Trends in International Mathematics and Science Study

TIMSS

2007

Summary Report on the Achievement of the 4th and 8th Grade Students in Mathematics and Science

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Oktatási Hivatal
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INTRODUCTION

TIMSS 2007 Summary Report contains the most important national and international results of the survey.[1] It also provides the assessment frameworks which serve as the theoretical basis of the assessment. Trends data on students' achievement of the participating countries as well as background factors influencing students' achievement are also included in the report. It attempts to identify and compare national mathematics and science instructional practices, contexts and conditions. The report includes the TIMSS 2007 International Benchmarks of Mathematics and Science achievement representing the range of performance shown by the participating students. In addition, the report contains some test sample items released for public use and provides some data on them.

About TIMSS

TIMSS (Trends in International Mathematics and Science Study) is a series of international assessments measuring trends in mathematics and science achievement at the end of the fourth and eighth grades in a number of countries from all over the world. The goal is to provide comparative data about educational achievements across countries to improve teaching and learning of mathematics and science. In addition to providing data on trends, TIMSS also monitors curriculum coverage and implementation and search for the most successful and effective instructional practices of the actual time.

TIMSS is a project of the IEA. The IEA (International Association for the Evaluation of Educational Achievement) is an independent international organization of national research institutions and government agencies that has been conducting research studies of cross-national achievement since 1959. TIMSS & PIRLS Study Center at Boston College is responsible for the technical implementation and the international coordination of the assessment.

In the 2007 assessment cycle around 425,000 students from 59 countries participated in the assessment. There were four assessment cycles before (in 1995, 1999, 2003, and 2007)[2] and the fifth cycle, in 2011 is underway.

Which Countries Participated in TIMSS 2007?

Implementing TIMSS 2007 involved widespread participation from countries around the world. Exhibit I shows the map of the world identifying the 59 countries and 7 benchmarking participants (regional entities)[3] participating in TIMSS 2007 in dark blue colour. The countries are listed in alphabetical order on the right hand side of the map.

For the fourth grade, this report contains TIMSS 2007 data for 37 countries[4] and 7 benchmarking participants, including 13 countries that participated for the first time. In all, 183,150 students participated in the fourth grade assessment. For the eighth grade, the report contains data for 50 countries and 7 benchmarking participants, including 10 countries participating for the first time. In all, 241,613 students participated in the eighth grade assessment.

TIMSS considered the difficulty of comparability since students' age in eighth and fourth grades can vary in the participating countries due to different tradition and education system. For the sake of comparability these characteristics needed to be regulated. For the most part, TIMSS participants are students in the fourth and eighth years of schooling. However, to avoid testing very young children, the TIMSS guidelines specify that the average age should not be below 9.5 years old for the fourth grade or 13.5 years old for the eighth grade. Thus, countries where students start school at a very young age

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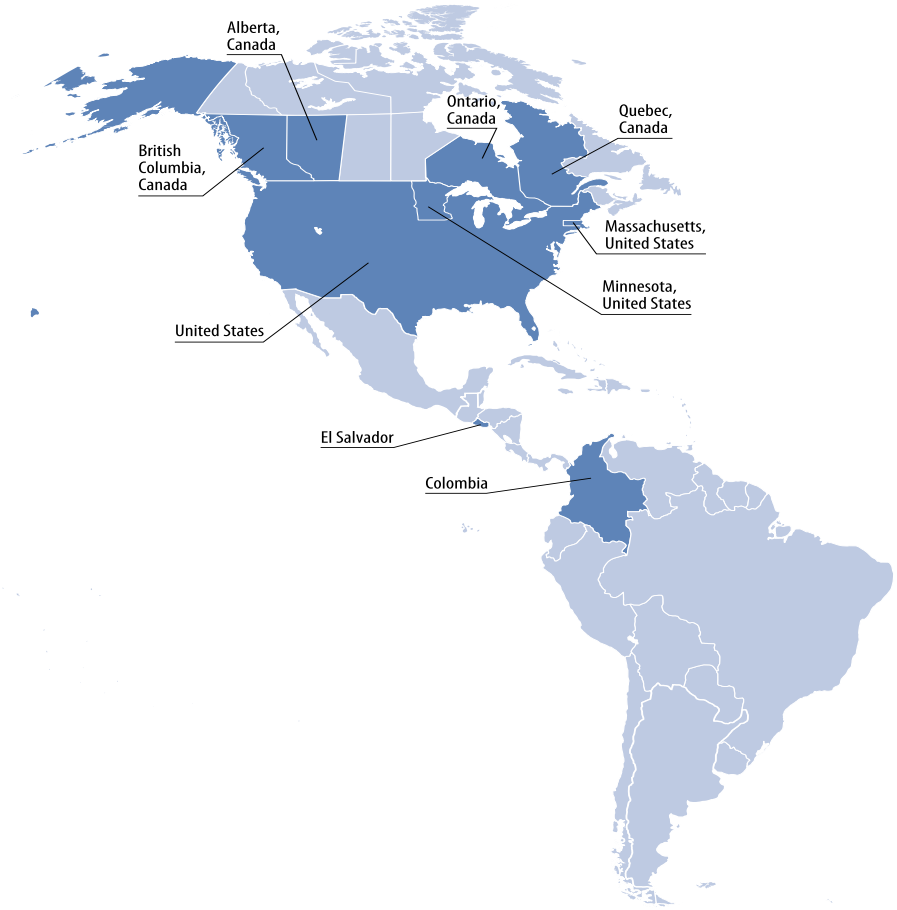
1 TIMSS International Reports: Mullis, I.V.S.et al.:TIMSS International Mathematics Report. TIMSS&PIRLS International Study Center, Lynch School of Education, Boston College, 2008. Martin, M.O. et al.: TIMSS 2007 International Science Report. TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College, 2008.

2 In 1999 only eighth grade students participated in the assessment.

3 Benchmarking participants are member states, provinces, autonomous entities having partly or fully their own education system. Their achievements have been presented separately for their own request.

4 Results of Mongolia are not listed in the exhibits because of their missing data.

Exhibit 1 Countries Participating in TIMSS 2007



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

Benchmarking Participants

Alberta, Canada
Basque Country, Spain
British Columbia, Canada
Dubai, UAE
Massachusetts, US
Minnesota, US
Ontario, Canada
Quebec, Canada

must assess students at the next higher grade. It should be noted that 5 countries (England, Scotland, New Zealand, Malta and Bosnia and Herzegovina) tested students in their fifth and/or ninth year of schooling in accordance with the guidelines.[5]

In each participating country and benchmarking entity the test should be conducted at the end of the school year.

Assessment Design

To create the TIMSS 2007 Assessment Design many aspects needed to be taken into consideration.

Test booklets had to include sufficient number of items in order to provide meaningful data about the students' achievement in the participating countries in mathematics and science as well as their achievement in the content and the cognitive domains.

To measure trends in 2007 test booklets had to contain items that were administered in previous assessment cycles.

To judge students' ability in mathematics and science there had to be sufficient number of questions and items in one test booklet.

It was also considered that impossible student burden should be avoided; however, testing time available had to be in proportion with the number of items to be tested.

The number of sampled students had to be ideal for calculating the students' average achievement in the participating countries.

To fulfil the above mentioned criteria there were 14 type of test booklets administered in each grade. Each student booklet consisted of four blocks of items, two blocks of mathematics items and two of science items. Each block of items appeared in two booklets. The 14 student booklets comprised 350 items at fourth grade, 430 items at eighth grade. There were 10-17 items in each block. Two of the blocks in each booklet contained trend items from 2003 and two comprised new items developed for TIMSS 2007. In order to have even more comparable data from the TIMSS 2003 and the TIMSS 2007 assessments, there were four student booklets per grade administered in 2007 which were previously used in the TIMSS 2003 assessment. Assessment time available for each student booklet at eighth grade was 2 x 45 (90) minutes, for fourth grades 2 x 36 (72) minutes. In Hungary there were 5,221 students at fourth grade, and 5,315 students at eighth grade completing the TIMSS 2007 student booklets.

Students, mathematics and science teachers and principals of the participating schools completed background questionnaires. The questions were designed to provide information about family background, school life and available school resources, students' attitudes and learning experiences, teachers' professional background and their practices as well as school climate.

[5] Years of formal schooling and average age at the time of testing are displayed in the fourth and fifth columns in Exhibits 1 and 2.

MATHEMATICS

OVERVIEW

The TIMSS 2007 Assessment Frameworks[6] contain the mathematics frameworks underlying the assessments at the fourth and the eighth grades. When compiling the students booklets and selecting items, test designers intended to cover the content domains of the subject. They also needed to take into consideration that students performed in the cognitive domains as well when completing the tests so they had to include items with different types of cognitive domains and difficulty in appropriate proportion suited to the students' ages. At both grades, the mathematics assessment framework for TIMSS 2007 was organized around two dimensions, a content dimension specifying the domains or subject matter to be assessed within mathematics, and a cognitive dimension specifying the domains of thinking process. The content domains differ for the two grades, reflecting the differences in the content of the mathematics taught at each grade. The definition of the cognitive domains are the same for both grades.

Mathematics Content Domains

Mathematics items in TIMSS 2007 assessment at fourth grade covered several topic areas which can be defined in the following content domains (for more details on content domains See Appendix):

NUMBER ~ Whole numbers. Fractions and decimals. Number sentences. Patterns and relationships.
GEOMETRIC SHAPES AND MEASURES ~ Lines and angles. Two- and three-dimensional shapes. Location and movement.
DATA DISPLAY ~ Reading and interpreting. Organizing and representing.

TIMSS 2007 mathematics assessment comprised 179 items at fourth grade (half of them were multiple choice items). The distribution of mathematics items by content domain at fourth grade is shown in Table I.

Table I Distribution of Test Items by Content Domains, Fourth Grade

Content Domain	Number of Items	Score to be Achieved
Number	93	98 (51%)
Geometric Shapes and Measures	60	65 (34%)
Data Display	26	29 (15%)
Total	179	192 (100%)

Mathematics items in TIMSS 2007 assessment at eighth grade covered several topic areas which can be defined in the following content domains.

NUMBER ~ Whole numbers. Fractions and decimals. Integers. Ratio, proportion, and percent.
ALGEBRA ~ Patterns. Algebraic expressions. Equations./Formulas and functions.
GEOMETRY ~ Geometric shapes. Geometric measurement. Location and movement.
DATA AND CHANCE ~ Data organization and representation. Data interpretation. Chance.

TIMSS 2007 mathematics assessment comprised 215 items at eighth grade (half of them were multiple choice items). The distribution of mathematics items by content domain at eighth grade is shown in Table II.

[6] Mullis, I.V.S.et al.:TIMMS 2007 Assessment Frameworks. TIMMS & PIRLS International Study Center, Lynch School of Education, Boston College, 2005.

Table II Distribution of Test Items by Content Domains, Eighth Grade

Content Domain	Number of Items	Score to be Achieved
Number	63	72 (30%)
Algebra	64	69 (29%)
Geometry	47	50 (21%)
Data and Chance	41	47 (20%)
Total	215	238 (100%)

Mathematics Cognitive Domains

The covered cognitive skills in TIMSS 2007 Mathematics Assessment were the same at both grades.

KNOWING ~ Recall. Recognize. Compute. Retrieve. Measure. Classify/Order.
APPLYING ~ Select. Represent. Model. Implement. Solve routine problems.
REASONING ~ Analyze. Generalize. Synthesize/integrate. Justify. Solve non-routine problems.

The distribution of mathematics items by cognitive domain at both fourth and eighth grades is shown in Table III.

III. táblázat A tesztkérdések megoszlása a kognitív területek között, 4. és 8. évfolyam

Grade	Cognitive Domains	Number of Items	Score to be Achieved
4.	Knowing	69	73 (38%)
	Applying	70	75 (39%)
	Reasoning	40	44 (23%)
	Total	179	192 (100%)
8.	Knowing	81	83 (35%)
	Applying	88	98 (41%)
	Reasoning	46	57 (24%)
	Total	215	238 (100%)

In order to have comparable data in trends, some of the items used in TIMSS 2007 are kept secure for use in measuring trends over time in subsequent assessments. On the other hand, there are items released into the public domain for those who are interested in the characteristics of items and the assessment in general. These items and those which were used in previous assessments and were released for public use can be found at the TIMSS website timss.bc.edu in Hungarian www.timss.hu.

