	606 (3.9)	606 (3.9)	608 (3.9)	611 (3.9)	607 (4.0)
Chinese Taipei	574 (1.9)	571 (2.0)	578 (2.0)	574 (2.0)	575 (2.0)	572 (1.9)	571 (1.9)	572 (1.9)	574 (1.9)	569 (1.9)	572 (2.0)
Japan	570 (2.1)	568 (2.2)	570 (2.2)	584 (2.1)	571 (2.2)	568 (2.1)	571 (2.1)	571 (2.1)	570 (2.1)	569 (2.1)	571 (2.2)
Korea, Rep. of	561 (2.1)	557 (2.2)	558 (2.1)	558 (2.2)	562 (2.2)	560 (2.1)	562 (2.1)	562 (2.1)	561 (2.1)	562 (2.2)	561 (2.2)
Finland	543 (3.1)	538 (3.3)	542 (3.2)	538 (3.1)	542 (3.2)	543 (3.2)	541 (3.1)	542 (3.1)	543 (3.2)	539 (3.2)	542 (3.2)
Russian Federation	543 (4.2)	541 (4.2)	543 (4.4)	541 (4.6)	542 (4.2)	542 (4.2)	543 (4.3)	544 (4.3)	542 (4.2)	544 (4.2)	539 (4.3)
Lithuania	534 (3.0)	530 (3.1)	534 (3.0)	532 (3.1)	533 (3.0)	533 (3.0)	534 (3.0)	535 (3.0)	534 (3.0)	533 (3.0)	534 (3.1)
Hungary	530 (2.6)	527 (2.6)	530 (2.7)	528 (2.6)	530 (2.6)	528 (2.6)	529 (2.6)	530 (2.6)	530 (2.6)	530 (2.5)	525 (2.7)
Australia	528 (3.2)	524 (3.2)	527 (3.2)	524 (3.3)	526 (3.2)	530 (3.2)	530 (3.2)	530 (3.2)	528 (3.2)	533 (3.2)	527 (3.3)
Ireland	523 (2.9)	517 (3.1)	522 (2.9)	517 (3.0)	523 (2.9)	524 (3.0)	524 (3.0)	524 (3.0)	523 (2.9)	523 (2.9)	526 (2.9)
United States	522 (4.7)	518 (4.5)	522 (4.6)	516 (4.4)	520 (4.6)	524 (4.6)	524 (4.7)	524 (4.7)	522 (4.7)	525 (4.7)	518 (4.8)
Sweden	521 (3.2)	517 (3.3)	520 (3.2)	517 (3.1)	523 (3.2)	522 (3.2)	520 (3.2)	520 (3.2)	522 (3.2)	519 (3.2)	522 (3.2)
Portugal	519 (2.9)	518 (3.0)	518 (2.9)	513 (2.9)	519 (2.9)	520 (2.9)	519 (2.9)	519 (2.9)	518 (2.9)	519 (2.9)	518 (3.0)
England	517 (4.8)	514 (4.8)	517 (4.8)	515 (4.8)	516 (4.8)	517 (4.8)	516 (4.8)	517 (4.9)	517 (4.8)	515 (4.8)	518 (5.0)
Turkey	515 (3.7)	517 (3.9)	516 (3.7)	510 (3.7)	512 (3.8)	517 (3.7)	515 (3.7)	514 (3.7)	515 (3.7)	516 (3.6)	519 (4.0)
Israel	513 (4.2)	517 (4.3)	513 (4.2)	514 (4.2)	514 (4.3)	514 (4.2)	514 (4.3)	514 (4.2)	513 (4.2)	515 (4.3)	514 (4.3)
Hong Kong SAR	504 (5.2)	502 (5.2)	503 (5.3)	507 (4.9)	505 (5.2)	504 (5.2)	501 (5.2)	501 (5.2)	504 (5.2)	503 (5.2)	501 (5.1)
Italy	500 (2.6)	494 (2.5)	501 (2.5)	497 (2.5)	499 (2.6)	499 (2.6)	501 (2.6)	501 (2.6)	500 (2.6)	502 (2.6)	495 (2.5)
New Zealand	499 (3.5)	494 (3.5)	497 (3.5)	489 (3.5)	498 (3.5)	502 (3.5)	500 (3.5)	500 (3.5)	499 (3.5)	500 (3.5)	497 (3.5)
Norway (9)	495 (3.1)	490 (3.2)	495 (3.1)	492 (3.1)	496 (3.1)	496 (3.2)	495 (3.1)	494 (3.1)	495 (3.1)	495 (3.1)	497 (3.2)
France	489 (2.7)	486 (2.7)	485 (2.7)	484 (2.8)	489 (2.7)	489 (2.7)	489 (2.7)	490 (2.7)	489 (2.7)	493 (2.7)	484 (2.8)
Bahrain	486 (1.9)	489 (2.0)	487 (1.9)	486 (2.1)	487 (1.9)	487 (1.9)	487 (1.9)	486 (2.0)	486 (1.9)	487 (1.9)	486 (2.0)
Cyprus	484 (1.9)	486 (1.9)	483 (2.0)	489 (1.9)	486 (1.9)	483 (1.9)	484 (1.9)	486 (1.9)	484 (1.9)	486 (1.9)	487 (1.9)
Kazakhstan	478 (3.1)	480 (3.1)	480 (3.1)	473 (3.3)	480 (3.1)	478 (3.1)	478 (3.1)	478 (3.1)	478 (3.1)	477 (3.0)	479 (3.0)
Qatar	475 (4.4)	481 (4.4)	476 (4.3)	482 (4.3)	478 (4.4)	473 (4.4)	474 (4.4)	474 (4.3)	475 (4.4)	476 (4.4)	475 (4.4)
United Arab Emirates	473 (2.2)	475 (2.3)	475 (2.2)	480 (2.2)	475 (2.2)	473 (2.2)	474 (2.2)	472 (2.2)	473 (2.2)	474 (2.2)	473 (2.2)
Romania	470 (4.2)	466 (4.4)	471 (4.2)	469 (4.2)	472 (4.2)	469 (4.2)	470 (4.2)	471 (4.2)	470 (4.2)	468 (4.2)	466 (4.2)
Chile	462 (2.9)	458 (2.9)	461 (2.8)	455 (2.8)	460 (2.9)	461 (2.9)	463 (2.9)	464 (2.9)	462 (2.9)	462 (2.9)	460 (3.0)
Malaysia	460 (3.5)	464 (3.6)	459 (3.5)	459 (3.5)	464 (3.5)	463 (3.5)	460 (3.5)	459 (3.5)	460 (3.5)	461 (3.5)	458 (3.5)
Oman	457 (2.9)	460 (2.9)	458 (2.9)	463 (2.9)	459 (2.9)	458 (2.9)	457 (2.9)	456 (2.9)	457 (2.9)	459 (2.9)	457 (2.8)
Jordan	452 (4.7)	457 (4.8)	453 (4.7)	453 (4.6)	450 (4.7)	452 (4.6)	451 (4.6)	452 (4.6)	452 (4.6)	452 (4.6)	446 (4.8)
Iran, Islamic Rep. of	449 (3.6)	449 (3.7)	449 (3.6)	447 (3.7)	445 (3.6)	450 (3.5)	448 (3.6)	448 (3.5)	449 (3.6)	451 (3.6)	446 (3.6)
Georgia	447 (3.9)	447 (4.1)	446 (3.9)	450 (4.1)	449 (4.0)	444 (4.0)	446 (3.9)	448 (3.9)	447 (3.9)	450 (3.9)	443 (3.9)
Kuwait	444 (5.7)	447 (5.6)	445 (5.6)	447 (5.5)	444 (5.6)	443 (5.6)	444 (5.6)	444 (5.6)	444 (5.6)	444 (5.4)	444 (5.6)
Saudi Arabia	431 (2.6)	432 (2.7)	430 (2.7)	430 (2.9)	430 (2.7)	431 (2.6)	431 (2.6)	432 (2.6)	432 (2.6)	432 (2.7)	432 (2.6)
Morocco	394 (2.7)	398 (2.8)	396 (2.6)	400 (2.7)	396 (2.6)	394 (2.7)	394 (2.7)	394 (2.7)	394 (2.6)	397 (2.6)	390 (2.7)
Egypt	389 (5.4)	393 (5.5)	389 (5.5)	401 (5.2)	394 (5.5)	388 (5.5)	390 (5.4)	390 (5.4)	389 (5.5)	391 (5.2)	393 (5.4)
Lebanon	377 (4.6)	385 (4.8)	382 (4.6)	390 (4.6)	382 (4.6)	375 (4.8)	378 (4.6)	377 (4.7)	377 (4.6)	377 (4.8)	385 (4.6)
South Africa (9)	370 (3.1)	374 (3.1)	370 (3.1)	380 (3.1)	372 (3.1)	373 (3.1)	370 (3.1)	369 (3.1)	370 (3.1)	367 (3.2)	377 (3.1)
International Average	490 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)	491 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)	489 (0.6)
Benchmarking Participants											
Moscow City, Russian Fed.	567 (2.9)	564 (2.9)	565 (2.9)	562 (3.0)	566 (2.9)	566 (3.0)	566 (3.0)	569 (3.0)	566 (2.9)	568 (3.0)	564 (3.0)
Dubai, UAE	548 (2.0)	550 (2.1)	550 (2.0)	550 (2.1)	548 (2.0)	548 (2.0)	548 (2.0)	547 (2.0)	548 (2.0)	547 (2.1)	549 (2.1)
Quebec, Canada	537 (3.6)	533 (3.6)	536 (3.6)	533 (3.4)	535 (3.5)	539 (3.7)	537 (3.6)	537 (3.6)	537 (3.6)	540 (3.5)	537 (3.7)
Ontario, Canada	522 (3.0)	518 (3.1)	523 (3.1)	515 (3.3)	520 (3.0)	523 (3.0)	523 (3.0)	523 (3.0)	522 (3.0)	526 (3.0)	520 (3.0)
Western Cape, RSA (9)	439 (5.1)	441 (5.2)	439 (5.1)	442 (5.3)	438 (5.2)	442 (5.1)	438 (5.2)	438 (5.1)	439 (5.1)	437 (5.3)	443 (5.2)
Gauteng, RSA (9)	422 (3.9)	425 (3.9)	422 (3.9)	428 (4.0)	424 (3.9)	425 (3.8)	422 (3.9)	421 (3.9)	422 (3.9)	420 (3.9)	428 (3.8)
Abu Dhabi, UAE	420 (3.6)	421 (3.7)	422 (3.6)	428 (3.6)	422 (3.6)	420 (3.6)	421 (3.6)	420 (3.6)	420 (3.6)	423 (3.6)	421 (3.7)
Number of Items (Score Points)*	211 (233)	138 (154)	174 (195)	95 (109)	159 (177)	198 (216)	193 (215)	197 (219)	208 (230)	157 (175)	148 (163)

* The number of items and score points are based on the number of items included in scaling the eighth grade science achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit C.4: Average Scale Scores for the Science Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Science Scale Score based on All Items	United States	Sweden	Portugal	England	Turkey	Israel	Hong Kong SAR	Italy	New Zealand	Norway (9)
Singapore	608 (3.9)	605 (3.8)	606 (3.9)	607 (3.9)	609 (3.9)	611 (4.0)	609 (4.0)	615 (4.0)	607 (3.9)	608 (3.9)	607 (4.0)
Chinese Taipei	574 (1.9)	571 (1.9)	574 (1.9)	575 (2.0)	574 (1.9)	571 (1.9)	572 (2.0)	570 (1.9)	574 (2.0)	571 (1.9)	574 (1.9)
Japan	570 (2.1)	571 (2.1)	570 (2.1)	569 (2.1)	569 (2.1)	571 (2.2)	565 (2.2)	570 (2.1)	569 (2.1)	566 (2.2)	570 (2.1)
Korea, Rep. of	561 (2.1)	562 (2.2)	562 (2.1)	560 (2.1)	560 (2.1)	561 (2.2)	562 (2.3)	563 (2.2)	561 (2.1)	559 (2.2)	559 (2.1)
Finland	543 (3.1)	542 (3.1)	544 (3.2)	542 (3.2)	541 (3.1)	541 (3.2)	537 (3.2)	542 (3.2)	542 (3.1)	543 (3.2)	543 (3.2)
Russian Federation	543 (4.2)	541 (4.3)	543 (4.2)	544 (4.3)	542 (4.3)	541 (4.3)	543 (4.4)	538 (4.2)	543 (4.2)	541 (4.3)	541 (4.2)
Lithuania	534 (3.0)	534 (3.0)	534 (3.0)	534 (3.0)	534 (3.0)	534 (3.0)	533 (3.2)	533 (3.0)	534 (3.0)	534 (3.0)	536 (3.0)
Hungary	530 (2.6)	529 (2.6)	529 (2.6)	530 (2.6)	530 (2.6)	528 (2.7)	526 (2.7)	529 (2.6)	530 (2.6)	531 (2.6)	529 (2.6)
Australia	528 (3.2)	530 (3.2)	528 (3.1)	528 (3.1)	528 (3.2)	528 (3.2)	528 (3.4)	529 (3.1)	528 (3.2)	529 (3.2)	530 (3.1)
Ireland	523 (2.9)	523 (3.0)	522 (2.9)	523 (3.0)	523 (3.0)	523 (3.0)	519 (3.1)	524 (3.0)	523 (2.9)	523 (3.0)	525 (3.0)
United States	522 (4.7)	524 (4.7)	522 (4.7)	524 (4.6)	522 (4.6)	521 (4.6)	521 (4.7)	519 (4.6)	522 (4.6)	522 (4.7)	524 (4.7)
Sweden	521 (3.2)	521 (3.2)	522 (3.2)	522 (3.2)	521 (3.2)	521 (3.2)	513 (3.3)	525 (3.2)	521 (3.2)	522 (3.2)	523 (3.2)
Portugal	519 (2.9)	519 (2.9)	520 (2.9)	526 (3.0)	517 (2.9)	518 (2.9)	516 (3.0)	520 (2.9)	519 (2.9)	518 (2.9)	523 (2.9)
England	517 (4.8)	517 (4.8)	516 (4.9)	517 (4.8)	518 (4.9)	516 (4.9)	516 (4.8)	516 (4.9)	516 (4.8)	516 (4.9)	518 (4.8)
Turkey	515 (3.7)	513 (3.6)	515 (3.7)	516 (3.7)	517 (3.8)	519 (3.8)	516 (3.7)	517 (3.7)	516 (3.7)	517 (3.8)	514 (3.7)
Israel	513 (4.2)	514 (4.2)	513 (4.2)	513 (4.1)	513 (4.2)	516 (4.3)	517 (4.4)	515 (4.2)	513 (4.2)	516 (4.2)	514 (4.2)
Hong Kong SAR	504 (5.2)	502 (5.2)	505 (5.2)	501 (5.3)	505 (5.1)	504 (5.1)	499 (5.2)	508 (5.3)	503 (5.2)	504 (5.2)	503 (5.2)
Italy	500 (2.6)	501 (2.6)	501 (2.6)	502 (2.5)	500 (2.6)	499 (2.6)	497 (2.6)	500 (2.6)	500 (2.6)	501 (2.5)	503 (2.6)
New Zealand	499 (3.5)	500 (3.5)	499 (3.5)	500 (3.4)	499 (3.5)	498 (3.5)	493 (3.6)	501 (3.5)	498 (3.5)	501 (3.5)	501 (3.4)
Norway (9)	495 (3.1)	495 (3.1)	497 (3.1)	495 (3.1)	496 (3.1)	496 (3.2)	489 (3.2)	494 (3.1)	495 (3.1)	497 (3.2)	499 (3.1)
France	489 (2.7)	491 (2.7)	489 (2.7)	488 (2.7)	488 (2.7)	487 (2.7)	482 (2.8)	492 (2.7)	488 (2.7)	489 (2.7)	491 (2.7)
Bahrain	486 (1.9)	486 (1.9)	485 (2.0)	487 (2.0)	486 (1.9)	488 (2.0)	493 (2.0)	486 (2.0)	486 (1.9)	486 (1.9)	487 (1.9)
Cyprus	484 (1.9)	484 (1.9)	484 (1.9)	485 (1.9)	485 (1.9)	487 (1.9)	483 (1.9)	488 (1.9)	483 (1.9)	485 (1.9)	484 (2.0)
Kazakhstan	478 (3.1)	475 (3.0)	478 (3.1)	478 (3.1)	477 (3.1)	478 (3.1)	476 (3.1)	475 (3.1)	478 (3.1)	478 (3.0)	476 (3.1)
Qatar	475 (4.4)	475 (4.4)	474 (4.4)	476 (4.4)	475 (4.4)	476 (4.3)	480 (4.5)	476 (4.4)	475 (4.3)	474 (4.4)	476 (4.4)
United Arab Emirates	473 (2.2)	473 (2.2)	472 (2.2)	473 (2.2)	474 (2.2)	475 (2.2)	477 (2.3)	471 (2.2)	473 (2.2)	473 (2.2)	474 (2.2)
Romania	470 (4.2)	470 (4.1)	470 (4.1)	471 (4.2)	469 (4.2)	468 (4.2)	465 (4.2)	469 (4.2)	470 (4.2)	469 (4.2)	469 (4.2)
Chile	462 (2.9)	462 (2.9)	462 (2.9)	463 (2.9)	461 (2.9)	461 (2.9)	464 (3.0)	460 (2.8)	462 (2.9)	459 (2.8)	464 (2.9)
Malaysia	460 (3.5)	461 (3.5)	462 (3.5)	459 (3.6)	460 (3.5)	460 (3.6)	453 (3.5)	462 (3.5)	460 (3.5)	461 (3.5)	457 (3.5)
Oman	457 (2.9)	459 (2.9)	457 (2.9)	461 (2.9)	456 (2.9)	458 (2.9)	462 (2.9)	459 (2.9)	458 (2.9)	457 (2.9)	459 (2.9)
Jordan	452 (4.7)	454 (4.6)	452 (4.6)	453 (4.7)	451 (4.7)	451 (4.7)	455 (4.7)	452 (4.6)	453 (4.7)	453 (4.7)	450 (4.7)
Iran, Islamic Rep. of	449 (3.6)	449 (3.5)	450 (3.5)	448 (3.5)	448 (3.6)	448 (3.6)	452 (3.6)	447 (3.6)	449 (3.6)	450 (3.7)	446 (3.6)
Georgia	447 (3.9)	446 (3.9)	447 (3.9)	446 (4.0)	447 (3.9)	446 (3.9)	444 (4.2)	446 (3.9)	447 (3.9)	446 (4.0)	445 (3.9)
Kuwait	444 (5.7)	444 (5.5)	443 (5.6)	445 (5.6)	445 (5.6)	446 (5.5)	447 (5.7)	445 (5.4)	444 (5.7)	446 (5.6)	445 (5.6)
Saudi Arabia	431 (2.6)	434 (2.6)	432 (2.6)	434 (2.6)	430 (2.6)	431 (2.6)	439 (2.8)	430 (2.6)	432 (2.6)	432 (2.6)	433 (2.6)
Morocco	394 (2.7)	395 (2.6)	396 (2.6)	391 (2.6)	396 (2.6)	393 (2.7)	392 (2.8)	394 (2.7)	394 (2.7)	393 (2.7)	395 (2.6)
Egypt	389 (5.4)	390 (5.4)	388 (5.4)	388 (5.4)	391 (5.4)	391 (5.5)	395 (5.4)	392 (5.3)	390 (5.4)	391 (5.4)	387 (5.4)
Lebanon	377 (4.6)	373 (4.7)	375 (4.7)	377 (4.7)	381 (4.6)	384 (4.6)	381 (4.7)	374 (4.8)	376 (4.7)	379 (4.6)	377 (4.7)
South Africa (9)	370 (3.1)	367 (3.1)	369 (3.1)	369 (3.1)	372 (3.1)	373 (3.1)	376 (3.2)	371 (3.1)	370 (3.1)	371 (3.1)	369 (3.1)
International Average	490 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)	489 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)
Benchmarking Participants											
Moscow City, Russian Fed.	567 (2.9)	568 (3.0)	567 (2.9)	566 (3.0)	567 (2.9)	564 (3.0)	565 (3.1)	563 (2.9)	566 (3.0)	566 (2.9)	565 (2.9)
Dubai, UAE	548 (2.0)	548 (2.0)	547 (2.0)	549 (2.0)	548 (2.0)	550 (2.0)	553 (2.0)	545 (2.1)	548 (2.0)	548 (2.1)	549 (2.0)
Quebec, Canada	537 (3.6)	535 (3.6)	537 (3.6)	539 (3.7)	536 (3.6)	536 (3.6)	535 (3.6)	536 (3.5)	536 (3.6)	537 (3.6)	539 (3.6)
Ontario, Canada	522 (3.0)	523 (3.0)	522 (3.0)	524 (3.0)	520 (3.0)	521 (3.0)	519 (3.3)	524 (3.0)	521 (3.0)	521 (3.0)	524 (3.0)
Western Cape, RSA (9)	439 (5.1)	438 (5.1)	439 (5.1)	438 (5.2)	440 (5.1)	440 (5.2)	440 (5.3)	440 (5.2)	439 (5.1)	441 (5.2)	439 (5.2)
Gauteng, RSA (9)	422 (3.9)	420 (3.9)	421 (3.9)	422 (3.9)	423 (3.9)	424 (3.9)	427 (4.0)	423 (3.9)	422 (3.9)	423 (3.9)	422 (3.9)
Abu Dhabi, UAE	420 (3.6)	420 (3.6)	419 (3.6)	419 (3.7)	421 (3.6)	423 (3.6)	423 (3.7)	419 (3.6)	420 (3.6)	420 (3.6)	421 (3.6)
Number of Items (Score Points)*	211 (233)	186 (206)	201 (221)	175 (195)	194 (215)	171 (189)	131 (149)	150 (166)	204 (226)	171 (189)	181 (202)

* The number of items and score points are based on the number of items included in scaling the eighth grade science achievement data.

