TIMSS 2007

Ina V.S. Mullis and Michael O. Martin

49th IEA General Assembly

Berlin, 6-9 October, 2008
TIMSS 2007

- Mathematics and Science
- Grades 4 and 8
- Baseline for new countries

59 Countries, 425,000 Students!
Growth of TIMSS

- Trends for more than 50 countries
- Becoming incorporated into assessment strategies
- Impetus to revise curricula
- Model for large-scale assessments
- Learning by doing on a global scale
TIMSS 2007 Participants

Algeria  
Armenia  
Australia  
Austria  
Bahrain  
Bosnia and Herzegovina  
Botswana  
Bulgaria  
Chinese Taipei  
Colombia  
Cyprus  
Czech Republic  
Denmark  
Egypt  
El Salvador  
England  
Georgia  
Germany  
Ghana  
Hong Kong SAR  
Hungary  
Indonesia  
Iran, Islamic Rep. of  
Israel  
Italy  
Japan  
Jordan  
Kazakhstan  
Korea, Rep. of  
Kuwait  
Latvia  
Lebanon  
Lithuania  
Malaysia  
Malta  
Mongolia  
Morocco  
Netherlands  
New Zealand  
Norway  
Oman  
Palestinian Nat’l Auth.  
Qatar  
Romania  
Russian Federation  
Saudi Arabia  
Scotland  
Serbia  
Singapore  
Slovak Republic  
Slovenia  
Sweden  
Syrian Arab Republic  
Thailand  
Tunisia  
Turkey  
Ukraine  
United States  
Yemen  
Alberta, Canada  
Basque Country, Spain  
British Columbia, Canada  
Dubai, UAE  
Massachusetts, US  
Minnesota, US  
Ontario, Canada  
Quebec, Canada
Major Accomplishment

Since last General Assembly:

Completed Scaling, Analysis, and Reporting!
TIMSS 2007 SMIRC

Mathematics Experts
Kiril Bankov, Bulgaria
Hanako Senuma, Japan
Khattab Mohammad Abu Lebdeh, Jordan
Robert Garden, New Zealand
Liv Sissel Gronmo, Norway
Mary Lindquist, United States
TIMSS 2007 SMIRC

Science Experts
Ahmed Mohammed Rafea, Bahrain
Chen-yung Lin, Chinese Taipei
Jophus Anamuah-Mensah, Ghana
Gabriela Noveanu, Romania
Galina Kovaleva, Russian Federation
Jackie Heaton, Scotland
Audrey Champagne, United States
TIMSS 2007 QIRC

Sue Thomson, Australia
Serge Baillergeon, Quebec
Solaiman El-Khodary El-Sheikh, Egypt
Martina Meelissen, The Netherlands
Boey Kok Leong, Singapore
Barbara Japelj, Slovenia
Patrick Gonzales, United States
TIMSS 2007 Assessment Specialists

• Mathematics Coordinator
  – Graham Ruddock, NFER

• Science Coordinator
  – Christine O’Sullivan, K-12 Consulting

• Special “Task Force” consultants in mathematics and science
  – Intensive week-long working sessions
TIMSS 2007 Assessment Specialists

- Staff at TIMSS & PIRLS ISC
  - Content/measurement experience
  - Production/graphics experience
- IEA Secretariat and DPC
- Statistics Canada
- NRCs – National Research Coordinators
  - Wealth of knowledge and experience
## Mathematics Content Domains

### Fourth-Grade

<table>
<thead>
<tr>
<th>Domain</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>50%</td>
</tr>
<tr>
<td>Geometric Shapes and Measures</td>
<td>35%</td>
</tr>
<tr>
<td>Data Display</td>
<td>15%</td>
</tr>
</tbody>
</table>

### Eighth-Grade

<table>
<thead>
<tr>
<th>Domain</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>30%</td>
</tr>
<tr>
<td>Algebra</td>
<td>30%</td>
</tr>
<tr>
<td>Geometry</td>
<td>20%</td>
</tr>
<tr>
<td>Data and Chance</td>
<td>20%</td>
</tr>
</tbody>
</table>
# Science Content Domains

<table>
<thead>
<tr>
<th>Science Content Domains</th>
<th>Fourth-Grade</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life Science</td>
<td></td>
<td>45%</td>
</tr>
<tr>
<td>Physical Science</td>
<td></td>
<td>35%</td>
</tr>
<tr>
<td>Earth Science</td>
<td></td>
<td>20%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Eighth-Grade</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td></td>
<td>35%</td>
</tr>
<tr>
<td>Chemistry</td>
<td></td>
<td>20%</td>
</tr>
<tr>
<td>Physics</td>
<td></td>
<td>25%</td>
</tr>
<tr>
<td>Earth Science</td>
<td></td>
<td>20%</td>
</tr>
</tbody>
</table>
## Cognitive Domains