RESULTS AND TRENDS

Results of TIMSS 2007 can be compared in many ways. In this chapter the average student achievements in mathematics compared to the achievement of the previous cycles in the participating countries will be displayed. In addition, average student achievement by content and cognitive domains in participating countries and their relations are presented. Results of average achievements by gender and the percentage of students reaching TIMSS 2007 benchmarks are also described.

Results and differences

21., 22. pages

Exhibits 1 and 2[7] show the average mathematics scale scores for the participants in TIMSS 2007. For each grade, countries are shown in descending order of average scale score. There is a symbol by a participant's average scale score indicating if the average achievement is significantly higher (up arrow) or lower (down arrow) than the scale average of 500 TIMSS average scale score which was established based on the 1995 assessment.

Although the achievements are displayed on a scale with a mean of 500 and a standard deviation of 100 for both grade, it should be noted that the results for the fourth and eighth grades are not directly comparable.

In addition, Exhibits 1 and 2 show the average scale score with its confidence interval and the 5th, 25th, 75th, and 95th percentiles. 50 percent of students can be found between the 25th and the 75th percentiles in each country, and the middle 90 percent of students are between the 5th and 95th percentiles. From the difference between the results of the 95th and 5th percentiles the heterogeneity of the participating countries' results can be concluded. Higher difference rate means a more heterogeneous quality of the education system, while lower difference rate indicates more homogeneous quality of education in the country.

It can be concluded that Asian countries top at both the fourth and the eighth grades. The average achievements of Hungarian students are above the international average at both grades.

At the fourth grade, Hong Kong SAR and Singapore were the top performing countries, their average achievements were 100 points higher (one standard deviation above the mean) than the TIMSS average scale score of 500. At fourth grades, there were 13 countries outperforming the Hungarian students significantly (among them are Hong Kong SAR, Singapore, Chinese Taipei, Japan, Russia, England, Latvia, Netherlands, United States, Germany). There are five countries whose results show no statistically significant difference with the average performance of Hungarian students (Australia, Italy, Austria, Sweden, Armenia), and there are 17 countries where the average achievements are significantly lower than that of Hungarian students (among them are Slovakia, Czech Republic and Norway).

At eighth grade, Chinese Taipei, Korea and Singapore have outstandingly high results. Their average achievements were nearly 100 points higher than the TIMSS 500 scale average (598, 597, and 593). Also, Hong Kong SAR, improved with 32 points compared to the previous cycle, and Japan are among the top countries (572 and 570 respectively). At eighth grade, students from only these Far East countries outperformed Hungary significantly. Hungarian students' average achievements are similar to the performance of students from England, Russia and United States. On the other hand, Hungarian students achieved significantly higher scores than students from the other participating countries including Lithuania, Czech Republic, Slovenia, Australia and Sweden.

> The TIMSS mathematics scales for the fourth and eighth grades were established based on the performance of students in the 1995 assessments with an international mean of 500 and a standard deviation of 100. Since the range of the participating countries and the average achievements of the countries can be varied from one assessment cycle to another, instead of changing the scale each time the 1995 assessment scale was used in the 1999, the 2003 and the 2007 assessments. Therefore, the TIMSS 500 average scale score, which is noted several times in our report, is not equal with the international average achievement scale score of the participating countries in the 2007 assessment cycle.

How Has Mathematics Achievement Changed Since 1995, 1999 and 2003?

23–24. pages

Exhibit 3 displays changes in average mathematics achievement for the countries and benchmarking participants that have comparable data from previous TIMSS assessment at fourth grades. Exhibit 3 shows the differences in the scores of the consecutive cycles. Where the difference is significant, it is marked with an up or down arrow.

At the fourth grade, 23 countries have data from either 1995 or 2003 or both cycles that can be compared to 2007.

[7] See Exhibits and Tables at the end of this chapter.

Between 1995 and 2007 eight participating countries show significant improvement in their average student scale scores, the most considerable improvement can be found in England (57 points), Hong Kong SAR (50 points), and Slovenia (40 points). The average student achievements in these countries continuously improved in the assessment cycles; there was a significant improvement between 1995 and 2003 as well as between 2003 and 2007.

There are four participating countries which show significant decline in their average achievements in mathematics between 1995 and 2007, among them the Czech Republic (54 points) and Austria (25 points) declined the most significantly.

Among countries which joined the TIMSS assessment in 2003, Armenia and Chinese Taipei showed the most significant improvement. Armenia reached the TIMSS 500 scale average by 2007 with a 44-point improvement which is almost half of the standard deviation. On the other hand, Tunisia had much weaker results in 2007 compared to its achievement in 2003, its achievement declined with 12 score points.

Countries that participated in all of the three assessment cycles mostly showed consistency in their achievement, there was no significant change in the average results. Norway is an exception which showed a considerable decline in 2003 but recovered in 2007 showing no essential change from 1995.

It can be noted that Hungary had a significant decline by 2007 compared to both the results of 2003 and 1995. The 7-score-point increase between 1995 and 2003 did not result in significant improvement. On the other hand, the average achievement in 2007 shows a significant decrease compared to the results of both the 1995 (12 points decrease) and the 2003 (19 points decrease) average scale scores.

25–26. pages

At the eighth grade, there are 36 countries with at least two assessment results, Exhibit 4 shows their average scale scores and the differences from 1995, 1999, 2003 to 2007. There were five countries showing significant increase in their average student achievement in mathematics between 1995 and 2007. Colombia, with 47 points, had the highest improvement in trends in 2007; in addition Lithuania (34 points), Korea (17 points) and England (16 points) showed the most significant gains. There were ten countries showing significant decline in their average scale scores between 1995 and 2007, Hungary was one of them. Bulgaria had the most significant decline (63 points), followed by Sweden (48 points) and the Czech Republic (42 points). Similar to the fourth grades, countries which participated in more assessment cycles show consistency in their achievement, most countries have one or two increases/decreases in their achievement during the four assessment cycles and one or two non-significant changes. On the other hand, Norway, Cyprus and the top performing Hong Kong SAR also show fluctuation in their achievement.

Hungarian students showed slight fluctuation in their performance between 1995 and 2003, however, they showed significant decline by 2007 compared to each cycle (12 points compared to 2003, 15 to 1999, 10 points to 1995). Nevertheless, only the top four performing Far East countries were before them.

Trends Across Grades: Fourth to Eighth Grade Cohort Analysis

27. page

Because TIMSS is conducted on a four-year cycle, the cohort of students that was assessed in the fourth grade in 2003 had reached the eighth grade by 2007, and thus this cohort was assessed twice in TIMSS. This enables the 17 countries that assessed both grades in both assessments to examine how their performance order relative to each other changed as the fourth grade students of 2003 became the eighth grade students of 2007. The results are presented in Table 1. The four small tables of Table 1 show the average mathematics achievements of the 17 countries in descending order for both grades in 2003 and 2007. Triangles pointing upward indicate that the country average is significantly higher than TIMSS scale average of 500; triangles pointing downward indicate that the country average is significantly lower than TIMSS scale average.

Most countries do not show remarkable changes in their rankings in the 4 tables. Besides there are countries which performed better in both cycles at one particular grade. Lithuania, for example had better results at fourth grades in both assessment cycles. The reasons for such differences

between the grades can be concluded from differences in education systems and curricula. Some countries show declines at both grades, including Hungary; others show improvement between 2003 and 2007 at both grades.

Achievements in Content and Cognitive Domains

28., 29. pages

Tables 2 and 3 present average achievement in each of the content and cognitive domains for fourth and eighth grades. Results are presented in each domain on the TIMSS scale average of 500 with a standard deviation of 100. Countries are displayed in alphabetical order. The achievements in the scales cannot be directly compared because of the different characteristics of items. However, the relative rankings of participating countries, as well as the average scores compared to the TIMSS scale average can be analysed. It is also possible to describe each country's relative strengths and relative weaknesses in each content and cognitive domain and also that the results in which domain can be considered as relatively good or weak compared to the other countries.

Comparing average achievements in the mathematics content domains, it can be concluded that Hungarian students have significantly higher scale scores than the TIMSS scale average with around 10 points in each content domain except for Data Display, where the 4-point difference is within the statistical error.

At the eighth grade, Hungarian students have significantly higher scale scores than the TIMSS scale average in each content domain, except for Algebra, where Hungarian students have 3 points higher scores than the TIMSS scale average. The differences range from 8 to 24, and it is the Data and Chance domain where the difference is the highest.

Hungarian students have signifi cantly better results compared to the TIMSS scale average in all three cognitive domains in both fourth and eight grades. In fourth grade, the differences are 11, 7, and 9 points, in eighth grade the differences are 18, 13, and 13 points.

In both grades, the countries scoring highest on the overall mathematics assessment tended also to be the highest-scoring countries in each of the content and cognitive domains and the countries scoring lowest overall tended to be those with lowest scores in the subdomains.

In the fourth grade, Hong Kong SAR was a top performer in all three content areas, with Singapore with the highest achievement in Numbers and Data Display as well; with Japan joining these countries in Data Display. Hong Kong SAR also had the highest average achievement in each of the cognitive domains, Singapore alone had similar results in the cognitive domains.

In the eighth grade, Singapore had the highest average achievement in the content area of Numbers, closely followed by Korea and Taiwan. In algebra, Taiwan had the highest achievement followed closely by Korea. In Geometry, Taiwan and Korea had the highest average achievement, while in the Data and Chance category Korea and Singapore. At the eighth grade, Taiwan was the top-performer across the cognitive domains.

Gender Differences in Mathematics Achievement

At the fourth grade, there was no difference in international average achievement between boys and girls. The situation varies from country to country whether boys' average achievement is higher or that of girls'. Most of the participating countries, including Hungary, however, do not show significant difference in average achievement in mathematics between girls and boys. It can be concluded the same looking at the results in the content domains and cognitive domains achieved by Hungarian boys and Hungarian girls.

At the eighth grade, the average achievements of girls in mathematics are significantly better than those of boys internationally. In Hungary, however, there is no significant difference between the performance of boys and girls overall; considering content and cognitive domains, it can be concluded that boys have better results in number, while girls perform better in the algebra content domain.

MATHEMATICS ACHIEVEMENT SCALE, INTERNATIONAL BENCHMARKS AND PERCENTAGE OF STUDENTS REACHING THE INTERNATIONAL BENCHMARKS

In order to interpret the students ability in a meaningful way, TIMSS uses four points on the achievement scale as international benchmarks. The Students reaching over 625 scale scores belong to the Advanced International Benchmark, 550 to 625 scores to the High International Benchmark, 475 to 550 to the Intermediate International Benchmark, and 400 to 475 to the Low International Benchmark.

The TIMSS and PIRLS International Study Center worked with the TIMSS 2007 Science and Mathematics Item Review Committee to conduct a detailed scale anchoring analysis to describe mathematics achievement at these benchmarks. Scale anchoring is a way of describing TIMSS 2007 performance at different points on the TIMSS mathematics scale in terms of the types of items students answered correctly. They also examined the mathematics content and cognitive processing dimensions assessed by each item and generalized to describe students' knowledge and understandings.

TIMSS 2007 International Benchmarks of Mathematics Achievement

34–41. pages i.e.

This chapter presents the TIMSS 2007 International Benchmarks for fourth and eighth grades. Each of the international benchmarks is described with two illustrative items selected from items released for public use. For each example item, the percent correct for each of the TIMSS 2007 participating country is given (See chapter Example Mathematics Items). There are more example items released for public use on the Hungarian TIMSS website (www.timss.hu).

TIMSS 2007 International Benchmarks of Mathematics Achievement for Fourth Grades

Advanced International Benchmark – above 625

Students can apply their understanding and knowledge in a variety of relatively complex situations and explain their reasoning. They can apply proportional reasoning in a variety of contexts. They demonstrate a developing understanding of fractions and decimals. They can select appropriate information to solve multi-step word problems. They can formulate or select a rule for a relationship. Students can apply geometric knowledge of a range of two- and three-dimensional shapes in a variety of situations. They can organize, interpret, and represent data to solve problems.

High International Benchmark – 550-625

Students can apply their knowledge and understanding to solve problems. Students can solve multi-step word problems involving operations with whole numbers. They can use division in a variety of problem situations. They demonstrate understanding of place value and simple fractions. Students can extend patterns to find a later specified term and identify the relationship between ordered pairs. Students show some basic geometric knowledge. They can interpret and use data in tables and graphs to solve problems.