See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit C.4: Average Scale Scores for the Science Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Science Scale Score based on All Items	France	Bahrain	Cyprus	Kazakhstan	Qatar	United Arab Emirates	Romania	Chile	Malaysia	Oman
Singapore	608 (3.9)	613 (4.1)	608 (3.9)	610 (3.9)	608 (3.9)	610 (3.9)	608 (3.9)	608 (3.9)	607 (3.9)	608 (3.9)	606 (3.9)
Chinese Taipei	574 (1.9)	577 (2.1)	574 (1.9)	576 (2.0)	574 (1.9)	575 (1.9)	574 (1.9)	574 (1.9)	573 (1.9)	574 (1.9)	573 (1.9)
Japan	570 (2.1)	565 (2.2)	570 (2.1)	574 (2.2)	570 (2.1)	570 (2.2)	570 (2.1)	570 (2.1)	570 (2.1)	569 (2.1)	570 (2.2)
Korea, Rep. of	561 (2.1)	560 (2.2)	561 (2.1)	558 (2.1)	561 (2.1)	561 (2.2)	561 (2.1)	561 (2.1)	560 (2.1)	561 (2.1)	561 (2.1)
Finland	543 (3.1)	541 (3.2)	543 (3.1)	547 (3.2)	543 (3.1)	541 (3.2)	543 (3.1)	543 (3.1)	542 (3.1)	542 (3.1)	543 (3.1)
Russian Federation	543 (4.2)	538 (4.4)	543 (4.2)	539 (4.4)	543 (4.2)	541 (4.3)	543 (4.2)	543 (4.2)	542 (4.3)	543 (4.2)	542 (4.2)
Lithuania	534 (3.0)	537 (3.0)	534 (3.0)	536 (3.2)	534 (3.0)	533 (3.0)	534 (3.0)	534 (3.0)	534 (3.0)	534 (3.0)	533 (3.0)
Hungary	530 (2.6)	530 (2.7)	530 (2.6)	531 (2.7)	530 (2.6)	530 (2.6)	530 (2.6)	530 (2.6)	529 (2.6)	530 (2.6)	529 (2.6)
Australia	528 (3.2)	526 (3.2)	528 (3.2)	528 (3.3)	528 (3.2)	527 (3.3)	528 (3.2)	528 (3.2)	529 (3.2)	528 (3.2)	529 (3.2)
Ireland	523 (2.9)	522 (3.1)	523 (2.9)	522 (2.9)	523 (2.9)	521 (3.0)	523 (2.9)	523 (2.9)	522 (2.9)	523 (2.9)	523 (2.9)
United States	522 (4.7)	520 (4.6)	522 (4.7)	520 (4.8)	522 (4.7)	521 (4.6)	522 (4.7)	522 (4.7)	523 (4.7)	522 (4.7)	522 (4.7)
Sweden	521 (3.2)	524 (3.3)	521 (3.2)	520 (3.2)	521 (3.2)	520 (3.2)	521 (3.2)	521 (3.2)	520 (3.2)	521 (3.2)	522 (3.2)
Portugal	519 (2.9)	524 (3.2)	519 (2.9)	521 (3.0)	519 (2.9)	518 (2.9)	519 (2.9)	519 (2.9)	518 (2.9)	518 (2.9)	519 (2.9)
England	517 (4.8)	514 (4.8)	517 (4.8)	522 (4.9)	517 (4.8)	516 (4.9)	517 (4.8)	517 (4.8)	516 (4.8)	517 (4.9)	516 (4.8)
Turkey	515 (3.7)	522 (4.0)	515 (3.7)	504 (3.6)	515 (3.7)	517 (3.7)	515 (3.7)	515 (3.7)	515 (3.7)	516 (3.7)	516 (3.7)
Israel	513 (4.2)	519 (4.3)	513 (4.2)	512 (4.3)	513 (4.2)	514 (4.2)	513 (4.2)	513 (4.2)	514 (4.2)	514 (4.2)	513 (4.2)
Hong Kong SAR	504 (5.2)	506 (5.1)	504 (5.2)	502 (5.4)	504 (5.2)	503 (5.1)	504 (5.2)	504 (5.2)	502 (5.2)	503 (5.2)	504 (5.2)
Italy	500 (2.6)	497 (2.6)	500 (2.6)	509 (2.6)	500 (2.6)	497 (2.6)	500 (2.6)	500 (2.6)	500 (2.6)	500 (2.6)	499 (2.6)
New Zealand	499 (3.5)	494 (3.6)	499 (3.5)	495 (3.4)	499 (3.5)	496 (3.5)	499 (3.5)	499 (3.5)	499 (3.5)	499 (3.5)	499 (3.5)
Norway (9)	495 (3.1)	494 (3.3)	495 (3.1)	497 (3.2)	495 (3.1)	493 (3.1)	495 (3.1)	495 (3.1)	494 (3.1)	495 (3.1)	496 (3.1)
France	489 (2.7)	491 (2.8)	489 (2.7)	487 (2.9)	489 (2.7)	486 (2.7)	489 (2.7)	489 (2.7)	488 (2.7)	488 (2.7)	489 (2.7)
Bahrain	486 (1.9)	488 (2.0)	486 (1.9)	491 (2.0)	486 (1.9)	487 (2.0)	486 (1.9)	486 (1.9)	486 (1.9)	486 (1.9)	486 (1.9)
Cyprus	484 (1.9)	486 (1.9)	484 (1.9)	496 (2.0)	484 (1.9)	484 (1.9)	484 (1.9)	484 (1.9)	483 (1.9)	484 (1.9)	483 (1.9)
Kazakhstan	478 (3.1)	476 (3.1)	478 (3.1)	471 (3.2)	478 (3.1)	478 (3.1)	478 (3.1)	478 (3.1)	479 (3.0)	478 (3.1)	477 (3.0)
Qatar	475 (4.4)	478 (4.4)	475 (4.4)	481 (4.5)	475 (4.4)	476 (4.4)	475 (4.4)	475 (4.4)	474 (4.4)	475 (4.4)	475 (4.4)
United Arab Emirates	473 (2.2)	475 (2.2)	473 (2.2)	480 (2.3)	473 (2.2)	474 (2.2)	473 (2.2)	473 (2.2)	473 (2.2)	473 (2.2)	472 (2.2)
Romania	470 (4.2)	466 (4.2)	470 (4.2)	474 (4.1)	470 (4.2)	469 (4.2)	470 (4.2)	470 (4.2)	470 (4.2)	470 (4.2)	469 (4.2)
Chile	462 (2.9)	461 (2.9)	462 (2.9)	467 (3.1)	462 (2.9)	460 (2.9)	462 (2.9)	462 (2.9)	462 (2.9)	462 (2.9)	462 (2.9)
Malaysia	460 (3.5)	464 (3.6)	460 (3.5)	457 (3.7)	460 (3.5)	459 (3.5)	460 (3.5)	460 (3.5)	460 (3.5)	460 (3.5)	461 (3.5)
Oman	457 (2.9)	458 (2.8)	457 (2.9)	462 (3.0)	457 (2.9)	461 (2.9)	457 (2.9)	457 (2.9)	457 (2.9)	457 (2.9)	458 (2.9)
Jordan	452 (4.7)	453 (4.7)	452 (4.7)	450 (4.7)	452 (4.7)	453 (4.6)	452 (4.7)	452 (4.7)	453 (4.7)	452 (4.7)	452 (4.6)
Iran, Islamic Rep. of	449 (3.6)	446 (3.8)	449 (3.6)	445 (3.5)	449 (3.6)	448 (3.6)	449 (3.6)	449 (3.6)	449 (3.6)	449 (3.6)	448 (3.6)
Georgia	447 (3.9)	442 (4.2)	447 (3.9)	444 (4.2)	447 (3.9)	448 (3.9)	447 (3.9)	447 (3.9)	447 (3.9)	447 (3.9)	446 (3.9)
Kuwait	444 (5.7)	445 (5.5)	444 (5.7)	446 (5.7)	444 (5.7)	445 (5.6)	444 (5.7)	444 (5.7)	444 (5.7)	445 (5.7)	444 (5.6)
Saudi Arabia	431 (2.6)	436 (2.8)	431 (2.6)	436 (2.9)	431 (2.6)	431 (2.6)	431 (2.6)	431 (2.6)	432 (2.6)	432 (2.6)	432 (2.6)
Morocco	394 (2.7)	398 (2.7)	394 (2.7)	389 (2.6)	394 (2.7)	397 (2.6)	394 (2.7)	394 (2.7)	395 (2.6)	394 (2.7)	395 (2.6)
Egypt	389 (5.4)	394 (5.4)	389 (5.4)	390 (5.4)	389 (5.4)	391 (5.5)	389 (5.4)	389 (5.4)	390 (5.5)	389 (5.5)	390 (5.4)
Lebanon	377 (4.6)	387 (4.6)	377 (4.6)	384 (4.6)	377 (4.6)	380 (4.6)	377 (4.6)	377 (4.6)	377 (4.7)	377 (4.7)	375 (4.7)
South Africa (9)	370 (3.1)	365 (3.3)	370 (3.1)	370 (3.2)	370 (3.1)	370 (3.1)	370 (3.1)	370 (3.1)	369 (3.1)	370 (3.1)	371 (3.1)
International Average	490 (0.6)	491 (0.6)	490 (0.6)	491 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)
Benchmarking Participants											
Moscow City, Russian Fed.	567 (2.9)	562 (3.1)	567 (2.9)	566 (3.2)	567 (2.9)	564 (3.0)	567 (2.9)	567 (2.9)	568 (2.9)	567 (2.9)	566 (2.9)
Dubai, UAE	548 (2.0)	550 (2.1)	548 (2.0)	554 (2.1)	548 (2.0)	549 (2.0)	548 (2.0)	548 (2.0)	548 (2.0)	548 (2.0)	547 (2.0)
Quebec, Canada	537 (3.6)	536 (3.7)	537 (3.6)	534 (3.6)	537 (3.6)	535 (3.6)	537 (3.6)	537 (3.6)	535 (3.6)	537 (3.6)	537 (3.6)
Ontario, Canada	522 (3.0)	517 (3.2)	522 (3.0)	521 (3.2)	522 (3.0)	521 (3.1)	522 (3.0)	522 (3.0)	522 (3.0)	522 (3.0)	522 (3.0)
Western Cape, RSA (9)	439 (5.1)	433 (5.5)	439 (5.1)	435 (5.5)	439 (5.1)	439 (5.2)	439 (5.1)	439 (5.1)	439 (5.1)	439 (5.1)	440 (5.1)
Gauteng, RSA (9)	422 (3.9)	418 (4.1)	422 (3.9)	421 (4.0)	422 (3.9)	423 (3.9)	422 (3.9)	422 (3.9)	421 (3.9)	422 (3.9)	423 (3.8)
Abu Dhabi, UAE	420 (3.6)	423 (3.7)	420 (3.6)	425 (3.8)	420 (3.6)	421 (3.6)	420 (3.6)	420 (3.6)	420 (3.6)	420 (3.6)	419 (3.6)
Number of Items (Score Points)*	211 (233)	121 (131)	211 (233)	96 (110)	211 (233)	181 (201)	211 (233)	211 (233)	199 (220)	209 (231)	202 (224)

* The number of items and score points are based on the number of items included in scaling the eighth grade science achievement data.

See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Exhibit C.4: Average Scale Scores for the Science Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Science Scale Score based on All Items	Jordan	Iran, Islamic Rep. of	Georgia	Kuwait	Saudi Arabia	Morocco	Egypt	Lebanon	South Africa (9)
Singapore	608 (3.9)	608 (3.9)	612 (4.0)	603 (3.9)	609 (4.0)	608 (3.9)	607 (4.0)	608 (3.9)	616 (4.0)	610 (3.9)
Chinese Taipei	574 (1.9)	573 (1.9)	573 (1.9)	570 (1.9)	574 (1.9)	572 (1.9)	572 (1.9)	577 (1.9)	576 (2.0)	575 (1.9)
Japan	570 (2.1)	569 (2.1)	565 (2.1)	568 (2.1)	569 (2.1)	568 (2.2)	573 (2.2)	568 (2.2)	571 (2.2)	571 (2.1)
Korea, Rep. of	561 (2.1)	561 (2.1)	559 (2.2)	559 (2.2)	559 (2.2)	559 (2.2)	561 (2.2)	559 (2.3)	556 (2.1)	560 (2.1)
Finland	543 (3.1)	542 (3.1)	540 (3.2)	543 (3.2)	540 (3.2)	542 (3.1)	542 (3.2)	542 (3.2)	538 (3.2)	541 (3.1)
Russian Federation	543 (4.2)	543 (4.2)	542 (4.3)	544 (4.2)	540 (4.3)	543 (4.3)	545 (4.2)	542 (4.3)	540 (4.4)	543 (4.3)
Lithuania	534 (3.0)	534 (3.0)	534 (3.1)	535 (3.0)	533 (3.0)	533 (3.0)	534 (3.0)	532 (3.1)	531 (3.1)	533 (3.0)
Hungary	530 (2.6)	530 (2.6)	529 (2.6)	533 (2.6)	530 (2.7)	530 (2.6)	529 (2.6)	530 (2.5)	528 (2.7)	529 (2.6)
Australia	528 (3.2)	528 (3.2)	527 (3.3)	528 (3.2)	526 (3.2)	527 (3.2)	528 (3.2)	525 (3.3)	525 (3.2)	529 (3.2)
Ireland	523 (2.9)	522 (3.0)	523 (3.1)	523 (2.9)	522 (3.0)	522 (3.0)	520 (3.0)	519 (3.0)	520 (3.1)	523 (3.0)
United States	522 (4.7)	522 (4.6)	521 (4.7)	520 (4.7)	519 (4.6)	520 (4.8)	522 (4.7)	521 (4.7)	520 (4.6)	522 (4.6)
Sweden	521 (3.2)	522 (3.2)	520 (3.2)	521 (3.3)	520 (3.2)	521 (3.2)	522 (3.1)	517 (3.2)	518 (3.2)	521 (3.2)
Portugal	519 (2.9)	518 (2.9)	517 (2.9)	518 (2.9)	517 (2.9)	517 (2.9)	519 (2.9)	519 (2.8)	522 (3.0)	519 (2.9)
England	517 (4.8)	515 (4.9)	517 (4.9)	513 (5.0)	518 (4.9)	517 (4.8)	513 (4.8)	514 (4.8)	518 (4.8)	517 (4.9)
Turkey	515 (3.7)	516 (3.7)	516 (3.8)	516 (3.8)	517 (3.8)	515 (3.8)	514 (3.7)	514 (3.9)	516 (3.9)	517 (3.8)
Israel	513 (4.2)	515 (4.2)	514 (4.3)	512 (4.3)	514 (4.3)	512 (4.3)	515 (4.3)	514 (4.2)	517 (4.3)	514 (4.2)
Hong Kong SAR	504 (5.2)	503 (5.2)	503 (5.3)	502 (5.2)	503 (5.2)	503 (5.1)	503 (5.1)	502 (5.1)	509 (5.2)	504 (5.1)
Italy	500 (2.6)	500 (2.6)	500 (2.5)	499 (2.6)	500 (2.5)	500 (2.6)	500 (2.6)	497 (2.5)	501 (2.5)	500 (2.6)
New Zealand	499 (3.5)	498 (3.5)	497 (3.5)	498 (3.6)	495 (3.5)	496 (3.5)	498 (3.5)	491 (3.6)	494 (3.6)	498 (3.5)
Norway (9)	495 (3.1)	494 (3.1)	493 (3.1)	499 (3.2)	493 (3.1)	494 (3.1)	497 (3.1)	493 (3.1)	491 (3.2)	494 (3.1)
France	489 (2.7)	489 (2.7)	485 (2.7)	489 (2.7)	485 (2.7)	488 (2.7)	489 (2.8)	485 (2.7)	486 (2.7)	487 (2.7)
Bahrain	486 (1.9)	487 (1.9)	486 (2.0)	484 (1.9)	485 (2.0)	486 (1.9)	487 (2.0)	488 (2.0)	489 (2.0)	487 (1.9)
Cyprus	484 (1.9)	485 (1.9)	485 (2.0)	483 (1.9)	484 (1.9)	482 (1.9)	486 (1.9)	484 (1.9)	487 (1.9)	484 (1.9)
Kazakhstan	478 (3.1)	480 (3.0)	477 (3.1)	481 (3.1)	475 (3.1)	479 (3.1)	479 (3.1)	477 (3.2)	477 (3.2)	479 (3.1)
Qatar	475 (4.4)	475 (4.3)	475 (4.5)	473 (4.4)	477 (4.4)	476 (4.4)	476 (4.3)	479 (4.4)	483 (4.5)	476 (4.4)
United Arab Emirates	473 (2.2)	474 (2.2)	474 (2.3)	471 (2.2)	474 (2.3)	474 (2.2)	475 (2.2)	477 (2.3)	479 (2.3)	474 (2.2)
Romania	470 (4.2)	469 (4.2)	469 (4.2)	469 (4.2)	469 (4.2)	471 (4.2)	470 (4.1)	469 (4.2)	468 (4.2)	471 (4.2)
Chile	462 (2.9)	462 (2.9)	462 (2.9)	461 (2.9)	461 (2.9)	461 (2.9)	463 (2.9)	456 (2.9)	457 (2.9)	463 (2.9)
Malaysia	460 (3.5)	461 (3.5)	460 (3.6)	459 (3.5)	461 (3.5)	458 (3.6)	464 (3.5)	462 (3.6)	463 (3.6)	460 (3.5)
Oman	457 (2.9)	458 (2.9)	458 (2.9)	455 (2.9)	457 (2.9)	457 (2.9)	461 (2.9)	459 (2.9)	460 (3.0)	457 (2.9)
Jordan	452 (4.7)	453 (4.7)	452 (4.7)	452 (4.6)	453 (4.8)	453 (4.6)	453 (4.6)	454 (4.7)	455 (4.7)	452 (4.7)
Iran, Islamic Rep. of	449 (3.6)	450 (3.6)	452 (3.7)	450 (3.6)	448 (3.7)	449 (3.6)	448 (3.6)	448 (3.8)	446 (3.7)	446 (3.6)
Georgia	447 (3.9)	448 (3.9)	445 (4.0)	447 (3.9)	448 (3.9)	447 (4.0)	447 (4.0)	445 (4.1)	452 (3.9)	447 (3.9)
Kuwait	444 (5.7)	445 (5.6)	446 (5.6)	444 (5.6)	447 (5.7)	445 (5.7)	445 (5.5)	448 (5.4)	447 (5.6)	445 (5.7)
Saudi Arabia	431 (2.6)	431 (2.6)	431 (2.6)	431 (2.6)	432 (2.6)	432 (2.7)	433 (2.6)	436 (2.7)	435 (2.8)	429 (2.6)
Morocco	394 (2.7)	396 (2.6)	394 (2.7)	395 (2.7)	394 (2.7)	395 (2.6)	399 (2.6)	397 (2.7)	400 (2.6)	395 (2.6)
Egypt	389 (5.4)	392 (5.5)	391 (5.5)	389 (5.4)	392 (5.5)	390 (5.4)	394 (5.3)	396 (5.5)	393 (5.6)	390 (5.5)
Lebanon	377 (4.6)	379 (4.6)	378 (4.7)	379 (4.6)	379 (4.7)	381 (4.6)	381 (4.6)	383 (4.7)	394 (4.6)	381 (4.6)
South Africa (9)	370 (3.1)	369 (3.1)	373 (3.1)	367 (3.1)	373 (3.1)	369 (3.2)	372 (3.1)	372 (3.2)	371 (3.2)	371 (3.1)
International Average	490 (0.6)	490 (0.6)	490 (0.6)	489 (0.6)	490 (0.6)	490 (0.6)	491 (0.6)	490 (0.6)	491 (0.6)	490 (0.6)
Benchmarking Participants										
Moscow City, Russian Fed.	567 (2.9)	567 (2.9)	564 (3.0)	567 (3.0)	565 (2.9)	566 (2.9)	568 (3.0)	564 (3.0)	559 (3.1)	566 (3.0)
Dubai, UAE	548 (2.0)	548 (2.0)	550 (2.0)	545 (2.1)	550 (2.1)	549 (2.0)	548 (2.0)	552 (2.0)	553 (2.1)	549 (2.0)
Quebec, Canada	537 (3.6)	537 (3.5)	537 (3.6)	538 (3.7)	534 (3.6)	534 (3.6)	536 (3.6)	537 (3.6)	533 (3.6)	537 (3.6)
Ontario, Canada	522 (3.0)	521 (3.0)	520 (3.1)	519 (3.1)	518 (3.1)	520 (3.1)	522 (3.0)	516 (3.1)	517 (3.2)	522 (3.0)
Western Cape, RSA (9)	439 (5.1)	439 (5.2)	441 (5.1)	439 (5.2)	441 (5.2)	439 (5.2)	438 (5.1)	440 (5.3)	439 (5.3)	439 (5.2)
Gauteng, RSA (9)	422 (3.9)	422 (3.9)	424 (3.9)	419 (3.9)	424 (3.9)	422 (3.9)	424 (3.8)	425 (4.0)	424 (4.0)	423 (3.9)
Abu Dhabi, UAE	420 (3.6)	421 (3.6)	420 (3.7)	419 (3.6)	421 (3.7)	422 (3.6)	423 (3.6)	423 (3.7)	426 (3.7)	421 (3.6)
Number of Items (Score Points)*	211 (233)	199 (219)	177 (197)	177 (193)	178 (198)	191 (211)	168 (184)	138 (152)	123 (139)	193 (214)

* The number of items and score points are based on the number of items included in scaling the eighth grade science achievement data.

