

TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

# TIMSS

# TIMSS 2015 International Results in Mathematics

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TIMSS 2015 INTERNATIONAL RESULTS IN MATHEMATICS

# FOURTH GRADE MATHEMATICS



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# About TIMSS 2015

In 2015, IEA and its TIMSS & PIRLS International Study Center at Boston College conducted TIMSS 2015 at fourth and eighth grades and TIMSS Advanced 2015 for students in the final year of secondary school enrolled in special advanced mathematics and physics programs or tracks. Both TIMSS 2015 and TIMSS Advanced 2015 provide 20-year trend measures for countries that participated in the first TIMSS assessments in 1995.

TIMSS 2015 and TIMSS Advanced 2015 continue the long history of international assessments in mathematics and science conducted by IEA – the International Association for the Evaluation of Educational Achievement. IEA is an independent international cooperative of national research institutions and government agencies that has been conducting studies of cross-national achievement since 1959. 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's TIMSS & PIRLS International Study Center is located in the Lynch School of Education at Boston College and has been responsible for directing TIMSS and TIMSS Advanced since 1995.

## TIMSS 2015

TIMSS is an international assessment of mathematics and science at the fourth and eighth grades that has been conducted every four years since 1995. TIMSS 2015 is the sixth assessment in the TIMSS series monitoring 20 years of trends in educational achievement, together with comprehensive data on students' contexts for learning mathematics and science.

In 2015, 57 countries and 7 benchmarking entities (regional jurisdictions of countries such as states or provinces) participated in TIMSS. In total, more than 580,000 students participated in TIMSS 2015.

The TIMSS 2015 mathematics and science assessments are based on comprehensive frameworks developed collaboratively with the participating countries. For each curriculum area at each grade, the frameworks are organized around two dimensions: a content dimension specifying the content to be assessed and a cognitive dimension specifying the thinking processes to be assessed. The TIMSS assessments contain nearly 800 assessment items, about 200 per grade for each curriculum area. The majority of TIMSS items assess students' applying and reasoning skills.

New for TIMSS 2015, a home questionnaire was completed by fourth grade students' parents or caregivers, in addition to the questionnaires routinely given at both fourth and eighth grades to students, teachers, school principals, and curriculum specialists. The questionnaire data primarily are reported in the form of indices created using IRT scaling methods, and results are presented for three regions of the scales (most to least desirable). When possible, scales were developed in parallel to provide comparisons between mathematics and science as well as the fourth and eighth grades.

TIMSS has the goal of helping countries make informed decisions about how to improve teaching and learning in mathematics and science. With its strong curricular focus and emphasis on policy relevant information about the home, school, and classroom contexts for learning, TIMSS is a valuable tool that countries can use to evaluate achievement goals and standards and monitor students' achievement trends in an international context. The *TIMSS 2015 Encyclopedia* complements the quantitative information in the international reports with a chapter by each country summarizing mathematics and science curricula, instructional practices, and teacher education requirements.

## Countries Participating in TIMSS 2015

Exhibit 1 lists the 57 countries participating in TIMSS 2015, including some distinct educational 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 had 7 benchmarking participants including a variety of educational entities.

Armenia  
Australia  
Bahrain  
Belgium (Flemish)  
Botswana  
Bulgaria  
Canada  
Chile  
Chinese Taipei  
Croatia  
Cyprus  
Czech Republic  
Denmark  
Egypt  
England  
Finland  
France  
Georgia  
Germany  
Hong Kong SAR  
Hungary  
Indonesia  
Iran, Islamic Rep. of  
Ireland  
Israel  
Italy

Japan  
Jordan  
Kazakhstan  
Korea, Rep. of  
Kuwait  
Lebanon  
Lithuania  
Malaysia  
Malta  
Morocco  
Netherlands  
New Zealand  
Northern Ireland  
Norway  
Oman  
Poland  
Portugal  
Qatar  
Russian Federation  
Saudi Arabia  
Serbia  
Singapore  
Slovak Republic  
Slovenia  
South Africa  
Spain

Sweden  
Thailand  
Turkey  
United Arab Emirates  
United States

### Benchmarking Participants

Buenos Aires, Argentina  
Ontario, Canada  
Quebec, Canada  
Abu Dhabi, UAE  
Dubai, UAE  
Florida, US

Countries and benchmarking participants could elect to participate in the fourth grade assessment, the eighth grade assessment, or both. Also, countries where students were expected to find the TIMSS assessments too difficult at the fourth grade could participate in the newly developed TIMSS Numeracy assessment, a less difficult version of the fourth grade mathematics assessment. Fifty countries and the 7 benchmarking participants administered the fourth grade assessments. Of those, 7 countries and 1 benchmarking entity participated in the Numeracy assessment, including Bahrain, Indonesia, Iran, Kuwait, Jordan, Morocco, and South Africa as well as Buenos Aires. Each of these participants gave both the fourth grade assessments in mathematics and science as well as the Numeracy assessment, except Jordan and South Africa that participated in Numeracy only. Thirty-nine countries and the 7 benchmarking participants administered the eighth grade mathematics and science assessments. Norway chose to assess fifth and ninth grades to obtain better comparisons with Sweden and Finland (but also collected benchmark data at fourth and eighth grades). Botswana and South Africa assessed ninth grade to better match their curricula and to maintain trend measurement. Exhibit 2 provides more information about the students assessed in TIMSS 2015, including average ages as well as policies for age of entry, promotion, and retention.

In each grade, nationally representative samples of approximately 4,000 students from 150-200 schools participated in TIMSS 2015. Including the mathematics, numeracy, and science assessments and questionnaires, more than 312,000 students, 250,000 parents, 20,000 teachers, and 10,000 schools participated in the fourth grade assessments, and a further 270,000 students, 31,000 teachers, and 8,000 schools in the eighth grade assessments.



**Exhibit 2: Information About the Students Assessed in TIMSS 2015**

Reported by National Research Coordinators, except Average Ages are from TIMSS 2015 Data

Country	Grade 4		Grade 8		Information About Policy on Students' Age of Entry to Primary School	Information About Students' Age of Entry to Primary School in Practice
	Country's Name for Fourth Year of Formal Schooling*	Average Age at Time of Testing	Country's Name for Eighth Year of Formal Schooling*	Average Age at Time of Testing		
Australia	Year 4	10.0	Year 8	14.0	Varies by state, but generally children must begin school by age 6.	Most children begin school when they are 4.5–5 years old, but some wait until the compulsory age, either on advice from preschool staff or on the judgment of parents, usually because of maturity.
Bahrain	Grade 4	9.9	Grade 8	14.0	Children must be 6 years old to begin school in September.	Follows policy
Belgium (Flemish)	Grade 4	10.1			Children must begin school in September during the calendar year of their 6th birthday.	Parents can keep their child in kindergarten until age 7, with approval from an independent counseling center. Homeschooling is also practiced. Children with serious disabilities can be exempt from compulsory education.
Botswana (9)			Grade 9	15.6	Children must be 6 years old by the end of June to begin in January of the same calendar year.	Children from remote areas or disadvantaged children may begin later than age 6. Children enter private schools at age 5.
Bulgaria	Grade 4	10.8			Children must begin school during the calendar year of their 7th birthday.	Children may begin at the age of 6 with parental/guardian discretion.
Canada	Grade 4	9.9	Grade 8	14.0	Varies by province, but most children begin school at the age of 6.	Practice varies by province, but generally parents have the option of accelerating or delaying enrollment by one year. Some parents opt to homeschool their children.
Chile	Basic 4	10.2	Basic 8	14.3	Children must be 6 years old by March 31 of the year they begin school.	Principals are allowed some discretion regarding the admission of children who will turn 6 after March 31 but before June 30.
Chinese Taipei	Grade 4	10.2	Grade 8	14.3	Children must be 6 years old to begin school in September.	Parents can apply for early enrollment to elementary schools. Legal representatives can apply to delay enrollment to elementary schools for children with disabilities.
Croatia	Grade 4	10.6			Children can begin school during the calendar year of their 6th birthday.	Children typically begin primary school at age 7 because their parents feel they will benefit from being more mature.
Cyprus	Grade 4	9.8			Children can begin school if they are 5.75 years old before September 1.	Parents can apply to delay enrollment of children for one year with the approval of the Director of Primary Education.
Czech Republic	Grade 4	10.4			Children must be 6 years old to begin school in September.	On one hand, parents may request that children born after September 1 be allowed to enroll at age 5 with pedagogical and psychological certification. On the other hand, about 22% of students every year receive permission to postpone enrollment for one year.
Denmark	Grade 4	10.9			Children can begin school during the calendar year of their 6th birthday.	Parents may request early enrollment for mature children whose 5th birthdays are before October 1 from the school principal. Parents may also request a one-year postponement of enrollment for developmentally challenged children from the municipal council.
Egypt			–	14.1	Children must be 6 years old by the end of September to begin school.	Follows policy
England	Year 5	10.1	Year 9	14.1	Children must begin school during the calendar year of their 5th birthday.	Most children begin school the September after their 4th birthday. Parents may request that their child's entry to school is deferred until later in the school year and up until the compulsory school age.
Finland	Grade 4	10.8			Children must begin school during the calendar year of their 7th birthday.	It is possible for parents to enroll children one year earlier or one year later than the official policy.
France	CM1	9.9			Children must begin school in September of the calendar year of their 6th birthday.	In rare cases it is possible for parents and/or teachers to request early enrollment for academically advanced and mature children or to request a one-year delay in enrollment for immature children.

\* The TIMSS target population is the grade that represents four years or 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 year or ninth year of formal schooling.

A dash (-) indicates comparable data not available.

**Exhibit 2: Information About the Students Assessed in TIMSS 2015  
(Continued)**

Country	Grade 4		Grade 8		Information About Policy on Students' Age of Entry to Primary School	Information About Students' Age of Entry to Primary School in Practice
	Country's Name for Fourth Year of Formal Schooling*	Average Age at Time of Testing	Country's Name for Eighth Year of Formal Schooling*	Average Age at Time of Testing		
Georgia	Grade 4	9.7	Grade 8	13.7	Children must be 6 years old to begin school.	Follows policy
Germany	Grade 4	10.4			Varies by state, but generally children must have reached their 6th birthday before a statutory qualifying date (usually between June 30 and September 30) to begin school on August 1.	Varies by state, but generally, parents may request early enrollment from the local primary school or request deferred enrollment from the school administration for children with demonstrated physical or mental disabilities.
Hong Kong SAR	Primary 4	10.1	Secondary 2	14.2	Children begin school if they are 5.75 years old before September 1.	Some parents choose not to enroll their children according to policy.
Hungary	Grade 4	10.7	Grade 8	14.7	Children must be 6 years old before August 31 to begin school that year.	Children may remain in preschool for an extra year upon recommendation from a committee of experts.
Indonesia	Grade 4	10.4			Children must be 6 years old to begin school in August.	Parents may request early enrollment for mature students. In rural areas, it is common for children to enroll at age 7.
Iran, Islamic Rep. of	Grade 4	10.2	Grade 8	14.2	Children must be 6 years old by September 21 to begin school that year.	Parents may enroll their children at age 7.
Ireland	Fourth Class	10.4	Second Year	14.4	Children can begin school (ISCED 0) at age 4, but must begin school by age 6.	Most children begin primary school at age 4–5, the first two years of which are pre-primary grades.
Israel			Grade 8	14.0	Children begin school the calendar year of their 6th birthday.	Parents may apply for delayed enrollment and have the final say in enrollment decisions.
Italy	Primary Grade 4	9.7	Lower Secondary Grade 3	13.8	Children begin school the calendar year of their 6th birthday.	Parents have discretion over early or delayed enrollment.
Japan	Grade 4	10.5	Grade 8	14.5	Children must be 6 years old by April 1 to begin school.	Follows policy
Jordan	Grade 4	9.8	Grade 8	13.8	Children must be at least 5.75 years old by September 1 to begin school.	Follows policy
Kazakhstan	Grade 4	10.3	Grade 8	14.3	Children must begin school at age 6.	Parents can delay enrollment for one year.
Korea, Rep. of	Elementary School Grade 4	10.5	Middle School Grade 2	14.4	Children must be 6 years old by the end of December to begin school the following March.	Parents can decide to enroll academically advanced children one year earlier or postpone enrollment for one year for health reasons with the permission of the school superintendent.
Kuwait	Grade 4	9.7	Grade 8	13.7	Children must be 6 years old by March 15 to begin school that calendar year.	Follows policy
Lebanon			Grade 8	14.2	Children must be 6 years old by the end of June to begin school the following September.	Parental discretion is not allowed in private schools. In public schools there may be special cases authorized by the Ministry of Education.
Lithuania	Grade 4	10.7	Grade 8	14.7	Children begin school during the calendar year of their 7th birthday.	Parents can request early enrollment or request to delay enrollment by one year.
Malaysia			Form 2	14.3	Children must be at least 6 years old to begin school.	Follows policy
Malta			Year 9	13.8	Children begin school during the calendar year of their 5th birthday.	Follows policy
Morocco	Grade 4	10.3	Middle School Year 2	14.5	Children must be 6 years old to begin school.	Follows policy
Netherlands	Group 6	10.0			Children must start kindergarten on the first day of the month after their 5th birthday.	Most children begin kindergarten when they are 4 years old and begin primary school when they are 6 years old. Some children start primary school later if the school thinks that the child would benefit from being more mature. Parents are involved in this decision, but the school has the final say.
New Zealand	Year 5	10.0	Year 9	14.1	Children can begin school at age 5, but must be enrolled in primary school by their 6th birthday.	Most children begin school on or soon after their 5th birthday.
Northern Ireland	Year 6	10.4			Children must be 4 years old by July 1 to begin school in September.	Follows policy

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 2: Information About the Students Assessed in TIMSS 2015**  
**(Continued)**

Country	Grade 4		Grade 8		Information About Policy on Students' Age of Entry to Primary School	Information About Students' Age of Entry to Primary School in Practice
	Country's Name for Fourth Year of Formal Schooling*	Average Age at Time of Testing	Country's Name for Eighth Year of Formal Schooling*	Average Age at Time of Testing		
Norway (5, 9)	Grade 5	10.7	Grade 9	14.7	Children must begin school during the calendar year of their 6th birthday.	Follows policy
Oman	Grade 4	9.6	Grade 8	14.0	Children begin school during the calendar year of their 6th birthday.	Follows policy
Poland	Grade 4	10.7			Children must begin school during the calendar year of their 6th birthday.	From 2012–2015, parents could decide whether to send their children to school at age 6 or age 7.
Portugal	Grade 4	9.9			Children must be 6 years old by September 15 to begin school in that calendar year.	Parents or legal guardians can request that children who will be 6 years old between September 16 and December 31 be allowed to enroll in primary education in the school year of their 6th birthday.
Qatar	Grade 4	10.1	Grade 8	14.1	Children must be 6 years old by the end of December to begin school in September.	Follows policy
Russian Federation	Grade 4	10.8	Grade 8	14.7	Children begin school when they are at least 6.5 years old by September 1 of that school year.	Children under 6.5 years old may begin school with consent of the parents and school principal. Parents may delay entry until age 7 or older if they want the child to be more mature, or for health reasons.
Saudi Arabia	Grade 4	10.0	Grade 8	14.1	Children must be 6 years old by the end of August to begin school in September.	Follows policy
Serbia	Grade 4	10.7			Children must be 6.5–7 years old to begin school.	Schools may recommend one year of continued preparatory preschool for children not considered school ready. If the child is over 7.5 years old, and due to illness or other differences did not enroll in first grade, he or she may enroll in the first or other appropriate grade based on the results of testing.
Singapore	Primary 4	10.4	Secondary 2	14.4	According to the Compulsory Education Act, children must begin school in the calendar year of their 7th birthday.	Parents may seek a deferral of registration for medical reasons or if the child is homeschooled.
Slovak Republic	Grade 4	10.4			Children must begin school on September 1 if their 6th birthday is before August 31.	Children may begin school early or after an approved delay based on psychological tests and professional recommendations.
Slovenia	Grade 4	9.8	Grade 8	13.8	Children begin school during the calendar year of their 6th birthday.	Parents can request early enrollment for children who have their 6th birthday in January of the next calendar year or request a one-year delay in enrollment for medical or developmental reasons.
South Africa (5, 9)	Grade 5	11.5	Grade 9	15.7	Children must be 5 years old and have their 6th birthday by June 30 of the next year to begin school mid-January.	Follows policy
Spain	Grade 4	9.9			Children must begin school during the calendar year of their 6th birthday.	Almost all children begin kindergarten at age 3, even though it is not compulsory.
Sweden	Grade 4	10.8	Grade 8	14.7	Children begin school during the calendar year of their 7th birthday.	In special cases students may begin school when they are 6 or 8 years old.
Thailand			Grade 8	14.4	Children must be 6 years old by May 16 to begin school the following academic year.	Follows policy
Turkey	Grade 4	9.9	Grade 8	13.9	Children must be 5.5 years old to begin school in September.	If parents prefer, children ages 5.5–5.75 can delay enrollment for one year. Children ages 5.75–6 can delay enrollment for one year for medical or developmental reasons.
United Arab Emirates	Grade 4	9.8	Grade 8	13.9	Children can begin school during the calendar year of their 6th birthday, but must begin by age 8.	Parents may delay enrollment, but students may not be older than 8 years old on December 31 of their entry year.
United States	Grade 4	10.2	Grade 8	14.2	Each state requires parents to send their children to school between set ages. Required entry is often between 5 to 7 years old, exact age varies by state.	Children typically begin kindergarten at age 5.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 2: Information About the Students Assessed in TIMSS 2015  
(Continued)**

Country	Grade 4		Grade 8		Information About Policy on Students' Age of Entry to Primary School	Information About Students' Age of Entry to Primary School in Practice
	Country's Name for Fourth Year of Formal Schooling*	Average Age at Time of Testing	Country's Name for Eighth Year of Formal Schooling*	Average Age at Time of Testing		
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	Grade 4	9.8	Secondary 1	14.1	Children must be 6 years old by the end of June to begin school in March of the same year.	Follows policy
Ontario, Canada	Grade 4	9.8	Grade 8	13.8	Students can begin school in September if they have their 6th birthday before December 31.	Parents may enroll their children in junior kindergarten at age 4 or senior kindergarten at age 5. Some students may start school at the junior kindergarten level at 3 years old if their birthday is between September 1 and December 31. In addition, some parents homeschool their children.
Quebec, Canada	Grade 4	10.1	Secondary 2	14.3	Children must be 6 years old by September 30 to begin in September of that calendar year.	Follows policy
Norway (4, 8)	Grade 4	9.7	Grade 8	13.7	Children must be 6 years old by September 30 to begin in September of that calendar year.	Follows policy
Abu Dhabi, UAE	Grade 4	9.8	Grade 8	13.9	Children begin school during the calendar year of their 6th birthday.	Follows policy
Dubai, UAE	Grade 4	9.8	Grade 8	13.9	Children begin school during the calendar year of their 6th birthday.	Follows policy
Florida, US	Grade 4	10.4	Grade 8	14.4	Children must begin school if they have their 6th birthday by February 1 of that school year.	Children who are 5 years old on or before September 1 of the school year are eligible for admission to public kindergarten during that school year, based on rules prescribed by the school board. Parents may choose whether or not to enroll their children in kindergarten. School superintendents may authorize certificates of exemptions from school attendance requirements in certain situations.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

## TIMSS Advanced 2015

With the current emphasis on college and career readiness and increasing global competitiveness in STEM (science, technology, engineering, and mathematics) fields, in 2015 TIMSS Advanced once again was joined with TIMSS. First conducted in 1995 and then again in 2008, TIMSS Advanced is the only international assessment that provides essential information about students' achievement in advanced mathematics and physics. It assesses students in their final year of secondary school (often 12<sup>th</sup> grade) who are engaged in advanced mathematics and physics studies that prepare them to enter STEM programs in higher education.

TIMSS Advanced 2015 was offered together with TIMSS to provide 20 years of trends at three important points in students' schooling (4<sup>th</sup> grade, 8<sup>th</sup> grade, and final grade) and provide information about how the foundations established in primary school can influence students' educational career through lower secondary and impact achievement in students' final year of secondary school.

## Quality Assurance

TIMSS 2015 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 the IEA Data Processing and Research Center (DPC) 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. The IEA Secretariat 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 DPC staff worked closely with National Research Coordinators all through the project to organize data collection operations and to check all data for accuracy and consistency within and across countries.

## TIMSS 2015 Results

The international results for TIMSS 2015 are reported on this website and the results for TIMSS Advanced 2015 also can be accessed from here.

The TIMSS 2015 results are presented separately for mathematics and science, and within each subject separately for fourth grade and eighth grade. Each of the two reports contains 10 chapters or sections providing overviews in the form of infographics and numerous exhibits summarizing

fourth and eighth grade student achievement distributions, performance at the TIMSS International Benchmarks, achievement trends over time, and achievement in relation to students' home, school, and classroom educational contexts for learning mathematics and science. The exhibits can be downloaded and printed from the [Download Center](#).

The website includes links to:

- [TIMSS 2015 Assessment Frameworks](#) presents the mathematics and science assessment frameworks that describe in some detail the major content and cognitive domains to be assessed at the fourth and eighth grades as well as the framework describing the types of learning situations and factors that will be investigated via the questionnaire data and an overview of the assessment design.
- [TIMSS 2015 Encyclopedia: Education Policy and Curriculum in Mathematics and Science](#) describes national contexts for mathematics and science teaching and learning. It contains selected data about the countries' curricula together with a chapter written by each participant summarizing the structure of its education system, the mathematics and science curricula and instruction in primary and secondary grades, the teacher education requirements, and the types of examinations and assessments employed.
- [Methods and Procedures in TIMSS 2015](#) describes the methods and procedures used to develop, implement, and analyze the results from the TIMSS 2015 assessments.



# CHAPTER 1: STUDENT ACHIEVEMENT

TIMSS 2015 INTERNATIONAL RESULTS IN MATHEMATICS



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## International Mathematics Achievement

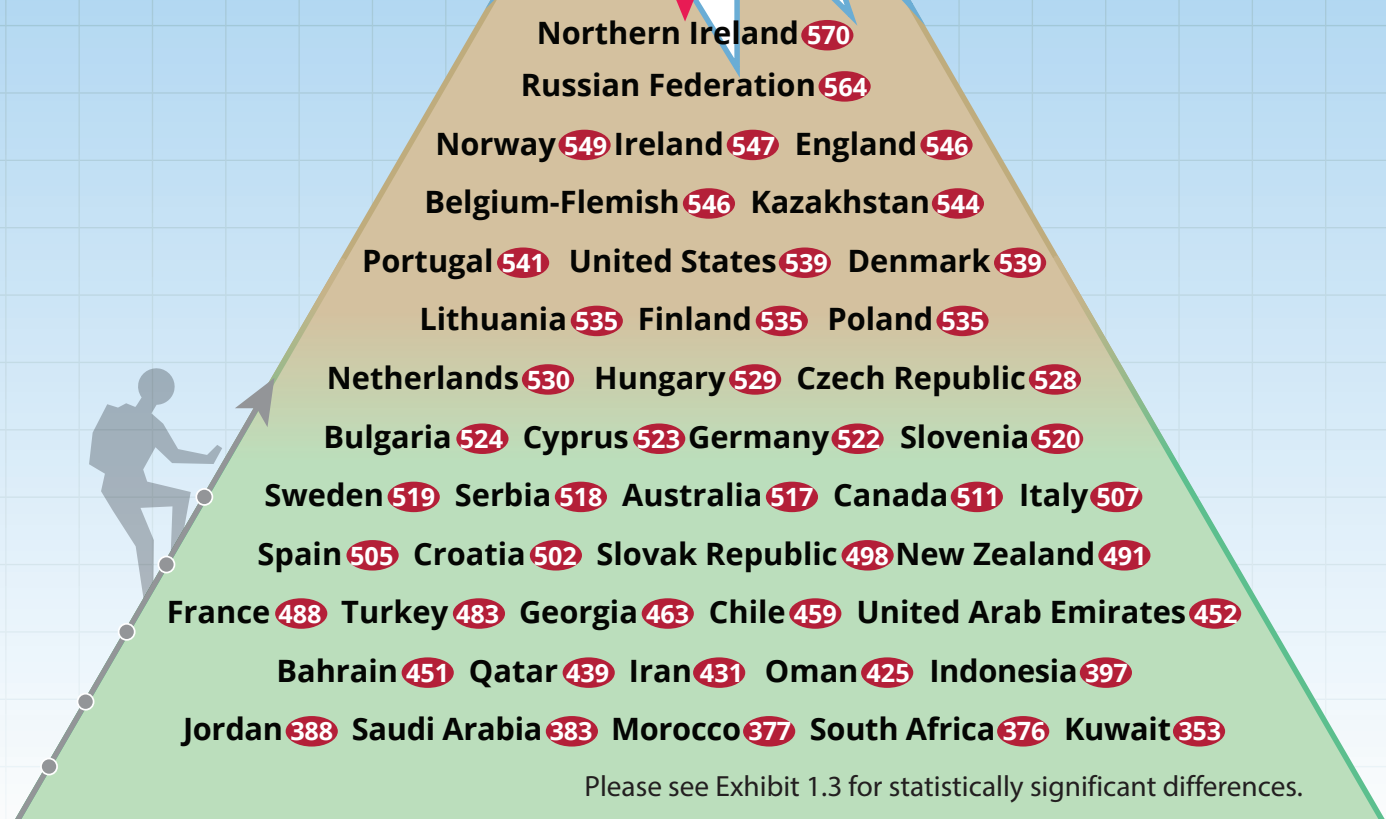
### East Asian Countries Top Achievers at Fourth Grade in Mathematics

TIMSS 2015 Mathematics has achievement results for **49** countries at the fourth grade.

Singapore **618** Hong Kong SAR **615**  
Korea **608**  
Chinese Taipei **597** Japan **593**

**23**

The gap between the East Asian countries and the next highest country was 23 in 2015, unchanged from 2011.



## Trends at Fourth Grade Show Increases in Mathematics Achievement Around the World

### Trends 2011-2015: 41 Countries

**21 Countries Higher Average Achievement**



Bahrain, Chinese Taipei, Croatia, Czech Republic, Georgia, Hong Kong SAR, Hungary, Ireland, Japan, Kazakhstan, Morocco, Oman, Portugal, Qatar, Russian Federation, Singapore, Slovenia, Spain, Sweden, Turkey, United Arab Emirates

**15 Countries Same Average Achievement**



Australia, Belgium (Flemish), Chile, Denmark, England, Iran, Italy, Korea, Lithuania, New Zealand, Northern Ireland, Norway, Serbia, Slovak Republic, the United States

**5 Countries Lower Average Achievement**



Finland, Germany, Kuwait, Netherlands, Saudi Arabia

### Trends 1995-2015: 17 Countries

**14 Countries Higher Average Achievement**



Australia, Cyprus, England, Hong Kong SAR, Iran, Ireland, Japan, Korea, New Zealand, Norway, Portugal, Singapore, Slovenia, the United States

**1 Country Same Average Achievement**



Hungary

**2 Countries Lower Average Achievement**



Czech Republic, Netherlands

## In TIMSS 2015 Boys Had Higher Mathematics Achievement in More Countries Than Girls.

### Of the 49 TIMSS 2015 Countries:

- Boys had higher achievement in **18** countries, with an average difference of **9** points.
- Girls had higher achievement in **8** countries, with an average difference of **18** points.
- 23** countries had no difference between boys and girls in average mathematics achievement.



## Mathematics Achievement Trends by Gender Show Little Change

### Trends 2011-2015: 41 Countries

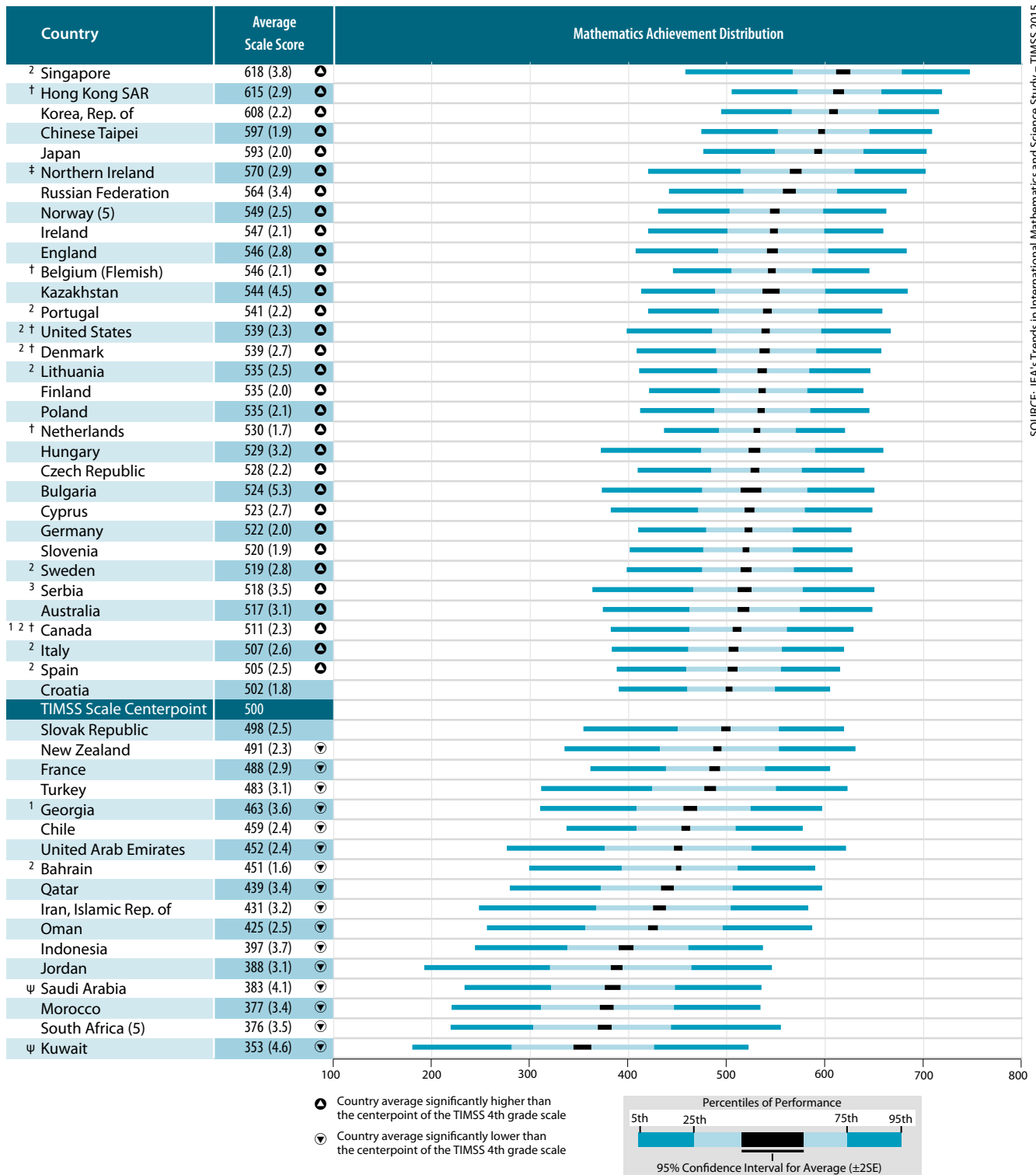
- In both assessments boys had higher achievement in **11** countries, compared to **2** for girls.
- 16** countries had no difference in average mathematics achievement between boys and girls.

### Trends 1995-2015: 17 Countries

- In 1995, boys had higher achievement in **7** countries, with an average achievement advantage of **8** points.
- In 2015, boys had higher achievement in **9** countries, with an average achievement advantage of **8** points.



**Exhibit 1.1: Distribution of Mathematics Achievement**



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

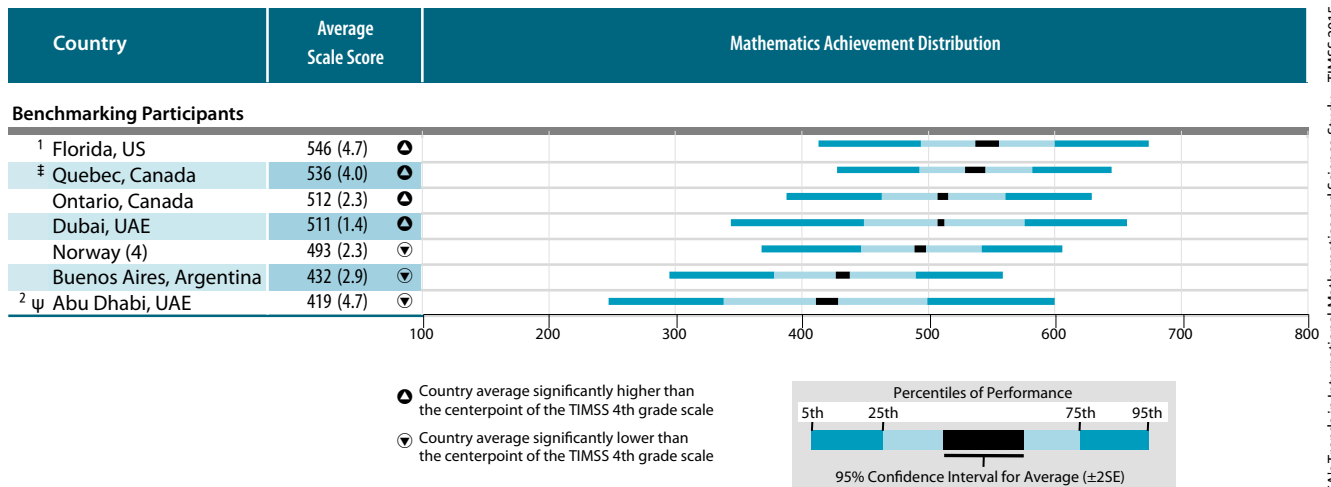
Note: Seven countries and 1 benchmarking entity participated in the TIMSS Numeracy assessment: Bahrain, Indonesia, Iran, Jordan, Kuwait, Morocco, and South Africa as well as Buenos Aires. Except for Jordan and South Africa, they also participated in the TIMSS fourth grade assessment and their mathematics achievement results are based on an average of both assessments.

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 C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 for sampling guidelines and sampling participation notes †, ‡, and §.

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

**Exhibit 1.1: Distribution of Mathematics Achievement (Continued)**



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 1.3: Multiple Comparisons of Average Mathematics Achievement**

Instructions: 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 lower than that of the comparison country, significantly higher than that of the comparison country, or if there is no statistically significant difference between the average achievement of the two countries.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Country	Average Scale Score	Comparison Countries																														
		Singapore	Hong Kong SAR	Korea, Rep. of	Chinese Taipei	Japan	Northern Ireland	Russian Federation	Norway (5)	Ireland	England	Belgium (Flemish)	Kazakhstan	Portugal	United States	Denmark	Lithuania	Finland	Poland	Netherlands	Hungary	Czech Republic	Bulgaria	Cyprus	Germany	Slovenia	Sweden	Serbia	Australia	Canada	Italy	
Singapore	618 (3.8)			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Hong Kong SAR	615 (2.9)				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Korea, Rep. of	608 (2.2)					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Chinese Taipei	597 (1.9)						▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Japan	593 (2.0)							▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Northern Ireland	570 (2.9)								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Russian Federation	564 (3.4)									▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Norway (5)	549 (2.5)										▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Ireland	547 (2.1)											▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
England	546 (2.8)												▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Belgium (Flemish)	546 (2.1)													▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Kazakhstan	544 (4.5)														▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Portugal	541 (2.2)															▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
United States	539 (2.3)																▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Denmark	539 (2.7)																	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Lithuania	535 (2.5)																		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Finland	535 (2.0)																			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Poland	535 (2.1)																				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Netherlands	530 (1.7)																					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Hungary	529 (3.2)																						▲	▲	▲	▲	▲	▲	▲	▲	▲	
Czech Republic	528 (2.2)																							▲	▲	▲	▲	▲	▲	▲	▲	
Bulgaria	524 (5.3)																								▲	▲	▲	▲	▲	▲	▲	
Cyprus	523 (2.7)																								▲	▲	▲	▲	▲	▲	▲	
Germany	522 (2.0)																									▲	▲	▲	▲	▲	▲	
Slovenia	520 (1.9)																										▲	▲	▲	▲	▲	
Sweden	519 (2.8)																											▲	▲	▲	▲	
Serbia	518 (3.5)																												▲	▲	▲	
Australia	517 (3.1)																													▲	▲	
Canada	511 (2.3)																														▲	▲
Italy	507 (2.6)																														▲	▲
Spain	505 (2.5)																														▲	▲
Croatia	502 (1.8)																														▲	▲
Slovak Republic	498 (2.5)																														▲	▲
New Zealand	491 (2.3)																														▲	▲
France	488 (2.9)																														▲	▲
Turkey	483 (3.1)																														▲	▲
Georgia	463 (3.6)																														▲	▲
Chile	459 (2.4)																														▲	▲
United Arab Emirates	452 (2.4)																														▲	▲
Bahrain	451 (1.6)																														▲	▲
Qatar	439 (3.4)																														▲	▲
Iran, Islamic Rep. of	431 (3.2)																														▲	▲
Oman	425 (2.5)																														▲	▲
Indonesia	397 (3.7)																														▲	▲
Jordan	388 (3.1)																														▲	▲
Saudi Arabia	383 (4.1)																														▲	▲
Morocco	377 (3.4)																														▲	▲
South Africa (5)	376 (3.5)																														▲	▲
Kuwait	353 (4.6)																														▲	▲

**Benchmarking Participants**

Florida, US	546 (4.7)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Quebec, Canada	536 (4.0)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ontario, Canada	512 (2.3)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Dubai, UAE	511 (1.4)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Norway (4)	493 (2.3)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Buenos Aires, Argentina	432 (2.9)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Abu Dhabi, UAE	419 (4.7)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲

- ▲ 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.

**Exhibit 1.3: Multiple Comparisons of Average Mathematics Achievement (Continued)**

Country	Average Scale Score	Comparison Countries														Benchmarking Participants												
		Spain	Croatia	Slovak Republic	New Zealand	France	Turkey	Georgia	Chile	United Arab Emirates	Bahrain	Qatar	Iran, Islamic Rep. of	Oman	Indonesia	Jordan	Saudi Arabia	Morocco	South Africa (5)	Kuwait	Florida, US	Quebec, Canada	Ontario, Canada	Dubai, UAE	Norway (4)	Buenos Aires, Argentina	Abu Dhabi, UAE	
Singapore	618 (3.8)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	
Hong Kong SAR	615 (2.9)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Korea, Rep. of	608 (2.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Chinese Taipei	597 (1.9)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Japan	593 (2.0)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Northern Ireland	570 (2.9)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Russian Federation	564 (3.4)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Norway (5)	549 (2.5)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ireland	547 (2.1)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
England	546 (2.8)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Belgium (Flemish)	546 (2.1)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Kazakhstan	544 (4.5)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Portugal	541 (2.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
United States	539 (2.3)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Denmark	539 (2.7)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Lithuania	535 (2.5)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Finland	535 (2.0)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Poland	535 (2.1)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Netherlands	530 (1.7)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hungary	529 (3.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Czech Republic	528 (2.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Bulgaria	524 (5.3)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Cyprus	523 (2.7)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Germany	522 (2.0)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Slovenia	520 (1.9)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Sweden	519 (2.8)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Serbia	518 (3.5)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Australia	517 (3.1)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Canada	511 (2.3)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Italy	507 (2.6)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Spain	505 (2.5)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Croatia	502 (1.8)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Slovak Republic	498 (2.5)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
New Zealand	491 (2.3)	▼	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
France	488 (2.9)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Turkey	483 (3.1)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Georgia	463 (3.6)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Chile	459 (2.4)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
United Arab Emirates	452 (2.4)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Bahrain	451 (1.6)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Qatar	439 (3.4)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Iran, Islamic Rep. of	431 (3.2)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Oman	425 (2.5)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Indonesia	397 (3.7)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Jordan	388 (3.1)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Saudi Arabia	383 (4.1)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Morocco	377 (3.4)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
South Africa (5)	376 (3.5)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Kuwait	353 (4.6)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
<b>Benchmarking Participants</b>																												
Florida, US	546 (4.7)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Quebec, Canada	536 (4.0)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ontario, Canada	512 (2.3)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Dubai, UAE	511 (1.4)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Norway (4)	493 (2.3)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Buenos Aires, Argentina	432 (2.9)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Abu Dhabi, UAE	419 (4.7)	▼	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲

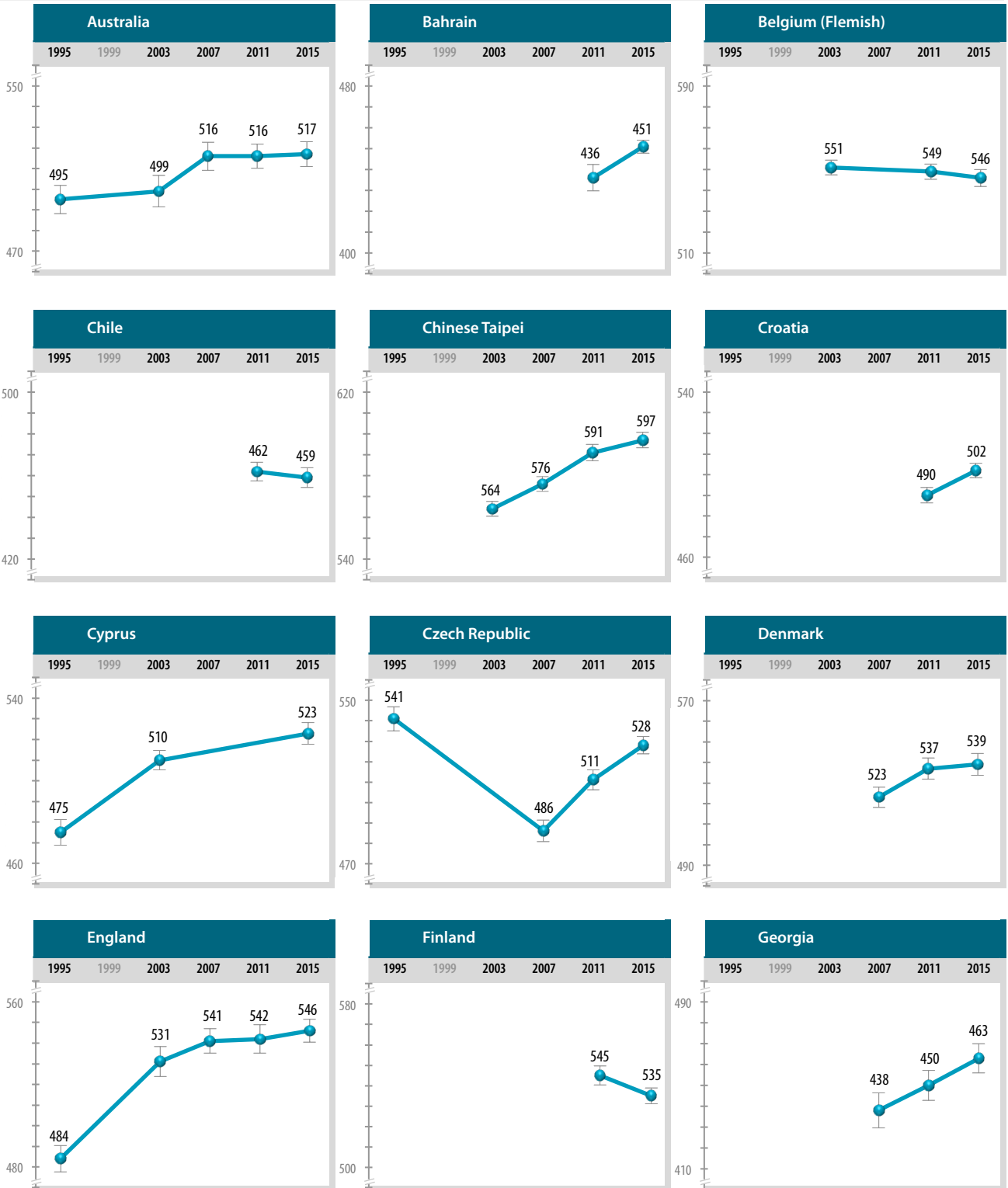
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

- ▲ 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.

**Exhibit 1.5: Trends in Mathematics Achievement<sup>o</sup>**

Displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The same scale is used for each country (10-point intervals), but the part of the scale shown differs according to each country's average achievement. The accompanying table (Exhibit 1.7) provides details, including statistical significance.



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

<sup>o</sup>No fourth grade assessment in 1999.

Scale interval is 10 points for each country, but the part of the scale shown differs according to each country's average achievement. The gray bars represent the 95% confidence interval.

**Exhibit 1.5: Trends in Mathematics Achievement<sup>o</sup> (Continued)**



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

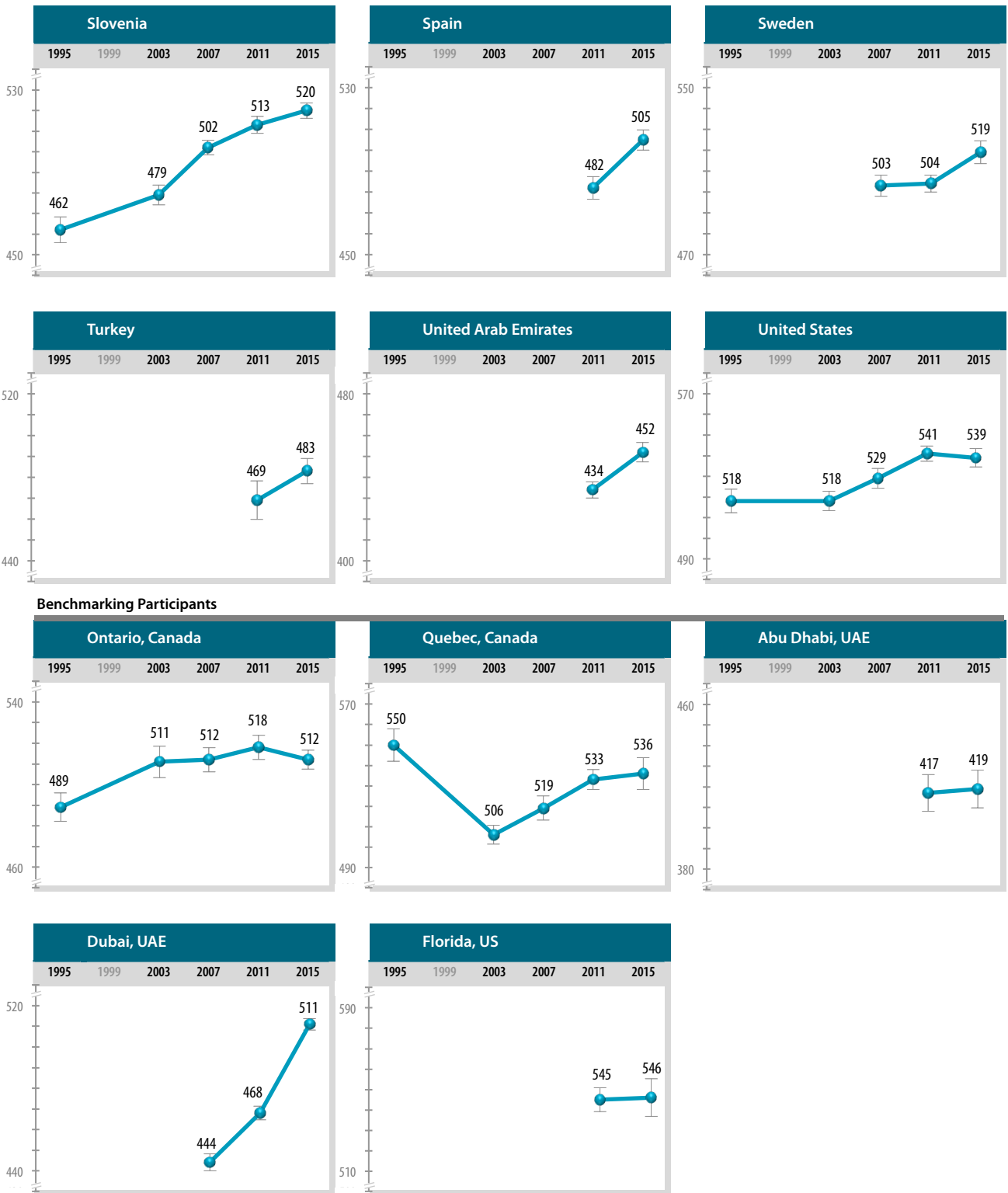


**Exhibit 1.5: Trends in Mathematics Achievement<sup>o</sup> (Continued)**



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

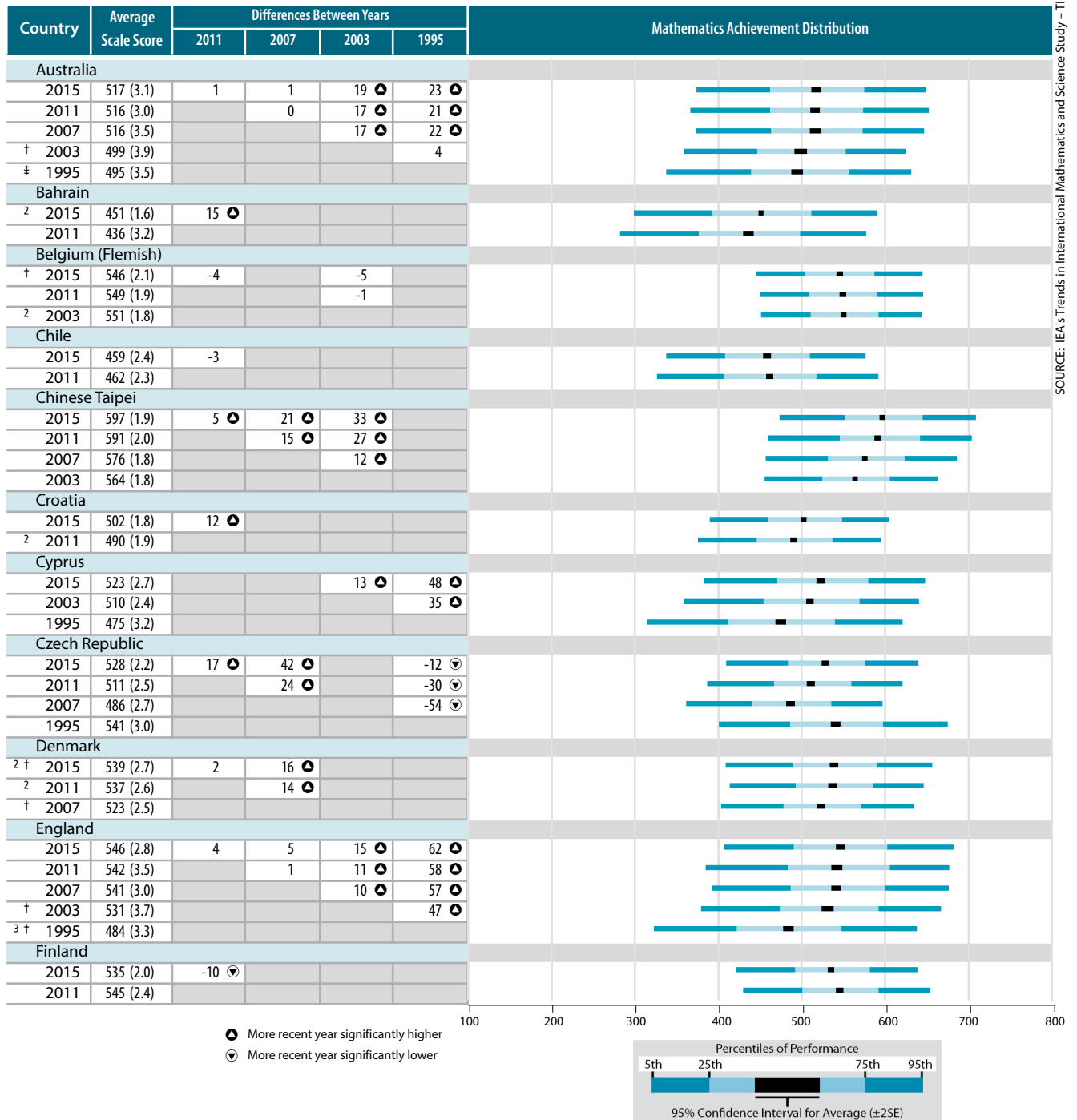
**Exhibit 1.5: Trends in Mathematics Achievement<sup>o</sup> (Continued)**



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 1.7: Differences in Mathematics Achievement Across Assessment Years**

Instructions: 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.



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Trend results for Kuwait do not include private schools. Trend results for Lithuania do not include students taught in Polish or in Russian.

✳ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%. Such annotations in exhibits with trend data began in 2011, so data from assessments prior to 2011 are not annotated for reservations.

✴ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%. Such annotations in exhibits with trend data began in 2011, so data from assessments prior to 2011 are not annotated for reservations.

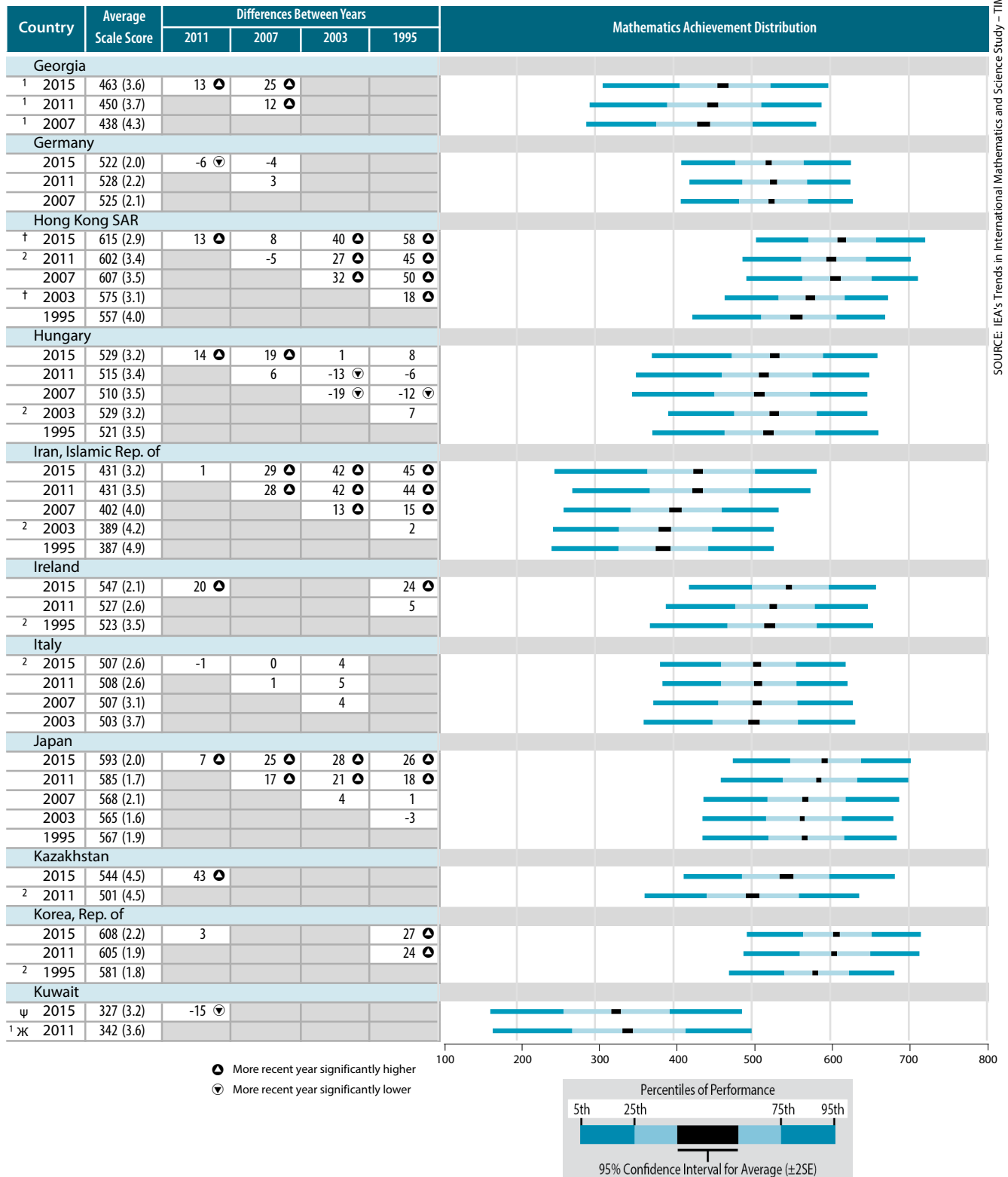
See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 for sampling guidelines and sampling participation notes †, ‡, and §.

▲ Tested the same cohort of students as other countries, but later in the assessment year at the beginning of the next school year.

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

**Exhibit 1.7: Differences in Mathematics Achievement Across Assessment Years (Continued)**

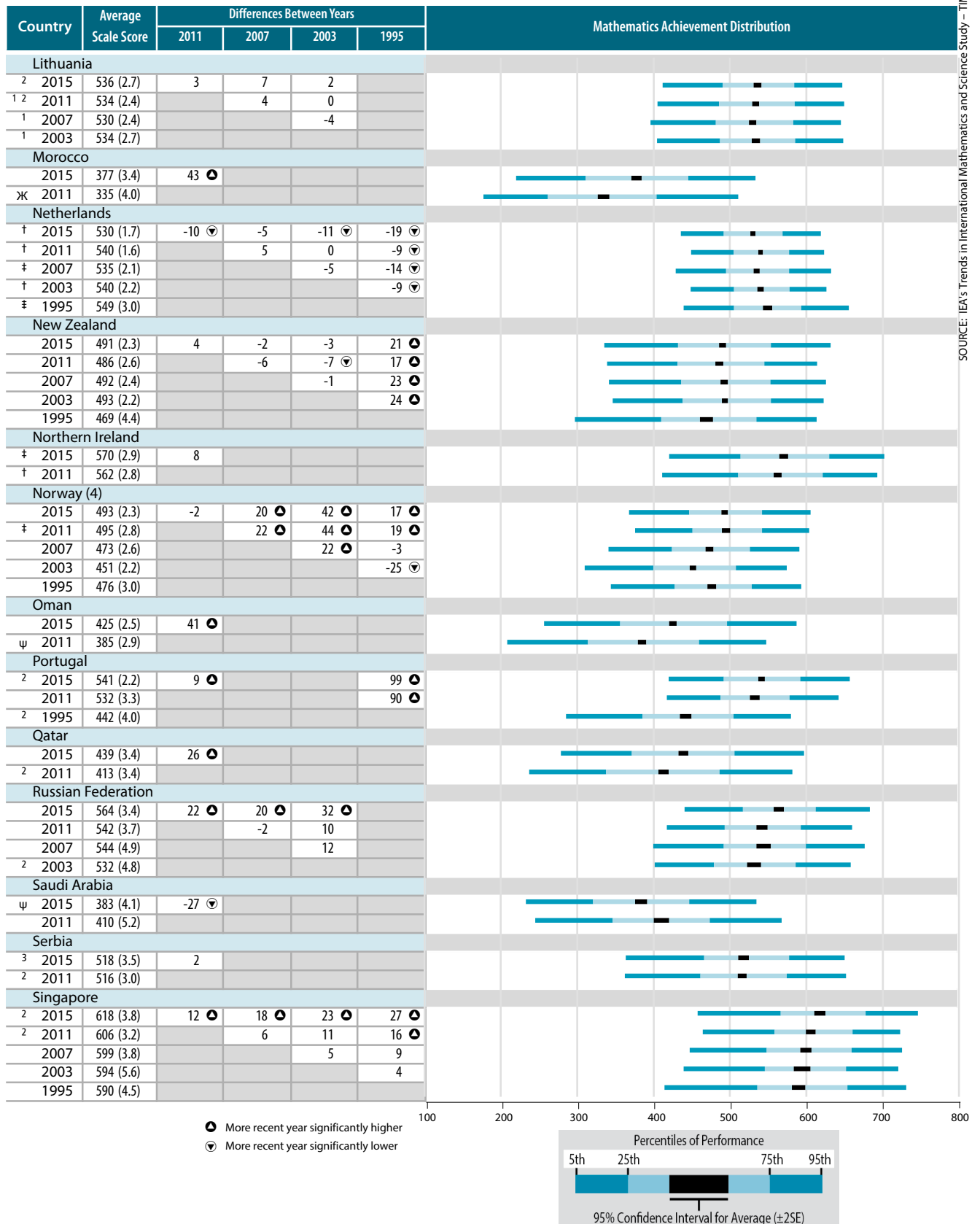
Instructions: Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▼) than the performance in the column year.



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 1.7: Differences in Mathematics Achievement Across Assessment Years (Continued)**

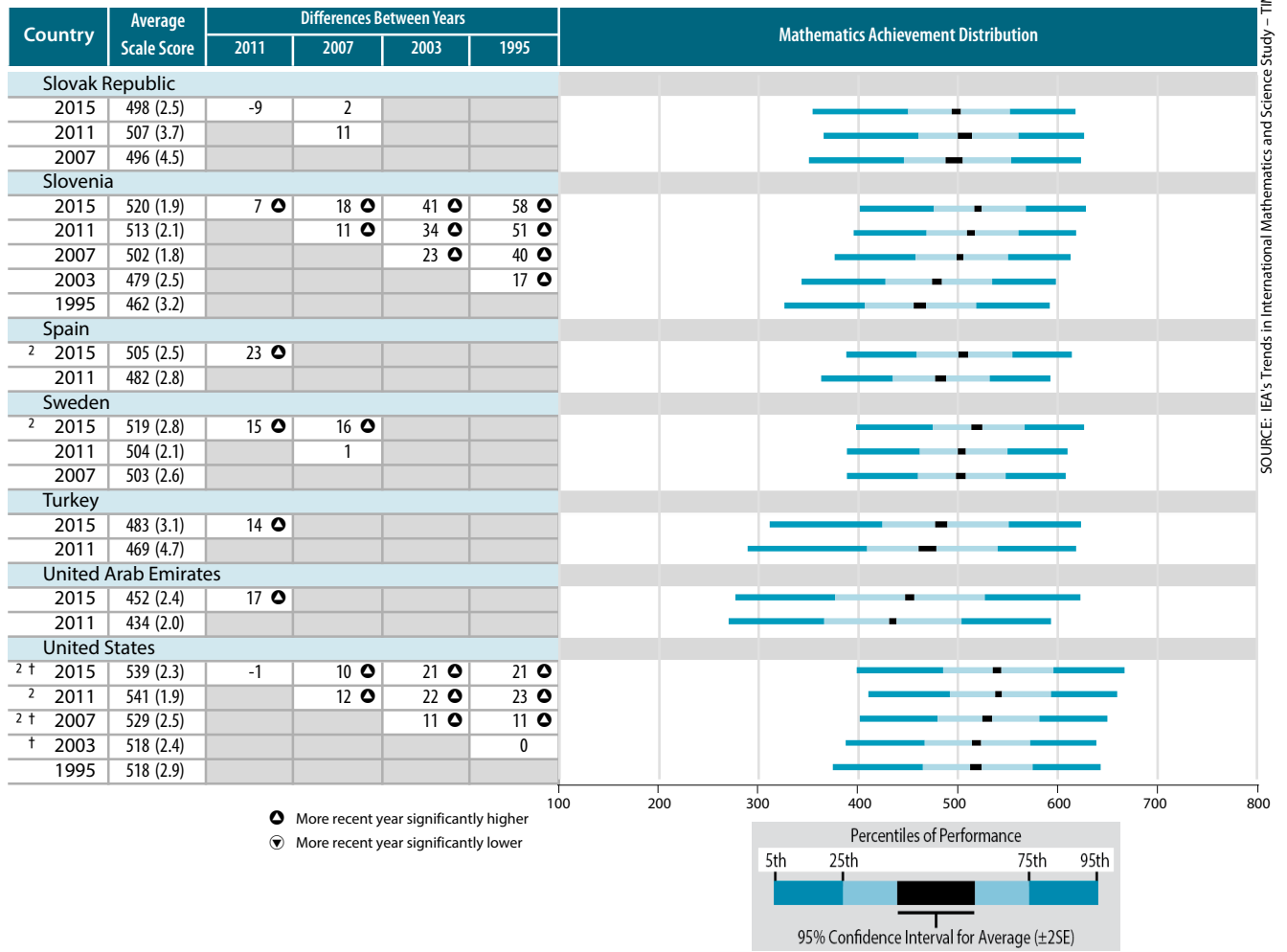
Instructions: Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▼) than the performance in the column year.



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 1.7: Differences in Mathematics Achievement Across Assessment Years (Continued)**

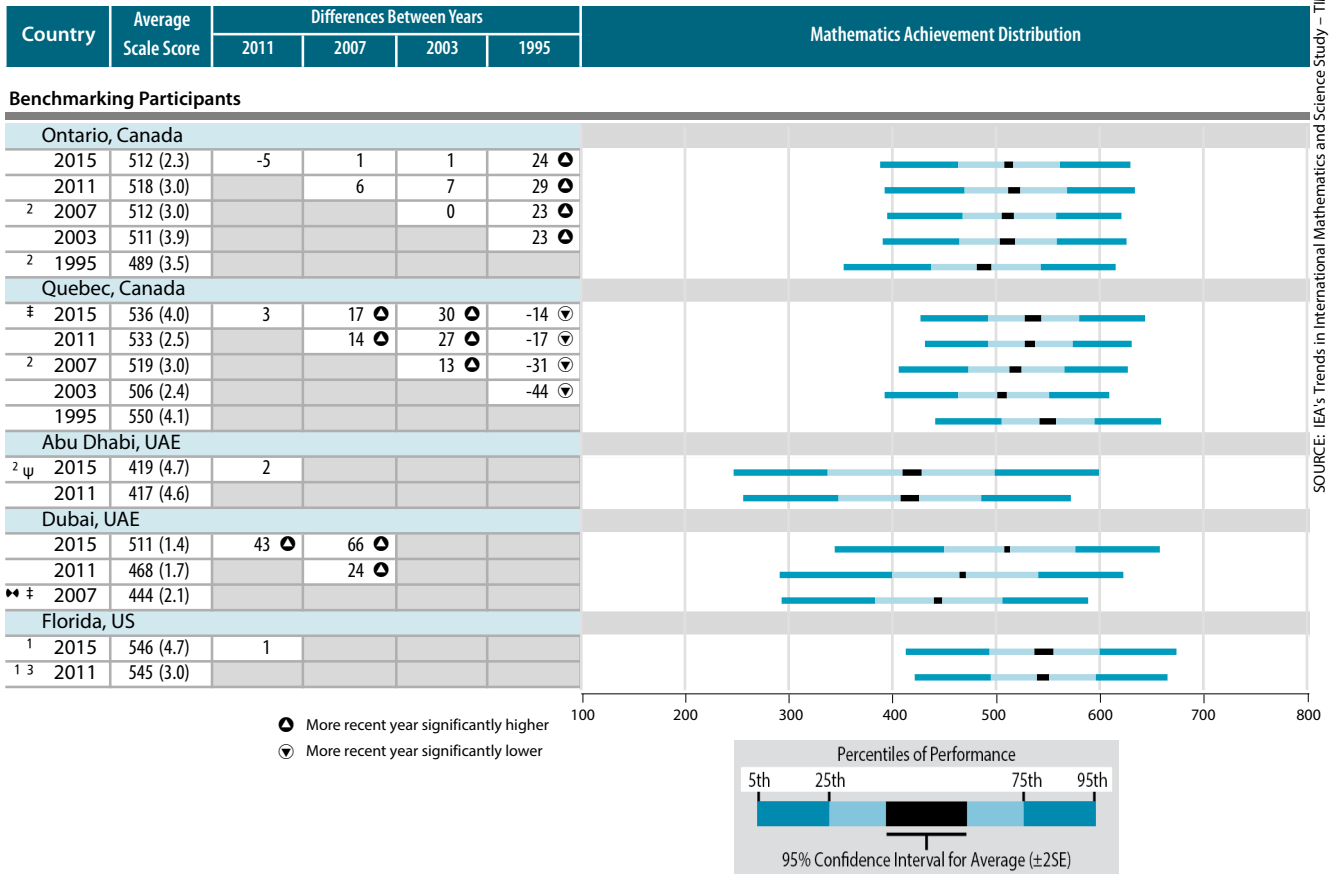
Instructions: Read across the row to determine if the performance in the row year is significantly higher (▲) or significantly lower (▼) than the performance in the column year.



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 1.7: Differences in Mathematics Achievement Across Assessment Years (Continued)**

Instructions: 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.



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 1.9: Relative Achievement of 2011 Fourth Grade Cohort as Eighth Grade Students in 2015 – Countries Assessed Both Grades in Both Assessment Years**

Follow the blue arrow pointing diagonally downwards to compare relative performance among the TIMSS countries at the fourth grade in 2011 (upper-left panel) to relative performance at the eighth grade in 2015 (lower-right panel).

2011 - Fourth Grade			2015 - Fourth Grade		
Country	Achievement Difference from TIMSS Scale Centerpoint (500)		Country	Achievement Difference from TIMSS Scale Centerpoint (500)	
Singapore	106 (3.2)	▲	Singapore	118 (3.8)	▲
Korea, Rep. of	105 (1.9)	▲	Hong Kong SAR	115 (2.9)	▲
Hong Kong SAR	102 (3.4)	▲	Korea, Rep. of	108 (2.2)	▲
Chinese Taipei	91 (2.0)	▲	Chinese Taipei	97 (1.9)	▲
Japan	85 (1.7)	▲	Japan	93 (2.0)	▲
England	42 (3.5)	▲	Russian Federation	64 (3.4)	▲
Russian Federation	42 (3.7)	▲	England	46 (2.8)	▲
United States	41 (1.9)	▲	Kazakhstan	44 (4.5)	▲
Lithuania	34 (2.4)	▲	United States	39 (2.3)	▲
Australia	16 (3.0)	▲	Lithuania	36 (2.7)	▲
Hungary	15 (3.4)	▲	Hungary	29 (3.2)	▲
Slovenia	13 (2.1)	▲	Slovenia	20 (1.9)	▲
Italy	8 (2.6)	▲	Sweden	19 (2.8)	▲
Sweden	4 (2.1)	▲	Australia	17 (3.1)	▲
Kazakhstan	1 (4.5)		Italy	7 (2.6)	▲
Norway (4)	-5 (2.8)		Norway (4)	-7 (2.3)	▼
New Zealand	-14 (2.6)	▼	New Zealand	-9 (2.3)	▼
Turkey	-31 (4.7)	▼	Turkey	-17 (3.1)	▼
Chile	-38 (2.3)	▼	Georgia	-37 (3.6)	▼
Georgia	-50 (3.7)	▼	Chile	-41 (2.4)	▼
Bahrain	-64 (3.2)	▼	United Arab Emirates	-48 (2.4)	▼
United Arab Emirates	-66 (2.0)	▼	Bahrain	-49 (1.6)	▼
Iran, Islamic Rep. of	-69 (3.5)	▼	Qatar	-61 (3.4)	▼
Qatar	-87 (3.4)	▼	Iran, Islamic Rep. of	-69 (3.2)	▼
Saudi Arabia	-90 (5.2)	▼	Oman	-75 (2.5)	▼
Oman	-115 (2.9)	▼	Saudi Arabia	-117 (4.1)	▼
Morocco	-165 (4.0)	▼	Morocco	-123 (3.4)	▼

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

2011 - Eighth Grade			2015 - Eighth Grade		
Country	Achievement Difference from TIMSS Scale Centerpoint (500)		Country	Achievement Difference from TIMSS Scale Centerpoint (500)	
Korea, Rep. of	113 (2.9)	▲	Singapore	121 (3.2)	▲
Singapore	111 (3.8)	▲	Korea, Rep. of	106 (2.6)	▲
Chinese Taipei	109 (3.2)	▲	Chinese Taipei	99 (2.4)	▲
Hong Kong SAR	86 (3.9)	▲	Hong Kong SAR	94 (4.6)	▲
Japan	70 (2.6)	▲	Japan	86 (2.3)	▲
Russian Federation	39 (3.6)	▲	Russian Federation	38 (4.7)	▲
United States	9 (2.7)	▲	Kazakhstan	28 (5.3)	▲
England	7 (5.6)		United States	18 (3.1)	▲
Hungary	5 (3.5)		England	18 (4.2)	▲
Australia	5 (5.2)		Slovenia	16 (2.1)	▲
Slovenia	5 (2.2)	▲	Hungary	14 (3.8)	▲
Lithuania	2 (2.5)		Lithuania	12 (2.9)	▲
Italy	-2 (2.3)		Australia	5 (3.1)	
New Zealand	-12 (5.4)	▼	Sweden	1 (2.8)	
Kazakhstan	-13 (4.2)	▼	Italy	-6 (2.5)	▼
Sweden	-16 (1.9)	▼	New Zealand	-7 (3.4)	▼
Norway (8)	-25 (2.5)	▼	Norway (8)	-13 (2.0)	▼
United Arab Emirates	-44 (2.1)	▼	United Arab Emirates	-35 (2.0)	▼
Turkey	-48 (4.0)	▼	Turkey	-42 (4.7)	▼
Georgia	-69 (3.7)	▼	Bahrain	-46 (1.4)	▼
Chile	-84 (2.7)	▼	Georgia	-47 (3.4)	▼
Iran, Islamic Rep. of	-85 (4.3)	▼	Qatar	-63 (3.0)	▼
Qatar	-90 (3.1)	▼	Iran, Islamic Rep. of	-64 (4.6)	▼
Bahrain	-91 (1.9)	▼	Chile	-73 (3.2)	▼
Saudi Arabia	-106 (4.7)	▼	Oman	-97 (2.4)	▼
Morocco	-129 (2.0)	▼	Morocco	-116 (2.3)	▼
Oman	-134 (2.9)	▼	Saudi Arabia	-132 (4.6)	▼

- ▲ Country average significantly higher than the centerpoint of the TIMSS scale
- ▼ Country average significantly lower than the centerpoint of the TIMSS scale

Trend results for Lithuania do not include students taught in Polish or in Russian.

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



**Exhibit 1.9: Relative Achievement of 2011 Fourth Grade Cohort as Eighth Grade Students in 2015 – Countries Assessed Both Grades in Both Assessment Years (Continued)**

2011 - Fourth Grade			2015 - Fourth Grade		
Country	Achievement Difference from TIMSS Scale Centerpoint (500)		Country	Achievement Difference from TIMSS Scale Centerpoint (500)	
<b>Benchmarking Participants</b>			<b>Benchmarking Participants</b>		
Florida, US	45 (3.0)	▲	Florida, US	46 (4.7)	▲
Quebec, Canada	33 (2.5)	▲	Quebec, Canada	36 (4.0)	▲
Ontario, Canada	18 (3.0)	▲	Ontario, Canada	12 (2.3)	▲
Dubai, UAE	-32 (1.7)	▼	Dubai, UAE	11 (1.4)	▲
Abu Dhabi, UAE	-83 (4.6)	▼	Abu Dhabi, UAE	-81 (4.7)	▼

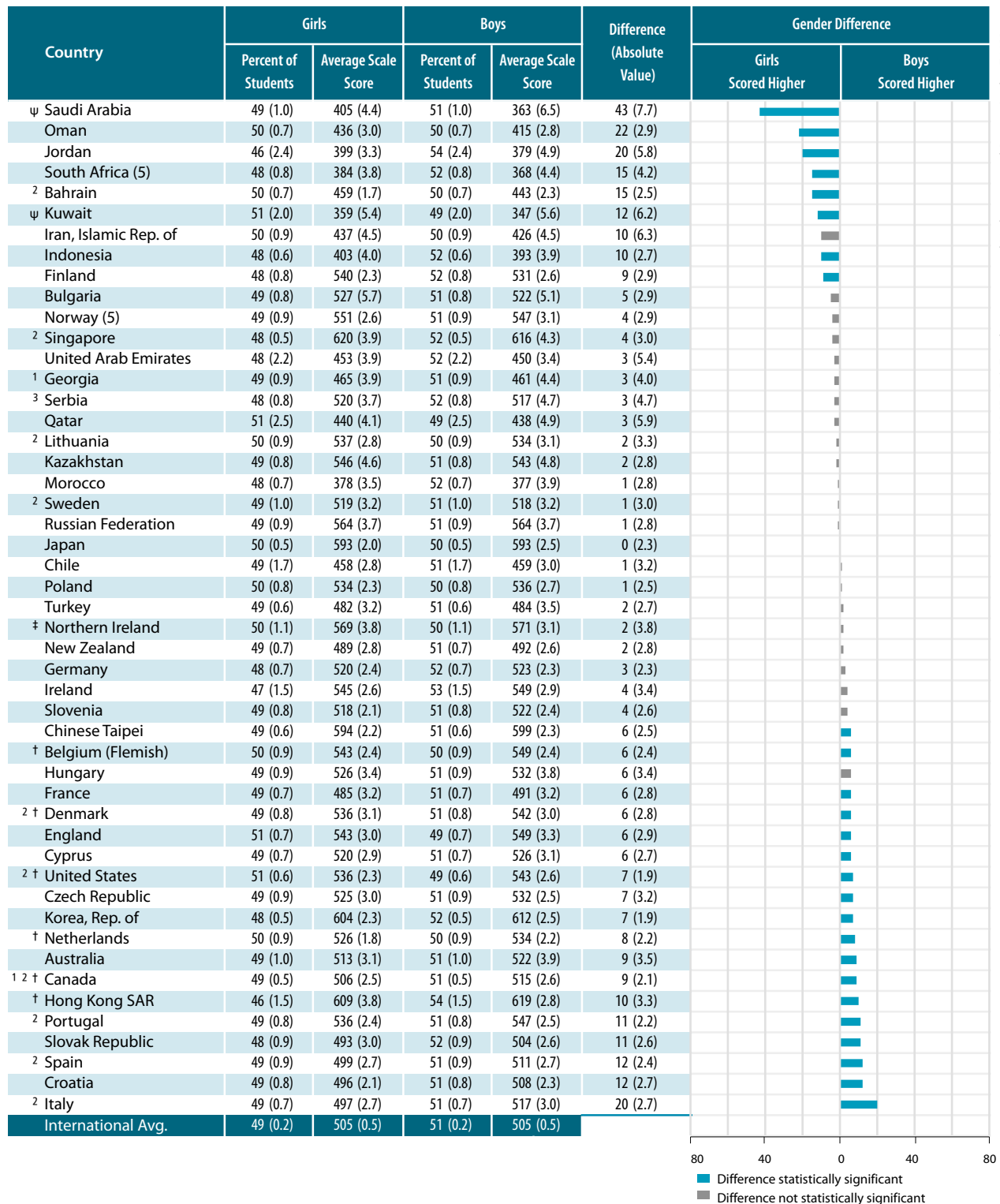
  

2011 - Eighth Grade			2015 - Eighth Grade		
Country	Achievement Difference from TIMSS Scale Centerpoint (500)		Country	Achievement Difference from TIMSS Scale Centerpoint (500)	
<b>Benchmarking Participants</b>			<b>Benchmarking Participants</b>		
Quebec, Canada	32 (2.4)	▲	Quebec, Canada	43 (3.9)	▲
Florida, US	13 (6.6)	▲	Ontario, Canada	22 (2.9)	▲
Ontario, Canada	12 (2.4)	▲	Dubai, UAE	12 (2.1)	▲
Dubai, UAE	-22 (2.2)	▼	Florida, US	-7 (6.4)	▼
Abu Dhabi, UAE	-51 (3.7)	▼	Abu Dhabi, UAE	-58 (4.7)	▼

- ▲ Country average significantly higher than the centerpoint of the TIMSS scale
- ▼ Country average significantly lower than the centerpoint of the TIMSS scale

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

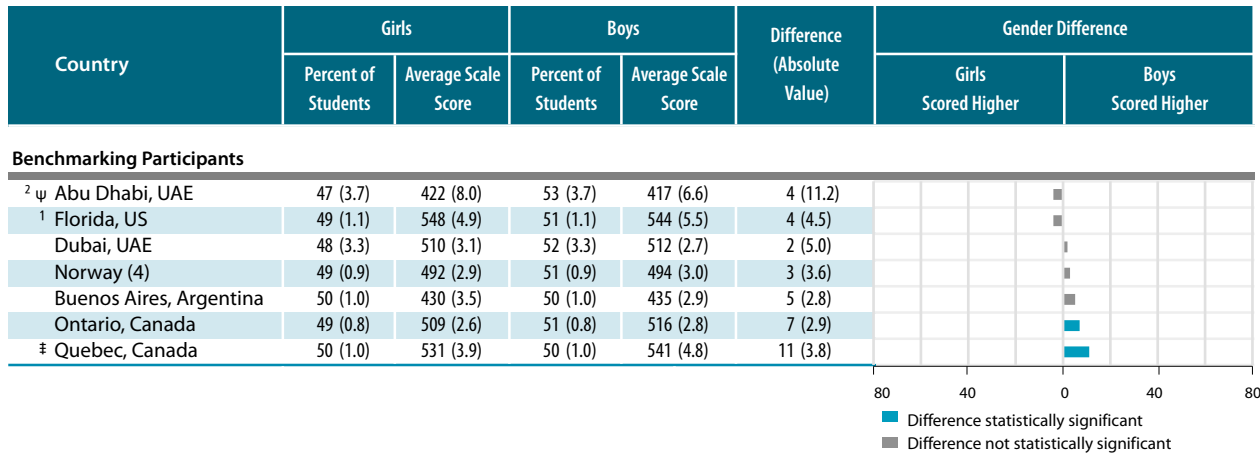
Exhibit 1.10: Average Mathematics Achievement by Gender



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

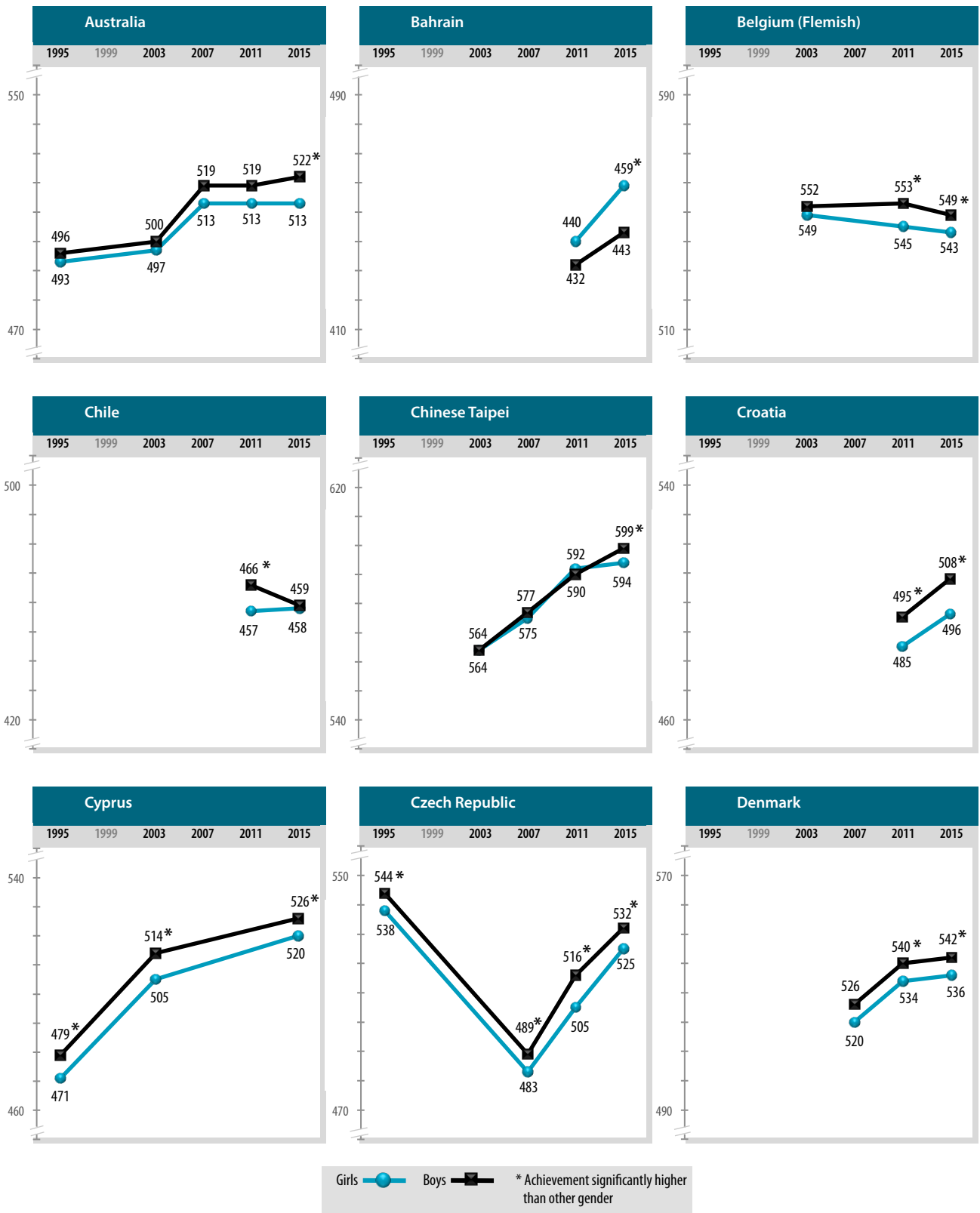
ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.  
 See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 for sampling guidelines and sampling participation notes †, ‡, and †.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

**Exhibit 1.10: Average Mathematics Achievement by Gender (Continued)**



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 1.12: Trends in Mathematics Achievement by Gender<sup>◇</sup>**

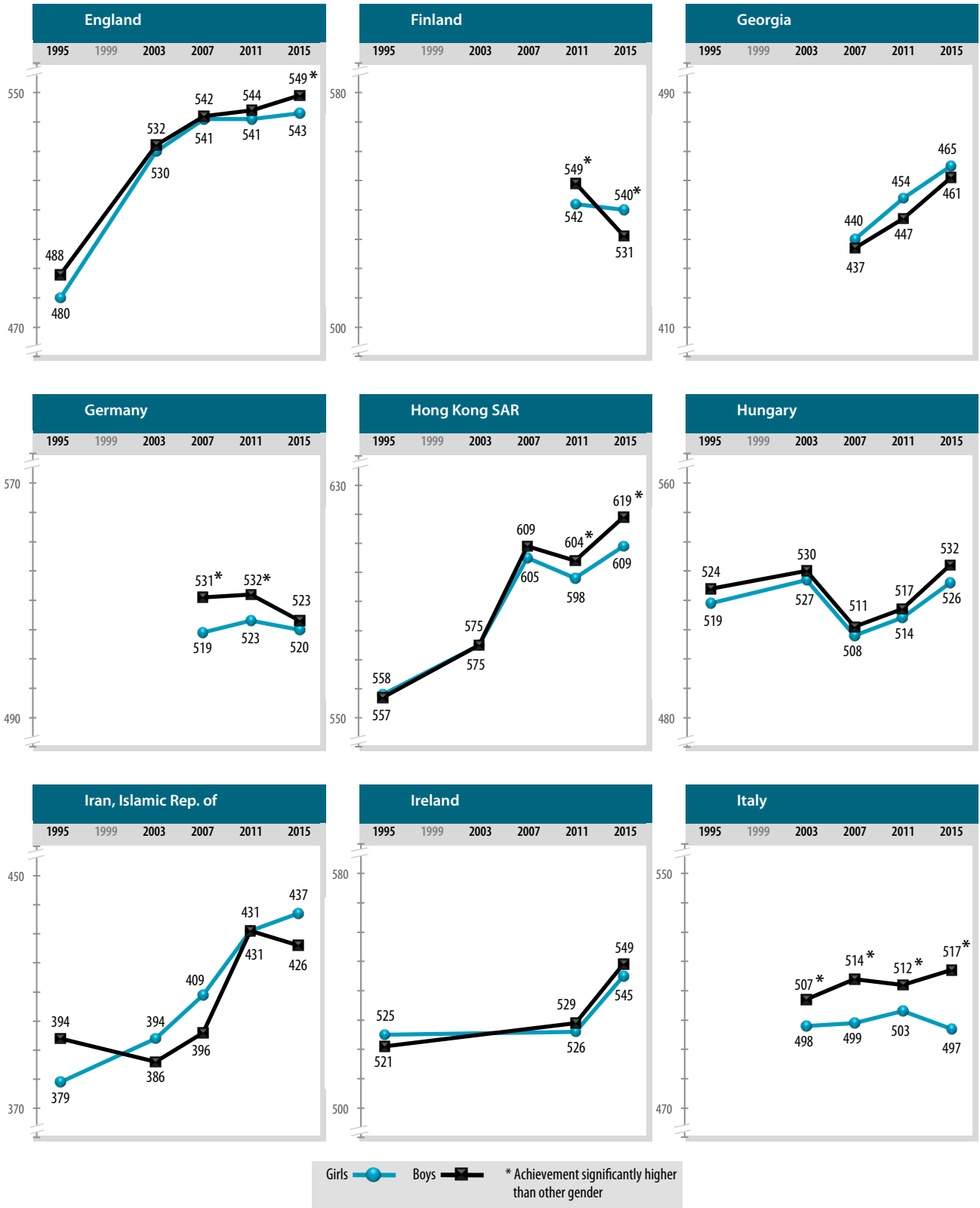


SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

<sup>◇</sup> No fourth grade assessment in 1999.

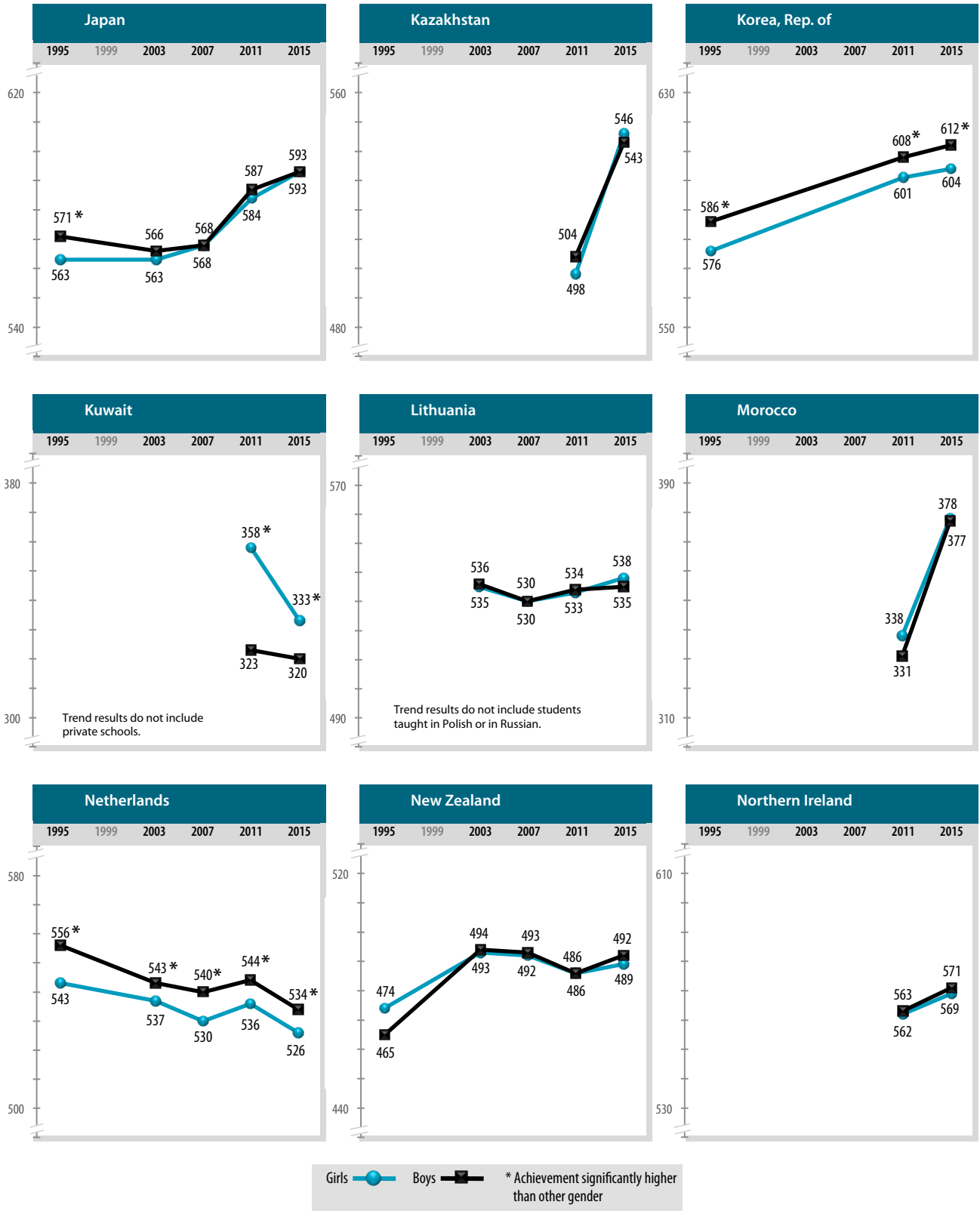
Scale interval is 10 points for each country, but the part of the scale shown differs according to each country's average achievement.