Intermediate International Benchmark – 475-550

Students can apply basic mathematical knowledge in straightforward situations. Students at this level demonstrate an understanding of whole numbers. They can extend simple numeric and geometric patterns. They are familiar with a range of two-dimensional shapes. They can read and interpret different representations of the same data.

Low International Benchmark – 400-475

Students have some basic mathematical knowledge. Students demonstrate an understanding of adding and subtracting with whole numbers. They demonstrate familiarity with triangles and informal coordinate systems. They can read information from simple bar graphs and tables.

TIMSS 2007 International Benchmarks of Mathematics Achievement for Eighth Grades

Advanced International Benchmark – above 625

Students can organize and draw conclusions from information, make generalizations, and solve non-routine problems. They can solve a variety of ratio, proportion, and percent problems. They can apply their knowledge of numeric and algebraic concepts and relationships. Students can express generalizations algebraically and model situations. They can apply their knowledge of geometry in complex problem situations. Students can derive and use data from several sources to solve multi-step problems.

High International Benchmark – 550-625

Students can apply their understanding and knowledge in a variety of relatively complex situations. They can relate and compute with fractions, decimals, and percents, operate with negative integers, and solve word problems involving proportions. Students can work with algebraic expressions and linear equations. Students use knowledge of geometric properties to solve problems, including area, volume, and angles. They can interpret data in a variety of graphs and table and solve simple problems involving probability.

Intermediate International Benchmark – 475-550

Students can apply basic mathematical knowledge in straightforward situations. They can add and multiply to solve one-step word problems involving whole numbers and decimals. They can work with familiar fractions. They understand simple algebraic relationships. They demonstrate understanding of properties of triangles and basic geometric concepts. They can read and interpret graphs and tables. They recognize basic notions of likelihood.

Low International Benchmark – 400-475

Students have some knowledge of whole numbers and decimals, operations, and basic graphs.

Percentage of Students Reaching the TIMSS 2007 International Benchmarks of Mathematics Achievement

30., 31. pages

Exhibits 5 and 6 display the percentage of students in each country that reached each international benchmark. Students at higher international benchmarks achieved also the lower benchmarks, thus percentage of students reaching lower international benchmarks include the students performed on the higher levels as well. At each grade, the results are presented in descending order according to the percentage of students reaching the Advanced International Benchmark.

Generally the descending order of the percentage of the students reaching the Advanced International Benchmark (as Exhibit 5 and 6 display) is similar to the order of the average score of the countries. Thus, Far East countries had the highest percentages of students reaching the advanced benchmark and appear at the top. In particular, at the fourth grade, Singapore and Hong Kong SAR, at the eighth grade, Chinese Taipei, Korea and Singapore had more than 40 percent of their students achieving at or above the Advanced International Benchmark. It is above the international median of students reaching the High International Benchmark, and more than the percentages of Hungarian students, who are also among the good performers, reaching the High International Benchmark.

At the fourth grade Following Singapore and Hong Kong SAR, Chinese Taipei and Japan had nearly one-fourth of their students reaching the advanced benchmark. Other countries with at least 10 percent of fourth grade students reaching the advanced benchmark included Kazakhstan, England, the Russian Federation, Latvia, the United States and Lithuania. Hungary has almost this percentage of students reaching the advanced benchmark (9%). Hungary, similarly to Australia, Armenia, Denmark, the Netherlands and Germany, is among the countries which performed above the international median, i.e. Hungary with the percentage of students reaching the Advanced International Benchmark are among the countries with good performance.

At the eighth grade, following Chinese Taipei, Korea, and Singapore, more than one-fourth of students in Hong Kong SAR and Japan reached the advanced benchmark (31, and 26%, respectively). After a gap to the next highest percent, there is Hungary having 10 percent of students reaching the advanced benchmark.

The exhibits also convey information about the distribution of low performers, or those who do not reach even the low benchmark, students who struggle with serious inefficiencies.

At the fourth grade, the median for the Low International Benchmark was 90 percent, indicating that in half of the countries at least 90% of the fourth grade students had elementary knowledge and skills in mathematics, even a number of countries had 95 percent or more of students reaching this benchmark. Hungary had 88 percent of students reaching the low benchmark, which does not differ significantly from the median. However, it is quite low compared to the results of Hungarian students on TIMSS scale average. There are a number of countries with lower average achievement on the scale than Hungary's with higher percentage of students reaching the low benchmark.

At the other end of the achievement distribution, however, there are countries, mainly some of the Latin American and Middle East countries, where less than half of the students reached the low benchmark.

At the eighth grade, the international median is 75 percent for the students reaching the Low Benchmark. There are four countries with 95 percent or more students achieving this benchmark (Chinese Taipei, Korea, Singapore, and Japan). In Hungary, 91 percent of students reached this level, thus Hungary is well above the international average. There are 15 participating countries where less than half of students reached the low benchmark.

Trends Across the Four Benchmarks

32., 33. pages

Countries that participated in more assessment cycles can be analysed in terms of trends across the four benchmarks. The results are displayed in Tables 4 and 5.

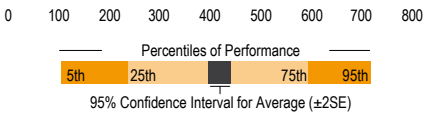
Most of the participating countries show significant change in a benchmark. In those countries where the average score changed significantly, similar patterns can be found in reaching most of the benchmarks. For example, at the fourth grade, Hong Kong SAR had increased percentages of students at each of the benchmarks (except at the low benchmark already reached by 99 per cent of the students in 2003). Hungary, with significantly lower achievement in 2007 compared to the previous cycles, stayed at the same level considering the percentage of students reaching the advanced benchmark. There was a six-percent decrease in the number of students reaching the high benchmark in 2007 compared to 2003. Similarly, there was a nine-percent decline in the number of students reaching the intermediate benchmark in 2007 compared to 2003. There was an increase in number of students not reaching even the low benchmark in 2007.

At the eighth grade, there were fewer Hungarian students reaching each of the benchmarks compared to the results in 2003, except for the advanced benchmark, where there was no significant change in the results. Compared to the results to those in 1999, there was no significant change in the number of students reaching the Low International Benchmark, but percentages declined in all other benchmarks. Comparing results to those in 1995, it can be concluded that there was no significant change in the results at the Advanced and the High International Benchmarks. However, there was a decline in the number of students achieving the lower benchmarks. In conclusion, the lower overall average achievement of Hungarian students resulted from the weaker performance of students at the lower benchmark.

Figure 1 TIMSS 2007 Distribution of Mathematics Achievement

TIMSS 2007 Mathematics 4

		Country	Mathematics Achievement Distribution		Average Scale Score		Years of Formal Schooling*	Average Age at Time of Testing
		Hong Kong SAR		▲	607	(3,6)	4	10,2
		Singapore		▲	599	(3,7)	4	10,4
		Chinese Taipei		▲	576	(1,7)	4	10,2
		Japan		▲	568	(2,1)	4	10,5
	1	Kazakhstan		▲	549	(7,1)	4	10,6
		Russian Federation		▲	544	(4,9)	4	10,8
		England		▲	541	(2,9)	5	10,2
	1	Latvia		▲	537	(2,3)	4	11,0
	‡	Netherlands		▲	535	(2,1)	4	10,2
	1	Lithuania		▲	530	(2,4)	4	10,8
2	†	United States		▲	529	(2,4)	4	10,3
		Germany		▲	525	(2,3)	4	10,4
	†	Denmark		▲	523	(2,4)	4	11,0
		Australia		▲	516	(3,5)	4	9,9
		Hungary		▲	510	(3,5)	4	10,7
		Italy		▲	507	(3,1)	4	9,8
		Austria		▲	505	(2,0)	4	10,3
		Sweden			503	(2,5)	4	10,8
		Slovenia			502	(1,8)	4	9,8
		TIMSS Scale Avg.			500			
		Armenia			500	(4,3)	4	10,6
		Slovak Republic			496	(4,5)	4	10,4
	†	Scotland		▼	494	(2,2)	5	9,8
		New Zealand		▼	492	(2,3)	4,5–5,5	10,0
		Czech Republic		▼	486	(2,8)	4	10,3
		Norway		▼	473	(2,5)	4	9,8
		Ukraine		▼	469	(2,9)	4	10,3
	1	Georgia		▼	438	(4,2)	4	10,1
		Iran, Islamic Rep. of		▼	402	(4,1)	4	10,2
		Algeria		▼	378	(5,2)	4	10,2
		Colombia		▼	355	(5,0)	4	10,4
		Morocco		▼	341	(4,7)	4	10,6
		El Salvador		▼	330	(4,1)	4	11,0
		Tunisia		▼	327	(4,5)	4	10,2
	¿	Kuwait		▼	316	(3,6)	4	10,2
		Qatar		▼	296	(1,0)	4	9,7
		Yemen		▼	224	(6,0)	4	11,2
Benchmarking Participants								
2		Massachusetts, US		▲	572	(3,5)	4	10,3
2	†	Minnesota, US		▲	554	(5,9)	4	10,3
2		Quebec, Canada		▲	519	(3,0)	4	10,1
2		Ontario, Canada		▲	512	(3,1)	4	9,8
2		Alberta, Canada			505	(3,0)	4	9,8
2		British Columbia, Canada			505	(2,7)	4	9,8
¿	‡	Dubai, UAE		▼	444	(2,1)	4	10,0

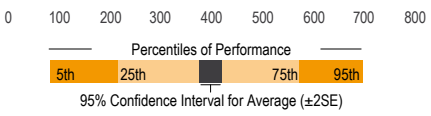


* Represents years of schooling counting from the first year of ISCED Level 1.
** Taken from United Nations Development Programme's Human Development Report 2007/2008, p.229-232, except for Chinese Taipei taken from Directorate-General.
† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
¿ Kuwait and Dubai, UAE tested the same cohort of students as other countries, but later in 2007, at the beginning of the next school year.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available. Note: See Exhibit D.1 for percentiles of achievement in mathematics.
▲ Country average significantly higher than TIMSS scale average.
▼ Country average significantly lower than TIMSS scale average.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Figure 2 TIMSS 2007 Distribution of Mathematics Achievement

TIMSS 2007 Mathematics 8

		Country		Average Scale Score		Years of Formal Schooling*	Average Age at Time of Testing
		Chinese Taipei	▲	598	(4,5)	8	14,2
		Korea, Rep. of	▲	597	(2,7)	8	14,3
		Singapore	▲	593	(3,8)	8	14,4
	†	Hong Kong SAR	▲	572	(5,8)	8	14,4
		Japan	▲	570	(2,4)	8	14,5
		Hungary	▲	517	(3,5)	8	14,6
	†	England	▲	513	(4,8)	9	14,2
		Russian Federation	▲	512	(4,1)	7 or 8	14,6
2	†	United States	▲	508	(2,8)	8	14,3
	1	Lithuania	▲	506	(2,3)	8	14,9
		Czech Republic		504	(2,4)	8	14,4
		Slovenia		501	(2,1)	7 or 8	13,8
		TIMSS Scale Avg.		500			
		Armenia		499	(3,5)	8	14,9
		Australia		496	(3,9)	8	13,9
		Sweden	▼	491	(2,3)	8	14,8
		Malta	▼	488	(1,2)	9	14,0
	†	Scotland	▼	487	(3,7)	9	13,7
1	2	Serbia	▼	486	(3,3)	8	14,9
		Italy	▼	480	(3,0)	8	13,9
		Malaysia	▼	474	(5,0)	8	14,3
		Norway	▼	469	(2,0)	8	13,8
		Cyprus	▼	465	(1,6)	8	13,8
		Bulgaria	▼	464	(5,0)	8	14,9
	3	Israel	▼	463	(3,9)	8	14,0
		Ukraine	▼	462	(3,6)	8	14,2
		Romania	▼	461	(4,1)	8	15,0
		Bosnia and Herzegovina	▼	456	(2,7)	8 or 9	14,7
		Lebanon	▼	449	(4,0)	8	14,4
		Thailand	▼	441	(5,0)	8	14,3
		Turkey	▼	432	(4,8)	8	14,0
		Jordan	▼	427	(4,1)	8	14,0
		Tunisia	▼	420	(2,4)	8	14,5
	1	Georgia	▼	410	(5,9)	8	14,2
		Iran, Islamic Rep. of	▼	403	(4,1)	8	14,2
		Bahrain	▼	398	(1,6)	8	14,1
		Indonesia	▼	397	(3,8)	8	14,3
		Syrian Arab Republic	▼	395	(3,8)	8	13,9
		Egypt	▼	391	(3,6)	8	14,1
		Algeria	▼	387	(2,1)	8	14,5
		Colombia	▼	380	(3,6)	8	14,5
		Oman	▼	372	(3,4)	8	14,3
		Palestinian Nat'l Auth.	▼	367	(3,5)	8	14,0
		Botswana	▼	364	(2,3)	8	14,9
	¿	Kuwait	▼	354	(2,3)	8	14,4
		El Salvador	▼	340	(2,8)	8	15,0
		Saudi Arabia	▼	329	(2,9)	8	14,4
		Ghana	▼	309	(4,4)	8	15,8
		Qatar	▼	307	(1,4)	8	13,9
	¶	Morocco	▼	381	(3,0)	8	14,8
Benchmarking Participants							
	2	Massachusetts, US	▲	547	(4,6)	8	14,2
2	†	Minnesota, US	▲	532	(4,4)	8	14,3
	3	Quebec, Canada	▲	528	(3,5)	8	14,2
	2	Ontario, Canada	▲	517	(3,5)	8	13,8
	3	British Columbia, Canada	▲	509	(3,0)	8	13,9
		Basque Country, Spain		499	(3,0)	8	14,1
¿	‡	Dubai, UAE	▼	461	(2,4)	8	14,2