<table>
<thead>
<tr>
<th>Mathematics</th>
<th>Percentages 4&lt;sup&gt;th&lt;/sup&gt; Grade</th>
<th>Percentages 8&lt;sup&gt;th&lt;/sup&gt; Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing</td>
<td>40%</td>
<td>35%</td>
</tr>
<tr>
<td>Applying</td>
<td>40%</td>
<td>40%</td>
</tr>
<tr>
<td>Reasoning</td>
<td>20%</td>
<td>25%</td>
</tr>
</tbody>
</table>

### Science

<table>
<thead>
<tr>
<th></th>
<th>Percentages 4&lt;sup&gt;th&lt;/sup&gt; Grade</th>
<th>Percentages 8&lt;sup&gt;th&lt;/sup&gt; Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing</td>
<td>40%</td>
<td>30%</td>
</tr>
<tr>
<td>Applying</td>
<td>35%</td>
<td>35%</td>
</tr>
<tr>
<td>Reasoning</td>
<td>25%</td>
<td>35%</td>
</tr>
</tbody>
</table>
Scope of the Assessment

Fourth Grade

- Total assessment time - 8 hours 45 minutes
  - 350 items
  - Half mathematics (177), half science (173)
  - Half trend (154), half new (196)

- Assessment time per student – 72 minutes
  - 14 student booklets
  - Each booklet – 2 blocks math, 2 blocks science
Scope of the Assessment (cont.)

Eighth Grade

• Total assessment time - 10 hours 30 minutes
  – 427 items
  – Half mathematics (215), half science (212)
  – Half trend (189), half new (238)

• Assessment time per student – 90 minutes
  – 14 student booklets
  – Each booklet – 2 blocks math, 2 blocks science
Scope of the Assessment (cont.)

Questionnaires at grades 4 and 8

- Students
- Teachers – mathematics and science
- Schools
- Curriculum – mathematics and science

12 questionnaires in all!
Major Activity - TIMSS 2007 Encyclopedia

One chapter per country

- Country context
- Curriculum in primary and lower secondary grades in mathematics and science
- Instruction in primary and lower secondary grades
- Teachers and teacher education
- Examinations and assessments
Major Activity – TIMSS 2007 Encyclopedia

- NRCs completed Encyclopedia chapters
  - February 2008
- Draft Encyclopedia completed and reviewed by IEA Publications Committee
  - July 2008
- TIMSS 2007 Encyclopedia published
  - August 2008
- TIMSS 2007 Encyclopedia distributed
  - September 2008
Major Activity – Scaling and Analysis for 2007 and Trends

30 achievement scales in total!

- 4 overall achievement scales - mathematics and science at grades 4 and 8

- 14 content domain scales
  - Mathematics grades 4(3) and 8(4)
  - Science grades 4(3) and 8(4)

- 12 cognitive domains scales
  - Knowing, applying, reasoning at grades 4 and 8
Major Activity – Prototype Tables for Two International Reports

- Mathematics - grades 4 and 8
- Science - grades 4 and 8

Contents of reports

Ch. 1: Achievement overall
Ch. 2: International Benchmarks
  - Advanced, High, Intermediate, Low
Ch. 3: Content and cognitive domains
Major Activity – TIMSS 2007
International Reports

Contents of reports (cont.)

Ch. 4: Students’ backgrounds and attitudes

Ch. 5: Curriculum – intended and implemented

Ch. 6: Teachers’ education and experience

Ch. 7: Classroom characteristics and instruction

Ch. 8: School contexts
Major Activity – TIMSS 2007
International Reports

• NRCs submitted data to IEA DPC
  – September 2007

• TIMSS & PIRLS ISC and IEA DPC completed data almanacs and exhibits
  – November 2007

• NRCs reviewed report exhibits with background data at 7th NRC meeting
  – December 2007, Salzburg, Austria
Major Activity – TIMSS 2007
International Reports

• Sampling adjudication - TIMSS & PIRLS ISC, Statistics Canada, Sampling Referee
  – January 2008

• TIMSS & PIRLS ISC and ETS completed achievement scaling
  – April 2008

• SMIRC conducted scale anchoring
  – May 2008, Kaoshiung, Chinese Taipei
Major Activity – TIMSS 2007 International Reports

• TIMSS & PIRLS ISC and IEA DPC completed data exhibits

• TIMSS & PIRLS ISC drafted Mathematics and Science International Reports

• NRCs reviewed drafts at 8th NRC meeting
  – June 2008, Gabarone, Botswana

• IEA Publications Committee reviewed drafts
Major Activity – TIMSS 2007
International Reports

• International Reports and Technical Report printed and distributed
  – November 2008

• International press release via web
  – December 9, 2008, Boston College
  – 10:00am EST
Major Activity – TIMSS 2007
International Database

9th NRC meeting, Sharm El-Sheikh, February 8-13, 2009

– Distribution of final International Database and User Guide

– Training for participating countries
TIMSS 2007 International Mathematics Report

Findings from IEA’s Trends in International Mathematics and Science Study at the Fourth and Eighth Grades

Ina V.S. Mullis
Michael O. Martin
Pierre Foy

In collaboration with
John E. Olson
Corinna Preuschoff
Ebru Erberber
Alka Atara
Joseph Gaila

TIMSS 2007 International Science Report

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