See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019

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Exhibit C.4: Average Scale Scores for the Science Test-Curriculum Matching Analysis

Results based on a subset of items specifically identified by each country as addressing its curriculum

(Continued)

Country	Average Science Scale Score based on All Items	Benchmarking Participants	Moscow City, Russian Fed.	Dubai, UAE	Quebec, Canada	Ontario, Canada	Western Cape, RSA (9)	Gauteng, RSA (9)	Abu Dhabi, UAE
Singapore	608 (3.9)		607 (3.9)	608 (3.9)	604 (3.7)	607 (3.8)	610 (3.9)	610 (3.9)	608 (3.9)
Chinese Taipei	574 (1.9)		571 (1.9)	574 (1.9)	567 (1.9)	571 (1.9)	575 (1.9)	575 (1.9)	574 (1.9)
Japan	570 (2.1)		571 (2.1)	570 (2.1)	573 (2.1)	571 (2.1)	571 (2.1)	571 (2.1)	570 (2.1)
Korea, Rep. of	561 (2.1)		561 (2.1)	561 (2.1)	559 (2.1)	563 (2.2)	560 (2.1)	560 (2.1)	561 (2.1)
Finland	543 (3.1)		541 (3.1)	543 (3.1)	540 (3.1)	541 (3.1)	541 (3.1)	541 (3.1)	543 (3.1)
Russian Federation	543 (4.2)		543 (4.2)	543 (4.2)	542 (4.4)	541 (4.2)	543 (4.3)	543 (4.3)	543 (4.2)
Lithuania	534 (3.0)		534 (3.0)	534 (3.0)	534 (3.1)	533 (3.0)	533 (3.0)	533 (3.0)	534 (3.0)
Hungary	530 (2.6)		529 (2.6)	530 (2.6)	524 (2.6)	529 (2.6)	529 (2.6)	529 (2.6)	530 (2.6)
Australia	528 (3.2)		529 (3.2)	528 (3.2)	533 (3.2)	531 (3.1)	529 (3.2)	529 (3.2)	528 (3.2)
Ireland	523 (2.9)		523 (2.9)	523 (2.9)	525 (3.0)	524 (2.9)	523 (3.0)	523 (3.0)	523 (2.9)
United States	522 (4.7)		523 (4.7)	522 (4.7)	527 (4.6)	525 (4.7)	522 (4.6)	522 (4.6)	522 (4.7)
Sweden	521 (3.2)		521 (3.2)	521 (3.2)	519 (3.3)	521 (3.2)	521 (3.2)	521 (3.2)	521 (3.2)
Portugal	519 (2.9)		518 (2.9)	519 (2.9)	526 (2.9)	520 (2.9)	519 (2.9)	519 (2.9)	519 (2.9)
England	517 (4.8)		517 (4.8)	517 (4.8)	518 (4.9)	515 (4.7)	517 (4.9)	517 (4.9)	517 (4.8)
Turkey	515 (3.7)		515 (3.7)	515 (3.7)	515 (3.7)	515 (3.6)	517 (3.8)	517 (3.8)	515 (3.7)
Israel	513 (4.2)		514 (4.2)	513 (4.2)	514 (4.3)	513 (4.2)	514 (4.2)	514 (4.2)	513 (4.2)
Hong Kong SAR	504 (5.2)		502 (5.2)	504 (5.2)	501 (5.1)	507 (5.2)	504 (5.1)	504 (5.1)	504 (5.2)
Italy	500 (2.6)		500 (2.6)	500 (2.6)	503 (2.6)	500 (2.6)	500 (2.6)	500 (2.6)	500 (2.6)
New Zealand	499 (3.5)		499 (3.5)	499 (3.5)	501 (3.5)	502 (3.5)	498 (3.5)	498 (3.5)	499 (3.5)
Norway (9)	495 (3.1)		495 (3.1)	495 (3.1)	496 (3.2)	495 (3.1)	494 (3.1)	494 (3.1)	495 (3.1)
France	489 (2.7)		488 (2.7)	489 (2.7)	493 (2.8)	493 (2.7)	487 (2.7)	487 (2.7)	489 (2.7)
Bahrain	486 (1.9)		487 (1.9)	486 (1.9)	489 (2.0)	488 (2.0)	487 (1.9)	487 (1.9)	486 (1.9)
Cyprus	484 (1.9)		483 (1.9)	484 (1.9)	487 (2.0)	484 (1.9)	484 (1.9)	484 (1.9)	484 (1.9)
Kazakhstan	478 (3.1)		478 (3.1)	478 (3.1)	471 (3.1)	476 (3.0)	479 (3.1)	479 (3.1)	478 (3.1)
Qatar	475 (4.4)		475 (4.4)	475 (4.4)	476 (4.4)	474 (4.4)	476 (4.4)	476 (4.4)	475 (4.4)
United Arab Emirates	473 (2.2)		473 (2.2)	473 (2.2)	475 (2.2)	472 (2.2)	474 (2.2)	474 (2.2)	473 (2.2)
Romania	470 (4.2)		470 (4.2)	470 (4.2)	464 (4.3)	469 (4.2)	471 (4.2)	471 (4.2)	470 (4.2)
Chile	462 (2.9)		463 (2.9)	462 (2.9)	461 (2.8)	463 (2.9)	463 (2.9)	463 (2.9)	462 (2.9)
Malaysia	460 (3.5)		460 (3.5)	460 (3.5)	456 (3.6)	464 (3.5)	460 (3.5)	460 (3.5)	460 (3.5)
Oman	457 (2.9)		457 (2.9)	457 (2.9)	460 (2.9)	459 (2.9)	457 (2.9)	457 (2.9)	457 (2.9)
Jordan	452 (4.7)		451 (4.6)	452 (4.7)	452 (4.6)	451 (4.6)	452 (4.7)	452 (4.7)	452 (4.7)
Iran, Islamic Rep. of	449 (3.6)		449 (3.6)	449 (3.6)	448 (3.6)	447 (3.6)	446 (3.6)	446 (3.6)	449 (3.6)
Georgia	447 (3.9)		446 (3.9)	447 (3.9)	446 (4.0)	444 (4.0)	447 (3.9)	447 (3.9)	447 (3.9)
Kuwait	444 (5.7)		444 (5.6)	444 (5.7)	445 (5.4)	443 (5.5)	445 (5.7)	445 (5.7)	444 (5.7)
Saudi Arabia	431 (2.6)		431 (2.6)	431 (2.6)	436 (2.7)	435 (2.6)	429 (2.6)	429 (2.6)	431 (2.6)
Morocco	394 (2.7)		393 (2.7)	394 (2.7)	394 (2.7)	393 (2.7)	395 (2.6)	395 (2.6)	394 (2.7)
Egypt	389 (5.4)		390 (5.4)	389 (5.4)	387 (5.3)	389 (5.3)	390 (5.5)	390 (5.5)	389 (5.4)
Lebanon	377 (4.6)		378 (4.6)	377 (4.6)	372 (5.0)	366 (4.9)	381 (4.6)	381 (4.6)	377 (4.6)
South Africa (9)	370 (3.1)		371 (3.1)	370 (3.1)	370 (3.2)	369 (3.1)	371 (3.1)	371 (3.1)	370 (3.1)
International Average	490 (0.6)		490 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)	490 (0.6)
Benchmarking Participants									
Moscow City, Russian Fed.	567 (2.9)		565 (3.0)	567 (2.9)	566 (3.2)	566 (3.0)	566 (3.0)	566 (3.0)	567 (2.9)
Dubai, UAE	548 (2.0)		548 (2.0)	548 (2.0)	549 (2.1)	546 (2.0)	549 (2.0)	549 (2.0)	548 (2.0)
Quebec, Canada	537 (3.6)		536 (3.6)	537 (3.6)	546 (3.6)	537 (3.6)	537 (3.6)	537 (3.6)	537 (3.6)
Ontario, Canada	522 (3.0)		522 (3.0)	522 (3.0)	525 (3.1)	527 (3.0)	522 (3.0)	522 (3.0)	522 (3.0)
Western Cape, RSA (9)	439 (5.1)		440 (5.1)	439 (5.1)	441 (5.4)	439 (5.1)	439 (5.2)	439 (5.2)	439 (5.1)
Gauteng, RSA (9)	422 (3.9)		423 (3.9)	422 (3.9)	424 (4.0)	421 (3.9)	423 (3.9)	423 (3.9)	422 (3.9)
Abu Dhabi, UAE	420 (3.6)		420 (3.6)	420 (3.6)	422 (3.6)	418 (3.6)	421 (3.6)	421 (3.6)	420 (3.6)
Number of Items (Score Points)*	211 (233)		198 (220)	211 (233)	113 (125)	176 (196)	193 (214)	193 (214)	211 (233)

* The number of items and score points are based on the number of items included in scaling the eighth grade science achievement data.
See Chapter 10 in *Methods and Procedures: TIMSS 2019 Technical Report* for information about items deleted or recoded for scaling.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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APPENDIX D

Percentiles of Achievement

Appendix D.1: Percentiles of Mathematics Achievement

Country	5th Percentile	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile	95th Percentile
Albania	346 (10.3)	382 (6.3)	441 (5.6)	500 (3.9)	552 (4.7)	597 (4.6)	627 (3.7)
Armenia	381 (4.0)	407 (4.6)	453 (3.5)	501 (2.8)	545 (2.6)	584 (3.4)	607 (4.9)
Australia	364 (6.0)	401 (5.9)	460 (3.6)	519 (3.0)	575 (3.4)	625 (3.7)	654 (5.8)
Austria	430 (4.8)	455 (3.5)	495 (2.9)	541 (2.4)	584 (2.7)	623 (2.1)	643 (3.5)
Azerbaijan	371 (4.8)	412 (5.6)	467 (3.6)	521 (2.7)	574 (2.5)	615 (3.1)	640 (4.0)
Bahrain	331 (6.2)	363 (5.3)	421 (3.5)	484 (2.7)	540 (2.9)	588 (3.3)	618 (4.5)
Belgium (Flemish)	419 (3.4)	445 (3.5)	487 (2.8)	534 (1.8)	580 (2.0)	619 (2.4)	641 (2.7)
Bosnia and Herzegovina	320 (4.9)	352 (3.7)	403 (3.0)	455 (2.8)	504 (2.6)	545 (2.9)	569 (3.7)
Bulgaria	360 (10.9)	397 (8.8)	461 (6.5)	524 (4.1)	575 (3.6)	618 (2.8)	642 (3.4)
Canada	383 (3.0)	412 (3.2)	460 (2.9)	514 (2.0)	564 (2.2)	608 (2.7)	633 (3.3)
Chile	318 (5.1)	344 (4.1)	389 (4.2)	441 (3.7)	493 (3.1)	537 (3.3)	565 (4.3)
Chinese Taipei	483 (5.6)	513 (4.9)	557 (2.7)	603 (1.7)	645 (3.2)	681 (2.4)	701 (2.6)
Croatia	398 (5.6)	424 (4.9)	465 (3.2)	511 (2.6)	556 (2.3)	595 (3.3)	617 (4.3)
Cyprus	397 (5.7)	428 (3.5)	480 (4.1)	535 (3.3)	587 (3.4)	632 (3.3)	657 (3.8)
Czech Republic	406 (5.8)	435 (5.0)	484 (3.5)	537 (2.7)	585 (2.8)	626 (3.8)	650 (3.9)
Denmark	402 (5.5)	429 (3.0)	474 (2.7)	526 (2.1)	577 (2.4)	618 (3.5)	644 (4.2)
England	411 (5.5)	445 (5.1)	499 (3.5)	558 (4.4)	615 (4.1)	665 (4.8)	693 (6.5)
Finland	402 (5.0)	431 (4.9)	483 (3.4)	535 (3.3)	585 (1.9)	628 (3.6)	653 (3.2)
France	347 (6.5)	379 (5.8)	431 (4.3)	488 (3.2)	540 (3.2)	586 (3.5)	611 (5.0)
Georgia	340 (6.2)	371 (7.2)	429 (5.3)	487 (3.4)	538 (3.9)	583 (4.9)	608 (4.4)
Germany	405 (4.5)	431 (3.7)	474 (2.9)	523 (2.8)	570 (2.8)	609 (2.9)	630 (3.2)
Hong Kong SAR	479 (5.2)	509 (5.8)	558 (4.1)	605 (3.8)	649 (3.7)	689 (3.6)	710 (4.3)
Hungary	388 (5.2)	418 (5.4)	472 (4.1)	529 (3.0)	578 (2.8)	621 (3.7)	645 (3.3)
Iran, Islamic Rep. of	278 (8.6)	316 (8.1)	379 (5.7)	447 (3.2)	512 (3.9)	563 (3.4)	592 (4.7)
Ireland	414 (5.6)	446 (5.2)	501 (3.5)	553 (2.3)	601 (2.1)	643 (4.2)	665 (3.4)
Italy	403 (4.8)	427 (3.6)	470 (3.2)	517 (2.8)	560 (2.8)	598 (3.4)	619 (4.4)
Japan	474 (3.7)	502 (3.3)	548 (2.5)	595 (2.0)	641 (2.3)	680 (2.9)	703 (3.1)
Kazakhstan	401 (4.4)	424 (4.1)	466 (2.8)	511 (3.0)	558 (3.3)	598 (3.8)	622 (3.3)
Korea, Rep. of	477 (5.7)	509 (4.1)	556 (3.0)	603 (2.3)	648 (2.7)	687 (3.3)	710 (4.0)
Kosovo	305 (7.7)	337 (5.1)	393 (4.1)	450 (3.4)	500 (3.5)	543 (3.6)	568 (3.1)
Kuwait	190 (6.7)	230 (7.8)	307 (6.1)	390 (5.2)	463 (6.0)	523 (6.5)	555 (6.5)
Latvia	427 (7.0)	454 (4.4)	501 (3.4)	551 (2.3)	594 (2.9)	629 (3.3)	650 (4.0)
Lithuania	410 (5.7)	442 (4.2)	493 (3.4)	546 (3.2)	596 (2.8)	636 (3.5)	660 (4.9)
Malta	373 (5.4)	404 (2.9)	460 (1.9)	516 (2.1)	563 (2.4)	602 (1.9)	625 (4.0)
Montenegro	298 (6.3)	340 (4.0)	402 (2.5)	461 (2.0)	512 (2.4)	554 (3.4)	578 (3.2)
Morocco	220 (7.2)	254 (6.1)	312 (4.5)	381 (4.3)	452 (5.1)	516 (8.0)	555 (11.3)
Netherlands	432 (4.3)	457 (4.4)	495 (2.7)	540 (3.2)	581 (2.5)	615 (3.5)	634 (3.7)
New Zealand	338 (4.7)	368 (4.4)	425 (3.4)	489 (3.2)	549 (3.3)	602 (3.6)	634 (4.2)
North Macedonia	295 (11.2)	339 (9.2)	411 (6.8)	479 (6.9)	540 (5.5)	591 (6.6)	622 (7.7)
Northern Ireland	410 (8.0)	449 (5.2)	510 (3.6)	572 (3.6)	627 (3.4)	672 (5.3)	699 (5.9)
Norway (5)	416 (5.9)	446 (4.2)	493 (3.5)	546 (2.3)	595 (2.7)	636 (2.8)	660 (3.6)
Oman	263 (5.5)	299 (4.2)	362 (3.6)	431 (3.7)	499 (5.1)	563 (7.9)	602 (10.6)
Pakistan	156 (12.0)	189 (10.1)	249 (12.6)	329 (15.5)	407 (15.6)	462 (10.2)	493 (11.0)
Philippines	121 (6.1)	156 (6.7)	216 (7.4)	293 (7.2)	376 (8.2)	444 (7.7)	480 (7.1)
Poland	386 (4.1)	418 (3.7)	471 (3.9)	523 (2.7)	573 (2.9)	617 (3.5)	642 (5.0)
Portugal	398 (4.8)	424 (4.5)	472 (3.1)	529 (3.5)	580 (3.2)	621 (3.4)	644 (3.9)
Qatar	300 (5.3)	329 (5.3)	384 (4.8)	450 (4.1)	515 (4.7)	569 (4.7)	599 (5.1)
Russian Federation	451 (7.7)	479 (4.8)	524 (4.1)	569 (3.1)	613 (4.0)	653 (4.6)	675 (5.2)
Saudi Arabia	223 (7.6)	261 (7.6)	331 (5.2)	403 (3.7)	469 (4.0)	525 (4.5)	558 (3.9)
Serbia	356 (8.1)	395 (7.5)	456 (5.4)	514 (3.3)	566 (3.5)	611 (4.1)	639 (4.4)
Singapore	481 (8.0)	519 (7.0)	578 (4.9)	633 (4.5)	682 (3.8)	720 (3.5)	741 (3.8)
Slovak Republic	368 (10.9)	406 (8.8)	466 (4.6)	517 (3.9)	561 (3.2)	600 (3.8)	626 (5.0)
South Africa (5)	222 (3.6)	251 (3.2)	301 (3.2)	365 (4.1)	439 (5.0)	509 (5.0)	552 (5.4)
Spain	378 (5.7)	405 (4.2)	453 (3.8)	505 (1.9)	554 (2.2)	594 (2.8)	617 (3.7)
Sweden	396 (5.4)	425 (5.2)	474 (4.0)	523 (3.0)	571 (3.4)	615 (4.1)	640 (4.4)
Turkey (5)	346 (8.0)	385 (8.4)	459 (6.0)	531 (4.9)	595 (4.1)	644 (5.0)	671 (5.0)
United Arab Emirates	316 (2.8)	350 (3.0)	412 (2.3)	484 (2.1)	553 (1.9)	607 (1.8)	638 (2.4)
United States	383 (5.9)	421 (4.4)	480 (3.2)	542 (2.8)	594 (3.0)	639 (2.8)	663 (4.0)
Benchmarking Participants							
Ontario, Canada	383 (5.7)	411 (5.3)	458 (4.5)	513 (4.1)	567 (4.2)	612 (4.6)	637 (6.1)
Quebec, Canada	421 (5.3)	445 (3.6)	487 (3.8)	535 (2.6)	578 (3.2)	616 (3.8)	638 (3.6)
Moscow City, Russian Fed.	483 (5.2)	512 (4.9)	554 (2.9)	596 (2.4)	636 (2.9)	669 (2.6)	686 (2.6)
Madrid, Spain	405 (6.5)	432 (3.6)	474 (4.1)	521 (2.7)	565 (2.2)	602 (2.6)	623 (4.2)
Abu Dhabi, UAE	283 (4.9)	314 (3.5)	369 (2.6)	439 (3.1)	510 (2.7)	571 (2.5)	604 (2.8)
Dubai, UAE	400 (4.5)	435 (3.6)	491 (2.7)	549 (1.9)	601 (2.6)	646 (3.3)	671 (4.2)

Percentiles are defined in terms of percentages of students at or below a point on the scale.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix D.2: Percentiles of Science Achievement