**Exhibit 1.12: Trends in Mathematics Achievement by Gender<sup>0</sup> (Continued)**



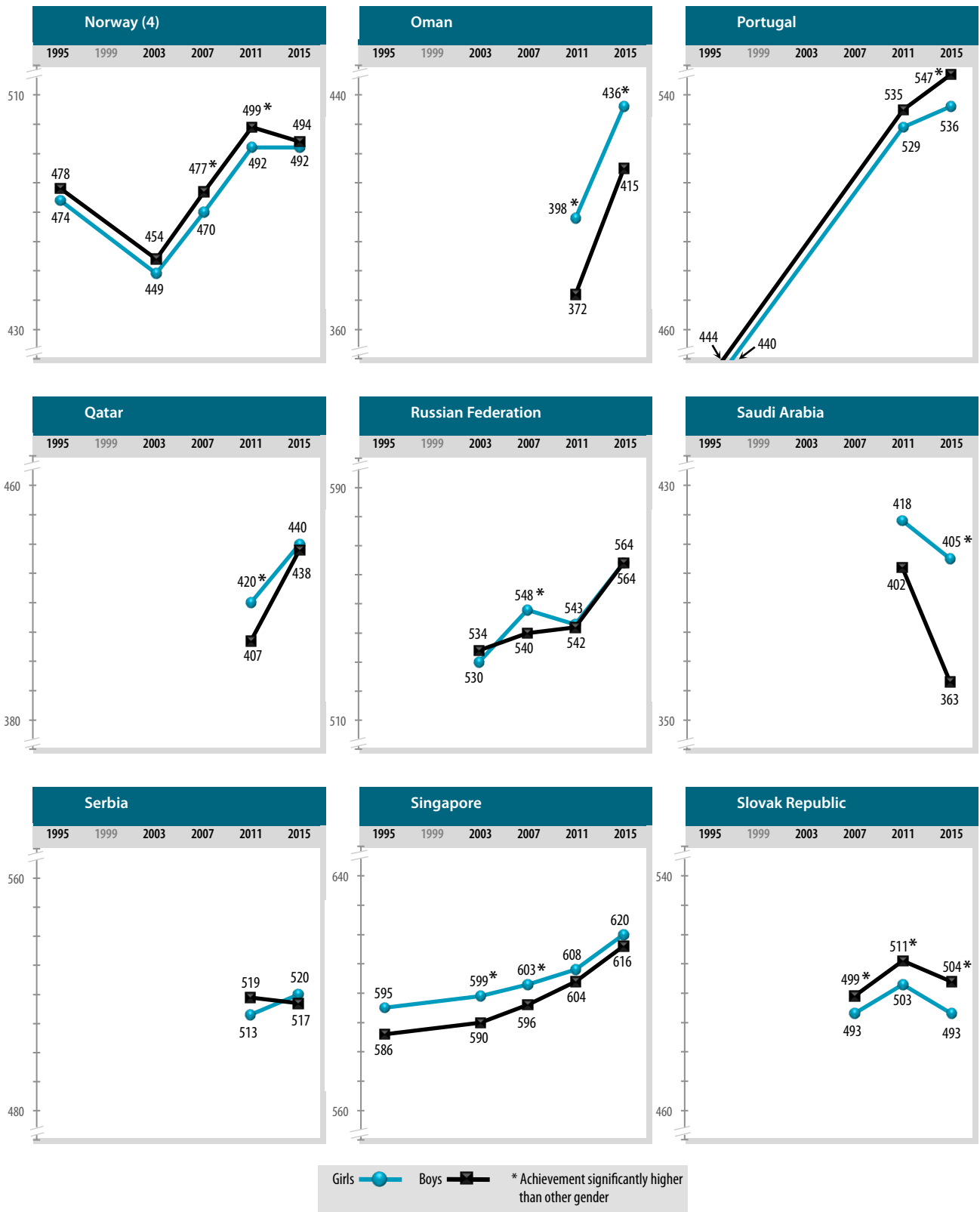
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 1.12: Trends in Mathematics Achievement by Gender<sup>0</sup> (Continued)**



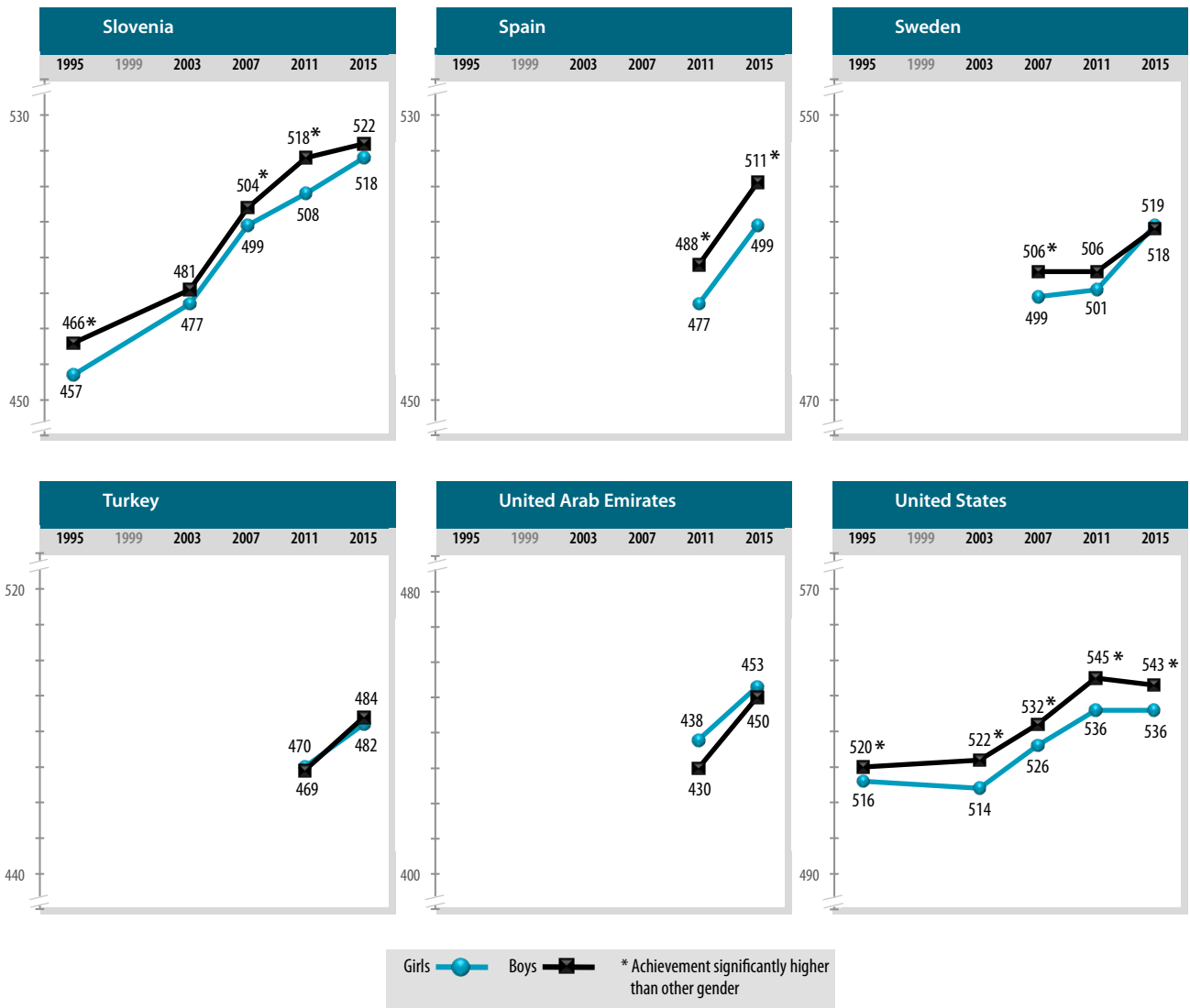
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 1.12: Trends in Mathematics Achievement by Gender<sup>0</sup> (Continued)**



SOURCE: IEA's Trends in International Mathematics and Science Study - TIMSS 2015

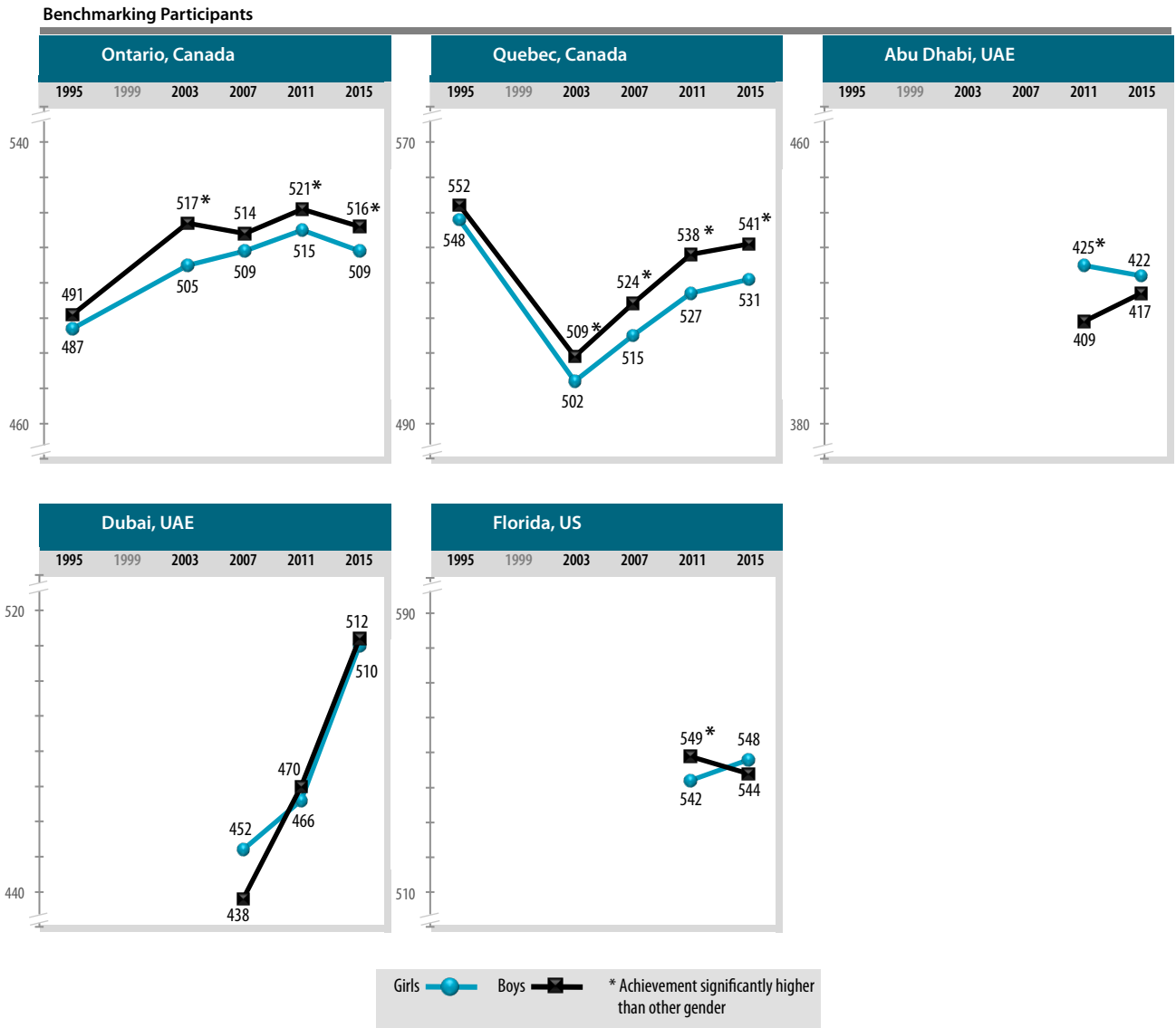
**Exhibit 1.12: Trends in Mathematics Achievement by Gender<sup>0</sup> (Continued)**



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**Exhibit 1.12: Trends in Mathematics Achievement by Gender<sup>0</sup> (Continued)**



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**TIMSS**  
**2015**

# CHAPTER 2: PERFORMANCE AT INTERNATIONAL BENCHMARKS

TIMSS 2015 INTERNATIONAL RESULTS IN MATHEMATICS



**IEA**

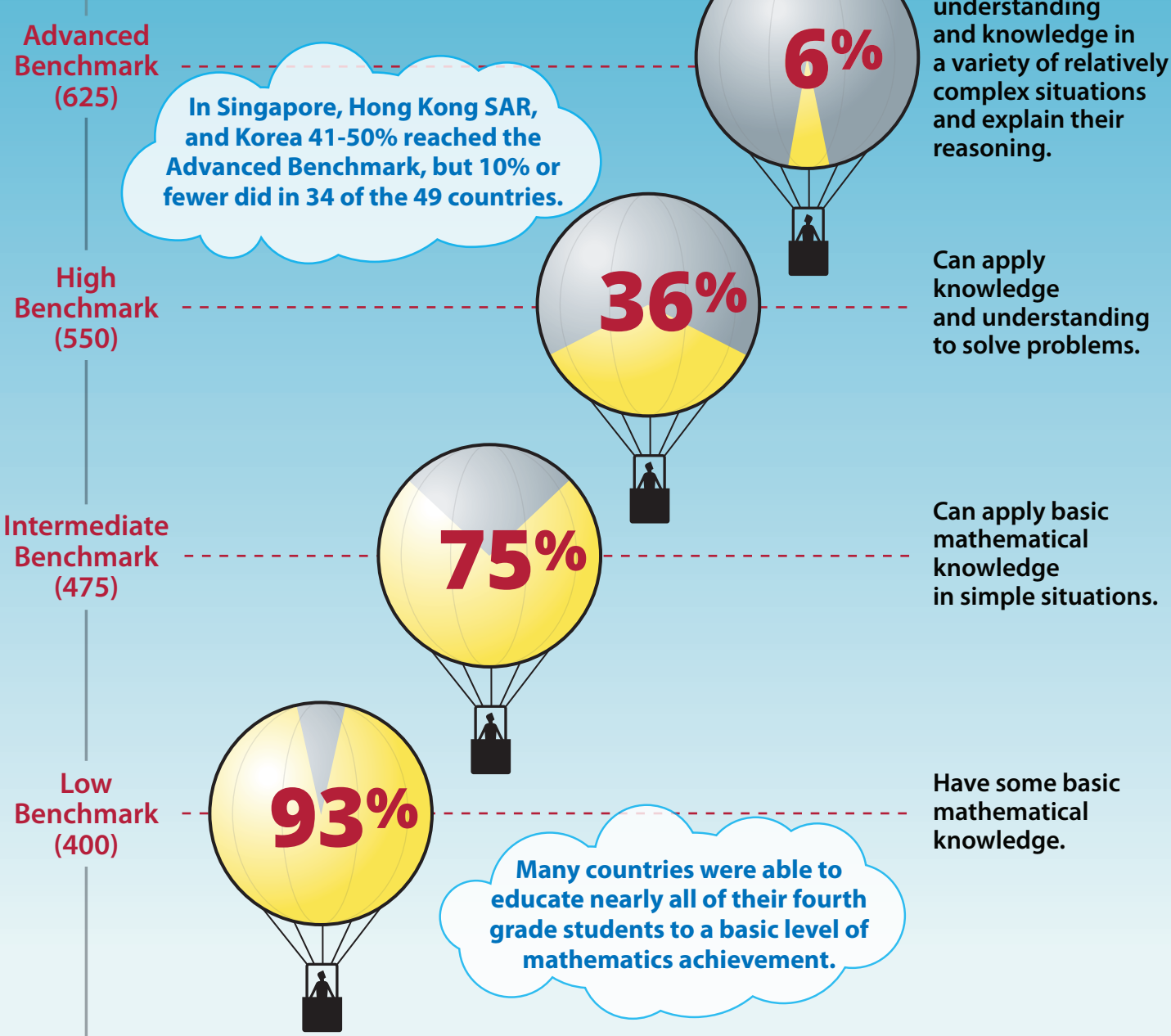
**TIMSS & PIRLS**  
International Study Center  
Lynch School of Education, Boston College



### Achievement at TIMSS International Benchmarks

TIMSS describes achievement at four International Benchmarks along the mathematics achievement scale: Advanced, High, Intermediate, and Low.

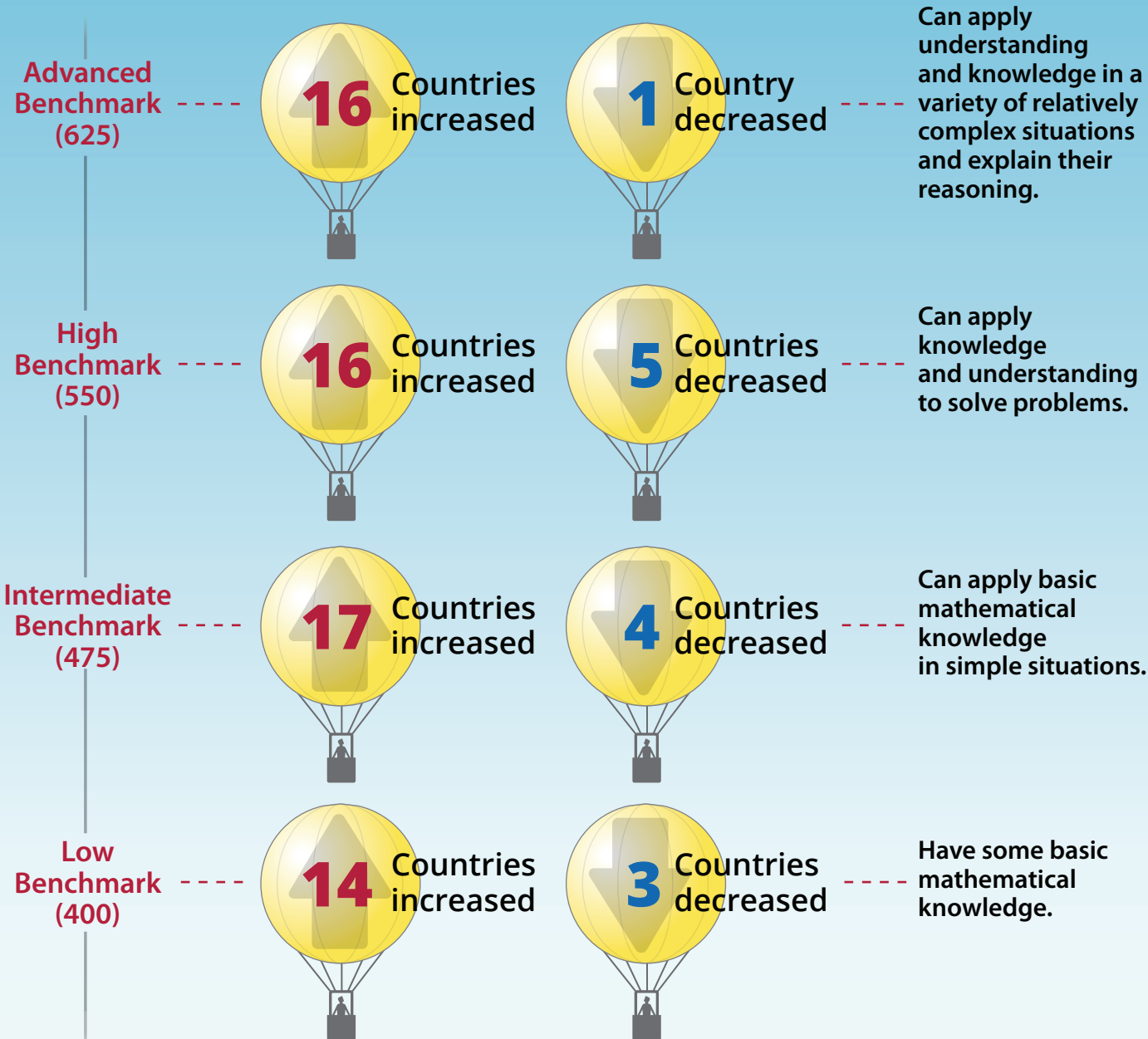
#### Percentage of Students Reaching Benchmarks (averaged across countries)



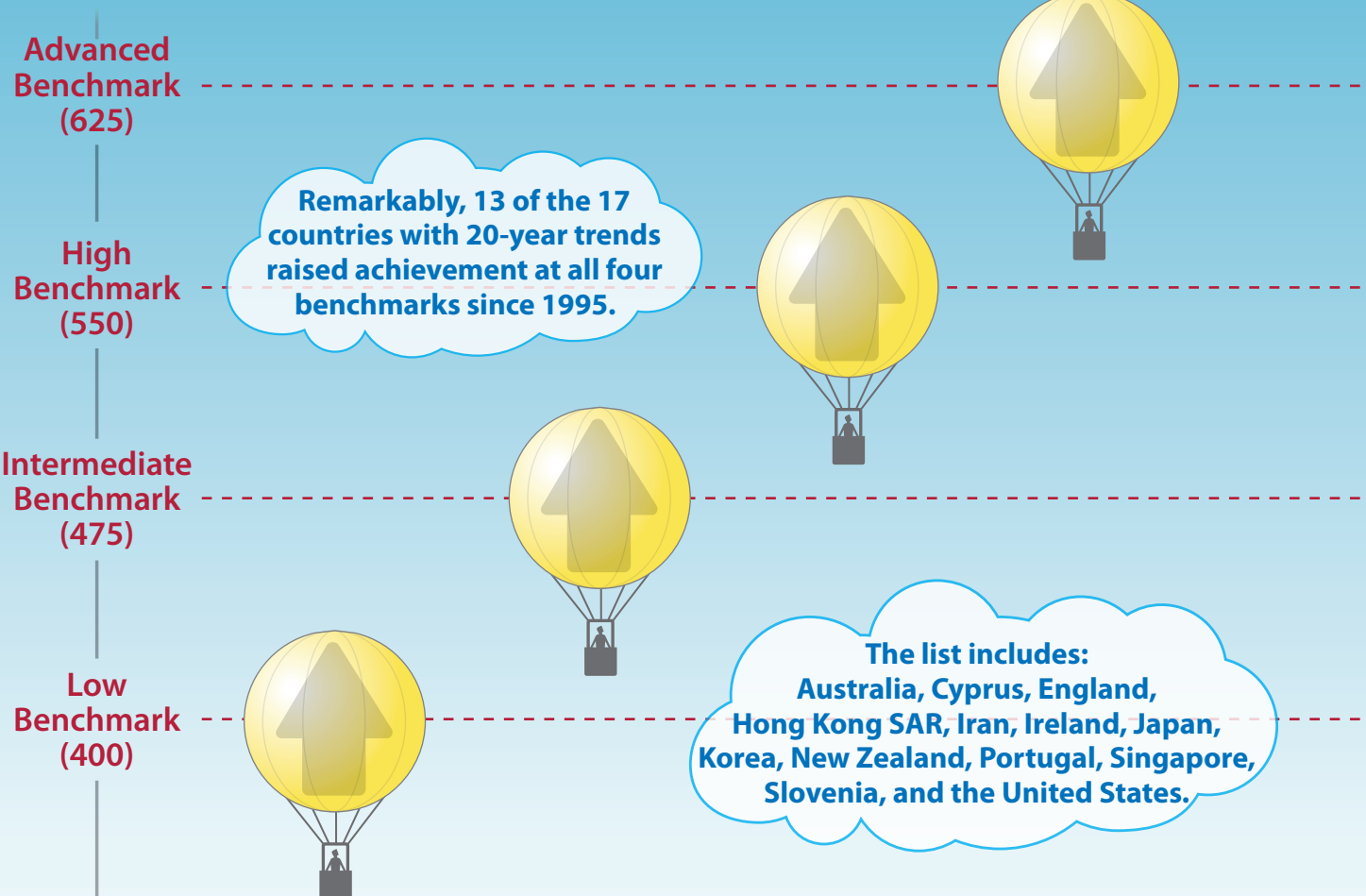
#### Trends at the TIMSS International Benchmarks

In general, there were more improvements across the International Benchmarks in 2015 than there were declines.

##### Trends 2011- 2015: 41 Countries



##### Trends 1995-2015: 17 Countries



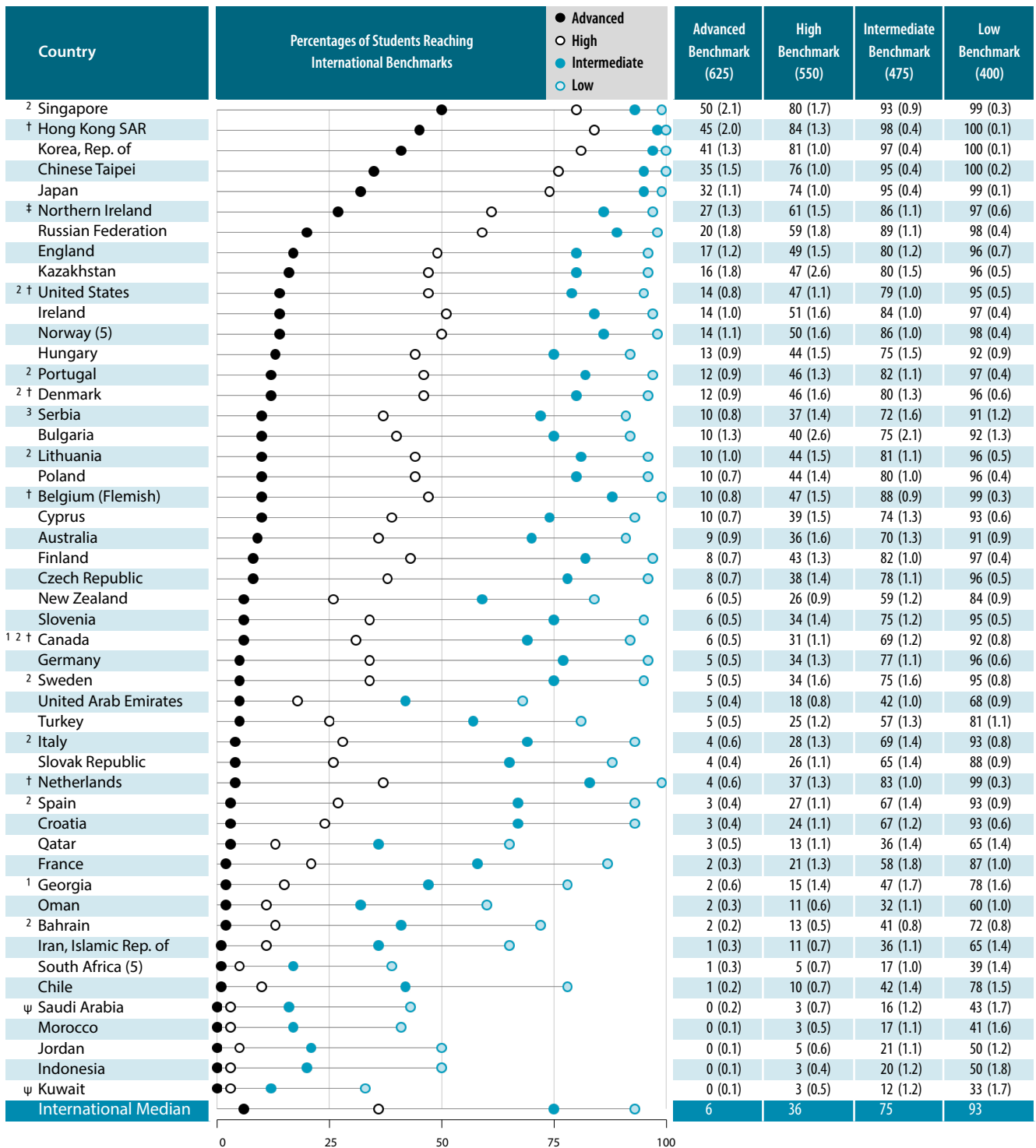


**Exhibit 2.1: Descriptions of the TIMSS 2015 International Benchmarks of Mathematics Achievement**

<b>625</b> Advanced International Benchmark	
<i>Students can apply their understanding and knowledge in a variety of relatively complex situations and explain their reasoning. They can solve a variety of multi-step word problems involving whole numbers. Students at this level show an increasing understanding of fractions and decimals. They can apply knowledge of a range of two- and three-dimensional shapes in a variety of situations. They can interpret and represent data to solve multi-step problems.</i>	
<b>550</b> High International Benchmark	
<i>Students can apply their knowledge and understanding to solve problems. They can solve word problems involving operations with whole numbers, simple fractions, and two-place decimals. Students demonstrate understanding of geometric properties of shapes and of angles that are less than or greater than a right angle. Students can interpret and use data in tables and a variety of graphs to solve problems.</i>	
<b>475</b> Intermediate International Benchmark	
<i>Students can apply basic mathematical knowledge in simple situations. They demonstrate an understanding of whole numbers and some understanding of fractions and decimals. Students can relate two- and three-dimensional shapes and identify and draw shapes with simple properties. They can read and interpret bar graphs and tables.</i>	
<b>400</b> Low International Benchmark	
<i>Students have some basic mathematical knowledge. They can add and subtract whole numbers, have some understanding of multiplication by one-digit numbers, and can solve simple word problems. They have some knowledge of simple fractions, geometric shapes, and measurement. Students can read and complete simple bar graphs and tables.</i>	

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 2.2: Performance at the International Benchmarks of Mathematics Achievement**

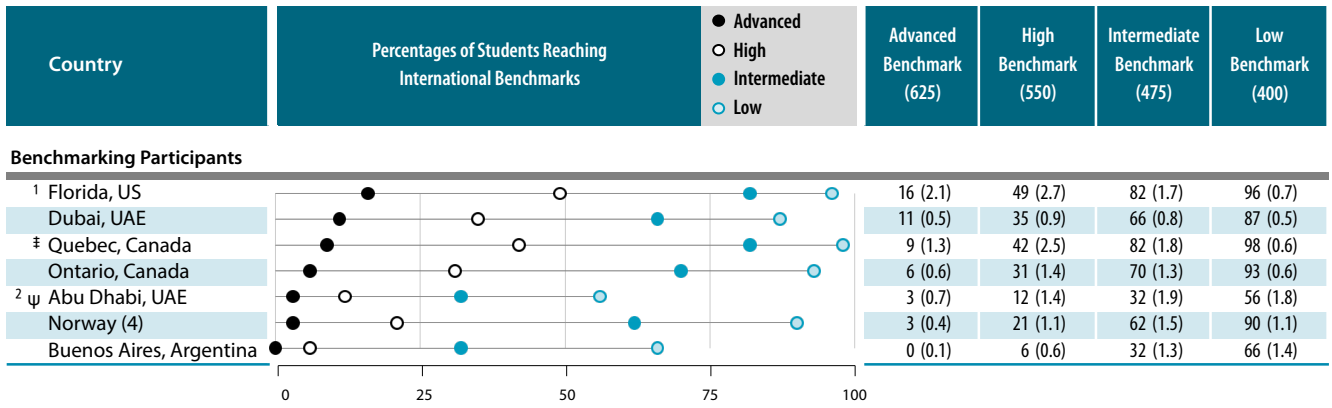


SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

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



**Exhibit 2.2: Performance at the International Benchmarks of Mathematics Achievement (Continued)**



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 2.3: Percentages of Students Reaching the International Benchmarks of Mathematics Achievement Across Assessment Years**

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

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Benchmarking Participants**

Florida, US	16	14				49	47			
Dubai, UAE	11	5 ▲	2 ▲			35	22 ▲	12 ▲		
Quebec, Canada	9	6	5 ▲	3 ▲	13 ▼	42	40	34 ▲	25 ▲	50
Ontario, Canada	6	7	4	5	4 ▲	31	34	29	29	22 ▲
ψ Abu Dhabi, UAE	3	1 ▲				12	8 ▲			

- ▲ 2015 percent significantly higher
- ▼ 2015 percent significantly lower

An empty cell indicates a country did not participate in that year's assessment.

Trend results for Kuwait do not include private schools. Trend results for Lithuania do not include students taught in Polish or in Russian.

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

**Exhibit 2.3: Percentages of Students Reaching the International Benchmarks of Mathematics Achievement Across Assessment Years (Continued)**

Country	Intermediate International Benchmark (475)					Low International Benchmark (400)				
	Percent of Students					Percent of Students				
	2015	2011	2007	2003	1995	2015	2011	2007	2003	1995
Singapore	93	94	92	91	89 ▲	99	99	98	97	96 ▲
Hong Kong SAR	98	96	97	94 ▲	87 ▲	100	99	100	99 ▲	97 ▲
Korea, Rep. of	97	97			94 ▲	100	100			99 ▲
Chinese Taipei	95	93 ▲	92 ▲	92 ▲		100	99	99 ▲	99 ▲	
Japan	95	93 ▲	89 ▲	89 ▲	89 ▲	99	99	98 ▲	98 ▲	98 ▲
Northern Ireland	86	85				97	96			
Russian Federation	89	82 ▲	81 ▲	76 ▲		98	97 ▲	95 ▲	95 ▲	
England	80	78	79	75 ▲	54 ▲	96	93 ▲	94	93 ▲	82 ▲
Kazakhstan	80	62 ▲				96	88 ▲			
United States	79	81	77	72 ▲	71 ▲	95	96 ▼	95	93 ▲	92 ▲
Ireland	84	77 ▲			73 ▲	97	94 ▲			91 ▲
Hungary	75	70 ▲	67 ▲	76	72	92	90	88 ▲	94 ▼	91
Portugal	82	80			37 ▲	97	97			70 ▲
Denmark	80	82	76 ▲			96	97	95		
Serbia	72	70				91	90			
Lithuania	81	79	77 ▲	79		96	96	94 ▲	96	
Belgium (Flemish)	88	89		90		99	99		99	
Cyprus	74			68 ▲	52 ▲	93			89 ▲	79 ▲
Australia	70	70	71	64 ▲	61 ▲	91	90	91	88 ▲	86 ▲
Finland	82	85				97	98			
Czech Republic	78	72 ▲	59 ▲		79	96	93 ▲	88 ▲		95
New Zealand	59	58	61	61	51 ▲	84	85	85	86	78 ▲
Slovenia	75	72	67 ▲	55 ▲	45 ▲	95	94	92 ▲	84 ▲	77 ▲
Germany	77	81 ▼	78			96	97	96		
Sweden	75	69 ▲	68 ▲			95	93	93		
United Arab Emirates	42	35 ▲				68	64 ▲			
Turkey	57	51 ▲				81	77 ▲			
Italy	69	69	67	65		93	93	91	89 ▲	
Slovak Republic	65	69	63			88	90	88		
Netherlands	83	88 ▼	84	89 ▼	87 ▼	99	99	98	99	99
Spain	67	56 ▲				93	87 ▲			
Norway (4)	62	63	52 ▲	41 ▲	53 ▲	90	91	83 ▲	75 ▲	84 ▲
Croatia	67	60 ▲				93	90 ▲			
Qatar	36	29 ▲				65	55 ▲			
Georgia	47	41 ▲	35 ▲			78	72 ▲	67 ▲		
Oman	32	20 ▲				60	46 ▲			
Bahrain	41	34 ▲				72	67 ▲			
Iran, Islamic Rep. of	36	33	20 ▲	17 ▲	15 ▲	65	64	53 ▲	45 ▲	44 ▲
Chile	42	44				78	77			
ψ Saudi Arabia	16	24 ▼				43	55 ▼			
Morocco	17	10 ▲				41	26 ▲			
ψ Kuwait	7	9 ▼				23	30 ▼			
<b>Benchmarking Participants</b>										
Florida, US	82	83				96	97			
Dubai, UAE	66	50 ▲	37 ▲			87	75 ▲	69 ▲		
Quebec, Canada	82	83	74 ▲	69 ▲	87 ▼	98	99	96 ▲	94 ▲	98
Ontario, Canada	70	73	71	70	59 ▲	93	94	94	94	86 ▲
ψ Abu Dhabi, UAE	32	29				56	58			

▲ 2015 percent significantly higher  
▼ 2015 percent significantly lower

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 2.4: Description of the TIMSS 2015 Low International Benchmark (400) of Mathematics Achievement**

400	Low International Benchmark
	<p><b>Summary</b></p> <p><i>Students have some basic mathematical knowledge. They can add and subtract whole numbers, have some understanding of multiplication by one-digit numbers, and can solve simple word problems. They have some knowledge of simple fractions, geometric shapes, and measurement. Students can read and complete simple bar graphs and tables.</i></p> <p>Students at this level are familiar with numbers into the thousands. They can add and subtract whole numbers, have some understanding of multiplication by one-digit numbers, and can solve simple word problems. They can recognize pictorial representations of simple fractions.</p> <p>Students have some recognition of simple two- and three-dimensional shapes and basic measurement ideas.</p> <p>Students can read and complete simple bar graphs and tables.</p>

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 2.4.1: Low International Benchmark – Example Item 1**

Country	Percent Correct	Content Domain: Number
		Cognitive Domain: Knowing
		Description: Identifies a four-digit number given in words
Chinese Taipei	98 (0.6)	<p>Three thousand twenty three can be written as:</p> <p>(A) 323</p> <p><input checked="" type="radio"/> 3,023</p> <p>(C) 30,023</p> <p>(D) 300,023</p>
Russian Federation	98 (0.7)	
Japan	98 (0.6)	
Korea, Rep. of	96 (0.8)	
Czech Republic	96 (0.8)	
<sup>†</sup> Hong Kong SAR	96 (0.9)	
<sup>2</sup> Spain	96 (1.0)	
<sup>2</sup> Lithuania	95 (1.1)	
<sup>2</sup> Portugal	94 (0.9)	
France	94 (1.2)	
Croatia	94 (1.2)	
<sup>†</sup> Belgium (Flemish)	94 (0.9)	
Norway (5)	94 (1.2)	
<sup>3</sup> Serbia	94 (1.5)	
Poland	94 (1.2)	
<sup>2</sup> Singapore	94 (1.0)	
<sup>†</sup> Netherlands	93 (1.3)	
Kazakhstan	93 (1.3)	
Ireland	93 (1.3)	
England	93 (1.1)	
<sup>‡</sup> Northern Ireland	92 (1.4)	
Finland	92 (1.2)	
<sup>2</sup> <sup>†</sup> United States	92 (0.8)	
Chile	92 (1.1)	
Germany	92 (1.3)	
Cyprus	92 (1.2)	
<sup>2</sup> Italy	91 (1.4)	
Bulgaria	91 (1.5)	
Hungary	91 (1.7)	
<sup>2</sup> Sweden	91 (1.4)	
Slovenia	90 (1.3)	
Australia	89 (1.3)	
Slovak Republic	88 (1.5)	
<sup>2</sup> <sup>†</sup> Denmark	88 (1.7)	
New Zealand	87 (1.2)	
<b>International Avg.</b>	<b>87 (0.2)</b>	
<sup>1</sup> Georgia	87 (1.8)	
<sup>1</sup> <sup>2</sup> <sup>†</sup> Canada	87 (1.1)	
Turkey	85 (1.7)	
United Arab Emirates	77 (1.2)	
Qatar	74 (1.9)	
<sup>2</sup> Bahrain	72 (1.8)	
Oman	66 (1.8)	
Morocco	62 (2.6)	
Indonesia	59 (2.7)	
Kuwait	58 (2.5)	
Saudi Arabia	58 (2.2)	
Iran, Islamic Rep. of	57 (3.2)	
Jordan	- -	
South Africa (5)	- -	

Country	Percent Correct
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Benchmarking Participants	
<sup>1</sup> Florida, US	94 (1.3)
<sup>‡</sup> Quebec, Canada	91 (1.8)
Dubai, UAE	89 (1.1)
Ontario, Canada	86 (1.7)
Norway (4)	84 (2.1)
Buenos Aires, Argentina	83 (1.8)
<sup>2</sup> Abu Dhabi, UAE	72 (2.5)

Percent significantly higher than international average  
 Percent significantly lower than international average

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 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 2015

**Exhibit 2.4.2: Low International Benchmark – Example Item 2\***

Country	Percent Full Credit	Content Domain: Number Cognitive Domain: Knowing Description: Multiplies a three-digit number by a one-digit number
Iran, Islamic Rep. of	64 (2.2) ▲	$512 \times 3 =$  Answer: <u>1536</u>
Morocco	63 (1.7) ▲	
<sup>2</sup> Bahrain	62 (1.4) ▲	
Indonesia	57 (2.0)	
International Avg.	53 (0.7)	
Jordan	50 (1.3) ▼	
South Africa (5)	41 (1.3) ▼	
Kuwait	38 (1.9) ▼	
<b>Benchmarking Participants</b>		
Buenos Aires, Argentina	74 (1.2) ▲	

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

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

- ▲ Percent significantly higher than international average
- ▼ Percent significantly lower than international average

\* Item administered only in TIMSS Numeracy.

See Appendix C.1 for target population coverage notes 1, 2, and 3.



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


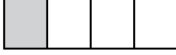
**Exhibit 2.4.3: Low International Benchmark – Example Item 3\***

Country	Percent Correct
<sup>2</sup> Bahrain	83 (0.8) ▲
Iran, Islamic Rep. of	82 (1.5) ▲
Jordan	65 (1.2)
<b>International Avg.</b>	<b>64 (0.6)</b>
Indonesia	62 (1.7)
Kuwait	62 (2.1)
South Africa (5)	61 (1.2) ▼
Morocco	33 (1.4) ▼
<b>Benchmarking Participants</b>	
Buenos Aires, Argentina	72 (2.0) ▲

**Content Domain: Number**  
**Cognitive Domain: Knowing**  
**Description: Recognizes a unit fraction represented pictorially**

Which rectangle is  $\frac{1}{3}$  shaded?

(A)  (B) 

(C)  (D) 

- ▲ Percent significantly higher than international average
- ▼ Percent significantly lower than international average

\* Item administered only in TIMSS Numeracy.

See Appendix C.1 for target population coverage notes 1, 2, and 3.

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

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 2.4.4: Low International Benchmark – Example Item 4\***

Country	Percent Correct
Indonesia	91 (1.0) ▲
<sup>2</sup> Bahrain	85 (0.9) ▲
Iran, Islamic Rep. of	74 (1.5) ▲
<b>International Avg.</b>	<b>71 (0.5)</b>
Jordan	70 (1.1)
Kuwait	63 (1.7) ▼
Morocco	58 (1.7) ▼
South Africa (5)	56 (1.4) ▼
<b>Benchmarking Participants</b>	
Buenos Aires, Argentina	73 (1.6)

**Content Domain: Geometric Shapes and Measures**  
**Cognitive Domain: Knowing**  
**Description: Identifies the greatest volume of four rectangular prisms represented pictorially**

John put 4 boxes on a table, as shown below.

Which box holds the most?

(A) Box 1  
 (B) Box 2  
 (C) Box 3  
 (D) Box 4

- ▲ Percent significantly higher than international average
- ▼ Percent significantly lower than international average

\* Item administered only in TIMSS Numeracy.

See Appendix C.1 for target population coverage notes 1, 2, and 3.

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

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**Exhibit 2.4.5: Low International Benchmark – Example Item 5**

Country	Percent Full Credit
Korea, Rep. of	98 (0.6) ▲
Chinese Taipei	96 (1.0) ▲
† Hong Kong SAR	96 (1.0) ▲
England	96 (1.0) ▲
Japan	96 (0.9) ▲
Norway (5)	94 (1.0) ▲
Ireland	94 (1.1) ▲
<sup>2</sup> Singapore	93 (1.0) ▲
† Belgium (Flemish)	93 (0.9) ▲
† Netherlands	93 (1.2) ▲
Germany	93 (1.0) ▲
‡ Northern Ireland	92 (1.5) ▲
<sup>2</sup> Portugal	91 (1.1) ▲
Russian Federation	91 (1.3) ▲
Croatia	91 (1.6) ▲
Finland	90 (1.4) ▲
Australia	90 (1.3) ▲
Poland	90 (1.2) ▲
<sup>2</sup> † United States	90 (1.0) ▲
<sup>2</sup> Sweden	89 (1.6) ▲
<sup>2</sup> Lithuania	88 (1.5) ▲
Czech Republic	88 (1.4) ▲
<sup>1</sup> <sup>2</sup> † Canada	87 (0.9) ▲
<sup>2</sup> † Denmark	87 (1.6) ▲
New Zealand	87 (1.3) ▲
<sup>2</sup> Spain	87 (1.3) ▲
Hungary	86 (1.6) ▲
<sup>3</sup> Serbia	86 (1.9) ▲
Slovenia	85 (1.7) ▲
France	85 (1.9) ▲
<sup>2</sup> Bahrain	84 (1.6) ▲
<b>International Avg.</b>	<b>84 (0.2)</b>
Bulgaria	82 (2.5) ▲
<sup>2</sup> Italy	81 (1.9) ▲
Slovak Republic	81 (1.8) ▲
Cyprus	81 (1.8) ▲
Turkey	79 (1.8) ▼
United Arab Emirates	79 (1.0) ▼
Kazakhstan	79 (1.8) ▼
Chile	78 (1.7) ▼
Qatar	78 (1.8) ▼
Oman	69 (1.7) ▼
Saudi Arabia	65 (2.0) ▼
Indonesia	64 (2.8) ▼
<sup>1</sup> Georgia	58 (2.1) ▼
Iran, Islamic Rep. of	57 (2.6) ▼
Kuwait	54 (2.3) ▼
Morocco	47 (2.3) ▼
Jordan	- -
South Africa (5)	- -

**Content Domain: Data Display**  
**Cognitive Domain: Knowing**  
**Description: Reads data from a bar graph**

**Visits to the “Find the Answer” Website**

The chart shows the number of visits to the “Find the Answer” website.  
How many visits were there on Wednesday?

Answer: 8,000

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

Country	Percent Full Credit
<b>Benchmarking Participants</b>	
‡ Quebec, Canada	92 (1.7) ▲
Dubai, UAE	90 (1.1) ▲
Ontario, Canada	88 (1.3) ▲
<sup>1</sup> Florida, US	86 (2.6) ▲
Norway (4)	84 (1.7) ▲
<sup>2</sup> Abu Dhabi, UAE	74 (2.2) ▼
Buenos Aires, Argentina	61 (2.4) ▼

- ▲ Percent significantly higher than international average
- ▼ Percent significantly lower than international average

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 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 2015

**Exhibit 2.5: Description of the TIMSS 2015 Intermediate International Benchmark (475) of Mathematics Achievement**

**475 Intermediate International Benchmark**

**Summary**

*Students can apply basic mathematical knowledge in simple situations.* They demonstrate an understanding of whole numbers and some understanding of fractions and decimals. Students can relate two- and three-dimensional shapes and identify and draw shapes with simple properties. They can read and interpret bar graphs and tables.

Students at this level demonstrate an understanding of whole numbers. They can add and subtract as well as multiply and divide by one-digit numbers in a variety of situations, including problems involving two steps. Students have some basic understanding of fractions and decimals. They can identify expressions representing simple situations.

Students can relate two- and three-dimensional shapes and compare volumes made with cubes. They can identify and draw shapes with simple properties, including right angles.

Students can read and interpret information in bar graphs and tables.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 2.5.1: Intermediate International Benchmark – Example Item 1\***

Country	Percent Correct	Content Domain: Number
Iran, Islamic Rep. of	57 (1.7) ▲	Cognitive Domain: Applying
<sup>2</sup> Bahrain	50 (1.2) ▲	Description: Solves a two-step word problem involving subtraction and division
Indonesia	47 (1.8) ▲	
International Avg.	42 (0.6)	
Jordan	41 (1.4)	
South Africa (5)	38 (1.0) ▼	
Kuwait	33 (1.6) ▼	
Morocco	26 (1.4) ▼	
<b>Benchmarking Participants</b>		
Buenos Aires, Argentina	60 (1.6) ▲	

Jeb had 16 peaches.  
 He gave away 4 peaches.  
 Then Jeb divided the remaining peaches equally between 2 baskets.  
 How many peaches did Jeb put in each basket?

6  
 8  
 10  
 12

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

- ▲ Percent significantly higher than international average
- ▼ Percent significantly lower than international average

\* Item administered only in TIMSS Numeracy.  
 See Appendix C.1 for target population coverage notes 1, 2, and 3.  
 ( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

Exhibit 2.5.2: Intermediate International Benchmark – Example Item 2

Country	Percent Full Credit
<sup>2</sup> Singapore	89 (1.0) ●
Korea, Rep. of	89 (1.7) ●
‡ Northern Ireland	87 (1.8) ●
Russian Federation	85 (1.8) ●
England	84 (1.9) ●
<sup>2</sup> Portugal	84 (1.3) ●
Ireland	81 (1.9) ●
† Hong Kong SAR	80 (1.9) ●
Finland	80 (2.2) ●
Japan	79 (1.5) ●
<sup>2</sup> † United States	78 (1.3) ●
Cyprus	78 (1.8) ●
Norway (5)	78 (1.9) ●
Czech Republic	76 (1.9) ●
† Netherlands	76 (2.2) ●
Kazakhstan	76 (1.6) ●
Australia	75 (1.8) ●
Croatia	75 (2.1) ●
† Belgium (Flemish)	75 (1.5) ●
Iran, Islamic Rep. of	74 (1.4) ●
<sup>2</sup> Spain	74 (1.7) ●
<sup>3</sup> Serbia	74 (2.4) ●
Turkey	74 (1.5) ●
Chinese Taipei	73 (2.0) ●
Hungary	73 (1.9) ●
Germany	72 (1.9) ●
<sup>1 2</sup> † Canada	72 (1.5) ●
<sup>2</sup> † Denmark	71 (2.0) ●
Poland	71 (2.1) ●
<sup>2</sup> Sweden	69 (2.7) ●
<b>International Avg.</b>	<b>69 (0.3)</b>
<sup>1</sup> Georgia	68 (2.5) ●
Bulgaria	68 (2.6) ●
Slovenia	68 (2.1) ●
New Zealand	66 (1.9) ●
<sup>2</sup> Lithuania	65 (2.3) ●
<sup>2</sup> Bahrain	65 (1.3) ●
<sup>2</sup> Italy	65 (2.4) ●
Slovak Republic	64 (1.9) ●
South Africa (5)	60 (1.3) ●
Chile	60 (2.2) ●
France	59 (2.4) ●
United Arab Emirates	58 (1.3) ●
Qatar	52 (2.3) ●
Indonesia	51 (1.8) ●
Saudi Arabia	50 (2.3) ●
Oman	48 (1.7) ●
Jordan	44 (1.7) ●
Kuwait	31 (1.7) ●
Morocco	23 (1.6) ●

**Content Domain: Number**  
**Cognitive Domain: Knowing**  
**Description: Generates the next term in a well defined number pattern**

Hanif starts to write a number pattern:  
 6, 13, 20, 27, ...  
 He adds the same number each time to get the next number.  
 What is the next number he should write in his pattern?

Answer: 34

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

Country	Percent Full Credit
<b>Benchmarking Participants</b>	
<sup>1</sup> Florida, US	82 (2.7) ●
‡ Quebec, Canada	76 (2.7) ●
Ontario, Canada	74 (2.1) ●
Dubai, UAE	72 (1.4) ●
Norway (4)	68 (2.2) ●
<sup>2</sup> Abu Dhabi, UAE	52 (2.5) ●
Buenos Aires, Argentina	50 (1.7) ●

● Percent significantly higher than international average  
 ● Percent significantly lower than international average

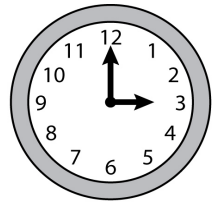
See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 for sampling guidelines and sampling participation notes †, ‡, and †. (.) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 2.5.3: Intermediate International Benchmark – Example Item 3**

Country	Percent Correct
Korea, Rep. of	97 (0.8) ▲
† Hong Kong SAR	93 (1.4) ▲
Chinese Taipei	92 (1.0) ▲
<sup>2</sup> Singapore	89 (1.2) ▲
Japan	88 (1.4) ▲
Poland	84 (1.7) ▲
Finland	83 (1.6) ▲
Russian Federation	82 (1.6) ▲
Croatia	82 (2.0) ▲
<sup>2</sup> Portugal	81 (1.6) ▲
<sup>2</sup> Spain	80 (2.1) ▲
‡ Northern Ireland	79 (1.9) ▲
<sup>2</sup> Italy	79 (1.9) ▲
Kazakhstan	79 (1.9) ▲
Cyprus	79 (2.0) ▲
<sup>2</sup> Lithuania	77 (2.1) ▲
Norway (5)	77 (1.8) ▲
Bulgaria	75 (2.2) ▲
<sup>2</sup> † United States	75 (1.5) ▲
Slovenia	75 (2.0) ▲
Ireland	75 (2.2) ▲
Hungary	74 (2.1) ▲
England	73 (2.3) ▲
<sup>3</sup> Serbia	73 (2.4) ▲
Germany	73 (2.3) ▲
† Netherlands	72 (2.1) ▲
France	71 (2.4)
Turkey	71 (2.1)
<sup>2</sup> Sweden	69 (2.5)
† Belgium (Flemish)	69 (2.0)
<b>International Avg.</b>	<b>68 (0.3)</b>
Czech Republic	65 (2.1)
<sup>1</sup> Georgia	65 (2.8)
<sup>2</sup> † Denmark	64 (2.7)
Iran, Islamic Rep. of	64 (1.6) ▼
Australia	62 (2.4) ▼
<sup>1 2</sup> † Canada	59 (2.1) ▼
Chile	56 (2.1) ▼
<sup>2</sup> Bahrain	55 (1.2) ▼
Slovak Republic	55 (2.2) ▼
Jordan	47 (1.2) ▼
United Arab Emirates	47 (1.3) ▼
Oman	46 (1.6) ▼
New Zealand	45 (2.4) ▼
Qatar	43 (2.4) ▼
Saudi Arabia	43 (2.3) ▼
Indonesia	41 (1.4) ▼
Morocco	41 (1.5) ▼
Kuwait	29 (1.4) ▼
South Africa (5)	23 (1.0) ▼

**Content Domain: Geometric Shapes and Measures**  
**Cognitive Domain: Applying**  
**Description: Identifies a time when the hands of a clock form a right angle**



The hands of a clock at 3:00 are at a right angle. Which is another time that the hands are at a right angle?

- (A) 3:15
- (B) 3:45
- (C) 9:00
- (D) 9:45

Country	Percent Correct
---------	-----------------

**Benchmarking Participants**

<sup>1</sup> Florida, US	80 (2.3) ▲
‡ Quebec, Canada	74 (2.9) ▲
Norway (4)	69 (2.1)
Dubai, UAE	63 (1.5) ▼
Ontario, Canada	61 (2.4) ▼
Buenos Aires, Argentina	61 (1.3) ▼
<sup>2</sup> Abu Dhabi, UAE	41 (3.1) ▼

▲ Percent significantly higher than international average  
▼ Percent significantly lower than international average

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 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 2015

Exhibit 2.5.4: Intermediate International Benchmark – Example Item 4

Country	Percent Full Credit
† Hong Kong SAR	97 (0.6) ⬆
Korea, Rep. of	95 (0.8) ⬆
Chinese Taipei	94 (1.1) ⬆
<sup>2</sup> Singapore	92 (1.0) ⬆
Finland	91 (1.2) ⬆
Japan	91 (1.2) ⬆
Norway (5)	89 (1.4) ⬆
Poland	88 (1.4) ⬆
<sup>2</sup> Sweden	86 (1.8) ⬆
‡ Northern Ireland	86 (1.8) ⬆
Czech Republic	85 (1.5) ⬆
† Belgium (Flemish)	84 (1.3) ⬆
Germany	84 (1.8) ⬆
Croatia	83 (1.9) ⬆
† Netherlands	83 (1.8) ⬆
Ireland	83 (1.6) ⬆
England	83 (1.6) ⬆
Russian Federation	81 (1.9) ⬆
Slovenia	81 (1.9) ⬆
<sup>2</sup> Portugal	79 (2.0) ⬆
<sup>2</sup> Lithuania	79 (1.9) ⬆
Hungary	78 (2.2) ⬆
Australia	78 (2.1) ⬆
<sup>1 2</sup> † Canada	78 (1.5) ⬆
<sup>2</sup> † United States	77 (1.4) ⬆
<sup>2</sup> † Denmark	77 (1.9) ⬆
<sup>2</sup> Spain	76 (1.8) ⬆
<sup>2</sup> Italy	75 (1.9) ⬆
<sup>3</sup> Serbia	74 (2.2) ⬆
Slovak Republic	74 (1.9) ⬆
New Zealand	71 (1.6)
Cyprus	70 (1.7)
Bulgaria	69 (2.6)
International Avg.	68 (0.2)
Kazakhstan	62 (2.8) ⬇
Chile	58 (2.6) ⬇
Turkey	53 (1.7) ⬇
<sup>1</sup> Georgia	51 (3.0) ⬇
United Arab Emirates	51 (1.1) ⬇
Qatar	50 (1.9) ⬇
<sup>2</sup> Bahrain	48 (1.1) ⬇
Iran, Islamic Rep. of	39 (1.7) ⬇
Indonesia	34 (1.6) ⬇
Oman	30 (1.6) ⬇
South Africa (5)	27 (1.1) ⬇
Jordan	24 (1.2) ⬇
Morocco	22 (1.6) ⬇
Kuwait	21 (1.5) ⬇
Saudi Arabia	2 (0.4) ⬇
France	- -

Content Domain: Data Display  
Cognitive Domain: Applying  
Description: Reads data from a table

The table below shows the sizes of large snakes.

Type of snake	Weight (kilograms)	Length (meters)
Boa Constrictor	27	4
Burmese Python	90	5 to 7
Green Anaconda	227	6 to 9
King Cobra	9	4

A. James saw a snake that was 8 meters long. Which type of snake could it be?

Answer: Green Anaconda

B. Naima saw a snake that was 6 meters long and weighed about 80 kilograms. Which type of snake could it be?

Answer: Burmese Python

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

Country	Percent Full Credit
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Benchmarking Participants

‡ Quebec, Canada	89 (2.5) ⬆
<sup>1</sup> Florida, US	79 (2.4) ⬆
Ontario, Canada	76 (1.7) ⬆
Norway (4)	69 (2.2)
Dubai, UAE	69 (1.4)
Buenos Aires, Argentina	54 (1.8) ⬇
<sup>2</sup> Abu Dhabi, UAE	43 (2.2) ⬇

- ⬆ Percent significantly higher than international average
- ⬇ Percent significantly lower than international average

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 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 2015

**Exhibit 2.6: Description of the TIMSS 2015 High International Benchmark (550) of Mathematics Achievement**

**550 High International Benchmark**

**Summary**

*Students can apply their knowledge and understanding to solve problems.* They can solve word problems involving operations with whole numbers, simple fractions, and two-place decimals. Students demonstrate understanding of geometric properties of shapes and of angles that are less than or greater than a right angle. Students can interpret and use data in tables and a variety of graphs to solve problems.

Students at this level have a conceptual understanding of whole numbers which they can apply to solve word problems. They can multiply two-digit numbers and perform division with a remainder. They show some understanding of multiples and factors and can round numbers. Students can add and subtract two-place decimals. They can relate different representations of fractions in problem situations. Students can identify an expression that represents a situation and solve simple number sentences.

Students can classify and compare a variety of shapes based on properties. They can compare and draw angles that are less than or greater than a right angle. Students can locate positions and carry out movements on lines and grids. They demonstrate understanding of line symmetry.

Students can solve problems by interpreting data presented in tables, pie charts, pictographs, and bar graphs labeled with intervals greater than one. They can compare data from two representations to draw conclusions.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 2.6.1: High International Benchmark – Example Item 1**

Country	Percent Correct
Korea, Rep. of	91 (1.2) ▲
† Hong Kong SAR	91 (1.6) ▲
Chinese Taipei	85 (1.7) ▲
<sup>2</sup> Singapore	85 (1.3) ▲
Japan	84 (1.5) ▲
Finland	81 (1.8) ▲
<sup>2</sup> Portugal	79 (1.6) ▲
<sup>2</sup> Sweden	77 (2.4) ▲
Russian Federation	76 (2.1) ▲
Hungary	74 (2.8) ▲
<sup>2</sup> † United States	74 (1.4) ▲
Germany	74 (2.1) ▲
Czech Republic	74 (1.9) ▲
Norway (5)	73 (2.1) ▲
<sup>2</sup> Italy	73 (2.2) ▲
Croatia	72 (2.3) ▲
Cyprus	72 (1.7) ▲
England	71 (1.8) ▲
France	71 (2.3) ▲
Bulgaria	71 (2.3) ▲
Slovak Republic	71 (2.0) ▲
† Netherlands	70 (2.0) ▲
‡ Northern Ireland	70 (2.3) ▲
Poland	69 (2.2) ▲
† Belgium (Flemish)	68 (1.9)
<sup>1</sup> <sup>2</sup> † Canada	67 (1.6)
<sup>2</sup> Spain	66 (1.9)
<sup>3</sup> Serbia	65 (2.5)
<b>International Avg.</b>	<b>64 (0.3)</b>
<sup>2</sup> † Denmark	64 (2.5)
Australia	63 (2.6)
Slovenia	62 (2.4)
Ireland	61 (2.2)
Kazakhstan	61 (2.3)
<sup>2</sup> Lithuania	61 (2.5)
Chile	56 (1.7) ▼
Turkey	56 (1.6) ▼
<sup>2</sup> Bahrain	55 (1.2) ▼
<sup>1</sup> Georgia	52 (2.4) ▼
New Zealand	51 (2.1) ▼
Oman	51 (1.6) ▼
Iran, Islamic Rep. of	50 (1.5) ▼
United Arab Emirates	49 (1.2) ▼
Jordan	48 (1.4) ▼
Qatar	45 (2.3) ▼
Morocco	38 (1.2) ▼
Saudi Arabia	37 (2.9) ▼
Indonesia	34 (1.3) ▼
Kuwait	33 (1.5) ▼
South Africa (5)	27 (0.9) ▼

**Content Domain: Number**  
**Cognitive Domain: Reasoning**  
**Description: Analyzes place value conditions to identify a four-digit number**

Blair made this puzzle about a 4-digit number:

The hundreds digit is 7.

The thousands digit is greater than the hundreds digit.

The ones digit is less than the hundreds digit.

What is Blair's number?

(A) 2708  
(B) 4733  
(C) 8726  
(D) 9718

Country	Percent Correct
<b>Benchmarking Participants</b>	
‡ Quebec, Canada	82 (3.0) ▲
<sup>1</sup> Florida, US	75 (2.5) ▲
Ontario, Canada	64 (1.9)
Dubai, UAE	62 (1.7)
Norway (4)	61 (2.6)
<sup>2</sup> Abu Dhabi, UAE	43 (2.2) ▼
Buenos Aires, Argentina	40 (1.6) ▼

▲ Percent significantly higher than international average  
▼ Percent significantly lower than international average

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 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 2015



Exhibit 2.6.2: High International Benchmark – Example Item 2

Country	Percent Correct	Content Domain: Number
		Cognitive Domain: Applying
		Description: Solves a multi-step problem involving two-place decimals and whole numbers
<sup>2</sup> Singapore	79 (1.6)	<p>A bottle of apple juice costs 1.87 zeds. A bottle of orange juice costs 3.29 zeds. Gavin has 4 zeds.</p> <p>How much <b>more</b> does Gavin need to buy both bottles of juice?</p> <p>(A) 1.06 zeds <input checked="" type="radio"/> 1.16 zeds (C) 5.06 zeds (D) 5.16 zeds</p>
Korea, Rep. of	75 (1.8)	
<sup>†</sup> Hong Kong SAR	73 (1.7)	
Japan	70 (2.4)	
<sup>‡</sup> Northern Ireland	70 (2.3)	
Ireland	65 (2.4)	
Poland	64 (2.5)	
England	62 (2.4)	
<sup>†</sup> Netherlands	62 (2.4)	
Germany	62 (2.1)	
<sup>2</sup> Lithuania	62 (2.6)	
Chinese Taipei	61 (2.0)	
Russian Federation	59 (2.2)	
<sup>2</sup> <sup>†</sup> Denmark	59 (2.2)	
<sup>†</sup> Belgium (Flemish)	59 (1.8)	
<sup>2</sup> Spain	59 (2.6)	
Kazakhstan	58 (3.0)	
Finland	58 (2.6)	
<sup>2</sup> <sup>†</sup> United States	58 (1.4)	
<sup>2</sup> Portugal	57 (2.2)	
Norway (5)	55 (2.6)	
Slovenia	54 (2.0)	
Bulgaria	54 (2.6)	
Australia	53 (2.3)	
Cyprus	52 (2.3)	
<b>International Avg.</b>	<b>51 (0.3)</b>	
Croatia	51 (2.2)	
Czech Republic	51 (2.5)	
Slovak Republic	50 (2.0)	
<sup>2</sup> Sweden	49 (2.6)	
<sup>1</sup> <sup>2</sup> <sup>†</sup> Canada	48 (1.9)	
Hungary	48 (2.3)	
Turkey	47 (2.0)	
<sup>2</sup> Italy	47 (2.5)	
New Zealand	47 (2.1)	
<sup>3</sup> Serbia	47 (2.5)	
France	42 (2.4)	
<sup>1</sup> Georgia	41 (2.6)	
<sup>2</sup> Bahrain	36 (2.2)	
United Arab Emirates	36 (1.1)	
Indonesia	33 (2.3)	
Qatar	30 (1.7)	
Chile	28 (1.7)	
Iran, Islamic Rep. of	28 (2.6)	
Oman	27 (1.4)	
Kuwait	27 (2.2)	
Saudi Arabia	26 (1.9)	
Morocco	22 (2.0)	
Jordan	--	
South Africa (5)	--	

Country	Percent Correct
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Benchmarking Participants	
<sup>1</sup> Florida, US	58 (2.7)
Dubai, UAE	51 (1.9)
Ontario, Canada	49 (3.0)
<sup>‡</sup> Quebec, Canada	47 (3.3)
Norway (4)	41 (2.4)
<sup>2</sup> Abu Dhabi, UAE	34 (2.6)
Buenos Aires, Argentina	25 (2.7)

- Percent significantly higher than international average
- Percent significantly lower than international average

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 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 2015

**Exhibit 2.6.3: High International Benchmark – Example Item 3**

Country	Percent Full Credit	
Finland	76 (1.9)	▲
Korea, Rep. of	76 (2.1)	▲
Poland	75 (2.2)	▲
Japan	73 (1.7)	▲
<sup>2</sup> † Denmark	73 (2.2)	▲
<sup>2</sup> Lithuania	73 (3.0)	▲
† Belgium (Flemish)	72 (2.2)	▲
<sup>2</sup> Sweden	71 (2.2)	▲
Slovenia	71 (2.0)	▲
‡ Northern Ireland	69 (2.8)	▲
Russian Federation	68 (2.2)	▲
Croatia	68 (2.3)	▲
Germany	67 (2.1)	▲
Hungary	66 (2.0)	▲
Czech Republic	66 (2.2)	▲
Cyprus	66 (2.1)	▲
<sup>1 2</sup> † Canada	65 (1.4)	▲
England	65 (2.3)	▲
<sup>2</sup> Singapore	64 (1.8)	▲
Norway (5)	64 (2.1)	▲
Australia	63 (2.2)	▲
† Netherlands	63 (2.5)	▲
Chinese Taipei	63 (2.3)	▲
<sup>2</sup> Portugal	62 (2.3)	▲
Ireland	62 (2.2)	▲
<sup>2</sup> Spain	62 (2.5)	▲
France	62 (2.3)	▲
New Zealand	60 (2.2)	▲
† Hong Kong SAR	59 (2.6)	▲
Slovak Republic	58 (2.3)	▲
<b>International Avg.</b>	<b>58 (0.3)</b>	
Kazakhstan	57 (2.8)	▲
<sup>2</sup> † United States	55 (1.4)	▲
Bulgaria	55 (2.4)	▲
Chile	54 (2.5)	▲
<sup>3</sup> Serbia	52 (2.6)	▼
<sup>1</sup> Georgia	49 (2.4)	▼
<sup>2</sup> Italy	46 (2.3)	▼
Qatar	46 (2.4)	▼
United Arab Emirates	43 (1.2)	▼
<sup>2</sup> Bahrain	42 (2.0)	▼
Iran, Islamic Rep. of	38 (2.8)	▼
Oman	38 (1.6)	▼
Turkey	35 (1.9)	▼
Saudi Arabia	30 (2.0)	▼
Kuwait	24 (2.2)	▼
Indonesia	21 (2.0)	▼
Morocco	18 (2.1)	▼
Jordan	--	
South Africa (5)	--	

**Content Domain: Geometric Shapes and Measures**  
**Cognitive Domain: Reasoning**  
**Description: Draws a specified geometric shape by connecting dots on a circle**

In the circle, draw a triangle with all sides the same length.

What points did you connect? 12, 4, 8, 12

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

Country	Percent Full Credit
<b>Benchmarking Participants</b>	
‡ Quebec, Canada	72 (2.5) ▲
Ontario, Canada	66 (2.1) ▲
Norway (4)	61 (2.4)
Dubai, UAE	55 (1.6)
<sup>1</sup> Florida, US	53 (2.9)
Buenos Aires, Argentina	39 (2.5) ▼
<sup>2</sup> Abu Dhabi, UAE	38 (2.5) ▼

▲ Percent significantly higher than international average  
▼ Percent significantly lower than international average

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 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 2015

**Exhibit 2.6.4: High International Benchmark – Example Item 4**

Country	Percent Full Credit
Korea, Rep. of	80 (1.6) ⬆
Japan	73 (1.9) ⬆
† Hong Kong SAR	71 (2.5) ⬆
Norway (5)	70 (1.8) ⬆
<sup>2</sup> Singapore	67 (1.6) ⬆
Chinese Taipei	67 (2.1) ⬆
Russian Federation	66 (2.1) ⬆
Australia	63 (2.3) ⬆
Slovenia	62 (2.2) ⬆
Poland	62 (2.5) ⬆
‡ Northern Ireland	61 (2.7) ⬆
† Netherlands	60 (2.8) ⬆
<sup>1 2</sup> † Canada	60 (2.1) ⬆
England	58 (2.3) ⬆
<sup>2</sup> Portugal	58 (2.1) ⬆
Turkey	57 (2.1) ⬆
<sup>2</sup> Sweden	56 (2.3) ⬆
<sup>2</sup> † Denmark	56 (2.7) ⬆
<sup>2</sup> Spain	56 (2.5) ⬆
Cyprus	55 (2.2) ⬆
Chile	54 (2.2)
<sup>2</sup> Lithuania	54 (2.3)
Germany	53 (2.3)
Ireland	52 (2.7)
<b>International Avg.</b>	<b>51 (0.3)</b>
Hungary	50 (2.4)
<sup>2</sup> Bahrain	48 (2.3)
Czech Republic	47 (2.2)
<sup>3</sup> Serbia	47 (2.7)
Qatar	46 (2.1) ⬇
United Arab Emirates	46 (1.4) ⬇
<sup>2</sup> Italy	44 (2.3) ⬇
Oman	44 (1.7) ⬇
<sup>2</sup> † United States	44 (1.5) ⬇
Slovak Republic	43 (2.2) ⬇
Finland	42 (2.1) ⬇
New Zealand	42 (2.3) ⬇
France	42 (2.3) ⬇
Bulgaria	39 (2.3) ⬇
Kazakhstan	38 (2.0) ⬇
Croatia	38 (2.3) ⬇
Iran, Islamic Rep. of	36 (2.7) ⬇
Indonesia	30 (2.1) ⬇
Saudi Arabia	29 (1.8) ⬇
<sup>1</sup> Georgia	29 (2.5) ⬇
Morocco	19 (1.9) ⬇
Kuwait	15 (1.6) ⬇
† Belgium (Flemish)	--
Jordan	--
South Africa (5)	--

**Content Domain: Data Display**  
**Cognitive Domain: Applying**  
**Description: Completes a bar graph from information given in a tally chart**

Mr. Smith asked the students in his class about what they did after school. These are the results for 3 things they did.

After School Activities

Activities	Tally Marks
Play sports	
Watch TV	
Study	

Mr. Smith started making a bar chart showing how many students did each activity.

Complete the graph by drawing and labeling the other two bars.

After School Activities

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

Country	Percent Full Credit
<b>Benchmarking Participants</b>	
‡ Quebec, Canada	69 (3.2) ⬆
Dubai, UAE	58 (1.7) ⬆
Ontario, Canada	56 (3.9)
Norway (4)	50 (2.5)
<sup>1</sup> Florida, US	49 (3.0)
<sup>2</sup> Abu Dhabi, UAE	43 (2.2) ⬇
Buenos Aires, Argentina	14 (2.0) ⬇

⬆ Percent significantly higher than international average  
⬇ Percent significantly lower than international average

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 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 2015

**Exhibit 2.6.5: High International Benchmark – Example Item 5**

Country	Percent Full Credit
Korea, Rep. of	77 (1.7) ⬆
Japan	66 (1.9) ⬆
Chinese Taipei	61 (2.1) ⬆
<sup>2</sup> Singapore	59 (2.1) ⬆
<sup>†</sup> Hong Kong SAR	59 (2.4) ⬆
Kazakhstan	59 (2.8) ⬆
Russian Federation	58 (2.1) ⬆
Czech Republic	57 (2.3) ⬆
<sup>‡</sup> Northern Ireland	56 (2.5) ⬆
<sup>†</sup> Netherlands	53 (2.1) ⬆
Norway (5)	53 (2.5) ⬆
Finland	51 (2.2) ⬆
England	50 (2.0) ⬆
Ireland	49 (2.7) ⬆
Slovak Republic	49 (2.3) ⬆
Slovenia	48 (2.4) ⬆
<sup>2</sup> Lithuania	47 (2.4) ⬆
Germany	47 (2.2) ⬆
<sup>2</sup> Portugal	46 (2.2) ⬆
<sup>†</sup> Belgium (Flemish)	46 (1.9) ⬆
<sup>3</sup> Serbia	45 (2.3) ⬆
<sup>2</sup> Sweden	44 (2.7) ⬆
Hungary	43 (2.0) ⬆
Australia	42 (2.6) ⬆
<sup>2</sup> Italy	42 (2.2) ⬆
<sup>2</sup> <sup>†</sup> United States	41 (1.5) ⬆
<sup>2</sup> <sup>†</sup> Denmark	40 (2.5) ⬆
Croatia	40 (2.2) ⬆
<sup>1</sup> <sup>2</sup> <sup>†</sup> Canada	40 (1.5) ⬆
<b>International Avg.</b>	<b>39 (0.3)</b>
<sup>2</sup> Spain	37 (2.1) ⬆
Cyprus	36 (2.5) ⬆
New Zealand	36 (1.7) ⬇
France	34 (2.3) ⬇
Bulgaria	33 (2.3) ⬇
Poland	32 (2.0) ⬇
Turkey	30 (1.8) ⬇
United Arab Emirates	21 (1.0) ⬇
<sup>1</sup> Georgia	20 (2.4) ⬇
Chile	17 (1.6) ⬇
Qatar	14 (1.6) ⬇
<sup>2</sup> Bahrain	14 (1.3) ⬇
Saudi Arabia	12 (1.7) ⬇
Iran, Islamic Rep. of	10 (1.9) ⬇
Morocco	9 (1.6) ⬇
Oman	7 (0.8) ⬇
Kuwait	7 (1.4) ⬇
Indonesia	4 (1.0) ⬇
Jordan	--
South Africa (5)	--

**Content Domain: Data Display**  
**Cognitive Domain: Applying**  
**Description: Compares information in a table and a bar graph to solve a problem**

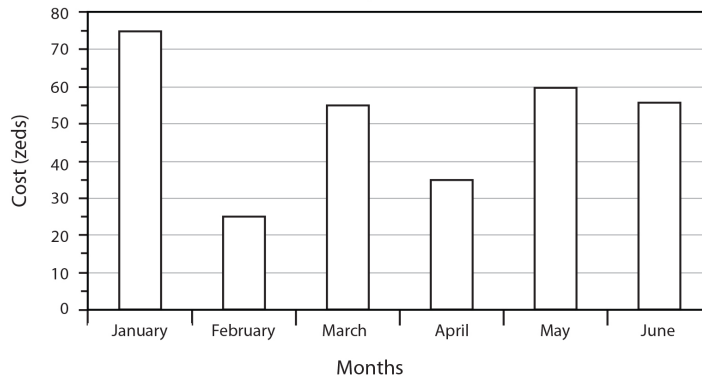
In 2008, Peter paid the following amounts in the first six months for his telephone bill.

**Peter's Telephone Bill in 2008**

Month	January	February	March	April	May	June
Cost (zeds)	65	20	60	40	60	45

In 2009, Peter paid the following amounts in the first six months for his telephone bill.

**Peter's Telephone Bill in 2009**



In some months, Peter paid less for his telephone bill in 2009 than in 2008.

In which months?

Answer: March and April

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

Country	Percent Full Credit
---------	---------------------

**Benchmarking Participants**

<sup>‡</sup> Quebec, Canada	53 (3.5) ⬆
<sup>1</sup> Florida, US	38 (3.0) ⬆
Ontario, Canada	38 (2.1) ⬆
Dubai, UAE	34 (1.7) ⬇
Norway (4)	34 (2.1) ⬇
Buenos Aires, Argentina	20 (2.5) ⬆
<sup>2</sup> Abu Dhabi, UAE	16 (1.8) ⬇

- ⬆ Percent significantly higher than international average
- ⬇ Percent significantly lower than international average

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 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.

**Exhibit 2.7: Description of the TIMSS 2015 Advanced International Benchmark (625) of Mathematics Achievement**

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**625 Advanced International Benchmark**

**Summary**

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

Students can solve a variety of multi-step word problems involving whole numbers. They can find more than one solution to a problem and solve number sentences with operations on both sides. Students can solve problems that show an increased understanding of fractions, including explanation of pictorial representations of fractions. They can solve problems involving both one- and two-place decimals.

Students can apply knowledge of a range of two- and three-dimensional shapes in a variety of situations. They can draw parallel and perpendicular lines to satisfy given conditions. Students can solve problems involving area and perimeter of simple shapes. They can read a ruler to find the length of an object beginning or ending at a half-unit.

Students can interpret and represent data to solve multi-step problems.

**Exhibit 2.7.1: Advanced International Benchmark – Example Item 1**

Country	Percent Correct
Korea, Rep. of	77 (1.7) ⬆
† Hong Kong SAR	71 (2.7) ⬆
Japan	66 (1.9) ⬆
<sup>2</sup> Singapore	65 (2.1) ⬆
Chinese Taipei	62 (1.9) ⬆
<sup>2</sup> † Denmark	55 (2.6) ⬆
Russian Federation	54 (2.0) ⬆
Kazakhstan	52 (2.3) ⬆
<sup>2</sup> Lithuania	52 (3.0) ⬆
Poland	49 (2.4) ⬆
Czech Republic	47 (2.4) ⬆
<sup>2</sup> Sweden	47 (2.6) ⬆
† Netherlands	47 (2.4) ⬆
Norway (5)	46 (2.0) ⬆
<sup>2</sup> † United States	43 (1.4) ⬆
‡ Northern Ireland	43 (3.3)
Finland	42 (1.7) ⬆
Bulgaria	41 (2.5)
Slovenia	39 (2.3)
Australia	39 (2.3)
Slovak Republic	38 (2.1)
England	38 (2.2)
<sup>2</sup> Portugal	38 (2.3)
Hungary	37 (2.0)
<b>International Avg.</b>	<b>37 (0.3)</b>
† Belgium (Flemish)	37 (2.6)
<sup>1</sup> <sup>2</sup> † Canada	36 (1.7)
Ireland	36 (3.0)
Germany	35 (2.0)
<sup>2</sup> Italy	34 (2.1)
<sup>3</sup> Serbia	34 (2.6)
Croatia	31 (2.4) ⬇
Cyprus	31 (2.3) ⬇
New Zealand	31 (1.7) ⬇
<sup>1</sup> Georgia	30 (2.4) ⬇
Turkey	29 (1.7) ⬇
France	28 (2.3) ⬇
United Arab Emirates	24 (1.1) ⬇
Qatar	23 (1.9) ⬇
<sup>2</sup> Spain	23 (1.9) ⬇
<sup>2</sup> Bahrain	21 (0.9) ⬇
Oman	21 (1.4) ⬇
Indonesia	21 (1.1) ⬇
Iran, Islamic Rep. of	21 (1.6) ⬇
Chile	19 (1.7) ⬇
Jordan	16 (1.3) ⬇
Morocco	16 (1.2) ⬇
Saudi Arabia	16 (1.9) ⬇
South Africa (5)	13 (0.6) ⬇
Kuwait	11 (0.8) ⬇

**Content Domain: Number**  
**Cognitive Domain: Reasoning**  
**Description: Solves a multi-step reasoning problem involving division**

Sally has 12 lengths of wire, 40 round beads, and 48 flat beads.  
She uses 1 length of wire, 10 round beads, and 8 flat beads to make 1 bracelet.  
If Sally makes all her bracelets the same, how many bracelets can she make?

(A) 40  
(B) 12  
(C) 5  
● 4

Country	Percent Correct
<b>Benchmarking Participants</b>	
<sup>1</sup> Florida, US	46 (3.9) ⬆
Ontario, Canada	39 (2.5)
‡ Quebec, Canada	36 (3.4)
Dubai, UAE	35 (1.6)
Norway (4)	30 (1.9) ⬇
Buenos Aires, Argentina	22 (1.3) ⬇
<sup>2</sup> Abu Dhabi, UAE	18 (1.8) ⬇

⬆ Percent significantly higher than international average  
⬇ Percent significantly lower than international average

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 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 2015

**Exhibit 2.7.2: Advanced International Benchmark – Example Item 2**

Country	Percent Full Credit
Korea, Rep. of	67 (1.9) ⬆
<sup>2</sup> Singapore	64 (1.6) ⬆
<sup>†</sup> Hong Kong SAR	50 (2.8) ⬆
Japan	49 (2.3) ⬆
<sup>2</sup> <sup>†</sup> United States	46 (1.4) ⬆
Chinese Taipei	43 (2.5) ⬆
Poland	41 (2.8) ⬆
<sup>2</sup> <sup>†</sup> Denmark	38 (2.4) ⬆
Turkey	35 (2.1) ⬆
Norway (5)	34 (2.3) ⬆
<sup>2</sup> Portugal	34 (2.2) ⬆
Russian Federation	33 (2.4) ⬆
<sup>†</sup> Belgium (Flemish)	32 (2.2) ⬆
Slovenia	32 (2.0) ⬆
Czech Republic	30 (2.4) ⬆
Kazakhstan	28 (2.3) ⬆
<sup>1</sup> <sup>2</sup> <sup>†</sup> Canada	28 (1.9) ⬆
Cyprus	27 (1.6) ⬆
England	26 (1.8) ⬆
<sup>2</sup> Lithuania	26 (2.1) ⬆
<sup>2</sup> Spain	24 (2.1) ⬆
<b>International Avg.</b>	<b>24 (0.3)</b>
<sup>‡</sup> Northern Ireland	24 (2.4) ⬆
Australia	23 (1.5) ⬆
Chile	23 (1.9) ⬆
<sup>†</sup> Netherlands	22 (2.1) ⬆
Ireland	21 (1.6) ⬇
<sup>2</sup> Sweden	21 (2.1) ⬇
New Zealand	21 (1.7) ⬇
<sup>3</sup> Serbia	21 (2.3) ⬇
Hungary	19 (1.7) ⬇
Oman	18 (1.3) ⬇
<sup>2</sup> Bahrain	17 (2.2) ⬇
Qatar	15 (1.6) ⬇
United Arab Emirates	15 (0.9) ⬇
France	15 (1.6) ⬇
Finland	13 (1.6) ⬇
Slovak Republic	13 (1.7) ⬇
<sup>2</sup> Italy	11 (1.4) ⬇
Iran, Islamic Rep. of	10 (1.5) ⬇
Bulgaria	7 (1.4) ⬇
Saudi Arabia	7 (1.1) ⬇
Indonesia	6 (1.2) ⬇
<sup>1</sup> Georgia	5 (1.2) ⬇
Kuwait	4 (1.0) ⬇
Morocco	4 (0.8) ⬇
Croatia	4 (1.1) ⬇
Germany	2 (0.7) ⬇
Jordan	--
South Africa (5)	--

**Content Domain: Number**  
**Cognitive Domain: Reasoning**  
**Description: Part B - Explains why a chosen circular representation shows a given non-unit fraction**

A. Which of the circles below has  $\frac{3}{8}$  of its area shaded?

B. Explain or show why your answer is correct.

There are 8 sections and 3 are shaded.

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

Country	Percent Full Credit
<b>Benchmarking Participants</b>	
<sup>1</sup> Florida, US	54 (3.6) ⬆
<sup>‡</sup> Quebec, Canada	34 (3.6) ⬆
Ontario, Canada	28 (2.5) ⬆
Dubai, UAE	28 (1.6) ⬆
Norway (4)	16 (2.1) ⬇
Buenos Aires, Argentina	10 (1.8) ⬇
<sup>2</sup> Abu Dhabi, UAE	9 (1.5) ⬇

⬆ Percent significantly higher than international average  
⬇ Percent significantly lower than international average

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 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 2015

**Exhibit 2.7.3: Advanced International Benchmark – Example Item 3**

Country	Percent Correct
Korea, Rep. of	70 (2.1) ▲
<sup>2</sup> Singapore	68 (1.8) ▲
<sup>†</sup> Hong Kong SAR	63 (2.3) ▲
Russian Federation	53 (2.2) ▲
<sup>‡</sup> Northern Ireland	52 (2.8) ▲
Kazakhstan	49 (2.8) ▲
Chinese Taipei	48 (2.3) ▲
Poland	45 (2.3) ▲
Bulgaria	45 (2.4) ▲
Japan	45 (2.1) ▲
Norway (5)	44 (2.9) ▲
Finland	44 (2.0) ▲
<sup>2</sup> Sweden	41 (2.3)
<sup>2</sup> <sup>†</sup> Denmark	41 (2.0)
England	40 (2.2)
Slovenia	39 (2.5)
<sup>2</sup> <sup>†</sup> United States	39 (1.4)
Cyprus	39 (1.9)
<sup>†</sup> Belgium (Flemish)	38 (2.1)
<b>International Avg.</b>	<b>37 (0.3)</b>
Turkey	37 (1.8)
<sup>2</sup> Spain	35 (2.3)
Hungary	35 (2.5)
<sup>†</sup> Netherlands	35 (2.1)
Ireland	35 (2.6)
<sup>3</sup> Serbia	35 (2.3)
Czech Republic	34 (2.2)
<sup>2</sup> Portugal	34 (2.0)
<sup>2</sup> Lithuania	34 (2.8)
Slovak Republic	33 (2.2) ▼
<sup>2</sup> Italy	33 (2.3)
Australia	33 (2.2) ▼
<sup>1</sup> <sup>2</sup> <sup>†</sup> Canada	33 (1.4) ▼
New Zealand	32 (1.9) ▼
United Arab Emirates	32 (1.2) ▼
<sup>1</sup> Georgia	32 (2.4) ▼
Croatia	31 (2.2) ▼
<sup>2</sup> Bahrain	30 (2.6) ▼
Germany	30 (1.9) ▼
Chile	30 (2.3) ▼
France	28 (2.0) ▼
Oman	28 (1.6) ▼
Saudi Arabia	25 (1.9) ▼
Qatar	25 (1.9) ▼
Iran, Islamic Rep. of	24 (2.2) ▼
Kuwait	24 (1.7) ▼
Morocco	22 (2.1) ▼
Indonesia	19 (2.0) ▼
Jordan	- -
South Africa (5)	- -

**Content Domain: Geometric Shapes and Measures**  
**Cognitive Domain: Applying**  
**Description: Solves a multi-step word problem involving perimeter**

The perimeter of a 5-sided figure is 30 centimeters. Three of the sides are each 4 cm long. The other two sides, A and B, are the same length. What is the length of side A?

(A) 6 cm  
 (B) 9 cm  
 (C) 12 cm  
 (D) 18 cm

Country	Percent Correct
<b>Benchmarking Participants</b>	
<sup>1</sup> Florida, US	47 (2.1) ▲
Dubai, UAE	41 (1.9)
Ontario, Canada	37 (1.9)
Norway (4)	32 (2.6) ▼
<sup>‡</sup> Quebec, Canada	30 (2.6) ▼
<sup>2</sup> Abu Dhabi, UAE	25 (2.0) ▼
Buenos Aires, Argentina	15 (1.9) ▼

▲ Percent significantly higher than international average  
 ▼ Percent significantly lower than international average

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 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 2015



**Exhibit 2.7.4: Advanced International Benchmark – Example Item 4**

Country	Percent Full Credit
Korea, Rep. of	77 (1.7) ●
Japan	68 (1.9) ●
<sup>2</sup> Singapore	64 (1.8) ●
Chinese Taipei	63 (2.1) ●
<sup>†</sup> Hong Kong SAR	59 (2.4) ●
Norway (5)	54 (2.3) ●
Finland	54 (2.5) ●
Poland	49 (2.8) ●
Slovenia	48 (2.2) ●
<sup>1 2 †</sup> Canada	48 (1.9) ●
Czech Republic	44 (2.0) ●
Ireland	43 (2.8) ●
<sup>2 †</sup> United States	43 (1.6) ●
<sup>2</sup> Sweden	42 (2.3) ●
England	42 (2.3) ●
Russian Federation	41 (2.3) ●
Germany	39 (2.2) ●
<sup>3</sup> Serbia	38 (1.9) ●
Hungary	36 (2.1)
<sup>2</sup> Lithuania	36 (2.0)
<sup>‡</sup> Northern Ireland	35 (2.2)
<b>International Avg.</b>	<b>34 (0.3)</b>
Australia	33 (2.2)
<sup>†</sup> Belgium (Flemish)	32 (2.1)
Cyprus	31 (1.7)
Kazakhstan	30 (2.6)
<sup>2</sup> Spain	29 (1.9) ◐
Slovak Republic	29 (1.6) ◐
<sup>†</sup> Netherlands	28 (2.3) ◐
New Zealand	28 (1.7) ◐
<sup>2</sup> Italy	28 (1.8) ◐
<sup>2</sup> Portugal	27 (1.7) ◐
Croatia	27 (2.0) ◐
Bulgaria	27 (2.4) ◐
<sup>2 †</sup> Denmark	25 (2.1) ◐
France	25 (1.8) ◐
Turkey	24 (1.7) ◐
Oman	20 (1.3) ◐
United Arab Emirates	20 (1.0) ◐
<sup>2</sup> Bahrain	18 (1.8) ◐
Qatar	16 (1.8) ◐
<sup>1</sup> Georgia	16 (1.8) ◐
Chile	15 (1.3) ◐
Saudi Arabia	14 (1.3) ◐
Indonesia	14 (1.6) ◐
Iran, Islamic Rep. of	10 (1.6) ◐
Morocco	9 (1.3) ◐
Kuwait	2 (0.8) ◐
Jordan	- -
South Africa (5)	- -

**Content Domain: Data Display**  
**Cognitive Domain: Reasoning**  
**Description: Part B - Draws and justifies a conclusion from data given in a table**

In a triathlon race, athletes first swim, then cycle, and then run. The table below shows the race results for Kathy, Barbara, and Sue. One total has been filled in for you.

Triathlon Results in Minutes

	Kathy	Barbara	Sue
Swimming	35	25	50
Cycling	80	90	85
Running	135	130	120
Total:	250		

A. The person who finishes in the smallest number of minutes wins. Who won the triathlon? How long did she take?

Answer: Barbara 245 minutes

B. Sue wants to finish the triathlon race faster next year. What does she need to improve in most so that she can beat Kathy and Barbara?

(Check one box.)

Swimming  
 Cycling  
 Running

*Sue should improve on swimming because she is 15 minutes behind Kathy and 25 minutes behind Barbara.*

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

Country	Percent Full Credit
<b>Benchmarking Participants</b>	
<sup>‡</sup> Quebec, Canada	55 (3.8) ●
Ontario, Canada	48 (2.2) ●
<sup>1</sup> Florida, US	40 (4.1)
Dubai, UAE	36 (1.9)
Norway (4)	32 (2.3)
<sup>2</sup> Abu Dhabi, UAE	14 (1.4) ◐
Buenos Aires, Argentina	13 (2.1) ◐

● Percent significantly higher than international average  
◐ Percent significantly lower than international average

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 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 2015



**TIMSS**  
**2015**

# **CHAPTER 3: ACHIEVEMENT IN CONTENT AND COGNITIVE DOMAINS**

TIMSS 2015 INTERNATIONAL RESULTS IN MATHEMATICS



**IEA**

**TIMSS & PIRLS**  
International Study Center  
Lynch School of Education, Boston College



## Achievement by Content Domains

Within mathematics, TIMSS at the fourth grade provided results for three content domains—Number, Geometric Shapes and Measures, and Data Display. Most countries demonstrated strengths in one or two content domains compared to mathematics achievement overall, and weaknesses in one or two content domains.

**TIMSS 2015: 49 Countries**

### Number

Relative Strength



### Geometric Shapes and Measures

Relative Strength



### Data Display

Relative Strength



### Trends 2011–2015: 41 Countries

Countries Improved | Countries Declined

**Number**

20

5

**Geometric Shapes and Measures**

20

3

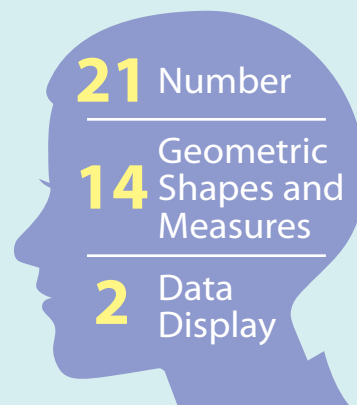
**Data Display**

18

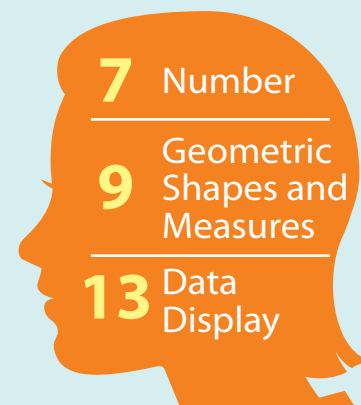
6

### Differences in Achievement by Gender in the Content Domains

Number of Countries Where **Boys** Outperformed Girls in the Content Domains



Number of Countries Where **Girls** Outperformed Boys in the Content Domains



## Achievement by Cognitive Domains

TIMSS at the fourth grade provided results for three cognitive domains—Knowing, Applying, and Reasoning. Although there was some balance in achievement across cognitive domains, most countries had at least one strength and one weakness compared to mathematics achievement overall.

**TIMSS 2015: 49 Countries**

### Knowing

Relative Strength



### Applying

Relative Strength



### Reasoning

Relative Strength



### Trends 2011–2015: 41 Countries

Countries Improved | Countries Declined

**Knowing**

21

7

**Applying**

22

4

**Reasoning**

20

2

### Differences in Achievement by Gender in the Cognitive Domains

Number of Countries Where **Boys** Outperformed Girls in the Cognitive Domains



Number of Countries Where **Girls** Outperformed Boys in the Cognitive Domains





**Exhibit 3.1: Achievement in Mathematics Content Domains**

Country	Overall Mathematics Average Scale Score	Number (89 items)		Geometric Shapes and Measures (56 items)		Data Display (24 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
<sup>2</sup> Singapore	618 (3.8)	630 (4.2)	12 (1.1) ▲	607 (4.2)	-10 (1.5) ▼	600 (4.1)	-18 (1.7) ▼
<sup>†</sup> Hong Kong SAR	615 (2.9)	616 (3.1)	2 (1.4)	617 (3.4)	2 (1.9)	611 (3.8)	-4 (2.9)
Korea, Rep. of	608 (2.2)	610 (2.6)	2 (1.4)	610 (2.3)	2 (1.8)	607 (2.6)	-1 (1.3)
Chinese Taipei	597 (1.9)	599 (1.8)	3 (1.2) ▲	597 (3.0)	0 (2.1)	591 (2.2)	-5 (1.3) ▼
Japan	593 (2.0)	592 (1.9)	-1 (1.1)	601 (2.5)	9 (1.3) ▲	593 (2.6)	1 (1.3)
<sup>‡</sup> Northern Ireland	570 (2.9)	574 (3.1)	4 (1.0) ▲	566 (3.3)	-4 (2.0) ▼	567 (3.8)	-4 (2.4)
Russian Federation	564 (3.4)	567 (3.3)	3 (1.2) ▲	557 (4.4)	-7 (1.4) ▼	573 (3.6)	9 (1.1) ▲
Norway (5)	549 (2.5)	542 (2.4)	-7 (1.1) ▼	559 (3.5)	10 (1.8) ▲	566 (3.0)	17 (1.2) ▲
Ireland	547 (2.1)	551 (2.2)	4 (1.2) ▲	542 (2.9)	-5 (2.1) ▼	548 (3.8)	0 (3.4)
England	546 (2.8)	547 (3.2)	1 (1.6)	542 (3.3)	-4 (1.6) ▼	552 (3.2)	6 (2.0) ▲
<sup>†</sup> Belgium (Flemish)	546 (2.1)	543 (2.1)	-3 (0.8) ▼	564 (2.3)	18 (1.3) ▲	523 (3.0)	-22 (2.5) ▼
Kazakhstan	544 (4.5)	552 (4.0)	7 (1.3) ▲	540 (5.8)	-5 (2.0) ▼	524 (5.3)	-20 (2.1) ▼
<sup>2</sup> Portugal	541 (2.2)	541 (2.1)	-1 (0.9)	539 (2.6)	-2 (1.0) ▼	546 (2.8)	5 (1.9) ▲
<sup>2</sup> <sup>†</sup> United States	539 (2.3)	546 (2.2)	6 (0.9) ▲	525 (2.6)	-14 (0.8) ▼	540 (2.8)	1 (2.1)
<sup>2</sup> <sup>†</sup> Denmark	539 (2.7)	535 (2.7)	-4 (1.4) ▼	555 (3.2)	16 (1.5) ▲	526 (3.5)	-13 (2.3) ▼
<sup>2</sup> Lithuania	535 (2.5)	538 (2.6)	3 (1.1) ▲	526 (3.0)	-10 (2.2) ▼	540 (3.6)	5 (2.4) ▲
Finland	535 (2.0)	532 (2.1)	-4 (1.0) ▼	539 (2.5)	4 (1.7) ▲	542 (3.3)	6 (2.6) ▲
Poland	535 (2.1)	534 (2.3)	0 (1.1)	534 (2.5)	-1 (1.7)	538 (2.8)	3 (2.0)
<sup>†</sup> Netherlands	530 (1.7)	531 (2.2)	1 (1.4)	522 (1.9)	-8 (1.2) ▼	539 (3.4)	9 (2.6) ▲
Hungary	529 (3.2)	531 (3.0)	2 (0.9) ▲	536 (3.6)	7 (1.6) ▲	513 (3.6)	-17 (1.2) ▼
Czech Republic	528 (2.2)	528 (2.4)	0 (1.1)	531 (2.5)	3 (0.9) ▲	525 (3.0)	-3 (1.7)
Bulgaria	524 (5.3)	529 (4.6)	5 (1.4) ▲	525 (5.9)	1 (2.0)	504 (7.6)	-20 (3.1) ▼
Cyprus	523 (2.7)	528 (2.5)	5 (0.9) ▲	524 (2.8)	1 (1.3)	507 (3.8)	-16 (2.6) ▼
Germany	522 (2.0)	515 (2.1)	-7 (0.9) ▼	531 (2.5)	9 (1.5) ▲	535 (2.6)	13 (1.4) ▲
Slovenia	520 (1.9)	511 (1.8)	-9 (0.9) ▼	530 (2.1)	10 (1.6) ▲	540 (3.1)	20 (2.2) ▲
<sup>2</sup> Sweden	519 (2.8)	514 (2.7)	-5 (1.4) ▼	523 (3.3)	4 (1.7) ▲	529 (3.9)	11 (2.8) ▲
<sup>3</sup> Serbia	518 (3.5)	524 (3.4)	6 (1.0) ▲	503 (3.8)	-15 (1.8) ▼	517 (3.8)	-1 (2.3)
Australia	517 (3.1)	509 (3.1)	-8 (0.7) ▼	527 (3.3)	10 (1.6) ▲	533 (3.6)	15 (2.2) ▲
<sup>1</sup> <sup>2</sup> <sup>†</sup> Canada	511 (2.3)	503 (2.4)	-8 (1.0) ▼	517 (2.5)	7 (0.7) ▲	528 (2.7)	18 (1.0) ▲
<sup>2</sup> Italy	507 (2.6)	510 (2.4)	3 (0.9) ▲	503 (2.8)	-3 (1.0) ▼	498 (2.9)	-9 (1.6) ▼
<sup>2</sup> Spain	505 (2.5)	504 (2.5)	-1 (1.0)	503 (2.8)	-2 (1.5)	509 (3.1)	4 (1.5) ▲
Croatia	502 (1.8)	498 (1.8)	-4 (1.1) ▼	512 (2.3)	10 (1.5) ▲	498 (3.0)	-4 (2.1)
Slovak Republic	498 (2.5)	502 (2.4)	4 (1.6) ▲	491 (2.6)	-7 (1.2) ▼	496 (3.8)	-2 (2.6)
New Zealand	491 (2.3)	485 (2.7)	-5 (1.0) ▼	489 (2.8)	-2 (1.9)	506 (2.9)	16 (2.0) ▲
France	488 (2.9)	483 (3.0)	-5 (1.7) ▼	503 (3.0)	15 (2.0) ▲	476 (3.1)	-12 (1.7) ▼
Turkey	483 (3.1)	489 (3.2)	6 (1.2) ▲	475 (3.0)	-8 (0.9) ▼	476 (3.4)	-7 (1.3) ▼
<sup>1</sup> Georgia	463 (3.6)	483 (3.5)	20 (1.1) ▲	429 (4.6)	-35 (2.2) ▼	435 (4.4)	-28 (1.9) ▼
Chile	459 (2.4)	455 (2.7)	-4 (1.2) ▼	460 (3.1)	1 (1.8)	463 (3.2)	5 (2.2) ▲
United Arab Emirates	452 (2.4)	455 (2.4)	3 (0.8) ▲	442 (2.7)	-10 (0.8) ▼	453 (2.4)	2 (0.9) ▲
<sup>2</sup> Bahrain	451 (1.6)	453 (1.7)	2 (0.9) ▲	447 (1.9)	-4 (1.1) ▼	454 (2.3)	3 (1.8)
Qatar	439 (3.4)	446 (3.4)	7 (1.6) ▲	423 (4.4)	-16 (2.1) ▼	435 (3.9)	-4 (1.7) ▼
Iran, Islamic Rep. of	431 (3.2)	435 (3.2)	4 (1.3) ▲	428 (3.5)	-4 (1.6) ▼	416 (3.2)	-16 (1.8) ▼
Oman	425 (2.5)	423 (2.6)	-3 (1.0) ▼	430 (2.9)	5 (1.9) ▲	414 (2.6)	-12 (1.5) ▼
Indonesia	397 (3.7)	399 (3.6)	2 (0.9)	394 (4.2)	-3 (1.8)	385 (4.2)	-12 (1.9) ▼
Jordan	388 (3.1)	388 (3.1)	-1 (1.1)	394 (3.1)	6 (1.0) ▲	381 (3.4)	-7 (1.5) ▼
<sup>ψ</sup> Saudi Arabia	383 (4.1)	384 (4.1)	0 (1.8)	381 (5.0)	-2 (3.1)	365 (4.2)	-18 (2.5) ▼
Morocco	377 (3.4)	381 (3.3)	3 (0.9) ▲	385 (3.8)	8 (1.7) ▲	351 (4.2)	-27 (1.4) ▼
South Africa (5)	376 (3.5)	379 (3.4)	3 (0.9) ▲	359 (3.7)	-16 (1.1) ▼	381 (4.0)	5 (1.8) ▲
<sup>ψ</sup> Kuwait	353 (4.6)	356 (4.6)	3 (1.2) ▲	338 (4.9)	-15 (1.4) ▼	345 (5.4)	-8 (2.4) ▼

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

Numbers of items are based on the TIMSS 2015 fourth grade mathematics assessment items included in scaling.