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

** Taken from United Nations Development Programme's Human Development Report 2007/2008, p.229-232, except for Chinese Taipei taken from Directorate-General of Budget, Accounting and Statistics, Executive Yuan, R.O.C. Statistical Yearbook 2007 and for Serbia taken from Human Development Analyses of Serbia 2007. Data for England and Scotland are for the United Kingdom.

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).

‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included (see Appendix A).

¶ Did not satisfy guidelines for sample participation rates (see Appendix A).

1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).

2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).

3 National Defined Population covers less than 90% of National Target Population (but at least 77%, see Appendix A).

¿ Kuwait and Dubai, UAE tested the same cohort of students as other countries, but later in 2007, at the beginning of the next school year.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

A dash (–) indicates comparable data are not available. Note: See Exhibit D.1 for percentiles of achievement in mathematics.

▲ Country average significantly higher than TIMSS scale average.

▼ Country average significantly lower than TIMSS scale average.

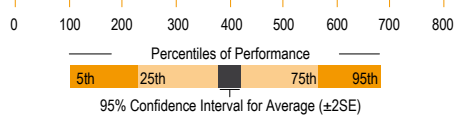
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Figure 3 Trends in Mathematics Achievement - 1995 through 2007

TIMSS 2007 Mathematics 4

	Country	Average Scale Score		2003 to 2007 Difference			1995 to 2007 Difference		
	Hong Kong SAR								
	2007	607	(3,6)						
†	2003	575	(3,2)	32	(4,8)	▲			
	1995	557	(4,0)				50	(5,4)	▲
	Singapore								
	2007	599	(3,7)						
	2003	594	(5,6)	5	(6,7)				
	1995	590	(4,5)				9	(5,9)	
	Chinese Taipei								
	2007	576	(1,7)						
	2003	564	(1,8)	12	(2,5)	▲			
	Japan								
	2007	568	(2,1)						
	2003	565	(1,6)	4	(2,6)				
	1995	567	(1,9)				1	(2,8)	
	Russian Federation								
	2007	544	(4,9)						
2	2003	532	(4,7)	12	(6,8)				
	England								
	2007	541	(2,9)						
†	2003	531	(3,7)	10	(4,7)	▲			
3 †	1995	484	(3,3)				57	(4,4)	▲
	Latvia								
1	2007	537	(2,3)						
1	2003	533	(3,1)	4	(3,8)				
1 ¶	1995	499	(4,6)				38	(5,1)	▲
	Netherlands								
‡	2007	535	(2,1)						
†	2003	540	(2,1)	–5	(3,0)				
¶	1995	549	(3,0)				–14	(3,7)	▼
	Lithuania								
1	2007	530	(2,4)						
1	2003	534	(2,8)	–4	(3,7)				
	United States								
2 †	2007	529	(2,4)						
†	2003	518	(2,4)	11	(3,4)	▲			
	1995	518	(2,9)				11	(3,8)	▲
	Australia								
	2007	516	(3,5)						
†	2003	499	(3,9)	17	(5,3)	▲			
¶	1995	495	(3,4)				22	(4,9)	▲
	Hungary								
	2007	510	(3,5)						
2	2003	529	(3,1)	–19	(4,8)	▼			
	1995	521	(3,6)				–12	(5,1)	▼
	Italy								
	2007	507	(3,1)						
	2003	503	(3,7)	4	(4,8)				
	Austria								
	2007	505	(2,0)						
¶	1995	531	(2,9)				–25	(3,5)	▼
	Slovenia								
	2007	502	(1,8)						
	2003	479	(2,6)	23	(3,2)	▲			
	1995	462	(3,1)				40	(3,6)	▲
	Armenia								
	2007	500	(4,3)						
	2003	456	(3,5)	44	(5,5)	▲			

Mathematics Achievement Distribution



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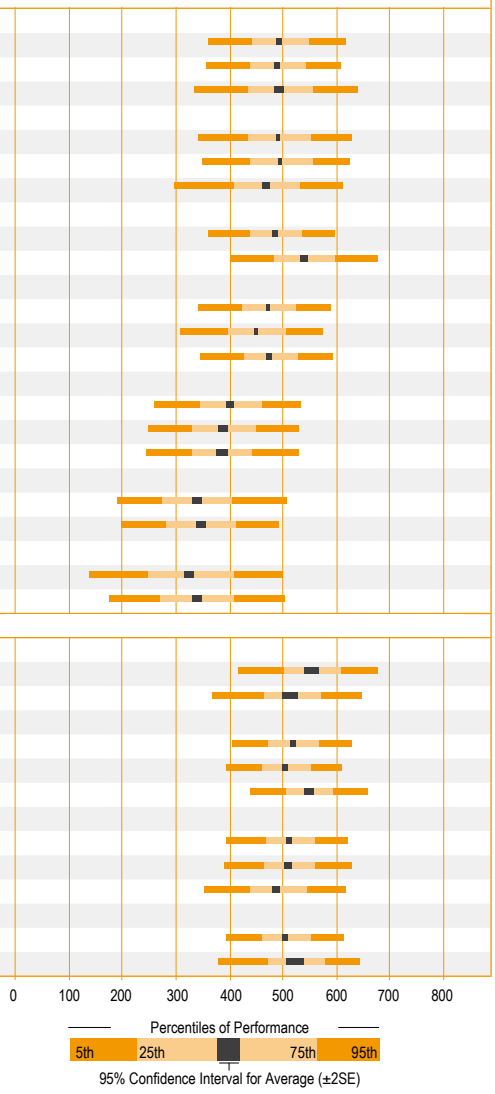
Mathematics

	Country	Average Scale Score		2003 to 2007 Difference			1995 to 2007 Difference		
	Scotland								
†	2007	494	(2,2)						
†	2003	490	(3,3)	4	(3,9)				
2 †	1995	493	(4,2)				1	(4,7)	
	New Zealand								
	2007	492	(2,3)						
	2003	496	(2,1)	–3	(3,2)				
	1995	469	(4,4)				23	(5,0)	▲
	Czech Republic								
	2007	486	(2,8)						
	1995	541	(3,1)				–54	(4,0)	▼
	Norway								
	2007	473	(2,5)						
	2003	451	(2,3)	22	(3,5)	▲			
	1995	476	(3,0)				–3	(4,1)	
	Iran, Islamic Rep. of								
	2007	402	(4,1)						
2	2003	389	(4,2)	13	(5,7)	▲			
	1995	387	(5,0)				15	(6,6)	▲
	Morocco								
	2007	341	(4,7)						
	2003	347	(5,1)	–6	(6,7)				
	Tunisia								
	2007	326	(4,5)						
	2003	339	(4,7)	–13	(6,5)	▼			
Benchmarking Participants									
	Minnesota, US								
2 †	2007	554	(5,9)						
†	1995	516	(7,4)				38	(9,5)	▲
	Quebec, Canada								
2	2007	519	(3,0)						
	2003	506	(2,4)	13	(3,8)	▲			
	1995	550	(4,2)				–31	(5,2)	▼
	Ontario, Canada								
2	2007	512	(3,1)						
	2003	511	(3,8)	0	(4,9)				
2	1995	489	(3,5)				23	(4,7)	▲
	Alberta, Canada								
2	2007	505	(3,0)						
	1995	523	(8,3)				–18	(8,8)	▼

Mathematics Achievement Distribution



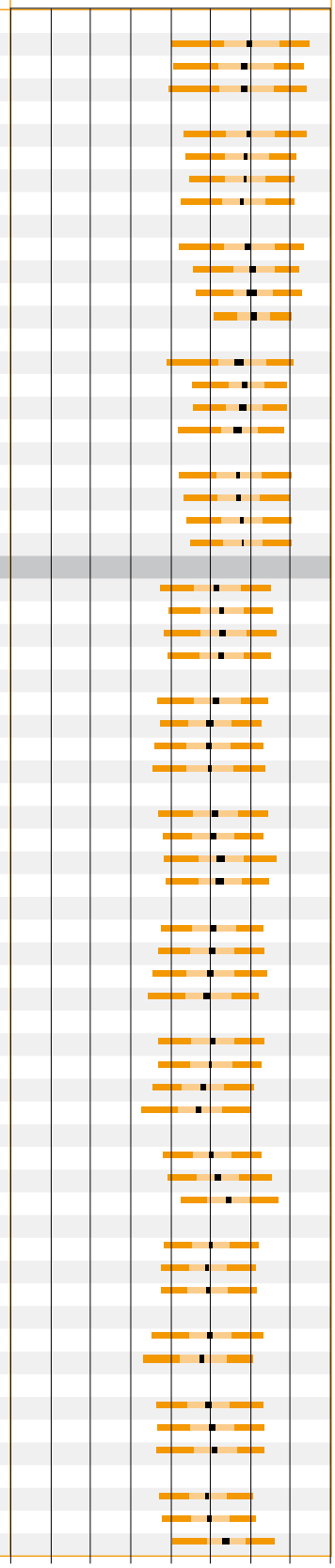
† Met guidelines for sample participation rates only after replacement schools were included.
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included.
¶ Did not satisfy guidelines for sample participation rates.
1 National Target Population does not include all of the International Target Population defined by TIMSS.
2 National Defined Population covers 90% to 95% of National Target Population.
3 National Defined Population covers less than 90% of National Target Population (but at least 77%).
Trend notes: Data are not shown for Kuwait, because comparable data from previous cycles are not available. Data for Tunisia do not include private schools.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ 2007 average significantly higher.
▼ 2007 average significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Figure 4 Trends in Mathematics Achievement – 1995 through 2007

