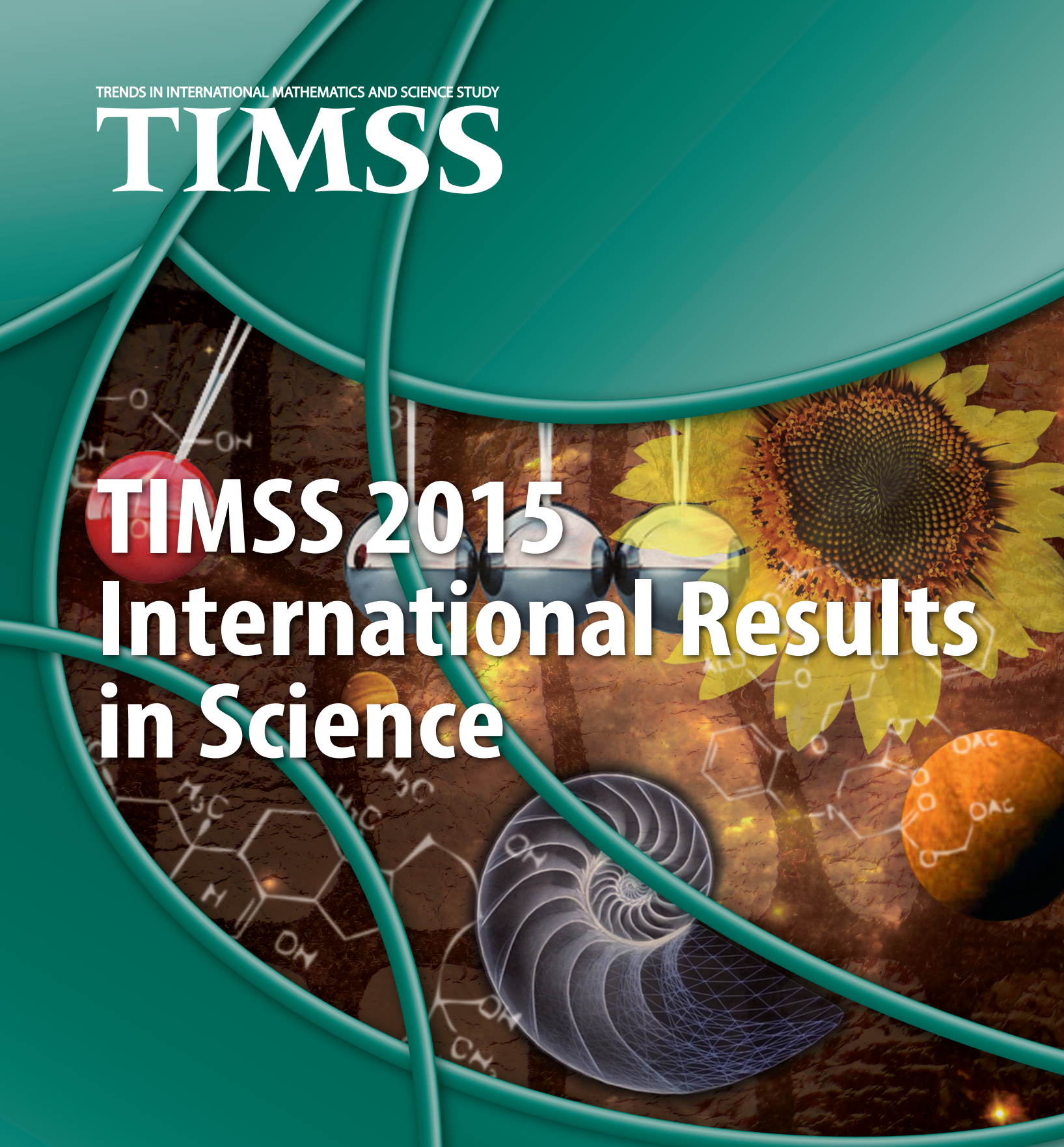
TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

TIMSS



TIMSS 2015 International Results in Science

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TIMSS 2015

TIMSS 2015 INTERNATIONAL RESULTS IN SCIENCE

FOURTH GRADE SCIENCE

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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.

Exhibit 1: Countries Participating in TIMSS 2015

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.

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		
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		
Benchmarking Participants						
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 12th 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 (4th grade, 8th 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.

TIMSS 2015

CHAPTER 1: STUDENT ACHIEVEMENT

TIMSS 2015 INTERNATIONAL RESULTS IN SCIENCE

IEA
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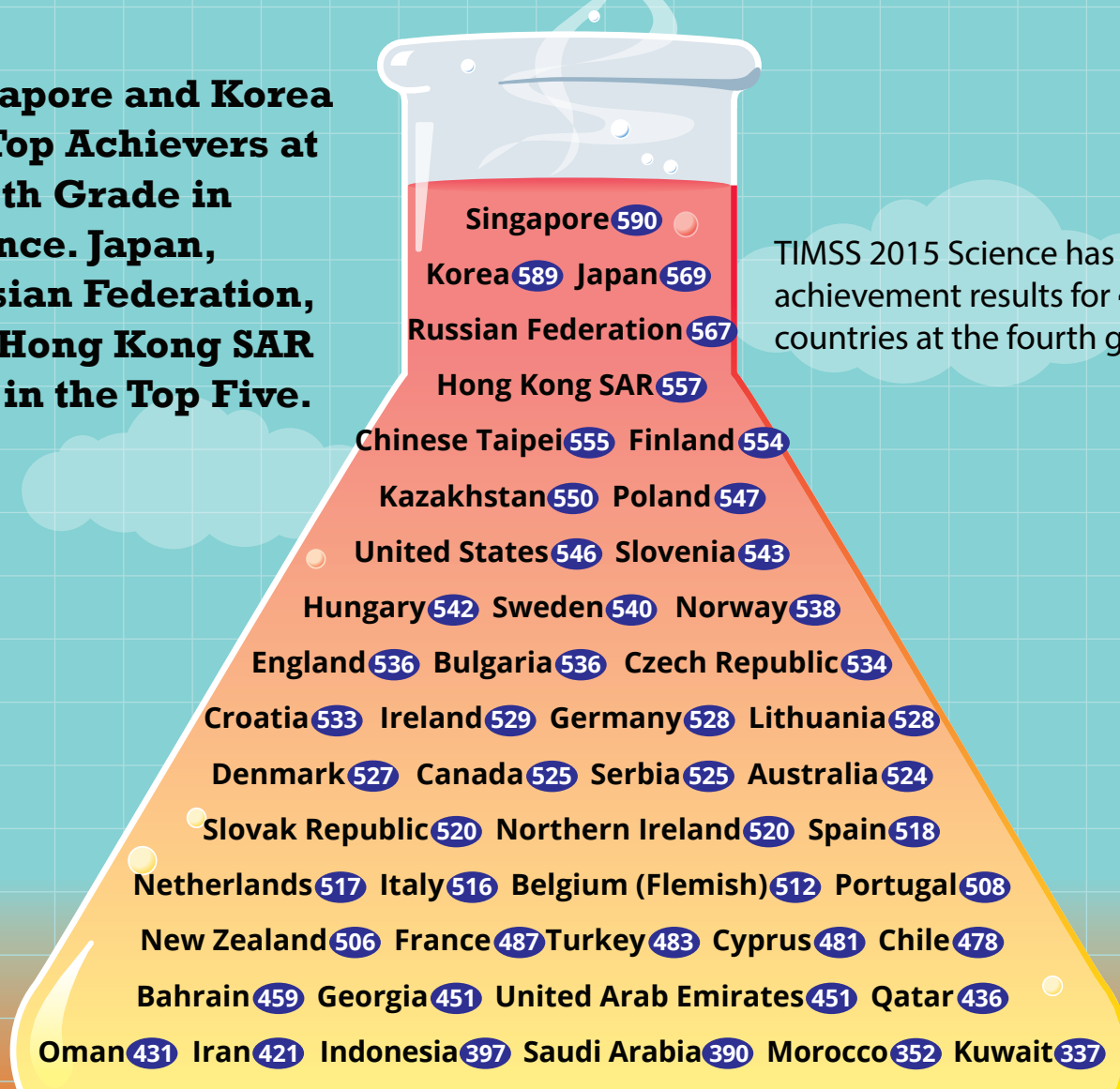
International Science Achievement

Singapore and Korea the Top Achievers at Fourth Grade in Science. Japan, Russian Federation, and Hong Kong SAR also in the Top Five.



TIMSS 2015 Science has achievement results for **47** countries at the fourth grade.

Please see Exhibit 1.3 for statistically significant differences.

Trends at Fourth Grade Show Increases in Science Achievement Around the World

Trends 2011-2015: 41 Countries

17 Countries Higher Average Achievement

Australia, Bahrain, Croatia, Hong Kong SAR, Ireland, Japan, Kazakhstan, Lithuania, Morocco, New Zealand, Oman, Qatar, Russian Federation, Slovenia, Spain, Turkey, United Arab Emirates

16 Countries Same Average Achievement

Belgium (Flemish), Chile, Chinese Taipei, Czech Republic, Denmark, England, Georgia, Germany, Hungary, Korea, Northern Ireland, Norway, Serbia, Singapore, Sweden, the United States

8 Countries Lower Average Achievement

Finland, Iran, Italy, Kuwait, Netherlands, Portugal, Saudi Arabia, Slovak Republic

Trends 1995-2015: 17 Countries

11 Countries Higher Average Achievement

Cyprus, England, Hong Kong SAR, Hungary, Iran, Ireland, Japan, Korea, Portugal, Singapore, Slovenia

4 Countries Same Average Achievement

Australia, Czech Republic, New Zealand, the United States

2 Countries Lower Average Achievement

Netherlands, Norway

In TIMSS 2015, No Difference between Boys and Girls in Science Achievement in More than Half the Countries

Of the 47 TIMSS 2015 Countries:

- **25** countries had no difference between boys and girls in average science achievement.
- Boys had higher achievement in **11** countries, with an average difference of **8** points.
- Girls had higher achievement in **11** countries, with an average difference of **24** points.

20-year Trends Show Reduction in Boys' Advantage in Science Achievement

Trends 2011-2015: 41 Countries

- In 2011, boys had higher average achievement in **13** countries, compared to **8** countries for girls.
- In 2015, boys had higher average achievement in **11** countries, compared to **10** countries for girls.
- Among the **41** countries, there was no average achievement difference between boys and girls in **20** countries in 2011 and **20** countries in 2015.

Trends 1995-2015: 17 Countries

- In 1995, boys had higher average achievement than girls in **10** countries, with an average difference of **14** points. There was no average achievement difference in **6** countries.
- In 2015, boys had higher average achievement than girls in **7** countries, with an average difference of **8** points. There was no average achievement difference in **10** countries.

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

IEA TIMSS & PIRLS International Study Center
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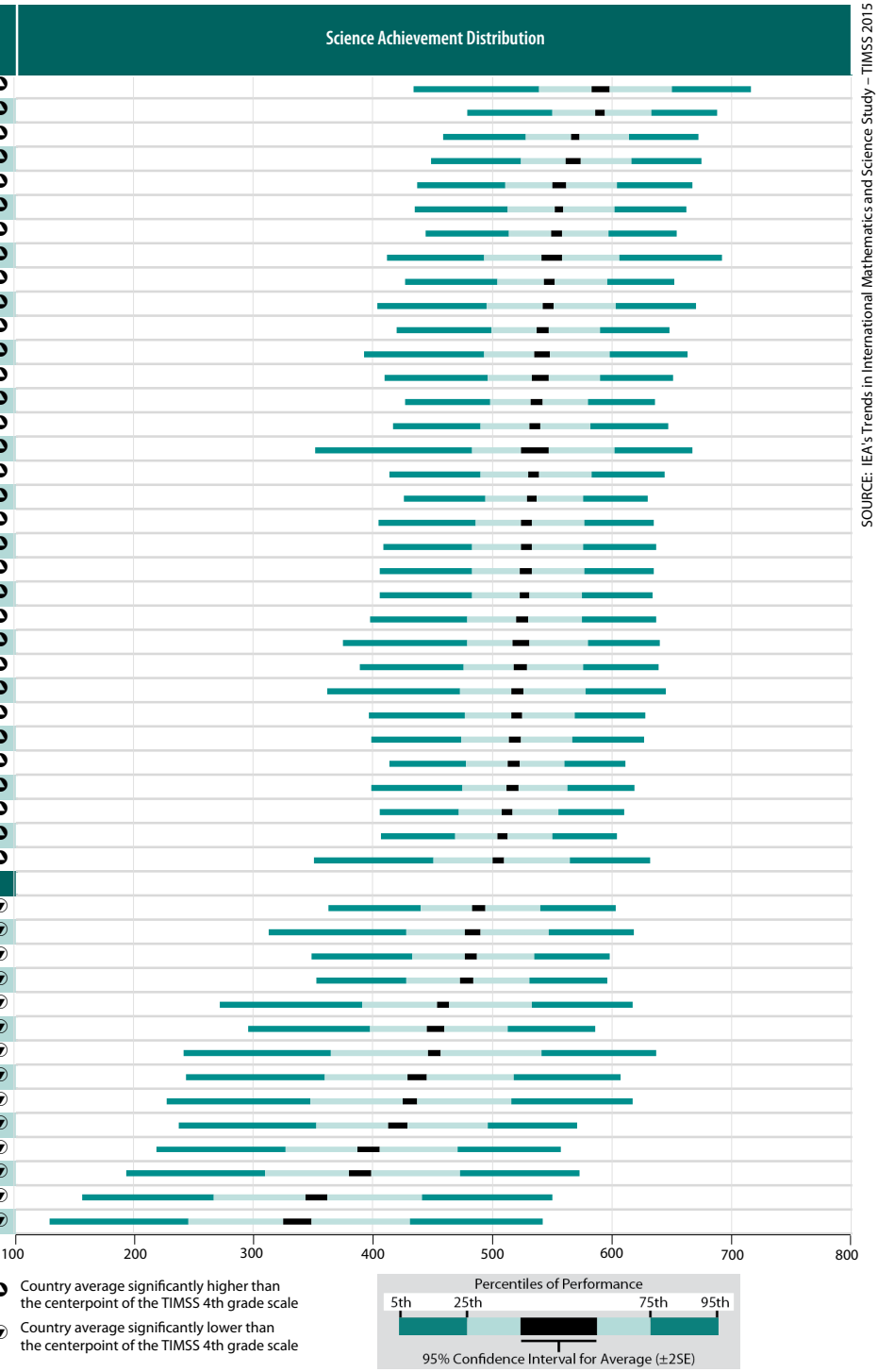
Exhibit 1.1: Distribution of Science Achievement

Country	Average Scale Score
[2] Singapore	590 (3.7) ▲
Korea, Rep. of	589 (2.0) ▲
Japan	569 (1.8) ▲
Russian Federation	567 (3.2) ▲
† Hong Kong SAR	557 (2.9) ▲
Chinese Taipei	555 (1.8) ▲
Finland	554 (2.3) ▲
Kazakhstan	550 (4.4) ▲
Poland	547 (2.4) ▲
[2] † United States	546 (2.2) ▲
Slovenia	543 (2.4) ▲
Hungary	542 (3.3) ▲
[2] Sweden	540 (3.6) ▲
Norway (5)	538 (2.6) ▲
England	536 (2.4) ▲
Bulgaria	536 (5.9) ▲
Czech Republic	534 (2.4) ▲
Croatia	533 (2.1) ▲
Ireland	529 (2.4) ▲
Germany	528 (2.4) ▲
[2] Lithuania	528 (2.5) ▲
[2] † Denmark	527 (2.1) ▲
[1 2] † Canada	525 (2.6) ▲
[3] Serbia	525 (3.7) ▲
Australia	524 (2.9) ▲
Slovak Republic	520 (2.6) ▲
‡ Northern Ireland	520 (2.2) ▲
[2] Spain	518 (2.6) ▲
† Netherlands	517 (2.7) ▲
[2] Italy	516 (2.6) ▲
† Belgium (Flemish)	512 (2.3) ▲
[2] Portugal	508 (2.2) ▲
New Zealand	506 (2.7) ▲
TIMSS Scale Centerpoint	500
France	487 (2.7) ▼
Turkey	483 (3.3) ▼
Cyprus	481 (2.6) ▼
Chile	478 (2.7) ▼
[2] Bahrain	459 (2.6) ▼
[1] Georgia	451 (3.7) ▼
United Arab Emirates	451 (2.8) ▼
Qatar	436 (4.1) ▼
Oman	431 (3.1) ▼
Iran, Islamic Rep. of	421 (4.0) ▼
Indonesia	397 (4.8) ▼
Saudi Arabia	390 (4.9) ▼
Ψ Morocco	352 (4.7) ▼
Ψ Kuwait	337 (6.2) ▼



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

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.

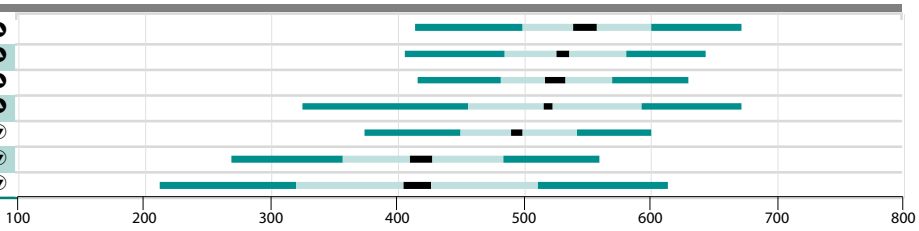
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

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.

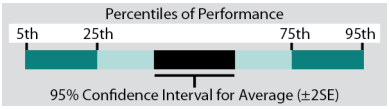
Exhibit 1.1: Distribution of Science Achievement (Continued)

Country	Average Scale Score	Science Achievement Distribution
Benchmarking Participants		
[1] Florida, US	549 (4.8)	▲
Ontario, Canada	530 (2.5)	▲
‡ Quebec, Canada	525 (4.1)	▲
Dubai, UAE	518 (1.8)	▲
Norway (4)	493 (2.2)	▼
Buenos Aires, Argentina	418 (4.7)	▼
[2] Abu Dhabi, UAE	415 (5.6)	▼



▲ Country average significantly higher than the centerpoint of the TIMSS 4th grade scale

▼ Country average significantly lower than the centerpoint of the TIMSS 4th grade scale



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

Exhibit 1.3: Multiple Comparisons of Average Science 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.

Country	Average Scale Score	Singapore	Korea, Rep. of	Japan	Russian Federation	Hong Kong SAR	Chinese Taipei	Finland	Kazakhstan	Poland	United States	Slovenia	Hungary	Sweden	Norway (5)	England	Bulgaria	Czech Republic	Croatia	Ireland	Germany	Lithuania	Denmark	Canada	Serbia	Australia	Slovak Republic	Northern Ireland	Spain	Netherlands	Italy
Singapore	590 (3.7)			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Korea, Rep. of	589 (2.0)			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Japan	569 (1.8)	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Russian Federation	567 (3.2)	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hong Kong SAR	557 (2.9)	▼	▼	▼	▼					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Chinese Taipei	555 (1.8)	▼	▼	▼	▼					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Finland	554 (2.3)	▼	▼	▼	▼					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Kazakhstan	550 (4.4)	▼	▼	▼	▼										▲	▲		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Poland	547 (2.4)	▼	▼	▼	▼	▼	▼	▼							▲	▲		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
United States	546 (2.2)	▼	▼	▼	▼	▼	▼	▼							▲	▲		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Slovenia	543 (2.4)	▼	▼	▼	▼	▼	▼	▼								▲		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hungary	542 (3.3)	▼	▼	▼	▼	▼	▼	▼											▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Sweden	540 (3.6)	▼	▼	▼	▼	▼	▼	▼												▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Norway (5)	538 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼									▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
England	536 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼								▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Bulgaria	536 (5.9)	▼	▼	▼	▼	▼	▼	▼															▲	▲	▲	▲	▲	▲	▲	▲	▲
Czech Republic	534 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼											▲	▲	▲	▲	▲	▲	▲	▲	▲
Croatia	533 (2.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼										▲	▲	▲	▲	▲	▲	▲	▲	▲
Ireland	529 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼											▲	▲	▲	▲	▲
Germany	528 (2.4)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼											▲	▲	▲	▲	▲
Lithuania	528 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼											▲	▲	▲	▲	▲
Denmark	527 (2.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▼	▼									▲	▲	▲	▲
Canada	525 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▼	▼											▲	▲
Serbia	525 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▼	▼												
Australia	524 (2.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▼	▼												
Slovak Republic	520 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼									
Northern Ireland	520 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼								
Spain	518 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼								
Netherlands	517 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							
Italy	516 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼							
Belgium (Flemish)	512 (2.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼			
Portugal	508 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
New Zealand	506 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
France	487 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Turkey	483 (3.3)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Cyprus	481 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Chile	478 (2.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Bahrain	459 (2.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Georgia	451 (3.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
United Arab Emirates	451 (2.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Qatar	436 (4.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Oman	431 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Iran, Islamic Rep. of	421 (4.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Indonesia	397 (4.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Saudi Arabia	390 (4.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Morocco	352 (4.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Kuwait	337 (6.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Benchmarking Participants																															
Florida, US	549 (4.8)	▼	▼	▼	▼										▲	▲		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ontario, Canada	530 (2.5)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼												▲	▲	▲	▲	▲
Quebec, Canada	525 (4.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		▼													
Dubai, UAE	518 (1.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼						
Norway (4)	493 (2.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Buenos Aires, Argentina	418 (4.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼
Abu Dhabi, UAE	415 (5.6)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼

▲ Average achievement significantly higher than comparison country

▼ Average achievement significantly lower than comparison country

Significance tests were not adjusted for multiple comparisons. Five percent of the comparisons would be statistically significant by chance alone.

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

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

Exhibit 1.3: Multiple Comparisons of Average Science Achievement (Continued)

Country	Average Scale Score	Belgium (Flemish)	Portugal	New Zealand	France	Turkey	Cyprus	Chile	Bahrain	Georgia	United Arab Emirates	Qatar	Oman	Iran, Islamic Rep. of	Indonesia	Saudi Arabia	Morocco	Kuwait
Singapore	590 (3.7)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Korea, Rep. of	589 (2.0)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Japan	569 (1.8)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Russian Federation	567 (3.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hong Kong SAR	557 (2.9)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Chinese Taipei	555 (1.8)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Finland	554 (2.3)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Kazakhstan	550 (4.4)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Poland	547 (2.4)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
United States	546 (2.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Slovenia	543 (2.4)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Hungary	542 (3.3)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Sweden	540 (3.6)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Norway (5)	538 (2.6)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
England	536 (2.4)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Bulgaria	536 (5.9)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Czech Republic	534 (2.4)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Croatia	533 (2.1)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Ireland	529 (2.4)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Germany	528 (2.4)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Lithuania	528 (2.5)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Denmark	527 (2.1)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Canada	525 (2.6)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Serbia	525 (3.7)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Australia	524 (2.9)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Slovak Republic	520 (2.6)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Northern Ireland	520 (2.2)	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Spain	518 (2.6)		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Netherlands	517 (2.7)		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Italy	516 (2.6)		▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Belgium (Flemish)	512 (2.3)				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Portugal	508 (2.2)				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
New Zealand	506 (2.7)				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
France	487 (2.7)	▼	▼	▼				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Turkey	483 (3.3)	▼	▼	▼					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Cyprus	481 (2.6)	▼	▼	▼					▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Chile	478 (2.7)	▼	▼	▼	▼				▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Bahrain	459 (2.6)	▼	▼	▼	▼	▼	▼	▼			▲	▲	▲	▲	▲	▲	▲	▲
Georgia	451 (3.7)	▼	▼	▼	▼	▼	▼	▼				▲	▲	▲	▲	▲	▲	▲
United Arab Emirates	451 (2.8)	▼	▼	▼	▼	▼	▼	▼	▼			▲	▲	▲	▲	▲	▲	▲
Qatar	436 (4.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼			▲	▲	▲	▲	▲
Oman	431 (3.1)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼				▲	▲	▲	▲
Iran, Islamic Rep. of	421 (4.0)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼			▲	▲	▲	▲
Indonesia	397 (4.8)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼			▲	▲
Saudi Arabia	390 (4.9)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼			▲	▲
Morocco	352 (4.7)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		
Kuwait	337 (6.2)	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼	▼		

Benchmarking Participants

Country	Average Scale Score	Florida, US	Ontario, Canada	Quebec, Canada	Dubai, UAE	Norway (4)	Buenos Aires, Argentina	Abu Dhabi, UAE
Florida, US	549 (4.8)		▲	▲	▲	▲	▲	▲
Ontario, Canada	530 (2.5)	▼			▲	▲	▲	▲
Quebec, Canada	525 (4.1)	▼				▲	▲	▲
Dubai, UAE	518 (1.8)	▼	▼			▲	▲	▲
Norway (4)	493 (2.2)	▼	▼	▼	▼		▲	▲
Buenos Aires, Argentina	418 (4.7)	▼	▼	▼	▼	▼		
Abu Dhabi, UAE	415 (5.6)	▼	▼	▼	▼	▼		

▲ Average achievement significantly higher than comparison country

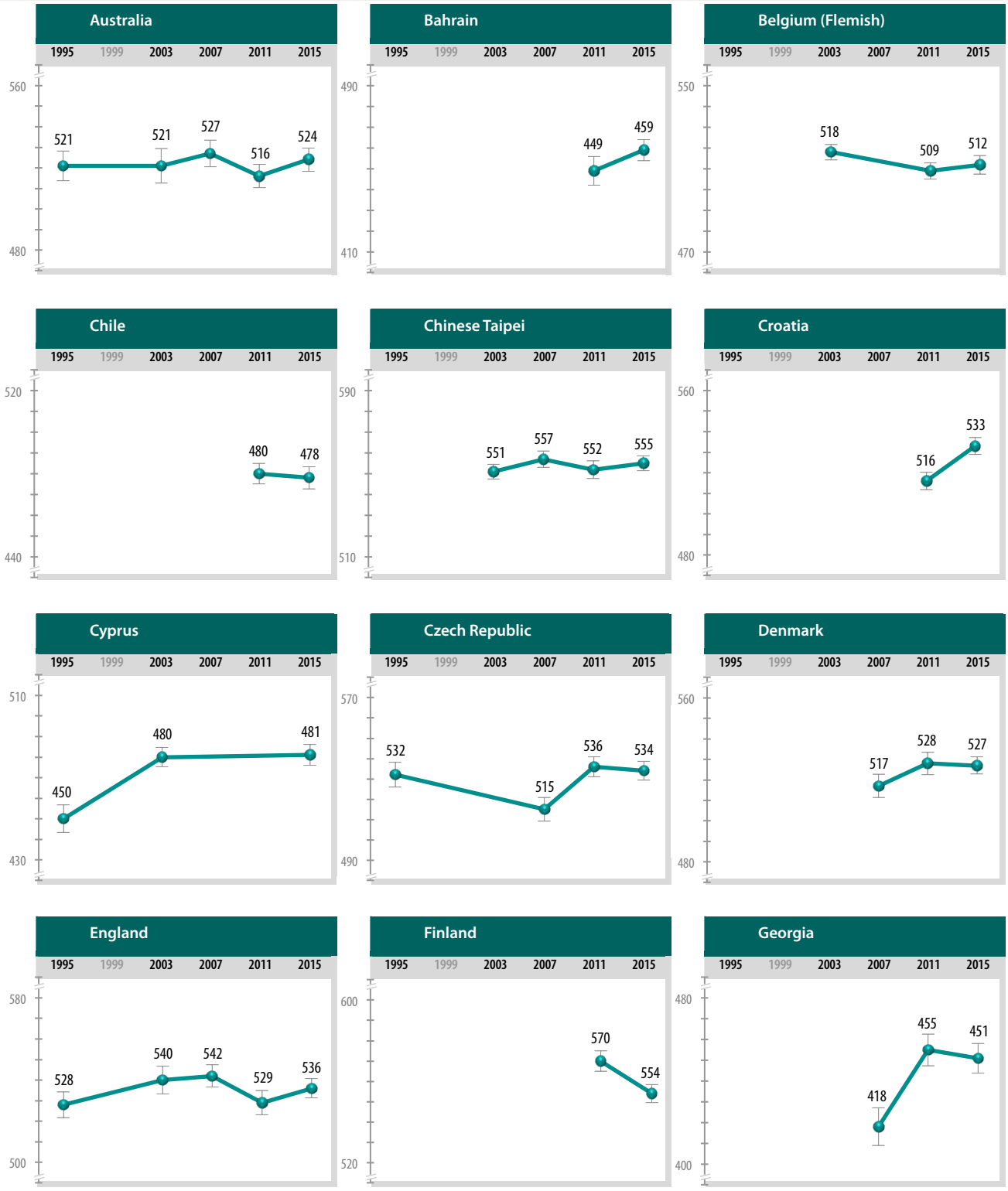
▼ Average achievement significantly lower than comparison country

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

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

Exhibit 1.5: Trends in Science Achievement◊

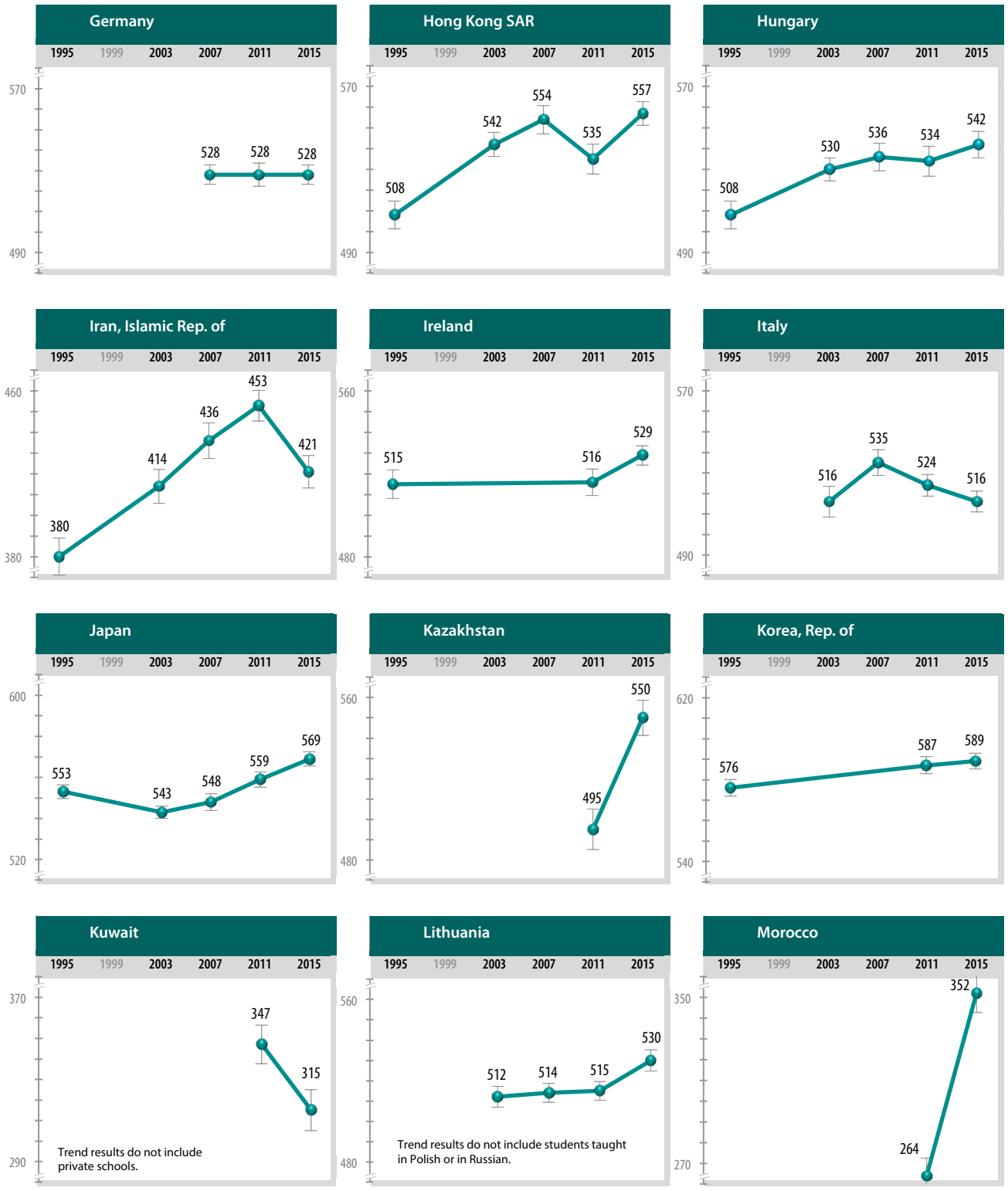
Displays changes in achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessments. The same scale is used for each country (10-point intervals), but the part of the scale shown differs according to each country's average achievement. The accompanying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



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

◊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 Science Achievement◊ (Continued)



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

Exhibit 1.5: Trends in Science Achievement◊ (Continued)

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

Exhibit 1.5: Trends in Science Achievement◊ (Continued)

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

Exhibit 1.7: Differences in Science 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.

Country	Average Scale Score	Differences Between Years 2011	2007	2003	1995
Australia					
2015	524 (2.9)	8 ▲	-4	3	2
2011	516 (2.9)		-12 ▼	-5	-6
2007	527 (3.3)			7	6
† 2003	521 (4.3)				-1
‡ 1995	521 (3.7)				
Bahrain					
2 2015	459 (2.6)	9 ▲			
2011	449 (3.5)				
Belgium (Flemish)					
† 2015	512 (2.3)	3		-7 ▼	
2011	509 (2.0)			-10 ▼	
2 2003	518 (1.9)				
Chile					
2015	478 (2.7)	-3			
2011	480 (2.5)				
Chinese Taipei					
2015	555 (1.8)	4	-1	4	
2011	552 (2.2)		-5	0	
2007	557 (2.0)			5 ▲	
2003	551 (1.8)				
Croatia					
2015	533 (2.1)	17 ▲			
2 2011	516 (2.2)				
Cyprus					
2015	481 (2.6)			1	31 ▲
2003	480 (2.4)				30 ▲
1995	450 (3.4)				
Czech Republic					
2015	534 (2.4)	-2	19 ▲		3
2011	536 (2.5)		21 ▲		5
2007	515 (3.0)				-17 ▼
1995	532 (3.1)				
Denmark					
2 † 2015	527 (2.1)	-1	10 ▲		
2 2011	528 (2.8)		11 ▲		
† 2007	517 (2.9)				
England					
2015	536 (2.4)	7	-6	-4	8 ▲
2011	529 (3.0)		-13 ▼	-11 ▼	1
2007	542 (2.8)			1	14 ▲
† 2003	540 (3.5)				13 ▲
3 † 1995	528 (3.2)				
Finland					
2015	554 (2.3)	-16 ▼			
2011	570 (2.6)				

Science Achievement Distribution

100 200 300 400 500 600 700 800

▲ More recent year significantly higher

▼ More recent year significantly lower

Percentiles of Performance
5th 25th 75th 95th
95% Confidence Interval for Average (±2SE)

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.

Ж 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.

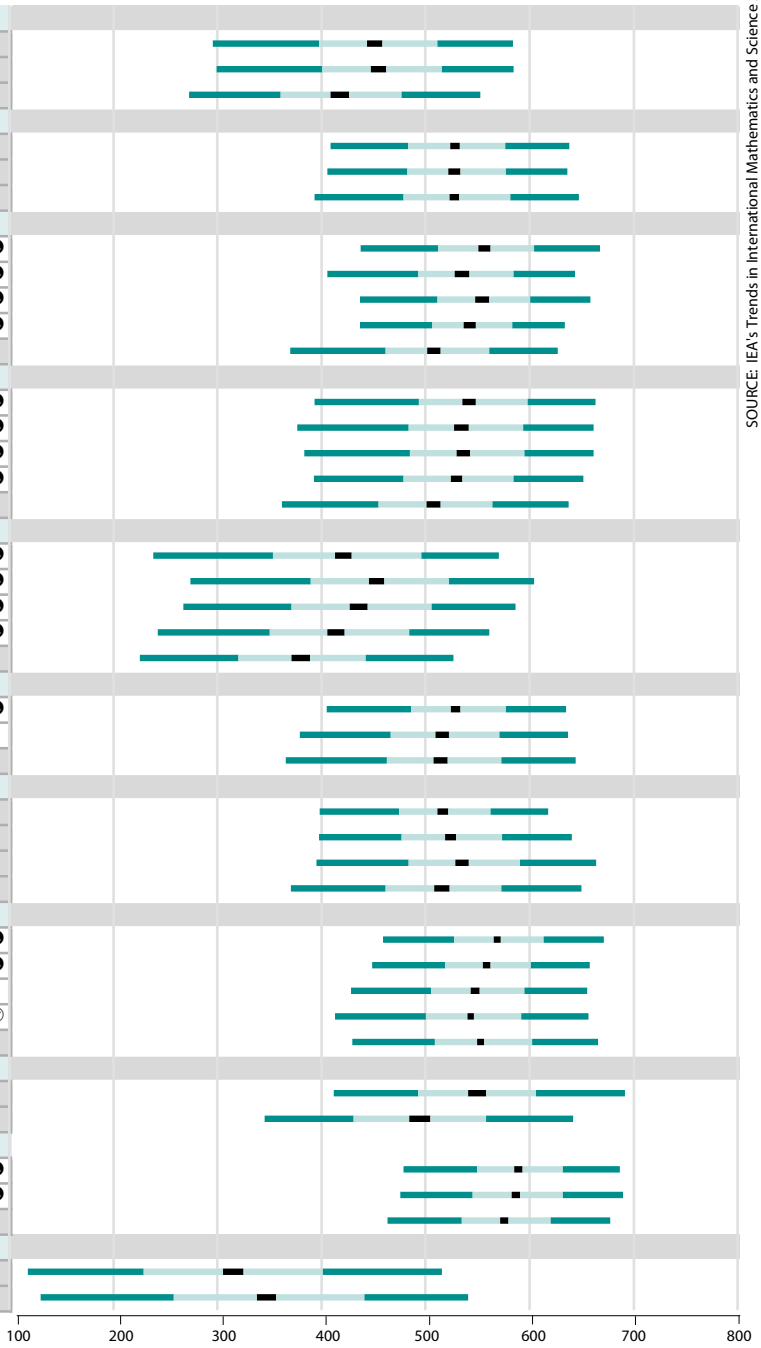
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

Exhibit 1.7: Differences in Science 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.

Country	Average Scale Score	Differences Between Years 2011	2007	2003	1995
Georgia					
[1] 2015	451 (3.7)	-4	34 ▲		
[1] 2011	455 (3.9)		37 ▲		
[1] 2007	418 (4.6)				
Germany					
2015	528 (2.4)	1	1		
2011	528 (2.9)		0		
2007	528 (2.4)				
Hong Kong SAR					
† 2015	557 (2.9)	22 ▲	2	14 ▲	49 ▲
[2] 2011	535 (3.7)		-19 ▼	-8	27 ▲
2007	554 (3.5)			12 ▲	46 ▲
† 2003	542 (3.0)				35 ▲
1995	508 (3.4)				
Hungary					
2015	542 (3.3)	8	6	12 ▲	34 ▲
2011	534 (3.7)		-2	5	27 ▲
2007	536 (3.4)			6	28 ▲
[2] 2003	530 (2.8)				22 ▲
1995	508 (3.4)				
Iran, Islamic Rep. of					
2015	421 (4.0)	-32 ▼	-15 ▼	7	41 ▲
2011	453 (3.8)		17 ▲	39 ▲	73 ▲
2007	436 (4.4)			22 ▲	55 ▲
[2] 2003	414 (4.2)				34 ▲
1995	380 (4.6)				
Ireland					
2015	529 (2.4)	13 ▲			14 ▲
2011	516 (3.3)				1
[2] 1995	515 (3.5)				
Italy					
[2] 2015	516 (2.6)	-7 ▼	-19 ▼	1	
2011	524 (2.7)		-11 ▼	8	
2007	535 (3.2)			20 ▲	
2003	516 (3.8)				
Japan					
2015	569 (1.8)	10 ▲	21 ▲	26 ▲	16 ▲
2011	559 (1.9)		11 ▲	15 ▲	5 ▲
2007	548 (2.1)			4	-5
2003	543 (1.5)				-10 ▼
1995	553 (1.7)				
Kazakhstan					
2015	550 (4.4)	55 ▲			
[2] 2011	495 (5.1)				
Korea, Rep. of					
2015	589 (2.0)	3			14 ▲
2011	587 (2.1)				11 ▲
[2] 1995	576 (2.1)				
Kuwait					
ψ 2015	315 (5.1)	-32 ▼			
[1] ψ 2011	347 (4.8)				

Science Achievement Distribution



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

Exhibit 1.7: Differences in Science 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.

Country	Average Scale Score	Differences Between Years				Science Achievement Distribution
		2011	2007	2003	1995	
Lithuania						
[2] 2015	530 (2.7)	15 ▲	16 ▲	18 ▲		
[1 2] 2011	515 (2.4)		0	3		
[1] 2007	514 (2.4)			2		
[1] 2003	512 (2.6)					
Morocco						
ψ 2015	352 (4.7)	89 ▲				
ж 2011	264 (4.4)					
Netherlands						
† 2015	517 (2.7)	-14 ▼	-6	-8 ▼	-13 ▼	
† 2011	531 (2.2)		8 ▲	6 ▲	1	
‡ 2007	523 (2.6)			-2	-7	
† 2003	525 (2.0)				-5	
‡ 1995	530 (3.2)					
New Zealand						
2015	506 (2.7)	9 ▲	1	-14 ▼	0	
2011	497 (2.4)		-7 ▼	-23 ▼	-8	
2007	504 (2.7)			-16 ▼	-1	
2003	520 (2.4)				15 ▲	
1995	505 (5.4)					
Northern Ireland						
‡ 2015	520 (2.2)	3				
† 2011	517 (2.5)					
Norway (4)						
2015	493 (2.2)	-1	16 ▲	27 ▲	-11 ▼	
‡ 2011	494 (2.5)		17 ▲	28 ▲	-10 ▼	
2007	477 (3.5)			10 ▲	-27 ▼	
2003	466 (2.6)				-38 ▼	
1995	504 (3.7)					
Oman						
2015	431 (3.1)	54 ▲				
2011	377 (4.3)					
Portugal						
[2] 2015	508 (2.2)	-14 ▼			56 ▲	
2011	522 (3.8)				70 ▲	
[2] 1995	452 (4.1)					
Qatar						
2015	436 (4.1)	42 ▲				
[2] 2011	394 (4.3)					
Russian Federation						
2015	567 (3.2)	15 ▲	21 ▲	41 ▲		
2011	552 (3.4)		6	26 ▲		
2007	546 (5.0)			20 ▲		
[2] 2003	526 (5.3)					
Saudi Arabia						
2015	390 (4.9)	-39 ▼				
2011	429 (5.5)					
Serbia						
[3] 2015	525 (3.7)	9				
[2] 2011	516 (3.1)					

100 200 300 400 500 600 700 800

▲ More recent year significantly higher

▼ More recent year significantly lower

Percentiles of Performance
5th 25th 75th 95th

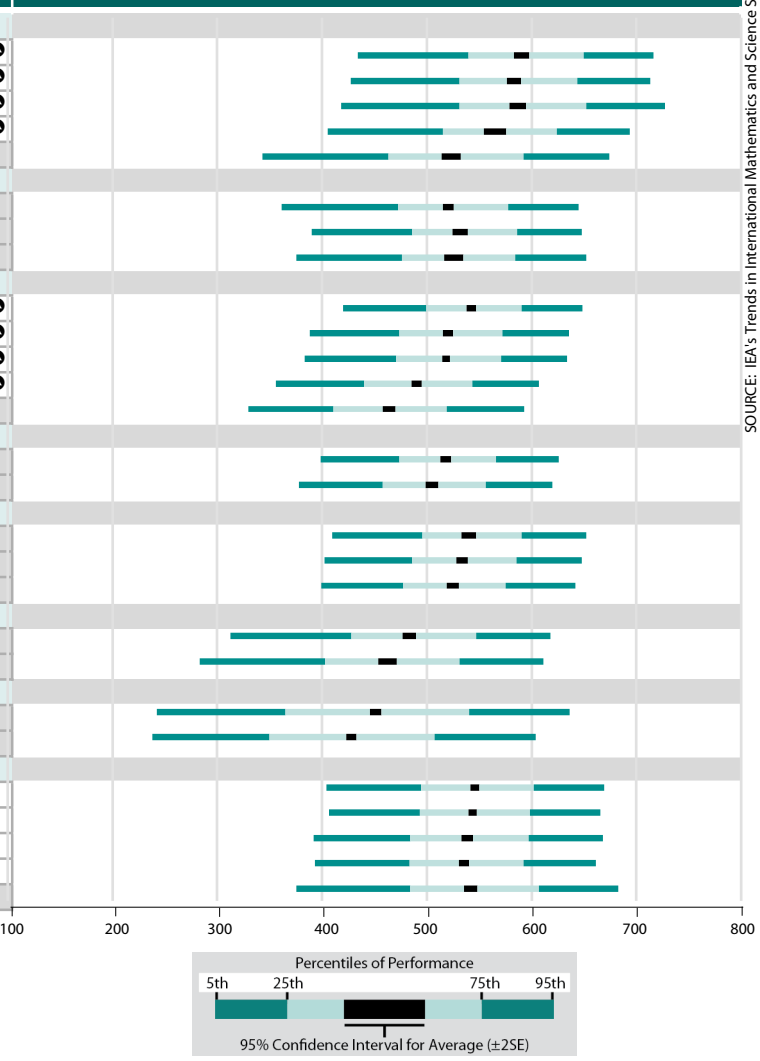
95% Confidence Interval for Average (±2SE)

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

Exhibit 1.7: Differences in Science 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.

Country	Average Scale Score	Differences Between Years				Science Achievement Distribution
		2011	2007	2003	1995	
Singapore						
[2] 2015	590 (3.7)	7	4	25 ▲	67 ▲	
[2] 2011	583 (3.4)		-3	18 ▲	60 ▲	
2007	587 (4.1)			22 ▲	63 ▲	
2003	565 (5.5)				42 ▲	
1995	523 (4.8)					
Slovak Republic						
2015	520 (2.6)	-11 ▼	-5			
2011	532 (3.7)		6			
2007	526 (4.8)					
Slovenia						
2015	543 (2.4)	22 ▲	24 ▲	52 ▲	78 ▲	
2011	520 (2.6)		2	30 ▲	56 ▲	
2007	518 (1.9)			28 ▲	54 ▲	
2003	490 (2.6)				26 ▲	
1995	464 (3.1)					
Spain						
[2] 2015	518 (2.6)	13 ▲				
2011	505 (3.1)					
Sweden						
[2] 2015	540 (3.6)	7	15 ▲			
2011	533 (2.8)		9 ▲			
2007	525 (2.9)					
Turkey						
2015	483 (3.3)	21 ▲				
2011	463 (4.7)					
United Arab Emirates						
2015	451 (2.8)	23 ▲				
2011	428 (2.5)					
United States						
[2] † 2015	546 (2.2)	2	7 ▲	10 ▲	4	
[2] 2011	544 (2.1)		5	8 ▲	2	
[2] † 2007	539 (2.7)			3	-3	
† 2003	536 (2.5)				-6	
1995	542 (3.4)					



▲ More recent year significantly higher

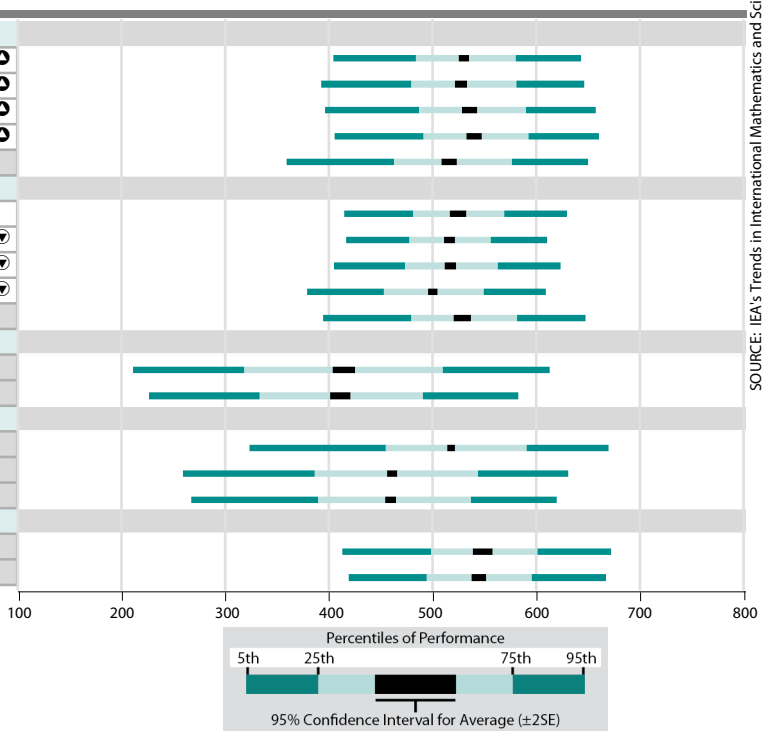
▼ More recent year significantly lower

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

Exhibit 1.7: Differences in Science 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.

Country	Average Scale Score	Differences Between Years				Science Achievement Distribution
		2011	2007	2003	1995	
Benchmarking Participants						
Ontario, Canada						
2015	530 (2.5)	3	-5	-10 ▼	14 ▲	
2011	528 (3.1)		-8	-13 ▼	11 ▲	
2 2007	536 (3.8)			-4	20 ▲	
2003	540 (3.8)				24 ▲	
2 1995	516 (3.7)					
Quebec, Canada						
‡ 2015	525 (4.1)	8	7	24 ▲	-4	
2011	516 (2.7)		-1	16 ▲	-12 ▼	
2 2007	517 (2.8)			17 ▲	-11 ▼	
2003	500 (2.4)				-28 ▼	
1995	529 (4.2)					
Abu Dhabi, UAE						
2 2015	415 (5.6)	3				
2011	411 (5.0)					
Dubai, UAE						
2015	518 (1.8)	57 ▲	58 ▲			
2011	461 (2.5)		2			
⧓ ‡ 2007	460 (2.6)					
Florida, US						
1 2015	549 (4.8)	4				
1 3 2011	545 (3.7)					



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 green 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

Country	Achievement Difference from TIMSS Scale Centerpoint (500)	
Korea, Rep. of	87 (2.1)	▲
Singapore	83 (3.4)	▲
Japan	59 (1.9)	▲
Russian Federation	52 (3.4)	▲
Chinese Taipei	52 (2.2)	▲
United States	44 (2.1)	▲
Hong Kong SAR	35 (3.7)	▲
Hungary	34 (3.7)	▲
Sweden	33 (2.8)	▲
England	29 (3.0)	▲
Italy	24 (2.7)	▲
Slovenia	20 (2.6)	▲
Australia	16 (2.9)	▲
Lithuania	15 (2.4)	▲
New Zealand	-3 (2.4)	
Kazakhstan	-5 (5.1)	
Norway (4)	-6 (2.5)	▼
Chile	-20 (2.5)	▼
Turkey	-37 (4.7)	▼
Georgia	-45 (3.9)	▼
Iran, Islamic Rep. of	-47 (3.8)	▼
Bahrain	-51 (3.5)	▼
Saudi Arabia	-71 (5.5)	▼
United Arab Emirates	-72 (2.5)	▼
Qatar	-106 (4.3)	▼
Oman	-123 (4.3)	▼
Morocco	-236 (4.4)	▼

2015 - Fourth Grade

Country	Achievement Difference from TIMSS Scale Centerpoint (500)	
Singapore	90 (3.7)	▲
Korea, Rep. of	89 (2.0)	▲
Japan	69 (1.8)	▲
Russian Federation	67 (3.2)	▲
Hong Kong SAR	57 (2.9)	▲
Chinese Taipei	55 (1.8)	▲
Kazakhstan	50 (4.4)	▲
United States	46 (2.2)	▲
Slovenia	43 (2.4)	▲
Hungary	42 (3.3)	▲
Sweden	40 (3.6)	▲
England	36 (2.4)	▲
Lithuania	30 (2.7)	▲
Australia	24 (2.9)	▲
Italy	16 (2.6)	▲
New Zealand	6 (2.7)	▲
Norway (4)	-7 (2.2)	▼
Turkey	-17 (3.3)	▼
Chile	-22 (2.7)	▼
Bahrain	-41 (2.6)	▼
Georgia	-49 (3.7)	▼
United Arab Emirates	-49 (2.8)	▼
Qatar	-64 (4.1)	▼
Oman	-69 (3.1)	▼
Iran, Islamic Rep. of	-79 (4.0)	▼
Saudi Arabia	-110 (4.9)	▼
Morocco	-148 (4.7)	▼

2011 - Eighth Grade

Country	Achievement Difference from TIMSS Scale Centerpoint (500)	
Singapore	90 (4.3)	▲
Chinese Taipei	64 (2.3)	▲
Korea, Rep. of	60 (2.0)	▲
Japan	58 (2.4)	▲
Slovenia	43 (2.6)	▲
Russian Federation	42 (3.3)	▲
Hong Kong SAR	35 (3.4)	▲
England	33 (4.9)	▲
United States	25 (2.4)	▲
Hungary	22 (3.1)	▲
Australia	19 (4.7)	▲
Lithuania	14 (2.5)	▲
New Zealand	12 (4.6)	▲
Sweden	9 (2.6)	▲
Italy	1 (2.4)	
Norway (8)	-6 (2.6)	▼
Kazakhstan	-10 (4.2)	▼
Turkey	-17 (3.4)	▼
Iran, Islamic Rep. of	-26 (4.0)	▼
United Arab Emirates	-35 (2.4)	▼
Chile	-39 (2.5)	▼
Bahrain	-48 (1.9)	▼
Saudi Arabia	-64 (3.8)	▼
Georgia	-80 (3.0)	▼
Oman	-80 (3.2)	▼
Qatar	-81 (3.2)	▼
Morocco	-124 (2.2)	▼

2015 - Eighth Grade

Country	Achievement Difference from TIMSS Scale Centerpoint (500)	
Singapore	97 (3.2)	▲
Japan	71 (1.8)	▲
Chinese Taipei	69 (2.1)	▲
Korea, Rep. of	56 (2.2)	▲
Slovenia	51 (2.4)	▲
Hong Kong SAR	46 (3.9)	▲
Russian Federation	44 (4.2)	▲
England	37 (3.8)	▲
Kazakhstan	33 (4.4)	▲
United States	30 (2.8)	▲
Hungary	27 (3.4)	▲
Sweden	22 (3.4)	▲
Lithuania	22 (3.0)	▲
New Zealand	13 (3.1)	▲
Australia	12 (2.7)	▲
Italy	-1 (2.4)	
Turkey	-7 (4.0)	
Norway (8)	-11 (2.4)	▼
United Arab Emirates	-23 (2.3)	▼
Bahrain	-34 (2.2)	▼
Qatar	-43 (3.0)	▼
Iran, Islamic Rep. of	-44 (4.0)	▼
Oman	-45 (2.7)	▼
Chile	-46 (3.1)	▼
Georgia	-57 (3.1)	▼
Saudi Arabia	-104 (4.5)	▼
Morocco	-107 (2.5)	▼

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

▲ 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

Country	Achievement Difference from TIMSS Scale Centerpoint (500)	
Benchmarking Participants		
Florida, US	45 (3.7)	▲
Ontario, Canada	28 (3.1)	▲
Quebec, Canada	16 (2.7)	▲
Dubai, UAE	-39 (2.5)	▼
Abu Dhabi, UAE	-89 (5.0)	▼

2015 - Fourth Grade

Country	Achievement Difference from TIMSS Scale Centerpoint (500)	
Benchmarking Participants		
Florida, US	49 (4.8)	▲
Ontario, Canada	30 (2.5)	▲
Quebec, Canada	25 (4.1)	▲
Dubai, UAE	18 (1.8)	▲
Abu Dhabi, UAE	-85 (5.6)	▼

2011 - Eighth Grade

Country	Achievement Difference from TIMSS Scale Centerpoint (500)	
Benchmarking Participants		
Florida, US	30 (7.4)	▲
Ontario, Canada	21 (2.4)	▲
Quebec, Canada	20 (2.6)	▲
Dubai, UAE	-15 (2.6)	▼
Abu Dhabi, UAE	-39 (3.9)	▼

2015 - Eighth Grade

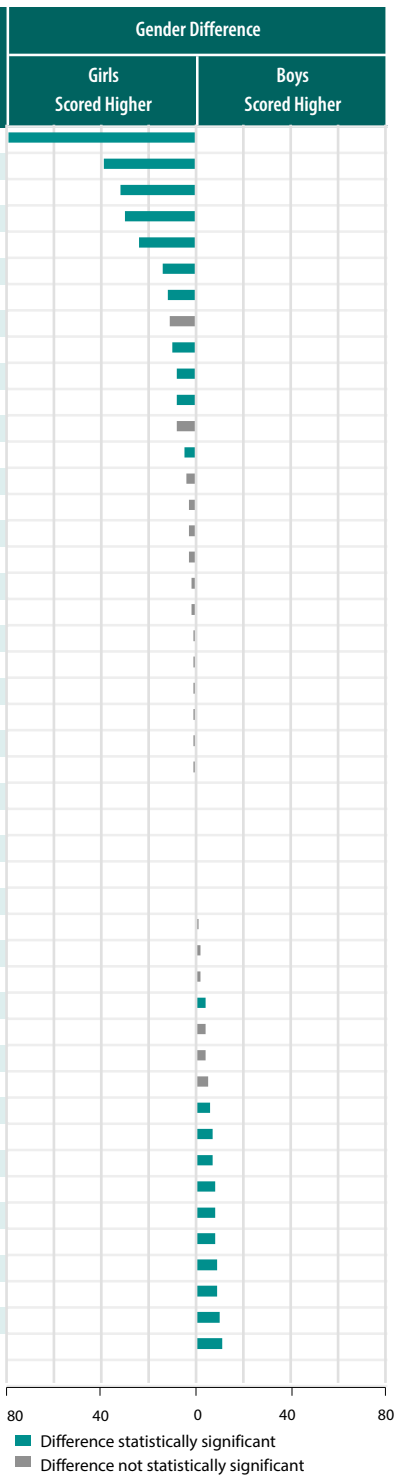
Country	Achievement Difference from TIMSS Scale Centerpoint (500)	
Benchmarking Participants		
Quebec, Canada	30 (4.4)	▲
Dubai, UAE	25 (2.0)	▲
Ontario, Canada	24 (2.5)	▲
Florida, US	8 (6.0)	
Abu Dhabi, UAE	-46 (5.6)	▼

▲ 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 Science Achievement by Gender

Country	Girls		Boys		Difference (Absolute Value)
	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score	
Saudi Arabia	49 (1.0)	431 (5.3)	51 (1.0)	352 (7.6)	79 (9.0)
2 Bahrain	50 (0.8)	478 (3.0)	50 (0.8)	439 (3.5)	39 (4.0)
Oman	50 (0.7)	447 (3.4)	50 (0.7)	415 (3.6)	32 (3.1)
ψ Kuwait	51 (2.1)	352 (7.6)	49 (2.1)	322 (7.6)	30 (9.1)
Qatar	51 (2.5)	448 (4.7)	49 (2.5)	424 (6.0)	24 (7.2)
United Arab Emirates	48 (2.2)	459 (4.4)	52 (2.2)	444 (4.0)	14 (6.4)
Finland	48 (0.8)	560 (2.3)	52 (0.8)	548 (2.9)	12 (2.5)
Iran, Islamic Rep. of	49 (1.1)	427 (5.2)	51 (1.1)	415 (5.6)	11 (7.4)
ψ Morocco	48 (0.8)	358 (4.7)	52 (0.8)	347 (5.7)	10 (4.9)
Bulgaria	49 (0.8)	540 (6.3)	51 (0.8)	532 (5.9)	8 (2.9)
2 Sweden	49 (1.0)	544 (4.1)	51 (1.0)	536 (3.5)	8 (2.7)
Indonesia	48 (0.7)	401 (5.2)	52 (0.7)	393 (5.3)	8 (4.2)
Kazakhstan	49 (0.8)	552 (4.5)	51 (0.8)	547 (4.7)	5 (2.7)
1 Georgia	49 (0.9)	453 (3.9)	51 (0.9)	449 (4.6)	4 (4.1)
New Zealand	49 (0.7)	507 (3.2)	51 (0.7)	504 (3.0)	3 (3.1)
2 Lithuania	50 (0.9)	529 (2.9)	50 (0.9)	526 (3.1)	3 (3.4)
3 Serbia	48 (0.8)	526 (3.6)	52 (0.8)	523 (4.9)	3 (4.6)
1 2 † Canada	49 (0.5)	526 (2.8)	51 (0.5)	524 (3.0)	2 (2.2)
† Belgium (Flemish)	50 (0.9)	512 (2.6)	50 (0.9)	511 (2.6)	2 (2.4)
Poland	50 (0.8)	548 (2.5)	50 (0.8)	546 (3.0)	1 (2.8)
Turkey	49 (0.6)	484 (3.3)	51 (0.6)	483 (4.0)	1 (3.1)
† Netherlands	50 (0.9)	517 (2.8)	50 (0.9)	517 (3.0)	1 (2.4)
Australia	49 (1.0)	524 (3.3)	51 (1.0)	523 (3.4)	1 (3.4)
England	51 (0.7)	536 (3.0)	49 (0.7)	536 (2.6)	1 (2.8)
Norway (5)	49 (0.9)	538 (3.1)	51 (0.9)	537 (3.1)	1 (3.2)
2 Singapore	48 (0.5)	591 (3.7)	52 (0.5)	590 (4.2)	0 (2.8)
Russian Federation	49 (0.9)	567 (3.1)	51 (0.9)	567 (3.7)	0 (2.7)
France	49 (0.7)	487 (3.1)	51 (0.7)	487 (2.9)	0 (2.4)
‡ Northern Ireland	50 (1.1)	520 (3.0)	50 (1.1)	520 (2.8)	0 (3.7)
Cyprus	49 (0.7)	481 (2.8)	51 (0.7)	481 (2.9)	0 (2.6)
Chile	49 (1.7)	477 (3.0)	51 (1.7)	478 (3.4)	1 (3.3)
Germany	48 (0.7)	527 (2.7)	52 (0.7)	529 (2.6)	2 (2.3)
Croatia	49 (0.8)	532 (2.7)	51 (0.8)	534 (2.2)	2 (2.8)
2 † United States	51 (0.6)	544 (2.4)	49 (0.6)	548 (2.5)	4 (2.0)
2 † Denmark	49 (0.8)	525 (2.5)	51 (0.8)	529 (2.6)	4 (2.8)
Japan	50 (0.5)	567 (2.0)	50 (0.5)	571 (2.3)	4 (2.4)
Ireland	47 (1.5)	526 (2.9)	53 (1.5)	531 (2.9)	5 (3.4)
2 Spain	49 (0.9)	515 (2.9)	51 (0.9)	521 (2.9)	6 (2.7)
Slovenia	49 (0.8)	539 (2.4)	51 (0.8)	546 (3.1)	7 (2.7)
2 Portugal	49 (0.8)	504 (2.5)	51 (0.8)	512 (2.4)	7 (2.2)
Hungary	49 (0.9)	538 (3.5)	51 (0.9)	546 (3.9)	8 (3.1)
Czech Republic	49 (0.9)	530 (2.8)	51 (0.9)	538 (2.7)	8 (2.6)
Slovak Republic	48 (0.9)	516 (3.2)	52 (0.9)	524 (2.7)	8 (2.7)
Chinese Taipei	49 (0.6)	551 (2.2)	51 (0.6)	560 (2.4)	9 (2.9)
2 Italy	49 (0.7)	512 (3.1)	51 (0.7)	521 (2.8)	9 (2.5)
† Hong Kong SAR	46 (1.5)	551 (3.9)	54 (1.5)	561 (3.3)	10 (3.9)
Korea, Rep. of	48 (0.5)	584 (2.3)	52 (0.5)	595 (2.3)	11 (2.4)
International Avg.	49 (0.1)	508 (0.5)	51 (0.1)	504 (0.6)	



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

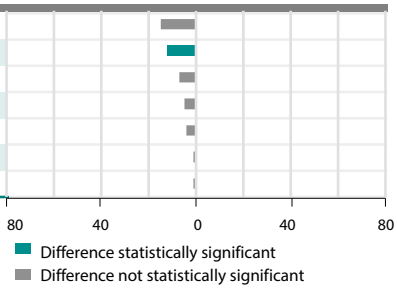
ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

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.

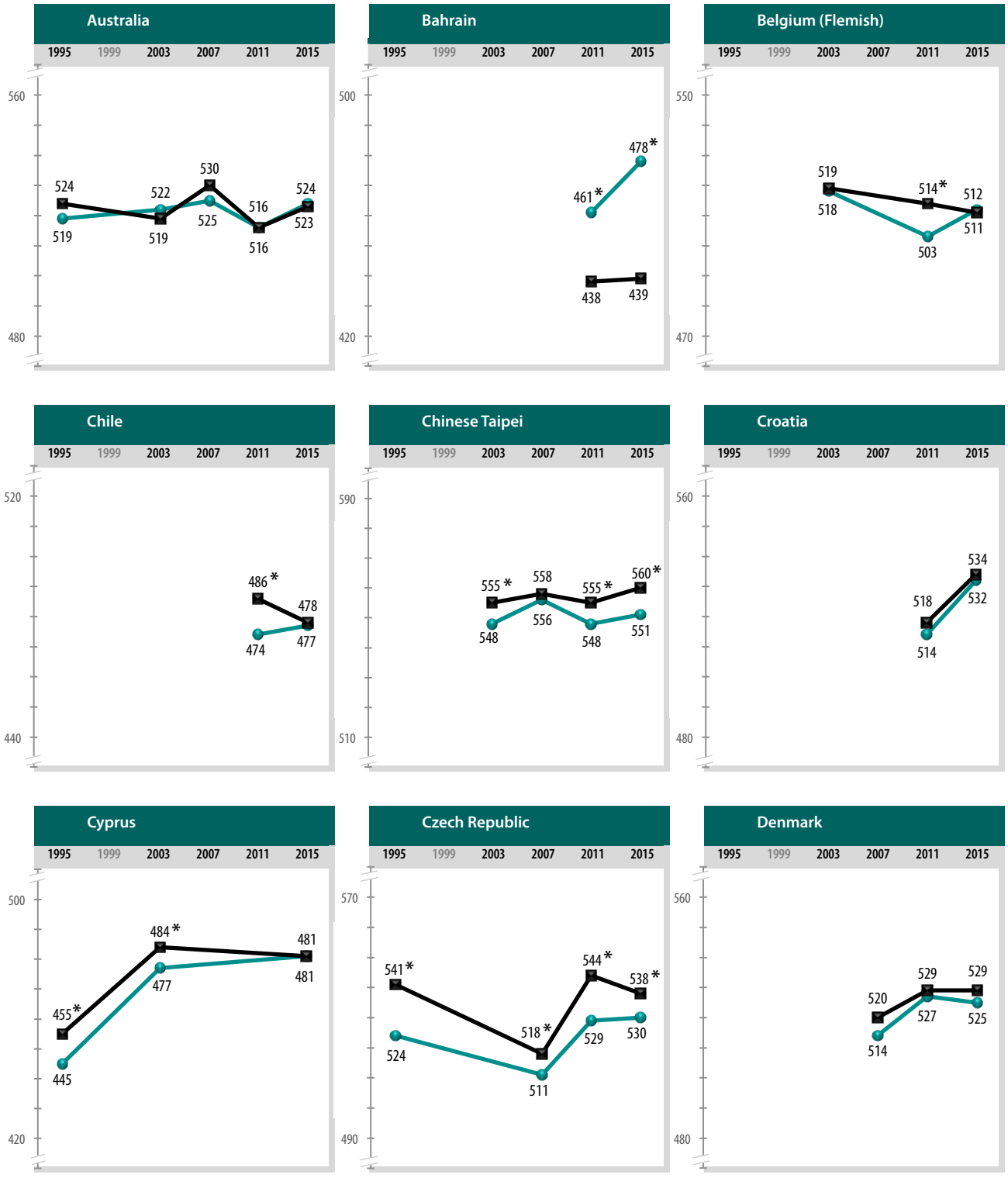
Exhibit 1.10: Average Science Achievement by Gender (Continued)

Country	Girls		Boys		Difference (Absolute Value)	Gender Difference	
	Percent of Students	Average Scale Score	Percent of Students	Average Scale Score		Girls Scored Higher	Boys Scored Higher
Benchmarking Participants							
[2] Abu Dhabi, UAE	47 (3.7)	423 (9.0)	53 (3.7)	408 (8.3)	15 (13.2)		
Dubai, UAE	48 (3.3)	524 (3.4)	52 (3.3)	512 (3.4)	12 (6.0)		
[1] Florida, US	49 (1.1)	552 (5.1)	51 (1.1)	545 (5.4)	7 (4.4)		
Ontario, Canada	49 (0.8)	533 (2.9)	51 (0.8)	528 (3.1)	5 (3.2)		
Buenos Aires, Argentina	49 (1.1)	420 (5.7)	51 (1.1)	416 (4.8)	4 (4.9)		
Norway (4)	49 (0.9)	493 (2.6)	51 (0.9)	493 (2.7)	1 (2.9)		
‡ Quebec, Canada	50 (1.0)	525 (3.6)	50 (1.0)	524 (5.3)	1 (4.0)		



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

Exhibit 1.12: Trends in Science Achievement by Gender◊

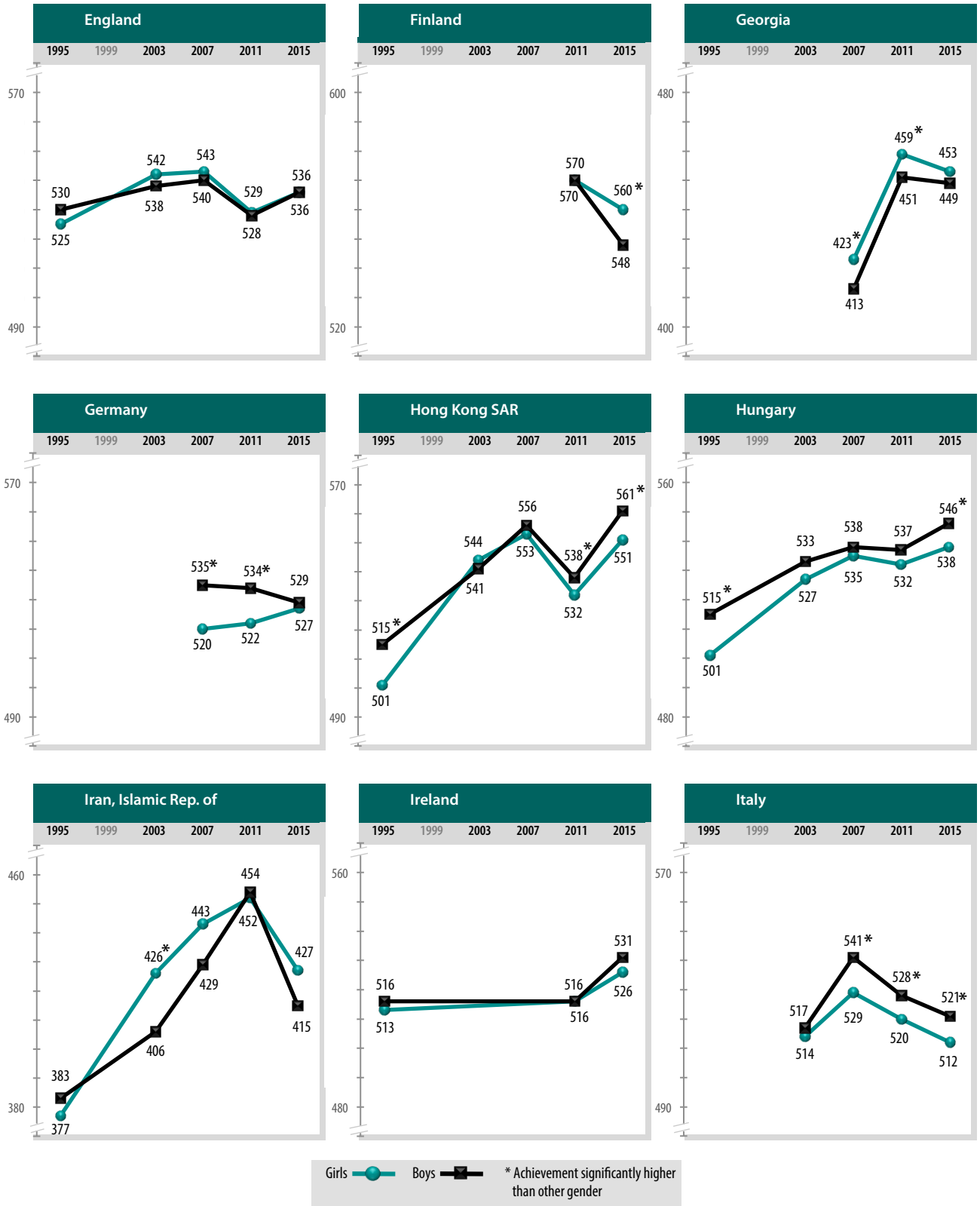


SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

◊ No fourth grade assessment in 1999.

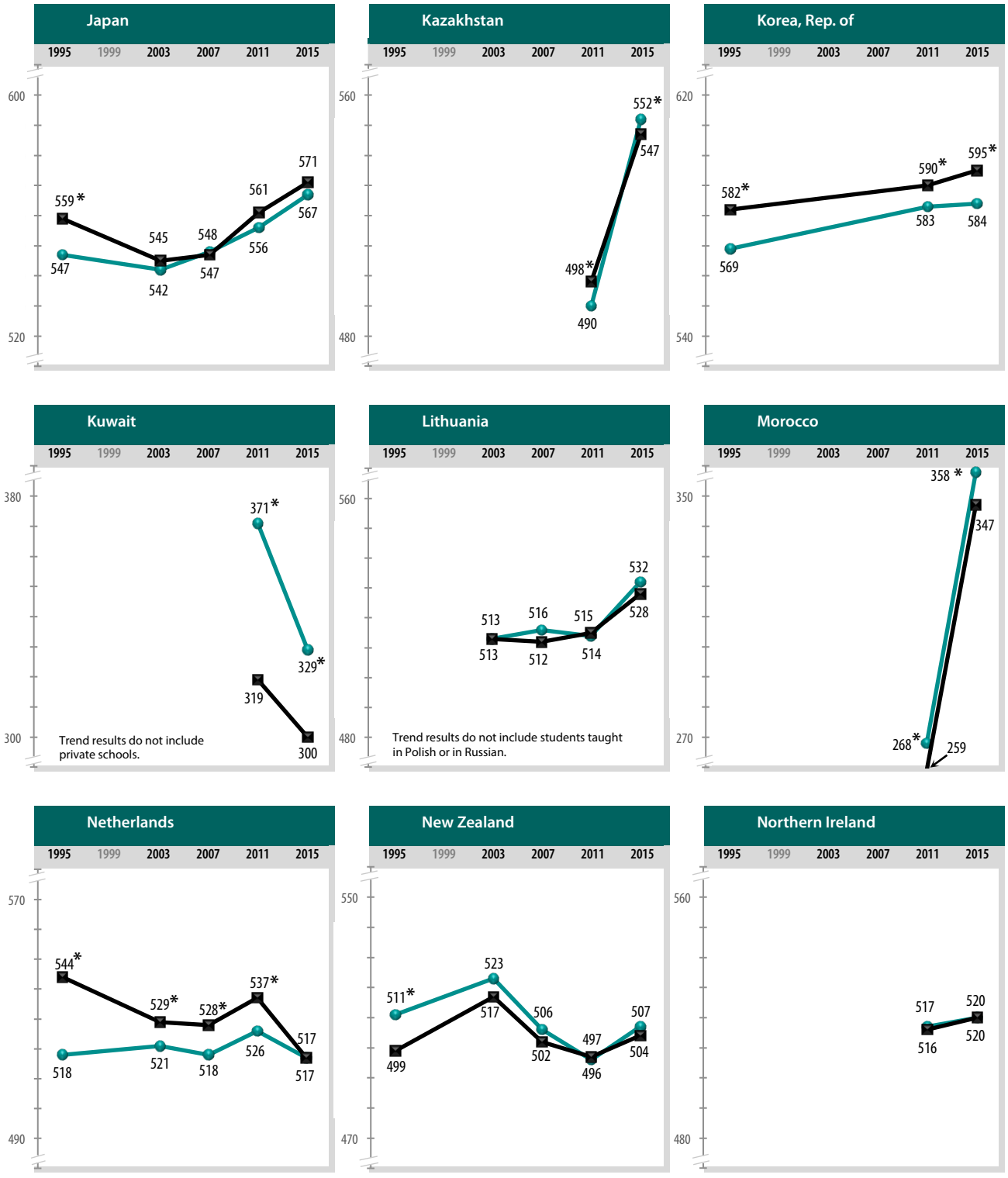
Scale interval is 10 points for each country, but the part of the scale shown differs according to each country's average achievement.

Exhibit 1.12: Trends in Science Achievement by Gender◊ (Continued)



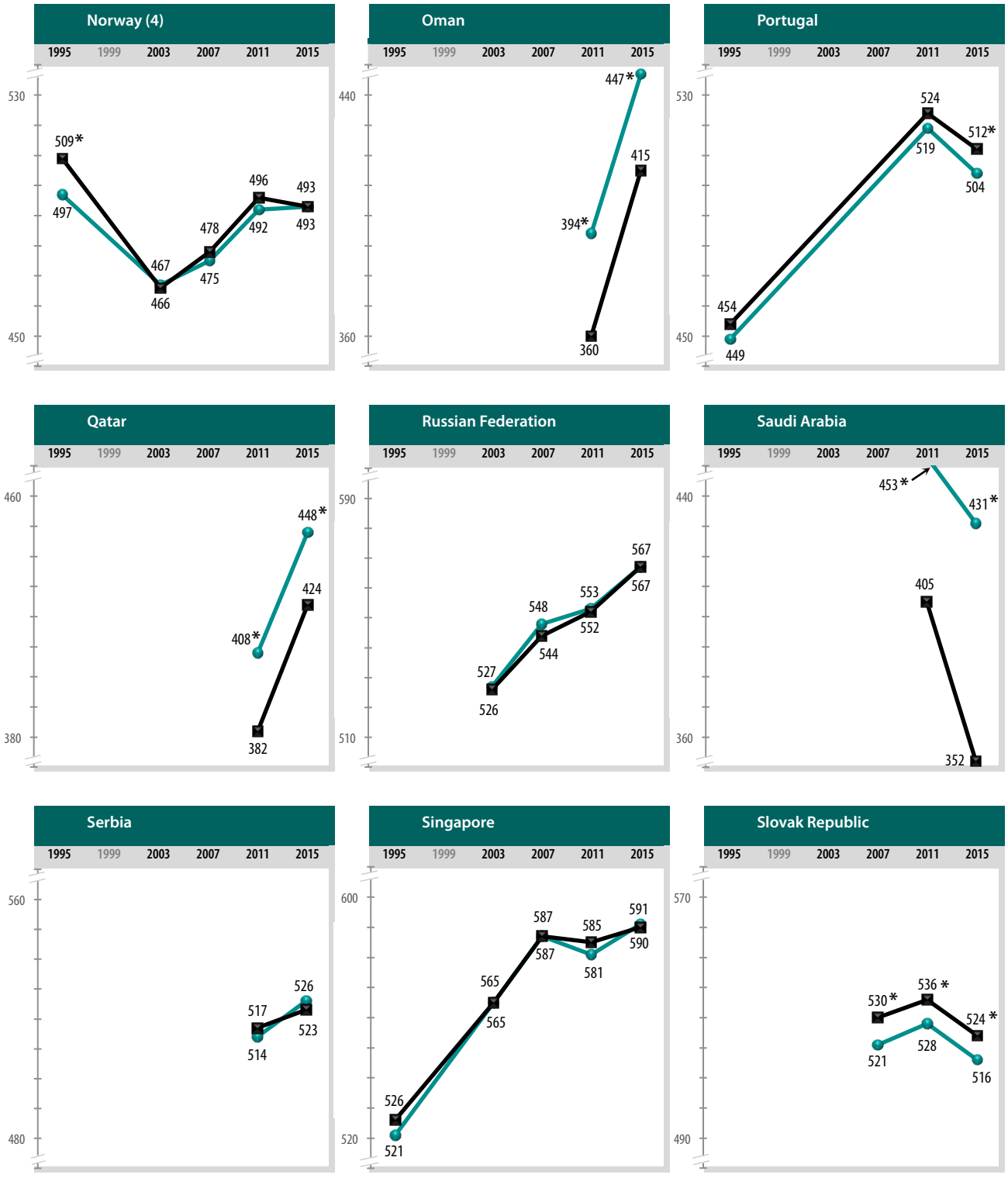
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Exhibit 1.12: Trends in Science Achievement by Gender◊ (Continued)



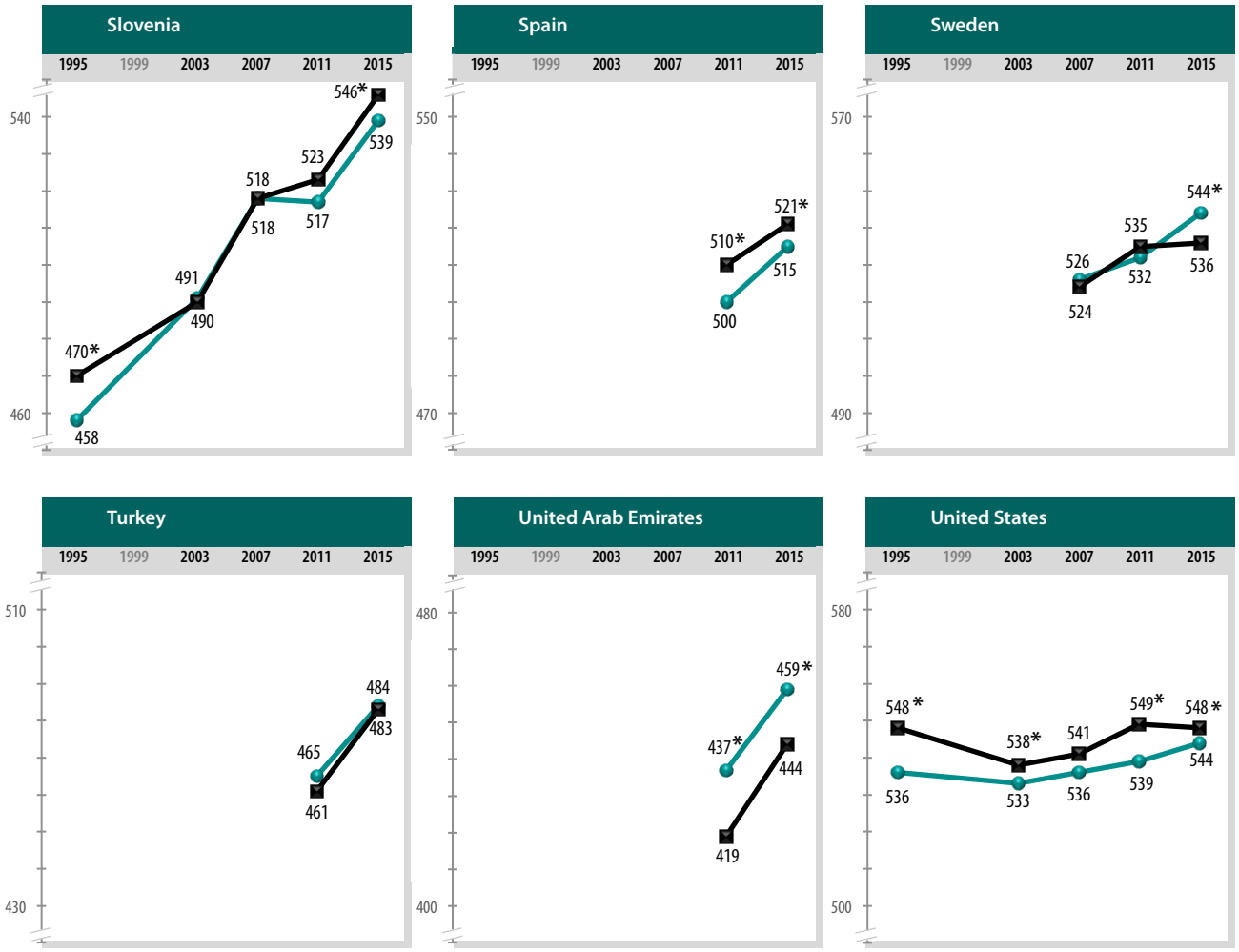
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Exhibit 1.12: Trends in Science Achievement by Gender◊ (Continued)



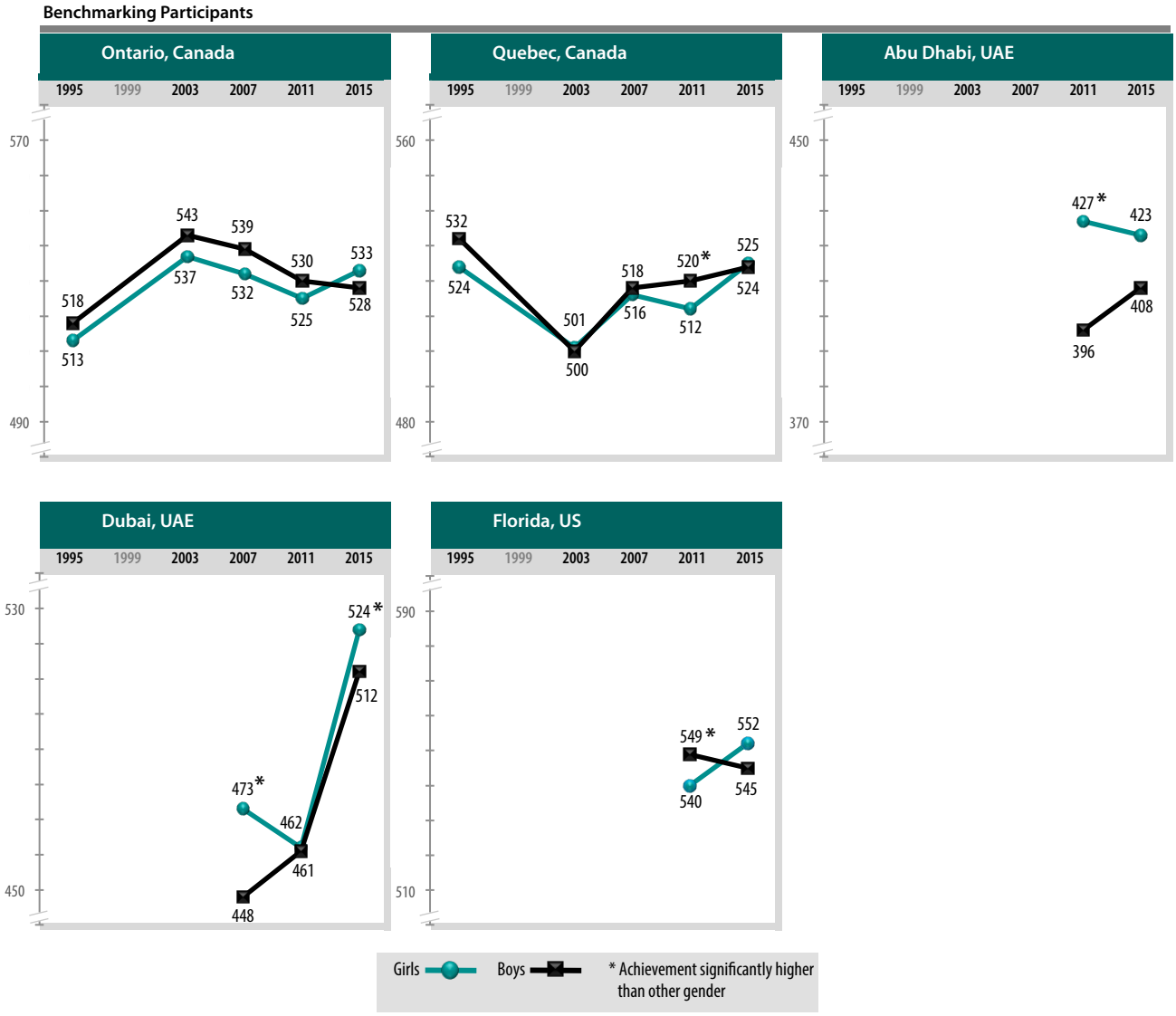
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Exhibit 1.12: Trends in Science Achievement by Gender◊ (Continued)



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

Exhibit 1.12: Trends in Science Achievement by Gender◊ (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 SCIENCE

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 science achievement scale: Advanced, High, Intermediate, and Low.