Country	5th Percentile	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile	95th Percentile
Albania	341 (10.5)	378 (7.7)	437 (5.2)	495 (3.7)	549 (3.5)	592 (3.4)	619 (4.7)
Armenia	336 (6.1)	364 (6.2)	415 (4.3)	469 (3.3)	520 (3.6)	564 (4.5)	590 (5.2)
Australia	389 (6.0)	427 (4.4)	484 (2.8)	538 (3.2)	587 (2.4)	629 (3.6)	653 (4.3)
Austria	394 (6.0)	424 (4.2)	474 (3.2)	526 (2.9)	575 (3.5)	614 (2.5)	636 (4.2)
Azerbaijan	260 (10.3)	309 (6.9)	371 (4.0)	434 (3.5)	492 (3.3)	542 (3.3)	569 (4.5)
Bahrain	329 (7.7)	368 (6.3)	432 (4.6)	498 (3.4)	557 (3.9)	606 (4.0)	635 (4.6)
Belgium (Flemish)	384 (3.6)	412 (3.8)	458 (2.8)	504 (2.8)	548 (2.5)	584 (2.7)	605 (3.4)
Bosnia and Herzegovina	321 (7.4)	355 (4.8)	408 (3.7)	463 (3.0)	514 (2.9)	556 (3.6)	580 (4.5)
Bulgaria	326 (14.0)	381 (10.8)	460 (8.1)	536 (5.2)	595 (4.2)	641 (3.4)	666 (3.4)
Canada	401 (3.5)	429 (3.0)	476 (2.8)	526 (2.1)	573 (2.6)	613 (2.6)	637 (2.5)
Chile	343 (5.8)	370 (4.4)	419 (3.7)	470 (4.1)	522 (2.5)	564 (2.9)	589 (3.3)
Chinese Taipei	444 (4.7)	471 (4.4)	516 (2.7)	562 (2.0)	604 (1.9)	639 (2.7)	659 (4.1)
Croatia	424 (5.2)	448 (4.5)	485 (3.3)	525 (3.0)	565 (2.3)	599 (3.4)	618 (4.3)
Cyprus	381 (5.3)	412 (3.7)	463 (3.4)	515 (3.6)	563 (3.2)	606 (4.3)	630 (4.5)
Czech Republic	414 (5.1)	443 (4.3)	490 (3.4)	538 (3.5)	582 (2.2)	619 (3.2)	640 (3.2)
Denmark	405 (6.6)	433 (3.4)	478 (3.1)	525 (2.8)	569 (2.7)	607 (4.0)	629 (3.4)
England	413 (6.8)	444 (4.5)	491 (3.3)	540 (2.7)	587 (3.3)	626 (4.6)	648 (4.8)
Finland	429 (6.9)	464 (4.5)	513 (3.1)	559 (1.9)	602 (2.8)	640 (3.0)	662 (3.3)
France	351 (6.1)	382 (5.0)	435 (4.6)	493 (3.6)	544 (2.9)	583 (3.4)	608 (3.5)
Georgia	307 (10.0)	344 (7.4)	400 (5.0)	459 (4.6)	512 (3.6)	556 (4.1)	582 (5.1)
Germany	383 (4.1)	416 (4.3)	468 (3.4)	524 (3.2)	573 (2.7)	613 (2.4)	634 (4.8)
Hong Kong SAR	408 (6.5)	438 (5.3)	486 (4.0)	535 (3.8)	580 (3.2)	620 (4.0)	643 (4.1)
Hungary	395 (5.6)	425 (5.0)	479 (3.9)	535 (2.8)	584 (3.2)	624 (2.5)	647 (3.2)
Iran, Islamic Rep. of	265 (10.4)	306 (7.0)	377 (6.0)	450 (4.7)	511 (3.9)	561 (3.4)	587 (4.4)
Ireland	393 (7.1)	427 (5.4)	481 (4.8)	534 (3.5)	580 (3.2)	620 (2.8)	643 (4.5)
Italy	400 (5.7)	424 (4.6)	467 (3.1)	512 (3.1)	555 (3.7)	592 (4.1)	615 (7.0)
Japan	442 (4.5)	473 (3.8)	519 (2.7)	566 (1.9)	609 (2.1)	645 (2.7)	668 (3.4)
Kazakhstan	373 (4.5)	397 (3.4)	441 (4.3)	492 (3.2)	544 (4.0)	595 (6.3)	625 (6.4)
Korea, Rep. of	474 (7.0)	504 (4.2)	545 (3.2)	590 (2.3)	633 (2.3)	671 (3.1)	693 (4.1)
Kosovo	260 (8.1)	298 (6.5)	358 (4.4)	419 (4.0)	474 (3.5)	520 (4.2)	545 (4.7)
Kuwait	181 (9.6)	226 (7.5)	307 (7.6)	398 (7.4)	482 (6.9)	548 (8.3)	582 (7.4)
Latvia	432 (6.1)	458 (3.9)	501 (3.5)	546 (2.5)	585 (2.1)	619 (3.1)	639 (2.4)
Lithuania	414 (6.0)	443 (4.3)	492 (3.4)	542 (2.9)	588 (2.2)	628 (3.2)	651 (4.7)
Malta	344 (4.4)	382 (5.3)	443 (2.5)	504 (2.1)	555 (1.8)	598 (2.4)	623 (2.8)
Montenegro	292 (5.4)	336 (5.5)	401 (3.4)	461 (3.4)	516 (2.9)	558 (2.5)	582 (3.4)
Morocco	172 (8.8)	216 (6.8)	291 (6.8)	375 (6.6)	458 (7.2)	531 (9.5)	571 (10.7)
Netherlands	407 (5.4)	434 (4.3)	476 (3.9)	522 (3.3)	564 (2.8)	599 (3.8)	619 (5.7)
New Zealand	360 (4.0)	392 (4.5)	448 (3.2)	507 (2.6)	561 (2.5)	605 (3.4)	629 (3.7)
North Macedonia	244 (9.1)	287 (10.0)	359 (8.1)	432 (8.8)	501 (6.4)	554 (6.7)	583 (5.3)
Northern Ireland	392 (7.0)	424 (4.1)	473 (3.3)	524 (3.0)	568 (2.8)	606 (3.7)	627 (4.7)
Norway (5)	422 (5.8)	451 (4.5)	497 (3.4)	543 (2.6)	586 (2.4)	622 (2.3)	643 (3.5)
Oman	234 (6.3)	278 (4.8)	355 (4.4)	441 (4.0)	518 (4.8)	582 (6.4)	619 (7.7)
Pakistan	83 (13.4)	125 (11.7)	197 (13.6)	288 (19.3)	385 (15.5)	457 (11.8)	496 (11.4)
Philippines	59 (7.2)	93 (8.1)	158 (8.1)	239 (8.1)	333 (9.3)	418 (10.3)	470 (9.3)
Poland	401 (6.6)	435 (4.6)	484 (3.2)	536 (3.3)	582 (3.0)	620 (3.6)	643 (5.1)
Portugal	391 (3.1)	416 (4.2)	459 (3.5)	507 (3.3)	551 (2.7)	587 (2.7)	608 (2.9)
Qatar	271 (7.2)	308 (6.5)	376 (5.0)	456 (5.6)	526 (5.0)	581 (4.3)	611 (5.2)
Russian Federation	457 (7.3)	484 (4.4)	526 (3.5)	570 (3.1)	611 (2.9)	646 (3.1)	666 (4.6)
Saudi Arabia	205 (7.3)	248 (7.6)	327 (5.4)	410 (4.5)	484 (3.2)	540 (3.8)	571 (4.7)
Serbia	368 (11.8)	412 (7.0)	471 (4.3)	525 (3.3)	571 (3.3)	613 (3.7)	637 (3.8)
Singapore	454 (6.3)	493 (5.8)	548 (4.5)	602 (3.7)	649 (3.3)	687 (3.2)	708 (3.7)
Slovak Republic	367 (13.8)	415 (10.0)	479 (4.4)	531 (3.1)	575 (2.6)	612 (3.8)	634 (4.1)
South Africa (5)	129 (4.3)	163 (4.7)	225 (5.0)	311 (6.6)	414 (7.4)	510 (8.7)	563 (7.9)
Spain	394 (4.8)	422 (4.8)	467 (2.8)	516 (2.2)	559 (2.0)	595 (2.8)	614 (2.3)
Sweden	409 (7.2)	439 (5.9)	490 (4.6)	541 (4.2)	588 (3.8)	629 (3.9)	652 (3.8)
Turkey (5)	350 (10.0)	401 (8.9)	475 (5.3)	538 (4.4)	591 (3.6)	631 (3.9)	653 (4.8)
United Arab Emirates	273 (2.5)	314 (2.9)	395 (2.8)	483 (2.6)	557 (2.2)	612 (1.9)	641 (2.1)
United States	387 (5.6)	426 (4.8)	486 (3.6)	546 (3.0)	598 (2.2)	641 (2.5)	664 (2.6)
Benchmarking Participants							
Ontario, Canada	397 (6.3)	426 (4.7)	474 (4.7)	527 (3.8)	577 (3.8)	617 (4.5)	641 (5.3)
Quebec, Canada	413 (5.3)	437 (4.2)	479 (4.4)	524 (3.4)	566 (3.2)	604 (3.8)	627 (4.7)
Moscow City, Russian Fed.	484 (5.8)	514 (4.6)	556 (2.7)	599 (2.2)	638 (2.3)	671 (3.5)	689 (3.8)
Madrid, Spain	417 (4.1)	442 (3.8)	484 (2.8)	526 (2.2)	565 (2.4)	599 (2.7)	618 (4.4)
Abu Dhabi, UAE	230 (4.1)	265 (3.6)	329 (4.0)	419 (3.2)	507 (3.3)	570 (3.7)	604 (3.3)
Dubai, UAE	389 (5.6)	429 (3.5)	492 (2.8)	554 (2.2)	605 (1.9)	646 (2.7)	671 (2.9)

Percentiles are defined in terms of percentages of students at or below a point on the scale.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix D.3: Percentiles of Mathematics Achievement

Country	5th Percentile	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile	95th Percentile
Australia	369 (5.3)	401 (4.0)	456 (3.8)	518 (4.2)	578 (5.2)	632 (7.0)	666 (9.0)
Bahrain	317 (3.4)	350 (3.1)	413 (3.3)	488 (2.6)	550 (2.3)	598 (2.2)	628 (3.2)
Chile	318 (4.7)	344 (3.9)	388 (3.7)	440 (4.2)	493 (3.5)	538 (4.7)	568 (7.5)
Chinese Taipei	435 (5.4)	475 (3.9)	550 (4.0)	623 (3.3)	682 (3.6)	731 (3.5)	759 (4.8)
Cyprus	362 (4.7)	392 (4.0)	445 (3.0)	504 (2.6)	559 (2.6)	604 (3.2)	631 (5.0)
Egypt	252 (6.5)	288 (6.9)	347 (6.1)	414 (5.9)	481 (5.5)	535 (6.2)	567 (7.3)
England	363 (9.2)	398 (8.3)	457 (6.9)	516 (5.9)	575 (6.8)	628 (7.6)	660 (10.2)
Finland	384 (6.0)	412 (5.4)	460 (3.6)	512 (2.7)	560 (2.9)	602 (3.1)	624 (2.9)
France	369 (3.2)	393 (3.9)	436 (3.7)	483 (3.3)	531 (2.9)	570 (3.4)	593 (5.1)
Georgia	318 (8.8)	349 (7.4)	400 (6.4)	461 (4.6)	524 (5.5)	576 (6.6)	604 (8.5)
Hong Kong SAR	410 (11.9)	455 (7.8)	524 (5.7)	587 (4.1)	641 (4.1)	686 (7.0)	714 (7.1)
Hungary	366 (6.7)	398 (5.8)	455 (4.4)	518 (4.6)	580 (4.1)	631 (4.7)	661 (7.0)
Iran, Islamic Rep. of	296 (7.2)	329 (5.9)	383 (4.4)	444 (3.3)	509 (5.1)	568 (7.0)	602 (9.5)
Ireland	395 (7.3)	426 (5.8)	476 (3.9)	528 (2.7)	574 (2.5)	614 (3.8)	636 (3.0)
Israel	352 (6.2)	387 (5.1)	450 (4.4)	523 (6.3)	591 (5.2)	647 (6.7)	674 (7.0)
Italy	378 (5.7)	405 (3.4)	448 (3.7)	499 (3.7)	548 (3.2)	589 (4.1)	611 (4.2)
Japan	451 (4.3)	485 (3.9)	538 (2.6)	595 (2.3)	653 (3.5)	700 (5.4)	727 (6.9)
Jordan	274 (7.1)	305 (5.4)	361 (5.4)	423 (4.6)	481 (4.2)	530 (4.6)	558 (4.5)
Kazakhstan	355 (4.2)	381 (4.6)	431 (4.2)	486 (3.7)	544 (4.7)	597 (4.9)	624 (6.0)
Korea, Rep. of	435 (6.2)	475 (5.5)	547 (3.1)	613 (2.7)	674 (4.1)	727 (6.6)	755 (6.0)
Kuwait	262 (6.9)	290 (5.9)	341 (5.4)	400 (5.4)	462 (5.9)	521 (7.6)	552 (8.1)
Lebanon	313 (4.3)	337 (3.6)	378 (2.9)	428 (3.5)	479 (4.0)	525 (4.1)	551 (4.4)
Lithuania	384 (5.2)	415 (3.7)	466 (3.0)	521 (4.0)	577 (3.8)	624 (4.2)	652 (6.3)
Malaysia	319 (4.8)	346 (4.9)	396 (4.7)	457 (3.8)	521 (3.8)	580 (3.3)	618 (4.6)
Morocco	277 (3.7)	300 (3.1)	339 (2.5)	384 (2.4)	433 (2.9)	482 (4.0)	514 (5.2)
New Zealand	333 (7.1)	367 (6.3)	422 (5.1)	482 (3.5)	542 (3.6)	598 (4.0)	629 (4.3)
Norway (9)	370 (6.4)	401 (4.1)	450 (3.3)	505 (3.8)	558 (2.6)	601 (3.4)	626 (3.3)
Oman	246 (5.5)	281 (4.5)	341 (3.6)	412 (3.1)	482 (3.1)	537 (3.3)	568 (3.6)
Portugal	380 (6.3)	406 (5.2)	451 (4.6)	499 (3.9)	551 (3.4)	596 (4.8)	623 (5.6)
Qatar	293 (5.8)	322 (4.6)	374 (4.0)	439 (4.3)	511 (5.8)	571 (8.5)	606 (8.2)
Romania	317 (6.5)	351 (5.2)	410 (5.2)	481 (6.8)	550 (5.2)	604 (5.1)	635 (6.5)
Russian Federation	409 (6.3)	438 (7.3)	488 (6.1)	545 (5.1)	598 (4.6)	647 (6.1)	676 (6.5)
Saudi Arabia	268 (4.6)	294 (4.3)	339 (4.0)	393 (3.8)	446 (2.8)	495 (3.2)	523 (3.4)
Singapore	445 (7.8)	487 (10.4)	565 (7.5)	628 (4.6)	679 (3.1)	718 (2.8)	740 (3.3)
South Africa (9)	274 (3.8)	297 (3.3)	336 (2.3)	383 (2.4)	436 (2.8)	491 (3.6)	527 (4.2)
Sweden	373 (5.5)	401 (4.1)	449 (3.6)	505 (2.8)	556 (3.3)	601 (4.3)	626 (4.3)
Turkey	322 (6.9)	355 (7.8)	418 (4.9)	493 (4.9)	572 (4.7)	637 (5.4)	677 (6.9)
United Arab Emirates	302 (2.5)	336 (2.8)	400 (2.7)	475 (2.5)	548 (2.3)	607 (2.5)	639 (2.8)
United States	348 (9.4)	385 (7.2)	448 (5.8)	518 (5.1)	588 (5.3)	642 (4.8)	671 (4.9)
Benchmarking Participants							
Ontario, Canada	398 (6.1)	427 (5.3)	477 (4.2)	532 (4.4)	582 (4.4)	629 (7.3)	658 (8.0)
Quebec, Canada	429 (8.2)	457 (6.4)	499 (4.6)	545 (4.8)	590 (4.1)	627 (5.3)	648 (5.7)
Moscow City, Russian Fed.	436 (4.9)	466 (5.4)	519 (3.9)	578 (4.6)	634 (4.7)	681 (5.2)	709 (6.8)
Gauteng, RSA (9)	305 (4.3)	328 (4.1)	367 (2.7)	415 (2.8)	469 (4.7)	523 (5.1)	558 (7.3)
Western Cape, RSA (9)	311 (4.2)	336 (4.4)	376 (4.0)	430 (4.6)	498 (7.4)	569 (9.1)	606 (7.8)
Abu Dhabi, UAE	270 (4.5)	300 (4.2)	357 (3.9)	436 (4.1)	512 (3.3)	573 (2.9)	605 (3.9)
Dubai, UAE	371 (6.1)	411 (4.1)	477 (3.1)	545 (2.7)	603 (2.9)	648 (3.0)	673 (4.2)

Percentiles are defined in terms of percentages of students at or below a point on the scale.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix D.4: Percentiles of Science Achievement

Country	5th Percentile	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile	95th Percentile
Australia	373 (6.5)	409 (4.6)	473 (4.3)	534 (3.4)	589 (3.8)	635 (4.8)	663 (6.2)
Bahrain	308 (5.6)	346 (3.7)	416 (3.6)	493 (2.5)	561 (2.5)	614 (3.1)	641 (3.5)
Chile	331 (6.3)	360 (4.9)	409 (3.8)	465 (2.7)	517 (3.6)	561 (4.6)	586 (4.2)
Chinese Taipei	426 (5.6)	464 (3.2)	522 (2.2)	581 (2.6)	634 (2.4)	674 (2.4)	698 (3.9)
Cyprus	335 (4.0)	370 (4.4)	429 (4.3)	490 (3.1)	543 (2.5)	587 (3.0)	612 (3.4)
Egypt	192 (10.1)	237 (7.6)	314 (6.6)	398 (5.8)	472 (5.8)	528 (5.6)	558 (5.4)
England	356 (9.3)	393 (8.6)	458 (6.9)	523 (5.0)	580 (4.7)	630 (6.6)	659 (7.9)
Finland	388 (8.8)	428 (6.6)	490 (4.2)	549 (3.1)	602 (2.7)	647 (4.0)	673 (3.8)
France	355 (4.5)	385 (4.7)	436 (3.9)	492 (3.4)	543 (3.7)	585 (3.2)	609 (4.7)
Georgia	302 (7.4)	338 (5.2)	392 (5.4)	450 (3.1)	506 (4.4)	551 (5.4)	577 (8.1)
Hong Kong SAR	337 (7.8)	373 (8.7)	440 (7.6)	510 (6.8)	571 (5.4)	622 (6.2)	651 (7.2)
Hungary	388 (6.4)	421 (5.2)	476 (4.4)	534 (3.6)	586 (3.0)	632 (4.8)	659 (5.2)
Iran, Islamic Rep. of	299 (7.2)	336 (5.0)	391 (4.2)	450 (4.0)	510 (4.2)	563 (7.0)	594 (6.5)
Ireland	376 (8.7)	413 (5.9)	470 (4.2)	529 (3.4)	582 (3.4)	624 (3.1)	649 (5.2)
Israel	343 (9.3)	384 (6.9)	450 (6.0)	521 (5.5)	582 (5.8)	633 (5.5)	661 (6.3)
Italy	373 (6.8)	404 (4.5)	453 (3.7)	503 (3.0)	551 (3.1)	593 (2.7)	619 (4.6)
Japan	444 (3.7)	473 (3.6)	523 (2.1)	573 (2.4)	620 (3.2)	659 (4.0)	681 (4.7)
Jordan	277 (8.9)	319 (7.7)	390 (6.3)	462 (5.6)	522 (4.1)	569 (4.6)	598 (4.4)
Kazakhstan	336 (6.5)	368 (6.5)	422 (4.2)	478 (3.3)	535 (3.8)	590 (5.4)	620 (5.6)
Korea, Rep. of	415 (6.5)	453 (4.1)	509 (3.4)	563 (1.9)	617 (2.9)	666 (3.9)	694 (5.6)
Kuwait	276 (9.7)	313 (7.1)	377 (7.1)	448 (5.9)	515 (6.3)	570 (6.6)	600 (8.3)
Lebanon	213 (7.0)	243 (7.8)	301 (6.7)	374 (5.9)	451 (6.7)	515 (5.2)	550 (6.7)
Lithuania	402 (5.5)	433 (4.9)	483 (4.2)	537 (3.2)	588 (3.6)	630 (4.2)	656 (4.8)
Malaysia	292 (7.6)	330 (7.2)	395 (5.6)	467 (4.1)	529 (3.1)	580 (2.9)	608 (3.4)
Morocco	251 (5.5)	284 (4.4)	337 (3.6)	396 (3.0)	453 (2.9)	503 (3.0)	531 (3.4)
New Zealand	336 (8.1)	375 (6.5)	440 (5.1)	505 (3.5)	563 (3.7)	613 (3.4)	643 (4.2)
Norway (9)	340 (7.1)	378 (7.4)	439 (4.8)	500 (3.3)	558 (4.0)	606 (3.2)	632 (3.5)
Oman	272 (5.3)	313 (5.3)	387 (4.7)	465 (3.6)	534 (2.9)	586 (3.7)	615 (4.2)
Portugal	398 (7.1)	426 (4.5)	470 (4.8)	520 (3.9)	569 (3.6)	610 (3.4)	636 (3.9)
Qatar	301 (7.2)	337 (5.5)	405 (5.0)	478 (5.6)	549 (5.5)	607 (5.1)	637 (6.4)
Romania	313 (6.7)	350 (5.3)	410 (5.5)	472 (4.7)	533 (5.2)	586 (6.9)	618 (6.3)
Russian Federation	415 (7.8)	442 (6.3)	494 (5.3)	546 (4.3)	595 (3.7)	637 (5.4)	661 (4.8)
Saudi Arabia	280 (4.7)	314 (4.3)	371 (3.5)	435 (3.1)	494 (3.0)	544 (2.7)	572 (3.3)
Singapore	439 (12.2)	485 (9.4)	557 (7.4)	621 (4.5)	669 (2.8)	708 (3.2)	731 (2.6)
South Africa (9)	211 (4.5)	243 (4.1)	298 (3.6)	364 (3.6)	435 (4.0)	506 (4.1)	552 (5.0)
Sweden	349 (7.2)	391 (5.5)	462 (5.3)	529 (3.4)	588 (3.9)	638 (5.0)	664 (3.9)
Turkey	351 (7.5)	388 (5.1)	449 (4.5)	519 (4.7)	585 (4.4)	639 (5.0)	669 (5.1)
United Arab Emirates	247 (4.4)	296 (3.4)	388 (3.4)	486 (2.8)	566 (2.4)	627 (2.4)	660 (2.5)
United States	345 (11.0)	388 (8.8)	458 (6.4)	531 (5.4)	594 (4.1)	642 (4.2)	670 (3.9)
Benchmarking Participants							
Ontario, Canada	388 (7.2)	419 (4.6)	470 (4.1)	525 (3.8)	575 (3.7)	621 (5.5)	648 (5.2)
Quebec, Canada	420 (8.0)	447 (6.3)	491 (4.5)	539 (4.1)	585 (4.5)	623 (4.7)	646 (5.2)
Moscow City, Russian Fed.	450 (5.0)	477 (3.7)	521 (3.4)	570 (3.5)	615 (4.1)	653 (3.4)	674 (5.1)
Gauteng, RSA (9)	267 (6.3)	299 (5.1)	353 (4.1)	418 (4.5)	489 (5.1)	554 (6.2)	591 (7.1)
Western Cape, RSA (9)	272 (6.0)	303 (4.8)	360 (4.6)	428 (5.0)	513 (8.2)	596 (10.1)	638 (9.5)
Abu Dhabi, UAE	200 (4.8)	236 (5.5)	313 (6.1)	426 (6.7)	528 (4.1)	595 (3.8)	629 (3.9)
Dubai, UAE	360 (5.4)	408 (4.6)	486 (2.5)	560 (2.2)	619 (2.6)	668 (3.9)	695 (6.0)

Percentiles are defined in terms of percentages of students at or below a point on the scale.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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APPENDIX E