<sup>ψ</sup> Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 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 2015

**Exhibit 3.1: Achievement in Mathematics Content Domains (Continued)**

Country	Overall Mathematics Average Scale Score	Number (89 items)		Geometric Shapes and Measures (56 items)		Data Display (24 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	
<b>Benchmarking Participants</b>								
<sup>1</sup> Florida, US	546 (4.7)	556 (4.9)	10 (1.9) ▲	529 (5.6)	-17 (3.2) ▼	541 (6.1)	-5 (4.3)	
<sup>‡</sup> Quebec, Canada	536 (4.0)	533 (4.2)	-3 (1.5)	542 (4.6)	7 (1.8) ▲	541 (5.0)	5 (3.1)	
Ontario, Canada	512 (2.3)	500 (2.6)	-13 (1.3) ▼	526 (2.9)	14 (1.6) ▲	536 (2.6)	23 (1.4) ▲	
Dubai, UAE	511 (1.4)	514 (1.5)	3 (1.2) ▲	503 (1.9)	-8 (1.2) ▼	517 (1.7)	6 (1.0) ▲	
Norway (4)	493 (2.3)	489 (2.2)	-4 (1.6) ▼	499 (2.7)	6 (1.9) ▲	495 (2.9)	2 (2.2)	
Buenos Aires, Argentina	432 (2.9)	445 (2.9)	13 (1.0) ▲	403 (3.2)	-29 (1.6) ▼	411 (3.4)	-21 (1.3) ▼	
<sup>2</sup> <sup>ψ</sup> Abu Dhabi, UAE	419 (4.7)	422 (4.7)	2 (1.6)	412 (5.1)	-8 (1.5) ▼	423 (4.8)	4 (1.7) ▲	

- ▲ Subscale score significantly higher than overall mathematics score
- ▼ Subscale score significantly lower than overall mathematics score

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**Exhibit 3.3: Achievement in Mathematics Cognitive Domains**

Country	Overall Mathematics Average Scale Score	Knowing (64 items)		Applying (72 items)		Reasoning (33 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
<sup>2</sup> Singapore	618 (3.8)	631 (4.0)	13 (1.4) ●	619 (4.0)	2 (1.0)	603 (4.5)	-15 (1.4) ▼
<sup>†</sup> Hong Kong SAR	615 (2.9)	618 (3.1)	4 (1.3) ●	621 (3.1)	6 (1.3) ●	600 (3.2)	-15 (1.5) ▼
Korea, Rep. of	608 (2.2)	627 (2.9)	19 (1.4) ●	595 (2.1)	-13 (1.2) ▼	619 (2.5)	11 (2.0) ●
Chinese Taipei	597 (1.9)	620 (2.3)	24 (1.9) ●	593 (2.1)	-3 (1.5) ▼	576 (3.1)	-21 (2.0) ▼
Japan	593 (2.0)	601 (2.4)	9 (1.3) ●	589 (2.1)	-4 (1.2) ▼	595 (2.7)	2 (1.9)
<sup>‡</sup> Northern Ireland	570 (2.9)	582 (3.9)	11 (1.6) ●	575 (3.2)	5 (1.2) ●	550 (3.3)	-21 (1.9) ▼
Russian Federation	564 (3.4)	556 (3.4)	-7 (1.0) ▼	566 (3.7)	3 (1.7)	570 (4.0)	6 (1.8) ●
Norway (5)	549 (2.5)	544 (3.1)	-5 (1.9) ▼	550 (2.6)	1 (1.1)	556 (2.9)	7 (2.2) ●
Ireland	547 (2.1)	554 (2.9)	7 (2.2) ●	549 (2.2)	1 (1.2)	535 (2.7)	-12 (1.7) ▼
England	546 (2.8)	554 (3.3)	8 (1.5) ●	544 (3.2)	-2 (1.7)	540 (3.2)	-6 (2.0) ▼
<sup>†</sup> Belgium (Flemish)	546 (2.1)	554 (2.3)	8 (0.8) ●	544 (2.2)	-2 (1.1)	536 (2.7)	-10 (1.4) ▼
Kazakhstan	544 (4.5)	546 (4.4)	1 (1.3)	541 (4.9)	-4 (1.3) ▼	553 (4.6)	9 (1.6) ●
<sup>2</sup> Portugal	541 (2.2)	548 (2.6)	6 (1.9) ●	540 (2.4)	-2 (1.2)	532 (2.3)	-10 (1.3) ▼
<sup>2 †</sup> United States	539 (2.3)	547 (2.3)	8 (1.2) ●	537 (2.4)	-2 (1.0)	531 (2.5)	-9 (1.3) ▼
<sup>2 †</sup> Denmark	539 (2.7)	536 (3.3)	-3 (1.6) ▼	538 (2.8)	-1 (1.7)	548 (3.2)	9 (2.0) ●
<sup>2</sup> Lithuania	535 (2.5)	532 (2.5)	-3 (1.1) ▼	537 (2.7)	1 (1.3)	534 (2.8)	-1 (1.4) ▼
Finland	535 (2.0)	530 (2.2)	-5 (1.4) ▼	536 (2.1)	1 (1.0)	540 (3.1)	5 (2.2) ●
Poland	535 (2.1)	517 (2.4)	-18 (1.0) ▼	541 (2.1)	6 (0.7) ●	546 (2.3)	11 (1.3) ●
<sup>†</sup> Netherlands	530 (1.7)	521 (1.8)	-9 (0.8) ▼	531 (1.7)	1 (1.4)	543 (2.6)	13 (2.4) ●
Hungary	529 (3.2)	532 (3.1)	3 (1.2) ●	526 (3.3)	-3 (1.0) ▼	529 (3.6)	0 (1.5)
Czech Republic	528 (2.2)	519 (2.5)	-9 (1.2) ▼	528 (2.4)	0 (0.9)	544 (3.0)	16 (1.9) ●
Bulgaria	524 (5.3)	527 (5.1)	3 (1.7)	523 (5.6)	-2 (1.8)	521 (5.8)	-4 (1.8) ▼
Cyprus	523 (2.7)	519 (2.8)	-4 (1.7) ▼	529 (2.8)	6 (1.6) ●	519 (3.1)	-4 (1.6) ▼
Germany	522 (2.0)	524 (2.3)	2 (0.9) ●	515 (2.2)	-6 (1.2) ▼	535 (2.4)	13 (1.6) ●
Slovenia	520 (1.9)	517 (1.9)	-3 (1.2) ▼	521 (2.1)	1 (0.8)	524 (2.2)	4 (1.2) ●
<sup>2</sup> Sweden	519 (2.8)	501 (3.4)	-18 (1.8) ▼	521 (2.7)	3 (0.9) ●	542 (3.3)	23 (1.5) ●
<sup>3</sup> Serbia	518 (3.5)	513 (3.5)	-5 (1.7) ▼	521 (3.4)	3 (1.4) ●	517 (3.8)	-1 (1.8)
Australia	517 (3.1)	509 (3.5)	-8 (1.6) ▼	521 (3.0)	4 (1.2) ●	523 (3.0)	6 (1.7) ●
<sup>1 2 †</sup> Canada	511 (2.3)	505 (2.4)	-5 (0.7) ▼	510 (2.3)	0 (0.6)	521 (2.4)	10 (0.7) ●
<sup>2</sup> Italy	507 (2.6)	511 (2.9)	4 (1.0) ●	504 (2.5)	-3 (1.7)	503 (3.3)	-4 (3.0)
<sup>2</sup> Spain	505 (2.5)	505 (2.4)	0 (1.2)	505 (2.4)	0 (0.9)	502 (2.5)	-3 (0.9) ▼
Croatia	502 (1.8)	502 (1.9)	0 (1.2)	499 (1.9)	-4 (1.2) ▼	507 (2.1)	5 (1.1) ●
Slovak Republic	498 (2.5)	491 (2.4)	-8 (1.3) ▼	497 (2.5)	-2 (1.0)	515 (2.9)	17 (1.8) ●
New Zealand	491 (2.3)	475 (2.6)	-15 (1.3) ▼	497 (2.5)	6 (1.5) ●	504 (2.7)	13 (1.3) ●
France	488 (2.9)	484 (2.8)	-4 (0.9) ▼	488 (3.1)	0 (1.0)	491 (3.4)	3 (2.2)
Turkey	483 (3.1)	491 (3.4)	8 (1.5) ●	482 (3.5)	-1 (2.0)	466 (3.5)	-17 (2.0) ▼
<sup>1</sup> Georgia	463 (3.6)	466 (4.0)	3 (1.8)	461 (4.1)	-2 (2.4)	452 (4.4)	-11 (2.1) ▼
Chile	459 (2.4)	449 (2.8)	-10 (1.8) ▼	462 (2.4)	4 (1.2) ●	466 (2.3)	7 (1.2) ●
United Arab Emirates	452 (2.4)	453 (2.7)	1 (1.0)	452 (2.5)	1 (0.7)	445 (2.4)	-6 (1.0) ▼
<sup>2</sup> Bahrain	451 (1.6)	453 (1.8)	2 (1.2)	450 (1.6)	-1 (0.9)	447 (2.0)	-4 (1.4) ▼
Qatar	439 (3.4)	444 (3.4)	5 (1.2) ●	434 (3.5)	-5 (1.0) ▼	431 (4.4)	-8 (3.0) ▼
Iran, Islamic Rep. of	431 (3.2)	429 (3.2)	-3 (1.7) ▼	435 (2.9)	3 (1.4) ●	426 (3.3)	-5 (1.8) ▼
Oman	425 (2.5)	422 (2.7)	-3 (1.0) ▼	428 (2.4)	2 (1.2) ●	420 (2.4)	-6 (1.1) ▼
Indonesia	397 (3.7)	395 (4.2)	-3 (1.8) ▼	397 (3.6)	0 (1.0)	397 (3.5)	-1 (1.2)
Jordan	388 (3.1)	389 (3.1)	1 (0.9)	388 (3.1)	0 (1.1)	385 (3.3)	-3 (1.9)
<sup>ψ</sup> Saudi Arabia	383 (4.1)	374 (4.6)	-10 (2.0) ▼	382 (4.5)	-2 (2.1)	383 (4.3)	-1 (2.4)
Morocco	377 (3.4)	377 (3.7)	-1 (1.2)	375 (3.6)	-3 (0.9) ▼	379 (3.6)	2 (1.7)
South Africa (5)	376 (3.5)	378 (3.6)	2 (0.6) ●	377 (3.4)	1 (0.7)	369 (3.5)	-7 (0.9) ▼
<sup>ψ</sup> Kuwait	353 (4.6)	354 (4.5)	1 (1.6)	348 (4.8)	-5 (1.7) ▼	332 (5.0)	-21 (1.5) ▼

● Subscale score significantly higher than overall mathematics score  
▼ Subscale score significantly lower than overall mathematics score

Numbers of items are based on the TIMSS 2015 fourth grade mathematics assessment 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 C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 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 2015

**Exhibit 3.3: Achievement in Mathematics Cognitive Domains (Continued)**

Country	Overall Mathematics Average Scale Score	Knowing (64 items)		Applying (72 items)		Reasoning (33 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	
<b>Benchmarking Participants</b>								
<sup>1</sup> Florida, US	546 (4.7)	555 (5.2)	9 (2.8) ▲	545 (4.9)	-2 (1.6)	534 (6.2)	-12 (3.7) ▼	
<sup>‡</sup> Quebec, Canada	536 (4.0)	542 (4.3)	6 (1.9) ▲	533 (4.1)	-3 (1.3) ▼	536 (4.9)	1 (2.3)	
Ontario, Canada	512 (2.3)	505 (2.5)	-8 (1.0) ▼	513 (2.3)	1 (0.8)	524 (2.6)	12 (1.0) ▲	
Dubai, UAE	511 (1.4)	514 (2.0)	3 (1.6)	510 (1.8)	0 (1.5)	507 (1.7)	-4 (1.1) ▼	
Norway (4)	493 (2.3)	479 (2.6)	-14 (1.3) ▼	495 (2.5)	2 (1.9)	506 (3.0)	13 (2.0) ▲	
Buenos Aires, Argentina	432 (2.9)	432 (2.9)	0 (1.3)	427 (3.0)	-5 (0.9) ▼	437 (3.4)	5 (1.8) ▲	
<sup>2</sup> <sup>ψ</sup> Abu Dhabi, UAE	419 (4.7)	418 (5.1)	-1 (1.3)	422 (4.8)	2 (1.8)	414 (4.4)	-6 (1.4) ▼	

- ▲ Subscale score significantly higher than overall mathematics score
- ▼ Subscale score significantly lower than overall mathematics score

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 3.5: Differences in Achievement for Mathematics Content Domains Across Assessment Years**

Instructions: 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 Average Scale Score	Number		Geometric Shapes and Measures Average Scale Score	Geometric Shapes and Measures		Data Display Average Scale Score	Data Display	
		Differences Between Years			Differences Between Years			Differences Between Years	
		2011	2007		2011	2007		2011	2007
<b>Australia</b>									
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)		
<b>Bahrain</b>									
<sup>2</sup> 2015	453 (1.7)	14 ▲		447 (1.9)	25 ▲		454 (2.3)	12 ▲	
2011	439 (3.1)			422 (3.8)			442 (4.0)		
<b>Belgium (Flemish)</b>									
<sup>†</sup> 2015	543 (2.1)	-8 ▼		564 (2.3)	11 ▲		523 (3.0)	-13 ▼	
2011	552 (2.1)			552 (1.9)			536 (2.8)		
<b>Chile</b>									
2015	455 (2.7)	-7		460 (3.1)	4		463 (3.2)	-2	
2011	462 (2.7)			455 (3.0)			465 (2.6)		
<b>Chinese Taipei</b>									
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)		
<b>Croatia</b>									
2015	498 (1.8)	7 ▲		512 (2.3)	22 ▲		498 (3.0)	10 ▲	
<sup>2</sup> 2011	491 (1.9)			490 (2.5)			488 (2.9)		
<b>Czech Republic</b>									
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)		
<b>Denmark</b>									
<sup>2 †</sup> 2015	535 (2.7)	1	21 ▲	555 (3.2)	7	10 ▲	526 (3.5)	-6	-1
<sup>2</sup> 2011	534 (2.5)		21 ▲	548 (3.1)		2	532 (2.9)		5
<sup>†</sup> 2007	513 (2.7)			546 (3.1)			527 (4.0)		
<b>England</b>									
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)		
<b>Finland</b>									
2015	532 (2.1)	-14 ▼		539 (2.5)	-4		542 (3.3)	-9	
2011	545 (2.4)			543 (3.0)			551 (3.7)		
<b>Georgia</b>									
<sup>1</sup> 2015	483 (3.5)	10 ▲	12 ▲	429 (4.6)	17 ▲	33 ▲	435 (4.4)	2	45 ▲
<sup>1</sup> 2011	473 (3.2)		2	411 (4.2)		16 ▲	433 (4.2)		43 ▲
<sup>1</sup> 2007	470 (3.7)			395 (5.9)			390 (5.4)		
<b>Germany</b>									
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)		
<b>Hong Kong SAR</b>									
<sup>†</sup> 2015	616 (3.1)	12 ▲	9	617 (3.4)	12 ▲	3	611 (3.8)	18 ▲	10 ▲
<sup>2</sup> 2011	604 (3.3)		-4	605 (3.4)		-9	593 (3.7)		-7
2007	608 (3.7)			613 (3.8)			600 (3.3)		
<b>Hungary</b>									
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)		

▲ More recent year significantly higher  
▼ More recent year significantly lower

Trend results for Kuwait do not include private schools. Trend results for Lithuania do not include students taught in Polish or in Russian.

✳ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%. Such annotations in exhibits with trend data began in 2011, so data from assessments prior to 2011 are not annotated for reservations.

✳ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%. Such annotations in exhibits with trend data began in 2011, so data from assessments prior to 2011 are not annotated for reservations.

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 for sampling guidelines and sampling participation notes †, ‡, and §.

◆ Tested the same cohort of students as other countries, but later in the assessment year at the beginning of the next school year.

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

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 3.5: Differences in Achievement for Mathematics Content Domains Across Assessment Years (Continued)**

Instructions: 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 Average Scale Score	Number		Geometric Shapes and Measures Average Scale Score	Geometric Shapes and Measures		Data Display Average Scale Score	Data Display	
		Differences Between Years			Differences Between Years			Differences Between Years	
		2011	2007		2011	2007		2011	2007
<b>Iran, Islamic Rep. of</b>									
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)		
<b>Ireland</b>									
2015	551 (2.2)	18 ▲		542 (2.9)	22 ▲		548 (3.8)	25 ▲	
2011	533 (2.6)			520 (3.1)			523 (3.0)		
<b>Italy</b>									
<sup>2</sup> 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)		
<b>Japan</b>									
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)		
<b>Kazakhstan</b>									
<sup>2</sup> 2015	552 (4.0)	37 ▲		540 (5.8)	48 ▲		524 (5.3)	48 ▲	
2011	515 (4.1)			491 (5.4)			476 (5.5)		
<b>Korea, Rep. of</b>									
2015	610 (2.6)	4		610 (2.3)	3		607 (2.6)	4	
2011	606 (2.0)			607 (2.0)			603 (1.8)		
<b>Kuwait</b>									
<sup>ψ</sup> 2015	329 (3.0)	-4		315 (3.8)	-6		321 (3.9)	-26 ▼	
<sup>1</sup> 2011	333 (4.0)			321 (4.1)			347 (3.8)		
<b>Lithuania</b>									
<sup>2</sup> 2015	539 (2.8)	1	3	527 (3.2)	-4	9 ▲	542 (4.0)	16 ▲	13 ▲
<sup>1 2</sup> 2011	537 (2.4)		1	531 (2.9)		12 ▲	526 (2.8)		-3
<sup>1</sup> 2007	536 (2.2)			518 (3.1)			529 (3.7)		
<b>Morocco</b>									
2015	381 (3.3)	41 ▲		385 (3.8)	35 ▲		351 (4.2)	80 ▲	
<sup>ж</sup> 2011	340 (4.0)			350 (3.8)			271 (4.7)		
<b>Netherlands</b>									
<sup>†</sup> 2015	531 (2.2)	-12 ▼	-8 ▼	522 (1.9)	-2	0	539 (3.4)	-20 ▼	-6
<sup>†</sup> 2011	543 (1.7)		4	524 (2.9)		2	559 (2.8)		14 ▲
<sup>‡</sup> 2007	539 (2.2)			522 (2.6)			545 (2.8)		
<b>New Zealand</b>									
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)		
<b>Northern Ireland</b>									
<sup>‡</sup> 2015	574 (3.1)	8		566 (3.3)	6		567 (3.8)	12 ▲	
<sup>†</sup> 2011	566 (2.9)			560 (3.2)			555 (2.9)		
<b>Norway (4)</b>									
2015	489 (2.2)	1	21 ▲	499 (2.7)	-7	20 ▲	495 (2.9)	1	21 ▲
<sup>‡</sup> 2011	488 (3.0)		20 ▲	507 (2.9)		27 ▲	494 (3.2)		20 ▲
2007	468 (2.8)			479 (3.5)			474 (2.9)		
<b>Oman</b>									
2015	423 (2.6)	39 ▲		430 (2.9)	54 ▲		414 (2.6)	33 ▲	
<sup>ψ</sup> 2011	384 (3.1)			376 (3.2)			381 (3.0)		
<b>Portugal</b>									
<sup>2</sup> 2015	541 (2.1)	18 ▲		539 (2.6)	-9		546 (2.8)	-2	
2011	522 (3.6)			548 (4.0)			548 (2.9)		
<b>Qatar</b>									
2015	446 (3.4)	29 ▲		423 (4.4)	24 ▲		435 (3.9)	19 ▲	
<sup>2</sup> 2011	417 (3.4)			399 (4.0)			416 (4.7)		

▲ More recent year significantly higher  
▼ More recent year significantly lower

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 3.5: Differences in Achievement for Mathematics Content Domains Across Assessment Years (Continued)**

Instructions: 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 Average Scale Score	Number		Geometric Shapes and Measures Average Scale Score	Geometric Shapes and Measures		Data Display Average Scale Score	Data Display	
		Differences Between Years			Differences Between Years			Differences Between Years	
		2011	2007		2011	2007		2011	2007
<b>Russian Federation</b>									
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)		
<b>Saudi Arabia</b>									
ψ 2015	384 (4.1)	-27 ▼		381 (5.0)	-23 ▼		365 (4.2)	-38 ▼	
2011	410 (5.5)			404 (6.2)			403 (6.1)		
<b>Serbia</b>									
<sup>3</sup> 2015	524 (3.4)	-5		503 (3.8)	6		517 (3.8)	14 ▲	
<sup>2</sup> 2011	529 (3.0)			497 (3.7)			503 (3.7)		
<b>Singapore</b>									
<sup>2</sup> 2015	630 (4.2)	11 ▲	18 ▲	607 (4.2)	18 ▲	24 ▲	600 (4.1)	12 ▲	3
<sup>2</sup> 2011	619 (3.4)		8	589 (3.6)		5	588 (3.3)		-9
2007	611 (4.0)			584 (4.2)			597 (3.7)		
<b>Slovak Republic</b>									
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)		
<b>Slovenia</b>									
2015	511 (1.8)	8 ▲	21 ▲	530 (2.1)	4	10 ▲	540 (3.1)	8	28 ▲
2011	503 (2.5)		13 ▲	526 (2.2)		6 ▲	532 (2.4)		21 ▲
2007	490 (1.8)			520 (1.9)			512 (2.5)		
<b>Spain</b>									
<sup>2</sup> 2015	504 (2.5)	18 ▲		503 (2.8)	26 ▲		509 (3.1)	30 ▲	
2011	487 (2.9)			476 (2.9)			479 (3.6)		
<b>Sweden</b>									
<sup>2</sup> 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)		
<b>Turkey</b>									
2015	489 (3.2)	12 ▲		475 (3.0)	28 ▲		476 (3.4)	-2	
2011	477 (4.5)			447 (5.0)			478 (5.1)		
<b>United Arab Emirates</b>									
2015	455 (2.4)	17 ▲		442 (2.7)	24 ▲		453 (2.4)	16 ▲	
2011	438 (2.1)			418 (2.2)			437 (1.9)		
<b>United States</b>									
<sup>2</sup> † 2015	546 (2.2)	3	16 ▲	525 (2.6)	-9 ▼	3	540 (2.8)	-4	-5
<sup>2</sup> 2011	543 (2.0)		13 ▲	535 (2.2)		13 ▲	545 (1.8)		-1
<sup>2</sup> † 2007	529 (2.6)			522 (3.0)			546 (2.8)		

▲ More recent year significantly higher  
▼ More recent year significantly lower

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 3.5: Differences in Achievement for Mathematics Content Domains Across Assessment Years (Continued)**

Instructions: 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 Average Scale Score	Number		Geometric Shapes and Measures Average Scale Score	Geometric Shapes and Measures		Data Display Average Scale Score	Data Display		
		Differences Between Years			Differences Between Years			Differences Between Years		
		2011	2007		2011	2007		2011	2007	
<b>Benchmarking Participants</b>										
<b>Ontario, Canada</b>										
	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
<sup>2</sup>	2007	495 (3.5)			530 (3.7)			545 (4.0)		
<b>Quebec, Canada</b>										
‡	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 ▲
<sup>2</sup>	2007	515 (3.0)			524 (3.8)			523 (4.4)		
<b>Abu Dhabi, UAE</b>										
<sup>2</sup> ψ	2015	422 (4.7)	2		412 (5.1)	10		423 (4.8)	5	
	2011	420 (4.7)			401 (5.3)			418 (4.4)		
<b>Dubai, UAE</b>										
	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)		
<b>Florida, US</b>										
<sup>1</sup>	2015	556 (4.9)	8		529 (5.6)	-16 ▼		541 (6.1)	0	
<sup>1 3</sup>	2011	548 (3.2)			546 (3.9)			541 (3.6)		

▲ More recent year significantly higher  
 ▼ More recent year significantly lower

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 3.7: Differences in Achievement for Mathematics Cognitive Domains Across Assessment Years**

Instructions: 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 Average Scale Score	Knowing		Applying Average Scale Score	Applying		Reasoning Average Scale Score	Reasoning	
		Differences Between Years			Differences Between Years			Differences Between Years	
		2011	2007		2011	2007		2011	2007
<b>Australia</b>									
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)		
<b>Bahrain</b>									
<sup>2</sup> 2015	453 (1.8)	15 ▲		450 (1.6)	19 ▲		447 (2.0)	8 ▲	
2011	438 (3.8)			431 (3.3)			439 (3.2)		
<b>Belgium (Flemish)</b>									
<sup>†</sup> 2015	554 (2.3)	-10 ▼		544 (2.2)	-2		536 (2.7)	4	
2011	564 (2.0)			546 (2.2)			532 (2.7)		
<b>Chile</b>									
2015	449 (2.8)	-7		462 (2.4)	0		466 (2.3)	-3	
2011	455 (2.4)			463 (2.4)			469 (2.5)		
<b>Chinese Taipei</b>									
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)		
<b>Croatia</b>									
2015	502 (1.9)	8 ▲		499 (1.9)	15 ▲		507 (2.1)	15 ▲	
<sup>2</sup> 2011	495 (1.9)			484 (2.0)			492 (2.9)		
<b>Czech Republic</b>									
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)		
<b>Denmark</b>									
<sup>2</sup> <sup>†</sup> 2015	536 (3.3)	5	22 ▲	538 (2.8)	-1	11 ▲	548 (3.2)	5	22 ▲
<sup>2</sup> 2011	531 (2.7)		18 ▲	539 (2.9)		12 ▲	543 (2.7)		17 ▲
<sup>†</sup> 2007	514 (2.7)			527 (2.8)			525 (2.5)		
<b>England</b>									
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)		
<b>Finland</b>									
2015	530 (2.2)	-18 ▼		536 (2.1)	-8 ▼		540 (3.1)	-5	
2011	548 (2.6)			544 (2.6)			546 (2.3)		
<b>Georgia</b>									
<sup>1</sup> 2015	466 (4.0)	16 ▲	21 ▲	461 (4.1)	14 ▲	31 ▲	452 (4.4)	1	19 ▲
<sup>1</sup> 2011	449 (3.7)		4	447 (3.4)		17 ▲	450 (3.3)		18 ▲
<sup>1</sup> 2007	445 (4.4)			430 (4.7)			433 (4.7)		
<b>Germany</b>									
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)		
<b>Hong Kong SAR</b>									
<sup>†</sup> 2015	618 (3.1)	-1	-4	621 (3.1)	23 ▲	14 ▲	600 (3.2)	11 ▲	4
<sup>2</sup> 2011	619 (3.4)		-3	597 (3.4)		-9	589 (3.3)		-7
2007	622 (3.8)			606 (3.8)			596 (3.8)		
<b>Hungary</b>									
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)		

▲ More recent year significantly higher

▼ More recent year significantly lower

Trend results for Kuwait do not include private schools. Trend results for Lithuania do not include students taught in Polish or in Russian.

✱ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%. Such annotations in exhibits with trend data began in 2011, so data from assessments prior to 2011 are not annotated for reservations.

ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%. Such annotations in exhibits with trend data began in 2011, so data from assessments prior to 2011 are not annotated for reservations.

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 for sampling guidelines and sampling participation notes †, ‡, and §.

♣ Tested the same cohort of students as other countries, but later in the assessment year at the beginning of the next school year.

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

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 3.7: Differences in Achievement for Mathematics Cognitive Domains Across Assessment Years (Continued)**

Instructions: 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 Average Scale Score	Knowing		Applying Average Scale Score	Applying		Reasoning Average Scale Score	Reasoning	
		Differences Between Years			Differences Between Years			Differences Between Years	
		2011	2007		2011	2007		2011	2007
<b>Iran, Islamic Rep. of</b>									
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)		
<b>Ireland</b>									
2015	554 (2.9)	15 ▲		549 (2.2)	20 ▲		535 (2.7)	26 ▲	
2011	539 (3.1)			529 (2.7)			510 (3.1)		
<b>Italy</b>									
<sup>2</sup> 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)		
<b>Japan</b>									
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)		
<b>Kazakhstan</b>									
2015	546 (4.4)	43 ▲		541 (4.9)	42 ▲		553 (4.6)	52 ▲	
<sup>2</sup> 2011	503 (4.7)			499 (5.0)			501 (4.7)		
<b>Korea, Rep. of</b>									
2015	627 (2.9)	13 ▲		595 (2.1)	-5		619 (2.5)	16 ▲	
2011	614 (2.0)			600 (2.2)			603 (2.3)		
<b>Kuwait</b>									
<sup>ψ</sup> 2015	326 (3.0)	-16 ▼		322 (3.3)	-8		306 (3.4)	-23 ▼	
<sup>1 ж</sup> 2011	343 (3.5)			330 (4.6)			329 (3.6)		
<b>Lithuania</b>									
<sup>2</sup> 2015	534 (2.8)	8 ▲	14 ▲	538 (2.9)	-2	-3	536 (3.2)	-1	7
<sup>1 2</sup> 2011	525 (2.9)		5	540 (2.4)		0	536 (2.5)		8 ▲
<sup>1</sup> 2007	520 (2.8)			540 (2.7)			529 (2.8)		
<b>Morocco</b>									
2015	377 (3.7)	57 ▲		375 (3.6)	43 ▲		379 (3.6)	32 ▲	
<sup>ж</sup> 2011	320 (4.3)			332 (3.9)			347 (4.2)		
<b>Netherlands</b>									
<sup>†</sup> 2015	521 (1.8)	-17 ▼	-8 ▼	531 (1.7)	-10 ▼	-10 ▼	543 (2.6)	0	6
<sup>†</sup> 2011	537 (2.0)		9 ▲	540 (1.7)		0	543 (2.7)		7
<sup>‡</sup> 2007	528 (2.3)			540 (2.2)			537 (2.5)		
<b>New Zealand</b>									
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)		
<b>Northern Ireland</b>									
<sup>‡</sup> 2015	582 (3.9)	2		575 (3.2)	11 ▲		550 (3.3)	12 ▲	
<sup>†</sup> 2011	580 (3.4)			565 (2.9)			538 (3.4)		
<b>Norway (4)</b>									
2015	479 (2.6)	-8	20 ▲	495 (2.5)	-4	20 ▲	506 (3.0)	5	20 ▲
<sup>‡</sup> 2011	487 (3.2)		28 ▲	499 (2.9)		24 ▲	501 (3.2)		15 ▲
2007	459 (3.0)			475 (2.9)			486 (2.9)		
<b>Oman</b>									
2015	422 (2.7)	43 ▲		428 (2.4)	46 ▲		420 (2.4)	29 ▲	
<sup>ψ</sup> 2011	380 (3.2)			382 (2.9)			391 (2.7)		
<b>Portugal</b>									
<sup>2</sup> 2015	548 (2.6)	17 ▲		540 (2.4)	6		532 (2.3)	1	
2011	531 (3.3)			534 (3.7)			531 (3.7)		
<b>Qatar</b>									
2015	444 (3.4)	33 ▲		434 (3.5)	23 ▲		431 (4.4)	15 ▲	
<sup>2</sup> 2011	411 (3.7)			411 (3.4)			416 (4.4)		

▲ More recent year significantly higher  
▼ More recent year significantly lower

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**Exhibit 3.7: Differences in Achievement for Mathematics Cognitive Domains Across Assessment Years (Continued)**

Instructions: 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 Average Scale Score	Knowing		Applying Average Scale Score	Applying		Reasoning Average Scale Score	Reasoning		
		Differences Between Years			Differences Between Years			Differences Between Years		
		2011	2007		2011	2007		2011	2007	
<b>Russian Federation</b>										
	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)		
<b>Saudi Arabia</b>										
ψ	2015	374 (4.6)	-36 ▼		382 (4.5)	-23 ▼		383 (4.3)	-29 ▼	
	2011	409 (6.0)			405 (5.8)			412 (6.0)		
<b>Serbia</b>										
<sup>3</sup>	2015	513 (3.5)	-7		521 (3.4)	10 ▲		517 (3.8)	2	
<sup>2</sup>	2011	520 (3.0)			511 (3.2)			514 (3.9)		
<b>Singapore</b>										
<sup>2</sup>	2015	631 (4.0)	2	5	619 (4.0)	17 ▲	23 ▲	603 (4.5)	15 ▲	19 ▲
<sup>2</sup>	2011	629 (3.6)		4	602 (3.4)		5	588 (3.7)		4
	2007	625 (4.2)			597 (4.1)			584 (4.0)		
<b>Slovak Republic</b>										
	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)		
<b>Slovenia</b>										
	2015	517 (1.9)	7 ▲	19 ▲	521 (2.1)	7 ▲	19 ▲	524 (2.2)	8 ▲	20 ▲
	2011	510 (2.7)		12 ▲	514 (2.3)		12 ▲	516 (2.6)		12 ▲
	2007	498 (2.0)			502 (2.0)			504 (2.5)		
<b>Spain</b>										
<sup>2</sup>	2015	505 (2.4)	23 ▲		505 (2.4)	22 ▲		502 (2.5)	19 ▲	
	2011	482 (3.4)			483 (3.1)			483 (2.9)		
<b>Sweden</b>										
<sup>2</sup>	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)		
<b>Turkey</b>										
	2015	491 (3.4)	17 ▲		482 (3.5)	13 ▲		466 (3.5)	5	
	2011	475 (5.3)			469 (4.7)			462 (4.3)		
<b>United Arab Emirates</b>										
	2015	453 (2.7)	16 ▲		452 (2.5)	22 ▲		445 (2.4)	11 ▲	
	2011	437 (2.2)			430 (2.0)			434 (2.3)		
<b>United States</b>										
<sup>2</sup> †	2015	547 (2.3)	-8 ▼	6	537 (2.4)	-2	13 ▲	531 (2.5)	5	6
<sup>2</sup>	2011	556 (2.1)		14 ▲	539 (2.1)		15 ▲	525 (2.1)		1
<sup>2</sup> †	2007	541 (2.8)			524 (2.8)			525 (2.4)		

▲ More recent year significantly higher  
▼ More recent year significantly lower

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 3.7: Differences in Achievement for Mathematics Cognitive Domains Across Assessment Years (Continued)**

Instructions: 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 Average Scale Score	Knowing		Applying Average Scale Score	Applying		Reasoning Average Scale Score	Reasoning		
		Differences Between Years			Differences Between Years			Differences Between Years		
		2011	2007		2011	2007		2011	2007	
<b>Benchmarking Participants</b>										
<b>Ontario, Canada</b>										
	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
<sup>2</sup>	2007	498 (3.5)			513 (3.3)			526 (3.1)		
<b>Quebec, Canada</b>										
	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 ▲
<sup>2</sup>	2007	519 (3.3)			516 (3.1)			523 (3.2)		
<b>Abu Dhabi, UAE</b>										
<sup>2</sup> <sup>ψ</sup>	2015	418 (5.1)	0		422 (4.8)	9		414 (4.4)	-5	
	2011	418 (4.9)			413 (4.7)			418 (4.5)		
<b>Dubai, UAE</b>										
	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 ▲
<sup>♦♦</sup> <sup>‡</sup>	2007	454 (2.5)			436 (2.2)			441 (3.0)		
<b>Florida, US</b>										
<sup>1</sup>	2015	555 (5.2)	-13 ▼		545 (4.9)	3		534 (6.2)	11	
<sup>1</sup> <sup>3</sup>	2011	568 (3.7)			542 (3.6)			523 (3.9)		

- ▲ More recent year significantly higher
- ▼ More recent year significantly lower

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 3.9: Achievement in Mathematics Content Domains by Gender**

Country	Number		Geometric Shapes and Measures		Data Display	
	Girls	Boys	Girls	Boys	Girls	Boys
Australia	503 (3.3)	515 (4.2)	523 (3.7)	531 (3.8)	530 (4.6)	535 (5.6)
<sup>2</sup> Bahrain	458 (1.7)	448 (2.5)	458 (2.4)	436 (2.7)	469 (4.1)	440 (2.9)
<sup>†</sup> Belgium (Flemish)	538 (2.5)	548 (2.3)	562 (2.5)	565 (3.0)	525 (2.9)	522 (4.6)
Bulgaria	531 (5.0)	528 (4.6)	530 (6.5)	520 (5.7)	509 (8.7)	500 (7.0)
<sup>1 2 †</sup> Canada	497 (2.6)	509 (2.6)	513 (2.7)	521 (2.8)	526 (2.7)	531 (3.1)
Chile	454 (3.2)	455 (3.2)	459 (3.5)	460 (3.5)	462 (3.7)	464 (4.3)
Chinese Taipei	595 (2.4)	603 (2.3)	597 (3.4)	597 (3.4)	591 (3.3)	592 (2.7)
Croatia	491 (2.3)	505 (2.4)	506 (2.7)	519 (2.9)	494 (3.2)	503 (3.4)
Cyprus	523 (3.0)	534 (2.9)	524 (3.2)	523 (3.4)	506 (4.1)	509 (4.4)
Czech Republic	524 (3.0)	532 (2.5)	529 (3.5)	533 (2.8)	522 (3.4)	528 (3.7)
<sup>2 †</sup> Denmark	530 (3.1)	539 (3.2)	553 (4.1)	557 (3.6)	526 (5.1)	526 (3.1)
England	542 (3.4)	552 (3.9)	538 (3.6)	546 (3.9)	555 (4.1)	549 (3.9)
Finland	536 (2.9)	528 (2.6)	545 (2.5)	534 (2.9)	550 (3.8)	534 (3.6)
France	478 (3.4)	488 (3.1)	500 (4.0)	507 (2.9)	474 (4.6)	477 (4.0)
<sup>1</sup> Georgia	484 (3.8)	482 (4.2)	430 (5.2)	427 (6.0)	443 (5.8)	427 (6.2)
Germany	511 (2.3)	519 (2.4)	531 (2.9)	531 (3.1)	535 (3.2)	535 (3.0)
<sup>†</sup> Hong Kong SAR	610 (4.1)	621 (3.1)	611 (4.5)	622 (3.8)	608 (4.4)	613 (4.3)
Hungary	527 (3.2)	535 (3.8)	530 (4.1)	542 (4.1)	513 (4.0)	512 (4.3)
Indonesia	407 (3.8)	392 (3.8)	394 (4.4)	395 (4.7)	392 (4.6)	378 (4.5)
Iran, Islamic Rep. of	439 (4.7)	431 (4.5)	437 (4.7)	419 (5.0)	423 (4.8)	408 (4.6)
Ireland	549 (2.6)	553 (3.0)	538 (3.2)	546 (3.7)	547 (5.5)	548 (4.1)
<sup>2</sup> Italy	499 (2.6)	520 (2.8)	497 (2.9)	510 (3.5)	490 (3.1)	506 (3.8)
Japan	591 (2.2)	592 (2.7)	605 (3.4)	597 (3.1)	594 (4.1)	593 (2.9)
Jordan	396 (3.4)	380 (5.1)	408 (3.6)	383 (5.2)	401 (3.4)	364 (5.4)
Kazakhstan	553 (4.2)	551 (4.5)	539 (6.0)	540 (6.3)	528 (5.8)	520 (6.1)
Korea, Rep. of	605 (2.7)	614 (2.9)	608 (2.7)	612 (3.0)	606 (2.7)	608 (4.1)
<sup>ψ</sup> Kuwait	360 (5.9)	353 (5.1)	350 (6.0)	325 (5.8)	357 (6.0)	333 (6.4)
<sup>2</sup> Lithuania	539 (3.1)	537 (3.3)	527 (4.0)	524 (3.6)	542 (3.7)	538 (6.4)
Morocco	381 (3.5)	381 (4.0)	387 (3.9)	384 (4.4)	357 (4.4)	345 (4.8)
<sup>†</sup> Netherlands	526 (2.6)	537 (2.6)	518 (2.1)	525 (2.4)	538 (3.3)	540 (4.3)
New Zealand	483 (3.1)	488 (3.1)	487 (3.7)	490 (2.7)	506 (3.3)	506 (3.5)
<sup>‡</sup> Northern Ireland	573 (4.1)	576 (3.1)	564 (4.1)	568 (3.9)	566 (4.5)	567 (4.2)
Norway (5)	543 (2.7)	541 (3.2)	562 (3.3)	556 (4.6)	573 (3.0)	559 (4.0)
Oman	432 (3.6)	413 (2.8)	440 (3.2)	421 (3.3)	428 (3.0)	400 (3.5)
Poland	532 (2.7)	537 (2.8)	535 (2.8)	532 (3.1)	534 (3.6)	542 (3.4)
<sup>2</sup> Portugal	535 (2.5)	546 (2.8)	534 (3.5)	544 (3.3)	542 (2.8)	550 (4.0)
Qatar	445 (4.4)	448 (4.7)	429 (5.0)	417 (6.1)	437 (4.8)	434 (5.9)
Russian Federation	567 (3.8)	567 (3.5)	558 (4.5)	556 (4.8)	572 (4.3)	573 (4.1)
<sup>ψ</sup> Saudi Arabia	401 (4.5)	368 (6.6)	405 (5.1)	358 (8.0)	394 (4.5)	337 (7.1)
<sup>3</sup> Serbia	523 (3.5)	525 (4.6)	504 (4.5)	501 (5.0)	522 (5.1)	512 (4.5)
<sup>2</sup> Singapore	632 (4.3)	628 (4.7)	610 (4.5)	605 (4.5)	603 (4.2)	597 (5.2)
Slovak Republic	496 (2.9)	508 (2.7)	483 (3.1)	498 (2.8)	493 (4.8)	499 (3.7)
Slovenia	507 (2.2)	515 (2.4)	530 (2.5)	530 (2.6)	541 (3.7)	539 (3.5)
South Africa (5)	386 (3.6)	371 (4.3)	367 (3.9)	353 (4.6)	391 (4.3)	371 (4.9)
<sup>2</sup> Spain	497 (2.8)	511 (2.7)	497 (3.1)	508 (3.1)	506 (3.5)	512 (3.6)
<sup>2</sup> Sweden	513 (3.1)	515 (3.1)	524 (3.7)	522 (3.7)	535 (5.1)	523 (3.9)
Turkey	487 (3.3)	491 (3.6)	474 (3.4)	476 (3.5)	478 (4.3)	474 (4.0)
United Arab Emirates	455 (3.9)	455 (3.4)	446 (4.0)	438 (3.7)	458 (4.0)	449 (3.5)
<sup>2 †</sup> United States	542 (2.2)	549 (2.7)	519 (2.5)	532 (3.0)	538 (3.2)	542 (2.8)
International Avg.	505 (0.5)	507 (0.5)	504 (0.5)	503 (0.6)	505 (0.6)	499 (0.6)

▲ Average significantly higher than other gender

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

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 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 2015

**Exhibit 3.9: Achievement in Mathematics Content Domains by Gender  
 (Continued)**

Country	Number		Geometric Shapes and Measures		Data Display	
	Girls	Boys	Girls	Boys	Girls	Boys
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	442 (3.4)	448 (3.2)	401 (4.2)	405 (3.1)	410 (4.6)	412 (3.6)
Ontario, Canada	495 (3.1)	504 (2.9) ▲	523 (3.0)	530 (3.6) ▲	534 (3.0)	537 (3.0)
‡ Quebec, Canada	526 (4.1)	539 (5.1) ▲	538 (4.5)	547 (5.5) ▲	539 (5.2)	543 (5.7)
Norway (4)	487 (2.6)	491 (3.4)	498 (3.6)	500 (4.1)	495 (3.4)	495 (4.3)
<sup>2</sup> ψ Abu Dhabi, UAE	422 (7.9)	421 (6.5)	416 (8.2)	407 (7.1)	429 (8.1)	418 (6.8)
Dubai, UAE	511 (3.1)	516 (2.9)	503 (3.8)	502 (3.3)	518 (3.9)	516 (3.0)
<sup>1</sup> Florida, US	556 (4.9)	556 (5.4)	531 (5.5)	527 (7.0)	546 (6.3)	536 (7.0)

▲ Average significantly higher than other gender

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 3.11: Achievement in Mathematics Cognitive Domains by Gender**

Country	Knowing		Applying		Reasoning	
	Girls	Boys	Girls	Boys	Girls	Boys
Australia	503 (3.5)	515 (4.7) ▲	516 (3.5)	526 (3.5) ▲	519 (3.5)	528 (3.8) ▲
<sup>2</sup> Bahrain	460 (1.9) ▲	446 (2.6)	457 (1.8) ▲	443 (2.3)	454 (2.3) ▲	440 (2.6)
<sup>†</sup> Belgium (Flemish)	550 (3.0)	558 (2.4) ▲	542 (2.4)	546 (2.6)	535 (3.3)	537 (3.2)
Bulgaria	529 (5.4)	526 (5.1)	525 (6.1)	521 (5.4)	524 (7.1)	518 (5.6)
<sup>1 2 †</sup> Canada	502 (2.5)	509 (2.8) ▲	506 (2.5)	514 (2.5) ▲	515 (2.5)	527 (2.8) ▲
Chile	450 (3.0)	447 (3.6)	461 (2.7)	464 (3.1)	464 (3.4)	467 (3.0)
Chinese Taipei	619 (2.7)	622 (3.1)	591 (2.4)	595 (2.7)	572 (3.6)	579 (3.3) ▲
Croatia	497 (2.1)	508 (2.7) ▲	493 (2.2)	504 (2.5) ▲	497 (2.9)	517 (3.3) ▲
Cyprus	514 (3.1)	524 (3.3)	526 (3.0)	531 (3.8)	516 (4.2)	522 (3.3)
Czech Republic	514 (3.3)	524 (2.6) ▲	523 (3.0)	533 (2.7) ▲	545 (4.0)	542 (3.2)
<sup>2 †</sup> Denmark	531 (4.4)	541 (3.2) ▲	535 (3.2)	541 (3.1)	545 (4.3)	550 (3.9)
England	548 (3.8)	560 (3.8) ▲	542 (3.9)	547 (3.5)	537 (3.3)	543 (4.2)
Finland	532 (2.9)	528 (2.9)	542 (2.7) ▲	530 (2.4)	547 (3.1) ▲	534 (3.9)
France	482 (3.4)	487 (3.5)	484 (3.5)	492 (3.7) ▲	485 (3.8)	497 (3.8) ▲
<sup>1</sup> Georgia	468 (4.5)	464 (4.6)	462 (4.4)	460 (4.8)	454 (4.8)	450 (5.5)
Germany	522 (2.9)	526 (2.9)	513 (2.6)	517 (2.6)	533 (2.8)	536 (2.9)
<sup>†</sup> Hong Kong SAR	614 (4.8)	621 (3.0)	615 (4.1)	626 (3.3) ▲	595 (4.6)	604 (3.5) ▲
Hungary	530 (3.6)	535 (3.8)	523 (3.4)	529 (4.1)	525 (4.3)	534 (4.3)
Indonesia	401 (4.9) ▲	389 (4.2)	403 (3.8) ▲	392 (3.9)	400 (3.8)	394 (3.9)
Iran, Islamic Rep. of	434 (4.8)	424 (4.6)	440 (4.3)	430 (4.3)	431 (4.5)	422 (5.0)
Ireland	552 (3.6)	556 (3.5)	547 (2.8)	550 (3.0)	532 (3.7)	538 (3.4)
<sup>2</sup> Italy	501 (3.2)	520 (4.0) ▲	494 (2.7)	514 (3.1) ▲	491 (3.0)	513 (4.4) ▲
Japan	602 (2.9)	601 (3.2)	590 (2.2)	588 (2.6)	595 (2.8)	595 (4.0)
Jordan	400 (3.4) ▲	380 (5.0)	398 (3.3) ▲	380 (5.0)	395 (4.0) ▲	376 (5.1)
Kazakhstan	547 (4.7)	544 (5.0)	541 (4.8)	540 (5.4)	555 (5.2)	551 (5.0)
Korea, Rep. of	624 (3.1)	630 (3.3) ▲	592 (2.2)	599 (2.6) ▲	612 (3.8)	624 (3.6) ▲
<sup>ψ</sup> Kuwait	360 (5.5)	349 (5.3)	355 (6.2) ▲	340 (5.4)	340 (5.9) ▲	323 (6.2)
<sup>2</sup> Lithuania	533 (3.2)	532 (3.0)	537 (3.2)	536 (3.3)	537 (3.3)	531 (4.1)
Morocco	378 (3.9)	376 (4.3)	375 (4.0)	374 (3.9)	383 (3.8)	375 (4.5)
<sup>†</sup> Netherlands	515 (2.0)	526 (2.5) ▲	528 (1.8)	533 (2.3) ▲	540 (2.8)	546 (3.6)
New Zealand	471 (3.1)	480 (3.1) ▲	497 (2.8)	497 (3.2)	503 (3.5)	504 (3.5)
<sup>‡</sup> Northern Ireland	577 (5.4)	587 (3.9)	576 (4.3)	575 (3.2)	548 (4.6)	551 (3.5)
Norway (5)	545 (3.0)	543 (4.0)	551 (2.7)	549 (3.3)	559 (3.3)	553 (4.6)
Oman	435 (3.1) ▲	410 (3.2)	436 (3.2) ▲	420 (3.1)	428 (3.2) ▲	411 (3.2)
Poland	515 (2.5)	519 (3.0)	540 (2.3)	543 (2.7)	546 (2.5)	547 (3.0)
<sup>2</sup> Portugal	540 (3.4)	554 (2.7) ▲	534 (2.7)	545 (2.9) ▲	527 (2.9)	536 (3.2) ▲
Qatar	445 (4.1)	444 (4.9)	435 (4.4)	434 (5.2)	433 (5.7)	429 (5.6)
Russian Federation	557 (4.0)	556 (3.8)	566 (3.9)	567 (3.9)	573 (4.2) ▲	567 (4.3)
<sup>ψ</sup> Saudi Arabia	398 (5.5) ▲	351 (7.4)	402 (5.1) ▲	362 (6.8)	406 (5.2) ▲	361 (7.0)
<sup>3</sup> Serbia	513 (3.7)	512 (4.7)	522 (3.8)	520 (4.3)	517 (4.8)	516 (4.8)
<sup>2</sup> Singapore	633 (4.5)	628 (4.1)	621 (4.3)	618 (4.4)	605 (4.9)	600 (4.9)
Slovak Republic	484 (2.8)	497 (2.9) ▲	491 (3.2)	502 (2.9) ▲	509 (3.4)	521 (3.3) ▲
Slovenia	514 (2.8)	520 (2.7)	518 (2.6)	523 (2.6)	522 (2.9)	526 (3.3)
South Africa (5)	387 (3.7) ▲	369 (4.6)	383 (3.6) ▲	371 (4.4)	376 (3.8) ▲	362 (4.5)
<sup>2</sup> Spain	498 (3.1)	512 (2.6) ▲	499 (2.6)	511 (2.6) ▲	496 (3.2)	507 (3.2) ▲
<sup>2</sup> Sweden	498 (3.7)	503 (3.8)	524 (3.0)	519 (3.0)	545 (3.8)	538 (4.3)
Turkey	490 (3.5)	493 (3.8)	481 (3.6)	484 (3.8)	466 (4.0)	467 (3.8)
United Arab Emirates	455 (4.2)	451 (3.8)	454 (4.1)	451 (3.5)	448 (3.9)	442 (3.3)
<sup>2 †</sup> United States	545 (2.5)	550 (2.7) ▲	532 (2.4)	542 (2.8) ▲	528 (2.7)	534 (2.9) ▲
International Avg.	504 (0.5)	505 (0.5)	504 (0.5)	505 (0.5)	504 (0.6)	504 (0.6)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

▲ Average significantly higher than other gender

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

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 for sampling guidelines and sampling participation notes †, ‡, and §.

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

**Exhibit 3.11: Achievement in Mathematics Cognitive Domains by Gender (Continued)**

Country	Knowing		Applying		Reasoning	
	Girls	Boys	Girls	Boys	Girls	Boys
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	430 (4.1)	434 (2.7)	424 (3.7)	430 (2.9)	436 (4.1)	438 (3.7)
Ontario, Canada	502 (2.9)	508 (2.9)	510 (2.7)	516 (2.8)	519 (2.9)	529 (3.3)
‡ Quebec, Canada	538 (4.1)	546 (5.3)	528 (4.1)	537 (4.8)	529 (4.9)	544 (5.8)
Norway (4)	478 (3.1)	481 (3.3)	492 (2.8)	498 (3.2)	507 (4.2)	506 (3.7)
<sup>2</sup> ψ Abu Dhabi, UAE	420 (8.3)	416 (7.1)	423 (8.1)	421 (6.5)	418 (7.5)	410 (5.9)
Dubai, UAE	513 (3.6)	515 (3.1)	509 (3.5)	512 (3.3)	508 (3.1)	507 (3.2)
<sup>1</sup> Florida, US	555 (5.4)	556 (6.1)	545 (5.0)	544 (5.7)	539 (6.4)	530 (6.8)

▲ Average significantly higher than other gender

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



# CHAPTER 4: HOME ENVIRONMENT SUPPORT

TIMSS 2015 INTERNATIONAL RESULTS IN MATHEMATICS



**IEA**

**TIMSS & PIRLS**  
International Study Center  
Lynch School of Education, Boston College

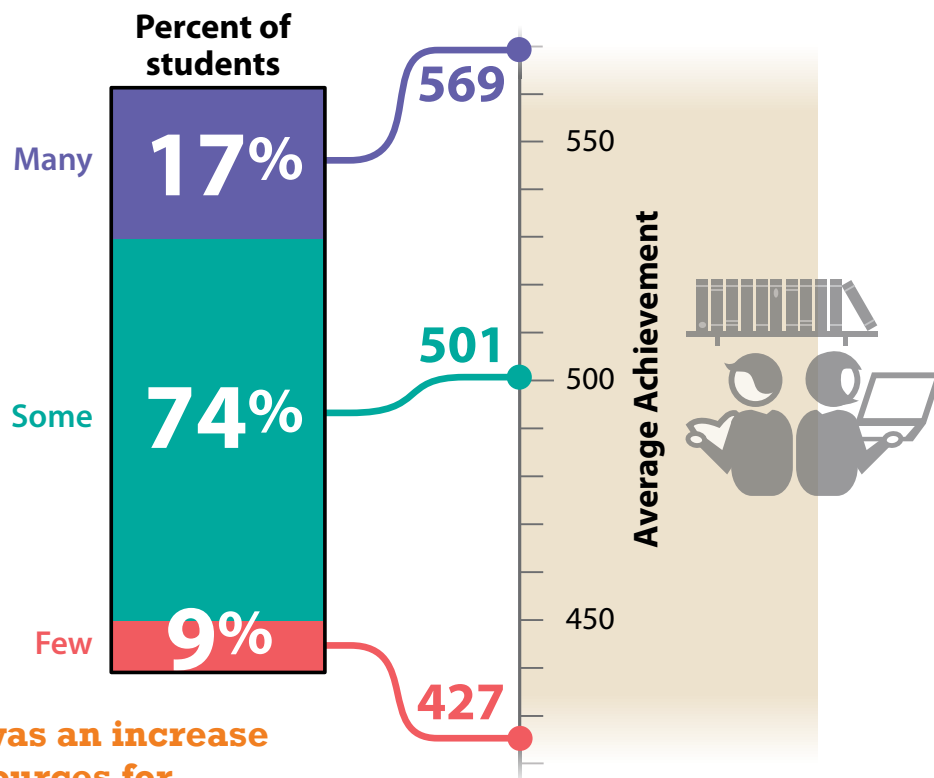




## Supportive Home Environment for Learning

### Home Resources for Learning

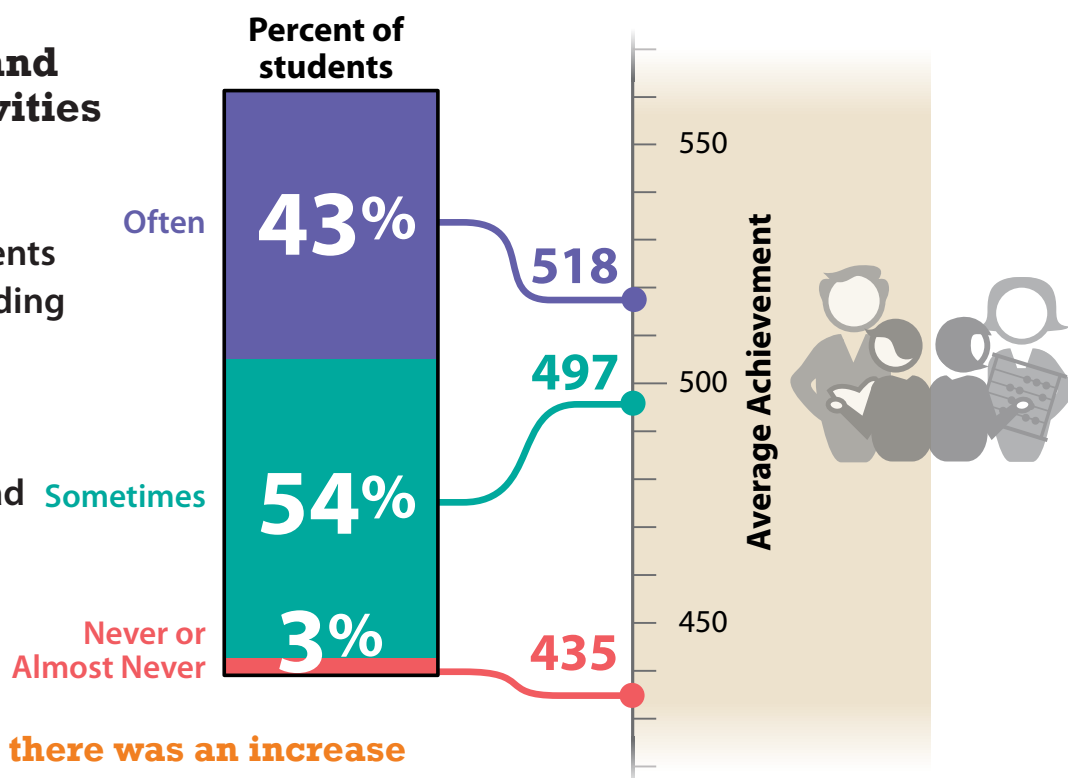
Students whose parents reported many home resources for learning had much higher achievement than students whose parents reported some or few resources.



**In 8 countries, there was an increase in students' home resources for learning between 2011 and 2015.**

### Early Literacy and Numeracy Activities

Students whose parents reported often spending time with them on early literacy and numeracy learning activities had higher achievement.

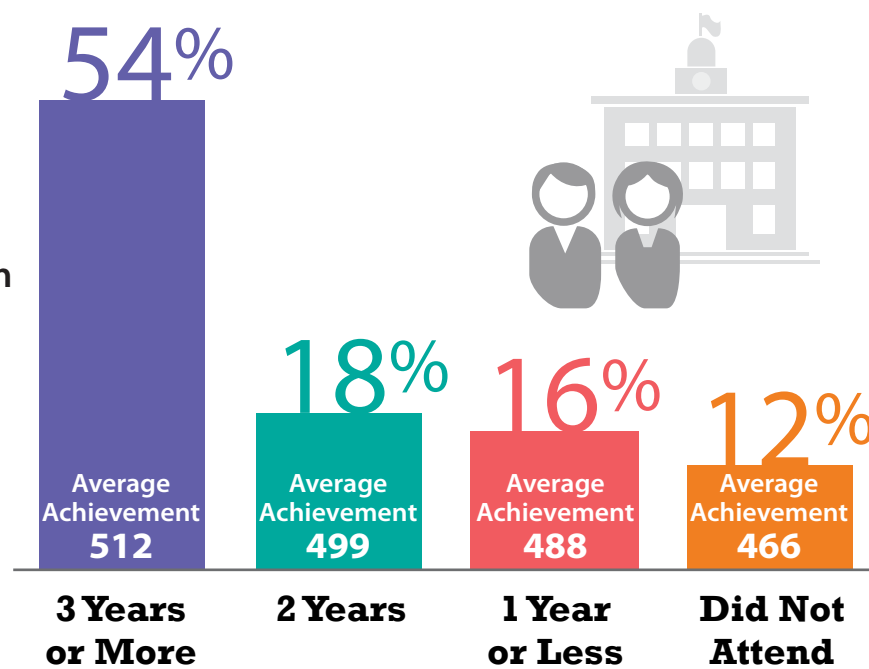


**In 14 countries, there was an increase in students' time spent on early literacy and numeracy learning activities.**

## An Early Start in School

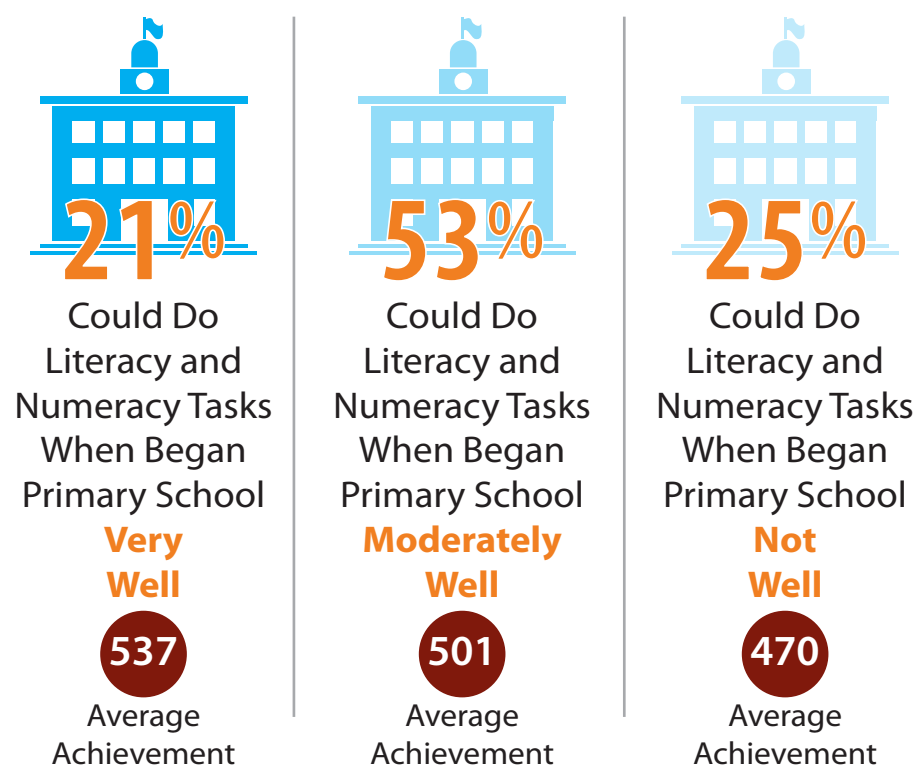
### Preprimary Education

There was a positive relationship for fourth grade students between the number of years students attended preprimary education programs and mathematics achievement.



### Early Literacy and Numeracy Tasks

Parents' reports on whether students could perform early literacy or numeracy tasks when they began primary school illustrates that early preparation appears to have an effect through the fourth grade.



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015.  
<http://timss2015.org/download-center/>



**Exhibit 4.1: Home Resources for Learning**

Reported by Parents, except Number of Books and Home Study Supports Reported by Students

Students were scored according to their own and their parents' responses concerning the availability of five resources on the *Home Resources for Learning* scale. Students with **Many Resources** had a score of at least 11.9, which is the point on the scale corresponding to students reporting they had more than 100 books in the home and both of the home study supports, and parents reporting that they had more than 25 children's books in the home, that at least one parent had finished university, and that at least one parent had a professional occupation, on average. Students with **Few Resources** had a score no higher than 7.4, which is the scale point corresponding to students reporting that they had 25 or fewer books in the home and neither of the home study supports, and parents reporting that 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 had a clerical or professional occupation, on average. All other students were assigned to the **Some Resources** category.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Country	Many Resources		Some Resources		Few Resources		Average Scale Score	Difference in Average Scale Score from 2011
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement		
Korea, Rep. of	50 (1.8)	635 (2.5)	49 (1.8)	584 (2.0)	1 (0.2)	~ ~	11.8 (0.07)	◇ ◇
New Zealand	s 41 (1.4)	547 (2.9)	58 (1.4)	490 (3.1)	1 (0.2)	~ ~	11.4 (0.05)	◇ ◇
Sweden	r 38 (1.6)	554 (2.6)	60 (1.6)	508 (2.8)	1 (0.3)	~ ~	11.3 (0.07)	r -0.1 (0.09)
Denmark	38 (0.9)	570 (3.3)	61 (0.9)	526 (3.3)	1 (0.2)	~ ~	11.3 (0.04)	◇ ◇
Northern Ireland	s 35 (1.4)	632 (3.2)	64 (1.4)	564 (3.9)	1 (0.3)	~ ~	11.1 (0.06)	s 0.2 (0.09)
Finland	34 (1.4)	563 (2.0)	66 (1.4)	525 (2.1)	0 (0.1)	~ ~	11.2 (0.05)	0.0 (0.06)
Ireland	33 (1.5)	587 (2.4)	65 (1.4)	534 (2.2)	2 (0.3)	~ ~	11.0 (0.06)	0.2 (0.09)
Canada	r 32 (1.2)	547 (2.4)	68 (1.2)	505 (2.1)	0 (0.1)	~ ~	11.2 (0.05)	◇ ◇
Singapore	27 (0.9)	669 (4.1)	71 (0.9)	605 (3.9)	2 (0.2)	~ ~	10.8 (0.04)	0.2 (0.05) ●
Belgium (Flemish)	26 (1.1)	581 (2.8)	72 (1.1)	539 (1.9)	3 (0.4)	493 (4.9)	10.8 (0.05)	◇ ◇
Hungary	24 (1.4)	590 (2.7)	69 (1.2)	522 (2.5)	7 (0.8)	413 (7.5)	10.4 (0.08)	0.3 (0.12)
Hong Kong SAR	24 (1.5)	655 (4.7)	69 (1.4)	607 (2.8)	7 (1.0)	581 (5.5)	10.3 (0.08)	0.5 (0.11) ●
France	23 (1.4)	542 (2.9)	75 (1.3)	479 (2.7)	2 (0.2)	~ ~	10.6 (0.06)	◇ ◇
Poland	22 (0.9)	578 (3.1)	75 (0.9)	526 (2.1)	3 (0.3)	456 (8.3)	10.4 (0.04)	◇ ◇
Slovenia	s 21 (1.3)	569 (3.4)	78 (1.3)	519 (2.6)	1 (0.2)	~ ~	10.7 (0.05)	s 0.2 (0.06) ●
Cyprus	20 (1.0)	567 (4.6)	79 (1.0)	520 (2.4)	1 (0.2)	~ ~	10.6 (0.04)	◇ ◇
Spain	r 20 (0.9)	545 (3.1)	76 (0.8)	505 (2.0)	4 (0.5)	437 (8.4)	10.4 (0.05)	r 0.1 (0.08)
Czech Republic	18 (0.9)	579 (2.9)	80 (0.9)	520 (2.1)	2 (0.4)	~ ~	10.5 (0.04)	0.0 (0.06)
Germany	s 18 (1.1)	576 (3.4)	80 (1.1)	528 (2.1)	2 (0.4)	~ ~	10.5 (0.06)	s -0.2 (0.09)
Chinese Taipei	17 (0.8)	641 (2.4)	76 (0.8)	592 (2.0)	6 (0.5)	547 (5.4)	10.1 (0.05)	-0.1 (0.08)
Portugal	16 (0.9)	591 (3.3)	77 (1.0)	537 (2.2)	7 (0.6)	496 (6.0)	9.9 (0.05)	0.1 (0.08)
Russian Federation	16 (1.0)	599 (5.0)	83 (1.0)	559 (3.2)	2 (0.3)	~ ~	10.4 (0.05)	0.0 (0.07)
Slovak Republic	15 (0.8)	555 (3.0)	77 (1.1)	498 (2.3)	8 (0.9)	404 (10.6)	10.0 (0.05)	0.1 (0.08)
Georgia	14 (1.0)	509 (6.6)	82 (1.0)	461 (3.6)	4 (0.6)	404 (10.3)	10.1 (0.06)	0.2 (0.09) ●
Lithuania	13 (0.9)	586 (5.4)	84 (0.9)	535 (2.5)	3 (0.5)	454 (9.3)	10.2 (0.05)	0.3 (0.07) ●
Bulgaria	12 (1.1)	578 (4.8)	68 (1.9)	529 (3.8)	20 (2.1)	488 (13.3)	9.4 (0.12)	◇ ◇
Japan	12 (0.9)	643 (3.5)	86 (0.9)	588 (1.6)	2 (0.2)	~ ~	10.2 (0.04)	◇ ◇
Qatar	r 11 (1.1)	522 (10.9)	86 (1.2)	442 (3.1)	3 (0.4)	382 (9.1)	10.2 (0.05)	r 0.0 (0.07)
United Arab Emirates	11 (0.4)	538 (4.4)	86 (0.4)	452 (2.3)	4 (0.2)	369 (6.0)	10.1 (0.02)	0.2 (0.04) ●
Croatia	9 (0.7)	547 (3.6)	88 (0.8)	501 (1.6)	3 (0.4)	430 (8.8)	10.0 (0.04)	0.2 (0.06) ●
Serbia	8 (0.8)	587 (5.1)	87 (1.0)	519 (2.7)	5 (0.8)	428 (17.5)	9.7 (0.06)	◇ ◇
Italy	8 (0.7)	552 (4.4)	85 (0.8)	510 (2.6)	7 (0.6)	465 (6.0)	9.6 (0.05)	-0.1 (0.07)
Bahrain	7 (0.3)	517 (5.2)	88 (0.4)	454 (1.6)	5 (0.2)	412 (7.4)	9.8 (0.01)	◇ ◇
Kazakhstan	7 (1.0)	578 (12.0)	88 (1.0)	543 (4.5)	6 (0.7)	521 (7.7)	9.8 (0.07)	◇ ◇
Chile	r 5 (0.5)	535 (6.8)	87 (0.9)	465 (2.4)	8 (0.9)	431 (5.6)	9.3 (0.06)	◇ ◇
Turkey	5 (0.7)	590 (5.9)	63 (1.2)	506 (2.6)	33 (1.3)	432 (5.0)	8.4 (0.07)	◇ ◇
Iran, Islamic Rep. of	4 (0.6)	533 (9.0)	62 (1.7)	453 (3.0)	33 (1.6)	386 (5.1)	8.3 (0.08)	0.2 (0.12)
Oman	3 (0.3)	485 (6.9)	78 (0.7)	436 (2.6)	19 (0.8)	398 (4.4)	8.9 (0.04)	0.2 (0.06) ●
Kuwait	r 3 (0.5)	425 (16.3)	94 (0.5)	359 (4.8)	3 (0.3)	317 (9.1)	9.6 (0.04)	◇ ◇
South Africa (5)	r 2 (0.4)	~ ~	65 (1.2)	391 (4.1)	34 (1.2)	348 (3.2)	8.1 (0.05)	◇ ◇
Jordan	2 (0.3)	~ ~	82 (1.1)	405 (2.9)	16 (1.1)	340 (7.2)	8.8 (0.05)	◇ ◇
Saudi Arabia	1 (0.3)	~ ~	84 (1.0)	391 (3.8)	14 (1.0)	371 (8.0)	9.0 (0.05)	0.0 (0.09)
Morocco	1 (0.1)	~ ~	38 (1.4)	400 (4.4)	62 (1.4)	373 (4.8)	6.8 (0.07)	s -0.4 (0.12) ▼
Indonesia	0 (0.1)	~ ~	50 (1.4)	418 (4.1)	49 (1.4)	381 (4.3)	7.6 (0.06)	◇ ◇
Australia	x x	x x	x x	x x	x x	x x	x x	x x
Netherlands	x x	x x	x x	x x	x x	x x	x x	x x
Norway (5)	x x	x x	x x	x x	x x	x x	x x	x x
England	- -	- -	- -	- -	- -	- -	- -	- -
United States	- -	- -	- -	- -	- -	- -	- -	- -
International Avg.	17 (0.2)	569 (0.9)	74 (0.2)	501 (0.4)	9 (0.1)	427 (1.5)		

This TIMSS 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 diamond (◇) indicates the country did not participate in the 2011 assessment.

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 less than 50% of students.

Significantly higher than 2011 ●  
Significantly lower than 2011 ▼

**Exhibit 4.1: Home Resources for Learning (Continued)**

Country	Many Resources		Some Resources		Few Resources		Average Scale Score	Difference in Average Scale Score from 2011	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement			
<b>Benchmarking Participants</b>									
Ontario, Canada	r 34 (1.5)	547 (2.6)	66 (1.5)	504 (2.4)	0 (0.1)	~ ~	11.2 (0.06)	◇ ◇	
Quebec, Canada	r 29 (2.4)	568 (4.8)	71 (2.3)	529 (3.7)	0 (0.1)	~ ~	11.0 (0.09)	r -0.1 (0.10)	
Dubai, UAE	19 (0.6)	570 (2.9)	79 (0.6)	504 (1.9)	1 (0.2)	~ ~	10.6 (0.02)	0.0 (0.03)	
Abu Dhabi, UAE	r 9 (1.1)	514 (14.4)	86 (1.2)	424 (4.3)	5 (0.5)	339 (11.3)	10.0 (0.06)	r 0.2 (0.09)	
Buenos Aires, Argentina	x x	x x	x x	x x	x x	x x	x x	x x	
Norway (4)	x x	x x	x x	x x	x x	x x	x x	x x	
Florida, US	--	--	--	--	--	--	--	--	

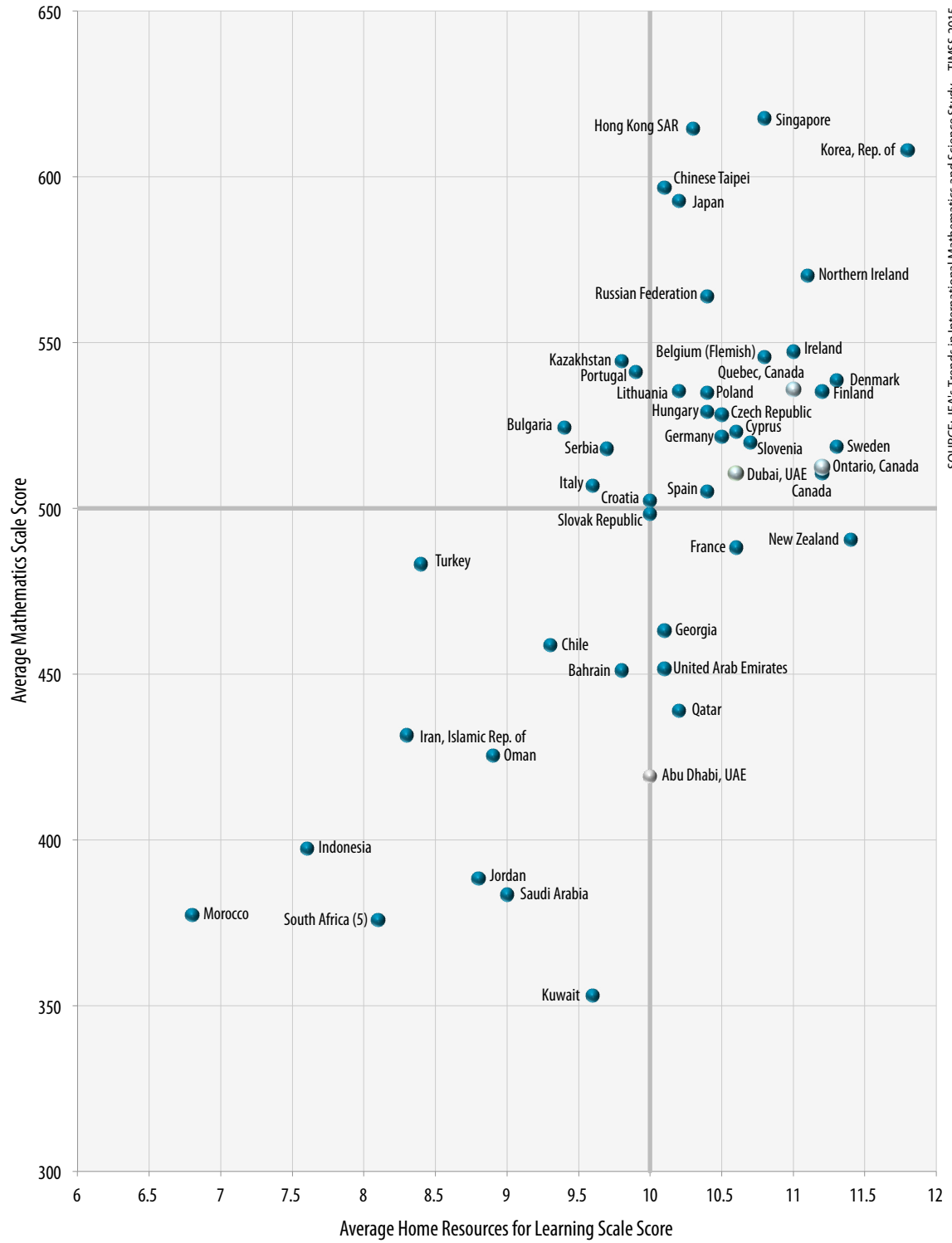
<p><b>Number of books in the home (students):</b></p> <p>1) 0-10 2) 11-25 3) 26-100 4) 101-200 5) More than 200</p> <p><b>Number of home study supports (students):</b></p> <p>1) None 2) Internet connection or own room 3) Both</p> <p><b>Highest level of occupation of either parent (parents):</b></p> <p>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)</p>	<p><b>Number of children's books in the home (parents):</b></p> <p>1) 0-10 2) 11-25 3) 26-50 4) 51-100 5) More than 100</p> <p><b>Highest level of education of either parent (parents):</b></p> <p>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</p>
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Significantly higher than 2011 ▲  
Significantly lower than 2011 ▼

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 4.1: Home Resources for Learning (Continued)**

Average Mathematics Achievement by Home Resources for Learning



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 4.3: Students Speak the Language of the Test at Home**

Reported by Students

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	73 (1.3)	516 (3.2)	12 (0.7)	531 (5.3)	14 (1.0)	518 (6.7)	1 (0.2)	~ ~
Bahrain	56 (0.7)	450 (1.6)	12 (0.4)	470 (4.0)	28 (0.6)	457 (2.9)	5 (0.3)	433 (6.4)
Belgium (Flemish)	68 (1.1)	555 (2.2)	10 (0.5)	544 (3.5)	18 (0.9)	519 (3.7)	3 (0.5)	521 (7.8)
Bulgaria	67 (2.3)	535 (4.1)	9 (0.7)	529 (9.7)	18 (1.7)	508 (10.7)	6 (1.0)	466 (14.1)
Canada	58 (1.0)	507 (2.5)	17 (0.5)	533 (2.8)	22 (0.8)	509 (3.9)	3 (0.3)	486 (8.2)
Chile	81 (0.7)	462 (2.5)	9 (0.4)	468 (6.1)	6 (0.4)	458 (5.4)	5 (0.4)	420 (6.5)
Chinese Taipei	43 (1.0)	593 (2.7)	17 (0.6)	616 (3.5)	40 (0.9)	596 (2.6)	1 (0.2)	~ ~
Croatia	80 (0.9)	499 (1.9)	12 (0.6)	523 (4.4)	7 (0.5)	503 (5.8)	1 (0.4)	~ ~
Cyprus	62 (1.4)	524 (2.6)	14 (0.8)	545 (4.8)	21 (0.9)	520 (3.6)	3 (0.4)	496 (8.2)
Czech Republic	77 (0.9)	525 (2.4)	14 (0.8)	548 (3.8)	8 (0.4)	523 (5.3)	1 (0.1)	~ ~
Denmark	70 (1.1)	542 (2.8)	18 (0.8)	547 (4.0)	11 (0.7)	514 (5.7)	1 (0.1)	~ ~
England	72 (1.8)	544 (2.8)	11 (0.7)	572 (6.6)	16 (1.4)	542 (6.5)	2 (0.3)	~ ~
Finland	72 (1.0)	538 (1.9)	17 (0.8)	541 (4.1)	10 (0.7)	514 (6.7)	1 (0.2)	~ ~
France	71 (1.2)	493 (3.0)	12 (0.6)	495 (4.9)	16 (0.8)	466 (4.5)	1 (0.1)	~ ~
Georgia	78 (1.1)	466 (3.6)	9 (0.6)	475 (8.0)	12 (0.8)	465 (5.6)	1 (0.5)	~ ~
Germany	66 (1.2)	532 (1.9)	14 (0.7)	524 (4.6)	18 (1.0)	503 (4.4)	1 (0.2)	~ ~
Hong Kong SAR	58 (1.7)	615 (3.2)	13 (0.8)	618 (4.7)	28 (1.6)	616 (4.5)	1 (0.3)	~ ~
Hungary	84 (0.7)	532 (3.1)	13 (0.7)	528 (5.6)	2 (0.3)	~ ~	0 (0.1)	~ ~
Indonesia	31 (1.8)	391 (5.1)	12 (0.6)	391 (5.4)	43 (1.7)	413 (4.8)	14 (0.9)	390 (7.0)
Iran, Islamic Rep. of	59 (2.0)	450 (3.7)	8 (0.6)	451 (6.6)	17 (1.1)	433 (5.5)	16 (1.5)	363 (9.4)
Ireland	77 (0.9)	553 (2.4)	11 (0.7)	531 (4.4)	10 (0.7)	538 (5.5)	2 (0.3)	~ ~
Italy	72 (1.1)	511 (2.6)	12 (0.8)	508 (4.2)	14 (0.8)	493 (5.3)	2 (0.3)	~ ~
Japan	91 (0.5)	596 (2.0)	7 (0.5)	576 (4.1)	1 (0.2)	~ ~	0 (0.1)	~ ~
Jordan	88 (1.0)	388 (3.2)	5 (0.6)	416 (12.3)	5 (0.5)	444 (7.0)	1 (0.4)	~ ~
Kazakhstan	78 (1.1)	544 (4.7)	9 (0.6)	553 (6.7)	12 (1.0)	548 (7.2)	1 (0.2)	~ ~
Korea, Rep. of	80 (0.7)	606 (2.3)	12 (0.6)	625 (3.5)	8 (0.5)	606 (5.1)	0 (0.0)	~ ~
Kuwait	17 (1.3)	334 (5.7)	11 (0.6)	359 (7.7)	34 (1.4)	376 (6.6)	37 (1.7)	342 (4.9)
Lithuania	77 (0.9)	534 (2.5)	14 (0.7)	556 (4.0)	9 (0.5)	525 (5.1)	0 (0.1)	~ ~
Morocco	35 (1.7)	361 (4.3)	12 (0.6)	380 (5.4)	25 (1.3)	401 (4.9)	29 (1.8)	387 (6.8)
Netherlands	65 (1.9)	532 (1.9)	15 (0.8)	541 (3.3)	17 (1.2)	512 (3.5)	3 (0.7)	531 (8.2)
New Zealand	69 (1.0)	492 (2.6)	15 (0.6)	500 (4.1)	14 (0.8)	481 (5.0)	2 (0.2)	~ ~
Northern Ireland	84 (1.1)	571 (3.1)	8 (0.6)	597 (7.4)	7 (0.9)	553 (6.2)	1 (0.2)	~ ~
Norway (5)	69 (1.5)	554 (2.8)	16 (0.8)	552 (3.8)	14 (1.1)	525 (6.3)	2 (0.2)	~ ~
Oman	50 (1.5)	432 (3.8)	13 (0.6)	427 (4.3)	24 (1.0)	425 (3.9)	13 (1.1)	416 (5.5)
Poland	83 (0.8)	531 (2.2)	14 (0.6)	558 (3.8)	4 (0.3)	538 (7.5)	0 (0.2)	~ ~
Portugal	84 (0.7)	541 (2.2)	7 (0.4)	561 (5.4)	8 (0.5)	529 (6.3)	1 (0.1)	~ ~
Qatar	41 (1.3)	416 (4.7)	12 (0.5)	453 (5.8)	39 (1.1)	466 (3.7)	8 (0.7)	419 (7.2)
Russian Federation	81 (1.5)	564 (3.3)	9 (0.7)	570 (5.1)	8 (1.0)	564 (8.9)	1 (0.3)	~ ~
Saudi Arabia	67 (1.7)	384 (4.4)	12 (1.1)	381 (6.4)	13 (1.0)	405 (6.4)	8 (0.8)	393 (10.0)
Serbia	87 (1.3)	521 (3.1)	8 (0.8)	540 (5.8)	5 (0.7)	475 (20.1)	0 (0.2)	~ ~
Singapore	28 (0.5)	622 (4.0)	20 (0.5)	640 (3.9)	48 (0.6)	609 (4.3)	4 (0.3)	574 (9.7)
Slovak Republic	70 (1.3)	505 (2.5)	15 (0.6)	519 (3.8)	12 (1.0)	465 (6.4)	3 (0.7)	404 (14.6)
Slovenia	72 (1.2)	524 (1.9)	14 (0.6)	532 (3.8)	11 (0.8)	496 (4.3)	3 (0.4)	466 (13.4)
South Africa (5)	20 (1.5)	414 (9.6)	10 (0.4)	401 (7.2)	56 (1.6)	374 (3.3)	14 (0.9)	317 (6.0)
Spain	60 (1.5)	504 (2.5)	14 (0.7)	528 (4.5)	18 (0.7)	505 (4.1)	9 (0.9)	484 (4.7)
Sweden	65 (1.5)	529 (2.5)	19 (0.8)	520 (3.9)	15 (1.1)	480 (5.8)	1 (0.3)	~ ~
Turkey	77 (1.3)	494 (2.7)	8 (0.5)	509 (5.8)	14 (1.0)	460 (8.0)	1 (0.3)	~ ~
United Arab Emirates	39 (0.8)	431 (3.1)	14 (0.5)	480 (3.6)	40 (0.8)	473 (3.2)	6 (0.3)	426 (5.3)
United States	67 (1.1)	543 (2.2)	12 (0.4)	557 (4.5)	19 (0.9)	525 (4.4)	2 (0.2)	~ ~
International Avg.	66 (0.2)	506 (0.5)	12 (0.1)	517 (0.8)	18 (0.1)	497 (0.9)	5 (0.1)	437 (1.9)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

( ) 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.

**Exhibit 4.3: Students Speak the Language of the Test at Home (Continued)**

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
<b>Benchmarking Participants</b>								
Buenos Aires, Argentina	78 (0.9)	435 (2.9)	9 (0.5)	456 (4.6)	12 (0.6)	439 (4.8)	1 (0.2)	~ ~
Ontario, Canada	55 (1.4)	506 (2.4)	19 (0.8)	534 (3.1)	24 (1.1)	515 (4.7)	2 (0.3)	~ ~
Quebec, Canada	60 (2.1)	534 (4.3)	18 (0.9)	551 (5.4)	20 (1.8)	529 (5.6)	3 (0.4)	530 (13.5)
Norway (4)	66 (1.4)	500 (2.2)	17 (0.7)	492 (4.0)	15 (0.9)	477 (4.7)	2 (0.3)	~ ~
Abu Dhabi, UAE	43 (1.9)	392 (5.6)	13 (0.7)	436 (7.9)	37 (1.7)	456 (6.7)	7 (0.6)	407 (8.8)
Dubai, UAE	29 (0.6)	503 (2.4)	19 (0.7)	529 (3.5)	46 (0.8)	516 (2.5)	6 (0.4)	468 (7.0)
Florida, US	61 (3.3)	551 (5.6)	11 (0.9)	566 (7.3)	26 (2.7)	529 (5.6)	2 (0.5)	~ ~

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Exhibit 4.5: Parental Attitude Toward Mathematics and Science

Reported by Parents

Students were scored on the *Parental Attitude Toward Mathematics and Science* scale according to their parents' responses to eight statements about their feelings toward the subjects. Students whose parents have a **Very Positive Attitude** had a score on the scale of at least 9.3, which corresponds 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 have a **Less than Positive Attitude** had a score no higher than 5.9, which corresponds 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 have a **Positive Attitude** toward mathematics and science.

Country	Very Positive Attitude		Positive Attitude		Less than Positive Attitude		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Kazakhstan	91 (0.6)	546 (4.6)	9 (0.6)	535 (7.0)	0 (0.1)	~ ~	11.4 (0.04)
Indonesia	89 (1.0)	399 (3.6)	10 (0.9)	396 (6.8)	1 (0.3)	~ ~	11.4 (0.06)
Portugal	87 (0.6)	543 (2.2)	13 (0.6)	538 (4.3)	0 (0.1)	~ ~	10.9 (0.02)
South Africa (5)	87 (0.8)	381 (3.4)	12 (0.8)	368 (6.6)	1 (0.1)	~ ~	11.2 (0.05)
Iran, Islamic Rep. of	85 (0.9)	436 (3.4)	15 (0.8)	415 (6.0)	1 (0.1)	~ ~	10.9 (0.05)
Turkey	82 (0.8)	488 (3.0)	17 (0.7)	473 (5.6)	1 (0.2)	~ ~	10.7 (0.05)
Oman	81 (0.5)	431 (2.7)	18 (0.5)	411 (4.0)	1 (0.1)	~ ~	10.6 (0.03)
Jordan	80 (0.9)	399 (3.2)	19 (0.9)	366 (5.9)	1 (0.2)	~ ~	10.6 (0.04)
Bahrain	80 (0.4)	459 (1.8)	20 (0.4)	435 (3.0)	1 (0.1)	~ ~	10.6 (0.02)
Singapore	79 (0.6)	624 (3.7)	20 (0.5)	603 (4.7)	1 (0.1)	~ ~	10.7 (0.03)
Qatar	r 79 (0.9)	454 (3.4)	20 (0.9)	423 (5.1)	1 (0.2)	~ ~	10.6 (0.04)
Kuwait	r 78 (0.9)	366 (5.4)	21 (0.9)	337 (3.8)	1 (0.1)	~ ~	10.6 (0.05)
Spain	77 (0.8)	512 (2.3)	22 (0.8)	501 (2.6)	1 (0.2)	~ ~	10.5 (0.03)
Northern Ireland	s 77 (1.1)	588 (3.7)	22 (1.1)	577 (5.3)	1 (0.3)	~ ~	10.4 (0.05)
Lithuania	76 (0.8)	542 (2.7)	24 (0.8)	530 (3.9)	0 (0.1)	~ ~	10.3 (0.03)
Ireland	76 (1.0)	555 (2.3)	24 (1.0)	536 (3.1)	1 (0.1)	~ ~	10.5 (0.04)
Chile	r 75 (0.7)	467 (2.6)	24 (0.7)	456 (3.5)	1 (0.2)	~ ~	10.4 (0.03)
Cyprus	75 (0.6)	529 (2.6)	24 (0.7)	521 (3.7)	1 (0.2)	~ ~	10.3 (0.02)
Morocco	75 (1.3)	386 (3.4)	22 (1.0)	364 (5.9)	3 (0.5)	342 (16.2)	10.4 (0.08)
Denmark	73 (0.8)	545 (2.7)	26 (0.8)	532 (3.8)	1 (0.2)	~ ~	10.2 (0.03)
United Arab Emirates	72 (0.5)	468 (2.6)	27 (0.4)	423 (3.0)	1 (0.1)	~ ~	10.4 (0.02)
Georgia	71 (1.1)	465 (3.4)	28 (1.1)	462 (5.5)	0 (0.1)	~ ~	10.3 (0.06)
Serbia	71 (1.2)	523 (3.4)	27 (1.1)	512 (6.9)	2 (0.3)	~ ~	10.3 (0.05)
Poland	71 (0.8)	541 (2.3)	29 (0.8)	523 (2.8)	1 (0.1)	~ ~	10.2 (0.04)
Saudi Arabia	70 (1.1)	391 (3.8)	28 (1.1)	377 (6.5)	2 (0.4)	~ ~	10.2 (0.06)
Canada	r 70 (1.1)	522 (2.1)	29 (1.0)	510 (2.4)	1 (0.2)	~ ~	10.2 (0.04)
New Zealand	s 70 (1.3)	520 (3.0)	28 (1.3)	493 (3.2)	2 (0.2)	~ ~	10.2 (0.05)
Bulgaria	69 (1.5)	532 (4.8)	28 (1.3)	518 (7.2)	3 (0.6)	493 (20.3)	10.1 (0.08)
Russian Federation	68 (1.0)	564 (3.3)	31 (1.0)	565 (4.5)	1 (0.1)	~ ~	10.1 (0.03)
Sweden	65 (1.0)	530 (2.9)	35 (1.0)	513 (3.5)	1 (0.1)	~ ~	9.9 (0.04)
Hungary	60 (1.1)	537 (3.7)	38 (0.9)	521 (3.8)	2 (0.2)	~ ~	9.7 (0.04)
Finland	60 (0.8)	545 (2.3)	38 (0.7)	527 (2.4)	2 (0.3)	~ ~	9.7 (0.04)
Hong Kong SAR	60 (1.2)	623 (3.5)	38 (1.2)	606 (3.2)	2 (0.3)	~ ~	9.7 (0.05)
Italy	52 (0.8)	511 (3.3)	45 (0.8)	508 (2.6)	3 (0.3)	497 (8.9)	9.3 (0.03)
Slovak Republic	51 (0.9)	497 (3.3)	46 (0.9)	505 (2.4)	3 (0.3)	487 (10.1)	9.3 (0.04)
France	50 (1.1)	501 (3.7)	48 (1.1)	482 (2.9)	1 (0.2)	~ ~	9.4 (0.05)
Chinese Taipei	49 (0.8)	605 (2.5)	48 (0.8)	592 (2.4)	4 (0.3)	573 (6.1)	9.2 (0.03)
Czech Republic	48 (0.8)	533 (2.8)	49 (0.8)	526 (2.6)	3 (0.3)	526 (8.6)	9.2 (0.03)
Germany	s 46 (1.0)	537 (2.8)	49 (1.1)	530 (2.2)	4 (0.5)	526 (6.2)	9.1 (0.04)
Belgium (Flemish)	42 (0.8)	553 (2.6)	54 (0.8)	547 (2.2)	4 (0.3)	520 (7.1)	8.9 (0.03)
Slovenia	s 34 (1.2)	538 (2.9)	63 (1.1)	525 (2.6)	3 (0.4)	510 (9.2)	8.8 (0.04)
Korea, Rep. of	34 (0.8)	625 (2.8)	62 (0.8)	602 (2.2)	5 (0.4)	583 (5.7)	8.7 (0.03)
Croatia	24 (0.8)	506 (3.3)	71 (0.8)	503 (1.6)	5 (0.5)	480 (6.2)	8.2 (0.03)
Japan	14 (0.6)	613 (4.3)	68 (0.7)	595 (2.0)	18 (0.7)	573 (3.1)	7.5 (0.03)
Australia	x x	x x	x x	x x	x x	x x	x x
Netherlands	x x	x x	x x	x x	x x	x x	x x
Norway (5)	x x	x x	x x	x x	x x	x x	x x
England	--	--	--	--	--	--	--
United States	--	--	--	--	--	--	--
International Avg.	66 (0.1)	510 (0.5)	32 (0.1)	495 (0.6)	2 (0.0)	509 (2.9)	

This TIMSS 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.