TIMSS 2007 Mathematics 8

Country	Average Scale Score		2003 to 2007 Difference			1999 to 2007 Difference			1995 to 2007 Difference		
Chinese Taipei											
2007	598	(4,5)									
2003	585	(4,6)	13	(6,4)	▲						
1999	585	(4,0)				13	(5,9)	▲			
Korea, Rep. of											
2007	597	(2,7)									
¿ 2003	589	(2,2)	8	(3,1)	▲						
1999	587	(2,0)				10	(3,4)	▲			
1995	581	(2,0)							17	(3,4)	▲
Singapore											
2007	593	(3,8)									
2003	605	(3,6)	–13	(5,2)	▼						
1999	604	(6,3)				–12	(7,2)				
1995	609	(4,0)							–16	(5,6)	▼
Hong Kong SAR											
† 2007	572	(5,8)									
† 2003	586	(3,3)	–14	(6,6)	▼						
† 1999	582	(4,3)				–10	(7,2)				
1995	569	(6,1)							4	(8,4)	
Japan											
2007	570	(2,4)									
2003	570	(2,1)	0	(3,1)							
1999	579	(1,7)				–9	(2,9)	▼			
1995	581	(1,6)							–11	(2,8)	▼
Hungary											
2007	517	(3,5)									
2 2003	529	(3,2)	–12	(4,7)	▼						
1999	532	(3,7)				–15	(5,0)	▼			
1995	527	(3,2)							–10	(4,7)	▼
England											
† 2007	513	(4,8)									
¶ 2003	498	(4,7)	15	(6,7)	▲						
† 1999	496	(4,1)				17	(6,4)	▲			
3 † 1995	498	(3,0)							16	(5,6)	▲
Russian Federation											
2007	512	(4,1)									
2003	508	(3,7)	4	(5,5)							
1999	526	(5,9)				–14	(7,2)	▼			
2 1995	524	(5,3)							–12	(6,7)	
United States											
2 † 2007	508	(2,8)									
‡ 2003	504	(3,3)	4	(4,4)							
1999	502	(4,0)				7	(4,8)				
† 1995	492	(4,7)							16	(5,5)	▲
Lithuania											
1 2007	506	(2,3)									
1 2003	502	(2,5)	4	(3,4)							
1 ¿ 1999	482	(4,3)				24	(4,9)	▲			
1 2 1995	472	(4,1)							34	(4,7)	▲
Czech Republic											
2007	504	(2,4)									
1999	520	(4,2)				–16	(4,8)	▼			
1995	546	(4,5)							–42	(5,1)	▼
Slovenia											
2007	501	(2,1)									
2003	493	(2,2)	9	(3,0)	▲						
1995	494	(2,9)							7	(3,6)	
Armenia											
2007	499	(3,5)									
2003	478	(3,0)	21	(4,6)	▲						
Australia											
2007	496	(3,9)									
2003	505	(4,6)	–8	(6,1)							
‡ 1995	509	(3,7)							–13	(5,4)	▼
Sweden											
2007	491	(2,3)									
2003	499	(2,6)	–8	(3,4)	▼						
1995	540	(4,3)							–48	(4,8)	▼

Mathematics Achievement Distribution



0 100 200 300 400 500 600 700 800

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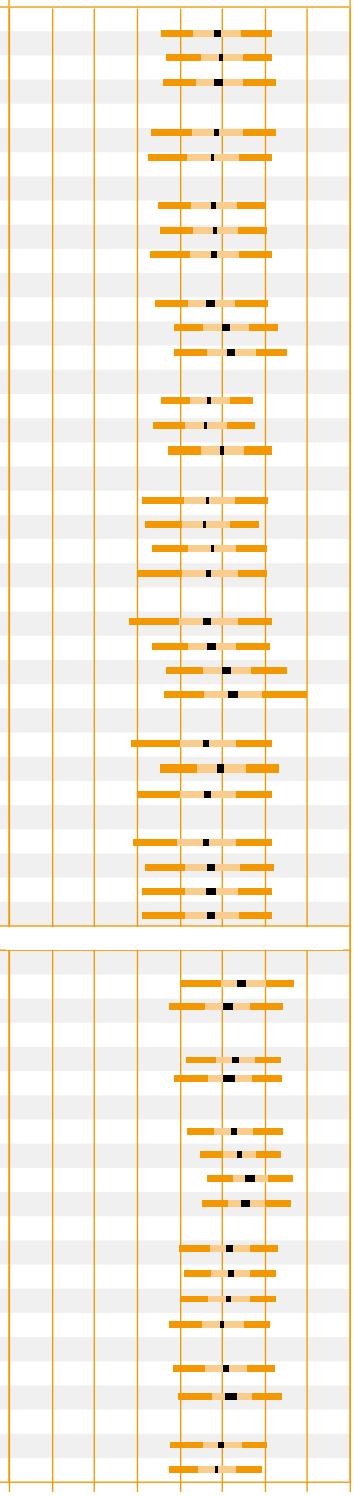
Mathematics

	Country	Average Scale Score		2003 to 2007 Difference			1999 to 2007 Difference			1995 to 2007 Difference		
	Scotland											
†	2007	487	(3,7)									
†	2003	498	(3,7)	–10	(5,2)	▼						
‡	1995	493	(5,7)							–6	(6,8)	
	Serbia											
1 2	2007	486	(3,3)									
1	2003	477	(2,6)	9	(4,1)	▲						
	Italy											
	2007	480	(3,0)									
	2003	484	(3,2)	–4	(4,3)							
2	1999	479	(3,8)				0	(4,8)				
	Malaysia											
	2007	474	(5,0)									
	2003	508	(4,1)	–34	(6,5)	▼						
	1999	519	(4,4)				–45	(6,7)	▼			
	Norway											
	2007	469	(2,0)									
	2003	461	(2,5)	8	(3,2)	▲						
	1995	498	(2,2)							–29	(2,9)	▼
	Cyprus											
	2007	465	(1,6)									
	2003	459	(1,7)	6	(2,3)	▲						
	1999	476	(1,8)				–11	(2,4)	▼			
	1995	468	(2,2)							–2	(2,9)	
	Bulgaria											
	2007	464	(5,0)									
	2003	476	(4,3)	–13	(6,5)							
	1999	511	(5,8)				–47	(7,7)	▼			
¶	1995	527	(5,8)							–63	(7,6)	▼
	Israel											
3	2007	463	(3,9)									
3	2003	496	(3,4)	–32	(5,2)	▼						
3	1999	466	(3,9)				–3	(5,6)				
	Romania											
	2007	461	(4,1)									
	2003	475	(4,8)	–14	(6,4)	▼						
	1999	472	(5,8)				–11	(7,2)				
	1995	474	(4,6)							–12	(6,2)	▼
Benchmarking Participants												
	Massachusetts, US											
2	2007	547	(4,6)									
	1999	513	(5,9)				34	(7,5)	▲			
	Minnesota, US											
2 †	2007	532	(4,4)									
†	1995	518	(7,3)							14	(8,6)	
	Quebec, Canada											
3	2007	528	(3,5)									
	2003	543	(3,0)	–15	(4,6)	▼						
	1999	566	(5,3)				–38	(6,3)	▼			
	1995	556	(5,9)							–28	(6,8)	▼
	Ontario, Canada											
2	2007	517	(3,5)									
2	2003	521	(3,1)	–4	(4,6)							
	1999	517	(3,0)				1	(4,6)				
	1995	501	(2,9)							17	(4,6)	▲
	British Columbia, Canada											
3	2007	509	(3,0)									
	1999	522	(7,3)				–12	(8,0)				
	Basque Country, Spain											
	2007	499	(3,0)									
2	2003	487	(2,7)	11	(3,8)	▲						

Mathematics Achievement Distribution



Percentiles of Performance

5th 25th 75th 95th

95% Confidence Interval for Average (±2SE)

† Met guidelines for sample participation rates only after replacement schools were included.
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included.
¶ Did not satisfy guidelines for sample participation rates.
1 National Target Population does not include all of the International Target Population defined by TIMSS.
2 National Defined Population covers 90% to 95% of National Target Population.
3 National Defined Population covers less than 90% of National Target Population (but at least 77%).
¿ Kuwait and Dubai, UAE tested the same cohort of students as other countries, but later in 2007, at the beginning of the next school year.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ 2007 average significantly higher.
▼ 2007 average significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 1 Cohort Comparison: 2003 Fourth Grade Students in Eighth Grade in 2007*

2003 - Fourth Grade			
Country	Difference From TIMSS Scale Avg.		
Singapore	94	(5,6)	▲
Hong Kong SAR	75	(3,2)	▲
Japan	65	(1,6)	▲
Chinese Taipei	64	(1,8)	▲
Lithuania	34	(2,8)	▲
Russian Federation	32	(4,7)	▲
England	31	(3,7)	▲
Hungary	29	(3,1)	▲
United States	18	(2,4)	▲
Italy	3	(3,7)	
Australia	–1	(3,9)	
Scotland	–10	(3,3)	▼
Slovenia	–21	(2,6)	▼
Armenia	–44	(3,5)	▼
Norway	–49	(2,3)	▼
Iran, Islamic Rrep. of	–111	(4,2)	▼
Tunisia	–161	(4,7)	▼
TIMSS Scale Avg.	500	(0,0)	

2007 - Fourth Grade			
Country	Difference From TIMSS Scale Avg.		
Hong Kong SAR	107	(3,6)	▲
Singapore	99	(3,7)	▲
Chinese Taipei	76	(1,7)	▲
Japan	68	(2,1)	▲
Russian Federation	44	(4,9)	▲
England	41	(2,9)	▲
Lithuania	30	(2,4)	▲
United States	29	(2,4)	▲
Australia	16	(3,5)	▲
Hungary	10	(3,5)	▲
Italy	7	(3,1)	▲
Slovenia	2	(1,8)	
Armenia	0	(4,3)	
Scotland	–6	(2,2)	▼
Norway	–27	(2,5)	▼
Iran, Islamic Rep. of	–98	(4,1)	▼
Tunisia	–173	(4,5)	▼
TIMSS Scale Avg.	500	(0,0)	

2003 - Eighth Grade			
Country	Difference From TIMSS Scale Avg.		
Singapore	105	(3,6)	▲
Hong Kong SAR	86	(3,3)	▲
Chinese Taipei	85	(4,6)	▲
Japan	70	(2,1)	▲
Hungary	29	(3,2)	▲
Russian Federation	8	(3,7)	▲
Australia	5	(4,6)	
United States	4	(3,3)	
Lithuania	2	(2,5)	
England	–2	(4,7)	
Scotland	–2	(3,7)	
Slovenia	–7	(2,2)	▼
Italy	–16	(3,2)	▼
Armenia	–22	(3,0)	▼
Norway	–39	(2,5)	▼
Iran, Islamic Rep. of	–89	(2,4)	▼
Tunisia	–90	(2,2)	▼
TIMSS Scale Avg.	500	(0,0)	

2007 - Eighth Grade			
Country	Difference From TIMSS Scale Avg.		
Chinese Taipei	98	(4,5)	▲
Singapore	93	(3,8)	▲
Hong Kong SAR	72	(5,8)	▲
Japan	70	(2,4)	▲
Hungary	17	(3,5)	▲
England	13	(4,8)	▲
Russian Federation	12	(4,1)	▲
United States	8	(2,8)	▲
Lithuania	6	(2,3)	▲
Slovenia	1	(2,1)	
Armenia	–1	(3,5)	
Australia	–4	(3,9)	
Scotland	–13	(3,7)	▼
Italy	–20	(3,0)	▼
Norway	–31	(2,0)	▼
Tunisia	–80	(2,4)	▼
Iran, Islamic Rep. of	–97	(4,1)	▼
TIMSS Scale Avg.	500	(0,0)	

* The results of the assessment in Grade 4 and Grade 8. are not directly comparable. The Grade 4 population in the 2003 cycle is the same as the Grade 8 population in the 2007 cycle. Therefore we can compare the relative rank of the countries participating in both studies.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

▲ Country average significantly higher than TIMSS scale average.