Percentage of Students Reaching Benchmarks
(averaged across countries)

Advanced Benchmark (625) — 7% — Students communicate understanding of life, physical, and Earth sciences and demonstrate some knowledge of the process of scientific inquiry.

Highest percentage of students reached the Advanced Benchmark in Singapore (37%) and Korea (29%) but 10% or fewer did so in 33 of the 47 countries.

High Benchmark (550) — 39% — Students communicate and apply knowledge of the life, physical, and Earth sciences in everyday and abstract contexts.

Intermediate Benchmark (475) — 77% — Students show basic knowledge and understanding of life, physical, and Earth sciences.

Low Benchmark (400) — 95% — Students show basic knowledge of life and physical sciences.

Many countries were able to educate nearly all of their fourth grade students to a basic level of science achievement.

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

	Countries increased	Countries decreased	
Advanced Benchmark (625)	9	4	Students communicate understanding of life, physical, and Earth sciences and demonstrate some knowledge of the process of scientific inquiry.
High Benchmark (550)	16	8	Students communicate and apply knowledge of the life, physical, and Earth sciences in everyday and abstract contexts.
Intermediate Benchmark (475)	20	6	Students show basic knowledge and understanding of life, physical, and Earth sciences.
Low Benchmark (400)	15	5	Students show basic knowledge of life and physical sciences.

Trends 1995-2015: 17 Countries

	Countries increased	Countries decreased
Advanced Benchmark (625)	8	6
High Benchmark (550)	9	2
Intermediate Benchmark (475)	13	1
Low Benchmark (400)	14	0

Of the 17 countries with 20-year trends, 8 managed to improve achievement at all four benchmarks: Singapore, Korea, Japan, Hong Kong SAR, Hungary, Slovenia, Cyprus, and Iran.

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

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

Exhibit 2.1: Descriptions of the TIMSS 2015 International Benchmarks of Science Achievement

625 Advanced International Benchmark

Students communicate understanding of life, physical, and Earth sciences and demonstrate some knowledge of the process of scientific inquiry. Students demonstrate knowledge of characteristics and life processes of a variety of organisms, communicate understanding of relationships in ecosystems and interactions between organisms and their environment, and communicate and apply knowledge of factors related to human health. They communicate understanding of properties and states of matter and physical and chemical changes, apply some knowledge of forms of energy and energy transfer, and show some knowledge of forces and an understanding of their effect on motion. Students communicate understanding of Earth's structure, physical characteristics, processes, and history and show knowledge of Earth's revolution and rotation. Students demonstrate basic knowledge and skills related to scientific inquiry, recognizing how a simple experiment should be set up, interpreting the results of an investigation, reasoning and drawing conclusions from descriptions and diagrams, and evaluating and supporting an argument.

550 High International Benchmark

Students communicate and apply knowledge of the life, physical, and Earth sciences in everyday and abstract contexts. Students communicate knowledge of characteristics of plants, animals, and their life cycles, and apply knowledge of ecosystems and of humans' and organisms' interactions with their environment. Students communicate and apply knowledge of states and properties of matter, and of energy transfer in practical contexts, as well as showing some understanding of forces and motion. Students apply knowledge of Earth's structure, physical characteristics, processes, and history and show basic understanding of the Earth-Moon-Sun system. Students compare, contrast, and make simple inferences using models, diagrams, and descriptions of investigations, and provide brief descriptive responses using science concepts, both in everyday and abstract contexts.

475 Intermediate International Benchmark

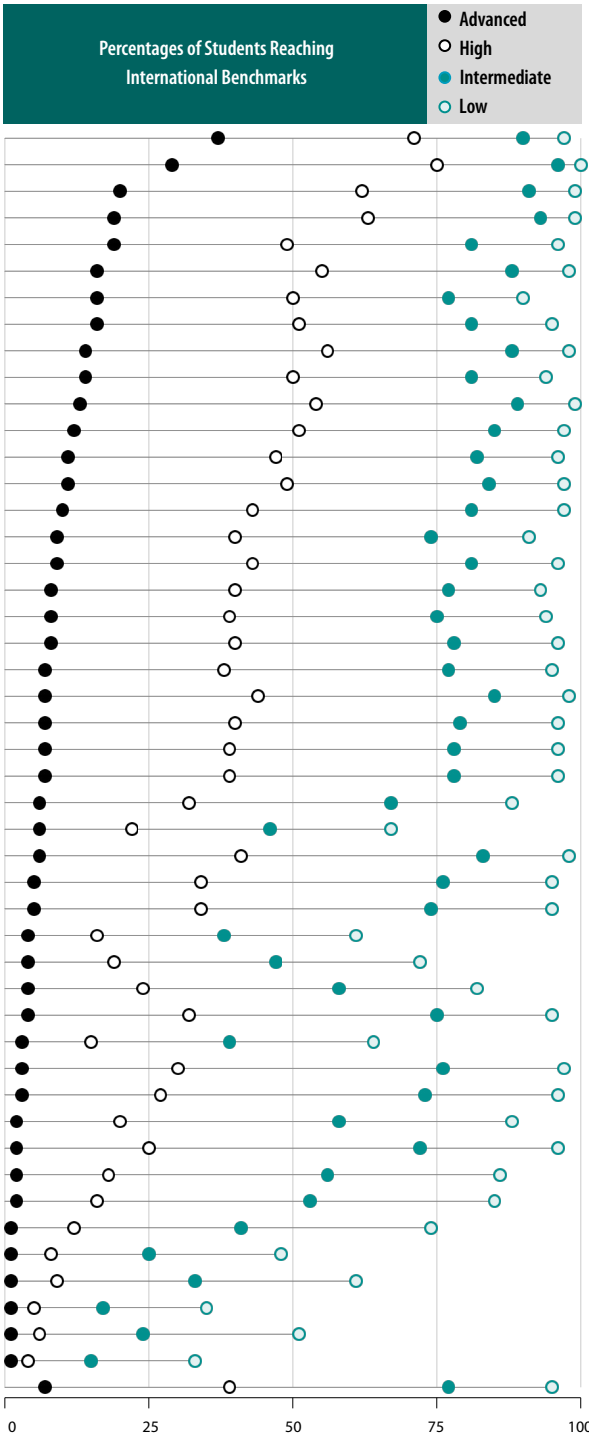
Students show basic knowledge and understanding of life, physical, and Earth sciences. Students demonstrate some knowledge of life processes of plants and humans, communicate and apply knowledge of the interaction of living things with their environments as well as impacts humans can have on their environment, and communicate knowledge of basic facts related to human health. They apply knowledge about some properties of matter and about some facts related to electricity and to energy transfer, and apply elementary knowledge of forces and motion. They show some understanding of Earth's physical characteristics and demonstrate some basic knowledge of Earth in the solar system. Students interpret information in diagrams, apply factual knowledge to everyday situations, and provide simple explanations for biological and physical phenomena.

400 Low International Benchmark

Students show basic knowledge of life and physical sciences. Students demonstrate some basic knowledge of behavioral and physical characteristics of plants and animals as well as of the interaction of living things with their environments, and apply knowledge of some facts related to human health. Students show basic knowledge of states of matter and physical properties of matter. They interpret simple diagrams, complete simple tables, and provide short, fact-based written responses.

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

Exhibit 2.2: Performance at the International Benchmarks of Science Achievement



Country	Advanced Benchmark (625)	High Benchmark (550)	Intermediate Benchmark (475)	Low Benchmark (400)
[2] Singapore	37 (2.0)	71 (1.8)	90 (1.1)	97 (0.5)
Korea, Rep. of	29 (1.6)	75 (1.1)	96 (0.5)	100 (0.1)
Russian Federation	20 (1.5)	62 (2.0)	91 (1.0)	99 (0.3)
Japan	19 (0.9)	63 (1.3)	93 (0.5)	99 (0.2)
Kazakhstan	19 (1.7)	49 (2.5)	81 (1.4)	96 (0.6)
† Hong Kong SAR	16 (1.2)	55 (1.8)	88 (1.1)	98 (0.4)
Bulgaria	16 (1.5)	50 (2.5)	77 (2.2)	90 (1.5)
[2] † United States	16 (0.8)	51 (1.1)	81 (0.9)	95 (0.5)
Chinese Taipei	14 (0.7)	56 (1.2)	88 (0.8)	98 (0.3)
Hungary	14 (1.1)	50 (1.5)	81 (1.6)	94 (0.9)
Finland	13 (0.9)	54 (1.4)	89 (0.9)	99 (0.4)
Poland	12 (0.9)	51 (1.4)	85 (1.3)	97 (0.4)
[2] Sweden	11 (1.1)	47 (2.1)	82 (1.5)	96 (0.8)
Slovenia	11 (0.9)	49 (1.4)	84 (1.0)	97 (0.5)
England	10 (0.8)	43 (1.5)	81 (1.2)	97 (0.5)
Slovak Republic	9 (0.6)	40 (1.4)	74 (1.2)	91 (0.8)
Czech Republic	9 (0.7)	43 (1.4)	81 (1.1)	96 (0.6)
[3] Serbia	8 (0.7)	40 (1.5)	77 (1.7)	93 (1.1)
Australia	8 (0.7)	39 (1.6)	75 (1.4)	94 (0.8)
Germany	8 (0.6)	40 (1.7)	78 (1.3)	96 (0.6)
[1 2] † Canada	7 (0.5)	38 (1.2)	77 (1.4)	95 (0.7)
Norway (5)	7 (0.9)	44 (1.8)	85 (1.1)	98 (0.6)
Ireland	7 (0.9)	40 (1.6)	79 (1.2)	96 (0.6)
[2] Lithuania	7 (0.8)	39 (1.6)	78 (1.2)	96 (0.5)
[2] † Denmark	7 (0.6)	39 (1.5)	78 (1.3)	96 (0.5)
New Zealand	6 (0.6)	32 (1.1)	67 (1.4)	88 (0.9)
United Arab Emirates	6 (0.4)	22 (0.9)	46 (1.0)	67 (0.9)
Croatia	6 (0.7)	41 (1.3)	83 (1.1)	98 (0.4)
‡ Northern Ireland	5 (0.6)	34 (1.3)	76 (1.3)	95 (0.6)
[2] Spain	5 (0.5)	34 (1.3)	74 (1.6)	95 (0.7)
Oman	4 (0.4)	16 (0.8)	38 (1.2)	61 (1.0)
[2] Bahrain	4 (0.4)	19 (0.9)	47 (1.2)	72 (1.0)
Turkey	4 (0.5)	24 (1.1)	58 (1.4)	82 (1.2)
[2] Italy	4 (0.5)	32 (1.5)	75 (1.7)	95 (0.7)
Qatar	3 (0.5)	15 (1.2)	39 (1.7)	64 (1.6)
† Netherlands	3 (0.4)	30 (1.5)	76 (1.4)	97 (0.6)
† Belgium (Flemish)	3 (0.4)	27 (1.5)	73 (1.4)	96 (0.6)
France	2 (0.3)	20 (1.2)	58 (1.6)	88 (1.1)
[2] Portugal	2 (0.3)	25 (1.2)	72 (1.5)	96 (0.6)
Cyprus	2 (0.3)	18 (1.1)	56 (1.4)	86 (1.0)
Chile	2 (0.2)	16 (1.2)	53 (1.5)	85 (1.2)
[1] Georgia	1 (0.6)	12 (1.3)	41 (1.7)	74 (1.7)
Saudi Arabia	1 (0.3)	8 (0.9)	25 (1.4)	48 (1.8)
Iran, Islamic Rep. of	1 (0.3)	9 (0.8)	33 (1.5)	61 (1.7)
ψ Morocco	1 (0.3)	5 (0.7)	17 (1.3)	35 (1.8)
Indonesia	1 (0.2)	6 (0.7)	24 (1.8)	51 (2.1)
ψ Kuwait	1 (0.2)	4 (0.6)	15 (1.4)	33 (1.9)
International Median	7	39	77	95

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

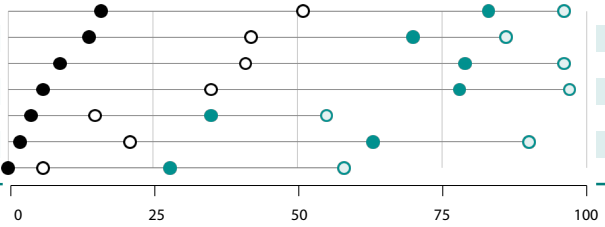
See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 for sampling guidelines and sampling participation notes †, ‡, and ‡.

( ) 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 2.2: Performance at the International Benchmarks of Science Achievement (Continued)

Country	Percentages of Students Reaching International Benchmarks	Advanced Benchmark (625)	High Benchmark (550)	Intermediate Benchmark (475)	Low Benchmark (400)
Benchmarking Participants					
[1] Florida, US		16 (2.1)	51 (2.7)	83 (1.7)	96 (0.9)
Dubai, UAE		14 (0.6)	42 (1.0)	70 (0.9)	86 (0.5)
Ontario, Canada		9 (0.9)	41 (1.4)	79 (1.3)	96 (0.6)
‡ Quebec, Canada		6 (0.9)	35 (2.5)	78 (2.0)	97 (0.6)
[2] Abu Dhabi, UAE		4 (0.7)	15 (1.5)	35 (2.0)	55 (2.0)
Norway (4)		2 (0.3)	21 (0.9)	63 (1.3)	90 (0.9)
Buenos Aires, Argentina		0 (0.2)	6 (0.8)	28 (1.9)	58 (2.3)



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

Exhibit 2.3: Percentages of Students Reaching the International Benchmarks of Science 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	37	33	36	25 ▲	14 ▲	71	68	68	61 ▲	42 ▲
Korea, Rep. of	29	29			22 ▲	75	73			67 ▲
Russian Federation	20	16 ▲	16	11 ▲		62	52 ▲	49 ▲	39 ▲	
Japan	19	14 ▲	12 ▲	12 ▲	15 ▲	63	58 ▲	51 ▲	49 ▲	54 ▲
Kazakhstan	19	7 ▲				49	28 ▲			
Hong Kong SAR	16	9 ▲	14	7 ▲	5 ▲	55	45 ▲	55	47 ▲	30 ▲
United States	16	15	15	13 ▲	19	51	49	47 ▲	45 ▲	50
Chinese Taipei	14	15	19 ▼	14		56	53	55	52	
Hungary	14	13	13	10 ▲	7 ▲	50	46	47	42 ▲	32 ▲
Finland	13	20 ▼				54	65 ▼			
Sweden	11	10	8 ▲			47	44	37 ▲		
Slovenia	11	7 ▲	6 ▲	3 ▲	2 ▲	49	36 ▲	36 ▲	22 ▲	14 ▲
England	10	11	14 ▼	15 ▼	15 ▼	43	42	48 ▼	47 ▼	42
Slovak Republic	9	10	11			40	44 ▼	42		
Czech Republic	9	10	7		12 ▼	43	44	33 ▲		42
Serbia	8	8				40	35 ▲			
Australia	8	7	10 ▼	9	13 ▼	39	35	41	38	40
Germany	8	7	10 ▼			40	39	41		
Lithuania	7	4 ▲	3 ▲	3 ▲		40	31 ▲	30 ▲	30 ▲	
Ireland	7	7			8	40	35 ▲			36
Denmark	7	8	7			39	39	35		
New Zealand	6	5	8	9 ▼	11 ▼	32	28 ▲	32	38 ▼	35
United Arab Emirates	6	3 ▲				22	14 ▲			
Croatia	6	3 ▲				41	30 ▲			
Northern Ireland	5	5				34	33			
Spain	5	4				34	28 ▲			
Oman	4	1 ▲				16	7 ▲			
Bahrain	4	4				19	17			
Turkey	4	3				24	18 ▲			
Italy	4	8 ▼	13 ▼	9 ▼		32	37 ▼	44 ▼	35	
Qatar	3	2				15	11 ▲			
Netherlands	3	3	4	3	6 ▼	30	37 ▼	34	32	38 ▼
Belgium (Flemish)	3	2		2		27	24		28	
Portugal	2	7 ▼			2	25	35 ▼			13 ▲
Cyprus	2			2	1 ▲	18			17	11 ▲
Norway (4)	2	1	1	2	8 ▼	21	19	17 ▲	15 ▲	32 ▼
Chile	2	2				16	19			
Georgia	1	1	1			12	13	5 ▲		
Saudi Arabia	1	3				8	12 ▼			
Iran, Islamic Rep. of	1	3 ▼	2	1	0 ▲	9	16 ▼	12 ▼	7 ▲	3 ▲
ψ Morocco	1	0				5	1 ▲			
ψ Kuwait	0	1				2	4 ▼			
Benchmarking Participants										
Florida, US	16	14				51	48			
Dubai, UAE	14	6 ▲	4 ▲			42	23 ▲	21 ▲		
Ontario, Canada	9	9	12 ▼	13 ▼	10	41	40	45	47 ▼	37 ▲
Quebec, Canada	6	3 ▲	5	3 ▲	9 ▼	35	29 ▲	32	25 ▲	40
Abu Dhabi, UAE	4	2 ▲				15	10 ▲			

▲ 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%.

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

Exhibit 2.3: Percentages of Students Reaching the International Benchmarks of Science 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	90	89	88	86 ▲	71 ▲	97	97	96	95 ▲	89 ▲
Korea, Rep. of	96	95			93 ▲	100	99			99 ▲
Russian Federation	91	86 ▲	82 ▲	74 ▲		99	98	96 ▲	93 ▲	
Japan	93	90 ▲	86 ▲	84 ▲	87 ▲	99	99	97 ▲	96 ▲	97 ▲
Kazakhstan	81	58 ▲				96	84 ▲			
Hong Kong SAR	88	82 ▲	88	87	69 ▲	98	96 ▲	98	98	91 ▲
United States	81	81	78 ▲	78 ▲	78 ▲	95	96	94	94	92 ▲
Chinese Taipei	88	85 ▲	86	87		98	97 ▲	97 ▲	98	
Hungary	81	78	78	76 ▲	67 ▲	94	93	93	94	90 ▲
Finland	89	92 ▼				99	99			
Sweden	82	79	76 ▲			96	95	95		
Slovenia	84	74 ▲	74 ▲	61 ▲	45 ▲	97	93 ▲	93 ▲	87 ▲	79 ▲
England	81	76 ▲	81	79	72 ▲	97	93 ▲	95 ▲	94 ▲	90 ▲
Slovak Republic	74	79 ▼	75			91	94 ▼	92		
Czech Republic	81	81	72 ▲		77 ▲	96	97	93 ▲		95 ▲
Serbia	77	72 ▲				93	91			
Australia	75	72 ▲	76	74	72	94	91 ▲	93	92	89 ▲
Germany	78	78	76			96	96	94 ▲		
Lithuania	79	73 ▲	74 ▲	73 ▲		96	95 ▲	95	95	
Ireland	79	72 ▲			70 ▲	96	92 ▲			91 ▲
Denmark	78	78	72 ▲			96	95	93 ▲		
New Zealand	67	63 ▲	65	73 ▼	66	88	86	87	91 ▼	85
United Arab Emirates	46	36 ▲				67	61 ▲			
Croatia	83	75 ▲				98	96 ▲			
Northern Ireland	76	74				95	94			
Spain	74	67 ▲				95	92 ▲			
Oman	38	23 ▲				61	45 ▲			
Bahrain	47	43 ▲				72	70			
Turkey	58	48 ▲				82	76 ▲			
Italy	75	76	78	70 ▲		95	95	94	91 ▲	
Qatar	39	29 ▲				64	50 ▲			
Netherlands	76	86 ▼	79	83 ▼	82 ▼	97	99 ▼	97	99 ▼	98
Belgium (Flemish)	73	73		79 ▼		96	96		98 ▼	
Portugal	72	75			43 ▲	96	95			73 ▲
Cyprus	56			55	39 ▲	86			86	74 ▲
Norway (4)	63	64	54 ▲	49 ▲	65	90	92	84 ▲	79 ▲	88
Chile	53	54				85	85			
Georgia	41	44	26 ▲			74	75	59 ▲		
Saudi Arabia	25	35 ▼				48	63 ▼			
Iran, Islamic Rep. of	33	44 ▼	36	28 ▲	15 ▲	61	72 ▼	65	58	42 ▲
ψ Morocco	17	6 ▲				35	16 ▲			
ψ Kuwait	10	16 ▼				25	37 ▼			
Benchmarking Participants										
Florida, US	83	82				96	97			
Dubai, UAE	70	48 ▲	48 ▲			86	72 ▲	72 ▲		
Ontario, Canada	79	77	79	81	71 ▲	96	94	95	96	90 ▲
Quebec, Canada	78	76	74	66 ▲	77	97	97	96	91 ▲	94 ▲
Abu Dhabi, UAE	35	30				55	55			

▲ 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 Science Achievement

400 Low International Benchmark

Summary

Students show basic knowledge of life and physical sciences. Students demonstrate some basic knowledge of behavioral and physical characteristics of plants and animals as well as of the interaction of living things with their environments, and apply knowledge of some facts related to human health. Students show basic knowledge of states of matter and physical properties of matter. They interpret simple diagrams, complete simple tables, and provide short, fact-based written responses.

Students demonstrate some basic knowledge of behavioral and physical characteristics of animals and plants. For example, they identify animals that lay eggs, recognize animals that have backbones, and recognize a feature necessary for plants to grow. Students demonstrate some elementary knowledge of the interaction of living things with their environments, matching animals to their ecosystems and recognizing a living thing that produces its own food. Students apply knowledge of some basic facts related to human health, such as a way to avoid illness or to maintain good physical health.

Students show some basic knowledge of states of matter and physical properties of matter. They classify various materials as solids, liquids, or gases and recognize that some metals are attracted by magnets.

Students interpret simple diagrams, complete simple tables, and provide short, fact-based, written responses.

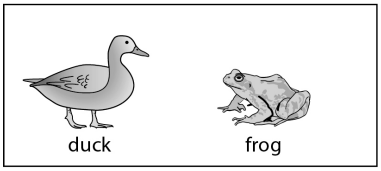
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

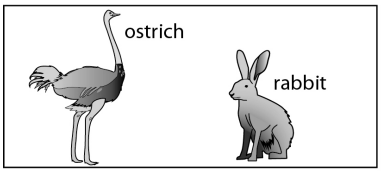
Exhibit 2.4.1: Low International Benchmark – Example Item 1

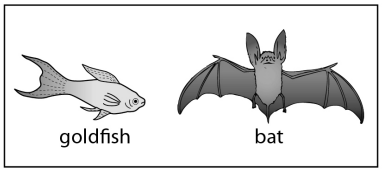
Country	Percent Correct	
[2] Singapore	94 (1.0)	▲
Korea, Rep. of	86 (1.4)	▲
[2] † United States	82 (1.0)	▲
Indonesia	81 (1.9)	▲
Australia	80 (1.5)	▲
Bulgaria	79 (2.2)	▲
Slovenia	79 (1.5)	▲
[2] Spain	78 (1.8)	▲
Ireland	77 (1.8)	▲
Slovak Republic	76 (1.4)	▲
Czech Republic	76 (1.5)	▲
Oman	76 (1.3)	▲
United Arab Emirates	75 (1.0)	▲
Hungary	75 (1.9)	▲
‡ Northern Ireland	75 (2.3)	▲
England	74 (1.7)	▲
[1 2] † Canada	74 (1.2)	▲
[3] Serbia	74 (2.1)	▲
[2] Bahrain	73 (2.1)	
Germany	72 (1.9)	
Russian Federation	72 (1.9)	
Poland	72 (2.3)	
† Netherlands	72 (2.5)	
† Belgium (Flemish)	70 (1.8)	
Qatar	70 (2.0)	
International Avg.	**69 (0.3)**	
[2] † Denmark	69 (1.9)	
New Zealand	68 (1.6)	
[1] Georgia	68 (2.8)	
[2] Italy	68 (2.5)	
Kazakhstan	67 (2.5)	
Chile	66 (1.9)	▼
Norway (5)	66 (2.7)	
Finland	64 (2.0)	▼
Japan	64 (2.3)	▼
Saudi Arabia	63 (2.2)	▼
Morocco	63 (2.5)	▼
[2] Portugal	62 (2.4)	▼
† Hong Kong SAR	62 (2.7)	▼
[2] Lithuania	62 (2.5)	▼
[2] Sweden	61 (2.3)	▼
Kuwait	59 (2.8)	▼
Croatia	59 (2.5)	▼
Turkey	57 (2.1)	▼
Iran, Islamic Rep. of	54 (2.7)	▼
Chinese Taipei	54 (2.1)	▼
France	53 (2.6)	▼
Cyprus	48 (2.2)	▼

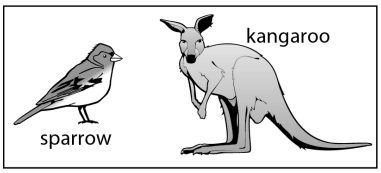
Content Domain: Life Science
Cognitive Domain: Applying
Description: Identifies examples of animals that lay eggs

Which box contains two animals that lay eggs?

● 

Ⓑ 

Ⓒ 

Ⓓ 

Country	Percent Correct	
Benchmarking Participants		
[1] Florida, US	88 (1.8)	▲
Dubai, UAE	80 (1.2)	▲
Ontario, Canada	78 (1.9)	▲
[2] Abu Dhabi, UAE	69 (2.0)	
Norway (4)	65 (2.4)	
‡ Quebec, Canada	63 (3.4)	▼
Buenos Aires, Argentina	47 (3.0)	▼

▲ 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.

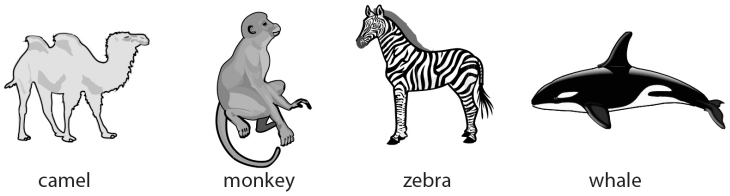
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Exhibit 2.4.2: Low International Benchmark – Example Item 2

Country	Percent Full Credit
Japan	97 (0.7) ▲
Australia	97 (0.9) ▲
Poland	97 (0.8) ▲
2 † United States	97 (0.4) ▲
Czech Republic	96 (0.8) ▲
† Hong Kong SAR	96 (0.8) ▲
2 Lithuania	96 (0.9) ▲
2 Singapore	96 (0.7) ▲
Hungary	96 (0.9) ▲
Croatia	96 (1.1) ▲
England	95 (1.0) ▲
† Netherlands	95 (1.3) ▲
Finland	94 (1.0) ▲
Germany	94 (0.9) ▲
Chinese Taipei	94 (1.0) ▲
‡ Northern Ireland	94 (1.3) ▲
Norway (5)	94 (1.0) ▲
1 2 † Canada	94 (0.9) ▲
2 Sweden	93 (1.3) ▲
New Zealand	93 (0.8) ▲
Ireland	93 (1.2) ▲
2 Spain	93 (1.0) ▲
Korea, Rep. of	92 (1.2) ▲
2 † Denmark	92 (1.1) ▲
Slovak Republic	92 (1.3) ▲
† Belgium (Flemish)	91 (1.1) ▲
France	91 (1.4) ▲
Bulgaria	91 (1.8) ▲
2 Italy	91 (1.2) ▲
Slovenia	89 (1.3) ▲
3 Serbia	89 (1.4) ▲
Russian Federation	87 (1.4)
Cyprus	86 (1.4)
International Avg.	**86 (0.2)**
Chile	85 (1.7)
Kazakhstan	84 (1.7)
1 Georgia	84 (1.9)
2 Portugal	81 (1.8) ▼
United Arab Emirates	74 (1.0) ▼
Qatar	73 (2.0) ▼
Oman	72 (1.5) ▼
Turkey	71 (1.8) ▼
Iran, Islamic Rep. of	70 (2.5) ▼
2 Bahrain	65 (2.1) ▼
Indonesia	61 (2.4) ▼
Saudi Arabia	59 (2.3) ▼
Kuwait	52 (2.3) ▼
Morocco	45 (2.2) ▼

Content Domain: Life Science
Cognitive Domain: Knowing
Description: Completes a table by matching diagrams of animals to their ecosystems

The pictures below show four animals.



camel monkey zebra whale

In the table below, write the name of the animal beside the ecosystem in which it is most likely to be found.

Ecosystem	Name of Animal
Tropical rain forest	monkey
Desert	camel
Ocean	whale
Grassland	zebra

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

Country	Percent Full Credit
Benchmarking Participants	
1 Florida, US	96 (1.4) ▲
Ontario, Canada	95 (0.8) ▲
‡ Quebec, Canada	93 (1.7) ▲
Norway (4)	89 (2.0)
Dubai, UAE	88 (0.9)
Buenos Aires, Argentina	79 (2.0) ▼
2 Abu Dhabi, UAE	65 (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.

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

Exhibit 2.4.3: Low International Benchmark – Example Item 3

Country	Percent Correct	
Korea, Rep. of	96 (0.9)	▲
† Hong Kong SAR	95 (1.1)	▲
3 Serbia	94 (1.3)	▲
2 Lithuania	92 (1.4)	▲
Bulgaria	92 (1.4)	▲
Slovenia	91 (1.2)	▲
Russian Federation	90 (1.3)	▲
Kazakhstan	90 (1.3)	▲
Chinese Taipei	89 (1.4)	▲
Japan	89 (1.2)	▲
2 Italy	89 (1.5)	▲
2 Singapore	89 (1.1)	▲
England	88 (1.4)	▲
Turkey	86 (1.3)	▲
France	86 (1.4)	▲
Croatia	85 (1.8)	▲
2 † United States	85 (0.9)	▲
Australia	84 (1.5)	▲
1 2 † Canada	83 (1.2)	▲
Hungary	82 (2.2)	▲
2 Portugal	79 (1.6)	
Slovak Republic	79 (1.9)	
2 Bahrain	78 (3.3)	
Germany	78 (1.8)	
2 Sweden	77 (2.9)	
Czech Republic	77 (1.8)	
International Avg.	**76 (0.3)**	
Ireland	76 (2.2)	
1 Georgia	75 (2.4)	
United Arab Emirates	75 (1.1)	
‡ Northern Ireland	74 (2.4)	
2 Spain	74 (2.4)	
Cyprus	73 (1.9)	▼
Qatar	72 (1.8)	▼
Finland	72 (2.4)	
Chile	72 (1.9)	▼
New Zealand	71 (1.6)	▼
Oman	69 (1.6)	▼
Saudi Arabia	67 (2.2)	▼
Indonesia	67 (2.3)	▼
Iran, Islamic Rep. of	66 (2.8)	▼
Poland	64 (2.5)	▼
Kuwait	59 (2.9)	▼
2 † Denmark	56 (2.5)	▼
Morocco	52 (2.2)	▼
Norway (5)	43 (2.3)	▼
† Netherlands	34 (2.2)	▼
† Belgium (Flemish)	32 (2.3)	▼

Content Domain: Physical Science
Cognitive Domain: Knowing
Description: Recognizes ice as the solid form of water

Water exists as a solid, liquid, or gas.

Which of the following is a solid?

Ⓐ steam
● ice cube
Ⓒ cloud
Ⓓ raindrop

Country	Percent Correct	
Benchmarking Participants		
1 Florida, US	89 (2.3)	▲
‡ Quebec, Canada	89 (2.6)	▲
Dubai, UAE	86 (1.1)	▲
Ontario, Canada	83 (1.5)	▲
2 Abu Dhabi, UAE	65 (2.1)	▼
Buenos Aires, Argentina	55 (2.9)	▼
Norway (4)	34 (2.6)	▼

▲ 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 2.5: Description of the TIMSS 2015 Intermediate International Benchmark (475) of Science Achievement

475 Intermediate International Benchmark

Summary

Students show basic knowledge and understanding of life, physical, and Earth sciences. Students demonstrate some knowledge of life processes of plants and humans, communicate and apply knowledge of the interaction of living things with their environments as well as impacts humans can have on their environment, and communicate knowledge of basic facts related to human health. They apply knowledge about some properties of matter and about some facts related to electricity and to energy transfer, and apply elementary knowledge of forces and motion. They show some understanding of Earth's physical characteristics and demonstrate some basic knowledge of Earth in the solar system. Students interpret information in diagrams, apply factual knowledge to everyday situations, and provide simple explanations for biological and physical phenomena.

Students demonstrate some knowledge of life processes of plants and humans. For example, they identify reproduction as a stage in the life cycle of a plant and explain that plants cannot survive without water and sunlight. Additionally, students recognize that the human body requires more oxygen during exercise. Students communicate and apply knowledge of the interaction of living things with their environments as well as impacts humans can have on their environment. For example, they complete a food chain in a desert ecosystem and describe one way a polar bear's fur helps it survive. Students communicate knowledge of some basic facts related to human health, including how to protect teeth from decay and the effect the Sun has on unprotected skin.

Students apply knowledge about some properties of matter. For example, they identify a property of steel that makes it better than wood in certain situations. Students apply knowledge about some facts related to electricity and to energy transfer. They identify the reason a bulb will not light up in a model of an electric circuit and the source of heat that causes ice cubes to melt in a particular context. Students apply elementary knowledge of forces and motion, identifying the direction of the force of Earth's gravity in a diagram and explaining that more force is required to move the heavier of two objects from rest.

Students show some understanding of Earth's physical characteristics, providing evidence for the existence of air and recognizing characteristics of landscape features. Students demonstrate some basic knowledge of Earth in the solar system by naming two planets other than the Earth that orbit the Sun.

Students interpret information in diagrams, apply factual knowledge to everyday situations, and provide simple explanations for biological and physical phenomena.

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	
† Hong Kong SAR	86 (1.7)	▲
Russian Federation	84 (1.7)	▲
2 Singapore	83 (1.3)	▲
Bulgaria	78 (2.4)	▲
† Belgium (Flemish)	77 (1.7)	▲
2 Lithuania	77 (2.1)	▲
Kazakhstan	75 (2.1)	▲
Turkey	74 (1.7)	▲
Croatia	74 (2.2)	▲
Korea, Rep. of	74 (2.0)	▲
Slovak Republic	74 (1.9)	▲
Norway (5)	73 (2.0)	▲
Poland	73 (2.1)	▲
Hungary	73 (2.0)	▲
2 † Denmark	73 (1.8)	▲
Iran, Islamic Rep. of	71 (2.5)	▲
Czech Republic	71 (2.0)	▲
† Netherlands	70 (2.2)	
Finland	70 (2.1)	
1 Georgia	69 (2.4)	
2 Spain	69 (2.0)	
2 Italy	68 (2.3)	
Japan	68 (2.0)	
Germany	67 (1.8)	
3 Serbia	67 (2.0)	
International Avg.	**66 (0.3)**	
Chinese Taipei	66 (1.9)	
2 Sweden	66 (2.4)	
France	65 (2.2)	
Australia	63 (2.2)	
2 † United States	63 (1.6)	
Slovenia	63 (2.2)	
England	62 (2.2)	
New Zealand	62 (2.3)	▼
‡ Northern Ireland	61 (2.3)	▼
Qatar	60 (2.0)	▼
1 2 † Canada	59 (1.8)	▼
United Arab Emirates	59 (1.3)	▼
Indonesia	58 (2.4)	▼
Ireland	58 (2.3)	▼
2 Portugal	55 (2.3)	▼
Chile	53 (2.3)	▼
Oman	52 (1.6)	▼
2 Bahrain	50 (2.3)	▼
Morocco	50 (2.5)	▼
Cyprus	49 (2.1)	▼
Saudi Arabia	49 (2.4)	▼
Kuwait	43 (2.9)	▼

Content Domain: Life Science
Cognitive Domain: Knowing
Description: Recognizes that the body needs more oxygen during exercise

Sandy is exercising and starts to breathe faster.

This is because his body needs more

Ⓐ carbon dioxide

Ⓑ hydrogen

Ⓒ water

● oxygen

Country	Percent Correct	
Benchmarking Participants		
Dubai, UAE	69 (1.8)	
1 Florida, US	64 (3.0)	
Norway (4)	63 (2.1)	
Ontario, Canada	61 (2.0)	▼
‡ Quebec, Canada	58 (3.2)	▼
2 Abu Dhabi, UAE	52 (2.3)	▼
Buenos Aires, Argentina	45 (3.0)	▼

▲ 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.

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

Exhibit 2.5.2: Intermediate International Benchmark – Example Item 2

Country	Percent Full Credit	
Korea, Rep. of	91 (1.4)	▲
Russian Federation	89 (1.5)	▲
Hungary	88 (1.4)	▲
Poland	88 (1.6)	▲
Japan	86 (1.5)	▲
† Hong Kong SAR	86 (1.7)	▲
Bulgaria	85 (2.0)	▲
2 Portugal	83 (1.8)	▲
2 Sweden	82 (2.0)	▲
Slovenia	82 (1.9)	▲
2 Lithuania	82 (1.7)	▲
2 Bahrain	80 (2.0)	▲
2 † United States	79 (1.4)	▲
2 Italy	79 (2.1)	▲
3 Serbia	79 (2.3)	▲
Finland	79 (1.6)	▲
2 Singapore	78 (1.5)	▲
1 2 † Canada	78 (1.4)	▲
Czech Republic	77 (1.9)	▲
England	76 (2.2)	▲
† Belgium (Flemish)	76 (1.8)	▲
Australia	75 (1.7)	▲
2 † Denmark	75 (1.9)	
2 Spain	75 (1.7)	
† Netherlands	74 (2.0)	
Chinese Taipei	74 (2.1)	
Germany	73 (1.9)	
Oman	73 (1.3)	
International Avg.	72 (0.3)	
Norway (5)	71 (2.1)	
Croatia	70 (2.6)	
Slovak Republic	68 (2.0)	
Cyprus	68 (2.2)	
Ireland	67 (2.1)	▼
France	67 (2.4)	▼
Chile	66 (1.9)	▼
United Arab Emirates	66 (1.1)	▼
New Zealand	65 (1.9)	▼
Kazakhstan	64 (2.7)	▼
‡ Northern Ireland	63 (2.7)	▼
Qatar	58 (1.9)	▼
Turkey	54 (2.0)	▼
Saudi Arabia	51 (2.9)	▼
Kuwait	51 (2.3)	▼
Morocco	49 (2.2)	▼
1 Georgia	49 (2.7)	▼
Indonesia	44 (2.6)	▼
Iran, Islamic Rep. of	35 (2.6)	▼

Content Domain: Life Science
Cognitive Domain: Applying
Description: Uses a list of living things in a desert ecosystem to complete a food chain

The living things shown in the picture all live in the desert.

Alfie starts to draw a food chain using the living things shown above. He puts the grass and the insect into the food chain because he knows that insects eat grass seeds.

Complete the food chain by writing in the names of the three missing living things.

grass (with seeds) → insect → lizard → snake → hawk

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

Country	Percent Full Credit	
Benchmarking Participants		
1 Florida, US	83 (2.6)	▲
Dubai, UAE	82 (1.1)	▲
Ontario, Canada	82 (1.6)	▲
‡ Quebec, Canada	76 (2.8)	
Norway (4)	64 (2.5)	▼
2 Abu Dhabi, UAE	59 (2.4)	▼
Buenos Aires, Argentina	41 (2.7)	▼

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

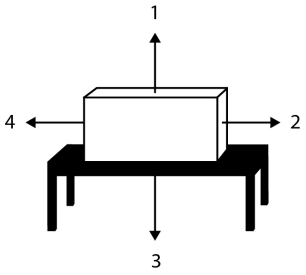
See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 for sampling guidelines and sampling participation notes †, ‡, and ‡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

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	
Russian Federation	95 (0.9)	▲
[2] Lithuania	90 (1.5)	▲
Chinese Taipei	88 (1.3)	▲
[3] Serbia	88 (1.7)	▲
† Hong Kong SAR	87 (1.8)	▲
Kazakhstan	87 (1.3)	▲
Slovenia	87 (1.5)	▲
Bulgaria	85 (2.0)	▲
Slovak Republic	84 (1.9)	▲
Korea, Rep. of	83 (1.6)	▲
England	82 (1.7)	▲
Finland	81 (1.8)	▲
Poland	79 (1.9)	▲
Iran, Islamic Rep. of	78 (2.2)	▲
Australia	78 (2.0)	▲
Germany	77 (1.9)	▲
[1 2] † Canada	77 (1.3)	▲
[2] Singapore	76 (1.7)	
[2] Spain	75 (2.1)	
Cyprus	75 (1.6)	
International Avg.	**72 (0.3)**	
Czech Republic	72 (2.0)	
[2] † Denmark	72 (1.8)	
Norway (5)	72 (2.0)	
[2] † United States	71 (1.2)	
[2] Italy	71 (2.3)	
Japan	70 (1.7)	
† Belgium (Flemish)	69 (2.1)	
Ireland	69 (2.3)	
Oman	69 (1.5)	▼
[2] Bahrain	68 (1.6)	▼
United Arab Emirates	67 (1.2)	▼
‡ Northern Ireland	67 (2.8)	
France	67 (2.2)	▼
Chile	67 (2.1)	▼
Saudi Arabia	67 (2.2)	▼
Turkey	67 (1.7)	▼
† Netherlands	64 (2.5)	▼
Morocco	64 (2.4)	▼
Hungary	64 (2.4)	▼
New Zealand	64 (1.8)	▼
[2] Sweden	64 (2.4)	▼
[2] Portugal	63 (2.3)	▼
Qatar	61 (2.0)	▼
Croatia	57 (2.2)	▼
Indonesia	56 (2.5)	▼
Kuwait	49 (2.3)	▼
[1] Georgia	41 (2.7)	▼

Content Domain: Physical Science
Cognitive Domain: Applying
Description: Identifies the direction of the force of Earth's gravity in a diagram



Look at the block on the table.

Which arrow shows the direction of the force of Earth's gravity?

Ⓐ 1
Ⓑ 2
● 3
Ⓓ 4

Country	Percent Correct	
Benchmarking Participants		
Ontario, Canada	80 (1.8)	▲
[1] Florida, US	78 (1.9)	▲
Dubai, UAE	73 (2.1)	
‡ Quebec, Canada	73 (3.2)	
[2] Abu Dhabi, UAE	63 (2.0)	▼
Norway (4)	60 (2.2)	▼
Buenos Aires, Argentina	59 (2.9)	▼

▲ 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.

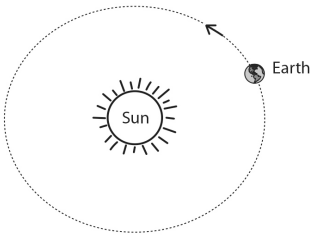
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Exhibit 2.5.4: Intermediate International Benchmark – Example Item 4

Country	Percent Full Credit
Bulgaria	81 (2.3) ▲
2 Portugal	79 (2.0) ▲
Poland	77 (1.9) ▲
Russian Federation	77 (2.0) ▲
Slovak Republic	74 (1.9) ▲
2 Spain	71 (2.2) ▲
Norway (5)	70 (2.0) ▲
Chile	69 (2.2) ▲
2 † United States	68 (1.7) ▲
Korea, Rep. of	66 (2.2) ▲
England	66 (2.2) ▲
Ireland	66 (2.8) ▲
Czech Republic	66 (2.3) ▲
1 Georgia	65 (2.4) ▲
2 Sweden	62 (2.6) ▲
Hungary	61 (2.4) ▲
Iran, Islamic Rep. of	61 (3.1)
† Hong Kong SAR	61 (2.7) ▲
Australia	60 (2.2) ▲
2 Bahrain	60 (3.0)
Kazakhstan	60 (2.5)
1 2 † Canada	58 (1.8)
New Zealand	58 (2.1)
‡ Northern Ireland	58 (2.6)
United Arab Emirates	58 (1.5)
Croatia	58 (2.9)
2 Lithuania	57 (2.7)
2 Italy	56 (2.6)
International Avg.	55 (0.3)
Slovenia	55 (2.2)
Finland	51 (2.6)
2 † Denmark	50 (2.3) ▼
Germany	50 (2.5) ▼
Oman	49 (1.5) ▼
† Belgium (Flemish)	49 (2.3) ▼
France	48 (2.4) ▼
Chinese Taipei	48 (2.3) ▼
† Netherlands	48 (2.8) ▼
2 Singapore	44 (1.9) ▼
Qatar	43 (1.8) ▼
3 Serbia	41 (2.9) ▼
Cyprus	40 (2.7) ▼
Saudi Arabia	38 (2.6) ▼
Japan	37 (2.0) ▼
Indonesia	28 (2.2) ▼
Turkey	28 (2.0) ▼
Kuwait	25 (2.2) ▼
Morocco	9 (1.6) ▼

Content Domain: Earth Science
Cognitive Domain: Knowing
Description: States two planets other than Earth that orbit the Sun

Earth is a planet that orbits the sun.



Write down two other planets that orbit the sun.

1. Mars

2. Neptune

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

Country	Percent Full Credit
Benchmarking Participants	
‡ Quebec, Canada	74 (3.3) ▲
Dubai, UAE	72 (1.5) ▲
1 Florida, US	66 (3.1) ▲
Norway (4)	64 (2.3) ▲
Ontario, Canada	54 (2.3)
2 Abu Dhabi, UAE	44 (3.0) ▼
Buenos Aires, Argentina	42 (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.

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 Science Achievement

550 High International Benchmark

Summary

Students communicate and apply knowledge of the life, physical, and Earth sciences in everyday and abstract contexts. Students communicate knowledge of characteristics of plants, animals, and their life cycles, and apply knowledge of ecosystems and of humans' and organisms' interactions with their environment. Students communicate and apply knowledge of states and properties of matter, and of energy transfer in practical contexts, as well as showing some understanding of forces and motion. Students apply knowledge of Earth's structure, physical characteristics, processes, and history and show basic understanding of the Earth-Moon-Sun system. Students compare, contrast, and make simple inferences using models, diagrams, and descriptions of investigations, and provide brief descriptive responses using science concepts, both in everyday and abstract contexts.

Students communicate knowledge of characteristics of plants and animals. For example, they distinguish living things from non-living things and state characteristics plants and animals have in common. Students interpret observations and data from investigations to identify the function of a plant's stalk and to recognize the best conditions for growing plants. Students demonstrate some knowledge of life cycles of plants and animals. For example, they recognize the part of a plant that produces seeds, describe one way pollen is spread, distinguish inherited from non-inherited features, and describe two ways that lions help their young survive. Students apply knowledge of ecosystems and of humans' and organisms' interactions with their environment, providing a reason why plastic objects are dangerous for marine animals, explaining why spiders have an important role in a garden, recognizing that competition is responsible for varying growth among trees, and recognizing some animal features that provide advantages in a given environment.

Students communicate and apply knowledge of states and properties of matter, explaining, for example, that water goes into the air when it is boiled and that water vapor turns to water droplets when it meets a cold surface. Students connect changes on the surface of a metal object to the process of rusting and, in the context of an investigation, explain that solids (e.g., candy) dissolve faster in hot water than in cold water. They identify the orientation of the poles of repelling magnets. Students apply knowledge of energy transfer in practical contexts. For example, they identify everyday objects that conduct electricity, identify sources of energy and specify which can be used to produce electricity, and explain the function of a battery in an electric circuit. They also explain how a sweater can be used to keep a bottle cold. Students show some understanding of forces and motion, recognizing, for example, the direction to which a force should be applied to reverse the direction of a moving object.

Students apply knowledge of Earth's structure, physical characteristics, processes, and history. For example, they state one component of the Earth's crust and recognize how rock formations change shape over time. Students interpret weather and climate data to indicate the crop best suited to given conditions and the likelihood of snowfall in given areas, and recognize a stage in the water cycle. Students recognize fossils as evidence that there were many kinds of animals on Earth that no longer exist today. Students show basic understanding of the Earth-Moon-Sun system, explaining that the Moon's shape in the sky looks different at different times of the month and recognizing that shadows cast by objects in sunlight change shape over the course of the day.

Students compare, contrast, and make simple inferences using models, diagrams, and descriptions of investigations. In addition, they provide brief descriptive responses using science concepts, both in everyday and abstract contexts.

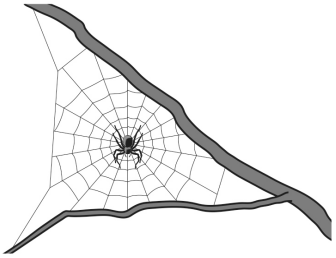
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Exhibit 2.6.1: High International Benchmark – Example Item 1

Country	Percent Full Credit	
Russian Federation	82 (2.1)	▲
Hungary	81 (1.7)	▲
Poland	74 (2.2)	▲
2 Singapore	73 (1.7)	▲
Slovak Republic	72 (2.1)	▲
Korea, Rep. of	71 (2.0)	▲
Kazakhstan	71 (1.8)	▲
Czech Republic	71 (2.0)	▲
2 Lithuania	68 (2.7)	▲
2 † United States	67 (1.6)	▲
† Belgium (Flemish)	65 (1.7)	▲
Australia	65 (1.6)	▲
Slovenia	65 (2.3)	▲
† Netherlands	63 (2.0)	▲
Chinese Taipei	63 (2.1)	▲
Japan	63 (2.2)	▲
1 2 † Canada	63 (1.5)	▲
† Hong Kong SAR	63 (2.4)	▲
Croatia	62 (2.2)	▲
Finland	62 (2.3)	▲
Germany	62 (2.2)	▲
Bulgaria	60 (2.6)	▲
2 Italy	59 (2.4)	▲
Norway (5)	58 (2.2)	▲
Ireland	57 (2.4)	
2 † Denmark	56 (2.2)	
3 Serbia	55 (2.7)	
New Zealand	55 (2.1)	
International Avg.	54 (0.3)	
2 Sweden	53 (2.3)	
2 Spain	53 (2.3)	
France	52 (2.3)	
Cyprus	52 (1.9)	
‡ Northern Ireland	48 (2.8)	▼
Chile	46 (2.4)	▼
England	45 (2.8)	▼
1 Georgia	44 (3.2)	▼
2 Portugal	43 (2.4)	▼
Iran, Islamic Rep. of	41 (3.0)	▼
2 Bahrain	36 (2.7)	▼
United Arab Emirates	30 (1.2)	▼
Morocco	29 (2.2)	▼
Turkey	28 (1.7)	▼
Qatar	27 (2.0)	▼
Saudi Arabia	26 (2.3)	▼
Oman	25 (1.5)	▼
Indonesia	22 (2.1)	▼
Kuwait	15 (1.8)	▼

Content Domain: Life Science
Cognitive Domain: Applying
Description: Explains one reason why it is important to have spiders in a garden

David wants to get rid of the spiders in his garden. Mohammad tells him this is a bad idea because spiders are important for the environment.



Write down one reason why it is important to have spiders in a garden.

Spiders eat bugs that might kill your plants.

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

Country	Percent Full Credit	
Benchmarking Participants		
‡ Quebec, Canada	75 (2.6)	▲
1 Florida, US	70 (2.9)	▲
Ontario, Canada	59 (2.0)	▲
Norway (4)	48 (2.5)	▼
Dubai, UAE	42 (2.0)	▼
2 Abu Dhabi, UAE	26 (2.2)	▼
Buenos Aires, Argentina	24 (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.

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	
Korea, Rep. of	91 (1.1)	▲
Finland	87 (1.5)	▲
Czech Republic	85 (1.8)	▲
Poland	84 (1.5)	▲
Russian Federation	82 (2.0)	▲
Kazakhstan	82 (1.8)	▲
† Hong Kong SAR	82 (1.8)	▲
† Netherlands	81 (1.8)	▲
2 † United States	81 (1.1)	▲
Slovenia	81 (1.8)	▲
Japan	79 (1.9)	▲
2 Singapore	79 (1.6)	▲
Hungary	78 (1.8)	▲
Chinese Taipei	78 (1.6)	▲
Croatia	77 (2.0)	▲
‡ Northern Ireland	76 (2.4)	▲
Norway (5)	75 (2.4)	▲
2 Lithuania	75 (2.3)	▲
Australia	74 (2.1)	▲
2 Italy	74 (2.0)	▲
† Belgium (Flemish)	73 (1.7)	▲
Bulgaria	72 (2.6)	
2 Sweden	72 (2.6)	
1 2 † Canada	72 (1.4)	▲
Germany	72 (2.0)	▲
3 Serbia	71 (2.2)	
England	71 (2.1)	
2 † Denmark	71 (2.1)	
Ireland	70 (2.5)	
International Avg.	**68 (0.3)**	
Slovak Republic	67 (2.2)	
New Zealand	66 (1.7)	
Cyprus	66 (2.2)	
Chile	63 (2.3)	▼
Turkey	60 (1.9)	▼
1 Georgia	59 (2.8)	▼
2 Spain	55 (2.2)	▼
France	54 (2.6)	▼
Oman	52 (1.3)	▼
2 Bahrain	52 (2.6)	▼
Iran, Islamic Rep. of	50 (3.0)	▼
United Arab Emirates	49 (1.2)	▼
2 Portugal	48 (2.5)	▼
Qatar	45 (2.5)	▼
Kuwait	45 (2.4)	▼
Saudi Arabia	44 (1.9)	▼
Morocco	35 (2.3)	▼
Indonesia	30 (2.1)	▼

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

Content Domain: Life Science
Cognitive Domain: Applying
Description: Identifies how having coloring similar to their surroundings helps birds stay alive

The feathers of some birds have similar colors to their surroundings.

How does this help them stay alive?

● They are hidden from danger.
Ⓑ They can see food more easily.
Ⓒ They are protected from the weather.
Ⓓ They can find each other more easily.

Country	Percent Correct	
Benchmarking Participants		
1 Florida, US	83 (2.3)	▲
‡ Quebec, Canada	72 (2.8)	
Ontario, Canada	71 (2.2)	
Dubai, UAE	64 (1.8)	▼
Norway (4)	60 (2.4)	▼
2 Abu Dhabi, UAE	42 (2.2)	▼
Buenos Aires, Argentina	34 (2.8)	▼

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

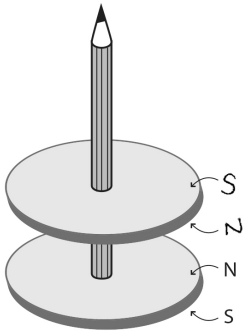
Exhibit 2.6.3: High International Benchmark – Example Item 3

Country	Percent Full Credit	
[2] Singapore	90 (1.3)	▲
Japan	84 (1.5)	▲
Korea, Rep. of	82 (1.9)	▲
Chinese Taipei	72 (2.1)	▲
Russian Federation	68 (2.3)	▲
† Hong Kong SAR	60 (2.0)	▲
Kazakhstan	58 (3.0)	▲
Slovak Republic	57 (2.1)	▲
Slovenia	57 (2.1)	▲
Finland	54 (2.6)	▲
England	53 (2.1)	▲
[2] † United States	49 (1.6)	▲
Czech Republic	49 (2.7)	▲
Hungary	48 (2.3)	▲
[2] Sweden	47 (2.5)	
[2] Lithuania	46 (2.9)	
Norway (5)	46 (2.2)	
[1 2] † Canada	45 (1.7)	
Germany	45 (2.4)	
Ireland	43 (2.6)	
[3] Serbia	43 (2.7)	
International Avg.	**43 (0.3)**	
[2] Spain	43 (1.8)	
† Netherlands	43 (2.1)	
† Belgium (Flemish)	41 (2.3)	
Australia	40 (1.9)	
United Arab Emirates	39 (1.3)	▼
Bulgaria	38 (2.4)	
Poland	38 (2.3)	▼
Turkey	37 (1.9)	▼
‡ Northern Ireland	37 (3.3)	
Croatia	36 (1.9)	▼
New Zealand	36 (1.8)	▼
[2] Portugal	35 (2.0)	▼
[2] Italy	35 (2.7)	▼
Iran, Islamic Rep. of	33 (2.5)	▼
[2] Bahrain	32 (2.5)	▼
Oman	32 (1.5)	▼
Qatar	29 (2.3)	▼
Cyprus	27 (2.1)	▼
[1] Georgia	26 (2.6)	▼
France	26 (2.2)	▼
Kuwait	25 (2.2)	▼
[2] † Denmark	23 (2.0)	▼
Saudi Arabia	18 (2.1)	▼
Chile	18 (1.7)	▼
Morocco	18 (2.2)	▼
Indonesia	16 (1.9)	▼

Content Domain: Physical Science
Cognitive Domain: Applying
Description: From a diagram, identifies the orientation of the poles on two repelling magnets

Two ringed magnets are placed around a pencil, as shown below. The top magnet is repelled by the bottom magnet. The poles of the bottom magnet have been labeled.

Label the poles on the top magnet.



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

Country	Percent Full Credit	
Benchmarking Participants		
[1] Florida, US	58 (3.6)	▲
Dubai, UAE	53 (1.6)	▲
Ontario, Canada	45 (2.2)	
‡ Quebec, Canada	44 (3.3)	
[2] Abu Dhabi, UAE	33 (2.3)	▼
Norway (4)	25 (1.8)	▼
Buenos Aires, Argentina	20 (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.

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	
Chinese Taipei	78 (2.0)	▲
Japan	78 (1.8)	▲
† Hong Kong SAR	68 (2.2)	▲
Slovenia	66 (2.4)	▲
2 Singapore	65 (1.5)	▲
Germany	62 (2.3)	▲
Slovak Republic	61 (2.3)	▲
England	60 (1.9)	▲
Kazakhstan	56 (2.1)	▲
Korea, Rep. of	55 (1.9)	▲
Poland	55 (2.5)	▲
2 † United States	55 (1.4)	▲
2 Portugal	55 (2.4)	▲
Croatia	54 (2.2)	▲
† Netherlands	53 (2.2)	
2 Sweden	52 (3.0)	
Bulgaria	52 (2.6)	
2 Spain	51 (2.1)	
Norway (5)	50 (2.1)	
† Belgium (Flemish)	50 (2.2)	
2 Italy	50 (2.4)	
Cyprus	50 (2.4)	
Finland	49 (2.2)	
International Avg.	**49 (0.3)**	
Czech Republic	48 (2.4)	
Hungary	48 (2.4)	
Oman	47 (1.7)	
2 Lithuania	47 (2.4)	
France	47 (2.7)	
2 † Denmark	46 (2.4)	
‡ Northern Ireland	46 (2.6)	
Australia	44 (1.9)	▼
Iran, Islamic Rep. of	44 (3.2)	
Ireland	43 (2.4)	▼
2 Bahrain	43 (1.9)	▼
United Arab Emirates	42 (1.2)	▼
Indonesia	42 (2.6)	▼
1 2 † Canada	41 (1.5)	▼
Qatar	41 (1.7)	▼
Saudi Arabia	41 (2.3)	▼
Turkey	40 (2.3)	▼
Russian Federation	39 (2.7)	▼
New Zealand	38 (2.3)	▼
Chile	38 (1.8)	▼
1 Georgia	36 (2.2)	▼
Morocco	30 (2.5)	▼
Kuwait	24 (2.7)	▼
3 Serbia	23 (2.0)	▼

Content Domain: Physical Science
Cognitive Domain: Knowing
Description: Given a list of five everyday objects, recognizes which ones conduct electricity

Which objects shown below conduct electricity?

Fill in one circle next to each object.

	Conducts Electricity	
	Yes	No
 wooden spoon	Ⓐ	●
 plastic comb	Ⓐ	●
 silver chain	●	Ⓑ
 rubber ball	Ⓐ	●
 iron key	●	Ⓑ

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

Country	Percent Full Credit	
Benchmarking Participants		
‡ Quebec, Canada	53 (3.7)	
1 Florida, US	53 (2.7)	
Dubai, UAE	51 (2.0)	
Buenos Aires, Argentina	39 (2.6)	▼
2 Abu Dhabi, UAE	39 (2.3)	▼
Norway (4)	38 (2.4)	▼
Ontario, Canada	38 (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.

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

Exhibit 2.6.5: High International Benchmark – Example Item 5

Country	Percent Correct	
† Belgium (Flemish)	87 (1.5)	▲
Japan	86 (1.6)	▲
Croatia	85 (1.7)	▲
Finland	85 (1.5)	▲
Poland	82 (1.8)	▲
Czech Republic	81 (2.0)	▲
‡ Northern Ireland	81 (2.6)	▲
† Netherlands	81 (1.7)	▲
Norway (5)	80 (1.7)	▲
Korea, Rep. of	79 (2.0)	▲
Slovak Republic	78 (1.6)	▲
Bulgaria	78 (2.4)	▲
Slovenia	78 (1.7)	▲
Ireland	78 (2.1)	▲
2 Lithuania	77 (1.9)	▲
† Hong Kong SAR	76 (2.0)	▲
2 Spain	74 (1.9)	▲
1 2 † Canada	74 (1.4)	▲
Hungary	73 (2.3)	▲
Russian Federation	73 (1.5)	▲
2 † Denmark	73 (2.5)	▲
England	73 (1.8)	▲
3 Serbia	72 (2.2)	▲
Cyprus	71 (2.0)	▲
2 Sweden	69 (2.5)	
2 Italy	69 (2.3)	
2 Portugal	68 (1.8)	
Chinese Taipei	68 (2.2)	
Kazakhstan	68 (2.4)	
2 † United States	67 (1.4)	
France	66 (2.5)	
Australia	66 (2.0)	
International Avg.	66 (0.3)	
2 Singapore	63 (1.9)	
New Zealand	62 (1.9)	▼
Germany	61 (2.3)	▼
Chile	58 (2.2)	▼
Turkey	57 (1.7)	▼
United Arab Emirates	52 (1.2)	▼
1 Georgia	48 (2.8)	▼
Qatar	46 (2.4)	▼
Oman	42 (1.5)	▼
Saudi Arabia	40 (2.3)	▼
2 Bahrain	40 (2.2)	▼
Morocco	38 (2.6)	▼
Kuwait	30 (2.3)	▼
Iran, Islamic Rep. of	30 (2.8)	▼
Indonesia	25 (1.8)	▼

Content Domain: Earth Science
Cognitive Domain: Applying
Description: From a table showing temperature and cloud cover at different locations, identifies the place where it is most likely to snow

The table below shows the weather at four different places.

Place	Temperature	Cloud Cover
A	5 °C	Clouds
B	–5 °C	No clouds
C	–5 °C	Clouds
D	5 °C	No clouds

In which place is it most likely to snow?

Ⓐ Place *A*
Ⓑ Place *B*
● Place *C*
Ⓓ Place *D*

Country	Percent Correct	
Benchmarking Participants		
‡ Quebec, Canada	82 (2.6)	▲
Ontario, Canada	72 (1.8)	▲
Norway (4)	66 (2.4)	
Dubai, UAE	64 (1.7)	
1 Florida, US	63 (3.1)	
Buenos Aires, Argentina	46 (2.8)	▼
2 Abu Dhabi, UAE	44 (2.3)	▼

▲ 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: Description of the TIMSS 2015 Advanced International Benchmark (625) of Science Achievement

625 Advanced International Benchmark

Summary

Students communicate understanding of life, physical, and Earth sciences and demonstrate some knowledge of the process of scientific inquiry. Students demonstrate knowledge of characteristics and life processes of a variety of organisms, communicate understanding of relationships in ecosystems and interactions between organisms and their environment, and communicate and apply knowledge of factors related to human health. They communicate understanding of properties and states of matter and physical and chemical changes, apply some knowledge of forms of energy and energy transfer, and show some knowledge of forces and an understanding of their effect on motion. Students communicate understanding of Earth's structure, physical characteristics, processes, and history and show knowledge of Earth's revolution and rotation. Students demonstrate basic knowledge and skills related to scientific inquiry, recognizing how a simple experiment should be set up, interpreting the results of an investigation, reasoning and drawing conclusions from descriptions and diagrams, and evaluating and supporting an argument.

Students demonstrate knowledge of characteristics and life processes of a variety of organisms. For example, they list two things other than water animals need to survive, recognize that muscles move bones, and identify the function of a structure of a flowering plant. Students communicate understanding of relationships in ecosystems and interactions between organisms and their environment, identifying predator-prey relationships and using a food web to identify animals that compete for food. They evaluate and propose experimental designs to test how light and water conditions affect the growth of plants, identify a feature that helps a cactus survive in the desert, and describe a physical change that takes place in a mammal as the weather gets cold. Students communicate and apply knowledge of factors related to human health and identify preventive health measures, including why people should drink liquids frequently, how flu-like diseases are spread, and how boiling water makes it safe to drink.

Students communicate understanding of properties and states of matter, and physical and chemical changes. For example, students explain how pairs of magnets should be oriented to attract or repel, describe why electrical wires are made of metals, and based on a diagram, recognize that objects with the same size and shape can have different masses. In the context of investigations, students explain what makes a solid dissolve faster in water, what makes a solution more dilute, and what is important when designing a fair test. They explain how water changing state is related to the process of drying. They evaluate methods for separating mixtures of solids of different sizes and solids of the same size. Students apply some knowledge of forms of energy and energy transfer. They state one form of energy present in a closed electric circuit, recognize which material in a list transfers heat the best, and identify a property of a metal pot that makes it good for boiling water. Students show some knowledge of forces and an understanding of their effect on motion. They identify gravity as the force causing objects to roll down a track or fall and they choose the direction to apply a force to change the motion of an object, and evaluating and supporting an argument.

Students communicate understanding of Earth's structure, physical characteristics, processes, and history. For example, they state two things that make up the Earth's crust, and recognize that water covers most of Earth's surface and that clouds are made from water droplets. They relate two different environments to the weathering of rocks and recognize how fish fossils are formed. Students show knowledge of Earth's revolution and rotation by indicating how long it takes the Earth to orbit the Sun and describing how the Earth's rotation causes day and night.

Students demonstrate basic knowledge and skills related to scientific inquiry, recognizing how a simple experiment should be set up, interpreting the results of an investigation, reasoning and drawing conclusions from descriptions and diagrams, and evaluating and supporting an argument.

Exhibit 2.7.1: Advanced International Benchmark – Example Item 1

Country	Percent Full Credit	
Korea, Rep. of	56 (2.3)	▲
Chinese Taipei	55 (2.2)	▲
Japan	55 (1.9)	▲
Norway (5)	52 (2.8)	▲
England	51 (2.1)	▲
2 † United States	51 (1.4)	▲
Australia	50 (2.4)	▲
† Netherlands	50 (2.4)	▲
1 2 † Canada	49 (1.9)	▲
Ireland	47 (2.2)	▲
‡ Northern Ireland	46 (3.0)	▲
2 Sweden	44 (2.9)	▲
2 Singapore	44 (1.9)	▲
New Zealand	43 (2.1)	▲
Hungary	42 (2.4)	▲
Germany	42 (2.2)	▲
Poland	42 (2.0)	▲
† Hong Kong SAR	41 (2.6)	
2 Spain	41 (1.9)	▲
† Belgium (Flemish)	41 (2.3)	
Finland	40 (2.7)	
Croatia	39 (2.2)	
2 † Denmark	39 (2.2)	
Turkey	38 (1.8)	
2 Italy	38 (2.2)	
Russian Federation	38 (2.2)	
Slovenia	37 (2.2)	
2 Portugal	37 (1.9)	
International Avg.	**36 (0.3)**	
2 Lithuania	34 (2.3)	
Chile	34 (2.1)	
Kazakhstan	32 (2.6)	
Cyprus	32 (1.9)	▼
Bulgaria	30 (2.4)	▼
2 Bahrain	30 (1.8)	▼
France	28 (1.9)	▼
Slovak Republic	28 (1.8)	▼
3 Serbia	24 (1.9)	▼
United Arab Emirates	24 (1.0)	▼
Czech Republic	24 (2.1)	▼
Qatar	24 (2.1)	▼
1 Georgia	23 (2.0)	▼
Iran, Islamic Rep. of	20 (2.3)	▼
Oman	17 (1.3)	▼
Morocco	17 (2.2)	▼
Saudi Arabia	15 (1.8)	▼
Kuwait	11 (1.7)	▼
Indonesia	11 (1.7)	▼

Content Domain: Life Science
Cognitive Domain: Reasoning
Description: Analyzes statements to identify possible characteristics of predators and prey

In a food chain, a **predator** is an animal that eats another animal. The animal that gets eaten is called **prey**.

Which statement about predators or prey is true or false?

Fill in one circle next to each statement.

	True	False
An animal with sharp teeth is likely to be a predator.	●	Ⓑ
Predators are always bigger than their prey.	Ⓐ	●
A large animal cannot be prey.	Ⓐ	●
Some animals can be both predators and prey.	●	Ⓑ

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

Country	Percent Full Credit	
Benchmarking Participants		
Ontario, Canada	52 (2.8)	▲
1 Florida, US	50 (2.8)	▲
‡ Quebec, Canada	45 (3.3)	▲
Norway (4)	41 (2.9)	
Dubai, UAE	32 (1.6)	▼
Buenos Aires, Argentina	28 (2.5)	▼
2 Abu Dhabi, UAE	22 (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 2.7.2: Advanced International Benchmark – Example Item 2

Country	Percent Full Credit	
Japan	78 (1.7)	▲
2 Singapore	77 (1.7)	▲
Korea, Rep. of	73 (1.9)	▲
Russian Federation	69 (2.0)	▲
2 Sweden	66 (2.6)	▲
† Hong Kong SAR	62 (2.5)	▲
Kazakhstan	60 (2.7)	▲
Hungary	60 (1.8)	▲
Finland	58 (2.4)	▲
2 † Denmark	57 (2.4)	▲
Slovenia	56 (2.6)	▲
Norway (5)	55 (2.2)	▲
Chinese Taipei	52 (2.4)	▲
Ireland	49 (2.4)	▲
1 2 † Canada	49 (1.7)	▲
Bulgaria	49 (2.3)	▲
England	46 (2.3)	▲
Australia	44 (2.6)	
3 Serbia	42 (2.3)	
2 Italy	42 (2.5)	
† Netherlands	42 (2.5)	
International Avg.	**41 (0.3)**	
1 Georgia	41 (2.8)	
2 † United States	40 (1.5)	
Slovak Republic	40 (2.3)	
Croatia	39 (2.5)	
Turkey	39 (1.8)	
Poland	38 (2.4)	
Cyprus	36 (2.4)	▼
Czech Republic	35 (2.1)	▼
Chile	34 (2.1)	▼
† Belgium (Flemish)	33 (1.9)	▼
‡ Northern Ireland	32 (2.7)	▼
2 Lithuania	31 (2.3)	▼
France	31 (2.5)	▼
Qatar	31 (1.8)	▼
Germany	31 (1.8)	▼
New Zealand	30 (1.6)	▼
United Arab Emirates	29 (1.4)	▼
2 Portugal	28 (1.8)	▼
2 Bahrain	23 (1.8)	▼
Saudi Arabia	22 (1.7)	▼
Indonesia	18 (2.1)	▼
Oman	18 (1.3)	▼
2 Spain	17 (1.6)	▼
Iran, Islamic Rep. of	15 (2.1)	▼
Kuwait	11 (1.4)	▼
Morocco	9 (1.6)	▼

Content Domain: Life Science
Cognitive Domain: Applying
Description: Explains how a flu-like disease can be transmitted through the air

How can you catch a disease (like the flu) from someone when they cough near you, even if you have not touched the person?

Germs spread through the air when someone coughs.

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

Country	Percent Full Credit	
Benchmarking Participants		
Ontario, Canada	57 (2.0)	▲
1 Florida, US	45 (3.8)	
Dubai, UAE	43 (2.0)	
Norway (4)	40 (2.6)	
‡ Quebec, Canada	34 (3.7)	
2 Abu Dhabi, UAE	24 (2.4)	▼
Buenos Aires, Argentina	19 (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.

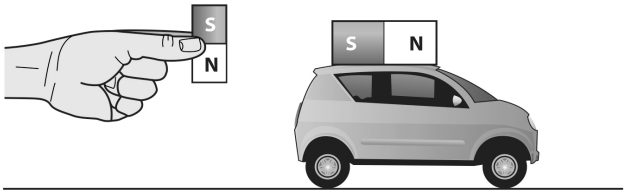
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Exhibit 2.7.3: Advanced International Benchmark – Example Item 3

Country	Percent Full Credit	
[2] Singapore	83 (1.4)	▲
Japan	76 (1.8)	▲
Korea, Rep. of	75 (2.3)	▲
Chinese Taipei	56 (2.5)	▲
Slovenia	48 (2.5)	▲
Kazakhstan	47 (2.9)	▲
[2] † United States	45 (1.8)	▲
[2] Sweden	44 (2.5)	▲
Slovak Republic	40 (1.9)	▲
[3] Serbia	38 (2.3)	▲
Ireland	37 (2.4)	▲
[1 2] † Canada	36 (1.7)	▲
Russian Federation	36 (2.4)	▲
† Hong Kong SAR	36 (2.0)	▲
Finland	36 (2.5)	▲
England	34 (2.1)	▲
Hungary	34 (2.3)	▲
Germany	31 (2.2)	
Turkey	30 (1.7)	
International Avg.	30 (0.3)	
Oman	29 (1.5)	
[2] Lithuania	28 (2.6)	
[2] † Denmark	27 (2.1)	
Iran, Islamic Rep. of	27 (2.4)	
United Arab Emirates	25 (1.1)	▼
Croatia	25 (2.3)	▼
Poland	25 (2.1)	▼
Australia	23 (1.8)	▼
[2] Bahrain	23 (1.9)	▼
Czech Republic	22 (1.7)	▼
† Netherlands	21 (1.9)	▼
New Zealand	21 (1.4)	▼
Cyprus	21 (2.1)	▼
† Belgium (Flemish)	21 (1.7)	▼
[2] Spain	21 (1.5)	▼
‡ Northern Ireland	18 (2.1)	▼
[1] Georgia	18 (2.2)	▼
[2] Italy	17 (1.6)	▼
Qatar	16 (1.6)	▼
[2] Portugal	16 (1.8)	▼
Chile	13 (1.5)	▼
Bulgaria	11 (1.6)	▼
Saudi Arabia	11 (1.2)	▼
Indonesia	10 (1.5)	▼
Kuwait	9 (1.2)	▼
France	9 (1.5)	▼
Morocco	2 (0.6)	▼
Norway (5)	- -	

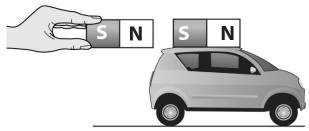
Content Domain: Physical Science
Cognitive Domain: Applying
Description: Explains how the poles of two magnets should be oriented to cause repulsion

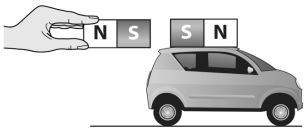
A magnet is glued to the top of a plastic toy car. Sarah wants to push the car away using another magnet.



Which way should she hold her magnet to push the car away?

(Check one box.)

☐ 

☑ 

Explain your answer.

The two south poles push each other away.

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

Country	Percent Full Credit	
Benchmarking Participants		
[1] Florida, US	54 (4.3)	▲
Ontario, Canada	39 (2.2)	▲
Dubai, UAE	38 (2.1)	▲
‡ Quebec, Canada	30 (3.8)	
[2] Abu Dhabi, UAE	20 (1.8)	▼
Buenos Aires, Argentina	12 (1.7)	▼
Norway (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.

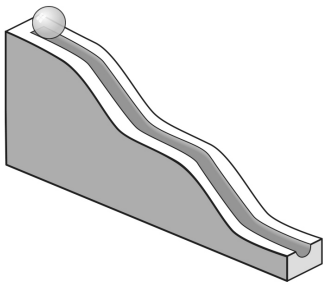
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Exhibit 2.7.4: Advanced International Benchmark – Example Item 4

Country	Percent Full Credit	
Kazakhstan	60 (3.0)	▲
Russian Federation	53 (2.6)	▲
2 Sweden	46 (2.5)	▲
2 † Denmark	45 (2.4)	▲
Slovak Republic	43 (2.1)	▲
† Netherlands	39 (2.9)	▲
2 † United States	39 (1.8)	▲
Bulgaria	38 (3.1)	▲
Norway (5)	37 (2.3)	▲
Korea, Rep. of	37 (2.0)	▲
Czech Republic	37 (2.3)	▲
England	35 (2.4)	▲
Finland	34 (2.3)	▲
Germany	32 (2.1)	▲
Ireland	31 (2.2)	▲
† Belgium (Flemish)	29 (1.9)	
Chinese Taipei	29 (2.1)	
1 2 † Canada	29 (1.4)	
‡ Northern Ireland	29 (2.3)	
Hungary	28 (1.9)	
2 Singapore	28 (1.7)	
New Zealand	27 (2.0)	
† Hong Kong SAR	27 (2.3)	
International Avg.	**26 (0.3)**	
Croatia	26 (1.9)	
2 Spain	25 (1.9)	
Australia	25 (2.0)	
Saudi Arabia	25 (2.0)	
Japan	23 (1.8)	
Poland	23 (1.7)	
United Arab Emirates	23 (1.1)	▼
2 Lithuania	23 (2.5)	
2 Bahrain	20 (1.9)	▼
3 Serbia	20 (2.6)	▼
Chile	18 (1.7)	▼
Indonesia	16 (2.1)	▼
Kuwait	16 (1.8)	▼
Slovenia	15 (2.1)	▼
2 Italy	15 (1.6)	▼
2 Portugal	14 (1.3)	▼
Oman	13 (1.0)	▼
Morocco	12 (2.0)	▼
Cyprus	11 (1.4)	▼
Qatar	11 (1.4)	▼
France	9 (1.4)	▼
Iran, Islamic Rep. of	8 (1.5)	▼
Turkey	6 (1.0)	▼
1 Georgia	6 (1.6)	▼

Content Domain: Physical Science
Cognitive Domain: Knowing
Description: Names the force that moves an object down a sloping track

Marcus puts a marble at the top of a sloping track as shown below.



The marble rolls down the track.

Name the force that moves the marble. Gravity

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

Country	Percent Full Credit	
Benchmarking Participants		
Ontario, Canada	37 (1.8)	▲
1 Florida, US	36 (3.3)	▲
Dubai, UAE	30 (2.1)	
Norway (4)	28 (2.3)	
2 Abu Dhabi, UAE	20 (1.7)	▼
‡ Quebec, Canada	18 (2.8)	▼
Buenos Aires, Argentina	13 (1.9)	▼

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

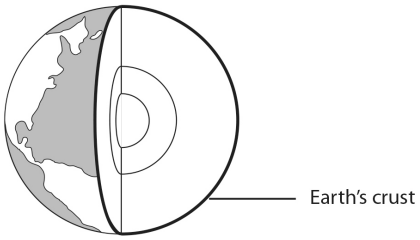
See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 for sampling guidelines and sampling participation notes †, ‡, and ‡.
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

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

Exhibit 2.7.5: Advanced International Benchmark – Example Item 5

Country	Percent Full Credit	
Norway (5)	52 (2.1)	▲
Finland	50 (2.4)	▲
Ireland	45 (3.1)	▲
Australia	43 (2.3)	▲
2 † United States	41 (1.4)	▲
Germany	40 (2.1)	▲
† Belgium (Flemish)	39 (2.0)	▲
2 † Denmark	39 (2.2)	▲
† Netherlands	39 (2.6)	▲
2 Sweden	38 (2.3)	▲
‡ Northern Ireland	37 (2.5)	▲
Russian Federation	37 (2.5)	▲
New Zealand	37 (1.6)	▲
Bulgaria	36 (3.0)	▲
Croatia	33 (2.3)	▲
Slovenia	32 (2.3)	▲
2 Lithuania	32 (2.5)	
† Hong Kong SAR	32 (3.0)	
Hungary	31 (1.8)	
Czech Republic	31 (2.3)	
2 Singapore	30 (1.8)	
Turkey	30 (1.8)	
Korea, Rep. of	29 (2.0)	
Japan	29 (1.8)	
1 2 † Canada	29 (1.2)	
International Avg.	**28 (0.3)**	
2 Portugal	27 (1.7)	
Chinese Taipei	26 (1.7)	
Cyprus	26 (1.7)	
2 Spain	26 (2.1)	
Poland	26 (2.3)	
England	25 (2.0)	
3 Serbia	24 (2.4)	
2 Italy	22 (2.5)	▼
Kazakhstan	21 (2.1)	▼
2 Bahrain	21 (2.1)	▼
Oman	20 (1.2)	▼
Slovak Republic	18 (1.7)	▼
Chile	18 (1.7)	▼
United Arab Emirates	17 (1.0)	▼
Qatar	15 (1.5)	▼
Saudi Arabia	14 (1.8)	▼
1 Georgia	13 (1.8)	▼
France	13 (1.7)	▼
Kuwait	12 (2.0)	▼
Iran, Islamic Rep. of	6 (1.2)	▼
Morocco	5 (1.0)	▼
Indonesia	3 (0.9)	▼

Content Domain: Earth Science
Cognitive Domain: Knowing
Description: States two things that make up Earth's crust



The picture shows the structure of Earth. The outer layer is called the crust.

Name two things that make up the crust.

1. rocks

2. dirt

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

Country	Percent Full Credit	
Benchmarking Participants		
Norway (4)	42 (2.6)	▲
1 Florida, US	36 (4.2)	
Ontario, Canada	30 (1.8)	
Dubai, UAE	28 (1.3)	
‡ Quebec, Canada	25 (2.4)	
2 Abu Dhabi, UAE	13 (2.0)	▼
Buenos Aires, Argentina	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.

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 SCIENCE

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

Achievement by Content Domains

Within science, TIMSS at the fourth grade provided results for three content domains—Life Science, Physical Science, and Earth Science. Most countries demonstrated strengths in one or two content domains compared to science achievement overall, and weaknesses in one or two content domains.

TIMSS 2015: 47 Countries

Life Science

Relative Strength: **16** Countries

Relative Weakness: **11** Countries

Physical Science

Relative Strength: **15** Countries

Relative Weakness: **23** Countries

Earth Science

Relative Strength: **7** Countries

Relative Weakness: **27** Countries

Trends 2011–2015: 41 Countries

	Countries Improved	Countries Declined
Life Science	20	8
Physical Science	15	7
Earth Science	15	9

Differences in Achievement by Gender in the Content Domains

Achievement differences in content domain by gender showed a large advantage for girls in Life Science. Boys had a larger advantage in Physical Science and Earth Science.

Number of Countries Where Boys Outperformed Girls in the Content Domains

- 0 Life Science
- 14 Physical Science
- 19 Earth Science

Number of Countries Where Girls Outperformed Boys in the Content Domains

- 25 Life Science
- 6 Physical Science
- 5 Earth Science

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 science achievement overall.