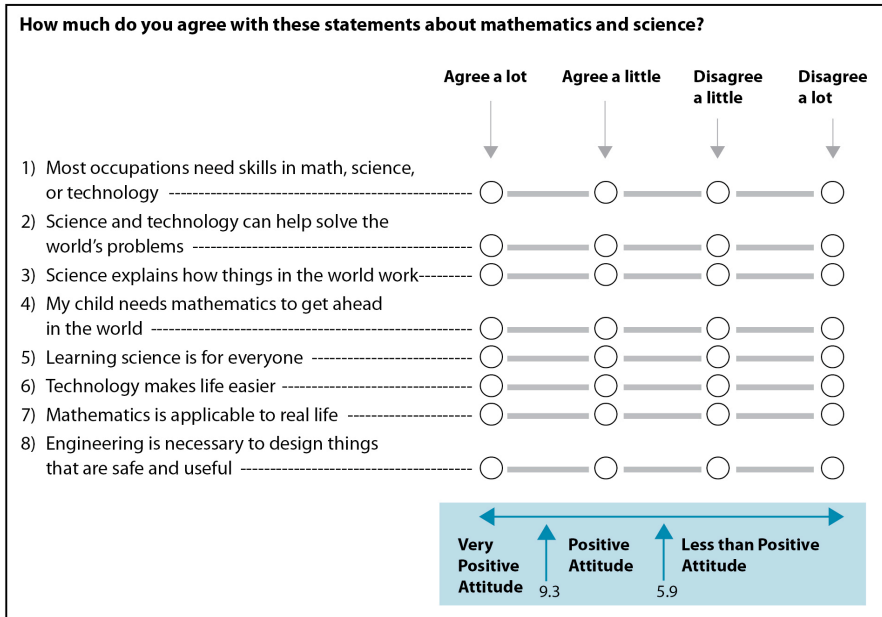
An "x" indicates data are available for less than 50% of students.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**Exhibit 4.5: Parental Attitude Toward Mathematics and Science  
 (Continued)**

Country	Very Positive Attitude		Positive Attitude		Less than Positive Attitude		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
<b>Benchmarking Participants</b>							
Dubai, UAE	80 (0.6)	519 (1.8)	19 (0.6)	487 (3.2)	1 (0.1)	~ ~	10.7 (0.03)
Ontario, Canada	r 75 (2.0)	524 (2.5)	24 (1.8)	505 (3.4)	1 (0.3)	~ ~	10.4 (0.08)
Abu Dhabi, UAE	r 67 (1.4)	441 (5.3)	32 (1.4)	393 (5.4)	1 (0.2)	~ ~	10.2 (0.06)
Quebec, Canada	r 57 (1.5)	547 (4.4)	42 (1.4)	531 (4.0)	1 (0.3)	~ ~	9.6 (0.06)
Buenos Aires, Argentina	x x	x x	x x	x x	x x	x x	x x
Norway (4)	x x	x x	x x	x x	x x	x x	x x
Florida, US	--	--	--	--	--	--	--



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 4.6: Early Literacy and Numeracy Activities Before Beginning Primary School**

Reported by Parents

Students were scored according to their parents' frequency of doing the sixteen activities on the *Early Literacy and Numeracy Activities* scale. Students **Often** engaged in early learning activities had a score on the scale of at least 10.4, which corresponds to their parents "often" doing eight of the sixteen activities with them and "sometimes" doing the other eight, on average. Students **Never or Almost Never** engaged in such activities had a score no higher than 6.5, which corresponds to parents "never or almost never" doing eight of the sixteen activities with them and "sometimes" doing the other eight, on average. All other students had parents who **Sometimes** engaged them in early literacy and numeracy activities.

Country	Often		Sometimes		Never or Almost Never		Average Scale Score	Difference in Average Scale Score from 2011	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement			
Russian Federation	70 (0.8)	568 (3.7)	30 (0.8)	558 (3.6)	1 (0.2)	~ ~	11.3 (0.04)	0.2 (0.07)	▲
Northern Ireland	s 68 (1.3)	592 (3.5)	31 (1.2)	571 (5.5)	0 (0.1)	~ ~	11.5 (0.06)	s 0.2 (0.08)	▲
Kazakhstan	66 (1.3)	551 (4.9)	34 (1.3)	532 (4.6)	0 (0.1)	~ ~	11.1 (0.06)	◊ ◊	
Serbia	62 (1.1)	530 (3.2)	37 (0.9)	504 (4.8)	1 (0.5)	~ ~	10.9 (0.06)	◊ ◊	
Ireland	62 (1.0)	560 (2.2)	38 (1.0)	535 (3.1)	1 (0.2)	~ ~	11.1 (0.05)	0.2 (0.07)	▲
New Zealand	s 61 (1.0)	525 (2.7)	38 (1.0)	492 (3.7)	1 (0.1)	~ ~	11.2 (0.05)	◊ ◊	
Poland	60 (1.0)	541 (2.3)	39 (1.0)	528 (2.8)	0 (0.1)	~ ~	10.9 (0.04)	◊ ◊	
Slovak Republic	60 (0.8)	506 (2.8)	39 (0.8)	493 (3.2)	1 (0.4)	~ ~	10.8 (0.04)	0.0 (0.06)	
Croatia	59 (0.9)	511 (2.0)	41 (0.9)	491 (2.1)	0 (0.1)	~ ~	10.8 (0.03)	0.1 (0.05)	▲
Czech Republic	57 (0.9)	533 (2.3)	43 (0.9)	525 (2.8)	0 (0.1)	~ ~	10.7 (0.03)	0.1 (0.04)	
Hungary	56 (1.0)	538 (3.4)	43 (1.0)	522 (3.8)	1 (0.4)	~ ~	10.6 (0.03)	0.0 (0.06)	
Slovenia	s 56 (1.0)	533 (2.9)	43 (1.0)	524 (2.7)	1 (0.2)	~ ~	10.7 (0.04)	s 0.2 (0.06)	▲
Canada	r 55 (1.2)	525 (2.0)	44 (1.1)	510 (2.8)	1 (0.2)	~ ~	10.7 (0.05)	◊ ◊	
Georgia	53 (1.0)	469 (3.8)	46 (1.0)	460 (4.2)	1 (0.2)	~ ~	10.6 (0.04)	0.4 (0.08)	▲
Italy	51 (1.0)	515 (2.6)	48 (1.0)	504 (3.1)	1 (0.2)	~ ~	10.5 (0.04)	0.1 (0.05)	
Cyprus	50 (0.9)	538 (3.0)	48 (0.8)	513 (2.9)	2 (0.2)	~ ~	10.5 (0.04)	◊ ◊	
Korea, Rep. of	48 (0.9)	625 (2.6)	50 (0.9)	596 (2.4)	2 (0.3)	~ ~	10.4 (0.04)	◊ ◊	
Lithuania	48 (1.1)	547 (2.8)	51 (1.1)	531 (3.2)	1 (0.2)	~ ~	10.3 (0.04)	0.3 (0.05)	▲
Spain	48 (0.9)	520 (2.2)	51 (0.9)	500 (2.6)	1 (0.2)	~ ~	10.3 (0.03)	0.1 (0.05)	▲
Germany	s 46 (0.9)	537 (2.7)	53 (0.9)	529 (2.6)	1 (0.2)	~ ~	10.3 (0.04)	s 0.0 (0.05)	
Bulgaria	44 (1.6)	541 (3.8)	45 (1.1)	520 (5.0)	11 (1.5)	485 (16.9)	9.7 (0.12)	◊ ◊	
Chile	r 44 (1.1)	478 (2.6)	55 (1.1)	454 (2.7)	2 (0.3)	~ ~	10.2 (0.05)	◊ ◊	
Portugal	43 (0.9)	553 (2.4)	55 (0.9)	534 (2.8)	1 (0.2)	~ ~	10.1 (0.03)	0.2 (0.06)	▲
France	41 (1.1)	503 (3.4)	58 (1.1)	484 (2.9)	1 (0.2)	~ ~	10.1 (0.03)	◊ ◊	
Bahrain	40 (0.7)	471 (1.8)	58 (0.7)	443 (2.4)	2 (0.2)	~ ~	10.0 (0.02)	◊ ◊	
United Arab Emirates	38 (0.6)	479 (2.9)	60 (0.6)	441 (2.5)	2 (0.2)	~ ~	9.9 (0.03)	0.2 (0.04)	▲
Denmark	36 (1.0)	552 (3.2)	63 (1.0)	536 (3.2)	1 (0.2)	~ ~	9.9 (0.04)	◊ ◊	
Qatar	r 35 (1.1)	470 (4.3)	62 (1.2)	433 (3.5)	2 (0.2)	~ ~	9.8 (0.04)	r 0.1 (0.06)	
Singapore	35 (0.7)	636 (3.7)	61 (0.7)	611 (4.0)	4 (0.3)	581 (7.8)	9.8 (0.04)	0.2 (0.05)	▲
Jordan	33 (1.0)	417 (4.1)	62 (0.9)	381 (3.2)	5 (1.0)	323 (15.1)	9.6 (0.09)	◊ ◊	
Sweden	32 (0.9)	535 (3.4)	67 (0.9)	519 (2.7)	1 (0.2)	~ ~	9.8 (0.03)	0.1 (0.05)	
Saudi Arabia	32 (1.2)	391 (4.8)	65 (1.1)	384 (4.1)	4 (0.6)	364 (11.3)	9.7 (0.07)	◊ ◊	
Kuwait	r 31 (1.1)	375 (5.5)	66 (1.2)	352 (4.4)	3 (0.3)	311 (13.6)	9.6 (0.04)	◊ ◊	
Finland	29 (0.8)	547 (2.8)	69 (0.9)	533 (1.9)	1 (0.2)	~ ~	9.7 (0.03)	0.1 (0.04)	
Belgium (Flemish)	28 (0.8)	556 (2.3)	69 (0.8)	545 (2.4)	3 (0.2)	538 (7.7)	9.5 (0.03)	◊ ◊	
South Africa (5)	27 (1.0)	415 (6.2)	66 (1.1)	367 (3.3)	7 (0.9)	339 (5.8)	9.3 (0.07)	◊ ◊	
Indonesia	26 (1.2)	418 (4.3)	67 (1.2)	395 (3.9)	7 (1.0)	363 (9.7)	9.2 (0.08)	◊ ◊	
Iran, Islamic Rep. of	25 (1.1)	453 (5.5)	67 (1.1)	432 (3.6)	7 (0.9)	358 (13.7)	9.2 (0.08)	0.2 (0.09)	
Turkey	25 (1.1)	523 (3.7)	64 (1.1)	483 (3.2)	11 (0.9)	400 (6.3)	9.0 (0.07)	◊ ◊	
Oman	24 (0.7)	449 (3.8)	72 (0.7)	421 (2.5)	3 (0.3)	390 (7.3)	9.4 (0.03)	0.3 (0.04)	▲
Chinese Taipei	23 (0.8)	616 (2.8)	69 (0.8)	595 (2.0)	8 (0.6)	561 (4.0)	9.0 (0.05)	0.2 (0.06)	▲
Japan	22 (0.7)	611 (3.1)	72 (0.7)	590 (2.0)	5 (0.3)	570 (5.9)	9.2 (0.03)	◊ ◊	
Hong Kong SAR	21 (0.8)	638 (4.1)	75 (1.0)	612 (2.9)	5 (0.5)	587 (5.7)	9.2 (0.04)	0.3 (0.05)	▲
Morocco	13 (0.7)	401 (4.4)	58 (1.7)	382 (3.9)	29 (2.0)	362 (7.1)	7.7 (0.12)	-0.5 (0.18)	▼
Australia	x x	x x	x x	x x	x x	x x	x x	x x	
Netherlands	x x	x x	x x	x x	x x	x x	x x	x x	
Norway (5)	x x	x x	x x	x x	x x	x x	x x	x x	
England	--	--	--	--	--	--	--	--	
United States	--	--	--	--	--	--	--	--	
International Avg.	43 (0.1)	518 (0.5)	54 (0.2)	497 (0.5)	3 (0.1)	435 (2.6)			

SOURCE: IEA's Trends in International Mathematics and Science Study - TIMSS 2015

Significantly higher than 2011 ▲  
Significantly lower than 2011 ▼

This TIMSS 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 diamond (◊) indicates the country did not participate in the 2011 assessment.

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.

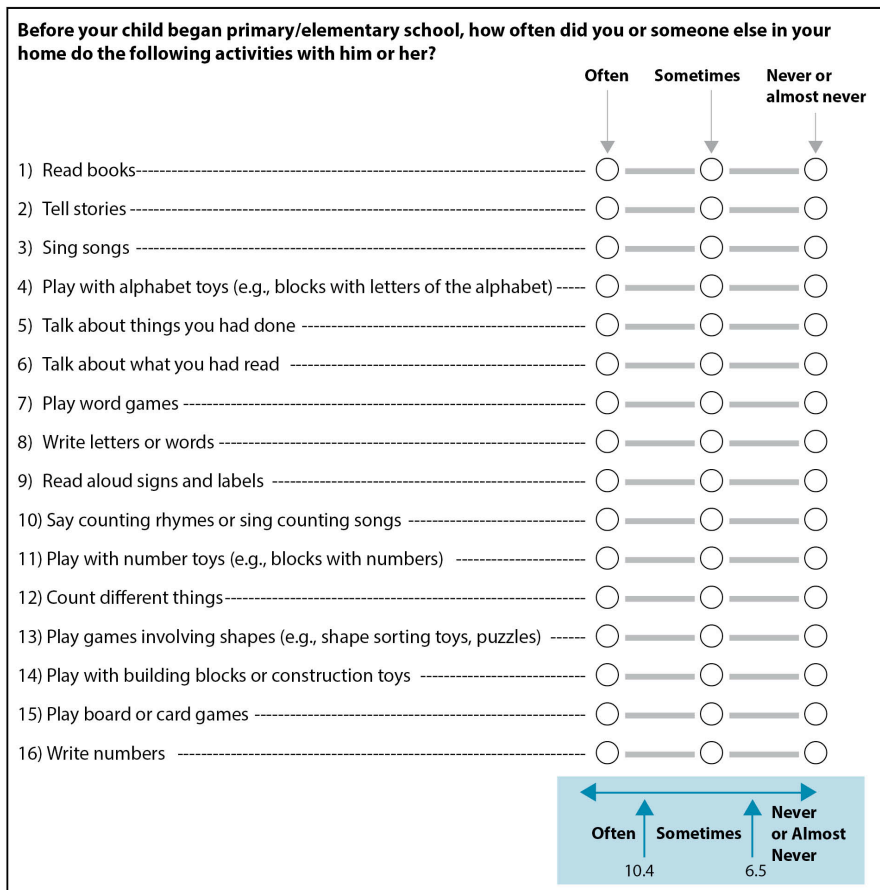
An "x" indicates that data are available for less than 50% of students.

**Exhibit 4.6: Early Literacy and Numeracy Activities Before Beginning Primary School (Continued)**

Country	Often		Sometimes		Never or Almost Never		Average Scale Score	Difference in Average Scale Score from 2011	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement			
<b>Benchmarking Participants</b>									
Ontario, Canada	r 58 (1.8)	527 (2.4)	41 (1.7)	508 (3.2)	1 (0.2)	~ ~	10.9 (0.08)	◇ ◇	
Quebec, Canada	r 47 (1.2)	547 (4.1)	51 (1.2)	534 (4.3)	2 (0.4)	~ ~	10.3 (0.05)	r 0.0 (0.07)	
Dubai, UAE	45 (0.7)	533 (1.9)	54 (0.7)	496 (2.3)	1 (0.2)	~ ~	10.2 (0.02)	0.2 (0.04) ▲	
Abu Dhabi, UAE	37 (1.0)	448 (6.1)	61 (1.0)	412 (5.1)	2 (0.3)	~ ~	9.9 (0.05)	0.3 (0.07) ▲	
Buenos Aires, Argentina	x x	x x	x x	x x	x x	x x	x x	x x	
Norway (4)	x x	x x	x x	x x	x x	x x	x x	x x	
Florida, US	--	--	--	--	--	--	--	--	

Significantly higher than 2011 ▲  
Significantly lower than 2011 ▼

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**Exhibit 4.7: Students Attended Preprimary Education**

*Policies Reported by National Research Coordinators and Preprimary Attendance Reported by Parents*

Country	Country Provides Universal Preprimary Coverage	National Preprimary Curriculum Includes Mathematics and Numeracy Skills	Students Attended Preprimary Education							
			3 Years or More		2 Years		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	●	●	93 (0.7)	534 (2.8)	4 (0.6)	479 (11.5)	2 (0.2)	~ ~	0 (0.1)	~ ~
Denmark	●	●	93 (0.5)	543 (2.8)	5 (0.5)	530 (8.5)	2 (0.2)	~ ~	1 (0.1)	~ ~
Italy	●	●	89 (0.6)	512 (2.5)	7 (0.4)	494 (5.4)	2 (0.3)	~ ~	2 (0.3)	~ ~
Sweden	●	●	89 (1.2)	527 (2.5)	5 (0.6)	510 (8.3)	4 (0.6)	503 (9.0)	2 (0.4)	~ ~
Belgium (Flemish)	●	●	88 (0.6)	552 (2.0)	5 (0.4)	531 (6.3)	3 (0.3)	527 (6.9)	3 (0.3)	497 (6.7)
France	●	●	88 (0.7)	495 (2.9)	6 (0.5)	476 (7.8)	4 (0.4)	464 (8.3)	3 (0.3)	472 (8.8)
Korea, Rep. of	●	●	86 (0.7)	610 (2.4)	11 (0.7)	599 (3.8)	2 (0.2)	~ ~	1 (0.2)	~ ~
Slovenia	s	●	80 (1.3)	531 (2.3)	9 (0.7)	530 (5.4)	5 (0.6)	503 (8.6)	5 (0.7)	525 (7.4)
Singapore	●	●	80 (0.6)	627 (3.6)	12 (0.5)	589 (5.8)	4 (0.2)	582 (9.0)	4 (0.3)	579 (9.5)
Czech Republic	●	●	78 (0.9)	535 (2.2)	14 (0.8)	516 (3.3)	5 (0.4)	504 (5.1)	3 (0.3)	496 (10.2)
Portugal	●	●	74 (1.0)	550 (2.3)	14 (0.8)	532 (3.6)	7 (0.4)	512 (4.2)	4 (0.4)	504 (6.6)
Slovak Republic	●	●	73 (1.4)	512 (2.4)	12 (0.7)	485 (5.5)	10 (1.0)	471 (11.1)	5 (0.6)	413 (10.1)
Hong Kong SAR	●	●	72 (0.9)	620 (3.0)	5 (0.4)	605 (11.4)	12 (0.5)	612 (4.5)	10 (0.8)	596 (5.3)
Finland	●	●	69 (1.4)	537 (2.5)	12 (0.8)	538 (3.6)	18 (1.0)	541 (3.8)	1 (0.2)	~ ~
Bulgaria	●	●	68 (1.8)	535 (3.7)	10 (1.2)	502 (9.8)	17 (1.1)	510 (12.8)	5 (0.7)	500 (13.8)
Lithuania	●	●	68 (1.2)	549 (2.6)	8 (0.6)	512 (6.5)	20 (1.0)	516 (3.9)	4 (0.4)	520 (8.8)
Germany	s	●	66 (1.1)	540 (2.3)	8 (0.6)	521 (4.9)	15 (0.7)	525 (4.6)	10 (0.8)	511 (5.4)
Poland	●	●	63 (1.5)	545 (2.3)	17 (0.8)	521 (3.5)	19 (1.5)	517 (4.1)	0 (0.1)	~ ~
Russian Federation	●	●	59 (1.7)	571 (4.2)	10 (0.5)	560 (4.2)	13 (0.7)	561 (4.1)	19 (1.1)	548 (4.3)
Georgia	●	●	59 (1.5)	468 (3.8)	21 (0.9)	460 (4.9)	10 (0.6)	464 (7.1)	11 (1.2)	446 (9.0)
Croatia	●	●	58 (1.6)	514 (2.1)	10 (0.8)	491 (4.3)	12 (0.8)	487 (4.6)	20 (1.7)	486 (3.7)
Spain	r	●	57 (0.9)	521 (2.1)	18 (0.8)	501 (3.7)	13 (0.6)	500 (4.8)	12 (0.5)	482 (4.8)
Cyprus	●	●	57 (1.0)	537 (2.8)	24 (0.8)	517 (3.4)	12 (0.6)	508 (4.5)	8 (0.6)	503 (5.6)
New Zealand	s	●	56 (1.2)	518 (3.1)	31 (1.0)	513 (3.4)	8 (0.6)	492 (7.2)	5 (0.5)	478 (10.5)
Chinese Taipei	●	●	52 (1.0)	601 (2.4)	40 (1.0)	596 (2.5)	7 (0.4)	586 (5.4)	1 (0.2)	~ ~
South Africa (5)	●	●	48 (1.3)	390 (4.6)	14 (0.8)	384 (5.6)	28 (1.2)	362 (3.5)	10 (0.6)	353 (4.3)
Kazakhstan	●	●	47 (1.7)	552 (5.6)	12 (1.1)	545 (7.1)	20 (1.1)	542 (5.8)	21 (1.4)	529 (7.0)
Serbia	●	●	46 (1.5)	541 (3.2)	12 (0.8)	517 (5.9)	38 (1.6)	498 (6.7)	4 (0.5)	471 (14.0)
Canada	r	●	44 (1.4)	529 (2.3)	25 (0.6)	515 (2.7)	20 (1.1)	505 (3.3)	11 (0.6)	506 (4.0)
Chile	r	●	42 (1.1)	471 (2.9)	35 (1.1)	464 (3.5)	15 (0.7)	455 (3.9)	7 (0.6)	444 (5.6)
Bahrain	●	●	34 (0.7)	462 (2.2)	34 (0.6)	460 (2.5)	17 (0.8)	451 (5.1)	15 (0.5)	429 (3.6)
Ireland	●	●	33 (1.0)	560 (2.6)	36 (1.0)	555 (3.0)	25 (0.9)	539 (4.1)	5 (0.5)	517 (7.0)
Morocco	●	●	29 (1.1)	397 (4.5)	21 (0.7)	383 (4.2)	18 (0.9)	360 (4.6)	32 (1.4)	373 (6.7)
United Arab Emirates	●	●	21 (0.4)	477 (3.6)	44 (0.6)	447 (2.7)	21 (0.4)	462 (3.6)	14 (0.5)	438 (3.9)
Qatar	r	●	20 (0.8)	463 (6.1)	33 (1.0)	454 (4.1)	25 (0.8)	449 (4.7)	22 (1.2)	417 (5.9)
Kuwait	r	●	20 (0.9)	372 (5.8)	40 (1.2)	352 (4.7)	20 (1.1)	367 (6.5)	20 (1.4)	355 (6.0)
Indonesia	●	●	18 (1.1)	410 (5.5)	28 (1.6)	425 (4.2)	26 (1.3)	405 (3.7)	28 (2.2)	360 (5.3)
Iran, Islamic Rep. of	●	●	17 (1.0)	452 (6.0)	14 (0.6)	462 (4.3)	48 (1.4)	432 (3.9)	21 (1.3)	396 (7.2)
Oman	○	n/a	15 (0.5)	441 (5.1)	27 (0.8)	444 (3.4)	29 (0.6)	432 (4.1)	29 (0.9)	400 (3.1)
Jordan	●	●	13 (0.9)	401 (7.0)	21 (1.0)	422 (4.8)	41 (1.3)	401 (3.5)	25 (1.1)	345 (5.1)
Turkey	●	●	11 (0.9)	496 (8.5)	11 (0.7)	523 (6.5)	50 (0.9)	493 (3.2)	28 (1.1)	447 (4.2)
Saudi Arabia	●	●	6 (0.6)	404 (8.4)	18 (1.2)	384 (5.6)	31 (1.4)	388 (4.4)	45 (1.8)	380 (5.6)
Australia	●	●	x x	x x	x x	x x	x x	x x	x x	x x
Netherlands	○	n/a	x x	x x	x x	x x	x x	x x	x x	x x
Norway (5)	●	●	x x	x x	x x	x x	x x	x x	x x	x x
England	●	●	--	--	--	--	--	--	--	--
Japan	●	●	--	--	--	--	--	--	--	--
Northern Ireland	●	●	--	--	--	--	--	--	--	--
United States	Varies by state	n/a	--	--	--	--	--	--	--	--
International Avg.			54 (0.2)	510 (0.6)	18 (0.1)	496 (0.9)	17 (0.1)	485 (1.0)	11 (0.1)	462 (1.2)

● Yes  
○ No

( ) 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 less than 50% of students.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 4.7: Students Attended Preprimary Education (Continued)**

Country	Country Provides Universal Preprimary Coverage	National Preprimary Curriculum Includes Mathematics and Numeracy Skills	Students Attended Preprimary Education							
			3 Years or More		2 Years		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
<b>Benchmarking Participants</b>										
Quebec, Canada	r ●	●	62 (1.6)	544 (4.2)	15 (0.8)	542 (5.5)	17 (1.3)	526 (5.1)	7 (0.9)	531 (7.6)
Ontario, Canada	r ●	●	40 (1.9)	527 (3.0)	29 (1.0)	518 (3.6)	17 (1.9)	514 (3.6)	14 (0.9)	506 (4.6)
Dubai, UAE	●	●	27 (0.6)	521 (2.8)	41 (0.7)	508 (1.9)	21 (0.6)	526 (3.2)	11 (0.5)	493 (4.4)
Abu Dhabi, UAE	r ●	●	19 (1.0)	456 (8.1)	45 (1.2)	412 (5.1)	22 (1.2)	430 (6.8)	14 (0.8)	419 (8.0)
Buenos Aires, Argentina	○	n/a	x x	x x	x x	x x	x x	x x	x x	x x
Norway (4)	●	●	x x	x x	x x	x x	x x	x x	x x	x x
Florida, US	●	●	--	--	--	--	--	--	--	--

● Yes  
 ○ No

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 4.8: Early Preparation for School**

Reported by Parents

Country	Attended Preprimary Education Program for Three Years or More and Often Engaged in Early Literacy and Numeracy Activities		Attended Preprimary Education Program for Three Years or More and Sometimes or Never Engaged in Early Literacy and Numeracy Activities		Attended Preprimary Education Program for Less than Three Years and Often Engaged in Early Literacy and Numeracy Activities		Attended Preprimary Education Program for Less than Three Years and 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
Hungary	53 (1.0)	542 (3.2)	41 (0.9)	524 (3.4)	4 (0.4)	489 (14.3)	3 (0.4)	463 (12.5)
Italy	46 (1.0)	517 (2.7)	43 (1.1)	507 (3.2)	5 (0.4)	497 (5.9)	5 (0.4)	480 (6.4)
Slovenia	46 (1.1)	536 (3.3)	34 (0.9)	525 (2.8)	10 (0.7)	527 (5.2)	10 (0.9)	516 (5.8)
Slovak Republic	46 (1.0)	513 (2.6)	28 (0.9)	509 (2.9)	14 (0.8)	482 (6.0)	13 (0.9)	450 (8.6)
Czech Republic	44 (0.9)	538 (2.4)	34 (0.9)	530 (2.8)	13 (0.7)	514 (3.3)	10 (0.6)	506 (4.9)
Russian Federation	44 (1.2)	573 (4.7)	16 (0.8)	566 (4.5)	26 (1.2)	560 (3.7)	15 (0.9)	547 (4.1)
Korea, Rep. of	42 (1.0)	626 (2.8)	44 (0.9)	596 (2.6)	6 (0.4)	619 (4.7)	8 (0.5)	582 (4.6)
Poland	39 (1.3)	549 (2.4)	24 (1.0)	539 (3.2)	22 (1.1)	525 (3.6)	15 (0.8)	510 (4.1)
France	37 (1.1)	505 (3.7)	50 (1.1)	487 (2.9)	4 (0.4)	488 (9.3)	8 (0.6)	463 (6.1)
Croatia	36 (1.2)	520 (2.7)	22 (0.9)	504 (2.3)	23 (0.9)	497 (3.6)	19 (1.0)	476 (3.5)
New Zealand	36 (1.0)	529 (3.4)	20 (0.8)	498 (4.3)	25 (0.8)	520 (3.6)	19 (0.9)	486 (5.1)
Bulgaria	35 (1.5)	546 (3.5)	33 (1.2)	524 (5.0)	9 (0.7)	525 (9.2)	23 (1.7)	499 (12.0)
Lithuania	34 (1.1)	556 (3.0)	34 (1.1)	543 (3.3)	14 (0.8)	527 (4.4)	18 (0.8)	507 (4.7)
Denmark	34 (1.1)	553 (3.3)	59 (1.1)	537 (3.3)	3 (0.4)	533 (9.8)	4 (0.3)	517 (9.4)
Portugal	33 (1.0)	561 (2.7)	41 (0.8)	541 (2.8)	10 (0.5)	529 (4.2)	16 (0.8)	517 (4.3)
Kazakhstan	33 (1.4)	558 (6.0)	14 (0.7)	540 (6.5)	33 (1.3)	544 (5.7)	20 (1.1)	526 (5.3)
Germany	32 (1.0)	543 (2.9)	35 (0.9)	537 (3.1)	14 (0.8)	525 (4.5)	19 (0.8)	515 (3.7)
Georgia	32 (1.1)	473 (4.0)	27 (1.0)	464 (4.6)	21 (1.0)	463 (5.6)	20 (0.9)	452 (5.7)
Serbia	32 (1.3)	545 (3.7)	15 (0.7)	531 (4.1)	30 (1.1)	516 (4.1)	23 (1.2)	481 (8.9)
Cyprus	31 (0.9)	550 (3.2)	25 (0.8)	522 (3.5)	19 (0.7)	521 (3.8)	25 (0.8)	505 (3.5)
Singapore	30 (0.7)	641 (3.6)	50 (0.7)	619 (3.9)	5 (0.3)	608 (7.4)	15 (0.5)	578 (6.1)
Sweden	29 (0.9)	538 (3.2)	60 (1.2)	522 (2.6)	3 (0.4)	514 (10.9)	8 (0.9)	495 (6.4)
Spain	29 (0.7)	531 (2.6)	28 (0.8)	510 (3.0)	19 (0.7)	505 (3.4)	24 (0.7)	488 (3.6)
Canada	26 (1.1)	534 (2.4)	19 (0.6)	523 (3.4)	29 (0.8)	518 (2.4)	26 (1.4)	500 (3.3)
Belgium (Flemish)	25 (0.8)	560 (2.3)	63 (0.9)	549 (2.3)	3 (0.2)	521 (6.2)	9 (0.6)	521 (5.2)
Ireland	22 (0.8)	569 (3.3)	12 (0.5)	545 (4.9)	40 (1.2)	557 (2.7)	26 (1.0)	530 (3.3)
Chile	20 (0.8)	484 (3.3)	23 (0.9)	460 (3.6)	24 (0.8)	474 (3.6)	34 (1.1)	450 (3.5)
Finland	20 (1.0)	548 (3.3)	49 (1.2)	532 (2.6)	10 (0.6)	548 (4.2)	21 (1.0)	535 (3.0)
Bahrain	16 (0.4)	477 (2.8)	18 (0.7)	450 (3.0)	24 (0.6)	469 (2.6)	42 (0.8)	440 (2.8)
Hong Kong SAR	16 (0.6)	643 (4.4)	56 (1.0)	614 (3.1)	5 (0.6)	625 (7.0)	23 (1.0)	601 (4.0)
South Africa (5)	15 (0.7)	429 (8.1)	33 (1.1)	376 (4.1)	12 (0.7)	404 (6.1)	40 (1.5)	357 (3.4)
Chinese Taipei	12 (0.6)	618 (3.5)	40 (1.0)	596 (2.5)	10 (0.6)	614 (4.0)	37 (1.0)	588 (2.8)
United Arab Emirates	9 (0.4)	504 (5.0)	12 (0.3)	457 (3.6)	29 (0.4)	472 (2.7)	49 (0.6)	436 (2.7)
Qatar	9 (0.6)	482 (8.5)	12 (0.6)	448 (5.9)	27 (1.0)	468 (4.0)	53 (1.1)	430 (3.8)
Kuwait	7 (0.4)	384 (7.1)	12 (0.6)	366 (6.2)	24 (1.0)	374 (5.9)	56 (1.2)	349 (4.7)
Indonesia	7 (0.7)	425 (8.6)	12 (0.7)	402 (6.9)	20 (1.0)	416 (4.5)	62 (1.4)	391 (4.0)
Morocco	6 (0.4)	417 (5.4)	23 (0.9)	392 (5.1)	7 (0.5)	394 (5.3)	64 (1.3)	371 (4.4)
Iran, Islamic Rep. of	6 (0.5)	473 (7.9)	12 (0.9)	442 (7.8)	19 (0.9)	447 (6.8)	63 (1.3)	422 (3.7)
Oman	5 (0.4)	456 (6.0)	10 (0.4)	433 (6.4)	19 (0.6)	449 (4.2)	65 (0.8)	419 (2.5)
Jordan	5 (0.6)	411 (9.4)	8 (0.6)	394 (8.0)	28 (0.9)	421 (3.9)	59 (1.1)	376 (3.4)
Turkey	4 (0.5)	525 (8.9)	7 (0.6)	481 (10.2)	21 (0.9)	524 (3.6)	68 (1.4)	470 (3.7)
Saudi Arabia	3 (0.4)	406 (11.3)	3 (0.4)	401 (10.4)	29 (1.1)	389 (4.8)	65 (1.2)	382 (4.2)
Australia	x x	x x	x x	x x	x x	x x	x x	x x
Netherlands	x x	x x	x x	x x	x x	x x	x x	x x
Norway (5)	x x	x x	x x	x x	x x	x x	x x	x x
England	--	--	--	--	--	--	--	--
Japan	--	--	--	--	--	--	--	--
Northern Ireland	--	--	--	--	--	--	--	--
United States	--	--	--	--	--	--	--	--
International Avg.	26 (0.1)	521 (0.8)	29 (0.1)	501 (0.7)	17 (0.1)	503 (0.9)	29 (0.2)	479 (0.8)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

( ) 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 that data are available for less than 50% of students.

**Exhibit 4.8: Early Preparation for School (Continued)**

Country	Attended Preprimary Education Program for Three Years or More and Often Engaged in Early Literacy and Numeracy Activities		Attended Preprimary Education Program for Three Years or More and Sometimes or Never Engaged in Early Literacy and Numeracy Activities		Attended Preprimary Education Program for Less than Three Years and Often Engaged in Early Literacy and Numeracy Activities		Attended Preprimary Education Program for Less than Three Years and 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	
<b>Benchmarking Participants</b>									
Quebec, Canada	r	30 (1.3)	550 (4.4)	32 (1.2)	540 (5.2)	18 (0.8)	544 (5.5)	20 (1.4)	524 (4.4)
Ontario, Canada	r	25 (1.5)	535 (3.3)	15 (0.8)	512 (4.5)	33 (1.2)	521 (3.1)	27 (2.1)	505 (3.3)
Dubai, UAE		13 (0.4)	546 (3.9)	14 (0.5)	500 (3.4)	32 (0.6)	530 (1.8)	41 (0.7)	495 (2.7)
Abu Dhabi, UAE	r	9 (0.7)	478 (10.1)	11 (0.7)	438 (9.5)	28 (0.9)	439 (5.9)	52 (1.2)	407 (5.0)
Buenos Aires, Argentina		x x	x x	x x	x x	x x	x x	x x	x x
Norway (4)		x x	x x	x x	x x	x x	x x	x x	x x
Florida, US		--	--	--	--	--	--	--	--

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 4.9: Could Do Literacy and Numeracy Tasks When Began Primary School**

*Reported by Parents*

Students were scored according to their parents' responses to how well their children could do *Literacy and Numeracy Tasks* when they began primary school. Students who could do the tasks **Very Well** had a score on the scale of at least 11.5, which corresponds to their parents reporting that the students could do all eleven of the tasks (five of the tasks at the highest level and four at the second highest level as well do simple addition and subtraction), on average. Students doing the tasks **Not Well** had a score no higher than 8.7, which corresponds to their parents reporting that the students could do the eleven tasks at a minimal level (five of the tasks at the second lowest level, four at the second highest level, and could not do simple addition and subtraction), on average. All other students could do the literacy and numeracy tasks **Moderately Well** when they began primary school.

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	
Korea, Rep. of	53 (0.9)	627 (2.4)	43 (0.8)	591 (2.5)	3 (0.3)	539 (7.7)	12.0 (0.04)
Ireland	51 (1.0)	575 (2.5)	43 (1.1)	530 (2.7)	6 (0.5)	489 (6.3)	11.6 (0.04)
Singapore	43 (1.1)	655 (3.4)	51 (1.0)	599 (3.9)	5 (0.4)	521 (7.7)	11.4 (0.05)
Bahrain	42 (0.9)	477 (1.8)	50 (1.0)	440 (2.9)	7 (0.3)	406 (4.7)	11.2 (0.02)
Jordan	34 (0.9)	439 (3.4)	52 (0.9)	378 (3.4)	14 (0.9)	313 (7.8)	10.7 (0.06)
Spain	34 (0.8)	535 (2.4)	53 (0.8)	501 (2.1)	13 (0.7)	473 (4.8)	10.7 (0.04)
Chinese Taipei	33 (0.9)	621 (2.7)	62 (0.9)	588 (2.1)	5 (0.3)	550 (6.3)	11.0 (0.03)
Hong Kong SAR	33 (1.2)	639 (3.4)	62 (1.1)	607 (2.8)	5 (0.4)	571 (7.8)	11.0 (0.04)
United Arab Emirates	31 (0.6)	491 (2.8)	55 (0.6)	447 (2.5)	14 (0.4)	403 (3.9)	10.7 (0.02)
Qatar	r 31 (1.0)	478 (3.9)	55 (0.9)	438 (3.8)	15 (0.8)	408 (7.0)	10.6 (0.04)
Poland	29 (0.9)	564 (2.9)	56 (1.0)	528 (2.2)	15 (0.6)	505 (3.6)	10.5 (0.03)
Japan	28 (0.7)	624 (2.4)	61 (0.9)	589 (2.1)	11 (0.6)	545 (3.7)	10.7 (0.03)
Croatia	28 (0.8)	534 (2.5)	58 (0.9)	495 (2.0)	15 (0.7)	471 (3.7)	10.5 (0.03)
Oman	26 (0.6)	459 (3.2)	59 (0.6)	423 (2.9)	14 (0.5)	383 (4.4)	10.4 (0.03)
Serbia	26 (0.8)	560 (3.6)	58 (1.3)	515 (3.5)	16 (1.3)	462 (10.5)	10.4 (0.05)
Saudi Arabia	25 (1.0)	399 (4.5)	54 (1.1)	386 (4.4)	21 (1.2)	364 (5.8)	10.2 (0.06)
Canada	r 25 (0.9)	550 (2.6)	57 (0.9)	514 (1.8)	19 (0.6)	488 (4.0)	10.3 (0.04)
Kazakhstan	22 (1.2)	567 (6.3)	65 (1.1)	540 (4.4)	13 (0.9)	526 (6.2)	10.4 (0.05)
Finland	22 (0.7)	581 (2.4)	49 (0.8)	539 (2.2)	29 (0.8)	501 (2.8)	9.9 (0.03)
Kuwait	r 21 (1.0)	403 (6.2)	57 (0.7)	357 (4.4)	22 (0.8)	319 (5.0)	10.1 (0.05)
Sweden	21 (0.8)	559 (3.9)	57 (0.9)	522 (2.9)	22 (0.7)	494 (3.8)	10.1 (0.04)
Lithuania	20 (0.8)	583 (3.7)	62 (1.0)	537 (2.4)	17 (0.8)	491 (3.9)	10.2 (0.03)
Indonesia	20 (0.9)	445 (3.9)	60 (1.3)	399 (3.6)	20 (1.8)	353 (5.9)	10.1 (0.08)
Bulgaria	r 17 (0.8)	562 (4.0)	48 (1.5)	530 (3.9)	34 (1.9)	501 (10.2)	9.4 (0.09)
Chile	r 17 (0.7)	505 (3.6)	59 (0.9)	465 (2.3)	24 (1.0)	432 (3.5)	9.9 (0.04)
Russian Federation	17 (0.9)	601 (4.3)	59 (1.0)	568 (3.8)	24 (1.0)	531 (4.4)	9.9 (0.05)
South Africa (5)	17 (0.7)	422 (5.5)	63 (1.1)	376 (3.5)	20 (1.3)	338 (4.3)	10.0 (0.05)
Turkey	16 (0.9)	512 (4.8)	40 (1.1)	493 (3.2)	44 (1.6)	466 (4.6)	9.1 (0.09)
Morocco	15 (0.9)	428 (4.0)	48 (1.3)	380 (4.0)	36 (1.7)	357 (5.8)	9.1 (0.10)
Cyprus	15 (0.6)	562 (5.1)	59 (0.9)	526 (2.7)	26 (0.9)	505 (3.2)	9.8 (0.03)
Iran, Islamic Rep. of	12 (0.7)	477 (4.4)	54 (1.6)	438 (4.1)	34 (1.7)	408 (5.2)	9.4 (0.08)
Czech Republic	10 (0.4)	570 (4.3)	54 (0.8)	531 (2.4)	35 (0.9)	514 (2.9)	9.4 (0.03)
France	10 (0.6)	519 (5.1)	59 (0.9)	497 (3.1)	31 (0.9)	471 (3.5)	9.5 (0.03)
Georgia	9 (0.6)	497 (5.4)	54 (1.0)	469 (3.9)	36 (1.0)	447 (5.3)	9.3 (0.04)
New Zealand	s 9 (0.6)	557 (6.8)	50 (0.9)	521 (2.5)	41 (1.1)	490 (4.2)	9.2 (0.04)
Portugal	8 (0.8)	574 (5.2)	55 (0.8)	545 (2.5)	37 (1.0)	529 (3.0)	9.3 (0.04)
Hungary	8 (0.5)	578 (5.8)	41 (0.8)	532 (4.2)	52 (0.9)	520 (3.4)	8.8 (0.04)
Slovenia	s 7 (0.6)	574 (7.4)	41 (1.0)	540 (2.6)	52 (0.9)	514 (2.8)	8.8 (0.03)
Italy	7 (0.5)	542 (5.4)	47 (0.9)	513 (3.0)	46 (0.9)	500 (2.9)	9.0 (0.04)
Germany	s 5 (0.5)	559 (7.3)	45 (1.1)	536 (2.7)	50 (1.2)	526 (2.6)	8.9 (0.03)
Denmark	4 (0.4)	580 (6.2)	52 (0.9)	550 (2.8)	43 (1.0)	528 (3.8)	9.0 (0.03)
Slovak Republic	4 (0.4)	541 (10.5)	41 (0.9)	508 (3.2)	55 (1.0)	489 (3.1)	8.6 (0.04)
Belgium (Flemish)	4 (0.3)	554 (5.5)	44 (1.0)	549 (2.5)	52 (1.1)	547 (2.2)	8.7 (0.03)
Australia	x x	x x	x x	x x	x x	x x	x x
Netherlands	x x	x x	x x	x x	x x	x x	x x
Norway (5)	x x	x x	x x	x x	x x	x x	x x
England	--	--	--	--	--	--	--
Northern Ireland	--	--	--	--	--	--	--
United States	--	--	--	--	--	--	--
International Avg.	21 (0.1)	537 (0.7)	53 (0.2)	501 (0.5)	25 (0.2)	470 (0.8)	

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

This TIMSS 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 that data are available for less than 50% of students.



**Exhibit 4.9: Could Do Literacy and Numeracy Tasks When Began Primary School (Continued)**

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	
<b>Benchmarking Participants</b>							
Dubai, UAE	35 (0.9)	538 (2.5)	54 (1.0)	505 (1.8)	11 (0.5)	469 (4.7)	10.8 (0.03)
Ontario, Canada	r 31 (1.6)	552 (3.2)	56 (1.6)	512 (2.1)	14 (0.6)	472 (4.5)	10.6 (0.06)
Abu Dhabi, UAE	28 (1.1)	471 (6.3)	55 (1.0)	418 (4.9)	16 (0.9)	367 (6.9)	10.5 (0.05)
Quebec, Canada	r 15 (1.0)	573 (6.0)	57 (1.4)	540 (3.7)	28 (1.2)	521 (5.3)	9.7 (0.05)
Buenos Aires, Argentina	x x	x x	x x	x x	x x	x x	x x
Norway (4)	x x	x x	x x	x x	x x	x x	x x
Florida, US	--	--	--	--	--	--	--

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**How well could your child do the following when he/she began the first grade of primary/elementary school?**

Very well      Moderately well      Not very well      Not at all

↓                      ↓                      ↓                      ↓

1) Recognize most of the letters of the alphabet ----- ○ ——— ○ ——— ○ ——— ○

2) Read some words ----- ○ ——— ○ ——— ○ ——— ○

3) Read sentences ----- ○ ——— ○ ——— ○ ——— ○

4) Read a story ----- ○ ——— ○ ——— ○ ——— ○

5) Write letters of the alphabet ----- ○ ——— ○ ——— ○ ——— ○

6) Write some words ----- ○ ——— ○ ——— ○ ——— ○

**Could your child do the following when he/she began the first grade of primary/elementary school?**

Up to 100 or higher      Up to 20      Up to 10      Not at all

↓                      ↓                      ↓                      ↓

1) Count by himself/herself ----- ○ ——— ○ ——— ○ ——— ○

2) Recognize written numbers ----- ○ ——— ○ ——— ○ ——— ○

3) Write numbers ----- ○ ——— ○ ——— ○ ——— ○

**Could your child do the following when he/she began the first grade of primary/elementary school?**

Yes    No

↓    ↓

1) Do simple addition ----- ○ ——— ○

2) Do simple subtraction ----- ○ ——— ○

Very Well      Moderately Well      Not Well

↑                      ↑

11.5                  8.7





# CHAPTER 5: SCHOOL COMPOSITION AND RESOURCES

TIMSS 2015 INTERNATIONAL RESULTS IN MATHEMATICS



**IEA**

**TIMSS & PIRLS**  
International Study Center  
Lynch School of Education, Boston College



## School Composition and Resources

### Socioeconomic Composition of Schools

PERCENT OF STUDENTS ▶ **37%**

Average Achievement ▶ **527**



Attended schools with more affluent than disadvantaged students

PERCENT OF STUDENTS ▶ **35%**

Average Achievement ▶ **505**



Attended schools with neither more affluent nor more disadvantaged students

PERCENT OF STUDENTS ▶ **29%**

Average Achievement ▶ **483**



Attended schools with more disadvantaged than affluent students

In nearly all the TIMSS 2015 countries, students attending schools with more affluent than disadvantaged students had higher average mathematics achievement.

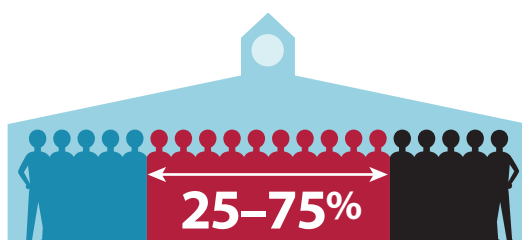
### Students Do Better in Schools Where Entering Students Had Key Skills

The more students in the school that enter school already able to read and work with numbers, the higher students' mathematics achievement at the fourth grade.



**21%** ◀ PERCENT OF STUDENTS

**516** ◀ Average Achievement



**54%** ◀ PERCENT OF STUDENTS

**504** ◀ Average Achievement



**24%** ◀ PERCENT OF STUDENTS

**474** ◀ Average Achievement

### Instruction Affected by Mathematics

#### Resource Shortages – Principals' Reports

Percent of Students Not Affected

**27%**

**519** Average Achievement



Percent of Students Affected

**69%**

**502** Average Achievement



Percent of Students Affected a Lot

**4%**

**466** Average Achievement





**Exhibit 5.1: School Composition by Economic Background of the Student Body**

Reported by Principals

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	35 (3.5)	551 (4.5)	34 (3.7)	519 (4.2)	31 (3.6)	479 (5.6)
Bahrain	r 31 (0.2)	457 (4.8)	45 (0.2)	451 (2.1)	24 (0.2)	442 (2.6)
Belgium (Flemish)	64 (3.5)	557 (2.7)	24 (3.4)	537 (4.2)	11 (2.2)	520 (11.6)
Bulgaria	17 (4.1)	555 (4.9)	48 (5.0)	528 (5.4)	35 (4.4)	507 (12.7)
Canada	42 (3.3)	528 (3.3)	33 (3.4)	507 (3.1)	25 (2.7)	484 (4.9)
Chile	r 14 (2.5)	512 (7.7)	18 (4.0)	475 (6.7)	68 (4.4)	446 (3.8)
Chinese Taipei	13 (2.6)	615 (4.0)	72 (3.5)	598 (2.1)	15 (2.4)	572 (5.1)
Croatia	35 (3.4)	508 (3.0)	46 (3.8)	505 (2.9)	18 (3.3)	485 (3.9)
Cyprus	39 (4.7)	536 (3.8)	45 (4.7)	522 (4.0)	15 (3.0)	498 (5.9)
Czech Republic	38 (4.3)	540 (3.8)	44 (4.4)	527 (2.9)	18 (3.3)	504 (7.1)
Denmark	s 63 (4.5)	549 (3.8)	30 (4.5)	533 (4.8)	7 (2.2)	523 (11.3)
England	31 (3.2)	569 (6.1)	32 (3.8)	550 (6.3)	37 (3.7)	522 (4.5)
Finland	34 (3.9)	537 (4.3)	59 (4.4)	537 (2.4)	7 (2.2)	524 (8.1)
France	r 34 (3.9)	511 (4.8)	34 (4.4)	492 (3.8)	32 (4.6)	459 (5.2)
Georgia	26 (3.5)	491 (9.4)	23 (4.0)	463 (7.7)	51 (4.4)	449 (5.6)
Germany	r 24 (2.8)	539 (3.3)	43 (3.8)	525 (3.2)	33 (3.3)	500 (5.0)
Hong Kong SAR	39 (3.6)	638 (4.9)	30 (3.8)	608 (4.7)	31 (4.0)	593 (6.3)
Hungary	27 (3.2)	564 (4.0)	33 (4.0)	544 (4.4)	40 (3.9)	494 (5.7)
Indonesia	r 16 (2.6)	433 (9.6)	32 (3.3)	405 (7.0)	52 (3.2)	387 (5.1)
Iran, Islamic Rep. of	14 (2.9)	465 (12.0)	44 (3.5)	445 (6.9)	42 (3.6)	405 (6.1)
Ireland	36 (4.2)	566 (3.7)	43 (4.7)	544 (3.0)	21 (2.9)	523 (5.0)
Italy	36 (4.2)	519 (4.0)	50 (4.7)	508 (4.1)	14 (2.9)	489 (6.9)
Japan	55 (4.4)	600 (2.7)	37 (4.2)	588 (2.5)	8 (2.3)	576 (4.8)
Jordan	r 14 (3.0)	434 (11.3)	25 (3.7)	389 (6.8)	61 (3.4)	377 (5.5)
Kazakhstan	69 (3.6)	553 (6.1)	25 (3.6)	535 (9.2)	6 (1.9)	513 (22.0)
Korea, Rep. of	29 (3.7)	630 (4.0)	51 (3.9)	605 (2.7)	21 (3.1)	584 (3.9)
Kuwait	r 23 (5.2)	389 (13.0)	40 (5.5)	348 (7.8)	37 (5.9)	342 (9.0)
Lithuania	55 (3.3)	546 (2.9)	29 (3.5)	527 (6.6)	16 (2.7)	513 (7.6)
Morocco	r 13 (1.9)	442 (8.9)	8 (1.9)	366 (10.6)	79 (2.8)	365 (4.5)
Netherlands	s 72 (4.5)	538 (2.4)	23 (4.5)	531 (3.4)	6 (2.8)	516 (4.5)
New Zealand	47 (3.2)	521 (3.7)	26 (3.5)	491 (4.6)	27 (2.7)	442 (6.8)
Northern Ireland	r 46 (5.1)	590 (4.4)	18 (4.2)	568 (9.4)	37 (3.8)	553 (6.6)
Norway (5)	59 (4.3)	554 (3.2)	34 (4.3)	546 (4.5)	7 (2.6)	513 (10.3)
Oman	35 (2.9)	426 (5.8)	42 (3.0)	430 (4.4)	23 (2.6)	419 (7.0)
Poland	17 (3.3)	548 (6.5)	57 (4.3)	538 (2.9)	25 (3.8)	514 (4.7)
Portugal	19 (2.9)	566 (5.9)	35 (4.3)	539 (4.3)	46 (3.9)	536 (3.7)
Qatar	r 72 (2.8)	447 (5.0)	16 (2.7)	411 (9.6)	12 (2.0)	436 (9.1)
Russian Federation	72 (3.6)	565 (3.1)	24 (3.8)	568 (10.9)	4 (1.2)	546 (16.1)
Saudi Arabia	r 46 (4.7)	400 (6.7)	36 (4.1)	365 (6.4)	19 (3.7)	369 (13.3)
Serbia	20 (3.3)	539 (5.6)	36 (4.5)	516 (5.3)	44 (4.6)	509 (6.9)
Singapore	44 (0.0)	633 (5.0)	46 (0.0)	614 (6.5)	10 (0.0)	576 (13.4)
Slovak Republic	31 (3.0)	515 (3.1)	48 (3.2)	508 (3.0)	21 (2.4)	448 (5.1)
Slovenia	35 (4.2)	523 (3.6)	41 (4.5)	521 (2.7)	23 (3.4)	516 (3.1)
South Africa (5)	9 (1.8)	531 (10.5)	15 (2.4)	370 (10.8)	77 (2.8)	366 (4.7)
Spain	46 (3.8)	518 (2.9)	34 (3.5)	506 (3.8)	20 (3.2)	477 (6.4)
Sweden	71 (4.3)	530 (3.1)	19 (3.6)	503 (5.6)	11 (3.0)	483 (14.3)
Turkey	22 (3.0)	519 (8.4)	27 (2.9)	499 (7.5)	51 (3.2)	459 (4.1)
United Arab Emirates	r 50 (1.9)	466 (4.3)	23 (1.9)	465 (7.0)	27 (1.8)	399 (4.4)
United States	19 (2.1)	585 (5.6)	23 (2.6)	555 (4.5)	59 (2.3)	519 (3.4)
International Avg.	37 (0.5)	527 (0.8)	35 (0.5)	505 (0.8)	29 (0.5)	483 (1.1)

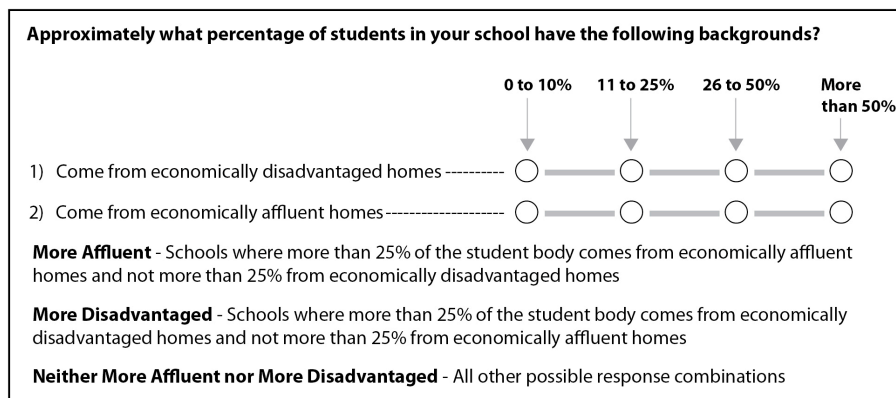
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

( ) 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.

**Exhibit 5.1: School Composition by Economic Background of the Student Body (Continued)**

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
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	50 (6.2)	456 (5.2)	15 (3.7)	417 (9.2)	35 (6.2)	402 (8.9)
Ontario, Canada	37 (5.5)	520 (3.9)	32 (5.1)	517 (4.0)	31 (4.1)	497 (4.3)
Quebec, Canada	63 (5.7)	549 (4.3)	23 (5.4)	523 (5.1)	15 (4.6)	509 (9.2)
Norway (4)	59 (4.5)	501 (2.8)	36 (4.8)	486 (3.6)	5 (2.2)	457 (20.7)
Abu Dhabi, UAE	47 (5.0)	427 (11.9)	19 (4.1)	424 (22.8)	35 (3.9)	381 (8.4)
Dubai, UAE	61 (0.3)	524 (1.6)	26 (0.3)	521 (3.5)	13 (0.1)	419 (3.5)
Florida, US	13 (4.3)	582 (10.0)	19 (6.2)	575 (11.1)	67 (5.8)	532 (6.3)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015





**Exhibit 5.3: Schools with Students Having the Language of the Test as Their Native Language**

Reported by Principals

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	62 (3.1)	517 (4.6)	22 (2.7)	530 (8.0)	16 (2.4)	502 (8.3)
Bahrain	67 (0.2)	446 (1.9)	8 (0.1)	468 (5.5)	25 (0.2)	454 (3.7)
Belgium (Flemish)	48 (3.6)	561 (3.0)	32 (4.0)	544 (3.6)	20 (2.8)	522 (5.6)
Bulgaria	49 (4.0)	544 (4.6)	23 (3.6)	515 (8.1)	28 (2.8)	497 (14.6)
Canada	47 (3.1)	513 (3.9)	34 (2.7)	508 (3.5)	19 (2.2)	509 (4.4)
Chile	100 (0.4)	460 (2.7)	0 (0.4)	~ ~	0 (0.0)	~ ~
Chinese Taipei	61 (4.1)	602 (2.5)	28 (3.5)	591 (3.8)	10 (2.7)	580 (7.1)
Croatia	95 (1.7)	503 (1.9)	4 (1.6)	489 (10.9)	1 (0.5)	~ ~
Cyprus	51 (4.0)	533 (3.7)	43 (4.2)	517 (3.4)	7 (2.2)	487 (10.1)
Czech Republic	94 (2.0)	528 (2.4)	6 (2.0)	535 (10.2)	0 (0.0)	~ ~
Denmark	66 (4.1)	545 (3.3)	27 (3.9)	534 (5.6)	7 (2.2)	531 (11.7)
England	49 (4.5)	545 (4.2)	30 (4.3)	557 (7.8)	20 (3.6)	536 (8.3)
Finland	84 (3.0)	537 (1.9)	15 (2.9)	526 (7.1)	1 (0.9)	~ ~
France	71 (3.6)	498 (3.6)	20 (3.2)	468 (5.6)	9 (2.4)	453 (9.0)
Georgia	88 (3.0)	464 (3.8)	11 (2.9)	461 (17.6)	1 (0.7)	~ ~
Germany	30 (3.2)	533 (3.2)	43 (3.8)	526 (2.7)	28 (3.0)	500 (5.3)
Hong Kong SAR	85 (3.1)	610 (3.0)	8 (3.3)	622 (23.5)	7 (3.0)	660 (10.2)
Hungary	99 (0.6)	529 (3.2)	0 (0.0)	~ ~	1 (0.6)	~ ~
Indonesia	24 (2.4)	420 (7.9)	23 (3.0)	388 (7.6)	53 (3.2)	392 (6.1)
Iran, Islamic Rep. of	49 (3.0)	457 (5.7)	10 (1.9)	462 (5.2)	41 (3.1)	393 (6.0)
Ireland	67 (3.0)	554 (2.8)	29 (2.8)	535 (3.4)	4 (1.6)	530 (17.5)
Italy	59 (3.6)	506 (3.5)	39 (3.7)	510 (3.6)	2 (1.2)	~ ~
Japan	100 (0.0)	593 (2.0)	0 (0.0)	~ ~	0 (0.0)	~ ~
Jordan	98 (0.9)	388 (3.2)	1 (0.7)	~ ~	1 (0.6)	~ ~
Kazakhstan	57 (2.8)	536 (6.8)	23 (3.3)	562 (10.0)	20 (3.0)	549 (9.2)
Korea, Rep. of	98 (1.0)	608 (2.2)	1 (0.8)	~ ~	1 (0.5)	~ ~
Kuwait	59 (4.6)	345 (5.1)	12 (3.5)	354 (23.5)	29 (3.4)	362 (6.7)
Lithuania	89 (1.7)	536 (2.7)	9 (1.9)	527 (9.9)	2 (1.1)	~ ~
Morocco	63 (2.6)	380 (4.4)	13 (2.0)	372 (11.5)	24 (2.2)	375 (8.3)
Netherlands	65 (5.3)	537 (2.4)	31 (5.4)	532 (3.1)	4 (2.2)	508 (8.0)
New Zealand	59 (3.3)	496 (3.7)	27 (3.1)	489 (5.7)	14 (2.8)	483 (10.7)
Northern Ireland	74 (5.0)	578 (3.7)	18 (4.4)	552 (10.1)	8 (3.1)	538 (11.5)
Norway (5)	58 (4.7)	551 (3.4)	32 (4.7)	551 (3.9)	10 (3.1)	525 (10.9)
Oman	78 (2.2)	430 (3.1)	10 (1.9)	425 (9.0)	12 (1.5)	398 (7.4)
Poland	99 (0.8)	534 (2.2)	1 (0.8)	~ ~	0 (0.0)	~ ~
Portugal	82 (3.3)	543 (2.5)	11 (2.5)	534 (7.5)	7 (2.4)	540 (11.9)
Qatar	43 (2.6)	405 (4.8)	11 (2.4)	451 (17.9)	46 (2.1)	467 (5.4)
Russian Federation	73 (3.4)	564 (2.8)	16 (2.9)	571 (14.3)	11 (1.8)	556 (10.1)
Saudi Arabia	84 (2.7)	383 (4.7)	11 (2.6)	388 (11.2)	5 (1.6)	406 (20.5)
Serbia	84 (3.1)	523 (3.4)	11 (2.6)	507 (11.9)	5 (2.0)	472 (35.0)
Singapore	0 (0.0)	~ ~	0 (0.0)	~ ~	100 (0.0)	618 (3.8)
Slovak Republic	83 (2.4)	505 (2.7)	10 (2.2)	481 (10.3)	8 (1.8)	446 (12.8)
Slovenia	70 (3.7)	520 (2.3)	28 (3.7)	524 (3.1)	2 (1.4)	~ ~
South Africa (5)	18 (2.5)	428 (12.5)	13 (2.3)	425 (18.4)	69 (3.1)	359 (4.9)
Spain	54 (3.0)	507 (2.8)	29 (3.2)	511 (4.0)	17 (2.4)	489 (5.8)
Sweden	44 (4.6)	530 (2.9)	43 (4.3)	521 (4.0)	13 (2.7)	480 (10.8)
Turkey	80 (1.8)	499 (3.3)	7 (1.5)	466 (11.4)	14 (1.9)	397 (10.5)
United Arab Emirates	40 (1.3)	410 (3.9)	5 (0.7)	503 (11.6)	56 (1.5)	470 (4.3)
United States	50 (3.0)	553 (3.4)	31 (3.2)	535 (5.4)	19 (2.7)	510 (8.5)
International Avg.	66 (0.4)	506 (0.6)	17 (0.4)	502 (1.6)	16 (0.3)	486 (1.9)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

( ) 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.

**Exhibit 5.3: Schools with Students Having the Language of the Test as Their Native Language (Continued)**

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
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	93 (2.9)	437 (3.8)	7 (2.9)	398 (19.8)	0 (0.0)	~ ~
Ontario, Canada	39 (4.8)	513 (4.0)	38 (4.7)	511 (4.0)	24 (3.4)	512 (5.8)
Quebec, Canada	60 (6.2)	545 (4.2)	23 (5.2)	522 (7.1)	17 (4.3)	526 (8.4)
Norway (4)	56 (4.5)	493 (2.8)	33 (4.9)	501 (4.2)	11 (3.4)	473 (12.6)
Abu Dhabi, UAE	47 (3.4)	376 (6.8)	4 (1.7)	510 (22.8)	49 (3.7)	440 (9.6)
Dubai, UAE	23 (0.2)	461 (3.0)	7 (0.1)	565 (3.0)	69 (0.2)	518 (1.7)
Florida, US	43 (7.8)	559 (8.3)	26 (7.5)	537 (9.3)	31 (7.4)	537 (10.2)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 5.5: Schools Where Students Enter the Primary Grades with Literacy and Numeracy Skills**

Reported by Principals

Students were scored according to their principals' responses about the percentage of children in the school who begin first grade with the eleven key skills on the *Schools Where Students Enter the Primary Grades with Literacy and Numeracy Skills* scale. Students who attend **Schools Where More than 75% Enter with Skills** had a score on the scale of at least 11.7, which corresponds to their principals reporting that over 75% of the students have six of the skills and 51-75% of the students have five of the skills, on average. Students who attend **Schools Where Less than 25% Enter with Skills** had a score no higher than 8.6, which corresponds to their principals reporting that less than 25% of the students have six of the skills and 25-50% of the students have five of the skills, on average. All other students attended **Schools Where 25% to 75% Enter with Skills**.

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	82 (3.7)	552 (2.3)	18 (3.7)	537 (6.9)	0 (0.0)	~ ~	12.6 (0.08)
Singapore	78 (0.0)	625 (4.1)	21 (0.0)	595 (10.4)	1 (0.0)	~ ~	12.6 (0.00)
Hong Kong SAR	78 (4.2)	619 (3.7)	22 (4.2)	597 (9.2)	0 (0.0)	~ ~	12.5 (0.11)
Korea, Rep. of	69 (3.9)	614 (2.7)	29 (3.8)	597 (3.4)	2 (1.2)	~ ~	12.2 (0.12)
United States	57 (3.0)	551 (3.9)	33 (2.9)	526 (5.4)	10 (1.9)	519 (7.9)	11.5 (0.13)
Spain	56 (3.4)	515 (2.8)	41 (3.4)	495 (4.3)	3 (1.2)	453 (17.2)	11.7 (0.09)
Chinese Taipei	52 (4.5)	602 (2.4)	47 (4.4)	591 (3.0)	1 (0.7)	~ ~	11.8 (0.13)
England	47 (4.8)	563 (6.4)	48 (5.0)	534 (4.8)	4 (2.0)	523 (20.7)	11.4 (0.15)
Qatar	46 (3.4)	446 (6.4)	41 (3.1)	444 (5.8)	13 (2.5)	397 (12.6)	11.2 (0.16)
United Arab Emirates	40 (2.0)	473 (4.2)	44 (2.2)	435 (4.2)	16 (1.2)	422 (6.4)	10.9 (0.07)
Indonesia	34 (3.0)	426 (5.6)	58 (3.5)	385 (5.1)	8 (1.9)	375 (12.1)	10.9 (0.10)
Kazakhstan	33 (3.9)	553 (9.1)	64 (3.9)	542 (5.0)	3 (0.9)	530 (29.2)	11.1 (0.11)
Bahrain	32 (0.2)	454 (4.2)	52 (0.2)	450 (1.7)	15 (0.1)	444 (3.8)	10.7 (0.01)
Japan	31 (4.0)	600 (4.1)	67 (4.0)	590 (2.1)	2 (1.1)	~ ~	10.9 (0.10)
Canada	31 (3.3)	517 (4.8)	61 (3.8)	511 (2.5)	8 (1.6)	485 (11.2)	10.8 (0.09)
Kuwait	24 (3.7)	389 (9.1)	42 (4.6)	352 (8.2)	33 (3.9)	319 (5.2)	9.8 (0.16)
Jordan	21 (3.0)	420 (11.3)	52 (4.1)	389 (4.9)	27 (3.7)	371 (8.5)	9.9 (0.16)
Finland	18 (3.3)	540 (4.3)	80 (3.5)	536 (1.9)	2 (1.5)	~ ~	10.8 (0.10)
Oman	17 (1.9)	419 (7.2)	54 (3.2)	428 (4.3)	29 (2.8)	427 (5.2)	9.7 (0.10)
Sweden	16 (3.4)	534 (6.6)	76 (4.1)	517 (3.6)	8 (2.4)	508 (9.1)	10.5 (0.12)
Saudi Arabia	16 (2.2)	386 (11.3)	56 (3.7)	394 (5.3)	29 (3.2)	362 (8.3)	9.6 (0.10)
Russian Federation	15 (2.1)	577 (5.8)	73 (2.9)	563 (3.0)	12 (2.0)	534 (8.8)	10.2 (0.09)
Georgia	13 (3.2)	460 (15.9)	45 (4.8)	469 (5.9)	42 (4.5)	458 (5.4)	9.3 (0.17)
Chile	10 (2.4)	492 (12.0)	69 (4.3)	460 (3.8)	21 (3.6)	440 (5.8)	9.7 (0.13)
South Africa (5)	10 (2.3)	436 (20.7)	64 (3.6)	369 (4.8)	26 (3.1)	374 (6.5)	9.5 (0.12)
Australia	9 (1.9)	536 (9.8)	41 (3.8)	537 (4.9)	50 (3.9)	498 (5.0)	8.8 (0.14)
Netherlands	9 (3.3)	541 (6.3)	86 (4.1)	535 (2.1)	5 (2.5)	520 (1.9)	10.3 (0.11)
Bulgaria	8 (2.5)	545 (11.2)	68 (4.0)	532 (4.1)	24 (3.5)	496 (16.6)	9.7 (0.12)
Portugal	7 (2.3)	554 (10.0)	56 (4.1)	545 (3.6)	37 (4.2)	535 (4.3)	9.1 (0.13)
Lithuania	7 (1.9)	544 (9.4)	76 (3.7)	537 (3.2)	17 (3.3)	526 (7.9)	9.7 (0.11)
Poland	6 (2.4)	535 (7.5)	71 (4.0)	536 (2.6)	22 (3.6)	532 (4.7)	9.7 (0.14)
Croatia	6 (2.2)	513 (7.7)	84 (3.3)	503 (2.1)	9 (2.5)	488 (6.5)	9.9 (0.09)
Morocco	6 (1.7)	441 (14.5)	38 (2.7)	387 (5.2)	56 (2.5)	365 (5.6)	8.4 (0.11)
Serbia	6 (2.0)	541 (9.7)	79 (3.4)	520 (3.4)	15 (3.1)	499 (15.6)	9.8 (0.10)
New Zealand	6 (1.5)	539 (8.3)	42 (4.0)	507 (4.8)	53 (3.8)	475 (4.4)	8.6 (0.12)
Norway (5)	5 (2.4)	566 (16.3)	65 (4.4)	550 (3.3)	30 (4.6)	542 (5.3)	9.2 (0.15)
France	5 (2.0)	503 (14.7)	92 (2.1)	487 (3.4)	3 (0.5)	470 (12.0)	10.1 (0.08)
Iran, Islamic Rep. of	5 (1.7)	456 (12.6)	25 (3.0)	437 (9.9)	70 (3.4)	428 (3.9)	8.1 (0.14)
Denmark	5 (1.8)	553 (9.5)	79 (3.1)	544 (3.2)	16 (2.9)	529 (6.5)	9.6 (0.11)
Italy	4 (1.8)	519 (8.0)	57 (4.1)	507 (3.7)	38 (4.0)	507 (4.0)	9.0 (0.13)
Cyprus	2 (1.5)	~ ~	53 (4.8)	527 (3.9)	45 (4.9)	518 (4.9)	8.6 (0.13)
Belgium (Flemish)	2 (1.1)	~ ~	69 (3.7)	547 (2.4)	30 (3.5)	548 (5.2)	9.1 (0.11)
Turkey	1 (0.9)	~ ~	35 (3.1)	493 (7.5)	63 (3.0)	475 (3.8)	8.2 (0.10)
Germany	1 (0.9)	~ ~	43 (3.5)	527 (2.7)	55 (3.5)	517 (3.6)	8.5 (0.09)
Slovak Republic	1 (0.6)	~ ~	50 (3.4)	511 (3.4)	49 (3.5)	484 (4.3)	8.6 (0.09)
Czech Republic	0 (0.0)	~ ~	51 (4.3)	533 (2.9)	49 (4.3)	523 (3.5)	8.5 (0.09)
Hungary	0 (0.0)	~ ~	34 (4.2)	551 (5.5)	66 (4.2)	518 (4.9)	7.8 (0.11)
Slovenia	0 (0.0)	~ ~	44 (4.6)	523 (2.9)	56 (4.6)	519 (2.7)	8.3 (0.11)
Northern Ireland	- -	- -	- -	- -	- -	- -	- -
International Avg.	21 (0.4)	516 (1.5)	54 (0.5)	504 (0.7)	24 (0.4)	474 (1.5)	

This TIMSS 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 are not available. A tilde (~) indicates insufficient data to report achievement.

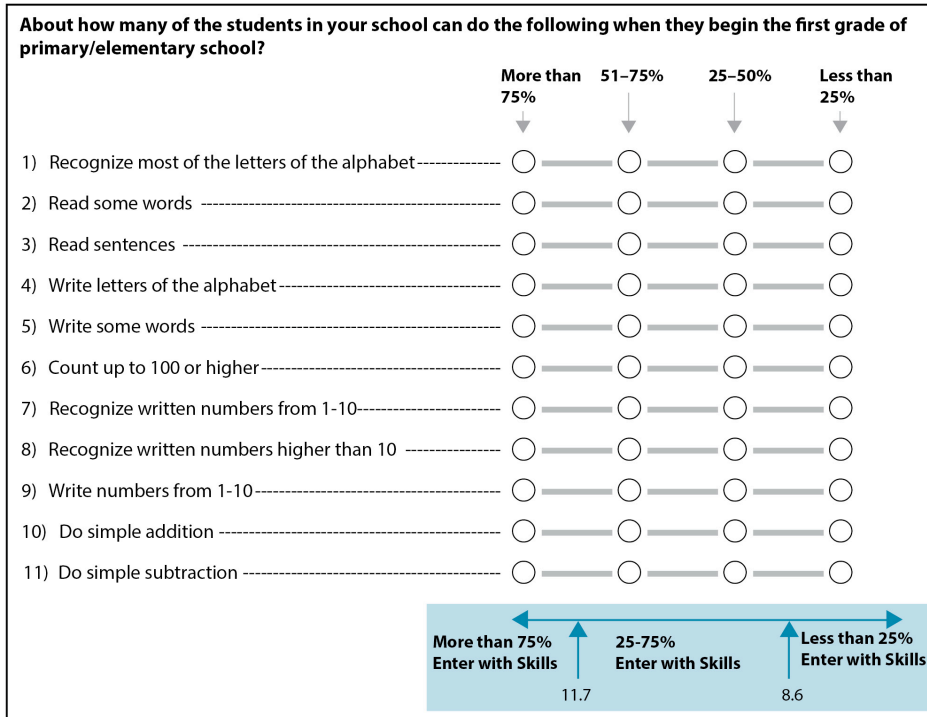
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study - TIMSS 2015

**Exhibit 5.5: Schools Where Students Enter the Primary Grades with Literacy and Numeracy Skills (Continued)**

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	
<b>Benchmarking Participants</b>							
Dubai, UAE	58 (0.3)	515 (1.8)	28 (0.3)	501 (2.5)	14 (0.1)	498 (3.3)	11.4 (0.01)
Florida, US	42 (9.1)	548 (7.4)	46 (9.7)	553 (9.6)	12 (4.6)	515 (12.9)	10.9 (0.32)
Ontario, Canada	41 (5.2)	524 (4.3)	54 (5.8)	505 (2.9)	5 (2.0)	484 (10.5)	11.2 (0.14)
Abu Dhabi, UAE	27 (3.8)	444 (13.9)	54 (4.4)	407 (8.3)	18 (3.2)	380 (15.4)	10.4 (0.17)
Quebec, Canada	15 (4.1)	538 (11.8)	76 (5.5)	539 (4.2)	9 (3.6)	524 (10.9)	10.3 (0.15)
Buenos Aires, Argentina	15 (4.3)	453 (8.5)	61 (5.2)	448 (4.6)	24 (4.1)	395 (7.0)	9.9 (0.19)
Norway (4)	4 (1.9)	499 (7.9)	67 (4.0)	493 (3.0)	29 (4.5)	494 (6.3)	9.2 (0.14)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**Exhibit 5.6: Instruction Affected by Mathematics Resource Shortages – Principals' Reports**

*Reported by Principals*

Students were scored according to their principals' responses concerning thirteen school and classroom resources on the *Mathematics Resource Shortages* scale. Students in schools where instruction was **Not Affected** by resource shortages had a score on the scale of at least 11.1, which corresponds 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 no higher than 6.9, which corresponds 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 **Affected** by resource shortages.

Country	Not Affected		Affected		Affected A Lot		Average Scale Score	Difference in Average Scale Score from 2011	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement			
Korea, Rep. of	73 (3.9)	607 (2.8)	27 (3.9)	610 (4.5)	0 (0.0)	~ ~	12.5 (0.18)	0.7 (0.24)	▲
Slovenia	59 (4.4)	518 (2.5)	41 (4.4)	525 (2.8)	0 (0.0)	~ ~	11.6 (0.15)	-0.2 (0.19)	
Singapore	49 (0.0)	614 (5.6)	43 (0.0)	617 (5.5)	8 (0.0)	650 (13.5)	10.9 (0.00)	0.4 (0.00)	▲
England	49 (4.6)	557 (5.4)	51 (4.6)	537 (5.2)	0 (0.0)	~ ~	11.2 (0.15)	0.1 (0.23)	
Poland	48 (3.9)	540 (2.9)	50 (3.8)	532 (3.4)	2 (1.4)	~ ~	11.1 (0.16)	∅ ∅	
Qatar	47 (3.1)	458 (5.9)	33 (3.2)	428 (6.5)	20 (2.2)	412 (6.8)	10.3 (0.20)	1.1 (0.31)	▲
Australia	44 (3.8)	526 (4.7)	55 (3.7)	512 (5.3)	1 (0.5)	~ ~	11.1 (0.15)	0.0 (0.21)	
United States	39 (3.1)	547 (5.4)	59 (3.2)	534 (3.3)	2 (0.9)	~ ~	10.8 (0.13)	-0.2 (0.18)	
Czech Republic	39 (3.6)	532 (4.0)	61 (3.6)	526 (2.5)	0 (0.0)	~ ~	11.1 (0.10)	0.3 (0.16)	
New Zealand	37 (3.8)	501 (4.1)	62 (3.8)	487 (3.9)	1 (0.6)	~ ~	10.8 (0.12)	-0.1 (0.17)	
Cyprus	37 (4.6)	532 (4.0)	60 (4.6)	519 (3.7)	3 (1.5)	502 (11.3)	10.6 (0.21)	∅ ∅	
Canada	37 (3.2)	520 (3.4)	63 (3.1)	505 (3.7)	0 (0.2)	~ ~	10.9 (0.12)	∅ ∅	
Bulgaria	37 (5.0)	532 (10.4)	62 (5.2)	521 (5.2)	1 (1.2)	~ ~	10.8 (0.16)	∅ ∅	
Georgia	36 (3.9)	471 (7.8)	64 (4.0)	458 (4.6)	0 (0.3)	~ ~	10.9 (0.13)	0.4 (0.19)	
Kazakhstan	34 (3.9)	546 (8.0)	63 (4.0)	543 (5.3)	3 (1.1)	551 (22.3)	10.3 (0.19)	0.2 (0.29)	
Norway (5)	34 (4.3)	556 (3.6)	66 (4.3)	545 (3.8)	0 (0.0)	~ ~	10.7 (0.11)	∅ ∅	
Northern Ireland	r 33 (4.8)	571 (7.3)	67 (4.8)	570 (4.4)	0 (0.0)	~ ~	10.7 (0.16)	r 0.1 (0.24)	
Netherlands	s 32 (5.4)	535 (3.4)	68 (5.4)	534 (2.3)	0 (0.0)	~ ~	10.6 (0.15)	s -0.5 (0.21)	
Sweden	30 (4.3)	518 (5.4)	70 (4.3)	519 (3.2)	0 (0.0)	~ ~	10.7 (0.13)	0.2 (0.19)	
Chinese Taipei	30 (3.4)	605 (3.1)	69 (3.5)	594 (2.3)	1 (1.0)	~ ~	10.5 (0.13)	1.7 (0.19)	▲
Denmark	r 30 (3.5)	535 (5.1)	70 (3.6)	544 (3.4)	1 (0.8)	~ ~	10.6 (0.11)	r 0.7 (0.14)	▲
Spain	29 (3.1)	513 (3.1)	71 (3.1)	502 (3.3)	0 (0.0)	~ ~	10.6 (0.09)	-0.3 (0.19)	
United Arab Emirates	28 (1.7)	494 (5.2)	58 (1.9)	426 (3.4)	14 (1.2)	444 (5.3)	9.8 (0.11)	0.0 (0.15)	
Finland	27 (3.7)	538 (3.1)	73 (3.7)	535 (2.8)	0 (0.0)	~ ~	10.5 (0.11)	0.3 (0.17)	
Chile	25 (3.5)	476 (5.9)	72 (3.7)	455 (3.4)	3 (1.7)	426 (11.0)	10.1 (0.18)	0.5 (0.24)	
Russian Federation	25 (3.7)	572 (6.4)	72 (4.0)	561 (4.3)	3 (1.4)	550 (11.6)	10.1 (0.14)	0.1 (0.21)	
Belgium (Flemish)	25 (3.6)	550 (4.5)	75 (3.6)	546 (2.6)	0 (0.0)	~ ~	10.3 (0.11)	-0.4 (0.17)	
Japan	24 (3.6)	595 (4.3)	75 (3.7)	592 (2.1)	1 (0.8)	~ ~	10.2 (0.15)	-0.2 (0.20)	
Ireland	23 (3.2)	552 (5.9)	76 (3.2)	546 (2.2)	1 (0.7)	~ ~	10.1 (0.11)	-0.3 (0.19)	
Hong Kong SAR	22 (3.5)	638 (7.9)	76 (3.6)	608 (3.8)	2 (1.2)	~ ~	9.9 (0.13)	1.7 (0.15)	▲
Croatia	22 (3.6)	505 (4.3)	78 (3.6)	502 (2.3)	0 (0.0)	~ ~	10.2 (0.12)	-0.3 (0.20)	
Lithuania	22 (3.1)	532 (8.2)	76 (3.6)	536 (2.8)	3 (1.5)	540 (9.5)	10.2 (0.13)	0.0 (0.18)	
Germany	20 (3.4)	524 (4.6)	79 (3.4)	520 (2.7)	0 (0.5)	~ ~	10.2 (0.10)	-0.3 (0.14)	
Bahrain	20 (0.2)	465 (3.8)	62 (0.2)	446 (1.7)	19 (0.2)	447 (5.6)	9.0 (0.01)	-0.2 (0.36)	
Portugal	19 (2.9)	542 (6.0)	81 (2.9)	541 (2.4)	0 (0.0)	~ ~	9.9 (0.10)	0.4 (0.17)	
Hungary	16 (3.0)	524 (11.3)	79 (3.5)	530 (3.9)	4 (1.9)	540 (15.4)	9.5 (0.14)	-1.0 (0.22)	▼
France	16 (3.5)	492 (8.6)	83 (3.5)	487 (3.2)	0 (0.4)	~ ~	9.7 (0.14)	∅ ∅	
Serbia	15 (2.7)	526 (7.9)	82 (3.1)	518 (3.9)	3 (1.5)	515 (21.0)	9.6 (0.12)	0.1 (0.19)	
Slovak Republic	13 (2.4)	503 (7.5)	84 (2.6)	498 (3.2)	3 (1.1)	472 (19.3)	9.3 (0.12)	-0.7 (0.15)	▼
Oman	13 (2.4)	412 (8.4)	77 (2.9)	429 (3.2)	10 (1.9)	417 (8.4)	8.9 (0.13)	r 0.4 (0.16)	▲
Kuwait	12 (3.0)	387 (16.0)	71 (4.4)	343 (4.8)	17 (4.2)	361 (16.0)	8.6 (0.23)	∅ ∅	
Saudi Arabia	9 (2.2)	418 (11.0)	81 (2.5)	378 (4.9)	10 (2.1)	398 (11.2)	8.9 (0.15)	-0.2 (0.21)	
Morocco	8 (1.9)	373 (13.9)	88 (2.0)	377 (3.9)	4 (1.3)	394 (27.2)	9.7 (0.09)	-0.2 (0.13)	
Jordan	7 (2.4)	437 (16.4)	78 (3.7)	376 (3.5)	15 (3.1)	431 (11.4)	8.5 (0.15)	∅ ∅	
South Africa (5)	5 (1.4)	498 (30.3)	88 (2.6)	371 (3.6)	7 (2.2)	341 (13.6)	9.0 (0.11)	∅ ∅	
Iran, Islamic Rep. of	4 (1.4)	469 (43.7)	88 (2.1)	429 (4.1)	8 (1.8)	436 (12.1)	8.5 (0.10)	0.1 (0.16)	
Italy	2 (1.3)	~ ~	98 (1.3)	506 (2.7)	0 (0.0)	~ ~	9.3 (0.07)	-0.4 (0.11)	▼
Turkey	1 (1.1)	~ ~	79 (3.0)	483 (4.1)	20 (2.8)	486 (7.5)	7.9 (0.12)	-0.1 (0.14)	
Indonesia	0 (0.3)	~ ~	97 (1.1)	395 (3.9)	3 (1.0)	476 (14.0)	9.1 (0.05)	∅ ∅	
International Avg.	27 (0.5)	519 (1.5)	69 (0.5)	502 (0.5)	4 (0.2)	466 (3.1)			

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

This TIMSS 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 diamond (∅) indicates the country did not participate in the 2011 assessment.

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.

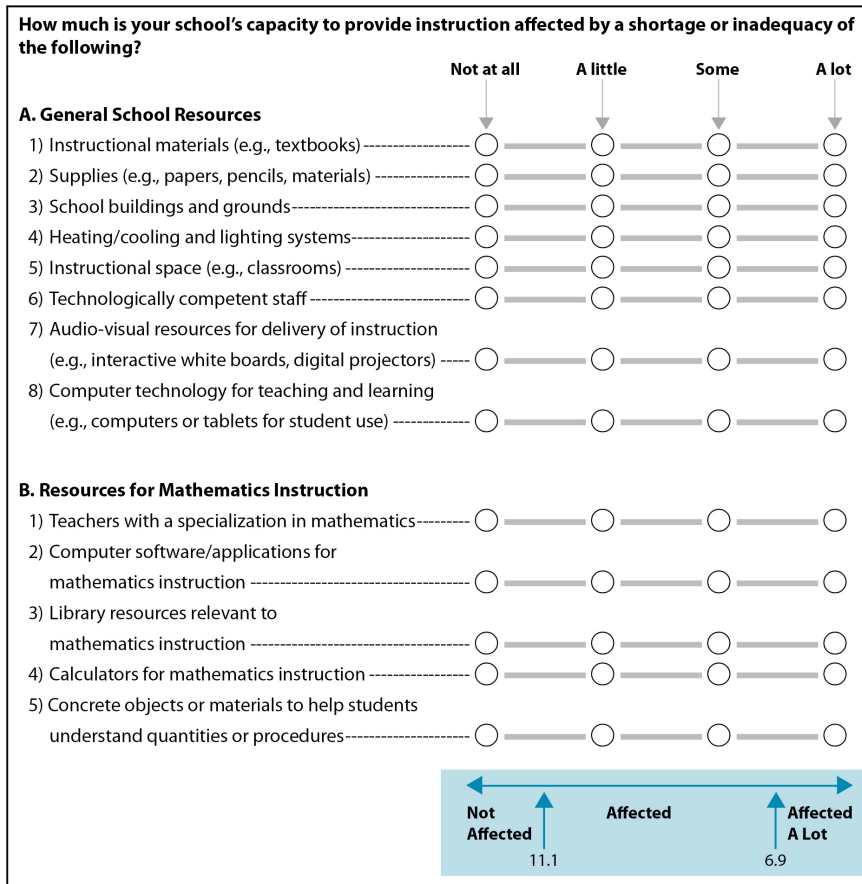
Significantly higher than 2011 ▲  
Significantly lower than 2011 ▼

**Exhibit 5.6: Instruction Affected by Mathematics Resource Shortages – Principals' Reports (Continued)**

Country	Not Affected		Affected		Affected A Lot		Average Scale Score	Difference in Average Scale Score from 2011
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement		
<b>Benchmarking Participants</b>								
Dubai, UAE	45 (0.2)	530 (2.1)	36 (0.2)	489 (2.2)	19 (0.2)	497 (3.1)	10.6 (0.01)	-0.1 (0.02)
Quebec, Canada	43 (6.5)	545 (4.4)	57 (6.5)	531 (5.2)	0 (0.2)	~ ~	11.2 (0.27)	0.4 (0.31)
Florida, US	42 (7.5)	534 (7.9)	56 (7.8)	556 (7.5)	2 (2.3)	~ ~	10.7 (0.32)	-0.3 (0.40)
Buenos Aires, Argentina	39 (5.2)	440 (7.8)	56 (5.3)	427 (5.2)	5 (1.7)	432 (11.7)	10.9 (0.23)	0 (0.00)
Norway (4)	34 (4.6)	500 (3.7)	66 (4.6)	490 (3.2)	0 (0.0)	~ ~	10.7 (0.11)	0.3 (0.16)
Ontario, Canada	32 (5.3)	518 (4.3)	68 (5.3)	509 (3.0)	0 (0.0)	~ ~	10.6 (0.17)	0.2 (0.22)
Abu Dhabi, UAE	25 (4.2)	468 (15.2)	66 (4.4)	389 (7.1)	9 (2.4)	429 (17.2)	9.7 (0.27)	0.4 (0.34)

Significantly higher than 2011 ▲  
Significantly lower than 2011 ▼

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



### Exhibit 5.8: Problems with School Conditions and Resources – Teachers' Reports

Reported by Teachers

Students were scored according to their teachers' responses concerning seven conditions and resources on the *Problems with School Conditions and Resources* scale. Students whose teachers reported **Hardly Any Problems** with their school conditions and resources had a score on the scale of at least 10.6, which corresponds to their teachers reporting "not a problem" for four of seven conditions and resources and "minor problem" for the other three, on average. Students whose teachers reported **Moderate to Severe Problems** had a score no higher than 8.2, which corresponds to their teachers reporting "moderate problem" for four of seven conditions and resources and "minor problem" for the other three, on average. All other students had teachers that reported **Minor Problems** with their school conditions and resources.

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	
Czech Republic	63 (3.5)	529 (2.9)	34 (3.5)	528 (4.1)	3 (1.3)	513 (11.7)	11.1 (0.13)
Northern Ireland	60 (4.2)	572 (3.5)	30 (3.3)	570 (7.5)	10 (3.2)	579 (9.1)	10.8 (0.19)
Qatar	58 (3.5)	432 (5.8)	31 (3.2)	451 (6.6)	11 (1.9)	444 (10.3)	11.1 (0.14)
United Arab Emirates	57 (2.4)	463 (3.9)	32 (1.9)	446 (4.6)	10 (1.7)	411 (11.3)	10.9 (0.09)
Korea, Rep. of	57 (3.8)	612 (3.0)	36 (3.9)	606 (3.8)	8 (2.3)	592 (8.1)	10.8 (0.15)
England	55 (4.1)	544 (5.0)	37 (3.7)	553 (5.1)	9 (2.4)	538 (10.1)	10.8 (0.16)
Bulgaria	54 (4.8)	524 (7.8)	36 (4.4)	524 (7.3)	10 (2.4)	528 (7.3)	10.6 (0.18)
Australia	53 (3.8)	518 (5.5)	38 (3.4)	518 (4.6)	8 (1.9)	519 (6.5)	10.6 (0.12)
Singapore	53 (2.6)	615 (5.7)	42 (2.5)	620 (5.5)	5 (1.2)	640 (13.0)	10.8 (0.09)
Chile	52 (4.4)	474 (4.5)	37 (4.3)	448 (4.8)	12 (2.7)	443 (8.0)	10.5 (0.17)
Kazakhstan	51 (4.1)	546 (6.6)	39 (4.0)	545 (7.6)	10 (2.2)	532 (12.9)	10.5 (0.16)
Ireland	51 (4.3)	548 (3.7)	34 (4.1)	547 (3.5)	15 (3.3)	548 (6.8)	10.4 (0.17)
Slovak Republic	50 (3.6)	492 (3.8)	39 (3.2)	506 (4.0)	11 (2.1)	498 (9.6)	10.7 (0.13)
Slovenia	50 (3.6)	519 (3.0)	33 (3.3)	518 (2.9)	17 (3.0)	529 (3.5)	10.4 (0.14)
New Zealand	48 (3.2)	494 (4.1)	44 (3.2)	490 (3.8)	8 (1.7)	484 (11.2)	10.5 (0.11)
Bahrain	47 (2.3)	454 (2.3)	40 (1.8)	453 (2.6)	12 (1.3)	452 (5.9)	10.6 (0.11)
Hong Kong SAR	45 (4.4)	622 (4.4)	46 (4.4)	611 (4.7)	9 (2.3)	597 (6.5)	10.4 (0.13)
Russian Federation	43 (3.5)	567 (4.0)	45 (3.9)	560 (4.5)	13 (3.5)	567 (18.4)	10.2 (0.11)
Oman	41 (2.8)	423 (4.7)	48 (2.9)	431 (3.9)	11 (1.9)	410 (7.9)	10.3 (0.11)
United States	41 (2.6)	544 (3.6)	48 (2.7)	538 (4.1)	11 (1.7)	522 (7.8)	10.3 (0.10)
Canada	40 (2.9)	508 (4.1)	49 (3.0)	512 (2.6)	11 (1.7)	515 (6.7)	10.2 (0.09)
Kuwait	40 (3.8)	358 (7.8)	42 (3.0)	351 (6.4)	18 (2.6)	339 (10.8)	10.0 (0.16)
Netherlands	39 (4.2)	525 (2.4)	49 (4.0)	532 (2.6)	12 (2.2)	539 (3.4)	10.1 (0.14)
Spain	39 (3.1)	507 (3.3)	46 (3.6)	506 (3.4)	15 (3.0)	498 (6.7)	10.3 (0.14)
Cyprus	37 (3.5)	528 (3.2)	45 (3.4)	523 (4.7)	18 (2.5)	513 (5.6)	10.1 (0.16)
Belgium (Flemish)	35 (3.6)	546 (3.2)	49 (3.5)	545 (3.7)	16 (2.8)	548 (6.7)	10.0 (0.14)
Lithuania	35 (3.9)	535 (5.2)	48 (3.6)	536 (3.6)	16 (2.8)	537 (7.0)	10.0 (0.16)
Portugal	34 (3.4)	545 (3.9)	45 (3.5)	545 (2.8)	21 (2.8)	531 (6.2)	9.9 (0.14)
Poland	33 (3.9)	537 (3.6)	57 (4.3)	535 (2.9)	10 (2.4)	524 (7.3)	10.0 (0.14)
Chinese Taipei	32 (3.6)	602 (3.2)	58 (3.6)	593 (2.6)	11 (1.8)	597 (6.5)	10.1 (0.13)
Norway (5)	31 (3.8)	554 (4.4)	52 (4.2)	555 (3.1)	17 (3.4)	528 (5.0)	9.8 (0.13)
Saudi Arabia	30 (3.2)	399 (7.0)	42 (3.4)	386 (6.7)	28 (3.1)	363 (8.4)	9.3 (0.14)
Jordan	27 (3.6)	419 (8.8)	34 (3.9)	379 (6.5)	39 (3.3)	376 (5.2)	9.2 (0.12)
Georgia	27 (3.7)	477 (8.8)	48 (4.5)	460 (5.3)	25 (3.8)	457 (8.8)	9.6 (0.17)
Turkey	27 (2.9)	511 (8.6)	37 (2.9)	486 (5.9)	36 (2.6)	459 (5.5)	9.0 (0.12)
Germany	26 (2.9)	531 (3.6)	38 (3.6)	515 (3.5)	35 (3.4)	519 (4.2)	9.2 (0.13)
Croatia	26 (3.3)	496 (3.1)	51 (3.2)	503 (2.7)	23 (2.8)	508 (5.0)	9.5 (0.17)
Serbia	25 (3.5)	521 (10.4)	40 (3.6)	512 (5.3)	35 (3.6)	523 (4.1)	9.3 (0.15)
Finland	23 (2.8)	533 (3.2)	55 (3.4)	537 (2.8)	22 (2.9)	532 (4.1)	9.5 (0.11)
Sweden	23 (3.4)	522 (5.7)	53 (4.3)	522 (3.8)	24 (3.7)	509 (7.4)	9.3 (0.13)
Italy	23 (2.6)	517 (5.9)	43 (4.0)	504 (3.2)	34 (3.9)	504 (5.4)	9.3 (0.12)
Japan	22 (3.0)	592 (4.4)	60 (3.6)	592 (2.3)	18 (2.7)	596 (5.3)	9.6 (0.12)
Denmark	20 (3.4)	539 (5.0)	53 (4.1)	536 (4.2)	27 (3.4)	541 (4.9)	9.3 (0.13)
Hungary	20 (3.2)	511 (8.6)	47 (4.0)	528 (6.1)	33 (3.7)	538 (6.3)	9.1 (0.15)
South Africa (5)	18 (2.4)	447 (12.6)	34 (3.4)	384 (6.1)	48 (3.2)	343 (4.5)	8.6 (0.12)
France	18 (2.7)	502 (4.9)	55 (3.6)	484 (3.7)	28 (3.2)	487 (6.3)	9.2 (0.14)
Iran, Islamic Rep. of	17 (2.2)	466 (7.7)	58 (3.6)	432 (4.8)	25 (3.2)	408 (7.6)	9.1 (0.10)
Morocco	14 (2.3)	428 (8.8)	30 (2.9)	372 (5.7)	56 (3.3)	366 (5.5)	8.2 (0.15)
Indonesia	12 (2.6)	429 (10.2)	27 (3.2)	406 (7.4)	61 (3.3)	387 (5.3)	8.0 (0.15)
International Avg.	37 (0.5)	512 (0.8)	43 (0.5)	505 (0.7)	20 (0.4)	499 (1.1)	

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

This TIMSS 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.