▼ Country average significantly lower than TIMSS scale average.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 2 Average Achievement in the Mathematics Content and Cognitive Domains

TIMSS 2007 Mathematics 4

	Country	Average Scale Scores for Mathematics Content Domains									Average Scale Scores for Mathematics Cognitive Domains								
		Number			Geometric Shapes and Measures			Data Display			Knowing			Applying			Reasoning		
	Algeria	391	(5,0)	▼	383	(4,5)	▼	361	(5,2)	▼	384	-5,4	▼	376	-5,2	▼	387	(4,7)	▼
	Armenia	522	(4,0)	▲	483	(4,7)	▼	458	(4,3)	▼	518	-4,8	▲	493	-4,1		489	(4,7)	▼
	Australia	496	(3,7)		536	(3,1)	▲	534	(3,1)	▲	509	-4,2	▲	523	-3,5	▲	516	(3,4)	▲
	Austria	502	(2,2)		509	(2,4)	▲	508	(2,6)	▲	505	-2	▲	507	-1,8	▲	506	(2,1)	▲
	Chinese Taipei	581	(1,9)	▲	556	(2,2)	▲	567	(2,0)	▲	584	-1,7	▲	569	-1,7	▲	566	(1,9)	▲
	Colombia	360	(4,3)	▼	361	(4,8)	▼	363	(5,9)	▼	360	-5,2	▼	357	-5,1	▼	372	(4,9)	▼
	Czech Republic	482	(2,8)	▼	494	(2,8)	▼	493	(3,3)	▼	473	-2,4	▼	496	-2,7		493	(3,4)	▼
†	Denmark	509	(2,9)	▲	544	(2,6)	▲	529	(3,4)	▲	513	-2,7	▲	528	-2,5	▲	524	(2,1)	▲
	El Salvador	317	(3,9)	▼	333	(4,3)	▼	367	(3,5)	▼	312	-4,1	▼	339	-3,7	▼	356	(4,0)	▼
	England	531	(3,2)	▲	548	(2,7)	▲	547	(2,5)	▲	544	-3,6	▲	540	-3,1	▲	537	(3,1)	▲
1	Georgia	464	(3,8)	▼	415	(4,8)	▼	414	(4,6)	▼	450	-4	▼	433	-4,5	▼	437	(4,2)	▼
	Germany	521	(2,2)	▲	528	(2,0)	▲	534	(3,1)	▲	514	-2	▲	531	-2,2	▲	528	(2,5)	▲
	Hong Kong SAR	606	(3,8)	▲	599	(3,1)	▲	585	(2,7)	▲	617	-3,5	▲	599	-3,4	▲	589	(3,5)	▲
	Hungary	510	(3,7)	▲	510	(3,3)	▲	504	(3,5)		511	-3,4	▲	507	-3,5	▲	509	(3,8)	▲
	Iran, Islamic Rep. of	398	(3,6)	▼	429	(3,3)	▼	400	(4,0)	▼	410	-3,6	▼	405	-3,7	▼	410	(3,8)	▼
	Italy	505	(3,2)		509	(3,0)	▲	506	(3,4)		514	-3,2	▲	501	-2,9		509	(3,1)	▲
	Japan	561	(2,2)	▲	566	(2,2)	▲	578	(2,8)	▲	565	-2,1	▲	566	-2	▲	563	(2,1)	▲
1	Kazakhstan	556	(6,6)	▲	542	(7,4)	▲	522	(5,8)	▲	559	-7,3	▲	547	-7,2	▲	539	(6,1)	▲
¿	Kuwait	321	(3,5)	▼	316	(3,6)	▼	318	(4,7)	▼	326	-4,6	▼	305	-4,1	▼	+	+	
1	Latvia	536	(2,1)	▲	532	(2,6)	▲	536	(3,0)	▲	530	-2,2	▲	540	-2,5	▲	537	(2,5)	▲
1	Lithuania	533	(2,3)	▲	518	(2,4)	▲	530	(2,9)	▲	520	-2,8	▲	539	-2,4	▲	526	(2,5)	▲
	Morocco	353	(4,7)	▼	365	(4,3)	▼	316	(6,1)	▼	354	-4,8	▼	346	-4,7	▼	+	+	
‡	Netherlands	535	(2,2)	▲	522	(2,3)	▲	543	(2,3)	▲	525	-2,2	▲	540	-2	▲	534	(2,4)	▲
	New Zealand	478	(2,7)	▼	502	(2,3)		513	(2,6)	▲	482	-2,5	▼	495	-2,3	▼	503	(2,8)	
	Norway	461	(2,8)	▼	490	(3,0)	▼	487	(2,6)	▼	461	-2,9	▼	479	-2,8	▼	489	(2,7)	▼
	Qatar	292	(1,2)	▼	296	(1,4)	▼	326	(1,6)	▼	293	-1,3	▼	296	-1,2	▼	+	+	
	Russian Federation	546	(4,4)	▲	538	(5,1)	▲	530	(4,9)	▲	538	-4,5	▲	547	-4,8	▲	540	(4,8)	▲
†	Scotland	481	(2,6)	▼	503	(2,6)		516	(2,2)	▲	489	-2,6	▼	500	-2,4		497	(2,2)	
	Singapore	611	(4,3)	▲	570	(3,6)	▲	583	(3,2)	▲	620	-4	▲	590	-3,7	▲	578	(3,8)	▲
	Slovak Republic	495	(3,9)		499	(4,3)		492	(4,2)		492	-3,9	▼	498	-4		499	(4,0)	
	Slovenia	485	(1,9)	▼	522	(1,8)	▲	518	(2,5)	▲	497	-1,8		504	-1,9	▲	505	(2,1)	▲
	Sweden	490	(2,5)	▼	508	(2,3)	▲	529	(2,7)	▲	482	-2,5	▼	508	-2,2	▲	519	(2,5)	▲
	Tunisia	352	(4,5)	▼	334	(4,5)	▼	307	(4,8)	▼	343	-4,9	▼	329	-4,8	▼	+	+	
	Ukraine	480	(2,9)	▼	457	(2,8)	▼	462	(3,2)	▼	472	-3	▼	466	-3,1	▼	474	(3,2)	▼
2 †	United States	524	(2,7)	▲	522	(2,5)	▲	543	(2,4)	▲	541	-2,6	▲	524	-2,6	▲	523	(2,2)	▲
	Yemen	+	+		+	+		+	+		+	+		+	+		+	+	
	TIMSS Scale Avg.	500			500			500			500			500			500		

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
¿ Kuwait and Dubai, UAE tested the same cohort of students as other countries, but later in 2007, at the beginning of the next school year.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A plus (+) sign indicates average achievement could not be accurately estimated.
▲ Country average significantly higher than TIMSS scale average.
▼ Country average significantly lower than TIMSS scale average.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 3 Average Achievement in the Mathematics Content and Cognitive Domains

TIMSS 2007 Mathematics 8

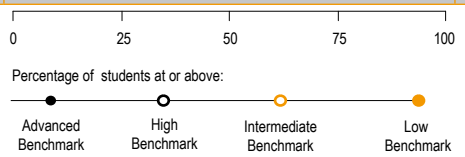
	Country	Average Scale Scores for Mathematics Content Domains												Average Scale Scores for Mathematics Cognitive Domains								
		Number			Algebra			Geometry			Data and Chance			Knowing			Applying			Reasoning		
	Algeria	403	(1,7)	▼	349	(2,4)	▼	432	(2,1)	▼	371	(1,7)	▼	371	-1,9	▼	412	(2,0)	▼	+	+	
	Armenia	492	(3,1)	▼	532	(2,5)	▲	493	(4,1)		427	(3,9)	▼	507	-3,1	▲	493	(3,8)		489	(3,8)	▼
	Australia	503	(3,7)		471	(3,7)	▼	487	(3,6)	▼	525	(3,2)	▲	487	-3,3	▼	500	(3,4)		502	(3,3)	
	Bahrain	388	(2,0)	▼	403	(1,8)	▼	412	(2,1)	▼	418	(2,1)	▼	395	-1,7	▼	403	(1,9)	▼	413	(2,1)	▼
	Bosnia and Herzegovina	451	(3,0)	▼	475	(3,2)	▼	451	(3,5)	▼	437	(2,3)	▼	478	-2,9	▼	440	(2,6)	▼	452	(2,9)	▼
	Botswana	366	(2,9)	▼	394	(2,2)	▼	325	(3,2)	▼	384	(2,6)	▼	376	-2,1	▼	351	(2,6)	▼	+	+	
	Bulgaria	458	(4,7)	▼	476	(5,1)	▼	468	(5,0)	▼	440	(4,7)	▼	477	-4,7	▼	458	(4,8)	▼	455	(4,7)	▼
	Chinese Taipei	577	(4,2)	▲	617	(5,4)	▲	592	(4,6)	▲	566	(3,6)	▲	594	-4,5	▲	592	(4,2)	▲	591	(4,1)	▲
	Colombia	369	(3,5)	▼	390	(3,1)	▼	371	(3,3)	▼	405	(3,8)	▼	364	-3,4	▼	384	(3,7)	▼	416	(3,3)	▼
	Cyprus	464	(1,6)	▼	468	(2,0)	▼	458	(2,7)	▼	464	(1,6)	▼	468	-1,6	▼	465	(1,8)	▼	461	(2,1)	▼
	Czech Republic	511	(2,5)	▲	484	(2,4)	▼	498	(2,7)		512	(2,8)	▲	502	-2,5		504	(2,7)		500	(2,6)	
	Egypt	393	(3,1)	▼	409	(3,3)	▼	406	(3,4)	▼	384	(3,1)	▼	392	-3,6	▼	393	(3,6)	▼	396	(3,4)	▼
	El Salvador	355	(3,0)	▼	331	(3,7)	▼	318	(3,7)	▼	362	(3,0)	▼	336	-3,1	▼	347	(3,3)	▼	+	+	
†	England	510	(5,0)		492	(4,6)		510	(4,4)	▲	547	(5,0)	▲	503	-4		514	(4,9)	▲	518	(4,3)	▲
1	Georgia	421	(5,6)	▼	421	(6,6)	▼	409	(6,7)	▼	373	(4,3)	▼	427	-5,8	▼	401	(5,5)	▼	389	(5,8)	▼
	Ghana	310	(3,9)	▼	358	(3,6)	▼	275	(4,9)	▼	321	(3,6)	▼	313	-4,6	▼	297	(4,2)	▼	+	+	
†	Hong Kong SAR	567	(5,6)	▲	565	(5,6)	▲	570	(5,5)	▲	549	(4,7)	▲	574	-5,4	▲	569	(5,9)	▲	557	(5,6)	▲
	Hungary	517	(3,6)	▲	503	(3,6)		508	(3,6)	▲	524	(3,3)	▲	518	-3,3	▲	513	(3,1)	▲	513	(3,2)	▲
	Indonesia	399	(3,7)	▼	405	(3,5)	▼	395	(4,5)	▼	402	(3,6)	▼	397	-4	▼	398	(3,7)	▼	405	(3,3)	▼
	Iran, Islamic Rep. of	395	(3,9)	▼	408	(3,9)	▼	423	(4,4)	▼	415	(3,5)	▼	403	-4,1	▼	402	(4,2)	▼	427	(3,5)	▼
3	Israel	469	(3,2)	▼	470	(3,9)	▼	436	(4,3)	▼	465	(4,4)	▼	473	-3,7	▼	456	(4,1)	▼	462	(4,1)	▼
	Italy	478	(2,8)	▼	460	(3,2)	▼	490	(3,1)	▼	491	(3,1)	▼	476	-3	▼	483	(2,9)	▼	483	(2,8)	▼
	Japan	551	(2,3)	▲	559	(2,5)	▲	573	(2,2)	▲	573	(2,2)	▲	560	-2,2	▲	565	(2,2)	▲	568	(2,4)	▲
	Jordan	416	(4,3)	▼	448	(4,1)	▼	436	(3,9)	▼	425	(3,8)	▼	432	-4,2	▼	422	(4,1)	▼	440	(3,6)	▼
	Korea, Rep. of	583	(2,4)	▲	596	(3,0)	▲	587	(2,3)	▲	580	(2,0)	▲	596	-2,5	▲	595	(2,8)	▲	579	(2,3)	▲
¿	Kuwait	347	(3,1)	▼	354	(3,0)	▼	385	(2,8)	▼	366	(3,5)	▼	347	-3,1	▼	361	(2,7)	▼	+	+	
	Lebanon	454	(3,4)	▼	465	(3,2)	▼	462	(4,0)	▼	407	(4,4)	▼	464	-3,9	▼	448	(4,6)	▼	429	(4,0)	▼
1	Lithuania	506	(2,7)	▲	483	(2,7)	▼	507	(2,6)	▲	523	(2,3)	▲	508	-2,5	▲	511	(2,4)	▲	486	(2,5)	▼
	Malaysia	491	(5,1)		454	(4,3)	▼	477	(5,6)	▼	469	(4,1)	▼	477	-4,8	▼	478	(4,9)	▼	468	(3,8)	▼
	Malta	496	(1,3)	▼	473	(1,4)	▼	495	(1,1)	▼	487	(1,4)	▼	490	-1,6	▼	492	(1,0)	▼	475	(1,3)	▼
	Norway	488	(2,0)	▼	425	(2,8)	▼	459	(2,3)	▼	505	(2,5)	▲	458	-1,8	▼	477	(2,2)	▼	475	(2,3)	▼
	Oman	363	(2,7)	▼	391	(3,2)	▼	387	(3,0)	▼	389	(3,0)	▼	372	-3,5	▼	368	(3,0)	▼	397	(3,3)	▼
	Palestinian Nat'l Auth.	366	(3,2)	▼	382	(3,4)	▼	388	(3,8)	▼	371	(2,9)	▼	365	-3,8	▼	371	(3,4)	▼	381	(3,5)	▼
	Qatar	334	(1,6)	▼	312	(1,5)	▼	301	(1,8)	▼	305	(1,6)	▼	307	-1,4	▼	305	(1,4)	▼	+	+	
	Romania	457	(3,5)	▼	478	(4,6)	▼	466	(4,0)	▼	429	(3,7)	▼	470	-4,2	▼	462	(4,0)	▼	449	(4,6)	▼
	Russian Federation	507	(3,8)		518	(4,5)	▲	510	(4,1)	▲	487	(3,8)	▼	521	-3,9	▲	510	(3,7)	▲	497	(3,6)	
	Saudi Arabia	309	(3,3)	▼	344	(2,8)	▼	359	(2,6)	▼	348	(2,2)	▼	308	-2,6	▼	335	(2,3)	▼	+	+	
†	Scotland	489	(3,7)	▼	467	(3,7)	▼	485	(3,9)	▼	517	(3,5)	▲	481	-3,3	▼	489	(3,7)	▼	495	(3,3)	
1 2	Serbia	478	(2,9)	▼	500	(3,2)		486	(3,6)	▼	458	(3,0)	▼	500	-3,2		478	(3,3)	▼	474	(3,3)	▼
	Singapore	597	(3,5)	▲	579	(3,7)	▲	578	(3,4)	▲	574	(3,9)	▲	581	-3,4	▲	593	(3,6)	▲	579	(4,1)	▲
	Slovenia	502	(2,3)		488	(2,4)	▼	499	(2,4)		511	(2,3)	▲	500	-2,2		503	(2,0)		496	(2,5)	
	Sweden	507	(1,8)	▲	456	(2,4)	▼	472	(2,5)	▼	526	(3,0)	▲	478	-2	▼	497	(2,0)		490	(2,6)	▼
	Syrian Arab Republic	393	(3,4)	▼	406	(3,7)	▼	417	(3,4)	▼	387	(2,7)	▼	393	-4,2	▼	401	(3,4)	▼	396	(3,4)	▼
	Thailand	444	(4,8)	▼	433	(5,0)	▼	442	(5,3)	▼	453	(4,1)	▼	436	-4,8	▼	446	(4,7)	▼	456	(4,4)	▼
	Tunisia	425	(2,6)	▼	423	(2,6)	▼	437	(2,6)	▼	411	(2,3)	▼	421	-2,6	▼	423	(2,4)	▼	425	(2,3)	▼
	Turkey	429	(4,0)	▼	440	(5,1)	▼	411	(5,1)	▼	445	(4,4)	▼	439	-4,8	▼	425	(4,5)	▼	441	(4,2)	▼
	Ukraine	460	(3,7)	▼	464	(3,9)	▼	467	(3,6)	▼	458	(3,5)	▼	471	-3,5	▼	464	(3,5)	▼	445	(3,8)	▼
2 †	United States	510	(2,7)	▲	501	(2,7)		480	(2,5)	▼	531	(2,8)	▲	514	-2,6	▲	503	(2,9)		505	(2,4)	▲
¶	Morocco	389	(3,4)	▼	362	(4,0)	▼	396	(3,6)	▼	371	(3,4)	▼	365	-4,4	▼	389	(3,3)	▼	383	(3,5)	▼
	TIMSS Scale Avg.	500			500			500			500			500			500			500		