TIMSS 2015: 47 Countries

Knowing

Relative Strength: **11** Countries

Relative Weakness: **12** Countries

Applying

Relative Strength: **12** Countries

Relative Weakness: **8** Countries

Reasoning

Relative Strength: **9** Countries

Relative Weakness: **15** Countries

Trends 2011–2015: 41 Countries

	Countries Improved	Countries Declined
Knowing	16	9
Applying	18	7
Reasoning	18	8

Differences in Achievement by Gender in the Cognitive Domains

Number of Countries Where Boys Outperformed Girls in the Cognitive Domains

- 17 Knowing
- 8 Applying
- 1 Reasoning

Number of Countries Where Girls Outperformed Boys in the Cognitive Domains

- 7 Knowing
- 10 Applying
- 24 Reasoning

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

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

Exhibit 3.1: Achievement in Science Content Domains

Country	Overall Science Average Scale Score	Life Science (74 items)		Physical Science (61 items)		Earth Science (33 items)	
		Average Scale Score	Difference from Overall Science Score	Average Scale Score	Difference from Overall Science Score	Average Scale Score	Difference from Overall Science Score
[2] Singapore	590 (3.7)	607 (4.4)	16 (1.4) ▲	603 (3.7)	13 (1.1) ▲	546 (3.7)	-44 (1.4) ▼
Korea, Rep. of	589 (2.0)	581 (1.9)	-8 (1.1) ▼	597 (2.0)	8 (1.5) ▲	591 (4.1)	1 (3.9)
Japan	569 (1.8)	556 (2.2)	-13 (1.5) ▼	587 (2.6)	18 (2.6) ▲	563 (2.5)	-6 (1.4) ▼
Russian Federation	567 (3.2)	569 (3.1)	2 (1.4)	567 (3.6)	0 (2.2)	562 (4.7)	-5 (2.8)
† Hong Kong SAR	557 (2.9)	550 (3.7)	-6 (1.6) ▼	555 (3.5)	-2 (2.1)	574 (3.1)	18 (1.7) ▲
Chinese Taipei	555 (1.8)	545 (2.0)	-11 (1.4) ▼	568 (2.0)	13 (1.5) ▲	555 (2.5)	0 (1.8)
Finland	554 (2.3)	556 (2.6)	2 (2.0)	547 (2.3)	-7 (1.6) ▼	560 (2.6)	6 (2.1) ▲
Kazakhstan	550 (4.4)	545 (4.1)	-5 (1.3) ▼	559 (5.0)	9 (1.9) ▲	542 (5.4)	-8 (2.5) ▼
Poland	547 (2.4)	557 (2.5)	9 (1.8) ▲	540 (2.1)	-7 (1.5) ▼	540 (2.6)	-7 (1.3) ▼
[2] † United States	546 (2.2)	555 (2.3)	10 (1.0) ▲	537 (2.6)	-8 (1.1) ▼	539 (2.4)	-7 (1.3) ▼
Slovenia	543 (2.4)	545 (2.3)	2 (2.0)	546 (2.4)	4 (2.2)	531 (4.1)	-12 (2.2) ▼
Hungary	542 (3.3)	550 (3.4)	8 (1.0) ▲	534 (3.5)	-8 (0.9) ▼	535 (4.0)	-7 (2.6) ▼
[2] Sweden	540 (3.6)	540 (3.3)	0 (1.3)	534 (3.6)	-6 (1.5) ▼	552 (4.1)	12 (2.3) ▲
Norway (5)	538 (2.6)	546 (2.6)	8 (1.2) ▲	522 (2.8)	-16 (1.8) ▼	549 (3.8)	12 (2.2) ▲
England	536 (2.4)	536 (2.5)	0 (1.4)	540 (2.7)	4 (1.8) ▲	527 (3.3)	-8 (2.0) ▼
Bulgaria	536 (5.9)	542 (6.3)	6 (1.9) ▲	529 (6.5)	-6 (2.0) ▼	532 (6.9)	-4 (3.6)
Czech Republic	534 (2.4)	538 (2.0)	4 (1.6) ▲	531 (2.4)	-4 (1.4) ▼	531 (3.0)	-3 (1.5) ▼
Croatia	533 (2.1)	531 (2.6)	-3 (1.4)	535 (2.9)	2 (2.0)	535 (3.4)	2 (2.3)
Ireland	529 (2.4)	531 (2.4)	2 (1.5)	524 (2.8)	-5 (1.7) ▼	535 (3.0)	6 (2.1) ▲
Germany	528 (2.4)	528 (2.0)	-1 (1.2)	532 (2.5)	4 (2.0)	519 (4.0)	-10 (2.9) ▼
[2] Lithuania	528 (2.5)	527 (3.0)	-1 (2.5)	535 (2.5)	7 (2.0) ▲	515 (3.7)	-12 (2.5) ▼
[2] † Denmark	527 (2.1)	534 (2.4)	7 (1.6) ▲	516 (2.7)	-11 (1.6) ▼	531 (3.0)	3 (2.2)
[1 2] † Canada	525 (2.6)	536 (2.8)	11 (1.1) ▲	518 (2.7)	-7 (0.9) ▼	513 (3.1)	-12 (2.0) ▼
[3] Serbia	525 (3.7)	531 (3.8)	6 (2.2) ▲	529 (3.8)	4 (2.1) ▲	496 (4.8)	-29 (2.8) ▼
Australia	524 (2.9)	531 (3.0)	8 (1.4) ▲	516 (2.7)	-8 (1.1) ▼	520 (3.3)	-4 (1.9) ▼
Slovak Republic	520 (2.6)	517 (2.9)	-3 (1.6)	526 (3.4)	5 (2.1) ▲	514 (3.0)	-7 (1.5) ▼
‡ Northern Ireland	520 (2.2)	521 (2.7)	1 (1.7)	514 (2.6)	-6 (1.6) ▼	522 (3.0)	2 (2.1)
[2] Spain	518 (2.6)	523 (2.6)	5 (1.9) ▲	507 (2.9)	-11 (1.5) ▼	520 (3.0)	2 (2.1)
† Netherlands	517 (2.7)	525 (2.7)	8 (1.8) ▲	504 (2.6)	-13 (1.3) ▼	520 (3.0)	3 (2.2)
[2] Italy	516 (2.6)	519 (2.7)	3 (1.9)	513 (2.9)	-4 (1.5) ▼	510 (3.5)	-6 (2.5) ▼
† Belgium (Flemish)	512 (2.3)	513 (2.4)	1 (1.1)	506 (3.2)	-6 (2.0) ▼	513 (2.8)	1 (1.2)
[2] Portugal	508 (2.2)	508 (2.1)	0 (0.9)	502 (2.9)	-6 (2.0) ▼	513 (2.5)	5 (1.8) ▲
New Zealand	506 (2.7)	511 (2.7)	6 (1.4) ▲	497 (2.5)	-8 (1.2) ▼	506 (3.4)	0 (2.0)
France	487 (2.7)	490 (3.1)	2 (1.3)	482 (2.7)	-6 (0.9) ▼	485 (4.7)	-3 (2.8)
Turkey	483 (3.3)	472 (3.3)	-11 (1.1) ▼	496 (3.3)	12 (1.5) ▲	480 (3.3)	-4 (1.6) ▼
Cyprus	481 (2.6)	481 (2.8)	0 (0.9)	486 (2.7)	5 (1.2) ▲	463 (3.5)	-19 (1.7) ▼
Chile	478 (2.7)	487 (2.6)	10 (1.2) ▲	466 (2.9)	-12 (2.2) ▼	465 (3.4)	-13 (2.4) ▼
[2] Bahrain	459 (2.6)	455 (2.9)	-4 (1.6) ▼	465 (3.2)	6 (1.6) ▲	448 (3.2)	-11 (3.2) ▼
[1] Georgia	451 (3.7)	459 (4.1)	8 (1.6) ▲	438 (4.7)	-13 (1.7) ▼	441 (4.3)	-10 (1.6) ▼
United Arab Emirates	451 (2.8)	449 (3.3)	-2 (1.2)	453 (3.0)	2 (0.7) ▲	448 (3.5)	-3 (1.7) ▼
Qatar	436 (4.1)	436 (4.4)	0 (1.7)	435 (4.7)	-1 (2.4)	427 (5.0)	-9 (3.5) ▼
Oman	431 (3.1)	426 (3.2)	-5 (2.1) ▼	435 (3.4)	4 (1.8) ▲	423 (3.5)	-8 (2.4) ▼
Iran, Islamic Rep. of	421 (4.0)	417 (4.5)	-4 (2.7)	423 (5.0)	2 (2.2)	408 (4.8)	-13 (3.7) ▼
Indonesia	397 (4.8)	387 (5.1)	-10 (1.9) ▼	405 (5.5)	8 (2.0) ▲	384 (5.6)	-13 (2.8) ▼
Saudi Arabia	390 (4.9)	382 (4.9)	-9 (2.4) ▼	390 (5.5)	-1 (2.0)	395 (4.8)	4 (1.9) ▲
Ψ Morocco	352 (4.7)	350 (4.3)	-2 (1.9)	357 (5.9)	5 (3.1)	289 (6.6)	-63 (3.4) ▼
Ψ Kuwait	337 (6.2)	331 (6.6)	-6 (2.8) ▼	325 (6.5)	-12 (3.6) ▼	333 (6.4)	-4 (5.4)

▲ Subscale score significantly higher than overall science score

▼ Subscale score significantly lower than overall science score

Numbers of items are based on the TIMSS 2015 fourth grade science 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 3.1: Achievement in Science Content Domains (Continued)

Country	Overall Science Average Scale Score	Life Science (74 items)		Physical Science (61 items)		Earth Science (33 items)	
		Average Scale Score	Difference from Overall Science Score	Average Scale Score	Difference from Overall Science Score	Average Scale Score	Difference from Overall Science Score
Benchmarking Participants							
[1] Florida, US	549 (4.8)	558 (5.1)	10 (1.5) ▲	542 (5.2)	-7 (1.3) ▼	539 (6.5)	-10 (3.6) ▼
Ontario, Canada	530 (2.5)	544 (2.6)	14 (1.0) ▲	522 (2.5)	-8 (1.2) ▼	515 (3.7)	-16 (2.6) ▼
‡ Quebec, Canada	525 (4.1)	533 (4.3)	8 (1.6) ▲	519 (4.9)	-5 (2.0) ▼	515 (4.4)	-9 (2.3) ▼
Dubai, UAE	518 (1.8)	518 (2.6)	0 (1.7)	521 (2.2)	3 (1.4)	510 (2.9)	-8 (2.4) ▼
Norway (4)	493 (2.2)	502 (2.4)	9 (1.1) ▲	475 (2.8)	-18 (1.7) ▼	498 (3.7)	5 (2.7)
Buenos Aires, Argentina	418 (4.7)	426 (4.0)	8 (2.0) ▲	413 (3.9)	-5 (2.3) ▼	391 (5.7)	-27 (3.1) ▼
[2] Abu Dhabi, UAE	415 (5.6)	413 (6.0)	-2 (1.6)	413 (5.9)	-2 (1.8)	408 (6.9)	-7 (3.1) ▼

▲ Subscale score significantly higher than overall science score

▼ Subscale score significantly lower than overall science score

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

Exhibit 3.3: Achievement in Science Cognitive Domains

Country	Overall Science Average Scale Score	Knowing (67 items)		Applying (66 items)		Reasoning (35 items)	
		Average Scale Score	Difference from Overall Science Score	Average Scale Score	Difference from Overall Science Score	Average Scale Score	Difference from Overall Science Score
[2] Singapore	590 (3.7)	574 (4.1)	-16 (1.3) ▼	599 (4.0)	9 (1.3) ▲	605 (3.6)	15 (1.8) ▲
Korea, Rep. of	589 (2.0)	582 (2.2)	-8 (1.2) ▼	594 (1.9)	4 (1.8) ▲	594 (2.2)	5 (1.6) ▲
Japan	569 (1.8)	544 (2.3)	-25 (1.3) ▼	576 (1.8)	7 (0.8) ▲	594 (1.8)	25 (1.6) ▲
Russian Federation	567 (3.2)	569 (3.9)	1 (1.9)	568 (3.3)	1 (1.3)	561 (3.8)	-7 (2.5) ▼
† Hong Kong SAR	557 (2.9)	562 (3.0)	5 (1.9) ▲	554 (3.3)	-3 (1.6)	552 (4.1)	-4 (2.5)
Chinese Taipei	555 (1.8)	557 (2.5)	2 (1.6)	553 (2.6)	-2 (1.8)	558 (3.1)	3 (2.3)
Finland	554 (2.3)	556 (3.1)	2 (1.6)	553 (2.4)	-1 (1.9)	552 (2.3)	-2 (1.5)
Kazakhstan	550 (4.4)	551 (5.0)	1 (2.4)	547 (4.6)	-3 (2.1)	552 (4.5)	2 (1.5)
Poland	547 (2.4)	544 (2.5)	-4 (1.1) ▼	554 (2.8)	7 (2.2) ▲	542 (3.2)	-5 (2.0) ▼
[2] † United States	546 (2.2)	548 (2.5)	2 (0.7) ▲	546 (2.2)	0 (1.3)	542 (2.7)	-4 (1.4) ▼
Slovenia	543 (2.4)	541 (2.6)	-2 (1.4)	546 (2.9)	3 (1.9)	538 (2.7)	-4 (2.2) ▼
Hungary	542 (3.3)	550 (3.8)	8 (1.2) ▲	539 (3.4)	-3 (1.1) ▼	533 (3.9)	-9 (1.6) ▼
[2] Sweden	540 (3.6)	538 (3.8)	-2 (1.1)	540 (3.4)	0 (1.5)	542 (3.8)	2 (3.0)
Norway (5)	538 (2.6)	533 (3.0)	-5 (1.6) ▼	542 (2.9)	4 (1.0) ▲	537 (3.8)	-1 (2.8)
England	536 (2.4)	533 (2.6)	-3 (1.3)	538 (2.7)	2 (1.3)	539 (2.7)	3 (1.7)
Bulgaria	536 (5.9)	551 (6.5)	15 (2.2) ▲	536 (6.2)	0 (1.2)	507 (6.4)	-29 (1.5) ▼
Czech Republic	534 (2.4)	545 (3.0)	10 (1.9) ▲	528 (2.1)	-6 (1.6) ▼	529 (2.4)	-6 (1.4) ▼
Croatia	533 (2.1)	534 (2.9)	1 (1.7)	530 (2.2)	-3 (1.7)	536 (2.4)	2 (2.5)
Ireland	529 (2.4)	529 (2.5)	0 (1.0)	530 (2.5)	1 (1.5)	526 (2.9)	-3 (2.0)
Germany	528 (2.4)	527 (2.8)	-1 (1.5)	529 (2.4)	0 (1.0)	532 (2.3)	3 (1.8)
[2] Lithuania	528 (2.5)	524 (3.0)	-4 (2.4)	526 (2.4)	-1 (1.2)	538 (3.0)	10 (2.4) ▲
[2] † Denmark	527 (2.1)	524 (2.6)	-3 (1.7)	529 (2.4)	2 (1.3)	526 (2.9)	-1 (2.7)
[1 2] † Canada	525 (2.6)	523 (3.1)	-2 (1.8)	528 (2.6)	3 (0.9) ▲	524 (2.6)	0 (1.3)
[3] Serbia	525 (3.7)	527 (3.9)	2 (1.4)	522 (4.5)	-3 (1.8)	521 (3.9)	-4 (2.9)
Australia	524 (2.9)	523 (3.3)	-1 (1.7)	522 (2.7)	-1 (1.3)	527 (3.0)	4 (1.6) ▲
Slovak Republic	520 (2.6)	530 (3.3)	9 (1.5) ▲	517 (2.8)	-4 (1.1) ▼	507 (3.4)	-13 (2.3) ▼
‡ Northern Ireland	520 (2.2)	518 (2.9)	-1 (1.7)	519 (2.9)	-1 (1.9)	520 (2.6)	0 (1.7)
[2] Spain	518 (2.6)	522 (3.3)	4 (2.0) ▲	514 (3.3)	-4 (2.0) ▼	517 (2.6)	-2 (1.2)
† Netherlands	517 (2.7)	508 (2.4)	-9 (1.3) ▼	519 (2.4)	2 (1.4)	526 (2.9)	9 (2.3) ▲
[2] Italy	516 (2.6)	521 (3.1)	4 (1.4) ▲	513 (3.1)	-3 (1.3) ▼	511 (3.5)	-5 (2.2) ▼
† Belgium (Flemish)	512 (2.3)	498 (2.7)	-14 (1.3) ▼	513 (2.5)	2 (0.9) ▲	526 (2.9)	14 (2.0) ▲
[2] Portugal	508 (2.2)	507 (2.9)	-1 (2.5)	508 (1.9)	0 (1.8)	506 (1.9)	-2 (2.4)
New Zealand	506 (2.7)	504 (2.8)	-2 (2.2)	502 (3.1)	-3 (1.5) ▼	514 (2.4)	8 (1.0) ▲
France	487 (2.7)	482 (3.8)	-6 (2.0) ▼	494 (3.1)	6 (1.6) ▲	481 (2.8)	-6 (1.4) ▼
Turkey	483 (3.3)	478 (3.0)	-6 (1.2) ▼	486 (3.1)	3 (1.3) ▲	483 (3.3)	0 (1.7)
Cyprus	481 (2.6)	467 (3.2)	-14 (2.1) ▼	489 (3.4)	8 (1.9) ▲	490 (3.6)	8 (2.6) ▲
Chile	478 (2.7)	477 (3.2)	0 (1.9)	476 (3.0)	-2 (1.4)	477 (2.5)	-1 (2.5)
[2] Bahrain	459 (2.6)	456 (2.5)	-3 (1.8)	462 (3.0)	3 (2.0)	455 (3.0)	-4 (2.1)
[1] Georgia	451 (3.7)	460 (4.2)	8 (1.6) ▲	449 (4.8)	-2 (2.2)	426 (4.0)	-26 (1.6) ▼
United Arab Emirates	451 (2.8)	453 (3.3)	2 (1.0) ▲	452 (3.2)	1 (1.0)	444 (3.0)	-7 (1.2) ▼
Qatar	436 (4.1)	437 (4.5)	1 (2.5)	430 (4.7)	-6 (1.8) ▼	433 (4.4)	-3 (2.2)
Oman	431 (3.1)	422 (3.2)	-9 (2.1) ▼	435 (2.9)	4 (1.7) ▲	431 (3.0)	0 (1.3)
Iran, Islamic Rep. of	421 (4.0)	416 (4.1)	-5 (2.4)	417 (4.5)	-4 (3.3)	422 (4.9)	1 (2.5)
Indonesia	397 (4.8)	397 (4.9)	1 (2.4)	392 (5.3)	-5 (3.0)	390 (5.5)	-7 (1.9) ▼
Saudi Arabia	390 (4.9)	394 (5.3)	4 (2.5)	388 (4.7)	-3 (2.3)	365 (5.4)	-25 (4.2) ▼
Ψ Morocco	352 (4.7)	331 (5.6)	-21 (2.4) ▼	357 (4.7)	5 (1.9) ▲	354 (4.7)	2 (2.4)
Ψ Kuwait	337 (6.2)	343 (6.4)	6 (2.4) ▲	324 (7.3)	-13 (3.2) ▼	297 (8.1)	-40 (4.4) ▼

▲ Subscale score significantly higher than overall science score

▼ Subscale score significantly lower than overall science score

Numbers of items are based on the TIMSS 2015 fourth grade science 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 Science Cognitive Domains (Continued)

Country	Overall Science Average Scale Score	Knowing (67 items)		Applying (66 items)		Reasoning (35 items)	
		Average Scale Score	Difference from Overall Science Score	Average Scale Score	Difference from Overall Science Score	Average Scale Score	Difference from Overall Science Score
Benchmarking Participants							
[1] Florida, US	549 (4.8)	553 (5.7)	5 (2.9)	550 (4.9)	1 (1.5)	541 (5.8)	-8 (3.2) ▼
Ontario, Canada	530 (2.5)	527 (2.8)	-3 (1.8)	534 (2.5)	4 (1.1) ▲	529 (2.8)	-1 (1.3)
‡ Quebec, Canada	525 (4.1)	524 (4.3)	-1 (2.2)	525 (4.5)	1 (2.0)	526 (4.6)	2 (3.5)
Dubai, UAE	518 (1.8)	523 (2.3)	5 (1.4) ▲	517 (2.8)	-1 (1.8)	510 (2.9)	-8 (2.1) ▼
Norway (4)	493 (2.2)	495 (3.0)	2 (2.3)	494 (2.4)	1 (1.0)	482 (3.2)	-11 (2.4) ▼
Buenos Aires, Argentina	418 (4.7)	417 (4.4)	-1 (1.9)	416 (4.6)	-1 (2.6)	416 (5.0)	-2 (5.4)
[2] Abu Dhabi, UAE	415 (5.6)	410 (6.6)	-4 (2.1) ▼	417 (5.9)	2 (1.9)	412 (5.3)	-3 (2.0)

▲ Subscale score significantly higher than overall science score

▼ Subscale score significantly lower than overall science score

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

Exhibit 3.5: Differences in Achievement for Science 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	Life Science Average Scale Score	Life Science Differences Between Years		Physical Science Average Scale Score	Physical Science Differences Between Years		Earth Science Average Scale Score	Earth Science Differences Between Years	
		2011	2007		2011	2007		2011	2007
Australia									
2015	531 (3.0)	15 ▲	2	516 (2.7)	2	-5	520 (3.3)	0	-16 ▼
2011	516 (3.1)		-14 ▼	514 (3.1)		-7	520 (3.6)		-17 ▼
2007	529 (3.6)			521 (3.8)			536 (4.2)		
Bahrain									
[2] 2015	455 (2.9)	11 ▲		465 (3.2)	12 ▲		448 (3.2)	3	
2011	444 (4.2)			453 (4.6)			445 (3.7)		
Belgium (Flemish)									
† 2015	513 (2.4)	3		506 (3.2)	-1		513 (2.8)	8	
2011	510 (2.5)			507 (2.1)			505 (2.9)		
Chile									
2015	487 (2.6)	-2		466 (2.9)	-5		465 (3.4)	-10 ▼	
2011	490 (2.2)			471 (2.5)			475 (2.8)		
Chinese Taipei									
2015	545 (2.0)	7 ▲	-2	568 (2.0)	0	5	555 (2.5)	3	-8 ▼
2011	538 (2.5)		-9 ▼	569 (2.1)		5	553 (2.6)		-10 ▼
2007	547 (2.7)			564 (2.4)			563 (2.9)		
Croatia									
2015	531 (2.6)	6		535 (2.9)	33 ▲		535 (3.4)	14 ▲	
[2] 2011	525 (2.0)			502 (2.7)			521 (2.7)		
Czech Republic									
2015	538 (2.0)	-12 ▼	16 ▲	531 (2.4)	11 ▲	22 ▲	531 (3.0)	-6	18 ▲
2011	550 (3.0)		27 ▲	519 (3.1)		10 ▲	537 (3.2)		24 ▲
2007	522 (3.4)			509 (3.5)			514 (3.6)		
Denmark									
[2] † 2015	534 (2.4)	4	7	516 (2.7)	-10 ▼	14 ▲	531 (3.0)	4	12 ▲
[2] 2011	530 (2.7)		3	526 (2.4)		24 ▲	527 (3.0)		8
† 2007	527 (3.4)			502 (3.1)			519 (3.3)		
England									
2015	536 (2.5)	6	0	540 (2.7)	5	-6	527 (3.3)	5	-14 ▼
2011	530 (3.0)		-6	535 (3.4)		-10 ▼	522 (3.8)		-19 ▼
2007	536 (3.1)			546 (3.2)			542 (3.4)		
Finland									
2015	556 (2.6)	-18 ▼		547 (2.3)	-21 ▼		560 (2.6)	-5	
2011	574 (2.8)			568 (2.9)			566 (2.8)		
Georgia									
[1] 2015	459 (4.1)	-2	37 ▲	438 (4.7)	-2	35 ▲	441 (4.3)	-17 ▼	25 ▲
[1] 2011	461 (3.7)		39 ▲	440 (4.2)		37 ▲	458 (4.2)		42 ▲
[1] 2007	421 (4.2)			403 (4.9)			416 (5.6)		
Germany									
2015	528 (2.0)	3	-3	532 (2.5)	-3	6	519 (4.0)	-1	-5
2011	525 (2.7)		-6	535 (3.1)		8	520 (3.8)		-4
2007	531 (2.2)			527 (3.2)			524 (2.8)		
Hong Kong SAR									
† 2015	550 (3.7)	26 ▲	10	555 (3.5)	16 ▲	-7	574 (3.1)	26 ▲	6
[2] 2011	524 (3.9)		-16 ▼	539 (4.5)		-23 ▼	548 (3.4)		-20 ▼
2007	540 (3.8)			562 (3.9)			568 (4.2)		
Hungary									
2015	550 (3.4)	-1	-2	534 (3.5)	13 ▲	5	535 (4.0)	11	18 ▲
2011	552 (3.4)		-1	520 (3.7)		-8	524 (4.4)		7
2007	553 (3.3)			529 (3.7)			517 (4.4)		

▲ 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 3.5: Differences in Achievement for Science 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	Life Science Average Scale Score	Life Science Differences Between Years		Physical Science Average Scale Score	Physical Science Differences Between Years		Earth Science Average Scale Score	Earth Science Differences Between Years	
		2011	2007		2011	2007		2011	2007
Iran, Islamic Rep. of									
2015	417 (4.5)	-31 ▼	-20 ▼	423 (5.0)	-30 ▼	-16 ▼	408 (4.8)	-49 ▼	-8
2011	449 (4.0)		11	453 (3.9)		13 ▲	457 (3.6)		40 ▲
2007	437 (5.1)			440 (4.8)			416 (5.0)		
Ireland									
2015	531 (2.4)	18 ▲		524 (2.8)	7		535 (3.0)	15 ▲	
2011	513 (3.5)			517 (3.0)			520 (3.8)		
Italy									
[2] 2015	519 (2.7)	-16 ▼	-36 ▼	513 (2.9)	4	-7	510 (3.5)	-13 ▼	-16 ▼
2011	535 (2.8)		-20 ▼	509 (3.1)		-11 ▼	523 (3.7)		-3
2007	555 (3.7)			520 (3.6)			527 (4.2)		
Japan									
2015	556 (2.2)	16 ▲	20 ▲	587 (2.6)	-2	16 ▲	563 (2.5)	12 ▲	31 ▲
2011	540 (1.9)		4	589 (2.0)		18 ▲	551 (1.8)		20 ▲
2007	536 (2.3)			571 (2.8)			532 (3.5)		
Kazakhstan									
2015	545 (4.1)	45 ▲		559 (5.0)	73 ▲		542 (5.4)	51 ▲	
[2] 2011	500 (5.2)			486 (5.3)			491 (5.9)		
Korea, Rep. of									
2015	581 (1.9)	11 ▲		597 (2.0)	1		591 (4.1)	-12 ▼	
2011	571 (2.2)			597 (2.6)			603 (2.0)		
Kuwait									
ψ 2015	310 (5.6)	-12		303 (5.3)	-46 ▼		312 (5.9)	-40 ▼	
[1] ψ 2011	323 (4.9)			348 (4.6)			352 (4.8)		
Lithuania									
[2] 2015	529 (3.1)	9 ▲	11 ▲	538 (2.8)	24 ▲	26 ▲	517 (3.9)	17 ▲	9
[1 2] 2011	520 (3.0)		2	514 (3.1)		3	501 (3.0)		-8
[1] 2007	518 (2.2)			511 (2.1)			508 (2.8)		
Morocco									
ψ 2015	350 (4.3)	106 ▲		357 (5.9)	101 ▲		289 (6.6)	81 ▲	
Ж 2011	245 (4.6)			256 (5.4)			208 (4.9)		
Netherlands									
† 2015	525 (2.7)	-11 ▼	-14 ▼	504 (2.6)	-22 ▼	0	520 (3.0)	-5	-4
† 2011	537 (1.9)		-3	526 (2.0)		22 ▲	525 (2.8)		1
‡ 2007	539 (2.6)			503 (3.2)			524 (3.5)		
New Zealand									
2015	511 (2.7)	14 ▲	5	497 (2.5)	4	3	506 (3.4)	7	-7
2011	497 (2.5)		-8 ▼	493 (2.7)		-1	499 (3.1)		-14 ▼
2007	506 (2.7)			494 (3.3)			513 (3.5)		
Northern Ireland									
‡ 2015	521 (2.7)	3		514 (2.6)	-6		522 (3.0)	15 ▲	
† 2011	519 (2.9)			520 (3.2)			507 (2.7)		
Norway (4)									
2015	502 (2.4)	6	20 ▲	475 (2.8)	-8	14 ▲	498 (3.7)	-8	8
‡ 2011	496 (3.1)		13 ▲	482 (3.4)		21 ▲	506 (3.3)		17 ▲
2007	482 (2.8)			461 (3.5)			490 (3.7)		
Oman									
2015	426 (3.2)	56 ▲		435 (3.4)	65 ▲		423 (3.5)	53 ▲	
2011	370 (3.9)			370 (4.8)			371 (4.7)		
Portugal									
[2] 2015	508 (2.1)	-13 ▼		502 (2.9)	-15 ▼		513 (2.5)	-18 ▼	
2011	520 (4.2)			517 (4.1)			531 (4.3)		
Qatar									
2015	436 (4.4)	53 ▲		435 (4.7)	39 ▲		427 (5.0)	26 ▲	
[2] 2011	383 (5.1)			397 (5.0)			401 (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 Science 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	Life Science Average Scale Score	Life Science Differences Between Years		Physical Science Average Scale Score	Physical Science Differences Between Years		Earth Science Average Scale Score	Earth Science Differences Between Years	
		2011	2007		2011	2007		2011	2007
Russian Federation									
2015	569 (3.1)	13 ▲	24 ▲	567 (3.6)	19 ▲	15 ▲	562 (4.7)	10	21 ▲
2011	556 (3.7)		12	548 (4.0)		-4	552 (4.0)		11
2007	545 (4.7)			552 (5.6)			541 (5.6)		
Saudi Arabia									
2015	382 (4.9)	-33 ▼		390 (5.5)	-49 ▼		395 (4.8)	-37 ▼	
2011	415 (6.2)			439 (5.9)			432 (6.1)		
Serbia									
[3] 2015	531 (3.8)	13 ▲		529 (3.8)	6		496 (4.8)	-1	
[2] 2011	518 (3.0)			523 (3.8)			497 (3.6)		
Singapore									
[2] 2015	607 (4.4)	9	12	603 (3.7)	5	6	546 (3.7)	5	-18 ▼
[2] 2011	597 (4.4)		3	598 (3.6)		2	541 (3.1)		-24 ▼
2007	595 (4.8)			597 (4.3)			565 (4.1)		
Slovak Republic									
2015	517 (2.9)	-16 ▼	-18 ▼	526 (3.4)	-2	14 ▲	514 (3.0)	-22 ▼	-18 ▼
2011	534 (3.7)		-1	527 (4.1)		15 ▲	535 (4.0)		3
2007	535 (4.7)			512 (4.9)			532 (6.5)		
Slovenia									
2015	545 (2.3)	21 ▲	34 ▲	546 (2.4)	23 ▲	18 ▲	531 (4.1)	25 ▲	15 ▲
2011	524 (2.7)		13 ▲	524 (3.1)		-5	506 (2.7)		-10 ▼
2007	511 (2.1)			528 (2.3)			516 (3.2)		
Spain									
[2] 2015	523 (2.6)	10 ▲		507 (2.9)	10 ▲		520 (3.0)	21 ▲	
2011	513 (3.0)			497 (2.9)			499 (3.7)		
Sweden									
[2] 2015	540 (3.3)	6	8	534 (3.6)	6	26 ▲	552 (4.1)	13 ▲	13 ▲
2011	534 (2.8)		2	528 (2.5)		19 ▲	538 (3.2)		-1
2007	532 (2.7)			509 (3.2)			539 (3.9)		
Turkey									
2015	472 (3.3)	12 ▲		496 (3.3)	29 ▲		480 (3.3)	24 ▲	
2011	460 (4.5)			466 (4.8)			456 (5.2)		
United Arab Emirates									
2015	449 (3.3)	29 ▲		453 (3.0)	25 ▲		448 (3.5)	13 ▲	
2011	420 (2.7)			429 (2.7)			435 (2.4)		
United States									
[2 †] 2015	555 (2.3)	8 ▲	12 ▲	537 (2.6)	-6	3	539 (2.4)	0	2
[2] 2011	547 (2.0)		3	544 (2.0)		9 ▲	539 (2.2)		2
[2 †] 2007	544 (2.8)			535 (3.1)			537 (3.2)		

▲ 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 Science 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	Life Science Average Scale Score	Life Science Differences Between Years		Physical Science Average Scale Score	Physical Science Differences Between Years		Earth Science Average Scale Score	Earth Science Differences Between Years	
		2011	2007		2011	2007		2011	2007
Benchmarking Participants									
Ontario, Canada									
2015	544 (2.6)	9 ▲	5	522 (2.5)	-6	-13 ▼	515 (3.7)	1	-18 ▼
2011	535 (3.4)		-4	528 (3.2)		-7	514 (3.7)		-19 ▼
2 2007	539 (3.9)			535 (3.4)			533 (4.2)		
Quebec, Canada									
‡ 2015	533 (4.3)	9	9	519 (4.9)	12 ▲	10	515 (4.4)	-1	-7
2011	524 (2.6)		0	507 (3.3)		-2	516 (3.4)		-6
2 2007	524 (3.0)			509 (3.3)			522 (2.9)		
Abu Dhabi, UAE									
2 2015	413 (6.0)	10		413 (5.9)	-2		408 (6.9)	-10	
2011	403 (5.6)			415 (5.2)			418 (5.1)		
Dubai, UAE									
2015	518 (2.6)	62 ▲	62 ▲	521 (2.2)	61 ▲	64 ▲	510 (2.9)	41 ▲	49 ▲
2011	455 (3.0)		-1	460 (3.1)		4	469 (3.0)		8
◆ ‡ 2007	456 (2.7)			456 (3.5)			461 (3.7)		
Florida, US									
1 2015	558 (5.1)	9		542 (5.2)	-1		539 (6.5)	2	
1 3 2011	549 (4.1)			542 (3.9)			537 (4.5)		

▲ 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 Science 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 Differences Between Years		Applying Average Scale Score	Applying Differences Between Years		Reasoning Average Scale Score	Reasoning Differences Between Years	
		2011	2007		2011	2007		2011	2007
Australia									
2015	523 (3.3)	5	-9	522 (2.7)	9 ▲	0	527 (3.0)	10 ▲	-1
2011	517 (2.8)		-14 ▼	513 (3.0)		-9	518 (3.4)		-11 ▼
2007	532 (3.5)			522 (3.8)			528 (4.2)		
Bahrain									
[2] 2015	456 (2.5)	2		462 (3.0)	18 ▲		455 (3.0)	13 ▲	
2011	454 (3.8)			443 (3.8)			442 (4.8)		
Belgium (Flemish)									
† 2015	498 (2.7)	-9 ▼		513 (2.5)	2		526 (2.9)	17 ▲	
2011	507 (2.2)			511 (1.9)			508 (2.6)		
Chile									
2015	477 (3.2)	-5		476 (3.0)	-4		477 (2.5)	0	
2011	483 (2.8)			479 (2.3)			477 (2.8)		
Chinese Taipei									
2015	557 (2.5)	15 ▲	13 ▲	553 (2.6)	1	-6	558 (3.1)	-10 ▼	-16 ▼
2011	542 (2.6)		-1	552 (3.2)		-7	568 (3.1)		-6
2007	544 (2.7)			560 (2.1)			574 (3.3)		
Croatia									
2015	534 (2.9)	9 ▲		530 (2.2)	20 ▲		536 (2.4)	23 ▲	
[2] 2011	526 (2.0)			510 (2.4)			512 (3.5)		
Czech Republic									
2015	545 (3.0)	-6	24 ▲	528 (2.1)	-6	13 ▲	529 (2.4)	12 ▲	21 ▲
2011	551 (3.2)		30 ▲	534 (2.7)		19 ▲	516 (3.9)		9
2007	521 (3.0)			515 (3.3)			507 (3.6)		
Denmark									
[2] † 2015	524 (2.6)	0	7	529 (2.4)	-2	16 ▲	526 (2.9)	-2	1
[2] 2011	524 (2.6)		7	532 (2.5)		19 ▲	527 (2.9)		3
† 2007	517 (3.3)			513 (3.4)			524 (4.4)		
England									
2015	533 (2.6)	5	-14 ▼	538 (2.7)	5	1	539 (2.7)	12 ▲	-1
2011	529 (3.4)		-19 ▼	532 (3.2)		-4	526 (4.5)		-14 ▼
2007	547 (3.3)			537 (3.4)			540 (2.8)		
Finland									
2015	556 (3.1)	-23 ▼		553 (2.4)	-15 ▼		552 (2.3)	-8 ▼	
2011	579 (2.5)			568 (2.4)			560 (3.0)		
Georgia									
[1] 2015	460 (4.2)	-6	31 ▲	449 (4.8)	-3	35 ▲	426 (4.0)	3	46 ▲
[1] 2011	466 (3.8)		37 ▲	452 (4.3)		38 ▲	422 (4.8)		43 ▲
[1] 2007	429 (4.3)			415 (4.7)			379 (6.1)		
Germany									
2015	527 (2.8)	3	-1	529 (2.4)	-4	3	532 (2.3)	6	6
2011	524 (4.0)		-4	533 (2.5)		7 ▲	526 (3.7)		1
2007	529 (2.4)			526 (2.5)			525 (2.8)		
Hong Kong SAR									
† 2015	562 (3.0)	25 ▲	9	554 (3.3)	25 ▲	1	552 (4.1)	11	-10
[2] 2011	537 (3.7)		-16 ▼	529 (3.5)		-24 ▼	541 (4.2)		-21 ▼
2007	553 (4.0)			552 (3.5)			563 (4.9)		
Hungary									
2015	550 (3.8)	4	6	539 (3.4)	9	7	533 (3.9)	8	5
2011	547 (3.7)		2	530 (3.5)		-2	525 (4.7)		-3
2007	544 (3.5)			532 (3.9)			528 (4.1)		

▲ 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 Science 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 Differences Between Years		Applying Average Scale Score	Applying Differences Between Years		Reasoning Average Scale Score	Reasoning Differences Between Years	
		2011	2007		2011	2007		2011	2007
Iran, Islamic Rep. of									
2015	416 (4.1)	-32 ▼	-15 ▼	417 (4.5)	-34 ▼	-25 ▼	422 (4.9)	-37 ▼	-5
2011	448 (4.2)		17 ▲	452 (3.8)		9	459 (3.8)		32 ▲
2007	431 (5.0)			443 (4.9)			427 (4.6)		
Ireland									
2015	529 (2.5)	11 ▲		530 (2.5)	13 ▲		526 (2.9)	17 ▲	
2011	518 (3.8)			517 (3.6)			509 (3.3)		
Italy									
[2] 2015	521 (3.1)	-11 ▼	-14 ▼	513 (3.1)	-10 ▼	-28 ▼	511 (3.5)	2	-12 ▼
2011	532 (3.1)		-3	523 (2.8)		-18 ▼	510 (2.9)		-14 ▼
2007	535 (4.1)			541 (3.3)			523 (3.5)		
Japan									
2015	544 (2.3)	6 ▲	9 ▲	576 (1.8)	14 ▲	31 ▲	594 (1.8)	3	21 ▲
2011	538 (1.8)		3	562 (1.6)		16 ▲	591 (1.9)		18 ▲
2007	534 (2.6)			546 (3.1)			573 (2.1)		
Kazakhstan									
2015	551 (5.0)	64 ▲		547 (4.6)	48 ▲		552 (4.5)	56 ▲	
[2] 2011	486 (5.4)			499 (5.2)			496 (5.8)		
Korea, Rep. of									
2015	582 (2.2)	12 ▲		594 (1.9)	0		594 (2.2)	-11 ▼	
2011	570 (2.1)			593 (2.0)			605 (3.0)		
Kuwait									
ψ 2015	322 (5.0)	-20 ▼		304 (5.8)	-30 ▼		266 (6.2)	-69 ▼	
[1] ψ 2011	342 (5.6)			334 (4.9)			336 (5.2)		
Lithuania									
[2] 2015	526 (3.2)	18 ▲	14 ▲	529 (2.5)	8 ▲	15 ▲	541 (3.3)	26 ▲	21 ▲
[1 2] 2011	508 (2.8)		-4	521 (2.5)		7	515 (2.7)		-5
[1] 2007	511 (2.3)			513 (3.3)			521 (2.9)		
Morocco									
ψ 2015	331 (5.6)	94 ▲		357 (4.7)	101 ▲		354 (4.7)	114 ▲	
Ж 2011	237 (6.0)			256 (4.9)			240 (5.1)		
Netherlands									
† 2015	508 (2.4)	-19 ▼	-12 ▼	519 (2.4)	-15 ▼	-6	526 (2.9)	-6	0
† 2011	528 (2.2)		7 ▲	534 (2.0)		10 ▲	532 (3.0)		6
‡ 2007	521 (2.7)			525 (2.4)			526 (2.7)		
New Zealand									
2015	504 (2.8)	8 ▲	-7	502 (3.1)	5	6	514 (2.4)	17 ▲	11 ▲
2011	496 (2.7)		-15 ▼	497 (2.8)		1	497 (3.0)		-6
2007	511 (3.4)			496 (2.8)			503 (4.2)		
Northern Ireland									
‡ 2015	518 (2.9)	1		519 (2.9)	-3		520 (2.6)	17 ▲	
† 2011	517 (3.1)			521 (2.8)			503 (3.2)		
Norway (4)									
2015	495 (3.0)	-7	14 ▲	494 (2.4)	7	22 ▲	482 (3.2)	-10 ▼	7
‡ 2011	502 (3.0)		21 ▲	487 (2.8)		15 ▲	493 (3.7)		17 ▲
2007	480 (3.2)			472 (3.7)			475 (3.2)		
Oman									
2015	422 (3.2)	46 ▲		435 (2.9)	63 ▲		431 (3.0)	77 ▲	
2011	376 (4.6)			372 (4.2)			354 (4.3)		
Portugal									
[2] 2015	507 (2.9)	-21 ▼		508 (1.9)	-7		506 (1.9)	-19 ▼	
2011	528 (4.4)			515 (4.2)			524 (4.3)		

▲ 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 Science 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 Differences Between Years		Applying Average Scale Score	Applying Differences Between Years		Reasoning Average Scale Score	Reasoning Differences Between Years	
		2011	2007		2011	2007		2011	2007
Qatar									
2015	437 (4.5)	49 ▲		430 (4.7)	41 ▲		433 (4.4)	29 ▲	
[2] 2011	388 (5.2)			389 (5.4)			404 (4.7)		
Russian Federation									
2015	569 (3.9)	15 ▲	23 ▲	568 (3.3)	12 ▲	19 ▲	561 (3.8)	19 ▲	18 ▲
2011	553 (3.8)		7	556 (3.5)		6	542 (4.3)		0
2007	546 (5.5)			550 (5.3)			542 (5.3)		
Saudi Arabia									
2015	394 (5.3)	-38 ▼		388 (4.7)	-39 ▼		365 (5.4)	-51 ▼	
2011	432 (6.1)			427 (6.1)			416 (5.8)		
Serbia									
[3] 2015	527 (3.9)	3		522 (4.5)	16 ▲		521 (3.9)	1	
[2] 2011	524 (2.9)			506 (3.1)			519 (3.0)		
Singapore									
[2] 2015	574 (4.1)	4	-24 ▼	599 (4.0)	10	12 ▲	605 (3.6)	8	29 ▲
[2] 2011	570 (3.4)		-29 ▼	590 (4.0)		2	597 (3.8)		20 ▲
2007	599 (4.5)			587 (4.2)			576 (4.1)		
Slovak Republic									
2015	530 (3.3)	-17 ▼	-2	517 (2.8)	-11 ▼	-10	507 (3.4)	-7	-4
2011	547 (3.9)		15 ▲	528 (3.9)		1	514 (4.0)		2
2007	531 (4.9)			527 (5.0)			512 (5.4)		
Slovenia									
2015	541 (2.6)	23 ▲	31 ▲	546 (2.9)	28 ▲	21 ▲	538 (2.7)	13 ▲	13 ▲
2011	518 (2.2)		9 ▲	518 (2.8)		-7	525 (3.4)		0
2007	510 (2.0)			525 (2.5)			525 (2.1)		
Spain									
[2] 2015	522 (3.3)	6		514 (3.3)	15 ▲		517 (2.6)	21 ▲	
2011	516 (3.2)			499 (3.1)			496 (3.0)		
Sweden									
[2] 2015	538 (3.8)	3	10 ▲	540 (3.4)	9 ▲	20 ▲	542 (3.8)	5	14 ▲
2011	536 (2.8)		8	531 (3.0)		11 ▲	537 (3.0)		9
2007	528 (3.1)			520 (3.2)			528 (4.3)		
Turkey									
2015	478 (3.0)	21 ▲		486 (3.1)	23 ▲		483 (3.3)	11	
2011	457 (4.7)			463 (4.7)			472 (5.3)		
United Arab Emirates									
2015	453 (3.3)	21 ▲		452 (3.2)	31 ▲		444 (3.0)	19 ▲	
2011	433 (2.8)			421 (2.6)			426 (2.6)		
United States									
[2 †] 2015	548 (2.5)	2	3	546 (2.2)	2	12 ▲	542 (2.7)	4	6
[2] 2011	546 (1.9)		1	544 (2.2)		10 ▲	537 (2.4)		2
[2 †] 2007	546 (2.7)			534 (3.1)			535 (3.0)		

▲ 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 Science 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 Differences Between Years		Applying Average Scale Score	Applying Differences Between Years		Reasoning Average Scale Score	Reasoning Differences Between Years	
		2011	2007		2011	2007		2011	2007
Benchmarking Participants									
Ontario, Canada									
2015	527 (2.8)	-1	-15 ▼	534 (2.5)	9 ▲	6	529 (2.8)	0	-11 ▼
2011	529 (3.0)		-14 ▼	526 (3.3)		-3	529 (3.6)		-11 ▼
2 2007	542 (3.6)			529 (3.7)			540 (3.4)		
Quebec, Canada									
‡ 2015	524 (4.3)	5	7	525 (4.5)	12 ▲	11 ▲	526 (4.6)	7	0
2011	519 (2.7)		2	514 (2.5)		-1	520 (3.8)		-6
2 2007	517 (2.8)			515 (3.0)			526 (3.6)		
Abu Dhabi, UAE									
2 2015	410 (6.6)	-4		417 (5.9)	11		412 (5.3)	-5	
2011	415 (5.7)			405 (5.3)			416 (5.2)		
Dubai, UAE									
2015	523 (2.3)	55 ▲	62 ▲	517 (2.8)	64 ▲	59 ▲	510 (2.9)	55 ▲	54 ▲
2011	467 (2.5)		7	453 (2.2)		-5	455 (3.7)		-1
◆ ‡ 2007	461 (2.8)			458 (3.7)			456 (3.1)		
Florida, US									
1 2015	553 (5.7)	4		550 (4.9)	7		541 (5.8)	5	
1 3 2011	550 (3.9)			543 (3.8)			536 (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 Science Content Domains by Gender

Country	Life Science		Physical Science		Earth Science	
	Girls	Boys	Girls	Boys	Girls	Boys
Australia	535 (3.1) ▲	527 (3.8)	513 (2.9)	519 (3.6)	516 (4.1)	524 (4.0)
2 Bahrain	476 (3.2) ▲	433 (4.0)	483 (4.8) ▲	447 (3.6)	463 (3.7) ▲	433 (4.3)
† Belgium (Flemish)	517 (2.8) ▲	508 (2.7)	505 (3.5)	507 (3.4)	506 (3.0)	519 (3.9) ▲
Bulgaria	549 (6.8) ▲	535 (6.4)	533 (6.9) ▲	526 (6.5)	535 (7.4)	529 (7.0)
1 2 † Canada	541 (3.1) ▲	531 (2.9)	517 (3.1)	519 (2.9)	510 (3.6)	516 (3.5)
Chile	490 (2.9)	485 (3.1)	462 (3.1)	469 (3.4) ▲	461 (3.8)	468 (4.1)
Chinese Taipei	544 (2.8)	546 (2.6)	565 (2.7)	572 (3.2)	543 (2.6)	567 (3.1) ▲
Croatia	534 (3.3) ▲	528 (2.7)	532 (3.7)	539 (3.4)	531 (3.0)	540 (5.1)
Cyprus	483 (3.1)	479 (3.5)	483 (3.2)	489 (3.5)	463 (3.5)	463 (4.8)
Czech Republic	540 (2.5)	537 (2.8)	522 (3.2)	539 (2.6) ▲	525 (3.9)	538 (3.2) ▲
2 † Denmark	539 (3.2) ▲	530 (2.6)	511 (4.2)	520 (3.2)	518 (4.6)	542 (3.4) ▲
England	539 (2.8)	533 (3.6)	537 (2.9)	543 (3.2) ▲	523 (4.2)	532 (4.0)
Finland	566 (2.2) ▲	546 (3.9)	550 (2.2)	545 (3.1)	565 (2.8) ▲	556 (3.1)
France	494 (3.5) ▲	486 (3.3)	477 (2.9)	487 (3.2) ▲	480 (5.9)	489 (4.3) ▲
1 Georgia	464 (4.5) ▲	454 (4.7)	439 (5.9)	436 (5.4)	440 (4.5)	442 (5.5)
Germany	529 (2.8)	527 (2.6)	530 (2.8)	534 (3.1)	513 (4.8)	525 (4.1) ▲
† Hong Kong SAR	550 (5.2)	550 (3.7)	548 (4.2)	561 (4.2) ▲	565 (4.3)	582 (4.0) ▲
Hungary	550 (3.7)	551 (3.8)	528 (3.7)	539 (4.0) ▲	525 (4.6)	545 (5.0) ▲
Indonesia	396 (5.7) ▲	378 (5.5)	408 (6.1)	402 (6.2)	384 (6.5)	383 (5.8)
Iran, Islamic Rep. of	426 (6.0) ▲	408 (5.9)	425 (6.0)	421 (6.6)	409 (6.9)	407 (6.5)
Ireland	532 (3.1)	529 (3.7)	521 (3.8)	527 (3.9)	527 (3.8)	542 (4.1) ▲
2 Italy	519 (3.0)	519 (3.2)	506 (2.5)	520 (3.9) ▲	504 (4.7)	517 (4.5) ▲
Japan	556 (2.3)	556 (2.8)	585 (3.2)	589 (3.4)	556 (3.4)	570 (3.1) ▲
Kazakhstan	550 (4.6) ▲	540 (4.5)	561 (5.2)	557 (5.4)	542 (6.1)	542 (5.4)
Korea, Rep. of	581 (2.8)	582 (2.3)	589 (2.1)	605 (2.4) ▲	578 (4.1)	603 (5.3) ▲
ψ Kuwait	345 (8.1) ▲	318 (8.3)	342 (8.1) ▲	308 (8.7)	345 (7.8) ▲	321 (8.5)
2 Lithuania	534 (3.5) ▲	520 (3.3)	533 (3.2)	537 (3.2)	512 (3.8)	519 (4.7)
ψ Morocco	356 (5.2)	345 (6.0)	361 (5.8)	353 (7.4)	295 (7.7)	284 (7.4)
† Netherlands	530 (2.5) ▲	520 (3.5)	503 (2.9)	505 (3.2)	514 (2.9)	527 (4.1) ▲
New Zealand	518 (3.1) ▲	505 (3.4)	496 (3.0)	499 (3.0)	502 (4.4)	510 (3.3) ▲
‡ Northern Ireland	524 (3.5)	518 (3.3)	510 (3.6)	518 (3.1)	522 (4.0)	522 (3.7)
Norway (5)	552 (2.8) ▲	540 (3.1)	519 (3.2)	525 (3.2)	545 (4.1)	553 (4.5)
Oman	444 (3.3) ▲	408 (4.1)	449 (4.0) ▲	421 (4.0)	439 (3.7) ▲	408 (4.1)
Poland	563 (2.7) ▲	550 (3.2)	536 (2.2)	544 (2.8) ▲	542 (3.9)	539 (3.2)
2 Portugal	506 (2.4)	509 (2.7)	496 (3.8)	507 (2.6) ▲	507 (4.4)	519 (3.2) ▲
Qatar	449 (5.0) ▲	422 (6.2)	448 (5.1) ▲	423 (6.8)	435 (5.6)	419 (7.4)
Russian Federation	573 (3.6) ▲	565 (3.5)	565 (3.9)	569 (4.0)	560 (4.7)	565 (5.7)
Saudi Arabia	423 (6.3) ▲	342 (7.3)	433 (6.2) ▲	349 (8.4)	430 (6.6) ▲	360 (8.0)
3 Serbia	535 (4.1)	527 (4.8)	527 (4.0)	531 (4.7)	495 (6.5)	496 (5.8)
2 Singapore	610 (4.5)	604 (5.0)	603 (4.0)	604 (4.4)	541 (4.0)	552 (4.2) ▲
Slovak Republic	519 (3.8)	516 (2.8)	517 (3.8)	534 (3.6) ▲	510 (3.7)	518 (3.4) ▲
Slovenia	547 (2.3)	543 (3.5)	539 (2.9)	553 (3.3) ▲	520 (6.1)	541 (3.3) ▲
2 Spain	522 (3.2)	524 (2.8)	502 (3.6)	512 (3.1) ▲	515 (3.1)	524 (4.4)
2 Sweden	548 (3.6) ▲	532 (3.7)	534 (4.2)	535 (4.0)	553 (5.0)	551 (4.6)
Turkey	475 (3.7)	470 (3.7)	496 (4.0)	495 (4.2)	477 (3.7)	483 (3.7)
United Arab Emirates	458 (4.9) ▲	440 (4.6)	458 (4.7)	449 (4.1)	452 (5.1)	444 (4.5)
2 † United States	555 (2.7)	555 (2.4)	534 (2.9)	541 (2.8) ▲	535 (2.6)	544 (2.8) ▲
International Avg.	513 (0.6) ▲	502 (0.6)	505 (0.6)	505 (0.6)	498 (0.7)	501 (0.7) ▲

▲ 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 Science Content Domains by Gender (Continued)

Country	Life Science		Physical Science		Earth Science	
	Girls	Boys	Girls	Boys	Girls	Boys
Benchmarking Participants						
Buenos Aires, Argentina	432 (5.8)	420 (4.9)	412 (5.5)	414 (5.4)	382 (6.3)	400 (7.5) ▲
Ontario, Canada	551 (3.1) ▲	537 (3.0)	523 (3.4)	521 (2.9)	514 (4.5)	516 (4.1)
‡ Quebec, Canada	536 (4.2)	530 (5.1)	515 (5.0)	524 (5.5) ▲	510 (4.2)	520 (5.3) ▲
Norway (4)	507 (2.8) ▲	497 (2.8)	474 (3.4)	476 (3.3)	495 (5.9)	500 (3.4)
[2] Abu Dhabi, UAE	423 (9.8)	405 (8.8)	417 (9.5)	410 (8.3)	412 (10.0)	405 (9.3)
Dubai, UAE	527 (3.9) ▲	510 (4.2)	524 (4.0)	517 (3.6)	513 (4.2)	508 (4.5)
[1] Florida, US	564 (5.1) ▲	553 (6.0)	547 (5.6) ▲	537 (6.0)	537 (7.8)	541 (7.6)

▲ Average significantly higher than other gender

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

Exhibit 3.11: Achievement in Science Cognitive Domains by Gender

Country	Knowing		Applying		Reasoning	
	Girls	Boys	Girls	Boys	Girls	Boys
Australia	522 (3.6)	524 (4.2)	523 (3.5)	522 (3.6)	532 (3.8)	523 (3.9)
2 Bahrain	475 (3.7) ▲	437 (3.5)	480 (4.1) ▲	444 (3.5)	475 (3.6) ▲	435 (3.8)
† Belgium (Flemish)	495 (3.2)	500 (3.5)	515 (3.0)	511 (2.5)	530 (3.5) ▲	521 (2.9)
Bulgaria	557 (6.9) ▲	546 (6.4)	539 (6.6)	533 (6.2)	516 (6.9) ▲	497 (6.4)
1 2 † Canada	522 (3.6)	524 (3.2)	529 (3.1)	526 (2.7)	530 (2.7) ▲	520 (2.9)
Chile	474 (3.4)	481 (3.8) ▲	478 (3.7)	473 (3.2)	477 (2.7)	476 (3.1)
Chinese Taipei	549 (2.9)	565 (3.0) ▲	548 (3.4)	558 (3.2) ▲	561 (5.0)	555 (3.3)
Croatia	530 (3.4)	538 (3.2) ▲	529 (3.0)	531 (3.0)	540 (3.7) ▲	531 (2.3)
Cyprus	466 (3.7)	469 (4.7)	489 (2.9)	489 (4.4)	491 (4.6)	488 (4.1)
Czech Republic	539 (3.6)	550 (3.7) ▲	525 (2.8)	531 (2.6)	526 (3.9)	531 (3.7)
2 † Denmark	517 (2.6)	531 (3.3) ▲	527 (2.9)	532 (2.8)	531 (3.1) ▲	520 (4.5)
England	530 (3.6)	537 (3.1)	539 (3.4)	536 (2.7)	543 (3.1)	534 (4.7)
Finland	560 (3.3) ▲	552 (3.5)	561 (2.6) ▲	545 (2.9)	559 (3.1) ▲	546 (2.6)
France	479 (4.3)	484 (4.0)	492 (3.6)	495 (3.4)	483 (3.7)	479 (2.7)
1 Georgia	459 (4.4)	460 (5.0)	453 (4.9)	446 (5.7)	433 (5.4) ▲	418 (5.1)
Germany	524 (3.0)	530 (3.4)	529 (2.9)	529 (3.0)	534 (3.1)	530 (4.2)
† Hong Kong SAR	553 (3.8)	569 (3.8) ▲	549 (4.1)	558 (4.0) ▲	555 (6.1)	550 (4.0)
Hungary	545 (4.1)	555 (4.2) ▲	534 (4.0)	543 (4.0) ▲	533 (3.9)	533 (4.7)
Indonesia	402 (5.6)	394 (6.0)	396 (5.4)	388 (6.1)	399 (5.9) ▲	381 (6.9)
Iran, Islamic Rep. of	418 (5.5)	415 (5.7)	423 (6.1)	412 (5.8)	430 (6.8)	414 (6.3)
Ireland	523 (3.5)	534 (3.1) ▲	527 (3.2)	533 (3.1)	529 (3.8)	523 (3.5)
2 Italy	516 (3.4)	525 (3.8) ▲	507 (3.9)	519 (3.2) ▲	512 (3.2)	511 (4.4)
Japan	537 (2.8)	550 (3.9) ▲	575 (2.6)	578 (2.5)	598 (1.9) ▲	591 (2.5)
Kazakhstan	551 (4.7)	550 (5.6)	550 (4.7) ▲	544 (5.1)	556 (4.9) ▲	547 (4.8)
Korea, Rep. of	572 (2.9)	591 (2.6) ▲	587 (2.7)	600 (2.0) ▲	595 (2.0)	593 (3.3)
ψ Kuwait	358 (7.2) ▲	329 (9.4)	339 (8.4) ▲	309 (9.1)	311 (8.9) ▲	283 (10.1)
2 Lithuania	524 (3.1)	523 (3.8)	527 (2.7)	525 (3.1)	545 (3.8) ▲	531 (3.4)
ψ Morocco	330 (6.6)	332 (6.7)	366 (5.1) ▲	349 (5.8)	361 (5.6) ▲	347 (5.4)
† Netherlands	507 (2.5)	510 (3.2)	520 (2.6)	517 (2.8)	528 (2.2)	523 (5.0)
New Zealand	505 (3.6)	503 (2.9)	502 (3.9)	502 (3.3)	521 (3.7) ▲	507 (3.2)
‡ Northern Ireland	516 (3.8)	521 (3.3)	518 (3.2)	520 (3.9)	524 (3.1)	516 (4.1)
Norway (5)	531 (3.1)	534 (3.4)	541 (3.3)	542 (3.5)	540 (4.6) ▲	533 (3.8)
Oman	438 (3.4) ▲	406 (4.1)	449 (3.3) ▲	420 (3.4)	449 (3.5) ▲	413 (3.7)
Poland	542 (3.1)	545 (3.0)	555 (2.9)	553 (3.4)	547 (2.8) ▲	537 (4.3)
2 Portugal	502 (3.5)	511 (3.2) ▲	504 (2.5)	513 (2.2) ▲	506 (2.1)	505 (2.6)
Qatar	445 (5.3) ▲	429 (6.3)	445 (5.3) ▲	415 (6.4)	448 (5.5) ▲	418 (6.1)
Russian Federation	565 (4.0)	572 (4.7)	569 (3.5)	567 (3.5)	565 (4.0) ▲	556 (4.3)
Saudi Arabia	430 (5.5) ▲	360 (9.5)	431 (5.4) ▲	346 (8.2)	410 (7.3) ▲	322 (8.4)
3 Serbia	526 (3.8)	527 (5.2)	523 (3.9)	521 (6.2)	524 (5.1)	517 (4.9)
2 Singapore	569 (4.2)	579 (5.1) ▲	598 (4.3)	600 (4.4)	610 (4.3) ▲	600 (3.7)
Slovak Republic	525 (3.8)	534 (3.4) ▲	514 (3.2)	520 (3.2) ▲	502 (4.2)	512 (3.0) ▲
Slovenia	533 (3.1)	549 (2.9) ▲	543 (3.1)	549 (3.4)	539 (3.1)	537 (3.2)
2 Spain	517 (3.5)	527 (3.5) ▲	511 (3.5)	517 (3.5) ▲	516 (3.5)	518 (3.2)
2 Sweden	539 (3.8)	538 (4.4)	546 (3.9) ▲	534 (4.2)	548 (4.5)	536 (5.4)
Turkey	475 (3.5)	480 (3.2)	486 (3.3)	486 (3.8)	489 (3.6) ▲	478 (4.1)
United Arab Emirates	459 (5.2)	448 (4.6)	459 (4.5) ▲	445 (4.3)	453 (4.8) ▲	437 (3.9)
2 † United States	545 (2.6)	552 (2.8) ▲	544 (2.4)	548 (2.6)	542 (2.4)	541 (3.5)
International Avg.	504 (0.6)	505 (0.7)	508 (0.6) ▲	504 (0.6)	510 (0.6) ▲	498 (0.7)

▲ 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 3.11: Achievement in Science Cognitive Domains by Gender (Continued)

Country	Knowing		Applying		Reasoning	
	Girls	Boys	Girls	Boys	Girls	Boys
Benchmarking Participants						
Buenos Aires, Argentina	415 (5.8)	418 (5.0)	418 (5.9)	415 (4.5)	424 (6.1) ▲	408 (5.4)
Ontario, Canada	528 (3.4)	527 (3.4)	538 (3.1)	531 (2.9)	536 (2.8) ▲	522 (3.4)
‡ Quebec, Canada	521 (4.5)	527 (5.0)	525 (4.6)	526 (5.1)	528 (4.9)	524 (5.0)
Norway (4)	492 (3.3)	497 (3.9)	496 (3.0)	492 (3.1)	486 (3.4) ▲	479 (3.9)
[2] Abu Dhabi, UAE	416 (10.2)	405 (9.5)	425 (9.1)	410 (8.4)	421 (9.2)	404 (8.1)
Dubai, UAE	528 (4.2)	518 (4.1)	523 (3.7)	512 (4.4)	517 (4.1) ▲	503 (4.1)
[1] Florida, US	554 (6.7)	553 (5.9)	552 (5.4)	547 (5.8)	549 (7.6) ▲	533 (6.4)

▲ Average significantly higher than other gender

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

TIMSS 2015

CHAPTER 4: HOME ENVIRONMENT SUPPORT

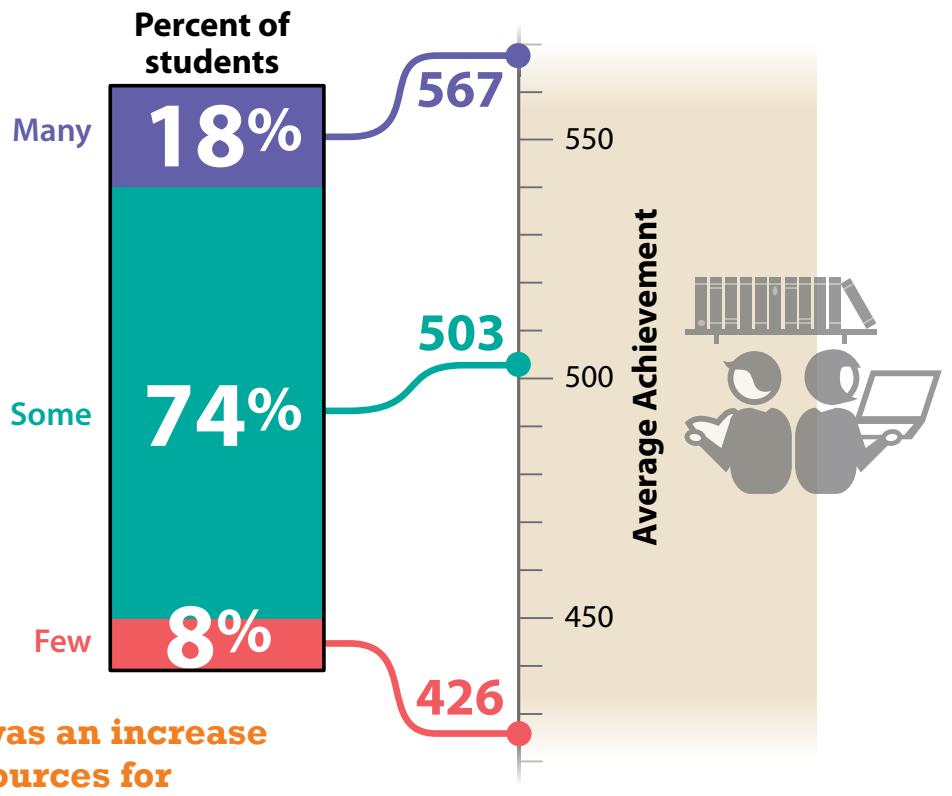
TIMSS 2015 INTERNATIONAL RESULTS IN SCIENCE

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

Supportive Home Environment for Learning

Home Resources for Learning

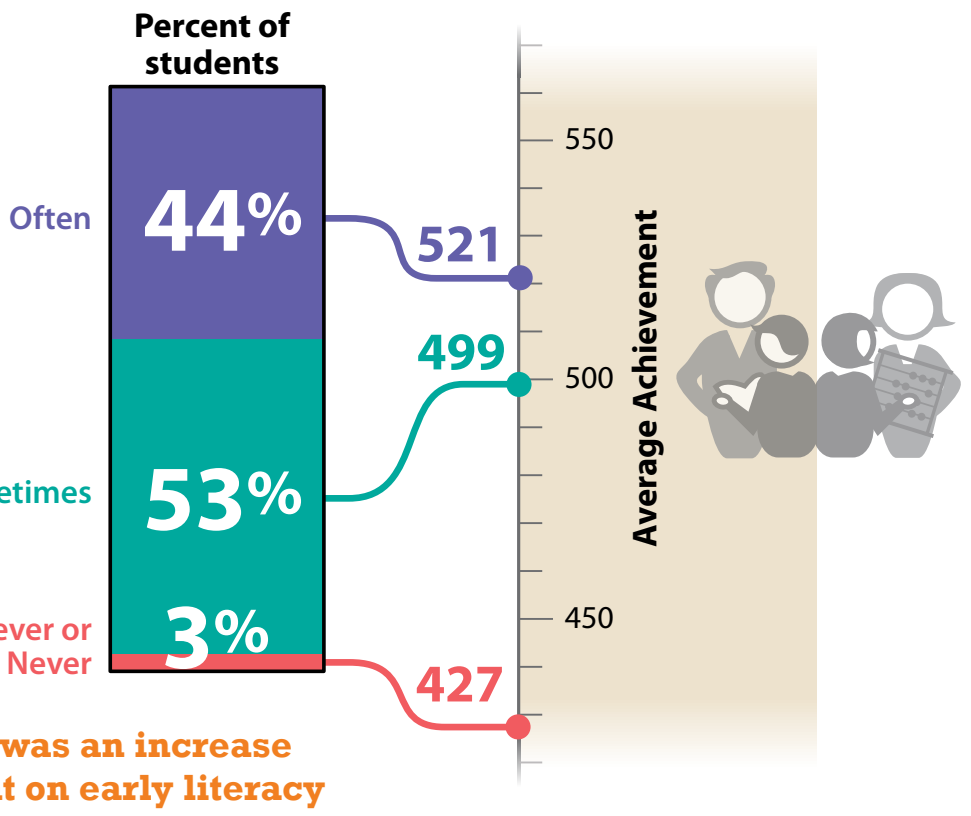
Students whose parents reported many home resources for learning had much higher achievement than students whose parents reported some or few resources.



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.

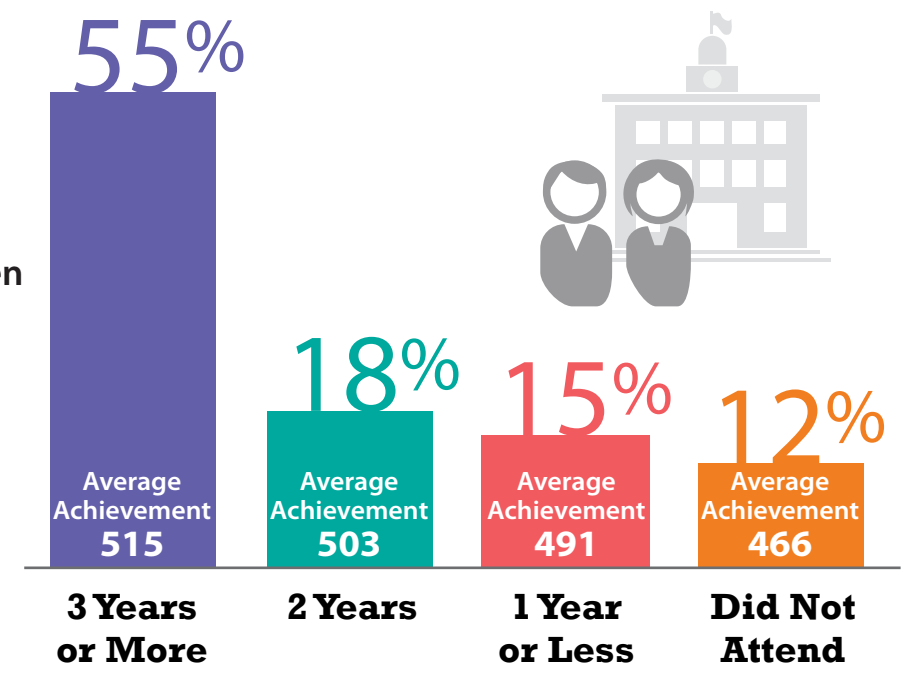


In 14 countries, there was an increase in students' time spent on early literacy and numeracy learning activities.

An Early Start in School

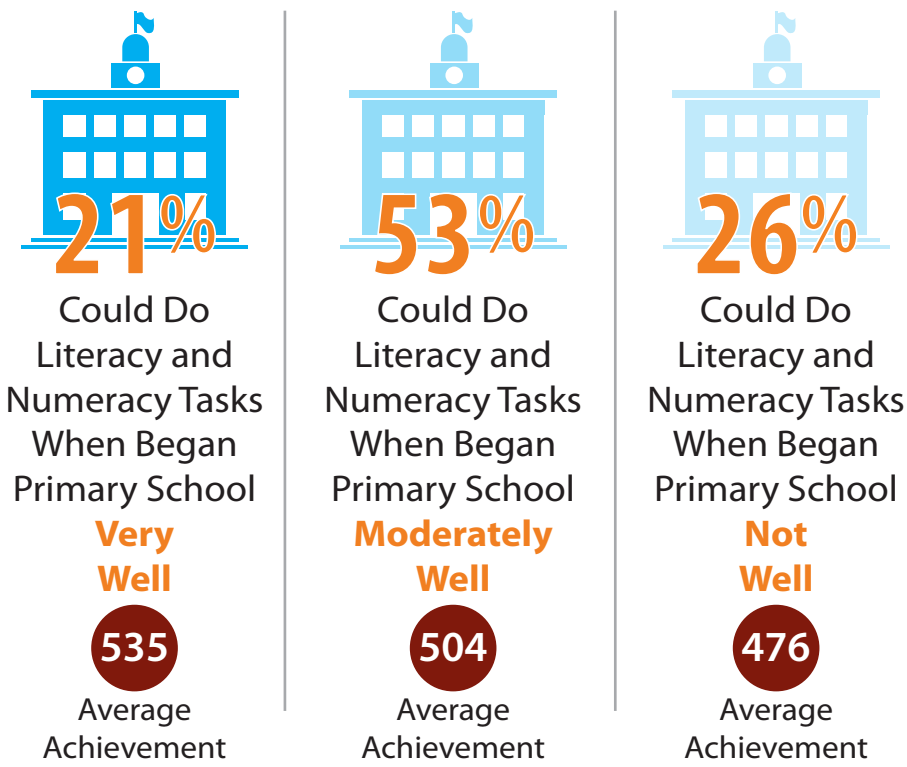
Preprimary Education

There was a positive relationship for fourth grade students between the number of years students attended preprimary education programs and science 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/

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

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.

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)	613 (1.9)	49 (1.8)	567 (2.2)	1 (0.2)	~ ~	11.8 (0.07)	◊ ◊
New Zealand s	41 (1.4)	563 (2.8)	58 (1.4)	503 (3.4)	1 (0.2)	~ ~	11.4 (0.05)	◊ ◊
Sweden r	38 (1.6)	580 (2.8)	60 (1.6)	529 (3.5)	1 (0.3)	~ ~	11.3 (0.07)	r -0.1 (0.09)
Denmark	38 (0.9)	556 (2.7)	61 (0.9)	515 (2.7)	1 (0.2)	~ ~	11.3 (0.04)	◊ ◊
Northern Ireland s	35 (1.4)	570 (3.1)	64 (1.4)	511 (3.1)	1 (0.3)	~ ~	11.1 (0.06)	s 0.2 (0.09)
Finland	34 (1.4)	581 (2.2)	66 (1.4)	543 (2.4)	0 (0.1)	~ ~	11.2 (0.05)	0.0 (0.06)
Ireland	33 (1.5)	567 (2.9)	65 (1.4)	516 (2.5)	2 (0.3)	~ ~	11.0 (0.06)	0.2 (0.09)
Canada r	32 (1.2)	563 (2.2)	68 (1.2)	517 (2.4)	0 (0.1)	~ ~	11.2 (0.05)	◊ ◊
Singapore	27 (0.9)	647 (3.8)	71 (0.9)	576 (3.6)	2 (0.2)	~ ~	10.8 (0.04)	0.2 (0.05) ▲
Belgium (Flemish)	26 (1.1)	552 (2.8)	72 (1.1)	504 (2.1)	3 (0.4)	438 (5.1)	10.8 (0.05)	◊ ◊
Hungary	24 (1.4)	597 (2.7)	69 (1.2)	536 (2.6)	7 (0.8)	431 (9.9)	10.4 (0.08)	0.3 (0.12)
Hong Kong SAR	24 (1.5)	599 (4.3)	69 (1.4)	548 (2.9)	7 (1.0)	521 (6.0)	10.3 (0.08)	0.5 (0.11) ▲
France	23 (1.4)	539 (2.9)	75 (1.3)	479 (2.6)	2 (0.2)	~ ~	10.6 (0.06)	◊ ◊
Poland	22 (0.9)	589 (2.9)	75 (0.9)	538 (2.3)	3 (0.3)	471 (10.6)	10.4 (0.04)	◊ ◊
Slovenia s	21 (1.3)	589 (3.1)	78 (1.3)	544 (3.1)	1 (0.2)	~ ~	10.7 (0.05)	s 0.2 (0.06) ▲
Cyprus	20 (1.0)	525 (4.0)	79 (1.0)	478 (2.4)	1 (0.2)	~ ~	10.6 (0.04)	◊ ◊
Spain r	20 (0.9)	558 (3.0)	76 (0.8)	519 (2.3)	4 (0.5)	446 (9.4)	10.4 (0.05)	r 0.1 (0.08)
Czech Republic	18 (0.9)	583 (3.0)	80 (0.9)	526 (2.1)	2 (0.4)	~ ~	10.5 (0.04)	0.0 (0.06)
Germany s	18 (1.1)	588 (3.1)	80 (1.1)	536 (2.5)	2 (0.4)	~ ~	10.5 (0.06)	s -0.2 (0.09)
Chinese Taipei	17 (0.8)	601 (2.3)	76 (0.8)	550 (1.8)	6 (0.5)	506 (5.6)	10.1 (0.05)	-0.1 (0.08)
Portugal	16 (0.9)	546 (3.6)	77 (1.0)	505 (2.2)	7 (0.6)	472 (4.8)	9.9 (0.05)	0.1 (0.08)
Russian Federation	16 (1.0)	606 (4.1)	83 (1.0)	562 (3.1)	2 (0.3)	~ ~	10.4 (0.05)	0.0 (0.07)
Slovak Republic	15 (0.8)	582 (2.9)	77 (1.1)	521 (2.2)	8 (0.9)	411 (12.2)	10.0 (0.05)	0.1 (0.08)
Georgia	14 (1.0)	501 (7.9)	82 (1.0)	449 (3.5)	4 (0.6)	381 (10.1)	10.1 (0.06)	0.2 (0.09) ▲
Lithuania	13 (0.9)	580 (4.9)	84 (0.9)	526 (2.6)	3 (0.5)	456 (9.9)	10.2 (0.05)	0.3 (0.07) ▲
Bulgaria	12 (1.1)	603 (5.1)	68 (1.9)	546 (4.3)	20 (2.1)	473 (14.0)	9.4 (0.12)	◊ ◊
Japan	12 (0.9)	612 (3.0)	86 (0.9)	565 (1.8)	2 (0.2)	~ ~	10.2 (0.04)	◊ ◊
Qatar r	11 (1.1)	525 (10.4)	86 (1.2)	443 (3.7)	3 (0.4)	374 (10.8)	10.2 (0.05)	r 0.0 (0.07)
United Arab Emirates	11 (0.4)	544 (4.1)	86 (0.4)	455 (2.6)	4 (0.2)	355 (7.5)	10.1 (0.02)	0.2 (0.04) ▲
Croatia	9 (0.7)	582 (3.8)	88 (0.8)	531 (2.0)	3 (0.4)	467 (8.6)	10.0 (0.04)	0.2 (0.06) ▲
Serbia	8 (0.8)	584 (4.5)	87 (1.0)	527 (2.7)	5 (0.8)	436 (22.4)	9.7 (0.06)	◊ ◊
Italy	8 (0.7)	562 (4.4)	85 (0.8)	520 (2.6)	7 (0.6)	470 (5.1)	9.6 (0.05)	-0.1 (0.07)
Kazakhstan	7 (1.0)	588 (10.8)	88 (1.0)	548 (4.4)	6 (0.7)	523 (6.7)	9.8 (0.07)	◊ ◊
Bahrain	7 (0.5)	523 (9.9)	88 (0.6)	465 (2.3)	5 (0.4)	408 (14.9)	9.8 (0.03)	◊ ◊
Chile r	5 (0.5)	554 (7.1)	87 (0.9)	485 (3.0)	8 (0.9)	445 (6.6)	9.3 (0.06)	◊ ◊
Turkey	5 (0.7)	583 (5.0)	63 (1.2)	504 (2.8)	33 (1.3)	437 (5.1)	8.4 (0.07)	◊ ◊
Iran, Islamic Rep. of	4 (0.6)	528 (11.1)	62 (1.8)	443 (3.8)	34 (1.8)	376 (6.8)	8.3 (0.08)	0.2 (0.13)
Oman	3 (0.3)	497 (6.7)	78 (0.7)	445 (3.0)	19 (0.8)	397 (6.0)	8.9 (0.04)	0.2 (0.06) ▲
Kuwait r	3 (0.6)	438 (18.8)	94 (0.7)	346 (6.5)	3 (0.5)	297 (14.6)	9.6 (0.05)	◊ ◊
Saudi Arabia	1 (0.3)	~ ~	84 (1.0)	402 (4.5)	14 (1.0)	365 (8.8)	9.0 (0.05)	0.0 (0.09)
Morocco	1 (0.2)	~ ~	38 (1.4)	382 (6.3)	61 (1.4)	346 (6.2)	6.8 (0.07)	s -0.4 (0.12) ▼
Indonesia	0 (0.1)	~ ~	51 (1.6)	422 (5.4)	49 (1.6)	376 (5.9)	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.	18 (0.2)	567 (0.9)	74 (0.2)	503 (0.5)	8 (0.1)	426 (1.9)		

▲ 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 data are available for less than 50% of students.

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

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		
Benchmarking Participants									
Ontario, Canada	r	34 (1.5)	567 (2.6)	66 (1.5)	521 (2.6)	0 (0.1)	~ ~	11.2 (0.06)	◊ ◊
Quebec, Canada	r	29 (2.4)	558 (3.7)	71 (2.3)	516 (3.9)	0 (0.1)	~ ~	11.0 (0.09)	r -0.1 (0.10)
Dubai, UAE		19 (0.6)	578 (2.8)	79 (0.6)	515 (2.2)	1 (0.2)	~ ~	10.6 (0.02)	0.0 (0.03)
Abu Dhabi, UAE	r	9 (1.1)	515 (13.4)	86 (1.2)	424 (5.3)	5 (0.5)	325 (14.3)	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		- -	- -	- -	- -	- -	- -	- -	- -

Significantly higher than 2011 ▲
Significantly lower than 2011 ▼

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

Number of books in the home (students):

1) 0-10
2) 11-25
3) 26-100
4) 101-200
5) More than 200

Number of children's books in the home (parents):

1) 0-10
2) 11-25
3) 26-50
4) 51-100
5) More than 100

Number of home study supports (students):

1) None
2) Internet connection or own room
3) Both

Highest level of education of either parent (parents):

1) Finished some primary or lower secondary or did not go to school
2) Finished lower secondary
3) Finished upper secondary
4) Finished post-secondary education
5) Finished university or higher

Highest level of occupation of either parent (parents):

1) Has never worked outside home for pay, general laborer, or semi-professional (skilled agricultural or fishery worker, craft or trade worker, plant or machine operator)
2) Clerical (clerk or service or sales worker)
3) Small business owner
4) Professional (corporate manager or senior official, professional, or technician or associate professional)

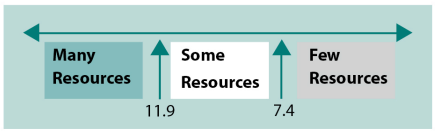


Exhibit 4.1: Home Resources for Learning (Continued)

Average Science Achievement by Home Resources for Learning

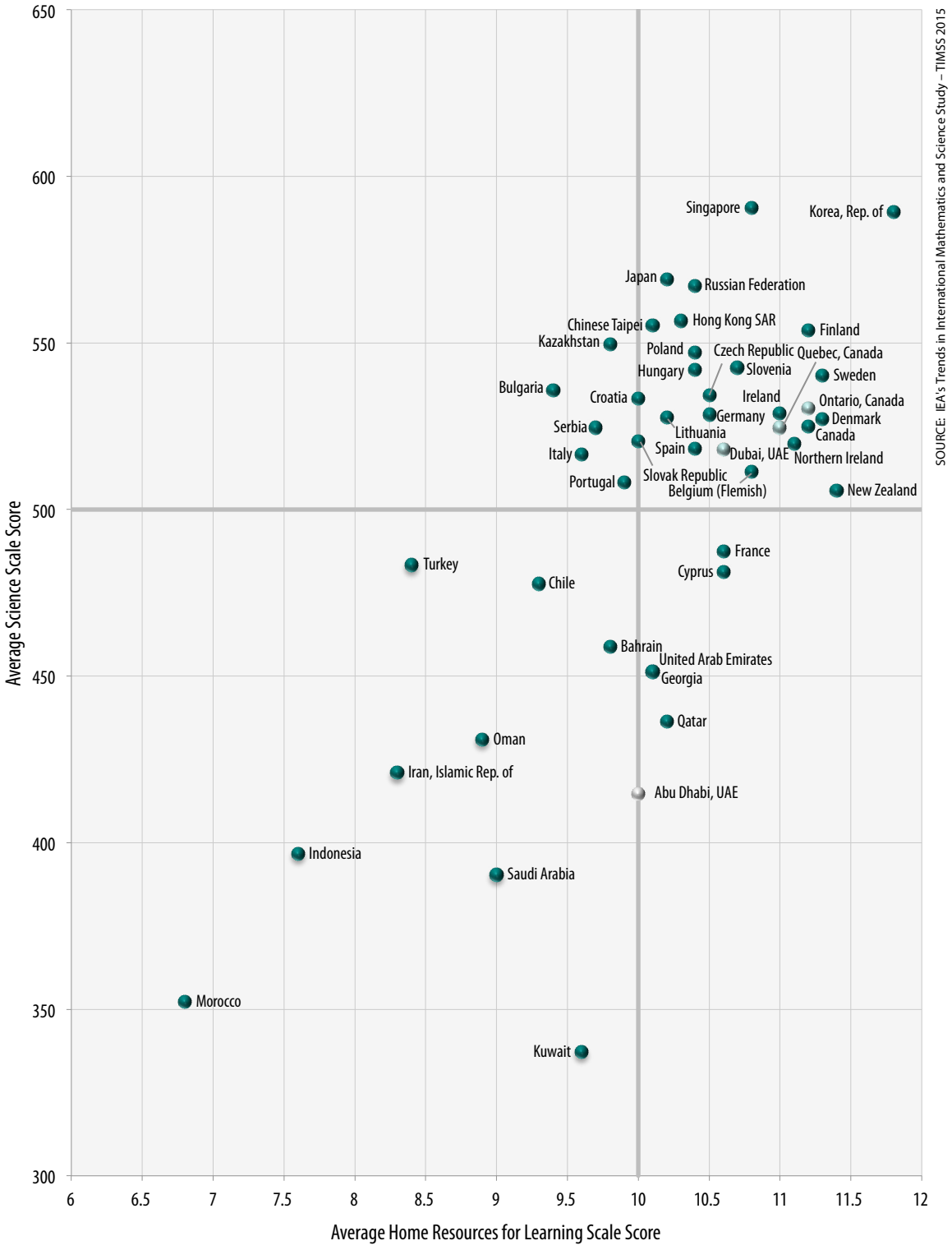


Exhibit 4.3: Students Speak the Language of the Test at Home

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)	528 (2.9)	12 (0.7)	527 (5.1)	14 (1.0)	509 (5.6)	1 (0.2)	~ ~
Bahrain	56 (1.0)	463 (2.8)	12 (0.6)	478 (9.3)	28 (0.6)	460 (4.5)	5 (0.5)	426 (10.3)
Belgium (Flemish)	68 (1.1)	524 (2.2)	10 (0.5)	509 (4.1)	18 (0.9)	475 (4.3)	3 (0.5)	467 (7.0)
Bulgaria	67 (2.3)	555 (4.4)	9 (0.7)	534 (11.8)	18 (1.7)	499 (11.3)	6 (1.0)	455 (14.0)
Canada	58 (1.0)	527 (2.5)	17 (0.5)	543 (3.6)	22 (0.8)	514 (4.2)	3 (0.3)	480 (8.9)
Chile	81 (0.7)	482 (2.8)	9 (0.4)	485 (6.3)	6 (0.4)	475 (6.0)	5 (0.4)	432 (7.5)
Chinese Taipei	43 (1.0)	551 (2.1)	17 (0.6)	576 (3.2)	40 (0.9)	554 (2.3)	1 (0.2)	~ ~
Croatia	80 (0.9)	531 (2.2)	12 (0.6)	552 (4.2)	7 (0.5)	536 (5.6)	1 (0.4)	~ ~
Cyprus	62 (1.4)	484 (2.6)	14 (0.8)	500 (4.4)	21 (0.9)	479 (4.0)	3 (0.4)	444 (9.0)
Czech Republic	77 (0.9)	532 (2.5)	14 (0.8)	554 (4.1)	8 (0.4)	526 (5.8)	1 (0.1)	~ ~
Denmark	70 (1.1)	531 (2.3)	18 (0.8)	533 (3.5)	11 (0.7)	496 (5.3)	1 (0.1)	~ ~
England	72 (1.8)	538 (2.4)	11 (0.7)	556 (5.7)	16 (1.4)	516 (6.0)	2 (0.3)	~ ~
Finland	72 (1.0)	558 (2.1)	17 (0.8)	558 (4.2)	10 (0.7)	525 (6.7)	1 (0.2)	~ ~
France	71 (1.2)	491 (2.8)	12 (0.6)	499 (4.4)	16 (0.8)	465 (3.8)	1 (0.1)	~ ~
Georgia	78 (1.1)	454 (3.4)	9 (0.6)	457 (9.2)	12 (0.8)	456 (6.8)	1 (0.5)	~ ~
Germany r	66 (1.2)	544 (2.0)	14 (0.7)	532 (4.5)	18 (1.0)	496 (5.0)	1 (0.2)	~ ~
Hong Kong SAR	58 (1.7)	554 (3.4)	13 (0.8)	561 (5.2)	28 (1.6)	563 (4.7)	1 (0.3)	~ ~
Hungary	84 (0.7)	544 (3.2)	13 (0.7)	542 (5.6)	2 (0.3)	~ ~	0 (0.1)	~ ~
Indonesia	32 (1.8)	390 (6.3)	12 (0.7)	386 (8.5)	42 (1.7)	416 (6.3)	14 (1.0)	381 (8.8)
Iran, Islamic Rep. of	59 (2.0)	441 (4.3)	8 (0.7)	440 (10.1)	17 (1.1)	425 (7.5)	17 (1.5)	350 (12.1)
Ireland	77 (0.9)	537 (2.5)	11 (0.7)	520 (4.3)	10 (0.7)	515 (5.1)	2 (0.3)	~ ~
Italy	72 (1.1)	523 (2.7)	12 (0.8)	515 (5.8)	14 (0.8)	497 (4.5)	2 (0.3)	~ ~
Japan	91 (0.5)	571 (1.9)	7 (0.5)	554 (3.8)	1 (0.2)	~ ~	0 (0.1)	~ ~
Kazakhstan	78 (1.1)	550 (4.5)	9 (0.6)	559 (8.1)	12 (1.0)	543 (7.5)	1 (0.2)	~ ~
Korea, Rep. of	80 (0.7)	586 (2.0)	12 (0.6)	609 (3.3)	8 (0.5)	589 (4.6)	0 (0.0)	~ ~
Kuwait	16 (1.4)	314 (8.5)	12 (0.8)	352 (11.7)	35 (1.5)	360 (8.9)	37 (1.7)	327 (7.0)
Lithuania	77 (0.9)	528 (2.7)	14 (0.7)	542 (4.3)	9 (0.5)	509 (4.8)	0 (0.1)	~ ~
Morocco	34 (1.7)	337 (5.8)	12 (0.7)	368 (7.8)	24 (1.4)	377 (7.2)	29 (1.8)	359 (10.1)
Netherlands	65 (1.9)	522 (2.5)	15 (0.8)	526 (3.7)	17 (1.2)	492 (5.0)	3 (0.7)	517 (7.5)
New Zealand	69 (1.0)	511 (3.0)	15 (0.6)	513 (3.8)	14 (0.8)	481 (4.8)	2 (0.2)	~ ~
Northern Ireland	84 (1.1)	521 (2.3)	8 (0.6)	538 (6.6)	7 (0.9)	505 (7.3)	1 (0.2)	~ ~
Norway (5)	69 (1.5)	545 (2.8)	16 (0.8)	537 (4.2)	14 (1.1)	506 (6.5)	2 (0.2)	~ ~
Oman	50 (1.5)	440 (4.3)	13 (0.6)	431 (5.3)	24 (1.0)	430 (4.7)	13 (1.1)	416 (6.8)
Poland	83 (0.8)	543 (2.4)	14 (0.6)	572 (4.9)	4 (0.3)	555 (6.2)	0 (0.2)	~ ~
Portugal	84 (0.7)	509 (2.2)	7 (0.4)	518 (4.9)	8 (0.5)	494 (4.9)	1 (0.1)	~ ~
Qatar	41 (1.3)	417 (5.1)	12 (0.5)	451 (7.2)	39 (1.1)	463 (4.6)	8 (0.7)	399 (7.9)
Russian Federation	81 (1.5)	569 (3.0)	9 (0.7)	576 (5.6)	8 (1.0)	551 (8.4)	1 (0.3)	~ ~
Saudi Arabia	67 (1.7)	394 (5.8)	12 (1.1)	384 (8.8)	13 (1.0)	419 (7.0)	8 (0.8)	395 (13.5)
Serbia	87 (1.3)	528 (3.2)	8 (0.8)	535 (7.4)	5 (0.7)	482 (20.7)	0 (0.2)	~ ~
Singapore	28 (0.5)	599 (4.0)	20 (0.5)	616 (4.3)	48 (0.6)	578 (4.1)	4 (0.3)	548 (9.3)
Slovak Republic	70 (1.3)	528 (2.6)	15 (0.6)	541 (4.1)	12 (1.0)	489 (7.4)	3 (0.7)	405 (14.4)
Slovenia	72 (1.2)	548 (2.3)	14 (0.6)	553 (4.2)	11 (0.8)	514 (5.6)	3 (0.4)	477 (12.7)
Spain	60 (1.5)	519 (2.9)	14 (0.7)	542 (4.7)	18 (0.7)	515 (3.9)	9 (0.9)	492 (5.6)
Sweden	65 (1.5)	555 (2.9)	19 (0.8)	538 (4.8)	15 (1.1)	487 (6.8)	1 (0.3)	~ ~
Turkey	77 (1.3)	495 (3.0)	8 (0.5)	505 (5.8)	14 (1.0)	460 (7.3)	1 (0.3)	~ ~
United Arab Emirates	39 (0.8)	427 (3.3)	14 (0.5)	483 (4.2)	40 (0.8)	480 (3.5)	6 (0.3)	411 (5.5)
United States	67 (1.1)	553 (2.0)	12 (0.4)	557 (4.8)	19 (0.9)	523 (4.1)	2 (0.2)	~ ~
International Avg.	66 (0.2)	508 (0.5)	13 (0.1)	516 (0.9)	17 (0.1)	493 (1.0)	4 (0.1)	431 (2.2)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students.