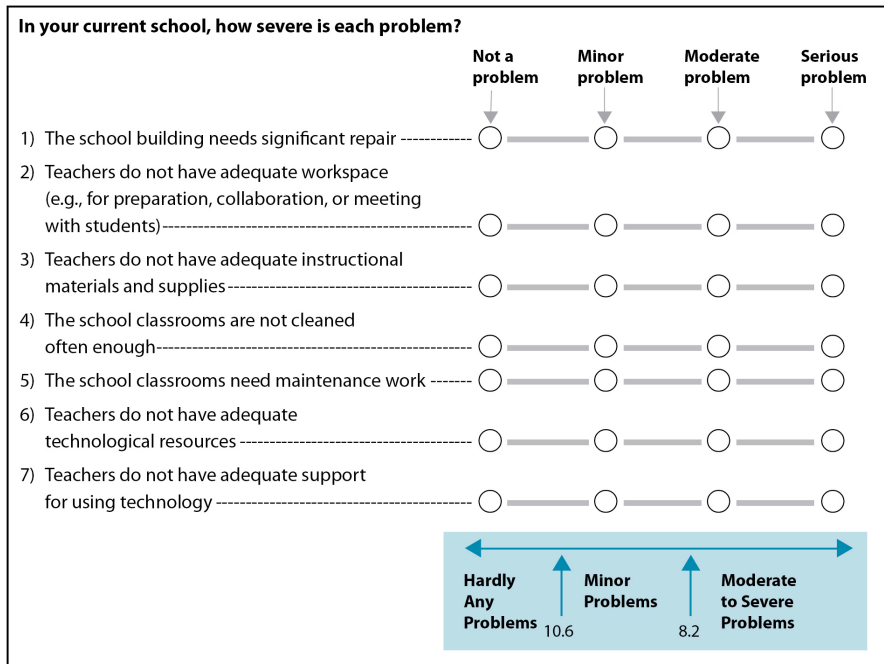
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

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 "x" indicates data are available for less than 50% of students.

**Exhibit 5.8: Problems with School Conditions and Resources – Teachers' Reports (Continued)**

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	
<b>Benchmarking Participants</b>							
Dubai, UAE	69 (1.5)	521 (2.5)	30 (1.6)	488 (4.0)	1 (0.5)	~ ~	11.5 (0.07)
Abu Dhabi, UAE	50 (5.0)	415 (10.1)	35 (4.5)	433 (10.5)	15 (3.2)	393 (17.7)	10.6 (0.20)
Florida, US	42 (5.7)	554 (9.1)	40 (5.3)	540 (8.2)	19 (5.3)	548 (12.7)	10.1 (0.26)
Norway (4)	40 (3.9)	497 (3.0)	49 (3.9)	494 (3.6)	11 (2.5)	490 (6.9)	10.1 (0.12)
Ontario, Canada	36 (3.7)	518 (4.0)	52 (4.0)	512 (3.0)	12 (2.4)	508 (6.3)	10.1 (0.12)
Quebec, Canada	33 (4.6)	538 (5.9)	53 (5.6)	532 (5.2)	14 (4.1)	547 (9.5)	9.9 (0.17)
Buenos Aires, Argentina	x x	x x	x x	x x	x x	x x	x x



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015





# CHAPTER 6: SCHOOL CLIMATE

TIMSS 2015 INTERNATIONAL RESULTS IN MATHEMATICS



**IEA**

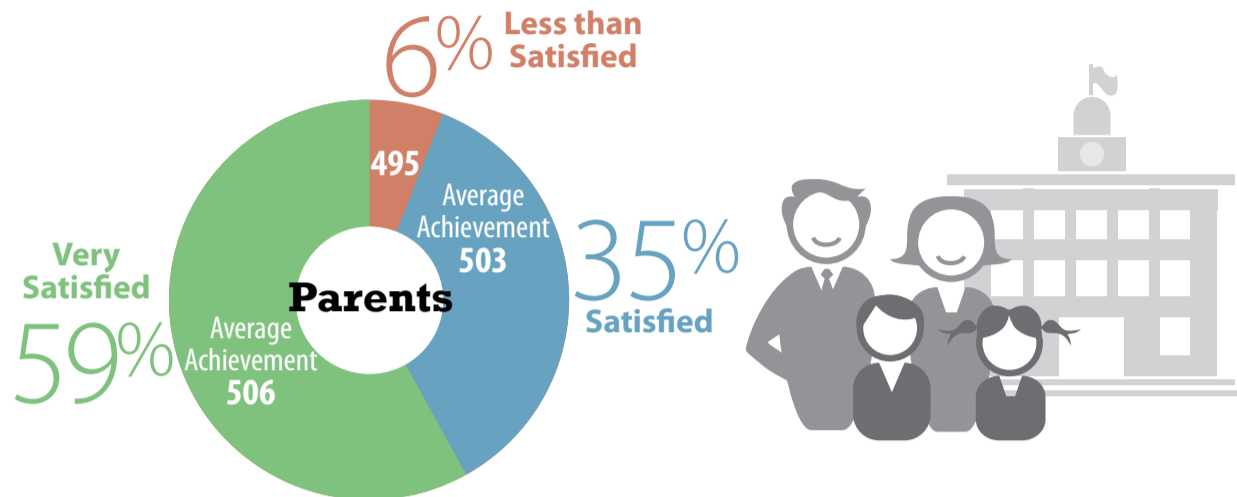
**TIMSS & PIRLS**  
International Study Center  
Lynch School of Education, Boston College



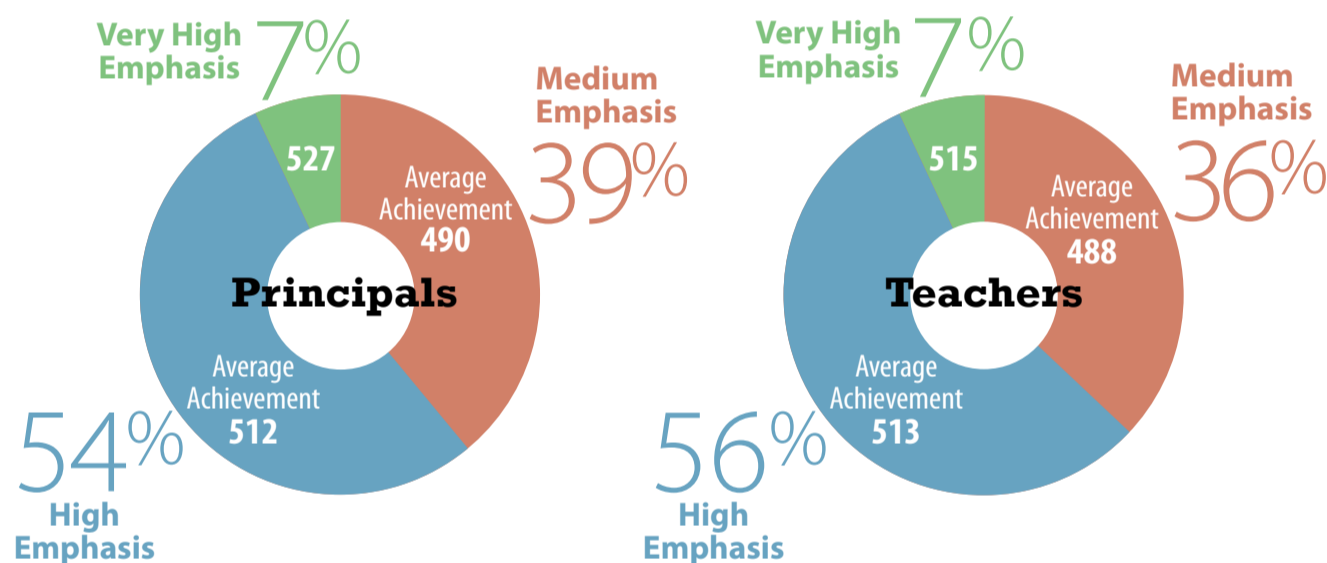
## Schools Have Positive Environments

Generally, fourth grade students were in positive school environments, according to their parents, principals, teachers, and the students themselves.

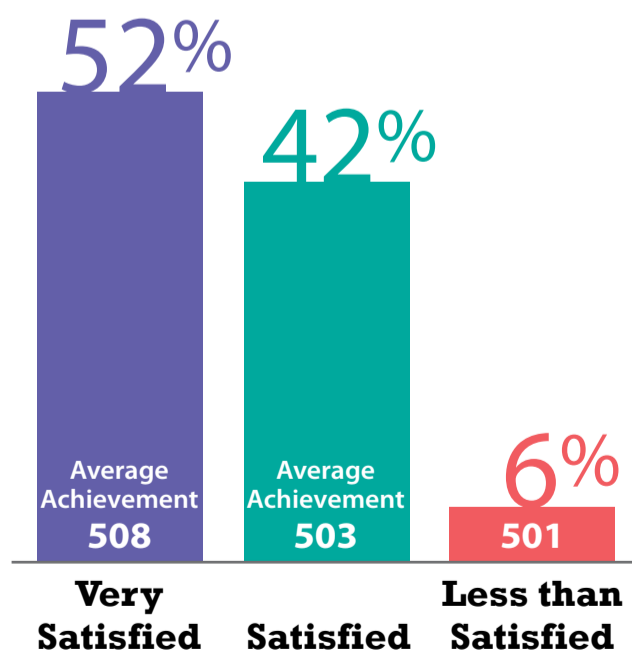
**The majority of PARENTS are very satisfied with the performance of their child's school.**



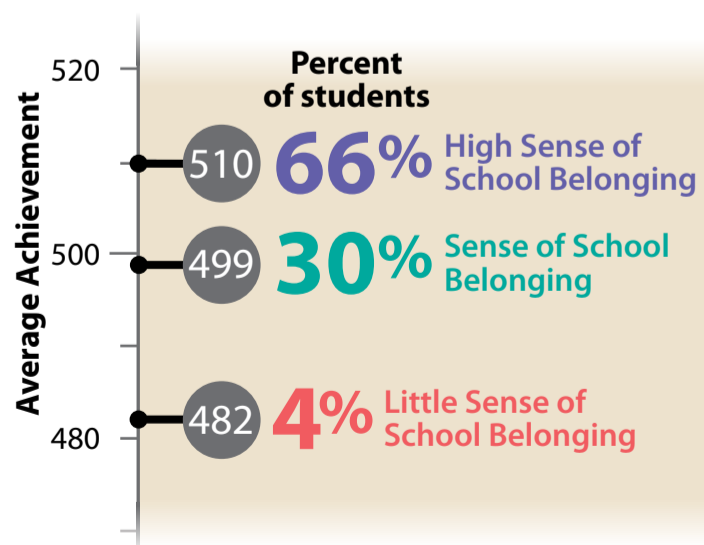
**PRINCIPALS and TEACHERS agree that the schools emphasize academic success.**



**TEACHERS of fourth grade mathematics reported a high degree of job satisfaction.**



**Almost all FOURTH GRADE STUDENTS reported a positive sense of school belonging, and a higher sense of school belonging was related to higher average mathematics achievement.**





**Exhibit 6.1: Parents' Perceptions of School Performance**

Reported by Parents

Students were scored on the *Parents' Perceptions of School Performance* scale according to their parents' responses to eight statements about the school. Students whose parents are **Very Satisfied** had a score on the scale of at least 9.7, which corresponds 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 no higher than 6.7, which corresponds 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 were **Satisfied**.

Country	Very Satisfied		Satisfied		Less than Satisfied		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Kazakhstan	91 (0.8)	546 (4.6)	8 (0.7)	539 (8.7)	1 (0.2)	~ ~	11.7 (0.04)
Indonesia	90 (0.8)	399 (3.6)	10 (0.8)	394 (7.8)	1 (0.1)	~ ~	11.4 (0.05)
Northern Ireland	s 81 (1.4)	584 (4.1)	16 (1.3)	590 (5.9)	3 (0.6)	581 (15.5)	11.0 (0.07)
South Africa (5)	80 (0.9)	384 (3.5)	17 (0.8)	361 (5.5)	2 (0.2)	~ ~	11.0 (0.04)
Ireland	80 (1.2)	550 (2.4)	18 (1.0)	553 (3.2)	2 (0.4)	~ ~	10.9 (0.06)
Bulgaria	76 (1.2)	526 (5.4)	20 (1.0)	525 (6.7)	4 (0.4)	521 (9.5)	10.8 (0.06)
Turkey	75 (1.1)	483 (3.5)	21 (0.8)	487 (4.4)	4 (0.4)	488 (7.8)	10.7 (0.05)
Oman	73 (0.7)	434 (2.8)	24 (0.7)	412 (3.5)	3 (0.2)	377 (8.2)	10.6 (0.03)
Georgia	70 (1.2)	466 (3.6)	28 (1.2)	461 (5.2)	1 (0.2)	~ ~	10.6 (0.05)
Portugal	68 (1.2)	546 (2.3)	28 (1.0)	536 (3.4)	4 (0.4)	524 (6.7)	10.4 (0.05)
Lithuania	68 (1.1)	540 (2.8)	29 (1.0)	537 (3.6)	3 (0.4)	530 (10.0)	10.3 (0.05)
Spain	67 (1.4)	510 (2.3)	28 (1.2)	509 (2.7)	5 (0.5)	495 (6.4)	10.4 (0.06)
Chile	r 67 (1.5)	465 (2.8)	28 (1.3)	464 (3.5)	5 (0.5)	449 (6.8)	10.3 (0.07)
Bahrain	66 (0.7)	462 (1.7)	28 (0.6)	441 (3.4)	5 (0.3)	424 (4.5)	10.3 (0.03)
Saudi Arabia	66 (1.3)	389 (3.8)	28 (1.1)	375 (5.5)	6 (0.5)	388 (9.4)	10.4 (0.06)
Serbia	66 (1.3)	514 (4.4)	27 (1.0)	530 (3.9)	8 (0.6)	517 (6.4)	10.3 (0.06)
Morocco	65 (1.3)	389 (3.7)	29 (1.1)	367 (4.9)	5 (0.6)	337 (8.9)	10.2 (0.06)
Qatar	r 65 (1.2)	454 (3.9)	29 (1.1)	438 (4.0)	6 (0.4)	406 (9.1)	10.3 (0.05)
Italy	64 (1.3)	510 (2.9)	30 (1.1)	510 (3.1)	5 (0.5)	491 (6.3)	10.2 (0.06)
Cyprus	64 (1.3)	526 (2.6)	30 (1.0)	529 (4.0)	6 (0.5)	520 (7.7)	10.1 (0.05)
Iran, Islamic Rep. of	64 (1.0)	432 (3.6)	32 (0.9)	431 (4.5)	4 (0.4)	438 (8.7)	10.1 (0.04)
New Zealand	s 63 (1.2)	514 (3.0)	32 (1.1)	511 (3.6)	6 (0.5)	484 (9.7)	10.1 (0.05)
Slovak Republic	62 (1.1)	496 (3.1)	34 (1.0)	508 (2.7)	4 (0.4)	500 (7.0)	10.2 (0.05)
Canada	r 60 (1.0)	518 (2.1)	36 (0.8)	521 (2.7)	5 (0.3)	501 (5.3)	10.1 (0.04)
Hungary	59 (1.1)	533 (3.3)	35 (1.0)	527 (4.3)	6 (0.5)	512 (7.5)	10.0 (0.05)
Jordan	59 (1.3)	403 (4.3)	30 (0.9)	383 (3.7)	11 (0.7)	348 (6.7)	9.9 (0.07)
Kuwait	r 58 (1.3)	364 (4.9)	32 (1.0)	355 (5.4)	10 (0.6)	342 (7.4)	9.9 (0.06)
Singapore	58 (0.8)	623 (4.0)	37 (0.7)	616 (3.7)	5 (0.3)	590 (7.4)	10.0 (0.03)
United Arab Emirates	56 (0.7)	469 (2.7)	38 (0.7)	439 (2.9)	6 (0.2)	419 (5.0)	10.0 (0.03)
Hong Kong SAR	55 (1.4)	622 (3.4)	40 (1.1)	611 (3.4)	5 (0.6)	592 (7.4)	9.9 (0.06)
Finland	54 (1.2)	537 (2.3)	42 (1.1)	538 (2.3)	4 (0.5)	536 (8.7)	9.8 (0.05)
Russian Federation	54 (1.3)	564 (3.7)	41 (1.0)	566 (3.9)	5 (0.6)	559 (6.9)	9.8 (0.06)
Belgium (Flemish)	49 (1.1)	548 (2.6)	47 (1.0)	550 (2.1)	4 (0.4)	533 (7.0)	9.6 (0.04)
Poland	49 (1.3)	533 (2.8)	47 (1.2)	539 (2.5)	5 (0.4)	527 (5.9)	9.7 (0.05)
Chinese Taipei	47 (1.0)	596 (2.6)	46 (0.9)	600 (2.2)	7 (0.4)	591 (4.5)	9.7 (0.04)
Denmark	46 (1.6)	545 (3.5)	42 (1.2)	544 (2.9)	12 (0.9)	523 (6.8)	9.3 (0.07)
Sweden	42 (1.6)	525 (3.8)	51 (1.4)	524 (2.9)	7 (0.7)	514 (6.0)	9.4 (0.07)
Germany	s 42 (1.4)	534 (3.5)	47 (1.2)	537 (2.4)	12 (0.8)	514 (4.7)	9.2 (0.06)
Croatia	39 (1.1)	502 (2.5)	55 (1.1)	504 (2.0)	7 (0.6)	495 (6.4)	9.3 (0.04)
France	35 (1.3)	489 (3.7)	58 (1.2)	493 (3.0)	7 (0.6)	486 (6.7)	9.1 (0.06)
Czech Republic	34 (1.0)	521 (3.5)	53 (0.9)	533 (2.1)	12 (0.8)	534 (3.9)	8.9 (0.05)
Slovenia	s 27 (1.3)	527 (4.3)	64 (1.2)	530 (2.4)	9 (0.5)	521 (6.6)	8.8 (0.05)
Korea, Rep. of	17 (0.9)	616 (3.1)	67 (1.0)	609 (2.5)	16 (0.8)	603 (3.5)	8.3 (0.04)
Japan	7 (0.7)	589 (6.2)	66 (0.8)	596 (1.9)	27 (0.9)	591 (3.3)	7.7 (0.04)
Australia	x x	x x	x x	x x	x x	x x	x x
Netherlands	x x	x x	x x	x x	x x	x x	x x
Norway (5)	x x	x x	x x	x x	x x	x x	x x
England	--	--	--	--	--	--	--
United States	--	--	--	--	--	--	--
International Avg.	59 (0.2)	506 (0.5)	35 (0.2)	503 (0.6)	6 (0.1)	495 (1.2)	

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

This TIMSS 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.

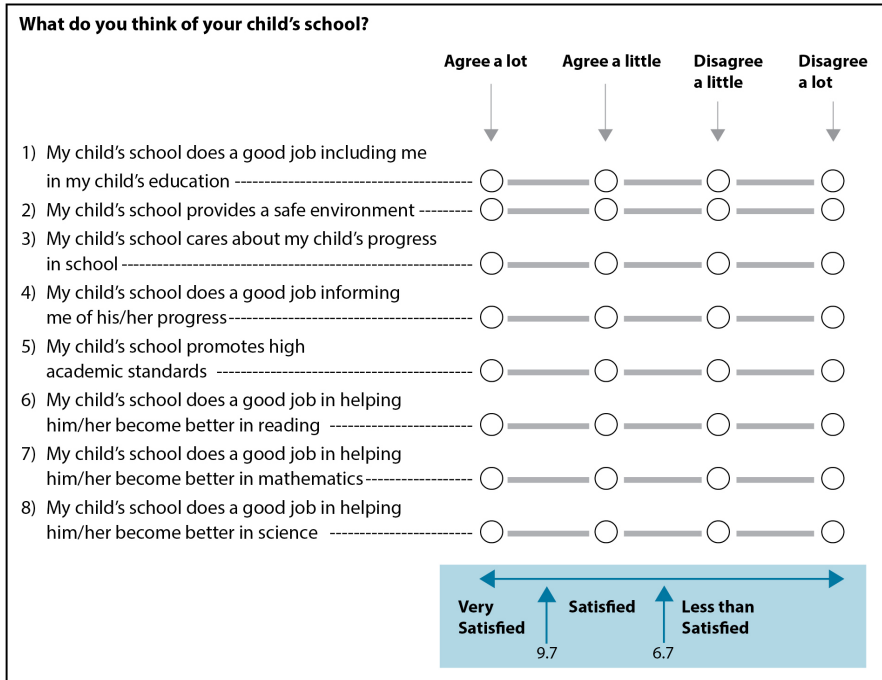
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

An "x" indicates data are available for less than 50% of students.

**Exhibit 6.1: Parents' Perceptions of School Performance (Continued)**

Country	Very Satisfied		Satisfied		Less than Satisfied		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
<b>Benchmarking Participants</b>							
Dubai, UAE	62 (1.0)	524 (2.1)	33 (1.0)	496 (2.5)	5 (0.3)	485 (6.8)	10.2 (0.04)
Ontario, Canada	62 (1.5)	523 (2.5)	32 (1.1)	515 (3.1)	6 (0.6)	498 (6.7)	10.1 (0.07)
Abu Dhabi, UAE	50 (1.6)	442 (6.0)	44 (1.5)	410 (5.4)	6 (0.5)	386 (8.5)	9.7 (0.06)
Quebec, Canada	48 (1.9)	537 (4.0)	49 (1.8)	543 (5.0)	3 (0.5)	531 (9.6)	9.7 (0.07)
Buenos Aires, Argentina	x x	x x	x x	x x	x x	x x	x x
Norway (4)	x x	x x	x x	x x	x x	x x	x x
Florida, US	--	--	--	--	--	--	--

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**Exhibit 6.2: School Emphasis on Academic Success – Principals’ Reports**

Reported by Principals

Students were scored according to their principals’ responses characterizing thirteen aspects on the *School Emphasis on Academic Success* scale. Students in schools where their principals reported a **Very High Emphasis** on academic success had a score on the scale of at least 13.0, which corresponds to their principals characterizing seven of the thirteen aspects as “very high” and the other six as “high,” on average. Students in schools with a **Medium Emphasis** on academic success had a score no higher than 9.2, which corresponds to their principals characterizing seven of the thirteen aspects as “medium” and the other six 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 2015

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	
Qatar	30 (2.6)	466 (8.0)	58 (3.2)	433 (5.1)	13 (2.6)	401 (9.1)	11.8 (0.14)
Korea, Rep. of	26 (4.2)	626 (6.1)	62 (4.4)	604 (2.1)	13 (2.6)	591 (6.5)	11.8 (0.20)
United Arab Emirates	20 (1.6)	503 (5.5)	59 (2.2)	448 (2.9)	21 (1.6)	393 (5.4)	11.2 (0.08)
Ireland	19 (3.7)	562 (3.9)	70 (4.1)	547 (2.9)	11 (2.4)	522 (6.5)	11.6 (0.15)
Canada	19 (2.0)	537 (5.5)	51 (3.1)	510 (3.3)	30 (2.8)	494 (4.4)	10.7 (0.13)
New Zealand	18 (2.8)	516 (5.3)	61 (3.6)	499 (3.7)	21 (2.6)	454 (6.7)	11.1 (0.13)
Northern Ireland	r 15 (3.9)	589 (8.6)	76 (4.6)	569 (4.2)	9 (2.7)	548 (9.8)	11.4 (0.19)
United States	14 (2.2)	586 (7.9)	46 (3.2)	540 (3.8)	40 (2.9)	520 (3.5)	10.3 (0.15)
England	14 (2.5)	576 (7.3)	65 (4.4)	549 (4.1)	21 (3.9)	522 (6.6)	10.8 (0.15)
Australia	12 (2.8)	555 (8.7)	53 (4.1)	525 (4.2)	34 (3.4)	492 (5.5)	10.4 (0.16)
Chinese Taipei	12 (2.5)	613 (5.0)	63 (3.8)	599 (2.7)	25 (3.4)	584 (3.2)	10.6 (0.15)
Kazakhstan	11 (2.7)	557 (14.7)	78 (3.3)	544 (5.0)	11 (2.4)	536 (14.6)	11.1 (0.15)
Singapore	11 (0.0)	653 (13.0)	63 (0.0)	625 (4.2)	27 (0.0)	589 (8.8)	10.6 (0.00)
Bahrain	10 (0.1)	463 (2.8)	66 (0.2)	455 (2.3)	24 (0.2)	430 (2.2)	10.5 (0.00)
Kuwait	9 (3.3)	398 (20.5)	51 (4.0)	359 (5.3)	40 (3.1)	328 (5.7)	9.8 (0.20)
Cyprus	9 (3.2)	535 (6.7)	51 (5.2)	531 (4.4)	40 (4.3)	511 (3.4)	10.0 (0.16)
Oman	8 (2.0)	411 (8.8)	67 (3.0)	430 (3.3)	25 (3.0)	418 (5.6)	10.4 (0.13)
Hong Kong SAR	7 (2.7)	660 (8.2)	55 (4.7)	619 (5.0)	38 (4.0)	599 (4.6)	10.0 (0.18)
Saudi Arabia	7 (1.8)	404 (6.7)	56 (3.8)	388 (5.7)	37 (3.5)	372 (7.6)	9.9 (0.13)
Georgia	7 (2.4)	486 (13.0)	61 (4.2)	467 (5.6)	32 (4.0)	452 (6.1)	10.1 (0.15)
Croatia	6 (2.0)	505 (7.6)	70 (3.4)	503 (2.3)	23 (3.1)	499 (5.0)	10.7 (0.13)
Bulgaria	6 (2.7)	556 (10.3)	50 (4.7)	542 (5.7)	44 (4.4)	499 (8.9)	9.6 (0.20)
Iran, Islamic Rep. of	6 (1.6)	442 (21.9)	56 (3.4)	441 (4.9)	37 (2.9)	415 (5.3)	10.0 (0.12)
Jordan	5 (1.7)	423 (18.4)	44 (3.5)	402 (5.8)	51 (3.7)	373 (5.7)	9.5 (0.15)
Indonesia	5 (1.5)	381 (33.0)	57 (3.7)	408 (4.6)	38 (3.5)	383 (6.6)	10.0 (0.12)
Spain	5 (1.5)	525 (7.7)	59 (3.8)	517 (2.2)	36 (3.1)	484 (4.3)	9.8 (0.10)
South Africa (5)	5 (1.4)	429 (34.6)	36 (3.7)	378 (10.0)	59 (3.8)	370 (5.1)	9.2 (0.13)
Turkey	4 (1.2)	551 (15.8)	40 (3.7)	508 (5.3)	56 (3.6)	460 (4.0)	9.2 (0.13)
Denmark	r 4 (1.5)	555 (16.5)	57 (4.3)	544 (3.6)	39 (4.1)	535 (4.3)	9.7 (0.14)
Sweden	4 (1.6)	550 (4.6)	59 (4.4)	526 (3.1)	37 (4.2)	505 (5.3)	9.9 (0.14)
Portugal	3 (1.7)	559 (11.8)	37 (3.9)	555 (3.9)	59 (3.7)	532 (3.1)	9.1 (0.13)
Japan	3 (1.5)	622 (16.0)	46 (4.1)	597 (2.7)	50 (4.2)	588 (2.3)	9.4 (0.13)
Lithuania	3 (1.2)	559 (17.7)	76 (3.3)	539 (3.1)	20 (3.0)	519 (6.8)	10.3 (0.10)
Serbia	3 (1.3)	552 (15.4)	40 (3.9)	535 (4.6)	57 (4.0)	505 (4.8)	9.2 (0.12)
Morocco	2 (1.0)	~ ~	19 (1.8)	412 (6.8)	79 (1.7)	367 (4.3)	8.2 (0.09)
Chile	2 (0.9)	~ ~	30 (3.7)	478 (5.5)	69 (3.8)	449 (4.0)	8.5 (0.16)
Poland	1 (0.9)	~ ~	63 (3.8)	541 (2.5)	36 (3.8)	524 (4.0)	9.9 (0.11)
Finland	1 (0.9)	~ ~	67 (4.1)	536 (2.5)	32 (4.0)	534 (3.9)	10.0 (0.11)
Slovak Republic	1 (0.8)	~ ~	42 (3.5)	516 (3.6)	57 (3.5)	484 (4.3)	9.1 (0.09)
Germany	1 (0.6)	~ ~	55 (3.0)	529 (2.5)	45 (2.9)	511 (4.0)	9.6 (0.08)
Russian Federation	1 (0.5)	~ ~	55 (3.7)	570 (5.1)	45 (3.7)	557 (4.0)	9.4 (0.07)
Hungary	0 (0.2)	~ ~	46 (3.9)	553 (4.1)	53 (3.9)	508 (4.9)	9.2 (0.11)
Belgium (Flemish)	0 (0.0)	~ ~	49 (4.1)	557 (2.9)	51 (4.1)	538 (3.7)	9.3 (0.09)
Czech Republic	0 (0.0)	~ ~	33 (4.4)	534 (4.3)	67 (4.4)	525 (2.3)	8.8 (0.12)
France	0 (0.0)	~ ~	59 (4.3)	495 (3.8)	41 (4.3)	477 (5.7)	9.6 (0.11)
Italy	0 (0.0)	~ ~	45 (4.3)	509 (4.1)	55 (4.3)	506 (3.5)	9.1 (0.11)
Netherlands	s 0 (0.0)	~ ~	46 (5.5)	537 (3.3)	54 (5.5)	533 (2.2)	9.3 (0.13)
Norway (5)	0 (0.0)	~ ~	48 (4.6)	558 (3.4)	52 (4.6)	541 (3.9)	9.4 (0.13)
Slovenia	0 (0.0)	~ ~	51 (4.1)	522 (2.4)	49 (4.1)	519 (3.2)	9.3 (0.11)
International Avg.	7 (0.3)	527 (2.4)	54 (0.5)	512 (0.6)	39 (0.5)	490 (0.8)	

This TIMSS 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.

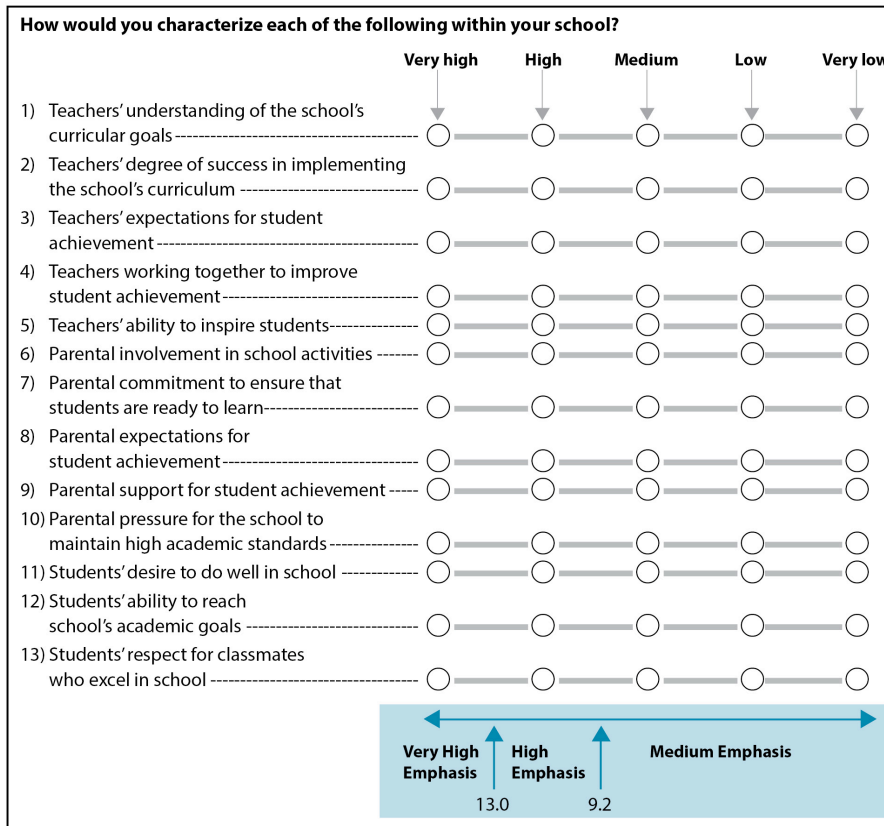
A tilde (~) indicates insufficient data to report achievement.

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.

**Exhibit 6.2: School Emphasis on Academic Success – Principals’ Reports  
 (Continued)**

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	
<b>Benchmarking Participants</b>							
Dubai, UAE	42 (0.2)	533 (2.4)	47 (0.2)	502 (1.9)	11 (0.1)	445 (3.2)	12.3 (0.01)
Quebec, Canada	41 (5.7)	545 (6.2)	53 (5.5)	533 (5.3)	7 (2.5)	518 (6.5)	12.5 (0.18)
Abu Dhabi, UAE	10 (2.6)	459 (21.5)	56 (4.3)	432 (6.6)	35 (4.1)	368 (8.2)	10.3 (0.18)
Ontario, Canada	9 (2.6)	547 (11.0)	45 (5.2)	515 (3.6)	46 (5.3)	502 (3.1)	9.9 (0.21)
Buenos Aires, Argentina	6 (2.7)	463 (8.8)	47 (4.6)	450 (4.9)	46 (4.9)	412 (5.9)	9.7 (0.23)
Florida, US	3 (2.7)	580 (7.7)	59 (7.0)	550 (6.4)	38 (6.4)	539 (9.7)	10.2 (0.24)
Norway	0 (0.0)	~ ~	47 (4.8)	503 (3.1)	53 (4.8)	485 (3.7)	9.3 (0.14)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015





**Exhibit 6.4: School Emphasis on Academic Success – Teachers' Reports**

Reported by Teachers

Students were scored according to their teachers' responses characterizing fourteen aspects on the *School Emphasis on Academic Success* scale. Students in schools where their teachers reported a **Very High Emphasis** on academic success had a score on the scale of at least 12.9, which corresponds to their teachers characterizing seven of the fourteen aspects as "very high" and the other seven as "high," on average. Students in schools with a **Medium Emphasis** on academic success had a score no higher than 9.2, which corresponds to their teachers characterizing seven of the fourteen aspects as "medium" and the other seven as "high," on average. All other students attended schools with a **High Emphasis** on academic success.

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	29 (2.8)	627 (4.7)	57 (3.5)	603 (2.5)	15 (2.7)	590 (4.6)	11.6 (0.15)
Kazakhstan	22 (2.7)	555 (10.5)	69 (2.7)	543 (5.8)	8 (1.6)	528 (11.8)	11.6 (0.15)
Northern Ireland	22 (3.6)	585 (7.3)	67 (4.4)	574 (4.2)	11 (3.1)	539 (6.6)	11.8 (0.20)
Ireland	20 (3.5)	562 (4.9)	67 (3.9)	548 (2.6)	13 (2.5)	518 (6.4)	11.2 (0.18)
Croatia	19 (3.1)	500 (4.3)	70 (3.8)	502 (2.3)	11 (2.4)	505 (7.1)	11.3 (0.16)
Qatar	19 (3.5)	457 (8.5)	67 (4.5)	440 (5.2)	14 (2.9)	409 (11.0)	11.1 (0.16)
United Arab Emirates	15 (1.7)	482 (7.4)	62 (2.3)	463 (3.7)	23 (1.8)	405 (7.0)	10.8 (0.09)
England	15 (2.7)	575 (9.8)	56 (4.0)	552 (4.0)	29 (3.7)	521 (6.3)	10.7 (0.17)
Canada	13 (1.7)	524 (4.4)	58 (2.7)	518 (2.8)	28 (2.5)	492 (5.5)	10.6 (0.12)
Bahrain	13 (0.8)	457 (9.8)	57 (2.2)	461 (2.0)	29 (2.0)	432 (2.9)	10.5 (0.15)
New Zealand	12 (2.2)	510 (6.4)	68 (2.8)	499 (2.9)	20 (2.2)	454 (6.0)	10.6 (0.11)
Indonesia	11 (2.2)	408 (16.5)	57 (3.4)	407 (4.5)	32 (3.3)	377 (6.9)	10.3 (0.14)
Oman	11 (1.9)	437 (10.2)	66 (3.2)	429 (3.4)	23 (2.7)	413 (5.7)	10.6 (0.11)
Georgia	10 (2.8)	472 (8.8)	72 (3.8)	469 (4.6)	18 (3.1)	437 (8.6)	10.7 (0.14)
Iran, Islamic Rep. of	9 (2.0)	471 (12.6)	57 (3.3)	435 (5.1)	34 (3.2)	414 (5.4)	10.2 (0.15)
Australia	9 (2.2)	555 (7.7)	63 (4.1)	526 (3.5)	28 (4.0)	488 (5.8)	10.4 (0.13)
United States	8 (1.7)	576 (9.7)	51 (2.4)	547 (3.6)	41 (2.2)	520 (3.4)	9.8 (0.11)
Lithuania	8 (2.1)	554 (11.3)	72 (3.7)	540 (3.2)	20 (3.4)	513 (6.8)	10.7 (0.13)
Spain	8 (1.7)	522 (4.7)	62 (3.3)	515 (2.3)	30 (3.5)	479 (5.3)	10.2 (0.12)
South Africa (5)	7 (1.4)	402 (18.4)	58 (3.3)	377 (5.3)	35 (3.2)	373 (6.7)	9.9 (0.13)
Kuwait	6 (2.1)	372 (15.3)	60 (3.2)	364 (7.2)	34 (2.7)	326 (5.2)	10.0 (0.13)
Serbia	6 (1.9)	526 (9.9)	63 (3.7)	525 (4.2)	31 (3.7)	502 (8.1)	10.1 (0.14)
Bulgaria	5 (1.9)	574 (14.7)	61 (3.8)	532 (6.2)	34 (3.7)	503 (8.3)	9.9 (0.14)
Turkey	5 (1.3)	544 (21.0)	45 (3.2)	501 (5.6)	50 (3.5)	461 (4.3)	9.3 (0.14)
Saudi Arabia	4 (1.6)	434 (11.7)	46 (3.8)	395 (6.1)	50 (3.8)	370 (6.3)	9.4 (0.14)
Singapore	4 (1.3)	639 (18.0)	52 (3.0)	637 (4.8)	44 (2.8)	594 (5.6)	9.7 (0.09)
Sweden	4 (1.5)	561 (9.0)	46 (4.2)	522 (3.1)	50 (4.1)	512 (4.5)	9.4 (0.13)
Morocco	4 (1.3)	397 (21.7)	17 (2.8)	430 (7.4)	79 (3.1)	364 (4.1)	8.0 (0.13)
Jordan	4 (1.4)	423 (20.1)	49 (3.9)	402 (5.4)	48 (3.9)	373 (5.1)	9.4 (0.14)
Czech Republic	3 (1.3)	528 (17.8)	44 (3.7)	532 (2.7)	52 (3.5)	525 (4.0)	9.3 (0.11)
Chinese Taipei	3 (1.4)	605 (9.0)	63 (3.6)	600 (2.4)	34 (3.7)	590 (3.9)	9.8 (0.13)
Cyprus	3 (1.3)	552 (20.3)	59 (3.6)	530 (2.6)	38 (3.6)	509 (4.0)	9.9 (0.13)
Italy	3 (1.4)	514 (16.6)	48 (3.7)	509 (3.2)	49 (3.6)	504 (4.0)	9.5 (0.12)
Norway (5)	3 (1.7)	592 (11.6)	52 (4.0)	557 (3.8)	45 (3.8)	539 (2.8)	9.5 (0.11)
Poland	2 (1.0)	~ ~	61 (3.6)	541 (2.3)	37 (3.7)	524 (4.1)	9.8 (0.10)
Denmark	2 (1.2)	~ ~	41 (3.6)	544 (4.5)	57 (3.7)	531 (3.8)	9.1 (0.12)
Finland	2 (0.9)	~ ~	64 (3.3)	538 (2.0)	34 (3.3)	530 (4.1)	9.8 (0.10)
Chile	2 (1.4)	~ ~	36 (4.1)	475 (5.3)	62 (4.3)	451 (3.7)	8.8 (0.19)
Belgium (Flemish)	2 (1.4)	~ ~	47 (3.8)	556 (3.1)	51 (3.7)	536 (2.7)	9.2 (0.12)
Portugal	2 (1.0)	~ ~	54 (3.4)	553 (3.5)	45 (3.2)	527 (4.5)	9.5 (0.10)
Hungary	1 (0.8)	~ ~	47 (3.3)	548 (4.1)	52 (3.4)	510 (4.9)	9.2 (0.12)
Slovak Republic	1 (0.6)	~ ~	49 (3.3)	511 (3.8)	50 (3.2)	485 (4.4)	9.3 (0.09)
Slovenia	1 (0.9)	~ ~	61 (4.0)	521 (2.5)	38 (4.1)	519 (3.4)	9.6 (0.10)
France	1 (0.6)	~ ~	61 (3.3)	498 (3.5)	38 (3.3)	471 (3.6)	9.6 (0.09)
Germany	1 (0.6)	~ ~	58 (3.5)	529 (2.6)	41 (3.4)	510 (4.2)	9.4 (0.11)
Hong Kong SAR	0 (0.4)	~ ~	71 (3.7)	624 (3.9)	29 (3.7)	591 (4.6)	9.9 (0.13)
Russian Federation	0 (0.5)	~ ~	54 (3.9)	570 (3.8)	46 (3.9)	557 (6.5)	9.4 (0.09)
Japan	0 (0.4)	~ ~	46 (3.4)	599 (3.0)	54 (3.4)	588 (2.1)	9.1 (0.09)
Netherlands	0 (0.3)	~ ~	42 (4.3)	532 (3.2)	57 (4.3)	528 (2.3)	9.1 (0.11)
International Avg.	7 (0.3)	515 (2.2)	56 (0.5)	513 (0.6)	36 (0.5)	488 (0.8)	

This TIMSS 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.

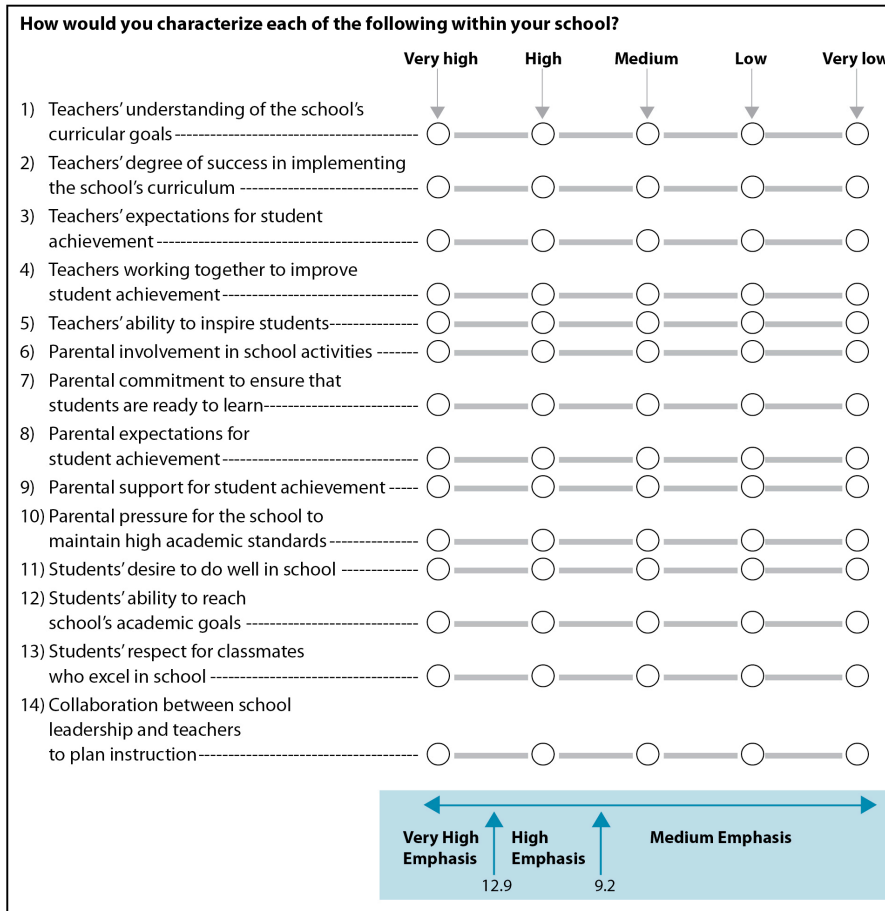
A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "x" indicates data are available for less than 50% of students.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 6.4: School Emphasis on Academic Success – Teachers' Reports (Continued)**

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	
<b>Benchmarking Participants</b>							
Quebec, Canada	24 (5.0)	539 (5.3)	66 (5.2)	536 (5.6)	10 (2.4)	524 (12.0)	11.7 (0.20)
Dubai, UAE	17 (1.9)	542 (8.5)	67 (2.1)	513 (2.7)	16 (2.5)	472 (9.0)	11.2 (0.09)
Florida, US	14 (3.8)	579 (13.2)	44 (4.7)	561 (5.5)	43 (5.3)	522 (7.0)	9.8 (0.30)
Abu Dhabi, UAE	9 (2.5)	470 (16.0)	58 (4.3)	435 (8.1)	33 (3.9)	378 (10.6)	10.2 (0.15)
Ontario, Canada	8 (2.3)	519 (9.1)	55 (3.4)	521 (3.3)	37 (3.8)	503 (3.8)	10.0 (0.20)
Norway (4)	2 (1.0)	~ ~	59 (4.2)	501 (2.6)	39 (4.2)	487 (4.6)	9.5 (0.13)
Buenos Aires, Argentina	x x	x x	x x	x x	x x	x x	x x



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 6.6: Teacher Job Satisfaction**

Reported by Teachers

Students were scored according to how often their teachers responded positively to the seven statements on the *Teacher Job Satisfaction* scale. Students with **Very Satisfied** teachers had a score on the scale of at least 10.1, which corresponds to their teachers responding "very often" to four of the seven statements and responding "often" to the other three, on average. Students with **Less than Satisfied** teachers had a score no higher than 6.6, which corresponds to their teachers responding "sometimes" to four of the seven statements and "often" to the other three, on average. All other students had **Satisfied** teachers.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Country	Very Satisfied		Satisfied		Less than Satisfied		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Iran, Islamic Rep. of	83 (2.3)	430 (3.6)	16 (2.3)	439 (10.4)	1 (0.3)	~ ~	11.3 (0.10)
Qatar	75 (3.2)	438 (4.2)	22 (3.1)	442 (9.1)	3 (1.5)	460 (23.3)	11.0 (0.13)
Oman	74 (3.0)	428 (3.1)	24 (2.9)	422 (5.3)	2 (0.7)	~ ~	10.8 (0.11)
United Arab Emirates	70 (1.8)	461 (3.4)	27 (1.8)	437 (5.7)	3 (0.7)	405 (14.9)	10.7 (0.07)
Georgia	69 (3.5)	464 (4.4)	31 (3.4)	462 (7.9)	1 (0.5)	~ ~	10.7 (0.13)
Serbia	66 (3.7)	520 (4.6)	31 (3.8)	514 (5.3)	3 (1.3)	508 (11.3)	10.6 (0.14)
Chile	65 (4.3)	468 (3.4)	33 (4.2)	447 (5.2)	2 (1.3)	~ ~	10.7 (0.16)
Kazakhstan	64 (3.7)	548 (5.6)	36 (3.7)	540 (8.2)	0 (0.0)	~ ~	10.8 (0.13)
Spain	64 (3.4)	511 (2.7)	31 (3.3)	496 (4.2)	4 (1.9)	493 (10.7)	10.5 (0.15)
Indonesia	64 (3.1)	396 (4.8)	35 (3.0)	402 (6.1)	1 (0.9)	~ ~	10.5 (0.11)
Croatia	64 (3.4)	503 (2.2)	35 (3.3)	501 (3.5)	1 (0.8)	~ ~	10.6 (0.13)
South Africa (5)	62 (3.4)	375 (5.4)	32 (3.3)	382 (10.5)	7 (1.5)	353 (14.9)	10.3 (0.15)
Ireland	62 (4.1)	548 (3.2)	33 (4.0)	547 (4.0)	5 (1.9)	545 (11.0)	10.3 (0.18)
Saudi Arabia	61 (3.6)	391 (4.4)	32 (3.7)	380 (8.5)	7 (1.4)	342 (18.8)	10.3 (0.14)
Kuwait	59 (4.0)	355 (5.6)	33 (3.2)	345 (6.5)	8 (2.0)	361 (17.3)	10.2 (0.18)
Northern Ireland	r 59 (5.0)	574 (4.3)	37 (4.7)	572 (6.4)	4 (2.0)	563 (23.8)	10.3 (0.21)
Cyprus	58 (3.4)	527 (3.1)	37 (3.5)	516 (4.3)	5 (1.4)	534 (7.0)	10.2 (0.13)
Bahrain	58 (2.1)	460 (2.3)	35 (2.0)	444 (3.7)	7 (0.6)	439 (4.8)	10.2 (0.10)
Turkey	56 (3.4)	492 (4.2)	41 (3.6)	472 (6.2)	3 (0.9)	471 (18.6)	10.3 (0.10)
Korea, Rep. of	55 (3.9)	613 (3.4)	38 (3.9)	602 (3.5)	7 (1.9)	602 (4.8)	10.1 (0.17)
Morocco	55 (3.3)	385 (4.4)	38 (3.1)	368 (6.4)	7 (1.2)	353 (11.9)	10.0 (0.13)
Canada	55 (2.5)	509 (3.3)	41 (2.3)	512 (3.5)	5 (1.0)	520 (7.0)	10.2 (0.09)
Netherlands	r 53 (4.6)	529 (2.4)	40 (4.8)	530 (2.8)	7 (2.4)	535 (6.1)	9.9 (0.17)
Slovenia	52 (3.9)	520 (2.4)	47 (3.9)	521 (2.9)	0 (0.2)	~ ~	10.1 (0.13)
Australia	52 (3.9)	522 (4.1)	45 (3.9)	514 (5.8)	3 (1.0)	507 (9.5)	10.2 (0.14)
Portugal	51 (3.0)	548 (3.4)	45 (3.0)	536 (3.6)	4 (1.3)	519 (11.9)	10.1 (0.11)
Lithuania	50 (4.0)	537 (4.4)	46 (3.9)	532 (4.4)	4 (1.8)	558 (17.8)	9.9 (0.16)
New Zealand	50 (2.8)	494 (3.8)	43 (2.8)	487 (3.7)	7 (1.7)	482 (8.5)	9.8 (0.11)
Jordan	49 (4.1)	399 (5.6)	39 (4.1)	379 (6.2)	12 (2.6)	378 (13.5)	9.6 (0.19)
Bulgaria	48 (3.8)	526 (7.8)	44 (4.0)	526 (5.8)	8 (2.4)	506 (15.4)	9.8 (0.15)
Belgium (Flemish)	48 (3.5)	545 (3.6)	47 (3.7)	547 (2.7)	4 (1.5)	537 (12.1)	9.9 (0.14)
Russian Federation	48 (3.6)	560 (4.2)	51 (3.5)	567 (5.8)	1 (0.8)	~ ~	9.9 (0.12)
United States	47 (2.7)	542 (3.5)	45 (2.7)	538 (3.5)	7 (1.3)	521 (8.0)	9.9 (0.12)
Norway (5)	47 (3.7)	553 (2.6)	49 (4.0)	548 (4.4)	4 (1.9)	534 (6.1)	9.8 (0.15)
Chinese Taipei	46 (3.8)	597 (2.7)	48 (4.0)	596 (3.1)	6 (2.0)	600 (6.3)	9.7 (0.16)
Finland	45 (3.4)	535 (2.7)	50 (3.4)	535 (2.6)	6 (1.6)	530 (8.1)	9.8 (0.14)
Slovak Republic	44 (3.1)	502 (4.1)	46 (3.4)	497 (3.7)	10 (2.1)	485 (10.3)	9.7 (0.14)
Hungary	42 (3.6)	531 (5.7)	54 (3.5)	531 (4.1)	4 (1.2)	464 (27.6)	9.6 (0.14)
England	42 (4.2)	550 (6.2)	46 (4.0)	547 (5.7)	12 (2.8)	532 (9.2)	9.5 (0.20)
Italy	41 (3.5)	502 (4.3)	48 (3.4)	512 (3.8)	10 (2.1)	503 (6.3)	9.5 (0.14)
Germany	41 (3.6)	522 (3.1)	55 (3.8)	522 (3.1)	4 (1.4)	498 (17.3)	9.8 (0.14)
Singapore	37 (2.7)	625 (6.3)	53 (2.8)	612 (5.3)	11 (1.7)	620 (8.9)	9.3 (0.13)
Czech Republic	36 (3.5)	530 (3.5)	51 (3.4)	528 (3.0)	13 (2.2)	523 (7.6)	9.2 (0.15)
Sweden	36 (4.5)	524 (4.0)	61 (4.5)	517 (4.1)	4 (1.4)	499 (14.2)	9.5 (0.17)
Poland	35 (3.5)	538 (3.7)	55 (3.9)	532 (3.3)	11 (2.5)	538 (6.6)	9.1 (0.15)
Denmark	34 (3.8)	537 (4.6)	54 (4.1)	535 (4.1)	12 (3.0)	553 (10.0)	9.1 (0.17)
Hong Kong SAR	33 (4.3)	620 (5.9)	59 (4.8)	613 (3.7)	9 (2.5)	605 (16.0)	9.0 (0.19)
France	30 (3.5)	492 (5.3)	58 (3.7)	491 (3.5)	12 (2.5)	470 (7.1)	8.9 (0.14)
Japan	23 (3.0)	593 (3.8)	59 (3.2)	594 (2.4)	18 (2.8)	588 (3.2)	8.6 (0.15)
International Avg.	52 (0.5)	508 (0.6)	42 (0.5)	503 (0.8)	6 (0.2)	501 (2.0)	

This TIMSS 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.

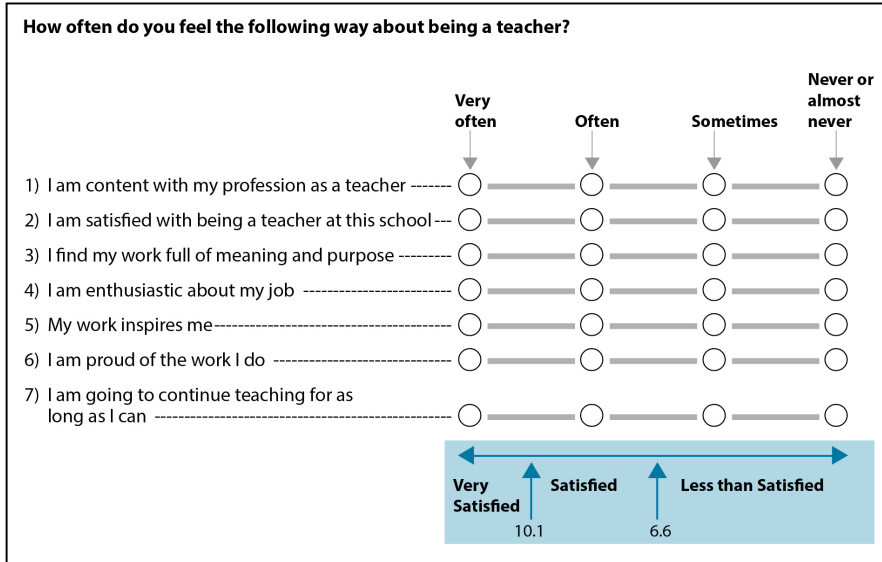
A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students. An "x" indicates that data are available for less than 50% of students.

**Exhibit 6.6: Teacher Job Satisfaction (Continued)**

Country	Very Satisfied		Satisfied		Less than Satisfied		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
<b>Benchmarking Participants</b>							
Abu Dhabi, UAE	67 (3.7)	432 (7.0)	29 (3.7)	396 (10.3)	4 (1.4)	352 (14.9)	10.5 (0.14)
Dubai, UAE	67 (2.1)	518 (2.7)	29 (2.2)	500 (5.9)	4 (1.0)	467 (25.7)	10.6 (0.07)
Ontario, Canada	55 (3.3)	512 (3.0)	39 (3.0)	514 (3.9)	7 (1.7)	523 (8.2)	10.1 (0.13)
Florida, US	52 (6.1)	558 (6.1)	37 (5.1)	541 (8.8)	11 (3.4)	515 (15.8)	9.8 (0.27)
Quebec, Canada	49 (4.9)	538 (5.5)	47 (4.8)	533 (5.6)	3 (1.8)	539 (13.1)	10.1 (0.20)
Norway (4)	46 (3.8)	498 (3.1)	47 (3.7)	493 (3.9)	6 (2.0)	489 (7.8)	9.7 (0.16)
Buenos Aires, Argentina	x x	x x	x x	x x	x x	x x	x x

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**Exhibit 6.8: Challenges Facing Teachers**

*Reported by Teachers*

Students were scored according to their teachers' responses concerning eight challenging conditions on the *Challenges Facing Teachers* scale. Students whose teachers faced **Few Challenges** had a score on the scale of at least 10.4, which corresponds to their teachers "disagreeing a little" with four of eight statements and "agreeing a little" with the other four, on average. Students whose teachers faced **Many Challenges** had a score no higher than 7.1, which corresponds to their teachers reporting "agreeing a lot" with four of eight statements and "agreeing a little" with the other four, on average. All other students had teachers that reported facing **Some Challenges**.

Country	Few Challenges		Some Challenges		Many Challenges		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Georgia	85 (3.3)	467 (3.9)	15 (3.3)	446 (11.1)	0 (0.0)	~ ~	11.9 (0.11)
Poland	78 (3.1)	535 (2.5)	21 (2.9)	535 (4.3)	1 (1.0)	~ ~	11.4 (0.13)
Russian Federation	77 (2.6)	567 (4.2)	23 (2.6)	553 (5.9)	0 (0.0)	~ ~	11.2 (0.10)
Finland	71 (3.0)	534 (2.4)	29 (3.0)	538 (3.3)	0 (0.0)	~ ~	11.0 (0.09)
Turkey	68 (3.2)	483 (4.2)	29 (2.9)	485 (7.4)	2 (1.3)	~ ~	11.4 (0.14)
Kazakhstan	65 (3.9)	547 (6.0)	34 (3.9)	542 (7.6)	1 (0.4)	~ ~	10.8 (0.09)
Lithuania	65 (4.0)	532 (3.7)	34 (3.9)	544 (4.7)	1 (0.9)	~ ~	10.9 (0.12)
Qatar	63 (3.2)	448 (4.6)	36 (3.3)	423 (6.1)	1 (0.7)	~ ~	11.0 (0.13)
Bulgaria	60 (4.4)	524 (5.8)	37 (4.4)	523 (8.1)	3 (1.6)	539 (13.8)	10.6 (0.14)
Italy	53 (3.5)	506 (3.9)	44 (3.7)	508 (4.0)	3 (1.0)	510 (13.2)	10.6 (0.13)
Slovak Republic	51 (3.2)	499 (3.1)	44 (2.9)	497 (4.4)	5 (1.2)	494 (10.3)	10.4 (0.13)
Czech Republic	50 (3.5)	527 (3.2)	48 (3.5)	529 (3.0)	2 (0.8)	~ ~	10.5 (0.12)
United Arab Emirates	50 (2.4)	464 (3.9)	44 (2.6)	442 (4.5)	6 (0.8)	433 (13.9)	10.7 (0.11)
Indonesia	47 (3.0)	401 (5.6)	48 (3.2)	397 (5.5)	5 (1.3)	365 (20.2)	10.2 (0.10)
Bahrain	46 (2.5)	453 (3.1)	49 (2.5)	454 (2.8)	5 (0.6)	448 (5.8)	10.3 (0.08)
Kuwait	46 (3.3)	363 (6.2)	46 (3.1)	344 (6.8)	8 (1.8)	329 (12.3)	10.1 (0.13)
Croatia	46 (3.4)	500 (2.9)	48 (3.5)	504 (2.8)	6 (1.8)	504 (10.1)	10.0 (0.11)
Morocco	45 (3.2)	385 (5.6)	45 (3.3)	372 (5.8)	10 (1.7)	361 (10.4)	10.0 (0.15)
Chinese Taipei	45 (3.9)	597 (2.6)	53 (4.0)	597 (2.5)	2 (1.1)	~ ~	10.2 (0.13)
Saudi Arabia	41 (3.6)	392 (7.1)	48 (3.8)	380 (6.0)	11 (2.4)	368 (12.2)	9.8 (0.13)
Belgium (Flemish)	40 (3.4)	539 (3.7)	56 (3.5)	550 (2.7)	4 (1.6)	565 (11.8)	10.0 (0.10)
Jordan	39 (3.3)	395 (6.6)	56 (3.5)	383 (4.6)	5 (1.6)	401 (10.2)	10.0 (0.14)
Japan	38 (3.0)	590 (2.7)	55 (3.2)	595 (2.9)	7 (1.7)	593 (5.9)	9.8 (0.10)
Iran, Islamic Rep. of	37 (3.4)	434 (6.6)	52 (3.9)	429 (5.2)	11 (2.2)	433 (10.4)	9.6 (0.14)
Germany	37 (2.9)	522 (3.5)	58 (3.1)	522 (3.0)	5 (1.7)	507 (13.2)	9.7 (0.11)
United States	36 (2.8)	535 (4.0)	54 (2.7)	539 (3.4)	10 (1.4)	549 (6.1)	9.7 (0.10)
Sweden	33 (4.3)	515 (4.9)	61 (4.6)	522 (3.5)	5 (1.9)	508 (14.6)	9.9 (0.14)
Serbia	33 (3.5)	511 (7.4)	59 (3.6)	523 (3.9)	8 (2.1)	511 (10.5)	9.7 (0.14)
Ireland	33 (3.7)	545 (4.0)	53 (4.3)	547 (3.3)	14 (3.1)	551 (4.9)	9.4 (0.15)
Oman	32 (2.9)	427 (4.7)	60 (2.6)	423 (3.5)	8 (1.8)	448 (10.6)	9.7 (0.11)
South Africa (5)	32 (3.1)	395 (9.0)	57 (2.9)	362 (5.7)	11 (2.1)	396 (14.3)	9.4 (0.14)
New Zealand	31 (2.3)	486 (6.2)	55 (2.7)	492 (2.6)	14 (1.9)	498 (5.9)	9.5 (0.11)
Canada	30 (2.6)	505 (4.3)	58 (2.7)	512 (3.3)	12 (1.4)	520 (4.6)	9.4 (0.09)
Cyprus	30 (3.1)	523 (4.1)	65 (3.1)	523 (3.0)	5 (1.5)	527 (11.0)	9.6 (0.11)
Hong Kong SAR	29 (4.0)	610 (6.1)	64 (4.4)	614 (4.2)	7 (2.5)	632 (13.4)	9.6 (0.17)
Hungary	29 (3.2)	523 (5.6)	56 (3.7)	529 (4.7)	15 (2.5)	539 (8.2)	9.3 (0.12)
Spain	28 (2.9)	506 (5.2)	61 (3.1)	505 (3.2)	11 (2.1)	504 (5.8)	9.3 (0.10)
Korea, Rep. of	27 (3.0)	612 (4.3)	58 (3.6)	604 (2.9)	15 (2.7)	615 (3.8)	9.3 (0.15)
Netherlands	27 (3.6)	524 (3.6)	69 (3.7)	532 (2.0)	4 (1.7)	541 (7.2)	9.5 (0.13)
Northern Ireland	25 (3.7)	581 (6.2)	57 (4.1)	568 (4.9)	18 (3.8)	576 (7.1)	9.1 (0.20)
England	25 (3.4)	555 (9.9)	57 (4.0)	543 (4.5)	19 (3.1)	544 (7.4)	9.2 (0.18)
Australia	24 (2.6)	522 (7.6)	67 (2.5)	515 (4.0)	8 (1.9)	529 (7.8)	9.4 (0.11)
Denmark	22 (3.0)	536 (6.6)	64 (3.7)	538 (4.0)	14 (2.7)	540 (6.4)	9.2 (0.14)
Norway (5)	22 (3.6)	550 (5.0)	69 (3.6)	551 (3.3)	9 (2.5)	541 (6.7)	9.4 (0.16)
Chile	19 (3.3)	467 (8.4)	62 (4.1)	460 (3.4)	18 (3.3)	454 (5.8)	8.9 (0.15)
Slovenia	17 (2.5)	518 (3.5)	74 (2.9)	522 (2.2)	9 (2.2)	517 (7.6)	9.1 (0.11)
Portugal	14 (2.8)	564 (9.6)	56 (4.0)	537 (3.7)	30 (3.3)	539 (3.8)	8.5 (0.16)
France	9 (2.1)	488 (8.2)	76 (2.9)	491 (2.9)	15 (3.0)	476 (6.1)	8.7 (0.12)
Singapore	--	--	--	--	--	--	--
International Avg.	41 (0.5)	504 (0.8)	51 (0.5)	501 (0.7)	8 (0.3)	497 (1.6)	

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

This TIMSS 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.

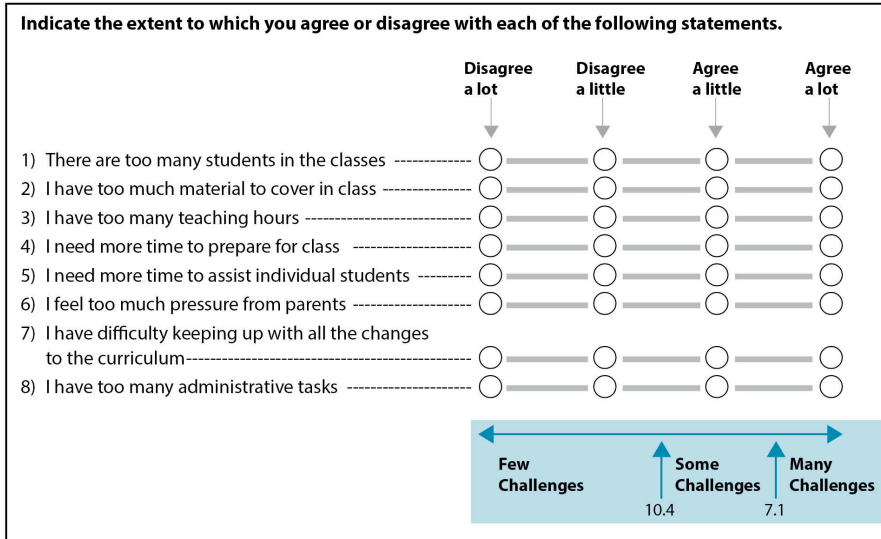
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

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 "x" indicates data are available for less than 50% of students.

**Exhibit 6.8: Challenges Facing Teachers (Continued)**

Country	Few Challenges		Some Challenges		Many Challenges		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
<b>Benchmarking Participants</b>							
Dubai, UAE	52 (3.8)	521 (3.3)	41 (3.8)	499 (5.4)	7 (0.4)	498 (6.3)	10.7 (0.19)
Abu Dhabi, UAE	49 (3.9)	437 (8.9)	45 (4.3)	406 (8.1)	6 (2.1)	371 (30.3)	10.4 (0.18)
Norway (4)	33 (3.6)	494 (4.1)	53 (4.0)	492 (3.9)	14 (3.2)	507 (4.9)	9.4 (0.16)
Ontario, Canada	32 (3.2)	508 (4.8)	58 (3.2)	515 (3.1)	10 (1.9)	524 (7.1)	9.6 (0.12)
Florida, US	29 (5.2)	547 (9.6)	66 (5.6)	548 (5.4)	5 (2.3)	542 (31.4)	9.6 (0.24)
Quebec, Canada	26 (5.0)	529 (6.7)	58 (5.5)	539 (5.3)	16 (3.6)	533 (6.3)	9.1 (0.18)
Buenos Aires, Argentina	x x	x x	x x	x x	x x	x x	x x



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 6.10: Students' Sense of School Belonging**

Reported by Students

Students were scored according to their agreement to seven statements about their *Sense of School Belonging*. Students with a **High Sense of School Belonging** had a score on the scale of at least 9.1, which corresponds to their "agreeing a lot" to four of the seven statements and "agreeing a little" to each of the other three statements, on average. Students with **Little Sense of School Belonging** had a score no higher than 6.8, which corresponds to their "disagreeing a little" to four of the seven statements and "agreeing a little" to each of the other three statements, on average. All other students had a **Sense of School Belonging**.

Country	High Sense of School Belonging		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	
Indonesia	92 (0.5)	403 (3.6)	7 (0.5)	369 (7.9)	1 (0.2)	~ ~	11.5 (0.04)
Portugal	88 (0.9)	543 (2.1)	11 (0.8)	529 (5.4)	1 (0.2)	~ ~	11.3 (0.05)
Morocco	86 (0.8)	386 (3.6)	12 (0.7)	352 (6.5)	2 (0.3)	~ ~	11.3 (0.05)
Bulgaria	82 (1.2)	528 (5.3)	16 (1.1)	519 (5.7)	2 (0.3)	~ ~	10.9 (0.06)
Turkey	81 (1.0)	493 (3.0)	18 (0.9)	446 (5.7)	1 (0.2)	~ ~	10.8 (0.05)
Kazakhstan	80 (1.3)	548 (4.6)	19 (1.3)	530 (5.5)	1 (0.1)	~ ~	10.9 (0.07)
Jordan	79 (1.3)	397 (3.3)	17 (1.2)	376 (5.3)	3 (0.3)	347 (10.4)	10.9 (0.08)
Oman	79 (0.9)	432 (2.8)	18 (0.7)	413 (3.7)	4 (0.3)	373 (7.8)	10.7 (0.05)
Spain	78 (1.1)	507 (2.4)	19 (0.9)	502 (3.4)	3 (0.3)	484 (7.9)	10.5 (0.06)
Norway (5)	75 (1.1)	553 (2.6)	22 (1.0)	538 (3.6)	2 (0.3)	~ ~	10.5 (0.05)
Ireland	73 (1.2)	553 (2.3)	23 (1.1)	537 (3.5)	4 (0.4)	519 (7.8)	10.2 (0.05)
Serbia	73 (1.2)	520 (4.0)	24 (1.1)	520 (4.2)	3 (0.3)	501 (8.8)	10.3 (0.06)
Iran, Islamic Rep. of	71 (1.2)	427 (3.7)	26 (1.1)	451 (4.4)	3 (0.3)	399 (15.2)	10.2 (0.07)
Northern Ireland	71 (1.3)	576 (3.3)	25 (1.1)	561 (5.0)	3 (0.5)	523 (10.4)	10.2 (0.06)
Lithuania	71 (1.1)	540 (2.7)	26 (1.0)	528 (3.3)	3 (0.3)	500 (10.6)	10.1 (0.05)
Kuwait	71 (1.1)	355 (4.6)	25 (1.0)	355 (6.9)	4 (0.4)	329 (10.7)	10.3 (0.06)
Saudi Arabia	71 (1.3)	396 (4.3)	23 (1.0)	369 (4.9)	6 (0.7)	349 (11.0)	10.4 (0.07)
England	71 (1.4)	551 (3.3)	25 (1.2)	538 (3.9)	4 (0.4)	505 (7.5)	10.2 (0.06)
Chile	70 (1.2)	466 (2.5)	24 (0.9)	447 (3.3)	6 (0.5)	430 (6.8)	10.2 (0.06)
Finland	68 (1.3)	539 (2.2)	28 (1.1)	531 (3.1)	3 (0.4)	509 (6.0)	10.0 (0.05)
Russian Federation	68 (1.3)	568 (3.6)	29 (1.2)	558 (4.4)	3 (0.3)	548 (9.3)	10.0 (0.06)
South Africa (5)	68 (1.2)	391 (3.4)	27 (0.9)	356 (5.0)	5 (0.4)	330 (8.0)	10.1 (0.07)
Netherlands	68 (1.4)	534 (1.8)	28 (1.2)	523 (2.5)	4 (0.4)	518 (6.9)	10.0 (0.06)
New Zealand	67 (1.0)	493 (2.6)	29 (0.9)	492 (3.4)	4 (0.3)	459 (8.3)	10.0 (0.05)
Bahrain	67 (0.8)	457 (1.8)	27 (0.8)	447 (2.7)	6 (0.4)	420 (4.8)	10.0 (0.04)
Hungary	66 (1.0)	535 (3.3)	31 (0.9)	523 (3.9)	4 (0.3)	492 (8.9)	9.9 (0.05)
Canada	66 (0.9)	516 (2.1)	30 (0.8)	507 (3.0)	5 (0.3)	488 (5.9)	10.0 (0.04)
Sweden	65 (1.2)	522 (2.8)	32 (1.1)	515 (3.8)	3 (0.3)	495 (8.3)	9.9 (0.06)
United States	64 (0.8)	548 (2.3)	29 (0.6)	532 (2.6)	7 (0.4)	506 (4.5)	9.9 (0.04)
Belgium (Flemish)	64 (1.2)	550 (2.2)	33 (1.1)	541 (2.8)	4 (0.3)	519 (4.4)	9.8 (0.06)
United Arab Emirates	64 (0.8)	464 (2.5)	31 (0.7)	436 (3.3)	6 (0.3)	415 (5.7)	9.9 (0.04)
Italy	63 (1.3)	510 (2.8)	33 (1.0)	507 (3.2)	5 (0.5)	477 (10.0)	9.7 (0.05)
Cyprus	62 (1.3)	527 (2.7)	30 (0.9)	525 (3.4)	8 (0.7)	511 (6.9)	9.8 (0.06)
Denmark	62 (1.3)	547 (3.0)	33 (1.1)	530 (3.0)	4 (0.4)	512 (8.6)	9.8 (0.06)
Australia	62 (1.2)	524 (3.7)	33 (1.0)	511 (3.2)	5 (0.4)	483 (7.3)	9.8 (0.05)
Slovak Republic	61 (1.3)	495 (3.0)	35 (1.1)	507 (2.7)	4 (0.4)	488 (7.0)	9.7 (0.05)
Qatar	60 (1.1)	451 (3.5)	30 (0.9)	431 (4.4)	9 (0.8)	409 (6.4)	9.7 (0.06)
Germany	57 (1.3)	528 (2.4)	36 (1.1)	527 (2.7)	7 (0.6)	506 (4.9)	9.5 (0.06)
Croatia	57 (1.5)	505 (2.0)	40 (1.3)	498 (2.9)	3 (0.4)	502 (7.9)	9.5 (0.06)
Singapore	56 (0.8)	622 (3.9)	39 (0.7)	615 (4.2)	6 (0.4)	596 (6.7)	9.5 (0.03)
Slovenia	55 (1.5)	519 (2.2)	39 (1.1)	523 (2.7)	6 (0.6)	518 (5.3)	9.5 (0.06)
Georgia	55 (1.3)	473 (4.2)	43 (1.3)	462 (4.0)	1 (0.3)	~ ~	9.7 (0.06)
Korea, Rep. of	52 (1.3)	614 (2.5)	45 (1.2)	603 (2.4)	3 (0.4)	587 (9.1)	9.5 (0.06)
France	51 (1.3)	490 (3.0)	45 (1.2)	489 (3.8)	3 (0.3)	453 (7.2)	9.3 (0.05)
Czech Republic	50 (1.4)	526 (2.7)	45 (1.3)	533 (2.8)	5 (0.7)	509 (6.7)	9.2 (0.05)
Poland	47 (1.4)	533 (2.4)	46 (1.2)	539 (2.6)	7 (0.6)	523 (5.7)	9.1 (0.05)
Chinese Taipei	46 (1.1)	603 (2.2)	46 (0.9)	595 (2.2)	8 (0.5)	572 (5.2)	9.1 (0.04)
Hong Kong SAR	46 (1.6)	624 (3.6)	43 (1.2)	611 (3.0)	11 (0.9)	593 (3.8)	9.0 (0.07)
Japan	41 (1.2)	604 (2.4)	52 (1.0)	589 (2.1)	8 (0.6)	565 (4.8)	8.9 (0.05)
International Avg.	66 (0.2)	510 (0.4)	30 (0.1)	499 (0.6)	4 (0.1)	482 (1.2)	

This TIMSS 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.

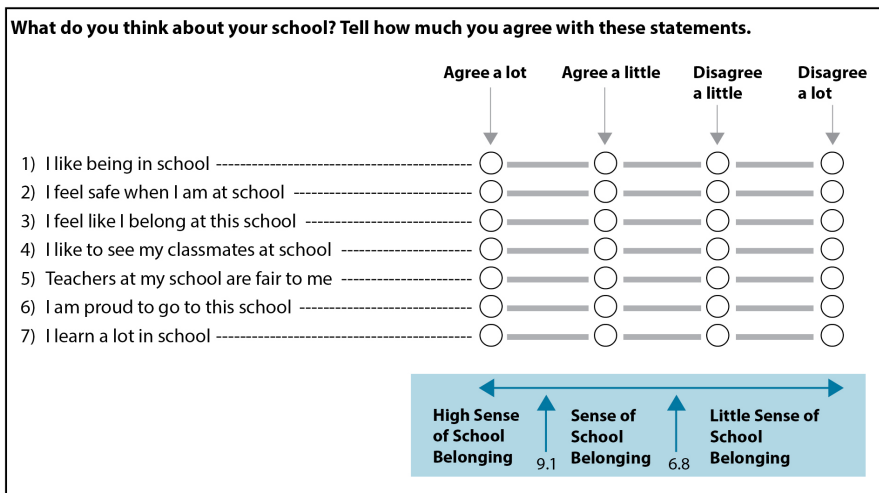
A tilde (~) indicates insufficient data to report achievement.

An "r" indicates data are available for at least 70% but less than 85% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 6.10: Students' Sense of School Belonging (Continued)**

Country	High Sense of School Belonging		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	
<b>Benchmarking Participants</b>							
Norway (4)	80 (1.4)	497 (2.1)	18 (1.3)	484 (5.0)	2 (0.4)	~ ~	10.7 (0.07)
Dubai, UAE	69 (0.8)	521 (1.9)	26 (0.8)	496 (2.7)	4 (0.3)	452 (5.5)	10.2 (0.03)
Florida, US	65 (1.5)	556 (5.4)	29 (1.2)	534 (5.3)	6 (0.7)	510 (8.1)	10.0 (0.08)
Ontario, Canada	64 (1.4)	518 (2.4)	30 (1.3)	505 (3.2)	6 (0.5)	492 (5.5)	9.9 (0.06)
Buenos Aires, Argentina	64 (1.1)	437 (3.1)	30 (0.8)	438 (3.7)	6 (0.5)	433 (5.5)	9.9 (0.05)
Quebec, Canada	63 (1.4)	539 (4.4)	33 (1.2)	533 (5.2)	4 (0.6)	518 (10.9)	9.8 (0.06)
Abu Dhabi, UAE	58 (1.8)	432 (5.5)	35 (1.4)	408 (6.4)	7 (0.6)	391 (8.1)	9.7 (0.08)



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**TIMSS**  
**2015**

# CHAPTER 7: SCHOOL SAFETY

TIMSS 2015 INTERNATIONAL RESULTS IN MATHEMATICS



**IEA**

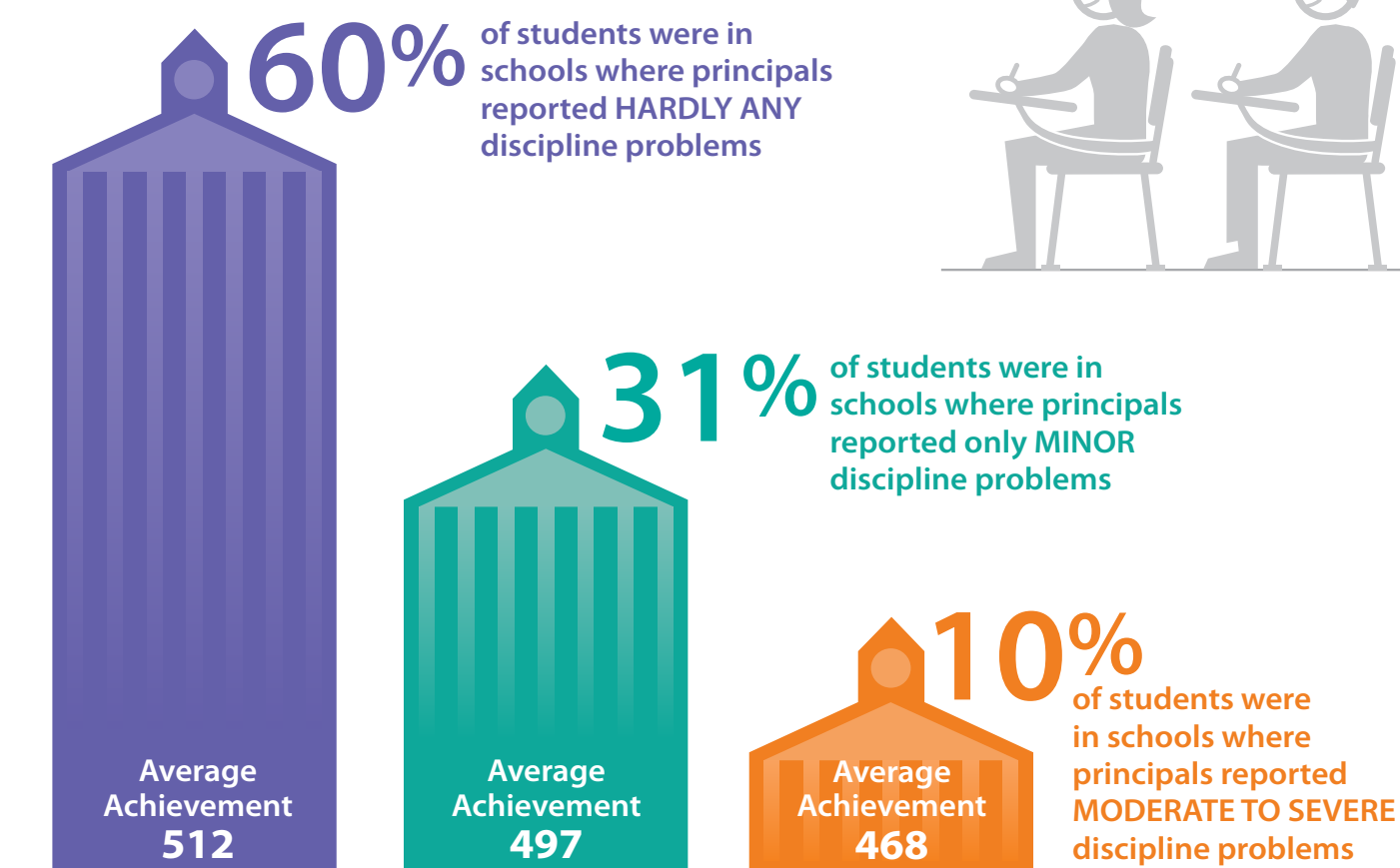
**TIMSS & PIRLS**  
International Study Center  
Lynch School of Education, Boston College



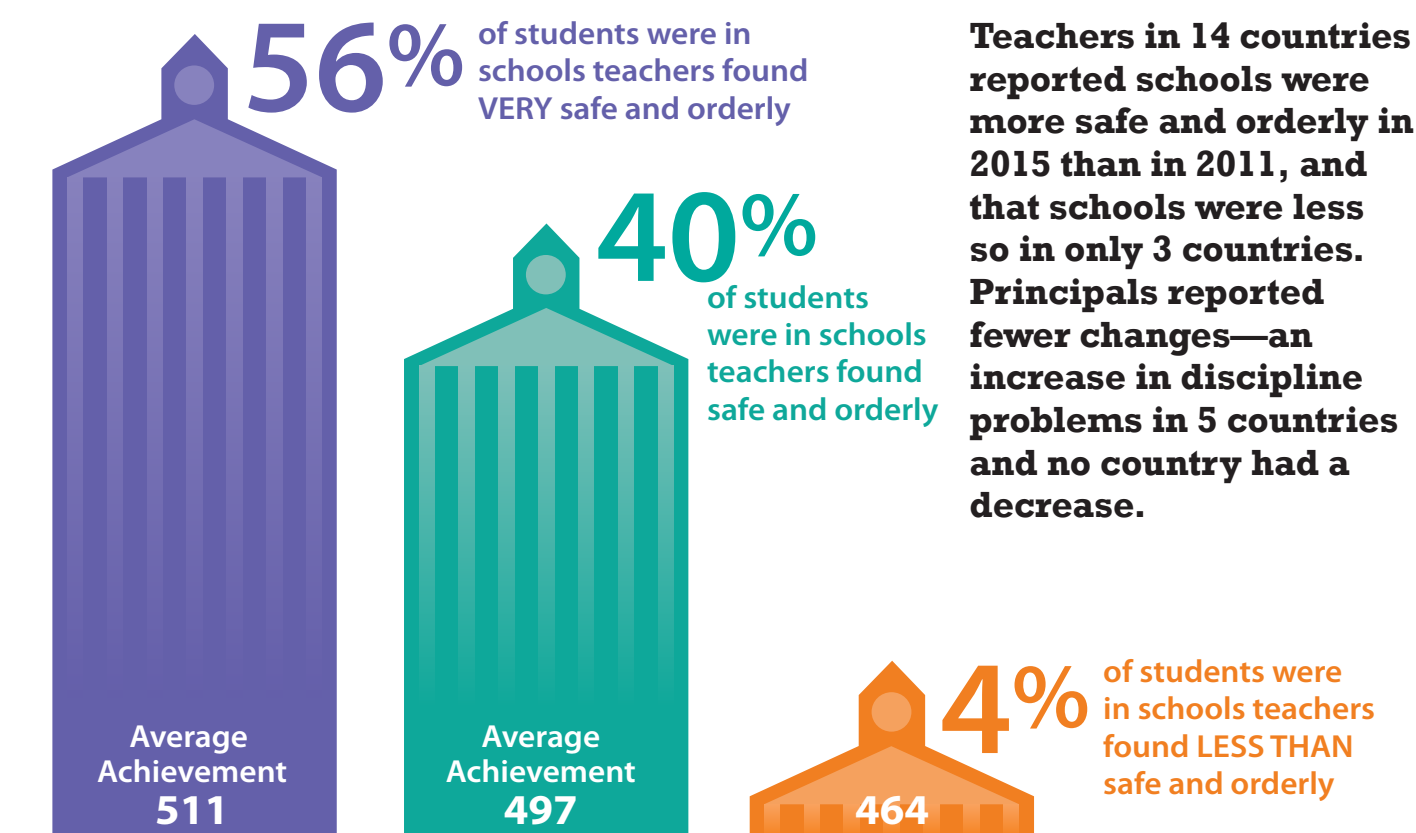
### Students Are in Safe Schools

Internationally, the majority of fourth grade students were in safe school environments according to their principals and teachers. However, students that attended schools with disorderly environments had much lower achievement than their counterparts in safe and orderly schools.

#### Principals' Reports



#### Teachers' Reports



### Student Bullying

With the emergence of cyber-bullying, there is growing evidence that school-related bullying is on the rise and does have a negative impact on student achievement.

#### Students' Reports

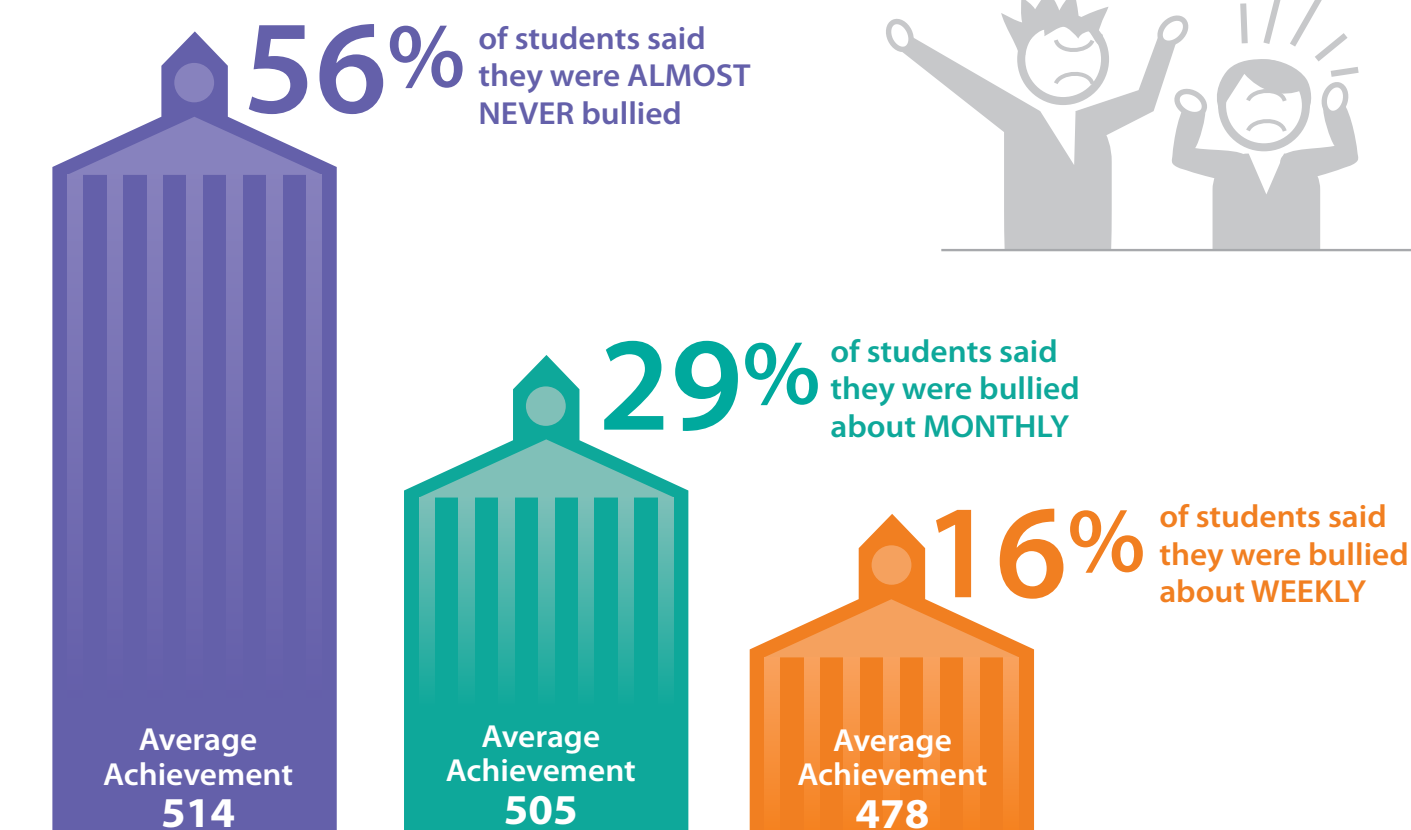




Exhibit 7.1: School Discipline Problems – Principals' Reports

Reported by Principals

Students were scored according to their principals' responses concerning ten potential school problems on the *School Discipline Problems* scale. Students in schools with **Hardly Any Problems** had a score on the scale of at least 9.7, which corresponds to their principals reporting "not a problem" for five of the ten issues and "minor problem" for the other five, on average. Students in schools with **Moderate to Severe Problems** had a score no higher than 7.6, which corresponds to their principals reporting "moderate problem" for five of the ten issues and "minor problem" for the other five, on average. All other students attended schools with **Minor Problems**.

Country	Hardly Any Problems		Minor Problems		Moderate to Severe Problems		Average Scale Score	Difference in Average Scale Score from 2011
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement		
Ireland	84 (3.3)	552 (2.6)	14 (3.1)	531 (7.3)	2 (1.2)	~ ~	10.9 (0.11)	-0.2 (0.17)
Netherlands	83 (4.1)	536 (2.2)	17 (4.1)	529 (3.8)	0 (0.0)	~ ~	11.1 (0.13)	-0.2 (0.20)
Korea, Rep. of	81 (3.4)	608 (2.5)	14 (3.0)	613 (5.1)	5 (1.8)	591 (9.4)	11.3 (0.16)	0.4 (0.22)
Lithuania	79 (3.4)	536 (2.7)	20 (3.4)	532 (9.4)	1 (1.0)	~ ~	10.6 (0.10)	0.1 (0.16)
England	78 (3.7)	553 (3.6)	21 (3.6)	524 (6.7)	1 (0.8)	~ ~	10.9 (0.11)	0.3 (0.16)
Northern Ireland	78 (4.0)	575 (3.6)	22 (4.0)	552 (8.8)	0 (0.0)	~ ~	10.8 (0.13)	-0.2 (0.19)
Croatia	76 (4.1)	503 (2.1)	24 (4.1)	501 (4.5)	0 (0.0)	~ ~	10.7 (0.14)	0.3 (0.18)
Japan	74 (3.2)	595 (2.1)	20 (3.0)	589 (4.2)	6 (2.0)	589 (7.8)	10.4 (0.14)	-0.1 (0.18)
Norway (5)	74 (4.3)	553 (3.0)	25 (4.2)	537 (4.9)	1 (0.8)	~ ~	10.7 (0.13)	0 0
Bulgaria	72 (4.2)	535 (4.6)	20 (3.8)	491 (10.0)	8 (2.9)	514 (33.2)	10.4 (0.18)	0 0
Singapore	72 (0.0)	620 (4.9)	28 (0.0)	615 (8.0)	0 (0.0)	~ ~	10.7 (0.00)	0.0 (0.00)
Kazakhstan	71 (3.9)	544 (5.5)	13 (2.7)	559 (14.8)	15 (2.8)	536 (9.7)	10.3 (0.21)	-0.9 (0.24)
New Zealand	71 (2.8)	506 (3.2)	28 (2.9)	462 (6.4)	1 (0.8)	~ ~	10.5 (0.08)	-0.1 (0.15)
Hong Kong SAR	71 (4.6)	617 (4.0)	29 (4.6)	610 (7.7)	0 (0.0)	~ ~	10.5 (0.13)	-0.8 (0.17)
Georgia	70 (3.9)	468 (4.3)	22 (3.5)	441 (7.7)	8 (2.6)	491 (24.2)	10.4 (0.19)	-0.3 (0.24)
Spain	70 (3.4)	512 (2.9)	22 (3.0)	489 (5.8)	8 (1.5)	489 (9.3)	10.3 (0.13)	-0.5 (0.21)
Chinese Taipei	70 (4.1)	600 (2.2)	28 (3.8)	591 (4.2)	3 (1.6)	573 (16.4)	10.6 (0.14)	-0.7 (0.20)
United States	69 (3.3)	549 (3.3)	29 (3.3)	521 (5.0)	3 (0.9)	475 (10.2)	10.3 (0.10)	0.0 (0.14)
Finland	68 (3.8)	538 (2.5)	31 (3.7)	529 (3.0)	1 (1.0)	~ ~	10.3 (0.11)	0.1 (0.16)
Belgium (Flemish)	68 (3.6)	553 (2.3)	31 (3.8)	535 (5.7)	1 (1.1)	~ ~	10.5 (0.12)	0.1 (0.18)
Russian Federation	67 (3.9)	566 (4.6)	32 (3.9)	560 (6.4)	0 (0.4)	~ ~	10.2 (0.09)	0.0 (0.13)
Canada	66 (3.1)	518 (2.6)	31 (2.9)	497 (4.6)	2 (1.0)	~ ~	10.2 (0.10)	0 0
Czech Republic	65 (3.6)	529 (2.9)	31 (3.5)	528 (4.3)	4 (1.8)	506 (18.7)	10.1 (0.10)	0.0 (0.15)
Iran, Islamic Rep. of	65 (3.5)	436 (5.0)	26 (3.3)	438 (6.3)	9 (2.4)	383 (17.6)	10.0 (0.13)	-0.7 (0.17)
Australia	64 (3.4)	530 (3.5)	30 (3.4)	506 (5.4)	6 (3.1)	446 (5.9)	10.2 (0.12)	-0.2 (0.17)
Qatar	63 (3.0)	444 (5.0)	26 (2.8)	428 (8.1)	11 (1.8)	434 (9.7)	10.0 (0.12)	0.0 (0.19)
Slovak Republic	63 (3.6)	510 (3.2)	32 (3.4)	484 (5.1)	5 (1.7)	444 (18.9)	10.0 (0.10)	0.1 (0.16)
United Arab Emirates	61 (2.4)	467 (3.5)	31 (2.5)	426 (4.9)	8 (1.2)	396 (9.6)	10.1 (0.07)	0.2 (0.13)
Italy	60 (4.5)	508 (3.7)	25 (3.7)	504 (5.4)	15 (3.0)	509 (7.9)	9.6 (0.16)	0.1 (0.22)
Bahrain	59 (0.2)	456 (1.8)	26 (0.2)	446 (2.6)	14 (0.1)	427 (7.3)	9.7 (0.01)	-0.4 (0.31)
France	58 (4.6)	497 (4.1)	33 (4.3)	480 (4.5)	9 (2.7)	454 (12.1)	9.9 (0.15)	0 0
Serbia	56 (4.3)	519 (5.0)	35 (3.8)	521 (4.8)	9 (2.0)	499 (13.2)	9.8 (0.15)	0.1 (0.23)
Hungary	55 (3.7)	541 (4.5)	37 (3.6)	524 (5.3)	8 (1.7)	471 (20.7)	9.8 (0.11)	0.1 (0.17)
Denmark	53 (4.3)	548 (3.8)	45 (4.4)	533 (4.5)	1 (1.0)	~ ~	9.9 (0.11)	-0.2 (0.14)
Slovenia	52 (4.3)	521 (2.5)	45 (4.5)	520 (3.2)	3 (1.3)	540 (5.2)	9.8 (0.13)	-0.2 (0.18)
Poland	52 (3.6)	534 (2.7)	45 (3.8)	537 (3.6)	3 (1.4)	528 (16.0)	9.8 (0.09)	0 0
Cyprus	50 (4.8)	530 (3.6)	42 (4.5)	517 (4.6)	8 (2.6)	514 (6.7)	9.7 (0.17)	0 0
Sweden	49 (4.1)	531 (3.5)	40 (4.0)	514 (3.6)	10 (2.6)	481 (13.8)	9.4 (0.11)	-0.3 (0.17)
Saudi Arabia	49 (3.9)	388 (5.2)	26 (3.1)	377 (9.1)	25 (3.4)	382 (10.4)	9.2 (0.19)	0.1 (0.26)
Chile	46 (4.0)	470 (4.1)	47 (4.3)	452 (5.5)	6 (2.2)	437 (15.5)	9.6 (0.11)	0.4 (0.18)
Turkey	44 (3.5)	506 (4.8)	29 (3.2)	464 (7.9)	26 (2.9)	465 (7.5)	8.8 (0.15)	-0.2 (0.21)
Portugal	43 (4.5)	546 (3.6)	46 (4.7)	538 (4.2)	11 (2.6)	541 (7.1)	9.4 (0.15)	-0.9 (0.23)
Germany	39 (3.8)	531 (3.3)	50 (3.7)	517 (2.7)	10 (2.4)	501 (10.6)	9.2 (0.10)	-0.3 (0.13)
Jordan	36 (4.0)	411 (6.0)	40 (3.9)	375 (6.7)	24 (3.2)	376 (9.0)	9.0 (0.17)	0 0
Oman	34 (3.4)	426 (6.0)	36 (3.0)	419 (4.8)	29 (2.8)	434 (4.8)	8.6 (0.15)	0.2 (0.21)
Kuwait	25 (3.9)	373 (8.3)	40 (4.4)	344 (7.0)	35 (3.5)	342 (10.3)	8.3 (0.19)	0 0
South Africa (5)	23 (3.1)	406 (13.6)	56 (3.5)	369 (5.4)	22 (3.1)	365 (8.3)	8.7 (0.11)	0 0
Morocco	21 (3.0)	394 (8.7)	30 (3.0)	367 (6.8)	49 (3.2)	377 (4.4)	7.7 (0.16)	0.5 (0.21)
Indonesia	18 (2.9)	407 (9.9)	28 (3.3)	408 (6.6)	54 (3.6)	389 (5.9)	7.4 (0.16)	0 0
International Avg.	60 (0.5)	512 (0.7)	31 (0.5)	497 (0.9)	10 (0.3)	468 (2.3)		

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Significantly higher than 2011 ●  
Significantly lower than 2011 ▼

This TIMSS 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 diamond (0) indicates the country did not participate in the 2011 assessment.