Standard Deviations of Achievement

Appendix E.1: Average Mathematics Achievement and Standard Deviations by Gender

Country	Overall		Girls		Boys	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Albania	494 (3.4)	86 (2.4)	493 (3.8)	85 (2.6)	495 (3.9)	87 (3.2)
Armenia	498 (2.5)	68 (1.5)	499 (2.6)	66 (1.3)	497 (3.2)	70 (2.1)
Australia	516 (2.8)	87 (1.9)	511 (2.9)	82 (2.0)	521 (3.3)	91 (2.3)
Austria	539 (2.0)	65 (1.1)	535 (2.8)	63 (1.4)	543 (2.1)	66 (1.3)
Azerbaijan	515 (2.7)	84 (1.7)	517 (3.1)	81 (2.2)	514 (3.1)	87 (2.1)
Bahrain	480 (2.6)	87 (1.6)	482 (3.2)	86 (2.2)	477 (3.5)	88 (1.8)
Belgium (Flemish)	532 (1.9)	68 (1.2)	527 (2.1)	66 (1.4)	538 (2.8)	68 (1.7)
Bosnia and Herzegovina	452 (2.4)	75 (1.2)	447 (2.7)	73 (1.5)	456 (2.8)	77 (1.6)
Bulgaria	515 (4.3)	86 (3.0)	514 (4.7)	84 (3.0)	516 (4.6)	88 (3.6)
Canada	512 (1.9)	76 (1.2)	502 (2.5)	74 (1.5)	521 (2.0)	77 (1.3)
Chile	441 (2.7)	75 (1.6)	437 (3.4)	73 (1.9)	445 (3.1)	76 (2.2)
Chinese Taipei	599 (1.9)	66 (1.3)	597 (2.4)	63 (1.7)	601 (2.3)	69 (1.7)
Croatia	509 (2.2)	67 (1.8)	504 (2.6)	65 (1.9)	515 (2.7)	69 (2.4)
Cyprus	532 (2.9)	79 (1.5)	523 (3.0)	76 (1.8)	542 (3.5)	80 (2.1)
Czech Republic	533 (2.5)	74 (1.8)	527 (2.7)	73 (1.9)	538 (3.1)	75 (2.2)
Denmark	525 (1.9)	73 (1.1)	521 (2.2)	70 (1.7)	528 (2.6)	76 (1.4)
England	556 (3.0)	86 (2.0)	552 (4.0)	83 (2.6)	560 (3.0)	88 (2.4)
Finland	532 (2.3)	76 (1.4)	531 (2.9)	75 (1.5)	533 (2.8)	78 (2.0)
France	485 (3.0)	80 (1.4)	478 (3.3)	78 (2.0)	491 (3.5)	81 (1.8)
Georgia	482 (3.7)	81 (1.7)	478 (3.9)	80 (1.9)	486 (4.1)	81 (2.1)
Germany	521 (2.3)	70 (1.4)	516 (2.8)	68 (1.6)	526 (2.4)	71 (1.7)
Hong Kong SAR	602 (3.3)	69 (1.5)	599 (3.5)	67 (1.9)	604 (3.9)	71 (2.3)
Hungary	523 (2.6)	78 (1.4)	518 (3.0)	76 (1.9)	529 (3.1)	79 (1.8)
Iran, Islamic Rep. of	443 (3.9)	95 (2.3)	439 (6.4)	93 (3.4)	447 (5.3)	97 (2.5)
Ireland	548 (2.5)	76 (1.3)	545 (3.2)	75 (1.7)	552 (2.9)	77 (1.7)
Italy	515 (2.4)	66 (1.0)	509 (2.7)	64 (1.3)	521 (3.2)	68 (1.3)
Japan	593 (1.8)	70 (1.0)	593 (2.2)	67 (1.3)	593 (1.9)	73 (1.3)
Kazakhstan	512 (2.5)	68 (1.4)	512 (3.0)	67 (1.8)	512 (2.6)	68 (1.5)
Korea, Rep. of	600 (2.2)	71 (1.2)	597 (2.3)	68 (1.7)	602 (2.8)	73 (1.7)
Kosovo	444 (3.0)	80 (1.5)	442 (3.1)	79 (1.7)	447 (3.7)	82 (2.0)
Kuwait	383 (4.7)	111 (2.4)	387 (6.0)	106 (2.7)	380 (6.9)	116 (3.5)
Latvia	546 (2.6)	68 (1.8)	544 (2.9)	67 (1.7)	548 (3.0)	69 (2.3)
Lithuania	542 (2.8)	76 (1.4)	540 (2.9)	74 (2.0)	544 (3.7)	77 (2.1)
Malta	509 (1.4)	76 (0.9)	505 (2.1)	74 (1.5)	513 (1.9)	79 (1.3)
Montenegro	453 (2.0)	85 (1.5)	450 (2.6)	84 (1.7)	455 (2.4)	87 (1.9)
Morocco	383 (4.3)	102 (4.0)	385 (4.8)	101 (4.2)	382 (4.3)	103 (4.2)
Netherlands	538 (2.2)	62 (1.1)	533 (2.2)	60 (1.4)	542 (3.0)	63 (1.6)
New Zealand	487 (2.6)	90 (1.3)	484 (3.7)	87 (1.7)	490 (3.3)	93 (1.8)
North Macedonia	472 (5.3)	98 (2.7)	472 (5.9)	100 (3.4)	472 (5.4)	96 (2.9)
Northern Ireland	566 (2.7)	88 (2.0)	564 (3.2)	86 (2.5)	568 (3.7)	89 (2.6)
Norway (5)	543 (2.2)	74 (1.4)	540 (2.7)	73 (2.1)	545 (2.9)	75 (1.8)
Oman	431 (3.7)	102 (2.4)	438 (3.6)	97 (2.7)	424 (4.4)	107 (2.4)
Pakistan	328 (12.0)	105 (2.6)	338 (16.4)	102 (3.6)	319 (11.8)	105 (4.4)
Philippines	297 (6.4)	110 (2.3)	315 (6.6)	106 (2.3)	280 (6.4)	111 (2.7)
Poland	520 (2.7)	77 (1.5)	516 (3.0)	74 (1.9)	524 (3.0)	80 (1.8)
Portugal	525 (2.6)	76 (1.3)	516 (2.9)	74 (1.4)	533 (2.9)	76 (1.9)
Qatar	449 (3.4)	92 (2.0)	450 (5.1)	87 (2.2)	449 (3.2)	96 (2.9)
Russian Federation	567 (3.3)	68 (1.6)	563 (3.6)	67 (1.9)	571 (3.5)	69 (1.8)
Saudi Arabia	398 (3.6)	101 (2.0)	412 (4.9)	91 (1.9)	385 (5.8)	108 (3.0)
Serbia	508 (3.2)	84 (2.2)	509 (3.4)	79 (2.2)	507 (4.0)	89 (2.9)
Singapore	625 (3.9)	79 (2.3)	621 (4.0)	76 (2.0)	629 (4.2)	81 (2.8)
Slovak Republic	510 (3.5)	77 (2.3)	503 (3.5)	74 (2.6)	516 (4.2)	79 (2.7)
South Africa (5)	374 (3.6)	100 (1.8)	384 (4.0)	99 (2.2)	364 (3.7)	100 (2.3)
Spain	502 (2.1)	73 (1.6)	495 (2.5)	70 (1.8)	509 (2.6)	75 (2.0)
Sweden	521 (2.8)	73 (1.5)	518 (3.2)	72 (1.7)	525 (3.1)	74 (2.1)
Turkey (5)	523 (4.4)	100 (2.3)	521 (4.5)	95 (2.5)	525 (5.6)	104 (2.8)
United Arab Emirates	481 (1.7)	99 (0.9)	477 (2.5)	95 (1.1)	486 (2.3)	101 (1.3)
United States	535 (2.5)	85 (1.3)	529 (3.0)	83 (1.8)	540 (2.9)	86 (1.4)
Benchmarking Participants						
Ontario, Canada	512 (3.3)	78 (1.9)	502 (4.9)	76 (2.4)	521 (3.2)	79 (2.1)
Quebec, Canada	532 (2.3)	67 (1.3)	523 (3.0)	65 (1.8)	541 (2.4)	67 (1.8)
Moscow City, Russian Fed.	593 (2.2)	62 (1.3)	588 (2.5)	61 (1.6)	597 (2.5)	63 (1.6)
Madrid, Spain	518 (2.2)	66 (1.3)	510 (2.6)	65 (1.8)	526 (2.4)	67 (1.5)
Abu Dhabi, UAE	441 (2.2)	98 (1.2)	438 (2.8)	96 (1.6)	443 (3.2)	100 (1.7)
Dubai, UAE	544 (1.6)	82 (1.6)	540 (3.2)	80 (2.4)	548 (2.3)	85 (1.6)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix E.2: Average Science Achievement and Standard Deviations by Gender

Country	Overall		Girls		Boys	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Albania	489 (3.5)	85 (2.4)	494 (3.9)	84 (2.5)	485 (3.9)	86 (3.2)
Armenia	466 (3.4)	77 (1.6)	471 (3.5)	75 (1.8)	462 (4.0)	79 (2.1)
Australia	533 (2.4)	79 (1.4)	533 (2.9)	75 (1.6)	532 (2.7)	83 (1.9)
Austria	522 (2.6)	74 (1.4)	519 (3.1)	72 (1.5)	525 (3.0)	76 (1.9)
Azerbaijan	427 (3.3)	97 (2.0)	429 (3.9)	94 (2.5)	425 (3.5)	99 (2.3)
Bahrain	493 (3.4)	92 (2.2)	510 (3.8)	86 (2.2)	476 (5.1)	95 (2.9)
Belgium (Flemish)	501 (2.1)	67 (1.0)	499 (2.3)	66 (1.3)	503 (2.8)	68 (1.4)
Bosnia and Herzegovina	459 (2.9)	79 (1.1)	462 (3.1)	76 (1.4)	455 (3.5)	81 (1.7)
Bulgaria	521 (4.9)	103 (3.5)	525 (5.3)	101 (3.7)	518 (5.4)	105 (4.2)
Canada	523 (1.9)	72 (1.0)	520 (2.1)	71 (1.3)	526 (2.2)	73 (1.3)
Chile	469 (2.6)	75 (1.3)	466 (3.1)	74 (1.5)	472 (3.3)	76 (1.9)
Chinese Taipei	558 (1.8)	65 (1.3)	557 (2.0)	62 (1.9)	559 (2.2)	68 (1.6)
Croatia	524 (2.2)	59 (1.3)	524 (2.6)	57 (1.6)	524 (2.7)	61 (1.9)
Cyprus	511 (3.0)	75 (1.4)	509 (2.8)	73 (1.8)	514 (4.1)	77 (1.8)
Czech Republic	534 (2.6)	69 (1.8)	529 (3.0)	68 (2.1)	538 (3.0)	69 (2.0)
Denmark	522 (2.4)	68 (1.1)	523 (2.7)	66 (1.4)	522 (2.8)	71 (1.4)
England	537 (2.7)	71 (1.8)	537 (3.6)	69 (2.1)	537 (2.7)	74 (2.5)
Finland	555 (2.6)	71 (1.5)	557 (3.5)	69 (1.9)	552 (2.4)	72 (1.7)
France	488 (3.0)	78 (1.3)	489 (3.2)	78 (1.6)	487 (3.4)	78 (1.9)
Georgia	454 (3.9)	84 (2.0)	452 (4.7)	83 (2.6)	457 (4.2)	84 (2.4)
Germany	518 (2.2)	77 (1.6)	516 (2.8)	76 (1.8)	520 (2.4)	78 (1.8)
Hong Kong SAR	531 (3.3)	71 (1.7)	531 (3.1)	69 (2.0)	531 (4.3)	73 (2.1)
Hungary	529 (2.7)	77 (1.5)	526 (3.2)	75 (2.2)	533 (3.1)	78 (2.0)
Iran, Islamic Rep. of	441 (4.1)	98 (2.3)	440 (6.6)	98 (3.6)	442 (5.4)	97 (2.2)
Ireland	528 (3.2)	75 (1.8)	526 (3.8)	74 (2.0)	530 (3.4)	76 (2.0)
Italy	510 (3.0)	65 (1.5)	506 (3.3)	65 (1.7)	514 (3.3)	65 (2.1)
Japan	562 (1.8)	69 (1.6)	565 (2.0)	64 (1.9)	559 (2.1)	73 (1.8)
Kazakhstan	494 (3.1)	76 (2.1)	497 (3.6)	76 (2.2)	491 (3.1)	77 (2.3)
Korea, Rep. of	588 (2.1)	67 (1.6)	583 (2.4)	63 (1.4)	592 (2.5)	70 (2.3)
Kosovo	413 (3.7)	87 (1.8)	420 (4.2)	85 (2.1)	407 (4.0)	88 (2.3)
Kuwait	392 (6.1)	122 (2.9)	413 (6.9)	114 (2.7)	374 (8.7)	127 (4.2)
Latvia	542 (2.4)	63 (1.7)	544 (2.6)	63 (1.8)	540 (3.0)	64 (2.1)
Lithuania	538 (2.5)	73 (1.4)	540 (2.8)	72 (1.9)	536 (3.3)	74 (1.9)
Malta	496 (1.3)	84 (1.2)	493 (2.1)	81 (2.1)	498 (2.4)	86 (1.4)
Montenegro	453 (2.5)	89 (1.3)	457 (2.9)	87 (1.7)	451 (2.8)	91 (1.8)
Morocco	374 (5.8)	121 (3.3)	379 (6.4)	119 (3.9)	370 (5.8)	122 (3.8)
Netherlands	518 (2.9)	65 (1.5)	519 (3.1)	62 (1.8)	518 (3.3)	67 (2.0)
New Zealand	503 (2.3)	82 (1.4)	505 (3.2)	80 (1.7)	500 (2.8)	84 (1.7)
North Macedonia	426 (6.2)	103 (2.9)	433 (6.5)	103 (3.5)	419 (6.7)	102 (3.1)
Northern Ireland	518 (2.3)	71 (1.5)	519 (2.9)	70 (1.7)	518 (2.8)	72 (2.1)
Norway (5)	539 (2.2)	67 (1.4)	541 (2.4)	65 (1.7)	538 (3.1)	68 (2.1)
Oman	435 (4.1)	118 (2.4)	447 (3.8)	110 (2.7)	423 (5.0)	124 (2.6)
Pakistan	290 (13.4)	126 (3.4)	311 (15.4)	119 (4.5)	273 (14.5)	129 (4.9)
Philippines	249 (7.5)	124 (2.8)	261 (7.8)	123 (3.0)	238 (7.8)	124 (3.0)
Poland	531 (2.6)	74 (1.4)	532 (2.8)	71 (2.1)	529 (3.2)	76 (1.7)
Portugal	504 (2.6)	67 (1.0)	501 (3.1)	66 (1.2)	506 (2.7)	67 (1.5)
Qatar	449 (3.9)	104 (2.3)	456 (6.0)	99 (2.9)	443 (3.7)	109 (2.8)
Russian Federation	567 (3.0)	64 (1.6)	567 (3.5)	63 (1.8)	568 (3.3)	64 (1.8)
Saudi Arabia	402 (4.1)	112 (2.5)	434 (4.8)	97 (2.3)	373 (6.5)	116 (3.1)
Serbia	517 (3.5)	81 (2.7)	521 (3.5)	78 (2.6)	513 (4.3)	84 (3.7)
Singapore	595 (3.4)	78 (2.1)	591 (3.6)	75 (2.0)	598 (3.8)	80 (2.6)
Slovak Republic	521 (3.7)	81 (3.3)	518 (3.8)	79 (3.4)	523 (4.4)	82 (4.0)
South Africa (5)	324 (4.9)	133 (2.5)	335 (5.4)	132 (3.1)	314 (5.2)	133 (3.0)
Spain	511 (2.0)	67 (1.3)	511 (2.4)	65 (1.8)	512 (2.5)	69 (1.9)
Sweden	537 (3.3)	74 (1.9)	538 (3.6)	72 (1.8)	536 (3.8)	75 (2.5)
Turkey (5)	526 (4.2)	91 (2.6)	524 (4.4)	87 (3.0)	529 (5.2)	94 (3.0)
United Arab Emirates	473 (2.1)	113 (1.0)	475 (3.1)	109 (1.4)	471 (2.6)	117 (1.4)
United States	539 (2.7)	84 (1.5)	536 (3.0)	83 (1.7)	541 (3.2)	86 (1.8)
Benchmarking Participants						
Ontario, Canada	524 (3.2)	74 (1.7)	522 (4.0)	73 (2.3)	526 (3.3)	75 (2.0)
Quebec, Canada	522 (2.5)	65 (1.3)	519 (2.7)	64 (1.3)	525 (3.0)	66 (1.9)
Moscow City, Russian Fed.	595 (2.2)	63 (1.7)	595 (2.5)	61 (1.6)	595 (2.6)	64 (2.1)
Madrid, Spain	523 (2.0)	61 (1.2)	521 (2.5)	61 (1.7)	524 (2.3)	61 (1.4)
Abu Dhabi, UAE	418 (2.8)	116 (1.4)	422 (3.8)	114 (1.9)	413 (3.9)	119 (1.8)
Dubai, UAE	545 (1.7)	86 (1.5)	545 (3.6)	84 (2.6)	544 (2.4)	88 (1.6)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix E.3: Average Mathematics Achievement and Standard Deviations by Gender

Country	Overall		Girls		Boys	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Australia	517 (3.8)	90 (2.5)	515 (3.6)	84 (2.0)	519 (5.5)	95 (3.8)
Bahrain	481 (1.7)	95 (1.1)	492 (2.4)	94 (1.6)	471 (2.2)	95 (1.7)
Chile	441 (2.8)	75 (1.9)	436 (3.5)	74 (2.1)	445 (3.8)	77 (2.2)
Chinese Taipei	612 (2.7)	98 (1.5)	614 (3.1)	95 (1.9)	611 (3.2)	101 (1.8)
Cyprus	501 (1.6)	82 (1.8)	503 (2.1)	77 (1.7)	499 (2.3)	85 (2.5)
Egypt	413 (5.2)	95 (2.3)	420 (5.3)	91 (2.6)	404 (7.9)	100 (3.4)
England	515 (5.3)	89 (3.4)	514 (5.6)	86 (4.2)	516 (7.2)	93 (4.1)
Finland	509 (2.6)	73 (1.6)	511 (2.6)	70 (1.9)	507 (3.2)	77 (1.9)
France	483 (2.5)	69 (1.5)	478 (2.5)	66 (1.6)	487 (3.1)	71 (2.1)
Georgia	461 (4.3)	88 (3.1)	457 (4.5)	86 (3.4)	465 (5.2)	90 (3.6)
Hong Kong SAR	578 (4.1)	91 (3.5)	582 (4.9)	85 (4.1)	575 (5.4)	95 (3.7)
Hungary	517 (2.9)	89 (2.4)	510 (3.2)	87 (2.5)	524 (3.6)	91 (2.8)
Iran, Islamic Rep. of	446 (3.7)	93 (2.7)	453 (5.0)	87 (3.1)	440 (5.6)	97 (4.0)
Ireland	524 (2.6)	73 (1.7)	524 (2.9)	70 (1.7)	523 (3.4)	76 (2.3)
Israel	519 (4.3)	99 (3.0)	514 (4.3)	95 (2.6)	525 (5.3)	103 (4.1)
Italy	497 (2.7)	71 (1.4)	491 (3.0)	70 (1.6)	504 (3.3)	72 (1.8)
Japan	594 (2.7)	84 (2.1)	593 (2.9)	80 (2.5)	595 (3.2)	89 (2.1)
Jordan	420 (4.3)	87 (2.1)	432 (3.8)	81 (1.9)	409 (6.4)	90 (2.9)
Kazakhstan	488 (3.3)	82 (1.8)	490 (3.9)	80 (1.9)	486 (3.7)	84 (2.4)
Korea, Rep. of	607 (2.8)	97 (1.9)	604 (3.4)	94 (2.3)	609 (3.1)	99 (2.3)
Kuwait	403 (5.0)	88 (2.1)	407 (5.4)	82 (2.7)	398 (7.9)	94 (3.0)
Lebanon	429 (2.9)	72 (1.6)	427 (3.5)	73 (2.2)	432 (3.3)	72 (2.0)
Lithuania	520 (2.9)	82 (1.9)	519 (2.8)	80 (2.0)	521 (3.7)	83 (2.4)
Malaysia	461 (3.2)	91 (1.7)	465 (3.0)	88 (2.0)	456 (4.1)	93 (1.8)
Morocco	388 (2.3)	72 (1.4)	386 (2.5)	72 (1.7)	391 (2.6)	71 (1.6)
New Zealand	482 (3.4)	90 (2.2)	478 (3.6)	85 (2.6)	484 (4.7)	93 (2.5)
Norway (9)	503 (2.4)	78 (1.4)	503 (2.7)	76 (1.5)	503 (3.0)	80 (2.1)
Oman	411 (2.8)	99 (1.6)	432 (3.3)	90 (1.5)	391 (4.0)	103 (2.5)
Portugal	500 (3.2)	74 (2.2)	495 (3.3)	73 (2.1)	505 (3.9)	75 (2.9)
Qatar	443 (4.0)	95 (2.7)	447 (5.0)	91 (3.1)	440 (5.4)	99 (3.2)
Romania	479 (4.3)	98 (2.2)	487 (4.6)	95 (2.3)	471 (4.7)	100 (2.6)
Russian Federation	543 (4.5)	81 (2.4)	541 (4.8)	79 (2.8)	546 (4.9)	83 (2.5)
Saudi Arabia	394 (2.5)	78 (1.2)	403 (3.4)	74 (1.5)	385 (3.4)	80 (1.6)
Singapore	616 (4.0)	89 (2.9)	617 (4.6)	83 (3.3)	614 (4.4)	94 (3.2)
South Africa (9)	389 (2.3)	77 (1.4)	393 (2.4)	77 (1.6)	386 (2.5)	77 (1.4)
Sweden	503 (2.5)	77 (1.5)	504 (3.0)	74 (1.9)	501 (2.9)	79 (1.9)
Turkey	496 (4.3)	109 (2.4)	501 (4.4)	106 (2.8)	490 (5.8)	113 (3.5)
United Arab Emirates	473 (1.9)	103 (1.1)	476 (3.4)	97 (1.9)	471 (3.4)	108 (1.7)
United States	515 (4.8)	99 (2.6)	517 (4.0)	95 (2.4)	514 (6.1)	103 (3.5)
Benchmarking Participants						
Ontario, Canada	530 (4.3)	79 (2.7)	528 (4.4)	76 (2.9)	531 (4.8)	81 (3.4)
Quebec, Canada	543 (3.7)	67 (2.4)	541 (4.3)	66 (2.5)	546 (4.0)	67 (2.8)
Moscow City, Russian Fed.	575 (4.2)	83 (2.0)	566 (4.2)	82 (1.9)	584 (4.8)	84 (2.6)
Gauteng, RSA (9)	421 (3.0)	77 (2.0)	423 (3.1)	76 (2.0)	417 (3.5)	77 (2.4)
Western Cape, RSA (9)	441 (4.4)	89 (3.0)	436 (5.1)	86 (3.6)	447 (5.4)	92 (3.6)
Abu Dhabi, UAE	436 (2.9)	104 (1.7)	441 (5.4)	100 (2.4)	431 (4.4)	107 (2.3)
Dubai, UAE	537 (2.0)	92 (1.9)	532 (4.8)	88 (2.8)	541 (5.9)	96 (3.0)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix E.4: Average Science Achievement and Standard Deviations by Gender