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

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
Benchmarking Participants								
Buenos Aires, Argentina	77 (1.1)	421 (4.7)	10 (0.6)	440 (7.6)	12 (0.8)	428 (7.7)	1 (0.2)	~ ~
Ontario, Canada	55 (1.4)	530 (2.9)	19 (0.8)	549 (3.9)	24 (1.1)	523 (4.2)	2 (0.3)	~ ~
Quebec, Canada	60 (2.1)	526 (3.9)	18 (0.9)	537 (6.4)	20 (1.8)	514 (5.8)	3 (0.4)	504 (12.5)
Norway (4)	66 (1.4)	503 (2.0)	17 (0.7)	490 (3.7)	15 (0.9)	464 (4.5)	2 (0.3)	~ ~
Abu Dhabi, UAE	43 (1.9)	387 (6.1)	13 (0.7)	431 (9.9)	37 (1.7)	459 (7.6)	7 (0.6)	390 (10.0)
Dubai, UAE	29 (0.6)	509 (2.7)	19 (0.7)	539 (3.7)	46 (0.8)	526 (2.5)	6 (0.4)	458 (7.8)
Florida, US	61 (3.3)	557 (5.7)	11 (0.9)	567 (7.8)	26 (2.7)	527 (5.0)	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)	550 (4.5)	9 (0.6)	548 (7.3)	0 (0.1)	~ ~	11.4 (0.04)
Indonesia	89 (1.1)	401 (4.8)	10 (1.1)	387 (9.6)	1 (0.4)	~ ~	11.4 (0.06)
Portugal	87 (0.6)	511 (2.1)	13 (0.6)	499 (3.4)	0 (0.1)	~ ~	10.9 (0.02)
Iran, Islamic Rep. of	84 (1.2)	426 (4.3)	15 (1.2)	403 (8.9)	1 (0.2)	~ ~	10.8 (0.05)
Turkey	82 (0.8)	488 (3.1)	17 (0.7)	476 (5.9)	1 (0.2)	~ ~	10.7 (0.05)
Oman	81 (0.5)	440 (3.1)	18 (0.5)	410 (5.2)	1 (0.1)	~ ~	10.6 (0.03)
Bahrain	80 (0.6)	471 (3.3)	19 (0.6)	433 (4.2)	1 (0.2)	~ ~	10.6 (0.02)
Singapore	79 (0.6)	597 (3.5)	20 (0.5)	576 (4.9)	1 (0.1)	~ ~	10.7 (0.03)
Qatar r	79 (0.9)	455 (3.7)	20 (0.9)	419 (7.2)	1 (0.2)	~ ~	10.6 (0.04)
Kuwait r	78 (1.1)	355 (7.0)	21 (1.1)	317 (6.5)	1 (0.2)	~ ~	10.6 (0.05)
Spain	77 (0.8)	526 (2.6)	22 (0.8)	513 (2.9)	1 (0.2)	~ ~	10.5 (0.03)
Northern Ireland s	77 (1.1)	533 (2.9)	22 (1.1)	522 (3.9)	1 (0.3)	~ ~	10.4 (0.05)
Lithuania	76 (0.8)	533 (2.7)	24 (0.8)	527 (3.5)	0 (0.1)	~ ~	10.3 (0.03)
Ireland	76 (1.0)	536 (2.5)	24 (1.0)	519 (3.2)	1 (0.1)	~ ~	10.5 (0.04)
Chile r	75 (0.7)	486 (3.0)	24 (0.7)	478 (3.9)	1 (0.2)	~ ~	10.4 (0.03)
Morocco	75 (1.3)	364 (4.9)	22 (1.1)	332 (8.5)	3 (0.5)	299 (18.6)	10.4 (0.08)
Cyprus	75 (0.6)	488 (2.5)	24 (0.7)	478 (3.5)	1 (0.2)	~ ~	10.3 (0.02)
Denmark	73 (0.8)	532 (2.1)	26 (0.8)	521 (3.3)	1 (0.2)	~ ~	10.2 (0.03)
United Arab Emirates	72 (0.5)	473 (2.8)	27 (0.4)	416 (3.5)	1 (0.1)	~ ~	10.4 (0.02)
Georgia	71 (1.1)	455 (3.4)	28 (1.1)	447 (5.7)	0 (0.1)	~ ~	10.3 (0.06)
Serbia	71 (1.2)	530 (3.5)	27 (1.1)	519 (7.0)	2 (0.3)	~ ~	10.3 (0.05)
Poland	71 (0.8)	553 (2.4)	29 (0.8)	535 (3.2)	1 (0.1)	~ ~	10.2 (0.04)
Saudi Arabia	70 (1.1)	400 (4.7)	28 (1.1)	383 (7.5)	2 (0.4)	~ ~	10.2 (0.06)
Canada r	70 (1.1)	536 (2.5)	29 (1.0)	520 (2.1)	1 (0.2)	~ ~	10.2 (0.04)
New Zealand s	70 (1.3)	533 (3.0)	28 (1.3)	511 (3.1)	2 (0.2)	~ ~	10.2 (0.05)
Bulgaria	69 (1.5)	545 (5.3)	28 (1.3)	527 (9.1)	3 (0.6)	486 (20.1)	10.1 (0.08)
Russian Federation	68 (1.0)	567 (3.1)	31 (1.0)	569 (4.0)	1 (0.1)	~ ~	10.1 (0.03)
Sweden	65 (1.0)	553 (3.5)	35 (1.0)	535 (4.3)	1 (0.1)	~ ~	9.9 (0.04)
Hungary	60 (1.1)	548 (3.7)	38 (0.9)	536 (4.4)	2 (0.2)	~ ~	9.7 (0.04)
Finland	60 (0.8)	563 (2.4)	38 (0.7)	545 (3.1)	2 (0.3)	~ ~	9.7 (0.04)
Hong Kong SAR	60 (1.2)	566 (3.5)	38 (1.2)	545 (3.1)	2 (0.3)	~ ~	9.7 (0.05)
Italy	52 (0.8)	521 (2.9)	45 (0.8)	517 (3.0)	3 (0.3)	503 (8.9)	9.3 (0.03)
Slovak Republic	51 (0.9)	518 (3.5)	46 (0.9)	529 (2.4)	3 (0.3)	510 (12.7)	9.3 (0.04)
France	50 (1.1)	500 (3.4)	48 (1.1)	481 (3.0)	1 (0.2)	~ ~	9.4 (0.05)
Chinese Taipei	49 (0.8)	564 (2.3)	48 (0.8)	551 (2.6)	4 (0.3)	532 (6.5)	9.2 (0.03)
Czech Republic	48 (0.8)	540 (2.6)	49 (0.8)	531 (2.9)	3 (0.3)	525 (7.5)	9.2 (0.03)
Germany s	46 (1.0)	544 (2.9)	49 (1.1)	538 (3.0)	4 (0.5)	532 (6.1)	9.1 (0.04)
Belgium (Flemish)	42 (0.8)	520 (3.1)	54 (0.8)	512 (2.2)	4 (0.3)	489 (5.7)	8.9 (0.03)
Slovenia s	34 (1.2)	561 (2.8)	63 (1.1)	548 (3.3)	3 (0.4)	541 (10.2)	8.8 (0.04)
Korea, Rep. of	34 (0.8)	604 (2.9)	62 (0.8)	584 (1.9)	5 (0.4)	572 (5.9)	8.7 (0.03)
Croatia	24 (0.8)	537 (3.4)	71 (0.8)	534 (2.1)	5 (0.5)	516 (5.6)	8.2 (0.03)
Japan	14 (0.6)	591 (3.7)	68 (0.7)	571 (1.8)	18 (0.7)	549 (3.0)	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)	512 (0.5)	32 (0.1)	496 (0.8)	2 (0.0)	504 (3.0)	

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.

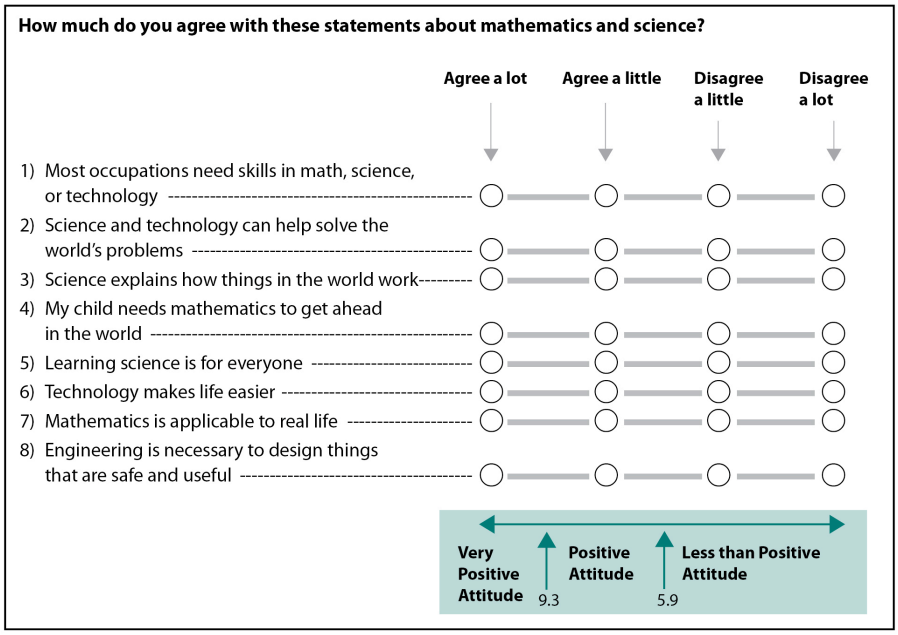
A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

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	
Benchmarking Participants								
Dubai, UAE		80 (0.6)	531 (2.0)	19 (0.6)	488 (3.6)	1 (0.1)	~ ~	10.7 (0.03)
Ontario, Canada	r	75 (2.0)	541 (2.7)	24 (1.8)	524 (3.4)	1 (0.3)	~ ~	10.4 (0.08)
Abu Dhabi, UAE	r	67 (1.4)	445 (5.9)	32 (1.4)	384 (6.6)	1 (0.2)	~ ~	10.2 (0.06)
Quebec, Canada	r	57 (1.5)	534 (4.9)	42 (1.4)	520 (3.5)	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)	572 (3.2)	30 (0.8)	558 (3.9)	1 (0.2)	~ ~	11.3 (0.04)	0.2 (0.07) ▲
Northern Ireland s	68 (1.3)	537 (2.5)	31 (1.2)	514 (4.5)	0 (0.1)	~ ~	11.5 (0.06)	s 0.2 (0.08) ▲
Kazakhstan	66 (1.3)	557 (4.7)	34 (1.3)	535 (4.8)	0 (0.1)	~ ~	11.1 (0.06)	◊ ◊
Serbia	62 (1.1)	536 (2.8)	37 (0.9)	513 (5.8)	1 (0.5)	~ ~	10.9 (0.06)	◊ ◊
Ireland	62 (1.0)	541 (2.5)	38 (1.0)	516 (3.2)	1 (0.2)	~ ~	11.1 (0.05)	0.2 (0.07) ▲
New Zealand s	61 (1.0)	539 (2.7)	38 (1.0)	507 (3.7)	1 (0.1)	~ ~	11.2 (0.05)	◊ ◊
Poland	60 (1.0)	552 (2.5)	39 (1.0)	541 (3.1)	0 (0.1)	~ ~	10.9 (0.04)	◊ ◊
Slovak Republic	60 (0.8)	528 (2.9)	39 (0.8)	516 (3.4)	1 (0.4)	~ ~	10.8 (0.04)	0.0 (0.06)
Croatia	59 (0.9)	542 (2.4)	41 (0.9)	522 (1.9)	0 (0.1)	~ ~	10.8 (0.03)	0.1 (0.05) ▲
Czech Republic	57 (0.9)	537 (2.3)	43 (0.9)	532 (2.9)	0 (0.1)	~ ~	10.7 (0.03)	0.1 (0.04)
Hungary	56 (1.0)	549 (3.4)	43 (1.0)	536 (3.9)	1 (0.4)	~ ~	10.6 (0.03)	0.0 (0.06)
Slovenia s	56 (1.0)	557 (2.7)	43 (1.0)	547 (3.5)	1 (0.2)	~ ~	10.7 (0.04)	s 0.2 (0.06) ▲
Canada r	55 (1.2)	541 (2.1)	44 (1.1)	520 (2.8)	1 (0.2)	~ ~	10.7 (0.05)	◊ ◊
Georgia	53 (1.0)	460 (4.0)	46 (1.0)	445 (4.3)	1 (0.2)	~ ~	10.6 (0.04)	0.4 (0.08) ▲
Italy	51 (1.0)	526 (2.8)	48 (1.0)	512 (3.0)	1 (0.2)	~ ~	10.5 (0.04)	0.1 (0.05)
Cyprus	50 (0.9)	499 (2.8)	48 (0.8)	470 (2.5)	2 (0.2)	~ ~	10.5 (0.04)	◊ ◊
Korea, Rep. of	48 (0.9)	603 (2.5)	50 (0.9)	579 (2.2)	2 (0.3)	~ ~	10.4 (0.04)	◊ ◊
Lithuania	48 (1.1)	538 (3.2)	51 (1.1)	525 (2.9)	1 (0.2)	~ ~	10.3 (0.04)	0.3 (0.05) ▲
Spain	48 (0.9)	534 (2.6)	51 (0.9)	514 (2.5)	1 (0.2)	~ ~	10.3 (0.03)	0.1 (0.05) ▲
Germany s	46 (0.9)	545 (3.0)	53 (0.9)	537 (3.2)	1 (0.2)	~ ~	10.3 (0.04)	s 0.0 (0.05)
Bulgaria	44 (1.6)	561 (4.0)	45 (1.1)	531 (5.7)	11 (1.5)	465 (18.3)	9.7 (0.12)	◊ ◊
Chile r	44 (1.1)	498 (3.3)	55 (1.1)	474 (3.2)	2 (0.3)	~ ~	10.2 (0.05)	◊ ◊
Portugal	43 (0.9)	519 (2.6)	55 (0.9)	502 (2.4)	1 (0.2)	~ ~	10.1 (0.03)	0.2 (0.06) ▲
France	41 (1.1)	503 (3.2)	58 (1.1)	482 (2.9)	1 (0.2)	~ ~	10.1 (0.03)	◊ ◊
Bahrain	40 (1.0)	483 (3.1)	58 (1.0)	451 (3.4)	2 (0.3)	~ ~	10.0 (0.03)	◊ ◊
United Arab Emirates	38 (0.6)	485 (3.0)	60 (0.6)	440 (3.0)	2 (0.2)	~ ~	9.9 (0.03)	0.2 (0.04) ▲
Denmark	36 (1.0)	537 (2.4)	63 (1.0)	525 (2.5)	1 (0.2)	~ ~	9.9 (0.04)	◊ ◊
Qatar r	35 (1.1)	475 (4.6)	62 (1.2)	432 (4.4)	2 (0.2)	~ ~	9.8 (0.04)	r 0.1 (0.06)
Singapore	35 (0.7)	611 (3.6)	61 (0.7)	583 (3.9)	4 (0.3)	547 (7.0)	9.8 (0.04)	0.2 (0.05) ▲
Sweden	32 (0.9)	557 (3.7)	67 (0.9)	541 (3.9)	1 (0.2)	~ ~	9.8 (0.03)	0.1 (0.05)
Kuwait r	32 (1.2)	366 (9.0)	65 (1.3)	340 (5.8)	3 (0.5)	262 (18.7)	9.6 (0.05)	◊ ◊
Saudi Arabia	32 (1.2)	406 (5.5)	65 (1.1)	388 (5.2)	4 (0.6)	349 (13.0)	9.7 (0.07)	◊ ◊
Finland	29 (0.8)	567 (3.4)	69 (0.9)	551 (2.2)	1 (0.2)	~ ~	9.7 (0.03)	0.1 (0.04)
Belgium (Flemish)	28 (0.8)	523 (3.1)	69 (0.8)	511 (2.5)	3 (0.2)	500 (8.1)	9.5 (0.03)	◊ ◊
Indonesia	27 (1.4)	420 (6.0)	67 (1.4)	393 (5.7)	6 (1.0)	364 (13.2)	9.2 (0.08)	◊ ◊
Iran, Islamic Rep. of	26 (1.4)	443 (7.2)	67 (1.4)	420 (4.5)	7 (1.1)	355 (19.3)	9.2 (0.09)	0.2 (0.10)
Turkey	25 (1.1)	522 (3.4)	64 (1.1)	484 (3.4)	11 (0.9)	401 (6.7)	9.0 (0.07)	◊ ◊
Oman	24 (0.7)	464 (4.6)	72 (0.7)	426 (3.2)	3 (0.3)	376 (9.0)	9.4 (0.03)	0.3 (0.04) ▲
Chinese Taipei	23 (0.8)	575 (2.4)	69 (0.8)	554 (1.9)	8 (0.6)	522 (4.0)	9.0 (0.05)	0.2 (0.06) ▲
Japan	22 (0.7)	583 (2.7)	72 (0.7)	567 (2.0)	5 (0.3)	549 (5.5)	9.2 (0.03)	◊ ◊
Hong Kong SAR	21 (0.8)	582 (4.1)	75 (1.0)	552 (3.1)	5 (0.5)	533 (7.3)	9.2 (0.04)	0.3 (0.05) ▲
Morocco	14 (0.8)	387 (6.4)	57 (1.7)	360 (5.4)	29 (2.0)	326 (9.8)	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.	44 (0.2)	521 (0.6)	53 (0.2)	499 (0.6)	3 (0.1)	427 (3.3)		

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.

▲ Significantly higher than 2011
▼ Significantly lower than 2011

( ) 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.

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

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		
Benchmarking Participants								
Ontario, Canada r	58 (1.8)	546 (2.7)	41 (1.7)	523 (3.0)	1 (0.2)	~ ~	10.9 (0.08)	◊ ◊
Quebec, Canada r	47 (1.2)	536 (3.8)	51 (1.2)	522 (4.5)	2 (0.4)	~ ~	10.3 (0.05)	r 0.0 (0.07)
Dubai, UAE	45 (0.7)	545 (2.2)	54 (0.7)	504 (2.5)	1 (0.2)	~ ~	10.2 (0.02)	0.2 (0.04) ▲
Abu Dhabi, UAE	37 (1.0)	452 (6.2)	61 (1.0)	408 (6.2)	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

Before your child began primary/elementary school, how often did you or someone else in your home do the following activities with him or her?

	Often	Sometimes	Never or almost never
1) Read books	○	○	○
2) Tell stories	○	○	○
3) Sing songs	○	○	○
4) Play with alphabet toys (e.g., blocks with letters of the alphabet)	○	○	○
5) Talk about things you had done	○	○	○
6) Talk about what you had read	○	○	○
7) Play word games	○	○	○
8) Write letters or words	○	○	○
9) Read aloud signs and labels	○	○	○
10) Say counting rhymes or sing counting songs	○	○	○
11) Play with number toys (e.g., blocks with numbers)	○	○	○
12) Count different things	○	○	○
13) Play games involving shapes (e.g., shape sorting toys, puzzles)	○	○	○
14) Play with building blocks or construction toys	○	○	○
15) Play board or card games	○	○	○
16) Write numbers	○	○	○

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 Science	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)	546 (2.9)	4 (0.6)	495 (10.5)	2 (0.2)	~ ~	0 (0.1)	~ ~
Denmark		●	●	93 (0.5)	531 (2.2)	5 (0.5)	517 (6.5)	2 (0.2)	~ ~	1 (0.1)	~ ~
Italy		●	●	89 (0.6)	521 (2.4)	7 (0.4)	511 (6.0)	2 (0.3)	~ ~	2 (0.3)	~ ~
Sweden		●	●	89 (1.2)	551 (3.2)	5 (0.6)	533 (11.0)	4 (0.6)	510 (9.4)	2 (0.4)	~ ~
Belgium (Flemish)		●	●	88 (0.6)	520 (2.2)	5 (0.4)	491 (6.4)	3 (0.3)	478 (7.6)	3 (0.3)	453 (6.8)
France		●	●	88 (0.7)	494 (2.7)	6 (0.5)	482 (6.9)	4 (0.4)	465 (8.6)	3 (0.3)	470 (11.1)
Korea, Rep. of		●	●	86 (0.7)	591 (2.1)	11 (0.7)	584 (3.5)	2 (0.2)	~ ~	1 (0.2)	~ ~
Slovenia	s	●	●	80 (1.3)	554 (3.1)	9 (0.7)	551 (5.3)	5 (0.6)	535 (8.1)	5 (0.7)	547 (8.1)
Singapore		●	●	80 (0.6)	601 (3.4)	12 (0.5)	563 (5.5)	4 (0.2)	549 (9.6)	4 (0.3)	545 (9.8)
Czech Republic		●	●	78 (0.9)	540 (2.2)	14 (0.8)	522 (4.1)	5 (0.4)	518 (5.6)	3 (0.3)	496 (12.2)
Portugal		●	●	74 (1.0)	514 (2.3)	14 (0.8)	502 (2.6)	7 (0.4)	491 (5.0)	4 (0.4)	482 (5.7)
Slovak Republic		●	●	73 (1.4)	535 (2.4)	12 (0.7)	510 (4.8)	10 (1.0)	494 (12.1)	5 (0.6)	412 (11.7)
Hong Kong SAR		●	●	72 (0.9)	562 (3.0)	5 (0.4)	556 (8.5)	12 (0.5)	548 (5.5)	10 (0.8)	540 (5.7)
Finland		●	●	69 (1.4)	554 (2.8)	12 (0.8)	555 (4.9)	18 (1.0)	561 (3.8)	1 (0.2)	~ ~
Bulgaria		●	●	68 (1.8)	551 (4.4)	10 (1.2)	507 (10.4)	17 (1.1)	515 (14.8)	5 (0.7)	481 (16.3)
Lithuania		●	●	68 (1.2)	539 (2.8)	8 (0.6)	516 (6.2)	20 (1.0)	511 (4.0)	4 (0.4)	515 (8.8)
Germany	s	●	●	66 (1.1)	550 (2.6)	8 (0.6)	530 (5.5)	15 (0.7)	530 (4.3)	10 (0.8)	509 (6.4)
Poland		●	●	63 (1.5)	558 (2.5)	17 (0.8)	532 (3.5)	19 (1.5)	529 (3.6)	0 (0.1)	~ ~
Russian Federation		●	●	59 (1.7)	576 (3.8)	10 (0.5)	560 (5.2)	13 (0.7)	564 (3.9)	19 (1.1)	550 (3.5)
Georgia		●	●	59 (1.5)	454 (4.2)	21 (0.9)	454 (4.7)	10 (0.6)	459 (7.8)	11 (1.2)	432 (8.2)
Croatia		●	●	58 (1.6)	543 (2.6)	10 (0.8)	525 (3.9)	12 (0.8)	520 (3.5)	20 (1.7)	519 (3.6)
Spain	r	●	○	57 (0.9)	532 (2.6)	18 (0.8)	518 (3.4)	13 (0.6)	513 (4.3)	12 (0.5)	498 (5.3)
Cyprus		●	●	57 (1.0)	496 (2.7)	24 (0.8)	476 (3.3)	12 (0.6)	469 (4.2)	8 (0.6)	457 (5.9)
New Zealand	s	●	●	56 (1.2)	534 (3.1)	31 (1.0)	527 (3.5)	8 (0.6)	503 (6.3)	5 (0.5)	469 (9.9)
Chinese Taipei		●	●	52 (1.0)	559 (2.0)	40 (1.0)	555 (2.3)	7 (0.4)	542 (5.5)	1 (0.2)	~ ~
Kazakhstan		●	●	47 (1.7)	559 (5.5)	12 (1.1)	556 (7.5)	20 (1.1)	546 (5.6)	21 (1.4)	529 (6.9)
Serbia		●	●	46 (1.5)	546 (2.9)	12 (0.8)	526 (6.6)	38 (1.6)	506 (7.2)	4 (0.5)	480 (14.8)
Canada	r	●	●	44 (1.4)	537 (2.5)	25 (0.6)	535 (3.1)	20 (1.1)	522 (2.3)	11 (0.6)	517 (3.4)
Chile	r	●	○	42 (1.1)	489 (3.3)	35 (1.1)	485 (4.1)	15 (0.7)	474 (3.8)	7 (0.6)	470 (6.0)
Bahrain		●	●	34 (0.8)	474 (3.6)	33 (0.8)	472 (5.2)	17 (0.8)	454 (4.5)	16 (0.6)	432 (5.7)
Ireland		●	●	33 (1.0)	542 (2.6)	36 (1.0)	536 (3.2)	25 (0.9)	518 (3.8)	5 (0.5)	498 (6.6)
Morocco		●	●	28 (1.2)	383 (7.5)	22 (0.7)	359 (6.2)	17 (1.0)	326 (7.2)	32 (1.5)	343 (9.5)
United Arab Emirates		●	●	21 (0.4)	477 (4.0)	44 (0.6)	448 (3.1)	21 (0.4)	469 (3.6)	14 (0.5)	438 (4.9)
Qatar	r	●	●	20 (0.8)	462 (6.5)	33 (1.0)	459 (4.3)	25 (0.8)	451 (5.3)	22 (1.2)	411 (6.4)
Kuwait	r	●	○	19 (1.1)	362 (8.8)	41 (1.2)	340 (6.0)	19 (1.1)	358 (10.4)	21 (1.5)	339 (9.7)
Indonesia		●	●	19 (1.2)	406 (7.8)	28 (1.7)	427 (5.8)	26 (1.4)	404 (6.0)	27 (2.2)	360 (7.2)
Iran, Islamic Rep. of		●	●	17 (1.2)	444 (6.2)	13 (0.8)	449 (7.0)	49 (1.7)	423 (5.0)	21 (1.4)	384 (10.4)
Oman		○	n/a	15 (0.5)	451 (5.6)	27 (0.8)	456 (4.1)	29 (0.6)	438 (4.3)	29 (0.9)	402 (4.7)
Turkey		●	●	11 (0.9)	500 (7.5)	11 (0.7)	523 (6.1)	50 (0.9)	492 (3.2)	28 (1.1)	450 (4.9)
Saudi Arabia		●	●	6 (0.6)	415 (9.8)	18 (1.2)	393 (7.5)	31 (1.4)	404 (5.8)	45 (1.8)	380 (6.4)
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.				56 (0.2)	514 (0.7)	18 (0.1)	501 (0.9)	16 (0.1)	489 (1.1)	11 (0.1)	463 (1.5)

● Yes

○ No

( ) 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. 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 Science	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
Benchmarking Participants											
Quebec, Canada	r	●	●	62 (1.6)	531 (4.3)	15 (0.8)	533 (6.0)	17 (1.3)	518 (4.7)	7 (0.9)	519 (9.3)
Ontario, Canada	r	●	○	40 (1.9)	544 (3.0)	29 (1.0)	539 (3.5)	17 (1.9)	530 (3.7)	14 (0.9)	519 (4.1)
Dubai, UAE		●	○	27 (0.6)	528 (2.9)	41 (0.7)	516 (2.5)	21 (0.6)	542 (3.5)	11 (0.5)	503 (4.7)
Abu Dhabi, UAE	r	●	●	19 (1.0)	451 (9.0)	45 (1.2)	410 (5.9)	22 (1.2)	435 (7.2)	14 (0.8)	416 (9.0)
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)	553 (3.1)	41 (0.9)	538 (3.8)	4 (0.4)	505 (14.5)	3 (0.4)	476 (11.7)
Italy		46 (1.0)	528 (2.8)	43 (1.1)	515 (2.9)	5 (0.4)	511 (6.8)	5 (0.4)	490 (6.8)
Slovenia	s	46 (1.1)	559 (3.3)	34 (0.9)	548 (3.9)	10 (0.7)	552 (5.4)	10 (0.9)	540 (6.2)
Slovak Republic		46 (1.0)	535 (2.9)	28 (0.9)	535 (2.7)	14 (0.8)	504 (5.9)	13 (0.9)	466 (8.9)
Czech Republic		44 (0.9)	542 (2.2)	34 (0.9)	537 (3.0)	13 (0.7)	521 (4.3)	10 (0.6)	514 (5.9)
Russian Federation		44 (1.2)	578 (4.1)	16 (0.8)	568 (4.6)	26 (1.2)	563 (2.9)	15 (0.9)	545 (4.8)
Korea, Rep. of		42 (1.0)	604 (2.6)	44 (0.9)	580 (2.3)	6 (0.4)	599 (4.2)	8 (0.5)	569 (4.1)
Poland		39 (1.3)	561 (2.6)	24 (1.0)	552 (3.4)	22 (1.1)	537 (3.1)	15 (0.8)	521 (4.2)
France		37 (1.1)	505 (3.5)	50 (1.1)	485 (2.8)	4 (0.4)	487 (8.9)	8 (0.6)	468 (6.2)
Croatia		36 (1.2)	550 (3.2)	22 (0.9)	533 (2.6)	23 (0.9)	531 (3.0)	19 (1.0)	509 (3.2)
New Zealand	s	36 (1.0)	544 (3.3)	20 (0.8)	517 (4.1)	25 (0.8)	532 (3.5)	19 (0.9)	496 (4.8)
Bulgaria		35 (1.5)	566 (3.8)	33 (1.2)	536 (5.7)	9 (0.7)	546 (9.2)	23 (1.7)	493 (13.4)
Lithuania		34 (1.1)	545 (3.4)	34 (1.1)	534 (3.3)	14 (0.8)	521 (4.7)	18 (0.8)	507 (4.9)
Denmark		34 (1.1)	539 (2.6)	59 (1.1)	527 (2.5)	3 (0.4)	522 (8.0)	4 (0.3)	504 (7.8)
Portugal		33 (1.0)	523 (2.9)	41 (0.8)	506 (2.4)	10 (0.5)	505 (3.9)	16 (0.8)	490 (3.5)
Kazakhstan		33 (1.4)	564 (5.8)	14 (0.7)	546 (6.5)	33 (1.3)	550 (5.5)	20 (1.1)	528 (5.5)
Germany	s	32 (1.0)	552 (2.9)	35 (0.9)	548 (3.5)	14 (0.8)	530 (5.4)	19 (0.8)	518 (4.1)
Georgia		32 (1.1)	461 (4.9)	27 (1.0)	446 (4.7)	21 (1.0)	458 (5.4)	20 (0.9)	441 (5.5)
Serbia		32 (1.3)	549 (3.2)	15 (0.7)	538 (4.1)	30 (1.1)	522 (3.6)	23 (1.2)	492 (10.5)
Cyprus		31 (0.9)	508 (3.3)	25 (0.8)	480 (3.1)	19 (0.7)	485 (3.3)	25 (0.8)	461 (3.4)
Singapore		30 (0.7)	617 (3.5)	50 (0.7)	591 (3.7)	5 (0.3)	583 (8.0)	15 (0.5)	547 (5.9)
Sweden		29 (0.9)	561 (3.4)	60 (1.2)	546 (3.6)	3 (0.4)	521 (11.0)	8 (0.9)	510 (8.7)
Spain	r	29 (0.7)	543 (3.0)	28 (0.8)	521 (3.4)	19 (0.7)	521 (3.5)	24 (0.7)	503 (3.2)
Canada	r	26 (1.1)	546 (2.8)	19 (0.6)	526 (3.3)	29 (0.8)	538 (2.4)	26 (1.4)	516 (3.3)
Belgium (Flemish)		25 (0.8)	529 (3.1)	63 (0.9)	516 (2.3)	3 (0.2)	485 (6.5)	9 (0.6)	475 (4.9)
Ireland		22 (0.8)	548 (3.2)	12 (0.5)	530 (4.3)	40 (1.2)	538 (2.7)	26 (1.0)	509 (3.6)
Chile	r	20 (0.8)	502 (4.1)	23 (0.9)	478 (3.8)	24 (0.8)	495 (4.0)	34 (1.1)	471 (3.9)
Finland		20 (1.0)	567 (4.1)	49 (1.2)	549 (2.7)	10 (0.6)	569 (4.1)	21 (1.0)	554 (3.4)
Bahrain		16 (0.6)	490 (4.2)	18 (0.8)	460 (5.2)	24 (0.9)	479 (4.3)	41 (0.9)	446 (4.5)
Hong Kong SAR		16 (0.6)	587 (4.5)	56 (1.0)	555 (3.1)	5 (0.6)	569 (7.7)	23 (1.0)	542 (4.3)
Chinese Taipei		12 (0.6)	578 (2.9)	40 (1.0)	554 (2.2)	10 (0.6)	572 (3.6)	37 (1.0)	547 (2.5)
United Arab Emirates		9 (0.4)	509 (5.2)	12 (0.3)	453 (4.6)	29 (0.4)	479 (2.8)	49 (0.6)	436 (3.1)
Qatar	r	9 (0.6)	485 (8.5)	12 (0.6)	445 (6.9)	27 (1.0)	473 (4.4)	53 (1.1)	429 (4.6)
Kuwait	r	8 (0.6)	382 (12.2)	11 (0.7)	349 (8.6)	24 (1.1)	364 (10.1)	57 (1.2)	336 (6.3)
Morocco		7 (0.5)	412 (9.3)	22 (1.0)	374 (8.5)	7 (0.5)	368 (7.6)	65 (1.4)	341 (5.8)
Indonesia		7 (0.8)	420 (12.1)	12 (0.9)	399 (10.1)	20 (1.2)	420 (6.1)	61 (1.5)	390 (5.6)
Iran, Islamic Rep. of		6 (0.6)	468 (7.5)	11 (1.0)	433 (7.8)	20 (1.2)	437 (8.5)	63 (1.6)	411 (4.6)
Oman		5 (0.4)	474 (7.8)	10 (0.4)	438 (6.4)	19 (0.6)	464 (5.1)	65 (0.8)	422 (3.3)
Turkey		4 (0.5)	527 (8.0)	7 (0.6)	486 (9.2)	21 (0.9)	522 (3.5)	68 (1.4)	471 (3.9)
Saudi Arabia		3 (0.4)	429 (11.2)	3 (0.4)	402 (13.3)	29 (1.1)	404 (5.5)	65 (1.2)	385 (5.2)
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.		27 (0.1)	526 (0.9)	29 (0.1)	504 (0.8)	17 (0.1)	507 (1.0)	28 (0.2)	482 (0.9)

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

A dash (-) indicates comparable data not available.

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

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

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
Benchmarking Participants									
Quebec, Canada	r	30 (1.3)	537 (4.4)	32 (1.2)	526 (5.4)	18 (0.8)	535 (5.6)	20 (1.4)	514 (5.1)
Ontario, Canada	r	25 (1.5)	554 (3.4)	15 (0.8)	526 (4.1)	33 (1.2)	541 (3.2)	27 (2.1)	521 (3.5)
Dubai, UAE		13 (0.4)	555 (4.1)	14 (0.5)	504 (3.7)	32 (0.6)	543 (2.6)	41 (0.7)	504 (3.3)
Abu Dhabi, UAE	r	9 (0.7)	481 (10.8)	11 (0.7)	427 (11.1)	28 (0.9)	444 (6.1)	52 (1.2)	404 (5.9)
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)	606 (1.8)	43 (0.8)	574 (2.6)	3 (0.3)	532 (6.9)	12.0 (0.04)
Ireland	51 (1.0)	552 (2.7)	43 (1.1)	515 (2.9)	6 (0.5)	477 (5.8)	11.6 (0.04)
Bahrain	44 (1.3)	489 (2.8)	49 (1.4)	448 (3.6)	7 (0.4)	405 (7.3)	11.3 (0.03)
Singapore	43 (1.1)	626 (3.3)	51 (1.0)	572 (3.7)	5 (0.4)	495 (7.2)	11.4 (0.05)
Spain	34 (0.8)	544 (2.4)	53 (0.8)	517 (2.4)	13 (0.7)	493 (4.7)	10.7 (0.04)
Chinese Taipei	33 (0.9)	576 (2.3)	62 (0.9)	548 (2.1)	5 (0.3)	518 (6.0)	11.0 (0.03)
Hong Kong SAR	33 (1.2)	582 (3.6)	62 (1.1)	548 (3.1)	5 (0.4)	505 (8.1)	11.0 (0.04)
United Arab Emirates	31 (0.6)	501 (2.9)	55 (0.6)	447 (2.9)	14 (0.4)	392 (4.6)	10.7 (0.02)
Qatar r	31 (1.0)	486 (4.3)	55 (0.9)	437 (4.3)	15 (0.8)	396 (8.0)	10.6 (0.04)
Poland	29 (0.9)	571 (3.2)	56 (1.0)	541 (2.3)	15 (0.6)	524 (4.7)	10.5 (0.03)
Japan	28 (0.7)	595 (2.4)	61 (0.9)	565 (2.0)	11 (0.6)	533 (3.9)	10.7 (0.03)
Croatia	28 (0.8)	558 (2.7)	58 (0.9)	529 (2.4)	15 (0.7)	505 (3.3)	10.5 (0.03)
Oman	26 (0.6)	474 (3.2)	59 (0.6)	429 (3.5)	14 (0.5)	378 (6.1)	10.4 (0.03)
Serbia	26 (0.8)	557 (3.7)	58 (1.3)	524 (3.8)	16 (1.3)	477 (12.1)	10.4 (0.05)
Saudi Arabia	25 (1.0)	415 (5.5)	54 (1.1)	395 (5.0)	21 (1.2)	357 (8.3)	10.2 (0.06)
Canada r	25 (0.9)	561 (2.9)	57 (0.9)	528 (2.3)	19 (0.6)	503 (3.4)	10.3 (0.04)
Kazakhstan	22 (1.2)	571 (6.5)	65 (1.1)	545 (4.2)	13 (0.9)	532 (6.2)	10.4 (0.05)
Finland	22 (0.7)	589 (2.9)	49 (0.8)	555 (2.6)	29 (0.8)	530 (3.4)	9.9 (0.03)
Sweden	21 (0.8)	575 (4.1)	57 (0.9)	543 (3.7)	22 (0.7)	525 (4.8)	10.1 (0.04)
Kuwait r	21 (1.2)	392 (9.2)	56 (1.2)	346 (6.9)	23 (1.0)	304 (7.8)	10.0 (0.06)
Lithuania	20 (0.8)	563 (3.4)	62 (1.0)	531 (2.6)	17 (0.8)	492 (4.5)	10.2 (0.03)
Indonesia	20 (1.1)	455 (4.7)	60 (1.3)	395 (4.7)	21 (1.8)	350 (8.7)	10.1 (0.09)
Bulgaria	17 (0.8)	577 (4.4)	48 (1.5)	548 (4.6)	34 (1.9)	501 (11.1)	9.4 (0.09)
Chile r	17 (0.7)	515 (4.4)	59 (0.9)	486 (3.0)	24 (1.0)	457 (3.8)	9.9 (0.04)
Russian Federation	17 (0.9)	598 (3.8)	59 (1.0)	572 (3.4)	24 (1.0)	535 (4.4)	9.9 (0.05)
Turkey	16 (0.9)	507 (4.9)	40 (1.1)	493 (3.2)	44 (1.6)	468 (4.7)	9.1 (0.09)
Morocco	15 (1.0)	416 (7.3)	48 (1.4)	360 (5.0)	37 (1.6)	321 (7.8)	9.1 (0.10)
Cyprus	15 (0.6)	514 (4.4)	59 (0.9)	484 (2.5)	26 (0.9)	468 (3.4)	9.8 (0.03)
Iran, Islamic Rep. of	11 (0.8)	459 (7.1)	55 (1.8)	426 (4.7)	34 (1.9)	402 (7.4)	9.4 (0.08)
Czech Republic	10 (0.4)	564 (3.9)	54 (0.8)	536 (2.6)	35 (0.9)	525 (3.0)	9.4 (0.03)
France	10 (0.6)	510 (5.3)	59 (0.9)	494 (2.9)	31 (0.9)	478 (3.3)	9.5 (0.03)
Georgia	9 (0.6)	480 (5.3)	54 (1.0)	458 (4.2)	36 (1.0)	435 (4.9)	9.3 (0.04)
New Zealand s	9 (0.6)	556 (5.8)	50 (0.9)	532 (2.8)	41 (1.1)	512 (3.8)	9.2 (0.04)
Portugal	8 (0.8)	530 (4.6)	55 (0.8)	511 (2.4)	37 (1.0)	500 (2.6)	9.3 (0.04)
Hungary	8 (0.5)	579 (5.2)	41 (0.8)	542 (4.1)	52 (0.9)	536 (3.8)	8.8 (0.04)
Slovenia s	7 (0.6)	587 (6.6)	41 (1.0)	560 (3.1)	52 (0.9)	541 (3.2)	8.8 (0.03)
Italy	7 (0.5)	537 (4.8)	47 (0.9)	520 (3.3)	46 (0.9)	515 (2.9)	9.0 (0.04)
Germany s	5 (0.5)	551 (8.2)	45 (1.1)	542 (3.4)	50 (1.2)	538 (3.0)	8.9 (0.03)
Denmark	4 (0.4)	557 (5.6)	52 (0.9)	533 (2.4)	43 (1.0)	522 (3.2)	9.0 (0.03)
Slovak Republic	4 (0.4)	550 (10.6)	41 (0.9)	530 (3.5)	55 (1.0)	512 (3.4)	8.6 (0.04)
Belgium (Flemish)	4 (0.3)	506 (6.5)	44 (1.0)	511 (2.9)	52 (1.1)	517 (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)	535 (0.8)	53 (0.2)	504 (0.5)	26 (0.2)	476 (0.9)	

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.

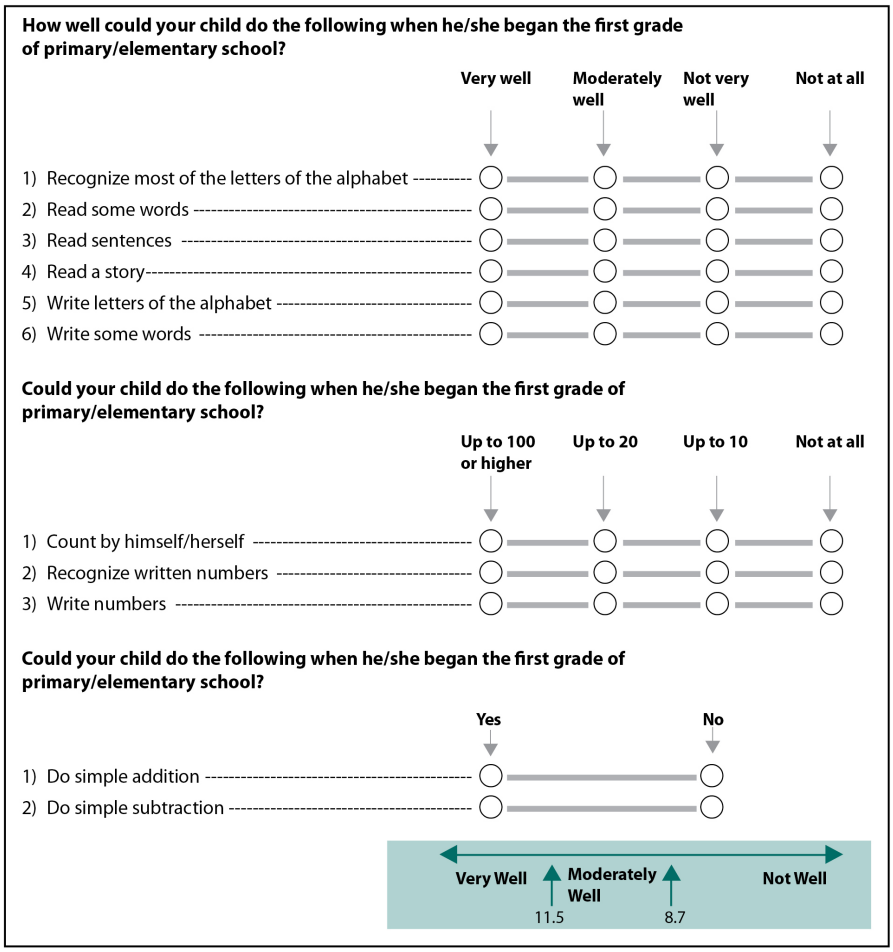
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students. An "x" indicates data are available for less than 50% of students.

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

Exhibit 4.9: 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	
Benchmarking Participants							
Dubai, UAE	35 (0.9)	551 (2.6)	54 (1.0)	514 (2.5)	11 (0.5)	468 (5.3)	10.8 (0.03)
Ontario, Canada r	31 (1.6)	564 (3.7)	56 (1.6)	531 (2.7)	14 (0.6)	497 (4.5)	10.6 (0.06)
Abu Dhabi, UAE	28 (1.1)	479 (6.7)	55 (1.0)	416 (5.5)	16 (0.9)	353 (8.3)	10.5 (0.05)
Quebec, Canada r	15 (1.0)	554 (5.8)	57 (1.4)	528 (4.0)	28 (1.2)	514 (5.4)	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



TIMSS 2015

CHAPTER 5: SCHOOL COMPOSITION AND RESOURCES

TIMSS 2015 INTERNATIONAL RESULTS IN SCIENCE

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

School Composition and Resources

Socioeconomic Composition of Schools

PERCENT OF STUDENTS 38%
Average Achievement 526
Attended schools with more affluent than disadvantaged students

PERCENT OF STUDENTS 35%
Average Achievement 507
Attended schools with neither more affluent nor more disadvantaged students

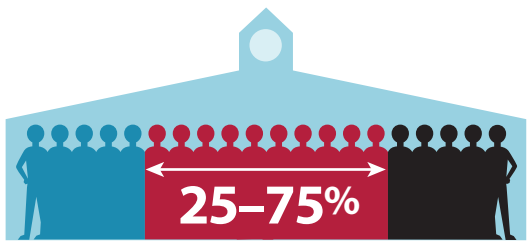
PERCENT OF STUDENTS 27%
Average Achievement 483
Attended schools with more disadvantaged than affluent students

In nearly all the TIMSS 2015 countries, students attending schools with more affluent than disadvantaged students had higher average science 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' science achievement at the fourth grade.

22% PERCENT OF STUDENTS
519 Average Achievement



54% PERCENT OF STUDENTS
507 Average Achievement

24% PERCENT OF STUDENTS
479 Average Achievement

Instruction Affected by Science Resource Shortages – Principals' Reports

Percent of Students Not Affected
25%
517 Average Achievement

Percent of Students Affected
69%
504 Average Achievement

Percent of Students Affected a Lot
5%
483 Average Achievement

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

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

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)	552 (3.8)	34 (3.7)	525 (4.1)	31 (3.6)	490 (5.0)
Bahrain	r	31 (0.2)	460 (6.7)	45 (0.2)	461 (3.4)	24 (0.2)	452 (4.4)
Belgium (Flemish)		64 (3.5)	524 (2.9)	24 (3.4)	502 (4.5)	11 (2.2)	478 (12.2)
Bulgaria		17 (4.1)	579 (4.7)	48 (5.0)	546 (6.1)	35 (4.4)	505 (13.8)
Canada		42 (3.3)	537 (3.1)	33 (3.4)	526 (3.6)	25 (2.7)	502 (4.7)
Chile	r	14 (2.5)	530 (6.9)	18 (4.0)	495 (6.1)	68 (4.4)	464 (3.8)
Chinese Taipei		13 (2.6)	572 (4.0)	72 (3.5)	557 (2.0)	15 (2.4)	533 (5.0)
Croatia		35 (3.4)	539 (3.4)	46 (3.8)	534 (2.8)	18 (3.3)	518 (3.6)
Cyprus		39 (4.7)	493 (3.9)	45 (4.7)	481 (3.8)	15 (3.0)	453 (5.4)
Czech Republic		38 (4.3)	545 (3.4)	44 (4.4)	534 (2.7)	18 (3.3)	514 (7.1)
Denmark	s	63 (4.5)	536 (2.9)	30 (4.5)	522 (4.7)	7 (2.2)	512 (10.1)
England		31 (3.2)	559 (4.7)	32 (3.8)	541 (5.2)	37 (3.7)	512 (4.2)
Finland		34 (3.9)	554 (4.9)	59 (4.4)	555 (2.3)	7 (2.2)	544 (8.1)
France	r	34 (3.9)	510 (4.0)	34 (4.4)	490 (4.1)	32 (4.6)	460 (5.3)
Georgia		26 (3.5)	480 (9.8)	23 (4.0)	450 (6.4)	51 (4.4)	437 (5.2)
Germany	r	24 (2.8)	548 (3.8)	43 (3.8)	532 (3.7)	33 (3.3)	504 (5.3)
Hong Kong SAR		39 (3.6)	580 (4.8)	30 (3.8)	550 (4.6)	31 (4.0)	535 (6.1)
Hungary		27 (3.2)	576 (4.0)	33 (4.0)	558 (4.3)	40 (3.9)	507 (5.9)
Indonesia	r	16 (2.6)	438 (12.2)	32 (3.3)	406 (9.2)	52 (3.2)	384 (6.5)
Iran, Islamic Rep. of		14 (2.9)	458 (11.6)	44 (3.5)	433 (7.3)	42 (3.6)	393 (7.9)
Ireland		36 (4.2)	548 (3.3)	43 (4.7)	524 (3.8)	21 (2.9)	510 (5.1)
Italy		36 (4.2)	526 (4.2)	50 (4.7)	518 (4.0)	14 (2.9)	497 (6.8)
Japan		55 (4.4)	575 (2.2)	37 (4.2)	564 (2.3)	8 (2.3)	555 (5.3)
Kazakhstan		69 (3.6)	558 (5.7)	25 (3.6)	542 (9.6)	6 (1.9)	522 (25.3)
Korea, Rep. of		29 (3.7)	607 (3.3)	51 (3.9)	587 (2.3)	21 (3.1)	570 (3.6)
Kuwait	r	23 (5.2)	379 (16.0)	40 (5.5)	331 (10.1)	37 (5.9)	331 (11.8)
Lithuania		55 (3.3)	537 (2.9)	29 (3.5)	520 (6.1)	16 (2.7)	507 (6.9)
Morocco	r	13 (1.9)	436 (14.3)	8 (1.9)	345 (14.6)	79 (2.8)	336 (5.7)
Netherlands	s	72 (4.5)	528 (3.5)	23 (4.5)	520 (5.0)	6 (2.8)	494 (8.3)
New Zealand		47 (3.2)	534 (3.9)	26 (3.5)	509 (4.5)	27 (2.7)	458 (6.9)
Northern Ireland	r	46 (5.1)	535 (3.2)	18 (4.2)	517 (7.6)	37 (3.8)	505 (5.0)
Norway (5)		59 (4.3)	543 (3.0)	34 (4.3)	534 (4.6)	7 (2.6)	499 (10.4)
Oman		35 (2.9)	430 (6.8)	42 (3.0)	438 (5.6)	23 (2.6)	422 (7.8)
Poland		17 (3.3)	560 (5.3)	57 (4.3)	551 (3.0)	25 (3.8)	526 (4.8)
Portugal		19 (2.9)	526 (4.1)	35 (4.3)	506 (3.3)	46 (3.9)	503 (3.1)
Qatar	r	72 (2.8)	444 (5.5)	16 (2.7)	413 (11.8)	12 (2.0)	427 (11.1)
Russian Federation		72 (3.6)	569 (2.5)	24 (3.8)	567 (10.3)	4 (1.2)	551 (13.6)
Saudi Arabia	r	46 (4.7)	408 (7.9)	36 (4.1)	370 (7.6)	19 (3.7)	363 (16.4)
Serbia		20 (3.3)	543 (4.9)	36 (4.5)	523 (5.2)	44 (4.6)	517 (7.5)
Singapore		44 (0.0)	608 (4.9)	46 (0.0)	585 (6.1)	10 (0.0)	546 (12.6)
Slovak Republic		31 (3.0)	540 (3.2)	48 (3.2)	533 (3.2)	21 (2.4)	460 (5.3)
Slovenia		35 (4.2)	546 (4.2)	41 (4.5)	544 (3.1)	23 (3.4)	539 (4.0)
Spain		46 (3.8)	532 (2.9)	34 (3.5)	519 (3.7)	20 (3.2)	489 (6.3)
Sweden		71 (4.3)	555 (3.4)	19 (3.6)	521 (6.4)	11 (3.0)	491 (17.5)
Turkey		22 (3.0)	514 (7.9)	27 (2.9)	499 (7.2)	51 (3.2)	461 (4.0)
United Arab Emirates	r	50 (1.9)	469 (5.1)	23 (1.9)	468 (7.7)	27 (1.8)	392 (5.3)
United States		19 (2.1)	591 (5.2)	23 (2.6)	564 (4.2)	59 (2.3)	525 (3.4)
International Avg.		38 (0.5)	526 (0.9)	35 (0.6)	507 (0.9)	27 (0.5)	483 (1.3)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

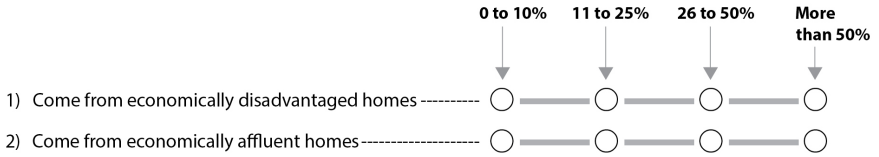
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

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
Benchmarking Participants							
Buenos Aires, Argentina	s	50 (6.2)	444 (6.8)	15 (3.7)	405 (10.9)	35 (6.2)	384 (11.4)
Ontario, Canada		37 (5.5)	535 (5.0)	32 (5.1)	538 (3.8)	31 (4.1)	514 (4.4)
Quebec, Canada		63 (5.7)	537 (4.3)	23 (5.4)	511 (5.2)	15 (4.6)	500 (9.1)
Norway (4)		59 (4.5)	501 (2.4)	36 (4.8)	487 (3.7)	5 (2.2)	458 (19.0)
Abu Dhabi, UAE	r	47 (5.0)	425 (14.4)	19 (4.1)	419 (25.3)	35 (3.9)	372 (10.0)
Dubai, UAE	r	61 (0.3)	532 (2.1)	26 (0.3)	535 (3.7)	13 (0.1)	414 (4.5)
Florida, US	r	13 (4.3)	587 (12.3)	19 (6.2)	579 (9.8)	67 (5.8)	535 (5.7)

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

Approximately what percentage of students in your school have the following backgrounds?



More Affluent - Schools where more than 25% of the student body comes from economically affluent homes and not more than 25% from economically disadvantaged homes

More Disadvantaged - Schools where more than 25% of the student body comes from economically disadvantaged homes and not more than 25% from economically affluent homes

Neither More Affluent nor More Disadvantaged - All other possible response combinations

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)	526 (4.2)	22 (2.7)	533 (6.3)	16 (2.4)	502 (7.1)
Bahrain		67 (0.2)	458 (2.6)	8 (0.1)	479 (7.4)	25 (0.2)	450 (6.8)
Belgium (Flemish)		48 (3.6)	529 (3.0)	32 (4.0)	509 (3.3)	20 (2.8)	483 (6.9)
Bulgaria		49 (4.0)	564 (5.4)	23 (3.6)	530 (8.6)	28 (2.8)	491 (16.5)
Canada		47 (3.1)	527 (3.7)	34 (2.7)	526 (4.0)	19 (2.2)	516 (4.2)
Chile		100 (0.4)	479 (3.0)	0 (0.4)	~ ~	0 (0.0)	~ ~
Chinese Taipei		61 (4.1)	560 (2.5)	28 (3.5)	549 (3.5)	10 (2.7)	544 (6.0)
Croatia		95 (1.7)	534 (2.2)	4 (1.6)	524 (8.9)	1 (0.5)	~ ~
Cyprus		51 (4.0)	491 (3.3)	43 (4.2)	476 (3.3)	7 (2.2)	443 (9.2)
Czech Republic		94 (2.0)	534 (2.5)	6 (2.0)	539 (10.0)	0 (0.0)	~ ~
Denmark	r	66 (4.1)	532 (2.3)	27 (3.9)	524 (5.1)	7 (2.2)	521 (10.4)
England		49 (4.5)	540 (3.8)	30 (4.3)	543 (6.2)	20 (3.6)	520 (7.7)
Finland		84 (3.0)	556 (2.3)	15 (2.9)	540 (7.7)	1 (0.9)	~ ~
France		71 (3.6)	497 (3.2)	20 (3.2)	468 (5.9)	9 (2.4)	450 (8.0)
Georgia		88 (3.0)	451 (3.5)	11 (2.9)	455 (20.7)	1 (0.7)	~ ~
Germany		30 (3.2)	542 (3.4)	43 (3.8)	534 (3.1)	28 (3.0)	503 (5.9)
Hong Kong SAR		85 (3.1)	551 (3.1)	8 (3.3)	572 (27.5)	7 (3.0)	616 (9.9)
Hungary		99 (0.6)	542 (3.4)	0 (0.0)	~ ~	1 (0.6)	~ ~
Indonesia		24 (2.4)	419 (10.1)	23 (3.0)	388 (9.7)	53 (3.2)	391 (7.8)
Iran, Islamic Rep. of		49 (3.0)	449 (6.1)	10 (1.9)	453 (6.8)	41 (3.1)	380 (7.1)
Ireland		67 (3.0)	534 (3.0)	29 (2.8)	519 (3.5)	4 (1.6)	510 (17.2)
Italy		59 (3.6)	515 (3.7)	39 (3.7)	519 (3.5)	2 (1.2)	~ ~
Japan		100 (0.0)	569 (1.8)	0 (0.0)	~ ~	0 (0.0)	~ ~
Kazakhstan		57 (2.8)	538 (6.6)	23 (3.3)	571 (10.5)	20 (3.0)	558 (10.1)
Korea, Rep. of		98 (1.0)	589 (2.0)	1 (0.8)	~ ~	1 (0.5)	~ ~
Kuwait		59 (4.6)	332 (7.5)	12 (3.5)	355 (24.9)	29 (3.4)	336 (9.3)
Lithuania		89 (1.7)	529 (2.8)	9 (1.9)	519 (7.9)	2 (1.1)	~ ~
Morocco		63 (2.6)	358 (5.8)	13 (2.0)	350 (16.5)	24 (2.2)	340 (10.9)
Netherlands	s	65 (5.3)	528 (3.3)	31 (5.4)	520 (4.7)	4 (2.2)	492 (19.2)
New Zealand		59 (3.3)	515 (3.8)	27 (3.1)	500 (5.6)	14 (2.8)	488 (10.3)
Northern Ireland	r	74 (5.0)	525 (2.9)	18 (4.4)	509 (8.1)	8 (3.1)	491 (9.8)
Norway (5)		58 (4.7)	542 (3.2)	32 (4.7)	539 (3.5)	10 (3.1)	505 (10.3)
Oman		78 (2.2)	437 (4.0)	10 (1.9)	427 (11.4)	12 (1.5)	399 (8.5)
Poland		99 (0.8)	547 (2.5)	1 (0.8)	~ ~	0 (0.0)	~ ~
Portugal		82 (3.3)	509 (2.3)	11 (2.5)	505 (5.8)	7 (2.4)	507 (6.9)
Qatar		43 (2.6)	409 (5.5)	11 (2.4)	453 (17.3)	46 (2.1)	457 (6.9)
Russian Federation		73 (3.4)	569 (2.6)	16 (2.9)	575 (12.5)	11 (1.8)	543 (9.4)
Saudi Arabia		84 (2.7)	388 (5.5)	11 (2.6)	410 (14.9)	5 (1.6)	411 (23.9)
Serbia		84 (3.1)	529 (3.5)	11 (2.6)	516 (10.4)	5 (2.0)	473 (38.5)
Singapore		0 (0.0)	~ ~	0 (0.0)	~ ~	100 (0.0)	591 (3.7)
Slovak Republic		83 (2.4)	529 (2.8)	10 (2.2)	499 (11.7)	8 (1.8)	460 (15.0)
Slovenia		70 (3.7)	543 (3.0)	28 (3.7)	546 (3.4)	2 (1.4)	~ ~
Spain		54 (3.0)	523 (2.9)	29 (3.2)	522 (3.5)	17 (2.4)	499 (6.2)
Sweden		44 (4.6)	555 (3.6)	43 (4.3)	543 (4.5)	13 (2.7)	489 (14.2)
Turkey		80 (1.8)	499 (3.5)	7 (1.5)	469 (10.6)	14 (1.9)	402 (9.9)
United Arab Emirates		40 (1.3)	402 (4.0)	5 (0.7)	498 (12.5)	56 (1.5)	476 (5.0)
United States		50 (3.0)	562 (3.1)	31 (3.2)	541 (5.3)	19 (2.7)	511 (8.7)
International Avg.		67 (0.5)	508 (0.6)	18 (0.4)	501 (1.6)	15 (0.3)	478 (2.1)

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.
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
Benchmarking Participants							
Buenos Aires, Argentina	s	93 (2.9)	423 (5.6)	7 (2.9)	372 (21.4)	0 (0.0)	~ ~
Ontario, Canada		39 (4.8)	534 (4.5)	38 (4.7)	531 (4.2)	24 (3.4)	521 (5.7)
Quebec, Canada		60 (6.2)	535 (4.1)	23 (5.2)	510 (7.1)	17 (4.3)	510 (8.7)
Norway (4)		56 (4.5)	496 (2.6)	33 (4.9)	499 (3.7)	11 (3.4)	468 (10.5)
Abu Dhabi, UAE		47 (3.4)	367 (7.5)	4 (1.7)	503 (22.5)	49 (3.7)	439 (11.8)
Dubai, UAE		23 (0.2)	460 (3.6)	7 (0.1)	567 (4.0)	69 (0.2)	529 (2.2)
Florida, US	r	43 (7.8)	565 (8.3)	26 (7.5)	540 (8.8)	31 (7.4)	538 (10.8)

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)	533 (2.6)	18 (3.7)	519 (6.9)	0 (0.0)	~ ~	12.6 (0.08)
Singapore	78 (0.0)	598 (3.9)	21 (0.0)	565 (9.8)	1 (0.0)	~ ~	12.6 (0.00)
Hong Kong SAR	78 (4.2)	561 (4.0)	22 (4.2)	541 (10.8)	0 (0.0)	~ ~	12.5 (0.11)
Korea, Rep. of	69 (3.9)	594 (2.4)	29 (3.8)	581 (2.8)	2 (1.2)	~ ~	12.2 (0.12)
United States	57 (3.0)	559 (3.6)	33 (2.9)	531 (5.5)	10 (1.9)	523 (7.7)	11.5 (0.13)
Spain	56 (3.4)	528 (2.6)	41 (3.4)	508 (4.4)	3 (1.2)	468 (20.7)	11.7 (0.09)
Chinese Taipei	52 (4.5)	561 (2.4)	47 (4.4)	550 (2.9)	1 (0.7)	~ ~	11.8 (0.13)
England r	47 (4.8)	552 (5.3)	48 (5.0)	524 (4.2)	4 (2.0)	507 (22.4)	11.4 (0.15)
Qatar	46 (3.4)	443 (6.9)	41 (3.1)	442 (6.2)	13 (2.5)	391 (14.0)	11.2 (0.16)
United Arab Emirates	40 (2.0)	480 (5.3)	44 (2.2)	432 (4.9)	16 (1.2)	413 (7.0)	10.9 (0.07)
Indonesia	34 (3.0)	431 (7.3)	58 (3.5)	382 (6.5)	8 (1.9)	364 (15.5)	10.9 (0.10)
Kazakhstan	33 (3.9)	558 (9.3)	64 (3.9)	548 (5.0)	3 (0.9)	529 (30.3)	11.1 (0.11)
Bahrain	32 (0.2)	455 (6.0)	52 (0.2)	462 (2.7)	15 (0.1)	453 (6.0)	10.7 (0.01)
Japan	31 (4.0)	575 (3.4)	67 (4.0)	566 (1.9)	2 (1.1)	~ ~	10.9 (0.10)
Canada	31 (3.3)	534 (4.4)	61 (3.8)	524 (2.8)	8 (1.6)	498 (10.1)	10.8 (0.09)
Kuwait	24 (3.7)	381 (11.7)	42 (4.6)	336 (10.9)	33 (3.9)	301 (6.7)	9.8 (0.16)
Finland	18 (3.3)	557 (3.8)	80 (3.5)	555 (2.3)	2 (1.5)	~ ~	10.8 (0.10)
Oman	17 (1.9)	424 (8.7)	54 (3.2)	434 (5.3)	29 (2.8)	432 (6.2)	9.7 (0.10)
Sweden	16 (3.4)	555 (6.7)	76 (4.1)	539 (4.6)	8 (2.4)	529 (10.1)	10.5 (0.12)
Saudi Arabia	16 (2.2)	403 (12.6)	56 (3.7)	405 (6.3)	29 (3.2)	355 (10.3)	9.6 (0.10)
Russian Federation	15 (2.1)	581 (5.1)	73 (2.9)	567 (2.8)	12 (2.0)	533 (7.5)	10.2 (0.09)
Georgia	13 (3.2)	447 (13.8)	45 (4.8)	459 (6.3)	42 (4.5)	445 (5.2)	9.3 (0.17)
Chile	10 (2.4)	508 (11.1)	69 (4.3)	478 (4.1)	21 (3.6)	462 (6.0)	9.7 (0.13)
Australia	9 (1.9)	538 (8.1)	41 (3.8)	541 (4.3)	50 (3.9)	507 (4.3)	8.8 (0.14)
Netherlands s	9 (3.3)	531 (8.6)	86 (4.1)	524 (3.3)	5 (2.5)	508 (2.9)	10.3 (0.11)
Bulgaria	8 (2.5)	568 (11.3)	68 (4.0)	548 (4.7)	24 (3.5)	490 (18.4)	9.7 (0.12)
Portugal	7 (2.3)	519 (7.1)	56 (4.1)	510 (3.2)	37 (4.2)	504 (3.2)	9.1 (0.13)
Lithuania	7 (1.9)	535 (8.7)	76 (3.7)	529 (3.0)	17 (3.3)	518 (7.3)	9.7 (0.11)
Poland	6 (2.4)	546 (8.6)	71 (4.0)	549 (2.7)	22 (3.6)	544 (4.7)	9.7 (0.14)
Croatia	6 (2.2)	544 (7.4)	84 (3.3)	534 (2.3)	9 (2.5)	518 (6.3)	9.9 (0.09)
Morocco	6 (1.7)	432 (17.2)	38 (2.7)	363 (6.9)	56 (2.5)	337 (7.0)	8.4 (0.11)
Serbia	6 (2.0)	547 (9.5)	79 (3.4)	527 (3.4)	15 (3.1)	505 (16.9)	9.8 (0.10)
New Zealand	6 (1.5)	553 (6.3)	42 (4.0)	522 (4.8)	53 (3.8)	491 (4.5)	8.6 (0.12)
Norway (5)	5 (2.4)	558 (13.9)	65 (4.4)	538 (3.4)	30 (4.6)	532 (4.9)	9.2 (0.15)
France	5 (2.0)	505 (13.2)	92 (2.1)	486 (3.1)	3 (0.5)	467 (13.1)	10.1 (0.08)
Iran, Islamic Rep. of	5 (1.7)	453 (14.9)	25 (3.0)	421 (10.0)	70 (3.4)	419 (4.5)	8.1 (0.14)
Denmark r	5 (1.8)	542 (6.3)	79 (3.1)	531 (2.6)	16 (2.9)	518 (6.1)	9.6 (0.11)
Italy	4 (1.8)	526 (5.9)	57 (4.1)	516 (3.9)	38 (4.0)	517 (3.6)	9.0 (0.13)
Cyprus	2 (1.5)	~ ~	53 (4.8)	486 (3.5)	45 (4.9)	477 (5.0)	8.6 (0.13)
Belgium (Flemish)	2 (1.1)	~ ~	69 (3.7)	513 (2.8)	30 (3.5)	512 (5.4)	9.1 (0.11)
Turkey	1 (0.9)	~ ~	35 (3.1)	494 (6.7)	63 (3.0)	475 (3.8)	8.2 (0.10)
Germany	1 (0.9)	~ ~	43 (3.5)	535 (3.0)	55 (3.5)	522 (3.8)	8.5 (0.09)
Slovak Republic	1 (0.6)	~ ~	50 (3.4)	537 (3.4)	49 (3.5)	503 (4.5)	8.6 (0.09)
Czech Republic	0 (0.0)	~ ~	51 (4.3)	538 (2.8)	49 (4.3)	530 (3.5)	8.5 (0.09)
Hungary	0 (0.0)	~ ~	34 (4.2)	563 (5.4)	66 (4.2)	531 (5.0)	7.8 (0.11)
Slovenia	0 (0.0)	~ ~	44 (4.6)	546 (3.6)	56 (4.6)	541 (3.1)	8.3 (0.11)
Northern Ireland	- -	- -	- -	- -	- -	- -	- -
International Avg.	22 (0.4)	519 (1.4)	54 (0.5)	507 (0.8)	24 (0.4)	479 (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.

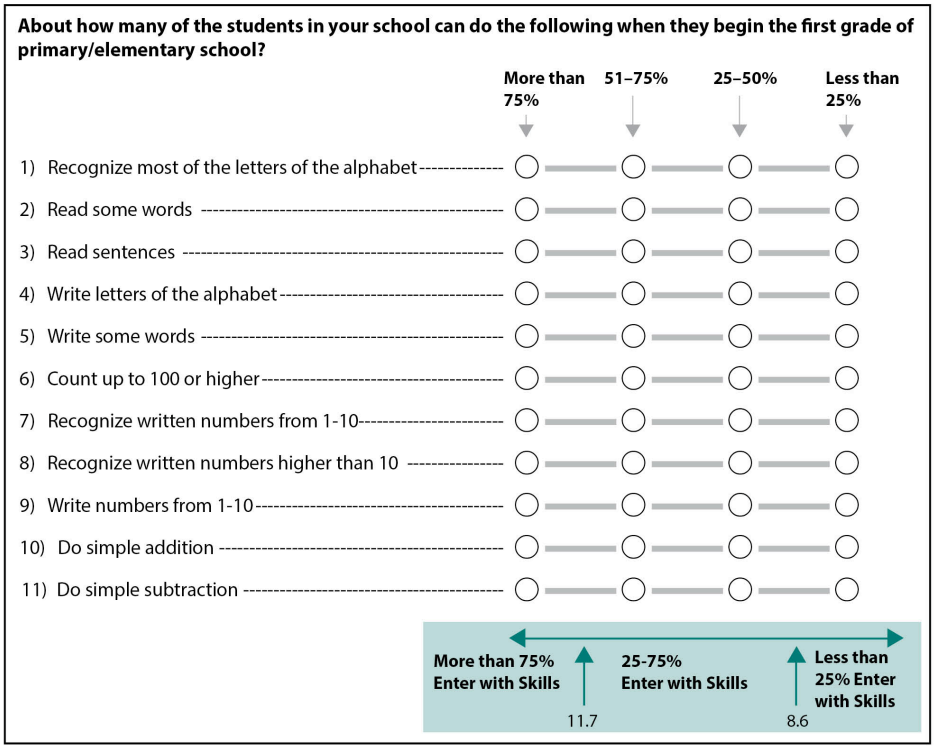
A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

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

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 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	
Benchmarking Participants								
Dubai, UAE		58 (0.3)	528 (2.5)	28 (0.3)	503 (3.7)	14 (0.1)	493 (3.8)	11.4 (0.01)
Florida, US	r	42 (9.1)	551 (8.7)	46 (9.7)	555 (9.1)	12 (4.6)	526 (12.0)	10.9 (0.32)
Ontario, Canada		41 (5.2)	541 (4.2)	54 (5.8)	524 (3.8)	5 (2.0)	498 (12.1)	11.2 (0.14)
Abu Dhabi, UAE		27 (3.8)	441 (17.1)	54 (4.4)	403 (9.7)	18 (3.2)	370 (16.9)	10.4 (0.17)
Quebec, Canada		15 (4.1)	525 (10.6)	76 (5.5)	528 (4.5)	9 (3.6)	511 (11.0)	10.3 (0.15)
Buenos Aires, Argentina	s	15 (4.3)	444 (10.4)	61 (5.2)	433 (6.7)	24 (4.1)	375 (11.5)	9.9 (0.19)
Norway (4)		4 (1.9)	502 (8.0)	67 (4.0)	493 (2.8)	29 (4.5)	494 (5.8)	9.2 (0.14)



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

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

Reported by Principals

Students were scored according to their principals' responses concerning twelve school and classroom resources on the *Science Resource Shortages* scale. Students in schools where instruction was **Not Affected** by resource shortages had a score on the scale of at least 11.2, which corresponds to their principals reporting that shortages affected instruction "not at all" for six of the twelve 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 7.2, which corresponds to their principals reporting that shortages affected instruction "a lot" for six of the twelve 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	76 (3.8)	589 (2.3)	24 (3.8)	591 (4.6)	1 (0.7)	~ ~	12.7 (0.19)	0.6 (0.26)
Slovenia	58 (4.9)	538 (3.4)	42 (4.9)	550 (3.1)	0 (0.0)	~ ~	11.7 (0.15)	-0.2 (0.19)
Qatar	50 (3.1)	453 (6.2)	26 (2.8)	427 (8.4)	24 (2.3)	410 (8.7)	10.3 (0.20)	1.0 (0.32) ▲
Singapore	49 (0.0)	588 (5.5)	42 (0.0)	589 (5.1)	9 (0.0)	621 (12.2)	10.9 (0.00)	0.3 (0.00) ▲
Poland	45 (3.8)	551 (3.4)	52 (3.8)	545 (3.2)	3 (1.5)	550 (10.4)	11.1 (0.15)	◊ ◊
Georgia	40 (4.3)	459 (7.7)	59 (4.3)	446 (4.6)	0 (0.3)	~ ~	11.0 (0.13)	0.5 (0.19)
England	40 (4.3)	546 (4.9)	60 (4.3)	530 (4.5)	0 (0.0)	~ ~	11.0 (0.15)	0.0 (0.22)
Czech Republic	40 (3.8)	535 (4.0)	60 (3.8)	534 (2.5)	0 (0.0)	~ ~	11.1 (0.11)	0.2 (0.18)
United States	36 (3.3)	555 (5.5)	61 (3.3)	540 (3.3)	2 (1.0)	~ ~	10.7 (0.12)	-0.1 (0.17)
Bulgaria	36 (5.1)	543 (12.1)	63 (5.3)	532 (6.4)	1 (1.2)	~ ~	10.8 (0.14)	◊ ◊
Cyprus	34 (4.8)	488 (3.5)	60 (4.8)	477 (3.2)	6 (2.7)	489 (20.5)	10.6 (0.22)	◊ ◊
Chinese Taipei	31 (3.3)	565 (3.2)	67 (3.4)	551 (2.2)	1 (1.0)	~ ~	10.6 (0.12)	2.0 (0.21) ▲
Canada	31 (3.6)	533 (3.5)	68 (3.6)	521 (3.5)	0 (0.2)	~ ~	10.6 (0.10)	◊ ◊
Kazakhstan	31 (3.5)	553 (8.1)	64 (3.7)	548 (5.5)	6 (1.6)	556 (18.2)	10.3 (0.18)	0.1 (0.29)
Australia	30 (3.5)	531 (4.9)	69 (3.4)	521 (4.3)	1 (0.5)	~ ~	10.7 (0.14)	0.1 (0.19)
United Arab Emirates	30 (1.7)	491 (6.1)	54 (1.9)	426 (4.5)	16 (1.2)	441 (6.3)	9.8 (0.12)	0.0 (0.16)
Spain	29 (2.9)	529 (3.4)	70 (3.0)	514 (3.3)	1 (0.8)	~ ~	10.6 (0.08)	-0.3 (0.18)
Chile	28 (3.5)	496 (5.5)	68 (3.7)	473 (3.9)	4 (1.9)	445 (9.4)	10.2 (0.18)	0.5 (0.23)
Sweden	27 (4.2)	536 (6.8)	73 (4.2)	542 (3.8)	0 (0.0)	~ ~	10.6 (0.13)	0.1 (0.20)
New Zealand	26 (3.7)	518 (5.2)	74 (3.7)	503 (3.9)	1 (0.6)	~ ~	10.5 (0.12)	0.1 (0.15)
Norway (5)	25 (4.1)	542 (4.1)	74 (4.1)	536 (3.5)	1 (1.0)	~ ~	10.6 (0.10)	◊ ◊
Japan	25 (3.9)	573 (4.1)	73 (4.1)	568 (1.9)	2 (1.2)	~ ~	10.3 (0.15)	0.0 (0.20)
Finland	22 (3.6)	556 (3.4)	78 (3.6)	553 (2.8)	0 (0.0)	~ ~	10.5 (0.10)	0.3 (0.17)
Russian Federation	22 (3.5)	576 (5.9)	71 (3.7)	565 (4.2)	7 (2.1)	560 (7.2)	10.0 (0.15)	0.1 (0.21)
Croatia	22 (3.1)	537 (4.9)	78 (3.1)	532 (2.4)	0 (0.0)	~ ~	10.3 (0.12)	-0.3 (0.20)
Denmark r	21 (3.1)	525 (5.9)	78 (3.2)	530 (2.7)	1 (0.8)	~ ~	10.4 (0.12)	r 0.6 (0.15) ▲
Germany	21 (3.3)	532 (5.3)	79 (3.4)	527 (3.0)	0 (0.5)	~ ~	10.3 (0.10)	-0.3 (0.14)
Portugal	21 (3.0)	507 (4.2)	79 (3.0)	509 (2.4)	0 (0.0)	~ ~	10.1 (0.10)	0.5 (0.17) ▲
Lithuania	21 (3.3)	525 (8.1)	76 (3.6)	528 (2.8)	4 (1.7)	540 (5.1)	10.1 (0.14)	-0.2 (0.18)
Bahrain	20 (0.2)	472 (7.5)	55 (0.2)	453 (3.0)	25 (0.2)	454 (4.2)	9.0 (0.01)	-0.3 (0.37)
Netherlands s	20 (4.4)	525 (6.4)	80 (4.4)	524 (3.2)	0 (0.0)	~ ~	10.1 (0.12)	s -0.4 (0.18)
Northern Ireland r	20 (4.4)	526 (7.7)	80 (4.4)	517 (3.4)	0 (0.0)	~ ~	10.3 (0.14)	r -0.1 (0.23)
Hong Kong SAR	18 (3.1)	583 (9.6)	79 (3.3)	551 (4.0)	3 (1.4)	551 (20.5)	9.9 (0.14)	1.7 (0.16) ▲
Belgium (Flemish)	17 (2.9)	522 (6.1)	82 (2.9)	511 (2.5)	1 (0.9)	~ ~	10.2 (0.11)	-0.5 (0.17) ▼
Serbia	16 (2.8)	531 (6.6)	80 (3.2)	525 (4.3)	4 (1.6)	513 (17.3)	9.7 (0.12)	0.2 (0.19)
Hungary	15 (2.9)	533 (11.9)	77 (3.6)	543 (4.1)	8 (2.6)	550 (8.8)	9.6 (0.14)	-0.9 (0.22) ▼
Ireland	15 (2.7)	533 (6.2)	84 (2.8)	528 (2.6)	1 (0.9)	~ ~	10.0 (0.10)	-0.2 (0.17)
Oman	14 (2.5)	419 (8.7)	71 (3.2)	434 (3.9)	16 (2.0)	429 (8.7)	9.0 (0.14)	r 0.4 (0.16)
Kuwait	14 (3.2)	369 (19.1)	59 (5.4)	323 (8.2)	27 (5.1)	347 (13.3)	8.7 (0.24)	◊ ◊
Slovak Republic	13 (2.5)	517 (9.1)	82 (2.9)	521 (3.2)	4 (1.5)	508 (15.8)	9.5 (0.11)	-0.7 (0.15) ▼
Saudi Arabia	12 (2.4)	445 (13.9)	75 (2.8)	380 (6.1)	13 (2.4)	399 (14.1)	9.0 (0.16)	-0.2 (0.22)
France	11 (3.1)	491 (11.3)	86 (3.4)	486 (2.8)	2 (1.2)	~ ~	9.6 (0.14)	◊ ◊
Morocco	9 (1.9)	345 (14.9)	87 (2.2)	351 (5.4)	4 (1.3)	374 (34.6)	9.8 (0.08)	-0.3 (0.13)
Italy	4 (1.8)	530 (14.1)	95 (1.9)	516 (2.8)	1 (0.6)	~ ~	9.3 (0.07)	-0.3 (0.11) ▼
Iran, Islamic Rep. of	3 (1.0)	434 (57.6)	82 (3.0)	418 (5.1)	16 (2.8)	435 (12.8)	8.6 (0.10)	0.2 (0.18)
Indonesia	2 (0.8)	~ ~	95 (1.2)	394 (5.1)	4 (1.0)	489 (13.5)	9.2 (0.06)	◊ ◊
Turkey	1 (1.1)	~ ~	64 (3.8)	483 (4.5)	35 (3.6)	485 (5.8)	7.8 (0.14)	-0.1 (0.16)
International Avg.	25 (0.5)	517 (1.7)	69 (0.5)	504 (0.6)	5 (0.2)	483 (3.1)		

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 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 5.6: Instruction Affected by Science 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		
Benchmarking Participants								
Dubai, UAE	46 (0.2)	532 (2.8)	35 (0.2)	503 (3.2)	19 (0.2)	503 (3.9)	10.6 (0.01)	-0.1 (0.02) ▼
Florida, US r	42 (7.5)	537 (8.4)	56 (7.8)	560 (7.4)	2 (2.3)	~ ~	10.6 (0.32)	r -0.4 (0.40)
Buenos Aires, Argentina s	35 (4.8)	440 (7.4)	61 (4.8)	404 (7.5)	4 (1.3)	426 (24.9)	10.9 (0.23)	◊ ◊
Quebec, Canada	32 (6.4)	541 (5.1)	67 (6.4)	518 (4.5)	1 (0.5)	~ ~	10.7 (0.19)	0.1 (0.24)
Ontario, Canada	29 (5.9)	532 (5.9)	71 (5.9)	528 (3.5)	0 (0.2)	~ ~	10.5 (0.17)	0.1 (0.22)
Abu Dhabi, UAE	28 (4.3)	460 (16.7)	59 (4.6)	382 (9.8)	13 (2.9)	414 (19.1)	9.9 (0.28)	0.4 (0.36)
Norway (4)	24 (4.1)	497 (4.3)	74 (4.1)	492 (2.8)	1 (1.0)	~ ~	10.6 (0.10)	0.1 (0.16)

Significantly higher than 2011 ▲
Significantly lower than 2011 ▼

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

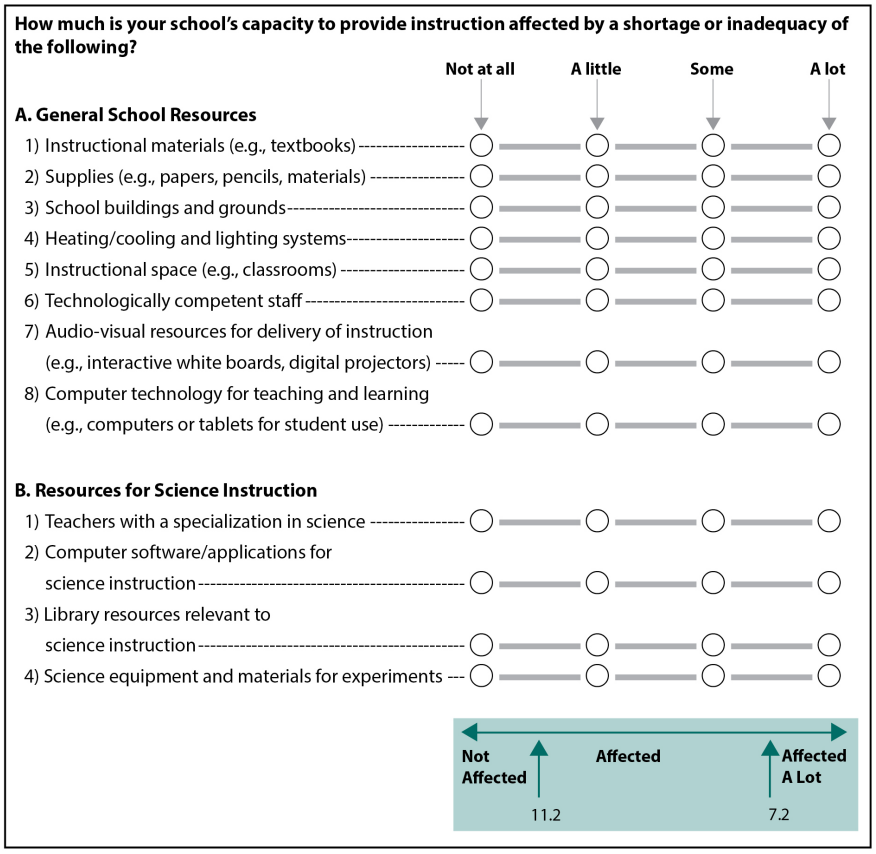


Exhibit 5.8: Problems with School Conditions and Resources – Teachers' Reports

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	66 (3.3)	536 (2.9)	30 (3.2)	533 (3.4)	4 (1.4)	518 (10.3)	11.2 (0.12)
Qatar	62 (3.0)	438 (5.2)	24 (2.9)	425 (9.3)	13 (2.2)	449 (13.6)	11.2 (0.13)
Northern Ireland r	60 (4.3)	522 (2.7)	30 (3.3)	517 (5.4)	9 (3.1)	524 (9.2)	10.8 (0.19)
United Arab Emirates	57 (2.0)	466 (4.8)	32 (1.8)	446 (5.1)	11 (1.3)	396 (13.4)	11.0 (0.08)
Korea, Rep. of	57 (3.5)	590 (2.6)	35 (3.8)	590 (3.0)	8 (2.2)	577 (5.1)	10.9 (0.14)
Singapore	56 (2.7)	589 (5.6)	39 (2.8)	593 (5.8)	6 (1.2)	595 (12.0)	10.9 (0.10)
Bahrain	55 (0.5)	460 (2.9)	35 (0.8)	463 (4.7)	10 (0.7)	445 (7.3)	10.8 (0.03)
Australia	54 (4.1)	526 (4.8)	37 (3.7)	523 (4.9)	8 (1.9)	527 (6.1)	10.6 (0.13)
Bulgaria	54 (4.7)	535 (8.8)	35 (4.3)	535 (9.3)	11 (2.5)	541 (8.5)	10.6 (0.18)
England	52 (4.1)	534 (4.5)	39 (3.7)	544 (3.9)	9 (2.5)	524 (9.4)	10.8 (0.17)
Chile	52 (4.1)	494 (4.8)	34 (3.8)	462 (6.1)	15 (3.0)	464 (8.1)	10.4 (0.16)
Kazakhstan	51 (4.1)	551 (6.9)	39 (4.0)	551 (7.5)	10 (2.2)	536 (14.0)	10.5 (0.16)
Ireland	51 (4.3)	530 (3.7)	34 (4.1)	527 (4.1)	15 (3.3)	527 (7.4)	10.4 (0.17)
Slovenia	50 (3.6)	542 (3.5)	33 (3.3)	541 (3.3)	17 (3.0)	552 (4.8)	10.4 (0.14)
Slovak Republic	49 (3.6)	517 (4.4)	41 (3.4)	524 (4.9)	11 (2.0)	523 (10.3)	10.7 (0.13)
New Zealand	48 (3.2)	508 (4.4)	44 (3.2)	506 (3.8)	8 (1.7)	496 (10.5)	10.6 (0.11)
Hong Kong SAR	47 (4.3)	565 (5.6)	43 (4.5)	552 (4.7)	11 (2.8)	539 (7.4)	10.4 (0.15)
United States	43 (2.4)	553 (4.1)	45 (2.6)	545 (3.7)	11 (1.8)	524 (7.2)	10.4 (0.10)
Russian Federation	42 (3.4)	572 (3.4)	45 (3.9)	563 (4.4)	13 (3.5)	568 (17.0)	10.2 (0.11)
Poland	42 (3.5)	549 (3.4)	41 (3.4)	547 (3.8)	17 (3.1)	543 (6.0)	10.1 (0.15)
Kuwait	42 (2.9)	344 (11.4)	38 (3.2)	336 (6.5)	20 (2.8)	332 (15.5)	10.1 (0.15)
Oman	42 (2.8)	427 (5.7)	43 (3.2)	438 (5.7)	15 (2.1)	420 (7.9)	10.2 (0.10)
Canada	40 (3.1)	523 (4.2)	48 (3.0)	525 (2.8)	11 (1.6)	531 (6.1)	10.2 (0.09)
Netherlands r	39 (4.2)	512 (3.8)	49 (4.0)	519 (3.7)	12 (2.2)	530 (4.9)	10.1 (0.14)
Spain	39 (3.4)	522 (3.3)	46 (3.4)	516 (3.8)	15 (3.1)	515 (7.2)	10.2 (0.14)
Lithuania	36 (3.9)	527 (5.1)	47 (3.6)	529 (3.6)	17 (2.8)	529 (6.0)	10.0 (0.16)
Belgium (Flemish)	35 (3.6)	512 (4.1)	49 (3.5)	511 (3.7)	16 (2.8)	511 (7.2)	10.0 (0.14)
Portugal	34 (3.4)	513 (3.0)	45 (3.5)	509 (2.6)	21 (2.8)	500 (4.6)	9.9 (0.14)
Chinese Taipei	33 (4.1)	556 (3.9)	53 (4.4)	554 (2.2)	14 (2.8)	559 (5.8)	10.0 (0.13)
Cyprus	32 (4.5)	485 (4.0)	51 (4.7)	481 (4.6)	17 (2.9)	473 (4.9)	9.9 (0.17)
Saudi Arabia	29 (2.9)	398 (10.3)	40 (4.0)	392 (8.0)	31 (3.3)	382 (10.7)	9.6 (0.15)
Norway (5)	29 (3.8)	545 (4.3)	57 (4.5)	540 (2.6)	14 (3.5)	524 (5.3)	9.9 (0.15)
Georgia	28 (3.9)	467 (9.3)	46 (4.1)	446 (4.8)	26 (3.6)	444 (8.0)	9.7 (0.18)
Turkey	27 (2.9)	510 (8.3)	37 (2.9)	486 (5.5)	36 (2.6)	461 (5.3)	9.0 (0.12)
Croatia	26 (3.3)	528 (3.1)	51 (3.2)	534 (2.8)	23 (2.8)	540 (5.4)	9.5 (0.17)
Serbia	25 (3.5)	525 (11.0)	40 (3.6)	520 (4.9)	35 (3.6)	530 (3.9)	9.3 (0.15)
Germany	24 (2.9)	541 (4.3)	43 (3.7)	524 (4.0)	33 (3.5)	523 (4.9)	9.3 (0.13)
Sweden	23 (3.5)	550 (7.5)	51 (4.0)	539 (4.2)	26 (4.3)	534 (8.5)	9.3 (0.15)
Finland	23 (2.9)	551 (3.5)	55 (3.5)	556 (2.9)	22 (3.0)	550 (4.2)	9.5 (0.12)
Hungary	22 (2.9)	532 (7.7)	44 (3.6)	544 (6.3)	34 (3.8)	546 (6.0)	9.3 (0.15)
Italy	22 (2.6)	523 (5.6)	44 (3.9)	516 (3.5)	34 (3.8)	512 (5.3)	9.3 (0.12)
Japan	22 (3.3)	569 (3.7)	62 (3.7)	569 (2.1)	16 (2.5)	571 (4.0)	9.7 (0.13)
France	19 (2.9)	499 (4.7)	56 (3.4)	486 (3.1)	25 (2.9)	484 (6.5)	9.2 (0.13)
Denmark	18 (3.3)	530 (5.4)	53 (4.4)	528 (3.6)	29 (3.6)	522 (4.0)	9.2 (0.13)
Iran, Islamic Rep. of	17 (2.2)	453 (9.3)	58 (3.6)	421 (6.0)	25 (3.2)	399 (8.0)	9.1 (0.10)
Morocco	15 (1.8)	424 (11.8)	32 (2.5)	352 (7.5)	53 (2.7)	333 (7.0)	8.3 (0.12)
Indonesia	13 (2.6)	415 (16.0)	27 (3.4)	425 (8.2)	61 (3.7)	381 (6.4)	8.0 (0.16)
International Avg.	38 (0.5)	512 (0.9)	43 (0.5)	506 (0.7)	19 (0.4)	500 (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.