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.

**Exhibit 7.1: School Discipline Problems – Principals' Reports (Continued)**

Country	Hardly Any Problems		Minor Problems		Moderate to Severe Problems		Average Scale Score	Difference in Average Scale Score from 2011
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement		
<b>Benchmarking Participants</b>								
Dubai, UAE	83 (0.2)	520 (1.6)	14 (0.2)	466 (2.6)	3 (0.1)	401 (5.8)	11.0 (0.01)	0.4 (0.01) ⬆
Quebec, Canada	77 (4.8)	542 (4.3)	23 (4.8)	520 (6.6)	0 (0.0)	~ ~	10.7 (0.18)	0.7 (0.22) ⬆
Norway (4)	72 (4.6)	494 (2.4)	26 (4.3)	496 (4.7)	2 (1.6)	~ ~	10.6 (0.14)	0.7 (0.19) ⬆
Ontario, Canada	58 (5.5)	518 (3.3)	38 (5.3)	503 (3.5)	4 (1.7)	484 (12.5)	9.9 (0.16)	-0.5 (0.21)
Florida, US	57 (8.1)	553 (7.5)	39 (8.3)	543 (7.3)	4 (2.8)	480 (11.9)	10.0 (0.22)	-0.3 (0.30)
Buenos Aires, Argentina	53 (5.7)	448 (5.0)	35 (5.5)	420 (7.1)	13 (3.8)	421 (18.1)	9.5 (0.16)	◇ ◇
Abu Dhabi, UAE	51 (4.6)	423 (8.7)	41 (4.7)	409 (8.6)	8 (2.5)	381 (22.6)	9.8 (0.13)	-0.1 (0.22)

Significantly higher than 2011 ⬆  
 Significantly lower than 2011 ⬇

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

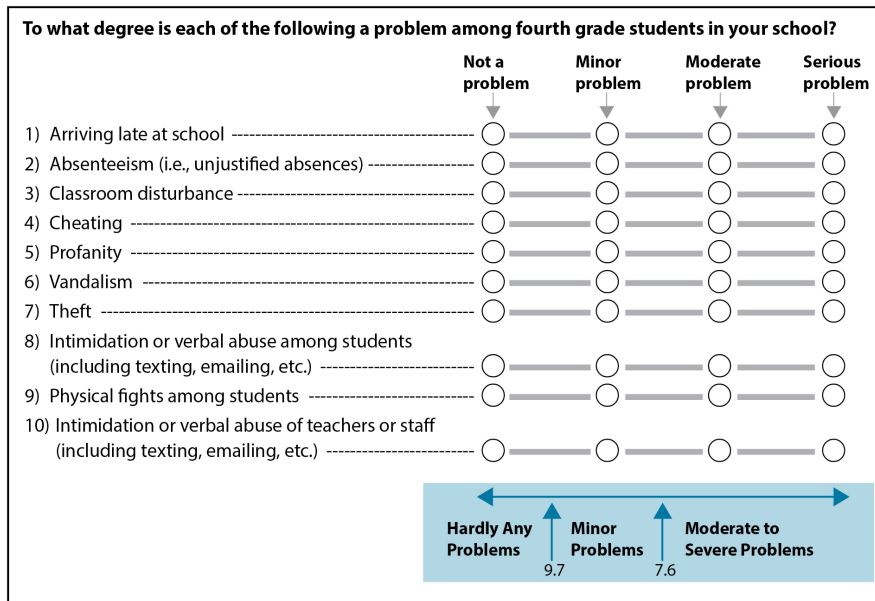


Exhibit 7.3: Safe and Orderly School – Teachers' Reports

Reported by Teachers

Students were scored according to their teachers' degree of agreement with eight statements on the *Safe and Orderly School* scale. Students in **Very Safe and Orderly** schools had a score on the scale of at least 10.0, which corresponds to their teachers "agreeing a lot" with four of the eight qualities of a safe and orderly school and "agreeing a little" with the other four, on average. Students in **Less than Safe and Orderly** schools had a score no higher than 6.7, which corresponds to their teachers "disagreeing a little" with four of the eight qualities and "agreeing a little" with the other four, on average. All other students attended **Safe and Orderly** schools.

Country	Very Safe and Orderly		Safe and Orderly		Less than Safe and Orderly		Average Scale Score	Difference in Average Scale Score from 2011
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement		
Indonesia	89 (2.1)	399 (3.7)	11 (2.1)	390 (12.3)	0 (0.1)	~ ~	12.1 (0.11)	∅ ∅
Northern Ireland	r 85 (3.1)	576 (3.1)	15 (3.1)	554 (12.1)	0 (0.0)	~ ~	12.0 (0.16)	r 0.5 (0.21)
Ireland	83 (2.7)	551 (2.2)	14 (2.7)	536 (5.6)	2 (1.3)	~ ~	11.7 (0.15)	0.4 (0.21)
Qatar	77 (3.2)	444 (4.3)	21 (3.2)	432 (9.0)	2 (1.2)	~ ~	11.3 (0.15)	0.9 (0.19)
Spain	76 (2.6)	512 (2.6)	21 (2.6)	489 (5.0)	3 (1.0)	442 (19.5)	11.1 (0.11)	1.4 (0.20)
England	76 (3.7)	550 (4.0)	24 (3.7)	536 (6.2)	0 (0.4)	~ ~	11.3 (0.17)	0.6 (0.25)
Kazakhstan	75 (3.7)	545 (5.6)	25 (3.7)	544 (8.2)	0 (0.0)	~ ~	11.5 (0.16)	0.7 (0.22)
Australia	75 (2.8)	529 (4.1)	23 (2.9)	490 (5.8)	2 (0.8)	~ ~	11.4 (0.13)	r 0.3 (0.21)
Norway (5)	72 (3.0)	553 (3.0)	24 (2.9)	540 (3.6)	4 (1.4)	554 (20.1)	10.8 (0.14)	∅ ∅
New Zealand	71 (2.5)	504 (2.6)	26 (2.2)	461 (5.0)	3 (0.8)	446 (12.7)	11.0 (0.12)	0.0 (0.15)
Iran, Islamic Rep. of	70 (2.5)	432 (4.1)	27 (2.5)	436 (6.8)	3 (1.1)	379 (23.5)	10.7 (0.12)	0.4 (0.19)
Bulgaria	69 (3.5)	533 (5.3)	29 (3.7)	504 (8.9)	2 (1.8)	~ ~	10.4 (0.13)	∅ ∅
Portugal	65 (3.4)	547 (3.1)	32 (3.5)	534 (4.4)	3 (1.1)	503 (24.5)	10.6 (0.13)	1.0 (0.23)
Oman	64 (2.9)	430 (3.2)	33 (3.0)	418 (5.2)	3 (1.1)	421 (9.5)	10.5 (0.12)	0.6 (0.15)
Hong Kong SAR	64 (4.5)	616 (3.4)	34 (4.5)	612 (6.5)	2 (1.3)	~ ~	10.6 (0.17)	0.4 (0.24)
Singapore	63 (2.6)	619 (4.5)	35 (2.6)	616 (6.5)	2 (0.6)	~ ~	10.7 (0.11)	0.4 (0.15)
Georgia	62 (3.8)	468 (5.3)	37 (3.9)	456 (6.3)	1 (0.6)	~ ~	10.4 (0.14)	-0.9 (0.18)
United Arab Emirates	62 (1.8)	473 (3.5)	35 (1.8)	420 (4.6)	3 (0.8)	409 (23.1)	10.6 (0.08)	-0.2 (0.11)
Cyprus	60 (3.8)	530 (3.1)	36 (3.7)	513 (4.1)	4 (1.3)	514 (7.7)	10.5 (0.17)	∅ ∅
Netherlands	r 60 (3.7)	534 (2.2)	39 (3.8)	523 (2.7)	1 (1.1)	~ ~	10.3 (0.16)	r 0.1 (0.24)
Saudi Arabia	59 (3.0)	397 (5.5)	34 (3.2)	361 (6.9)	7 (2.0)	379 (19.9)	10.1 (0.13)	-0.3 (0.21)
Lithuania	57 (4.3)	535 (3.7)	42 (4.2)	536 (4.5)	1 (0.8)	~ ~	10.3 (0.13)	0.6 (0.18)
Bahrain	56 (2.5)	464 (2.4)	37 (2.5)	442 (2.8)	8 (0.9)	427 (5.6)	10.2 (0.13)	-0.1 (0.22)
Canada	55 (2.2)	512 (2.8)	42 (2.3)	511 (4.8)	3 (0.8)	484 (14.1)	10.4 (0.09)	∅ ∅
Kuwait	55 (3.5)	355 (5.3)	41 (3.4)	347 (9.0)	3 (1.0)	360 (36.1)	10.1 (0.15)	∅ ∅
United States	55 (2.5)	552 (3.0)	38 (2.3)	526 (4.4)	7 (1.4)	500 (11.1)	10.3 (0.12)	-0.2 (0.15)
Russian Federation	55 (3.8)	566 (4.6)	43 (3.9)	562 (6.5)	2 (0.9)	~ ~	10.1 (0.12)	0.2 (0.21)
Czech Republic	54 (3.6)	532 (3.0)	45 (3.5)	524 (3.7)	2 (0.8)	~ ~	9.8 (0.12)	0.3 (0.17)
Italy	53 (3.3)	508 (4.0)	44 (3.3)	507 (3.7)	3 (1.5)	482 (16.0)	10.0 (0.14)	1.4 (0.19)
Slovak Republic	53 (3.3)	504 (3.3)	44 (3.3)	494 (4.0)	3 (1.0)	453 (19.4)	9.8 (0.11)	0.4 (0.14)
Serbia	52 (3.5)	521 (4.0)	41 (3.6)	513 (6.4)	7 (1.6)	522 (9.6)	10.1 (0.14)	0.7 (0.21)
Jordan	52 (3.9)	397 (4.8)	39 (3.9)	385 (5.9)	9 (2.1)	353 (10.8)	10.0 (0.16)	∅ ∅
Poland	50 (3.8)	536 (3.0)	48 (3.6)	534 (3.1)	2 (0.9)	~ ~	9.9 (0.12)	∅ ∅
Turkey	49 (3.3)	497 (5.6)	44 (3.3)	472 (4.7)	7 (1.6)	454 (15.6)	9.7 (0.14)	0.8 (0.23)
South Africa (5)	49 (3.8)	385 (7.3)	41 (3.7)	366 (7.3)	10 (2.2)	373 (10.8)	9.7 (0.15)	∅ ∅
Croatia	48 (3.5)	501 (2.4)	50 (3.5)	503 (2.8)	2 (1.0)	~ ~	9.9 (0.13)	-0.9 (0.18)
Chile	47 (4.2)	475 (4.5)	41 (4.4)	451 (4.9)	12 (2.6)	438 (6.8)	9.6 (0.20)	0.4 (0.27)
Germany	46 (3.2)	529 (3.1)	50 (3.1)	516 (3.7)	5 (1.5)	496 (11.4)	9.7 (0.11)	-0.1 (0.17)
Hungary	46 (3.9)	539 (4.9)	48 (3.9)	524 (5.9)	6 (2.2)	480 (22.4)	9.6 (0.15)	-0.2 (0.20)
Korea, Rep. of	44 (3.7)	615 (3.8)	54 (3.6)	603 (2.8)	2 (1.2)	~ ~	10.0 (0.17)	1.3 (0.25)
Belgium (Flemish)	43 (3.5)	552 (3.6)	52 (3.6)	542 (3.3)	5 (1.6)	530 (9.8)	9.6 (0.11)	-0.1 (0.16)
Morocco	43 (2.9)	388 (6.0)	47 (3.1)	372 (5.5)	11 (1.8)	352 (9.8)	9.6 (0.13)	0.8 (0.22)
Denmark	41 (3.6)	547 (4.9)	53 (3.8)	533 (3.9)	6 (1.8)	525 (10.7)	9.5 (0.15)	-1.1 (0.19)
France	40 (3.6)	501 (4.2)	54 (3.8)	483 (3.5)	6 (1.6)	444 (10.7)	9.4 (0.13)	∅ ∅
Sweden	37 (4.3)	533 (3.9)	57 (4.4)	515 (3.5)	6 (1.9)	467 (17.4)	9.6 (0.15)	r -0.1 (0.22)
Finland	37 (3.1)	540 (2.5)	60 (3.1)	534 (2.4)	3 (1.0)	509 (15.3)	9.5 (0.11)	0.2 (0.17)
Chinese Taipei	35 (3.6)	597 (3.0)	61 (3.9)	596 (2.6)	4 (1.5)	605 (13.9)	9.4 (0.14)	0.4 (0.21)
Slovenia	29 (3.2)	522 (3.2)	64 (3.4)	521 (2.5)	7 (1.6)	510 (5.7)	9.0 (0.10)	0.1 (0.15)
Japan	7 (1.8)	606 (6.2)	83 (2.5)	593 (2.1)	9 (2.2)	577 (4.7)	8.2 (0.08)	0.3 (0.12)
International Avg.	56 (0.5)	511 (0.6)	40 (0.5)	497 (0.8)	4 (0.2)	464 (2.9)		

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

This TIMSS 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 diamond (∅) indicates the country did not participate in the 2011 assessment.

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 less than 50% of students.

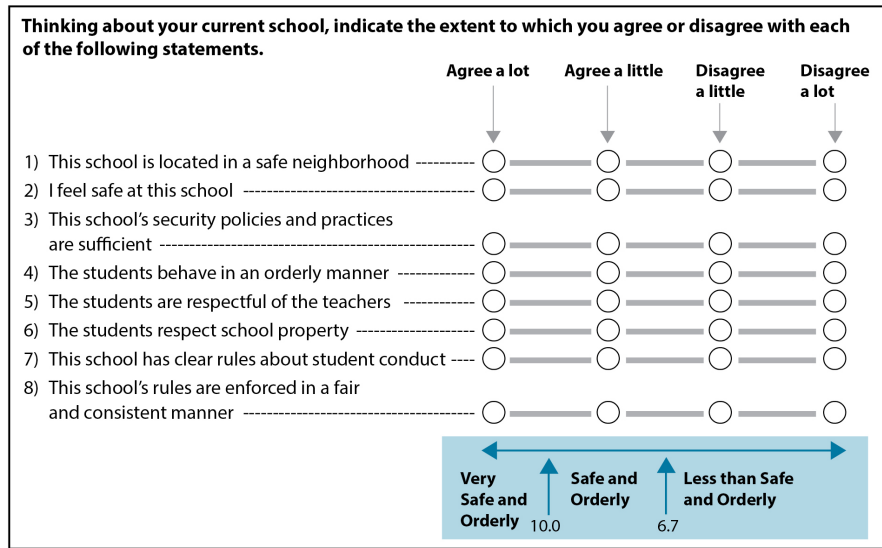
Significantly higher than 2011 (●)  
Significantly lower than 2011 (▼)

**Exhibit 7.3: Safe and Orderly School – Teachers' Reports (Continued)**

Country	Very Safe and Orderly		Safe and Orderly		Less than Safe and Orderly		Average Scale Score	Difference in Average Scale Score from 2011
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement		
<b>Benchmarking Participants</b>								
Norway (4)	73 (3.4)	497 (2.6)	25 (3.5)	494 (5.1)	2 (1.2)	~ ~	10.9 (0.15)	0.2 (0.23)
Dubai, UAE	69 (2.4)	529 (2.6)	31 (2.4)	470 (3.8)	1 (0.4)	~ ~	11.2 (0.10)	r -0.2 (0.13)
Florida, US	r 53 (4.8)	565 (5.7)	34 (5.3)	531 (7.2)	13 (3.1)	515 (13.4)	10.0 (0.25)	r -0.5 (0.35)
Ontario, Canada	52 (3.2)	516 (3.1)	45 (3.2)	513 (3.8)	3 (0.9)	486 (14.7)	10.3 (0.15)	-0.2 (0.22)
Abu Dhabi, UAE	51 (4.2)	445 (9.2)	44 (4.1)	392 (7.5)	5 (1.8)	397 (38.2)	9.9 (0.18)	-0.8 (0.22) ▼
Quebec, Canada	48 (5.3)	538 (5.3)	49 (5.6)	535 (5.6)	3 (2.1)	514 (16.9)	9.9 (0.17)	0.1 (0.25)
Buenos Aires, Argentina	x x	x x	x x	x x	x x	x x	x x	x x

Significantly higher than 2011 ●  
Significantly lower than 2011 ▼

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015





**Exhibit 7.5: Student Bullying**

*Reported by Students*

Students were scored according to their responses to how often they experienced eight bullying behaviors on the *Student Bullying* scale. Students bullied **Almost Never** had a score on the scale of at least 9.6, which corresponds to “never” experiencing four of the eight bullying behaviors and experiencing each of the other four behaviors “a few times a year,” on average. Students bullied **About Weekly** had a score no higher than 8.0, which corresponds to their experiencing each of four of the eight behaviors “once or twice a month” and each of the other four “a few times a year,” on average. All other students were bullied **About Monthly**.

Country	Almost Never		About Monthly		About Weekly		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Korea, Rep. of	76 (1.0)	608 (2.3)	20 (0.8)	609 (3.5)	4 (0.4)	604 (6.9)	11.0 (0.05)
Kazakhstan	75 (1.1)	549 (4.6)	18 (0.8)	539 (7.0)	7 (0.6)	517 (7.5)	11.1 (0.07)
Ireland	73 (1.2)	555 (2.2)	20 (1.0)	538 (3.7)	6 (0.4)	496 (5.9)	10.8 (0.06)
Croatia	73 (1.2)	507 (1.8)	19 (0.9)	493 (3.7)	8 (0.6)	485 (4.9)	10.8 (0.06)
Georgia	73 (1.1)	476 (3.3)	18 (0.7)	459 (4.7)	9 (0.7)	413 (7.8)	10.8 (0.05)
Serbia	73 (1.0)	522 (3.9)	19 (0.9)	523 (5.2)	8 (0.5)	488 (6.8)	10.9 (0.05)
Poland	73 (1.0)	540 (2.1)	19 (0.8)	531 (3.8)	8 (0.5)	502 (5.5)	10.7 (0.05)
Finland	71 (1.2)	540 (1.9)	22 (0.9)	531 (3.3)	7 (0.5)	504 (5.4)	10.5 (0.05)
Norway (5)	70 (1.3)	554 (2.6)	23 (1.0)	543 (3.2)	7 (0.6)	521 (6.9)	10.5 (0.05)
Japan	68 (1.3)	598 (2.0)	23 (1.0)	588 (3.1)	8 (0.6)	566 (6.1)	10.6 (0.05)
France	65 (1.2)	492 (2.9)	26 (1.0)	486 (4.0)	8 (0.6)	467 (6.4)	10.4 (0.05)
Sweden	65 (1.3)	526 (2.8)	28 (1.1)	512 (6.3)	7 (0.5)	482 (6.4)	10.3 (0.05)
Northern Ireland	64 (1.5)	578 (3.0)	27 (1.1)	568 (4.4)	10 (0.7)	529 (7.2)	10.3 (0.06)
Chile	60 (1.3)	468 (2.6)	24 (0.9)	460 (3.6)	16 (0.8)	426 (4.2)	10.1 (0.06)
Czech Republic	60 (1.1)	535 (2.5)	28 (0.9)	526 (3.2)	12 (0.7)	501 (4.2)	10.2 (0.05)
Netherlands	59 (1.4)	533 (1.9)	31 (0.9)	531 (2.4)	10 (0.9)	512 (3.5)	10.0 (0.05)
Hungary	58 (1.3)	541 (3.1)	31 (1.1)	523 (3.4)	11 (0.7)	489 (8.7)	10.0 (0.05)
Chinese Taipei	58 (1.1)	602 (1.9)	29 (1.0)	593 (3.0)	13 (0.7)	583 (4.2)	10.1 (0.04)
Denmark	58 (1.2)	546 (3.0)	32 (0.9)	536 (3.4)	10 (0.7)	514 (4.4)	10.0 (0.05)
Slovenia	58 (1.0)	526 (2.1)	29 (0.9)	521 (2.6)	14 (0.8)	499 (3.4)	10.0 (0.05)
Turkey	57 (1.1)	500 (3.2)	28 (0.8)	481 (3.4)	14 (0.7)	428 (5.8)	10.1 (0.05)
Germany	57 (1.3)	531 (2.2)	30 (0.9)	526 (2.5)	13 (0.7)	503 (4.2)	10.0 (0.05)
Slovak Republic	57 (1.1)	507 (3.0)	30 (0.8)	494 (3.1)	13 (0.7)	472 (5.6)	10.1 (0.06)
Portugal	57 (1.0)	547 (2.3)	29 (0.9)	542 (3.1)	15 (0.9)	521 (4.6)	10.0 (0.04)
Lithuania	56 (1.3)	547 (2.7)	31 (1.0)	530 (3.2)	13 (0.7)	502 (4.9)	9.9 (0.05)
United States	56 (0.8)	550 (2.5)	29 (0.5)	540 (2.5)	15 (0.5)	510 (3.5)	9.9 (0.04)
Cyprus	55 (1.2)	534 (3.0)	29 (1.0)	523 (3.1)	16 (0.8)	497 (3.9)	9.9 (0.06)
Hong Kong SAR	54 (1.4)	618 (3.1)	32 (1.1)	613 (3.4)	14 (0.9)	603 (4.6)	9.9 (0.05)
England	54 (1.3)	553 (3.4)	31 (1.1)	546 (3.4)	15 (0.8)	522 (5.2)	9.8 (0.05)
Bulgaria	54 (1.9)	539 (5.5)	30 (1.1)	519 (4.8)	16 (1.1)	494 (6.9)	9.9 (0.08)
Canada	53 (0.9)	520 (2.3)	30 (0.6)	513 (2.2)	17 (0.8)	486 (3.4)	9.7 (0.04)
Jordan	52 (1.8)	411 (4.1)	26 (1.1)	395 (4.1)	21 (1.4)	339 (5.0)	9.8 (0.09)
Russian Federation	51 (1.3)	571 (3.3)	33 (0.9)	564 (4.7)	16 (0.6)	544 (5.2)	9.8 (0.05)
Italy	50 (1.0)	512 (2.8)	35 (0.9)	507 (3.2)	15 (0.7)	494 (4.7)	9.6 (0.04)
Iran, Islamic Rep. of	50 (1.6)	434 (4.4)	32 (0.9)	439 (4.2)	18 (1.1)	419 (7.0)	9.7 (0.07)
Spain	48 (1.0)	512 (2.8)	33 (0.6)	504 (3.0)	19 (0.8)	491 (3.7)	9.6 (0.05)
Kuwait	48 (1.2)	359 (3.4)	31 (0.8)	356 (6.5)	21 (0.9)	338 (8.3)	9.7 (0.06)
Saudi Arabia	47 (1.7)	405 (4.6)	27 (1.1)	386 (5.3)	26 (1.3)	356 (5.0)	9.5 (0.08)
Singapore	47 (0.9)	631 (3.8)	34 (0.6)	618 (4.0)	19 (0.7)	585 (5.3)	9.5 (0.03)
Belgium (Flemish)	47 (1.3)	547 (2.4)	36 (0.9)	550 (2.5)	17 (0.8)	532 (3.6)	9.6 (0.05)
Australia	45 (1.3)	529 (3.7)	36 (1.1)	518 (2.9)	20 (1.1)	490 (5.5)	9.4 (0.05)
Morocco	44 (1.5)	395 (4.0)	35 (1.1)	381 (4.1)	21 (1.0)	348 (5.7)	9.5 (0.06)
Indonesia	44 (1.4)	402 (4.1)	31 (1.0)	406 (4.1)	25 (1.0)	389 (5.0)	9.4 (0.07)
Qatar	43 (1.2)	457 (3.5)	28 (0.8)	449 (4.9)	28 (1.0)	408 (4.7)	9.3 (0.06)
United Arab Emirates	43 (1.0)	469 (3.0)	31 (0.5)	458 (3.1)	26 (0.8)	420 (3.4)	9.4 (0.05)
Oman	42 (1.6)	436 (3.1)	33 (1.0)	430 (3.3)	25 (1.0)	406 (3.7)	9.4 (0.06)
New Zealand	40 (1.0)	503 (3.1)	36 (0.7)	496 (2.7)	24 (0.7)	467 (3.5)	9.2 (0.04)
Bahrain	34 (0.7)	468 (1.8)	33 (0.6)	457 (2.5)	33 (0.7)	432 (2.4)	9.0 (0.03)
South Africa (5)	23 (1.0)	419 (6.2)	34 (0.9)	391 (3.5)	44 (1.5)	347 (3.9)	8.5 (0.05)
International Avg.	56 (0.2)	514 (0.5)	29 (0.1)	505 (0.5)	16 (0.1)	478 (0.8)	

This TIMSS 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.

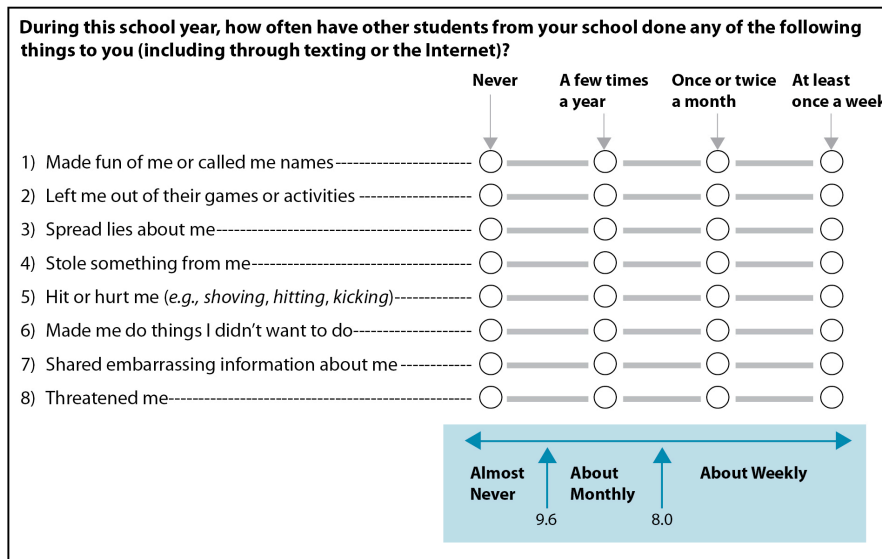
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent. An “r” indicates data are available for at least 70% but less than 85% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 7.5: Student Bullying (Continued)**

Country	Almost Never		About Monthly		About Weekly		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
<b>Benchmarking Participants</b>							
Norway (4)	70 (1.2)	499 (2.3)	21 (0.9)	488 (3.6)	9 (0.6)	465 (7.1)	10.6 (0.05)
Florida, US	56 (1.6)	558 (5.7)	28 (1.1)	544 (5.1)	16 (1.0)	517 (6.1)	10.0 (0.07)
Quebec, Canada	54 (1.6)	541 (4.3)	31 (1.1)	538 (4.3)	14 (1.2)	515 (6.5)	9.9 (0.07)
Ontario, Canada	52 (1.3)	521 (2.3)	31 (0.8)	513 (3.2)	17 (1.2)	490 (4.0)	9.7 (0.05)
Buenos Aires, Argentina	50 (1.2)	445 (3.1)	29 (0.8)	444 (4.1)	21 (0.7)	413 (3.9)	9.6 (0.05)
Dubai, UAE	46 (1.3)	523 (2.1)	32 (0.9)	514 (2.8)	22 (1.0)	484 (3.5)	9.5 (0.06)
Abu Dhabi, UAE	39 (2.0)	439 (7.1)	31 (1.0)	430 (6.2)	30 (1.6)	388 (6.7)	9.1 (0.10)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**TIMSS**  
**2015**

# **CHAPTER 8: TEACHERS' AND PRINCIPALS' PREPARATION**

TIMSS 2015 INTERNATIONAL RESULTS IN MATHEMATICS



**IEA**

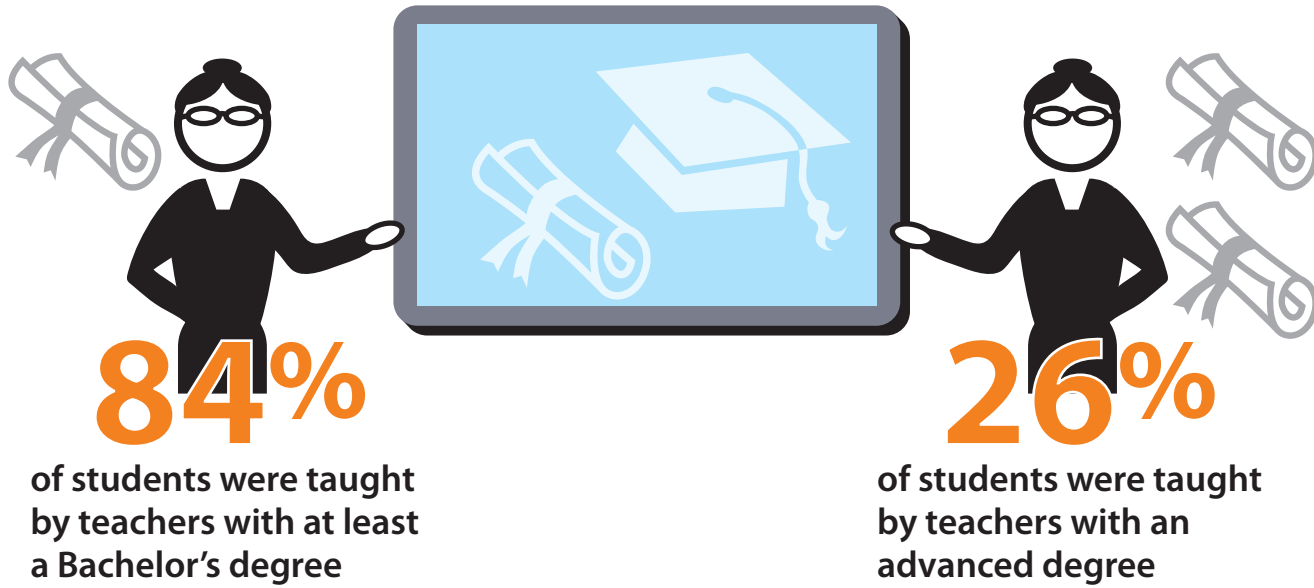
**TIMSS & PIRLS**  
International Study Center  
Lynch School of Education, Boston College



## Students Have Well Qualified Teachers and Principals

### Mathematics Teachers' Preparation and Experience

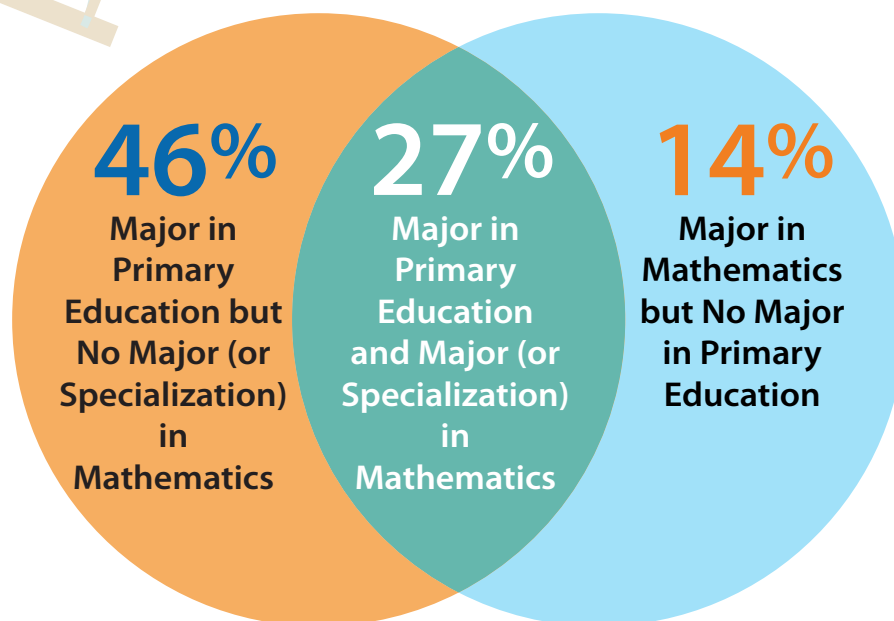
Internationally, teachers of fourth grade students reported high levels of education and considerable experience.



**40%**

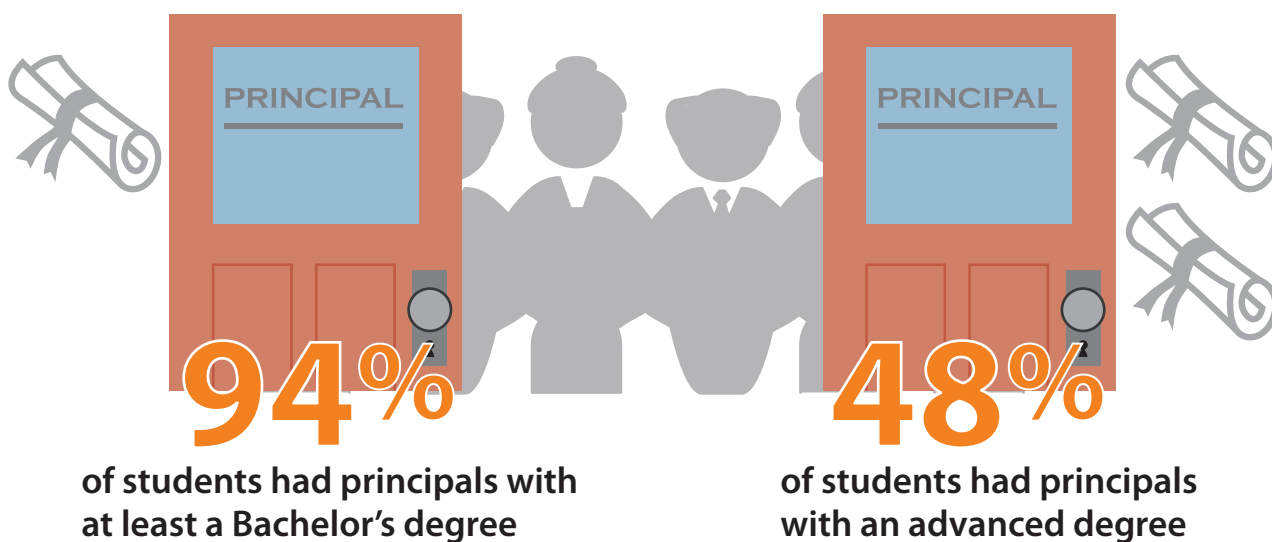
of students were taught by teachers with at least 20 years of experience (on average, students' teachers had 17 years of experience).

**Most students (73%) had teachers that majored in primary education and 41% had teachers that majored in mathematics or had a specialization in mathematics.**



### Principals' Preparation and Experience

Internationally, principals of fourth grade students reported high levels of education and considerable experience.



**On average, principals had 10 years of experience. They were required to have teaching experience in 40 countries, but completion of a specialized leadership program was less common (21 countries).**



**Exhibit 8.1: Teachers' Formal Education\***

Reported by Teachers

Country	Percent of Students by Teacher Educational 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	12 (2.6)	81 (3.2)	7 (1.9)	0 (0.0)
Bahrain	12 (3.0)	87 (3.1)	1 (0.5)	0 (0.4)
Belgium (Flemish)	1 (0.7)	98 (0.8)	1 (0.4)	0 (0.0)
Bulgaria	74 (3.4)	17 (2.5)	10 (2.2)	0 (0.0)
Canada	14 (2.0)	86 (2.0)	0 (0.0)	0 (0.0)
Chile	10 (2.7)	82 (3.6)	8 (2.3)	0 (0.0)
Chinese Taipei	39 (4.0)	61 (4.0)	0 (0.3)	0 (0.0)
Croatia	0 (0.4)	41 (3.5)	58 (3.5)	0 (0.0)
Cyprus	61 (3.6)	37 (3.6)	1 (0.7)	0 (0.0)
Czech Republic	94 (1.6)	2 (1.0)	0 (0.2)	4 (1.2)
Denmark	4 (1.5)	87 (2.8)	3 (1.4)	7 (2.0)
England	13 (2.9)	86 (3.0)	1 (0.7)	0 (0.0)
Finland	90 (1.8)	9 (1.7)	0 (0.1)	1 (0.6)
France	40 (3.7)	48 (3.8)	9 (2.3)	3 (1.2)
Georgia	85 (3.3)	12 (3.0)	3 (1.4)	0 (0.0)
Germany	85 (1.8)	0 (0.0)	15 (1.8)	0 (0.0)
Hong Kong SAR	30 (3.8)	66 (4.4)	4 (1.8)	0 (0.0)
Hungary	1 (0.3)	99 (0.5)	0 (0.4)	0 (0.0)
Indonesia	2 (0.7)	85 (2.2)	5 (1.3)	8 (2.0)
Iran, Islamic Rep. of	7 (1.5)	55 (3.8)	28 (3.7)	10 (2.3)
Ireland	13 (2.3)	84 (2.7)	3 (1.2)	1 (0.5)
Italy	3 (1.4)	16 (3.4)	13 (2.6)	68 (3.6)
Japan	4 (1.1)	90 (2.2)	7 (1.8)	0 (0.0)
Jordan	7 (2.0)	72 (3.9)	16 (3.3)	5 (1.8)
Kazakhstan	1 (0.6)	78 (3.5)	14 (2.8)	8 (2.5)
Korea, Rep. of	21 (3.2)	72 (3.4)	6 (2.0)	0 (0.0)
Kuwait	r 12 (2.7)	68 (3.8)	17 (2.8)	3 (1.2)
Lithuania	21 (3.6)	74 (3.5)	5 (1.4)	0 (0.0)
Morocco	r 1 (0.6)	28 (3.7)	3 (1.2)	67 (3.7)
Netherlands	r 4 (2.0)	70 (4.2)	25 (4.0)	2 (0.3)
New Zealand	27 (2.3)	58 (2.6)	15 (2.0)	0 (0.0)
Northern Ireland	r 16 (3.3)	83 (3.4)	0 (0.0)	2 (0.9)
Norway (5)	8 (2.7)	88 (3.0)	4 (1.4)	0 (0.0)
Oman	r 29 (2.9)	66 (3.2)	3 (1.2)	2 (1.0)
Poland	97 (1.3)	3 (1.3)	0 (0.0)	0 (0.0)
Portugal	7 (1.8)	89 (2.3)	4 (1.3)	0 (0.0)
Qatar	r 15 (2.3)	79 (2.5)	4 (1.4)	2 (1.4)
Russian Federation	30 (4.5)	53 (4.3)	17 (2.8)	0 (0.0)
Saudi Arabia	s 8 (2.0)	67 (4.2)	9 (2.6)	17 (3.5)
Serbia	12 (2.6)	39 (4.1)	48 (4.3)	1 (0.5)
Singapore	10 (1.6)	69 (2.6)	20 (2.1)	1 (0.6)
Slovak Republic	100 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Slovenia	59 (3.2)	0 (0.4)	41 (3.2)	0 (0.0)
South Africa (5)	1 (0.5)	46 (3.4)	49 (3.4)	4 (1.0)
Spain	r 4 (1.5)	33 (4.0)	61 (4.2)	2 (1.0)
Sweden	11 (2.7)	76 (3.7)	9 (2.7)	4 (1.8)
Turkey	3 (1.1)	81 (2.6)	16 (2.5)	0 (0.0)
United Arab Emirates	r 32 (2.7)	61 (2.6)	6 (1.3)	1 (0.3)
United States	53 (2.4)	47 (2.4)	0 (0.0)	0 (0.0)
International Avg.	26 (0.3)	58 (0.4)	12 (0.3)	5 (0.2)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

\* 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.

An "x" indicates data are available for less than 50% of students.

**Exhibit 8.1: Teachers' Formal Education\* (Continued)**

Country	Percent of Students by Teacher Educational 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
<b>Benchmarking Participants</b>				
Buenos Aires, Argentina	x x	x x	x x	x x
Ontario, Canada	17 (3.6)	83 (3.6)	0 (0.0)	0 (0.0)
Quebec, Canada	7 (2.3)	93 (2.3)	0 (0.0)	0 (0.0)
Norway (4)	4 (1.3)	84 (3.4)	10 (3.2)	1 (0.7)
Abu Dhabi, UAE	r 39 (4.6)	53 (4.2)	7 (2.7)	1 (0.6)
Dubai, UAE	r 38 (3.7)	58 (3.8)	4 (0.9)	0 (0.0)
Florida, US	r 47 (6.5)	53 (6.5)	0 (0.0)	0 (0.0)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**Exhibit 8.3: Teachers Majored in Education and Mathematics**

Reported by Teachers

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
Australia	13 (2.6)	536 (7.1)	80 (3.2)	514 (3.8)	1 (0.6)	~ ~	6 (1.5)	531 (8.7)	0 (0.0)	~ ~
Bahrain	30 (1.7)	451 (3.0)	4 (1.4)	516 (24.2)	59 (2.8)	449 (1.9)	7 (3.3)	439 (22.3)	0 (0.3)	~ ~
Belgium (Flemish)	--	--	--	--	--	--	--	--	--	--
Bulgaria	r 27 (3.9)	540 (11.4)	70 (4.0)	516 (5.6)	1 (0.3)	~ ~	2 (1.2)	~ ~	0 (0.0)	~ ~
Canada	6 (1.0)	495 (11.1)	79 (2.1)	513 (2.6)	3 (0.9)	518 (10.7)	12 (1.6)	501 (5.0)	0 (0.0)	~ ~
Chile	r 46 (5.2)	463 (4.8)	51 (5.3)	466 (5.1)	2 (1.4)	~ ~	1 (0.6)	~ ~	1 (0.0)	~ ~
Chinese Taipei	37 (3.8)	599 (2.8)	44 (3.6)	594 (3.0)	3 (1.4)	602 (14.6)	15 (2.7)	599 (5.0)	0 (0.0)	~ ~
Croatia	--	--	--	--	--	--	--	--	--	--
Cyprus	22 (3.0)	527 (5.3)	75 (3.0)	521 (2.8)	1 (0.7)	~ ~	2 (0.9)	~ ~	0 (0.0)	~ ~
Czech Republic	6 (1.4)	526 (8.3)	75 (2.7)	529 (2.8)	3 (1.4)	521 (13.7)	13 (2.0)	531 (5.3)	4 (1.2)	507 (12.6)
Denmark	r 38 (3.6)	534 (4.0)	12 (2.8)	527 (10.3)	30 (3.7)	536 (5.7)	13 (2.6)	548 (10.2)	7 (2.1)	551 (10.8)
England	12 (2.6)	548 (11.9)	57 (4.3)	543 (4.7)	4 (1.7)	582 (23.5)	27 (3.8)	552 (8.7)	0 (0.0)	~ ~
Finland	10 (2.1)	538 (6.6)	82 (2.8)	536 (2.0)	0 (0.4)	~ ~	7 (1.7)	521 (9.3)	1 (0.6)	~ ~
France	s 10 (2.4)	484 (7.1)	28 (4.0)	492 (6.6)	20 (3.6)	485 (8.8)	38 (4.4)	481 (5.4)	4 (1.5)	489 (6.3)
Georgia	64 (4.2)	464 (5.5)	11 (3.0)	475 (7.3)	18 (3.5)	465 (9.8)	8 (2.2)	457 (12.5)	0 (0.0)	~ ~
Germany	62 (3.4)	523 (2.6)	30 (3.0)	526 (3.8)	4 (1.2)	511 (12.5)	4 (1.4)	494 (10.7)	0 (0.0)	~ ~
Hong Kong SAR	64 (4.3)	611 (3.3)	23 (3.8)	620 (8.0)	10 (2.9)	621 (14.4)	3 (1.4)	597 (14.4)	0 (0.0)	~ ~
Hungary	r 5 (2.2)	563 (12.5)	94 (2.3)	528 (3.7)	1 (0.6)	~ ~	0 (0.0)	~ ~	0 (0.0)	~ ~
Indonesia	24 (3.0)	389 (9.3)	42 (3.5)	402 (6.0)	9 (2.3)	413 (15.0)	17 (2.5)	405 (9.3)	8 (2.1)	373 (11.3)
Iran, Islamic Rep. of	15 (2.7)	432 (13.2)	43 (3.5)	434 (7.1)	6 (1.5)	447 (28.7)	27 (3.0)	436 (6.0)	9 (2.3)	413 (19.3)
Ireland	12 (2.6)	547 (4.8)	78 (3.6)	545 (2.7)	3 (2.0)	556 (5.9)	6 (2.1)	560 (5.2)	1 (0.6)	~ ~
Italy	r 2 (0.7)	~ ~	6 (2.0)	511 (9.5)	3 (1.4)	490 (23.8)	16 (3.2)	507 (7.6)	73 (3.7)	505 (3.1)
Japan	17 (2.8)	590 (3.1)	73 (3.1)	595 (2.5)	2 (1.2)	~ ~	7 (2.0)	594 (7.3)	0 (0.0)	~ ~
Jordan	10 (2.3)	378 (13.1)	1 (0.7)	~ ~	77 (3.7)	390 (4.2)	6 (2.3)	398 (10.0)	5 (1.9)	333 (16.8)
Kazakhstan	54 (4.0)	548 (5.5)	33 (3.6)	552 (10.9)	3 (1.4)	541 (41.4)	2 (0.9)	~ ~	8 (2.6)	531 (10.1)
Korea, Rep. of	12 (2.7)	609 (6.7)	86 (2.9)	608 (2.3)	0 (0.0)	~ ~	2 (1.1)	~ ~	0 (0.0)	~ ~
Kuwait	41 (4.3)	348 (7.3)	2 (0.8)	~ ~	48 (4.6)	350 (7.9)	7 (2.0)	374 (21.1)	3 (1.1)	346 (27.6)
Lithuania	18 (2.8)	526 (5.9)	79 (2.9)	539 (3.0)	1 (0.6)	~ ~	2 (0.7)	~ ~	0 (0.0)	~ ~
Morocco	r 3 (1.2)	383 (16.1)	5 (1.4)	365 (21.0)	9 (2.0)	416 (14.4)	21 (3.4)	374 (10.1)	63 (3.8)	372 (4.8)
Netherlands	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x
New Zealand	19 (2.1)	499 (6.8)	75 (2.5)	490 (3.0)	0 (0.3)	~ ~	6 (1.3)	503 (12.6)	0 (0.0)	~ ~
Northern Ireland	r 17 (4.0)	581 (11.2)	65 (4.7)	572 (4.2)	1 (1.0)	~ ~	16 (3.7)	567 (5.6)	2 (0.9)	~ ~
Norway (5)	47 (4.3)	552 (3.7)	44 (4.2)	548 (3.6)	4 (1.8)	553 (9.6)	5 (1.5)	552 (7.2)	0 (0.0)	~ ~
Oman	64 (3.0)	432 (3.3)	10 (1.8)	414 (8.7)	23 (2.4)	413 (5.9)	2 (1.0)	~ ~	1 (0.9)	~ ~
Poland	7 (1.8)	544 (8.0)	0 (0.0)	~ ~	93 (1.8)	534 (2.4)	0 (0.0)	~ ~	0 (0.0)	~ ~
Portugal	29 (2.9)	534 (5.4)	70 (2.9)	544 (2.8)	0 (0.0)	~ ~	1 (0.7)	~ ~	0 (0.0)	~ ~
Qatar	28 (2.7)	433 (6.1)	11 (2.4)	508 (14.0)	45 (2.8)	421 (5.2)	13 (2.2)	440 (10.0)	2 (1.3)	~ ~
Russian Federation	44 (4.6)	565 (4.8)	53 (5.0)	564 (5.7)	1 (0.7)	~ ~	2 (0.9)	~ ~	0 (0.0)	~ ~
Saudi Arabia	34 (3.7)	380 (7.0)	4 (1.7)	373 (39.4)	45 (3.9)	384 (6.7)	5 (1.6)	411 (16.1)	12 (2.6)	373 (12.4)
Serbia	25 (3.8)	532 (5.5)	70 (3.6)	513 (4.8)	1 (0.9)	~ ~	2 (1.3)	~ ~	1 (0.6)	~ ~
Singapore	59 (2.9)	621 (5.2)	14 (1.9)	629 (7.7)	14 (1.8)	611 (10.6)	11 (1.7)	598 (10.5)	1 (0.7)	~ ~
Slovak Republic	23 (2.9)	502 (4.8)	70 (3.0)	499 (3.4)	3 (1.0)	453 (32.2)	4 (1.3)	481 (22.6)	0 (0.0)	~ ~
Slovenia	5 (1.2)	520 (4.9)	94 (1.3)	521 (2.0)	0 (0.0)	~ ~	0 (0.3)	~ ~	0 (0.0)	~ ~
South Africa (5)	47 (3.8)	382 (7.5)	30 (3.3)	370 (10.1)	11 (2.3)	374 (10.3)	9 (2.1)	376 (17.1)	4 (1.1)	343 (20.3)
Spain	22 (2.5)	508 (4.5)	62 (3.5)	504 (3.4)	4 (1.6)	499 (16.5)	10 (2.3)	505 (7.6)	1 (0.9)	~ ~
Sweden	70 (4.1)	521 (3.6)	12 (2.8)	516 (9.0)	12 (3.2)	523 (8.1)	2 (0.9)	~ ~	4 (1.7)	506 (12.7)
Turkey	r 17 (2.1)	495 (8.2)	68 (3.4)	484 (4.2)	2 (1.0)	~ ~	13 (2.8)	482 (10.1)	0 (0.0)	~ ~
United Arab Emirates	25 (1.8)	448 (7.1)	16 (1.5)	449 (9.2)	50 (2.1)	453 (3.8)	8 (1.2)	483 (9.7)	0 (0.3)	~ ~
United States	13 (1.6)	537 (6.6)	73 (2.3)	540 (2.8)	2 (0.7)	~ ~	12 (1.5)	541 (9.5)	0 (0.0)	~ ~
International Avg.	27 (0.4)	505 (1.1)	46 (0.5)	512 (1.5)	14 (0.3)	487 (2.9)	8 (0.3)	495 (2.0)	5 (0.2)	434 (4.0)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

\* 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 less than 50% of students.

**Exhibit 8.3: Teachers Majored in Education and Mathematics (Continued)**

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
<b>Benchmarking Participants</b>										
Buenos Aires, Argentina	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x
Ontario, Canada	r 5 (1.5)	510 (9.0)	76 (3.0)	516 (2.8)	1 (0.5)	~ ~	18 (2.7)	506 (6.2)	0 (0.0)	~ ~
Quebec, Canada	6 (2.1)	519 (8.9)	86 (3.9)	537 (4.4)	5 (2.9)	531 (15.8)	3 (1.5)	530 (8.8)	0 (0.0)	~ ~
Norway (4)	44 (4.4)	497 (3.6)	42 (4.5)	497 (3.0)	2 (1.2)	~ ~	11 (2.6)	487 (11.4)	1 (0.8)	~ ~
Abu Dhabi, UAE	r 29 (4.0)	407 (15.4)	29 (3.9)	391 (12.8)	33 (4.7)	449 (8.9)	9 (2.5)	472 (22.5)	1 (0.6)	~ ~
Dubai, UAE	30 (2.7)	511 (4.0)	17 (1.3)	556 (4.3)	42 (3.0)	487 (3.7)	11 (2.0)	531 (10.0)	0 (0.0)	~ ~
Florida, US	r 11 (3.5)	566 (12.9)	68 (3.8)	549 (5.6)	4 (2.5)	536 (25.1)	16 (3.6)	535 (18.6)	0 (0.0)	~ ~

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 8.5: Teachers' Years of Experience**

Reported by Teachers

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	36 (4.0)	522 (4.2)	24 (3.3)	519 (5.8)	17 (2.8)	518 (7.2)	23 (3.8)	510 (10.4)	15 (0.9)
Bahrain	10 (1.3)	463 (9.7)	44 (2.8)	455 (3.2)	18 (1.4)	455 (4.1)	29 (2.2)	444 (3.6)	10 (0.2)
Belgium (Flemish)	42 (3.5)	552 (3.7)	34 (3.0)	545 (3.2)	15 (2.4)	538 (6.0)	10 (1.9)	535 (6.7)	18 (0.8)
Bulgaria	84 (2.7)	528 (5.2)	9 (2.0)	545 (14.3)	4 (1.4)	476 (21.5)	3 (1.2)	503 (17.8)	27 (0.7)
Canada	29 (2.8)	513 (2.8)	39 (2.6)	509 (4.2)	18 (2.2)	508 (5.7)	13 (1.4)	519 (5.8)	15 (0.5)
Chile	28 (3.7)	462 (6.2)	17 (3.5)	475 (8.0)	37 (4.7)	457 (5.6)	18 (3.7)	445 (6.9)	13 (0.9)
Chinese Taipei	40 (3.9)	598 (2.9)	42 (4.2)	598 (3.2)	10 (2.5)	593 (7.5)	8 (1.9)	587 (5.0)	17 (0.6)
Croatia	67 (3.2)	506 (2.2)	21 (3.1)	498 (4.8)	8 (1.8)	488 (7.8)	4 (1.4)	500 (5.0)	24 (0.7)
Cyprus	33 (3.1)	524 (3.4)	52 (3.3)	523 (3.6)	13 (2.4)	518 (7.2)	2 (1.1)	~ ~	16 (0.5)
Czech Republic	50 (3.7)	529 (3.1)	30 (3.4)	526 (4.8)	10 (2.0)	533 (4.2)	10 (2.2)	524 (5.9)	20 (0.8)
Denmark	29 (3.5)	537 (6.0)	38 (3.8)	538 (3.9)	17 (2.9)	544 (6.3)	16 (3.0)	529 (8.3)	15 (0.8)
England	19 (3.2)	557 (8.7)	24 (3.4)	531 (6.4)	22 (3.6)	557 (10.5)	35 (3.8)	546 (5.1)	11 (0.7)
Finland	38 (2.7)	539 (2.5)	31 (3.1)	533 (3.7)	15 (1.8)	535 (3.1)	16 (2.2)	530 (6.1)	16 (0.5)
France	26 (3.5)	497 (6.1)	42 (3.7)	488 (4.5)	21 (3.0)	484 (4.9)	10 (2.1)	472 (8.2)	15 (0.8)
Georgia	64 (4.3)	456 (5.4)	25 (3.8)	474 (7.5)	9 (2.7)	466 (14.3)	1 (1.1)	~ ~	22 (1.0)
Germany	56 (3.4)	525 (3.0)	25 (3.0)	523 (3.7)	9 (1.9)	508 (10.0)	10 (2.1)	515 (6.4)	22 (0.8)
Hong Kong SAR	27 (3.8)	608 (5.6)	43 (4.6)	613 (4.9)	17 (3.9)	629 (9.7)	13 (2.4)	613 (7.1)	15 (0.8)
Hungary	73 (3.2)	526 (3.6)	18 (2.8)	537 (7.7)	7 (1.3)	530 (11.2)	1 (0.7)	~ ~	24 (0.6)
Indonesia	36 (3.2)	397 (7.4)	35 (3.2)	406 (5.9)	19 (2.6)	401 (9.6)	10 (2.6)	382 (20.6)	16 (0.6)
Iran, Islamic Rep. of	48 (3.2)	441 (5.5)	26 (3.1)	421 (8.7)	13 (2.6)	428 (13.3)	13 (3.0)	425 (18.6)	17 (0.6)
Ireland	21 (3.5)	550 (5.2)	39 (4.1)	548 (4.8)	23 (3.4)	544 (4.8)	17 (2.8)	547 (5.7)	13 (0.8)
Italy	69 (3.5)	507 (2.9)	26 (3.2)	508 (5.5)	4 (1.6)	512 (9.8)	2 (1.1)	~ ~	24 (0.7)
Japan	40 (3.5)	591 (2.6)	19 (2.9)	601 (5.0)	16 (2.8)	590 (4.0)	25 (3.2)	591 (4.0)	16 (0.8)
Jordan	14 (2.8)	376 (12.7)	23 (3.6)	386 (9.6)	31 (3.4)	392 (6.8)	32 (3.7)	393 (7.8)	10 (0.6)
Kazakhstan	57 (3.8)	546 (6.2)	27 (3.4)	548 (8.8)	8 (1.7)	536 (17.7)	9 (2.5)	539 (12.6)	21 (0.9)
Korea, Rep. of	35 (3.7)	617 (4.2)	31 (3.4)	606 (3.3)	14 (2.2)	610 (6.3)	21 (3.0)	595 (4.8)	16 (0.7)
Kuwait	12 (3.0)	369 (14.3)	26 (2.6)	352 (9.5)	33 (3.4)	346 (8.6)	29 (3.6)	349 (8.8)	9 (0.6)
Lithuania	83 (2.8)	534 (3.0)	14 (2.7)	549 (9.3)	2 (1.0)	~ ~	1 (0.6)	~ ~	28 (0.6)
Morocco	42 (2.8)	369 (4.6)	35 (3.5)	363 (5.6)	8 (2.0)	396 (18.0)	15 (2.2)	417 (16.2)	18 (0.6)
Netherlands	32 (4.0)	533 (3.0)	38 (4.2)	528 (2.8)	20 (3.1)	527 (4.3)	10 (2.5)	532 (5.8)	17 (1.0)
New Zealand	27 (2.3)	498 (6.1)	34 (2.8)	490 (3.2)	21 (2.0)	490 (5.1)	18 (1.8)	485 (8.2)	14 (0.5)
Northern Ireland	34 (4.3)	578 (6.2)	31 (4.1)	575 (5.6)	21 (3.8)	571 (7.8)	14 (3.1)	556 (8.6)	15 (0.8)
Norway (5)	23 (3.8)	552 (4.4)	42 (4.1)	551 (3.6)	21 (3.9)	547 (7.0)	14 (2.7)	549 (4.8)	14 (0.9)
Oman	8 (1.6)	422 (10.7)	48 (3.2)	434 (4.1)	33 (3.1)	421 (4.8)	10 (1.6)	409 (12.3)	10 (0.3)
Poland	46 (3.5)	538 (3.3)	35 (3.7)	526 (3.6)	12 (2.4)	537 (8.1)	7 (1.8)	549 (10.3)	19 (0.6)
Portugal	50 (3.5)	541 (4.1)	46 (3.5)	541 (4.1)	3 (1.1)	549 (14.6)	1 (0.6)	~ ~	22 (0.6)
Qatar	14 (2.9)	463 (10.8)	21 (2.8)	431 (10.7)	43 (3.7)	431 (6.3)	21 (2.9)	451 (7.4)	10 (0.6)
Russian Federation	78 (2.8)	569 (4.3)	12 (2.5)	554 (9.9)	5 (1.3)	561 (7.8)	4 (1.7)	526 (15.5)	25 (0.7)
Saudi Arabia	23 (3.0)	382 (7.9)	34 (3.5)	374 (8.6)	27 (3.4)	385 (7.9)	16 (2.9)	405 (11.5)	13 (0.6)
Serbia	61 (3.5)	516 (5.4)	23 (3.0)	523 (4.9)	9 (2.2)	528 (8.4)	7 (2.3)	513 (10.7)	20 (0.7)
Singapore	14 (1.9)	615 (8.8)	30 (2.5)	617 (7.4)	23 (2.2)	621 (8.3)	32 (2.4)	617 (5.8)	11 (0.5)
Slovak Republic	63 (2.7)	500 (2.9)	22 (2.8)	494 (6.0)	6 (1.6)	507 (9.7)	8 (1.9)	496 (9.4)	23 (0.6)
Slovenia	64 (3.0)	522 (2.4)	27 (3.2)	520 (3.7)	6 (1.5)	506 (6.1)	3 (1.1)	534 (8.9)	24 (0.6)
South Africa (5)	44 (3.9)	373 (6.2)	26 (3.0)	375 (10.0)	19 (2.9)	359 (12.7)	10 (2.1)	415 (20.6)	17 (0.8)
Spain	52 (3.4)	507 (3.7)	29 (3.0)	502 (4.1)	11 (2.0)	496 (7.5)	8 (1.8)	518 (5.8)	21 (0.8)
Sweden	21 (3.6)	519 (4.1)	43 (4.5)	517 (5.5)	21 (3.5)	518 (6.3)	15 (3.2)	523 (6.3)	15 (0.9)
Turkey	35 (3.3)	511 (5.1)	33 (3.4)	489 (4.8)	17 (2.4)	471 (8.2)	15 (2.2)	419 (13.5)	16 (0.6)
United Arab Emirates	12 (1.6)	474 (8.8)	32 (2.4)	447 (5.2)	31 (2.7)	453 (6.9)	25 (2.1)	453 (6.4)	10 (0.3)
United States	24 (2.4)	544 (5.5)	35 (2.8)	540 (3.8)	20 (2.1)	535 (6.2)	21 (2.5)	530 (4.9)	13 (0.5)
International Avg.	40 (0.5)	508 (0.9)	31 (0.5)	505 (0.9)	16 (0.4)	502 (1.3)	13 (0.3)	500 (1.5)	17 (0.1)

( ) 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 "x" indicates data are available for less than 50% of students.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 8.5: Teachers' Years of Experience (Continued)**

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	
<b>Benchmarking Participants</b>									
Buenos Aires, Argentina	x x	x x	x x	x x	x x	x x	x x	x x	x x
Ontario, Canada	29 (3.4)	510 (4.5)	43 (3.9)	514 (3.5)	16 (3.0)	516 (7.8)	13 (2.2)	523 (6.6)	15 (0.6)
Quebec, Canada	35 (6.1)	535 (4.2)	34 (4.5)	533 (7.2)	20 (4.9)	530 (7.4)	12 (3.3)	562 (12.8)	15 (1.1)
Norway (4)	29 (4.0)	500 (3.8)	34 (4.0)	491 (3.9)	21 (2.8)	494 (4.6)	16 (3.1)	494 (7.8)	15 (0.8)
Abu Dhabi, UAE	10 (3.0)	460 (25.2)	32 (4.3)	405 (11.6)	35 (4.6)	415 (11.5)	23 (3.5)	433 (13.3)	10 (0.6)
Dubai, UAE	16 (2.4)	518 (5.7)	33 (3.4)	508 (4.7)	25 (3.3)	516 (6.5)	25 (3.0)	510 (7.6)	11 (0.5)
Florida, US	r 24 (4.4)	553 (11.0)	34 (4.2)	561 (7.0)	26 (5.3)	533 (7.6)	16 (3.5)	530 (13.6)	13 (1.0)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 8.7: Teacher Participation in Professional Development in Mathematics in the Past Two Years**

Reported by Teachers

Teachers could indicate participating in more than one area of professional development.

Country	Percent of Students by Teachers' Area of Professional Development						
	Mathematics Content	Mathematics Pedagogy/ Instruction	Mathematics Curriculum	Integrating Information Technology into Mathematics	Improving Students' Critical Thinking or Problem Solving Skills	Mathematics Assessment	Addressing Individual Students' Needs
Australia	70 (2.7)	62 (3.9)	66 (4.1)	37 (3.8)	50 (4.2)	43 (3.6)	52 (4.0)
Bahrain	52 (1.6)	66 (2.0)	59 (2.9)	61 (2.0)	57 (3.9)	50 (3.4)	50 (2.0)
Belgium (Flemish)	14 (2.3)	16 (2.6)	22 (3.1)	25 (3.1)	18 (2.6)	10 (2.1)	42 (3.3)
Bulgaria	15 (2.7)	15 (2.8)	20 (4.0)	30 (3.8)	13 (2.9)	31 (3.3)	28 (3.5)
Canada	65 (2.9)	71 (2.6)	48 (2.6)	36 (2.7)	63 (2.2)	49 (2.7)	53 (2.5)
Chile	44 (4.2)	33 (4.1)	28 (4.4)	27 (4.2)	32 (4.4)	17 (3.7)	26 (3.9)
Chinese Taipei	44 (4.1)	50 (3.8)	46 (4.1)	34 (3.4)	40 (3.7)	39 (4.0)	67 (3.0)
Croatia	59 (3.7)	43 (4.0)	37 (3.7)	31 (3.6)	50 (3.8)	31 (3.3)	52 (4.3)
Cyprus	86 (2.2)	70 (2.6)	86 (2.3)	51 (3.3)	48 (3.3)	40 (3.5)	25 (3.1)
Czech Republic	21 (2.9)	31 (3.6)	9 (2.3)	40 (3.4)	29 (3.1)	9 (2.0)	36 (2.9)
Denmark	22 (3.5)	23 (3.2)	11 (2.3)	22 (3.1)	9 (2.1)	12 (2.4)	23 (3.3)
England	64 (3.7)	68 (3.6)	72 (3.8)	31 (3.9)	52 (3.9)	51 (4.2)	43 (4.1)
Finland	6 (1.3)	17 (2.3)	4 (1.3)	11 (2.2)	11 (2.0)	3 (0.9)	24 (2.7)
France	26 (3.0)	30 (2.9)	13 (2.3)	10 (2.2)	16 (2.6)	3 (1.0)	15 (2.5)
Georgia	30 (3.7)	38 (4.1)	34 (4.3)	59 (4.5)	49 (4.2)	38 (3.9)	48 (4.1)
Germany	43 (3.7)	33 (3.7)	32 (3.8)	1 (0.9)	32 (3.5)	20 (3.4)	45 (3.0)
Hong Kong SAR	78 (3.2)	83 (3.1)	53 (4.0)	69 (4.0)	73 (4.6)	45 (4.7)	51 (4.7)
Hungary	14 (3.0)	20 (3.0)	9 (2.3)	15 (2.8)	17 (2.6)	9 (2.2)	27 (3.6)
Indonesia	52 (3.6)	60 (3.6)	43 (3.6)	40 (3.4)	71 (2.8)	68 (3.1)	63 (3.3)
Iran, Islamic Rep. of	80 (2.6)	79 (3.0)	59 (3.3)	29 (3.5)	34 (3.6)	44 (3.8)	39 (3.5)
Ireland	46 (3.7)	37 (3.7)	38 (4.1)	34 (4.0)	45 (3.9)	25 (3.6)	27 (3.8)
Italy	16 (2.5)	28 (3.1)	20 (2.7)	26 (3.5)	20 (3.0)	12 (2.6)	28 (3.4)
Japan	43 (3.4)	52 (3.8)	13 (2.2)	23 (2.8)	30 (2.8)	16 (2.6)	44 (3.3)
Jordan	31 (4.1)	49 (4.0)	35 (4.1)	37 (3.3)	48 (3.8)	40 (3.9)	52 (3.9)
Kazakhstan	49 (4.1)	59 (4.0)	65 (4.1)	76 (3.8)	81 (3.2)	73 (3.6)	69 (4.0)
Korea, Rep. of	32 (3.6)	40 (3.8)	44 (3.9)	16 (3.0)	42 (4.1)	33 (4.0)	38 (4.0)
Kuwait	56 (3.5)	59 (3.1)	55 (3.5)	57 (3.5)	50 (3.8)	45 (3.6)	56 (3.8)
Lithuania	12 (2.4)	14 (2.8)	13 (2.6)	60 (4.0)	54 (3.7)	46 (3.4)	55 (3.6)
Morocco	13 (2.0)	19 (2.4)	15 (2.3)	8 (1.8)	19 (2.4)	19 (2.5)	24 (2.7)
Netherlands	r 22 (4.0)	r 28 (4.1)	r 15 (3.0)	r 18 (3.7)	r 23 (3.5)	r 19 (3.8)	r 49 (4.3)
New Zealand	74 (2.8)	70 (3.0)	63 (2.9)	42 (2.8)	59 (2.9)	58 (2.5)	62 (3.2)
Northern Ireland	r 50 (4.6)	r 63 (4.3)	r 54 (5.0)	r 40 (4.7)	r 46 (4.8)	r 57 (4.9)	r 45 (4.3)
Norway (5)	18 (3.0)	18 (2.7)	6 (1.8)	14 (3.2)	16 (3.4)	13 (2.9)	11 (2.7)
Oman	40 (2.8)	65 (2.8)	36 (3.4)	37 (2.8)	48 (3.1)	42 (2.9)	36 (2.7)
Poland	85 (2.6)	69 (3.9)	72 (3.3)	68 (3.6)	47 (3.8)	51 (3.9)	70 (3.6)
Portugal	46 (3.3)	37 (3.0)	49 (3.5)	23 (2.5)	22 (3.0)	13 (2.5)	24 (2.7)
Qatar	64 (3.1)	68 (2.7)	57 (3.2)	57 (2.8)	67 (2.8)	62 (2.9)	66 (3.4)
Russian Federation	37 (3.8)	43 (4.2)	68 (3.4)	67 (3.2)	51 (3.8)	66 (3.2)	55 (3.5)
Saudi Arabia	50 (4.0)	68 (3.7)	44 (4.3)	45 (3.4)	53 (4.1)	41 (4.4)	49 (4.1)
Serbia	49 (3.8)	33 (3.6)	29 (3.6)	19 (3.0)	45 (3.9)	30 (3.7)	42 (4.4)
Singapore	64 (2.9)	81 (2.6)	60 (2.5)	59 (2.7)	58 (2.8)	62 (2.9)	43 (2.7)
Slovak Republic	5 (1.3)	11 (2.0)	27 (2.8)	37 (3.4)	17 (2.8)	11 (2.0)	22 (2.9)
Slovenia	20 (3.0)	17 (2.5)	31 (3.7)	29 (3.5)	29 (3.7)	38 (3.7)	30 (3.4)
South Africa (5)	79 (2.5)	54 (3.1)	82 (2.6)	38 (3.4)	66 (3.3)	83 (2.3)	61 (3.2)
Spain	27 (3.5)	34 (4.2)	23 (2.9)	34 (3.9)	32 (3.5)	17 (2.5)	45 (3.7)
Sweden	56 (4.3)	58 (4.3)	43 (4.6)	10 (2.5)	50 (4.5)	49 (4.1)	24 (2.3)
Turkey	5 (1.5)	6 (1.4)	6 (1.6)	9 (2.0)	10 (2.1)	7 (1.8)	12 (3.5)
United Arab Emirates	60 (2.2)	59 (2.6)	59 (2.5)	60 (2.3)	72 (2.2)	60 (2.4)	67 (2.3)
United States	71 (2.4)	62 (2.5)	70 (2.5)	41 (2.3)	62 (2.8)	48 (2.7)	59 (2.6)
International Avg.	43 (0.5)	45 (0.5)	40 (0.5)	36 (0.5)	41 (0.5)	36 (0.5)	42 (0.5)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

( ) 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 students.

**Exhibit 8.7: Teacher Participation in Professional Development in Mathematics in the Past Two Years (Continued)**

Country	Percent of Students by Teachers' Area of Professional Development						
	Mathematics Content	Mathematics Pedagogy/ Instruction	Mathematics Curriculum	Integrating Information Technology into Mathematics	Improving Students' Critical Thinking or Problem Solving Skills	Mathematics Assessment	Addressing Individual Students' Needs
<b>Benchmarking Participants</b>							
Buenos Aires, Argentina	x x	x x	x x	x x	x x	x x	x x
Ontario, Canada	69 (4.2)	81 (2.9)	56 (4.0)	37 (4.1)	81 (3.1)	55 (3.9)	55 (4.2)
Quebec, Canada	62 (6.1)	63 (5.8)	31 (5.4)	33 (6.0)	38 (5.7)	47 (5.5)	40 (5.7)
Norway (4)	11 (2.4)	14 (2.8)	5 (1.8)	8 (2.5)	8 (2.1)	8 (1.9)	8 (1.8)
Abu Dhabi, UAE	63 (3.8)	57 (4.7)	64 (4.2)	58 (4.2)	73 (3.5)	51 (4.0)	66 (4.0)
Dubai, UAE	57 (1.8)	60 (2.4)	56 (1.9)	61 (2.0)	73 (1.8)	66 (2.3)	67 (1.6)
Florida, US	r 75 (4.8)	r 61 (6.3)	r 74 (5.1)	r 45 (6.5)	r 60 (4.4)	r 52 (5.4)	r 62 (5.1)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 8.9: Principals' Formal Education\***

Principal Education Level Reported by Principals and Current Requirements Reported by National Research Coordinators

Country	Percent of Students by Principal Educational Level			Current Requirements	
	Completed Postgraduate University Degree**	Completed Bachelor's Degree or Equivalent but Not a Postgraduate Degree	Did Not Complete Bachelor's Degree	Teaching Experience	Completion of Specialized School Leadership Training Program
Australia	38 (3.9)	59 (4.1)	3 (1.4)	●	○
Bahrain	36 (0.2)	61 (0.2)	3 (0.0)	●	●
Belgium (Flemish)	4 (1.7)	96 (1.8)	0 (0.4)	●	Varies by educational network
Bulgaria	98 (1.1)	2 (1.1)	0 (0.0)	●	○
Canada	62 (2.7)	38 (2.7)	0 (0.0)	●	●
Chile	62 (4.6)	38 (4.6)	0 (0.0)	●	●
Chinese Taipei	88 (2.7)	12 (2.7)	0 (0.0)	●	●
Croatia	6 (2.1)	88 (3.0)	6 (2.1)	●	○
Cyprus	74 (4.0)	22 (3.6)	4 (2.3)	●	○
Czech Republic	100 (0.0)	0 (0.0)	0 (0.0)	●	●
Denmark	19 (3.0)	75 (3.6)	7 (2.1)	○	○
England	57 (4.3)	42 (4.2)	1 (1.0)	○	○
Finland	94 (2.0)	6 (2.0)	0 (0.0)	●	○
France	23 (3.5)	48 (4.3)	29 (3.5)	●	○
Georgia	98 (1.4)	2 (1.4)	0 (0.0)	○	○
Germany	88 (1.4)	1 (0.6)	12 (1.5)	●	○
Hong Kong SAR	71 (4.0)	28 (3.8)	2 (1.2)	●	●
Hungary	41 (4.5)	59 (4.5)	1 (0.8)	○	●
Indonesia	15 (2.6)	67 (3.6)	18 (2.4)	●	●
Iran, Islamic Rep. of	13 (2.5)	73 (3.3)	14 (2.8)	○	○
Ireland	37 (4.1)	61 (4.3)	2 (1.3)	●	○
Italy	24 (3.7)	70 (4.0)	7 (2.0)	●	○
Japan	9 (2.6)	91 (2.6)	0 (0.0)	●	○
Jordan	49 (4.0)	49 (3.9)	2 (1.1)	○	○
Kazakhstan	9 (2.0)	90 (2.2)	1 (0.8)	●	●
Korea, Rep. of	83 (2.9)	16 (2.7)	1 (1.0)	●	●
Kuwait	18 (2.5)	54 (4.3)	28 (3.8)	●	●
Lithuania	48 (3.6)	52 (3.6)	0 (0.0)	●	○
Morocco	5 (1.3)	54 (3.9)	41 (3.7)	●	●
Netherlands	19 (4.5)	61 (5.0)	20 (3.9)	○	●
New Zealand	44 (3.7)	37 (3.6)	19 (3.0)	●	○
Northern Ireland	83 (3.8)	16 (3.6)	1 (1.2)	●	○
Norway (5)	35 (4.3)	61 (4.4)	4 (1.6)	○	○
Oman	21 (2.2)	61 (2.9)	18 (2.2)	●	○
Poland	100 (0.0)	0 (0.0)	0 (0.0)	●	●
Portugal	33 (4.2)	65 (4.2)	2 (1.1)	●	○
Qatar	44 (2.9)	53 (2.9)	2 (1.4)	●	●
Russian Federation	83 (2.9)	17 (2.9)	0 (0.2)	●	○
Saudi Arabia	4 (1.8)	81 (3.2)	15 (2.8)	●	○
Serbia	29 (3.6)	70 (3.9)	2 (1.3)	●	○
Singapore	59 (0.0)	39 (0.0)	3 (0.0)	●	●
Slovak Republic	100 (0.0)	0 (0.0)	0 (0.0)	●	●
Slovenia	99 (0.8)	1 (0.8)	0 (0.0)	●	●
South Africa (5)	12 (2.2)	66 (3.3)	22 (2.8)	●	○
Spain	9 (1.8)	82 (2.6)	9 (2.3)	●	○
Sweden	32 (3.9)	60 (4.2)	8 (2.4)	○	●
Turkey	23 (3.0)	68 (3.5)	9 (2.0)	●	○
United Arab Emirates	54 (2.2)	45 (2.2)	1 (0.5)	●	●
United States	97 (1.2)	3 (1.2)	0 (0.0)	●	●
International Avg.	48 (0.4)	46 (0.5)	6 (0.3)		

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

● Yes  
○ No

\* 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.

**Exhibit 8.9: Principals' Formal Education\* (Continued)**

Country	Percent of Students by Principal Educational Level			Current Requirements	
	Completed Postgraduate University Degree**	Completed Bachelor's Degree or Equivalent but Not a Postgraduate Degree	Did Not Complete Bachelor's Degree	Teaching Experience	Completion of Specialized School Leadership Training Program
<b>Benchmarking Participants</b>					
Buenos Aires, Argentina	12 (3.8)	72 (5.6)	16 (4.4)	●	○
Ontario, Canada	50 (4.1)	50 (4.1)	0 (0.0)	●	●
Quebec, Canada	68 (5.1)	32 (5.1)	0 (0.1)	●	○
Norway (4)	36 (4.5)	61 (4.5)	3 (1.5)	○	○
Abu Dhabi, UAE	45 (5.1)	53 (5.1)	1 (0.9)	●	●
Dubai, UAE	64 (0.3)	35 (0.3)	0 (0.0)	●	○
Florida, US	100 (0.0)	0 (0.0)	0 (0.0)	●	●

● Yes  
 ○ No

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**Exhibit 8.11: Principals' Years of Experience**

Reported by Principals

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	18 (3.0)	31 (3.5)	26 (3.4)	25 (3.9)	11 (0.6)
Bahrain	8 (0.1)	13 (0.2)	37 (0.2)	43 (0.2)	7 (0.0)
Belgium (Flemish)	4 (1.6)	40 (3.8)	32 (3.5)	24 (4.0)	9 (0.5)
Bulgaria	22 (3.4)	42 (5.6)	20 (3.8)	16 (4.1)	13 (0.7)
Canada	3 (0.9)	35 (3.3)	30 (2.8)	32 (2.6)	8 (0.3)
Chile	17 (3.5)	24 (3.8)	22 (3.9)	37 (4.5)	10 (0.8)
Chinese Taipei	4 (1.7)	37 (4.0)	32 (3.6)	27 (3.7)	9 (0.4)
Croatia	11 (3.0)	30 (3.4)	22 (2.6)	36 (3.8)	9 (0.7)
Cyprus	6 (1.4)	3 (1.4)	27 (4.6)	65 (4.9)	5 (0.4)
Czech Republic	13 (2.5)	42 (4.2)	23 (3.6)	22 (3.3)	11 (0.6)
Denmark	r 20 (3.3)	36 (3.9)	21 (3.3)	22 (3.8)	12 (0.7)
England	4 (1.7)	38 (4.6)	24 (3.7)	34 (4.6)	9 (0.5)
Finland	18 (3.4)	38 (4.1)	25 (4.0)	18 (3.5)	12 (0.7)
France	9 (2.7)	40 (4.5)	27 (4.0)	23 (4.1)	10 (0.6)
Georgia	17 (3.2)	15 (3.1)	38 (4.6)	30 (4.4)	9 (0.7)
Germany	15 (2.7)	25 (3.1)	29 (3.4)	30 (3.7)	10 (0.6)
Hong Kong SAR	14 (3.0)	44 (4.3)	20 (4.0)	22 (3.1)	12 (0.6)
Hungary	14 (3.3)	32 (4.3)	31 (3.8)	22 (3.6)	11 (0.7)
Indonesia	5 (1.5)	17 (2.7)	42 (3.6)	36 (3.6)	7 (0.4)
Iran, Islamic Rep. of	16 (2.6)	38 (3.5)	25 (2.8)	21 (3.1)	11 (0.6)
Ireland	17 (3.5)	32 (4.3)	22 (3.6)	30 (4.1)	11 (0.8)
Italy	15 (3.1)	25 (3.8)	30 (3.7)	30 (3.5)	10 (0.7)
Japan	0 (0.0)	5 (1.8)	39 (4.0)	56 (3.9)	4 (0.2)
Jordan	13 (2.3)	23 (3.2)	36 (3.1)	28 (3.6)	9 (0.6)
Kazakhstan	14 (2.5)	28 (3.7)	29 (3.8)	30 (3.6)	10 (0.7)
Korea, Rep. of	33 (4.2)	0 (0.0)	22 (3.1)	45 (4.1)	14 (1.4)
Kuwait	12 (2.9)	19 (4.0)	45 (4.3)	24 (3.8)	9 (0.7)
Lithuania	40 (3.6)	36 (3.6)	19 (3.0)	6 (1.9)	17 (0.6)
Morocco	3 (1.0)	57 (2.9)	26 (2.7)	13 (2.1)	11 (0.2)
Netherlands	s 13 (4.0)	30 (4.7)	28 (4.8)	30 (4.9)	10 (1.0)
New Zealand	31 (3.4)	34 (3.5)	20 (3.1)	15 (2.7)	14 (0.6)
Northern Ireland	r 17 (3.7)	36 (4.8)	24 (4.9)	23 (4.9)	12 (0.8)
Norway (5)	11 (3.1)	24 (3.6)	33 (4.2)	32 (4.6)	9 (0.7)
Oman	14 (2.5)	44 (3.4)	19 (2.7)	23 (3.0)	11 (0.5)
Poland	16 (3.3)	44 (4.0)	26 (3.2)	13 (3.1)	12 (0.6)
Portugal	11 (2.5)	29 (4.3)	38 (4.4)	22 (3.0)	10 (0.6)
Qatar	8 (1.7)	21 (2.9)	43 (3.7)	28 (2.9)	8 (0.4)
Russian Federation	21 (3.4)	29 (3.9)	24 (3.6)	26 (3.5)	12 (0.7)
Saudi Arabia	14 (2.7)	33 (3.7)	22 (3.1)	31 (4.0)	11 (0.6)
Serbia	1 (0.8)	33 (3.8)	23 (3.5)	43 (3.5)	7 (0.4)
Singapore	2 (0.0)	41 (0.0)	30 (0.0)	27 (0.0)	8 (0.0)
Slovak Republic	13 (2.6)	38 (4.1)	20 (3.3)	29 (3.4)	10 (0.6)
Slovenia	7 (2.1)	37 (4.2)	33 (4.3)	23 (3.7)	10 (0.5)
South Africa (5)	20 (3.5)	29 (2.9)	21 (2.6)	29 (3.7)	11 (0.8)
Spain	6 (1.4)	27 (3.5)	29 (3.4)	38 (3.7)	8 (0.4)
Sweden	12 (3.1)	32 (4.4)	31 (3.6)	25 (2.9)	10 (0.6)
Turkey	8 (2.1)	24 (3.5)	29 (3.1)	39 (3.3)	8 (0.6)
United Arab Emirates	r 20 (1.8)	27 (1.8)	28 (2.2)	25 (1.8)	11 (0.3)
United States	r 5 (1.6)	27 (3.1)	27 (3.2)	42 (3.6)	7 (0.4)
International Avg.	13 (0.4)	30 (0.5)	28 (0.5)	29 (0.5)	10 (0.1)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

( ) 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.

**Exhibit 8.11: Principals' Years of Experience (Continued)**

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	
<b>Benchmarking Participants</b>					
Buenos Aires, Argentina	9 (3.1)	13 (4.0)	36 (5.1)	42 (5.1)	8 (0.6)
Ontario, Canada	0 (0.0)	38 (5.7)	31 (4.5)	31 (4.3)	8 (0.4)
Quebec, Canada	4 (2.5)	37 (5.1)	29 (5.1)	30 (4.9)	9 (0.7)
Norway (4)	10 (2.6)	24 (3.4)	33 (4.4)	32 (4.8)	9 (0.7)
Abu Dhabi, UAE	21 (3.9)	34 (4.1)	19 (4.4)	26 (3.9)	11 (0.7)
Dubai, UAE	12 (0.2)	25 (0.2)	36 (0.3)	27 (0.3)	10 (0.0)
Florida, US	4 (2.9)	25 (6.6)	29 (7.4)	42 (7.1)	7 (0.9)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**TIMSS**  
**2015**

# CHAPTER 9: CLASSROOM INSTRUCTION

TIMSS 2015 INTERNATIONAL RESULTS IN MATHEMATICS



**IEA**

**TIMSS & PIRLS**  
International Study Center  
Lynch School of Education, Boston College

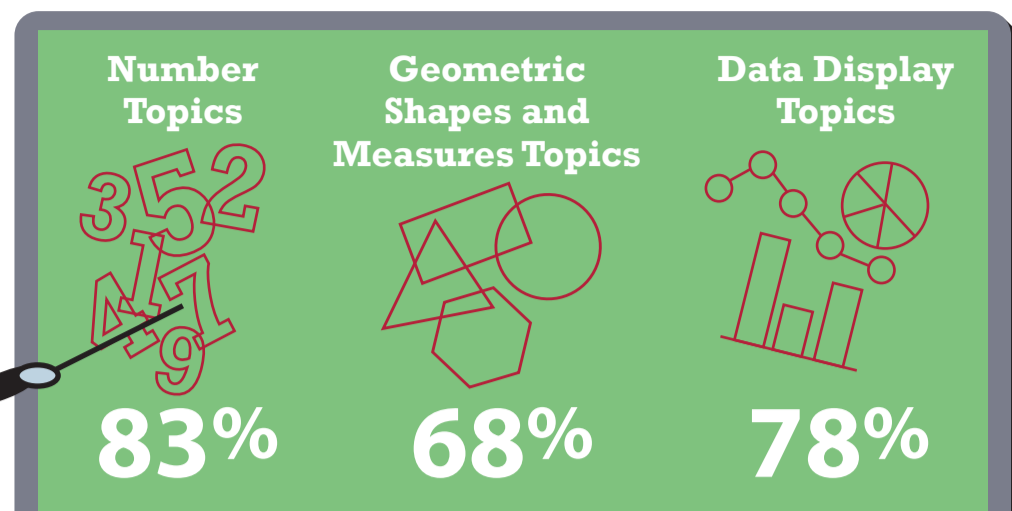


## Instruction in Mathematics Classes

### Curriculum Coverage

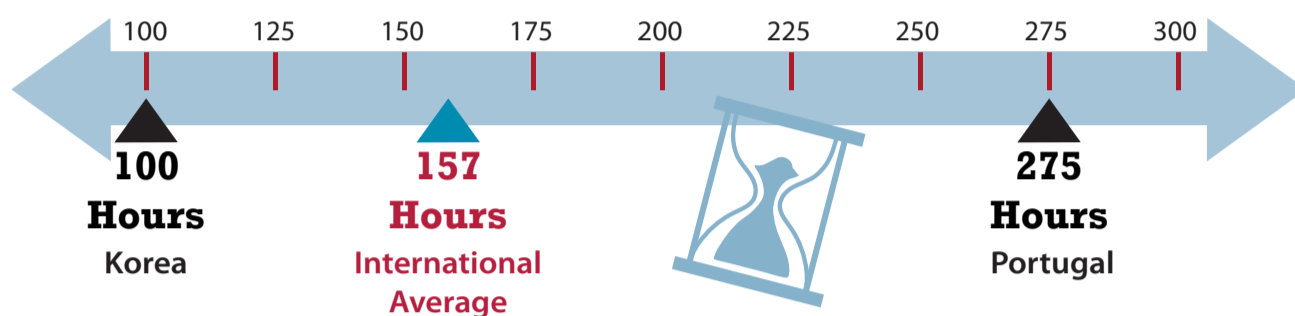
There was variation in topic coverage within content domains. However, according to their teachers most students had been taught the TIMSS topics.

Percentage of students taught the TIMSS 2015 topics

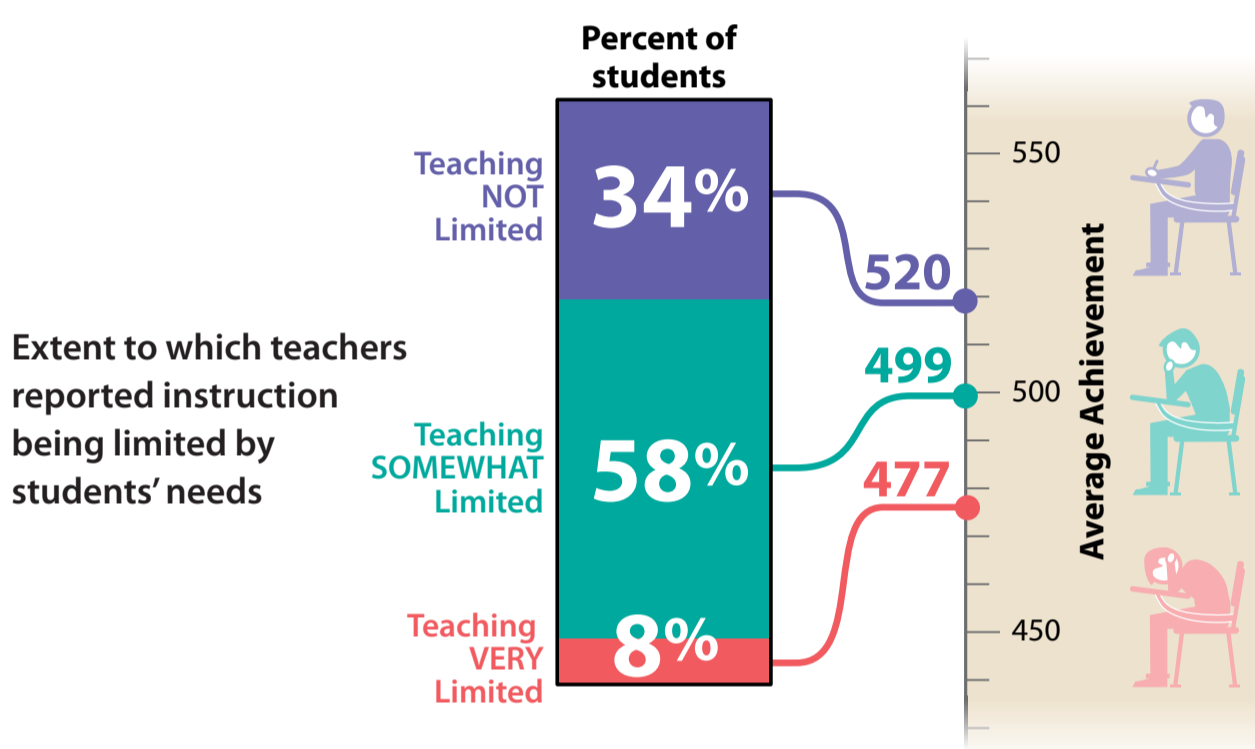


### Instructional Time

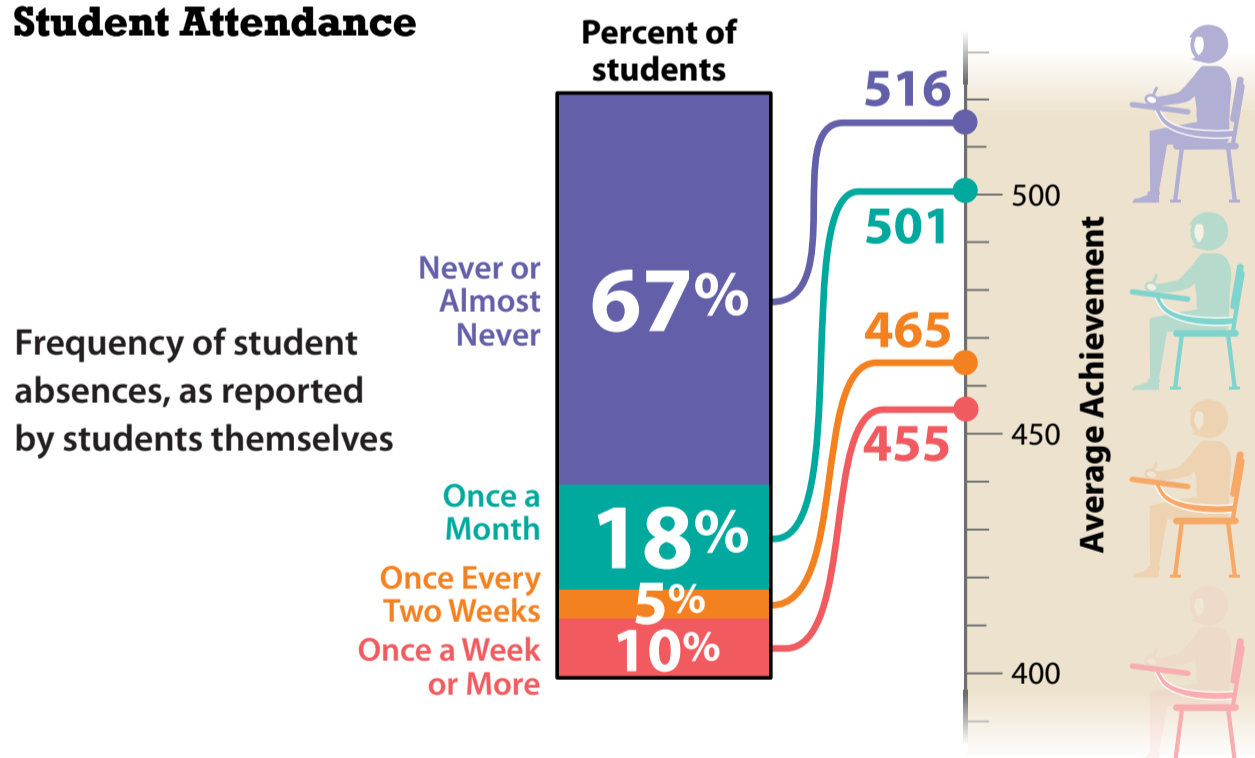
Instructional time remains a crucial resource in considering students' opportunity to learn, even though there are many factors that influence the effectiveness of an educational system. There was a considerable range in the yearly number of instructional hours in mathematics.