Country	Overall		Girls		Boys	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Australia	528 (3.2)	88 (2.0)	529 (3.1)	82 (1.6)	528 (4.6)	94 (3.0)
Bahrain	486 (1.9)	103 (1.7)	512 (2.6)	89 (1.9)	461 (2.8)	109 (2.3)
Chile	462 (2.9)	78 (1.7)	457 (3.6)	76 (2.0)	468 (3.9)	80 (2.2)
Chinese Taipei	574 (1.9)	83 (1.2)	572 (2.4)	80 (1.4)	576 (2.5)	85 (1.7)
Cyprus	484 (1.9)	84 (1.5)	491 (2.4)	78 (1.8)	476 (2.5)	90 (2.0)
Egypt	389 (5.4)	112 (2.4)	402 (6.1)	106 (2.9)	374 (8.2)	117 (3.8)
England	517 (4.8)	92 (3.2)	518 (5.5)	88 (4.1)	515 (6.6)	95 (3.4)
Finland	543 (3.1)	87 (2.0)	552 (3.1)	80 (2.2)	533 (3.9)	92 (2.4)
France	489 (2.7)	77 (1.3)	487 (2.6)	73 (1.7)	490 (3.6)	81 (1.8)
Georgia	447 (3.9)	83 (2.2)	447 (4.4)	80 (2.5)	446 (4.5)	86 (2.9)
Hong Kong SAR	504 (5.2)	95 (3.2)	505 (5.9)	92 (3.6)	503 (6.3)	98 (3.7)
Hungary	530 (2.6)	82 (2.0)	520 (2.9)	81 (2.4)	540 (3.2)	82 (2.1)
Iran, Islamic Rep. of	449 (3.6)	89 (2.2)	459 (4.6)	81 (2.6)	441 (5.4)	94 (3.6)
Ireland	523 (2.9)	83 (1.9)	526 (3.0)	79 (2.0)	521 (3.9)	87 (2.5)
Israel	513 (4.2)	97 (2.7)	512 (4.5)	90 (2.2)	515 (5.0)	103 (4.0)
Italy	500 (2.6)	74 (1.5)	497 (2.8)	72 (1.9)	504 (3.0)	76 (1.8)
Japan	570 (2.1)	72 (1.6)	565 (2.4)	67 (1.7)	575 (2.5)	77 (1.9)
Jordan	452 (4.7)	98 (2.6)	480 (4.0)	85 (2.1)	427 (6.6)	102 (3.4)
Kazakhstan	478 (3.1)	85 (1.8)	483 (3.4)	82 (1.9)	474 (3.6)	87 (2.3)
Korea, Rep. of	561 (2.1)	83 (1.3)	555 (2.9)	79 (1.8)	566 (2.6)	87 (2.0)
Kuwait	444 (5.7)	98 (2.0)	461 (5.7)	87 (2.6)	426 (9.4)	107 (3.0)
Lebanon	377 (4.6)	104 (2.9)	379 (5.3)	105 (3.4)	374 (5.2)	103 (2.9)
Lithuania	534 (3.0)	78 (1.6)	535 (3.0)	75 (1.8)	533 (3.6)	80 (1.9)
Malaysia	460 (3.5)	96 (2.0)	463 (3.5)	93 (2.3)	458 (4.3)	100 (2.1)
Morocco	394 (2.7)	85 (1.7)	395 (2.9)	85 (2.0)	393 (2.9)	86 (1.7)
New Zealand	499 (3.5)	93 (2.2)	497 (3.6)	87 (2.6)	500 (4.9)	97 (2.4)
Norway (9)	495 (3.1)	89 (1.7)	495 (3.5)	84 (1.9)	496 (3.8)	94 (2.1)
Oman	457 (2.9)	105 (2.0)	485 (3.1)	91 (2.0)	431 (4.5)	109 (2.8)
Portugal	519 (2.9)	72 (1.9)	516 (3.2)	71 (2.0)	522 (3.4)	73 (2.7)
Qatar	475 (4.4)	103 (2.2)	488 (5.2)	94 (2.3)	461 (6.0)	109 (2.9)
Romania	470 (4.2)	92 (2.2)	475 (4.3)	88 (2.5)	465 (4.9)	95 (2.6)
Russian Federation	543 (4.2)	75 (2.1)	539 (4.5)	73 (2.6)	546 (4.6)	77 (2.2)
Saudi Arabia	431 (2.6)	89 (1.2)	455 (3.3)	79 (1.5)	408 (3.9)	91 (1.5)
Singapore	608 (3.9)	88 (2.8)	604 (4.5)	82 (3.3)	611 (4.5)	92 (3.0)
South Africa (9)	370 (3.1)	103 (1.5)	376 (3.2)	101 (1.6)	364 (3.6)	104 (1.9)
Sweden	521 (3.2)	95 (2.1)	527 (3.7)	90 (2.7)	516 (3.8)	100 (2.4)
Turkey	515 (3.7)	98 (2.2)	520 (3.8)	94 (2.3)	510 (5.1)	102 (3.2)
United Arab Emirates	473 (2.2)	125 (1.3)	486 (3.9)	115 (2.5)	461 (4.0)	133 (1.9)
United States	522 (4.7)	99 (2.7)	525 (3.9)	94 (2.2)	520 (6.1)	103 (3.8)
Benchmarking Participants						
Ontario, Canada	522 (3.0)	79 (1.8)	520 (3.4)	75 (1.9)	523 (3.5)	82 (2.8)
Quebec, Canada	537 (3.6)	69 (2.2)	537 (4.1)	69 (2.4)	536 (4.0)	70 (2.7)
Moscow City, Russian Fed.	567 (2.9)	69 (1.3)	561 (3.2)	68 (1.6)	572 (3.3)	69 (1.6)
Gauteng, RSA (9)	422 (3.9)	98 (2.3)	427 (4.1)	96 (2.4)	416 (4.3)	101 (2.6)
Western Cape, RSA (9)	439 (5.1)	111 (3.4)	434 (6.1)	107 (4.1)	445 (6.2)	115 (4.0)
Abu Dhabi, UAE	420 (3.6)	135 (2.2)	436 (6.9)	127 (3.5)	406 (5.8)	140 (2.6)
Dubai, UAE	548 (2.0)	102 (2.0)	551 (5.5)	95 (2.9)	544 (6.6)	108 (3.5)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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APPENDIX F

Average Percent Correct in the Content and Cognitive Domains

Appendix F.1: Average Percent Correct in the Mathematics Content and Cognitive Domains

eTIMSS

Country	Overall Mathematics	Mathematics Content Domains			Mathematics Cognitive Domains		
		Number	Measurement and Geometry	Data	Knowing	Applying	Reasoning
Austria	50 (0.6)	52 (0.6)	48 (0.6)	50 (0.8)	58 (0.5)	49 (0.7)	42 (0.6)
Canada	43 (0.5)	42 (0.5)	42 (0.5)	48 (0.6)	50 (0.5)	42 (0.5)	37 (0.5)
Chile	27 (0.5)	27 (0.5)	27 (0.5)	29 (0.6)	32 (0.5)	26 (0.5)	24 (0.4)
Chinese Taipei	67 (0.4)	69 (0.5)	65 (0.5)	66 (0.6)	78 (0.4)	67 (0.5)	53 (0.5)
Croatia	43 (0.5)	44 (0.5)	42 (0.6)	41 (0.7)	51 (0.6)	41 (0.6)	36 (0.6)
Czech Republic	49 (0.6)	51 (0.7)	49 (0.6)	47 (0.7)	56 (0.6)	48 (0.7)	44 (0.7)
Denmark	47 (0.5)	46 (0.6)	47 (0.5)	49 (0.6)	54 (0.5)	45 (0.6)	41 (0.5)
England	55 (0.8)	57 (0.9)	50 (0.8)	60 (0.7)	63 (0.7)	54 (0.8)	47 (0.9)
Finland	49 (0.5)	48 (0.5)	48 (0.6)	52 (0.7)	56 (0.6)	48 (0.6)	42 (0.5)
France	37 (0.7)	37 (0.8)	39 (0.7)	38 (0.8)	46 (0.8)	35 (0.7)	30 (0.7)
Georgia	36 (0.8)	41 (0.8)	32 (0.7)	31 (0.9)	42 (0.9)	36 (0.8)	29 (0.8)
Germany	46 (0.6)	45 (0.6)	46 (0.6)	46 (0.8)	54 (0.6)	42 (0.6)	41 (0.7)
Hong Kong SAR	67 (0.8)	67 (0.9)	66 (0.9)	69 (0.8)	73 (0.7)	69 (0.9)	58 (1.1)
Hungary	47 (0.7)	50 (0.7)	44 (0.7)	45 (0.8)	56 (0.7)	45 (0.7)	40 (0.7)
Italy	44 (0.7)	47 (0.7)	40 (0.7)	42 (0.8)	53 (0.7)	43 (0.8)	33 (0.6)
Korea, Rep. of	67 (0.6)	67 (0.6)	66 (0.6)	70 (0.6)	75 (0.5)	66 (0.6)	59 (0.7)
Lithuania	51 (0.7)	51 (0.8)	49 (0.7)	55 (0.7)	58 (0.7)	52 (0.8)	42 (0.7)
Malta	43 (0.3)	44 (0.4)	38 (0.4)	46 (0.6)	51 (0.3)	41 (0.4)	35 (0.4)
Netherlands	50 (0.6)	49 (0.6)	47 (0.6)	56 (0.8)	56 (0.5)	48 (0.7)	44 (0.6)
Norway (5)	52 (0.6)	52 (0.6)	50 (0.6)	55 (0.8)	58 (0.5)	50 (0.7)	46 (0.6)
Portugal	47 (0.7)	48 (0.8)	44 (0.7)	49 (0.7)	55 (0.7)	47 (0.7)	38 (0.7)
Qatar	31 (0.7)	33 (0.8)	27 (0.7)	31 (0.9)	38 (0.8)	29 (0.8)	23 (0.6)
Russian Federation	58 (0.9)	60 (0.9)	56 (1.0)	58 (0.9)	62 (0.8)	59 (1.0)	52 (1.0)
Singapore	73 (0.9)	76 (0.9)	68 (1.0)	72 (0.9)	80 (0.8)	73 (1.0)	63 (1.1)
Slovak Republic	43 (0.8)	44 (0.8)	40 (0.8)	45 (0.9)	49 (0.8)	41 (0.9)	39 (0.8)
Spain	41 (0.4)	42 (0.5)	37 (0.5)	43 (0.5)	49 (0.4)	40 (0.5)	33 (0.5)
Sweden	46 (0.7)	45 (0.8)	44 (0.7)	50 (0.9)	52 (0.8)	44 (0.8)	42 (0.7)
Turkey (5)	48 (1.0)	50 (1.1)	46 (0.9)	47 (1.1)	54 (1.0)	49 (1.1)	38 (1.0)
United Arab Emirates	38 (0.3)	40 (0.4)	35 (0.3)	38 (0.3)	45 (0.4)	37 (0.4)	30 (0.3)
United States	50 (0.7)	52 (0.7)	44 (0.6)	52 (0.7)	58 (0.7)	49 (0.7)	40 (0.6)
International Average	**48 (0.1)**	**49 (0.1)**	**46 (0.1)**	**49 (0.1)**	**55 (0.1)**	**47 (0.1)**	**41 (0.1)**
Benchmarking Participants							
Ontario, Canada	44 (0.9)	41 (0.8)	43 (1.0)	49 (1.0)	49 (0.9)	43 (1.0)	38 (0.8)
Quebec, Canada	49 (0.6)	49 (0.6)	47 (0.6)	52 (0.8)	57 (0.5)	48 (0.7)	38 (0.6)
Moscow City, Russian Fed.	66 (0.6)	67 (0.7)	61 (0.7)	70 (0.7)	68 (0.5)	68 (0.7)	60 (0.8)
Madrid, Spain	45 (0.6)	47 (0.7)	40 (0.6)	46 (0.6)	53 (0.6)	43 (0.6)	36 (0.6)
Abu Dhabi, UAE	30 (0.4)	31 (0.4)	28 (0.4)	30 (0.4)	37 (0.4)	28 (0.4)	23 (0.4)
Dubai, UAE	52 (0.4)	54 (0.4)	48 (0.4)	55 (0.5)	59 (0.5)	52 (0.4)	43 (0.5)

paperTIMSS

Country	Overall Mathematics	Mathematics Content Domains			Mathematics Cognitive Domains		
		Number	Measurement and Geometry	Data	Knowing	Applying	Reasoning
Armenia	42 (0.7)	48 (0.6)	38 (0.7)	32 (0.9)	49 (0.7)	42 (0.8)	31 (0.6)
Australia	48 (0.7)	46 (0.7)	46 (0.7)	54 (0.8)	53 (0.7)	47 (0.7)	42 (0.7)
Azerbaijan	48 (0.7)	51 (0.7)	42 (0.8)	47 (0.8)	54 (0.7)	48 (0.8)	38 (0.7)
Bahrain	39 (0.6)	39 (0.6)	36 (0.6)	41 (0.7)	46 (0.5)	37 (0.7)	31 (0.6)
Belgium (Flemish)	52 (0.5)	51 (0.6)	53 (0.6)	52 (0.6)	62 (0.5)	49 (0.6)	42 (0.6)
Bulgaria	48 (1.0)	50 (1.0)	46 (1.0)	44 (1.2)	54 (1.0)	48 (1.2)	39 (1.0)
Cyprus	51 (0.7)	54 (0.8)	48 (0.7)	51 (0.9)	58 (0.8)	52 (0.8)	42 (0.8)
Iran, Islamic Rep. of	31 (0.7)	33 (0.7)	31 (0.7)	29 (0.7)	38 (0.7)	31 (0.7)	22 (0.6)
Ireland	56 (0.7)	58 (0.7)	51 (0.7)	56 (0.8)	63 (0.7)	56 (0.7)	46 (0.7)
Japan	68 (0.4)	67 (0.4)	66 (0.6)	73 (0.5)	74 (0.4)	68 (0.5)	59 (0.6)
Kazakhstan	45 (0.7)	50 (0.7)	43 (0.7)	40 (0.7)	52 (0.6)	45 (0.8)	37 (0.7)
Latvia	55 (0.7)	57 (0.8)	52 (0.8)	56 (0.8)	60 (0.7)	55 (0.8)	49 (0.8)
New Zealand	40 (0.6)	39 (0.6)	37 (0.5)	46 (0.7)	45 (0.6)	39 (0.6)	36 (0.6)
Northern Ireland	60 (0.7)	63 (0.8)	55 (0.7)	61 (0.6)	68 (0.7)	60 (0.7)	51 (0.7)
Oman	30 (0.8)	30 (0.9)	30 (0.8)	31 (0.8)	36 (0.9)	29 (0.9)	24 (0.8)
Poland	48 (0.7)	47 (0.7)	48 (0.7)	51 (0.8)	52 (0.7)	48 (0.8)	42 (0.7)
Serbia	45 (0.7)	49 (0.7)	41 (0.8)	43 (1.0)	51 (0.8)	45 (0.8)	38 (0.8)
International Average	**47 (0.2)**	**49 (0.2)**	**45 (0.2)**	**48 (0.2)**	**54 (0.2)**	**47 (0.2)**	**39 (0.2)**

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix F.1: Average Percent Correct in the Mathematics Content and Cognitive Domains

paperTIMSS Less Difficult

(Continued)

Country	Overall Mathematics	Mathematics Content Domains			Mathematics Cognitive Domains		
		Number	Measurement and Geometry	Data	Knowing	Applying	Reasoning
Albania	61 (0.8)	62 (0.9)	58 (0.7)	60 (0.8)	69 (0.8)	59 (0.8)	45 (0.8)
Bosnia and Herzegovina	49 (0.6)	51 (0.6)	49 (0.6)	43 (0.7)	57 (0.5)	45 (0.6)	38 (0.7)
Kosovo	49 (0.7)	50 (0.7)	48 (0.6)	46 (0.8)	59 (0.7)	46 (0.8)	33 (0.7)
Kuwait	39 (0.9)	39 (0.9)	37 (0.9)	40 (1.0)	48 (1.0)	35 (0.9)	25 (0.9)
Montenegro	50 (0.4)	50 (0.4)	50 (0.4)	49 (0.5)	57 (0.4)	47 (0.4)	39 (0.5)
Morocco	38 (0.8)	38 (0.8)	38 (0.8)	38 (1.0)	47 (0.8)	35 (0.9)	25 (0.9)
North Macedonia	55 (1.1)	56 (1.1)	54 (1.0)	55 (1.2)	64 (1.0)	53 (1.2)	41 (1.1)
Ψ Pakistan	28 (1.9)	31 (2.0)	25 (1.7)	23 (2.0)	37 (2.3)	23 (1.8)	18 (1.3)
Ψ Philippines	25 (0.8)	26 (0.8)	22 (0.7)	26 (1.0)	33 (1.0)	22 (0.8)	14 (0.5)
Saudi Arabia	41 (0.7)	41 (0.7)	40 (0.6)	42 (0.7)	50 (0.7)	37 (0.7)	29 (0.6)
South Africa (5)	36 (0.6)	35 (0.6)	34 (0.7)	40 (0.7)	45 (0.7)	33 (0.7)	23 (0.6)
International Average	**43 (0.3)**	**44 (0.3)**	**41 (0.3)**	**42 (0.3)**	**51 (0.3)**	**40 (0.3)**	**30 (0.2)**

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix F.2: Average Percent Correct in the Science Content and Cognitive Domains

eTIMSS

Country	Overall Science	Science Content Domains			Science Cognitive Domains		
		Life Science	Physical Science	Earth Science	Knowing	Applying	Reasoning
Austria	51 (0.5)	50 (0.5)	54 (0.5)	50 (0.6)	54 (0.5)	52 (0.5)	44 (0.5)
Canada	52 (0.3)	52 (0.3)	52 (0.4)	49 (0.4)	55 (0.3)	51 (0.4)	44 (0.4)
Chile	40 (0.5)	41 (0.5)	40 (0.5)	38 (0.6)	44 (0.5)	39 (0.5)	34 (0.5)
Chinese Taipei	60 (0.3)	54 (0.3)	66 (0.4)	60 (0.4)	62 (0.3)	62 (0.4)	52 (0.5)
Croatia	51 (0.4)	49 (0.4)	55 (0.5)	49 (0.5)	56 (0.5)	51 (0.5)	44 (0.6)
Czech Republic	54 (0.4)	54 (0.5)	55 (0.4)	53 (0.5)	58 (0.4)	53 (0.5)	48 (0.5)
Denmark	51 (0.4)	51 (0.5)	51 (0.5)	53 (0.6)	54 (0.4)	51 (0.5)	45 (0.6)
England	55 (0.5)	53 (0.6)	57 (0.6)	53 (0.6)	59 (0.5)	53 (0.6)	49 (0.7)
Finland	59 (0.5)	58 (0.5)	60 (0.6)	59 (0.6)	61 (0.5)	59 (0.5)	54 (0.6)
France	45 (0.6)	45 (0.6)	45 (0.6)	44 (0.7)	48 (0.7)	47 (0.6)	35 (0.6)
Georgia	38 (0.6)	37 (0.6)	40 (0.7)	35 (0.7)	42 (0.7)	37 (0.6)	31 (0.6)
Germany	51 (0.5)	51 (0.5)	53 (0.6)	47 (0.6)	54 (0.5)	51 (0.5)	44 (0.6)
Hong Kong SAR	54 (0.6)	51 (0.7)	56 (0.7)	56 (0.8)	58 (0.6)	53 (0.7)	47 (0.7)
Hungary	53 (0.5)	53 (0.5)	54 (0.6)	52 (0.7)	57 (0.6)	53 (0.6)	47 (0.6)
Italy	49 (0.6)	49 (0.6)	49 (0.6)	47 (0.7)	53 (0.6)	48 (0.6)	40 (0.6)
Korea, Rep. of	66 (0.4)	62 (0.5)	73 (0.4)	64 (0.6)	67 (0.4)	69 (0.6)	60 (0.5)
Lithuania	55 (0.5)	53 (0.5)	60 (0.6)	51 (0.7)	58 (0.5)	54 (0.6)	50 (0.6)
Malta	47 (0.3)	46 (0.4)	48 (0.3)	44 (0.4)	51 (0.4)	47 (0.3)	38 (0.4)
Netherlands	50 (0.6)	49 (0.6)	52 (0.6)	49 (0.7)	52 (0.6)	51 (0.6)	44 (0.7)
Norway (5)	55 (0.5)	56 (0.5)	55 (0.6)	56 (0.6)	59 (0.5)	55 (0.5)	48 (0.6)
Portugal	47 (0.4)	47 (0.4)	48 (0.5)	46 (0.5)	50 (0.4)	47 (0.5)	40 (0.5)
Qatar	39 (0.7)	38 (0.7)	41 (0.7)	38 (0.8)	44 (0.7)	39 (0.7)	30 (0.7)
Russian Federation	62 (0.7)	61 (0.7)	66 (0.7)	57 (0.8)	63 (0.8)	65 (0.7)	55 (0.6)
Singapore	68 (0.7)	68 (0.7)	73 (0.7)	59 (0.8)	69 (0.7)	70 (0.8)	65 (0.8)
Slovak Republic	52 (0.7)	50 (0.7)	55 (0.7)	49 (0.7)	56 (0.7)	52 (0.7)	44 (0.7)
Spain	49 (0.4)	48 (0.3)	50 (0.5)	48 (0.5)	53 (0.4)	49 (0.5)	40 (0.5)
Sweden	55 (0.7)	55 (0.7)	55 (0.7)	56 (0.8)	59 (0.7)	55 (0.7)	49 (0.7)
Turkey (5)	54 (0.8)	51 (0.9)	59 (0.9)	51 (0.9)	58 (0.9)	54 (0.9)	45 (0.8)
United Arab Emirates	44 (0.3)	42 (0.4)	47 (0.4)	43 (0.3)	49 (0.3)	44 (0.4)	35 (0.4)
United States	55 (0.5)	56 (0.5)	55 (0.6)	54 (0.6)	59 (0.5)	55 (0.6)	48 (0.6)
International Average	**52 (0.1)**	**51 (0.1)**	**54 (0.1)**	**50 (0.1)**	**55 (0.1)**	**52 (0.1)**	**45 (0.1)**
Benchmarking Participants							
Ontario, Canada	52 (0.6)	53 (0.6)	52 (0.7)	49 (0.8)	55 (0.6)	51 (0.7)	45 (0.7)
Quebec, Canada	51 (0.5)	52 (0.5)	52 (0.6)	49 (0.7)	55 (0.5)	51 (0.6)	44 (0.6)
Moscow City, Russian Fed.	68 (0.5)	66 (0.5)	71 (0.6)	65 (0.6)	69 (0.5)	71 (0.5)	61 (0.6)
Madrid, Spain	51 (0.4)	50 (0.5)	53 (0.5)	51 (0.5)	55 (0.6)	52 (0.5)	44 (0.5)
Abu Dhabi, UAE	35 (0.4)	33 (0.4)	38 (0.4)	35 (0.4)	39 (0.4)	35 (0.4)	27 (0.3)
Dubai, UAE	57 (0.3)	55 (0.3)	62 (0.4)	55 (0.3)	63 (0.3)	57 (0.3)	47 (0.4)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix F.2: Average Percent Correct in the Science Content and Cognitive Domains

paperTIMSS

(Continued)