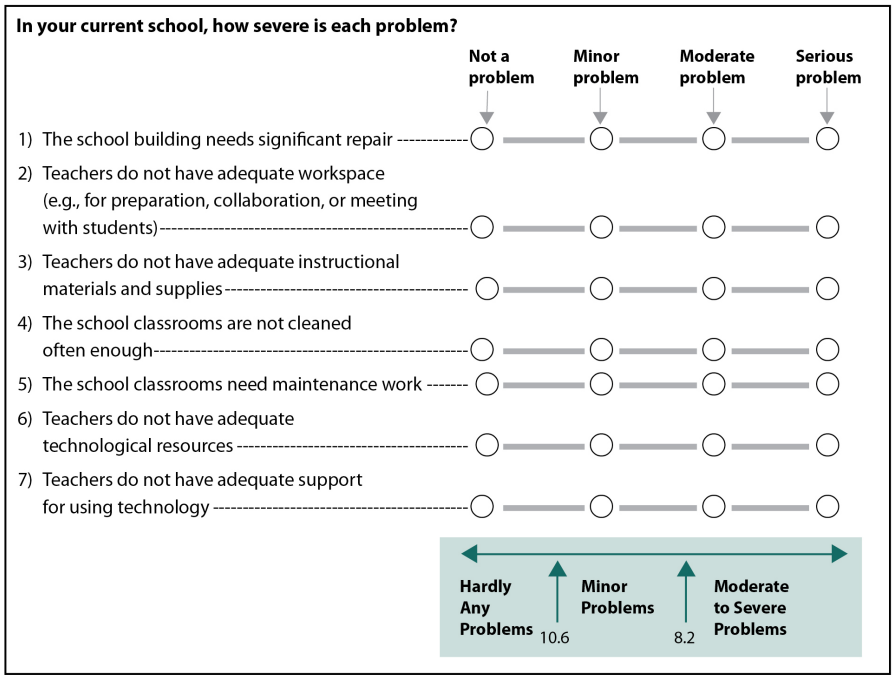
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

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 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	
Benchmarking Participants							
Dubai, UAE	65 (1.3)	531 (2.5)	30 (1.4)	494 (3.9)	4 (0.4)	439 (15.0)	11.4 (0.05)
Abu Dhabi, UAE	51 (4.5)	412 (11.1)	34 (4.2)	435 (12.1)	15 (3.3)	380 (22.0)	10.8 (0.19)
Florida, US r	44 (6.2)	555 (8.4)	40 (5.3)	545 (8.4)	17 (4.9)	553 (14.4)	10.3 (0.26)
Norway (4)	38 (4.2)	497 (2.6)	49 (4.0)	493 (2.9)	13 (3.0)	486 (11.3)	10.1 (0.15)
Quebec, Canada	38 (4.9)	527 (4.9)	50 (5.7)	519 (5.7)	12 (3.7)	539 (8.7)	10.1 (0.17)
Ontario, Canada	36 (4.0)	533 (4.2)	51 (4.2)	529 (3.6)	14 (2.5)	532 (7.1)	10.1 (0.12)
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

TIMSS 2015

CHAPTER 6: SCHOOL CLIMATE

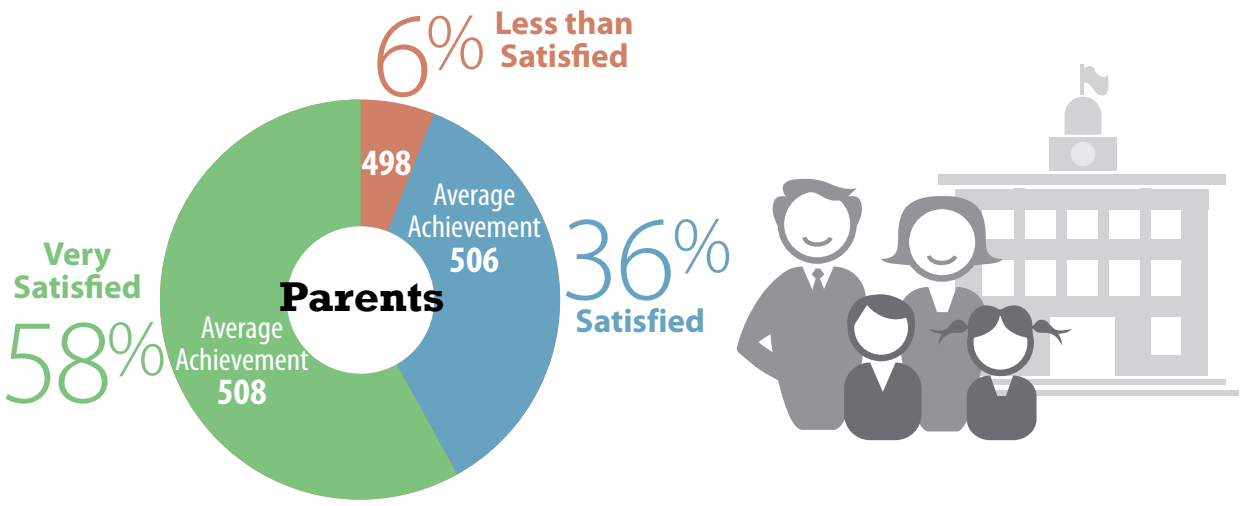
TIMSS 2015 INTERNATIONAL RESULTS IN SCIENCE

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

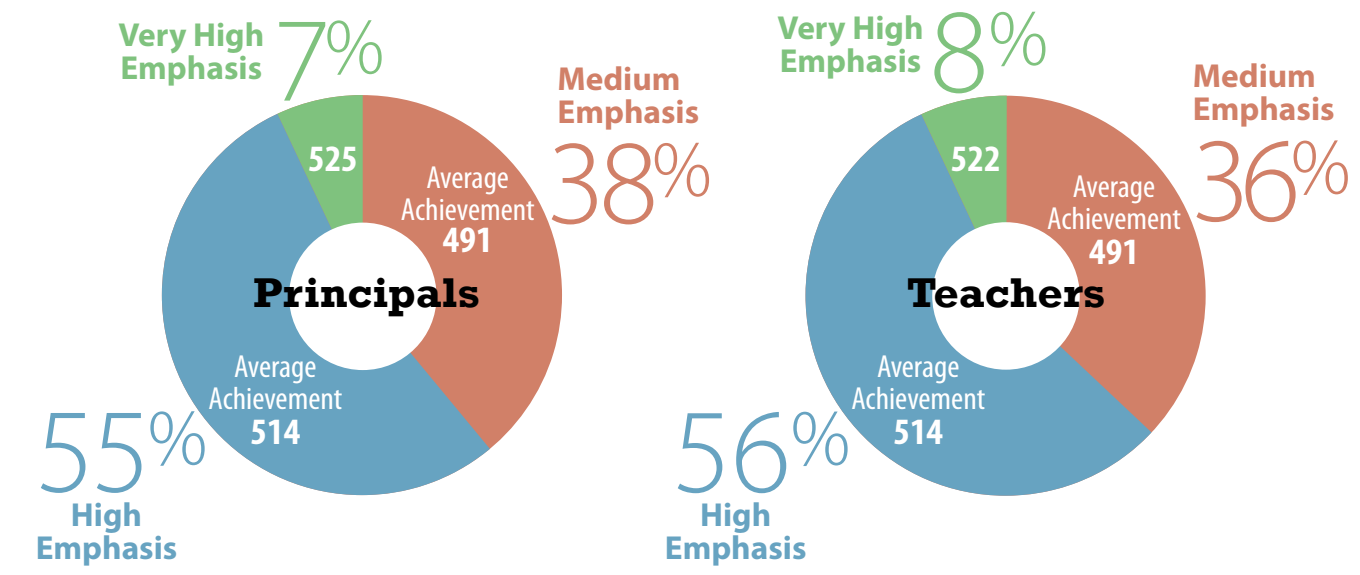
Schools Have Positive Environments

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

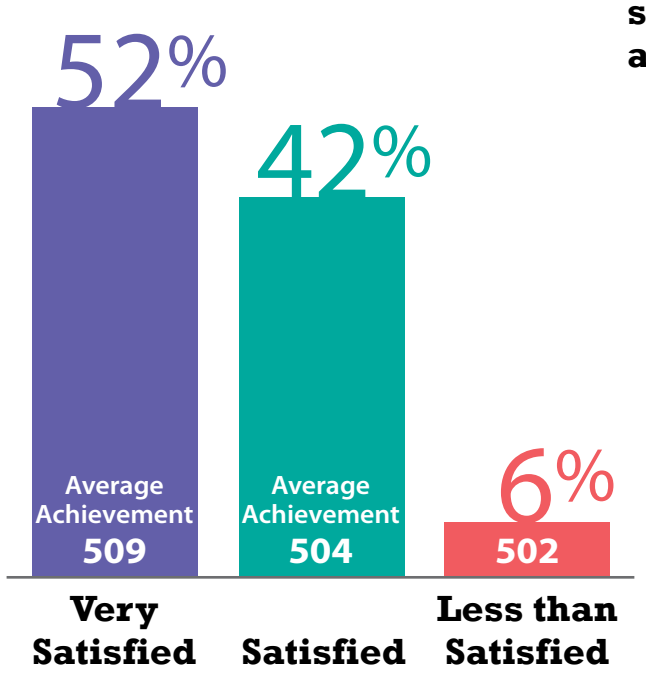
The majority of PARENTS are very satisfied with the performance of their child's school.



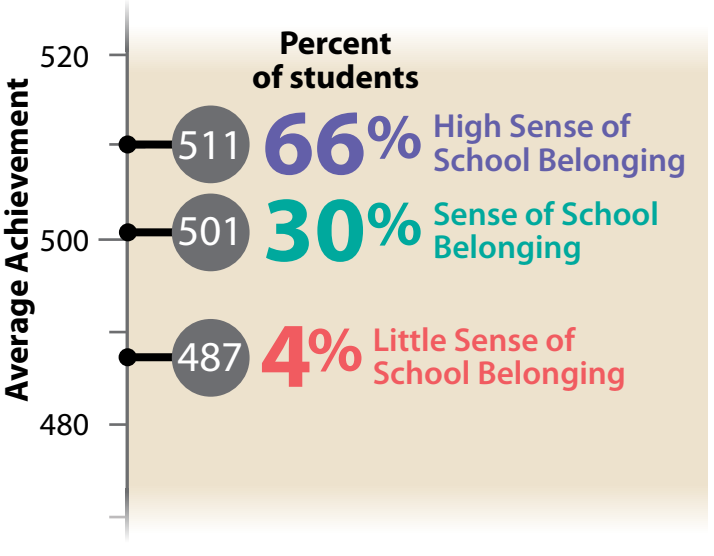
PRINCIPALS and TEACHERS agree that the schools emphasize academic success.



TEACHERS of fourth grade science 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 science achievement.



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

http://timss2015.org/download-center/

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

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)	550 (4.5)	8 (0.7)	553 (8.4)	1 (0.2)	~ ~	11.7 (0.04)
Indonesia	89 (1.0)	399 (4.8)	10 (0.9)	393 (10.4)	1 (0.2)	~ ~	11.4 (0.05)
Northern Ireland s	81 (1.4)	527 (3.1)	16 (1.3)	540 (6.1)	3 (0.6)	544 (15.9)	11.0 (0.07)
Ireland	80 (1.2)	531 (2.6)	18 (1.0)	533 (3.2)	2 (0.4)	~ ~	10.9 (0.06)
Bulgaria	76 (1.2)	536 (5.9)	20 (1.0)	540 (8.5)	4 (0.4)	540 (12.2)	10.8 (0.06)
Turkey	75 (1.1)	484 (3.5)	21 (0.8)	487 (5.2)	4 (0.4)	483 (7.2)	10.7 (0.05)
Oman	73 (0.7)	443 (3.3)	24 (0.7)	414 (4.3)	3 (0.2)	378 (10.2)	10.6 (0.03)
Georgia	70 (1.2)	454 (3.7)	28 (1.2)	448 (5.5)	1 (0.2)	~ ~	10.6 (0.05)
Portugal	68 (1.2)	511 (2.1)	28 (1.0)	505 (3.3)	4 (0.4)	498 (5.4)	10.4 (0.05)
Lithuania	68 (1.1)	531 (3.1)	29 (1.0)	532 (3.7)	3 (0.4)	533 (10.1)	10.3 (0.05)
Spain	67 (1.4)	523 (2.3)	28 (1.2)	523 (2.7)	5 (0.5)	519 (7.2)	10.4 (0.06)
Chile r	67 (1.5)	485 (3.3)	28 (1.3)	487 (4.0)	5 (0.5)	465 (6.9)	10.3 (0.07)
Saudi Arabia	66 (1.3)	396 (4.8)	28 (1.1)	385 (6.4)	6 (0.5)	391 (10.9)	10.4 (0.06)
Bahrain	66 (0.7)	475 (2.6)	28 (0.7)	444 (4.8)	6 (0.5)	421 (8.6)	10.3 (0.04)
Serbia	66 (1.3)	520 (4.8)	27 (1.0)	537 (3.5)	8 (0.6)	535 (6.2)	10.3 (0.06)
Morocco	66 (1.5)	371 (5.1)	29 (1.2)	327 (8.0)	5 (0.7)	302 (11.7)	10.2 (0.07)
Qatar r	65 (1.2)	457 (4.2)	29 (1.1)	433 (4.6)	6 (0.4)	403 (10.1)	10.3 (0.05)
Italy	64 (1.3)	518 (2.6)	30 (1.1)	522 (3.8)	5 (0.5)	507 (5.4)	10.2 (0.06)
Cyprus	64 (1.3)	483 (2.3)	30 (1.0)	488 (4.2)	6 (0.5)	485 (6.2)	10.1 (0.05)
Iran, Islamic Rep. of	63 (1.2)	422 (4.4)	32 (1.0)	418 (6.2)	4 (0.6)	442 (11.3)	10.1 (0.05)
New Zealand s	63 (1.2)	526 (3.1)	32 (1.1)	529 (3.9)	6 (0.5)	510 (8.1)	10.1 (0.05)
Slovak Republic	62 (1.1)	517 (3.3)	34 (1.0)	532 (2.7)	4 (0.4)	529 (6.5)	10.2 (0.05)
Canada r	60 (1.0)	532 (2.3)	36 (0.8)	532 (2.8)	5 (0.3)	518 (4.8)	10.1 (0.04)
Hungary	59 (1.1)	545 (3.4)	35 (1.0)	541 (4.2)	6 (0.5)	525 (7.1)	10.0 (0.05)
Kuwait r	58 (1.3)	352 (6.9)	31 (1.1)	344 (8.1)	10 (0.7)	319 (11.0)	9.9 (0.06)
Singapore	58 (0.8)	595 (3.9)	37 (0.7)	590 (3.6)	5 (0.3)	567 (7.3)	10.0 (0.03)
United Arab Emirates	56 (0.7)	474 (3.0)	38 (0.7)	437 (3.3)	6 (0.2)	416 (6.1)	10.0 (0.03)
Hong Kong SAR	55 (1.4)	562 (3.7)	40 (1.1)	554 (3.3)	5 (0.6)	529 (7.8)	9.9 (0.06)
Finland	54 (1.2)	556 (2.9)	42 (1.1)	555 (2.6)	4 (0.5)	553 (8.4)	9.8 (0.05)
Russian Federation	54 (1.3)	564 (3.9)	41 (1.0)	573 (3.1)	5 (0.6)	565 (5.5)	9.8 (0.06)
Belgium (Flemish)	49 (1.1)	512 (2.8)	47 (1.0)	516 (2.5)	4 (0.4)	509 (6.9)	9.6 (0.04)
Poland	49 (1.3)	544 (2.9)	47 (1.2)	551 (2.6)	5 (0.4)	547 (6.3)	9.7 (0.05)
Chinese Taipei	47 (1.0)	552 (2.4)	46 (0.9)	561 (2.3)	7 (0.4)	551 (4.7)	9.7 (0.04)
Denmark	46 (1.6)	533 (2.9)	42 (1.2)	530 (2.6)	12 (0.9)	518 (4.9)	9.3 (0.07)
Sweden	42 (1.6)	544 (4.5)	51 (1.4)	549 (3.8)	7 (0.7)	537 (6.7)	9.4 (0.07)
Germany s	42 (1.4)	540 (3.7)	47 (1.2)	545 (2.5)	12 (0.8)	528 (5.0)	9.2 (0.06)
Croatia	39 (1.1)	532 (2.5)	55 (1.1)	536 (2.2)	7 (0.6)	525 (6.0)	9.3 (0.04)
France	35 (1.3)	487 (3.8)	58 (1.2)	493 (2.6)	7 (0.6)	484 (6.6)	9.1 (0.06)
Czech Republic	34 (1.0)	526 (3.5)	53 (0.9)	540 (2.2)	12 (0.8)	541 (4.5)	8.9 (0.05)
Slovenia s	27 (1.3)	550 (3.8)	64 (1.2)	554 (3.0)	9 (0.5)	546 (6.0)	8.8 (0.05)
Korea, Rep. of	17 (0.9)	593 (3.8)	67 (1.0)	590 (2.1)	16 (0.8)	587 (3.5)	8.3 (0.04)
Japan	7 (0.7)	570 (6.2)	66 (0.8)	572 (1.9)	27 (0.9)	566 (2.7)	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.	58 (0.2)	508 (0.6)	36 (0.2)	506 (0.7)	6 (0.1)	498 (1.3)	

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.

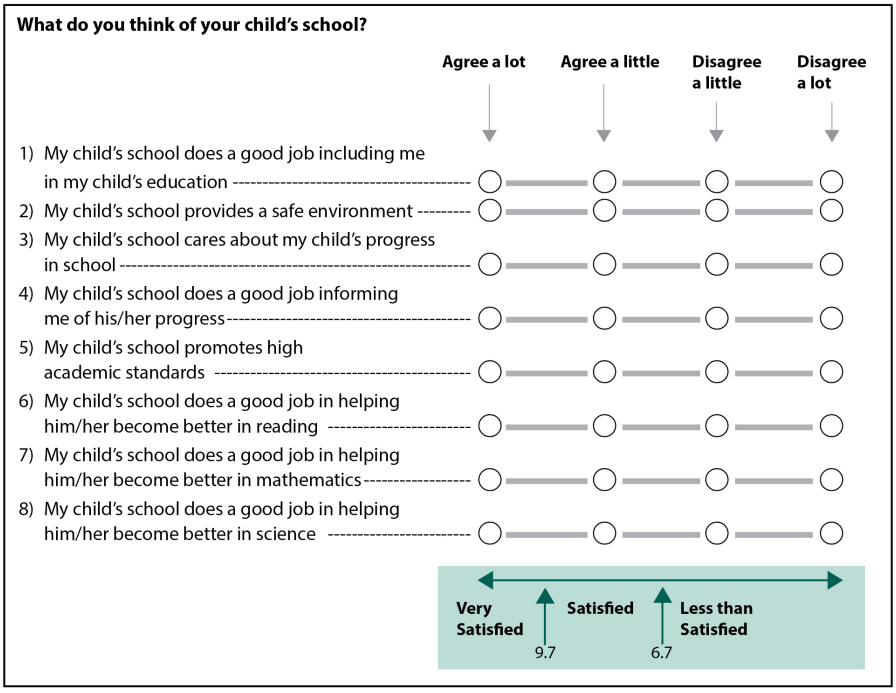
A dash (-) indicates comparable data not available. A tilde (~) indicates insufficient data to report achievement.

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 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	
Benchmarking Participants							
Dubai, UAE	62 (1.0)	535 (2.1)	33 (1.0)	503 (3.0)	5 (0.3)	496 (7.4)	10.2 (0.04)
Ontario, Canada r	62 (1.5)	539 (2.7)	32 (1.1)	536 (3.3)	6 (0.6)	517 (6.1)	10.1 (0.07)
Abu Dhabi, UAE r	50 (1.6)	445 (6.7)	44 (1.5)	405 (6.4)	6 (0.5)	378 (10.0)	9.7 (0.06)
Quebec, Canada r	48 (1.9)	525 (4.3)	49 (1.8)	531 (4.7)	3 (0.5)	527 (10.0)	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.

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)	468 (7.9)	58 (3.2)	429 (5.7)	13 (2.6)	392 (10.6)	11.8 (0.14)
Korea, Rep. of	26 (4.2)	603 (4.5)	62 (4.4)	586 (2.1)	13 (2.6)	579 (5.8)	11.8 (0.20)
United Arab Emirates	20 (1.6)	511 (6.5)	59 (2.2)	449 (3.5)	21 (1.6)	381 (6.2)	11.2 (0.08)
Ireland	19 (3.7)	542 (5.2)	70 (4.1)	529 (3.1)	11 (2.4)	505 (6.4)	11.6 (0.15)
Canada	19 (2.0)	538 (4.8)	51 (3.1)	524 (3.3)	30 (2.8)	518 (5.0)	10.7 (0.13)
New Zealand	18 (2.8)	531 (4.3)	61 (3.6)	513 (4.0)	21 (2.6)	472 (6.9)	11.1 (0.13)
Northern Ireland r	15 (3.9)	529 (7.5)	76 (4.6)	519 (3.3)	9 (2.7)	503 (7.8)	11.4 (0.19)
United States	14 (2.2)	592 (7.2)	46 (3.2)	549 (3.7)	40 (2.9)	526 (3.8)	10.3 (0.15)
England	14 (2.5)	566 (5.7)	65 (4.4)	539 (3.4)	21 (3.9)	512 (6.1)	10.8 (0.15)
Australia	12 (2.8)	556 (7.1)	53 (4.1)	530 (3.5)	34 (3.4)	503 (5.3)	10.4 (0.16)
Chinese Taipei	12 (2.5)	573 (4.7)	63 (3.8)	557 (2.4)	25 (3.4)	542 (3.3)	10.6 (0.15)
Kazakhstan	11 (2.7)	562 (15.2)	78 (3.3)	549 (4.9)	11 (2.4)	539 (16.0)	11.1 (0.15)
Singapore	11 (0.0)	626 (11.9)	63 (0.0)	598 (4.1)	27 (0.0)	561 (8.3)	10.6 (0.00)
Bahrain	10 (0.1)	473 (7.0)	66 (0.2)	464 (3.5)	24 (0.2)	434 (3.8)	10.5 (0.00)
Kuwait	9 (3.3)	395 (26.1)	51 (4.0)	346 (7.5)	40 (3.1)	309 (7.7)	9.8 (0.20)
Cyprus	9 (3.2)	494 (6.1)	51 (5.2)	488 (4.0)	40 (4.3)	470 (3.5)	10.0 (0.16)
Oman	8 (2.0)	415 (11.4)	67 (3.0)	436 (4.0)	25 (3.0)	424 (6.7)	10.4 (0.13)
Hong Kong SAR	7 (2.7)	608 (9.6)	55 (4.7)	560 (5.3)	38 (4.0)	542 (4.6)	10.0 (0.18)
Saudi Arabia	7 (1.8)	421 (10.6)	56 (3.8)	400 (7.2)	37 (3.5)	370 (9.6)	9.9 (0.13)
Georgia	7 (2.4)	468 (9.7)	61 (4.2)	454 (5.5)	32 (4.0)	442 (5.9)	10.1 (0.15)
Croatia	6 (2.0)	535 (7.9)	70 (3.4)	534 (2.7)	23 (3.1)	531 (4.7)	10.7 (0.13)
Bulgaria	6 (2.7)	577 (9.4)	50 (4.7)	562 (6.6)	44 (4.4)	499 (9.7)	9.6 (0.20)
Iran, Islamic Rep. of	6 (1.6)	429 (20.0)	56 (3.4)	431 (5.7)	37 (2.9)	404 (6.9)	10.0 (0.12)
Indonesia	5 (1.5)	382 (36.6)	57 (3.7)	410 (6.0)	38 (3.5)	378 (8.2)	10.0 (0.12)
Spain	5 (1.5)	541 (7.4)	59 (3.8)	529 (2.2)	36 (3.1)	497 (4.5)	9.8 (0.10)
Turkey	4 (1.2)	547 (13.8)	40 (3.7)	506 (4.8)	56 (3.6)	462 (4.3)	9.2 (0.13)
Denmark r	4 (1.5)	542 (16.5)	57 (4.3)	532 (3.0)	39 (4.1)	524 (3.4)	9.7 (0.14)
Sweden	4 (1.6)	573 (4.5)	59 (4.4)	549 (3.5)	37 (4.2)	523 (6.9)	9.9 (0.14)
Portugal	3 (1.7)	518 (8.0)	37 (3.9)	516 (3.1)	59 (3.7)	503 (2.8)	9.1 (0.13)
Japan	3 (1.5)	593 (13.9)	46 (4.1)	572 (2.2)	50 (4.2)	565 (2.5)	9.4 (0.13)
Lithuania	3 (1.2)	543 (16.7)	76 (3.3)	530 (3.0)	20 (3.0)	515 (6.3)	10.3 (0.10)
Serbia	3 (1.3)	556 (13.2)	40 (3.9)	538 (4.4)	57 (4.0)	513 (5.3)	9.2 (0.12)
Morocco	2 (1.0)	~ ~	19 (1.8)	402 (10.7)	79 (1.7)	338 (5.4)	8.2 (0.09)
Chile	2 (0.9)	~ ~	30 (3.7)	496 (5.7)	69 (3.8)	469 (4.2)	8.5 (0.16)
Poland	1 (0.9)	~ ~	63 (3.8)	553 (2.6)	36 (3.8)	537 (3.9)	9.9 (0.11)
Finland	1 (0.9)	~ ~	67 (4.1)	553 (3.1)	32 (4.0)	554 (3.6)	10.0 (0.11)
Slovak Republic	1 (0.8)	~ ~	42 (3.5)	539 (4.0)	57 (3.5)	506 (4.7)	9.1 (0.09)
Germany	1 (0.6)	~ ~	55 (3.0)	537 (3.1)	45 (2.9)	516 (4.1)	9.6 (0.08)
Russian Federation	1 (0.5)	~ ~	55 (3.7)	574 (4.7)	45 (3.7)	560 (3.6)	9.4 (0.07)
Hungary	0 (0.2)	~ ~	46 (3.9)	565 (4.0)	53 (3.9)	522 (5.1)	9.2 (0.11)
Belgium (Flemish)	0 (0.0)	~ ~	49 (4.1)	524 (3.0)	51 (4.1)	503 (4.1)	9.3 (0.09)
Czech Republic	0 (0.0)	~ ~	33 (4.4)	540 (3.9)	67 (4.4)	532 (2.5)	8.8 (0.12)
France	0 (0.0)	~ ~	59 (4.3)	494 (3.2)	41 (4.3)	476 (5.5)	9.6 (0.11)
Italy	0 (0.0)	~ ~	45 (4.3)	519 (3.9)	55 (4.3)	515 (3.4)	9.1 (0.11)
Netherlands s	0 (0.0)	~ ~	46 (5.5)	528 (4.4)	54 (5.5)	521 (3.4)	9.3 (0.13)
Norway (5)	0 (0.0)	~ ~	48 (4.6)	543 (3.4)	52 (4.6)	532 (3.7)	9.4 (0.13)
Slovenia	0 (0.0)	~ ~	51 (4.1)	545 (3.1)	49 (4.1)	542 (3.6)	9.3 (0.11)
International Avg.	7 (0.3)	525 (2.2)	55 (0.6)	514 (0.6)	38 (0.5)	491 (0.9)	

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.

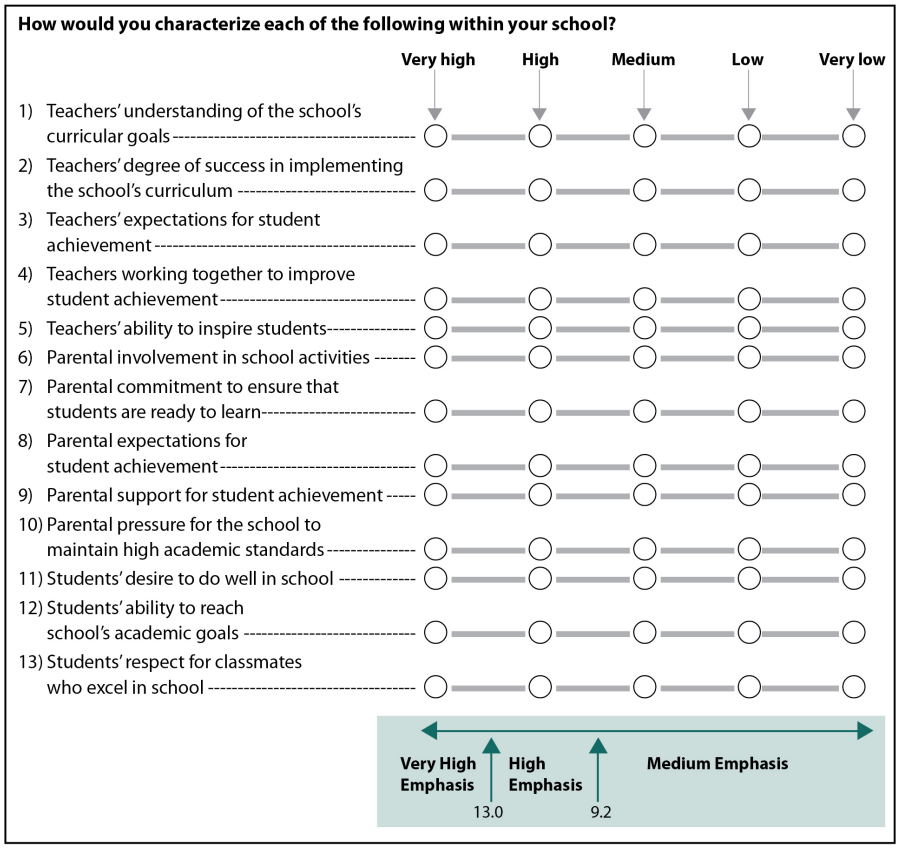
A tilde (~) indicates insufficient data to report achievement.

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 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	
Benchmarking Participants							
Dubai, UAE	42 (0.2)	542 (3.6)	47 (0.2)	511 (2.3)	11 (0.1)	439 (4.3)	12.3 (0.01)
Quebec, Canada	41 (5.7)	532 (6.4)	53 (5.5)	521 (5.5)	7 (2.5)	516 (7.5)	12.5 (0.18)
Abu Dhabi, UAE	10 (2.6)	459 (22.6)	56 (4.3)	433 (7.9)	35 (4.1)	353 (9.4)	10.3 (0.18)
Ontario, Canada	9 (2.6)	549 (12.1)	45 (5.2)	532 (4.7)	46 (5.3)	523 (3.6)	9.9 (0.21)
Buenos Aires, Argentina s	6 (2.7)	457 (6.9)	47 (4.6)	439 (7.0)	46 (4.9)	393 (8.1)	9.7 (0.23)
Florida, US r	3 (2.7)	563 (5.1)	59 (7.0)	552 (6.8)	38 (6.4)	546 (9.3)	10.2 (0.24)
Norway (4)	0 (0.0)	~ ~	47 (4.8)	501 (2.9)	53 (4.8)	487 (3.5)	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	35 (3.6)	601 (3.7)	49 (4.0)	586 (2.6)	16 (3.2)	574 (3.7)	11.8 (0.19)
Kazakhstan	22 (2.7)	560 (10.9)	69 (2.7)	548 (5.7)	8 (1.6)	540 (12.8)	11.6 (0.15)
Northern Ireland r	22 (3.6)	529 (5.3)	66 (4.4)	522 (3.4)	11 (3.1)	500 (5.9)	11.8 (0.20)
Qatar	21 (3.5)	458 (7.2)	64 (3.7)	436 (5.5)	15 (3.0)	401 (14.4)	11.2 (0.14)
Ireland	20 (3.5)	545 (5.2)	67 (3.9)	530 (2.7)	13 (2.5)	495 (6.2)	11.2 (0.18)
Croatia	19 (3.1)	531 (4.6)	70 (3.8)	534 (2.5)	11 (2.4)	536 (6.4)	11.3 (0.16)
United Arab Emirates	17 (2.0)	493 (7.1)	62 (2.5)	460 (4.3)	22 (1.7)	397 (9.0)	10.9 (0.09)
Bahrain	14 (0.9)	437 (8.5)	58 (1.7)	475 (3.1)	28 (1.5)	440 (4.0)	10.8 (0.05)
Canada	13 (1.7)	526 (5.0)	59 (2.8)	532 (2.9)	28 (2.4)	512 (5.4)	10.6 (0.12)
England	13 (2.7)	561 (9.1)	57 (4.1)	542 (3.2)	29 (3.7)	516 (5.7)	10.7 (0.17)
Oman	12 (1.9)	440 (13.4)	64 (3.3)	432 (4.4)	24 (3.0)	424 (7.3)	10.6 (0.12)
Australia	12 (2.5)	552 (5.6)	64 (3.7)	527 (4.2)	24 (3.2)	504 (4.6)	10.4 (0.12)
New Zealand	11 (2.2)	523 (7.5)	68 (2.8)	513 (3.2)	20 (2.3)	473 (6.3)	10.6 (0.11)
Indonesia	11 (2.2)	416 (19.1)	59 (3.5)	403 (5.8)	30 (3.1)	377 (7.9)	10.3 (0.13)
Georgia	11 (2.8)	483 (18.3)	68 (4.2)	453 (4.1)	21 (3.6)	431 (7.3)	10.6 (0.16)
Iran, Islamic Rep. of	9 (2.0)	469 (11.5)	57 (3.3)	421 (5.8)	34 (3.2)	407 (6.3)	10.2 (0.15)
United States	9 (1.8)	585 (8.3)	51 (2.5)	554 (3.6)	40 (2.0)	526 (3.1)	9.9 (0.11)
Lithuania	9 (2.3)	548 (9.2)	71 (3.7)	531 (3.2)	20 (3.4)	509 (5.8)	10.6 (0.14)
Saudi Arabia	8 (1.8)	417 (18.3)	45 (3.6)	400 (8.4)	47 (3.5)	379 (8.3)	9.5 (0.15)
Chinese Taipei	7 (2.0)	563 (9.2)	65 (3.7)	555 (2.3)	28 (3.4)	553 (3.3)	10.2 (0.14)
Spain	7 (1.8)	536 (5.5)	62 (3.3)	529 (2.5)	32 (3.3)	494 (5.2)	10.1 (0.12)
Serbia	6 (1.9)	538 (7.2)	63 (3.7)	531 (4.0)	31 (3.7)	509 (8.8)	10.1 (0.14)
Kuwait	5 (1.4)	347 (22.9)	63 (3.1)	348 (8.6)	32 (2.9)	317 (8.6)	10.1 (0.12)
Sweden	5 (1.7)	549 (15.1)	46 (4.4)	548 (3.8)	50 (4.3)	532 (5.6)	9.4 (0.16)
Turkey	5 (1.3)	538 (19.0)	45 (3.2)	499 (5.5)	50 (3.5)	464 (4.4)	9.3 (0.14)
Bulgaria	4 (1.7)	598 (11.3)	61 (3.8)	549 (6.3)	35 (3.8)	505 (10.2)	9.9 (0.15)
Poland	4 (1.4)	555 (9.9)	64 (3.5)	552 (2.7)	33 (3.4)	537 (4.2)	9.9 (0.10)
Singapore	3 (0.9)	629 (11.5)	56 (2.5)	609 (4.7)	41 (2.2)	562 (5.4)	9.7 (0.07)
Italy	3 (1.5)	527 (12.5)	49 (3.7)	517 (3.7)	48 (3.5)	514 (3.9)	9.6 (0.13)
Cyprus	3 (2.0)	516 (31.8)	56 (4.3)	489 (2.5)	41 (4.0)	468 (4.2)	9.7 (0.14)
Hong Kong SAR	3 (1.3)	578 (32.6)	62 (4.3)	564 (4.4)	36 (4.2)	543 (7.0)	9.7 (0.17)
Czech Republic	3 (1.1)	548 (13.4)	43 (3.6)	540 (2.8)	54 (3.5)	529 (3.5)	9.2 (0.12)
Finland	2 (1.0)	~ ~	64 (3.4)	557 (2.2)	33 (3.3)	547 (4.8)	9.8 (0.10)
Hungary	2 (1.2)	~ ~	46 (3.5)	560 (3.7)	52 (3.4)	526 (4.7)	9.3 (0.13)
Japan	2 (1.3)	~ ~	43 (4.2)	574 (2.1)	55 (4.1)	564 (2.1)	9.2 (0.13)
Belgium (Flemish)	2 (1.4)	~ ~	47 (3.8)	523 (3.5)	51 (3.7)	501 (3.1)	9.2 (0.12)
Morocco	2 (0.8)	~ ~	18 (2.3)	408 (11.1)	80 (2.2)	339 (5.0)	7.9 (0.09)
Slovak Republic	2 (0.7)	~ ~	49 (3.5)	534 (3.7)	49 (3.3)	506 (4.8)	9.3 (0.09)
Chile	2 (1.1)	~ ~	36 (4.1)	496 (6.0)	63 (4.2)	468 (4.0)	8.7 (0.17)
Portugal	2 (1.0)	~ ~	54 (3.4)	516 (2.7)	45 (3.2)	498 (3.4)	9.5 (0.10)
Norway (5)	2 (1.7)	~ ~	54 (4.6)	544 (3.3)	44 (4.4)	530 (2.7)	9.4 (0.13)
Germany	1 (0.9)	~ ~	58 (3.5)	537 (2.8)	40 (3.4)	514 (4.9)	9.5 (0.10)
Slovenia	1 (0.9)	~ ~	61 (4.0)	544 (3.3)	38 (4.1)	541 (3.7)	9.6 (0.10)
France	1 (0.6)	~ ~	63 (3.5)	496 (3.3)	36 (3.4)	472 (3.6)	9.6 (0.10)
Denmark	1 (0.7)	~ ~	42 (4.4)	535 (3.3)	57 (4.5)	519 (3.5)	9.0 (0.11)
Russian Federation	0 (0.5)	~ ~	54 (3.9)	574 (3.5)	46 (3.9)	560 (5.9)	9.4 (0.09)
Netherlands r	0 (0.3)	~ ~	42 (4.3)	523 (4.5)	57 (4.3)	513 (3.4)	9.1 (0.11)
International Avg.	8 (0.3)	522 (2.4)	56 (0.5)	514 (0.6)	36 (0.5)	491 (0.9)	

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 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	
Benchmarking Participants							
Quebec, Canada	25 (5.2)	526 (5.2)	65 (5.5)	524 (5.9)	10 (2.6)	517 (8.4)	11.7 (0.21)
Dubai, UAE	20 (2.4)	552 (3.9)	67 (2.6)	520 (2.4)	14 (1.1)	450 (8.6)	11.3 (0.09)
Florida, US r	17 (3.7)	566 (15.0)	39 (5.3)	566 (6.0)	44 (5.6)	530 (7.9)	9.9 (0.32)
Ontario, Canada	9 (2.3)	525 (9.2)	56 (3.4)	541 (3.2)	36 (3.7)	520 (4.0)	10.1 (0.19)
Abu Dhabi, UAE	7 (2.5)	489 (24.6)	57 (4.7)	428 (10.4)	36 (4.5)	379 (15.6)	10.1 (0.18)
Norway (4)	1 (0.7)	~ ~	58 (4.4)	499 (2.5)	40 (4.3)	486 (4.3)	9.4 (0.15)
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

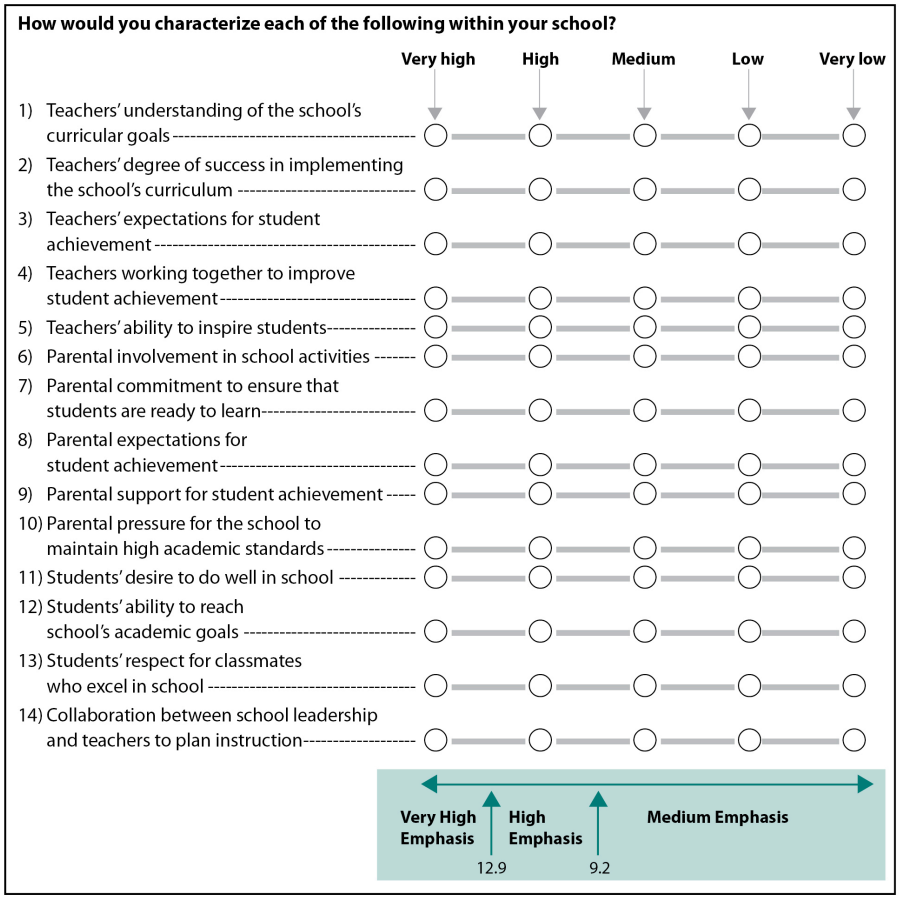


Exhibit 6.6: Teacher Job Satisfaction

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.

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)	419 (4.7)	16 (2.3)	430 (9.7)	1 (0.3)	~ ~	11.3 (0.10)
Qatar	75 (2.9)	438 (4.7)	23 (2.8)	427 (10.7)	2 (1.2)	~ ~	11.1 (0.11)
Oman	73 (2.7)	431 (4.1)	24 (2.5)	436 (6.7)	3 (1.1)	405 (14.1)	10.7 (0.10)
Georgia	69 (3.4)	454 (4.7)	31 (3.3)	445 (7.1)	0 (0.4)	~ ~	10.7 (0.12)
United Arab Emirates	67 (1.9)	460 (3.9)	29 (1.8)	441 (6.3)	5 (0.8)	415 (15.6)	10.6 (0.07)
Chile	67 (4.2)	483 (4.1)	31 (4.0)	473 (5.3)	2 (1.2)	~ ~	10.7 (0.15)
Serbia	66 (3.7)	526 (4.7)	31 (3.8)	521 (5.0)	3 (1.3)	523 (14.6)	10.6 (0.14)
Kazakhstan	64 (3.7)	553 (5.6)	36 (3.7)	546 (8.3)	0 (0.0)	~ ~	10.8 (0.13)
Croatia	64 (3.4)	534 (2.6)	35 (3.3)	532 (3.3)	1 (0.8)	~ ~	10.6 (0.13)
Kuwait	62 (3.3)	341 (9.0)	32 (3.2)	340 (7.6)	6 (1.4)	304 (14.9)	10.3 (0.13)
Ireland	62 (4.1)	530 (3.3)	33 (4.0)	528 (4.5)	5 (1.9)	515 (12.2)	10.3 (0.18)
Bahrain	61 (1.7)	463 (3.1)	34 (1.7)	453 (4.7)	5 (0.2)	455 (6.6)	10.3 (0.08)
Spain	60 (3.5)	524 (3.1)	35 (3.5)	513 (4.1)	5 (2.0)	500 (7.6)	10.3 (0.14)
Indonesia	60 (3.3)	397 (6.6)	38 (3.2)	396 (7.4)	2 (1.0)	~ ~	10.4 (0.12)
Northern Ireland r	59 (4.9)	522 (3.3)	37 (4.7)	520 (4.6)	4 (2.1)	514 (21.2)	10.3 (0.21)
Morocco	56 (2.8)	361 (6.3)	39 (2.9)	342 (7.8)	5 (0.9)	341 (31.0)	10.1 (0.10)
Korea, Rep. of	56 (4.1)	592 (2.7)	38 (3.9)	586 (3.1)	6 (1.9)	585 (5.1)	10.2 (0.18)
Turkey	56 (3.4)	491 (4.1)	41 (3.6)	473 (6.2)	3 (0.9)	472 (16.3)	10.3 (0.10)
Saudi Arabia	55 (3.4)	403 (5.8)	41 (3.3)	374 (8.5)	4 (1.2)	375 (38.8)	10.2 (0.13)
Canada	54 (2.7)	524 (3.8)	41 (2.5)	524 (3.6)	5 (1.1)	537 (5.9)	10.1 (0.10)
Australia	54 (3.4)	526 (4.8)	43 (3.3)	525 (3.5)	3 (0.9)	508 (10.7)	10.3 (0.12)
Netherlands r	53 (4.6)	517 (3.9)	40 (4.8)	518 (3.6)	7 (2.4)	516 (10.6)	9.9 (0.17)
Slovenia	52 (3.9)	544 (3.0)	47 (3.9)	543 (3.5)	0 (0.2)	~ ~	10.1 (0.13)
Portugal	51 (3.0)	513 (2.5)	45 (3.0)	504 (3.5)	4 (1.3)	489 (9.4)	10.1 (0.11)
New Zealand	50 (2.9)	511 (4.1)	43 (2.8)	501 (3.5)	7 (1.6)	499 (8.6)	9.8 (0.11)
Lithuania	50 (4.0)	530 (4.2)	46 (3.9)	525 (4.1)	4 (1.8)	543 (16.2)	10.0 (0.16)
Chinese Taipei	49 (3.7)	557 (2.9)	41 (3.8)	555 (2.7)	10 (2.3)	549 (6.2)	9.8 (0.16)
Belgium (Flemish)	48 (3.5)	511 (3.9)	47 (3.7)	513 (3.0)	4 (1.5)	502 (11.3)	9.9 (0.14)
Norway (5)	48 (3.5)	540 (3.3)	47 (3.5)	538 (3.5)	5 (1.6)	536 (5.6)	9.9 (0.15)
Bulgaria	48 (3.8)	535 (9.4)	44 (4.1)	541 (7.1)	8 (2.5)	513 (19.3)	9.7 (0.16)
United States	47 (2.5)	549 (4.0)	44 (2.4)	545 (3.4)	9 (1.7)	536 (7.8)	9.8 (0.13)
Russian Federation	47 (3.6)	564 (3.9)	52 (3.4)	570 (4.9)	1 (0.6)	~ ~	9.9 (0.12)
Slovak Republic	47 (3.1)	523 (4.3)	41 (3.3)	520 (4.8)	13 (2.3)	510 (8.6)	9.7 (0.14)
Italy	45 (4.0)	514 (4.2)	46 (3.8)	521 (3.6)	9 (2.0)	508 (6.9)	9.6 (0.16)
Cyprus	45 (5.1)	484 (4.5)	45 (4.6)	476 (4.0)	10 (3.0)	490 (5.9)	9.6 (0.21)
Finland	44 (3.3)	555 (3.5)	51 (3.3)	554 (2.7)	5 (1.5)	548 (9.2)	9.8 (0.13)
Hungary	43 (3.8)	543 (5.5)	54 (3.8)	543 (4.9)	3 (0.6)	514 (42.5)	9.7 (0.13)
England	43 (4.0)	539 (4.6)	43 (3.6)	537 (4.8)	13 (2.8)	528 (6.3)	9.4 (0.19)
Germany	43 (3.8)	530 (3.8)	52 (3.9)	525 (3.7)	4 (1.5)	532 (9.7)	9.9 (0.15)
Denmark	37 (3.4)	528 (3.5)	48 (3.7)	524 (3.7)	14 (2.9)	532 (8.5)	9.1 (0.16)
Czech Republic	37 (3.6)	536 (3.1)	52 (3.3)	535 (3.1)	11 (2.4)	527 (7.1)	9.3 (0.16)
Sweden	37 (4.2)	545 (5.2)	59 (4.2)	538 (4.7)	4 (1.4)	528 (16.1)	9.5 (0.16)
Singapore	35 (2.5)	596 (6.4)	53 (2.6)	585 (5.2)	12 (1.7)	600 (9.0)	9.2 (0.12)
Hong Kong SAR	33 (4.1)	570 (7.0)	53 (4.3)	552 (4.6)	14 (3.2)	542 (6.8)	8.9 (0.20)
France	30 (3.5)	492 (4.5)	56 (3.5)	489 (3.3)	14 (2.7)	475 (6.9)	8.9 (0.15)
Poland	28 (3.9)	549 (4.3)	62 (4.2)	546 (3.3)	10 (2.6)	549 (7.7)	9.0 (0.16)
Japan	27 (3.8)	569 (3.1)	58 (4.0)	571 (2.2)	15 (2.8)	562 (3.9)	8.9 (0.16)
International Avg.	52 (0.5)	509 (0.7)	42 (0.5)	504 (0.8)	6 (0.3)	502 (2.4)	

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 6.6: 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	
Benchmarking Participants							
Dubai, UAE	64 (2.0)	524 (2.5)	32 (2.1)	502 (5.1)	3 (0.9)	503 (15.0)	10.5 (0.07)
Abu Dhabi, UAE	61 (4.3)	419 (9.2)	32 (4.2)	414 (15.2)	6 (1.7)	370 (27.5)	10.3 (0.17)
Quebec, Canada	54 (4.7)	526 (5.7)	42 (4.8)	521 (5.8)	4 (2.1)	531 (9.9)	10.1 (0.17)
Ontario, Canada	53 (3.5)	529 (3.2)	41 (3.2)	533 (4.5)	6 (1.6)	541 (8.1)	10.1 (0.13)
Norway (4)	49 (4.3)	499 (2.8)	43 (4.2)	488 (4.0)	8 (2.8)	484 (6.2)	9.8 (0.20)
Florida, US r	45 (5.4)	561 (6.9)	45 (5.5)	549 (7.4)	10 (3.3)	516 (15.5)	9.6 (0.22)
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

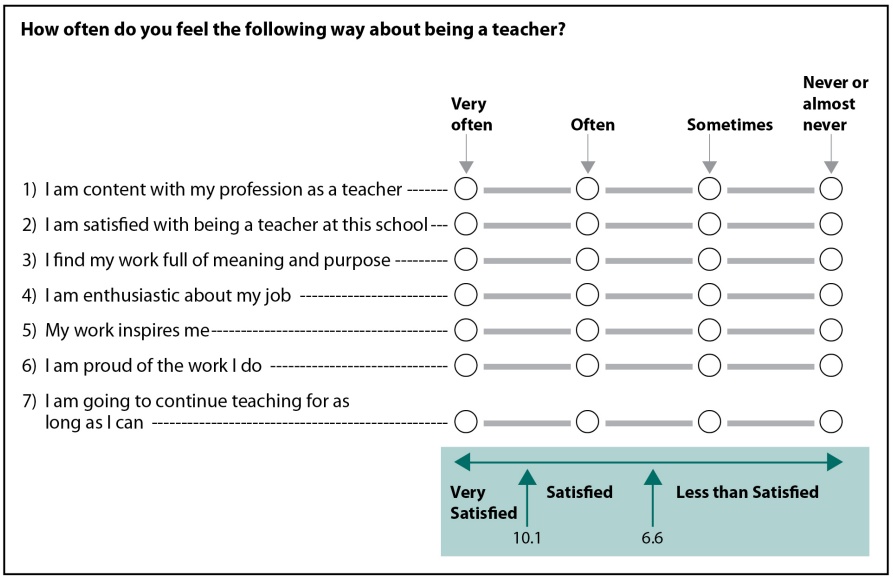


Exhibit 6.8: Challenges Facing Teachers

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 (3.1)	455 (4.1)	15 (3.1)	433 (8.3)	0 (0.0)	~ ~	11.9 (0.12)
Poland	84 (3.2)	546 (2.7)	16 (3.2)	555 (4.8)	0 (0.4)	~ ~	11.7 (0.15)
Russian Federation	78 (2.5)	570 (3.9)	22 (2.5)	557 (5.7)	0 (0.0)	~ ~	11.2 (0.10)
Qatar	70 (3.2)	441 (4.8)	27 (3.1)	429 (9.4)	3 (0.9)	390 (33.7)	11.2 (0.15)
Finland	69 (3.4)	552 (2.8)	31 (3.4)	556 (3.4)	0 (0.0)	~ ~	11.0 (0.10)
Turkey	68 (3.2)	484 (4.2)	29 (2.9)	483 (6.7)	2 (1.3)	~ ~	11.4 (0.14)
Chinese Taipei	66 (3.9)	554 (2.3)	31 (3.8)	558 (3.3)	3 (1.1)	546 (13.8)	11.1 (0.15)
Lithuania	66 (3.9)	525 (3.5)	33 (3.8)	535 (4.8)	1 (0.9)	~ ~	11.0 (0.12)
Kazakhstan	65 (3.9)	553 (6.1)	34 (3.9)	547 (7.2)	1 (0.4)	~ ~	10.8 (0.09)
Italy	58 (3.8)	514 (3.6)	39 (3.8)	519 (4.2)	3 (1.1)	518 (12.2)	10.8 (0.15)
Bulgaria	56 (4.4)	535 (6.7)	41 (4.3)	535 (9.1)	3 (1.5)	557 (18.3)	10.5 (0.15)
Kuwait	54 (3.6)	346 (8.6)	39 (3.4)	328 (10.3)	7 (1.6)	333 (14.8)	10.6 (0.15)
Slovak Republic	53 (3.4)	519 (4.0)	43 (3.3)	522 (4.5)	4 (1.2)	517 (13.0)	10.4 (0.13)
United Arab Emirates	52 (1.9)	468 (4.2)	41 (2.2)	437 (6.5)	8 (1.0)	426 (13.2)	10.5 (0.09)
Czech Republic	51 (3.3)	532 (3.3)	46 (3.2)	538 (2.9)	3 (1.1)	529 (16.1)	10.5 (0.12)
Bahrain	50 (1.3)	459 (3.7)	44 (1.5)	462 (4.3)	6 (0.8)	442 (5.6)	10.5 (0.06)
Indonesia	50 (2.9)	401 (7.0)	46 (3.0)	394 (6.8)	4 (1.2)	371 (27.6)	10.4 (0.09)
Morocco	46 (3.2)	366 (6.7)	47 (3.1)	344 (7.2)	6 (1.4)	310 (14.4)	10.1 (0.13)
Croatia	46 (3.4)	531 (2.8)	48 (3.5)	535 (3.0)	6 (1.8)	534 (10.4)	10.0 (0.11)
Saudi Arabia	44 (3.7)	400 (8.0)	45 (3.8)	387 (7.7)	11 (2.2)	365 (17.0)	10.0 (0.15)
Belgium (Flemish)	40 (3.4)	504 (4.2)	56 (3.5)	516 (2.8)	4 (1.6)	529 (12.6)	10.0 (0.10)
Germany	39 (3.2)	527 (4.8)	55 (3.4)	528 (3.5)	6 (1.9)	526 (7.1)	9.8 (0.11)
Iran, Islamic Rep. of	37 (3.4)	425 (8.4)	52 (3.9)	416 (5.9)	11 (2.2)	432 (11.7)	9.6 (0.14)
Japan	37 (3.8)	567 (3.1)	56 (4.0)	570 (2.1)	7 (2.2)	573 (5.0)	9.7 (0.11)
United States	36 (2.8)	542 (4.3)	54 (2.7)	547 (3.2)	10 (1.5)	556 (6.2)	9.8 (0.13)
Cyprus	35 (4.3)	486 (5.0)	59 (4.4)	478 (3.0)	6 (2.3)	478 (9.6)	9.8 (0.12)
Oman	34 (2.5)	427 (5.4)	59 (2.7)	434 (4.6)	6 (1.6)	434 (16.4)	9.9 (0.10)
Hong Kong SAR	34 (4.0)	565 (5.4)	58 (4.1)	552 (3.4)	8 (2.3)	552 (9.5)	9.7 (0.14)
Serbia	33 (3.5)	517 (7.8)	59 (3.6)	530 (3.9)	8 (2.1)	518 (9.3)	9.7 (0.14)
Ireland	33 (3.7)	529 (4.0)	53 (4.3)	529 (3.5)	14 (3.1)	530 (7.1)	9.4 (0.15)
Canada	32 (2.6)	518 (4.2)	57 (2.6)	527 (3.3)	11 (1.6)	531 (4.8)	9.5 (0.09)
New Zealand	31 (2.5)	499 (6.2)	54 (2.8)	508 (2.7)	14 (2.0)	516 (6.0)	9.4 (0.12)
Norway (5)	30 (3.9)	543 (3.6)	62 (3.7)	537 (3.2)	8 (2.1)	535 (6.2)	9.7 (0.17)
Korea, Rep. of	30 (3.4)	591 (3.8)	56 (3.7)	588 (2.5)	15 (2.9)	593 (3.5)	9.3 (0.18)
Hungary	29 (3.2)	529 (7.0)	55 (3.6)	549 (4.4)	16 (2.7)	549 (8.4)	9.2 (0.13)
England	28 (3.5)	539 (6.5)	52 (3.9)	536 (3.5)	19 (2.9)	537 (6.4)	9.2 (0.18)
Spain	28 (2.7)	520 (4.6)	58 (2.8)	517 (3.7)	14 (2.3)	518 (5.5)	9.2 (0.10)
Sweden	27 (3.6)	545 (5.7)	66 (3.8)	539 (4.3)	7 (2.2)	536 (12.0)	9.6 (0.12)
Denmark	27 (3.0)	531 (4.9)	59 (3.3)	523 (3.1)	14 (2.6)	532 (6.1)	9.3 (0.12)
Netherlands r	27 (3.6)	509 (4.9)	69 (3.7)	520 (3.1)	4 (1.7)	534 (7.9)	9.5 (0.13)
Australia	26 (2.9)	532 (5.8)	67 (2.8)	522 (3.8)	7 (1.7)	526 (4.9)	9.4 (0.11)
Northern Ireland r	25 (3.8)	526 (5.0)	57 (4.1)	517 (3.6)	17 (3.9)	525 (5.7)	9.1 (0.20)
Chile	23 (3.2)	486 (8.1)	59 (4.1)	476 (4.1)	17 (3.6)	475 (5.9)	9.0 (0.16)
Slovenia	17 (2.5)	541 (4.5)	74 (2.9)	544 (2.7)	9 (2.2)	538 (9.2)	9.1 (0.11)
Portugal	14 (2.8)	521 (7.4)	56 (4.0)	506 (3.0)	30 (3.3)	505 (3.1)	8.5 (0.16)
France	8 (1.8)	488 (10.6)	77 (2.9)	490 (2.7)	15 (2.8)	480 (6.8)	8.7 (0.11)
Singapore	- -	- -	- -	- -	- -	- -	- -
International Avg.	43 (0.5)	506 (0.8)	49 (0.5)	503 (0.7)	8 (0.3)	497 (1.9)	

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

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

Exhibit 6.8: 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	
Benchmarking Participants							
Dubai, UAE	57 (3.4)	523 (3.5)	37 (3.4)	509 (6.9)	6 (0.8)	501 (9.3)	10.6 (0.10)
Abu Dhabi, UAE	45 (3.8)	431 (10.0)	46 (4.2)	405 (9.5)	8 (2.5)	381 (33.2)	10.2 (0.17)
Ontario, Canada	34 (3.1)	523 (4.5)	55 (3.0)	535 (3.0)	11 (2.1)	537 (7.1)	9.6 (0.11)
Norway (4)	34 (4.0)	495 (3.5)	55 (4.3)	491 (3.5)	11 (2.5)	499 (7.0)	9.5 (0.13)
Quebec, Canada	30 (5.2)	518 (5.7)	57 (5.3)	528 (5.7)	13 (3.5)	520 (7.5)	9.2 (0.18)
Florida, US r	28 (5.1)	547 (9.1)	67 (5.5)	552 (5.9)	4 (2.2)	559 (30.8)	9.7 (0.24)
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

Indicate the extent to which you agree or disagree with each of the following statements.

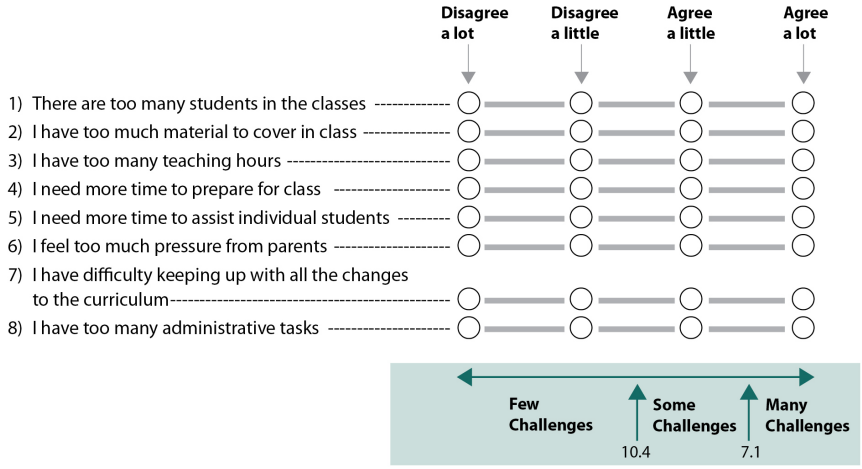


Exhibit 6.10: Students' Sense of School Belonging

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 (0.6)	404 (4.7)	7 (0.6)	366 (11.1)	1 (0.2)	~ ~	11.5 (0.04)
Portugal	88 (0.9)	509 (2.3)	11 (0.8)	506 (4.4)	1 (0.2)	~ ~	11.3 (0.05)
Morocco	87 (1.0)	366 (4.8)	11 (0.8)	311 (10.6)	2 (0.3)	~ ~	11.3 (0.06)
Bulgaria	82 (1.2)	539 (6.0)	16 (1.1)	535 (6.9)	2 (0.3)	~ ~	10.9 (0.06)
Turkey	81 (1.0)	493 (3.1)	18 (0.9)	451 (6.0)	1 (0.2)	~ ~	10.8 (0.05)
Kazakhstan	80 (1.3)	556 (4.5)	19 (1.3)	526 (5.6)	1 (0.1)	~ ~	10.9 (0.07)
Oman	79 (0.9)	440 (3.4)	18 (0.7)	411 (4.4)	4 (0.3)	367 (8.5)	10.7 (0.05)
Spain	78 (1.1)	521 (2.4)	19 (0.9)	515 (3.8)	3 (0.3)	491 (8.6)	10.5 (0.06)
Norway (5)	75 (1.1)	540 (2.6)	22 (1.0)	531 (4.1)	2 (0.3)	~ ~	10.5 (0.05)
Ireland	73 (1.2)	533 (2.7)	23 (1.1)	521 (3.3)	4 (0.4)	513 (8.3)	10.2 (0.05)
Serbia	73 (1.2)	524 (4.2)	24 (1.1)	533 (4.0)	3 (0.3)	510 (10.5)	10.3 (0.06)
Northern Ireland	71 (1.3)	523 (2.5)	25 (1.1)	515 (4.2)	3 (0.5)	494 (8.4)	10.2 (0.06)
Lithuania	71 (1.1)	532 (2.7)	26 (1.0)	521 (3.3)	3 (0.3)	492 (9.6)	10.1 (0.05)
Saudi Arabia	71 (1.3)	408 (5.2)	23 (1.0)	371 (5.2)	6 (0.7)	347 (13.8)	10.4 (0.07)
Iran, Islamic Rep. of	71 (1.3)	417 (4.7)	26 (1.3)	443 (5.2)	3 (0.3)	384 (19.0)	10.2 (0.07)
England	71 (1.4)	540 (2.8)	25 (1.2)	530 (3.9)	4 (0.4)	503 (6.1)	10.2 (0.06)
Kuwait	71 (1.3)	343 (6.6)	25 (1.2)	335 (8.8)	5 (0.4)	277 (13.7)	10.3 (0.07)
Chile	70 (1.2)	484 (2.6)	24 (0.9)	469 (4.1)	6 (0.5)	455 (7.6)	10.2 (0.06)
Finland	68 (1.3)	556 (2.3)	28 (1.1)	552 (3.4)	3 (0.4)	527 (5.9)	10.0 (0.05)
Russian Federation	68 (1.3)	568 (3.3)	29 (1.2)	566 (4.2)	3 (0.3)	566 (10.1)	10.0 (0.06)
Netherlands	68 (1.4)	522 (2.5)	28 (1.2)	507 (4.0)	4 (0.4)	499 (7.3)	10.0 (0.06)
New Zealand	67 (1.0)	508 (3.3)	29 (0.9)	507 (3.0)	4 (0.3)	481 (9.3)	10.0 (0.05)
Bahrain	67 (0.9)	468 (2.4)	27 (0.9)	452 (4.2)	6 (0.5)	418 (10.9)	10.0 (0.04)
Hungary	66 (1.0)	545 (3.3)	31 (0.9)	540 (4.1)	4 (0.3)	521 (9.3)	9.9 (0.05)
Canada	66 (0.9)	530 (2.5)	30 (0.8)	520 (2.9)	5 (0.3)	506 (6.3)	10.0 (0.04)
Sweden	65 (1.2)	544 (3.7)	32 (1.1)	536 (4.4)	3 (0.3)	508 (11.6)	9.9 (0.06)
United States	64 (0.8)	554 (2.3)	29 (0.6)	539 (2.6)	7 (0.4)	518 (4.8)	9.9 (0.04)
Belgium (Flemish)	64 (1.2)	516 (2.3)	33 (1.1)	507 (3.3)	4 (0.3)	479 (6.1)	9.8 (0.06)
United Arab Emirates	64 (0.8)	468 (2.8)	31 (0.7)	431 (4.0)	6 (0.3)	403 (6.1)	9.9 (0.04)
Italy	63 (1.3)	518 (2.8)	33 (1.0)	519 (3.3)	5 (0.5)	495 (9.1)	9.7 (0.05)
Cyprus	62 (1.3)	486 (2.5)	30 (0.9)	481 (3.2)	8 (0.7)	473 (6.3)	9.8 (0.06)
Denmark	62 (1.3)	533 (2.3)	33 (1.1)	520 (2.5)	4 (0.4)	506 (7.5)	9.8 (0.06)
Australia	62 (1.2)	529 (3.3)	33 (1.0)	520 (3.6)	5 (0.4)	493 (6.0)	9.8 (0.05)
Slovak Republic	61 (1.3)	517 (3.3)	35 (1.1)	530 (2.8)	4 (0.4)	508 (7.1)	9.7 (0.05)
Qatar	60 (1.1)	451 (3.6)	30 (0.9)	427 (5.8)	9 (0.8)	396 (7.7)	9.7 (0.06)
Germany r	57 (1.3)	535 (2.7)	36 (1.1)	532 (2.9)	7 (0.6)	518 (5.4)	9.5 (0.06)
Croatia	57 (1.5)	535 (2.6)	40 (1.3)	532 (2.7)	3 (0.4)	519 (7.4)	9.5 (0.06)
Singapore	56 (0.8)	593 (3.7)	39 (0.7)	590 (4.0)	6 (0.4)	573 (7.1)	9.5 (0.03)
Slovenia	55 (1.5)	542 (2.8)	39 (1.1)	545 (2.8)	6 (0.6)	541 (6.5)	9.5 (0.06)
Georgia	55 (1.3)	458 (4.5)	43 (1.3)	452 (3.8)	1 (0.3)	~ ~	9.7 (0.06)
Korea, Rep. of	52 (1.3)	591 (2.3)	45 (1.2)	588 (2.3)	3 (0.4)	578 (8.0)	9.5 (0.06)
France	51 (1.3)	492 (2.8)	45 (1.2)	485 (3.3)	3 (0.3)	456 (7.6)	9.3 (0.05)
Czech Republic	50 (1.4)	531 (2.9)	45 (1.3)	540 (3.0)	5 (0.7)	525 (6.3)	9.2 (0.05)
Poland	47 (1.4)	545 (2.8)	46 (1.2)	551 (2.8)	7 (0.6)	543 (5.4)	9.1 (0.05)
Chinese Taipei	46 (1.1)	559 (2.3)	46 (0.9)	554 (2.3)	8 (0.5)	539 (5.0)	9.1 (0.04)
Hong Kong SAR	46 (1.6)	565 (3.9)	43 (1.2)	552 (3.1)	11 (0.9)	540 (4.7)	9.0 (0.07)
Japan	41 (1.2)	578 (2.4)	52 (1.0)	566 (2.0)	8 (0.6)	547 (5.2)	8.9 (0.05)
International Avg.	66 (0.2)	511 (0.5)	30 (0.2)	501 (0.7)	4 (0.1)	487 (1.4)	

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.

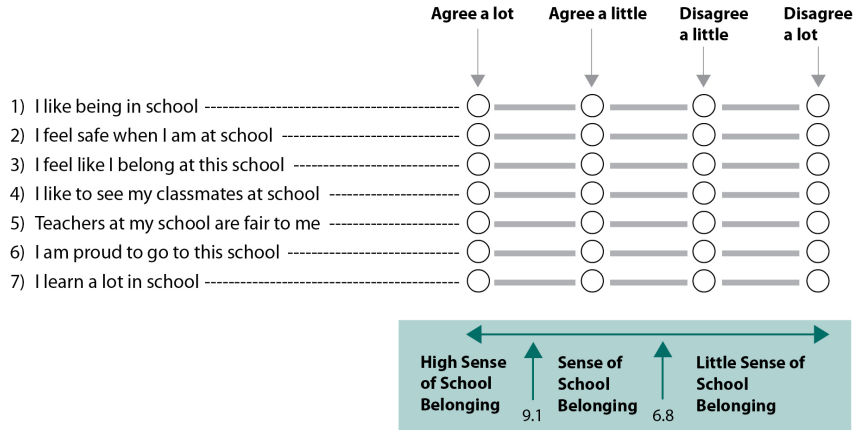
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

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	
Benchmarking Participants							
Norway (4)	80 (1.4)	497 (2.1)	18 (1.3)	482 (4.9)	2 (0.4)	~ ~	10.7 (0.07)
Dubai, UAE	69 (0.8)	531 (1.9)	26 (0.8)	498 (3.0)	4 (0.3)	450 (6.1)	10.2 (0.03)
Florida, US	65 (1.5)	558 (5.2)	29 (1.2)	538 (6.0)	6 (0.7)	518 (8.6)	10.0 (0.08)
Ontario, Canada	64 (1.4)	536 (2.7)	30 (1.3)	524 (3.1)	6 (0.5)	514 (6.3)	9.9 (0.06)
Buenos Aires, Argentina	63 (1.2)	424 (4.6)	30 (1.0)	427 (6.1)	7 (0.7)	413 (12.5)	9.8 (0.05)
Quebec, Canada	63 (1.4)	528 (4.2)	33 (1.2)	521 (5.3)	4 (0.6)	509 (12.2)	9.8 (0.06)
Abu Dhabi, UAE	58 (1.8)	431 (6.7)	35 (1.4)	400 (7.4)	7 (0.6)	376 (8.6)	9.7 (0.08)

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

What do you think about your school? Tell how much you agree with these statements.



TIMSS 2015

CHAPTER 7: SCHOOL SAFETY

TIMSS 2015 INTERNATIONAL RESULTS IN SCIENCE

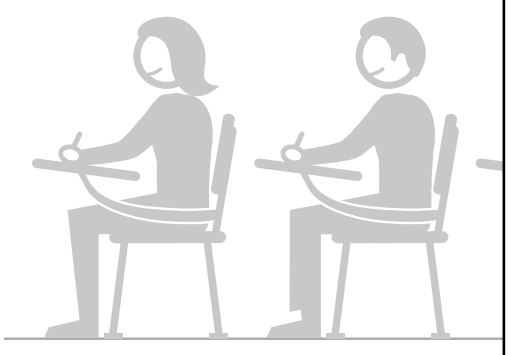
IEA
TIMSS & PIRLS International Study Center
Lynch School of Education, Boston College

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

61% of students were in schools where principals reported HARDLY ANY discipline problems



30% of students were in schools where principals reported only MINOR discipline problems

9% of students were in schools where principals reported MODERATE TO SEVERE discipline problems

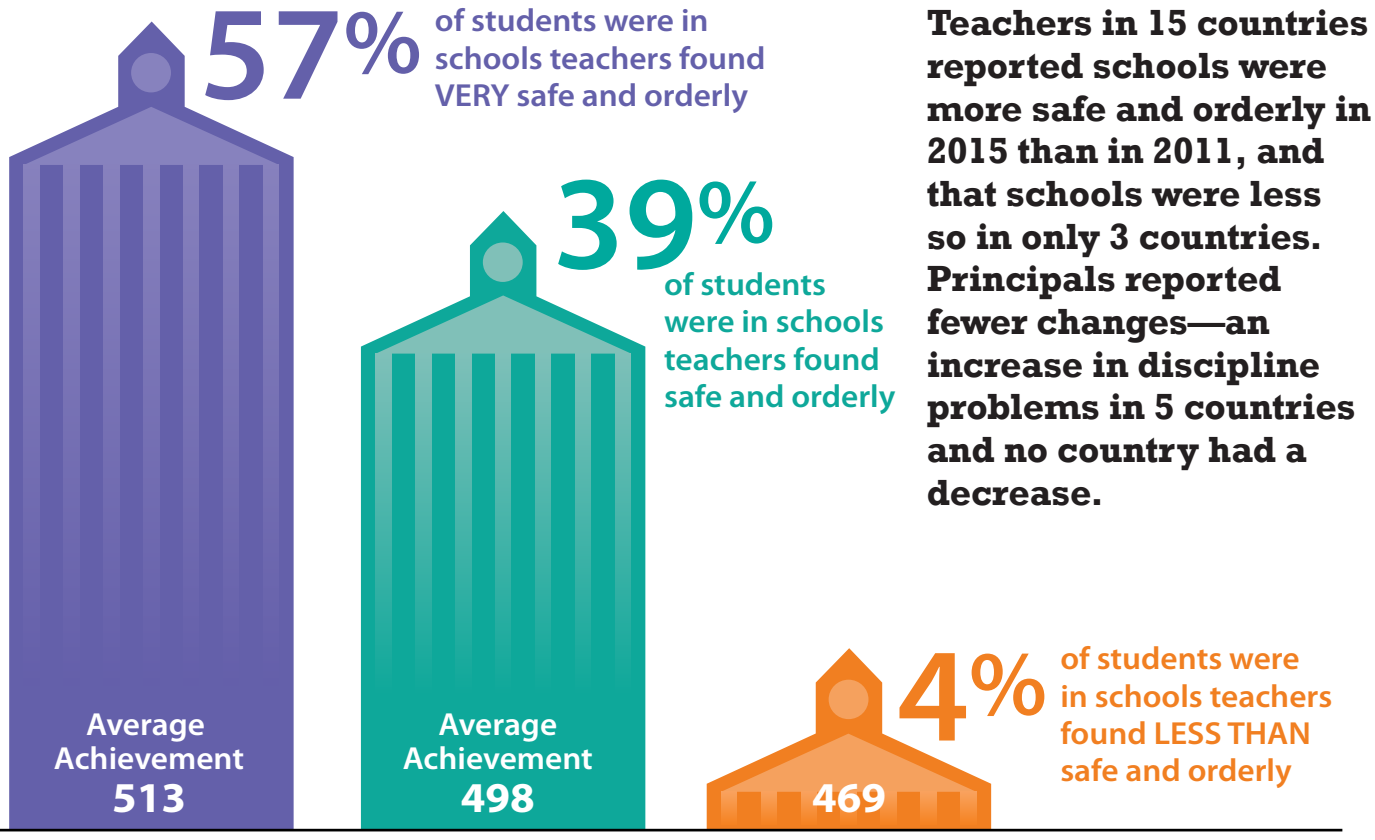
Teachers' Reports

57% of students were in schools teachers found VERY safe and orderly

39% of students were in schools teachers found safe and orderly

Teachers in 15 countries reported schools were more safe and orderly in 2015 than in 2011, and that schools were less so in only 3 countries. Principals reported fewer changes—an increase in discipline problems in 5 countries and no country had a decrease.

4% of students were in schools teachers found LESS THAN safe and orderly



Student Bullying

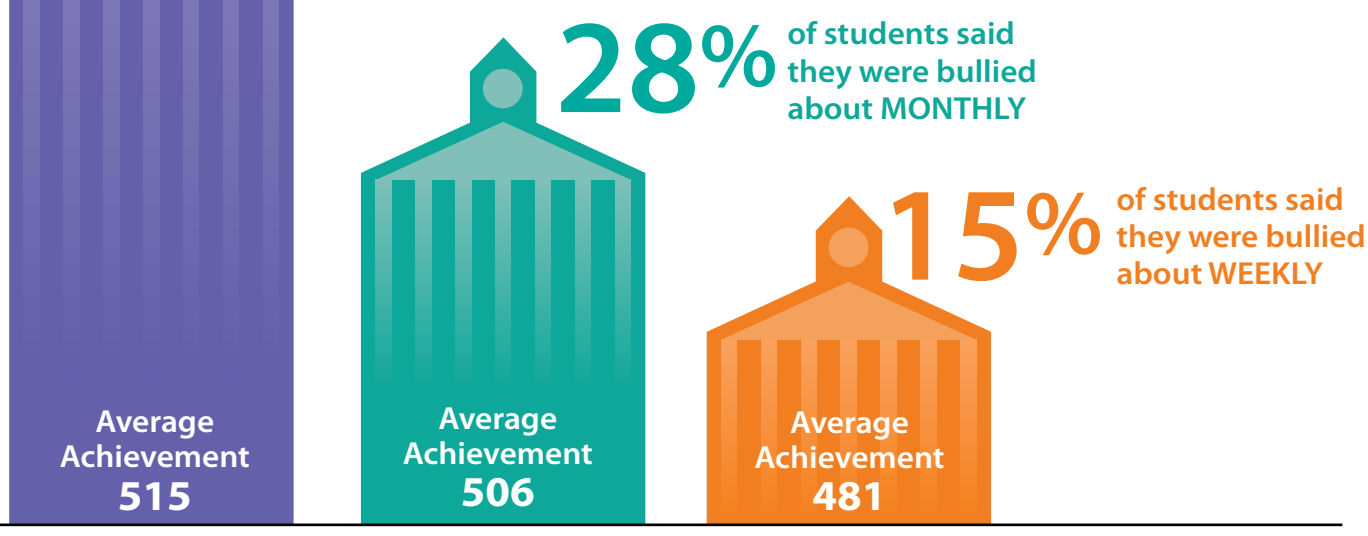
With the emergence of cyber-bullying, there is growing evidence that school-related bullying is on the rise and does have a negative impact on student achievement.

Students' Reports

57% of students said they were ALMOST NEVER bullied

28% of students said they were bullied about MONTHLY

15% of students said they were bullied about WEEKLY



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

http://timss2015.org/download-center/

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

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)	532 (2.8)	14 (3.1)	516 (7.4)	2 (1.2)	~ ~	10.9 (0.11)	-0.2 (0.17)
Netherlands s	83 (4.1)	526 (3.4)	17 (4.1)	514 (5.7)	0 (0.0)	~ ~	11.1 (0.13)	s -0.2 (0.20)
Korea, Rep. of	81 (3.4)	590 (2.2)	14 (3.0)	593 (4.6)	5 (1.8)	574 (7.0)	11.3 (0.16)	0.4 (0.22)
Lithuania	79 (3.4)	528 (2.8)	20 (3.4)	524 (8.8)	1 (1.0)	~ ~	10.6 (0.10)	0.1 (0.16)
England	78 (3.7)	542 (3.1)	21 (3.6)	517 (6.8)	1 (0.8)	~ ~	10.9 (0.11)	0.3 (0.16)
Northern Ireland r	78 (4.0)	522 (2.8)	22 (4.0)	508 (7.7)	0 (0.0)	~ ~	10.8 (0.13)	r -0.2 (0.19)
Croatia	76 (4.1)	533 (2.5)	24 (4.1)	533 (4.2)	0 (0.0)	~ ~	10.7 (0.14)	0.3 (0.18)
Japan	74 (3.2)	571 (1.9)	20 (3.0)	566 (3.7)	6 (2.0)	563 (6.5)	10.4 (0.14)	-0.1 (0.18)
Norway (5)	74 (4.3)	540 (3.0)	25 (4.2)	528 (5.2)	1 (0.8)	~ ~	10.7 (0.13)	◊ ◊
Bulgaria	72 (4.2)	550 (5.2)	20 (3.8)	496 (12.2)	8 (2.9)	506 (36.2)	10.4 (0.18)	◊ ◊
Singapore	72 (0.0)	592 (4.6)	28 (0.0)	588 (7.7)	0 (0.0)	~ ~	10.7 (0.00)	0.0 (0.00)
Kazakhstan	71 (3.9)	552 (5.6)	13 (2.7)	560 (15.3)	15 (2.8)	535 (10.3)	10.3 (0.21)	-0.9 (0.24) ▼
New Zealand	71 (2.8)	520 (3.4)	28 (2.9)	478 (6.3)	1 (0.8)	~ ~	10.5 (0.08)	-0.1 (0.15)
Hong Kong SAR	71 (4.6)	559 (4.3)	29 (4.6)	552 (8.3)	0 (0.0)	~ ~	10.5 (0.13)	-0.8 (0.17) ▼
Georgia	70 (3.9)	455 (4.2)	22 (3.5)	432 (8.1)	8 (2.6)	481 (26.8)	10.4 (0.19)	-0.3 (0.24)
Spain	70 (3.4)	525 (2.8)	22 (3.0)	501 (5.1)	8 (1.5)	507 (9.5)	10.3 (0.13)	-0.5 (0.21)
Chinese Taipei	70 (4.1)	559 (2.1)	28 (3.8)	549 (4.0)	3 (1.6)	531 (12.5)	10.6 (0.14)	-0.7 (0.20) ▼
United States	69 (3.3)	556 (3.0)	29 (3.3)	528 (5.5)	3 (0.9)	480 (11.8)	10.3 (0.10)	0.0 (0.14)
Finland	68 (3.8)	556 (2.8)	31 (3.7)	548 (3.3)	1 (1.0)	~ ~	10.3 (0.11)	0.1 (0.16)
Belgium (Flemish)	68 (3.6)	520 (2.6)	31 (3.8)	499 (6.0)	1 (1.1)	~ ~	10.5 (0.12)	0.1 (0.18)
Russian Federation	67 (3.9)	570 (4.0)	32 (3.9)	561 (5.6)	0 (0.4)	~ ~	10.2 (0.09)	0.0 (0.13)
Canada	66 (3.1)	531 (2.8)	31 (2.9)	514 (4.2)	2 (1.0)	~ ~	10.2 (0.10)	◊ ◊
Czech Republic	65 (3.6)	536 (2.6)	31 (3.5)	534 (4.4)	4 (1.8)	514 (20.0)	10.1 (0.10)	0.0 (0.15)
Iran, Islamic Rep. of	65 (3.5)	427 (5.6)	26 (3.3)	428 (7.8)	9 (2.4)	365 (21.0)	10.0 (0.13)	-0.7 (0.17) ▼
Australia	64 (3.4)	534 (2.9)	30 (3.4)	516 (4.7)	6 (3.1)	462 (6.3)	10.2 (0.12)	-0.2 (0.17)
Qatar	63 (3.0)	444 (5.5)	26 (2.8)	417 (9.1)	11 (1.8)	433 (12.1)	10.0 (0.12)	0.0 (0.19)
Slovak Republic	63 (3.6)	535 (3.4)	32 (3.4)	503 (5.7)	5 (1.7)	459 (19.0)	10.0 (0.10)	0.1 (0.16)
United Arab Emirates	61 (2.4)	470 (4.1)	31 (2.5)	422 (6.0)	8 (1.2)	385 (11.2)	10.1 (0.07)	0.2 (0.13)
Italy	60 (4.5)	518 (3.6)	25 (3.7)	513 (4.9)	15 (3.0)	517 (8.2)	9.6 (0.16)	0.1 (0.22)
Bahrain	59 (0.2)	469 (3.3)	26 (0.2)	450 (4.2)	14 (0.1)	423 (7.6)	9.7 (0.01)	-0.4 (0.31)
France	58 (4.6)	496 (3.7)	33 (4.3)	479 (4.3)	9 (2.7)	454 (12.8)	9.9 (0.15)	◊ ◊
Serbia	56 (4.3)	524 (5.2)	35 (3.8)	528 (4.4)	9 (2.0)	513 (13.5)	9.8 (0.15)	0.1 (0.23)
Hungary	55 (3.7)	553 (4.4)	37 (3.6)	537 (5.4)	8 (1.7)	484 (20.8)	9.8 (0.11)	0.1 (0.17)
Denmark r	53 (4.3)	536 (3.3)	45 (4.4)	522 (3.7)	1 (1.0)	~ ~	9.9 (0.11)	r -0.2 (0.14)
Slovenia	52 (4.3)	544 (3.4)	45 (4.5)	542 (3.5)	3 (1.3)	559 (4.1)	9.8 (0.13)	-0.2 (0.18)
Poland	52 (3.6)	546 (3.0)	45 (3.8)	549 (3.6)	3 (1.4)	543 (14.1)	9.8 (0.09)	◊ ◊
Cyprus	50 (4.8)	488 (3.4)	42 (4.5)	475 (4.4)	8 (2.6)	471 (8.4)	9.7 (0.17)	◊ ◊
Sweden	49 (4.1)	554 (4.1)	40 (4.0)	536 (4.5)	10 (2.6)	492 (16.8)	9.4 (0.11)	-0.3 (0.17)
Saudi Arabia	49 (3.9)	397 (6.5)	26 (3.1)	380 (11.0)	25 (3.4)	387 (12.8)	9.2 (0.19)	0.1 (0.26)
Chile	46 (4.0)	489 (4.1)	47 (4.3)	471 (5.6)	6 (2.2)	455 (17.0)	9.6 (0.11)	0.4 (0.18)
Turkey	44 (3.5)	505 (4.6)	29 (3.2)	464 (7.5)	26 (2.9)	468 (7.0)	8.8 (0.15)	-0.2 (0.21)
Portugal	43 (4.5)	511 (2.8)	46 (4.7)	507 (3.4)	11 (2.6)	507 (5.3)	9.4 (0.15)	-0.9 (0.23) ▼
Germany	39 (3.8)	541 (3.7)	50 (3.7)	522 (3.2)	10 (2.4)	506 (10.8)	9.2 (0.10)	-0.3 (0.13)
Oman	34 (3.4)	431 (7.4)	36 (3.0)	426 (5.8)	29 (2.8)	439 (6.0)	8.6 (0.15)	0.2 (0.21)
Kuwait	25 (3.9)	368 (10.6)	40 (4.4)	324 (10.0)	35 (3.5)	326 (12.3)	8.3 (0.19)	◊ ◊
Morocco	21 (3.0)	378 (12.5)	30 (3.0)	342 (7.8)	49 (3.2)	348 (5.9)	7.7 (0.16)	0.5 (0.21)
Indonesia	18 (2.9)	407 (11.7)	28 (3.3)	411 (8.9)	54 (3.6)	386 (7.0)	7.4 (0.16)	◊ ◊
International Avg.	61 (0.5)	513 (0.7)	30 (0.5)	498 (1.0)	9 (0.3)	471 (2.5)		

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 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 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		
Benchmarking Participants								
Dubai, UAE	83 (0.2)	529 (2.0)	14 (0.2)	466 (3.6)	3 (0.1)	393 (8.3)	11.0 (0.01)	0.4 (0.01) ▲
Quebec, Canada	77 (4.8)	530 (4.3)	23 (4.8)	508 (6.6)	0 (0.0)	~ ~	10.7 (0.18)	0.7 (0.22) ▲
Norway (4)	72 (4.6)	494 (2.4)	26 (4.3)	495 (4.0)	2 (1.6)	~ ~	10.6 (0.14)	0.7 (0.19) ▲
Ontario, Canada	58 (5.5)	535 (4.1)	38 (5.3)	523 (3.8)	4 (1.7)	499 (17.5)	9.9 (0.16)	-0.5 (0.21)
Florida, US r	57 (8.1)	556 (7.7)	39 (8.3)	547 (7.3)	4 (2.8)	494 (12.1)	10.0 (0.22)	r -0.3 (0.30)
Buenos Aires, Argentina s	53 (5.7)	440 (6.4)	35 (5.5)	396 (9.4)	13 (3.8)	397 (18.7)	9.5 (0.16)	◊ ◊
Abu Dhabi, UAE	51 (4.6)	421 (10.3)	41 (4.7)	403 (9.6)	8 (2.5)	366 (24.6)	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

To what degree is each of the following a problem among fourth grade students in your school?