### Teaching Limited by Student Needs



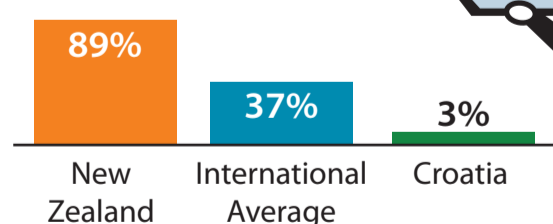
### Student Attendance



### Computer Activities During Mathematics Lessons

There is a continuing debate about the role of technology in education, and more particularly in mathematics classes.

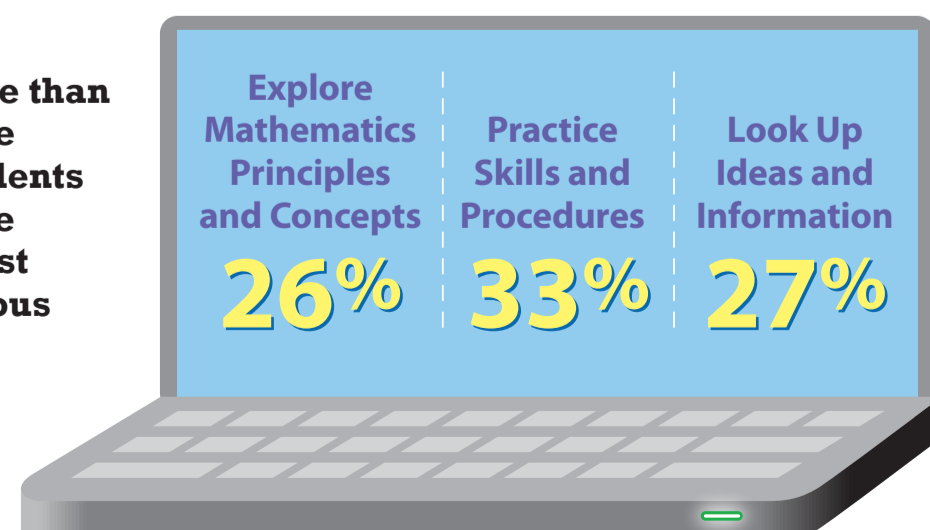
Teachers reported considerable variation in computer availability for use in mathematics lessons.



Average mathematics achievement for students with computer availability compared to those without availability:

**510** vs **504**

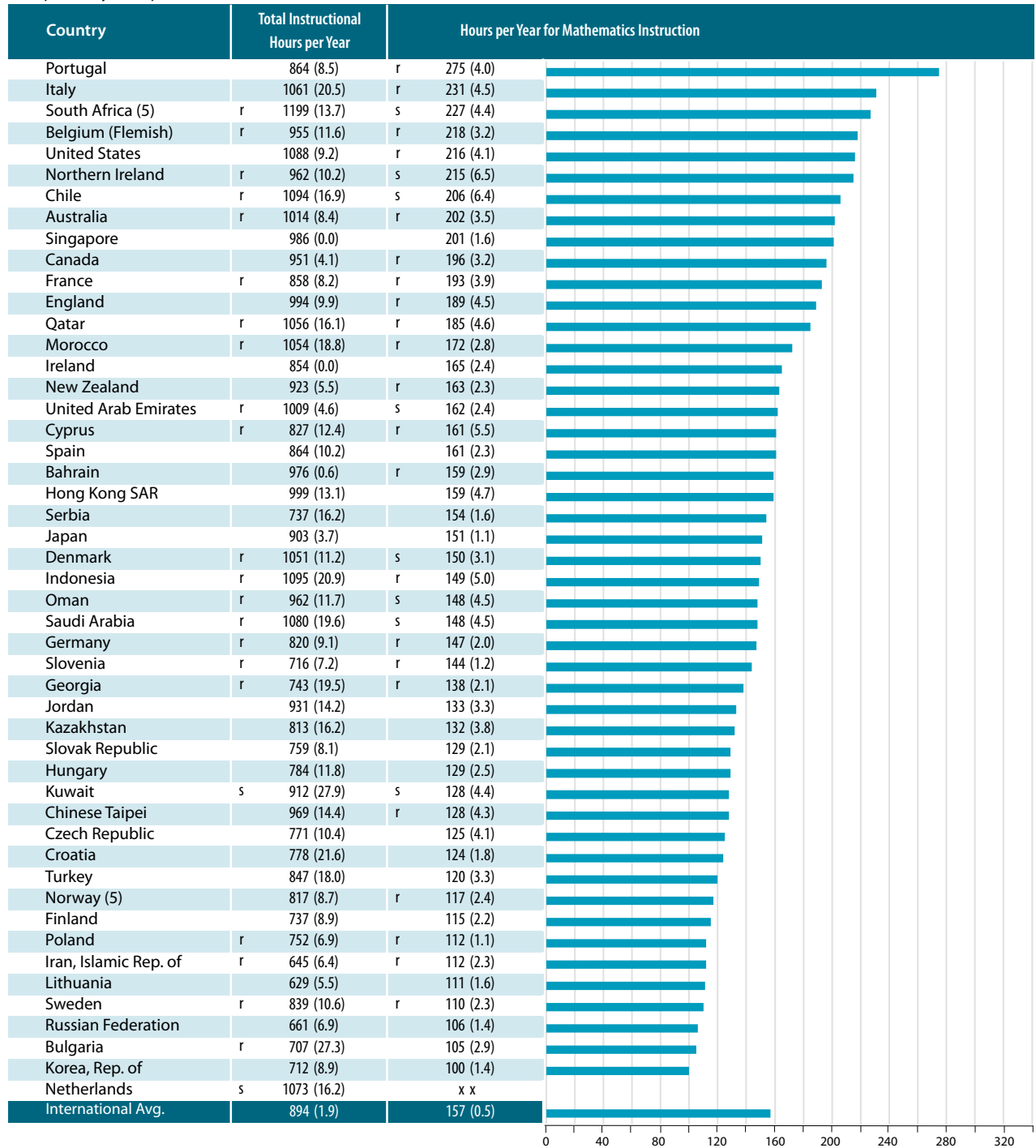
On average, more than one quarter of the fourth grade students were asked to use computers at least monthly for various activities.





**Exhibit 9.1: Instructional Time Spent on Mathematics**

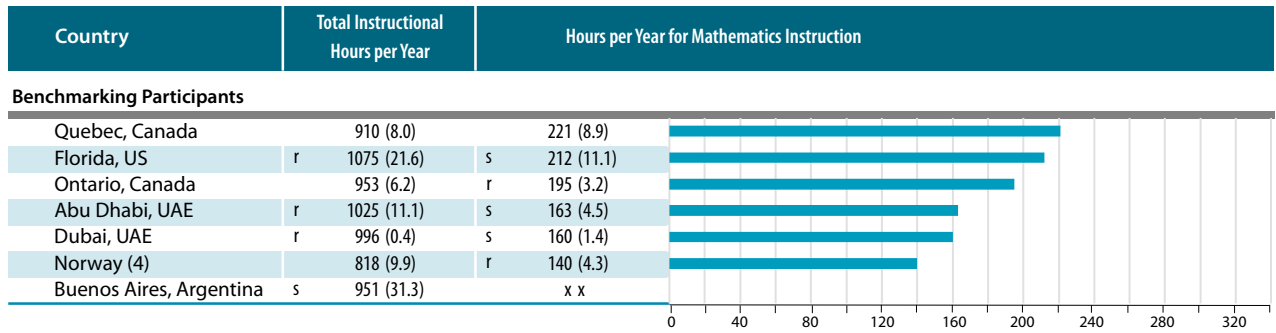
Reported by Principals and Teachers



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

( ) 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 less than 50% of students.

**Exhibit 9.1: Instructional Time Spent on Mathematics (Continued)**



<b>Total Instructional Hours per Year</b>	=	Principal Reports of School Days per Year	<b>X</b>	Principal Reports of Instructional Hours per Day
<b>Hours per Year for Mathematics Instruction</b>	=	Teacher Reports of Weekly Mathematics Instructional Hours	<b>X</b>	Principal Reports of School Days per Year
		Principal Reports of School Days per Week		

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**Exhibit 9.3: Percentages of Students Taught the TIMSS Mathematics Topics\***

Reported by Teachers

Country	All Mathematics (17 topics)	Number (8 topics)	Geometric Shapes and Measures (7 topics)	Data Display (2 topics)
Australia	87 (1.0)	89 (0.9)	83 (1.4)	93 (1.6)
Bahrain	86 (1.4)	87 (1.8)	82 (0.6)	90 (3.0)
Belgium (Flemish)	85 (0.7)	97 (0.7)	74 (1.2)	76 (2.6)
Bulgaria	60 (1.0)	63 (0.5)	56 (1.4)	62 (4.0)
Canada	77 (0.8)	80 (0.7)	69 (1.2)	92 (1.2)
Chile	90 (1.2)	94 (1.0)	88 (1.6)	83 (3.0)
Chinese Taipei	75 (1.0)	85 (0.9)	65 (1.2)	72 (3.5)
Croatia	60 (0.7)	61 (0.6)	67 (1.2)	30 (2.8)
Cyprus	83 (0.9)	84 (0.7)	80 (1.4)	89 (2.2)
Czech Republic	66 (1.0)	71 (1.0)	59 (1.4)	69 (3.1)
Denmark	77 (1.0)	78 (1.0)	79 (1.6)	62 (3.3)
England	89 (1.2)	95 (0.8)	85 (1.9)	80 (3.0)
Finland	76 (1.0)	89 (0.9)	58 (2.1)	85 (2.2)
France	75 (1.0)	75 (1.1)	77 (1.4)	71 (2.8)
Georgia	61 (1.5)	65 (1.3)	49 (2.3)	89 (2.2)
Germany	69 (0.8)	67 (1.0)	64 (1.3)	92 (1.7)
Hong Kong SAR	85 (0.9)	94 (0.8)	71 (1.5)	93 (2.1)
Hungary	75 (1.0)	79 (0.6)	68 (1.6)	85 (2.7)
Indonesia	74 (1.4)	89 (1.1)	65 (1.9)	42 (2.7)
Iran, Islamic Rep. of	76 (1.2)	93 (0.7)	60 (1.7)	61 (3.6)
Ireland	81 (1.0)	92 (0.8)	66 (1.7)	94 (1.9)
Italy	80 (1.0)	88 (1.0)	70 (1.6)	83 (2.5)
Japan	76 (1.0)	85 (0.8)	71 (1.2)	62 (3.2)
Jordan	72 (1.3)	89 (1.1)	59 (1.8)	52 (4.1)
Kazakhstan	79 (1.4)	82 (1.4)	80 (1.6)	65 (3.1)
Korea, Rep. of	73 (1.1)	83 (1.2)	60 (1.2)	80 (2.6)
Kuwait	84 (1.0)	90 (0.9)	74 (1.5)	89 (2.3)
Lithuania	81 (1.1)	88 (1.1)	69 (1.7)	95 (1.5)
Morocco	55 (0.9)	59 (1.1)	56 (1.2)	39 (3.1)
Netherlands	r 64 (1.4)	r 70 (1.5)	r 51 (1.8)	r 84 (2.8)
New Zealand	82 (0.9)	87 (0.8)	74 (1.3)	93 (1.4)
Northern Ireland	r 92 (0.9)	r 97 (0.6)	r 85 (1.7)	r 94 (2.7)
Norway (5)	r 74 (1.2)	r 78 (1.4)	r 70 (1.7)	r 74 (3.0)
Oman	91 (0.8)	97 (0.8)	83 (1.2)	96 (1.1)
Poland	58 (1.3)	71 (1.4)	46 (1.4)	47 (3.7)
Portugal	93 (0.5)	96 (0.5)	88 (1.0)	99 (0.4)
Qatar	75 (1.2)	91 (1.1)	57 (1.8)	75 (2.9)
Russian Federation	- -	- -	- -	- -
Saudi Arabia	82 (1.0)	89 (1.0)	73 (1.6)	84 (2.6)
Serbia	73 (0.8)	81 (0.6)	68 (1.0)	63 (3.6)
Singapore	85 (0.5)	100 (0.1)	66 (1.1)	95 (1.0)
Slovak Republic	56 (0.8)	66 (0.7)	44 (1.1)	57 (2.9)
Slovenia	64 (0.8)	70 (1.0)	48 (1.2)	95 (1.1)
South Africa (5)	90 (0.6)	95 (0.5)	82 (1.2)	95 (1.0)
Spain	74 (1.3)	86 (1.3)	58 (2.1)	83 (2.4)
Sweden	56 (1.3)	65 (1.5)	44 (2.0)	63 (4.3)
Turkey	78 (1.3)	84 (1.2)	65 (1.9)	96 (1.5)
United Arab Emirates	80 (0.7)	90 (0.6)	68 (1.3)	83 (2.0)
United States	83 (0.8)	94 (0.6)	69 (1.4)	86 (1.7)
International Avg.	76 (0.2)	83 (0.1)	68 (0.2)	78 (0.4)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

\* Percentage mostly taught before or in the assessment year averaged across topics.

( ) 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 "x" indicates data are available for less than 50% of students.

**Exhibit 9.3: Percentages of Students Taught the TIMSS Mathematics Topics\* (Continued)**

Country	All Mathematics (17 topics)	Number (8 topics)	Geometric Shapes and Measures (7 topics)	Data Display (2 topics)
<b>Benchmarking Participants</b>				
Buenos Aires, Argentina	x x	x x	x x	x x
Ontario, Canada	r 80 (1.1)	r 77 (1.3)	r 78 (1.8)	r 99 (0.5)
Quebec, Canada	85 (1.4)	88 (1.4)	79 (1.9)	91 (3.1)
Norway (4)	72 (1.5)	71 (1.6)	74 (2.0)	71 (3.1)
Abu Dhabi, UAE	80 (1.7)	87 (1.2)	72 (2.5)	78 (3.9)
Dubai, UAE	83 (0.6)	92 (0.6)	71 (1.1)	90 (0.9)
Florida, US	r 86 (1.2)	r 97 (0.7)	r 71 (2.5)	r 90 (2.8)

**TIMSS 2015 Mathematics Topics**

**A. Number**

- 1) Concepts of whole numbers, including place value and ordering
- 2) Adding, subtracting, multiplying, and/or dividing with whole numbers
- 3) Concepts of multiples and factors; odd and even numbers
- 4) Concepts of fractions
- 5) Adding and subtracting with fractions, comparing and ordering fractions
- 6) Concepts of decimals, including place value and ordering, adding and subtracting with decimals
- 7) Number sentences
- 8) Number patterns

**B. Geometric Shapes and Measures**

- 1) Lines: measuring, estimating length of; parallel and perpendicular lines
- 2) Comparing and drawing angles
- 3) Using informal coordinate systems to locate points in a plane
- 4) Elementary properties of common geometric shapes
- 5) Reflections and rotations
- 6) Relationships between two-dimensional and three-dimensional shapes
- 7) Finding and estimating areas, perimeters, and volumes

**C. Data Display**

- 1) Reading and representing data from tables, pictographs, bar graphs, or pie charts
- 2) Drawing conclusions from data displays

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 9.5: Computer Activities During Mathematics Lessons**

Reported by Teachers

Country	Computers Available for Students to Use in Mathematics Lessons			Percent of Students Whose Teachers Have Them Use Computers at Least Monthly		
	Percent of Students	Average Achievement		To Explore Mathematics Principles and Concepts	To Practice Skills and Procedures	To Look Up Ideas and Information
	Yes	Yes	No			
New Zealand	89 (1.6)	492 (2.6)	481 (8.7)	78 (2.3)	86 (2.0)	76 (2.3)
Denmark	84 (2.9)	537 (3.4)	540 (5.7)	52 (4.1)	79 (3.1)	45 (3.9)
Netherlands	r 76 (3.6)	531 (2.1)	527 (2.9)	r 48 (4.1)	r 73 (3.7)	r 49 (3.9)
Northern Ireland	r 71 (3.8)	573 (4.1)	572 (5.1)	r 58 (3.9)	r 68 (3.8)	r 58 (5.0)
Georgia	70 (3.6)	458 (4.3)	477 (8.1)	58 (4.6)	65 (4.1)	62 (4.4)
Sweden	65 (3.9)	522 (2.9)	514 (6.4)	33 (3.4)	63 (4.1)	33 (3.7)
Russian Federation	62 (3.6)	564 (4.8)	564 (4.8)	49 (4.1)	60 (3.7)	58 (4.0)
Australia	60 (3.8)	520 (3.5)	517 (6.2)	53 (3.8)	57 (3.9)	49 (3.8)
Norway (5)	59 (3.9)	551 (3.8)	548 (3.8)	44 (3.8)	54 (3.7)	40 (3.5)
England	58 (3.6)	551 (5.0)	542 (5.5)	49 (3.7)	52 (3.6)	45 (3.9)
Germany	57 (3.7)	518 (3.4)	524 (2.6)	23 (2.8)	43 (4.0)	29 (3.1)
Finland	56 (3.1)	536 (2.9)	534 (2.4)	32 (3.3)	50 (3.5)	30 (3.3)
Cyprus	51 (3.0)	523 (3.4)	523 (3.3)	42 (3.0)	49 (2.9)	38 (3.2)
Japan	50 (3.8)	590 (2.8)	596 (2.6)	10 (2.3)	14 (2.6)	12 (2.6)
United States	46 (3.2)	536 (3.8)	540 (3.3)	38 (3.0)	43 (3.2)	32 (2.5)
Canada	46 (2.7)	501 (4.1)	518 (2.9)	36 (2.6)	41 (2.6)	32 (2.5)
Hong Kong SAR	45 (4.4)	617 (4.5)	612 (4.7)	33 (4.9)	35 (4.4)	29 (4.4)
Chile	43 (4.2)	465 (5.2)	456 (3.7)	31 (3.8)	36 (4.2)	31 (4.1)
Kazakhstan	40 (3.7)	551 (7.2)	541 (6.2)	38 (3.9)	39 (3.8)	39 (3.8)
Ireland	40 (4.2)	548 (3.5)	547 (3.0)	31 (3.7)	34 (3.8)	27 (4.0)
Belgium (Flemish)	37 (3.4)	546 (3.4)	546 (2.9)	14 (2.2)	32 (3.4)	20 (2.9)
Singapore	37 (2.4)	621 (5.7)	616 (5.3)	30 (2.2)	34 (2.2)	28 (2.3)
Italy	35 (3.1)	506 (3.4)	507 (3.5)	25 (2.9)	29 (3.3)	25 (3.0)
Qatar	35 (3.4)	436 (8.4)	441 (4.9)	32 (3.5)	34 (3.3)	31 (3.3)
Spain	34 (3.4)	506 (4.1)	504 (2.9)	20 (3.0)	28 (3.4)	26 (3.2)
Poland	31 (3.7)	533 (3.6)	535 (2.9)	18 (3.2)	28 (3.6)	23 (3.7)
Jordan	31 (3.5)	405 (8.0)	382 (4.1)	25 (3.1)	28 (3.3)	27 (3.2)
Chinese Taipei	30 (3.9)	595 (3.3)	598 (2.3)	24 (3.3)	25 (3.4)	18 (3.2)
Lithuania	30 (3.9)	533 (6.2)	537 (3.4)	26 (3.7)	27 (3.7)	29 (3.9)
Turkey	30 (2.8)	503 (6.0)	474 (4.2)	25 (2.9)	26 (3.0)	27 (3.0)
Czech Republic	28 (3.3)	531 (4.4)	527 (2.4)	14 (2.4)	27 (3.2)	19 (2.8)
United Arab Emirates	26 (1.5)	483 (5.6)	443 (3.5)	23 (1.4)	24 (1.5)	23 (1.4)
Hungary	25 (3.1)	517 (8.6)	532 (4.0)	10 (2.3)	20 (2.9)	14 (2.8)
Bulgaria	25 (3.6)	530 (10.9)	523 (4.8)	11 (2.5)	21 (3.6)	23 (3.6)
Bahrain	24 (1.1)	461 (4.3)	446 (2.3)	19 (1.1)	17 (1.0)	20 (1.1)
Iran, Islamic Rep. of	24 (3.0)	444 (7.7)	429 (3.9)	17 (2.6)	19 (2.9)	17 (2.7)
Slovak Republic	22 (2.9)	502 (5.7)	497 (3.0)	19 (2.7)	21 (2.9)	21 (2.7)
Saudi Arabia	21 (3.1)	393 (10.3)	379 (4.5)	18 (2.9)	19 (3.0)	18 (2.9)
Portugal	20 (2.7)	540 (5.7)	542 (2.6)	13 (2.3)	15 (2.4)	17 (2.7)
France	19 (3.1)	506 (6.1)	484 (3.1)	3 (1.2)	9 (2.3)	6 (1.8)
Kuwait	16 (2.1)	353 (11.1)	352 (5.6)	12 (1.9)	12 (2.0)	13 (1.9)
Slovenia	16 (2.6)	517 (5.3)	521 (2.0)	9 (2.1)	12 (2.5)	12 (2.3)
Korea, Rep. of	14 (3.1)	611 (8.2)	608 (2.3)	7 (2.2)	8 (2.4)	8 (2.3)
Serbia	13 (2.6)	522 (7.4)	518 (3.8)	7 (1.6)	11 (2.3)	10 (2.3)
Oman	11 (1.9)	433 (9.7)	424 (2.9)	10 (1.8)	11 (1.9)	10 (1.9)
South Africa (5)	10 (2.1)	432 (15.7)	371 (4.3)	5 (1.6)	5 (1.3)	5 (1.4)
Indonesia	6 (1.4)	452 (14.9)	395 (3.8)	5 (1.3)	5 (1.2)	5 (1.1)
Morocco	4 (1.1)	403 (19.9)	375 (3.8)	2 (0.9)	2 (0.9)	2 (0.9)
Croatia	3 (1.3)	482 (10.3)	503 (1.8)	1 (0.7)	2 (1.0)	1 (0.8)
International Avg.	37 (0.5)	510 (1.0)	504 (0.6)	26 (0.4)	33 (0.4)	27 (0.4)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

( ) 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 students.

**Exhibit 9.5: Computer Activities During Mathematics Lessons (Continued)**

Country	Computers Available for Students to Use in Mathematics Lessons			Percent of Students Whose Teachers Have Them Use Computers at Least Monthly		
	Percent of Students	Average Achievement		To Explore Mathematics Principles and Concepts	To Practice Skills and Procedures	To Look Up Ideas and Information
		Yes	No			
<b>Benchmarking Participants</b>						
Norway (4)	55 (4.0)	499 (3.6)	491 (3.1)	42 (4.3)	54 (4.0)	37 (4.3)
Ontario, Canada	50 (3.9)	512 (3.1)	515 (3.6)	38 (3.8)	42 (3.9)	34 (3.8)
Florida, US	r 47 (5.7)	553 (7.6)	542 (5.8)	r 39 (6.2)	r 44 (5.9)	r 39 (5.7)
Dubai, UAE	44 (2.3)	537 (4.1)	497 (3.5)	40 (2.3)	42 (2.2)	41 (2.2)
Quebec, Canada	25 (4.7)	537 (6.3)	535 (4.8)	17 (4.1)	24 (4.3)	18 (4.3)
Abu Dhabi, UAE	22 (3.2)	426 (12.2)	418 (6.6)	19 (3.0)	20 (3.0)	18 (2.9)
Buenos Aires, Argentina	x x	x x	x x	x x	x x	x x

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 9.9: Teaching Limited by Student Needs**

*Reported by Teachers*

Students were scored according to their teachers' responses concerning six needs on the *Teaching Limited by Student Needs* scale. Students with teachers who felt **Not Limited** by student needs had a score on the scale of at least 11.0, which corresponds to their teachers feeling "not at all" limited by three of the six needs and to "some" extent limited by the other three needs, on average. Students with teachers who felt **Very Limited** by student needs had a score no higher than 6.9, which corresponds to their teachers reporting feeling limited "a lot" by three of the six needs and to "some" extent limited by the other three needs, on average. All other students had teachers who felt **Somewhat Limited** by student needs.

Country	Not Limited		Somewhat Limited		Very Limited		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Japan	71 (3.0)	595 (2.1)	28 (3.0)	586 (2.9)	1 (0.6)	~ ~	11.8 (0.13)
Indonesia	58 (3.0)	407 (4.8)	42 (2.9)	385 (6.7)	0 (0.3)	~ ~	10.8 (0.09)
Czech Republic	57 (3.3)	534 (3.0)	42 (3.3)	520 (3.7)	0 (0.3)	~ ~	11.1 (0.11)
Slovak Republic	54 (2.8)	509 (3.2)	38 (2.9)	487 (4.6)	8 (1.8)	477 (13.9)	10.8 (0.13)
Serbia	51 (4.0)	521 (4.5)	45 (4.1)	514 (6.4)	4 (1.6)	526 (10.5)	10.6 (0.15)
Belgium (Flemish)	49 (3.4)	554 (3.0)	49 (3.4)	538 (3.1)	2 (0.7)	~ ~	10.6 (0.11)
Poland	48 (3.3)	543 (3.1)	50 (3.2)	528 (3.0)	1 (0.6)	~ ~	10.6 (0.11)
Ireland	48 (3.8)	559 (2.9)	48 (3.8)	538 (3.1)	4 (1.6)	516 (9.5)	10.7 (0.14)
Hong Kong SAR	47 (4.0)	628 (4.8)	51 (4.0)	602 (4.7)	2 (1.1)	~ ~	10.7 (0.12)
Kazakhstan	47 (3.5)	557 (6.1)	45 (4.0)	533 (6.6)	8 (2.1)	537 (14.8)	10.3 (0.15)
Norway (5)	47 (4.2)	554 (3.9)	50 (4.2)	547 (2.6)	4 (1.5)	527 (7.2)	10.5 (0.15)
Singapore	44 (3.0)	649 (4.5)	52 (2.9)	598 (5.4)	4 (1.0)	538 (18.0)	10.4 (0.11)
Finland	44 (3.4)	545 (2.8)	54 (3.4)	528 (2.2)	2 (0.9)	~ ~	10.6 (0.10)
Spain	44 (3.6)	515 (2.3)	53 (3.7)	499 (4.1)	3 (1.3)	460 (8.4)	10.3 (0.14)
Northern Ireland	43 (4.5)	592 (4.1)	55 (4.6)	558 (4.3)	2 (1.1)	~ ~	10.5 (0.16)
Bulgaria	41 (3.8)	534 (5.9)	55 (3.4)	519 (7.2)	4 (1.4)	504 (14.7)	10.4 (0.12)
Sweden	41 (3.9)	534 (4.0)	55 (3.8)	508 (3.9)	5 (1.6)	520 (7.9)	10.3 (0.16)
Hungary	39 (4.0)	544 (6.5)	56 (4.0)	521 (5.0)	4 (1.2)	471 (20.1)	10.3 (0.14)
Korea, Rep. of	39 (3.8)	612 (3.9)	53 (3.7)	604 (2.9)	8 (1.9)	615 (5.9)	10.2 (0.16)
Croatia	39 (3.7)	505 (3.4)	56 (3.6)	502 (2.6)	5 (1.8)	493 (5.5)	10.2 (0.16)
Georgia	38 (4.1)	480 (6.6)	59 (4.2)	455 (4.7)	2 (1.2)	~ ~	10.3 (0.14)
England	38 (4.3)	568 (6.8)	58 (4.2)	537 (3.9)	5 (2.0)	510 (8.7)	10.3 (0.17)
Germany	36 (3.2)	530 (2.7)	59 (3.4)	519 (2.9)	5 (1.5)	481 (7.8)	10.0 (0.11)
New Zealand	36 (2.6)	520 (3.8)	58 (2.8)	479 (3.3)	6 (1.4)	436 (10.3)	10.1 (0.10)
United Arab Emirates	35 (2.4)	486 (5.7)	61 (2.5)	441 (4.0)	4 (0.7)	370 (7.1)	10.1 (0.08)
Netherlands	34 (4.7)	539 (2.9)	62 (5.1)	526 (2.2)	4 (1.8)	514 (10.5)	10.0 (0.14)
Australia	34 (3.4)	547 (5.3)	58 (3.3)	508 (3.3)	8 (3.0)	474 (13.0)	9.9 (0.15)
Italy	33 (3.3)	517 (4.9)	54 (3.8)	501 (2.9)	14 (2.7)	503 (6.4)	9.7 (0.15)
Denmark	32 (4.0)	550 (5.6)	61 (4.0)	533 (3.6)	6 (1.6)	520 (11.5)	9.9 (0.15)
Qatar	31 (2.8)	462 (7.4)	67 (3.0)	430 (4.2)	2 (1.1)	~ ~	10.1 (0.11)
Lithuania	28 (3.4)	547 (4.3)	62 (3.5)	530 (3.8)	10 (1.6)	541 (8.9)	9.5 (0.12)
Bahrain	27 (1.5)	458 (3.8)	63 (2.4)	452 (2.0)	9 (1.8)	431 (5.6)	9.6 (0.10)
Russian Federation	27 (3.6)	576 (6.1)	58 (4.0)	563 (5.0)	15 (2.7)	545 (10.1)	9.3 (0.15)
Portugal	26 (3.4)	557 (5.5)	63 (3.6)	537 (3.5)	12 (2.1)	530 (7.1)	9.5 (0.14)
Oman	26 (2.8)	418 (6.2)	55 (3.4)	430 (3.9)	19 (2.5)	429 (6.3)	9.1 (0.14)
Cyprus	24 (3.2)	534 (3.7)	60 (3.4)	521 (3.3)	17 (2.4)	513 (5.9)	9.1 (0.14)
Canada	22 (2.0)	531 (3.7)	69 (2.1)	511 (2.0)	9 (1.4)	460 (12.7)	9.5 (0.10)
Iran, Islamic Rep. of	21 (2.9)	457 (10.5)	57 (4.1)	429 (5.3)	22 (2.9)	413 (9.1)	8.8 (0.12)
United States	21 (2.0)	564 (6.5)	70 (2.3)	536 (2.6)	9 (1.2)	498 (7.4)	9.3 (0.09)
Chinese Taipei	21 (3.3)	599 (4.3)	68 (3.9)	599 (2.2)	12 (2.8)	576 (6.5)	9.3 (0.15)
France	19 (2.8)	506 (5.4)	72 (3.0)	485 (3.5)	9 (2.3)	478 (7.0)	9.3 (0.14)
Chile	19 (3.3)	491 (7.2)	54 (4.6)	457 (3.9)	27 (3.8)	444 (6.6)	8.6 (0.17)
Kuwait	19 (3.7)	379 (9.5)	73 (3.9)	350 (5.8)	9 (1.5)	311 (5.3)	9.3 (0.13)
Slovenia	18 (2.8)	524 (4.2)	69 (3.3)	520 (2.3)	13 (2.4)	521 (4.2)	9.1 (0.12)
South Africa (5)	18 (2.5)	403 (14.1)	73 (3.1)	373 (4.5)	9 (2.1)	371 (17.9)	9.3 (0.14)
Saudi Arabia	14 (2.5)	423 (8.0)	77 (2.9)	377 (4.7)	9 (2.1)	368 (18.4)	9.2 (0.11)
Jordan	13 (2.7)	415 (13.8)	68 (3.4)	387 (4.2)	19 (3.2)	377 (10.4)	8.7 (0.14)
Turkey	13 (2.6)	510 (10.3)	70 (3.1)	483 (4.0)	17 (2.4)	464 (9.3)	8.7 (0.12)
Morocco	10 (1.8)	395 (13.5)	72 (2.7)	378 (4.9)	18 (2.3)	358 (5.7)	8.6 (0.10)
International Avg.	34 (0.5)	520 (0.9)	58 (0.5)	499 (0.6)	8 (0.3)	477 (1.7)	

This TIMSS 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.

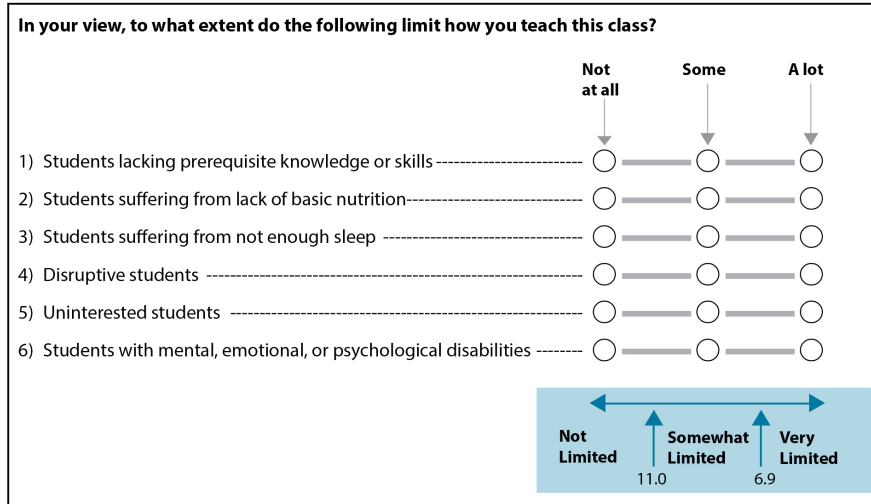
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

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 "x" indicates that data are available for less than 50% of students.

**Exhibit 9.9: Teaching Limited by Student Needs (Continued)**

Country	Not Limited		Somewhat Limited		Very Limited		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
<b>Benchmarking Participants</b>							
Norway (4)	47 (4.7)	502 (2.9)	49 (4.6)	490 (3.3)	3 (1.4)	468 (28.7)	10.6 (0.16)
Dubai, UAE	46 (3.2)	539 (4.5)	53 (3.2)	495 (3.6)	2 (0.4)	~ ~	10.7 (0.12)
Abu Dhabi, UAE	29 (4.3)	458 (13.6)	64 (4.6)	411 (8.0)	6 (1.9)	336 (10.3)	9.8 (0.16)
Ontario, Canada	23 (2.8)	529 (4.3)	68 (3.4)	512 (2.7)	9 (2.0)	485 (7.3)	9.5 (0.11)
Quebec, Canada	23 (4.6)	557 (5.4)	74 (4.7)	530 (4.1)	3 (1.5)	509 (11.2)	9.7 (0.17)
Florida, US	16 (5.1)	569 (12.6)	72 (4.6)	548 (5.6)	12 (3.7)	509 (12.1)	9.4 (0.28)
Buenos Aires, Argentina	x x	x x	x x	x x	x x	x x	x x



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 9.11: Frequency of Student Absences**

Reported by Students

Country	Never or Almost Never		Once a Month		Once Every Two Weeks		Once a Week or More	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Korea, Rep. of	93 (0.5)	612 (2.3)	5 (0.4)	574 (5.6)	1 (0.2)	~ ~	1 (0.2)	~ ~
Portugal	87 (0.6)	546 (2.2)	6 (0.4)	524 (4.8)	2 (0.2)	~ ~	5 (0.4)	491 (6.9)
Spain	86 (0.7)	510 (2.4)	7 (0.5)	498 (4.9)	2 (0.2)	~ ~	5 (0.4)	452 (7.0)
Belgium (Flemish)	85 (0.8)	551 (2.1)	9 (0.5)	526 (5.1)	1 (0.2)	~ ~	5 (0.4)	513 (5.1)
Chinese Taipei	83 (0.7)	603 (1.9)	11 (0.5)	584 (4.3)	1 (0.2)	~ ~	5 (0.4)	541 (5.3)
France	83 (0.8)	494 (2.9)	9 (0.6)	478 (4.5)	2 (0.3)	~ ~	5 (0.5)	437 (7.1)
Germany	82 (0.8)	530 (1.9)	10 (0.7)	522 (5.2)	3 (0.3)	505 (9.9)	5 (0.4)	473 (7.5)
Russian Federation	81 (0.9)	568 (3.2)	12 (0.6)	558 (5.9)	3 (0.3)	541 (10.1)	5 (0.4)	523 (7.8)
Hong Kong SAR	80 (0.8)	621 (2.9)	14 (0.8)	599 (5.3)	2 (0.3)	~ ~	3 (0.3)	553 (7.9)
Netherlands	80 (0.9)	534 (1.9)	12 (0.6)	524 (3.9)	2 (0.3)	~ ~	6 (0.5)	496 (4.3)
Japan	79 (0.8)	602 (2.0)	12 (0.6)	571 (3.9)	6 (0.5)	547 (4.3)	3 (0.3)	540 (8.0)
Lithuania	79 (0.8)	540 (2.6)	12 (0.6)	536 (4.0)	4 (0.3)	514 (11.3)	5 (0.4)	488 (6.2)
Singapore	76 (0.8)	634 (3.5)	14 (0.5)	598 (4.4)	3 (0.2)	541 (8.4)	8 (0.6)	519 (7.3)
Norway (5)	76 (0.8)	553 (2.4)	15 (0.6)	548 (3.5)	3 (0.3)	526 (7.3)	5 (0.3)	516 (6.9)
England	75 (0.9)	555 (3.0)	16 (0.7)	541 (4.8)	3 (0.3)	518 (7.6)	6 (0.5)	483 (5.6)
Cyprus	73 (1.0)	535 (2.7)	18 (0.8)	510 (3.8)	3 (0.3)	485 (6.8)	5 (0.4)	475 (5.7)
Northern Ireland	73 (1.2)	583 (2.8)	16 (0.9)	560 (4.6)	3 (0.3)	518 (8.5)	7 (0.5)	490 (6.5)
Sweden	71 (1.0)	523 (3.1)	21 (1.0)	520 (3.6)	4 (0.5)	498 (8.2)	4 (0.4)	463 (9.2)
Croatia	70 (1.0)	509 (1.8)	22 (0.9)	497 (2.8)	3 (0.3)	459 (7.6)	5 (0.4)	455 (7.0)
United States	70 (0.7)	549 (2.3)	18 (0.5)	539 (3.1)	4 (0.2)	509 (5.6)	9 (0.4)	484 (3.3)
Italy	70 (1.0)	515 (2.8)	16 (0.6)	504 (3.8)	5 (0.4)	490 (6.4)	9 (0.7)	462 (4.9)
Ireland	70 (1.2)	558 (2.1)	20 (0.9)	541 (3.5)	4 (0.5)	506 (8.6)	6 (0.5)	476 (5.7)
Canada	68 (0.6)	520 (2.0)	18 (0.4)	513 (2.6)	6 (0.3)	490 (6.3)	9 (0.4)	452 (5.2)
Slovenia	68 (1.0)	528 (1.9)	18 (0.7)	517 (3.7)	4 (0.4)	496 (6.5)	10 (0.6)	484 (5.0)
Serbia	66 (1.3)	530 (3.2)	20 (1.4)	519 (5.6)	6 (0.4)	497 (6.6)	8 (1.7)	442 (15.4)
Chile	66 (1.0)	465 (2.6)	12 (0.6)	471 (3.8)	7 (0.4)	447 (5.7)	15 (0.7)	432 (3.8)
Poland	65 (1.0)	546 (2.1)	20 (0.8)	532 (4.0)	6 (0.4)	514 (6.5)	10 (0.5)	481 (4.7)
Denmark	64 (1.2)	548 (3.1)	17 (0.8)	532 (4.2)	4 (0.3)	520 (7.5)	15 (0.8)	517 (4.5)
Australia	63 (1.1)	528 (3.4)	23 (1.0)	523 (4.1)	5 (0.4)	474 (7.8)	8 (0.5)	450 (5.1)
Turkey	63 (1.1)	502 (3.2)	21 (0.8)	474 (3.5)	7 (0.4)	443 (8.0)	9 (0.8)	419 (7.3)
Oman	62 (1.0)	440 (2.8)	17 (0.8)	419 (4.1)	5 (0.3)	380 (6.9)	15 (0.6)	399 (4.1)
Bulgaria	62 (1.2)	540 (4.5)	16 (0.8)	515 (7.0)	12 (0.7)	505 (7.9)	10 (0.6)	477 (9.0)
Morocco	62 (1.3)	391 (3.5)	22 (1.1)	377 (5.7)	7 (0.4)	345 (6.4)	9 (0.6)	346 (7.1)
Kazakhstan	61 (1.2)	553 (5.2)	21 (0.9)	540 (4.9)	8 (0.5)	526 (6.5)	11 (0.7)	522 (6.2)
Iran, Islamic Rep. of	61 (1.3)	442 (3.8)	21 (0.8)	435 (4.9)	7 (0.4)	408 (7.3)	12 (0.6)	396 (5.5)
Bahrain	57 (0.7)	466 (1.9)	20 (0.6)	457 (3.0)	6 (0.3)	412 (5.1)	17 (0.4)	413 (3.2)
United Arab Emirates	57 (0.6)	473 (2.4)	18 (0.5)	456 (3.6)	7 (0.3)	403 (4.8)	18 (0.5)	404 (3.3)
Qatar	56 (1.1)	458 (3.8)	18 (0.7)	438 (4.3)	8 (0.5)	402 (6.2)	18 (0.8)	400 (5.8)
Finland	55 (1.1)	541 (2.3)	37 (0.9)	534 (2.5)	4 (0.4)	530 (6.3)	4 (0.3)	473 (6.8)
Jordan	54 (1.5)	410 (3.8)	24 (1.3)	385 (5.7)	8 (0.8)	360 (6.5)	13 (0.7)	349 (5.6)
Kuwait	53 (1.2)	372 (5.4)	20 (0.9)	344 (5.8)	9 (0.5)	324 (6.4)	18 (0.8)	326 (5.5)
Czech Republic	50 (1.1)	539 (2.2)	34 (0.9)	530 (3.0)	8 (0.5)	508 (5.0)	8 (0.5)	476 (5.3)
Hungary	47 (1.2)	554 (2.6)	38 (1.0)	527 (3.1)	6 (0.5)	478 (8.7)	9 (0.6)	449 (6.5)
South Africa (5)	45 (1.2)	405 (3.8)	17 (0.6)	384 (5.4)	13 (0.6)	324 (5.9)	25 (0.9)	349 (4.0)
Georgia	44 (1.1)	482 (3.9)	30 (1.0)	462 (4.8)	12 (0.7)	446 (6.3)	14 (0.7)	431 (6.2)
Saudi Arabia	43 (1.2)	396 (4.5)	22 (0.9)	399 (4.5)	13 (0.7)	373 (8.7)	22 (0.9)	362 (5.8)
Slovak Republic	41 (0.9)	516 (2.8)	37 (0.8)	504 (3.1)	9 (0.5)	473 (6.5)	13 (0.7)	446 (5.0)
Indonesia	41 (1.2)	414 (4.1)	17 (0.8)	406 (5.4)	10 (0.6)	378 (7.2)	32 (1.1)	383 (4.2)
New Zealand	--	--	--	--	--	--	--	--
International Avg.	67 (0.1)	516 (0.4)	18 (0.1)	501 (0.6)	5 (0.1)	465 (1.1)	10 (0.1)	455 (0.9)

( ) 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.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Exhibit 9.11: Frequency of Student Absences (Continued)**

Country	Never or Almost Never		Once a Month		Once Every Two Weeks		Once a Week or More	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
<b>Benchmarking Participants</b>								
Quebec, Canada	76 (1.1)	540 (4.1)	15 (0.8)	540 (6.1)	4 (0.5)	519 (8.2)	5 (0.6)	490 (8.2)
Norway (4)	75 (0.8)	497 (2.3)	13 (0.6)	494 (4.3)	3 (0.3)	493 (11.8)	9 (0.6)	462 (4.9)
Florida, US	68 (1.1)	557 (4.5)	15 (0.8)	545 (7.5)	6 (0.6)	526 (10.4)	11 (0.8)	497 (7.3)
Ontario, Canada	65 (0.7)	521 (2.5)	20 (0.6)	513 (3.1)	6 (0.4)	500 (5.7)	9 (0.5)	461 (5.1)
Buenos Aires, Argentina	64 (0.8)	443 (3.1)	14 (0.7)	437 (4.9)	8 (0.4)	422 (4.8)	15 (0.7)	410 (3.6)
Dubai, UAE	63 (0.9)	522 (1.6)	18 (0.8)	517 (4.8)	5 (0.3)	476 (5.7)	13 (0.6)	461 (2.9)
Abu Dhabi, UAE	53 (1.5)	449 (4.9)	18 (0.8)	418 (6.6)	8 (0.6)	368 (6.8)	21 (1.0)	371 (6.1)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015





# CHAPTER 10: STUDENT ENGAGEMENT AND ATTITUDES

TIMSS 2015 INTERNATIONAL RESULTS IN MATHEMATICS



**IEA**

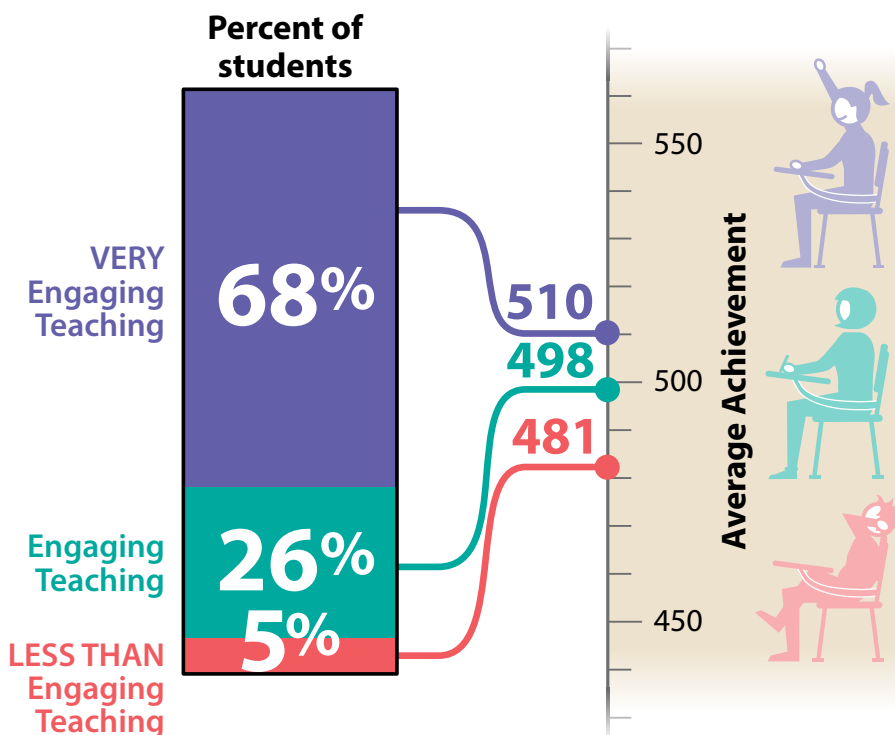
**TIMSS & PIRLS**  
International Study Center  
Lynch School of Education, Boston College



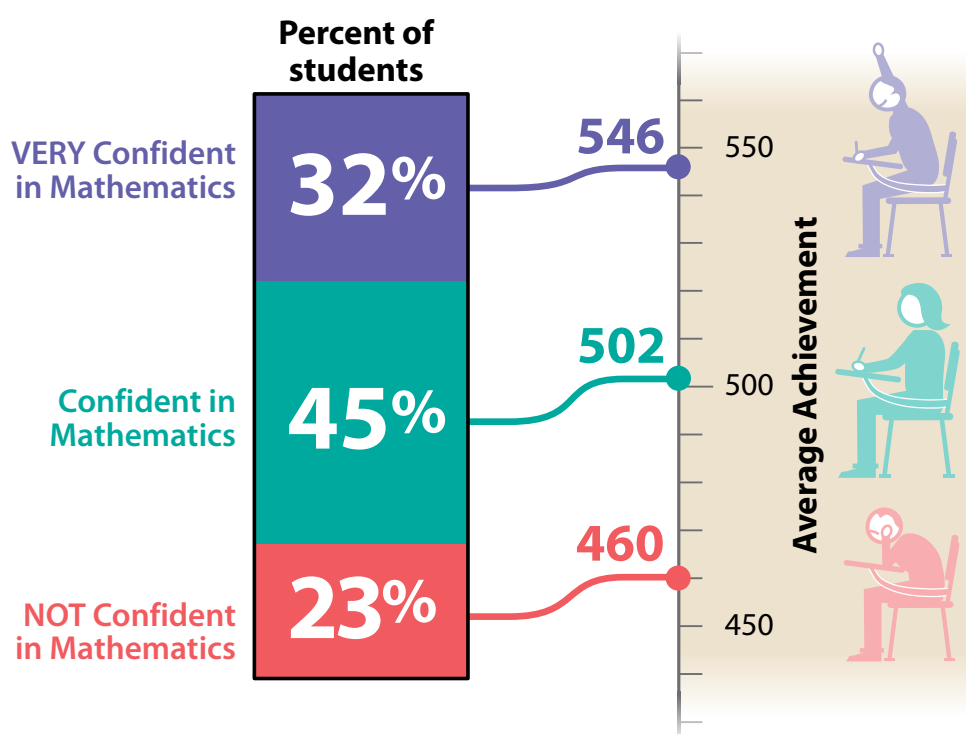
## Students' Attitudes Toward Mathematics

The fourth grade students were very positive about their mathematics teaching, but less so about the subject.

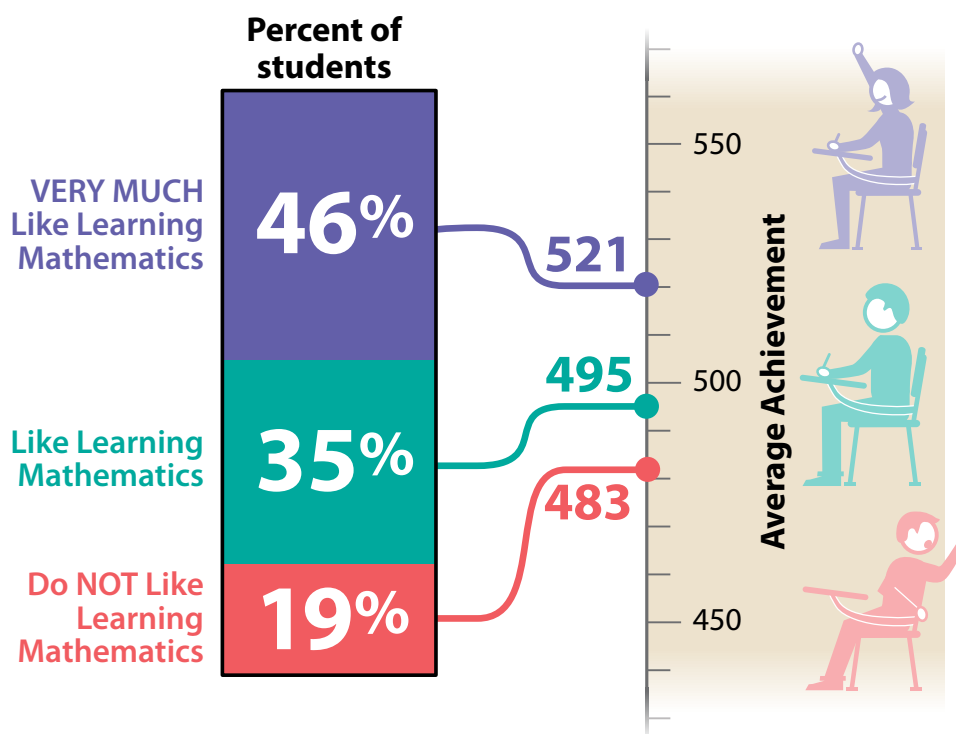
Almost all students (94%) were positive about their instruction—68% reported VERY engaging teaching and 26% engaging teaching.



Most students (77%) were VERY confident or confident in mathematics, but 23% were NOT confident.



Most students (81%) VERY MUCH liked or liked learning mathematics, but 19% did NOT.



### Trends 2011-2015: 39 Countries

Between 2011 and 2015, there were more decreases than increases in students' attitudes.

- The scale average for *Students Like Learning Mathematics* decreased in **11** countries and increased in **8** countries.
- The scale average for *Students Confident in Mathematics* decreased in **16** countries and increased in **7** countries.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015.  
<http://timss2015.org/download-center/>



**Exhibit 10.1: Students' Views on Engaging Teaching in Mathematics Lessons**

Reported by Students

Students were scored according to their degree of agreement with ten statements on the *Students' Views on Engaging Teaching in Mathematics Lessons* scale. Students who experienced **Very Engaging Teaching** in mathematics lessons had a score on the scale of at least 9.0, which corresponds to their "agreeing a lot" with five of the ten statements and "agreeing a little" with the other five, on average. Students who experienced teaching that was **Less than Engaging** had a score no higher than 7.0, which corresponds to their "disagreeing a little" with five of the ten statements and "agreeing a little" with the other five, on average. All other students experienced **Engaging Teaching** in mathematics lessons.

Country	Very Engaging Teaching		Engaging Teaching		Less than Engaging Teaching		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Portugal	88 (0.7)	543 (2.3)	11 (0.7)	535 (4.3)	1 (0.2)	~ ~	10.9 (0.04)
Bulgaria	87 (1.0)	530 (5.1)	11 (0.9)	503 (8.0)	2 (0.3)	~ ~	11.2 (0.06)
Iran, Islamic Rep. of	86 (0.8)	436 (3.5)	11 (0.7)	419 (7.0)	2 (0.2)	~ ~	11.1 (0.05)
Serbia	85 (0.9)	520 (3.7)	14 (0.8)	513 (5.5)	2 (0.2)	~ ~	11.0 (0.06)
Turkey	83 (0.7)	495 (3.0)	15 (0.6)	438 (5.7)	2 (0.2)	~ ~	10.7 (0.05)
Indonesia	83 (0.7)	405 (3.7)	15 (0.6)	381 (5.9)	2 (0.3)	~ ~	10.8 (0.05)
Jordan	83 (1.3)	399 (3.1)	14 (1.1)	359 (8.3)	3 (0.4)	332 (12.9)	10.9 (0.07)
Morocco	82 (1.0)	386 (3.6)	15 (0.9)	359 (6.5)	3 (0.3)	311 (12.1)	10.8 (0.06)
Oman	82 (0.9)	435 (2.6)	15 (0.7)	393 (4.2)	3 (0.4)	364 (8.1)	10.7 (0.05)
Spain	82 (1.3)	506 (2.5)	15 (0.9)	509 (3.2)	3 (0.5)	493 (7.1)	10.7 (0.07)
Russian Federation	77 (1.1)	566 (3.6)	21 (1.0)	560 (4.5)	2 (0.2)	~ ~	10.3 (0.06)
Hungary	77 (1.0)	532 (3.3)	20 (0.9)	523 (4.3)	3 (0.3)	504 (12.8)	10.4 (0.05)
Cyprus	77 (1.2)	527 (2.6)	18 (0.9)	521 (4.6)	6 (0.7)	509 (7.2)	10.4 (0.06)
Bahrain	75 (0.8)	460 (1.8)	20 (0.6)	436 (2.2)	6 (0.4)	413 (5.7)	10.4 (0.05)
Lithuania	75 (1.0)	538 (2.7)	23 (0.9)	527 (3.9)	3 (0.3)	534 (6.8)	10.1 (0.05)
Northern Ireland	74 (1.2)	572 (3.4)	22 (1.0)	570 (4.7)	4 (0.5)	549 (13.0)	10.2 (0.07)
Kazakhstan	73 (1.6)	551 (4.5)	25 (1.5)	529 (5.6)	1 (0.2)	~ ~	10.4 (0.08)
Ireland	73 (1.3)	550 (2.2)	23 (1.1)	545 (4.0)	4 (0.4)	525 (7.3)	10.2 (0.06)
Kuwait	73 (1.3)	359 (5.0)	21 (1.0)	343 (5.8)	6 (0.5)	321 (8.9)	10.3 (0.07)
Chile	73 (1.3)	465 (2.6)	22 (0.9)	451 (3.8)	6 (0.5)	430 (6.8)	10.3 (0.07)
England	73 (1.3)	548 (3.3)	24 (1.2)	545 (3.7)	4 (0.4)	527 (8.1)	10.1 (0.06)
United States	73 (0.7)	545 (2.3)	22 (0.6)	535 (2.9)	5 (0.3)	510 (4.7)	10.2 (0.04)
Saudi Arabia	73 (1.1)	396 (3.9)	21 (0.9)	370 (5.4)	6 (0.5)	342 (8.6)	10.3 (0.06)
Canada	72 (0.8)	514 (2.0)	24 (0.7)	511 (2.7)	4 (0.3)	487 (6.8)	10.1 (0.04)
Slovak Republic	70 (1.4)	495 (2.9)	26 (1.1)	507 (3.2)	5 (0.4)	499 (8.4)	10.0 (0.06)
Qatar	70 (1.1)	452 (3.5)	23 (0.8)	429 (4.7)	8 (0.6)	387 (5.6)	10.1 (0.06)
United Arab Emirates	70 (0.7)	465 (2.5)	25 (0.6)	431 (3.2)	6 (0.4)	402 (8.0)	10.1 (0.04)
Norway (5)	70 (1.2)	552 (2.6)	26 (1.0)	545 (3.6)	4 (0.5)	533 (8.4)	9.9 (0.05)
Italy	69 (1.2)	510 (2.7)	28 (1.0)	506 (3.6)	3 (0.4)	479 (10.7)	9.8 (0.05)
South Africa (5)	68 (1.3)	396 (3.8)	25 (1.0)	345 (4.1)	6 (0.5)	314 (5.6)	10.1 (0.06)
Germany	67 (1.2)	526 (2.3)	29 (1.0)	526 (2.9)	4 (0.4)	512 (6.3)	9.8 (0.05)
Belgium (Flemish)	66 (1.5)	544 (2.0)	32 (1.4)	550 (2.9)	2 (0.3)	~ ~	9.7 (0.06)
Croatia	64 (1.3)	505 (2.0)	33 (1.2)	498 (2.5)	3 (0.4)	490 (11.2)	9.9 (0.07)
France	64 (1.2)	488 (2.7)	33 (1.1)	491 (4.0)	3 (0.3)	464 (8.3)	9.8 (0.05)
Netherlands	64 (1.3)	533 (1.9)	33 (1.2)	527 (2.7)	4 (0.4)	513 (6.2)	9.6 (0.04)
Australia	63 (1.2)	519 (3.5)	31 (0.9)	520 (3.5)	6 (0.4)	492 (6.8)	9.7 (0.05)
New Zealand	63 (1.1)	489 (2.6)	31 (0.9)	498 (3.2)	6 (0.4)	482 (6.6)	9.7 (0.04)
Sweden	60 (1.1)	518 (3.1)	35 (1.0)	521 (3.1)	5 (0.4)	512 (6.6)	9.5 (0.04)
Czech Republic	59 (1.4)	525 (2.5)	35 (1.1)	534 (2.9)	6 (0.5)	522 (5.2)	9.4 (0.05)
Georgia	58 (1.3)	474 (4.0)	40 (1.3)	461 (4.3)	2 (0.3)	~ ~	9.9 (0.06)
Finland	58 (1.1)	540 (2.3)	37 (1.0)	532 (2.8)	5 (0.5)	516 (6.2)	9.4 (0.04)
Slovenia	58 (1.4)	521 (2.3)	37 (1.1)	522 (2.3)	5 (0.7)	503 (6.2)	9.6 (0.06)
Poland	57 (1.3)	535 (2.3)	35 (1.0)	538 (2.9)	8 (0.8)	522 (5.6)	9.5 (0.06)
Singapore	55 (1.0)	625 (4.0)	37 (0.7)	613 (4.3)	7 (0.5)	592 (6.7)	9.3 (0.04)
Denmark	53 (1.6)	547 (3.1)	38 (1.2)	533 (3.0)	9 (0.8)	522 (5.3)	9.1 (0.06)
Chinese Taipei	51 (1.2)	603 (2.2)	37 (0.9)	595 (2.5)	11 (0.8)	576 (4.2)	9.2 (0.05)
Hong Kong SAR	50 (1.3)	621 (3.3)	38 (1.0)	612 (3.5)	11 (0.8)	591 (4.6)	9.2 (0.06)
Korea, Rep. of	28 (1.3)	620 (2.9)	55 (1.1)	606 (2.4)	17 (1.3)	597 (4.4)	8.2 (0.05)
Japan	26 (1.2)	597 (2.7)	54 (1.0)	595 (2.1)	20 (1.2)	583 (3.8)	8.2 (0.05)
International Avg.	68 (0.2)	510 (0.4)	26 (0.1)	498 (0.6)	5 (0.1)	481 (1.2)	

This TIMSS 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.

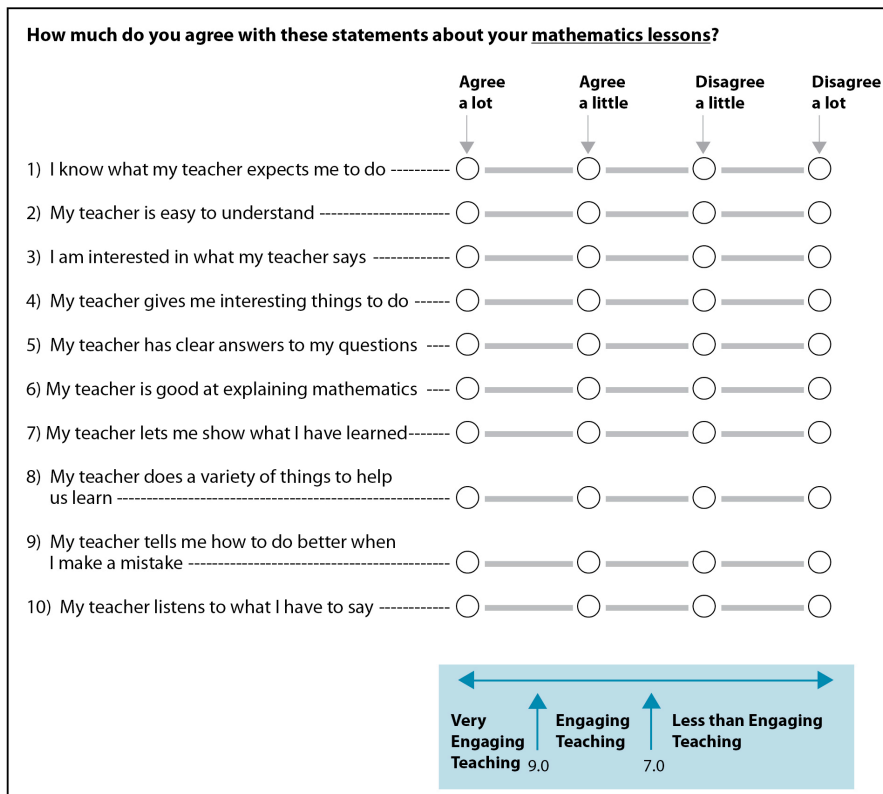
An "r" indicates data are available for at least 70% but less than 85% of the students.

SOURCE: IEA's Trends in International Mathematics and Science Study - TIMSS 2015

**Exhibit 10.1: Students' Views on Engaging Teaching in Mathematics Lessons (Continued)**

Country	Very Engaging Teaching		Engaging Teaching		Less than Engaging Teaching		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
<b>Benchmarking Participants</b>							
Buenos Aires, Argentina	79 (1.0)	439 (2.9)	17 (0.8)	437 (4.3)	4 (0.3)	434 (8.5)	10.5 (0.05)
Norway (4)	77 (1.3)	495 (2.3)	20 (1.1)	492 (3.9)	3 (0.4)	467 (11.1)	10.3 (0.06)
Florida, US	77 (1.1)	551 (4.9)	20 (1.0)	541 (5.5)	3 (0.4)	500 (11.5)	10.5 (0.06)
Dubai, UAE	76 (0.7)	519 (1.8)	20 (0.6)	490 (2.9)	4 (0.3)	473 (9.7)	10.5 (0.03)
Ontario, Canada	72 (1.1)	516 (2.3)	23 (1.0)	509 (3.2)	5 (0.5)	490 (6.5)	10.1 (0.05)
Quebec, Canada	69 (1.4)	536 (4.2)	28 (1.2)	538 (5.5)	3 (0.6)	523 (11.0)	10.0 (0.07)
Abu Dhabi, UAE	64 (1.4)	436 (5.2)	30 (1.3)	401 (6.7)	7 (0.7)	372 (10.0)	9.9 (0.06)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**Exhibit 10.3: Students Like Learning Mathematics**

Reported by Students

Students were scored according to their degree of agreement with nine statements on the *Students Like Learning Mathematics* scale. Students who **Very Much Like Learning Mathematics** had a score on the scale of at least 10.1, which corresponds to their “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 no higher than 8.3, which corresponds to their “disagreeing a little” with five of the nine statements and “agreeing a little” with the other four, on average. All other students **Like Learning Mathematics**.

Country	Very Much Like Learning Mathematics		Like Learning Mathematics		Do Not Like Learning Mathematics		Average Scale Score	Difference in Average Scale Score from 2011	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement			
Turkey	79 (1.0)	497 (2.7)	18 (0.8)	439 (5.5)	4 (0.4)	436 (9.9)	11.3 (0.04)	0.3 (0.06)	▲
Oman	70 (0.9)	443 (2.8)	25 (0.8)	391 (3.2)	5 (0.3)	374 (7.0)	11.0 (0.04)	0.5 (0.06)	▲
Kazakhstan	69 (1.4)	552 (4.5)	29 (1.2)	530 (5.7)	2 (0.4)	~ ~	11.0 (0.05)	0.1 (0.07)	
Jordan	68 (1.5)	409 (3.5)	25 (1.3)	350 (5.8)	7 (0.6)	364 (10.4)	11.0 (0.06)	◇ ◇	
Morocco	67 (1.3)	399 (3.6)	28 (1.1)	346 (4.9)	5 (0.4)	324 (12.9)	10.9 (0.04)	0.7 (0.08)	▲
Indonesia	66 (1.3)	415 (3.3)	31 (1.2)	376 (4.6)	4 (0.6)	337 (16.5)	10.7 (0.04)	◇ ◇	
Iran, Islamic Rep. of	65 (1.4)	449 (3.7)	28 (1.2)	398 (5.5)	7 (0.5)	411 (8.6)	10.8 (0.05)	0.1 (0.07)	
Portugal	61 (1.0)	556 (2.4)	28 (0.8)	522 (2.9)	10 (0.7)	508 (4.8)	10.6 (0.05)	0.2 (0.08)	▲
Bulgaria	56 (1.3)	540 (4.9)	30 (1.0)	511 (6.2)	14 (0.9)	498 (6.5)	10.4 (0.06)	◇ ◇	
Cyprus	56 (1.2)	538 (2.6)	27 (0.9)	514 (3.7)	17 (0.9)	501 (4.8)	10.3 (0.05)	◇ ◇	
Bahrain	55 (0.9)	471 (1.9)	32 (0.6)	428 (2.3)	13 (0.6)	435 (3.7)	10.4 (0.04)	0.2 (0.08)	
Kuwait	55 (1.5)	371 (4.9)	31 (1.2)	330 (5.8)	13 (0.9)	336 (6.6)	10.3 (0.06)	◇ ◇	
United Arab Emirates	55 (0.8)	472 (2.7)	33 (0.5)	427 (2.9)	12 (0.6)	437 (5.1)	10.4 (0.03)	-0.1 (0.05)	
Saudi Arabia	54 (1.3)	406 (3.7)	33 (1.0)	364 (5.6)	13 (1.0)	367 (6.7)	10.3 (0.05)	-0.2 (0.08)	
Russian Federation	52 (1.1)	577 (4.4)	37 (0.8)	555 (3.4)	11 (0.9)	536 (3.9)	10.2 (0.04)	-0.3 (0.06)	▼
Georgia	52 (1.5)	481 (3.9)	45 (1.4)	452 (4.4)	4 (0.4)	420 (10.6)	10.5 (0.05)	-0.8 (0.06)	▼
Italy	51 (1.2)	515 (3.2)	31 (0.9)	502 (3.0)	18 (0.8)	496 (4.2)	10.1 (0.05)	0.0 (0.07)	
France	50 (1.1)	501 (3.0)	35 (0.9)	480 (3.8)	14 (0.7)	466 (3.9)	10.1 (0.04)	◇ ◇	
Lithuania	50 (1.1)	545 (2.6)	36 (1.1)	530 (3.3)	13 (0.7)	514 (5.0)	10.2 (0.04)	-0.2 (0.06)	▼
England	50 (1.4)	555 (3.7)	32 (0.9)	546 (3.5)	17 (1.0)	523 (4.4)	10.1 (0.05)	0.3 (0.08)	▲
Serbia	50 (1.5)	527 (5.2)	30 (1.1)	517 (4.1)	19 (1.0)	502 (5.0)	10.1 (0.06)	0.3 (0.09)	▲
Qatar	49 (1.3)	462 (3.6)	36 (1.1)	423 (4.6)	15 (0.8)	414 (5.3)	10.2 (0.06)	0.2 (0.08)	▲
Chile	47 (1.3)	476 (2.9)	33 (0.8)	447 (2.9)	19 (1.0)	442 (3.4)	10.0 (0.06)	0.1 (0.07)	
Spain	46 (1.3)	516 (3.1)	34 (1.0)	500 (2.6)	19 (1.0)	492 (3.1)	9.9 (0.05)	-0.1 (0.08)	
South Africa (5)	46 (1.2)	416 (3.5)	46 (0.9)	345 (3.9)	8 (0.4)	350 (6.7)	10.1 (0.04)	◇ ◇	
Norway (5)	43 (1.4)	558 (3.4)	36 (1.0)	548 (3.1)	20 (1.0)	534 (3.7)	9.8 (0.05)	◇ ◇	
New Zealand	43 (0.9)	498 (3.1)	34 (0.7)	488 (3.2)	23 (0.8)	485 (3.4)	9.8 (0.04)	-0.1 (0.06)	
United States	42 (0.8)	555 (2.8)	35 (0.5)	536 (2.7)	23 (0.7)	524 (2.3)	9.7 (0.04)	0.0 (0.05)	
Slovak Republic	42 (1.2)	504 (3.4)	38 (0.9)	497 (3.0)	20 (0.9)	490 (3.9)	9.8 (0.05)	-0.1 (0.07)	
Singapore	39 (0.8)	640 (4.1)	38 (0.7)	611 (4.1)	23 (0.8)	591 (4.5)	9.6 (0.03)	-0.3 (0.05)	▼
Hungary	39 (1.1)	548 (3.9)	38 (0.9)	523 (4.0)	22 (1.1)	507 (4.3)	9.7 (0.05)	-0.3 (0.07)	▼
Canada	38 (0.9)	529 (2.2)	38 (0.6)	508 (2.6)	24 (0.9)	491 (3.0)	9.6 (0.04)	◇ ◇	
Germany	38 (1.2)	537 (2.6)	35 (0.9)	525 (2.6)	27 (1.1)	511 (3.0)	9.5 (0.05)	-0.1 (0.07)	
Ireland	38 (1.2)	561 (3.0)	39 (0.9)	547 (2.6)	23 (1.1)	528 (3.2)	9.6 (0.05)	0.0 (0.08)	
Denmark	38 (1.4)	553 (3.6)	42 (1.1)	538 (2.9)	21 (1.1)	518 (4.0)	9.6 (0.05)	0.1 (0.07)	
Australia	37 (1.0)	535 (4.7)	36 (0.8)	516 (3.1)	27 (0.7)	496 (4.2)	9.5 (0.04)	-0.2 (0.07)	▼
Northern Ireland	35 (1.1)	585 (4.0)	38 (1.0)	573 (3.8)	27 (1.1)	547 (4.4)	9.5 (0.05)	0.1 (0.08)	
Hong Kong SAR	35 (1.1)	631 (3.2)	38 (1.0)	612 (3.6)	27 (1.2)	596 (3.8)	9.5 (0.05)	-0.5 (0.07)	▼
Sweden	35 (1.3)	523 (4.1)	40 (1.1)	518 (3.2)	25 (1.3)	514 (3.3)	9.5 (0.05)	-0.3 (0.08)	▼
Czech Republic	35 (0.9)	539 (2.8)	40 (0.8)	530 (2.8)	25 (0.9)	511 (3.2)	9.5 (0.04)	-0.4 (0.06)	▼
Poland	35 (1.0)	547 (2.9)	41 (1.1)	532 (2.7)	25 (1.3)	524 (3.2)	9.4 (0.05)	◇ ◇	
Slovenia	35 (1.1)	535 (2.7)	39 (0.9)	518 (2.7)	27 (1.4)	505 (2.5)	9.4 (0.06)	-0.4 (0.08)	▼
Netherlands	33 (1.0)	543 (2.2)	39 (1.1)	528 (1.9)	27 (1.0)	517 (2.7)	9.3 (0.04)	0.1 (0.06)	
Belgium (Flemish)	31 (1.2)	552 (2.3)	38 (0.8)	546 (2.7)	31 (1.5)	540 (2.9)	9.2 (0.05)	0.1 (0.08)	
Croatia	29 (1.2)	515 (2.7)	41 (1.1)	500 (2.7)	29 (1.2)	494 (2.6)	9.3 (0.05)	0.2 (0.07)	▲
Finland	28 (1.0)	550 (3.4)	41 (0.9)	537 (2.4)	31 (1.0)	521 (2.5)	9.2 (0.04)	0.0 (0.08)	
Japan	26 (0.9)	621 (2.6)	44 (0.9)	594 (2.3)	30 (1.2)	567 (2.4)	9.2 (0.04)	-0.1 (0.06)	
Chinese Taipei	23 (1.0)	618 (3.4)	38 (1.0)	598 (2.7)	38 (1.1)	582 (2.3)	8.9 (0.05)	-0.2 (0.07)	▼
Korea, Rep. of	19 (0.7)	645 (3.3)	46 (1.0)	610 (2.4)	35 (1.0)	586 (2.7)	8.9 (0.03)	-0.1 (0.05)	
International Avg.	46 (0.2)	521 (0.5)	35 (0.1)	495 (0.5)	19 (0.1)	483 (0.8)			

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

This TIMSS 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 diamond (◇) indicates the country did not participate in the 2011 assessment.

A tilde (~) indicates insufficient data to report achievement.

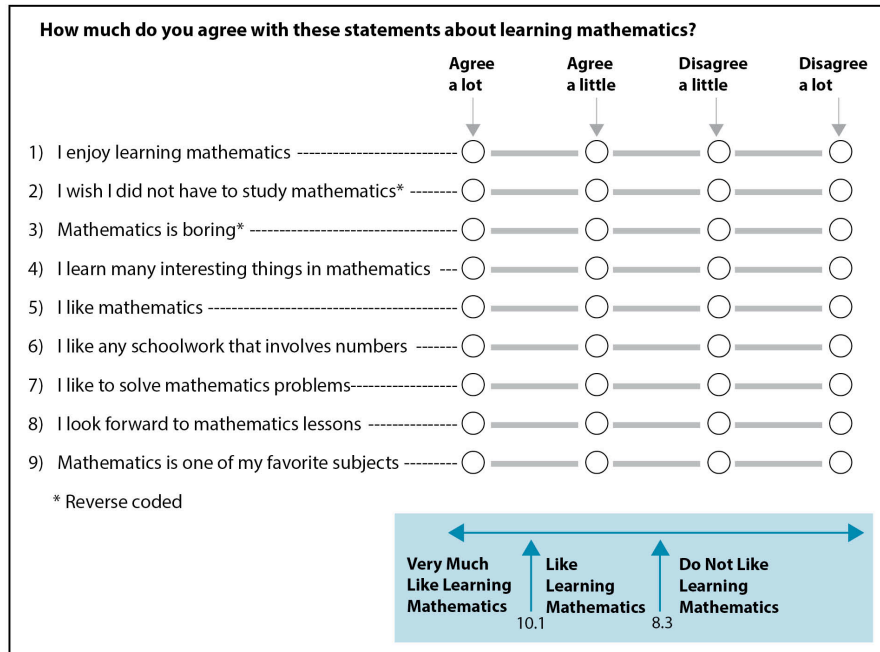
An “r” indicates data are available for at least 70% but less than 85% of the students.

Significantly higher than 2011 ▲  
Significantly lower than 2011 ▼

**Exhibit 10.3: Students Like Learning Mathematics (Continued)**

Country	Very Much Like Learning Mathematics		Like Learning Mathematics		Do Not Like Learning Mathematics		Average Scale Score	Difference in Average Scale Score from 2011
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement		
<b>Benchmarking Participants</b>								
Dubai, UAE	59 (0.8)	523 (2.2)	30 (0.7)	496 (2.4)	11 (0.5)	492 (4.4)	10.5 (0.03)	0.0 (0.06)
Norway (4)	55 (1.7)	503 (2.6)	30 (0.9)	487 (3.4)	15 (1.2)	471 (5.3)	10.3 (0.07)	0.1 (0.11)
Abu Dhabi, UAE	50 (1.5)	445 (5.4)	36 (1.0)	393 (5.7)	14 (1.0)	405 (7.7)	10.2 (0.06)	-0.2 (0.09)
Florida, US	49 (1.8)	563 (5.4)	32 (1.3)	538 (6.4)	19 (1.4)	525 (4.8)	10.0 (0.08)	0.2 (0.10)
Buenos Aires, Argentina	49 (1.2)	444 (3.1)	33 (0.7)	429 (3.8)	18 (1.0)	437 (4.4)	10.0 (0.05)	◇ ◇
Quebec, Canada	43 (1.4)	547 (4.4)	41 (1.2)	533 (5.1)	16 (1.1)	516 (5.0)	9.9 (0.06)	0.3 (0.08) ●
Ontario, Canada	37 (1.3)	530 (2.5)	37 (1.0)	509 (2.9)	26 (1.5)	494 (3.7)	9.5 (0.06)	0.1 (0.08)

Significantly higher than 2011 ●  
Significantly lower than 2011 ◇



SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**Exhibit 10.5: Students Confident in Mathematics**

Reported by Students

Students were scored according to their degree of agreement with nine statements on the *Students Confident in Mathematics* scale. Students **Very Confident in Mathematics** had a score on the scale of at least 10.6, which corresponds to their “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 no higher than 8.5, which corresponds to their “disagreeing a little” with five of the nine statements and “agreeing a little” with the other four, on average. All other students were **Confident in Mathematics**.

Country	Very Confident in Mathematics		Confident in Mathematics		Not Confident in Mathematics		Average Scale Score	Difference in Average Scale Score from 2011
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement		
Serbia	45 (1.2)	556 (5.2)	36 (1.0)	507 (4.1)	19 (0.8)	458 (4.7)	10.5 (0.05)	0.4 (0.07) ▲
Cyprus	44 (1.1)	560 (2.9)	38 (0.9)	511 (2.8)	17 (0.8)	469 (3.9)	10.5 (0.05)	◊ ◊
Norway (5)	44 (1.0)	578 (3.0)	44 (0.9)	536 (2.6)	12 (0.6)	493 (4.5)	10.5 (0.05)	◊ ◊
Bulgaria	42 (1.2)	561 (4.0)	37 (0.9)	513 (5.0)	20 (1.1)	478 (8.3)	10.5 (0.06)	◊ ◊
Jordan	42 (1.2)	434 (3.6)	39 (0.9)	376 (3.6)	19 (1.0)	328 (7.5)	10.5 (0.06)	◊ ◊
Turkey	41 (1.0)	532 (3.0)	40 (0.9)	464 (3.6)	19 (0.8)	423 (4.4)	10.4 (0.05)	0.1 (0.06)
Netherlands	40 (1.0)	562 (1.8)	39 (1.0)	522 (2.1)	21 (0.8)	484 (2.1)	10.3 (0.04)	0.2 (0.06) ▲
Kazakhstan	40 (1.5)	566 (4.9)	48 (1.2)	535 (5.3)	12 (0.9)	515 (6.3)	10.6 (0.06)	0.1 (0.09)
England	37 (1.1)	578 (4.7)	43 (1.0)	541 (3.4)	20 (0.9)	499 (3.3)	10.1 (0.05)	0.1 (0.06)
Kuwait	37 (1.1)	387 (5.2)	45 (0.9)	342 (4.9)	18 (0.7)	317 (6.5)	10.3 (0.05)	◊ ◊
Georgia	37 (1.6)	501 (4.2)	50 (1.3)	458 (3.6)	13 (0.8)	400 (6.2)	10.3 (0.06)	-0.2 (0.07) ▼
Ireland	37 (0.9)	583 (2.6)	45 (0.8)	539 (2.4)	18 (0.8)	498 (3.7)	10.2 (0.04)	-0.2 (0.07) ▼
Sweden	36 (1.3)	548 (3.0)	49 (1.2)	511 (3.2)	15 (0.6)	475 (4.0)	10.2 (0.05)	-0.2 (0.07)
Italy	36 (1.0)	532 (3.1)	46 (0.9)	505 (2.8)	18 (0.7)	466 (4.0)	10.1 (0.04)	0.2 (0.06) ▲
Germany	36 (1.2)	557 (2.4)	42 (1.0)	523 (2.2)	22 (0.8)	483 (3.4)	10.1 (0.05)	-0.2 (0.06) ▼
Hungary	35 (0.9)	581 (3.0)	42 (0.8)	522 (3.6)	23 (0.9)	464 (5.0)	10.1 (0.04)	-0.2 (0.06) ▼
United States	35 (0.7)	583 (2.4)	41 (0.6)	534 (2.5)	24 (0.6)	492 (2.2)	10.0 (0.03)	-0.2 (0.04) ▼
Iran, Islamic Rep. of	35 (1.0)	471 (4.3)	47 (0.8)	424 (3.9)	18 (0.9)	383 (6.1)	10.2 (0.05)	-0.3 (0.08) ▼
Bahrain	35 (0.8)	492 (1.6)	44 (0.7)	444 (1.9)	21 (0.6)	407 (2.8)	10.2 (0.05)	-0.1 (0.06)
Qatar	34 (1.2)	475 (4.2)	43 (0.9)	439 (3.4)	23 (0.9)	395 (4.4)	10.1 (0.05)	-0.1 (0.07)
Oman	34 (1.1)	465 (3.4)	49 (0.9)	418 (2.8)	17 (0.6)	377 (3.3)	10.1 (0.04)	-0.3 (0.06) ▼
Denmark	34 (1.1)	578 (3.0)	49 (0.9)	529 (3.0)	17 (0.8)	490 (3.7)	10.1 (0.04)	0.2 (0.06) ▲
France	33 (0.9)	521 (3.0)	46 (1.1)	487 (3.3)	21 (0.8)	439 (4.2)	10.0 (0.03)	◊ ◊
Saudi Arabia	33 (1.3)	420 (4.2)	43 (1.1)	382 (4.7)	23 (1.1)	350 (6.3)	10.1 (0.06)	-0.3 (0.09) ▼
Spain	33 (1.0)	543 (2.6)	41 (0.8)	503 (2.8)	26 (0.9)	461 (2.9)	10.0 (0.04)	0.0 (0.07)
Canada	33 (0.7)	552 (2.3)	44 (0.6)	506 (2.3)	23 (0.7)	467 (2.5)	9.9 (0.04)	◊ ◊
Croatia	33 (1.1)	538 (2.4)	49 (1.1)	497 (2.1)	18 (0.8)	455 (3.7)	10.1 (0.04)	-0.1 (0.06)
Slovak Republic	32 (0.9)	538 (2.9)	45 (0.8)	494 (2.9)	23 (0.6)	453 (3.6)	9.9 (0.04)	0.0 (0.06)
Slovenia	32 (0.9)	559 (2.6)	46 (1.0)	517 (2.3)	22 (0.8)	471 (3.0)	9.9 (0.04)	-0.5 (0.06) ▼
Northern Ireland	31 (1.1)	614 (3.8)	46 (1.0)	568 (3.8)	23 (1.1)	518 (3.7)	9.9 (0.04)	-0.1 (0.07)
United Arab Emirates	31 (0.7)	499 (2.7)	49 (0.6)	444 (2.6)	20 (0.5)	403 (3.3)	10.0 (0.03)	-0.4 (0.04) ▼
Lithuania	30 (1.0)	578 (3.2)	50 (1.0)	530 (2.9)	20 (0.9)	486 (3.7)	9.9 (0.04)	0.1 (0.05)
Belgium (Flemish)	30 (0.9)	576 (2.7)	45 (0.8)	543 (2.5)	25 (0.9)	515 (2.7)	9.7 (0.04)	0.0 (0.06)
Morocco	29 (1.2)	421 (4.2)	49 (1.0)	375 (4.0)	22 (0.8)	337 (5.2)	10.0 (0.05)	0.3 (0.07) ▲
Poland	29 (0.9)	578 (2.9)	46 (1.1)	534 (2.3)	25 (1.0)	488 (2.7)	9.8 (0.04)	◊ ◊
Finland	28 (0.9)	572 (2.8)	51 (1.0)	532 (2.1)	20 (0.7)	493 (2.7)	9.8 (0.03)	-0.1 (0.05) ▼
Russian Federation	28 (0.8)	599 (4.7)	45 (0.9)	569 (3.6)	28 (0.8)	522 (3.4)	9.7 (0.04)	-0.1 (0.06) ▼
Australia	27 (0.8)	569 (3.9)	46 (1.0)	514 (2.9)	27 (1.0)	473 (4.1)	9.7 (0.03)	-0.4 (0.05) ▼
Chile	26 (0.9)	504 (3.1)	42 (0.9)	461 (2.6)	32 (1.1)	425 (3.0)	9.6 (0.04)	0.1 (0.06)
Portugal	25 (1.0)	592 (2.7)	42 (1.0)	546 (2.6)	33 (1.1)	497 (2.5)	9.6 (0.05)	-0.1 (0.07) ▼
Czech Republic	24 (0.8)	570 (3.4)	48 (0.9)	530 (2.5)	28 (0.7)	489 (3.2)	9.6 (0.03)	-0.2 (0.05) ▼
Indonesia	23 (1.0)	440 (3.7)	53 (1.0)	397 (3.5)	24 (1.1)	365 (6.2)	9.7 (0.04)	◊ ◊
New Zealand	22 (0.7)	543 (3.4)	48 (0.8)	492 (2.6)	30 (0.7)	452 (3.3)	9.5 (0.03)	-0.1 (0.04) ▼
Hong Kong SAR	19 (0.8)	660 (3.7)	45 (1.0)	622 (3.0)	36 (1.1)	583 (3.4)	9.3 (0.05)	-0.1 (0.06)
Singapore	19 (0.8)	681 (3.6)	42 (0.6)	633 (3.6)	39 (1.1)	572 (4.0)	9.2 (0.05)	0.0 (0.06)
South Africa (5)	16 (0.7)	460 (6.0)	51 (0.7)	376 (3.2)	33 (0.9)	341 (3.5)	9.3 (0.03)	◊ ◊
Japan	15 (0.6)	648 (3.5)	48 (0.9)	602 (2.4)	37 (1.0)	559 (2.2)	9.1 (0.03)	0.4 (0.04) ▲
Chinese Taipei	15 (0.6)	653 (2.9)	39 (0.8)	612 (2.4)	46 (0.9)	566 (2.2)	8.9 (0.03)	-0.3 (0.05) ▼
Korea, Rep. of	13 (0.6)	668 (3.2)	51 (0.9)	623 (2.2)	36 (1.0)	566 (2.3)	9.1 (0.03)	0.1 (0.04) ▲
International Avg.	32 (0.1)	546 (0.5)	45 (0.1)	502 (0.5)	23 (0.1)	460 (0.6)		

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

This TIMSS 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 diamond (◊) indicates the country did not participate in the 2011 assessment.

An “r” indicates data are available for at least 70% but less than 85% of the students.

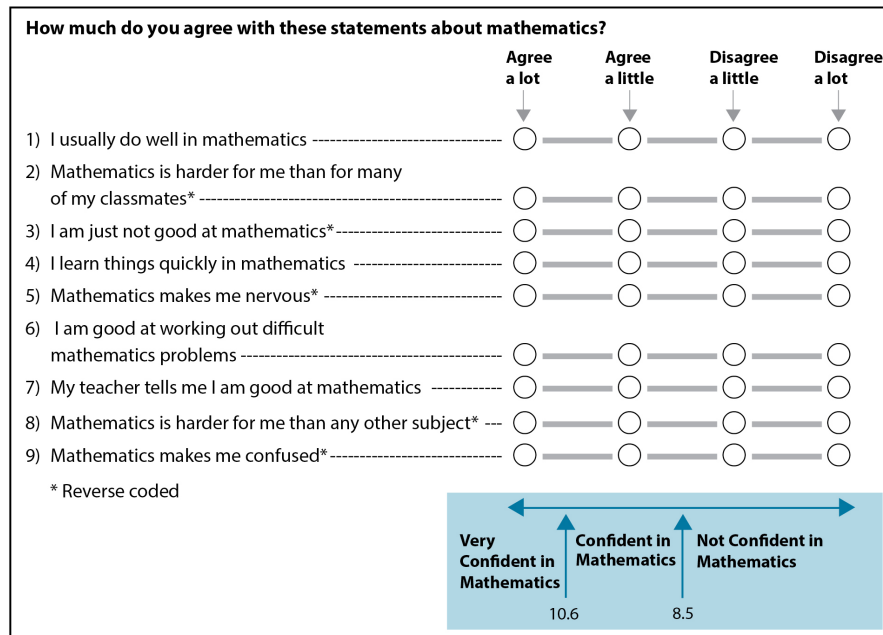
Significantly higher than 2011 ▲  
Significantly lower than 2011 ▼

**Exhibit 10.5: Students Confident in Mathematics (Continued)**

Country	Very Confident in Mathematics		Confident in Mathematics		Not Confident in Mathematics		Average Scale Score	Difference in Average Scale Score from 2011
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement		
<b>Benchmarking Participants</b>								
Norway (4)	47 (1.3)	520 (2.6)	42 (1.0)	478 (3.1)	11 (0.7)	442 (5.2)	10.7 (0.05)	0.1 (0.07)
Florida, US	39 (1.7)	585 (4.9)	39 (1.3)	541 (5.2)	22 (1.2)	493 (5.5)	10.3 (0.07)	0.0 (0.09)
Quebec, Canada	38 (1.4)	567 (4.7)	44 (1.4)	528 (4.0)	17 (1.2)	491 (5.9)	10.2 (0.06)	0.1 (0.08)
Dubai, UAE	36 (0.9)	545 (2.8)	46 (0.8)	503 (1.7)	17 (0.5)	463 (3.1)	10.2 (0.04)	-0.1 (0.06)
Ontario, Canada	31 (1.0)	556 (2.7)	44 (0.7)	508 (2.4)	25 (0.8)	470 (3.4)	9.9 (0.05)	-0.1 (0.07)
Buenos Aires, Argentina	27 (0.8)	477 (3.3)	45 (0.8)	438 (3.4)	28 (0.8)	403 (3.7)	9.7 (0.04)	∅ ∅
Abu Dhabi, UAE	27 (1.0)	480 (5.7)	49 (1.2)	414 (5.4)	24 (1.1)	368 (5.6)	9.8 (0.04)	-0.6 (0.08) ▼

Significantly higher than 2011 ▲  
 Significantly lower than 2011 ▼

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



**TIMSS**  
**2015**

# MATHEMATICS APPENDICES

TIMSS 2015 INTERNATIONAL RESULTS IN MATHEMATICS



**IEA**

**TIMSS & PIRLS**  
International Study Center  
Lynch School of Education, Boston College



**Appendix A.1: Countries Participating in TIMSS 2015 and in Earlier TIMSS Assessments**

Country	Grade 4					Grade 8					
	2015	2011	2007	2003	1995	2015	2011	2007	2003	1999	1995
Armenia	○	●	○	●		○	●	○	●		
Australia	●	●	●	●	●	●	●	●	●	○	●
Bahrain	●	●				●	●	●	●		
Belgium (Flemish)	●	●		●					●	●	●
Botswana (6, 9)		●				●	●	○	○		
Bulgaria	●							●	●		●
Canada	●				○	●				○	○
Chile	●	●				●	●		●	●	
Chinese Taipei	●	●	●	●		●	●	●	●	●	
Croatia	●	●									
Cyprus	●			●	●			●	●	●	●
Czech Republic	●	●	●		●			●		●	●
Denmark	●	●	●								●
Egypt						●		●	●		
England	●	●	●	●	●	●	●	●	●	●	●
Finland	●	●					●			○	
France	●										●
Georgia	●	●	●			●	●	●			
Germany	●	●	●								●
Hong Kong SAR	●	●	●	●	●	●	●	●	●	●	●
Hungary	●	●	●	●	●	●	●	●	●	●	●
Indonesia	●				○		●	●	○	○	○
Iran, Islamic Rep. of	●	●	●	●	●	●	●	●	●	●	●
Ireland	●	●			●	●					●
Israel					○	●	●	○	○	○	○
Italy	●	●	●	●	○	●	●	●	●	●	○
Japan	●	●	●	●	●	●	●	●	●	●	●
Jordan	●					●	●	●	●	●	
Kazakhstan	●	●	○			●	●				
Korea, Rep. of	●	●			●	●	●	●	●	●	●
Kuwait	●	●	○		○	●		○			○
Lebanon						●	●	●	●		
Lithuania	●	●	●	●		●	●	●	●	●	●
Malaysia						●	●	●	●	●	
Malta		●				●		●			
Morocco	●	●	○	○		●	●	○	○	○	
Netherlands	●	●	●	●	●				●	●	●
New Zealand	●	●	●	●	●	●	●		●	●	●
Northern Ireland	●	●									
Norway (5,9)						●					
Oman	●	●				●	●	●			
Poland	●	○									
Portugal	●	●			●						●
Qatar	●	●	○			●	●	○			
Russian Federation	●	●	●	●		●	●	●	●	●	●
Saudi Arabia	●	●				●	●	○	○		
Serbia	●	●						●	●		
Singapore	●	●	●	●	●	●	●	●	●	●	●
Slovak Republic	●	●	●						●	●	●
Slovenia	●	●	●	●	●	●	●	●		○	●
South Africa (5, 9)	●					●	●		○	○	○
Spain	●	●									●
Sweden	●	●	●			●	●	●	●		●
Thailand		●			○	●	●	●		●	○
Turkey	●	●				●	●	○		○	
United Arab Emirates	●	●				●	●				
United States	●	●	●	●	●	●	●	●	●	●	●

● Indicates participation in that testing cycle.  
○ Indicates participation but data not comparable for measuring trends to 2015, primarily due to countries improving translations or increasing population coverage.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Appendix A.1: Countries Participating in TIMSS 2015 and in Earlier TIMSS Assessments (Continued)**

Country	Grade 4					Grade 8					
	2015	2011	2007	2003	1995	2015	2011	2007	2003	1999	1995
<b>Benchmarking Participants</b>											
Buenos Aires, Argentina	●					●					
Ontario, Canada	●	●	●	●	●	●	●	●	●	●	●
Quebec, Canada	●	●	●	●	●	●	●	●	●	●	●
Norway (4,8)	●	●	●	●	●	●	●	●	●		●
Abu Dhabi, UAE	●	●				●	●				
Dubai, UAE	●	●	●			●	●	●			
Florida, US	●	●				●	●				

- Indicates participation in that testing cycle.
- Indicates participation but data not comparable for measuring trends to 2015, primarily due to countries improving translations or increasing population coverage.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Appendix B.1: Distribution of Items Included in the Assessment by Content Domain, Cognitive Domain, and Item Format**

TIMSS Assessment Items	Multiple-Choice Items	Constructed Response Items	Total Items	Percentage of Score Points
<b>Content Domain</b>				
Number	46 (46)	43 (49)	89 (95)	52%
Geometric Shapes and Measures	35 (35)	21 (24)	56 (59)	32%
Data Display	8 (8)	16 (20)	24 (28)	15%
Total	89 (89)	80 (93)	169 (182)	100%
Percentage of Score Points	49%	51%		

<b>Cognitive Domain</b>				
Knowing	37 (37)	27 (28)	64 (65)	36%
Applying	36 (36)	36 (44)	72 (80)	44%
Reasoning	16 (16)	17 (21)	33 (37)	20%
Total	89 (89)	80 (93)	169 (182)	100%
Percentage of Score Points	49%	51%		

TIMSS Numeracy Assessment Items	Multiple-Choice Items	Constructed Response Items	Total Items	Percentage of Score Points
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<b>Content Domain</b>				
Whole Numbers	21 (21)	31 (32)	52 (53)	50%
Fractions and Decimals	7 (7)	8 (8)	15 (15)	14%
Shapes and Measures	18 (18)	17 (20)	35 (38)	36%
Total	46 (46)	56 (60)	102 (106)	100%
Percentage of Score Points	43%	57%		

<b>Cognitive Domain</b>				
Knowing	30 (30)	25 (25)	55 (55)	52%
Applying	11 (11)	24 (25)	35 (36)	34%
Reasoning	5 (5)	7 (10)	12 (15)	14%
Total	46 (46)	56 (60)	102 (106)	100%
Percentage of Score Points	43%	57%		

Counts of TIMSS Numeracy achievement items do not include the two fourth grade TIMSS 2015 mathematics blocks (see Chapter 4 of the *TIMSS 2015 Assessment Frameworks*).