Country	Overall Science	Science Content Domains			Science Cognitive Domains		
		Life Science	Physical Science	Earth Science	Knowing	Applying	Reasoning
Albania	47 (0.7)	45 (0.6)	50 (0.7)	44 (0.9)	51 (0.7)	46 (0.7)	39 (0.8)
Armenia	41 (0.6)	42 (0.6)	41 (0.7)	38 (0.7)	45 (0.6)	39 (0.6)	38 (0.7)
Australia	55 (0.5)	55 (0.6)	56 (0.6)	54 (0.6)	59 (0.6)	54 (0.6)	50 (0.6)
Azerbaijan	36 (0.5)	34 (0.5)	39 (0.6)	35 (0.5)	39 (0.5)	35 (0.6)	31 (0.5)
Bahrain	48 (0.6)	47 (0.6)	51 (0.6)	44 (0.6)	52 (0.6)	48 (0.7)	38 (0.7)
Belgium (Flemish)	48 (0.4)	46 (0.4)	51 (0.5)	46 (0.5)	49 (0.5)	48 (0.5)	44 (0.5)
Bosnia and Herzegovina	40 (0.5)	41 (0.5)	41 (0.6)	35 (0.6)	42 (0.5)	40 (0.6)	34 (0.6)
Bulgaria	54 (1.0)	54 (1.0)	56 (1.1)	51 (0.9)	58 (0.9)	55 (1.0)	45 (1.0)
Cyprus	50 (0.6)	50 (0.7)	53 (0.7)	47 (0.6)	52 (0.7)	53 (0.6)	43 (0.7)
Iran, Islamic Rep. of	38 (0.7)	35 (0.7)	44 (0.8)	36 (0.7)	42 (0.7)	38 (0.7)	31 (0.6)
Ireland	54 (0.7)	53 (0.7)	55 (0.6)	55 (0.8)	58 (0.7)	54 (0.7)	47 (0.7)
Japan	61 (0.4)	57 (0.4)	68 (0.4)	60 (0.5)	58 (0.4)	66 (0.4)	60 (0.5)
Kazakhstan	47 (0.6)	44 (0.6)	52 (0.7)	44 (0.8)	49 (0.6)	47 (0.7)	41 (0.7)
Kosovo	33 (0.5)	31 (0.6)	36 (0.6)	32 (0.5)	39 (0.6)	31 (0.5)	26 (0.5)
Kuwait	33 (0.9)	32 (0.9)	35 (0.9)	32 (1.0)	38 (1.0)	32 (0.9)	25 (0.8)
Latvia	57 (0.5)	54 (0.5)	62 (0.6)	55 (0.8)	59 (0.5)	58 (0.6)	52 (0.7)
Montenegro	39 (0.4)	40 (0.4)	40 (0.4)	34 (0.5)	42 (0.3)	40 (0.5)	32 (0.4)
Ψ Morocco	30 (0.8)	29 (0.7)	32 (0.9)	29 (0.9)	33 (0.8)	30 (0.9)	24 (0.7)
New Zealand	49 (0.4)	49 (0.5)	49 (0.5)	48 (0.5)	52 (0.4)	48 (0.5)	43 (0.5)
North Macedonia	36 (1.0)	34 (0.9)	40 (1.2)	33 (1.0)	39 (1.0)	35 (1.0)	30 (0.9)
Northern Ireland	52 (0.4)	51 (0.5)	53 (0.5)	52 (0.5)	56 (0.4)	51 (0.5)	45 (0.6)
Oman	39 (0.7)	38 (0.7)	42 (0.8)	36 (0.7)	42 (0.7)	38 (0.8)	33 (0.7)
Ж Pakistan	21 (1.1)	20 (1.1)	23 (1.4)	22 (0.7)	24 (1.2)	21 (1.2)	18 (0.9)
Ж Philippines	20 (0.5)	18 (0.5)	21 (0.6)	21 (0.5)	22 (0.6)	20 (0.5)	16 (0.4)
Poland	55 (0.5)	54 (0.5)	56 (0.6)	53 (0.6)	56 (0.5)	58 (0.5)	47 (0.7)
Saudi Arabia	34 (0.5)	32 (0.5)	37 (0.6)	32 (0.5)	39 (0.6)	33 (0.5)	25 (0.5)
Serbia	52 (0.7)	52 (0.7)	56 (0.8)	45 (0.8)	53 (0.6)	55 (0.8)	45 (0.7)
Ж South Africa (5)	25 (0.6)	24 (0.6)	26 (0.6)	26 (0.5)	27 (0.7)	25 (0.6)	21 (0.5)
International Average	**43 (0.1)**	**41 (0.1)**	**45 (0.1)**	**41 (0.1)**	**46 (0.1)**	**43 (0.1)**	**37 (0.1)**

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix F.3: Average Percent Correct in the Mathematics Content and Cognitive Domains

eTIMSS

Country	Overall Mathematics	Mathematics Content Domains				Mathematics Cognitive Domains		
		Number	Algebra	Geometry	Data and Probability	Knowing	Applying	Reasoning
Ψ Chile	25 (0.5)	28 (0.6)	23 (0.5)	21 (0.5)	27 (0.6)	31 (0.6)	24 (0.5)	18 (0.5)
Chinese Taipei	66 (0.6)	70 (0.6)	66 (0.6)	64 (0.6)	64 (0.6)	72 (0.5)	66 (0.6)	60 (0.6)
England	42 (1.3)	46 (1.3)	37 (1.3)	36 (1.2)	48 (1.4)	47 (1.2)	43 (1.3)	32 (1.3)
Finland	39 (0.6)	45 (0.7)	33 (0.6)	36 (0.6)	45 (0.7)	45 (0.6)	40 (0.6)	30 (0.6)
France	33 (0.5)	35 (0.6)	27 (0.6)	31 (0.6)	40 (0.6)	38 (0.6)	33 (0.5)	24 (0.5)
Georgia	30 (0.9)	35 (1.1)	31 (1.0)	24 (0.8)	28 (0.8)	37 (1.0)	29 (0.9)	21 (0.9)
Hong Kong SAR	58 (1.0)	61 (0.9)	58 (0.9)	57 (1.0)	56 (1.2)	65 (0.9)	58 (1.0)	50 (1.0)
Hungary	42 (0.7)	46 (0.8)	38 (0.7)	39 (0.8)	47 (0.7)	49 (0.8)	43 (0.7)	32 (0.7)
Israel	44 (1.1)	47 (1.1)	45 (1.2)	36 (1.0)	45 (1.1)	51 (1.1)	44 (1.1)	36 (1.1)
Italy	37 (0.6)	40 (0.7)	32 (0.6)	35 (0.7)	39 (0.7)	43 (0.7)	36 (0.6)	29 (0.5)
Korea, Rep. of	65 (0.6)	68 (0.6)	63 (0.7)	62 (0.6)	65 (0.6)	72 (0.6)	65 (0.6)	57 (0.7)
Lithuania	43 (0.7)	45 (0.8)	40 (0.8)	40 (0.7)	46 (0.8)	49 (0.7)	44 (0.8)	32 (0.7)
Malaysia	30 (0.6)	33 (0.6)	28 (0.6)	28 (0.5)	33 (0.6)	36 (0.6)	31 (0.6)	22 (0.5)
Norway (9)	38 (0.5)	43 (0.6)	31 (0.6)	33 (0.5)	46 (0.8)	44 (0.5)	39 (0.6)	28 (0.5)
Portugal	37 (0.7)	40 (0.7)	35 (0.8)	34 (0.7)	40 (0.8)	45 (0.8)	37 (0.7)	29 (0.6)
Ψ Qatar	28 (0.8)	30 (0.9)	28 (0.8)	22 (0.8)	28 (1.0)	35 (1.0)	27 (0.9)	20 (0.8)
Russian Federation	49 (1.2)	53 (1.2)	51 (1.3)	43 (1.3)	45 (1.1)	57 (1.3)	49 (1.2)	36 (1.2)
Singapore	68 (1.1)	71 (1.1)	67 (1.2)	63 (1.1)	70 (1.0)	73 (1.0)	68 (1.1)	61 (1.2)
Sweden	38 (0.6)	42 (0.6)	34 (0.6)	32 (0.6)	46 (0.8)	43 (0.6)	38 (0.7)	32 (0.7)
Turkey	39 (0.9)	41 (1.0)	38 (1.0)	33 (0.8)	43 (0.9)	47 (1.0)	37 (0.9)	31 (0.9)
United Arab Emirates	34 (0.4)	37 (0.4)	35 (0.5)	28 (0.4)	34 (0.3)	42 (0.4)	33 (0.4)	26 (0.4)
United States	43 (1.1)	47 (1.1)	44 (1.2)	35 (0.9)	45 (1.1)	52 (1.1)	43 (1.1)	32 (1.0)
International Average	**42 (0.2)**	**46 (0.2)**	**40 (0.2)**	**38 (0.2)**	**45 (0.2)**	**49 (0.2)**	**42 (0.2)**	**33 (0.2)**
Benchmarking Participants								
Ontario, Canada	45 (1.2)	49 (1.2)	38 (1.3)	42 (1.1)	52 (1.3)	49 (1.1)	45 (1.3)	38 1.1
Quebec, Canada	48 (1.0)	53 (1.1)	42 (1.0)	44 (1.1)	54 (1.0)	56 (0.9)	49 (1.1)	37 (1.1)
Moscow City, Russian Fed.	57 (1.1)	61 (1.1)	60 (1.2)	49 (1.1)	58 (1.0)	67 (1.0)	57 (1.2)	45 (1.2)
Ψ Abu Dhabi, UAE	27 (0.5)	30 (0.5)	28 (0.6)	22 (0.5)	27 (0.5)	35 (0.6)	26 (0.5)	20 (0.4)
Dubai, UAE	48 (0.5)	52 (0.6)	49 (0.6)	41 (0.5)	49 (0.5)	56 (0.6)	47 (0.5)	39 (0.5)

paperTIMSS

Country	Overall Mathematics	Mathematics Content Domains				Mathematics Cognitive Domains		
		Number	Algebra	Geometry	Data and Probability	Knowing	Applying	Reasoning
Australia	45 (1.0)	50 (1.0)	40 (1.1)	39 (1.0)	53 (0.9)	51 (1.0)	46 (1.0)	36 (1.1)
Bahrain	38 (0.4)	40 (0.5)	38 (0.4)	36 (0.5)	38 (0.4)	44 (0.5)	38 (0.4)	32 (0.5)
Cyprus	41 (0.4)	45 (0.5)	44 (0.5)	33 (0.5)	42 (0.5)	52 (0.5)	39 (0.4)	32 (0.4)
Ψ Egypt	25 (0.9)	29 (1.0)	26 (1.0)	21 (0.8)	22 (0.8)	34 (1.0)	23 (0.8)	18 (0.8)
Iran, Islamic Rep. of	30 (0.8)	33 (0.9)	30 (0.8)	26 (0.8)	31 (0.8)	38 (0.9)	29 (0.8)	24 (0.8)
Ireland	47 (0.7)	56 (0.7)	40 (0.7)	36 (0.6)	55 (0.8)	56 (0.7)	47 (0.7)	33 (0.7)
Japan	65 (0.6)	64 (0.7)	65 (0.6)	64 (0.7)	69 (0.5)	69 (0.6)	67 (0.6)	58 (0.7)
Ψ Jordan	25 (0.7)	26 (0.8)	29 (1.0)	20 (0.6)	24 (0.6)	33 (1.0)	23 (0.7)	19 (0.6)
Kazakhstan	38 (0.9)	41 (0.9)	42 (1.1)	32 (0.8)	36 (0.7)	47 (1.0)	37 (0.9)	29 (0.8)
Ψ Kuwait	23 (0.8)	26 (0.9)	22 (0.8)	19 (0.8)	23 (0.8)	30 (1.0)	21 (0.8)	16 (0.7)
Lebanon	26 (0.5)	30 (0.6)	29 (0.6)	20 (0.5)	20 (0.6)	40 (0.6)	22 (0.5)	15 (0.5)
Ψ Morocco	19 (0.4)	21 (0.4)	18 (0.5)	19 (0.4)	18 (0.3)	26 (0.5)	18 (0.3)	12 (0.4)
New Zealand	37 (0.7)	41 (0.8)	32 (0.7)	31 (0.6)	44 (0.8)	41 (0.7)	38 (0.7)	29 (0.6)
Ψ Oman	25 (0.4)	25 (0.4)	27 (0.5)	22 (0.4)	24 (0.5)	32 (0.5)	23 (0.4)	18 (0.4)
Romania	37 (1.0)	41 (1.1)	40 (1.1)	31 (1.0)	35 (0.9)	47 (1.1)	35 (1.0)	29 (1.0)
Ψ Saudi Arabia	21 (0.3)	22 (0.3)	21 (0.4)	16 (0.3)	24 (0.3)	27 (0.3)	20 (0.3)	14 (0.3)
Ж South Africa (9)	19 (0.3)	22 (0.3)	21 (0.4)	15 (0.2)	19 (0.3)	26 (0.4)	18 (0.3)	13 (0.2)
International Average	**33 (0.2)**	**36 (0.2)**	**33 (0.2)**	**28 (0.2)**	**34 (0.2)**	**41 (0.2)**	**32 (0.2)**	**25 (0.2)**
Benchmarking Participants								
Ψ Gauteng, RSA (9)	24 (0.6)	27 (0.6)	25 (0.6)	18 (0.5)	23 (0.6)	31 (0.7)	23 (0.6)	17 (0.5)
Ψ Western Cape, RSA (9)	28 (1.0)	32 (1.1)	30 (1.1)	22 (0.9)	28 (1.0)	36 (1.1)	28 (1.0)	21 (0.9)

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix F.4: Average Percent Correct in the Science Content and Cognitive Domains

eTIMSS

Country	Overall Science	Science Content Domains				Science Cognitive Domains		
		Biology	Chemistry	Physics	Earth Science	Knowing	Applying	Reasoning
Chile	36 (0.5)	40 (0.6)	30 (0.5)	33 (0.5)	38 (0.6)	39 (0.5)	37 (0.5)	31 (0.6)
Chinese Taipei	59 (0.4)	62 (0.4)	60 (0.5)	54 (0.5)	60 (0.5)	67 (0.4)	57 (0.5)	52 (0.5)
England	47 (0.9)	49 (0.9)	43 (1.0)	45 (1.0)	48 (1.0)	50 (1.0)	47 (0.9)	42 (1.1)
Finland	52 (0.6)	53 (0.7)	50 (0.7)	51 (0.7)	56 (0.6)	55 (0.6)	51 (0.6)	50 (0.7)
France	40 (0.5)	43 (0.5)	32 (0.6)	40 (0.5)	45 (0.6)	42 (0.5)	40 (0.5)	39 (0.6)
Georgia	33 (0.6)	35 (0.7)	32 (0.7)	32 (0.6)	32 (0.6)	39 (0.6)	32 (0.6)	27 (0.7)
Hong Kong SAR	45 (1.0)	45 (1.1)	39 (1.0)	46 (1.0)	48 (0.9)	47 (1.1)	45 (0.9)	41 (1.0)
Hungary	49 (0.5)	52 (0.6)	46 (0.6)	48 (0.6)	51 (0.6)	54 (0.5)	49 (0.5)	44 (0.6)
Israel	46 (0.8)	48 (0.8)	45 (0.9)	47 (0.9)	44 (0.9)	50 (0.9)	46 (0.9)	43 (0.9)
Italy	43 (0.5)	47 (0.6)	37 (0.6)	39 (0.6)	47 (0.7)	47 (0.5)	43 (0.6)	37 (0.6)
Korea, Rep. of	55 (0.5)	57 (0.5)	49 (0.5)	56 (0.5)	56 (0.5)	57 (0.5)	55 (0.5)	53 (0.5)
Lithuania	50 (0.6)	52 (0.6)	45 (0.7)	48 (0.7)	51 (0.7)	52 (0.6)	49 (0.6)	48 (0.8)
Malaysia	37 (0.5)	39 (0.6)	30 (0.5)	38 (0.6)	38 (0.6)	38 (0.5)	39 (0.5)	32 (0.5)
Norway (9)	43 (0.5)	43 (0.5)	39 (0.6)	41 (0.6)	48 (0.6)	46 (0.5)	43 (0.6)	38 (0.6)
Portugal	47 (0.6)	51 (0.7)	42 (0.7)	41 (0.6)	51 (0.6)	50 (0.6)	46 (0.6)	42 (0.7)
Qatar	40 (0.8)	42 (0.9)	37 (0.8)	38 (0.8)	40 (0.9)	45 (0.8)	39 (0.8)	33 (0.9)
Russian Federation	52 (0.9)	54 (1.0)	49 (0.9)	50 (1.0)	51 (0.9)	55 (0.9)	52 (0.9)	47 (0.8)
Singapore	66 (0.8)	71 (0.8)	64 (1.0)	67 (0.9)	56 (0.7)	70 (0.8)	66 (0.8)	61 (0.9)
Sweden	48 (0.6)	50 (0.7)	43 (0.7)	47 (0.7)	50 (0.7)	51 (0.6)	48 (0.6)	44 (0.7)
Turkey	47 (0.7)	48 (0.7)	45 (0.9)	46 (0.8)	46 (0.7)	49 (0.8)	46 (0.7)	44 (0.8)
United Arab Emirates	41 (0.4)	43 (0.4)	39 (0.4)	39 (0.4)	41 (0.3)	46 (0.4)	40 (0.4)	35 (0.3)
United States	48 (0.9)	52 (0.9)	42 (0.8)	46 (0.9)	51 (0.9)	50 (0.9)	49 (0.9)	46 (0.9)
International Average	**47 (0.1)**	**49 (0.2)**	**43 (0.2)**	**45 (0.2)**	**48 (0.2)**	**50 (0.1)**	**46 (0.1)**	**42 (0.2)**
Benchmarking Participants								
Ontario, Canada	47 (0.6)	52 (0.6)	38 (0.7)	46 (0.7)	48 (0.6)	47 (0.5)	48 (0.6)	46 (0.7)
Quebec, Canada	50 (0.8)	51 (0.8)	48 (0.8)	46 (0.8)	55 (0.8)	51 (0.7)	51 (0.8)	48 (1.0)
Moscow City, Russian Fed.	57 (0.6)	59 (0.7)	51 (0.6)	57 (0.7)	57 (0.7)	60 (0.6)	56 (0.7)	53 (0.8)
Abu Dhabi, UAE	34 (0.5)	35 (0.6)	31 (0.5)	32 (0.5)	35 (0.5)	38 (0.5)	33 (0.5)	28 (0.5)
Dubai, UAE	54 (0.4)	57 (0.3)	52 (0.4)	51 (0.5)	53 (0.5)	59 (0.4)	53 (0.4)	49 (0.4)

paperTIMSS

Country	Overall Science	Science Content Domains				Science Cognitive Domains		
		Biology	Chemistry	Physics	Earth Science	Knowing	Applying	Reasoning
Australia	50 (0.7)	52 (0.7)	44 (0.7)	49 (0.7)	52 (0.6)	50 (0.6)	51 (0.7)	48 (0.7)
Bahrain	43 (0.3)	46 (0.4)	39 (0.4)	41 (0.4)	42 (0.4)	48 (0.4)	41 (0.3)	38 (0.4)
Cyprus	41 (0.4)	44 (0.5)	37 (0.4)	40 (0.4)	40 (0.5)	44 (0.4)	40 (0.4)	38 (0.4)
Egypt	28 (0.7)	28 (0.7)	28 (0.7)	28 (0.6)	28 (0.6)	33 (0.8)	27 (0.7)	22 (0.6)
Iran, Islamic Rep. of	35 (0.6)	36 (0.6)	34 (0.8)	36 (0.6)	35 (0.6)	40 (0.6)	36 (0.6)	29 (0.6)
Ireland	49 (0.5)	51 (0.6)	44 (0.7)	47 (0.6)	52 (0.5)	50 (0.5)	49 (0.6)	48 (0.6)
Japan	59 (0.5)	62 (0.5)	52 (0.5)	58 (0.6)	59 (0.5)	59 (0.5)	60 (0.5)	56 (0.5)
Jordan	37 (0.7)	40 (0.9)	35 (0.8)	35 (0.7)	34 (0.7)	41 (0.8)	37 (0.8)	31 (0.7)
Kazakhstan	40 (0.6)	41 (0.6)	40 (0.8)	39 (0.7)	37 (0.6)	42 (0.6)	40 (0.6)	36 (0.6)
Kuwait	35 (0.9)	36 (1.0)	35 (1.0)	33 (0.9)	35 (1.0)	40 (1.1)	34 (1.0)	29 (0.9)
Lebanon	26 (0.5)	25 (0.5)	28 (0.6)	27 (0.6)	24 (0.5)	32 (0.5)	26 (0.6)	19 (0.5)
Morocco	26 (0.3)	26 (0.4)	26 (0.4)	28 (0.4)	26 (0.3)	29 (0.4)	27 (0.3)	23 (0.3)
New Zealand	44 (0.7)	46 (0.6)	38 (0.7)	44 (0.8)	47 (0.6)	44 (0.7)	46 (0.7)	42 (0.7)
Oman	38 (0.4)	41 (0.5)	33 (0.4)	35 (0.4)	38 (0.5)	42 (0.5)	37 (0.5)	32 (0.4)
Romania	39 (0.8)	43 (0.9)	36 (0.8)	37 (0.7)	38 (0.7)	43 (0.7)	39 (0.8)	34 (0.9)
Saudi Arabia	32 (0.4)	34 (0.5)	30 (0.4)	29 (0.4)	35 (0.4)	37 (0.5)	31 (0.4)	28 (0.4)
Ψ South Africa (9)	25 (0.3)	25 (0.3)	23 (0.4)	25 (0.3)	26 (0.4)	28 (0.4)	25 (0.3)	19 (0.3)
International Average	**38 (0.1)**	**40 (0.2)**	**35 (0.2)**	**37 (0.1)**	**38 (0.1)**	**41 (0.1)**	**38 (0.1)**	**34 (0.1)**
Benchmarking Participants								
Gauteng, RSA (9)	31 (0.6)	32 (0.7)	29 (0.6)	31 (0.6)	32 (0.7)	33 (0.7)	32 (0.6)	26 (0.6)
Western Cape, RSA (9)	34 (0.9)	35 (0.9)	32 (0.9)	34 (0.9)	36 (0.9)	36 (0.8)	35 (0.9)	30 (1.0)