	Not a problem	Minor problem	Moderate problem	Serious problem
1) Arriving late at school	○	○	○	○
2) Absenteeism (i.e., unjustified absences)	○	○	○	○
3) Classroom disturbance	○	○	○	○
4) Cheating	○	○	○	○
5) Profanity	○	○	○	○
6) Vandalism	○	○	○	○
7) Theft	○	○	○	○
8) Intimidation or verbal abuse among students (including texting, emailing, etc.)	○	○	○	○
9) Physical fights among students	○	○	○	○
10) Intimidation or verbal abuse of teachers or staff (including texting, emailing, etc.)	○	○	○	○

Hardly Any Problems | Minor Problems | Moderate to Severe Problems
9.7 | 7.6

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	87 (2.3)	400 (5.3)	12 (2.2)	376 (13.0)	1 (0.5)	~ ~	12.1 (0.12)	◊ ◊
Northern Ireland r	85 (3.1)	523 (2.4)	15 (3.1)	506 (7.3)	0 (0.0)	~ ~	12.0 (0.16)	r 0.5 (0.21)
Ireland	83 (2.7)	534 (2.5)	14 (2.7)	511 (6.1)	2 (1.3)	~ ~	11.7 (0.15)	0.4 (0.21)
Qatar	79 (3.1)	444 (4.6)	19 (3.0)	410 (10.7)	1 (0.8)	~ ~	11.4 (0.12)	1.0 (0.24) ▲
Australia	77 (2.7)	533 (3.6)	21 (2.7)	502 (5.6)	2 (0.6)	~ ~	11.4 (0.15)	r 0.4 (0.22)
Kazakhstan	75 (3.7)	550 (5.5)	25 (3.7)	547 (8.2)	0 (0.0)	~ ~	11.5 (0.16)	0.7 (0.22) ▲
Spain	74 (2.7)	525 (2.7)	23 (2.7)	505 (4.6)	3 (1.2)	456 (15.1)	11.1 (0.11)	1.3 (0.20) ▲
England	73 (3.5)	541 (3.3)	26 (3.4)	524 (5.4)	1 (0.6)	~ ~	11.2 (0.17)	0.4 (0.23)
Norway (5)	72 (2.9)	543 (2.8)	25 (2.8)	528 (3.8)	3 (0.9)	538 (11.0)	11.0 (0.15)	◊ ◊
New Zealand	71 (2.6)	517 (3.1)	26 (2.3)	480 (5.1)	3 (0.8)	469 (13.2)	11.0 (0.12)	0.0 (0.16)
Iran, Islamic Rep. of	70 (2.5)	421 (5.0)	27 (2.5)	428 (7.5)	3 (1.1)	363 (21.2)	10.7 (0.12)	0.4 (0.19)
Bulgaria	68 (3.7)	548 (6.0)	30 (3.9)	509 (9.5)	2 (1.8)	~ ~	10.4 (0.14)	◊ ◊
Poland	66 (3.7)	549 (2.8)	33 (3.8)	543 (4.3)	0 (0.4)	~ ~	10.2 (0.11)	◊ ◊
Georgia	66 (3.8)	455 (5.2)	33 (3.9)	445 (5.7)	1 (0.6)	~ ~	10.5 (0.15)	-0.8 (0.19) ▼
Portugal	65 (3.4)	513 (2.6)	32 (3.5)	502 (3.5)	3 (1.1)	478 (15.5)	10.6 (0.13)	1.0 (0.23) ▲
Singapore	64 (2.4)	599 (4.8)	32 (2.3)	576 (6.1)	4 (0.9)	570 (15.4)	10.7 (0.10)	0.4 (0.14) ▲
Cyprus	62 (4.3)	484 (3.2)	33 (4.2)	478 (4.4)	5 (2.0)	468 (14.7)	10.4 (0.18)	◊ ◊
Hong Kong SAR	61 (4.6)	562 (4.7)	37 (4.8)	551 (6.7)	2 (1.3)	~ ~	10.7 (0.17)	0.8 (0.24) ▲
Bahrain	60 (1.6)	469 (3.2)	34 (1.6)	444 (4.1)	5 (0.2)	451 (3.2)	10.5 (0.05)	0.4 (0.20)
United Arab Emirates	60 (1.8)	474 (4.2)	36 (1.8)	423 (5.4)	4 (0.7)	386 (19.0)	10.6 (0.08)	-0.2 (0.11)
Netherlands r	60 (3.7)	524 (3.3)	39 (3.8)	508 (4.0)	1 (1.1)	~ ~	10.3 (0.16)	r 0.1 (0.24)
Lithuania	57 (4.2)	527 (3.6)	41 (4.2)	530 (4.5)	2 (0.9)	~ ~	10.3 (0.14)	0.6 (0.18) ▲
United States	57 (2.6)	560 (2.7)	36 (2.5)	531 (4.1)	8 (1.5)	510 (9.9)	10.3 (0.13)	r -0.2 (0.16)
Saudi Arabia	56 (3.4)	404 (6.8)	37 (3.6)	377 (8.6)	7 (1.8)	351 (17.8)	10.2 (0.13)	0.3 (0.22)
Canada	56 (2.4)	528 (3.1)	41 (2.5)	523 (4.4)	3 (0.8)	496 (12.4)	10.4 (0.10)	◊ ◊
Oman	55 (2.9)	436 (4.9)	41 (2.9)	424 (4.7)	4 (1.3)	431 (10.8)	10.3 (0.12)	0.4 (0.15) ▲
Russian Federation	54 (4.0)	568 (4.3)	44 (4.0)	567 (6.0)	2 (0.9)	~ ~	10.1 (0.13)	0.2 (0.21)
Italy	53 (3.6)	515 (3.6)	43 (3.5)	520 (4.2)	4 (1.6)	488 (10.1)	10.0 (0.15)	1.5 (0.18) ▲
Serbia	52 (3.5)	528 (3.8)	41 (3.6)	520 (6.8)	7 (1.6)	526 (7.8)	10.1 (0.14)	0.7 (0.21) ▲
Slovak Republic	51 (3.3)	530 (3.6)	45 (3.3)	513 (4.5)	3 (1.0)	471 (22.6)	9.8 (0.12)	0.4 (0.15) ▲
Czech Republic	51 (3.3)	538 (3.0)	47 (3.3)	531 (3.2)	2 (0.8)	~ ~	9.8 (0.12)	0.4 (0.17)
Kuwait	51 (3.2)	345 (10.4)	41 (3.6)	333 (7.4)	7 (1.8)	326 (24.0)	10.0 (0.15)	◊ ◊
Hungary	51 (3.8)	553 (4.4)	43 (3.6)	534 (5.4)	6 (2.2)	508 (14.4)	9.7 (0.15)	0.0 (0.20)
Germany	50 (3.4)	537 (3.7)	46 (3.3)	520 (3.9)	3 (1.3)	490 (16.4)	9.8 (0.12)	0.2 (0.17)
Turkey	49 (3.3)	497 (5.3)	44 (3.3)	473 (4.7)	7 (1.6)	454 (14.5)	9.7 (0.14)	0.8 (0.23) ▲
Croatia	48 (3.5)	532 (2.5)	50 (3.5)	534 (3.0)	2 (1.0)	~ ~	9.9 (0.13)	-0.9 (0.18) ▼
Morocco	47 (2.4)	370 (6.5)	39 (2.5)	341 (7.6)	14 (2.2)	327 (12.7)	9.7 (0.13)	0.8 (0.19) ▲
Korea, Rep. of	46 (4.2)	595 (3.1)	52 (4.2)	585 (2.5)	2 (1.2)	~ ~	10.1 (0.17)	1.4 (0.25) ▲
Chinese Taipei	44 (4.1)	554 (3.0)	49 (4.2)	556 (2.6)	7 (2.1)	558 (7.7)	9.7 (0.15)	0.3 (0.22)
Belgium (Flemish)	43 (3.5)	518 (4.0)	52 (3.6)	508 (3.4)	5 (1.6)	492 (11.0)	9.6 (0.11)	-0.1 (0.16)
Chile	43 (4.2)	499 (4.5)	44 (4.6)	469 (5.3)	13 (2.5)	447 (6.4)	9.4 (0.17)	0.2 (0.25)
France	43 (3.6)	501 (3.5)	52 (3.8)	481 (3.6)	5 (1.5)	448 (12.5)	9.5 (0.13)	◊ ◊
Denmark	41 (3.9)	537 (3.4)	53 (4.1)	521 (3.8)	6 (1.7)	500 (8.5)	9.5 (0.15)	-0.8 (0.19) ▼
Sweden	39 (4.5)	558 (4.5)	57 (4.4)	532 (3.9)	4 (1.5)	485 (32.7)	9.5 (0.16)	r 0.0 (0.23)
Finland	37 (3.4)	558 (2.7)	60 (3.4)	553 (2.7)	3 (1.0)	511 (20.9)	9.6 (0.11)	0.2 (0.17)
Slovenia	29 (3.2)	547 (3.7)	64 (3.4)	543 (3.3)	7 (1.6)	533 (6.4)	9.0 (0.10)	0.1 (0.15)
Japan	9 (2.5)	575 (6.0)	81 (3.2)	570 (1.9)	10 (2.0)	554 (4.4)	8.2 (0.08)	0.4 (0.13) ▲
International Avg.	57 (0.5)	513 (0.6)	39 (0.5)	498 (0.8)	4 (0.2)	469 (2.8)		

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 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 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		
Benchmarking Participants								
Dubai, UAE	70 (1.8)	536 (1.9)	28 (1.8)	472 (4.9)	1 (0.0)	~ ~	11.3 (0.05)	r 0.1 (0.10)
Norway (4)	70 (3.7)	496 (2.5)	26 (3.9)	494 (3.5)	4 (2.1)	436 (13.6)	11.0 (0.18)	0.4 (0.23)
Florida, US r	55 (4.7)	565 (6.2)	33 (5.1)	540 (8.1)	12 (3.0)	517 (13.2)	10.1 (0.29)	r -0.2 (0.38)
Ontario, Canada	54 (3.3)	533 (3.3)	43 (3.4)	532 (3.8)	3 (1.0)	497 (11.4)	10.3 (0.16)	-0.2 (0.23)
Quebec, Canada	47 (5.3)	524 (5.8)	50 (5.7)	525 (5.1)	3 (1.8)	506 (13.5)	9.9 (0.17)	0.2 (0.23)
Abu Dhabi, UAE	45 (4.6)	428 (11.0)	49 (4.4)	409 (8.5)	6 (2.0)	377 (33.6)	9.9 (0.18)	-0.9 (0.24) ▼
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

Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements.

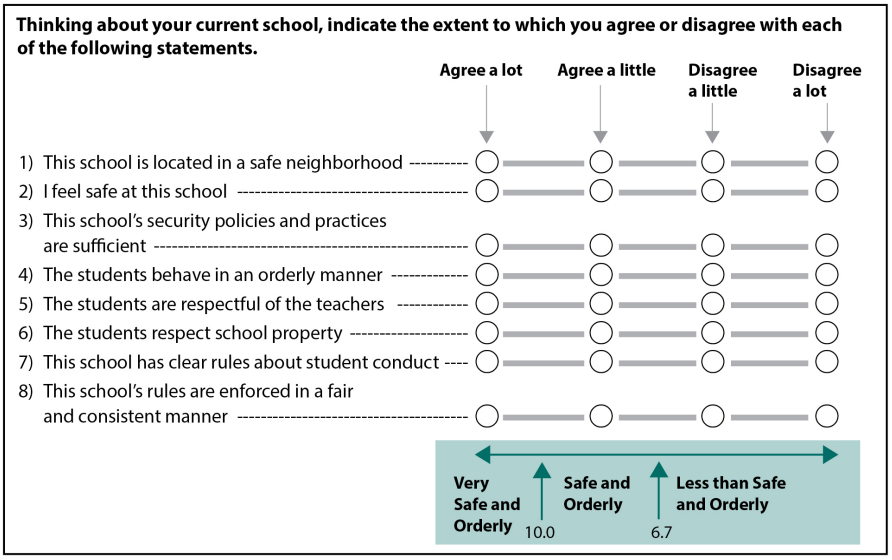


Exhibit 7.5: Student Bullying

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)	588 (2.1)	20 (0.8)	594 (3.4)	4 (0.4)	589 (6.2)	11.0 (0.05)
Kazakhstan	75 (1.1)	554 (4.5)	18 (0.8)	544 (7.4)	7 (0.6)	526 (7.7)	11.1 (0.07)
Ireland	73 (1.2)	535 (2.7)	20 (1.0)	522 (3.6)	6 (0.4)	485 (7.5)	10.8 (0.06)
Croatia	73 (1.2)	537 (2.2)	19 (0.9)	526 (3.4)	8 (0.6)	519 (5.2)	10.8 (0.06)
Georgia	73 (1.1)	462 (3.3)	18 (0.7)	449 (5.2)	9 (0.7)	409 (8.5)	10.8 (0.05)
Serbia	73 (1.0)	529 (4.1)	19 (0.9)	529 (4.9)	8 (0.5)	493 (6.6)	10.9 (0.05)
Poland	73 (1.0)	552 (2.5)	19 (0.8)	544 (3.8)	8 (0.5)	516 (5.4)	10.7 (0.05)
Finland	71 (1.2)	558 (2.4)	22 (0.9)	550 (3.3)	7 (0.5)	530 (5.5)	10.5 (0.05)
Norway (5)	70 (1.3)	542 (2.5)	23 (1.0)	533 (3.5)	7 (0.6)	518 (6.3)	10.5 (0.05)
Japan	68 (1.3)	572 (1.8)	23 (1.0)	567 (2.8)	8 (0.6)	548 (5.5)	10.6 (0.05)
France	65 (1.2)	492 (2.7)	26 (1.0)	484 (3.7)	8 (0.6)	463 (6.9)	10.4 (0.05)
Sweden	65 (1.3)	548 (3.1)	28 (1.1)	534 (4.9)	7 (0.5)	502 (7.7)	10.3 (0.05)
Northern Ireland	64 (1.5)	524 (2.7)	27 (1.1)	520 (3.6)	10 (0.7)	496 (5.3)	10.3 (0.06)
Chile	60 (1.3)	487 (3.0)	24 (0.9)	479 (3.3)	16 (0.8)	447 (5.1)	10.1 (0.06)
Czech Republic	60 (1.1)	539 (2.5)	28 (0.9)	534 (3.4)	12 (0.7)	513 (4.8)	10.2 (0.05)
Netherlands	59 (1.4)	523 (2.8)	31 (0.9)	513 (3.4)	10 (0.9)	496 (4.6)	10.0 (0.05)
Hungary	58 (1.3)	554 (3.1)	31 (1.1)	536 (3.7)	11 (0.7)	500 (9.6)	10.0 (0.05)
Chinese Taipei	58 (1.1)	560 (2.0)	29 (1.0)	551 (2.6)	13 (0.7)	546 (4.2)	10.1 (0.04)
Denmark	58 (1.2)	532 (2.3)	32 (0.9)	526 (2.7)	10 (0.7)	509 (4.9)	10.0 (0.05)
Slovenia	58 (1.0)	548 (2.6)	29 (0.9)	544 (3.2)	14 (0.8)	520 (3.8)	10.0 (0.05)
Turkey	57 (1.1)	500 (3.4)	28 (0.8)	481 (3.9)	14 (0.7)	431 (6.0)	10.1 (0.05)
Germany r	57 (1.3)	540 (2.6)	30 (0.9)	531 (2.9)	13 (0.7)	503 (4.9)	10.0 (0.05)
Slovak Republic	57 (1.1)	530 (3.1)	30 (0.8)	515 (3.6)	13 (0.7)	495 (6.6)	10.1 (0.06)
Portugal	57 (1.0)	512 (2.3)	29 (0.9)	508 (2.6)	15 (0.9)	495 (3.7)	10.0 (0.04)
Lithuania	56 (1.3)	541 (2.8)	31 (1.0)	520 (2.9)	13 (0.7)	491 (5.2)	9.9 (0.05)
United States	56 (0.8)	555 (2.4)	29 (0.5)	547 (2.4)	15 (0.5)	518 (3.5)	9.9 (0.04)
Cyprus	55 (1.2)	494 (2.5)	29 (1.0)	479 (3.0)	16 (0.8)	457 (4.1)	9.9 (0.06)
Hong Kong SAR	54 (1.4)	560 (3.1)	32 (1.1)	556 (3.8)	14 (0.9)	545 (5.3)	9.9 (0.05)
England	54 (1.3)	542 (2.9)	31 (1.1)	535 (3.6)	15 (0.8)	516 (4.6)	9.8 (0.05)
Bulgaria	54 (1.9)	552 (5.9)	30 (1.1)	530 (5.8)	16 (1.1)	502 (9.0)	9.9 (0.08)
Canada	53 (0.9)	534 (2.4)	30 (0.6)	527 (2.6)	17 (0.8)	500 (4.2)	9.7 (0.04)
Russian Federation	51 (1.3)	573 (2.9)	33 (0.9)	568 (4.2)	16 (0.6)	552 (5.1)	9.8 (0.05)
Italy	50 (1.0)	521 (2.9)	35 (0.9)	516 (3.0)	15 (0.7)	507 (4.9)	9.6 (0.04)
Iran, Islamic Rep. of	49 (1.8)	425 (5.0)	32 (1.1)	429 (5.1)	19 (1.3)	406 (8.7)	9.7 (0.07)
Spain	48 (1.0)	525 (2.8)	33 (0.6)	518 (2.8)	19 (0.8)	504 (3.7)	9.6 (0.05)
Kuwait	47 (1.2)	348 (5.4)	31 (1.0)	344 (8.0)	21 (1.0)	311 (11.6)	9.7 (0.06)
Saudi Arabia	47 (1.7)	421 (5.9)	27 (1.1)	394 (5.7)	26 (1.3)	352 (6.2)	9.5 (0.08)
Singapore	47 (0.9)	603 (3.4)	34 (0.6)	591 (3.9)	19 (0.7)	559 (5.4)	9.5 (0.03)
Belgium (Flemish)	47 (1.3)	514 (2.4)	36 (0.9)	516 (2.9)	17 (0.8)	497 (3.7)	9.6 (0.05)
Australia	45 (1.3)	533 (3.3)	36 (1.1)	525 (2.9)	20 (1.1)	502 (5.3)	9.4 (0.05)
Morocco	44 (1.7)	374 (5.9)	35 (1.3)	355 (6.0)	21 (1.0)	322 (8.5)	9.4 (0.07)
Indonesia	43 (1.4)	402 (5.4)	31 (1.0)	403 (5.7)	26 (1.2)	391 (7.3)	9.4 (0.07)
Qatar	43 (1.2)	460 (4.0)	28 (0.8)	448 (5.5)	28 (1.0)	398 (5.3)	9.3 (0.06)
United Arab Emirates	43 (1.0)	475 (3.1)	31 (0.5)	459 (3.4)	26 (0.8)	409 (4.2)	9.4 (0.05)
Oman	42 (1.6)	444 (4.1)	33 (1.0)	438 (4.2)	25 (1.0)	405 (4.4)	9.4 (0.06)
New Zealand	40 (1.0)	516 (3.3)	36 (0.7)	511 (3.3)	24 (0.7)	484 (3.4)	9.2 (0.04)
Bahrain	34 (0.9)	481 (3.5)	33 (1.0)	464 (3.7)	34 (1.0)	436 (4.4)	9.0 (0.04)
International Avg.	57 (0.2)	515 (0.5)	28 (0.1)	506 (0.6)	15 (0.1)	481 (0.9)	

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.

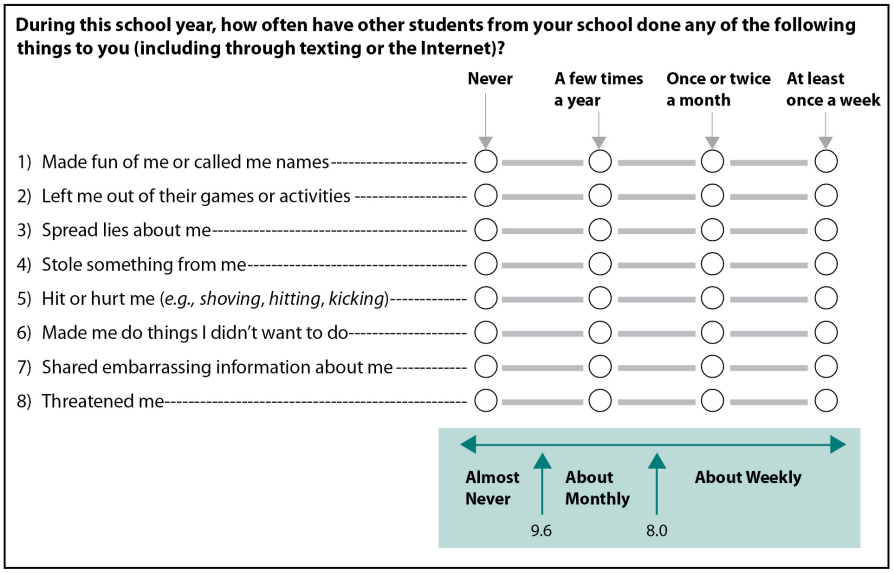
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

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	
Benchmarking Participants							
Norway (4)	70 (1.2)	499 (2.0)	21 (0.9)	488 (3.8)	9 (0.6)	461 (6.4)	10.6 (0.05)
Florida, US	56 (1.6)	562 (5.7)	28 (1.1)	543 (5.2)	16 (1.0)	520 (6.5)	10.0 (0.07)
Quebec, Canada	54 (1.6)	531 (4.0)	31 (1.1)	526 (4.9)	14 (1.2)	500 (7.2)	9.9 (0.07)
Ontario, Canada	52 (1.3)	539 (2.7)	31 (0.8)	531 (3.2)	17 (1.2)	508 (4.4)	9.7 (0.05)
Buenos Aires, Argentina	49 (1.4)	432 (5.2)	29 (1.1)	427 (7.0)	22 (0.9)	407 (5.5)	9.6 (0.06)
Dubai, UAE	46 (1.3)	534 (2.6)	32 (0.9)	524 (2.7)	22 (1.0)	481 (4.1)	9.5 (0.06)
Abu Dhabi, UAE	39 (2.0)	442 (7.4)	31 (1.0)	427 (6.9)	30 (1.6)	373 (7.7)	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 SCIENCE

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

Students Have Well Qualified Teachers and Principals

Science Teachers' Preparation and Experience

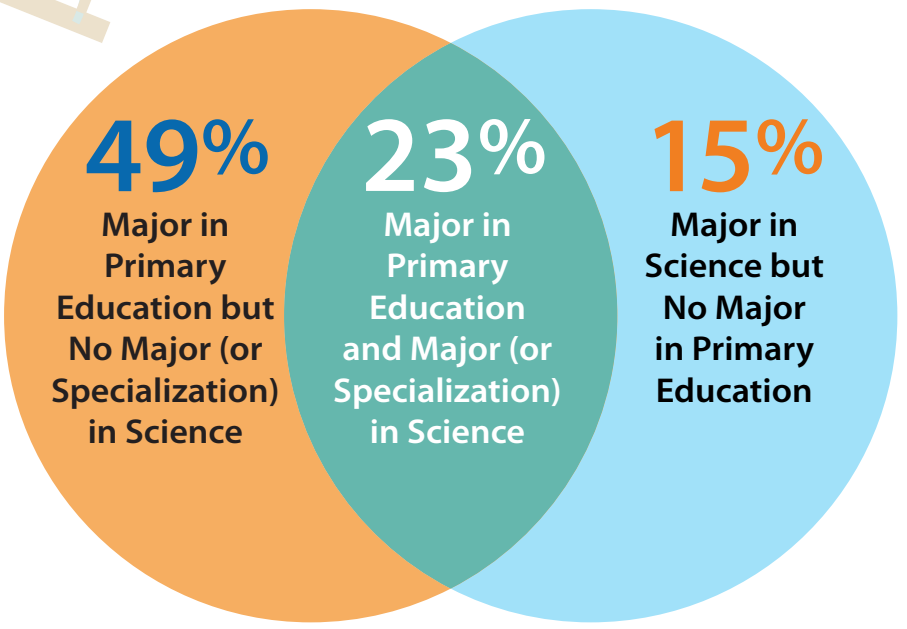
Internationally, teachers of fourth grade students reported high levels of education and considerable experience.

85%
of students were taught by teachers with at least a Bachelor's degree

28%
of students were taught by teachers with an advanced degree

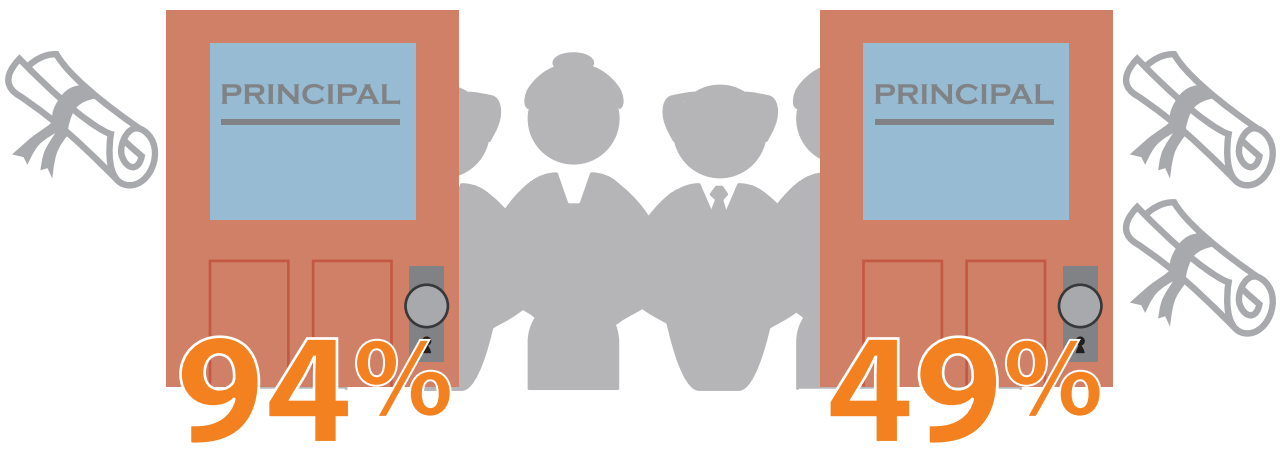
39%
of students were taught by teachers with at least 20 years of experience (on average, students' teachers had 17 years of experience).

Most students (72%) had teachers that majored in primary education and 38% had teachers that majored in science or had a specialization in science.



Principals' Preparation and Experience

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



94%
of students had principals with at least a Bachelor's degree

49%
of students had principals with an advanced degree

On average, principals had 10 years of experience. They were required to have teaching experience in 39 countries, but completion of a specialized leadership program was less common (21 countries).

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

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

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 (2.7)	81 (3.3)	7 (1.9)	0 (0.0)
Bahrain	r	24 (1.0)	73 (1.1)	3 (0.5)	0 (0.0)
Belgium (Flemish)		1 (0.7)	98 (0.8)	1 (0.4)	0 (0.0)
Bulgaria		75 (3.6)	17 (2.7)	8 (2.1)	0 (0.0)
Canada		12 (1.9)	88 (1.9)	0 (0.0)	0 (0.0)
Chile		12 (3.0)	82 (3.6)	6 (2.1)	0 (0.2)
Chinese Taipei		36 (4.1)	63 (4.1)	1 (0.7)	0 (0.0)
Croatia		0 (0.4)	41 (3.5)	58 (3.5)	0 (0.0)
Cyprus		59 (4.3)	36 (4.1)	4 (1.9)	0 (0.0)
Czech Republic		92 (2.3)	2 (1.0)	0 (0.2)	6 (2.1)
Denmark		6 (1.8)	88 (2.6)	2 (1.0)	5 (1.8)
England		12 (2.7)	87 (2.7)	1 (0.9)	0 (0.0)
Finland		90 (1.8)	8 (1.7)	0 (0.1)	1 (0.5)
France		40 (3.8)	46 (4.0)	9 (2.3)	4 (1.6)
Georgia		85 (3.0)	11 (2.7)	3 (1.5)	0 (0.3)
Germany		85 (1.7)	0 (0.3)	15 (1.8)	0 (0.0)
Hong Kong SAR		39 (5.4)	54 (5.2)	7 (2.3)	0 (0.0)
Hungary		2 (0.6)	98 (0.8)	1 (0.6)	0 (0.0)
Indonesia		2 (0.6)	85 (2.0)	5 (1.3)	8 (1.8)
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 (1.5)	20 (3.6)	9 (2.1)	68 (3.9)
Japan		6 (1.8)	89 (2.5)	5 (1.8)	0 (0.0)
Kazakhstan		1 (0.6)	78 (3.5)	14 (2.8)	8 (2.5)
Korea, Rep. of		24 (3.0)	70 (3.2)	7 (2.0)	0 (0.0)
Kuwait	r	12 (4.2)	85 (4.3)	0 (0.4)	3 (1.6)
Lithuania		21 (3.3)	74 (3.3)	5 (1.4)	0 (0.0)
Morocco	r	1 (0.7)	28 (4.0)	6 (1.6)	65 (3.9)
Netherlands	r	4 (2.0)	70 (4.2)	25 (4.0)	2 (0.3)
New Zealand		26 (2.3)	58 (2.7)	16 (2.0)	0 (0.0)
Northern Ireland	r	16 (3.3)	83 (3.4)	0 (0.0)	2 (0.9)
Norway (5)		9 (2.5)	84 (3.2)	6 (2.0)	1 (0.7)
Oman		30 (2.8)	67 (2.8)	3 (1.0)	0 (0.2)
Poland		100 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Portugal		7 (1.8)	89 (2.3)	4 (1.3)	0 (0.0)
Qatar		22 (4.1)	71 (4.2)	5 (1.6)	3 (1.5)
Russian Federation		31 (4.6)	52 (4.4)	17 (2.8)	0 (0.0)
Saudi Arabia	r	1 (0.1)	41 (3.8)	46 (4.2)	12 (2.8)
Serbia		12 (2.6)	39 (4.1)	48 (4.3)	1 (0.5)
Singapore		13 (1.7)	69 (2.3)	16 (2.0)	2 (0.7)
Slovak Republic		99 (0.5)	0 (0.0)	0 (0.0)	1 (0.5)
Slovenia		59 (3.2)	0 (0.4)	41 (3.2)	0 (0.0)
Spain	r	5 (1.5)	34 (3.7)	58 (3.7)	2 (1.1)
Sweden		10 (2.5)	80 (3.5)	6 (2.1)	4 (1.9)
Turkey		3 (1.1)	81 (2.6)	16 (2.5)	0 (0.0)
United Arab Emirates	r	34 (2.5)	61 (2.6)	4 (1.0)	1 (0.3)
United States		52 (2.5)	48 (2.5)	0 (0.0)	0 (0.0)
International Avg.		28 (0.4)	57 (0.4)	11 (0.3)	4 (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 "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
Benchmarking Participants					
Buenos Aires, Argentina		x x	x x	x x	x x
Ontario, Canada		14 (3.2)	86 (3.2)	0 (0.0)	0 (0.0)
Quebec, Canada		8 (2.5)	92 (2.5)	0 (0.0)	0 (0.0)
Norway (4)		5 (1.8)	83 (3.1)	11 (2.8)	1 (0.7)
Abu Dhabi, UAE	r	37 (4.5)	59 (4.4)	3 (1.6)	0 (0.4)
Dubai, UAE	r	41 (2.7)	53 (3.7)	6 (2.5)	0 (0.0)
Florida, US	r	44 (5.9)	56 (5.9)	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 Science

Reported by Teachers

Country		Major in Primary Education and Major (or Specialization) in Science		Major in Primary Education but No Major (or Specialization) in Science		Major in Science but No Major in Primary Education		All Other Majors		No Formal Education Beyond Upper-Secondary*	
		Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia		16 (3.5)	519 (12.9)	77 (3.7)	524 (2.8)	0 (0.3)	~ ~	7 (1.8)	530 (7.7)	0 (0.0)	~ ~
Bahrain		24 (1.0)	466 (4.4)	5 (1.5)	516 (29.1)	68 (1.6)	455 (2.8)	4 (0.7)	417 (9.7)	0 (0.0)	~ ~
Belgium (Flemish)		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Bulgaria	r	22 (4.1)	548 (11.5)	67 (4.0)	530 (6.9)	9 (2.5)	529 (23.8)	2 (1.3)	~ ~	0 (0.0)	~ ~
Canada		11 (1.4)	528 (8.5)	74 (2.2)	525 (3.1)	3 (1.1)	524 (7.8)	12 (1.7)	521 (5.3)	0 (0.0)	~ ~
Chile	s	29 (3.8)	483 (6.3)	66 (4.1)	480 (4.5)	2 (1.1)	~ ~	3 (1.6)	461 (21.4)	0 (0.3)	~ ~
Chinese Taipei		26 (3.3)	562 (3.6)	44 (3.8)	555 (2.8)	11 (2.6)	541 (6.9)	19 (2.9)	557 (4.2)	0 (0.0)	~ ~
Croatia		- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
Cyprus		25 (4.3)	484 (3.9)	69 (4.0)	480 (3.6)	2 (1.5)	~ ~	3 (1.4)	494 (14.0)	0 (0.0)	~ ~
Czech Republic		4 (1.1)	541 (12.4)	68 (3.5)	536 (2.8)	10 (2.7)	532 (5.4)	12 (2.2)	535 (6.4)	6 (2.1)	517 (10.6)
Denmark	r	16 (3.0)	528 (4.6)	26 (4.1)	521 (5.9)	28 (3.9)	527 (6.2)	24 (4.3)	529 (6.9)	6 (2.1)	527 (7.9)
England		17 (3.0)	545 (8.8)	52 (4.0)	534 (4.2)	10 (2.6)	553 (9.9)	21 (3.1)	533 (5.8)	0 (0.0)	~ ~
Finland		12 (2.0)	559 (4.8)	81 (2.5)	554 (2.5)	0 (0.4)	~ ~	6 (1.5)	542 (12.8)	1 (0.5)	~ ~
France	r	13 (3.0)	489 (5.5)	24 (3.6)	485 (5.5)	32 (4.4)	488 (6.6)	27 (4.0)	481 (5.5)	5 (1.8)	490 (7.4)
Georgia		57 (4.5)	448 (4.8)	11 (2.9)	460 (8.4)	23 (4.0)	467 (11.9)	9 (2.5)	432 (11.1)	0 (0.4)	~ ~
Germany	r	53 (3.5)	530 (3.3)	40 (3.4)	529 (3.6)	5 (1.6)	506 (13.1)	3 (1.1)	515 (28.0)	0 (0.0)	~ ~
Hong Kong SAR		25 (4.7)	556 (10.3)	50 (4.8)	558 (5.2)	9 (3.0)	566 (16.4)	15 (3.4)	545 (7.8)	0 (0.0)	~ ~
Hungary	r	7 (2.1)	556 (12.7)	93 (2.2)	541 (3.7)	0 (0.5)	~ ~	0 (0.0)	~ ~	0 (0.0)	~ ~
Indonesia		28 (3.0)	402 (10.5)	40 (3.6)	406 (6.9)	4 (1.4)	368 (35.3)	20 (2.4)	410 (9.4)	9 (1.9)	336 (13.2)
Iran, Islamic Rep. of		13 (2.3)	442 (12.9)	44 (3.5)	420 (7.9)	4 (1.3)	444 (21.6)	30 (3.3)	419 (9.2)	9 (2.3)	410 (19.8)
Ireland		5 (1.7)	535 (10.7)	86 (2.5)	527 (2.5)	3 (2.1)	533 (18.3)	4 (1.3)	543 (6.8)	1 (0.5)	~ ~
Italy	r	1 (0.7)	~ ~	10 (2.7)	528 (7.7)	3 (1.3)	526 (11.7)	16 (3.1)	515 (6.8)	69 (3.9)	515 (3.3)
Japan		20 (3.4)	566 (3.7)	70 (3.7)	570 (2.0)	2 (1.3)	~ ~	8 (2.3)	568 (6.2)	0 (0.0)	~ ~
Kazakhstan		46 (4.3)	554 (6.8)	41 (4.0)	558 (8.7)	1 (0.8)	~ ~	4 (1.7)	541 (41.1)	8 (2.6)	533 (10.9)
Korea, Rep. of		19 (3.1)	597 (5.2)	78 (3.3)	588 (2.1)	1 (0.7)	~ ~	2 (1.2)	~ ~	0 (0.0)	~ ~
Kuwait		40 (4.4)	332 (8.7)	3 (1.3)	353 (38.5)	46 (4.2)	340 (10.2)	8 (2.2)	350 (17.2)	2 (1.4)	~ ~
Lithuania		17 (2.8)	516 (6.2)	80 (2.9)	532 (2.9)	2 (0.7)	~ ~	1 (0.6)	~ ~	0 (0.0)	~ ~
Morocco	r	2 (0.8)	~ ~	4 (0.9)	314 (24.6)	14 (2.0)	375 (16.9)	17 (3.2)	355 (11.8)	63 (3.9)	338 (5.5)
Netherlands		x x	x x	x x	x x	x x	x x	x x	x x	x x	x x
New Zealand		13 (1.8)	515 (7.4)	81 (2.1)	505 (3.1)	2 (0.7)	~ ~	4 (1.1)	510 (12.0)	0 (0.0)	~ ~
Northern Ireland	r	9 (2.8)	541 (12.2)	71 (4.3)	519 (2.9)	3 (1.9)	528 (6.2)	15 (3.6)	518 (4.9)	2 (0.9)	~ ~
Norway (5)		43 (4.2)	541 (3.0)	42 (4.0)	536 (4.0)	8 (2.4)	542 (5.3)	6 (2.0)	542 (6.7)	1 (0.7)	~ ~
Oman		58 (3.0)	434 (4.3)	6 (1.4)	432 (15.0)	27 (2.9)	429 (7.5)	8 (1.8)	432 (12.8)	0 (0.2)	~ ~
Poland	s	6 (2.9)	528 (10.5)	0 (0.0)	~ ~	94 (2.9)	549 (3.0)	0 (0.0)	~ ~	0 (0.0)	~ ~
Portugal		28 (3.6)	503 (3.7)	70 (3.6)	510 (2.6)	0 (0.0)	~ ~	1 (0.7)	~ ~	0 (0.0)	~ ~
Qatar		12 (2.6)	431 (17.4)	14 (2.1)	495 (11.5)	63 (3.0)	426 (4.7)	8 (1.9)	437 (15.9)	3 (1.5)	427 (19.3)
Russian Federation		41 (4.4)	565 (5.0)	54 (4.9)	570 (4.7)	3 (1.3)	588 (17.0)	1 (0.5)	~ ~	0 (0.0)	~ ~
Saudi Arabia		29 (3.4)	372 (9.0)	2 (1.3)	~ ~	60 (3.6)	396 (6.6)	0 (0.3)	~ ~	9 (2.1)	393 (14.7)
Serbia	r	23 (3.4)	538 (4.8)	72 (3.5)	525 (4.2)	0 (0.4)	~ ~	3 (1.6)	535 (18.1)	1 (0.6)	~ ~
Singapore		54 (2.7)	592 (5.7)	17 (1.7)	600 (7.1)	15 (1.9)	577 (9.9)	12 (1.8)	584 (7.9)	2 (0.7)	~ ~
Slovak Republic		20 (2.8)	521 (7.0)	69 (3.4)	522 (3.9)	4 (1.6)	513 (31.7)	5 (1.3)	501 (15.1)	1 (0.5)	~ ~
Slovenia		7 (1.5)	544 (6.4)	93 (1.5)	543 (2.6)	0 (0.3)	~ ~	0 (0.0)	~ ~	0 (0.0)	~ ~
Spain		20 (2.5)	523 (4.7)	63 (3.5)	516 (3.5)	5 (1.6)	524 (13.1)	10 (1.8)	518 (7.0)	2 (1.0)	~ ~
Sweden		68 (4.1)	541 (4.3)	18 (3.0)	541 (8.1)	6 (2.2)	542 (17.6)	3 (1.4)	526 (18.6)	4 (1.8)	535 (11.0)
Turkey		14 (1.9)	492 (7.4)	69 (3.5)	486 (4.5)	4 (1.4)	477 (19.2)	13 (2.8)	472 (12.1)	0 (0.0)	~ ~
United Arab Emirates		25 (2.0)	457 (8.5)	16 (1.5)	438 (10.6)	53 (2.5)	456 (4.3)	5 (0.7)	469 (14.6)	1 (0.3)	~ ~
United States		11 (1.5)	547 (9.5)	74 (2.5)	548 (2.7)	5 (1.4)	544 (16.0)	11 (1.6)	539 (7.8)	0 (0.0)	~ ~
International Avg.		23 (0.5)	511 (1.3)	49 (0.5)	510 (1.6)	15 (0.3)	496 (2.7)	9 (0.3)	496 (2.3)	5 (0.2)	457 (3.7)

* 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.

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

Exhibit 8.3: Teachers Majored in Education and Science (Continued)

Country	Major in Primary Education and Major (or Specialization) in Science		Major in Primary Education but No Major (or Specialization) in Science		Major in Science but No Major in Primary Education		All Other Majors		No Formal Education Beyond Upper-Secondary*	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Benchmarking Participants										
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	12 (2.6)	549 (6.2)	70 (3.2)	531 (2.9)	3 (1.1)	541 (10.1)	16 (2.5)	523 (7.5)	0 (0.0)	~ ~
Quebec, Canada	8 (2.4)	511 (8.4)	81 (4.2)	525 (4.5)	4 (2.8)	523 (15.3)	6 (2.4)	517 (11.0)	0 (0.0)	~ ~
Norway (4)	31 (3.8)	489 (5.1)	52 (3.9)	497 (2.3)	5 (2.4)	476 (8.5)	12 (2.9)	495 (6.5)	1 (0.8)	~ ~
Abu Dhabi, UAE	21 (3.1)	403 (18.9)	30 (4.0)	380 (14.5)	46 (4.3)	459 (8.2)	3 (1.1)	392 (33.1)	0 (0.4)	~ ~
Dubai, UAE	31 (2.8)	516 (4.9)	16 (1.4)	551 (6.4)	44 (3.3)	499 (4.7)	9 (1.9)	540 (14.6)	0 (0.0)	~ ~
Florida, US r	6 (2.6)	560 (17.3)	79 (4.6)	555 (5.2)	2 (1.7)	~ ~	13 (3.5)	524 (17.3)	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	35 (4.0)	526 (3.8)	26 (4.0)	521 (8.5)	21 (2.7)	522 (5.6)	18 (2.8)	530 (6.1)	15 (0.8)
Bahrain	15 (3.0)	458 (13.4)	38 (1.7)	458 (4.5)	21 (1.0)	475 (4.4)	26 (3.3)	454 (6.4)	10 (0.5)
Belgium (Flemish)	42 (3.5)	518 (3.9)	34 (3.0)	513 (3.6)	15 (2.4)	502 (5.8)	10 (1.9)	495 (6.8)	18 (0.8)
Bulgaria	83 (2.8)	540 (6.0)	11 (2.3)	555 (13.3)	3 (1.2)	439 (22.2)	3 (1.0)	535 (18.0)	27 (0.7)
Canada	28 (2.6)	523 (3.7)	38 (2.7)	525 (4.3)	20 (2.3)	523 (5.5)	15 (1.5)	533 (4.8)	14 (0.5)
Chile	28 (3.5)	475 (7.3)	19 (3.3)	489 (6.9)	33 (4.0)	477 (6.1)	20 (3.8)	472 (7.9)	13 (0.9)
Chinese Taipei	39 (4.0)	552 (3.1)	33 (3.8)	563 (3.2)	9 (2.6)	551 (7.3)	18 (3.3)	550 (3.8)	15 (0.7)
Croatia	67 (3.2)	536 (2.5)	21 (3.1)	529 (4.6)	8 (1.8)	522 (7.4)	4 (1.4)	528 (4.7)	24 (0.7)
Cyprus	27 (4.3)	481 (4.7)	45 (4.9)	481 (3.3)	22 (3.2)	472 (5.9)	6 (1.8)	496 (13.5)	15 (0.5)
Czech Republic	51 (3.6)	531 (3.1)	24 (3.0)	536 (4.9)	11 (2.2)	545 (3.2)	14 (3.0)	534 (4.7)	20 (0.9)
Denmark	19 (3.2)	525 (5.8)	38 (4.2)	525 (4.1)	24 (3.3)	528 (4.7)	19 (3.5)	524 (5.8)	13 (0.7)
England	18 (3.4)	543 (6.4)	24 (3.1)	534 (8.0)	21 (3.5)	546 (6.8)	36 (3.9)	531 (4.2)	10 (0.8)
Finland	38 (2.7)	557 (2.9)	28 (3.1)	552 (4.1)	17 (2.1)	554 (3.9)	17 (2.2)	549 (6.3)	16 (0.6)
France	24 (3.3)	500 (6.0)	40 (3.5)	486 (3.9)	23 (3.0)	487 (4.9)	13 (2.5)	473 (7.3)	14 (0.7)
Georgia	53 (4.4)	438 (5.1)	29 (4.2)	453 (5.6)	10 (2.6)	484 (21.8)	7 (2.7)	478 (6.8)	20 (1.0)
Germany	52 (3.6)	532 (3.6)	26 (2.9)	530 (4.1)	8 (1.9)	517 (11.5)	14 (2.3)	519 (5.9)	21 (0.9)
Hong Kong SAR	23 (4.3)	558 (9.2)	32 (4.1)	550 (4.7)	25 (4.7)	573 (7.6)	21 (3.9)	544 (7.0)	13 (0.8)
Hungary	74 (3.1)	537 (3.6)	16 (2.5)	555 (7.6)	7 (1.4)	566 (11.0)	2 (0.9)	~ ~	25 (0.7)
Indonesia	32 (2.9)	405 (7.3)	35 (2.8)	396 (9.1)	23 (2.6)	396 (9.3)	11 (2.5)	406 (20.0)	15 (0.6)
Iran, Islamic Rep. of	48 (3.2)	433 (6.0)	26 (3.1)	414 (8.7)	13 (2.6)	408 (14.9)	13 (3.0)	409 (21.4)	17 (0.6)
Ireland	21 (3.5)	532 (5.1)	39 (4.1)	531 (4.5)	23 (3.4)	524 (5.9)	17 (2.8)	527 (6.5)	13 (0.8)
Italy	64 (4.1)	517 (3.1)	26 (3.6)	514 (4.7)	7 (2.1)	529 (6.7)	3 (1.4)	523 (15.0)	23 (0.8)
Japan	43 (4.0)	567 (2.7)	16 (2.9)	575 (4.0)	13 (2.6)	569 (4.1)	27 (3.8)	569 (3.0)	16 (1.0)
Kazakhstan	57 (3.8)	552 (6.4)	27 (3.4)	552 (8.8)	8 (1.7)	536 (17.9)	9 (2.5)	545 (13.8)	21 (0.9)
Korea, Rep. of	34 (3.7)	596 (3.7)	30 (3.4)	589 (2.9)	13 (2.2)	590 (5.2)	23 (2.7)	578 (3.9)	15 (0.8)
Kuwait	4 (1.8)	386 (25.1)	31 (3.9)	349 (13.2)	40 (3.7)	337 (9.7)	25 (2.6)	322 (10.1)	8 (0.5)
Lithuania	82 (2.8)	526 (3.0)	15 (2.8)	543 (8.4)	2 (1.0)	~ ~	1 (0.7)	~ ~	27 (0.6)
Morocco	51 (2.4)	347 (5.9)	29 (2.6)	342 (10.5)	8 (1.8)	389 (25.2)	12 (2.2)	385 (20.3)	20 (0.6)
Netherlands r	32 (4.0)	523 (4.2)	38 (4.2)	515 (4.0)	20 (3.1)	512 (6.0)	10 (2.5)	519 (7.9)	17 (1.0)
New Zealand	27 (2.4)	514 (5.8)	34 (2.8)	505 (3.4)	21 (2.0)	506 (5.7)	18 (1.8)	496 (7.8)	14 (0.5)
Northern Ireland r	35 (4.4)	527 (4.6)	31 (4.1)	522 (4.7)	20 (3.9)	514 (5.9)	14 (3.1)	512 (7.4)	15 (0.8)
Norway (5)	23 (3.8)	547 (4.0)	34 (4.0)	539 (3.4)	24 (4.1)	537 (5.4)	19 (2.8)	532 (4.2)	13 (0.9)
Oman	8 (1.9)	427 (10.5)	39 (3.5)	442 (5.3)	32 (2.7)	434 (6.5)	21 (2.8)	411 (8.5)	9 (0.3)
Poland	60 (4.1)	549 (2.6)	27 (3.7)	548 (4.0)	6 (1.8)	523 (10.1)	7 (2.1)	546 (11.9)	21 (0.8)
Portugal	50 (3.5)	509 (3.2)	46 (3.5)	506 (3.3)	3 (1.1)	513 (12.2)	1 (0.6)	~ ~	22 (0.6)
Qatar	11 (2.3)	462 (18.2)	28 (3.9)	440 (10.1)	35 (4.0)	435 (7.8)	26 (3.4)	435 (6.5)	10 (0.6)
Russian Federation	78 (3.0)	572 (4.0)	13 (2.5)	556 (8.0)	5 (1.3)	562 (8.1)	4 (1.7)	541 (14.2)	25 (0.7)
Saudi Arabia	25 (3.6)	374 (10.3)	32 (3.7)	391 (9.8)	31 (3.6)	399 (9.5)	12 (2.3)	409 (20.0)	13 (0.6)
Serbia	61 (3.5)	522 (5.7)	23 (3.0)	529 (4.1)	9 (2.2)	533 (7.0)	7 (2.3)	523 (10.5)	20 (0.7)
Singapore	14 (1.9)	593 (10.2)	33 (2.8)	590 (6.7)	24 (2.0)	588 (7.8)	30 (2.4)	591 (6.1)	11 (0.6)
Slovak Republic	62 (2.9)	521 (3.4)	21 (2.6)	510 (7.3)	6 (1.6)	544 (9.5)	10 (2.2)	522 (10.7)	23 (0.7)
Slovenia	64 (3.0)	545 (2.9)	27 (3.2)	542 (4.4)	6 (1.5)	529 (6.5)	3 (1.1)	554 (10.5)	24 (0.6)
Spain	48 (3.6)	522 (3.6)	28 (2.8)	515 (3.9)	14 (2.4)	504 (7.7)	10 (2.0)	533 (4.6)	20 (0.8)
Sweden	21 (3.7)	539 (6.1)	42 (4.9)	538 (6.6)	20 (3.5)	539 (6.4)	17 (3.5)	545 (6.6)	14 (0.9)
Turkey	35 (3.3)	507 (4.7)	33 (3.4)	490 (4.5)	17 (2.4)	475 (8.7)	15 (2.2)	424 (12.7)	16 (0.6)
United Arab Emirates	10 (1.1)	457 (12.1)	29 (2.4)	438 (6.5)	34 (2.7)	461 (6.6)	27 (2.1)	464 (7.6)	9 (0.3)
United States	23 (2.1)	554 (4.6)	38 (2.7)	546 (3.8)	19 (2.0)	542 (5.1)	20 (2.5)	539 (6.0)	13 (0.5)
International Avg.	39 (0.5)	510 (1.1)	30 (0.5)	507 (0.9)	17 (0.4)	505 (1.4)	14 (0.4)	502 (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	
Benchmarking Participants									
Buenos Aires, Argentina	x x	x x	x x	x x	x x	x x	x x	x x	x x
Ontario, Canada	27 (3.4)	527 (5.2)	43 (4.0)	532 (3.6)	17 (3.3)	536 (6.4)	12 (2.2)	534 (7.3)	15 (0.7)
Quebec, Canada	31 (5.8)	520 (5.5)	28 (4.8)	522 (7.6)	23 (5.3)	518 (6.4)	18 (4.3)	542 (9.1)	14 (1.1)
Norway (4)	29 (3.7)	499 (3.6)	34 (4.4)	484 (5.0)	20 (3.8)	495 (4.6)	17 (3.4)	499 (4.1)	14 (0.7)
Abu Dhabi, UAE r	6 (2.0)	421 (35.0)	28 (3.8)	389 (11.1)	41 (4.6)	425 (15.2)	25 (4.1)	443 (17.1)	9 (0.5)
Dubai, UAE	11 (1.8)	522 (8.3)	24 (2.8)	511 (6.7)	35 (3.9)	524 (5.5)	30 (3.1)	513 (7.6)	9 (0.4)
Florida, US r	23 (4.4)	560 (10.1)	33 (4.8)	559 (8.1)	24 (4.9)	533 (8.1)	19 (4.8)	544 (13.4)	13 (1.0)

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

Exhibit 8.7: Teacher Participation in Professional Development in Science 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							
	Science Content	Science Pedagogy/ Instruction	Science Curriculum	Integrating Information Technology into Science	Improving Students' Critical Thinking or Inquiry Skills	Science Assessment	Addressing Individual Students' Needs	Integrating Science with Other Subjects
Australia	31 (2.9)	27 (3.4)	40 (3.6)	16 (2.5)	32 (3.3)	16 (2.6)	28 (3.1)	22 (3.3)
Bahrain	45 (1.7)	68 (1.5)	44 (1.7)	64 (1.6)	66 (1.6)	46 (1.8)	55 (1.7)	65 (1.9)
Belgium (Flemish)	37 (3.0)	26 (2.9)	50 (3.4)	29 (3.0)	20 (2.7)	15 (2.7)	22 (2.9)	25 (2.7)
Bulgaria	15 (3.4)	10 (2.2)	19 (3.4)	20 (4.0)	8 (2.6)	31 (3.3)	21 (3.0)	21 (3.7)
Canada	18 (1.9)	18 (2.0)	15 (1.7)	22 (2.5)	32 (2.6)	12 (1.8)	31 (2.3)	23 (2.1)
Chile	21 (3.5)	18 (3.6)	15 (3.4)	15 (3.3)	16 (3.4)	17 (3.6)	24 (3.8)	14 (3.2)
Chinese Taipei	63 (4.3)	54 (3.0)	55 (4.3)	43 (4.2)	40 (4.1)	29 (3.7)	42 (3.8)	30 (3.7)
Croatia	51 (4.1)	38 (3.3)	43 (3.5)	32 (3.8)	37 (3.1)	27 (3.5)	38 (3.7)	50 (3.7)
Cyprus	52 (3.9)	60 (3.9)	56 (4.2)	32 (3.5)	48 (3.5)	25 (3.4)	22 (4.3)	21 (2.6)
Czech Republic	19 (2.7)	14 (2.2)	3 (1.1)	28 (3.0)	17 (2.4)	4 (1.5)	29 (3.1)	14 (2.1)
Denmark	15 (2.8)	11 (2.7)	10 (2.4)	7 (1.9)	9 (2.2)	8 (1.9)	13 (2.7)	8 (2.2)
England	r 37 (4.4)	r 32 (4.0)	r 47 (4.4)	r 16 (3.1)	r 33 (4.0)	r 30 (3.8)	r 24 (3.8)	r 23 (3.3)
Finland	3 (1.3)	5 (1.7)	5 (1.6)	8 (2.1)	4 (1.5)	2 (1.2)	12 (2.0)	7 (1.8)
France	14 (2.5)	18 (2.6)	10 (2.4)	8 (2.1)	9 (2.3)	4 (1.6)	12 (2.6)	8 (2.0)
Georgia	28 (3.8)	31 (3.5)	31 (3.8)	53 (4.6)	37 (4.0)	32 (4.1)	39 (4.0)	43 (4.1)
Germany	36 (3.3)	24 (3.0)	29 (3.2)	6 (1.9)	25 (2.9)	12 (2.4)	22 (2.8)	16 (2.5)
Hong Kong SAR	42 (4.7)	43 (4.7)	36 (4.7)	45 (4.9)	63 (5.2)	25 (3.8)	46 (4.9)	31 (4.1)
Hungary	4 (1.3)	8 (2.0)	4 (1.5)	10 (2.1)	12 (2.3)	4 (1.7)	21 (3.0)	10 (2.1)
Indonesia	45 (3.2)	52 (3.3)	42 (3.2)	46 (3.5)	70 (2.9)	64 (3.4)	57 (3.7)	61 (3.5)
Iran, Islamic Rep. of	55 (3.5)	66 (3.7)	46 (3.2)	21 (3.1)	28 (3.2)	35 (3.6)	39 (3.5)	28 (3.5)
Ireland	18 (3.3)	14 (3.2)	20 (3.5)	12 (2.7)	17 (3.0)	7 (1.8)	13 (3.0)	24 (3.8)
Italy	11 (2.4)	11 (2.6)	10 (2.2)	13 (2.5)	12 (2.4)	5 (1.3)	20 (3.0)	12 (2.7)
Japan	41 (4.5)	42 (4.3)	11 (2.7)	20 (3.4)	10 (2.6)	11 (2.4)	20 (3.1)	3 (1.4)
Kazakhstan	50 (4.7)	59 (4.3)	60 (4.3)	74 (3.6)	77 (3.7)	66 (4.0)	64 (4.2)	62 (4.1)
Korea, Rep. of	46 (4.0)	46 (4.2)	54 (4.3)	30 (3.5)	39 (4.1)	30 (3.6)	36 (4.0)	39 (4.1)
Kuwait	65 (3.0)	67 (3.3)	62 (3.8)	70 (2.9)	71 (3.0)	56 (4.3)	63 (3.2)	60 (3.4)
Lithuania	13 (2.6)	15 (2.9)	15 (2.5)	48 (4.1)	46 (3.3)	27 (3.3)	41 (3.4)	42 (4.1)
Morocco	5 (1.4)	12 (2.4)	r 10 (2.1)	12 (1.8)	r 13 (2.4)	r 17 (2.7)	20 (2.7)	14 (2.4)
Netherlands	r 3 (1.8)	r 3 (1.3)	r 5 (2.3)	r 5 (1.9)	r 21 (4.2)	r 2 (1.2)	r 24 (4.0)	r 13 (3.3)
New Zealand	26 (3.1)	27 (3.2)	24 (2.6)	20 (2.5)	37 (3.0)	11 (1.8)	25 (2.4)	27 (2.7)
Northern Ireland	r 27 (4.1)	r 31 (4.2)	r 25 (4.0)	r 24 (4.3)	r 31 (4.1)	r 7 (2.5)	r 20 (3.7)	r 31 (4.1)
Norway (5)	r 11 (2.8)	r 11 (2.6)	r 6 (2.2)	r 3 (1.5)	r 6 (2.3)	r 4 (1.8)	r 11 (2.6)	r 7 (2.1)
Oman	45 (3.5)	55 (3.1)	40 (3.5)	29 (3.1)	41 (3.3)	47 (3.0)	27 (2.4)	33 (3.3)
Poland	74 (3.3)	49 (3.8)	61 (4.6)	67 (4.3)	44 (3.4)	35 (3.8)	59 (3.8)	39 (4.3)
Portugal	19 (3.3)	17 (2.8)	9 (2.3)	12 (2.1)	10 (1.9)	6 (1.8)	18 (2.7)	11 (2.3)
Qatar	61 (3.4)	61 (2.6)	61 (3.9)	58 (3.3)	68 (2.9)	58 (3.3)	66 (3.6)	59 (3.2)
Russian Federation	37 (4.1)	41 (4.3)	66 (3.1)	60 (4.3)	49 (3.5)	63 (3.8)	47 (3.2)	54 (3.5)
Saudi Arabia	52 (3.7)	66 (3.8)	56 (4.3)	45 (4.0)	61 (3.8)	48 (3.9)	50 (4.1)	44 (3.8)
Serbia	31 (3.7)	21 (3.3)	16 (2.7)	20 (3.0)	30 (4.1)	19 (3.0)	38 (4.1)	29 (3.5)
Singapore	64 (2.7)	78 (2.1)	58 (2.7)	50 (2.6)	61 (2.5)	65 (2.6)	35 (2.7)	33 (2.8)
Slovak Republic	10 (1.6)	12 (2.3)	33 (3.3)	39 (3.5)	21 (3.2)	10 (2.1)	17 (2.7)	36 (3.4)
Slovenia	24 (3.1)	15 (2.5)	29 (3.6)	28 (3.4)	24 (3.2)	26 (3.2)	25 (3.3)	22 (3.6)
Spain	16 (2.7)	20 (3.1)	18 (2.6)	34 (3.6)	23 (2.9)	15 (2.4)	40 (3.6)	27 (3.3)
Sweden	31 (4.2)	27 (4.1)	30 (4.0)	6 (2.1)	12 (2.4)	21 (3.7)	18 (3.0)	18 (3.7)
Turkey	3 (1.0)	4 (1.1)	5 (1.4)	9 (1.8)	9 (2.1)	10 (2.0)	8 (2.0)	7 (1.5)
United Arab Emirates	59 (2.1)	53 (2.3)	59 (2.0)	51 (2.3)	66 (2.0)	56 (2.3)	61 (2.6)	54 (2.4)
United States	r 42 (2.5)	r 33 (2.4)	r 43 (2.6)	r 28 (2.3)	r 40 (2.9)	r 22 (2.6)	r 37 (2.7)	r 41 (2.5)
International Avg.	32 (0.5)	32 (0.5)	32 (0.5)	30 (0.5)	33 (0.5)	25 (0.4)	32 (0.5)	29 (0.5)

( ) 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.

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

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

Country	Percent of Students by Teachers' Area of Professional Development							
	Science Content	Science Pedagogy/ Instruction	Science Curriculum	Integrating Information Technology into Science	Improving Students' Critical Thinking or Inquiry Skills	Science Assessment	Addressing Individual Students' Needs	Integrating Science with Other Subjects
Benchmarking Participants								
Buenos Aires, Argentina	x x	x x	x x	x x	x x	x x	x x	x x
Ontario, Canada	14 (2.8)	15 (2.6)	14 (2.5)	19 (3.6)	39 (4.0)	10 (2.4)	35 (4.0)	24 (3.6)
Quebec, Canada	22 (4.2)	23 (4.4)	14 (3.1)	22 (4.8)	13 (3.6)	12 (3.8)	15 (3.7)	15 (4.1)
Norway (4)	6 (2.5)	5 (2.4)	3 (1.9)	4 (2.3)	4 (2.0)	3 (1.9)	10 (2.9)	7 (2.7)
Abu Dhabi, UAE	55 (4.7)	40 (4.7)	50 (4.7)	44 (4.8)	60 (4.6)	42 (4.7)	54 (4.5)	53 (4.7)
Dubai, UAE	54 (3.7)	54 (2.9)	58 (2.9)	58 (2.9)	69 (2.7)	58 (1.7)	62 (2.9)	59 (3.1)
Florida, US	r 41 (5.4)	r 35 (5.2)	r 39 (5.3)	r 33 (6.1)	r 44 (5.8)	r 18 (3.8)	r 41 (6.0)	r 39 (6.6)

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 r	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)	●	○
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 s	19 (4.5)	61 (5.0)	20 (3.9)	○	●
New Zealand	44 (3.7)	37 (3.6)	19 (3.0)	●	○
Northern Ireland r	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)	●	●
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.	49 (0.4)	45 (0.5)	6 (0.3)		

● 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.

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

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
Benchmarking Participants						
Buenos Aires, Argentina	s	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	r	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)
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)
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	
Benchmarking Participants						
Buenos Aires, Argentina	s	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	r	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	r	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 SCIENCE

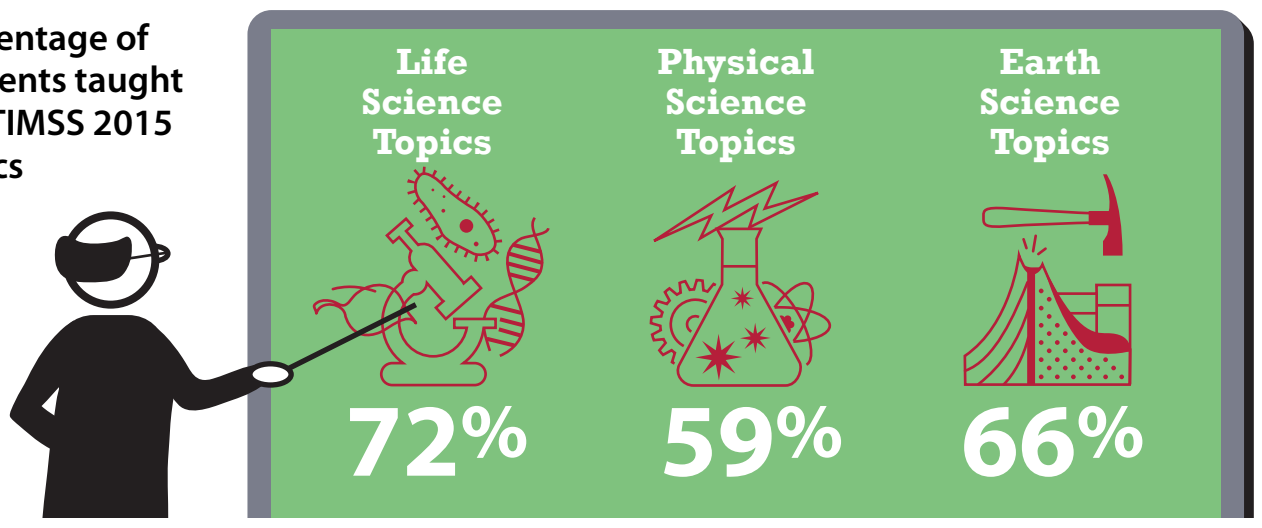
IEA
TIMSS & PIRLS International Study Center
Lynch School of Education, Boston College

Instruction in Science Classes

Curriculum Coverage

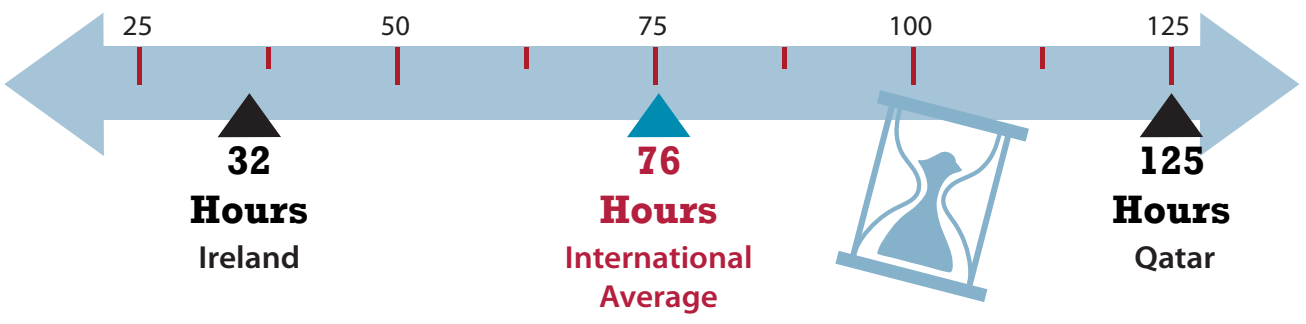
There was variation in topic coverage within content domains. However, according to their teachers most students had been taught the TIMSS topics.

Percentage of students taught the TIMSS 2015 topics



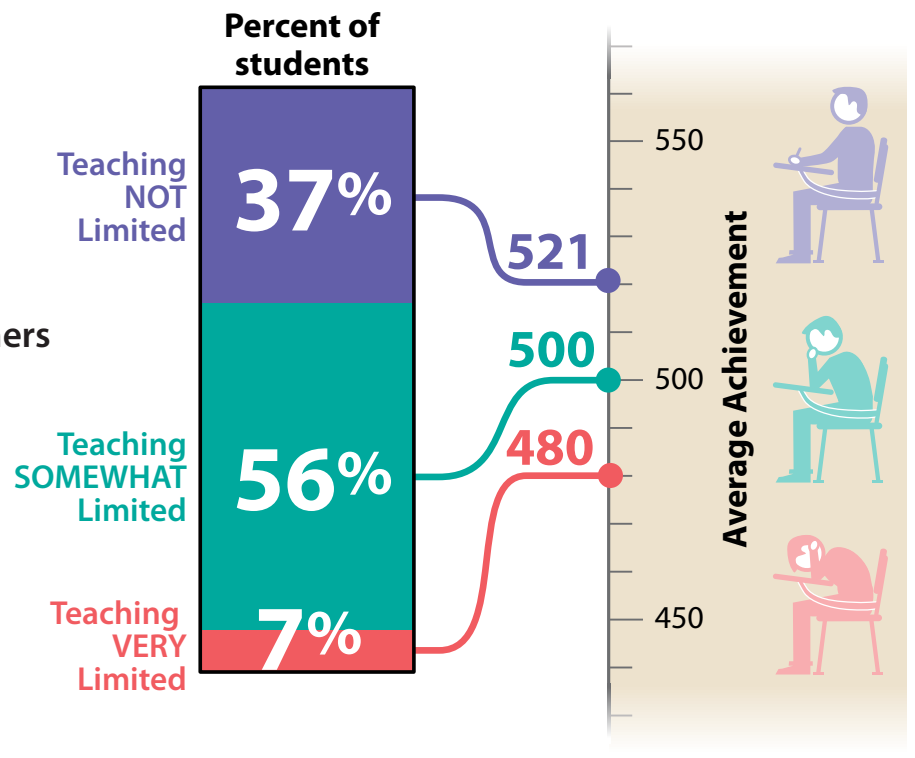
Instructional Time

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 science.



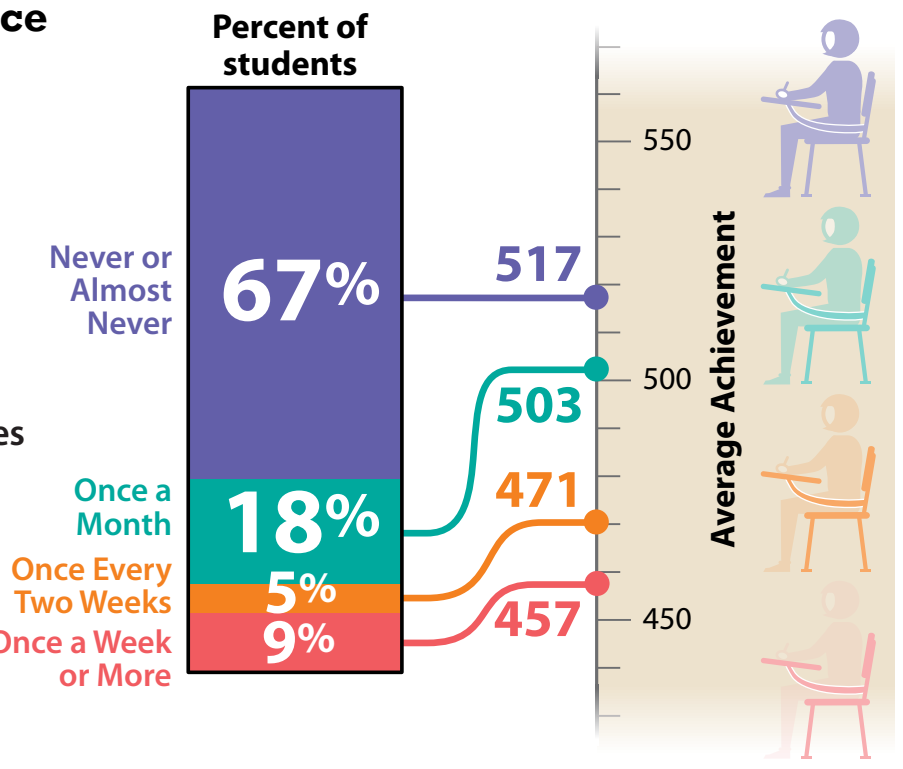
Teaching Limited by Student Needs

Extent to which teachers reported instruction being limited by students' needs



Student Attendance

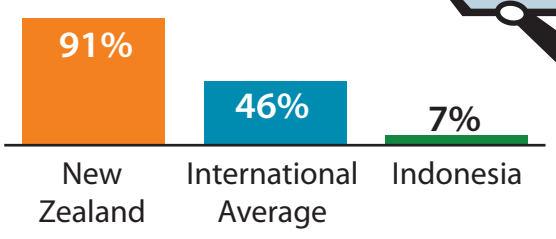
Frequency of student absences, as reported by students themselves



Computer Activities During Science Lessons

There is a continuing debate about the role of technology in education, including in science classes.

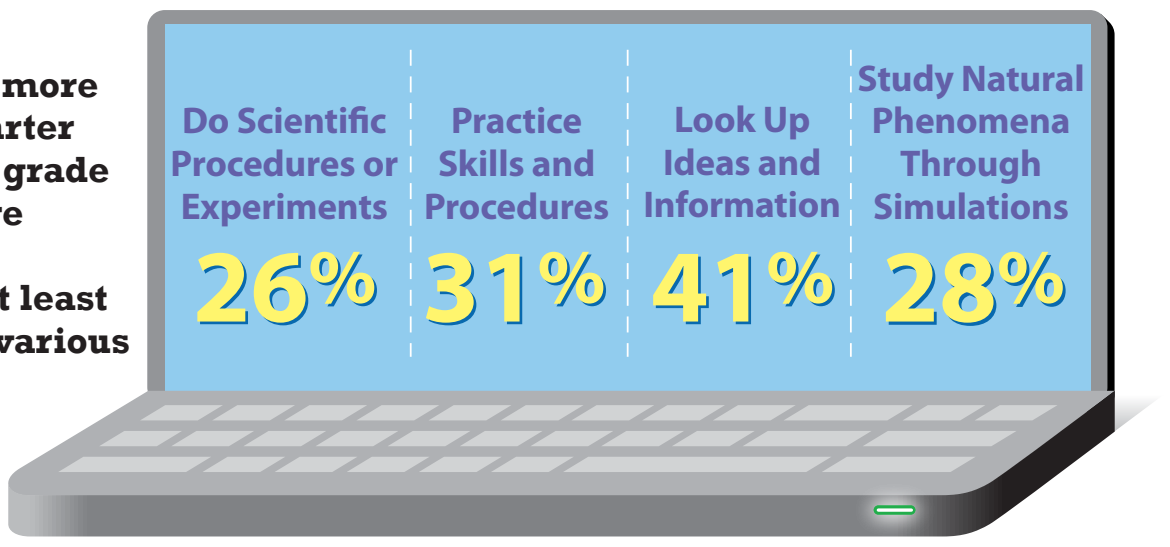
Teachers reported considerable variation in computer availability for use in science lessons.



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

509 vs 504

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



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

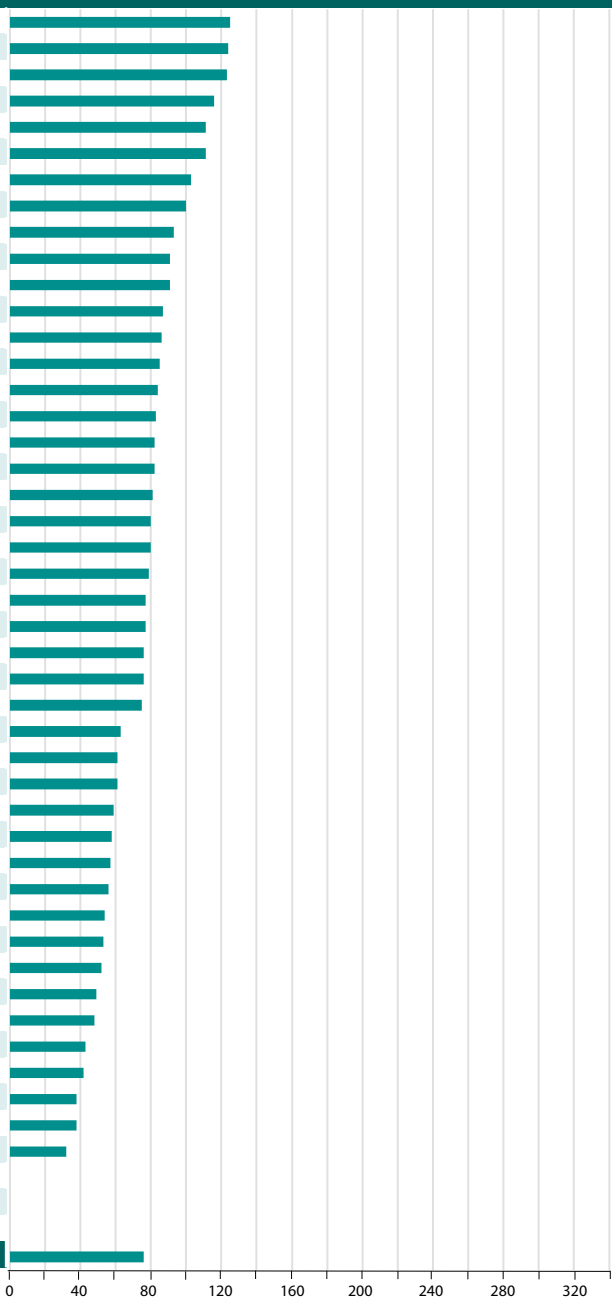
http://timss2015.org/download-center/

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

Exhibit 9.1: Instructional Time Spent on Science

Reported by Principals and Teachers

Country	Total Instructional Hours per Year	Hours per Year for Science Instruction
Qatar	r 1056 (16.1)	r 125 (4.4)
Spain	864 (10.2)	r 124 (2.6)
Oman	r 962 (11.7)	s 123 (3.1)
Indonesia	r 1095 (20.9)	r 116 (4.0)
Portugal	864 (8.5)	r 111 (3.8)
United Arab Emirates	r 1009 (4.6)	s 111 (2.1)
Bahrain	976 (0.6)	r 103 (0.6)
United States	1088 (9.2)	r 100 (3.7)
Chile	r 1094 (16.9)	s 93 (2.5)
Japan	903 (3.7)	91 (0.5)
Chinese Taipei	969 (14.4)	91 (1.9)
Iran, Islamic Rep. of	r 645 (6.4)	r 87 (3.0)
Slovenia	r 716 (7.2)	r 86 (1.3)
Singapore	986 (0.0)	85 (1.4)
Poland	r 752 (6.9)	r 84 (1.1)
Turkey	847 (18.0)	83 (1.7)
Croatia	778 (21.6)	82 (1.5)
Finland	737 (8.9)	82 (1.8)
Canada	951 (4.1)	r 81 (2.0)
Georgia	r 743 (19.5)	80 (1.4)
Denmark	r 1051 (11.2)	s 80 (2.3)
Sweden	r 839 (10.6)	79 (1.8)
Kuwait	s 912 (27.9)	s 77 (3.5)
Saudi Arabia	r 1080 (19.6)	r 77 (3.7)
Italy	1061 (20.5)	76 (1.6)
Korea, Rep. of	712 (8.9)	76 (1.0)
Serbia	737 (16.2)	75 (3.5)
Hungary	784 (11.8)	63 (1.7)
England	994 (9.9)	r 61 (2.2)
Germany	r 820 (9.1)	s 61 (3.8)
Norway (5)	817 (8.7)	r 59 (1.7)
Kazakhstan	813 (16.2)	58 (2.9)
Australia	r 1014 (8.4)	r 57 (1.5)
France	r 858 (8.2)	r 56 (1.8)
Morocco	r 1054 (18.8)	r 54 (0.9)
Lithuania	629 (5.5)	53 (1.0)
Slovak Republic	759 (8.1)	52 (2.0)
Russian Federation	661 (6.9)	49 (0.9)
Cyprus	r 827 (12.4)	r 48 (0.9)
New Zealand	923 (5.5)	r 43 (2.0)
Bulgaria	r 707 (27.3)	42 (2.3)
Czech Republic	771 (10.4)	38 (2.0)
Northern Ireland	r 962 (10.2)	s 38 (2.1)
Ireland	854 (0.0)	32 (0.7)
Hong Kong SAR	999 (13.1)	x x
Netherlands	s 1073 (16.2)	x x
Belgium (Flemish)	r 955 (11.6)	- -
International Avg.	887 (1.9)	76 (0.3)



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

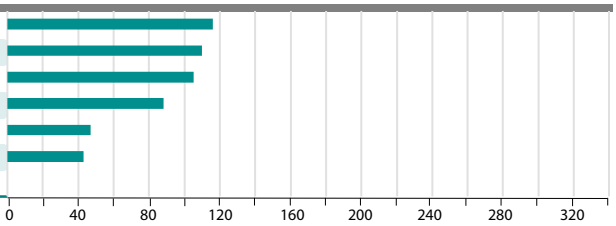
( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A dash (-) indicates comparable data not available.