Score points are shown in parentheses.

Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Appendix C.1: Coverage of TIMSS 2015 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%		2.1%	2.1%	4.2%
<sup>2</sup> Bahrain	100%		0.4%	5.1%	5.6%
Belgium (Flemish)	100%		0.2%	1.2%	1.4%
Bulgaria	100%		1.2%	1.7%	2.9%
<sup>1 2</sup> Canada	79%	Students from the provinces of Alberta, Manitoba, Newfoundland, Ontario, and Quebec	2.5%	3.6%	6.1%
Chile	100%		1.9%	1.8%	3.7%
Chinese Taipei	100%		0.1%	2.3%	2.4%
Croatia	100%		1.5%	2.9%	4.4%
Cyprus	100%		1.0%	3.6%	4.6%
Czech Republic	100%		3.5%	0.7%	4.2%
<sup>2</sup> Denmark	100%		0.9%	6.6%	7.5%
England	100%		2.1%	0.2%	2.3%
Finland	100%		1.3%	0.7%	2.0%
France	100%		4.7%	0.6%	5.3%
<sup>1</sup> Georgia	90%	Students taught in Georgian	2.1%	2.7%	4.9%
Germany	100%		1.4%	1.3%	2.7%
Hong Kong SAR	100%		1.1%	1.1%	2.2%
Hungary	100%		2.3%	2.5%	4.8%
Indonesia	100%		0.2%	0.0%	0.2%
Iran, Islamic Rep. of	100%		3.9%	0.0%	4.0%
Ireland	100%		1.7%	1.0%	2.7%
<sup>2</sup> Italy	100%		0.9%	5.3%	6.2%
Japan	100%		0.6%	2.4%	2.9%
Jordan	100%		0.0%	1.2%	1.2%
Kazakhstan	100%		3.5%	0.4%	3.9%
Korea, Rep. of	100%		1.2%	1.3%	2.5%
Kuwait	100%		2.5%	0.5%	3.0%
<sup>2</sup> Lithuania	100%		2.5%	3.6%	6.1%
Morocco	100%		1.5%	0.0%	1.5%
Netherlands	100%		2.4%	0.8%	3.2%
New Zealand	100%		2.8%	2.1%	4.8%
Northern Ireland	100%		2.6%	0.1%	2.7%
Norway (5)	100%		1.1%	3.6%	4.7%
Oman	100%		0.1%	0.7%	0.8%
Poland	100%		1.4%	2.6%	4.0%
<sup>2</sup> Portugal	100%		1.0%	5.5%	6.5%
Qatar	100%		1.6%	2.2%	3.8%
Russian Federation	100%		1.9%	2.0%	4.0%
Saudi Arabia	100%		1.9%	0.0%	1.9%
<sup>3</sup> Serbia	100%		5.0%	6.3%	11.3%
<sup>2</sup> Singapore	100%		10.1%	0.0%	10.1%
Slovak Republic	100%		3.2%	1.0%	4.2%
Slovenia	100%		2.9%	1.6%	4.5%
South Africa (5)	100%		1.6%	0.6%	2.2%
<sup>2</sup> Spain	100%		1.6%	4.1%	5.6%
<sup>2</sup> Sweden	100%		1.7%	4.0%	5.7%
Turkey	100%		2.2%	1.4%	3.6%
United Arab Emirates	100%		2.0%	2.7%	4.7%
<sup>2</sup> United States	100%		0.0%	6.8%	6.8%

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

<sup>1</sup> National Target Population does not include all of the International Target Population.  
<sup>2</sup> National Defined Population covers 90% to 95% of the National Target Population.  
<sup>3</sup> National Defined Population covers less than 90% of the National Target population (but at least 77%).



**Appendix C.1: Coverage of TIMSS 2015 Target Population (Continued)**

Country	International Target Population		Exclusions from National Target Population		
	Coverage	Notes on Coverage	School-Level Exclusions	Within-Sample Exclusions	Overall Exclusions
<b>Benchmarking Participants</b>					
Buenos Aires, Argentina	100%		1.7%	0.2%	1.9%
Ontario, Canada	100%		2.2%	1.3%	3.4%
Quebec, Canada	100%		3.2%	2.2%	5.4%
Norway (4)	100%		1.5%	3.5%	5.0%
<sup>2</sup> Abu Dhabi, UAE	100%		1.5%	4.3%	5.8%
Dubai, UAE	100%		3.3%	2.0%	5.3%
<sup>1</sup> Florida, US	90%	Students from public schools	0.0%	4.7%	4.7%

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Appendix C.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
Australia	290	289	285	2	287
Bahrain	182	182	182	0	182
Belgium (Flemish)	160	157	117	36	153
Bulgaria	154	153	148	1	149
Canada	520	513	403	38	441
Chile	190	189	161	18	179
Chinese Taipei	150	150	149	1	150
Croatia	168	163	161	2	163
Cyprus	150	148	148	0	148
Czech Republic	160	159	159	0	159
Denmark	220	212	113	80	193
England	150	150	142	5	147
Finland	160	158	157	1	158
France	166	165	159	5	164
Georgia	162	153	151	2	153
Germany	210	208	199	5	204
Hong Kong SAR	160	160	123	9	132
Hungary	150	145	143	1	144
Indonesia	230	230	230	0	230
Iran, Islamic Rep. of	250	248	248	0	248
Ireland	149	149	149	0	149
Italy	166	166	136	28	164
Japan	150	149	143	5	148
Jordan	257	254	254	0	254
Kazakhstan	176	175	165	6	171
Korea, Rep. of	150	149	149	0	149
Kuwait	176	175	166	0	166
Lithuania	231	225	223	2	225
Morocco	361	359	358	0	358
Netherlands	150	148	74	55	129
New Zealand	182	182	147	27	174
Northern Ireland	154	154	100	18	118
Norway (5)	150	150	140	0	140
Oman	308	305	296	4	300
Poland	150	150	137	13	150
Portugal	222	221	193	24	217
Qatar	220	211	211	0	211
Russian Federation	208	208	208	0	208
Saudi Arabia	198	189	178	11	189
Serbia	160	160	158	2	160
Singapore	179	179	179	0	179
Slovak Republic	200	199	193	5	198
Slovenia	150	150	144	4	148
South Africa (5)	300	297	293	4	297
Spain	364	363	357	1	358
Sweden	150	144	144	0	144
Turkey	260	242	242	0	242
United Arab Emirates	573	558	558	0	558
United States	300	295	228	22	250

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Benchmarking Participants**

Buenos Aires, Argentina	150	150	127	9	136
Ontario, Canada	160	158	151	0	151
Quebec, Canada	176	174	101	20	121
Norway (4)	152	148	139	0	139
Abu Dhabi, UAE	173	163	163	0	163
Dubai, UAE	170	168	168	0	168
Florida, US	54	53	53	0	53

**Appendix C.5: Student Sample Sizes**

Country	Within-School Student Participation (Weighted Percentage)	Number of Sampled Students in Participating Schools	Number of Students Withdrawn from Class/School	Number of Students Excluded	Number of Eligible Students	Number of Students Absent	Number of Students Assessed
Australia	95%	6,705	149	129	6,427	370	6,057
Bahrain (Combined)	99%	9,335	63	540	8,732	157	8,575
Numeracy	99%	4,825	38	277	4,510	81	4,429
TIMSS	99%	4,510	25	263	4,222	76	4,146
Belgium (Flemish)	98%	5,580	24	32	5,524	120	5,404
Bulgaria	96%	4,563	78	80	4,405	177	4,228
Canada	94%	13,583	118	294	13,171	888	12,283
Chile	94%	5,196	68	64	5,064	308	4,756
Chinese Taipei	99%	4,461	37	84	4,340	49	4,291
Croatia	95%	4,354	25	109	4,220	235	3,985
Cyprus	98%	4,343	12	132	4,199	74	4,125
Czech Republic	95%	5,562	41	31	5,490	288	5,202
Denmark	95%	4,213	57	241	3,915	205	3,710
England	98%	4,232	117	0	4,115	109	4,006
Finland	97%	5,251	17	34	5,200	185	5,015
France	98%	5,110	66	35	5,009	136	4,873
Georgia	98%	4,091	30	59	4,002	83	3,919
Germany	96%	4,202	44	45	4,113	165	3,948
Hong Kong SAR	93%	3,936	17	45	3,874	274	3,600
Hungary	97%	5,329	24	102	5,203	167	5,036
Indonesia (Combined)	99%	8,730	207	0	8,523	204	8,319
Numeracy	99%	4,522	118	0	4,404	110	4,294
TIMSS	99%	4,208	89	0	4,119	94	4,025
Iran, Islamic Rep. of (Combined)	99%	8,115	77	3	8,035	107	7,928
Numeracy	99%	4,203	35	2	4,166	61	4,105
TIMSS	99%	3,912	42	1	3,869	46	3,823
Ireland	96%	4,624	31	52	4,541	197	4,344
Italy	95%	4,859	18	264	4,577	204	4,373
Japan	98%	4,511	7	35	4,469	86	4,383
Jordan	96%	8,514	276	0	8,238	377	7,861
Kazakhstan	98%	4,830	51	0	4,779	77	4,702
Korea, Rep. of	97%	4,903	54	54	4,795	126	4,669
Kuwait (Combined)	96%	7,991	79	4	7,908	612	7,296
Numeracy	95%	4,128	38	2	4,088	385	3,703
TIMSS	97%	3,863	41	2	3,820	227	3,593
Lithuania	94%	5,034	12	175	4,847	318	4,529
Morocco (Combined)	99%	10,795	84	0	10,711	283	10,428
Numeracy	98%	5,581	43	0	5,538	178	5,360
TIMSS	99%	5,214	41	0	5,173	105	5,068
Netherlands	96%	4,791	77	20	4,694	179	4,515
New Zealand	94%	6,920	118	77	6,725	403	6,322
Northern Ireland	93%	3,388	17	2	3,369	253	3,116
Norway (5)	95%	4,764	27	166	4,571	242	4,329
Oman	99%	9,490	131	84	9,275	170	9,105
Poland	92%	5,346	49	118	5,179	432	4,747
Portugal	93%	5,391	33	295	5,063	370	4,693
Qatar	99%	5,484	116	113	5,255	61	5,194
Russian Federation	98%	5,145	24	87	5,034	113	4,921
Saudi Arabia	93%	4,759	74	2	4,683	346	4,337
Serbia	96%	4,310	21	80	4,209	173	4,036
Singapore	96%	6,800	26	0	6,774	257	6,517
Slovak Republic	97%	6,235	208	50	5,977	204	5,773
Slovenia	95%	4,790	13	77	4,700	255	4,445
South Africa (5)	98%	11,305	151	0	11,154	222	10,932
Spain	96%	8,353	40	302	8,011	247	7,764
Sweden	95%	4,505	29	126	4,350	208	4,142
Turkey	98%	6,892	217	90	6,585	129	6,456
United Arab Emirates	97%	22,249	110	275	21,864	687	21,177
United States	96%	11,267	147	648	10,472	443	10,029

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

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.”

**Appendix C.5: Student Sample Sizes (Continued)**

Country	Within-School Student Participation (Weighted Percentage)	Number of Sampled Students in Participating Schools	Number of Students Withdrawn from Class/School	Number of Students Excluded	Number of Eligible Students	Number of Students Absent	Number of Students Assessed
<b>Benchmarking Participants</b>							
Buenos Aires, Argentina (Combined)	93%	7,464	54	16	7,180	745	6,435
Numeracy	93%	3,852	27	8	3,697	366	3,331
TIMSS	93%	3,612	27	8	3,483	379	3,104
Ontario, Canada	95%	4,938	52	59	4,827	253	4,574
Quebec, Canada	95%	3,012	13	54	2,945	147	2,798
Norway (4)	95%	4,583	27	149	4,407	243	4,164
Abu Dhabi, UAE	97%	5,281	32	64	5,185	184	5,001
Dubai, UAE	97%	7,906	35	153	7,718	265	7,453
Florida, US	95%	2,269	55	76	2,138	113	2,025

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Appendix C.7: Participation Rates (Weighted)**

Country	School Participation		Class Participation	Student Participation	Overall Participation	
	Before Replacement	After Replacement			Before Replacement	After Replacement
Australia	98%	99%	100%	95%	94%	94%
Bahrain (Combined)	100%	100%	100%	99%	99%	99%
Numeracy	100%	100%	100%	99%	99%	99%
TIMSS	100%	100%	100%	99%	99%	99%
† Belgium (Flemish)	74%	97%	100%	98%	73%	95%
Bulgaria	97%	97%	100%	96%	93%	93%
† Canada	80%	86%	99%	94%	74%	80%
Chile	87%	94%	100%	94%	82%	88%
Chinese Taipei	99%	100%	100%	99%	98%	99%
Croatia	99%	100%	99%	95%	93%	94%
Cyprus	100%	100%	100%	98%	98%	98%
Czech Republic	100%	100%	100%	95%	95%	95%
† Denmark	53%	91%	100%	95%	50%	86%
England	95%	98%	100%	98%	92%	96%
Finland	99%	100%	100%	97%	95%	97%
France	96%	99%	100%	98%	93%	97%
Georgia	99%	100%	100%	98%	97%	98%
Germany	97%	99%	100%	96%	93%	95%
† Hong Kong SAR	76%	82%	100%	93%	70%	76%
Hungary	99%	99%	100%	97%	96%	96%
Indonesia (Combined)	100%	100%	100%	99%	99%	99%
Numeracy	100%	100%	100%	99%	99%	99%
TIMSS	100%	100%	100%	99%	99%	99%
Iran, Islamic Rep. of (Combined)	100%	100%	100%	99%	99%	99%
Numeracy	100%	100%	100%	99%	99%	99%
TIMSS	100%	100%	100%	99%	99%	99%
Ireland	100%	100%	100%	96%	96%	96%
Italy	80%	99%	99%	95%	75%	94%
Japan	96%	99%	100%	98%	94%	97%
Jordan	100%	100%	100%	96%	96%	96%
Kazakhstan	97%	99%	100%	98%	95%	97%
Korea, Rep. of	100%	100%	100%	97%	97%	97%
Kuwait (Combined)	94%	94%	100%	96%	90%	90%
Numeracy	94%	94%	100%	95%	89%	89%
TIMSS	94%	94%	100%	97%	90%	90%
Lithuania	99%	100%	100%	94%	93%	94%
Morocco (Combined)	100%	100%	100%	99%	99%	99%
Numeracy	100%	100%	100%	98%	98%	98%
TIMSS	100%	100%	100%	99%	99%	99%
† Netherlands	48%	87%	100%	96%	46%	83%
New Zealand	81%	96%	100%	94%	76%	90%
‡ Northern Ireland	65%	76%	100%	93%	60%	71%
Norway (5)	93%	93%	100%	95%	89%	89%
Oman	97%	98%	100%	99%	96%	97%
Poland	91%	100%	100%	92%	84%	92%
Portugal	89%	99%	100%	93%	83%	92%
Qatar	100%	100%	100%	99%	99%	99%
Russian Federation	100%	100%	100%	98%	98%	98%
Saudi Arabia	95%	100%	100%	93%	88%	93%
Serbia	99%	100%	100%	96%	95%	96%
Singapore	100%	100%	100%	96%	96%	96%
Slovak Republic	98%	100%	100%	97%	95%	97%
Slovenia	96%	99%	100%	95%	91%	93%
South Africa (5)	99%	100%	100%	98%	98%	98%
Spain	98%	99%	100%	96%	95%	95%
Sweden	100%	100%	100%	95%	95%	95%
Turkey	100%	100%	100%	98%	98%	98%
United Arab Emirates	100%	100%	100%	97%	97%	97%
† United States	77%	85%	100%	96%	74%	81%

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

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.

**Appendix C.7: Participation Rates (Weighted) (Continued)**

Country	School Participation		Class Participation	Student Participation	Overall Participation	
	Before Replacement	After Replacement			Before Replacement	After Replacement
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina (Combined)	86%	91%	93%	93%	74%	79%
Numeracy	86%	91%	93%	93%	74%	79%
TIMSS	86%	91%	93%	93%	75%	79%
Ontario, Canada	95%	95%	100%	95%	90%	90%
‡ Quebec, Canada	48%	62%	100%	95%	46%	59%
Norway (4)	94%	94%	100%	95%	89%	89%
Abu Dhabi, UAE	100%	100%	100%	97%	97%	97%
Dubai, UAE	100%	100%	100%	97%	97%	97%
Florida, US	100%	100%	100%	95%	95%	95%

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Appendix C.9: Trends in Student Populations**

Country	Years of Formal Schooling*					Average Age at Time of Testing				
	2015	2011	2007	2003	1995	2015	2011	2007	2003	1995
Australia	4	4	4	4	4	10.0	10.0	9.9	9.9	9.9
Bahrain	4	4				9.9	10.4			
Belgium (Flemish)	4	4		4		10.1	10.0		10.0	
Chile	4	4				10.2	10.1			
Chinese Taipei	4	4	4	4		10.2	10.2	10.2	10.2	
Croatia	4	4				10.6	10.7			
Cyprus	4			4	4	9.8			9.9	9.8
Czech Republic	4	4	4		4	10.4	10.4	10.3		10.4
Denmark	4	4	4			10.9	11.0	11.0		
England	5	5	5	5	5	10.1	10.2	10.2	10.3	10.0
Finland	4	4				10.8	10.8			
Georgia	4	4	4			9.7	10.0	10.1		
Germany	4	4	4			10.4	10.4	10.4		
Hong Kong SAR	4	4	4	4	4	10.1	10.1	10.2	10.2	10.1
Hungary	4	4	4	4	4	10.7	10.7	10.7	10.5	10.4
Iran, Islamic Rep. of	4	4	4	4	4	10.2	10.2	10.2	10.4	10.5
Ireland	4	4			4	10.4	10.3			10.3
Italy	4	4	4	4		9.7	9.7	9.8	9.8	
Japan	4	4	4	4	4	10.5	10.5	10.5	10.4	10.4
Kazakhstan	4	4				10.3	10.4			
Korea, Rep. of	4	4			4	10.5	10.4			10.3
Kuwait	4	4				9.7	9.7			
Lithuania	4	4	4	4		10.7	10.7	10.8	10.9	
Morocco	4	4				10.3	10.5			
Netherlands	4	4	4	4	4	10.0	10.2	10.2	10.2	10.3
New Zealand	4.5-5.5	4.5-5.5	4.5-5.5	4.5-5.5	4.5-5.5	10.0	9.9	10.0	10.0	10.0
Northern Ireland	4	4				10.4	10.4			
Oman	4	4				9.6	9.9			
Portugal	4	4			4	9.9	10.0			10.4
Qatar	4	4				10.1	10.0			
Russian Federation	4	4	4	3 or 4		10.8	10.8	10.8	10.6	
Saudi Arabia	4	4				10.0	10.0			
Serbia	4	4				10.7	10.8			
Singapore	4	4	4	4	4	10.4	10.4	10.4	10.3	10.3
Slovak Republic	4	4	4			10.4	10.4	10.4		
Slovenia	4	4	4	3 or 4	3	9.8	9.9	9.8	9.8	9.9
Spain	4	4				9.9	9.8			
Sweden	4	4	4			10.8	10.7	10.8		
Turkey	4	4				9.9	10.1			
United Arab Emirates	4	4				9.8	9.8			
United States	4	4	4	4	4	10.2	10.2	10.3	10.2	10.2

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Benchmarking Participants**

Ontario, Canada	4	4	4	4	4	9.8	9.8	9.8	9.9	9.8
Quebec, Canada	4	4	4	4	4	10.1	10.1	10.1	10.1	10.3
Norway (4)	4	4	4	3	3	9.7	9.7	9.8	9.8	9.9
Abu Dhabi, UAE	4	4				9.8	9.7			
Dubai, UAE	4	4	4			9.8	9.9	10.0		
Florida, US	4	4				10.4	10.4			

\* Represents years of schooling counting from the first year of ISCED Level 1.

Georgian schools in South Ossetia and Abkhazia were excluded in 2011 due to lack of access and absence of official statistics. Abkhazia refugee schools in other territories of Georgia were included in the sample frame.

Bahrain in 2011, Korea in 2003, Lithuania in 1999, and Dubai (UAE) in 2007 tested the same cohort of students as other countries, but later in the assessment year. South Africa (9) tested one year later.

Trend results for Kuwait do not include private schools. Trend results for Lithuania do not include students taught in Polish or in Russian.

An empty cell indicates a country did not participate in that year's assessment. A dash (-) indicates comparable data not available.

**Appendix C.9: Trends in Student Populations (Continued)**

Country	Overall Exclusion Rates					Overall Participation Rates (After Replacement)				
	2015	2011	2007	2003	1995	2015	2011	2007	2003	1995
Australia	4.2%	4.4%	4.0%	2.7%	2.0%	94%	93%	95%	85%	66%
Bahrain	5.6%	1.1%				99%	90%			
Belgium (Flemish)	1.4%	5.0%		6.3%		95%	92%		97%	
Chile	3.7%	3.7%				88%	95%			
Chinese Taipei	2.4%	1.4%	2.8%	3.1%		99%	99%	100%	99%	
Croatia	4.4%	7.9%				94%	95%			
Cyprus	4.6%			2.9%	3.0%	98%			97%	83%
Czech Republic	4.2%	5.1%	4.9%		4.0%	95%	94%	92%		86%
Denmark	7.5%	6.3%	4.1%			86%	87%	85%		
England	2.3%	2.0%	2.1%	1.9%	12.0%	96%	78%	84%	76%	83%
Finland	2.0%	3.1%				97%	96%			
Georgia	4.9%	4.9%	4.8%			98%	96%	98%		
Germany	2.7%	1.9%	1.3%			95%	95%	96%		
Hong Kong SAR	2.2%	8.6%	5.4%	3.8%	3.0%	76%	82%	81%	83%	83%
Hungary	4.8%	4.2%	4.4%	8.1%	4.0%	96%	96%	96%	93%	92%
Iran, Islamic Rep. of	4.0%	4.5%	3.0%	5.7%	1.0%	99%	99%	99%	98%	97%
Ireland	2.7%	2.5%			7.0%	96%	95%			90%
Italy	6.2%	3.7%	5.3%	4.2%		94%	95%	97%	97%	
Japan	2.9%	3.2%	1.1%	0.8%	3.0%	97%	96%	95%	97%	92%
Kazakhstan	3.9%	6.3%				97%	99%			
Korea, Rep. of	2.5%	2.5%			7.0%	97%	98%			95%
Kuwait	3.0%	0.3%				90%	91%			
Lithuania	6.1%	5.6%	5.4%	4.6%		94%	94%	94%	87%	
Morocco	1.5%	2.0%				99%	96%			
Netherlands	3.2%	4.0%	4.8%	5.2%	4.0%	83%	79%	91%	84%	59%
New Zealand	4.8%	4.9%	5.4%	4.0%	1.0%	90%	90%	96%	93%	95%
Northern Ireland	2.7%	3.5%				71%	79%			
Oman	0.8%	1.5%				97%	96%			
Portugal	6.5%	2.5%			7.0%	92%	92%			92%
Qatar	3.8%	6.2%				99%	99%			
Russian Federation	4.0%	5.3%	3.6%	6.8%		98%	98%	98%	97%	
Saudi Arabia	1.9%	1.6%				93%	99%			
Serbia	11.3%	9.4%				96%	97%			
Singapore	10.1%	6.3%	1.5%	0.0%	0.0%	96%	96%	96%	98%	98%
Slovak Republic	4.2%	4.6%	3.3%			97%	96%	97%		
Slovenia	4.5%	2.6%	2.1%	1.3%	2.0%	93%	94%	93%	91%	76%
Spain	5.6%	5.3%				95%	97%			
Sweden	5.7%	4.1%	3.1%			95%	91%	97%		
Turkey	3.6%	2.5%				98%	98%			
United Arab Emirates	4.7%	3.3%				97%	97%			
United States	6.8%	7.0%	9.2%	5.1%	5.0%	81%	80%	84%	78%	80%

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Benchmarking Participants**

Ontario, Canada	3.4%	5.3%	6.3%	4.8%	-	90%	94%	92%	90%	92%
Quebec, Canada	5.4%	3.7%	6.4%	3.6%	-	59%	91%	84%	91%	81%
Norway (4)	5.0%	4.3%	5.1%	4.4%	3.0%	89%	70%	92%	88%	91%
Abu Dhabi, UAE	5.8%	2.7%				97%	97%			
Dubai, UAE	5.3%	5.1%	5.4%			97%	96%	67%		
Florida, US	4.7%	12.1%				95%	91%			



**Appendix D.1: Percentages of Students with Achievement Too Low for Estimation\***

Country	Combined TIMSS and TIMSS Numeracy Percentage of Students with Achievement Too Low for Estimation	TIMSS Percentage of Students with Achievement Too Low for Estimation	TIMSS Numeracy Percentage of Students with Achievement Too Low for Estimation	TIMSS Average Percent Correct	TIMSS Numeracy Average Percent Correct
Australia	3 (0.3)	3 (0.3)	--	51 (0.7)	--
Bahrain	5 (0.4)	10 (0.7)	1 (0.2)	36 (0.4)	55 (0.4)
Belgium (Flemish)	1 (0.1)	1 (0.1)	--	58 (0.6)	--
Bulgaria	4 (0.6)	4 (0.6)	--	53 (1.3)	--
Canada	3 (0.4)	3 (0.4)	--	49 (0.5)	--
Chile	7 (0.6)	7 (0.6)	--	37 (0.5)	--
Chinese Taipei	0 (0.1)	0 (0.1)	--	70 (0.4)	--
Croatia	3 (0.3)	3 (0.3)	--	47 (0.5)	--
Cyprus	3 (0.3)	3 (0.3)	--	53 (0.6)	--
Czech Republic	2 (0.3)	2 (0.3)	--	53 (0.6)	--
Denmark	2 (0.3)	2 (0.3)	--	56 (0.7)	--
England	2 (0.3)	2 (0.3)	--	58 (0.7)	--
Finland	1 (0.2)	1 (0.2)	--	55 (0.5)	--
France	4 (0.4)	4 (0.4)	--	43 (0.7)	--
Georgia	8 (0.7)	8 (0.7)	--	39 (0.8)	--
Germany	2 (0.3)	2 (0.3)	--	52 (0.5)	--
Hong Kong SAR	0 (0.1)	0 (0.1)	--	75 (0.7)	--
Hungary	4 (0.5)	4 (0.5)	--	55 (0.7)	--
Indonesia	11 (0.7)	19 (1.2)	2 (0.4)	26 (0.6)	44 (0.7)
Iran, Islamic Rep. of	9 (0.8)	14 (1.2)	3 (0.6)	32 (0.6)	53 (0.6)
Ireland	1 (0.2)	1 (0.2)	--	59 (0.6)	--
Italy	3 (0.3)	3 (0.3)	--	48 (0.6)	--
Japan	0 (0.1)	0 (0.1)	--	70 (0.4)	--
Jordan	5 (0.4)	--	5 (0.4)	--	43 (0.6)
Kazakhstan	1 (0.2)	1 (0.2)	--	57 (1.2)	--
Korea, Rep. of	0 (0.1)	0 (0.1)	--	73 (0.5)	--
ψ Kuwait	20 (0.9)	32 (1.3)	8 (0.7)	21 (0.6)	35 (0.9)
Lithuania	1 (0.2)	1 (0.2)	--	56 (0.7)	--
Morocco	12 (0.5)	21 (0.8)	4 (0.3)	25 (0.6)	40 (0.7)
Netherlands	1 (0.2)	1 (0.2)	--	53 (0.5)	--
New Zealand	6 (0.4)	6 (0.4)	--	45 (0.5)	--
Northern Ireland	2 (0.3)	2 (0.3)	--	64 (0.7)	--
Norway (5)	1 (0.2)	1 (0.2)	--	59 (0.7)	--
Oman	14 (0.5)	14 (0.5)	--	33 (0.5)	--
Poland	2 (0.2)	2 (0.2)	--	55 (0.6)	--
Portugal	1 (0.2)	1 (0.2)	--	57 (0.6)	--
Qatar	13 (0.7)	13 (0.7)	--	35 (0.7)	--
Russian Federation	1 (0.2)	1 (0.2)	--	63 (0.9)	--
ψ Saudi Arabia	22 (1.0)	22 (1.0)	--	25 (0.6)	--
Serbia	4 (0.8)	4 (0.8)	--	51 (0.8)	--
Singapore	1 (0.1)	1 (0.1)	--	74 (0.8)	--
Slovak Republic	5 (0.4)	5 (0.4)	--	46 (0.5)	--
Slovenia	2 (0.3)	2 (0.3)	--	51 (0.5)	--
South Africa (5)	3 (0.4)	--	3 (0.4)	--	39 (0.7)
Spain	3 (0.4)	3 (0.4)	--	47 (0.6)	--
Sweden	2 (0.4)	2 (0.4)	--	51 (0.7)	--
Turkey	7 (0.5)	7 (0.5)	--	44 (0.7)	--
United Arab Emirates	12 (0.4)	12 (0.4)	--	38 (0.5)	--
United States	2 (0.2)	2 (0.2)	--	57 (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%.

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

**Appendix D.1: Percentages of Students with Achievement Too Low for Estimation\*  
 (Continued)**

Country	Combined TIMSS and TIMSS Numeracy Percentage of Students with Achievement Too Low for Estimation	TIMSS Percentage of Students with Achievement Too Low for Estimation	TIMSS Numeracy Percentage of Students with Achievement Too Low for Estimation	TIMSS Average Percent Correct	TIMSS Numeracy Average Percent Correct
<b>Benchmarking Participants</b>					
Buenos Aires, Argentina	10 (0.6)	19 (1.0)	2 (0.3)	28 (0.6)	52 (0.7)
Ontario, Canada	3 (0.4)	3 (0.4)	--	50 (0.6)	--
Quebec, Canada	1 (0.2)	1 (0.2)	--	55 (1.1)	--
Norway (4)	4 (0.5)	4 (0.5)	--	45 (0.5)	--
ψ Abu Dhabi, UAE	18 (0.9)	18 (0.9)	--	32 (0.9)	--
Dubai, UAE	5 (0.3)	5 (0.3)	--	50 (0.4)	--
Florida, US	2 (0.3)	2 (0.3)	--	58 (1.2)	--

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Appendix E.1: Average Percent Correct in the Mathematics Content and Cognitive Domains**

Country	Overall Mathematics	Mathematics Content Domains			Mathematics Cognitive Domains		
		Number	Geometric Shapes and Measures	Data Display	Knowing	Applying	Reasoning
Australia	51 (0.7)	47 (0.8)	53 (0.7)	63 (0.8)	56 (0.7)	50 (0.7)	46 (0.7)
Bahrain	36 (0.4)	35 (0.4)	36 (0.4)	44 (0.7)	44 (0.5)	33 (0.4)	29 (0.5)
Belgium (Flemish)	58 (0.6)	56 (0.7)	60 (0.6)	61 (0.6)	66 (0.6)	56 (0.6)	48 (0.7)
Bulgaria	53 (1.3)	53 (1.2)	52 (1.3)	56 (1.6)	60 (1.3)	51 (1.3)	44 (1.3)
Canada	49 (0.5)	45 (0.6)	51 (0.6)	62 (0.6)	55 (0.6)	47 (0.6)	45 (0.6)
Chile	37 (0.5)	34 (0.5)	38 (0.5)	47 (0.7)	42 (0.6)	35 (0.6)	33 (0.5)
Chinese Taipei	70 (0.4)	71 (0.5)	67 (0.5)	77 (0.5)	80 (0.4)	68 (0.5)	58 (0.6)
Croatia	47 (0.5)	44 (0.5)	48 (0.5)	54 (0.7)	53 (0.5)	43 (0.5)	41 (0.6)
Cyprus	53 (0.6)	52 (0.7)	52 (0.6)	57 (0.8)	58 (0.6)	52 (0.7)	45 (0.6)
Czech Republic	53 (0.6)	51 (0.7)	53 (0.7)	61 (0.7)	58 (0.6)	51 (0.7)	50 (0.7)
Denmark	56 (0.7)	53 (0.8)	59 (0.7)	62 (0.8)	62 (0.8)	54 (0.7)	51 (0.8)
England	58 (0.7)	56 (0.8)	57 (0.7)	68 (0.7)	66 (0.7)	56 (0.7)	50 (0.8)
Finland	55 (0.5)	52 (0.5)	55 (0.6)	65 (0.6)	60 (0.5)	53 (0.5)	50 (0.7)
France	43 (0.7)	40 (0.7)	47 (0.7)	49 (0.8)	50 (0.7)	41 (0.7)	38 (0.7)
Georgia	39 (0.8)	41 (0.8)	34 (0.8)	41 (0.9)	45 (0.9)	37 (0.8)	31 (0.8)
Germany	52 (0.5)	48 (0.6)	53 (0.6)	64 (0.7)	58 (0.6)	48 (0.6)	48 (0.6)
Hong Kong SAR	75 (0.7)	74 (0.8)	73 (0.7)	81 (0.7)	80 (0.6)	76 (0.7)	64 (0.9)
Hungary	55 (0.7)	54 (0.7)	55 (0.8)	58 (0.9)	62 (0.7)	52 (0.8)	48 (0.8)
Indonesia	26 (0.6)	24 (0.6)	28 (0.7)	31 (0.9)	32 (0.8)	24 (0.6)	20 (0.5)
Iran, Islamic Rep. of	32 (0.6)	31 (0.6)	34 (0.7)	34 (0.8)	39 (0.7)	31 (0.6)	25 (0.6)
Ireland	59 (0.6)	58 (0.6)	57 (0.6)	67 (0.7)	67 (0.6)	57 (0.6)	48 (0.6)
Italy	48 (0.6)	47 (0.6)	47 (0.7)	54 (0.7)	56 (0.7)	45 (0.6)	40 (0.6)
Japan	70 (0.4)	69 (0.5)	69 (0.5)	78 (0.5)	76 (0.4)	67 (0.5)	64 (0.6)
Kazakhstan	57 (1.2)	58 (1.1)	55 (1.4)	60 (1.1)	63 (1.1)	55 (1.2)	52 (1.3)
Korea, Rep. of	73 (0.5)	73 (0.5)	70 (0.4)	81 (0.5)	81 (0.5)	69 (0.5)	69 (0.5)
ψ Kuwait	21 (0.6)	21 (0.7)	21 (0.6)	24 (0.9)	27 (0.9)	19 (0.6)	16 (0.5)
Lithuania	56 (0.7)	55 (0.7)	53 (0.7)	65 (0.7)	61 (0.7)	54 (0.7)	48 (0.8)
Morocco	25 (0.6)	23 (0.6)	28 (0.7)	26 (0.8)	32 (0.7)	22 (0.6)	20 (0.6)
Netherlands	53 (0.5)	52 (0.5)	50 (0.5)	64 (0.7)	57 (0.5)	51 (0.5)	50 (0.6)
New Zealand	45 (0.5)	42 (0.5)	45 (0.6)	57 (0.6)	48 (0.5)	43 (0.6)	42 (0.6)
Northern Ireland	64 (0.7)	64 (0.8)	63 (0.7)	71 (0.7)	71 (0.8)	64 (0.7)	52 (0.8)
Norway (5)	59 (0.7)	55 (0.7)	59 (0.8)	71 (0.7)	63 (0.7)	57 (0.7)	54 (0.8)
Oman	33 (0.5)	31 (0.5)	35 (0.5)	38 (0.6)	39 (0.5)	32 (0.5)	26 (0.4)
Poland	55 (0.6)	53 (0.6)	53 (0.5)	65 (0.7)	57 (0.6)	55 (0.6)	51 (0.6)
Portugal	57 (0.6)	55 (0.6)	56 (0.7)	67 (0.6)	65 (0.6)	55 (0.7)	47 (0.6)
Qatar	35 (0.7)	34 (0.7)	33 (0.7)	42 (0.9)	42 (0.7)	32 (0.7)	28 (0.7)
Russian Federation	63 (0.9)	63 (0.9)	59 (1.0)	72 (0.9)	67 (0.8)	62 (0.9)	57 (1.0)
ψ Saudi Arabia	25 (0.6)	23 (0.6)	27 (0.7)	28 (0.6)	30 (0.7)	23 (0.6)	20 (0.6)
Serbia	51 (0.8)	51 (0.8)	48 (0.8)	59 (0.9)	56 (0.8)	50 (0.8)	45 (0.8)
Singapore	74 (0.8)	77 (0.9)	70 (0.8)	78 (0.8)	81 (0.7)	74 (0.9)	65 (1.0)
Slovak Republic	46 (0.5)	45 (0.6)	44 (0.6)	54 (0.7)	50 (0.5)	44 (0.6)	44 (0.6)
Slovenia	51 (0.5)	47 (0.5)	53 (0.6)	65 (0.6)	56 (0.5)	50 (0.6)	45 (0.5)
Spain	47 (0.6)	45 (0.6)	46 (0.8)	58 (0.8)	55 (0.6)	45 (0.6)	40 (0.7)
Sweden	51 (0.7)	48 (0.7)	51 (0.8)	63 (0.8)	53 (0.7)	49 (0.7)	51 (0.8)
Turkey	44 (0.7)	43 (0.7)	43 (0.6)	51 (0.8)	53 (0.7)	42 (0.7)	34 (0.6)
United Arab Emirates	38 (0.5)	37 (0.5)	37 (0.6)	46 (0.6)	45 (0.6)	36 (0.5)	31 (0.4)
United States	57 (0.5)	57 (0.6)	52 (0.6)	65 (0.6)	65 (0.6)	54 (0.6)	47 (0.6)
International Avg.	50 (0.1)	49 (0.1)	50 (0.1)	57 (0.1)	56 (0.1)	48 (0.1)	44 (0.1)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

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.

**Appendix E.1: Average Percent Correct in the Mathematics Content and Cognitive Domains (Continued)**

Country	Overall Mathematics	Mathematics Content Domains			Mathematics Cognitive Domains		
		Number	Geometric Shapes and Measures	Data Display	Knowing	Applying	Reasoning
<b>Benchmarking Participants</b>							
Buenos Aires, Argentina	28 (0.6)	29 (0.6)	26 (0.6)	30 (1.0)	35 (0.7)	25 (0.6)	23 (0.7)
Ontario, Canada	50 (0.6)	44 (0.7)	53 (0.7)	64 (0.7)	54 (0.7)	48 (0.7)	46 (0.6)
Quebec, Canada	55 (1.1)	53 (1.1)	56 (1.2)	65 (1.0)	63 (1.0)	52 (1.1)	49 (1.3)
Norway (4)	45 (0.5)	41 (0.5)	47 (0.6)	54 (0.8)	48 (0.6)	44 (0.6)	41 (0.6)
ψ Abu Dhabi, UAE	32 (0.9)	31 (0.9)	32 (1.0)	40 (1.1)	38 (1.0)	31 (1.0)	26 (0.8)
Dubai, UAE	50 (0.4)	49 (0.4)	48 (0.4)	59 (0.5)	57 (0.4)	48 (0.4)	42 (0.4)
Florida, US	58 (1.2)	60 (1.3)	53 (1.2)	65 (1.1)	67 (1.1)	56 (1.3)	48 (1.3)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Appendix E.2: Average Percent Correct in the Mathematics Content and Cognitive Domains – TIMSS Numeracy**

Country	Overall Mathematics	Mathematics Content Domains			Mathematics Cognitive Domains		
		Number	Geometric Shapes and Measures	Data Display	Knowing	Applying	Reasoning
Bahrain	54 (0.4)	64 (0.4)	54 (0.4)	52 (0.4)	63 (0.4)	49 (0.4)	34 (0.4)
Indonesia	43 (0.7)	48 (0.8)	44 (0.7)	41 (0.7)	52 (0.8)	38 (0.7)	25 (0.6)
Iran, Islamic Rep. of	51 (0.6)	58 (0.7)	50 (0.6)	51 (0.6)	61 (0.6)	47 (0.6)	32 (0.6)
Jordan	41 (0.6)	47 (0.7)	45 (0.5)	39 (0.6)	51 (0.6)	37 (0.6)	23 (0.6)
ψ Kuwait	34 (0.8)	42 (1.1)	36 (0.8)	32 (0.9)	43 (0.9)	30 (0.9)	18 (0.7)
Morocco	38 (0.7)	43 (0.9)	44 (0.7)	35 (0.7)	47 (0.7)	35 (0.7)	22 (0.6)
South Africa	38 (0.6)	47 (0.7)	39 (0.6)	36 (0.7)	47 (0.7)	33 (0.6)	21 (0.6)
International Avg.	43 (0.2)	50 (0.3)	45 (0.2)	41 (0.3)	52 (0.3)	38 (0.3)	25 (0.2)

**Benchmarking Participants**

Buenos Aires, Argentina	51 (0.7)	56 (0.9)	46 (0.7)	51 (0.7)	60 (0.6)	44 (0.7)	35 (0.8)
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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 2015

# Appendix F: The Test–Curriculum Matching Analysis

TIMSS went to great lengths to ensure that comparisons of student achievement across countries would be as fair and equitable as possible. The [TIMSS 2015 Assessment Frameworks](#) were designed to specify the important aspects of mathematics that participating countries agreed should be the focus of an international assessment of mathematics achievement, and the assessment items were developed through a collaborative process with national representatives to faithfully represent the specifications in the frameworks and field tested extensively in participating countries. Finalizing the TIMSS 2015 assessments involved a series of reviews by representatives of the participating countries, experts in mathematics, and testing specialists. At the end of this process, the National Research Coordinators (NRCs) from each country formally approved the TIMSS 2015 assessments, thus accepting them as being sufficiently fair to compare their students' mathematics achievement with that of students from other countries.

Although the assessments were developed to represent an agreed-upon framework and were intended to have as much in common across countries as possible, it was unavoidable that the match between the TIMSS 2015 assessment (or test) and the mathematics curriculum would not be the same in all countries. To restrict test items to just those topics included in the curricula of all participating countries and covered in the same sequence 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 2015 mathematics assessment matched each country's curriculum. 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.<sup>1</sup>

To gather data about the extent to which the TIMSS 2015 tests matched the curricula of the TIMSS countries and benchmarking participants, NRCs were asked to examine each achievement item and indicate whether 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 Poland the curriculum specifies the curricular goals to be achieved by the end of the sixth and ninth grades, but does not provide a grade-by-grade specification. In such

<sup>1</sup> Because there also may be curriculum areas covered in some countries that are not covered by the TIMSS 2015 tests, the TCMA does not provide complete information about how well the tests cover the curricula of the countries.

situations, coordinators were asked to make the best judgment possible.<sup>2</sup> 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. All TIMSS 2015 participants took part in the TCMA analysis except Norway (4) and Buenos Aires at the fourth grade and Egypt, Norway (8), and Buenos Aires at the eighth grade. TCMA was not administered for TIMSS Numeracy and therefore Jordan and South Africa (5), who participated in TIMSS Numeracy but did not participate in TIMSS at the fourth grade, are not included in the fourth grade exhibit.

Exhibits F.1 through F.4 present the TCMA results for the TIMSS 2015 mathematics test at the fourth and eighth grades. Exhibits F.1 and F.2 show the average percent correct on the mathematics items judged appropriate by each country at the fourth and eighth grades, respectively. Exhibits F.3 and F.4 show the standard errors corresponding to the percentages presented in Exhibits F.1 and F.2.

In Exhibit F.1, the bottom row of the exhibit shows the number of items, in terms of score points, identified as appropriate in each country. At the fourth grade, the maximum number of score points in the assessment was 178 points.<sup>3</sup> Generally, the proportion of items judged appropriate was fairly high. Reading along the bottom row, it can be seen that 4 of the 47 countries that took part in the TCMA analysis judged 100 percent of the items to be included in their curricula as did 1 of the 5 benchmarking participants. A further 34 countries and 2 of the other 4 benchmarking participants judged 75 percent or more (134 score points) to be appropriate. All of the participants concurred that more than half of the mathematics items were included in their curricula.

At the eighth grade, the percentage of items judged appropriate was similar; 4 of the 38 countries and 1 of the 5 benchmarking participants judged 100 percent of the items to be appropriate (all 221 score points), and an additional 33 countries and the remainder of the benchmarking participants judged 75 percent or more (166 score points) to be appropriate.

Because most countries indicated that at least some items were not included in their intended curriculum at the grade tested, the data were analyzed to determine whether the inclusion of these items had any effect on the international performance comparisons.<sup>4</sup>

The first column of data in Exhibits F.1 and F.2 show the average percent correct on all test items for each participant, together with its standard error. Subsequent columns show the performance of each participant on those items judged appropriate by the participant listed at the head of the column. Participants are presented in order of their performance based on average percent correct on all items, from highest to lowest. To interpret these exhibits, choosing a country and reading across its row provides the average percent correct for the students in that country on the items selected by each of the countries listed along the top of the exhibit. For example, at the fourth grade, Hong Kong, where the average percent correct was 75 percent on its own set of items,

2 Exhibits 5 and 6 of the TIMSS 2015 Encyclopedia provide information on the grade-to-grade structure of the curriculum for each TIMSS 2015 participant.  
 3 The TIMSS 2015 fourth grade mathematics assessment contained 169 items, yielding 182 score points. However, following item review, response categories for four of the items were combined, resulting in data for 178 score points. Similarly, following item review, the 212 items and 229 score points in the eighth grade assessment were reduced to 209 items and 221 score points.  
 4 It should be noted that the mathematics achievement presented in Exhibits F.1 and F.2 is based on average percent correct (the percentage of students in a country answering each item correctly, averaged across all items), which is different from the average scale scores that are presented in main tables of the report.





**Exhibit F.1: Average Percent Correct for the Test-Curriculum Matching Analysis, Fourth Grade (Continued)**

Based on a subset of items specifically identified by each country as addressing its curriculum

Read across the row to compare that country's performance based on the test items included by each of the countries across the top. Read down the column under a country name to compare the performance of the country down the left on the items included by the country listed on the top. Read along the diagonal to compare performance for each different country based on its own decisions about the test items to include.

Country	Average Percent Correct on All Items																	Benchmarking Participants					
	Spain	Croatia	Slovak Republic	New Zealand	Turkey	France	Georgia	United Arab Emirates	Chile	Bahrain	Qatar	Oman	Iran, Islamic Rep. of	Indonesia	Morocco	Saudi Arabia	Kuwait						
Hong Kong SAR	75 (0.7)	76	74	74	76	75	75	74	75	75	75	76	75	74	75	75	75	Florida, US	75	75	75	74	76
Singapore	74 (0.8)	74	73	73	74	75	74	73	74	74	74	76	74	74	74	74	75	Quebec, Canada	75	75	74	74	73
Korea, Rep. of	73 (0.5)	74	73	74	74	74	74	73	73	73	74	73	73	73	72	74	73	Dubai, UAE	74	75	73	72	73
Chinese Taipei	70 (0.4)	71	70	71	70	71	71	71	70	70	71	71	73	70	70	71	70	Ontario, Canada	71	71	70	70	69
Japan	70 (0.4)	71	69	70	71	71	71	71	70	69	70	70	70	69	71	70	70	Abu Dhabi, UAE	70	71	70	70	70
Northern Ireland	64 (0.7)	65	62	65	65	65	65	64	64	64	65	64	66	64	65	64	65						
Russian Federation	63 (0.9)	63	65	66	64	64	64	65	63	63	63	63	63	63	61	64	63						
Ireland	59 (0.6)	59	56	58	60	59	59	58	59	58	59	59	61	59	58	59	59						
Norway (5)	59 (0.7)	60	57	60	61	60	60	59	59	59	59	59	60	59	57	59	59						
England	58 (0.7)	59	57	60	60	59	59	58	58	58	59	58	60	58	57	59	58						
Belgium (Flemish)	58 (0.6)	59	57	57	59	59	59	57	58	58	58	58	60	58	57	59	58						
Kazakhstan	57 (1.2)	58	61	59	58	58	58	57	58	58	58	58	58	57	59	57	58						
Portugal	57 (0.6)	58	55	56	59	57	57	57	57	57	57	57	59	57	56	57	57						
United States	57 (0.5)	57	55	56	58	57	57	56	57	56	57	56	58	57	56	57	57						
Denmark	56 (0.7)	57	56	57	58	57	57	56	56	56	56	57	56	55	57	56	56						
Lithuania	56 (0.7)	56	55	57	57	56	56	56	56	55	56	55	56	56	54	57	56						
Finland	55 (0.5)	55	53	56	57	56	55	55	55	54	55	54	56	55	53	55	55						
Hungary	55 (0.7)	55	57	58	56	56	56	55	54	55	55	56	55	54	58	55	55						
Poland	55 (0.6)	55	54	56	57	56	55	56	55	54	55	54	55	55	53	54	55						
Czech Republic	53 (0.6)	54	55	57	55	54	55	55	53	53	54	53	55	54	52	55	53						
Netherlands	53 (0.5)	54	53	58	54	54	54	53	53	54	53	54	54	51	54	53	53						
Bulgaria	53 (1.3)	53	58	57	54	54	54	55	53	53	54	53	54	53	53	57	53						
Cyprus	53 (0.6)	53	53	52	55	54	54	54	53	52	53	53	54	53	52	54	53						
Germany	52 (0.5)	53	53	56	54	53	53	52	52	52	52	52	53	52	50	55	52						
Slovenia	51 (0.5)	52	51	53	54	52	52	52	51	51	52	51	52	52	49	52	51						
Australia	51 (0.7)	52	49	51	54	52	52	51	51	51	52	51	52	51	49	52	51						
Serbia	51 (0.8)	52	54	54	53	52	52	53	51	51	52	51	52	52	50	53	51						
Sweden	51 (0.7)	51	51	54	53	52	52	52	51	51	51	50	51	51	48	52	51						
Canada	49 (0.5)	50	48	50	52	50	50	50	49	49	50	49	50	50	47	50	49						
Italy	48 (0.6)	49	48	48	50	49	48	48	48	48	48	48	49	48	47	49	48						
Spain	47 (0.6)	48	47	48	50	48	48	48	47	47	48	48	49	48	46	49	47						
Croatia	47 (0.5)	47	52	50	48	48	48	49	47	46	47	47	48	47	45	51	47						
Slovak Republic	46 (0.5)	46	48	52	47	47	47	48	46	45	46	46	47	46	45	48	46						
New Zealand	45 (0.5)	45	42	45	47	45	45	45	45	44	45	44	45	45	43	44	45						
Turkey	44 (0.7)	45	44	44	46	45	45	45	44	44	45	45	46	45	44	45	44						
France	44 (0.7)	44	44	43	46	44	44	44	44	44	44	44	45	44	43	45	44						
Georgia	39 (0.8)	39	42	43	39	40	40	41	39	38	39	39	40	39	39	42	39						
United Arab Emirates	38 (0.5)	38	36	38	39	39	39	38	38	38	38	38	39	38	37	38	38						
Chile	37 (0.5)	38	35	37	40	38	38	37	37	37	37	38	38	36	37	37	37						
Bahrain	36 (0.4)	37	35	36	38	37	37	36	36	36	37	36	38	37	35	37	36						
Qatar	35 (0.7)	35	33	35	36	35	35	35	34	35	35	36	35	34	35	35	35						
Oman	33 (0.5)	34	32	31	34	34	34	33	33	33	34	33	35	34	33	34	33						
Iran, Islamic Rep. of	32 (0.6)	33	31	30	34	33	33	32	32	32	33	33	34	33	32	32	33						
Indonesia	26 (0.6)	27	26	25	27	27	27	25	26	26	26	26	27	26	26	27	26						
Morocco	25 (0.6)	26	25	24	26	26	26	25	25	25	26	26	25	26	27	25	26						
Saudi Arabia	25 (0.6)	26	25	24	26	26	26	25	25	25	25	26	25	25	25	25	25						
Kuwait	21 (0.6)	21	20	20	22	22	21	21	21	21	21	21	22	21	21	21	21						
International Avg.	50 (0.1)	51	50	51	52	51	51	50	50	50	50	50	51	50	49	51	50						
<b>Benchmarking Participants</b>																							
Florida, US	58 (1.2)	58	56	58	60	59	58	58	58	58	59	58	60	58	58	58	59	59	60	58	58	58	
Quebec, Canada	55 (1.1)	57	55	55	58	56	56	56	55	55	56	56	57	56	54	56	55	56	58	55	56	56	
Dubai, UAE	50 (0.4)	51	49	50	52	51	51	50	50	50	51	50	51	50	49	51	50	51	52	50	50	51	
Ontario, Canada	50 (0.6)	51	48	51	53	51	51	50	50	50	50	50	51	51	48	51	50	50	52	50	51	52	
Abu Dhabi, UAE	32 (0.9)	33	31	32	33	33	33	32	32	32	33	33	33	32	32	33	32	33	33	32	32	33	
Number of Items (Score Points) Identified*	178	160	111	102	132	172	166	146	178	169	175	170	130	168	142	129	178	161	170	149	178	125	127

SOURCE: IEA's Trends in International Mathematics and Science Study - TIMSS 2015

**Exhibit F.2: Average Percent Correct for the Test-Curriculum Matching Analysis, Eighth Grade**

Based on a subset of items specifically identified by each country as addressing its curriculum

Read across the row to compare that country's performance based on the test items included by each of the countries across the top. Read down the column under a country name to compare the performance of the country down the left on the items included by the country listed on the top. Read along the diagonal to compare performance for each different country based on its own decisions about the test items to include.

Country	Average Percent Correct on All Items	Singapore	Korea, Rep. of	Chinese Taipei	Hong Kong SAR	Japan	Russian Federation	Kazakhstan	Canada	Ireland	United States	England	Hungary	Israel	Slovenia	Lithuania	Norway (9)	Australia	Malta	Sweden	New Zealand	Italy	United Arab Emirates	Malaysia	Turkey	Bahrain	Georgia	Qatar	Iran, Islamic Rep. of	Lebanon	Thailand
	Singapore	74 (0.8)	74	74	74	75	74	75	74	75	74	74	74	74	74	74	75	74	74	74	75	76	75	74	75	74	74	74	74	75	77
Korea, Rep. of	69 (0.6)	70	70	70	70	70	70	69	70	70	69	69	69	69	69	69	70	70	70	71	72	70	69	70	69	69	70	70	69	72	70
Chinese Taipei	68 (0.5)	68	68	68	69	68	69	68	69	68	68	68	68	68	68	69	68	68	68	69	69	68	68	69	68	68	68	68	69	70	69
Hong Kong SAR	68 (1.1)	68	68	68	69	68	69	68	70	68	68	68	68	68	68	69	68	68	68	70	70	69	68	69	68	68	68	68	69	71	69
Japan	65 (0.5)	65	66	65	65	67	66	65	66	65	65	65	65	65	65	65	65	66	66	66	68	65	65	66	65	65	65	66	66	66	66
Russian Federation	53 (1.3)	53	53	53	54	53	55	53	53	53	53	53	53	53	53	54	53	53	53	53	53	54	53	53	53	53	53	54	56	54	
Kazakhstan	50 (1.4)	51	51	50	51	50	52	50	50	50	50	50	50	50	51	51	50	51	50	50	51	50	51	50	50	50	51	51	53	51	
Canada	50 (0.6)	50	51	50	51	52	51	50	54	51	50	50	50	50	50	51	51	51	51	51	53	55	51	50	52	50	50	51	52	52	
Ireland	49 (0.7)	50	50	50	50	51	51	50	53	50	49	49	50	49	50	50	50	51	50	52	54	51	49	51	50	50	51	51	53	51	
United States	48 (0.8)	49	49	48	48	50	49	49	50	49	49	49	50	48	49	48	49	49	49	50	51	49	48	49	49	49	49	49	50	49	
England	48 (1.1)	48	48	48	48	49	49	48	51	49	48	48	48	48	48	49	49	49	49	50	52	49	48	49	48	48	48	49	49	50	
Hungary	48 (0.9)	48	49	48	48	49	49	48	50	49	48	48	48	48	48	49	49	49	49	49	50	52	49	48	50	48	48	48	49	51	
Israel	47 (0.9)	48	48	47	48	48	49	47	48	48	47	47	47	47	48	48	48	48	48	48	48	49	48	47	48	48	48	48	48	49	
Slovenia	47 (0.5)	47	48	47	48	49	48	47	50	48	47	47	47	47	48	48	48	48	48	48	50	51	48	47	49	47	47	47	48	51	
Lithuania	46 (0.7)	46	46	46	47	47	47	46	49	47	46	46	46	46	46	46	48	47	47	47	49	50	47	46	48	46	46	46	47	49	
Norway (9)	46 (0.6)	46	46	46	46	47	47	46	49	47	46	46	46	46	46	47	47	47	47	49	50	47	46	47	46	46	46	47	47	48	
Australia	45 (0.7)	45	45	45	45	46	46	45	48	46	45	45	45	45	45	46	46	46	46	46	47	49	46	45	46	45	45	45	46	46	
Malta	43 (0.3)	43	43	43	43	44	44	43	45	43	43	43	43	43	43	44	44	44	44	44	45	46	44	43	44	43	43	43	44	45	
Sweden	43 (0.7)	43	43	43	43	44	44	43	45	43	43	43	43	43	43	44	44	44	44	44	46	47	44	43	44	43	43	43	44	45	
New Zealand	42 (0.8)	42	43	42	42	44	43	42	45	43	42	42	42	42	42	43	43	43	43	43	45	46	43	42	43	42	42	43	43	44	
Italy	42 (0.6)	42	42	42	42	43	43	42	44	42	42	42	42	42	42	43	42	42	42	43	45	43	42	43	42	42	42	43	43	44	
United Arab Emirates	37 (0.4)	37	37	37	37	38	38	37	39	37	37	37	37	37	37	37	37	37	37	38	39	38	37	37	37	37	37	37	38	39	
Malaysia	36 (0.8)	37	37	37	37	37	38	36	39	37	36	36	36	36	37	37	38	37	37	38	39	37	36	38	37	37	37	37	37	39	
Turkey	36 (1.0)	36	36	36	36	36	37	36	38	37	36	36	36	36	36	36	36	36	36	37	38	37	36	37	36	36	36	37	37	37	
Bahrain	35 (0.3)	35	35	35	34	36	36	35	36	36	35	35	35	35	35	35	35	35	35	35	37	35	35	35	35	35	35	35	36	35	
Georgia	34 (0.7)	34	34	34	34	35	35	34	35	34	34	34	34	34	34	34	34	34	34	35	36	34	34	35	34	34	34	34	35	36	
Qatar	32 (0.5)	32	32	32	32	33	33	32	33	32	32	32	32	32	32	32	32	32	32	33	34	33	32	33	32	32	32	33	33	34	
Iran, Islamic Rep. of	31 (0.9)	31	31	31	31	32	32	31	32	32	31	31	31	31	31	31	31	31	31	32	33	32	31	32	31	31	31	32	32	32	
Lebanon	30 (0.7)	30	30	30	31	30	31	30	30	30	30	30	30	30	30	30	30	30	30	31	30	30	31	30	30	30	30	31	30	31	
Thailand	30 (1.0)	30	30	30	29	30	30	30	31	30	30	30	30	30	30	30	30	30	30	31	31	30	30	30	30	30	30	30	30	31	
Chile	28 (0.5)	28	28	28	28	29	29	28	30	29	28	28	28	28	28	28	28	28	28	29	31	29	28	29	28	28	28	29	29	30	
Oman	26 (0.4)	26	26	26	26	27	26	27	26	26	26	26	26	26	26	26	26	26	26	27	27	26	26	26	26	26	26	27	26	27	
Kuwait	24 (0.8)	24	24	24	23	24	25	24	25	24	24	24	24	24	24	24	24	24	24	24	24	25	24	24	24	24	24	24	24	25	
Jordan	23 (0.4)	23	23	23	23	24	24	23	24	23	23	23	23	23	23	23	23	23	23	23	24	23	23	23	23	23	23	24	24	24	
Botswana (9)	23 (0.3)	23	23	23	23	24	24	23	25	24	23	23	23	23	23	23	23	23	23	24	25	24	23	24	23	23	23	24	23	25	
Morocco	22 (0.3)	22	22	22	22	22	22	22	23	22	22	22	22	22	22	22	22	22	22	22	23	22	22	22	22	22	22	22	22	23	
South Africa (9)	21 (0.7)	21	21	21	21	22	22	21	22	21	21	21	21	21	21	21	21	21	21	21	22	21	21	21	21	21	21	21	21	22	
Saudi Arabia	21 (0.6)	21	20	20	20	21	21	20	22	21	21	21	21	21	21	20	20	21	21	21	22	21	21	20	21	21	21	21	21	21	
International Avg.	42 (0.1)	42	42	42	42	42	43	42	43	42	42	42	42	42	42	42	42	42	42	43	44	42	42	43	42	42	42	42	42	44	

SOURCE: IEA's Trends in International Mathematics and Science Study - TIMSS 2015

**Benchmarking Participants**

Quebec, Canada	54 (1.0)	55	55	55	55	56	55	54	57	55	54	54	54	55	55	55	55	56	55	57	59	55	54	56	54	54	54	55	56	57	56
Ontario, Canada	49 (0.8)	49	49	49	49	50	49	49	53	50	49	49	49	49	49	50	50	50	50	52	53	50	49	50	49	49	49	50	50	51	50
Dubai, UAE	47 (0.5)	48	47	47	47	48	48	47	49	48	47	47	47	47	48	48	48	48	48	50	48	48	47	48	47	47	47	48	48	49	48
Florida, US	43 (1.5)	43	43	42	42	44	43	43	44	43	43	43	43	43	43	43	43	44	44	45	43	43	43	43	43	43	43	43	43	44	43
Abu Dhabi, UAE	32 (0.9)	33	33	33	33	33	33	32	34	33	32	32	32	33	33	33	33	33	33	34	35	33	32	33	33	33	33	33	33	34	33
Number of Items (Score Points) Identified*	221	215	210	217	190	196	203	217	188	214	218	221	220																		

**Exhibit F.2: Average Percent Correct for the Test-Curriculum Matching Analysis, Eighth Grade (Continued)**

Based on a subset of items specifically identified by each country as addressing its curriculum

Read across the row to compare that country's performance based on the test items included by each of the countries across the top. Read down the column under a country name to compare the performance of the country down the left on the items included by the country listed on the top. Read along the diagonal to compare performance for each different country based on its own decisions about the test items to include.

Country	Average Percent Correct on All Items	Benchmarking Participants												
	Chile	Oman	Kuwait	Jordan	Botswana (9)	Morocco	South Africa (9)	Saudi Arabia	Quebec, Canada	Ontario, Canada	Dubai, UAE	Florida, US	Abu Dhabi, UAE	
Singapore	74 (0.8)	75	75	75	76	74	75	74	74	75	76	74	74	74
Korea, Rep. of	69 (0.6)	71	71	70	73	70	70	69	69	70	70	69	69	70
Chinese Taipei	68 (0.5)	69	69	69	71	68	69	68	68	69	69	68	68	68
Hong Kong SAR	68 (1.1)	70	69	69	71	68	69	68	68	69	70	68	68	68
Japan	65 (0.5)	66	66	66	69	66	65	65	65	66	67	65	65	65
Russian Federation	53 (1.3)	53	54	54	57	53	54	53	53	54	54	53	53	53
Kazakhstan	50 (1.4)	50	51	51	54	51	51	50	50	51	51	50	50	50
Canada	50 (0.6)	52	52	52	54	51	51	50	50	51	54	50	50	51
Ireland	49 (0.7)	52	51	51	53	50	50	49	49	51	53	49	49	50
United States	48 (0.8)	49	49	49	53	49	48	48	48	49	51	48	49	49
England	48 (1.1)	50	49	49	52	49	48	48	48	49	52	48	48	49
Hungary	48 (0.9)	50	50	49	52	49	49	48	48	49	51	48	48	49
Israel	47 (0.9)	48	48	48	51	48	47	47	47	48	49	47	47	48
Slovenia	47 (0.5)	49	49	49	51	48	48	47	47	49	51	47	47	48
Lithuania	46 (0.7)	48	48	47	50	46	47	46	46	47	49	46	46	47
Norway (9)	46 (0.6)	49	47	47	49	46	46	46	46	47	49	46	46	46
Australia	45 (0.7)	47	46	46	49	45	45	45	45	46	48	45	45	46
Malta	43 (0.3)	44	44	44	47	43	43	43	43	44	46	43	43	43
Sweden	43 (0.7)	45	45	44	46	43	43	43	43	44	46	43	43	43
New Zealand	42 (0.8)	44	44	43	46	43	42	42	42	43	45	42	42	43
Italy	42 (0.6)	44	43	43	46	42	43	42	42	43	45	42	42	42
United Arab Emirates	37 (0.4)	38	38	38	41	37	37	37	37	37	39	37	37	37
Malaysia	36 (0.8)	38	38	37	41	37	37	36	36	37	39	36	36	37
Turkey	36 (1.0)	37	36	37	40	36	36	36	36	37	38	36	36	36
Bahrain	35 (0.3)	35	35	35	40	35	34	35	35	35	36	35	35	35
Georgia	34 (0.7)	35	35	35	38	34	35	34	34	34	35	34	34	34
Qatar	32 (0.5)	33	33	33	36	32	32	32	32	33	34	32	32	32
Iran, Islamic Rep. of	31 (0.9)	32	32	32	35	31	32	31	31	32	33	31	31	32
Lebanon	30 (0.7)	31	31	31	34	30	31	30	30	31	30	30	30	30
Thailand	30 (1.0)	31	30	31	33	30	30	30	30	30	32	30	30	30
Chile	28 (0.5)	29	29	29	32	28	28	28	28	29	30	28	28	29
Oman	26 (0.4)	26	26	27	30	26	26	26	26	26	27	26	26	26
Kuwait	24 (0.8)	24	24	24	27	24	24	24	24	24	25	24	24	24
Jordan	23 (0.4)	23	23	24	27	23	23	23	23	23	24	23	23	23
Botswana (9)	23 (0.3)	24	24	24	27	23	23	23	23	23	25	23	23	23
Morocco	22 (0.3)	22	22	22	25	22	22	22	22	22	23	22	22	22
South Africa (9)	21 (0.7)	22	22	22	24	21	21	21	21	21	23	21	21	21
Saudi Arabia	21 (0.6)	21	20	21	24	21	20	21	21	20	22	21	21	21
International Avg.	42 (0.1)	43	43	43	45	42	42	42	42	42	44	42	42	42
<b>Benchmarking Participants</b>														
Quebec, Canada	54 (1.0)	57	57	56	58	55	55	54	54	56	58	54	54	55
Ontario, Canada	49 (0.8)	51	50	50	52	49	49	49	49	50	53	49	49	50
Dubai, UAE	47 (0.5)	48	48	48	51	48	47	47	47	48	49	47	47	48
Florida, US	43 (1.5)	43	43	43	47	43	42	43	43	43	45	43	43	43
Abu Dhabi, UAE	32 (0.9)	33	33	33	36	33	33	32	32	33	34	32	32	33
Number of Items (Score Points) Identified*	221	193	194	207	183	207	181	221	221	205	184	221	218	215

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

also had 75 percent correct on the items selected by Singapore and Korea, 74 percent on the items selected by Chinese Taipei, 76 percent on the items selected by Japan, and so forth.

The column for a country listed at the top shows how each of the other participants performed on the set of items selected as appropriate for that country's students. Using the set of items selected by England at the fourth grade as an example, 75 percent of these items, on average, were answered correctly by students in Hong Kong and Singapore, 74 percent by students in Korea, 71 percent by students in Chinese Taipei, 70 percent by students in Japan, 65 percent by those in Northern Ireland, and so forth. The shaded diagonal element in the exhibit shows how each country performed on the set of items that it selected based on its own curriculum. Thus, students from the England averaged 59 percent correct on the set of items identified by England for the analysis.

For each country's selected items, the international averages across participating countries are presented in the lower part of the exhibit. These show that the selections of items by the participating countries varied somewhat in average difficulty, ranging at the fourth grade from 49 percent correct (the most difficult) for those chosen by Chinese Taipei and Indonesia, to 53 percent correct (the least difficult) for those chosen by Denmark. At the eighth grade, the average percent correct ranged from 42 percent for many participants to 45 percent for those chosen by Jordan.

Comparing the diagonal element for a country with the overall average percent correct shows the difference between performance on the set of items chosen as appropriate for that country and performance on the test as a whole. In general, countries performed better on their own item sets than on the items overall, although not by much. To illustrate, the average percent correct for Singapore across all fourth grade mathematics items was 74 percent. The diagonal element shows that students from Singapore had a slightly greater average percent correct (76 percent) across the set of items selected as appropriate for Singapore than they did overall. Most participants had a difference of one or two percentage points between the two performance measures, with the largest differences in Bulgaria and the Slovak Republic (6 percentage points). At the eighth grade, the differences were generally smaller; the largest being in Canada, New Zealand, Lebanon, Jordan, and the province of Ontario (4 percentage points).

It is clear that the selection of items does not have a major effect on the relative performance among TIMSS participants. Participants that had relatively high or low performance across all the mathematics items also had relatively high or low performance on each of the various sets of items selected for the TCMA. For example, at the eighth grade, Singapore had the highest average percent correct, not only on the test as a whole, but also on all of the different item selections, with Korea, Chinese Taipei, Hong Kong SAR and Japan next in order of performance (with some ties) on practically all selections of items. 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.<sup>5</sup>

5 Small differences in performance between adjacent countries shown in this exhibit usually are not statistically significant. The standard errors for the average percent correct statistics based on the TIMSS 2015 sample are provided in Exhibits F.3 and F.4. For any sample average shown in Exhibits F.1 and F.2, it can be said with 95 percent confidence that the corresponding value in the population falls between the sample estimate plus or minus two standard errors.

Even when countries performed better on the items judged by them to be included in their curriculum than they did overall, their performance relative to other participants was changed little. As an example, consider the 154 score points selected by Slovenia at the fourth grade. The students in Slovenia did better on these items (54% correct) than on the test as a whole (51% correct). However, most other countries also did better on these particular items, with an international average of 52 percent correct compared with 50 percent correct overall. The countries that performed better than Slovenia on the overall test also performed as well or better on the items selected by Slovenia.

The TCMA results provide evidence that the TIMSS 2015 mathematics assessment provides a reasonable basis for comparing achievement of the participating countries and benchmarking entities. This result is not unexpected; making the assessment as fair as possible was a major consideration in test development. The fact that the majority of countries indicated that most items were appropriate for their students means that the different average percent correct estimates 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.



**Exhibit F.3: Standard Errors for the Test-Curriculum Matching Analysis, Fourth Grade (Continued)**

Based on a subset of items specifically identified by each country as addressing its curriculum

Read across the row to compare that country's performance based on the test items included by each of the countries across the top. Read down the column under a country name to compare the performance of the country down the left on the items included by the country listed on the top. Read along the diagonal to compare performance for each different country based on its own decisions about the test items to include.

Country	Average Percent Correct on All Items	Benchmarking Participants																					
		Spain	Croatia	Slovak Republic	New Zealand	Turkey	France	Georgia	United Arab Emirates	Chile	Bahrain	Qatar	Oman	Iran, Islamic Rep. of	Indonesia	Morocco	Saudi Arabia	Kuwait	Florida, US	Quebec, Canada	Dubai, UAE	Ontario, Canada	Abu Dhabi, UAE
Hong Kong SAR	75 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Singapore	74 (0.8)	0.8	0.9	0.9	0.8	0.9	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8
Korea, Rep. of	73 (0.5)	0.4	0.5	0.5	0.4	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Chinese Taipei	70 (0.4)	0.4	0.5	0.5	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5
Japan	70 (0.4)	0.4	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5
Northern Ireland	64 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Russian Federation	63 (0.9)	0.9	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Ireland	59 (0.6)	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Norway (5)	59 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
England	58 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Belgium (Flemish)	58 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Kazakhstan	57 (1.2)	1.2	1.1	1.1	1.2	1.2	1.2	1.1	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1
Portugal	57 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
United States	57 (0.5)	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.6
Denmark	56 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Lithuania	56 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Finland	55 (0.5)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Hungary	55 (0.7)	0.7	0.7	0.8	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8
Poland	55 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Czech Republic	53 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7
Netherlands	53 (0.5)	0.4	0.5	0.5	0.4	0.5	0.4	0.5	0.4	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Bulgaria	53 (1.3)	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Cyprus	53 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Germany	52 (0.5)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.6	0.6	0.6	0.5	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6
Slovenia	51 (0.5)	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Australia	51 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Serbia	51 (0.8)	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Sweden	51 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Canada	49 (0.5)	0.6	0.5	0.5	0.6	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.6	0.5	0.6	0.6	0.6	0.5	0.6	0.5
Italy	48 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Spain	47 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Croatia	47 (0.5)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Slovak Republic	46 (0.5)	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.6	0.6	0.6
New Zealand	45 (0.5)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Turkey	44 (0.7)	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
France	44 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Georgia	39 (0.8)	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
United Arab Emirates	38 (0.5)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Chile	37 (0.5)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Bahrain	36 (0.4)	0.4	0.3	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Qatar	35 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Oman	33 (0.5)	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Iran, Islamic Rep. of	32 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Indonesia	26 (0.6)	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Morocco	25 (0.6)	0.6	0.7	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Saudi Arabia	25 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Kuwait	21 (0.6)	0.6	0.6	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.7	0.6	0.6	0.7	0.6	0.6	0.6	0.7	0.6	0.6
International Avg.	50 (0.1)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
<b>Benchmarking Participants</b>																							
Florida, US	58 (1.2)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Quebec, Canada	55 (1.1)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Dubai, UAE	50 (0.4)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Ontario, Canada	50 (0.6)	0.6	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Abu Dhabi, UAE	32 (0.9)	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Number of Items (Score Points) Identified*	178	160	111	102	132	172	166	146	178	169	175	170	130	168	142	129	178	161	170	149	178	125	127

SOURCE: IEA's Trends in International Mathematics and Science Study - TIMSS 2015

**Exhibit F.4: Standard Errors for the Test-Curriculum Matching Analysis, Eighth Grade**

Based on a subset of items specifically identified by each country as addressing its curriculum

Read across the row to compare that country's performance based on the test items included by each of the countries across the top. Read down the column under a country name to compare the performance of the country down the left on the items included by the country listed on the top. Read along the diagonal to compare performance for each different country based on its own decisions about the test items to include.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Country	Average Percent Correct on All Items	Singapore	Korea, Rep. of	Chinese Taipei	Hong Kong SAR	Japan	Russian Federation	Kazakhstan	Canada	Ireland	United States	England	Hungary	Israel	Slovenia	Lithuania	Norway (9)	Australia	Malta	Sweden	New Zealand	Italy	United Arab Emirates	Malaysia	Turkey	Bahrain	Georgia	Qatar	Iran, Islamic Rep. of	Lebanon	Thailand
	Singapore	74 (0.8)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Korea, Rep. of	69 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.6
Chinese Taipei	68 (0.5)	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6
Hong Kong SAR	68 (1.1)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Japan	65 (0.5)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Russian Federation	53 (1.3)	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Kazakhstan	50 (1.4)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Canada	50 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Ireland	49 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
United States	48 (0.8)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
England	48 (1.1)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Hungary	48 (0.9)	0.9	0.9	0.9	1.0	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	1.0
Israel	47 (0.9)	1.0	1.0	0.9	1.0	0.9	1.0	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	0.9	0.9	0.9	1.0	0.9	1.0	
Slovenia	47 (0.5)	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	
Lithuania	46 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
Norway (9)	46 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
Australia	45 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
Malta	43 (0.3)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Sweden	43 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
New Zealand	42 (0.8)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Italy	42 (0.6)	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	
United Arab Emirates	37 (0.4)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
Malaysia	36 (0.8)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
Turkey	36 (1.0)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Bahrain	35 (0.3)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Georgia	34 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	
Qatar	32 (0.5)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	
Iran, Islamic Rep. of	31 (0.9)	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	0.9	
Lebanon	30 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	
Thailand	30 (1.0)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Chile	28 (0.5)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5		
Oman	26 (0.4)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
Kuwait	24 (0.8)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.9	
Jordan	23 (0.4)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
Botswana (9)	23 (0.3)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Morocco	22 (0.3)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
South Africa (9)	21 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8		
Saudi Arabia	21 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6		
International Avg.	42 (0.1)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1		

**Benchmarking Participants**

Quebec, Canada	54 (1.0)	1.1	1.1	1.1	1.1	1.1	1.0	1.0	1.1	1.1	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.0	1.1	1.0	1.1	1.0	1.1	1.1	1.1	1.1
Ontario, Canada	49 (0.8)																													



**Exhibit F.4: Standard Errors for the Test-Curriculum Matching Analysis, Eighth Grade (Continued)**

Based on a subset of items specifically identified by each country as addressing its curriculum

Read across the row to compare that country's performance based on the test items included by each of the countries across the top. Read down the column under a country name to compare the performance of the country down the left on the items included by the country listed on the top. Read along the diagonal to compare performance for each different country based on its own decisions about the test items to include.

Country	Average Percent Correct on All Items	Country								Benchmarking Participants				
		Chile	Oman	Kuwait	Jordan	Botswana (9)	Morocco	South Africa (9)	Saudi Arabia	Quebec, Canada	Ontario, Canada	Dubai, UAE	Florida, US	Abu Dhabi, UAE
Singapore	74 (0.8)	0.8	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Korea, Rep. of	69 (0.6)	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Chinese Taipei	68 (0.5)	0.5	0.5	0.6	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Hong Kong SAR	68 (1.1)	1.1	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Japan	65 (0.5)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Russian Federation	53 (1.3)	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Kazakhstan	50 (1.4)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Canada	50 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Ireland	49 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
United States	48 (0.8)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
England	48 (1.1)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Hungary	48 (0.9)	0.9	1.0	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Israel	47 (0.9)	0.9	1.0	0.9	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0
Slovenia	47 (0.5)	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lithuania	46 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Norway (9)	46 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Australia	45 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Malta	43 (0.3)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Sweden	43 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
New Zealand	42 (0.8)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Italy	42 (0.6)	0.7	0.7	0.7	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6
United Arab Emirates	37 (0.4)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Malaysia	36 (0.8)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Turkey	36 (1.0)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Bahrain	35 (0.3)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Georgia	34 (0.7)	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Qatar	32 (0.5)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Iran, Islamic Rep. of	31 (0.9)	1.0	1.0	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Lebanon	30 (0.7)	0.7	0.8	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Thailand	30 (1.0)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Chile	28 (0.5)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Oman	26 (0.4)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Kuwait	24 (0.8)	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Jordan	23 (0.4)	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Botswana (9)	23 (0.3)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Morocco	22 (0.3)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
South Africa (9)	21 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Saudi Arabia	21 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
International Avg.	42 (0.1)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
<b>Benchmarking Participants</b>														
Quebec, Canada	54 (1.0)	1.1	1.1	1.1	1.1	1.0	1.1	1.0	1.0	1.1	1.1	1.1	1.1	1.1
Ontario, Canada	49 (0.8)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Dubai, UAE	47 (0.5)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Florida, US	43 (1.5)	1.6	1.6	1.5	1.5	1.6	1.6	1.5	1.5	1.5	1.6	1.5	1.5	1.5
Abu Dhabi, UAE	32 (0.9)	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Number of Items (Score Points) Identified*	221	193	194	207	183	207	181	221	221	205	184	221	218	215

SOURCE: IEA's Trends in International Mathematics and Science Study - TIMSS 2015

**Appendix G.1: Percentiles of Mathematics Achievement**

Country	5th Percentile	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile	95th Percentile
Australia	374 (6.3)	408 (4.9)	462 (4.0)	521 (3.2)	575 (3.5)	622 (3.8)	649 (3.8)
Bahrain	299 (3.9)	335 (4.5)	393 (2.5)	455 (1.8)	512 (1.9)	561 (2.1)	591 (2.8)
Belgium (Flemish)	445 (4.0)	468 (3.5)	505 (2.7)	546 (2.1)	587 (2.7)	624 (3.0)	645 (3.6)
Bulgaria	373 (9.7)	413 (9.6)	475 (7.1)	531 (5.2)	581 (4.9)	624 (5.9)	649 (6.0)
Canada	382 (5.4)	413 (4.5)	462 (2.9)	514 (2.1)	562 (2.4)	604 (2.7)	629 (3.1)
Chile	337 (5.0)	363 (3.8)	408 (4.3)	460 (3.2)	509 (2.9)	551 (2.8)	577 (3.6)
Chinese Taipei	474 (4.0)	505 (3.3)	552 (2.9)	599 (2.3)	645 (2.8)	685 (2.8)	709 (4.0)
Croatia	390 (4.7)	415 (3.9)	460 (2.3)	505 (2.0)	548 (2.4)	584 (2.5)	605 (3.3)
Cyprus	382 (6.8)	415 (4.6)	471 (4.0)	527 (3.3)	579 (3.3)	623 (3.1)	648 (4.6)
Czech Republic	409 (5.6)	437 (2.8)	484 (3.3)	530 (3.0)	576 (2.4)	616 (3.0)	640 (4.3)
Denmark	408 (5.6)	440 (5.3)	490 (3.7)	542 (3.3)	591 (3.4)	633 (4.1)	656 (3.1)
England	407 (5.9)	438 (5.1)	490 (3.9)	547 (2.9)	602 (3.7)	651 (3.6)	682 (7.8)
Finland	421 (5.0)	448 (3.5)	492 (2.8)	538 (2.1)	582 (2.3)	619 (2.7)	639 (2.8)
France	361 (5.2)	390 (4.6)	438 (4.1)	491 (3.8)	540 (3.7)	584 (4.1)	607 (4.0)
Georgia	310 (7.3)	347 (6.8)	408 (6.2)	469 (4.1)	524 (4.1)	570 (5.8)	597 (6.5)
Germany	410 (5.4)	437 (4.1)	479 (2.7)	524 (2.0)	566 (2.2)	604 (3.0)	626 (3.0)
Hong Kong SAR	505 (5.5)	531 (5.0)	573 (3.8)	616 (3.7)	659 (3.1)	696 (4.1)	721 (5.4)
Hungary	372 (7.5)	412 (6.7)	475 (5.4)	537 (2.9)	591 (2.9)	635 (2.7)	660 (4.1)
Indonesia	244 (6.9)	280 (5.2)	339 (4.5)	401 (4.4)	461 (3.8)	509 (3.5)	537 (4.3)
Iran, Islamic Rep. of	248 (10.0)	290 (7.1)	367 (5.1)	441 (3.8)	504 (3.3)	555 (2.6)	583 (4.0)
Ireland	420 (4.0)	451 (4.4)	501 (3.6)	552 (2.7)	598 (3.6)	636 (4.0)	658 (4.0)
Italy	383 (5.5)	413 (4.8)	461 (4.3)	510 (2.7)	556 (2.9)	596 (2.6)	619 (4.8)
Japan	476 (3.9)	505 (2.6)	549 (2.0)	594 (2.3)	639 (2.6)	680 (3.2)	703 (4.3)
Jordan	192 (7.8)	240 (6.7)	320 (4.9)	400 (3.8)	465 (3.5)	518 (4.3)	547 (3.8)
Kazakhstan	413 (4.4)	440 (4.3)	487 (4.7)	543 (5.8)	599 (5.2)	650 (6.6)	682 (8.5)
Korea, Rep. of	494 (5.5)	522 (3.0)	565 (2.9)	611 (2.3)	653 (2.4)	691 (3.8)	715 (4.4)
Kuwait	180 (5.0)	217 (5.7)	281 (5.9)	354 (4.6)	426 (4.9)	487 (6.3)	522 (7.7)
Lithuania	411 (5.9)	441 (5.1)	489 (3.8)	540 (3.2)	584 (2.9)	624 (4.7)	646 (4.7)
Morocco	220 (6.1)	253 (4.4)	311 (3.6)	377 (3.6)	445 (4.6)	504 (4.6)	533 (6.1)
Netherlands	436 (3.7)	457 (2.7)	492 (2.4)	531 (2.1)	569 (2.0)	601 (2.7)	619 (3.6)
New Zealand	335 (5.2)	371 (4.6)	432 (4.1)	495 (2.9)	553 (2.0)	602 (3.2)	632 (4.7)
Northern Ireland	420 (6.8)	456 (5.3)	514 (4.2)	576 (3.5)	630 (3.1)	675 (3.3)	702 (4.6)
Norway (5)	430 (5.3)	459 (5.6)	504 (3.3)	550 (3.0)	597 (2.6)	638 (3.5)	661 (4.3)
Oman	256 (4.7)	293 (4.4)	356 (3.5)	428 (3.7)	496 (2.6)	553 (3.5)	587 (4.0)
Poland	412 (5.1)	441 (4.0)	487 (3.1)	539 (2.2)	585 (2.4)	624 (2.6)	645 (3.9)
Portugal	420 (4.2)	447 (3.9)	492 (2.9)	543 (2.7)	592 (3.0)	632 (3.1)	657 (3.3)
Qatar	279 (6.4)	312 (4.9)	372 (4.8)	441 (3.5)	506 (3.9)	563 (6.8)	597 (7.9)
Russian Federation	441 (6.0)	470 (5.4)	517 (3.7)	565 (3.6)	613 (4.2)	656 (5.8)	683 (7.7)
Saudi Arabia	233 (8.4)	264 (6.3)	321 (4.7)	383 (4.3)	446 (4.2)	502 (5.4)	534 (6.5)
Serbia	363 (9.4)	403 (7.4)	466 (4.8)	523 (3.8)	577 (3.5)	625 (3.6)	650 (3.3)
Singapore	458 (9.0)	502 (8.6)	566 (5.2)	625 (4.7)	677 (3.8)	722 (3.8)	746 (4.6)
Slovak Republic	354 (6.9)	391 (5.2)	450 (3.7)	506 (3.0)	552 (2.3)	593 (3.4)	618 (2.8)
Slovenia	401 (5.6)	430 (3.3)	476 (2.7)	522 (2.6)	568 (2.4)	605 (2.9)	629 (2.5)
South Africa (5)	219 (5.1)	250 (4.5)	303 (3.9)	369 (4.2)	443 (4.5)	513 (5.4)	554 (7.7)
Spain	388 (5.8)	414 (4.8)	459 (3.5)	508 (2.6)	554 (2.1)	592 (2.3)	614 (2.9)
Sweden	398 (7.0)	428 (4.9)	475 (3.9)	522 (2.6)	567 (3.2)	604 (3.1)	626 (3.6)
Turkey	311 (8.0)	354 (6.6)	424 (4.7)	492 (3.0)	551 (3.3)	598 (3.6)	623 (4.0)
United Arab Emirates	276 (3.9)	312 (3.5)	377 (3.1)	454 (2.9)	527 (3.2)	587 (3.4)	623 (3.7)
United States	398 (4.5)	432 (3.1)	485 (2.4)	543 (2.3)	596 (2.3)	640 (2.6)	667 (3.5)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.  
Note: Percentiles are defined in terms of percentages of students at or below a point on the scale.

**Appendix G.1: Percentiles of Mathematics Achievement (Continued)**

Country	5th Percentile	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile	95th Percentile
<b>Benchmarking Participants</b>							
Buenos Aires, Argentina	295 (5.3)	325 (4.5)	377 (4.1)	436 (3.6)	490 (3.1)	534 (2.8)	559 (3.1)
Ontario, Canada	388 (4.5)	417 (4.4)	464 (3.1)	515 (2.3)	562 (2.9)	604 (3.5)	630 (4.2)
Quebec, Canada	428 (7.9)	451 (5.2)	492 (5.1)	536 (4.8)	580 (4.2)	620 (6.2)	644 (7.4)
Norway (4)	368 (7.1)	400 (5.4)	447 (3.2)	496 (3.0)	542 (2.6)	583 (2.9)	605 (4.1)
Abu Dhabi, UAE	247 (6.3)	279 (6.1)	338 (5.7)	418 (6.0)	499 (7.5)	561 (7.5)	599 (9.9)
Dubai, UAE	344 (3.2)	385 (3.0)	450 (2.4)	516 (1.6)	576 (2.6)	627 (2.5)	658 (4.5)
Florida, US	413 (8.2)	443 (6.9)	494 (6.3)	548 (5.7)	600 (6.1)	647 (7.5)	674 (6.8)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

**Appendix G.3: Standard Deviations of Mathematics Achievement**

Country	Overall		Girls		Boys	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Australia	517 (3.1)	83 (1.8)	513 (3.1)	81 (1.9)	522 (3.9)	85 (2.3)
Bahrain	451 (1.6)	88 (1.1)	459 (1.7)	82 (1.5)	443 (2.3)	93 (1.5)
Belgium (Flemish)	546 (2.1)	61 (1.2)	543 (2.4)	60 (1.5)	549 (2.4)	61 (1.4)
Bulgaria	524 (5.3)	83 (2.6)	527 (5.7)	82 (2.8)	522 (5.1)	83 (2.9)
Canada	511 (2.3)	75 (1.9)	506 (2.5)	73 (1.9)	515 (2.6)	76 (2.1)
Chile	459 (2.4)	73 (1.5)	458 (2.8)	71 (1.8)	459 (3.0)	75 (1.7)
Chinese Taipei	597 (1.9)	71 (1.2)	594 (2.2)	67 (1.5)	599 (2.3)	74 (1.6)
Croatia	502 (1.8)	66 (1.0)	496 (2.1)	64 (1.4)	508 (2.3)	68 (1.8)
Cyprus	523 (2.7)	81 (1.2)	520 (2.9)	77 (1.4)	526 (3.1)	84 (1.7)
Czech Republic	528 (2.2)	70 (1.3)	525 (3.0)	69 (1.8)	532 (2.5)	70 (1.6)
Denmark	539 (2.7)	75 (1.6)	536 (3.1)	74 (2.0)	542 (3.0)	76 (2.1)
England	546 (2.8)	84 (2.2)	543 (3.0)	80 (2.4)	549 (3.3)	87 (2.6)
Finland	535 (2.0)	67 (1.2)	540 (2.3)	64 (1.3)	531 (2.6)	69 (1.8)
France	488 (2.9)	74 (1.3)	485 (3.2)	73 (1.8)	491 (3.2)	75 (1.4)
Georgia	463 (3.6)	87 (2.4)	465 (3.9)	84 (2.7)	461 (4.4)	89 (3.1)
Germany	522 (2.0)	65 (1.2)	520 (2.4)	64 (1.6)	523 (2.3)	66 (1.6)
Hong Kong SAR	615 (2.9)	66 (1.7)	609 (3.8)	64 (2.1)	619 (2.8)	67 (2.0)
Hungary	529 (3.2)	88 (2.3)	526 (3.4)	86 (2.3)	532 (3.8)	90 (3.0)
Indonesia	397 (3.7)	89 (1.8)	403 (4.0)	87 (2.1)	393 (3.9)	91 (2.2)
Iran, Islamic Rep. of	431 (3.2)	102 (2.3)	437 (4.5)	97 (2.6)	426 (4.5)	106 (3.1)
Ireland	547 (2.1)	73 (1.2)	545 (2.6)	71 (1.7)	549 (2.9)	75 (1.7)
Italy	507 (2.6)	72 (1.7)	497 (2.7)	70 (2.0)	517 (3.0)	72 (2.2)
Japan	593 (2.0)	69 (1.0)	593 (2.0)	66 (1.0)	593 (2.5)	72 (1.5)
Jordan	388 (3.1)	107 (1.9)	399 (3.3)	94 (1.9)	379 (4.9)	116 (2.7)
Kazakhstan	544 (4.5)	82 (2.1)	546 (4.6)	82 (2.1)	543 (4.8)	83 (2.6)
Korea, Rep. of	608 (2.2)	67 (1.4)	604 (2.3)	65 (1.6)	612 (2.5)	69 (1.7)
Kuwait	353 (4.6)	104 (2.0)	359 (5.4)	98 (2.3)	347 (5.6)	110 (2.5)
Lithuania	535 (2.5)	71 (1.5)	537 (2.8)	68 (1.8)	534 (3.1)	74 (2.1)
Morocco	377 (3.4)	96 (1.7)	378 (3.5)	95 (1.9)	377 (3.9)	97 (1.9)
Netherlands	530 (1.7)	56 (1.0)	526 (1.8)	55 (1.2)	534 (2.2)	57 (1.3)
New Zealand	491 (2.3)	90 (1.5)	489 (2.8)	86 (1.9)	492 (2.6)	93 (1.6)
Northern Ireland	570 (2.9)	86 (1.7)	569 (3.8)	85 (2.5)	571 (3.1)	86 (2.2)
Norway (5)	549 (2.5)	71 (1.4)	551 (2.6)	68 (1.8)	547 (3.1)	73 (1.9)
Oman	425 (2.5)	101 (1.3)	436 (3.0)	98 (1.7)	415 (2.8)	102 (1.7)
Poland	535 (2.1)	71 (1.1)	534 (2.3)	68 (1.5)	536 (2.7)	74 (1.6)
Portugal	541 (2.2)	72 (1.2)	536 (2.4)	70 (1.5)	547 (2.5)	74 (1.8)
Qatar	439 (3.4)	97 (2.3)	440 (4.1)	91 (2.8)	438 (4.9)	102 (3.1)
Russian Federation	564 (3.4)	73 (2.4)	564 (3.7)	73 (2.5)	564 (3.7)	73 (2.6)
Saudi Arabia	383 (4.1)	92 (2.2)	405 (4.4)	81 (2.2)	363 (6.5)	97 (3.8)
Serbia	518 (3.5)	87 (2.8)	520 (3.7)	82 (2.2)	517 (4.7)	91 (4.6)
Singapore	618 (3.8)	86 (2.6)	620 (3.9)	84 (2.7)	616 (4.3)	88 (2.9)
Slovak Republic	498 (2.5)	80 (1.7)	493 (3.0)	79 (2.3)	504 (2.6)	80 (1.7)
Slovenia	520 (1.9)	69 (1.5)	518 (2.1)	65 (1.7)	522 (2.4)	72 (1.7)
South Africa (5)	376 (3.5)	102 (2.0)	384 (3.8)	99 (2.5)	368 (4.4)	105 (2.6)
Spain	505 (2.5)	69 (1.3)	499 (2.7)	66 (1.5)	511 (2.7)	71 (1.6)
Sweden	519 (2.8)	69 (1.7)	519 (3.2)	69 (2.0)	518 (3.2)	69 (2.1)
Turkey	483 (3.1)	95 (2.5)	482 (3.2)	92 (2.7)	484 (3.5)	99 (2.8)
United Arab Emirates	452 (2.4)	105 (1.5)	453 (3.9)	101 (1.9)	450 (3.4)	109 (2.4)
United States	539 (2.3)	81 (1.3)	536 (2.3)	80 (1.2)	543 (2.6)	83 (1.7)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

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

**Appendix G.3: Standard Deviations of Mathematics Achievement  
(Continued)**

Country	Overall		Girls		Boys	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	432 (2.9)	81 (1.4)	430 (3.5)	80 (1.6)	435 (2.9)	81 (1.7)
Ontario, Canada	512 (2.3)	72 (1.4)	509 (2.6)	72 (1.8)	516 (2.8)	73 (1.5)
Quebec, Canada	536 (4.0)	66 (1.7)	531 (3.9)	64 (1.8)	541 (4.8)	68 (2.1)
Norway (4)	493 (2.3)	72 (2.0)	492 (2.9)	69 (2.5)	494 (3.0)	74 (2.4)
Abu Dhabi, UAE	419 (4.7)	108 (3.2)	422 (8.0)	103 (3.7)	417 (6.6)	112 (3.8)
Dubai, UAE	511 (1.4)	94 (1.1)	510 (3.1)	89 (2.3)	512 (2.7)	99 (2.2)
Florida, US	546 (4.7)	79 (2.4)	548 (4.9)	77 (2.7)	544 (5.5)	81 (2.6)

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

# Appendix H: Organizations and Individuals Responsible for TIMSS 2015

## Introduction

TIMSS 2015 was a collaborative effort involving hundreds of individuals around the world. This appendix acknowledges the individuals and organizations for their contributions. Given that work on TIMSS 2015 has spanned approximately four years and has involved so many people and organizations, this list may not include all who contributed. Any omission is inadvertent. TIMSS 2015 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 was conducted by IEA's TIMSS & PIRLS International Study Center at Boston College, which has responsibility for the overall direction and management of the TIMSS and PIRLS projects, including design, development, and implementation. Headed by Executive Directors Drs. Ina V.S. Mullis and Michael O. Martin, the study center is located in the Lynch School of Education. In carrying out the project, the TIMSS & PIRLS International Study Center worked closely with the IEA Secretariat in 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. Staff at the IEA Data Processing and Research Center in 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; and 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 Secretariat and IEA Data Processing and Research

Center, Statistics Canada, and ETS 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 yearly 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 provide feedback and contributions throughout the development of the TIMSS assessment. 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 involved. Continuing the tradition of exemplary work established in previous cycles of TIMSS, the TIMSS 2015 NRCs performed their many tasks with dedication, competence, energy, and goodwill, and have been commended by the IEA Secretariat, the TIMSS & PIRLS International Study Center, the IEA Data Processing and Research Center, and Statistics Canada for their commitment to the project and the high quality of their work.

## Funding

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Boston College also is gratefully acknowledged for its generous financial support and stimulating educational environment.

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