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

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APPENDIX G

Percentages of Students with Achievement Too Low for Estimation

Appendix G.1: Percentages of Students with Mathematics Achievement Too Low for Estimation*

Country	eTIMSS		paperTIMSS		paperTIMSS Less Difficult Mathematics	
	Percentage of Students with Achievement Too Low for Estimation	Average Percent Correct	Percentage of Students with Achievement Too Low for Estimation	Average Percent Correct	Percentage of Students with Achievement Too Low for Estimation	Average Percent Correct
Albania	- -	- -	- -	- -	2 (0.3)	61 (0.8)
Armenia	- -	- -	4 (0.3)	42 (0.7)	- -	- -
Australia	- -	- -	4 (0.3)	48 (0.7)	- -	- -
Austria	1 (0.2)	50 (0.6)	- -	- -	- -	- -
Azerbaijan	- -	- -	4 (0.4)	48 (0.7)	- -	- -
Bahrain	- -	- -	9 (0.5)	39 (0.6)	- -	- -
Belgium (Flemish)	- -	- -	1 (0.2)	52 (0.5)	- -	- -
Bosnia and Herzegovina	- -	- -	- -	- -	2 (0.2)	49 (0.6)
Bulgaria	- -	- -	5 (0.8)	48 (1.0)	- -	- -
Canada	3 (0.2)	43 (0.5)	- -	- -	- -	- -
Chile	12 (0.7)	27 (0.5)	- -	- -	- -	- -
Chinese Taipei	0 (0.1)	67 (0.4)	- -	- -	- -	- -
Croatia	2 (0.3)	43 (0.5)	- -	- -	- -	- -
Cyprus	- -	- -	2 (0.3)	51 (0.7)	- -	- -
Czech Republic	2 (0.3)	49 (0.6)	- -	- -	- -	- -
Denmark	2 (0.3)	47 (0.5)	- -	- -	- -	- -
England	2 (0.3)	55 (0.8)	- -	- -	- -	- -
Finland	2 (0.2)	49 (0.5)	- -	- -	- -	- -
France	6 (0.6)	37 (0.7)	- -	- -	- -	- -
Georgia	7 (0.7)	36 (0.8)	- -	- -	- -	- -
Germany	2 (0.3)	46 (0.6)	- -	- -	- -	- -
Hong Kong SAR	0 (0.1)	67 (0.8)	- -	- -	- -	- -
Hungary	3 (0.4)	47 (0.7)	- -	- -	- -	- -
Iran, Islamic Rep. of	- -	- -	14 (0.9)	31 (0.7)	- -	- -
Ireland	- -	- -	2 (0.2)	56 (0.7)	- -	- -
Italy	2 (0.3)	44 (0.7)	- -	- -	- -	- -
Japan	- -	- -	0 (0.1)	68 (0.4)	- -	- -
Kazakhstan	- -	- -	2 (0.2)	45 (0.7)	- -	- -
Korea, Rep. of	0 (0.1)	67 (0.6)	- -	- -	- -	- -
Kosovo	- -	- -	- -	- -	2 (0.3)	49 (0.7)
Kuwait	- -	- -	- -	- -	8 (0.6)	39 (0.9)
Latvia	- -	- -	1 (0.3)	55 (0.7)	- -	- -
Lithuania	2 (0.2)	51 (0.7)	- -	- -	- -	- -
Malta	4 (0.3)	43 (0.3)	- -	- -	- -	- -
Montenegro	- -	- -	- -	- -	3 (0.3)	50 (0.4)
Morocco	- -	- -	- -	- -	6 (0.4)	38 (0.8)
Netherlands	1 (0.2)	50 (0.6)	- -	- -	- -	- -
New Zealand	- -	- -	6 (0.4)	40 (0.6)	- -	- -
North Macedonia	- -	- -	- -	- -	3 (0.5)	55 (1.1)
Northern Ireland	- -	- -	2 (0.3)	60 (0.7)	- -	- -
Norway (5)	2 (0.3)	52 (0.6)	- -	- -	- -	- -
Oman	- -	- -	14 (0.6)	30 (0.8)	- -	- -
Ψ Pakistan	- -	- -	- -	- -	16 (2.1)	28 (1.9)
Ψ Philippines	- -	- -	- -	- -	20 (1.2)	25 (0.8)
Poland	- -	- -	3 (0.3)	48 (0.7)	- -	- -
Portugal	2 (0.3)	47 (0.7)	- -	- -	- -	- -
Qatar	12 (0.8)	31 (0.7)	- -	- -	- -	- -
Russian Federation	1 (0.2)	58 (0.9)	- -	- -	- -	- -
Saudi Arabia	- -	- -	- -	- -	5 (0.6)	41 (0.7)
Serbia	- -	- -	5 (0.6)	45 (0.7)	- -	- -
Singapore	0 (0.1)	73 (0.9)	- -	- -	- -	- -
Slovak Republic	5 (0.7)	43 (0.8)	- -	- -	- -	- -
South Africa (5)	- -	- -	- -	- -	6 (0.4)	36 (0.6)
Spain	4 (0.4)	41 (0.4)	- -	- -	- -	- -
Sweden	3 (0.4)	46 (0.7)	- -	- -	- -	- -
Turkey (5)	5 (0.5)	48 (1.0)	- -	- -	- -	- -
United Arab Emirates	8 (0.3)	38 (0.3)	- -	- -	- -	- -
United States	3 (0.3)	50 (0.7)	- -	- -	- -	- -
Benchmarking Participants						
Ontario, Canada	3 (0.4)	44 (0.9)	- -	- -	- -	- -
Quebec, Canada	1 (0.2)	49 (0.6)	- -	- -	- -	- -
Moscow City, Russian Fed.	0 (0.1)	66 (0.6)	- -	- -	- -	- -
Madrid, Spain	2 (0.3)	45 (0.6)	- -	- -	- -	- -
Abu Dhabi, UAE	14 (0.5)	30 (0.4)	- -	- -	- -	- -
Dubai, UAE	2 (0.3)	52 (0.4)	- -	- -	- -	- -

* Students were considered to have achievement too low for estimation if their performance on the assessment was no better than could be achieved by simply guessing on the multiple-choice assessment items. However, such students were assigned scale scores (plausible values) by the achievement scaling procedure, despite concerns about their reliability.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix G.2: Percentages of Students with Science Achievement Too Low for Estimation*

Country	eTIMSS		paperTIMSS	
	Percentage of Students with Achievement Too Low for Estimation	Average Percent Correct	Percentage of Students with Achievement Too Low for Estimation	Average Percent Correct
Albania	- -	- -	3 (0.5)	47 (0.7)
Armenia	- -	- -	4 (0.4)	41 (0.6)
Australia	- -	- -	2 (0.3)	55 (0.5)
Austria	1 (0.2)	51 (0.5)	- -	- -
Azerbaijan	- -	- -	8 (0.6)	36 (0.5)
Bahrain	- -	- -	4 (0.4)	48 (0.6)
Belgium (Flemish)	- -	- -	2 (0.2)	48 (0.4)
Bosnia and Herzegovina	- -	- -	5 (0.4)	40 (0.5)
Bulgaria	- -	- -	4 (0.6)	54 (1.0)
Canada	2 (0.2)	52 (0.3)	- -	- -
Chile	5 (0.5)	40 (0.5)	- -	- -
Chinese Taipei	0 (0.1)	60 (0.3)	- -	- -
Croatia	1 (0.2)	51 (0.4)	- -	- -
Cyprus	- -	- -	2 (0.3)	50 (0.6)
Czech Republic	1 (0.2)	54 (0.4)	- -	- -
Denmark	1 (0.3)	51 (0.4)	- -	- -
England	1 (0.2)	55 (0.5)	- -	- -
Finland	1 (0.2)	59 (0.5)	- -	- -
France	4 (0.4)	45 (0.6)	- -	- -
Georgia	6 (0.7)	38 (0.6)	- -	- -
Germany	2 (0.3)	51 (0.5)	- -	- -
Hong Kong SAR	1 (0.2)	54 (0.6)	- -	- -
Hungary	1 (0.3)	53 (0.5)	- -	- -
Iran, Islamic Rep. of	- -	- -	9 (0.7)	38 (0.7)
Ireland	- -	- -	2 (0.4)	54 (0.7)
Italy	2 (0.2)	49 (0.6)	- -	- -
Japan	- -	- -	1 (0.1)	61 (0.4)
Kazakhstan	- -	- -	2 (0.3)	47 (0.6)
Korea, Rep. of	0 (0.1)	66 (0.4)	- -	- -
Kosovo	- -	- -	9 (0.7)	33 (0.5)
Kuwait	- -	- -	14 (0.9)	33 (0.9)
Latvia	- -	- -	0 (0.2)	57 (0.5)
Lithuania	1 (0.2)	55 (0.5)	- -	- -
Malta	3 (0.3)	47 (0.3)	- -	- -
Montenegro	- -	- -	8 (0.4)	39 (0.4)
Ψ Morocco	- -	- -	17 (0.9)	30 (0.8)
Netherlands	2 (0.3)	50 (0.6)	- -	- -
New Zealand	- -	- -	3 (0.3)	49 (0.4)
North Macedonia	- -	- -	11 (0.9)	36 (1.0)
Northern Ireland	- -	- -	2 (0.3)	52 (0.4)
Norway (5)	1 (0.2)	55 (0.5)	- -	- -
Oman	- -	- -	10 (0.6)	39 (0.7)
Ж Pakistan	- -	- -	31 (3.5)	21 (1.1)
Ж Philippines	- -	- -	34 (1.4)	20 (0.5)
Poland	- -	- -	1 (0.2)	55 (0.5)
Portugal	2 (0.2)	47 (0.4)	- -	- -
Qatar	8 (0.8)	39 (0.7)	- -	- -
Russian Federation	0 (0.1)	62 (0.7)	- -	- -
Saudi Arabia	- -	- -	12 (0.7)	34 (0.5)
Serbia	- -	- -	3 (0.6)	52 (0.7)
Singapore	1 (0.1)	68 (0.7)	- -	- -
Slovak Republic	2 (0.4)	52 (0.7)	- -	- -
Ж South Africa (5)	- -	- -	28 (1.0)	25 (0.6)
Spain	1 (0.2)	49 (0.4)	- -	- -
Sweden	1 (0.2)	55 (0.7)	- -	- -
Turkey (5)	3 (0.4)	54 (0.8)	- -	- -
United Arab Emirates	7 (0.2)	44 (0.3)	- -	- -
United States	2 (0.2)	55 (0.5)	- -	- -
Benchmarking Participants				
Ontario, Canada	2 (0.3)	52 (0.6)	- -	- -
Quebec, Canada	1 (0.2)	51 (0.5)	- -	- -
Moscow City, Russian Fed.	0 (0.1)	68 (0.5)	- -	- -
Madrid, Spain	1 (0.2)	51 (0.4)	- -	- -
Abu Dhabi, UAE	14 (0.5)	35 (0.4)	- -	- -
Dubai, UAE	1 (0.1)	57 (0.3)	- -	- -

* Students were considered to have achievement too low for estimation if their performance on the assessment was no better than could be achieved by simply guessing on the multiple-choice assessment items. However, such students were assigned scale scores (plausible values) by the achievement scaling procedure, despite concerns about their reliability.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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Appendix G.3: Percentages of Students with Mathematics Achievement Too Low for Estimation*

Country	eTIMSS		paperTIMSS	
	Percentage of Students with Achievement Too Low for Estimation	Average Percent Correct	Percentage of Students with Achievement Too Low for Estimation	Average Percent Correct
Australia	- -	- -	5 (0.4)	45 (1.0)
Bahrain	- -	- -	9 (0.4)	38 (0.4)
Ψ Chile	16 (0.8)	25 (0.5)	- -	- -
Chinese Taipei	2 (0.2)	66 (0.6)	- -	- -
Cyprus	- -	- -	5 (0.4)	41 (0.4)
Ψ Egypt	- -	- -	20 (1.1)	25 (0.9)
England	7 (0.8)	42 (1.3)	- -	- -
Finland	5 (0.5)	39 (0.6)	- -	- -
France	8 (0.5)	33 (0.5)	- -	- -
Georgia	13 (1.0)	30 (0.9)	- -	- -
Hong Kong SAR	3 (0.5)	58 (1.0)	- -	- -
Hungary	6 (0.6)	42 (0.7)	- -	- -
Iran, Islamic Rep. of	- -	- -	14 (0.5)	30 (0.8)
Ireland	- -	- -	3 (0.4)	47 (0.7)
Israel	6 (0.5)	44 (1.1)	- -	- -
Italy	6 (0.5)	37 (0.6)	- -	- -
Japan	- -	- -	1 (0.1)	65 (0.6)
Ψ Jordan	- -	- -	17 (1.2)	25 (0.7)
Kazakhstan	- -	- -	7 (0.5)	38 (0.9)
Korea, Rep. of	2 (0.3)	65 (0.6)	- -	- -
Ψ Kuwait	- -	- -	21 (1.2)	23 (0.8)
Lebanon	- -	- -	14 (0.8)	26 (0.5)
Lithuania	5 (0.5)	43 (0.7)	- -	- -
Malaysia	14 (0.8)	30 (0.6)	- -	- -
Ψ Morocco	- -	- -	25 (0.9)	19 (0.4)
New Zealand	- -	- -	9 (0.8)	37 (0.7)
Norway (9)	7 (0.5)	38 (0.5)	- -	- -
Ψ Oman	- -	- -	21 (0.8)	25 (0.4)
Portugal	5 (0.6)	37 (0.7)	- -	- -
Ψ Qatar	17 (0.8)	28 (0.8)	- -	- -
Romania	- -	- -	11 (0.9)	37 (1.0)
Russian Federation	3 (0.4)	49 (1.2)	- -	- -
Ψ Saudi Arabia	- -	- -	22 (0.8)	21 (0.3)
Singapore	1 (0.2)	68 (1.1)	- -	- -
Ж South Africa (9)	- -	- -	26 (0.7)	19 (0.3)
Sweden	6 (0.4)	38 (0.6)	- -	- -
Turkey	10 (0.7)	39 (0.9)	- -	- -
United Arab Emirates	13 (0.4)	34 (0.4)	- -	- -
United States	7 (0.6)	43 (1.1)	- -	- -
Benchmarking Participants				
Ontario, Canada	4 (0.4)	45 (1.2)	- -	- -
Quebec, Canada	1 (0.3)	48 (1.0)	- -	- -
Moscow City, Russian Fed.	1 (0.2)	57 (1.1)	- -	- -
Ψ Gauteng, RSA (9)	- -	- -	18 (0.8)	24 (0.6)
Ψ Western Cape, RSA (9)	- -	- -	16 (0.8)	28 (1.0)
Ψ Abu Dhabi, UAE	18 (0.7)	27 (0.5)	- -	- -
Dubai, UAE	5 (0.4)	48 (0.5)	- -	- -

* Students were considered to have achievement too low for estimation if their performance on the assessment was no better than could be achieved by simply guessing on the multiple-choice assessment items. However, such students were assigned scale scores (plausible values) by the achievement scaling procedure, despite concerns about their reliability.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
Downloaded from http://timss2019.org/download

Appendix G.4: Percentages of Students with Science Achievement Too Low for Estimation*

Country	eTIMSS		paperTIMSS	
	Percentage of Students with Achievement Too Low for Estimation	Average Percent Correct	Percentage of Students with Achievement Too Low for Estimation	Average Percent Correct
Australia	- -	- -	2 (0.3)	50 (0.7)
Bahrain	- -	- -	5 (0.3)	43 (0.3)
Chile	4 (0.4)	36 (0.5)	- -	- -
Chinese Taipei	1 (0.1)	59 (0.4)	- -	- -
Cyprus	- -	- -	3 (0.3)	41 (0.4)
Egypt	- -	- -	14 (1.0)	28 (0.7)
England	3 (0.5)	47 (0.9)	- -	- -
Finland	2 (0.3)	52 (0.6)	- -	- -
France	3 (0.4)	40 (0.5)	- -	- -
Georgia	6 (0.6)	33 (0.6)	- -	- -
Hong Kong SAR	4 (0.7)	45 (1.0)	- -	- -
Hungary	1 (0.3)	49 (0.5)	- -	- -
Iran, Islamic Rep. of	- -	- -	5 (0.4)	35 (0.6)
Ireland	- -	- -	2 (0.3)	49 (0.5)
Israel	3 (0.4)	46 (0.8)	- -	- -
Italy	2 (0.3)	43 (0.5)	- -	- -
Japan	- -	- -	1 (0.1)	59 (0.5)
Jordan	- -	- -	7 (0.5)	37 (0.7)
Kazakhstan	- -	- -	3 (0.3)	40 (0.6)
Korea, Rep. of	1 (0.2)	55 (0.5)	- -	- -
Kuwait	- -	- -	7 (0.8)	35 (0.9)
Lebanon	- -	- -	15 (0.9)	26 (0.5)
Lithuania	1 (0.1)	50 (0.6)	- -	- -
Malaysia	6 (0.5)	37 (0.5)	- -	- -
Morocco	- -	- -	11 (0.6)	26 (0.3)
New Zealand	- -	- -	3 (0.4)	44 (0.7)
Norway (9)	4 (0.4)	43 (0.5)	- -	- -
Oman	- -	- -	7 (0.4)	38 (0.4)
Portugal	1 (0.3)	47 (0.6)	- -	- -
Qatar	5 (0.5)	40 (0.8)	- -	- -
Romania	- -	- -	5 (0.5)	39 (0.8)
Russian Federation	1 (0.2)	52 (0.9)	- -	- -
Saudi Arabia	- -	- -	7 (0.5)	32 (0.4)
Singapore	1 (0.1)	66 (0.8)	- -	- -
Ψ South Africa (9)	- -	- -	17 (0.5)	25 (0.3)
Sweden	3 (0.4)	48 (0.6)	- -	- -
Turkey	3 (0.4)	47 (0.7)	- -	- -
United Arab Emirates	7 (0.3)	41 (0.4)	- -	- -
United States	3 (0.4)	48 (0.9)	- -	- -
Benchmarking Participants				
Ontario, Canada	1 (0.2)	47 (0.6)	- -	- -
Quebec, Canada	1 (0.3)	50 (0.8)	- -	- -
Moscow City, Russian Fed.	0 (0.1)	57 (0.6)	- -	- -
Gauteng, RSA (9)	- -	- -	9 (0.5)	31 (0.6)
Western Cape, RSA (9)	- -	- -	7 (0.4)	34 (0.9)
Abu Dhabi, UAE	14 (0.6)	34 (0.5)	- -	- -
Dubai, UAE	2 (0.2)	54 (0.4)	- -	- -

* Students were considered to have achievement too low for estimation if their performance on the assessment was no better than could be achieved by simply guessing on the multiple-choice assessment items. However, such students were assigned scale scores (plausible values) by the achievement scaling procedure, despite concerns about their reliability.
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A dash (-) indicates comparable data not available.

SOURCE: IEA's Trends in International Mathematics and Science Study TIMSS 2019
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APPENDIX H

Organizations and Individuals Responsible for TIMSS 2019

Introduction

TIMSS 2019 was a collaborative effort involving hundreds of individuals around the world. This appendix acknowledges the individuals and organizations for their contributions. Given that the work on TIMSS 2019 spanned more than four years and involved so many people and organizations, this list may not include all who contributed. Any omission is inadvertent. TIMSS 2019 also acknowledges the students, parents, teachers, and school principals who contributed their time and effort to the study. This report would not be possible without them.

Management and Coordination

TIMSS is a major undertaking of IEA, and together with the Progress in International Reading Literacy Study (PIRLS), comprises the core of IEA's regular cycles of studies. The TIMSS assessment at the fourth grade complements PIRLS, which regularly assesses reading achievement at fourth grade.

TIMSS 2019 was conducted by IEA's TIMSS & PIRLS International Study Center at Boston College, which has responsibility for the overall direction and management of TIMSS and PIRLS, including design, development, and implementation. For TIMSS 2019, this also included managing the transition of TIMSS to a digital assessment, with the development of eTIMSS. Headed by Executive Directors Drs. Ina V.S. Mullis, Michael O. Martin, and Matthias von Davier, the study center is located in the Lynch School of Education and Human Development. The TIMSS & PIRLS International Study Center worked closely with IEA Amsterdam, which managed country participation, was responsible for verification of all translations produced by the participating countries, and coordinated the school visits by International Quality Control Monitors. In addition to developing the software system used to create and deliver the eTIMSS 2019 digital assessments, staff at IEA Hamburg worked closely with participating countries to organize sampling and data collection operations and to check all data for accuracy and consistency within and across countries. Statistics Canada in Ottawa was responsible for school and student sampling activities. Educational Testing Service in Princeton, New Jersey consulted on psychometric methodology, provided software for scaling the achievement data, and replicated the achievement scaling for quality assurance.

The Project Management Team, comprising the study directors and representatives from the TIMSS & PIRLS International Study Center, IEA Amsterdam, IEA Hamburg, and Statistics Canada

met twice a year throughout the study to discuss the study's progress, procedures, and schedule. In addition, the study directors met with members of IEA's Technical Executive Group twice each year to review technical issues.

To work with the international team and coordinate within-country activities, each participating country designates an individual to be the TIMSS National Research Coordinator (NRC). The NRCs have the challenging task of implementing TIMSS in their countries in accordance with the TIMSS guidelines and procedures. In addition, the NRCs contribute to the development of the TIMSS assessments and provide input throughout the course of the project. The quality of the TIMSS assessment and data depends on the work of the NRCs and their colleagues in carrying out the complex sampling, data collection, and scoring tasks. NRCs from countries participating in eTIMSS were responsible for carrying out additional tasks related to the transition of TIMSS to a digital assessment. Continuing the tradition of exemplary work established in previous cycles of TIMSS, the TIMSS 2019 NRCs performed their many tasks with dedication, competence, energy, and goodwill, and demonstrated a commitment to the project and high quality work.

Funding

Funding for TIMSS 2019 was provided primarily by the participating countries. The National Center for Education Statistics of the U.S. Department of Education was a major funding partner, providing funding under contract number EDIES17C0060. The content of this publication does not necessarily reflect the views or policies of the U.S. Department of Education nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

Boston College also is gratefully acknowledged for its generous financial support and stimulating educational environment.

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