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 Science (Continued)

Country		Total Instructional Hours per Year		Hours per Year for Science Instruction
Benchmarking Participants				
Abu Dhabi, UAE	r	1025 (11.1)	s	116 (4.3)
Dubai, UAE	r	996 (0.4)	r	110 (1.2)
Florida, US	r	1075 (21.6)	s	105 (5.8)
Ontario, Canada		953 (6.2)	r	88 (3.1)
Norway (4)		818 (9.9)	r	47 (2.1)
Quebec, Canada		910 (8.0)		43 (2.9)
Buenos Aires, Argentina	s	951 (31.3)		x x



Total Instructional Hours per Year = Principal Reports of School Days per Year X Principal Reports of Instructional Hours per Day

Hours per Year for Science Instruction = (Teacher Reports of Weekly Science Instructional Hours / Principal Reports of School Days per Week) X Principal Reports of School Days per Year

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

Exhibit 9.3: Percentages of Students Taught the TIMSS Science Topics*

Reported by Teachers

Country	All Science (23 topics)	Life Science (7 topics)	Physical Science (9 topics)	Earth Science (7 topics)
Australia	61 (1.4)	72 (1.6)	52 (2.0)	62 (2.3)
Bahrain	72 (0.6)	67 (0.5)	75 (0.4)	75 (1.3)
Belgium (Flemish)	47 (1.4)	61 (1.9)	30 (1.7)	57 (1.9)
Bulgaria	81 (0.9)	91 (0.8)	72 (1.7)	82 (1.1)
Canada	54 (0.9)	66 (1.4)	46 (1.2)	53 (1.2)
Chile	76 (1.3)	89 (1.8)	62 (2.0)	80 (1.8)
Chinese Taipei	55 (1.6)	67 (1.8)	57 (1.8)	41 (2.3)
Croatia	57 (1.3)	69 (1.6)	38 (1.7)	71 (1.6)
Cyprus	62 (1.6)	75 (2.1)	53 (2.3)	59 (2.6)
Czech Republic	60 (1.3)	75 (1.5)	34 (1.8)	76 (2.0)
Denmark	r 57 (1.6)	r 62 (1.9)	r 47 (2.1)	r 66 (2.4)
England	r 73 (2.0)	r 67 (2.5)	r 78 (2.2)	r 72 (2.7)
Finland	60 (1.4)	72 (1.4)	48 (2.2)	64 (1.7)
France	59 (1.1)	68 (1.8)	42 (1.4)	72 (1.7)
Georgia	71 (1.3)	78 (1.7)	59 (2.0)	79 (1.6)
Germany	62 (1.3)	68 (1.4)	56 (1.9)	63 (1.9)
Hong Kong SAR	52 (1.6)	67 (2.1)	45 (2.2)	47 (2.4)
Hungary	68 (1.0)	84 (1.1)	50 (1.6)	75 (1.7)
Indonesia	74 (1.3)	85 (1.4)	72 (1.5)	65 (1.9)
Iran, Islamic Rep. of	75 (1.3)	69 (2.0)	80 (1.1)	73 (1.6)
Ireland	75 (1.3)	78 (1.6)	74 (1.4)	74 (2.3)
Italy	52 (1.3)	62 (1.9)	38 (1.7)	59 (1.7)
Japan	39 (1.2)	34 (1.5)	51 (1.5)	29 (1.6)
Kazakhstan	78 (1.8)	88 (1.7)	62 (3.0)	90 (1.2)
Korea, Rep. of	49 (1.6)	53 (2.0)	51 (1.5)	44 (2.0)
Kuwait	81 (1.2)	85 (1.0)	79 (1.8)	80 (1.9)
Lithuania	76 (1.6)	95 (1.0)	61 (2.5)	78 (2.0)
Morocco	48 (1.1)	69 (1.4)	51 (1.5)	25 (1.4)
Netherlands	r 51 (1.7)	r 58 (2.2)	r 38 (2.3)	r 59 (2.3)
New Zealand	62 (1.2)	72 (1.7)	55 (1.4)	64 (1.7)
Northern Ireland	r 61 (1.9)	r 73 (2.6)	r 50 (2.9)	r 64 (2.5)
Norway (5)	r 57 (1.6)	r 62 (2.4)	r 46 (2.3)	r 67 (2.4)
Oman	76 (1.1)	86 (1.1)	82 (1.1)	59 (2.1)
Poland	33 (0.9)	53 (1.7)	16 (1.2)	37 (1.4)
Portugal	78 (1.1)	94 (0.8)	59 (2.1)	86 (1.0)
Qatar	67 (1.3)	74 (1.3)	61 (1.8)	67 (1.7)
Russian Federation	- -	- -	- -	- -
Saudi Arabia	87 (0.9)	82 (1.3)	91 (1.1)	87 (1.2)
Serbia	80 (1.2)	75 (1.8)	93 (0.9)	68 (2.0)
Singapore	40 (0.6)	52 (0.9)	58 (0.8)	6 (0.8)
Slovak Republic	89 (0.7)	87 (0.9)	91 (0.8)	88 (1.3)
Slovenia	68 (1.3)	65 (2.0)	76 (1.8)	63 (1.6)
Spain	74 (1.0)	88 (1.1)	54 (1.9)	85 (0.9)
Sweden	55 (1.5)	56 (2.4)	45 (2.2)	68 (2.1)
Turkey	70 (1.3)	52 (2.5)	81 (1.1)	74 (1.6)
United Arab Emirates	75 (0.9)	76 (1.0)	69 (1.3)	81 (1.2)
United States	r 74 (1.0)	r 74 (1.4)	r 70 (1.5)	r 80 (1.3)
International Avg.	65 (0.2)	72 (0.2)	59 (0.3)	66 (0.3)

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 Science Topics* (Continued)

Country	All Science (23 topics)	Life Science (7 topics)	Physical Science (9 topics)	Earth Science (7 topics)
Benchmarking Participants				
Buenos Aires, Argentina	x x	x x	x x	x x
Ontario, Canada	55 (1.3)	71 (2.0)	45 (1.7)	51 (1.8)
Quebec, Canada	58 (2.0)	61 (2.9)	46 (2.4)	70 (2.8)
Norway (4)	r 57 (1.8)	r 67 (2.5)	r 29 (1.8)	r 82 (2.5)
Abu Dhabi, UAE	76 (1.6)	79 (1.8)	70 (2.4)	81 (2.1)
Dubai, UAE	75 (0.7)	78 (1.0)	68 (0.9)	80 (1.0)
Florida, US	r 79 (2.5)	r 75 (3.5)	r 80 (2.9)	r 82 (3.8)

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

TIMSS 2015 Science Topics

A. Life Science

1) Characteristics of living things and the major groups of living things
2) Major body structures and their functions in humans, other animals, and plants
3) Life cycles of common plants and animals
4) Understanding that some characteristics are inherited and some are the result of the environment
5) How physical features and behaviors help living things survive in their environments
6) Relationships in communities and ecosystems
7) Human health

B. Physical Science

1) States of matter and properties of the states of matter; how the state of matter changes by heating or cooling
2) Classifying materials based on physical properties
3) Mixtures and how to separate a mixture into its components
4) Chemical changes in everyday life
5) Common sources of energy
6) Light and sound in everyday life
7) Electricity and simple circuits
8) Properties of magnets
9) Forces that cause objects to move

C. Earth Science

1) Common features of the Earth's landscape and their relationship to human use
2) Where water is found on the Earth and how it moves in and out of the air
3) Understanding that weather can change from day to day, from season to season, and by geographic location
4) Understanding what fossils are and what they can tell us about past conditions on Earth
5) Objects in the solar system and their movements
6) Understanding how day and night result from the Earth's rotation on its axis and how the Earth's rotation results in changing shadows throughout the day
7) Understanding how seasons are related to the Earth's annual movement around the Sun

Exhibit 9.5: Teachers Emphasize Science Investigation

Reported by Teachers

Students were scored according to their teachers' responses to how often they used each of eight instructional activities on the *Emphasize Science Investigation* scale. Students with teachers who emphasized science investigation in **About Half the Lessons or More** had a score on the scale of at least 11.3, which corresponds to their teachers using all eight activities in "about half the lessons," on average. All other students had teachers who emphasized science investigation in **Less than Half the Lessons**.

Country	About Half the Lessons or More		Less than Half the Lessons		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Oman	74 (2.9)	433 (4.3)	26 (2.9)	426 (6.5)	12.1 (0.10)
Cyprus	74 (4.0)	481 (3.0)	26 (4.0)	482 (6.4)	11.9 (0.13)
Iran, Islamic Rep. of	72 (3.5)	421 (5.3)	28 (3.5)	420 (10.0)	12.1 (0.13)
Korea, Rep. of	60 (4.0)	590 (2.6)	40 (4.0)	589 (3.0)	11.4 (0.14)
United Arab Emirates	57 (2.4)	465 (4.0)	43 (2.4)	444 (5.9)	11.3 (0.08)
Japan	50 (4.2)	571 (2.5)	50 (4.2)	568 (2.3)	11.3 (0.12)
Kuwait	49 (4.3)	332 (6.4)	51 (4.3)	345 (10.7)	11.2 (0.15)
Qatar	49 (3.4)	422 (5.8)	51 (3.4)	448 (6.9)	11.1 (0.15)
Saudi Arabia	46 (4.0)	399 (6.4)	54 (4.0)	382 (8.0)	11.1 (0.12)
Morocco	45 (3.6)	361 (8.2)	55 (3.6)	344 (6.7)	11.1 (0.12)
Turkey	44 (4.0)	494 (4.2)	56 (4.0)	475 (5.7)	11.0 (0.17)
Bahrain	41 (1.7)	470 (3.5)	59 (1.7)	452 (3.3)	10.7 (0.04)
Indonesia	40 (3.4)	404 (7.8)	60 (3.4)	392 (6.4)	10.6 (0.15)
Kazakhstan	39 (3.8)	557 (7.8)	61 (3.8)	545 (5.7)	10.9 (0.17)
Singapore	34 (2.4)	596 (6.1)	66 (2.4)	588 (4.5)	10.7 (0.07)
Chinese Taipei	31 (3.6)	558 (3.8)	69 (3.6)	554 (2.3)	10.6 (0.11)
Slovak Republic	28 (2.7)	532 (4.9)	72 (2.7)	515 (3.3)	10.2 (0.12)
Italy	28 (3.4)	515 (5.3)	72 (3.4)	518 (3.1)	10.0 (0.15)
Croatia	27 (3.0)	534 (3.2)	73 (3.0)	533 (2.5)	10.1 (0.15)
England r	26 (3.6)	540 (5.9)	74 (3.6)	537 (3.4)	10.1 (0.14)
United States r	24 (2.3)	546 (6.4)	76 (2.3)	545 (2.3)	9.9 (0.11)
Serbia	23 (3.5)	522 (6.2)	77 (3.5)	525 (4.2)	9.8 (0.15)
Australia	22 (2.8)	529 (4.5)	78 (2.8)	526 (3.0)	9.9 (0.12)
Chile	22 (3.6)	470 (8.1)	78 (3.6)	481 (3.7)	9.9 (0.17)
Georgia	20 (3.3)	460 (12.5)	80 (3.3)	449 (3.7)	9.8 (0.15)
Ireland	20 (3.0)	540 (5.6)	80 (3.0)	526 (2.5)	10.0 (0.12)
Poland	19 (3.3)	542 (5.4)	81 (3.3)	549 (2.4)	9.6 (0.16)
Portugal	18 (2.8)	508 (4.4)	82 (2.8)	508 (2.3)	9.2 (0.13)
Canada	17 (2.4)	519 (5.4)	83 (2.4)	525 (2.9)	9.7 (0.09)
Russian Federation	16 (2.9)	572 (6.5)	84 (2.9)	567 (3.7)	9.2 (0.13)
New Zealand	14 (2.1)	505 (8.2)	86 (2.1)	506 (2.9)	9.5 (0.08)
Spain	13 (2.1)	526 (4.5)	87 (2.1)	517 (2.9)	9.1 (0.11)
Bulgaria	12 (2.3)	522 (11.1)	88 (2.3)	537 (6.1)	9.3 (0.13)
Slovenia	12 (2.3)	541 (8.1)	88 (2.3)	544 (2.5)	9.4 (0.12)
France	11 (2.2)	499 (6.9)	89 (2.2)	487 (2.9)	9.7 (0.11)
Lithuania	11 (2.3)	522 (9.6)	89 (2.3)	529 (2.7)	8.8 (0.13)
Denmark	10 (2.1)	513 (8.0)	90 (2.1)	529 (2.6)	9.2 (0.10)
Hong Kong SAR	10 (2.1)	570 (6.9)	90 (2.1)	554 (3.4)	9.0 (0.15)
Sweden	9 (2.6)	544 (9.4)	91 (2.6)	540 (3.9)	9.1 (0.14)
Czech Republic	8 (2.0)	540 (6.4)	92 (2.0)	534 (2.4)	9.0 (0.12)
Germany	6 (1.9)	548 (8.8)	94 (1.9)	527 (2.6)	8.9 (0.14)
Hungary	6 (1.5)	540 (16.8)	94 (1.5)	542 (3.1)	9.1 (0.08)
Finland	4 (1.4)	559 (8.6)	96 (1.4)	553 (2.4)	8.7 (0.09)
Belgium (Flemish)	4 (1.5)	486 (15.4)	96 (1.5)	513 (2.4)	8.3 (0.10)
Norway (5) r	4 (1.5)	537 (7.7)	96 (1.5)	539 (2.7)	8.4 (0.12)
Netherlands r	3 (0.7)	540 (11.6)	97 (0.7)	517 (2.9)	8.3 (0.11)
Northern Ireland r	3 (0.7)	504 (12.0)	97 (0.7)	521 (2.2)	8.5 (0.13)
International Avg.	27 (0.4)	508 (1.1)	73 (0.4)	505 (0.7)	

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.

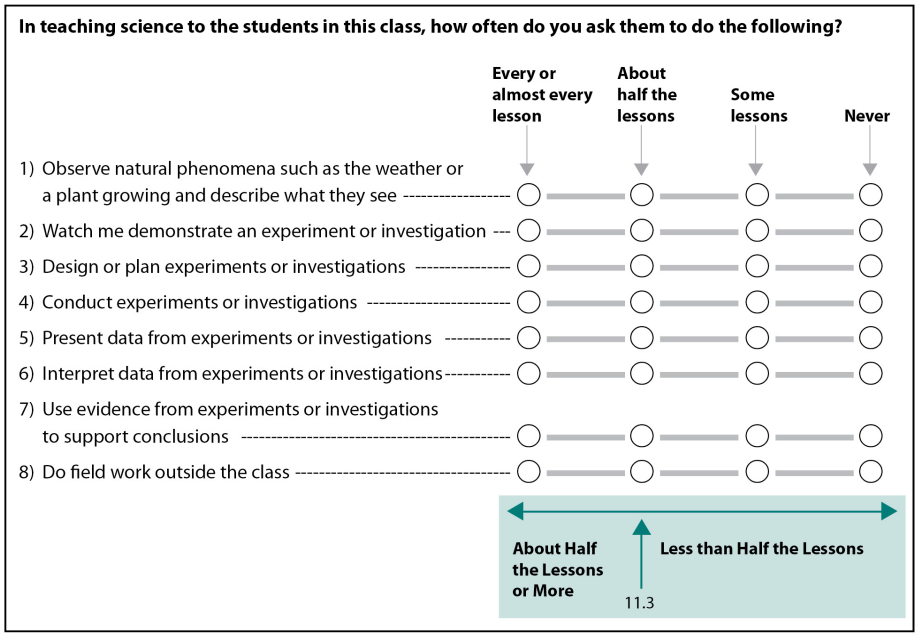
A tilde (~) indicates insufficient data to report achievement.

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

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

Exhibit 9.5: Teachers Emphasize Science Investigation (Continued)

Country	About Half the Lessons or More		Less than Half the Lessons		Average Scale Score
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Benchmarking Participants					
Dubai, UAE	61 (1.6)	527 (3.2)	39 (1.6)	523 (4.1)	11.5 (0.11)
Abu Dhabi, UAE	45 (5.1)	427 (10.8)	55 (5.1)	411 (11.7)	10.9 (0.18)
Florida, US r	22 (4.6)	553 (11.1)	78 (4.6)	551 (6.0)	9.7 (0.23)
Quebec, Canada	21 (4.4)	528 (6.9)	79 (4.4)	522 (4.7)	9.9 (0.16)
Ontario, Canada	12 (2.6)	522 (8.0)	88 (2.6)	532 (2.9)	9.5 (0.13)
Norway (4) r	1 (0.9)	~ ~	99 (0.9)	493 (2.5)	8.1 (0.10)
Buenos Aires, Argentina	x x	x x	x x	x x	x x



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

Exhibit 9.7: Resources for Conducting Science Experiments

Reported by Principals

Country	Schools Have a Science Laboratory				Teachers Have Assistance when Students are Conducting Experiments			
	Yes		No		Yes		No	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Korea, Rep. of	99 (0.8)	589 (2.0)	1 (0.8)	~ ~	89 (2.6)	590 (2.1)	11 (2.6)	582 (4.9)
Singapore	98 (0.0)	592 (3.7)	2 (0.0)	~ ~	69 (0.0)	595 (4.8)	31 (0.0)	583 (5.7)
Japan	97 (1.4)	569 (1.7)	3 (1.4)	593 (8.5)	28 (4.1)	569 (3.8)	72 (4.1)	570 (1.6)
Chinese Taipei	94 (1.8)	555 (1.9)	6 (1.8)	552 (4.5)	90 (2.5)	556 (1.8)	10 (2.5)	551 (7.9)
Kuwait	93 (2.5)	330 (6.9)	7 (2.5)	406 (10.2)	83 (3.7)	329 (7.0)	17 (3.7)	367 (15.6)
Bahrain	85 (0.2)	456 (2.4)	15 (0.2)	468 (8.6)	72 (0.2)	453 (2.9)	28 (0.2)	468 (4.0)
United Arab Emirates	84 (1.7)	445 (3.2)	16 (1.7)	463 (10.9)	86 (1.6)	445 (2.8)	14 (1.6)	467 (9.9)
Qatar	80 (2.4)	429 (4.3)	20 (2.4)	465 (9.6)	79 (2.8)	430 (5.1)	21 (2.8)	456 (9.4)
Saudi Arabia	74 (3.3)	393 (5.9)	26 (3.3)	382 (10.3)	65 (3.5)	394 (6.5)	35 (3.5)	384 (9.9)
Poland	68 (3.9)	550 (2.7)	32 (3.9)	542 (4.1)	56 (4.1)	550 (3.2)	44 (4.1)	544 (3.3)
Cyprus	65 (4.1)	482 (3.1)	35 (4.1)	479 (4.0)	23 (3.9)	481 (5.3)	77 (3.9)	481 (3.1)
Chile	61 (4.0)	487 (4.2)	39 (4.0)	464 (4.3)	22 (3.6)	486 (7.3)	78 (3.6)	476 (3.6)
Denmark r	51 (3.9)	530 (2.6)	49 (3.9)	529 (3.7)	r 15 (3.1)	526 (6.4)	85 (3.1)	530 (2.4)
Georgia	50 (4.3)	465 (5.4)	50 (4.3)	437 (5.6)	12 (3.0)	485 (16.4)	88 (3.0)	446 (3.7)
Turkey	44 (2.9)	504 (4.5)	56 (2.9)	468 (4.9)	8 (1.8)	525 (12.3)	92 (1.8)	479 (3.6)
Portugal	41 (4.0)	510 (3.7)	59 (4.0)	507 (2.7)	38 (3.8)	509 (3.4)	62 (3.8)	508 (2.7)
Czech Republic	40 (4.4)	532 (3.5)	60 (4.4)	536 (2.7)	4 (2.1)	510 (19.7)	96 (2.1)	535 (2.3)
Hong Kong SAR	38 (4.5)	565 (6.4)	62 (4.5)	551 (4.9)	42 (4.6)	558 (5.5)	58 (4.6)	556 (5.0)
Iran, Islamic Rep. of	37 (3.3)	437 (7.8)	63 (3.3)	415 (5.6)	11 (2.0)	461 (10.5)	89 (2.0)	419 (4.7)
Kazakhstan	35 (3.8)	562 (7.7)	65 (3.8)	543 (5.3)	60 (4.0)	556 (5.9)	40 (4.0)	540 (6.6)
Russian Federation	34 (4.2)	565 (5.2)	66 (4.2)	568 (4.0)	29 (3.1)	564 (5.3)	71 (3.1)	568 (4.4)
Spain	32 (2.7)	526 (3.6)	68 (2.7)	514 (3.3)	21 (3.1)	527 (4.3)	79 (3.1)	516 (3.1)
Italy	31 (3.8)	515 (4.7)	69 (3.8)	518 (3.2)	9 (2.5)	519 (8.0)	91 (2.5)	516 (2.9)
Norway (5)	31 (3.9)	539 (5.0)	69 (3.9)	536 (3.2)	20 (3.8)	529 (4.8)	80 (3.8)	539 (3.1)
Sweden	31 (3.5)	536 (7.2)	69 (3.5)	543 (3.7)	28 (4.4)	535 (8.9)	72 (4.4)	544 (3.7)
Oman	31 (2.6)	421 (5.5)	69 (2.6)	437 (4.1)	32 (3.0)	425 (6.2)	68 (3.0)	432 (4.3)
United States	29 (3.0)	546 (6.7)	71 (3.0)	546 (2.9)	22 (2.6)	542 (6.9)	78 (2.6)	547 (2.8)
Slovak Republic	27 (3.3)	519 (5.7)	73 (3.3)	521 (3.2)	10 (2.2)	481 (13.3)	90 (2.2)	525 (3.0)
Finland	25 (4.0)	555 (3.2)	75 (4.0)	554 (2.8)	29 (3.7)	552 (4.8)	71 (3.7)	555 (2.4)
Slovenia	23 (3.7)	537 (5.8)	77 (3.7)	545 (2.4)	31 (4.3)	541 (4.3)	69 (4.3)	544 (2.8)
Croatia	22 (3.1)	535 (4.3)	78 (3.1)	533 (2.3)	19 (3.6)	544 (3.8)	81 (3.6)	531 (2.2)
Serbia	18 (3.2)	532 (5.5)	82 (3.2)	523 (4.3)	32 (4.3)	533 (4.8)	68 (4.3)	521 (4.8)
Indonesia	16 (2.5)	454 (9.5)	84 (2.5)	386 (4.9)	9 (1.8)	390 (16.2)	91 (1.8)	397 (5.3)
Germany	15 (2.4)	519 (7.7)	85 (2.4)	529 (2.7)	4 (1.4)	522 (7.2)	96 (1.4)	528 (2.6)
Australia	13 (2.1)	521 (5.2)	87 (2.1)	524 (3.4)	13 (2.1)	529 (6.0)	87 (2.1)	523 (3.4)
Hungary	12 (2.8)	544 (11.1)	88 (2.8)	542 (3.6)	17 (3.1)	554 (6.0)	83 (3.1)	540 (3.9)
Canada	11 (2.0)	521 (4.8)	89 (2.0)	525 (2.9)	14 (1.9)	531 (5.5)	86 (1.9)	524 (2.9)
England	8 (1.4)	592 (10.2)	92 (1.4)	532 (2.6)	62 (4.5)	535 (4.0)	38 (4.5)	541 (5.5)
New Zealand	6 (1.6)	549 (8.0)	94 (1.6)	505 (3.1)	10 (2.4)	493 (13.3)	90 (2.4)	509 (3.2)
Morocco	5 (1.4)	469 (17.5)	95 (1.4)	347 (4.9)	30 (2.7)	375 (11.2)	70 (2.7)	342 (4.9)
Bulgaria	4 (1.6)	470 (40.9)	96 (1.6)	538 (5.5)	1 (0.5)	~ ~	99 (0.5)	536 (6.0)
Belgium (Flemish)	2 (1.5)	~ ~	98 (1.5)	514 (2.3)	62 (4.2)	509 (3.2)	38 (4.2)	520 (4.4)
Lithuania	2 (1.0)	~ ~	98 (1.0)	528 (2.5)	4 (1.5)	539 (8.5)	96 (1.5)	527 (2.5)
Netherlands s	1 (1.5)	~ ~	99 (1.5)	524 (3.1)	s 20 (4.4)	526 (5.8)	80 (4.4)	524 (3.4)
Ireland	1 (0.9)	~ ~	99 (0.9)	529 (2.4)	8 (2.4)	522 (8.9)	92 (2.4)	529 (2.7)
France	1 (0.9)	~ ~	99 (0.9)	486 (2.9)	2 (0.9)	~ ~	98 (0.9)	486 (2.9)
Northern Ireland r	0 (0.0)	~ ~	100 (0.0)	519 (2.5)	r 17 (4.0)	507 (8.1)	83 (4.0)	522 (2.7)
International Avg.	38 (0.4)	511 (1.4)	62 (0.4)	504 (0.7)	32 (0.5)	507 (1.2)	68 (0.5)	507 (0.7)

( ) Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
An "r" indicates data are available for at least 70% but less than 85% of the students. An "s" indicates data are available for at least 50% but less than 70% of the students.

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

Exhibit 9.7: Resources for Conducting Science Experiments (Continued)

Country	Schools Have a Science Laboratory					Teachers Have Assistance when Students are Conducting Experiments				
	Yes			No		Yes			No	
	Percent of Students		Average Achievement	Percent of Students	Average Achievement	Percent of Students		Average Achievement	Percent of Students	Average Achievement
Benchmarking Participants										
Dubai, UAE		85 (0.2)	512 (2.0)	15 (0.2)	540 (4.1)		81 (0.2)	510 (2.2)	19 (0.2)	542 (4.0)
Abu Dhabi, UAE		81 (3.8)	402 (8.0)	19 (3.8)	434 (27.0)		90 (3.1)	411 (6.5)	10 (3.1)	395 (27.0)
Buenos Aires, Argentina	s	66 (4.5)	423 (6.7)	34 (4.5)	411 (9.5)	s	35 (5.0)	434 (10.1)	65 (5.0)	411 (6.8)
Florida, US	r	34 (6.4)	549 (9.0)	66 (6.4)	551 (6.7)	r	19 (6.4)	553 (15.1)	81 (6.4)	550 (5.6)
Norway (4)		29 (3.7)	496 (5.5)	71 (3.7)	492 (2.4)		19 (3.6)	496 (5.4)	81 (3.6)	493 (2.6)
Quebec, Canada		12 (3.8)	522 (5.6)	88 (3.8)	525 (4.6)		14 (4.0)	523 (10.5)	86 (4.0)	525 (4.2)
Ontario, Canada		7 (2.7)	511 (11.8)	93 (2.7)	531 (2.8)		10 (3.0)	544 (8.4)	90 (3.0)	528 (2.8)

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

Exhibit 9.9: Computer Activities During Science Lessons

Reported by Teachers

Country	Computers Available for Students to Use in Science Lessons			Percent of Students Whose Teachers Have Them Use Computers at Least Monthly			
	Percent of Students	Average Achievement					
	Yes	Yes	No	To Practice Skills and Procedures	To Look Up Ideas and Information	To Do Scientific Procedures or Experiments	To Study Natural Phenomena Through Simulations
New Zealand	91 (1.6)	508 (2.8)	477 (11.9)	46 (2.3)	87 (1.8)	52 (2.7)	55 (2.8)
Denmark	90 (2.5)	527 (2.5)	527 (5.7)	50 (4.3)	82 (3.3)	38 (3.9)	49 (4.0)
Georgia	82 (3.2)	449 (4.6)	459 (8.5)	79 (3.6)	80 (3.4)	62 (4.8)	74 (3.7)
Belgium (Flemish)	79 (3.1)	513 (2.7)	505 (5.3)	62 (3.7)	75 (3.5)	18 (2.6)	29 (3.2)
Northern Ireland	r 76 (3.9)	523 (2.8)	516 (5.7)	r 37 (4.5)	r 69 (4.2)	r 23 (4.5)	r 39 (4.8)
Sweden	73 (3.6)	544 (3.7)	531 (7.8)	24 (3.6)	61 (3.9)	22 (3.7)	29 (3.9)
England	r 71 (4.1)	536 (3.7)	543 (6.4)	r 43 (4.5)	r 69 (4.3)	r 42 (4.4)	r 54 (4.2)
Norway (5)	r 66 (4.1)	540 (3.3)	538 (4.1)	r 47 (3.8)	r 59 (4.2)	r 42 (3.9)	r 36 (4.1)
Russian Federation	66 (3.6)	569 (4.5)	564 (4.4)	59 (4.2)	62 (3.6)	45 (3.5)	39 (3.4)
Japan	65 (3.9)	568 (2.4)	572 (2.9)	13 (2.4)	29 (3.7)	12 (2.4)	35 (4.0)
Finland	64 (3.4)	554 (3.0)	553 (3.0)	48 (4.0)	61 (3.3)	25 (3.1)	22 (2.8)
Canada	63 (3.0)	524 (3.6)	525 (3.4)	42 (2.9)	59 (2.9)	36 (2.7)	40 (3.0)
Australia	63 (3.3)	528 (3.3)	524 (4.2)	39 (3.2)	60 (3.4)	37 (3.3)	46 (3.5)
Netherlands	r 63 (4.1)	515 (3.8)	521 (3.4)	r 37 (4.9)	r 55 (4.8)	r 22 (4.1)	r 20 (3.6)
Germany	54 (4.0)	530 (3.2)	527 (3.6)	22 (2.8)	47 (3.8)	10 (1.7)	14 (2.3)
Cyprus	51 (4.8)	484 (3.2)	478 (4.4)	35 (4.4)	46 (4.7)	32 (4.2)	46 (4.8)
Kazakhstan	50 (3.9)	557 (6.9)	543 (7.2)	48 (3.8)	48 (3.8)	48 (3.9)	46 (3.6)
Chile	49 (3.9)	484 (5.1)	473 (4.2)	38 (4.3)	43 (4.0)	30 (4.0)	34 (4.2)
Singapore	49 (2.4)	594 (5.4)	587 (5.3)	36 (2.7)	43 (2.6)	35 (2.7)	31 (2.5)
Hong Kong SAR	47 (4.5)	564 (5.4)	549 (5.6)	29 (4.5)	37 (4.5)	33 (4.3)	27 (4.1)
United States	r 47 (2.9)	547 (3.9)	543 (3.4)	r 30 (2.4)	r 40 (2.7)	r 28 (2.6)	r 27 (2.4)
Chinese Taipei	47 (4.5)	557 (3.0)	554 (2.9)	31 (4.0)	36 (4.0)	31 (3.9)	31 (3.8)
Italy	44 (3.9)	522 (3.7)	513 (3.6)	34 (3.5)	41 (3.8)	33 (3.6)	34 (3.6)
Poland	43 (3.9)	547 (3.3)	547 (3.4)	36 (3.9)	35 (3.7)	29 (3.2)	31 (3.5)
Qatar	43 (3.8)	427 (6.9)	444 (6.2)	37 (3.9)	41 (3.8)	33 (3.8)	33 (3.6)
Ireland	42 (4.1)	532 (3.6)	527 (3.4)	22 (3.4)	36 (4.1)	14 (3.1)	22 (3.6)
Lithuania	41 (3.9)	525 (4.6)	530 (3.8)	37 (4.0)	41 (3.9)	26 (3.5)	18 (3.2)
Spain	40 (4.2)	516 (4.1)	521 (2.9)	27 (3.1)	36 (4.3)	19 (2.9)	21 (2.9)
Saudi Arabia	40 (3.4)	399 (7.4)	384 (7.2)	32 (3.5)	34 (3.5)	31 (3.4)	33 (3.5)
Bahrain	37 (1.3)	468 (3.8)	454 (3.5)	28 (1.3)	34 (1.3)	29 (1.3)	29 (1.3)
Kuwait	37 (4.2)	332 (11.8)	342 (7.6)	31 (4.3)	33 (4.3)	31 (4.2)	32 (4.1)
Slovak Republic	35 (2.8)	526 (5.4)	517 (3.2)	33 (2.8)	35 (2.8)	22 (2.6)	26 (2.9)
Czech Republic	35 (3.2)	535 (3.7)	534 (2.8)	26 (3.2)	30 (3.2)	18 (2.7)	20 (3.0)
United Arab Emirates	34 (2.0)	482 (5.7)	442 (4.2)	29 (2.1)	33 (2.0)	27 (2.0)	28 (2.1)
Hungary	33 (3.7)	529 (7.7)	548 (3.8)	26 (3.5)	27 (3.6)	19 (3.3)	20 (3.2)
Turkey	33 (2.9)	505 (4.9)	473 (4.5)	31 (3.0)	32 (3.0)	31 (3.0)	25 (2.7)
France	33 (3.9)	495 (3.9)	485 (3.4)	7 (1.8)	21 (3.3)	7 (1.6)	15 (2.9)
Bulgaria	31 (3.8)	538 (11.5)	533 (6.5)	25 (3.7)	31 (3.8)	13 (2.8)	16 (3.1)
Iran, Islamic Rep. of	28 (3.1)	450 (6.8)	413 (5.1)	18 (2.7)	22 (2.8)	21 (2.7)	20 (2.9)
Portugal	23 (2.8)	507 (3.7)	509 (2.4)	18 (2.5)	22 (2.8)	13 (2.3)	13 (2.5)
Slovenia	22 (2.9)	536 (6.0)	545 (2.4)	15 (2.6)	20 (2.8)	11 (2.3)	17 (2.6)
Korea, Rep. of	22 (3.7)	589 (4.5)	589 (2.3)	14 (3.2)	19 (3.5)	18 (3.4)	16 (3.2)
Serbia	21 (3.3)	526 (5.1)	524 (4.3)	18 (3.1)	18 (3.0)	9 (2.1)	8 (1.8)
Oman	15 (2.4)	422 (10.4)	432 (3.5)	14 (2.4)	14 (2.4)	13 (2.1)	12 (2.2)
Croatia	10 (2.1)	537 (4.8)	533 (2.2)	9 (1.9)	10 (1.9)	7 (1.6)	6 (1.4)
Morocco	10 (1.9)	368 (14.2)	350 (5.4)	5 (1.5)	8 (1.8)	7 (1.8)	8 (1.9)
Indonesia	7 (1.4)	410 (17.7)	396 (5.4)	4 (0.8)	4 (0.8)	4 (0.7)	4 (1.0)
International Avg.	46 (0.5)	509 (0.9)	504 (0.7)	31 (0.5)	41 (0.5)	26 (0.5)	28 (0.5)

( ) 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.

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

Exhibit 9.9: Computer Activities During Science Lessons (Continued)

Country	Computers Available for Students to Use in Science Lessons			Percent of Students Whose Teachers Have Them Use Computers at Least Monthly			
	Percent of Students	Average Achievement					
	Yes	Yes	No	To Practice Skills and Procedures	To Look Up Ideas and Information	To Do Scientific Procedures or Experiments	To Study Natural Phenomena Through Simulations
Benchmarking Participants							
Ontario, Canada	62 (4.5)	535 (3.5)	524 (4.7)	42 (4.5)	59 (4.5)	35 (4.2)	43 (4.2)
Norway (4)	r 61 (4.6)	497 (2.6)	488 (4.6)	r 41 (4.4)	r 50 (4.9)	r 23 (3.9)	r 28 (4.4)
Florida, US	r 56 (6.2)	560 (7.6)	540 (6.7)	r 37 (5.2)	r 53 (6.5)	r 40 (4.7)	r 42 (5.3)
Quebec, Canada	55 (6.0)	524 (5.3)	523 (6.2)	35 (5.7)	48 (6.1)	27 (5.6)	23 (4.3)
Dubai, UAE	53 (2.0)	545 (3.5)	506 (4.1)	46 (2.2)	53 (2.1)	44 (2.0)	46 (2.2)
Abu Dhabi, UAE	30 (4.3)	413 (13.1)	417 (8.5)	23 (4.1)	28 (4.2)	21 (4.0)	22 (4.2)
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 9.13: 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	73 (3.7)	571 (2.0)	27 (3.7)	563 (2.9)	0 (0.0)	~ ~	12.0 (0.14)
Czech Republic	60 (3.7)	540 (3.0)	40 (3.7)	526 (3.4)	0 (0.0)	~ ~	11.1 (0.11)
Indonesia	58 (3.3)	403 (6.7)	41 (3.3)	388 (8.6)	0 (0.2)	~ ~	10.9 (0.09)
Poland	55 (3.8)	551 (3.2)	44 (3.7)	542 (3.2)	1 (0.7)	~ ~	11.0 (0.13)
Slovak Republic	54 (3.2)	535 (3.5)	40 (3.2)	505 (4.8)	6 (1.7)	484 (17.9)	10.8 (0.14)
Serbia	51 (4.0)	527 (4.5)	45 (4.1)	520 (6.7)	4 (1.6)	538 (9.8)	10.6 (0.15)
Norway (5) r	51 (4.4)	544 (3.4)	45 (4.6)	534 (2.8)	5 (1.7)	520 (10.4)	10.7 (0.17)
Belgium (Flemish)	49 (3.4)	521 (3.2)	49 (3.4)	503 (3.2)	2 (0.7)	~ ~	10.6 (0.11)
Singapore	48 (2.7)	614 (4.7)	49 (2.6)	572 (5.2)	3 (0.9)	532 (31.8)	10.6 (0.11)
Ireland	48 (3.8)	541 (3.1)	48 (3.8)	520 (3.1)	4 (1.6)	491 (8.3)	10.7 (0.14)
Kazakhstan	47 (3.5)	562 (6.0)	45 (4.0)	538 (6.5)	8 (2.1)	543 (16.1)	10.3 (0.15)
Spain	46 (3.5)	528 (2.4)	50 (3.8)	512 (4.4)	4 (1.5)	477 (8.1)	10.4 (0.14)
Hong Kong SAR	45 (4.6)	567 (5.3)	53 (4.6)	549 (4.6)	2 (1.0)	~ ~	10.7 (0.15)
Sweden	44 (3.9)	556 (4.4)	51 (3.9)	526 (5.4)	5 (1.7)	546 (12.6)	10.3 (0.17)
Bulgaria	43 (3.7)	552 (5.8)	53 (3.4)	524 (9.5)	4 (1.4)	519 (20.2)	10.5 (0.12)
Northern Ireland r	43 (4.5)	535 (2.9)	55 (4.6)	511 (3.4)	2 (1.1)	~ ~	10.5 (0.16)
Finland	43 (3.1)	564 (2.6)	55 (3.1)	548 (2.9)	2 (0.9)	~ ~	10.5 (0.11)
Korea, Rep. of	42 (4.1)	592 (3.1)	51 (4.0)	586 (2.5)	7 (1.8)	598 (7.3)	10.3 (0.18)
Hungary	41 (4.1)	557 (6.0)	56 (4.1)	535 (4.6)	3 (1.0)	469 (25.2)	10.5 (0.16)
United Arab Emirates	39 (2.4)	488 (5.9)	57 (2.5)	438 (4.8)	4 (0.7)	356 (14.0)	10.3 (0.08)
Croatia	39 (3.7)	536 (3.3)	56 (3.6)	533 (2.7)	5 (1.8)	520 (6.6)	10.2 (0.16)
Chinese Taipei	39 (3.7)	554 (3.4)	55 (4.1)	557 (2.5)	6 (1.9)	551 (5.2)	10.2 (0.16)
Germany	39 (3.6)	541 (3.2)	55 (3.6)	523 (3.4)	6 (1.6)	483 (9.8)	10.1 (0.12)
Georgia	38 (3.7)	468 (7.2)	61 (3.8)	442 (4.6)	1 (0.6)	~ ~	10.3 (0.14)
Australia	38 (3.4)	544 (4.4)	57 (3.5)	517 (3.3)	5 (1.6)	495 (12.9)	10.1 (0.13)
Bahrain	36 (1.7)	471 (4.4)	55 (1.5)	454 (2.9)	9 (1.5)	443 (7.7)	9.9 (0.06)
England r	35 (4.3)	552 (5.3)	60 (4.2)	532 (4.0)	4 (1.7)	506 (4.4)	10.3 (0.18)
New Zealand	34 (2.6)	533 (3.5)	60 (2.8)	495 (3.7)	6 (1.4)	460 (12.1)	10.0 (0.10)
Netherlands r	34 (4.7)	531 (4.0)	62 (5.1)	511 (3.4)	4 (1.8)	501 (14.2)	10.0 (0.14)
Italy	33 (3.2)	522 (5.2)	56 (3.8)	513 (2.8)	11 (2.5)	514 (6.8)	9.8 (0.14)
Qatar	33 (3.3)	462 (8.3)	63 (3.3)	429 (5.3)	4 (1.6)	381 (24.1)	10.1 (0.12)
Denmark	30 (3.5)	537 (4.5)	61 (3.3)	522 (3.0)	9 (2.1)	520 (9.4)	9.7 (0.14)
Lithuania	28 (3.4)	537 (4.3)	62 (3.5)	523 (3.6)	10 (1.6)	532 (8.4)	9.5 (0.12)
Kuwait	28 (2.8)	365 (15.1)	67 (2.7)	331 (6.5)	5 (1.2)	285 (16.1)	9.6 (0.12)
Russian Federation	27 (3.7)	579 (5.1)	58 (4.0)	567 (4.9)	15 (2.7)	548 (9.0)	9.3 (0.15)
Portugal	26 (3.4)	519 (4.1)	63 (3.6)	505 (2.9)	12 (2.1)	501 (4.9)	9.5 (0.14)
Oman	24 (2.4)	438 (7.7)	57 (3.4)	427 (4.4)	19 (2.4)	437 (8.5)	9.1 (0.11)
United States	24 (2.2)	569 (6.2)	67 (2.5)	544 (2.8)	9 (1.4)	500 (6.5)	9.4 (0.10)
Cyprus	23 (3.0)	486 (4.6)	61 (3.7)	481 (3.0)	16 (3.3)	477 (8.1)	9.1 (0.16)
Canada	22 (2.0)	541 (3.3)	68 (2.3)	524 (2.7)	9 (1.6)	488 (12.7)	9.5 (0.10)
Iran, Islamic Rep. of	21 (2.9)	447 (8.9)	57 (4.1)	419 (6.3)	22 (2.9)	401 (10.6)	8.8 (0.12)
France	21 (2.7)	509 (4.8)	68 (3.1)	484 (3.5)	11 (2.5)	477 (6.3)	9.3 (0.14)
Slovenia	18 (2.8)	547 (4.6)	69 (3.3)	542 (2.9)	13 (2.4)	544 (5.1)	9.1 (0.12)
Saudi Arabia	17 (2.7)	422 (10.6)	73 (3.5)	387 (5.7)	10 (2.4)	362 (18.6)	9.2 (0.14)
Chile	17 (3.1)	515 (6.9)	57 (4.2)	477 (4.1)	25 (3.6)	456 (6.7)	8.7 (0.16)
Turkey	13 (2.6)	510 (9.6)	70 (3.1)	482 (4.1)	17 (2.4)	468 (8.6)	8.7 (0.12)
Morocco	13 (1.7)	406 (10.3)	70 (2.3)	349 (6.2)	17 (2.0)	329 (9.3)	8.8 (0.09)
International Avg.	37 (0.5)	521 (0.8)	56 (0.5)	500 (0.7)	7 (0.3)	480 (2.1)	

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 9.13: 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	
Benchmarking Participants							
Dubai, UAE	53 (2.2)	544 (3.0)	47 (2.2)	499 (4.5)	0 (0.2)	~ ~	10.8 (0.08)
Norway (4)	47 (4.3)	499 (3.0)	48 (4.2)	490 (2.9)	4 (1.7)	462 (19.8)	10.5 (0.16)
Abu Dhabi, UAE	32 (4.2)	455 (13.9)	62 (4.5)	404 (9.7)	6 (2.0)	333 (26.0)	9.9 (0.16)
Quebec, Canada	24 (4.6)	543 (5.9)	74 (4.6)	518 (4.5)	2 (1.1)	~ ~	9.7 (0.16)
Ontario, Canada	23 (2.6)	543 (4.4)	67 (3.6)	530 (3.3)	10 (2.3)	512 (9.3)	9.5 (0.10)
Florida, US r	12 (3.7)	566 (15.4)	75 (4.5)	552 (5.6)	12 (3.8)	524 (13.4)	9.2 (0.21)
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

In your view, to what extent do the following limit how you teach this class?

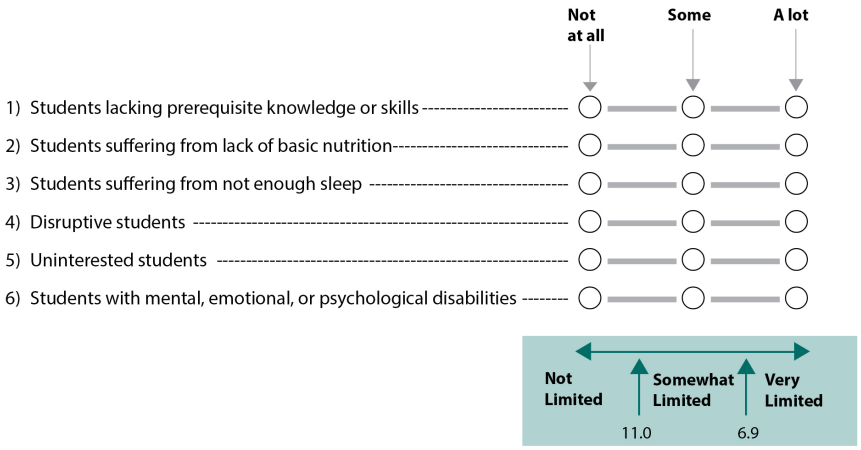


Exhibit 9.15: Frequency of Student Absences

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)	592 (2.1)	5 (0.4)	558 (5.4)	1 (0.2)	~ ~	1 (0.2)	~ ~
Portugal	87 (0.6)	511 (2.4)	6 (0.4)	499 (4.5)	2 (0.2)	~ ~	5 (0.4)	477 (5.6)
Spain	86 (0.7)	523 (2.4)	7 (0.5)	511 (5.5)	2 (0.2)	~ ~	5 (0.4)	468 (7.3)
Belgium (Flemish)	85 (0.8)	517 (2.3)	9 (0.5)	488 (4.0)	1 (0.2)	~ ~	5 (0.4)	473 (4.4)
Chinese Taipei	83 (0.7)	561 (1.7)	11 (0.5)	547 (4.6)	1 (0.2)	~ ~	5 (0.4)	496 (6.8)
France	83 (0.8)	492 (2.8)	9 (0.6)	482 (4.4)	2 (0.3)	~ ~	5 (0.5)	446 (7.3)
Germany r	82 (0.8)	538 (2.2)	10 (0.7)	523 (5.4)	3 (0.3)	511 (11.3)	5 (0.4)	472 (6.8)
Russian Federation	81 (0.9)	572 (3.1)	12 (0.6)	560 (4.8)	3 (0.3)	539 (10.1)	5 (0.4)	529 (6.0)
Hong Kong SAR	80 (0.8)	562 (3.0)	14 (0.8)	543 (5.7)	2 (0.3)	~ ~	3 (0.3)	490 (8.4)
Netherlands	80 (0.9)	521 (2.5)	12 (0.6)	512 (5.3)	2 (0.3)	~ ~	6 (0.5)	483 (5.6)
Japan	79 (0.8)	577 (1.8)	12 (0.6)	551 (4.0)	6 (0.5)	527 (5.3)	3 (0.3)	524 (7.3)
Lithuania	79 (0.8)	532 (2.8)	12 (0.6)	527 (4.0)	4 (0.3)	512 (10.1)	5 (0.4)	485 (6.3)
Singapore	76 (0.8)	607 (3.3)	14 (0.5)	571 (4.2)	3 (0.2)	512 (8.4)	8 (0.6)	489 (7.2)
Norway (5)	76 (0.8)	543 (2.6)	15 (0.6)	533 (3.7)	3 (0.3)	511 (6.6)	5 (0.3)	499 (6.8)
England	75 (0.9)	543 (2.5)	16 (0.7)	534 (4.1)	3 (0.3)	507 (7.1)	6 (0.5)	479 (5.2)
Cyprus	73 (1.0)	493 (2.4)	18 (0.8)	469 (3.2)	3 (0.3)	446 (6.9)	5 (0.4)	432 (7.6)
Northern Ireland	73 (1.2)	528 (2.2)	16 (0.9)	517 (3.8)	3 (0.3)	494 (7.5)	7 (0.5)	458 (5.7)
Sweden	71 (1.0)	544 (3.6)	21 (1.0)	544 (4.5)	4 (0.5)	517 (6.9)	4 (0.4)	478 (9.7)
Croatia	70 (1.0)	539 (2.0)	22 (0.9)	533 (3.3)	3 (0.3)	494 (8.3)	5 (0.4)	490 (7.9)
United States	70 (0.7)	556 (2.2)	18 (0.5)	545 (3.0)	4 (0.2)	519 (6.0)	9 (0.4)	490 (3.8)
Italy	70 (1.0)	523 (2.9)	16 (0.6)	516 (3.8)	5 (0.4)	498 (5.6)	9 (0.7)	479 (5.0)
Ireland	70 (1.2)	537 (2.4)	20 (0.9)	527 (3.5)	4 (0.5)	503 (7.9)	6 (0.5)	461 (6.2)
Canada	68 (0.6)	534 (2.4)	18 (0.4)	530 (3.0)	6 (0.3)	510 (6.2)	9 (0.4)	466 (5.3)
Slovenia	68 (1.0)	551 (2.3)	18 (0.7)	540 (3.9)	4 (0.4)	524 (7.7)	10 (0.6)	504 (6.2)
Serbia	66 (1.3)	536 (3.2)	20 (1.4)	528 (4.9)	6 (0.4)	502 (7.0)	8 (1.7)	446 (18.1)
Chile	66 (1.0)	484 (3.0)	12 (0.6)	487 (4.5)	7 (0.4)	474 (5.3)	15 (0.7)	451 (4.8)
Poland	65 (1.0)	557 (2.4)	20 (0.8)	548 (3.5)	6 (0.4)	524 (7.3)	10 (0.5)	499 (4.9)
Denmark	64 (1.2)	535 (2.3)	17 (0.8)	519 (3.4)	4 (0.3)	512 (7.1)	15 (0.8)	508 (4.2)
Australia	63 (1.1)	533 (2.9)	23 (1.0)	531 (3.7)	5 (0.4)	489 (6.2)	8 (0.5)	463 (5.4)
Turkey	63 (1.1)	501 (3.2)	21 (0.8)	476 (3.7)	7 (0.4)	445 (7.7)	9 (0.8)	425 (8.1)
Oman	62 (1.0)	448 (3.3)	17 (0.8)	422 (5.0)	5 (0.3)	383 (7.6)	15 (0.6)	402 (4.6)
Bulgaria	62 (1.2)	557 (5.3)	16 (0.8)	526 (8.1)	12 (0.7)	509 (10.0)	10 (0.6)	471 (9.0)
Morocco	61 (1.5)	371 (5.1)	22 (1.4)	352 (7.4)	7 (0.5)	299 (10.5)	9 (0.7)	319 (10.8)
Iran, Islamic Rep. of	61 (1.6)	433 (4.4)	21 (1.0)	424 (5.9)	7 (0.6)	392 (10.6)	11 (0.8)	382 (9.0)
Kazakhstan	61 (1.2)	560 (5.1)	21 (0.9)	543 (5.0)	8 (0.5)	529 (6.3)	11 (0.7)	522 (6.6)
Bahrain	57 (1.0)	478 (3.1)	19 (0.7)	464 (4.1)	7 (0.4)	418 (8.6)	17 (0.7)	412 (4.5)
United Arab Emirates	57 (0.6)	476 (2.6)	18 (0.5)	456 (4.1)	7 (0.3)	389 (5.7)	18 (0.5)	398 (4.2)
Qatar	56 (1.1)	462 (4.0)	18 (0.7)	437 (5.1)	8 (0.5)	379 (7.5)	18 (0.8)	385 (6.9)
Finland	55 (1.1)	560 (2.6)	37 (0.9)	552 (2.8)	4 (0.4)	543 (6.2)	4 (0.3)	505 (8.5)
Kuwait	53 (1.2)	359 (7.7)	20 (1.1)	335 (8.5)	9 (0.6)	303 (8.4)	18 (0.9)	303 (7.9)
Czech Republic	50 (1.1)	545 (2.4)	34 (0.9)	536 (2.7)	8 (0.5)	515 (7.1)	8 (0.5)	484 (5.4)
Hungary	47 (1.2)	565 (2.8)	38 (1.0)	540 (3.3)	6 (0.5)	492 (8.9)	9 (0.6)	469 (6.9)
Georgia	44 (1.1)	470 (4.3)	30 (1.0)	450 (4.6)	12 (0.7)	435 (6.4)	14 (0.7)	422 (6.3)
Saudi Arabia	43 (1.2)	412 (4.7)	22 (0.9)	402 (5.2)	13 (0.7)	374 (9.5)	22 (0.9)	364 (7.2)
Slovak Republic	41 (0.9)	539 (3.0)	37 (0.8)	527 (3.3)	9 (0.5)	493 (6.9)	13 (0.7)	466 (5.6)
Indonesia	41 (1.4)	406 (5.7)	17 (0.9)	408 (6.9)	10 (0.7)	375 (9.6)	33 (1.2)	390 (5.5)
New Zealand	- -	- -	- -	- -	- -	- -	- -	- -
International Avg.	67 (0.1)	517 (0.5)	18 (0.1)	503 (0.7)	5 (0.1)	471 (1.3)	9 (0.1)	457 (1.1)

( ) 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 9.15: 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
Benchmarking Participants								
Quebec, Canada	76 (1.1)	529 (4.1)	15 (0.8)	528 (6.2)	4 (0.5)	512 (8.3)	5 (0.6)	473 (8.4)
Norway (4)	75 (0.8)	497 (2.3)	13 (0.6)	494 (4.4)	3 (0.3)	490 (11.0)	9 (0.6)	466 (4.5)
Florida, US	68 (1.1)	557 (4.3)	15 (0.8)	555 (7.5)	6 (0.6)	531 (12.2)	11 (0.8)	501 (7.5)
Ontario, Canada	65 (0.7)	538 (2.7)	20 (0.6)	534 (3.4)	6 (0.4)	524 (5.1)	9 (0.5)	476 (5.2)
Dubai, UAE	63 (0.9)	532 (2.1)	18 (0.8)	523 (4.8)	5 (0.3)	473 (6.1)	13 (0.6)	466 (4.1)
Buenos Aires, Argentina	63 (1.0)	431 (5.3)	14 (0.9)	426 (8.2)	8 (0.5)	399 (8.7)	15 (0.9)	391 (6.3)
Abu Dhabi, UAE	53 (1.5)	450 (5.4)	18 (0.8)	414 (7.7)	8 (0.6)	347 (8.0)	21 (1.0)	360 (6.9)

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

TIMSS 2015

CHAPTER 10: STUDENT ENGAGEMENT AND ATTITUDES

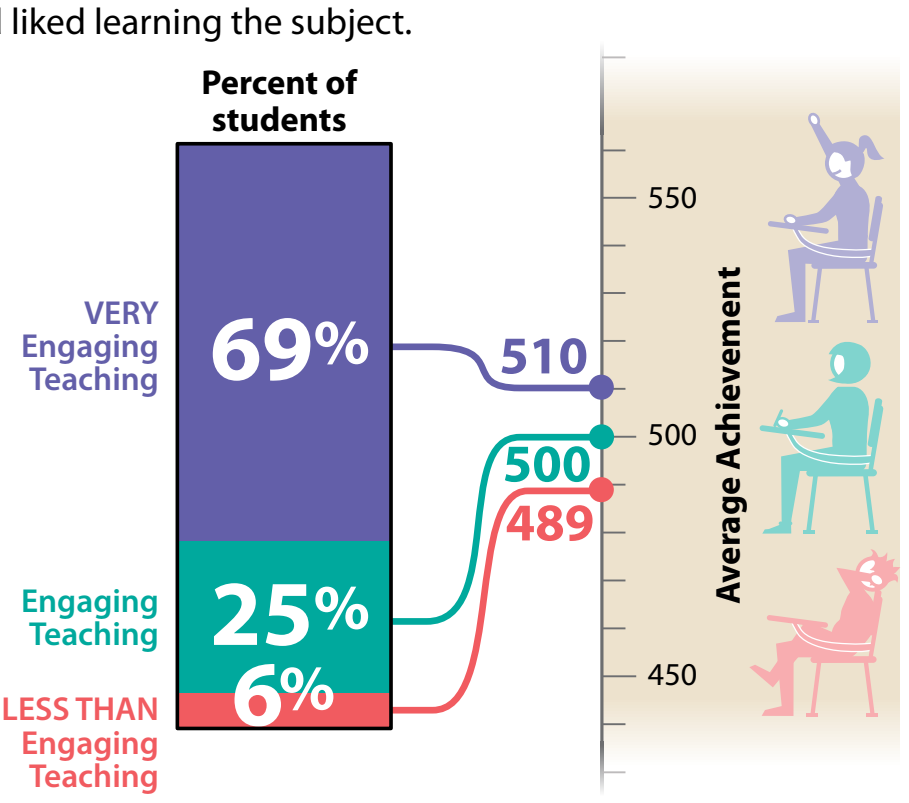
TIMSS 2015 INTERNATIONAL RESULTS IN SCIENCE

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

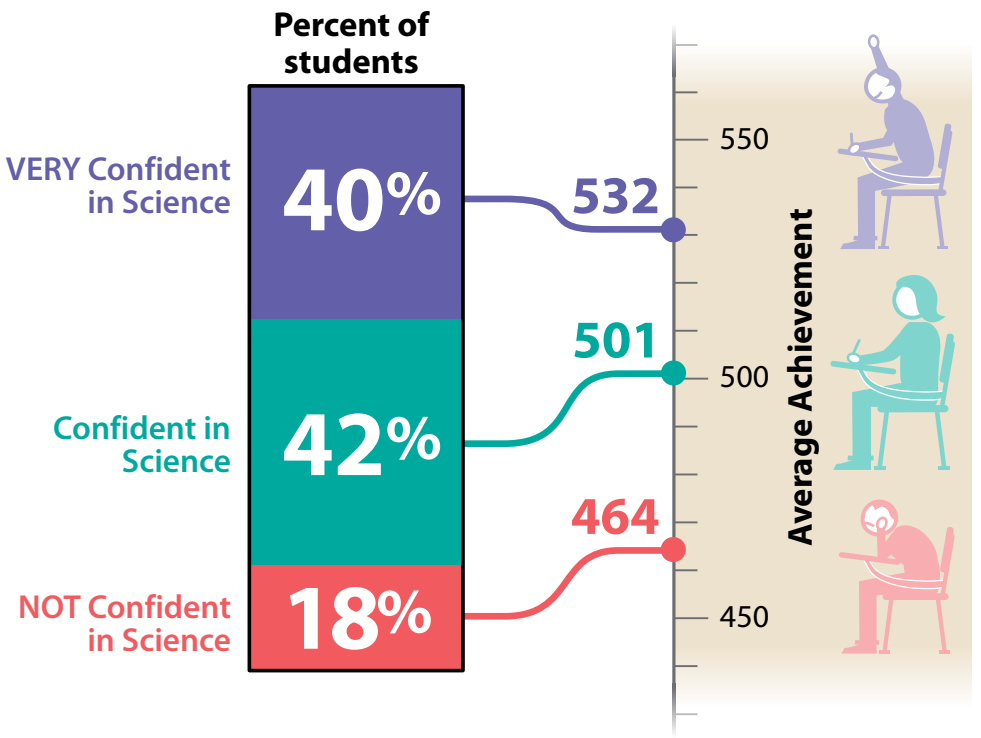
Students' Attitudes Toward Science

The fourth grade students were very positive about their science teaching, were confident in science, and liked learning the subject.

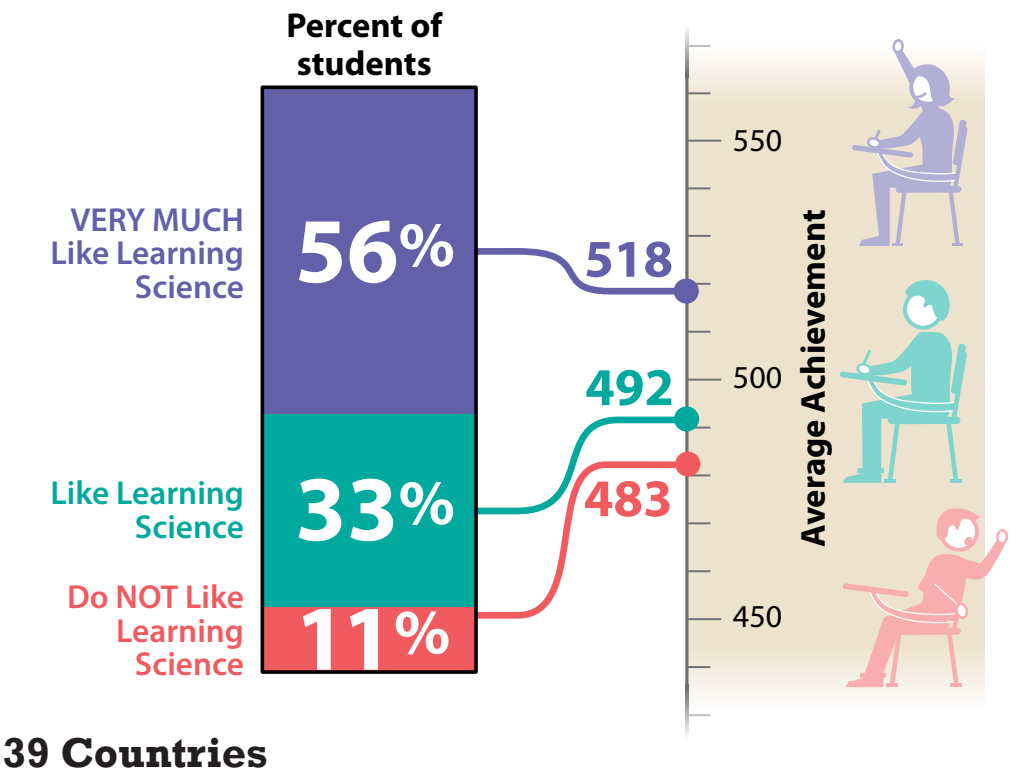
Almost all students (94%) were positive about their instruction—69% reported VERY engaging teaching and 25% engaging teaching.



Most students (82%) were VERY confident or confident in science, but 18% were NOT confident.



Most students (89%) VERY MUCH liked or liked learning science, and only 11% did NOT.



Trends 2011-2015: 39 Countries

Between 2011 and 2015, there were more increases than decreases in students' liking for learning science but more decreases than increases in students' confidence in science.

- The scale average for *Students Like Learning Science* increased in **16** countries and decreased in **5** countries.
- The scale average for *Students Confident in Science* increased in **6** countries and decreased in **13** countries.

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

http://timss2015.org/download-center/

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

Exhibit 10.1: Students' Views on Engaging Teaching in Science Lessons

Reported by Students

Students were scored according to their degree of agreement with ten statements on the *Students' Views on Engaging Teaching in Science Lessons* scale. Students who experienced **Very Engaging Teaching** in science 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 science 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	
Bulgaria	88 (1.0)	543 (5.4)	10 (0.9)	507 (10.0)	2 (0.3)	~ ~	11.1 (0.06)
Portugal	88 (0.7)	509 (2.3)	11 (0.7)	504 (3.7)	2 (0.2)	~ ~	10.8 (0.04)
Iran, Islamic Rep. of	86 (0.9)	427 (4.0)	11 (0.9)	404 (11.5)	2 (0.3)	~ ~	11.0 (0.05)
Serbia	85 (0.9)	526 (3.9)	13 (0.7)	528 (5.6)	2 (0.3)	~ ~	10.9 (0.05)
Oman	85 (0.8)	443 (3.2)	12 (0.6)	390 (5.3)	3 (0.2)	335 (8.2)	10.7 (0.04)
Turkey	84 (0.7)	495 (3.0)	14 (0.7)	436 (5.8)	2 (0.2)	~ ~	10.7 (0.04)
Morocco	83 (1.0)	366 (5.0)	14 (0.9)	319 (8.7)	3 (0.3)	267 (21.4)	10.6 (0.06)
Indonesia	81 (1.0)	409 (4.9)	16 (0.8)	367 (7.1)	2 (0.3)	~ ~	10.6 (0.06)
Spain	81 (1.2)	520 (2.6)	15 (0.8)	514 (4.3)	4 (0.6)	513 (8.6)	10.6 (0.07)
Russian Federation	80 (0.9)	567 (3.0)	18 (0.8)	568 (4.7)	2 (0.3)	~ ~	10.4 (0.05)
Kuwait	79 (1.1)	349 (6.4)	17 (0.9)	309 (10.0)	3 (0.4)	262 (16.9)	10.6 (0.06)
Bahrain	79 (0.7)	472 (2.6)	15 (0.6)	431 (6.2)	6 (0.5)	400 (11.1)	10.5 (0.04)
Hungary	78 (1.0)	544 (3.2)	19 (0.8)	539 (5.2)	3 (0.3)	534 (9.6)	10.5 (0.05)
Lithuania	75 (0.9)	531 (2.6)	21 (0.8)	519 (3.7)	3 (0.3)	506 (9.9)	10.2 (0.05)
United States	75 (0.7)	551 (2.2)	19 (0.5)	543 (3.2)	6 (0.4)	526 (4.8)	10.3 (0.04)
Qatar	74 (1.0)	452 (3.8)	20 (0.9)	413 (6.8)	7 (0.4)	376 (9.3)	10.3 (0.05)
United Arab Emirates	73 (0.8)	469 (2.8)	21 (0.6)	420 (4.1)	6 (0.3)	394 (7.5)	10.3 (0.04)
Saudi Arabia	72 (1.3)	406 (5.1)	21 (1.3)	374 (7.2)	7 (0.5)	370 (9.2)	10.2 (0.06)
Northern Ireland	72 (1.2)	519 (2.7)	23 (0.9)	522 (3.3)	6 (0.8)	526 (7.4)	10.0 (0.06)
Chile	72 (1.1)	484 (2.8)	21 (0.8)	471 (3.7)	7 (0.5)	460 (5.8)	10.2 (0.05)
Norway (5)	72 (1.3)	538 (2.9)	23 (1.0)	539 (2.8)	5 (0.5)	536 (7.1)	10.0 (0.05)
Kazakhstan	72 (1.4)	557 (4.7)	27 (1.3)	532 (5.4)	1 (0.2)	~ ~	10.2 (0.07)
Ireland	71 (1.3)	529 (2.7)	24 (1.2)	533 (3.9)	5 (0.4)	520 (6.6)	10.0 (0.06)
Canada	71 (0.8)	528 (2.4)	24 (0.7)	525 (2.6)	5 (0.3)	518 (6.7)	10.1 (0.04)
Italy	70 (1.1)	519 (2.7)	25 (0.9)	519 (3.3)	4 (0.5)	495 (8.5)	9.9 (0.05)
England	70 (1.3)	534 (2.5)	24 (0.9)	544 (3.9)	6 (0.6)	535 (6.6)	9.9 (0.06)
Croatia	69 (1.3)	536 (2.2)	29 (1.2)	531 (3.6)	2 (0.4)	~ ~	10.2 (0.06)
Slovak Republic	69 (1.3)	518 (3.2)	25 (1.0)	529 (3.6)	6 (0.5)	522 (7.6)	10.0 (0.06)
Germany r	68 (1.2)	532 (2.4)	27 (1.0)	536 (3.1)	5 (0.5)	528 (7.6)	9.9 (0.05)
Cyprus	65 (1.5)	485 (2.3)	22 (1.0)	482 (5.0)	12 (1.2)	478 (5.7)	9.7 (0.08)
Belgium (Flemish)	65 (1.4)	509 (2.4)	32 (1.2)	519 (2.9)	3 (0.4)	510 (6.6)	9.7 (0.05)
Australia	63 (1.0)	524 (3.2)	29 (0.8)	528 (3.6)	8 (0.5)	517 (5.5)	9.7 (0.05)
Poland	63 (1.4)	546 (2.6)	29 (1.0)	550 (3.2)	7 (0.7)	549 (6.1)	9.8 (0.06)
Netherlands	63 (1.0)	518 (2.8)	32 (1.0)	519 (3.5)	5 (0.5)	504 (6.3)	9.6 (0.04)
Slovenia	62 (1.0)	545 (2.8)	33 (1.0)	544 (3.0)	5 (0.5)	522 (6.5)	9.7 (0.05)
New Zealand	61 (1.0)	504 (3.4)	31 (1.0)	514 (2.8)	8 (0.5)	499 (6.1)	9.6 (0.05)
Czech Republic	60 (1.4)	531 (2.7)	33 (1.2)	541 (3.2)	6 (0.6)	535 (5.2)	9.5 (0.06)
Georgia	60 (1.5)	460 (4.3)	38 (1.5)	450 (4.1)	2 (0.2)	~ ~	10.0 (0.06)
Finland	60 (1.2)	556 (2.7)	34 (1.1)	554 (2.7)	6 (0.5)	532 (5.5)	9.4 (0.04)
France	60 (1.1)	487 (2.9)	34 (0.9)	492 (3.5)	5 (0.5)	480 (6.5)	9.6 (0.05)
Sweden	59 (1.1)	537 (4.2)	35 (1.0)	548 (3.5)	6 (0.5)	533 (8.4)	9.4 (0.04)
Chinese Taipei	58 (1.1)	559 (2.0)	31 (0.8)	553 (2.7)	11 (0.8)	541 (5.2)	9.5 (0.06)
Singapore	56 (0.9)	595 (3.9)	35 (0.7)	587 (4.2)	9 (0.6)	577 (5.8)	9.4 (0.04)
Hong Kong SAR	55 (1.2)	562 (3.6)	33 (0.9)	553 (3.0)	12 (0.8)	544 (4.8)	9.4 (0.06)
Denmark	49 (1.5)	530 (2.6)	38 (1.2)	526 (2.3)	13 (1.1)	523 (4.8)	9.0 (0.07)
Korea, Rep. of	33 (1.4)	597 (2.3)	50 (0.9)	587 (2.3)	17 (1.2)	583 (3.7)	8.4 (0.06)
Japan	28 (1.1)	571 (2.8)	49 (1.0)	572 (2.2)	23 (1.2)	562 (3.2)	8.1 (0.05)
International Avg.	69 (0.2)	510 (0.5)	25 (0.1)	500 (0.7)	6 (0.1)	489 (1.3)	

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 Science 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	
Benchmarking Participants							
Dubai, UAE	80 (0.8)	528 (2.0)	17 (0.7)	492 (3.9)	4 (0.3)	456 (8.6)	10.6 (0.04)
Buenos Aires, Argentina r	78 (1.1)	426 (4.4)	18 (0.9)	425 (7.5)	4 (0.5)	432 (15.5)	10.4 (0.06)
Norway (4)	77 (1.1)	495 (2.2)	20 (0.9)	490 (3.3)	4 (0.5)	482 (9.8)	10.3 (0.06)
Florida, US	76 (1.6)	556 (5.0)	19 (1.4)	541 (6.0)	5 (0.5)	505 (10.3)	10.4 (0.07)
Ontario, Canada	70 (1.2)	533 (2.7)	24 (1.1)	528 (3.2)	5 (0.4)	524 (6.9)	10.0 (0.05)
Abu Dhabi, UAE	67 (1.7)	434 (6.2)	26 (1.4)	392 (8.0)	7 (0.5)	368 (12.4)	10.0 (0.08)
Quebec, Canada	66 (1.3)	525 (4.3)	29 (1.1)	525 (5.6)	5 (0.7)	525 (9.0)	9.9 (0.07)

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

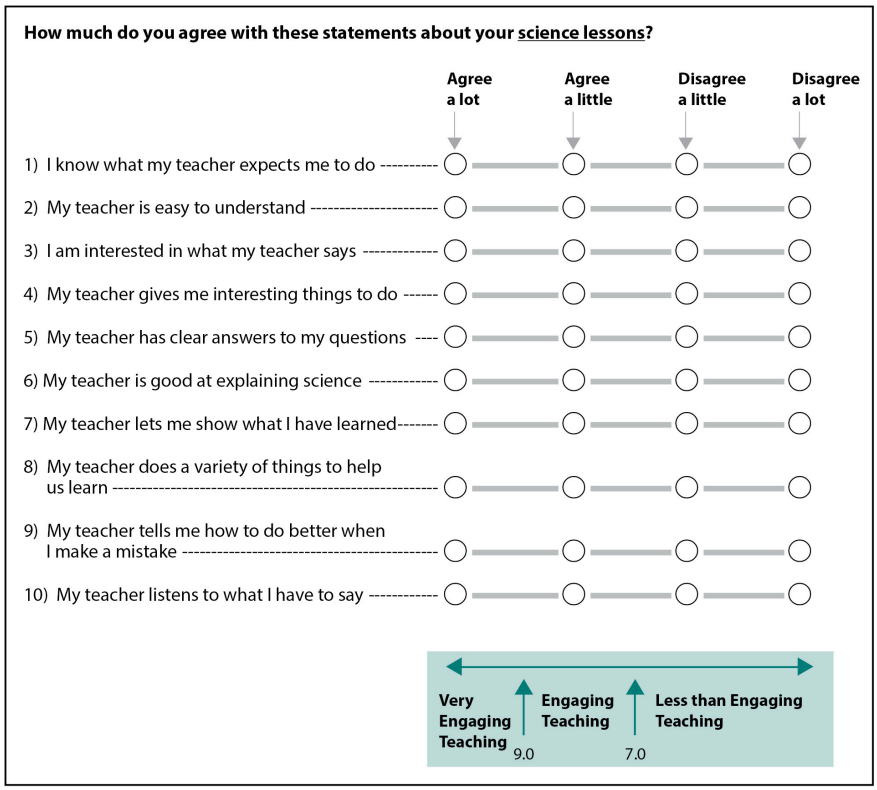


Exhibit 10.3: Students Like Learning Science

Reported by Students

Students were scored according to their degree of agreement with nine statements on the *Students Like Learning Science* scale. Students who **Very Much Like Learning Science** had a score on the scale of at least 9.6, 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 **Do Not Like Learning Science** had a score no higher than 7.6, 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 Science**.

Country	Very Much Like Learning Science		Like Learning Science		Do Not Like Learning Science		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		
Portugal	82 (1.0)	512 (2.2)	16 (0.9)	493 (3.9)	3 (0.3)	487 (6.7)	11.3 (0.05)	0.8 (0.08) ▲
Turkey	81 (1.0)	499 (2.9)	17 (0.8)	423 (6.5)	2 (0.2)	~ ~	11.1 (0.04)	0.2 (0.06) ▲
Oman	74 (0.9)	456 (3.3)	23 (0.8)	374 (4.4)	3 (0.3)	348 (8.0)	10.9 (0.04)	0.6 (0.06) ▲
Iran, Islamic Rep. of	74 (1.2)	439 (4.2)	23 (1.1)	377 (7.0)	3 (0.4)	381 (14.2)	11.0 (0.06)	0.3 (0.07) ▲
Bulgaria	71 (1.3)	554 (4.5)	24 (1.1)	502 (9.0)	5 (0.6)	479 (11.8)	10.7 (0.06)	◊ ◊
Kuwait	67 (1.5)	360 (7.0)	27 (1.3)	299 (7.2)	6 (0.5)	278 (13.4)	10.6 (0.06)	◊ ◊
Indonesia	66 (1.6)	420 (4.5)	31 (1.4)	364 (6.6)	3 (0.4)	286 (17.2)	10.5 (0.06)	◊ ◊
Morocco	66 (1.4)	384 (4.8)	30 (1.3)	304 (7.0)	4 (0.4)	291 (16.5)	10.7 (0.07)	0.9 (0.09) ▲
Bahrain	66 (0.9)	488 (2.9)	27 (0.8)	411 (4.6)	7 (0.4)	409 (10.7)	10.7 (0.03)	0.6 (0.09) ▲
Kazakhstan	66 (1.3)	559 (4.6)	32 (1.1)	533 (5.5)	3 (0.3)	528 (9.9)	10.5 (0.06)	0.1 (0.08)
United Arab Emirates	64 (0.9)	484 (2.6)	28 (0.6)	401 (3.4)	7 (0.4)	397 (6.1)	10.5 (0.04)	0.2 (0.05) ▲
Lithuania	62 (1.1)	537 (2.6)	30 (0.9)	515 (3.2)	8 (0.6)	507 (6.7)	10.2 (0.05)	-0.1 (0.07)
United States	61 (0.9)	555 (2.3)	28 (0.6)	540 (2.9)	11 (0.5)	526 (3.9)	10.3 (0.04)	0.3 (0.06) ▲
Qatar	60 (1.2)	469 (3.6)	31 (1.0)	398 (6.2)	9 (0.5)	383 (8.2)	10.4 (0.05)	0.4 (0.09) ▲
Italy	60 (1.1)	523 (2.9)	32 (1.0)	512 (3.0)	7 (0.5)	500 (6.4)	10.1 (0.04)	0.3 (0.07) ▲
Northern Ireland	59 (1.2)	526 (2.5)	32 (1.0)	515 (3.6)	10 (0.8)	500 (6.6)	10.2 (0.05)	0.4 (0.08) ▲
Ireland	58 (1.5)	539 (2.4)	31 (1.1)	519 (3.7)	11 (0.8)	506 (6.0)	10.2 (0.06)	-0.1 (0.09)
Russian Federation	58 (1.2)	570 (3.2)	34 (1.1)	564 (3.8)	8 (0.5)	566 (9.2)	10.1 (0.05)	-0.3 (0.07) ▼
New Zealand	58 (1.1)	514 (2.8)	32 (1.0)	501 (3.4)	10 (0.6)	480 (6.0)	10.1 (0.05)	0.1 (0.07)
Chinese Taipei	58 (1.2)	563 (2.1)	32 (0.9)	549 (2.6)	11 (0.8)	532 (5.2)	10.2 (0.06)	0.0 (0.08)
Spain	58 (1.3)	527 (2.8)	30 (0.8)	509 (3.2)	12 (0.9)	505 (3.6)	10.1 (0.06)	0.4 (0.08) ▲
Hong Kong SAR	57 (1.0)	569 (3.4)	32 (0.9)	543 (3.4)	11 (0.6)	533 (4.9)	10.1 (0.05)	0.2 (0.07) ▲
Serbia	57 (1.5)	528 (5.1)	32 (1.2)	522 (4.6)	11 (0.8)	527 (4.6)	10.0 (0.07)	0.2 (0.09) ▲
Saudi Arabia	56 (1.5)	427 (4.9)	34 (1.3)	357 (6.8)	11 (0.7)	364 (9.6)	10.2 (0.06)	-0.3 (0.09) ▼
Singapore	56 (0.9)	600 (3.8)	33 (0.7)	582 (4.2)	11 (0.5)	567 (5.1)	10.1 (0.04)	0.0 (0.05)
Germany r	55 (1.3)	539 (2.3)	32 (1.0)	527 (3.2)	12 (0.8)	523 (4.8)	10.0 (0.06)	r -0.1 (0.09)
Australia	54 (1.2)	531 (2.7)	34 (0.9)	522 (3.6)	12 (0.6)	505 (6.2)	10.0 (0.05)	0.0 (0.07)
Norway (5)	53 (1.5)	544 (2.8)	37 (1.0)	533 (3.4)	10 (0.8)	526 (4.6)	10.0 (0.07)	◊ ◊
Japan	53 (1.2)	577 (2.0)	37 (1.0)	563 (2.9)	10 (0.6)	551 (4.3)	10.0 (0.05)	0.0 (0.07)
Canada	52 (1.1)	533 (2.5)	34 (0.7)	522 (2.6)	13 (0.6)	513 (3.8)	9.9 (0.05)	◊ ◊
Georgia	50 (1.3)	470 (4.1)	45 (1.3)	441 (4.2)	4 (0.5)	405 (11.7)	10.0 (0.05)	-0.7 (0.06) ▼
Hungary	50 (1.3)	553 (2.7)	37 (1.0)	533 (4.6)	13 (0.7)	528 (6.6)	9.7 (0.05)	0.0 (0.08)
Croatia	50 (1.4)	538 (2.5)	40 (1.0)	528 (2.8)	11 (0.8)	532 (3.8)	9.8 (0.06)	-0.2 (0.08)
England	49 (1.2)	542 (2.9)	34 (0.8)	535 (3.1)	17 (0.9)	523 (4.1)	9.8 (0.06)	0.3 (0.09) ▲
Poland	48 (1.4)	553 (2.6)	40 (1.0)	543 (3.0)	12 (0.8)	543 (5.6)	9.6 (0.06)	◊ ◊
France	47 (1.2)	494 (3.0)	37 (0.9)	484 (3.4)	16 (1.0)	480 (4.7)	9.6 (0.06)	◊ ◊
Chile	46 (1.3)	491 (3.5)	39 (0.8)	469 (3.3)	15 (0.8)	471 (3.2)	9.6 (0.06)	-0.2 (0.08) ▼
Netherlands	46 (1.4)	527 (3.4)	39 (1.2)	510 (2.9)	15 (0.9)	508 (3.4)	9.5 (0.06)	0.0 (0.10)
Slovak Republic	46 (1.1)	526 (3.5)	38 (0.8)	517 (3.4)	16 (0.8)	517 (4.2)	9.5 (0.05)	-0.2 (0.07) ▼
Sweden	45 (1.2)	539 (4.7)	42 (1.0)	543 (3.3)	13 (0.9)	539 (5.7)	9.7 (0.05)	-0.1 (0.08)
Denmark	45 (1.8)	532 (3.0)	37 (1.2)	526 (2.4)	18 (1.3)	518 (3.9)	9.5 (0.09)	0.0 (0.11)
Belgium (Flemish)	44 (1.3)	518 (2.4)	39 (1.1)	514 (3.1)	17 (0.8)	493 (3.7)	9.5 (0.05)	0.2 (0.08) ▲
Cyprus	44 (1.6)	491 (2.5)	32 (1.1)	477 (3.4)	23 (1.3)	477 (4.4)	9.4 (0.08)	◊ ◊
Czech Republic	44 (1.2)	537 (3.1)	38 (0.9)	535 (3.1)	18 (0.8)	529 (3.2)	9.5 (0.05)	-0.1 (0.08)
Slovenia	43 (1.2)	551 (3.0)	40 (0.9)	540 (2.9)	17 (1.0)	531 (3.5)	9.4 (0.05)	0.1 (0.07)
Korea, Rep. of	42 (1.2)	605 (2.4)	44 (1.0)	582 (2.6)	14 (0.8)	566 (3.3)	9.5 (0.05)	0.1 (0.06)
Finland	38 (1.1)	558 (2.9)	44 (0.8)	555 (2.4)	19 (0.9)	545 (3.9)	9.2 (0.05)	0.1 (0.07)
International Avg.	56 (0.2)	518 (0.5)	33 (0.1)	492 (0.6)	11 (0.1)	483 (1.1)		

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 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 10.3: Students Like Learning Science (Continued)

Country	Very Much Like Learning Science		Like Learning Science		Do Not Like Learning Science		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		
Benchmarking Participants								
Dubai, UAE	72 (0.8)	535 (1.8)	23 (0.7)	483 (3.9)	5 (0.3)	458 (6.7)	10.9 (0.04)	0.3 (0.05) ▲
Florida, US	58 (2.0)	560 (5.2)	29 (1.4)	543 (6.4)	13 (1.2)	526 (5.9)	10.1 (0.09)	0.4 (0.12) ▲
Norway (4)	57 (1.7)	497 (2.4)	32 (1.1)	495 (2.7)	11 (0.9)	472 (5.1)	10.1 (0.07)	-0.1 (0.10)
Abu Dhabi, UAE	56 (1.7)	457 (5.8)	34 (1.2)	367 (6.5)	10 (0.8)	373 (10.4)	10.1 (0.08)	-0.1 (0.11)
Ontario, Canada	52 (1.5)	537 (3.1)	35 (0.9)	527 (3.2)	14 (0.9)	517 (3.7)	9.9 (0.07)	0.2 (0.09)
Quebec, Canada	49 (1.8)	531 (4.9)	37 (1.2)	521 (4.4)	14 (1.1)	514 (5.9)	9.7 (0.08)	-0.2 (0.10)
Buenos Aires, Argentina r	47 (1.4)	434 (5.4)	37 (1.2)	417 (5.7)	17 (1.2)	422 (6.5)	9.6 (0.07)	◊ ◊

▲ Significantly higher than 2011
▼ Significantly lower than 2011

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

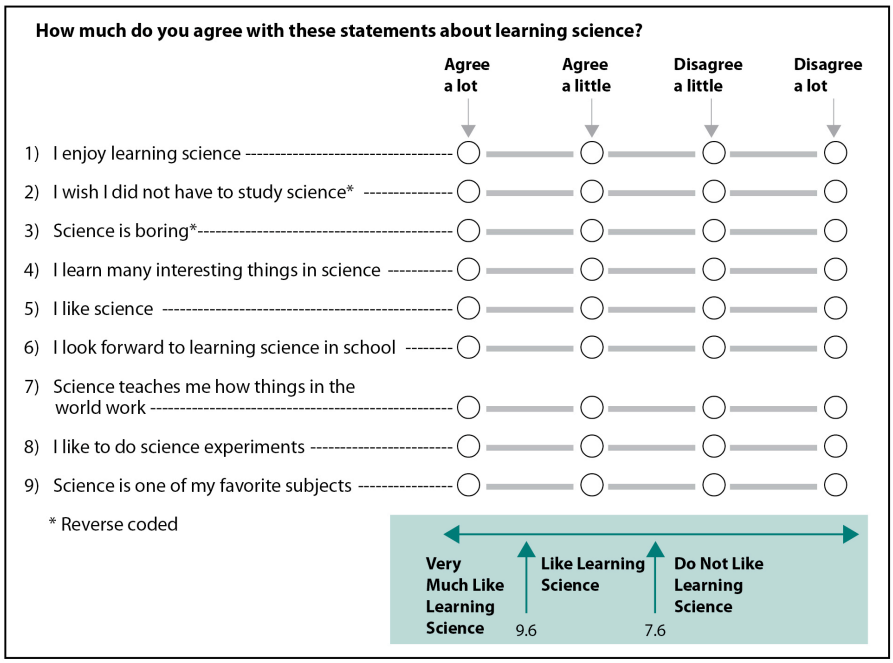


Exhibit 10.5: Students Confident in Science

Reported by Students

Students were scored according to their degree of agreement with seven statements on the *Students Confident in Science* scale. Students **Very Confident in Science** had a score on the scale of at least 10.2, which corresponds to their "agreeing a lot" with four of the seven statements and "agreeing a little" with the other three, on average. Students who were **Not Confident in Science** had a score no higher than 8.2, which corresponds to their "disagreeing a little" with four of the seven statements and "agreeing a little" with the other three, on average. All other students were **Confident in Science**.

Country	Very Confident in Science		Confident in Science		Not Confident in Science		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	61 (1.1)	514 (2.8)	28 (0.9)	453 (3.9)	11 (0.6)	399 (6.6)	10.8 (0.05)	0.2 (0.07) ▲
Bulgaria	60 (1.6)	569 (4.1)	28 (1.0)	514 (6.7)	12 (0.9)	445 (10.4)	10.8 (0.07)	◊ ◊
Iran, Islamic Rep. of	56 (1.3)	452 (4.7)	30 (1.3)	402 (5.1)	14 (0.9)	348 (9.1)	10.7 (0.06)	-0.3 (0.08) ▼
Serbia	54 (1.4)	544 (5.2)	31 (1.0)	517 (4.4)	15 (1.0)	478 (5.6)	10.5 (0.06)	0.1 (0.09)
Kuwait	52 (1.3)	373 (7.1)	33 (1.0)	314 (7.0)	15 (0.9)	277 (9.5)	10.4 (0.05)	◊ ◊
Oman	50 (1.3)	470 (3.7)	35 (1.0)	413 (3.5)	15 (0.7)	359 (5.3)	10.4 (0.05)	-0.2 (0.07)
Norway (5)	50 (1.2)	551 (2.7)	42 (1.0)	531 (3.0)	9 (0.6)	500 (5.7)	10.3 (0.05)	◊ ◊
Kazakhstan	49 (1.4)	568 (5.0)	41 (1.2)	536 (4.8)	10 (0.8)	516 (8.9)	10.5 (0.06)	0.0 (0.09)
Croatia	48 (1.3)	549 (2.3)	42 (1.1)	525 (2.5)	10 (0.7)	499 (5.3)	10.4 (0.05)	-0.5 (0.07) ▼
Bahrain	48 (1.0)	499 (3.1)	35 (1.0)	442 (4.0)	17 (0.7)	393 (6.1)	10.3 (0.04)	0.1 (0.08)
Portugal	47 (1.3)	523 (2.5)	41 (1.0)	502 (2.4)	11 (0.8)	469 (4.5)	10.2 (0.05)	0.2 (0.08) ▲
Qatar	47 (1.2)	478 (3.7)	34 (0.8)	427 (4.2)	20 (0.9)	371 (7.1)	10.2 (0.05)	0.0 (0.07)
Germany r	47 (1.1)	548 (2.4)	40 (1.0)	529 (2.8)	14 (0.7)	496 (5.3)	10.1 (0.04)	r -0.2 (0.06) ▼
Hungary	45 (1.2)	570 (2.7)	39 (0.9)	529 (3.8)	16 (0.8)	499 (6.2)	10.1 (0.05)	-0.1 (0.07)
United States	44 (0.8)	569 (2.1)	38 (0.7)	542 (2.2)	17 (0.6)	506 (3.6)	10.0 (0.03)	-0.1 (0.05)
Lithuania	44 (1.2)	552 (2.7)	42 (1.0)	519 (3.0)	14 (0.6)	483 (5.4)	10.0 (0.04)	0.0 (0.06)
Georgia	44 (1.3)	478 (3.7)	42 (1.3)	450 (4.3)	14 (1.0)	396 (5.7)	10.1 (0.05)	-0.4 (0.08) ▼
United Arab Emirates	43 (0.7)	503 (2.6)	40 (0.6)	435 (3.2)	17 (0.5)	379 (3.9)	10.1 (0.03)	-0.3 (0.04) ▼
Spain	42 (1.1)	544 (2.5)	36 (0.8)	513 (2.9)	22 (0.9)	480 (3.7)	10.0 (0.05)	0.2 (0.07)
Saudi Arabia	41 (1.3)	440 (5.3)	36 (1.1)	384 (5.2)	23 (1.1)	342 (7.8)	10.0 (0.06)	-0.7 (0.09) ▼
Russian Federation	40 (1.1)	582 (3.3)	41 (0.7)	566 (3.8)	19 (1.0)	543 (6.5)	9.9 (0.05)	-0.3 (0.07) ▼
Sweden	40 (1.1)	560 (3.3)	50 (1.0)	532 (4.3)	10 (0.6)	508 (5.8)	10.0 (0.04)	-0.3 (0.06) ▼
Poland	39 (1.1)	565 (2.6)	47 (1.0)	544 (2.6)	14 (0.8)	510 (4.8)	9.9 (0.05)	◊ ◊
Italy	39 (1.1)	531 (3.3)	46 (1.0)	517 (3.4)	14 (0.7)	485 (4.6)	9.9 (0.04)	0.1 (0.06)
Canada	39 (0.9)	547 (2.3)	43 (0.7)	523 (2.5)	18 (0.6)	495 (3.3)	9.8 (0.04)	◊ ◊
Belgium (Flemish)	39 (1.2)	527 (2.4)	45 (0.9)	512 (3.0)	16 (0.8)	475 (3.7)	9.8 (0.05)	0.2 (0.06)
Ireland	38 (1.4)	546 (2.9)	45 (1.2)	530 (2.9)	16 (0.7)	492 (4.0)	9.8 (0.05)	-0.3 (0.07) ▼
Chinese Taipei	38 (1.1)	578 (2.2)	46 (0.9)	551 (2.5)	16 (0.8)	514 (3.4)	9.8 (0.04)	-0.2 (0.07) ▼
Morocco	38 (1.3)	406 (5.4)	41 (1.2)	346 (5.7)	20 (1.0)	290 (8.8)	10.0 (0.05)	0.6 (0.08) ▲
Slovak Republic	38 (1.0)	547 (3.4)	40 (0.9)	518 (3.4)	22 (0.9)	481 (4.1)	9.8 (0.04)	-0.3 (0.06) ▼
Netherlands	38 (1.1)	535 (3.2)	45 (1.1)	517 (2.6)	18 (0.9)	482 (3.4)	9.8 (0.04)	0.0 (0.07)
Denmark	37 (1.2)	542 (2.9)	46 (1.0)	525 (2.5)	17 (1.0)	503 (4.1)	9.8 (0.05)	0.1 (0.06)
Cyprus	37 (1.3)	502 (2.6)	37 (1.0)	480 (3.2)	26 (1.2)	461 (4.0)	9.7 (0.07)	◊ ◊
Northern Ireland	36 (1.2)	534 (3.1)	45 (1.1)	521 (2.7)	19 (0.8)	492 (4.5)	9.7 (0.04)	0.0 (0.07)
Slovenia	35 (1.0)	566 (2.9)	47 (0.8)	543 (2.6)	18 (0.8)	497 (4.5)	9.7 (0.04)	-0.4 (0.06) ▼
Australia	35 (0.9)	542 (3.5)	45 (0.8)	525 (2.7)	20 (0.8)	494 (4.2)	9.7 (0.04)	-0.2 (0.06) ▼
Indonesia	35 (1.4)	436 (4.8)	46 (1.2)	394 (5.2)	19 (1.2)	345 (6.9)	9.8 (0.06)	◊ ◊
Finland	34 (1.0)	573 (2.9)	52 (0.9)	552 (2.5)	14 (0.7)	519 (3.9)	9.7 (0.03)	0.0 (0.05)
Czech Republic	33 (1.0)	550 (3.0)	45 (0.9)	537 (2.6)	22 (1.0)	505 (3.5)	9.6 (0.05)	-0.2 (0.07)
England	33 (1.0)	556 (3.0)	42 (0.8)	537 (2.6)	25 (0.9)	510 (3.7)	9.5 (0.05)	0.0 (0.07)
France	30 (1.0)	509 (2.8)	46 (0.9)	490 (3.1)	24 (0.9)	459 (4.0)	9.4 (0.05)	◊ ◊
Chile	29 (1.2)	512 (3.7)	40 (0.9)	477 (3.2)	31 (1.0)	455 (3.3)	9.3 (0.05)	0.0 (0.06)
Singapore	26 (0.6)	621 (3.7)	43 (0.7)	596 (3.9)	31 (0.7)	559 (4.6)	9.2 (0.03)	0.1 (0.04)
Hong Kong SAR	25 (1.2)	588 (3.9)	48 (1.0)	558 (3.2)	27 (0.9)	526 (3.3)	9.3 (0.04)	0.2 (0.06) ▲
New Zealand	24 (0.9)	537 (3.3)	51 (1.0)	510 (3.0)	25 (0.8)	470 (3.7)	9.3 (0.03)	0.0 (0.06)
Japan	24 (0.8)	589 (2.5)	59 (0.8)	568 (2.0)	17 (0.7)	545 (3.6)	9.3 (0.03)	0.4 (0.04) ▲
Korea, Rep. of	20 (0.7)	622 (2.6)	57 (1.0)	592 (2.2)	24 (1.1)	556 (2.9)	9.1 (0.03)	0.3 (0.05) ▲
International Avg.	40 (0.2)	532 (0.5)	42 (0.1)	501 (0.5)	18 (0.1)	464 (0.8)		

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

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

Exhibit 10.5: Students Confident in Science (Continued)

Country	Very Confident in Science		Confident in Science		Not Confident in Science		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		
Benchmarking Participants								
Dubai, UAE	51 (0.8)	547 (2.2)	36 (0.7)	505 (2.3)	13 (0.4)	453 (4.7)	10.4 (0.03)	-0.1 (0.05)
Norway (4)	50 (1.5)	509 (2.4)	38 (0.9)	484 (2.5)	11 (0.7)	458 (5.6)	10.3 (0.06)	-0.2 (0.08)
Florida, US	45 (1.8)	571 (5.5)	37 (1.1)	544 (4.6)	18 (1.4)	512 (5.7)	10.0 (0.08)	0.0 (0.11)
Ontario, Canada	38 (1.3)	551 (3.1)	42 (0.8)	528 (3.1)	20 (1.0)	501 (3.2)	9.7 (0.05)	-0.1 (0.07)
Quebec, Canada	38 (1.5)	542 (4.2)	47 (1.4)	522 (4.8)	16 (1.2)	496 (5.2)	9.9 (0.06)	-0.3 (0.08) ▼
Abu Dhabi, UAE	35 (1.5)	481 (6.0)	44 (1.3)	403 (5.7)	21 (1.1)	344 (6.8)	9.7 (0.06)	-0.6 (0.10) ▼
Buenos Aires, Argentina r	29 (1.3)	454 (5.0)	46 (1.1)	423 (4.9)	25 (1.2)	400 (6.8)	9.5 (0.06)	◊ ◊

Significantly higher than 2011 ▲
Significantly lower than 2011 ▼

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

How much do you agree with these statements about science?

	Agree a lot	Agree a little	Disagree a little	Disagree a lot
1) I usually do well in science	○	○	○	○
2) Science is harder for me than for many of my classmates*	○	○	○	○
3) I am just not good at science*	○	○	○	○
4) I learn things quickly in science	○	○	○	○
5) My teacher tells me I am good at science	○	○	○	○
6) Science is harder for me than any other subject*	○	○	○	○
7) Science makes me confused*	○	○	○	○

* Reverse coded

TIMSS 2015

SCIENCE APPENDICES

TIMSS 2015 INTERNATIONAL RESULTS IN SCIENCE

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	●	●	●	●	●	●	●	●	●	●	●

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

● 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.

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
Benchmarking Participants											
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
Content Domain				
Life Science	39 (39)	40 (48)	79 (87)	46%
Physical Science	36 (36)	28 (29)	64 (65)	35%
Earth Science	23 (23)	10 (13)	33 (36)	19%
Total	98 (98)	78 (90)	176 (188)	100%
Percentage of Score Points	52%	48%		
Cognitive Domain				
Knowing	47 (47)	25 (31)	72 (78)	41%
Applying	32 (32)	35 (39)	67 (71)	38%
Reasoning	19 (19)	18 (20)	37 (39)	21%
Total	98 (98)	78 (90)	176 (188)	100%
Percentage of Score Points	52%	48%		

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%
[2] 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%
[1] [2] 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%
[2] 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%
[1] 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%
[2] Italy	100%		0.9%	5.3%	6.2%
Japan	100%		0.6%	2.4%	2.9%
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%
[2] 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%
[2] 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%
[3] Serbia	100%		5.0%	6.3%	11.3%
[2] 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%
[2] Spain	100%		1.6%	4.1%	5.6%
[2] 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%
[2] United States	100%		0.0%	6.8%	6.8%

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

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

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
Benchmarking Participants					
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%
[2] Abu Dhabi, UAE	100%		1.5%	4.3%	5.8%
Dubai, UAE	100%		3.3%	2.0%	5.3%
[1] 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
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
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
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

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

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	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	99%	4,208	89	0	4,119	94	4,025
Iran, Islamic Rep. of	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
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	97%	3,863	41	2	3,820	227	3,593
Lithuania	94%	5,034	12	175	4,847	318	4,529
Morocco	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
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
Benchmarking Participants							
Buenos Aires, Argentina	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	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	100%	100%	100%	99%	99%	99%
Iran, Islamic Rep. of	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%
Kazakhstan	97%	99%	100%	98%	95%	97%
Korea, Rep. of	100%	100%	100%	97%	97%	97%
Kuwait	94%	94%	100%	97%	90%	90%
Lithuania	99%	100%	100%	94%	93%	94%
Morocco	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%
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
Benchmarking Participants						
Buenos Aires, Argentina	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
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			

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

* 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.

Dubai (UAE) in 2007 tested the same cohort of students as other countries, but later in the assessment year.

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%
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%			

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

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

Country	Percentage of Students with Achievement Too Low for Estimation	Average Percent Correct
Australia	2 (0.3)	52 (0.6)
Bahrain	7 (0.5)	41 (0.4)
Belgium (Flemish)	1 (0.2)	49 (0.4)
Bulgaria	2 (0.5)	57 (1.2)
Canada	2 (0.3)	52 (0.5)
Chile	3 (0.4)	42 (0.5)
Chinese Taipei	1 (0.1)	59 (0.4)
Croatia	1 (0.2)	54 (0.4)
Cyprus	4 (0.4)	43 (0.5)
Czech Republic	1 (0.1)	55 (0.4)
Denmark	2 (0.3)	53 (0.4)
England	1 (0.1)	55 (0.5)
Finland	1 (0.1)	58 (0.4)
France	3 (0.4)	44 (0.5)
Georgia	5 (0.5)	39 (0.7)
Germany	1 (0.2)	53 (0.4)
Hong Kong SAR	1 (0.1)	60 (0.6)
Hungary	2 (0.4)	56 (0.7)
Indonesia	12 (0.9)	32 (0.6)
Iran, Islamic Rep. of	11 (0.8)	34 (0.6)
Ireland	1 (0.2)	53 (0.5)
Italy	1 (0.2)	51 (0.5)
Japan	1 (0.1)	62 (0.4)
Kazakhstan	1 (0.1)	58 (0.9)
Korea, Rep. of	0 (0.1)	66 (0.4)
ψ Kuwait	25 (1.3)	25 (0.7)
Lithuania	1 (0.2)	53 (0.5)
ψ Morocco	19 (0.8)	27 (0.6)
Netherlands	1 (0.1)	50 (0.5)
New Zealand	4 (0.3)	49 (0.5)
Northern Ireland	1 (0.3)	51 (0.5)
Norway (5)	1 (0.2)	55 (0.5)
Oman	9 (0.4)	38 (0.5)
Poland	1 (0.2)	57 (0.5)
Portugal	1 (0.2)	48 (0.3)
Qatar	9 (0.7)	38 (0.6)
Russian Federation	0 (0.1)	62 (0.7)
Saudi Arabia	14 (0.8)	31 (0.6)
Serbia	2 (0.6)	52 (0.7)
Singapore	1 (0.1)	67 (0.8)
Slovak Republic	2 (0.4)	52 (0.6)
Slovenia	1 (0.2)	56 (0.4)
Spain	1 (0.2)	51 (0.5)
Sweden	1 (0.3)	56 (0.7)
Turkey	4 (0.4)	45 (0.5)
United Arab Emirates	8 (0.4)	41 (0.4)
United States	1 (0.2)	57 (0.4)

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

* 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	Percentage of Students with Achievement Too Low for Estimation	Average Percent Correct
Benchmarking Participants		
Buenos Aires, Argentina	14 (1.0)	32 (0.6)
Ontario, Canada	1 (0.2)	54 (0.5)
Quebec, Canada	1 (0.2)	52 (0.8)
Norway (4)	3 (0.3)	45 (0.5)
Abu Dhabi, UAE	13 (1.0)	35 (0.9)
Dubai, UAE	3 (0.2)	53 (0.3)
Florida, US	1 (0.2)	58 (1.1)

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

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

Country	Overall Science	Science Content Domains			Science Cognitive Domains		
		Life Science	Physical Science	Earth Science	Knowing	Applying	Reasoning
Australia	52 (0.6)	55 (0.6)	49 (0.7)	52 (0.7)	56 (0.6)	51 (0.7)	48 (0.6)
Bahrain	41 (0.4)	42 (0.4)	41 (0.4)	39 (0.4)	45 (0.4)	40 (0.4)	34 (0.5)
Belgium (Flemish)	49 (0.4)	50 (0.5)	46 (0.5)	49 (0.5)	50 (0.5)	48 (0.5)	47 (0.6)
Bulgaria	57 (1.2)	59 (1.2)	54 (1.2)	55 (1.2)	63 (1.2)	56 (1.2)	46 (1.2)
Canada	52 (0.5)	56 (0.5)	49 (0.5)	50 (0.6)	56 (0.5)	52 (0.5)	46 (0.5)
Chile	42 (0.5)	46 (0.5)	39 (0.5)	40 (0.6)	46 (0.5)	41 (0.6)	36 (0.6)
Chinese Taipei	59 (0.4)	58 (0.4)	61 (0.4)	58 (0.5)	62 (0.4)	58 (0.4)	56 (0.5)
Croatia	54 (0.4)	55 (0.5)	53 (0.5)	54 (0.7)	58 (0.5)	53 (0.5)	49 (0.6)
Cyprus	43 (0.5)	44 (0.5)	43 (0.6)	40 (0.6)	44 (0.5)	43 (0.6)	39 (0.5)
Czech Republic	55 (0.4)	57 (0.4)	52 (0.5)	54 (0.6)	60 (0.5)	52 (0.5)	48 (0.6)
Denmark	53 (0.4)	55 (0.4)	49 (0.6)	53 (0.6)	56 (0.5)	53 (0.5)	48 (0.6)
England	55 (0.5)	56 (0.5)	54 (0.5)	53 (0.7)	58 (0.5)	54 (0.5)	50 (0.6)
Finland	58 (0.4)	59 (0.4)	56 (0.5)	60 (0.5)	62 (0.5)	57 (0.4)	53 (0.5)
France	44 (0.5)	46 (0.5)	42 (0.5)	44 (0.7)	47 (0.6)	44 (0.6)	38 (0.5)
Georgia	39 (0.7)	42 (0.6)	35 (0.8)	37 (0.8)	44 (0.7)	38 (0.7)	29 (0.7)
Germany	53 (0.4)	54 (0.4)	53 (0.5)	51 (0.6)	56 (0.5)	52 (0.5)	48 (0.5)
Hong Kong SAR	60 (0.6)	59 (0.7)	58 (0.7)	63 (0.8)	64 (0.6)	58 (0.7)	53 (0.8)
Hungary	56 (0.7)	59 (0.7)	53 (0.7)	55 (0.8)	61 (0.7)	55 (0.7)	49 (0.7)
Indonesia	32 (0.6)	33 (0.7)	32 (0.7)	29 (0.6)	37 (0.7)	29 (0.5)	26 (0.7)
Iran, Islamic Rep. of	34 (0.6)	36 (0.6)	34 (0.6)	33 (0.7)	38 (0.6)	33 (0.6)	29 (0.7)
Ireland	53 (0.5)	55 (0.5)	51 (0.5)	55 (0.7)	57 (0.5)	53 (0.5)	47 (0.6)
Italy	51 (0.5)	53 (0.5)	49 (0.5)	49 (0.7)	56 (0.5)	49 (0.6)	45 (0.6)
Japan	62 (0.4)	60 (0.4)	65 (0.4)	60 (0.6)	59 (0.4)	63 (0.4)	63 (0.4)
Kazakhstan	58 (0.9)	58 (0.8)	58 (1.1)	56 (1.0)	62 (0.9)	56 (1.0)	53 (1.1)
Korea, Rep. of	66 (0.4)	66 (0.4)	67 (0.4)	66 (0.6)	67 (0.4)	66 (0.4)	64 (0.5)
ψ Kuwait	25 (0.7)	26 (0.8)	23 (0.7)	26 (0.6)	30 (0.8)	24 (0.7)	18 (0.6)
Lithuania	53 (0.5)	54 (0.6)	53 (0.6)	50 (0.6)	56 (0.6)	52 (0.5)	50 (0.7)
ψ Morocco	27 (0.6)	28 (0.6)	27 (0.7)	24 (0.6)	30 (0.6)	26 (0.6)	22 (0.6)
Netherlands	50 (0.5)	53 (0.5)	46 (0.5)	51 (0.7)	52 (0.6)	50 (0.5)	47 (0.6)
New Zealand	49 (0.5)	51 (0.5)	45 (0.5)	49 (0.6)	52 (0.5)	47 (0.5)	45 (0.5)
Northern Ireland	51 (0.5)	53 (0.5)	49 (0.5)	53 (0.7)	55 (0.6)	50 (0.5)	46 (0.6)
Norway (5)	55 (0.5)	58 (0.5)	50 (0.6)	58 (0.8)	58 (0.6)	55 (0.6)	49 (0.6)
Oman	38 (0.5)	39 (0.5)	38 (0.5)	36 (0.5)	41 (0.5)	37 (0.5)	32 (0.5)
Poland	57 (0.5)	61 (0.5)	54 (0.5)	56 (0.6)	60 (0.5)	58 (0.6)	52 (0.5)
Portugal	48 (0.3)	50 (0.3)	45 (0.4)	50 (0.5)	52 (0.4)	47 (0.4)	42 (0.5)
Qatar	38 (0.6)	40 (0.6)	36 (0.7)	36 (0.6)	42 (0.6)	36 (0.7)	32 (0.7)
Russian Federation	62 (0.7)	63 (0.7)	60 (0.7)	60 (0.7)	65 (0.8)	62 (0.6)	55 (0.7)
Saudi Arabia	31 (0.6)	32 (0.6)	30 (0.7)	32 (0.7)	37 (0.7)	30 (0.6)	23 (0.6)
Serbia	52 (0.7)	56 (0.6)	52 (0.8)	46 (0.9)	56 (0.7)	52 (0.8)	47 (0.8)
Singapore	67 (0.8)	71 (0.8)	68 (0.8)	57 (0.8)	67 (0.7)	68 (0.8)	65 (0.8)
Slovak Republic	52 (0.6)	53 (0.6)	52 (0.6)	50 (0.7)	57 (0.6)	50 (0.6)	44 (0.6)
Slovenia	56 (0.4)	58 (0.5)	56 (0.5)	53 (0.6)	59 (0.5)	57 (0.5)	51 (0.5)
Spain	51 (0.5)	54 (0.5)	47 (0.6)	51 (0.7)	56 (0.6)	49 (0.5)	45 (0.6)
Sweden	56 (0.7)	56 (0.6)	53 (0.8)	59 (0.8)	59 (0.7)	55 (0.8)	51 (0.7)
Turkey	45 (0.5)	45 (0.5)	46 (0.6)	44 (0.6)	48 (0.5)	44 (0.6)	41 (0.7)
United Arab Emirates	41 (0.4)	42 (0.5)	40 (0.5)	40 (0.5)	46 (0.5)	40 (0.5)	34 (0.5)
United States	57 (0.4)	61 (0.4)	54 (0.5)	56 (0.5)	61 (0.5)	57 (0.4)	51 (0.4)
International Avg.	50 (0.1)	51 (0.1)	48 (0.1)	49 (0.1)	53 (0.1)	49 (0.1)	44 (0.1)

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

Country	Overall Science	Science Content Domains			Science Cognitive Domains		
		Life Science	Physical Science	Earth Science	Knowing	Applying	Reasoning
Benchmarking Participants							
Buenos Aires, Argentina	32 (0.6)	35 (0.7)	30 (0.7)	29 (0.7)	36 (0.7)	31 (0.7)	27 (0.7)
Ontario, Canada	54 (0.5)	58 (0.5)	50 (0.5)	50 (0.6)	57 (0.5)	54 (0.5)	47 (0.6)
Quebec, Canada	52 (0.8)	55 (0.8)	49 (1.0)	50 (1.0)	56 (0.9)	51 (1.0)	47 (0.9)
Norway (4)	45 (0.5)	49 (0.5)	40 (0.5)	47 (0.6)	50 (0.5)	44 (0.6)	38 (0.5)
Abu Dhabi, UAE	35 (0.9)	37 (1.0)	34 (0.9)	35 (0.9)	39 (1.0)	34 (0.9)	29 (0.8)
Dubai, UAE	53 (0.3)	54 (0.4)	51 (0.4)	51 (0.4)	57 (0.4)	52 (0.4)	45 (0.4)
Florida, US	58 (1.1)	61 (1.0)	54 (1.2)	56 (1.2)	62 (1.0)	57 (1.1)	50 (1.2)

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

Appendix F: 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 science that participating countries agreed should be the focus of an international assessment of science 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 science, 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' science 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 science 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 science 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.[1]

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

1 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.[2] 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.

Exhibits F.1 through F.4 present the TCMA results for the TIMSS 2015 science test at the fourth and eighth grades. Exhibits F.1 and F.2 show the average percent correct on the science 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 180 points.[3] Generally, the proportion of items judged appropriate was fairly high. Reading along the bottom row, it can be seen that 2 of the 47 countries that took part in the TCMA analysis judged 100 percent of the items to be included in their curricula. A further 21 countries and 2 of the 5 benchmarking participants judged 75 percent or more (135 score points) to be appropriate.

At the eighth grade, the percentage of items judged appropriate was similar; 2 of the 38 countries judged 100 percent of the items to be appropriate (all 233 score points), and an additional 26 countries and 3 of the 5 benchmarking participants judged 75 percent or more (175 score points) to be appropriate. All but two of the countries and two of the benchmarking participants concurred that more than half of the science items were included in their curricula.

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.[4]

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, Singapore, where the average percent correct was 81 percent on its own set of items, also had 70 percent correct on the items selected by Korea, 74 percent on the items selected by Japan, 67 percent on the items selected by the Russian Federation, and so forth.

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 science assessment contained 176 items, yielding 188 score points. However, following item review, eight items were deleted, resulting in 168 items and 180 score points. Similarly, following item review, the 220 items and 239 score points in the eighth grade assessment were reduced to 215 items and 233 score points by deleting five items and reducing the point value of one item.

4 It should be noted that the science 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

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	Japan	Russian Federation	Hong Kong SAR	Chinese Taipei	Finland	Kazakhstan	Poland	United States	Bulgaria	Slovenia	Hungary	Sweden	Norway (5)	England	Czech Republic	Croatia	Ireland	Lithuania	Germany	Denmark	Serbia	Canada	Australia	Slovak Republic	Northern Ireland	Spain	Italy	Netherlands
Singapore	67 (0.8)	81	70	74	67	68	67	72	67	69	67	68	68	68	69	68	69	67	70	68	67	68	67	68	69	69	69	69	67	68	67
Korea, Rep. of	66 (0.4)	67	75	71	68	66	66	70	67	67	67	68	67	67	69	69	67	68	68	66	67	66	70	66	67	68	68	68	67	68	68
Japan	62 (0.4)	64	67	70	61	62	67	67	61	63	62	63	63	62	64	63	63	62	65	63	62	63	64	62	61	63	64	64	62	61	62
Russian Federation	62 (0.7)	61	65	63	63	62	60	66	62	62	62	63	62	62	63	63	62	63	60	61	62	62	65	61	61	62	64	63	62	62	63
Hong Kong SAR	60 (0.6)	60	62	62	61	60	59	65	60	60	60	61	61	60	61	61	59	61	60	59	60	59	63	58	57	60	60	61	60	59	61
Chinese Taipei	59 (0.4)	58	62	62	59	59	61	63	58	60	59	60	60	60	60	60	58	60	60	59	59	59	62	59	57	59	61	60	60	59	59
Finland	58 (0.4)	56	62	59	60	58	57	62	59	59	59	59	59	59	60	61	59	60	57	58	59	59	63	57	58	59	59	60	59	58	60
Kazakhstan	58 (0.9)	61	60	62	59	58	58	62	58	58	58	60	59	59	61	59	59	59	59	58	58	58	60	57	56	59	60	59	58	57	59
Poland	57 (0.5)	53	60	56	61	58	55	62	60	60	57	60	58	59	60	59	59	60	59	57	59	58	63	56	58	59	58	60	59	59	59
United States	57 (0.4)	54	60	57	59	57	53	61	59	58	57	58	58	58	59	59	58	59	56	57	59	57	61	56	58	59	58	60	58	57	60
Bulgaria	57 (1.2)	55	57	56	60	57	53	61	59	58	57	60	57	57	60	58	57	59	57	57	58	56	60	55	56	57	58	58	57	57	59
Slovenia	56 (0.4)	56	60	60	58	57	56	62	57	58	57	58	58	57	58	59	57	58	57	57	58	57	60	56	56	58	59	59	57	57	59
Hungary	56 (0.7)	55	60	58	59	57	55	61	59	58	57	58	57	58	59	60	57	59	56	56	57	56	61	55	56	58	58	58	57	57	58
Sweden	56 (0.7)	53	59	57	58	55	53	59	57	57	56	57	57	57	58	59	56	58	55	56	56	56	60	55	55	57	57	57	56	55	57
Norway (5)	55 (0.5)	51	57	52	57	55	52	58	57	55	55	56	56	56	57	59	55	57	53	54	56	55	60	54	54	55	55	57	56	54	57
England	55 (0.5)	53	57	55	56	55	53	59	55	55	55	55	56	55	57	57	56	56	53	55	56	55	59	53	55	55	56	57	55	54	57
Czech Republic	55 (0.4)	53	59	55	57	55	52	59	57	56	55	56	56	55	56	57	56	56	53	54	56	55	59	53	55	56	55	57	55	56	57
Croatia	54 (0.4)	53	57	56	57	54	53	59	56	56	54	56	56	55	55	57	56	56	58	54	55	55	58	53	54	55	56	57	55	55	56
Ireland	53 (0.5)	50	55	52	54	53	51	57	54	54	53	54	55	54	55	56	53	55	51	53	54	53	58	52	52	54	54	55	54	52	56
Lithuania	53 (0.5)	51	55	54	54	53	54	57	53	54	53	54	54	54	55	55	54	54	53	53	54	53	57	52	51	53	54	55	53	53	54
Germany	53 (0.4)	51	57	56	53	53	54	57	53	53	53	54	54	53	55	55	53	54	51	53	54	53	57	52	51	53	54	54	53	52	55
Denmark	53 (0.4)	48	55	50	54	53	51	56	54	53	53	53	54	53	54	55	52	54	50	52	54	53	58	51	51	53	53	54	53	52	54
Serbia	52 (0.7)	54	55	55	54	53	51	57	54	55	53	55	54	53	54	54	54	54	54	53	54	53	56	52	53	54	55	56	53	53	54
Canada	52 (0.5)	49	54	51	55	52	50	56	54	54	53	54	54	53	54	55	53	54	52	52	54	52	57	51	53	54	53	55	53	53	55
Australia	52 (0.6)	51	55	52	54	52	50	56	53	54	52	53	53	53	54	54	53	54	51	52	53	52	56	51	52	53	53	55	53	52	54
Slovak Republic	52 (0.6)	51	55	55	54	51	51	57	53	52	52	54	53	53	55	53	53	54	50	52	53	52	56	50	51	53	54	54	53	52	55
Northern Ireland	51 (0.5)	48	53	48	53	51	49	55	52	52	51	52	53	52	52	54	52	53	50	51	52	51	56	50	50	52	52	54	52	51	53
Spain	51 (0.5)	48	52	50	54	51	47	55	54	53	51	53	52	52	54	53	52	53	51	51	53	51	55	50	52	52	53	54	52	51	53
Italy	51 (0.5)	50	53	50	53	51	48	55	52	53	50	53	52	51	52	53	52	52	52	51	52	51	55	50	51	52	52	54	51	51	52
Netherlands	50 (0.5)	46	53	47	52	50	48	54	50	51	50	51	51	51	51	53	51	52	48	50	52	51	55	49	50	52	50	52	51	49	52
Belgium (Flemish)	49 (0.4)	46	51	48	50	48	47	53	49	50	49	50	50	49	50	51	49	50	49	48	50	49	53	48	48	49	50	51	49	48	50
New Zealand	49 (0.5)	45	51	48	50	49	47	52	50	50	49	49	50	49	50	51	49	50	48	48	50	49	53	47	48	50	49	51	49	48	50
Portugal	48 (0.3)	46	50	49	52	49	46	54	50	50	49	51	50	49	51	52	49	51	49	48	50	49	53	47	48	49	51	51	49	47	51
Turkey	45 (0.5)	45	48	47	46	46	46	49	45	46	45	47	46	45	47	47	46	46	47	46	46	45	48	44	43	46	46	47	45	44	47
France	44 (0.5)	41	45	44	47	44	44	49	45	45	44	46	45	45	47	46	44	46	44	44	46	44	49	43	43	45	45	47	45	43	46
Cyprus	43 (0.5)	42	45	44	45	43	43	47	44	45	43	44	44	43	45	44	43	44	44	43	44	43	47	43	42	43	44	46	43	42	44
Chile	42 (0.5)	41	44	41	46	43	40	47	45	44	42	44	43	43	45	45	43	44	42	42	44	42	47	41	42	43	44	45	43	42	44
Bahrain	41 (0.4)	42	41	44	43	42	39	45	43	42	41	43	42	42	44	43	43	43	42	41	42	41	44	41	41	42	42	43	42	41	43
United Arab Emirates	41 (0.4)	41	43	43	43	42	40	45	42	41	41	43	42	42	44	43	42	43	41	41	42	41	44	40	41	42	42	43	42	41	43
Georgia	39 (0.7)	40	41	40	41	39	36	44	40	39	39	41	39	39	42	41	39	40	38	38	39	39	42	37	37	40	40	40	39	38	40
Oman	38 (0.5)	39	39	42	40	38	36	42	39	37	38	40	38	39	41	39	39	39	38	38	39	38	40	37	37	38	39	40	38	38	39
Qatar	38 (0.6)	38	39	40	40	38	36	42	39	38	38	39	38	38	40	39	39	39	38	38	39	37	41	37	37	39	39	39	38	38	39
Iran, Islamic Rep. of	34 (0.6)	36	36	37	36	34	35	40	35	34	35	36	35	35	37	37	35	36	35	35	35	35	37	34	33	34	36	37	35	34	37
Indonesia	31 (0.6)	34	33	33	33	32	32	35	32	31	32	33	32	32	34	33	31	32	30	32	32	32	34	31	30	32	33	33	32	31	34
Saudi Arabia	31 (0.6)	31	33	33	33	31	30	35	32	31	32	33	32	31	34	32	32	33	31	31	32	31	34	30	31	32	32	32	32	31	33
Morocco	27 (0.6)	29	28	30	28	27	27	30	27	26	27	28	27	27	29	26	27	27	26	27	27	26	29	26	26	27	27	27	27	27	27
Kuwait	25 (0.7)	26	27	27	27	26	23	29	26	25	26	26	25	26	27	26	26	26	25	25	26	25	28	24	25	26	25	26	26	25	27
International Avg.	50 (0.1)	49	52	51	51	50	48	54	51	51	50	51	51	50	52	52	50	51	50	50	51	50	53	49	49	51	51	52	50	50	51
Benchmarking Participants																															
Florida, US	58 (1.1)	55	60	57	60	58	54	61	60	59	58	59	59	58	60	60	59	60	56	57	59	58	62	57	59	60	58	60	58	58	61
Ontario, Canada	54 (0.5)	51	55	52	56	54	50	57	55	56	54	55	55	54	55	55	54	56	53	54	55	54	58	53	55	55	54	56	54	54	56
Dubai, UAE	53 (0.3)	53	55	55	55	53	52	58	54	53	53	54	53	53	56	55	54	55	53	53	54	52	56	52	53	53	54	55	53	52	55
Quebec, Canada	52 (0.8)	48	53	51	54	52	51	56	54	54	52	54	53	53	54	55	52	54	52	52	54	52	57	51	51	53	54	55	53	51	54
Abu Dhabi, UAE	35 (0.9)	35	37	37	37	36	34	39	36	35	36	37	36	36	38	37	36	37	35	35	36	35	38	34	35	36	36	37	36	35	37
Number of Items (Score Points) Identified*	180	54	61	52	113	146	61	113	125	104	170	140	154	165	107	116	140	141	73	160	148	163	149	152	96	131	128	136	166	129	127

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

* Of the 176 items in the Science test, some extended response items were scored on a two-point scale, resulting in 188 score points. Following item review, eight items were deleted, resulting in 168 items and 180 score points.

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

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	Belgium (Flemish)	New Zealand	Portugal	Turkey	France	Cyprus	Chile	Bahrain	United Arab Emirates	Georgia	Oman	Qatar	Iran, Islamic Rep. of	Indonesia	Saudi Arabia	Morocco	Kuwait	**Benchmarking Participants**	Florida, US	Ontario, Canada	Dubai, UAE	Quebec, Canada	Abu Dhabi, UAE
Singapore	67 (0.8)	67	70	67	67	68	69	69	67	67	71	68	67	68	68	67	71	67		67	67	68	68	67
Korea, Rep. of	66 (0.4)	66	68	66	67	66	70	67	66	65	68	66	66	67	69	65	68	66		67	65	67	67	66
Japan	62 (0.4)	62	64	62	62	62	64	62	61	60	64	63	62	62	62	60	64	61		62	58	61	62	60
Russian Federation	62 (0.7)	62	62	62	62	62	64	62	61	59	62	62	62	62	64	59	63	61		62	61	61	61	60
Hong Kong SAR	60 (0.6)	59	62	60	60	60	61	60	59	59	60	60	60	60	61	59	61	59		60	57	60	60	58
Chinese Taipei	59 (0.4)	59	61	59	60	59	61	58	58	57	60	60	59	60	62	57	60	58		59	57	58	59	58
Finland	58 (0.4)	60	60	58	59	59	61	59	58	56	58	58	58	59	61	56	60	58		59	57	58	59	57
Kazakhstan	58 (0.9)	58	60	58	58	59	59	59	58	56	59	59	58	58	60	56	61	58		58	58	57	58	57
Poland	57 (0.5)	59	60	57	58	59	60	59	57	53	56	58	57	58	60	53	59	57		57	57	55	58	56
United States	57 (0.4)	58	59	57	58	58	60	59	57	55	57	57	57	58	60	55	59	56		57	59	57	58	56
Bulgaria	57 (1.2)	59	59	57	57	58	59	58	57	53	56	57	57	57	60	53	58	57		57	58	55	57	55
Slovenia	56 (0.4)	59	60	56	57	57	59	57	56	55	58	57	56	58	60	55	59	56		57	56	56	57	55
Hungary	56 (0.7)	59	58	56	57	57	60	58	56	54	56	57	56	57	61	54	59	56		57	57	56	57	55
Sweden	56 (0.7)	56	58	56	57	57	58	56	56	54	57	56	56	56	59	54	57	55		56	55	56	56	54
Norway (5)	55 (0.5)	58	56	55	56	56	57	56	55	52	56	55	55	55	56	52	55	54		55	52	54	56	52
England	55 (0.5)	55	57	55	55	55	57	56	54	53	54	55	55	55	57	53	57	54		55	55	55	55	54
Czech Republic	55 (0.4)	56	57	55	55	56	58	55	55	51	55	54	55	55	58	51	56	54		55	57	53	55	54
Croatia	54 (0.4)	54	58	54	55	56	57	55	54	53	54	55	54	55	58	53	55	53		54	55	55	55	53
Ireland	53 (0.5)	54	55	53	54	54	56	54	53	51	53	53	53	54	56	51	54	52		53	51	53	54	51
Lithuania	53 (0.5)	53	56	53	54	55	55	54	53	50	53	53	53	54	55	50	55	53		53	50	52	53	52
Germany	53 (0.4)	54	55	53	53	54	55	53	53	50	53	53	53	53	54	50	55	52		53	50	53	54	51
Denmark	53 (0.4)	55	54	53	53	53	54	53	52	48	52	52	53	53	53	48	55	52		53	50	50	53	50
Serbia	52 (0.7)	53	56	52	53	54	55	54	52	50	54	53	52	53	57	50	55	52		53	53	52	54	51
Canada	52 (0.5)	53	55	52	53	53	55	54	52	51	53	52	52	53	55	51	54	52		53	54	52	53	51
Australia	52 (0.6)	53	54	52	53	53	55	54	52	50	52	52	52	53	55	50	55	51		52	53	52	52	51
Slovak Republic	52 (0.6)	53	54	52	53	53	54	53	52	48	52	53	52	53	56	48	54	52		52	52	50	52	51
Northern Ireland	51 (0.5)	52	54	51	52	52	54	52	51	49	50	51	51	52	54	49	53	50		51	50	51	52	50
Spain	51 (0.5)	52	54	51	52	53	54	52	51	50	51	52	51	53	55	50	53	50		51	51	52	52	50
Italy	51 (0.5)	52	53	51	51	52	53	52	51	50	50	51	51	52	54	50	52	50		50	52	51	51	50
Netherlands	50 (0.5)	53	52	50	51	51	52	51	50	48	50	50	50	50	53	48	50	49		50	50	50	51	48
Belgium (Flemish)	49 (0.4)	52	51	49	49	50	51	49	49	46	49	49	49	49	51	46	49	48		49	48	48	49	46
New Zealand	49 (0.5)	50	51	49	49	49	51	50	48	47	49	48	49	49	51	47	51	48		49	48	48	49	47
Portugal	48 (0.3)	51	52	48	49	50	53	50	48	46	49	49	48	50	53	46	51	48		49	48	48	49	47
Turkey	45 (0.5)	44	46	45	46	46	47	46	45	45	45	45	45	46	48	45	46	45		45	43	46	45	44
France	44 (0.5)	45	46	44	44	46	47	44	44	42	43	44	44	45	48	42	46	43		44	42	44	45	42
Cyprus	43 (0.5)	43	45	43	44	44	46	44	42	41	44	44	43	44	46	41	46	43		43	41	43	43	41
Chile	42 (0.5)	45	45	42	43	43	46	44	42	41	44	43	42	43	47	41	45	42		42	43	43	43	40
Bahrain	41 (0.4)	41	44	41	42	42	42	42	41	41	41	42	41	43	44	41	43	42		41	42	42	42	41
United Arab Emirates	41 (0.4)	41	43	41	42	42	43	42	41	40	41	42	41	42	44	40	42	41		41	41	42	41	41
Georgia	39 (0.7)	41	41	39	39	39	41	40	38	35	41	39	39	39	42	35	42	39		39	38	37	39	38
Oman	38 (0.5)	37	40	38	39	39	39	38	38	37	38	39	38	39	40	37	39	38		38	39	38	39	38
Qatar	38 (0.6)	38	40	38	38	39	39	39	38	36	38	38	38	39	40	36	40	38		38	38	38	38	38
Iran, Islamic Rep. of	34 (0.6)	35	37	34	35	35	36	35	35	35	37	35	34	36	38	35	36	34		35	33	36	35	34
Indonesia	31 (0.6)	32	34	31	32	32	32	32	32	32	31	32	31	32	35	32	33	32		32	30	33	31	31
Saudi Arabia	31 (0.6)	31	33	31	32	32	32	32	31	29	30	32	31	32	33	29	33	32		32	32	31	31	31
Morocco	27 (0.6)	27	27	27	27	28	27	27	27	25	26	27	27	28	28	25	29	27		27	26	27	27	26
Kuwait	25 (0.7)	24	26	25	26	26	26	26	25	24	25	25	25	26	27	24	26	26		26	26	26	25	26
International Avg.	50 (0.1)	51	52	50	50	51	52	51	50	48	50	50	50	51	52	48	52	49		50	49	50	50	49
Benchmarking Participants																								
Florida, US	58 (1.1)	58	60	58	58	58	60	60	58	57	58	57	58	59	61	57	60	57		58	60	58	58	57
Ontario, Canada	54 (0.5)	54	56	54	54	54	56	55	53	52	53	53	54	54	57	52	56	53		54	56	53	54	52
Dubai, UAE	53 (0.3)	53	55	53	53	54	55	54	53	52	53	53	53	54	56	52	54	53		53	53	54	53	52
Quebec, Canada	52 (0.8)	53	55	52	52	53	55	53	52	50	53	52	52	53	55	50	54	51		52	52	51	53	50
Abu Dhabi, UAE	35 (0.9)	35	37	35	36	36	37	36	35	34	36	36	35	36	37	34	36	35		36	36	36	35	35
Number of Items (Score Points) Identified*	180	72	113	180	175	150	123	147	172	76	80	155	180	156	82	76	107	163		170	62	81	154	133

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	Chinese Taipei	Japan	Korea, Rep. of	Slovenia	Russian Federation	Hong Kong SAR	Kazakhstan	England	United States	Hungary	Ireland	Canada	Sweden	Lithuania	New Zealand	Australia	Israel	Norway (9)	Italy	Turkey	Malta	United Arab Emirates	Malaysia	Bahrain	Qatar	Iran, Islamic Rep. of	Oman	Thailand	Chile
Singapore	64 (0.7)	68	64	65	66	65	64	66	64	65	65	64	65	65	65	65	67	65	65	65	65	65	65	63	65	65	64	65	65	65	65
Chinese Taipei	59 (0.4)	59	60	59	59	60	58	60	59	59	59	59	60	60	59	59	61	60	60	60	60	60	58	57	59	59	59	59	59	59	60
Japan	59 (0.4)	58	59	61	59	59	59	60	59	59	59	59	59	59	59	60	61	59	58	60	60	59	59	58	59	59	59	59	58	59	59
Korea, Rep. of	56 (0.5)	56	55	53	58	56	55	56	56	56	56	55	56	56	56	57	58	56	56	56	56	56	56	55	52	55	55	56	56	56	56
Slovenia	55 (0.5)	54	56	54	56	57	54	56	55	55	56	55	55	57	55	57	57	56	57	57	56	56	55	56	55	55	55	55	56	56	56
Russian Federation	54 (0.9)	53	54	53	54	55	54	54	54	54	54	54	53	54	53	55	55	54	55	53	55	54	53	53	54	53	54	54	54	54	54
Hong Kong SAR	53 (0.8)	54	53	51	54	54	53	55	53	54	53	53	53	54	53	54	57	54	54	54	54	54	52	49	53	53	53	53	54	54	53
Kazakhstan	51 (1.0)	51	51	51	51	52	52	51	51	52	51	51	50	51	51	52	52	51	52	51	52	52	51	52	52	51	51	51	51	51	52
England	51 (0.8)	51	51	49	51	52	51	51	51	52	51	51	51	52	51	52	54	52	52	53	51	52	51	51	50	51	51	51	51	52	51
United States	50 (0.6)	50	50	48	50	52	49	50	50	50	50	50	50	52	50	52	53	51	52	51	51	51	50	51	50	50	50	50	50	51	51
Hungary	50 (0.7)	50	50	48	50	51	51	50	50	50	50	50	49	51	50	51	53	51	50	50	51	51	51	50	50	50	50	50	50	50	50
Ireland	50 (0.5)	49	50	49	51	51	50	50	50	50	50	50	51	51	50	51	53	51	50	51	51	51	50	49	50	50	50	50	50	51	50
Canada	49 (0.4)	49	49	46	49	50	48	49	49	49	49	49	49	51	49	50	52	50	50	50	50	50	49	49	49	49	49	49	49	49	49
Sweden	49 (0.7)	48	49	46	49	50	48	49	49	49	49	49	48	48	49	50	52	49	49	50	49	49	48	46	48	48	49	49	49	49	48
Lithuania	48 (0.6)	47	48	45	48	49	47	48	48	48	48	48	47	49	48	49	50	49	50	48	49	48	48	47	48	48	48	48	48	48	47
New Zealand	47 (0.6)	47	47	45	47	48	46	47	47	47	47	47	46	48	47	48	50	47	47	48	47	47	46	46	46	47	47	47	47	47	46
Australia	47 (0.5)	46	47	44	47	48	46	46	47	47	47	47	46	48	47	48	50	47	47	47	47	47	46	47	46	47	47	47	47	47	46
Israel	46 (0.7)	47	46	45	47	47	46	47	46	46	46	46	46	47	46	47	49	47	48	47	47	47	46	46	47	46	46	47	47	47	48
Norway (9)	46 (0.5)	44	46	44	45	47	45	46	45	46	46	46	45	46	46	46	49	47	46	47	46	46	45	43	45	45	46	45	46	46	45
Italy	44 (0.4)	42	44	41	44	45	44	43	44	44	44	44	43	45	44	45	47	45	45	45	45	45	43	42	43	44	44	44	44	44	44
Turkey	43 (0.8)	45	43	41	44	44	43	44	43	44	43	43	44	43	43	44	45	44	44	43	44	44	43	44	43	44	43	44	44	43	44
Malta	42 (0.3)	42	42	40	43	42	41	42	42	42	42	42	42	43	42	43	44	43	43	43	42	42	42	43	42	42	42	42	42	42	42
United Arab Emirates	41 (0.4)	42	41	41	42	42	41	42	41	41	41	41	41	42	41	42	43	42	43	42	42	42	41	43	41	41	41	42	42	42	42
Malaysia	40 (0.7)	41	40	38	40	40	40	40	40	40	40	39	42	40	40	42	40	40	39	41	40	40	40	40	40	40	40	40	40	40	40
Bahrain	39 (0.3)	40	39	38	39	40	39	39	39	39	39	38	41	39	40	41	40	41	40	40	40	39	40	39	39	39	39	40	39	40
Qatar	38 (0.5)	39	38	37	38	39	38	38	38	38	38	38	37	39	38	39	40	39	39	39	39	39	38	39	38	38	38	38	38	38	39
Iran, Islamic Rep. of	37 (0.7)	37	37	35	36	37	37	37	37	37	37	37	36	38	37	37	39	37	38	36	37	37	37	38	37	37	37	37	37	37	38
Oman	37 (0.4)	37	37	36	38	38	36	37	37	36	37	37	37	38	37	37	39	37	38	38	38	37	36	38	37	37	37	37	37	37	39
Thailand	37 (0.8)	35	37	34	36	38	36	36	36	36	37	36	35	37	36	37	39	37	36	37	38	37	36	36	37	36	37	37	37	37	37
Chile	36 (0.5)	35	36	33	35	37	35	35	35	35	36	36	34	36	36	37	38	36	37	36	37	36	35	34	35	36	36	36	35	36	36
Georgia	35 (0.5)	34	34	31	34	35	35	34	34	34	35	34	33	34	34	35	36	35	36	34	36	35	34	34	35	34	35	35	35	35	34
Jordan	33 (0.4)	33	33	31	32	33	32	32	33	32	33	32	31	33	33	33	34	33	34	33	33	33	32	34	33	33	33	33	33	33	34
Kuwait	31 (0.8)	31	30	29	30	31	31	30	31	30	31	30	29	31	31	31	32	31	32	31	31	31	30	31	30	31	31	31	31	31	32
Lebanon	29 (0.7)	30	29	29	29	29	29	28	29	28	29	29	28	28	29	29	29	29	30	28	29	29	28	30	29	29	29	29	29	29	30
Botswana (9)	28 (0.3)	29	28	27	29	29	28	28	28	28	29	28	28	29	29	29	30	29	29	29	29	29	28	27	29	28	28	29	29	29	30
Saudi Arabia	28 (0.6)	27	28	27	28	29	28	27	28	28	28	28	27	29	28	29	29	28	29	29	29	29	28	27	29	28	28	28	28	28	29
Morocco	27 (0.3)	26	26	25	26	27	26	27	26	26	27	26	26	27	27	27	28	27	28	27	27	27	26	26	26	26	27	26	26	27	27
South Africa (9)	24 (0.7)	24	24	23	24	25	24	24	24	24	24	24	23	24	24	25	25	25	25	25	24	25	24	24	23	24	24	24	24	24	25
International Avg.	44 (0.1)	43	43	42	44	44	43	44	43	43	44	43	43	44	43	44	46	44	44	44	44	44	43	43	43	43	44	44	44	44	44
Benchmarking Participants																															
Dubai, UAE	50 (0.4)	51	50	50	51	51	50	50	50	50	50	50	50	51	50	51	52	51	52	51	51	51	50	51	50	50	50	51	51	50	51
Quebec, Canada	50 (0.9)	49	50	47	49	51	49	50	50	50	50	50	49	52	50	51	52	50	51	51	51	50	49	50	49	50	50	50	50	50	50
Ontario, Canada	49 (0.5)	48	49	45	49	50	48	49	48	49	49	49	48	50	49	50	51	49	49	49	49	49	48	49	48	48	49	49	49	49	48
Florida, US	46 (1.2)	46	46	43	46	47	45	46	46	46	46	46	45	48	46	47	48	47	48	47	47	47	45	47	46	46	46	46	46	47	47
Abu Dhabi, UAE	38 (0.9)	38	37	36	38	38	37	38	37	37	37	37	37	39	38	38	39	38	39	38	38	38	37	39	37	37	38	38	38	38	38
Number of Items (Score Points) Identified*	233	150	225	125	176	204	194	182	217	211	224	230	167	131	224	214	166	206	141	187	194	228	197	64	186	226	233	219	211	212	152

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

* Of the 220 items in the Science test, some extended response items were scored on a two-point scale, resulting in 239 score points. Following item review, five items were deleted and the point value of one item was reduced, resulting in 215 items and 233 score points.

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

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	Georgia	Jordan	Kuwait	Lebanon	Botswana (9)	Saudi Arabia	Morocco	South Africa (9)	**Benchmarking Participants**	Dubai, UAE	Quebec, Canada	Ontario, Canada	Florida, US	Abu Dhabi, UAE
Singapore	64 (0.7)	64	66	64	63	65	65	65	64		64	64	68	65	65
Chinese Taipei	59 (0.4)	59	62	59	58	59	59	58	59		58	59	59	59	59
Japan	59 (0.4)	58	60	59	59	58	59	58	59		58	59	58	59	58
Korea, Rep. of	56 (0.5)	55	58	56	54	56	56	54	56		54	55	56	56	55
Slovenia	55 (0.5)	55	58	56	54	55	56	55	55		56	56	57	56	55
Russian Federation	54 (0.9)	54	56	54	54	54	54	53	54		55	53	55	54	53
Hong Kong SAR	53 (0.8)	52	55	53	52	53	53	51	53		51	54	54	53	53
Kazakhstan	51 (1.0)	51	52	51	54	51	51	51	51		53	51	50	51	50
England	51 (0.8)	50	53	51	51	50	51	48	51		52	52	51	51	50
United States	50 (0.6)	50	52	50	48	49	50	48	50		52	52	52	50	50
Hungary	50 (0.7)	50	52	50	50	50	50	48	50		52	50	50	50	50
Ireland	50 (0.5)	50	52	50	48	49	50	47	50		50	51	50	50	50
Canada	49 (0.4)	49	51	49	47	48	49	47	49		50	50	50	49	49
Sweden	49 (0.7)	48	50	49	48	47	49	46	49		47	48	47	49	47
Lithuania	48 (0.6)	48	50	48	48	47	48	46	48		48	48	48	48	48
New Zealand	47 (0.6)	46	49	47	44	46	47	45	47		47	47	48	47	46
Australia	47 (0.5)	46	49	46	45	46	47	44	47		48	47	47	47	46
Israel	46 (0.7)	46	48	46	47	46	46	45	46		47	46	47	46	46
Norway (9)	46 (0.5)	45	47	45	45	44	46	43	46		45	46	45	46	45
Italy	44 (0.4)	44	46	44	44	43	44	42	44		44	44	44	44	44
Turkey	43 (0.8)	43	45	43	43	43	44	43	43		45	43	45	43	43
Malta	42 (0.3)	42	44	42	40	41	42	40	42		44	42	43	42	42
United Arab Emirates	41 (0.4)	41	43	41	41	41	41	41	41		44	42	42	41	41
Malaysia	40 (0.7)	40	42	40	39	41	40	38	40		41	40	41	40	39
Bahrain	39 (0.3)	39	41	39	39	39	39	39	39		41	40	41	39	39
Qatar	38 (0.5)	38	40	38	37	38	38	37	38		40	38	39	38	38
Iran, Islamic Rep. of	37 (0.7)	37	39	37	39	37	37	36	37		39	37	38	37	37
Oman	37 (0.4)	37	39	37	36	37	37	37	37		38	37	39	37	37
Thailand	37 (0.8)	36	39	36	35	36	37	35	37		38	36	37	37	36
Chile	36 (0.5)	35	38	36	35	35	36	34	36		35	36	35	36	35
Georgia	35 (0.5)	35	36	34	35	34	35	34	35		35	34	34	35	34
Jordan	33 (0.4)	32	35	33	33	32	33	32	33		35	33	32	33	32
Kuwait	31 (0.8)	30	32	30	31	30	31	30	31		32	31	31	31	30
Lebanon	29 (0.7)	29	30	29	31	29	29	28	29		31	28	28	29	28
Botswana (9)	28 (0.3)	28	30	29	27	29	28	27	28		28	28	29	29	28
Saudi Arabia	28 (0.6)	28	30	28	27	28	28	28	28		30	28	29	28	28
Morocco	27 (0.3)	26	28	27	27	26	27	27	27		27	27	25	27	26
South Africa (9)	24 (0.7)	24	26	24	23	24	24	23	24		24	24	24	24	23
International Avg.	44 (0.1)	43	45	43	43	43	44	42	44		44	44	44	44	43
Benchmarking Participants															
Dubai, UAE	50 (0.4)	50	52	50	50	50	50	50	50		52	50	51	50	50
Quebec, Canada	50 (0.9)	50	52	49	49	48	50	48	50		52	52	50	50	49
Ontario, Canada	49 (0.5)	48	50	48	46	48	49	46	49		50	49	50	49	48
Florida, US	46 (1.2)	46	48	46	45	46	46	45	46		49	47	48	46	47
Abu Dhabi, UAE	38 (0.9)	37	39	37	37	37	38	37	38		40	38	38	37	38
Number of Items (Score Points) Identified*	233	192	213	216	111	197	232	152	233		67	176	108	224	180

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

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, 69 percent of these items, on average, were answered correctly by students in Singapore, 67 percent by students in Korea, 63 percent by students in Japan, 62 percent by students in the Russian Federation, 59 percent by those in Hong Kong SAR, 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 England averaged 56 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 and benchmarking entities are presented in the lower part of the exhibit. These show that the selections of items by the participating countries and benchmarking entities varied somewhat in average difficulty, ranging at the fourth grade from 48 percent correct (the most difficult) for those chosen by Chinese Taipei, the United Arab Emirates, and Saudi Arabia 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 Japan and Morocco to 46 percent for those chosen by New Zealand.

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 Chinese Taipei across all fourth grade mathematics items was 59 percent. The diagonal element shows that students from Chinese Taipei had a slightly greater average percent correct (61 percent) across the set of items selected as appropriate for Chinese Taipei than they did overall. Most participants had a difference of one or two percentage points between the two performance measures, with the largest difference in Singapore (14 percentage points). At the eighth grade, the differences were generally smaller; the largest being in Singapore (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 science 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 Chinese Taipei, Japan, Korea, and Slovenia 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.[5]

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

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.

little. As an example, consider the 149 score points selected by Denmark at the fourth grade. The students in Denmark did better on these items (58% correct) than on the test as a whole (53% correct). However, most other countries also did better on these particular items, with an international average of 53 percent correct compared with 50 percent correct overall. The countries that performed better than Denmark on the overall test also performed about as well or better on the items selected by Denmark.

The TCMA results provide evidence that the TIMSS 2015 science 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

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	Japan	Russian Federation	Hong Kong SAR	Chinese Taipei	Finland	Kazakhstan	Poland	United States	Bulgaria	Slovenia	Hungary	Sweden	Norway (5)	England	Czech Republic	Croatia	Ireland	Lithuania	Germany	Denmark	Serbia	Canada	Australia	Slovak Republic	Northern Ireland	Spain	Italy	Netherlands
Singapore	67 (0.8)	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.8	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	0.7	0.8	0.8	0.7	0.7	0.8	0.7	0.8	0.8
Korea, Rep. of	66 (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	0.4
Japan	62 (0.4)	0.4	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	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Russian Federation	62 (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	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
Hong Kong SAR	60 (0.6)	0.8	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.6	0.7	0.6	0.7	0.6
Chinese Taipei	59 (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	0.3	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
Finland	58 (0.4)	0.5	0.6	0.5	0.4	0.4	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	0.4	0.4	0.4	0.4	0.4	0.4
Kazakhstan	58 (0.9)	1.0	0.9	1.0	0.9	0.9	1.0	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	1.0	1.0	0.9	0.9	0.9	0.9	1.0	0.9
Poland	57 (0.5)	0.6	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	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
United States	57 (0.4)	0.5	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	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4
Bulgaria	57 (1.2)	1.2	1.2	1.2	1.2	1.2	1.1	1.2	1.2	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	1.2	1.2	1.2	1.1	1.2
Slovenia	56 (0.4)	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	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	0.4	0.5	0.5
Hungary	56 (0.7)	0.8	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	0.7	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
Sweden	56 (0.7)	0.7	0.8	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	0.7	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 (5)	55 (0.5)	0.5	0.7	0.6	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	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5
England	55 (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	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Czech Republic	55 (0.4)	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.5
Croatia	54 (0.4)	0.5	0.5	0.5	0.5	0.4	0.5	0.4	0.5	0.5	0.4	0.5	0.4	0.4	0.5	0.4	0.5	0.5	0.5	0.4	0.5	0.4	0.5	0.4	0.5	0.4	0.4	0.4	0.5	0.4	0.4
Ireland	53 (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	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lithuania	53 (0.5)	0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5
Germany	53 (0.4)	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	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	0.4	0.4	0.5	0.5	0.5	0.5
Denmark	53 (0.4)	0.5	0.6	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4
Serbia	52 (0.7)	0.8	0.8	0.8	0.7	0.7	0.8	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	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Canada	52 (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
Australia	52 (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	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6
Slovak Republic	52 (0.6)	0.7	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	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.6
Northern Ireland	51 (0.5)	0.6	0.7	0.6	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	0.6	0.5	0.5	0.5	0.5	0.5
Spain	51 (0.5)	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.5	0.6	0.5	0.5	0.6	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5
Italy	51 (0.5)	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.5
Netherlands	50 (0.5)	0.5	0.6	0.6	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	0.5	0.5	0.5	0.5	0.5
Belgium (Flemish)	49 (0.4)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.4	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.4	0.4	0.4
New Zealand	49 (0.5)	0.4	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	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	0.4
Portugal	48 (0.3)	0.4	0.4	0.5	0.3	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.3	0.3	0.3	0.3
Turkey	45 (0.5)	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.5	0.6	0.6	0.5	0.6
France	44 (0.5)	0.5	0.7	0.7	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.5	0.6	0.5	0.5	0.6	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Cyprus	43 (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	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Chile	42 (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	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Bahrain	41 (0.4)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
United Arab Emirates	41 (0.4)	0.4	0.4	0.5	0.5	0.4	0.5	0.5	0.4	0.5	0.4	0.5	0.5	0.4	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.4	0.4	0.5
Georgia	39 (0.7)	0.7	0.7	0.8	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	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Oman	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	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Qatar	38 (0.6)	0.5	0.6	0.7	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	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.7
Iran, Islamic Rep. of	34 (0.6)	0.6	0.7	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	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
Indonesia	31 (0.6)	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6
Saudi Arabia	31 (0.6)	0.7	0.6	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.7	0.6	0.7	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
Morocco	27 (0.6)	0.7	0.7	0.7	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	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5
Kuwait	25 (0.7)	0.7	0.6	0.8	0.7	0.7	0.6	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	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.7
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	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Benchmarking Participants																															
Florida, US	58 (1.1)	1.1	1.2	1.1	1.0	1.1	1.2	1.0	1.0	1.1	1.1	1.0	1.1	1.1	1.0	1.1	1.1	1.0	1.1	1.1	1.0	1.1	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.1	1.0
Ontario, Canada	54 (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
Dubai, UAE	53 (0.3)	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3
Quebec, Canada	52 (0.8)	0.9	1.0	0.9	0.9	0.8	0.9	0.8	0.8	0.9	0.8	0.9	0.8	0.8	0.9	0.8	0.8	0.9	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.8	0.8	0.9	0.9	0.9	0.8
Abu Dhabi, UAE	35 (0.9)	0.9	0.8	1.0	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.9	1.0	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	0.9
Number of Items (Score Points) Identified*	180	54	61	52	113	146	61	113	125	104	170	140	154	165	107	116	140	141	73	160	148	163	149	152	96	131	128	136	166	129	127

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

* Of the 176 items in the Science test, some extended response items were scored on a two-point scale, resulting in 188 score points. Following item review, eight items were deleted, resulting in 168 items and 180 score points.

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

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	Belgium (Flemish)	New Zealand	Portugal	Turkey	France	Cyprus	Chile	Bahrain	United Arab Emirates	Georgia	Oman	Qatar	Iran, Islamic Rep. of	Indonesia	Saudi Arabia	Morocco	Kuwait	**Benchmarking Participants**	Florida, US	Ontario, Canada	Dubai, UAE	Quebec, Canada	Abu Dhabi, UAE
Singapore	67 (0.8)	0.8	0.7	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.8	0.8	0.7		0.8	0.8	0.8	0.8	0.8
Korea, Rep. of	66 (0.4)	0.4	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.4		0.4	0.4	0.4	0.4	0.4
Japan	62 (0.4)	0.4	0.3	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
Russian Federation	62 (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
Hong Kong SAR	60 (0.6)	0.7	0.6	0.6	0.6	0.7	0.6	0.7	0.6	0.6	0.7	0.7	0.6	0.7	0.7	0.6	0.7	0.6		0.6	0.7	0.6	0.7	0.7
Chinese Taipei	59 (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
Finland	58 (0.4)	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4		0.4	0.5	0.5	0.4	0.4
Kazakhstan	58 (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	0.9	0.9		0.9	0.9	0.9	0.9	1.0
Poland	57 (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
United States	57 (0.4)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4		0.4	0.5	0.5	0.4	0.4
Bulgaria	57 (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	1.3	1.2	1.2	1.1
Slovenia	56 (0.4)	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.4		0.5	0.5	0.5	0.4	0.5
Hungary	56 (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	0.8	0.7	0.7	0.7		0.7	0.8	0.7	0.7	0.7
Sweden	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
Norway (5)	55 (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	0.6	0.5	0.5	0.5		0.5	0.6	0.5	0.5	0.5
England	55 (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	0.6	0.5	0.5	0.5
Czech Republic	55 (0.4)	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.5	0.4	0.5	0.4	0.4	0.4		0.4	0.4	0.5	0.4	0.4
Croatia	54 (0.4)	0.5	0.4	0.4	0.4	0.5	0.5	0.4	0.5	0.4	0.5	0.4	0.4	0.5	0.5	0.4	0.4	0.5		0.4	0.6	0.4	0.5	0.5
Ireland	53 (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
Lithuania	53 (0.5)	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.5	0.5	0.5	0.6	0.6	0.5	0.5		0.5	0.6	0.6	0.5	0.5
Germany	53 (0.4)	0.5	0.5	0.4	0.4	0.5	0.5	0.4	0.5	0.5	0.4	0.5	0.4	0.4	0.5	0.5	0.5	0.4		0.5	0.5	0.5	0.5	0.5
Denmark	53 (0.4)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.5	0.5	0.4	0.4		0.4	0.5	0.5	0.4	0.4
Serbia	52 (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	0.7	0.7	0.7	0.7
Canada	52 (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	0.6	0.5	0.5	0.5		0.5	0.6	0.5	0.5	0.5
Australia	52 (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		0.6	0.7	0.6	0.6	0.6
Slovak Republic	52 (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
Northern Ireland	51 (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
Spain	51 (0.5)	0.5	0.6	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	0.5	0.5		0.5	0.7	0.6	0.5	0.5
Italy	51 (0.5)	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.5		0.5	0.6	0.5	0.5	0.5
Netherlands	50 (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
Belgium (Flemish)	49 (0.4)	0.5	0.5	0.4	0.4	0.5	0.5	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.4		0.4	0.5	0.5	0.4	0.5
New Zealand	49 (0.5)	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.4	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
Portugal	48 (0.3)	0.4	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.4	0.4	0.4	0.3		0.3	0.4	0.4	0.3	0.4
Turkey	45 (0.5)	0.6	0.6	0.5	0.5	0.6	0.6	0.6	0.5	0.6	0.6	0.5	0.5	0.6	0.6	0.6	0.6	0.5		0.5	0.5	0.6	0.5	0.5
France	44 (0.5)	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.5		0.5	0.5	0.5	0.5	0.5
Cyprus	43 (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	0.6	0.5	0.5		0.5	0.5	0.6	0.5	0.5
Chile	42 (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
Bahrain	41 (0.4)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.3	0.4	0.4	0.4	0.5	0.4	0.4		0.3	0.4	0.5	0.3	0.4
United Arab Emirates	41 (0.4)	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.4	0.5	0.5	0.4	0.5	0.4		0.4	0.5	0.4	0.5	0.4
Georgia	39 (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	0.8	0.7	0.7		0.7	0.8	0.7	0.7	0.7
Oman	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
Qatar	38 (0.6)	0.7	0.7	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	0.7	0.6	0.6	0.6
Iran, Islamic Rep. of	34 (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	0.6
Indonesia	31 (0.6)	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.6		0.6	0.7	0.7	0.6	0.6
Saudi Arabia	31 (0.6)	0.7	0.7	0.6	0.6	0.7	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.7	0.7	0.6	0.7	0.6		0.6	0.6	0.6	0.6	0.6
Morocco	27 (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	25 (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
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
Benchmarking Participants																								
Florida, US	58 (1.1)	1.1	1.0	1.1	1.1	1.0	1.1	1.1	1.1	1.1	1.2	1.0	1.1	1.1	1.1	1.1	1.1	1.1		1.1	1.1	1.1	1.1	1.1
Ontario, Canada	54 (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
Dubai, UAE	53 (0.3)	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.3		0.3	0.3	0.4	0.3	0.3
Quebec, Canada	52 (0.8)	0.9	0.8	0.8	0.9	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.8		0.8	0.9	0.8	0.8	0.9
Abu Dhabi, UAE	35 (0.9)	1.0	1.0	0.9	0.9	0.9	0.9	1.0	0.9	0.9	1.0	0.9	0.9	0.9	1.0	0.9	1.0	0.9		0.9	0.9	0.9	0.9	0.9
Number of Items (Score Points) Identified*	180	72	113	180	175	150	123	147	172	76	80	155	180	156	82	76	107	163		170	62	81	154	133

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.

Country	Average Percent Correct on All Items	Singapore	Chinese Taipei	Japan	Korea, Rep. of	Slovenia	Russian Federation	Hong Kong SAR	Kazakhstan	England	United States	Hungary	Ireland	Canada	Sweden	Lithuania	New Zealand	Australia	Israel	Norway (9)	Italy	Turkey	Malta	United Arab Emirates	Malaysia	Bahrain	Qatar	Iran, Islamic Rep. of	Oman	Thailand	Chile
Singapore	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	0.7	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
Chinese Taipei	59 (0.4)	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4
Japan	59 (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	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4
Korea, Rep. of	56 (0.5)	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5
Slovenia	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	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Russian Federation	54 (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	0.9	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	1.0
Hong Kong SAR	53 (0.8)	0.9	0.8	0.9	0.9	0.8	0.8	0.9	0.8	0.9	0.8	0.8	0.9	0.9	0.8	0.8	0.9	0.8	0.9	0.8	0.8	0.8	0.9	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Kazakhstan	51 (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	0.9	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
England	51 (0.8)	0.9	0.8	0.9	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	0.8	0.8	0.8	0.8	0.8
United States	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
Hungary	50 (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
Ireland	50 (0.5)	0.6	0.5	0.6	0.6	0.6	0.5	0.6	0.6	0.6	0.5	0.5	0.6	0.6	0.5	0.5	0.6	0.5	0.6	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.6	0.6	0.5
Canada	49 (0.4)	0.4	0.4	0.5	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4	0.5	0.4	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4
Sweden	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	0.6	0.6	0.7	0.7	0.7	0.7	0.6
Lithuania	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	0.6	0.6	0.6	0.6	0.6	0.6	0.6
New Zealand	47 (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	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.6	0.6
Australia	47 (0.5)	0.6	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.6	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
Israel	46 (0.7)	0.8	0.7	0.8	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.8	0.7	0.8	0.8	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.8	0.7	0.7
Norway (9)	46 (0.5)	0.6	0.5	0.6	0.6	0.5	0.5	0.6	0.6	0.6	0.5	0.5	0.6	0.6	0.5	0.5	0.6	0.5	0.6	0.6	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5
Italy	44 (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	0.5	0.4	0.4	0.4	0.4	0.4	0.4
Turkey	43 (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
Malta	42 (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	0.4	0.3	0.3	0.3	0.3	0.3	0.3
United Arab Emirates	41 (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	40 (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
Bahrain	39 (0.3)	0.4	0.3	0.4	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.3	0.3
Qatar	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	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Iran, Islamic Rep. of	37 (0.7)	0.8	0.7	0.8	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.8	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	0.7	0.7	0.8
Oman	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
Thailand	37 (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
Chile	36 (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	0.5	0.5	0.5	0.5	0.5
Georgia	35 (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
Jordan	33 (0.4)	0.5	0.4	0.5	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	0.4	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.4
Kuwait	31 (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	0.7	0.8	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.8
Lebanon	29 (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	0.7	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
Botswana (9)	28 (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
Saudi Arabia	28 (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	0.7	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
Morocco	27 (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)	24 (0.7)	0.8	0.7	0.8	0.8	0.7	0.7	0.8	0.7	0.8	0.7	0.7	0.8	0.8	0.7	0.8	0.8	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7
International Avg.	44 (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	0.1
Benchmarking Participants																														
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	0.5	0.4	0.4	0.4	0.4	0.4	0.4
Quebec, Canada	50 (0.9)	0.9	0.9	1.0	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	1.0	0.9	1.0	1.0	0.9	1.0	0.9	0.9	0.9	1.0	1.0	0.9	0.9	0.9	0.9	0.9	1.0
Ontario, Canada	49 (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	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5
Florida, US	46 (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	1.1	1.2	1.2	1.2	1.2	1.2	1.2
Abu Dhabi, UAE	38 (0.9)	1.0	1.0	1.0	0.9	1.0	0.9	1.0	0.9	1.0	0.9	0.9	1.0	1.0	0.9	1.0	1.0	0.9	1.0	1.0	1.0	0.9	1.0	1.0	0.9	0.9	0.9	1.0	1.0	1.0
Number of Items (Score Points) Identified*	233	150	225	125	176	204	194	182	217	211	224	230	167	131	224	214	166	206	141	187	194	228	197	64	186	226	233	219	211	212	152

* Of the 220 items in the Science test, some extended response items were scored on a two-point scale, resulting in 239 score points. Following item review, five items were deleted and the point value of one item was reduced, resulting in 215 items and 233 score points.

( ) 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 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	Georgia	Jordan	Kuwait	Lebanon	Botswana (9)	Saudi Arabia	Morocco	South Africa (9)	**Benchmarking Participants** Dubai, UAE	Quebec, Canada	Ontario, Canada	Florida, US	Abu Dhabi, UAE
Singapore	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	0.7	0.7
Chinese Taipei	59 (0.4)	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.4	0.5	0.4	0.4
Japan	59 (0.4)	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.4	0.4	0.4	0.4
Korea, Rep. of	56 (0.5)	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5
Slovenia	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
Russian Federation	54 (0.9)	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.9	1.0	0.9	1.0	0.9	0.9
Hong Kong SAR	53 (0.8)	0.8	0.8	0.8	0.8	0.9	0.8	0.9	0.8	0.8	0.9	0.9	0.8	0.9
Kazakhstan	51 (1.0)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9	1.0	1.0	1.0
England	51 (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 States	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
Hungary	50 (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
Ireland	50 (0.5)	0.5	0.5	0.6	0.6	0.6	0.5	0.6	0.5	0.6	0.6	0.6	0.5	0.6
Canada	49 (0.4)	0.4	0.4	0.4	0.5	0.4	0.4	0.5	0.4	0.5	0.4	0.5	0.4	0.4
Sweden	49 (0.7)	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.7	0.7	0.7
Lithuania	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
New Zealand	47 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.7	0.6	0.6
Australia	47 (0.5)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.5
Israel	46 (0.7)	0.7	0.7	0.7	0.8	0.7	0.7	0.8	0.7	0.8	0.7	0.8	0.7	0.8
Norway (9)	46 (0.5)	0.5	0.5	0.5	0.6	0.5	0.5	0.6	0.5	0.6	0.5	0.6	0.5	0.6
Italy	44 (0.4)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.4	0.5	0.4	0.4
Turkey	43 (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
Malta	42 (0.3)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.3	0.3
United Arab Emirates	41 (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	40 (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
Bahrain	39 (0.3)	0.3	0.3	0.3	0.4	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.3	0.3
Qatar	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
Iran, Islamic Rep. of	37 (0.7)	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7
Oman	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
Thailand	37 (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
Chile	36 (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
Georgia	35 (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
Jordan	33 (0.4)	0.4	0.5	0.4	0.5	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.4	0.4
Kuwait	31 (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
Lebanon	29 (0.7)	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.7	0.8	0.7	0.8	0.7	0.7
Botswana (9)	28 (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
Saudi Arabia	28 (0.6)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.7	0.6	0.6
Morocco	27 (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)	24 (0.7)	0.7	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.7	0.7
International Avg.	44 (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														
Dubai, UAE	50 (0.4)	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.4	0.4
Quebec, Canada	50 (0.9)	0.9	0.9	1.0	1.0	0.9	0.9	1.0	0.9	1.0	1.0	1.0	0.9	0.9
Ontario, Canada	49 (0.5)	0.5	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.5	0.5
Florida, US	46 (1.2)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.2	1.2	1.2	1.2
Abu Dhabi, UAE	38 (0.9)	0.9	1.0	0.9	1.0	1.0	0.9	0.9	0.9	1.0	1.0	1.0	0.9	0.9
Number of Items (Score Points) Identified*	233	192	213	216	111	197	232	152	233	67	176	108	224	180

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

Appendix G.1: Percentiles of Science Achievement

Country	5th Percentile	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile	95th Percentile
Australia	389 (7.5)	423 (4.7)	476 (3.8)	529 (3.0)	576 (3.1)	617 (2.9)	640 (4.8)
Bahrain	272 (10.1)	317 (7.0)	391 (4.3)	468 (2.8)	533 (2.8)	587 (2.7)	617 (3.3)
Belgium (Flemish)	406 (4.2)	430 (3.8)	471 (3.2)	514 (2.4)	554 (2.8)	588 (3.1)	609 (3.6)
Bulgaria	352 (14.3)	403 (12.1)	483 (8.1)	549 (5.6)	602 (5.2)	644 (5.3)	668 (5.0)
Canada	398 (6.9)	429 (4.4)	479 (3.6)	528 (2.7)	575 (2.4)	615 (2.7)	638 (2.6)
Chile	353 (5.4)	380 (4.5)	428 (3.2)	480 (2.7)	530 (3.1)	571 (3.3)	595 (3.2)
Chinese Taipei	435 (5.5)	465 (3.5)	513 (2.3)	559 (1.8)	602 (2.4)	639 (2.3)	661 (4.1)
Croatia	426 (4.5)	453 (3.7)	494 (2.8)	536 (2.5)	576 (2.5)	611 (3.4)	630 (4.1)
Cyprus	349 (6.6)	381 (5.4)	432 (3.5)	486 (2.4)	534 (2.4)	574 (3.2)	597 (3.2)
Czech Republic	414 (6.1)	444 (4.3)	490 (3.5)	538 (2.8)	583 (2.7)	620 (2.7)	644 (3.4)
Denmark	406 (4.8)	436 (4.3)	483 (3.3)	531 (2.3)	575 (2.7)	612 (2.1)	633 (3.1)
England	417 (5.1)	445 (4.7)	490 (3.2)	537 (3.1)	583 (3.0)	623 (3.0)	648 (4.0)
Finland	444 (6.5)	472 (4.3)	514 (2.7)	557 (2.6)	597 (2.9)	633 (2.7)	654 (3.7)
France	363 (5.0)	391 (5.7)	439 (3.6)	491 (2.9)	539 (2.7)	579 (2.8)	602 (2.7)
Georgia	296 (9.4)	337 (8.0)	397 (5.1)	457 (3.4)	511 (3.6)	557 (5.9)	584 (7.2)
Germany	409 (5.3)	437 (4.1)	483 (3.0)	531 (3.1)	577 (2.6)	616 (2.3)	638 (3.6)
Hong Kong SAR	437 (5.7)	465 (6.4)	512 (4.0)	559 (3.4)	604 (3.6)	644 (4.0)	668 (4.5)
Hungary	393 (10.2)	433 (8.9)	493 (5.6)	551 (2.7)	598 (2.6)	639 (3.6)	663 (3.6)
Indonesia	219 (8.4)	259 (6.4)	327 (6.3)	402 (5.7)	471 (6.3)	526 (5.4)	557 (5.4)
Iran, Islamic Rep. of	238 (10.9)	279 (7.8)	354 (7.5)	432 (5.2)	496 (4.1)	545 (3.9)	571 (4.3)
Ireland	405 (5.5)	437 (4.7)	486 (3.2)	534 (2.5)	577 (3.3)	612 (4.2)	635 (5.0)
Italy	399 (5.5)	429 (4.7)	474 (4.4)	521 (3.1)	562 (2.5)	597 (2.3)	618 (2.8)
Japan	459 (3.9)	486 (3.0)	528 (2.4)	572 (2.4)	613 (1.9)	648 (2.7)	671 (4.2)
Kazakhstan	412 (5.2)	442 (5.3)	493 (5.0)	548 (5.2)	606 (5.7)	659 (6.9)	692 (7.7)
Korea, Rep. of	479 (3.5)	508 (3.5)	550 (2.5)	592 (2.6)	632 (2.8)	666 (2.8)	687 (3.6)
Kuwait	130 (9.5)	171 (7.9)	246 (7.7)	337 (7.0)	431 (7.8)	503 (8.0)	542 (6.4)
Lithuania	406 (5.4)	437 (4.2)	483 (3.9)	532 (2.7)	576 (3.0)	613 (3.1)	634 (3.9)
Morocco	157 (7.3)	197 (4.9)	266 (4.6)	349 (6.7)	440 (6.5)	512 (7.1)	550 (7.1)
Netherlands	414 (5.6)	438 (4.5)	477 (2.8)	520 (3.0)	559 (2.8)	592 (3.4)	610 (4.1)
New Zealand	351 (6.6)	389 (5.8)	451 (4.4)	513 (2.8)	566 (2.4)	608 (3.1)	633 (3.5)
Northern Ireland	397 (6.7)	429 (5.4)	477 (3.5)	524 (2.6)	568 (2.9)	605 (2.2)	627 (3.3)
Norway (5)	427 (5.4)	457 (4.3)	498 (3.4)	541 (3.0)	580 (3.1)	615 (3.8)	636 (4.6)
Oman	228 (5.0)	271 (5.1)	348 (4.1)	437 (4.2)	516 (3.9)	581 (4.1)	617 (4.0)
Poland	427 (6.1)	457 (3.8)	504 (3.3)	552 (2.9)	596 (2.2)	632 (2.7)	651 (3.3)
Portugal	407 (3.9)	430 (3.2)	469 (2.6)	509 (2.3)	549 (2.5)	583 (2.6)	604 (2.3)
Qatar	244 (7.2)	285 (6.5)	359 (5.8)	443 (5.1)	517 (3.9)	574 (4.8)	606 (5.5)
Russian Federation	449 (6.8)	479 (5.1)	524 (3.6)	570 (3.5)	615 (3.4)	653 (4.1)	674 (2.8)
Saudi Arabia	194 (8.7)	235 (7.6)	310 (6.4)	395 (6.4)	474 (5.3)	537 (5.3)	573 (6.6)
Serbia	375 (12.9)	419 (9.0)	480 (4.8)	532 (3.4)	580 (3.3)	619 (3.2)	641 (4.4)
Singapore	434 (7.1)	476 (6.6)	540 (5.2)	599 (4.3)	650 (3.5)	692 (4.2)	716 (4.9)
Slovak Republic	362 (7.3)	406 (5.2)	473 (4.4)	530 (3.1)	578 (3.2)	620 (2.4)	645 (3.6)
Slovenia	420 (5.7)	451 (4.1)	499 (3.4)	547 (2.6)	591 (2.4)	628 (2.8)	648 (3.3)
Spain	399 (5.8)	427 (4.2)	474 (3.8)	522 (2.4)	566 (2.0)	604 (2.0)	626 (2.9)
Sweden	410 (8.7)	444 (7.0)	496 (4.9)	545 (3.8)	591 (3.4)	629 (3.6)	652 (4.4)
Turkey	313 (10.1)	358 (7.4)	428 (4.4)	494 (2.9)	547 (2.5)	593 (3.5)	618 (4.0)
United Arab Emirates	242 (4.4)	285 (4.2)	365 (3.8)	460 (3.5)	541 (2.6)	602 (2.9)	636 (3.3)
United States	404 (4.8)	439 (3.3)	495 (3.2)	551 (2.3)	602 (2.1)	644 (2.7)	669 (3.4)

( ) 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.

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

Appendix G.1: Percentiles of Science Achievement (Continued)

Country	5th Percentile	10th Percentile	25th Percentile	50th Percentile	75th Percentile	90th Percentile	95th Percentile
Benchmarking Participants							
Buenos Aires, Argentina	268 (8.9)	300 (7.4)	355 (6.2)	420 (5.8)	483 (4.1)	531 (4.3)	559 (5.7)
Ontario, Canada	405 (4.9)	435 (3.2)	484 (2.8)	534 (3.4)	580 (2.8)	619 (3.7)	643 (3.7)
Quebec, Canada	415 (6.8)	442 (5.5)	481 (4.7)	525 (5.0)	569 (5.1)	607 (5.4)	629 (4.7)
Norway (4)	373 (6.4)	401 (5.5)	449 (3.1)	497 (2.2)	540 (2.3)	578 (2.9)	600 (3.3)
Abu Dhabi, UAE	211 (6.8)	249 (6.7)	319 (6.4)	418 (7.5)	510 (7.2)	577 (7.2)	613 (7.8)
Dubai, UAE	324 (4.7)	373 (3.8)	455 (3.6)	530 (2.2)	591 (2.2)	641 (2.5)	670 (2.5)
Florida, US	413 (10.1)	447 (7.0)	499 (5.7)	552 (5.5)	601 (6.7)	646 (6.7)	672 (7.6)

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

Appendix G.3: Standard Deviations of Science Achievement

Country	Overall		Girls		Boys	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Australia	524 (2.9)	76 (1.9)	524 (3.3)	74 (2.4)	523 (3.4)	77 (2.1)
Bahrain	459 (2.6)	105 (1.7)	478 (3.0)	96 (2.5)	439 (3.5)	110 (2.8)
Belgium (Flemish)	512 (2.3)	62 (1.2)	512 (2.6)	61 (1.6)	511 (2.6)	62 (1.4)
Bulgaria	536 (5.9)	95 (3.6)	540 (6.3)	94 (4.0)	532 (5.9)	96 (3.5)
Canada	525 (2.6)	73 (1.6)	526 (2.8)	71 (1.7)	524 (3.0)	75 (1.9)
Chile	478 (2.7)	74 (1.4)	477 (3.0)	71 (1.6)	478 (3.4)	76 (1.8)
Chinese Taipei	555 (1.8)	68 (1.1)	551 (2.2)	66 (1.3)	560 (2.4)	70 (1.4)
Croatia	533 (2.1)	62 (1.1)	532 (2.7)	61 (1.4)	534 (2.2)	63 (1.6)
Cyprus	481 (2.6)	76 (1.4)	481 (2.8)	74 (1.5)	481 (2.9)	78 (1.9)
Czech Republic	534 (2.4)	70 (1.4)	530 (2.8)	68 (1.6)	538 (2.7)	71 (1.7)
Denmark	527 (2.1)	69 (1.3)	525 (2.5)	67 (1.6)	529 (2.6)	71 (1.8)
England	536 (2.4)	70 (1.7)	536 (3.0)	67 (1.7)	536 (2.6)	72 (2.2)
Finland	554 (2.3)	65 (1.7)	560 (2.3)	61 (1.6)	548 (2.9)	67 (2.3)
France	487 (2.7)	73 (1.4)	487 (3.1)	71 (1.9)	487 (2.9)	74 (1.5)
Georgia	451 (3.7)	87 (2.5)	453 (3.9)	84 (2.8)	449 (4.6)	90 (3.3)
Germany	528 (2.4)	70 (1.3)	527 (2.7)	69 (1.6)	529 (2.6)	70 (1.7)
Hong Kong SAR	557 (2.9)	70 (1.4)	551 (3.9)	68 (1.9)	561 (3.3)	71 (1.7)
Hungary	542 (3.3)	83 (2.7)	538 (3.5)	81 (2.7)	546 (3.9)	84 (3.4)
Indonesia	397 (4.8)	103 (2.1)	401 (5.2)	101 (3.1)	393 (5.3)	104 (2.7)
Iran, Islamic Rep. of	421 (4.0)	103 (3.0)	427 (5.2)	98 (3.6)	415 (5.6)	106 (3.9)
Ireland	529 (2.4)	70 (2.0)	526 (2.9)	67 (1.9)	531 (2.9)	72 (2.7)
Italy	516 (2.6)	66 (1.3)	512 (3.1)	66 (1.7)	521 (2.8)	67 (1.5)
Japan	569 (1.8)	65 (1.0)	567 (2.0)	62 (1.2)	571 (2.3)	68 (1.5)
Kazakhstan	550 (4.4)	85 (2.5)	552 (4.5)	83 (2.7)	547 (4.7)	87 (2.6)
Korea, Rep. of	589 (2.0)	62 (0.9)	584 (2.3)	60 (1.2)	595 (2.3)	64 (1.3)
Kuwait	337 (6.2)	126 (2.0)	352 (7.6)	121 (2.6)	322 (7.6)	130 (2.9)
Lithuania	528 (2.5)	69 (1.2)	529 (2.9)	67 (1.7)	526 (3.1)	71 (1.7)
Morocco	352 (4.7)	120 (2.7)	358 (4.7)	116 (2.9)	347 (5.7)	123 (3.7)
Netherlands	517 (2.7)	60 (1.3)	517 (2.8)	58 (1.3)	517 (3.0)	62 (1.7)
New Zealand	506 (2.7)	85 (1.6)	507 (3.2)	82 (2.1)	504 (3.0)	88 (1.7)
Northern Ireland	520 (2.2)	70 (1.5)	520 (3.0)	69 (2.2)	520 (2.8)	70 (1.7)
Norway (5)	538 (2.6)	63 (1.5)	538 (3.1)	60 (1.2)	537 (3.1)	65 (2.2)
Oman	431 (3.1)	119 (1.8)	447 (3.4)	115 (1.9)	415 (3.6)	121 (2.2)
Poland	547 (2.4)	69 (1.4)	548 (2.5)	66 (1.5)	546 (3.0)	72 (2.0)
Portugal	508 (2.2)	60 (1.0)	504 (2.5)	60 (1.3)	512 (2.4)	60 (1.6)
Qatar	436 (4.1)	111 (2.2)	448 (4.7)	103 (3.2)	424 (6.0)	117 (3.0)
Russian Federation	567 (3.2)	69 (1.9)	567 (3.1)	68 (2.1)	567 (3.7)	69 (2.1)
Saudi Arabia	390 (4.9)	116 (2.9)	431 (5.3)	98 (2.9)	352 (7.6)	118 (4.1)
Serbia	525 (3.7)	81 (3.4)	526 (3.6)	75 (2.3)	523 (4.9)	86 (5.5)
Singapore	590 (3.7)	85 (2.6)	591 (3.7)	83 (2.8)	590 (4.2)	86 (2.7)
Slovak Republic	520 (2.6)	85 (1.9)	516 (3.2)	84 (2.5)	524 (2.7)	85 (1.9)
Slovenia	543 (2.4)	70 (1.5)	539 (2.4)	66 (1.9)	546 (3.1)	73 (1.9)
Spain	518 (2.6)	69 (1.6)	515 (2.9)	67 (1.8)	521 (2.9)	71 (2.4)
Sweden	540 (3.6)	73 (2.5)	544 (4.1)	72 (2.5)	536 (3.5)	74 (3.0)
Turkey	483 (3.3)	92 (2.5)	484 (3.3)	88 (2.6)	483 (4.0)	96 (2.9)
United Arab Emirates	451 (2.8)	121 (1.5)	459 (4.4)	115 (2.2)	444 (4.0)	126 (2.4)
United States	546 (2.2)	81 (1.2)	544 (2.4)	79 (1.3)	548 (2.5)	82 (1.6)

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

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

Appendix G.3: Standard Deviations of Science Achievement (Continued)

Country	Overall		Girls		Boys	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Benchmarking Participants						
Buenos Aires, Argentina	418 (4.7)	89 (1.9)	420 (5.7)	89 (2.1)	416 (4.8)	89 (2.5)
Ontario, Canada	530 (2.5)	72 (1.3)	533 (2.9)	70 (1.6)	528 (3.1)	74 (1.5)
Quebec, Canada	525 (4.1)	65 (1.6)	525 (3.6)	62 (2.1)	524 (5.3)	69 (2.4)
Norway (4)	493 (2.2)	69 (1.6)	493 (2.6)	67 (2.4)	493 (2.7)	71 (1.8)
Abu Dhabi, UAE	415 (5.6)	125 (2.9)	423 (9.0)	118 (3.8)	408 (8.3)	131 (3.5)
Dubai, UAE	518 (1.8)	105 (1.3)	524 (3.4)	98 (2.4)	512 (3.4)	110 (2.6)
Florida, US	549 (4.8)	78 (2.5)	552 (5.1)	75 (3.1)	545 (5.4)	80 (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.

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