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
3 National Defined Population covers less than 90% of National Target Population (but at least 77%, see Appendix A).
¿ Kuwait and Dubai, UAE tested the same cohort of students as other countries, but later in 2007, at the beginning of the next school year.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A plus (+) sign indicates average achievement could not be accurately estimated.
▲ Country average significantly higher than TIMSS scale average.
▼ Country average significantly lower than TIMSS scale average.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Figure 5 Percentages of Students Reaching the TIMSS 2007 International Benchmarks of Mathematics Achievement

TIMSS 2007 Mathematics 4

	Country	Advanced Benchmark (625)		High Benchmark (550)		Intermediate Benchmark (475)		Low Benchmark (400)	
	Singapore	41	(2,1)	74	(1,7)	92	(0,9)	98	(0,3)
	Hong Kong SAR	40	(2,2)	81	(1,6)	97	(0,5)	100	(0,1)
	Chinese Taipei	24	(1,2)	66	(1,2)	92	(0,5)	99	(0,2)
	Japan	23	(1,2)	61	(1,2)	89	(0,8)	98	(0,4)
1	Kazakhstan	19	(2,1)	52	(3,5)	81	(2,9)	95	(1,5)
	England	16	(1,2)	48	(1,4)	79	(1,2)	94	(0,7)
	Russian Federation	16	(1,8)	48	(2,3)	81	(1,7)	95	(0,7)
1	Latvia	11	(0,8)	44	(1,5)	81	(1,2)	97	(0,5)
2 †	United States	10	(0,8)	40	(1,3)	77	(1,2)	95	(0,5)
1	Lithuania	10	(0,7)	42	(1,4)	77	(1,4)	94	(0,7)
	Hungary	9	(0,8)	35	(1,4)	67	(1,7)	88	(1,2)
	Australia	9	(0,8)	35	(1,9)	71	(1,7)	91	(1,0)
	Armenia	8	(1,5)	28	(1,8)	60	(1,8)	87	(1,2)
†	Denmark	7	(0,7)	36	(1,5)	76	(1,2)	95	(0,8)
‡	Netherlands	7	(0,7)	42	(1,6)	84	(1,3)	98	(0,4)
	Germany	6	(0,5)	37	(1,3)	78	(1,2)	96	(0,5)
	Italy	6	(0,7)	29	(1,6)	67	(1,6)	91	(1,0)
	New Zealand	5	(0,5)	26	(1,0)	61	(1,1)	85	(1,0)
	Slovak Republic	5	(0,7)	26	(1,4)	63	(1,8)	88	(1,5)
†	Scotland	4	(0,5)	25	(1,1)	62	(1,4)	88	(0,9)
	Slovenia	3	(0,4)	25	(1,1)	67	(0,9)	92	(0,6)
	Austria	3	(0,3)	26	(1,0)	69	(1,4)	93	(0,8)
	Sweden	3	(0,3)	24	(1,4)	68	(1,4)	93	(0,7)
	Ukraine	2	(0,5)	17	(1,1)	50	(1,5)	79	(1,2)
	Czech Republic	2	(0,4)	19	(1,4)	59	(1,6)	88	(1,1)
	Norway	2	(0,3)	15	(1,0)	52	(1,6)	83	(1,1)
1	Georgia	1	(0,4)	10	(1,0)	35	(1,8)	67	(2,0)
	Colombia	0	(0,1)	2	(0,4)	9	(1,1)	31	(2,0)
	Morocco	0	(0,2)	2	(0,8)	9	(1,1)	26	(2,0)
	Iran, Islamic Rep. of	0	(0,1)	3	(0,5)	20	(1,5)	53	(2,0)
	Algeria	0	(0,1)	2	(0,4)	14	(1,4)	41	(2,2)
	Tunisia	0	(0,1)	1	(0,2)	9	(0,7)	28	(1,6)
	El Salvador	0	(0,0)	1	(0,2)	6	(0,5)	22	(1,6)
¿	Kuwait	0	(0,0)	0	(0,1)	5	(0,6)	21	(1,2)
	Qatar	0	(0,0)	0	(0,1)	2	(0,2)	13	(0,4)
	Yemen	0	(0,0)	0	(0,1)	1	(0,4)	6	(0,8)
	International Median	5		26		67		90	

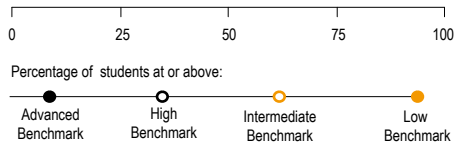


† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
¿ Kuwait and Dubai, UAE tested the same cohort of students as other countries, but later in 2007, at the beginning of the next school year.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Figure 6 Percentages of Students Reaching the TIMSS 2007 International Benchmarks of Mathematics Achievement

TIMSS 2007 Mathematics 8

	Country	Advanced Benchmark (625)		High Benchmark (550)		Intermediate Benchmark (475)		Low Benchmark (400)	
	Chinese Taipei	45	(1,9)	71	(1,5)	86	(1,2)	95	(0,6)
	Korea, Rep. of	40	(1,2)	71	(1,1)	90	(0,7)	98	(0,3)
	Singapore	40	(1,9)	70	(2,0)	88	(1,4)	97	(0,6)
†	Hong Kong SAR	31	(2,1)	64	(2,6)	85	(2,1)	94	(1,1)
	Japan	26	(1,3)	61	(1,2)	87	(0,9)	97	(0,3)
	Hungary	10	(1,0)	36	(1,6)	69	(1,6)	91	(1,0)
†	England	8	(1,5)	35	(2,5)	69	(2,3)	90	(1,4)
	Russian Federation	8	(0,9)	33	(1,8)	68	(2,1)	91	(1,2)
1	Lithuania	6	(0,7)	30	(1,1)	65	(1,3)	90	(0,8)
2 †	United States	6	(0,6)	31	(1,5)	67	(1,4)	92	(0,8)
	Australia	6	(1,3)	24	(1,8)	61	(1,9)	89	(1,0)
	Armenia	6	(0,9)	27	(1,9)	63	(1,4)	88	(0,8)
	Czech Republic	6	(0,7)	26	(1,2)	66	(1,4)	92	(0,8)
	Turkey	5	(0,6)	15	(1,3)	33	(1,8)	59	(1,8)
1 2	Serbia	5	(0,8)	24	(1,3)	57	(1,8)	83	(1,2)
	Malta	5	(0,4)	26	(0,8)	60	(0,6)	83	(0,5)
	Bulgaria	4	(0,8)	20	(1,5)	49	(1,9)	74	(1,7)
	Slovenia	4	(0,6)	25	(1,0)	65	(1,4)	92	(0,8)
3	Israel	4	(0,5)	19	(1,3)	48	(1,7)	75	(1,4)
	Romania	4	(0,6)	20	(1,3)	46	(1,8)	73	(1,7)
†	Scotland	4	(0,6)	23	(1,8)	57	(2,2)	85	(1,3)
	Thailand	3	(0,8)	12	(1,7)	34	(2,2)	66	(2,0)
	Ukraine	3	(0,5)	15	(1,1)	46	(1,7)	76	(1,5)
	Italy	3	(0,6)	17	(1,2)	54	(1,5)	85	(1,1)
	Malaysia	2	(0,5)	18	(2,1)	50	(2,7)	82	(1,9)
	Cyprus	2	(0,3)	17	(0,8)	48	(0,9)	78	(0,7)
	Sweden	2	(0,3)	20	(1,0)	60	(1,3)	90	(0,9)
	Jordan	1	(0,2)	11	(0,8)	35	(1,7)	61	(1,8)
	Bosnia and Herzegovina	1	(0,2)	10	(0,7)	42	(1,4)	77	(1,3)
	Iran, Islamic Rep. of	1	(0,2)	5	(0,9)	20	(1,7)	51	(1,9)
	Lebanon	1	(0,2)	10	(1,2)	36	(2,4)	74	(2,3)
1	Georgia	1	(0,3)	7	(0,8)	26	(1,7)	56	(2,8)
	Egypt	1	(0,1)	5	(0,4)	21	(1,0)	47	(1,5)
	Indonesia	0	(0,2)	4	(0,6)	19	(1,4)	48	(1,9)
	Norway	0	(0,1)	11	(0,7)	48	(1,5)	85	(0,8)
	Palestinian Nat'l Auth.	0	(0,1)	3	(0,4)	15	(0,9)	39	(1,4)
	Colombia	0	(0,0)	2	(0,3)	11	(1,1)	39	(2,1)
	Bahrain	0	(0,1)	3	(0,3)	19	(0,7)	49	(0,9)
	Syrian Arab Republic	0	(0,1)	3	(0,5)	17	(1,3)	47	(1,9)
	Tunisia	0	(0,1)	3	(0,3)	21	(1,2)	61	(1,5)
	Oman	0	(0,0)	2	(0,3)	14	(1,1)	41	(1,5)
	Qatar	0	(0,0)	0	(0,1)	4	(0,2)	16	(0,5)
¿	Kuwait	0	(0,0)	0	(0,2)	6	(0,5)	29	(1,3)
	Botswana	0	(0,0)	1	(0,1)	7	(0,7)	32	(1,3)
	El Salvador	0	(0,0)	0	(0,1)	3	(0,5)	20	(1,2)
	Ghana	0	(0,0)	0	(0,1)	4	(0,7)	17	(1,4)
	Algeria	0	(0,0)	0	(0,1)	7	(0,5)	41	(1,4)
	Saudi Arabia	0	(0,0)	0	(0,1)	3	(0,4)	18	(1,1)
¶	Morocco	0	(0,1)	1	(0,5)	13	(1,1)	41	(2,0)
	International Median	2		15		46		75	



† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
3 National Defined Population covers less than 90% of National Target Population (but at least 77%, see Appendix A).
¿ Kuwait and Dubai, UAE tested the same cohort of students as other countries, but later in 2007, at the beginning of the next school year.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 4 Trends in Percentages of Students Reaching the TIMSS 2007 International Benchmarks of Mathematics Achievement

Country	Advanced International Benchmark (625)								High International Benchmark (550)								Intermediate International Benchmark (475)								Low International Benchmark (400)							
	2007 Percent of Students		2003 Percent of Students			1995 Percent of Students			2007 Percent of Students		2003 Percent of Students			1995 Percent of Students			2007 Percent of Students		2003 Percent of Students			1995 Percent of Students			2007 Percent of Students		2003 Percent of Students			1995 Percent of Students		
Singapore	41	(2,1)	38	(2,9)		38	(2,2)		74	(1,7)	73	(2,4)		70	(1,6)		92	(0,9)	91	(1,3)		89	(1,0)	▲	98	(0,3)	97	(0,6)		96	(0,4)	▲
Hong Kong SAR	40	(2,2)	22	(1,7)	▲	17	(1,7)	▲	81	(1,6)	67	(2,0)	▲	56	(2,2)	▲	97	(0,5)	94	(0,7)	▲	87	(1,3)	▲	100	(0,1)	99	(0,2)		97	(0,6)	▲
Chinese Taipei	24	(1,2)	16	(0,9)	▲	◊	◊		66	(1,2)	61	(1,1)	▲	◊	◊		92	(0,5)	92	(0,7)		◊	◊		99	(0,2)	99	(0,2)		◊	◊	
Japan	23	(1,2)	21	(0,8)		22	(1,0)		61	(1,2)	60	(1,0)		61	(1,1)		89	(0,8)	89	(0,7)		89	(0,7)		98	(0,4)	98	(0,3)		98	(0,2)	
England	16	(1,2)	14	(1,4)		7	(0,8)	▲	48	(1,4)	43	(1,8)	▲	24	(1,5)	▲	79	(1,2)	75	(1,6)	▲	54	(1,6)	▲	94	(0,7)	93	(0,8)		82	(1,1)	▲
Russian Federation	16	(1,8)	11	(1,6)		◊	◊		48	(2,3)	41	(2,6)	▲	◊	◊		81	(1,7)	76	(2,0)		◊	◊		95	(0,7)	95	(0,8)		◊	◊	
Latvia	11	(0,8)	9	(0,9)		6	(1,3)	▲	44	(1,5)	43	(2,1)		27	(2,1)	▲	81	(1,2)	80	(1,4)		61	(1,9)	▲	97	(0,5)	96	(0,8)		88	(1,1)	▲
United States	10	(0,8)	7	(0,7)	▲	9	(0,9)		40	(1,3)	35	(1,3)	▲	37	(1,6)		77	(1,2)	72	(1,2)	▲	71	(1,3)	▲	95	(0,5)	93	(0,5)	▲	92	(0,7)	▲
Lithuania	10	(0,7)	10	(1,1)		◊	◊		42	(1,4)	44	(1,7)		◊	◊		77	(1,4)	79	(1,3)		◊	◊		94	(0,7)	96	(0,7)		◊	◊	
Hungary	9	(0,8)	10	(1,0)		11	(1,0)		35	(1,4)	41	(1,6)	▼	38	(1,8)		67	(1,7)	76	(1,6)	▼	72	(1,5)		88	(1,2)	94	(0,8)	▼	91	(0,9)	▼
Australia	9	(0,8)	5	(0,7)	▲	6	(0,6)	▲	35	(1,9)	26	(1,7)	▲	27	(1,4)	▲	71	(1,7)	64	(1,9)	▲	61	(1,6)	▲	91	(1,0)	88	(1,3)	▲	86	(1,1)	▲
Armenia	8	(1,5)	2	(0,3)	▲	◊	◊		28	(1,8)	13	(1,2)	▲	◊	◊		60	(1,8)	43	(1,7)	▲	◊	◊		87	(1,2)	75	(1,5)	▲	◊	◊	
Netherlands	7	(0,7)	5	(0,8)		12	(1,1)	▼	42	(1,6)	44	(1,5)		50	(1,9)	▼	84	(1,3)	89	(1,2)	▼	87	(1,4)		98	(0,4)	99	(0,4)	▼	99	(0,4)	
Italy	6	(0,7)	6	(1,0)		–	–		29	(1,6)	29	(1,8)		–	–		67	(1,6)	65	(1,7)		–	–		91	(1,0)	89	(1,1)		–	–	
New Zealand	5	(0,5)	5	(0,5)		4	(0,6)		26	(1,0)	27	(1,2)		19	(1,4)	▲	61	(1,1)	62	(1,3)		51	(1,9)	▲	85	(1,0)	86	(1,0)		78	(1,7)	▲
Scotland	4	(0,5)	3	(0,4)		7	(0,9)	▼	25	(1,1)	22	(1,4)		27	(1,7)		62	(1,4)	60	(1,6)		60	(1,9)		88	(0,9)	88	(1,2)		85	(1,2)	
Slovenia	3	(0,4)	2	(0,4)	▲	2	(0,4)	▲	25	(1,1)	18	(1,0)	▲	14	(1,1)	▲	67	(0,9)	55	(1,5)	▲	45	(2,0)	▲	92	(0,6)	84	(1,0)	▲	77	(1,4)	▲
Austria	3	(0,3)	◊	◊		10	(0,9)	▼	26	(1,0)	◊	◊		42	(1,9)	▼	69	(1,4)	◊	◊		77	(1,4)	▼	93	(0,8)	◊	◊		94	(0,7)	
Czech Republic	2	(0,4)	◊	◊		16	(1,2)	▼	19	(1,4)	◊	◊		46	(1,6)	▼	59	(1,6)	◊	◊		79	(1,1)	▼	88	(1,1)	◊	◊		95	(0,5)	▼
Norway	2	(0,3)	1	(0,2)	▲	2	(0,4)		15	(1,0)	10	(1,0)	▲	16	(1,2)		52	(1,6)	41	(1,3)	▲	53	(2,0)		83	(1,1)	75	(1,2)	▲	84	(1,2)	
Morocco	0	(0,2)	0	(0,0)		◊	◊		2	(0,8)	1	(0,2)		◊	◊		9	(1,1)	8	(0,8)		◊	◊		26	(2,0)	29	(2,2)		◊	◊	
Iran, Islamic Rep. of	0	(0,1)	0	(0,1)		0	(0,2)		3	(0,5)	2	(0,3)		3	(0,7)		20	(1,5)	17	(1,3)		15	(1,9)	▲	53	(2,0)	45	(2,2)	▲	44	(2,5)	▲
Tunisia	0	(0,1)	0	(0,1)		◊	◊		1	(0,2)	1	(0,3)		◊	◊		9	(0,8)	9	(1,0)		◊	◊		28	(1,6)	28	(1,7)		◊	◊	

Trend notes: Data are not shown for Kuwait, because comparable data from previous cycles are not available. Data for Tunisia do not include private schools.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear
A dash (–) indicates comparable data are not available.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 percent significantly higher.
▼ 2007 percent significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 5 Trends in Percentages of Students Reaching the TIMSS 2007 International Benchmarks of Mathematics Achievement

Country	Advanced International Benchmark (625)				High International Benchmark (550)				Intermediate International Benchmark (475)				Low International Benchmark (400)			
	2007 Percent of Students	2003 Percent of Students	1999 Percent of Students	1995 Percent of Students	2007 Percent of Students	2003 Percent of Students	1999 Percent of Students	1995 Percent of Students	2007 Percent of Students	2003 Percent of Students	1999 Percent of Students	1995 Percent of Students	2007 Percent of Students	2003 Percent of Students	1999 Percent of Students	1995 Percent of Students
Chinese Taipei	45 (1,9)	38 (2,0) ▲	37 (1,6) ▲	◊ ◊	71 (1,5)	66 (1,8) ▲	67 (1,5)	◊ ◊	86 (1,2)	85 (1,2)	85 (1,0)	◊ ◊	95 (0,6)	96 (0,6)	95 (0,5)	◊ ◊
Korea, Rep. of	40 (1,2)	35 (1,3) ▲	32 (0,9) ▲	31 (1,1) ▲	71 (1,1)	70 (1,0)	70 (1,0)	67 (1,0) ▲	90 (0,7)	90 (0,5)	91 (0,5)	89 (0,7)	98 (0,3)	98 (0,3)	99 (0,2) ▼	97 (0,4)
Singapore	40 (1,9)	44 (2,0)	42 (3,5)	40 (2,9)	70 (2,0)	77 (2,0) ▼	77 (2,6) ▼	84 (1,8) ▼	88 (1,4)	93 (1,0) ▼	94 (1,2) ▼	98 (0,4) ▼	97 (0,6)	99 (0,2) ▼	99 (0,3) ▼	100 (0,0) ▼
Hong Kong SAR	31 (2,1)	31 (1,6)	28 (2,1)	23 (2,4) ▲	64 (2,6)	73 (1,8) ▼	70 (2,3)	65 (3,2)	85 (2,1)	93 (1,3) ▼	92 (1,3) ▼	88 (2,1)	94 (1,1)	98 (0,6) ▼	98 (0,6) ▼	96 (1,1)
Japan	26 (1,3)	24 (1,0)	29 (0,9)	29 (1,0)	61 (1,2)	62 (1,2)	66 (1,0) ▼	67 (0,8) ▼	87 (0,9)	88 (0,6)	90 (0,5) ▼	91 (0,5) ▼	97 (0,3)	98 (0,2) ▼	98 (0,2) ▼	98 (0,2) ▼
Hungary	10 (1,0)	11 (1,0)	13 (1,2) ▼	10 (0,8)	36 (1,6)	41 (1,9) ▼	43 (1,9) ▼	40 (1,6)	69 (1,6)	75 (1,6) ▼	75 (1,5) ▼	74 (1,6) ▼	91 (1,0)	95 (0,8) ▼	93 (1,0)	94 (0,9) ▼
England	8 (1,5)	5 (1,0)	6 (0,8)	6 (1,0)	35 (2,5)	26 (2,8) ▲	25 (2,0) ▲	27 (1,5) ▲	69 (2,3)	61 (2,9) ▲	60 (2,2) ▲	61 (1,5) ▲	90 (1,4)	90 (1,5)	88 (1,2)	87 (1,0)
Russian Federation	8 (0,9)	6 (0,8) ▲	12 (1,6) ▼	9 (1,2)	33 (1,8)	30 (1,8)	39 (2,8)	38 (3,1)	68 (2,1)	66 (1,8)	73 (2,7)	73 (2,4)	91 (1,2)	92 (0,9)	93 (1,4)	93 (1,1)
Lithuania	6 (0,7)	5 (0,6)	3 (0,6) ▲	2 (0,5) ▲	30 (1,1)	28 (1,2)	18 (2,0) ▲	17 (1,5) ▲	65 (1,3)	63 (1,4)	53 (2,3) ▲	50 (2,3) ▲	90 (0,8)	90 (0,8)	85 (1,8) ▲	81 (1,7) ▲
United States	6 (0,6)	7 (0,7)	7 (1,0)	4 (0,7)	31 (1,5)	29 (1,6)	30 (1,6)	26 (2,0) ▲	67 (1,4)	64 (1,6)	62 (1,8)	61 (2,4) ▲	92 (0,8)	90 (1,0)	87 (1,1) ▲	86 (1,5) ▲
Australia	6 (1,3)	7 (1,1)	– –	7 (1,0)	24 (1,8)	29 (2,4)	– –	33 (1,8) ▼	61 (1,9)	65 (2,3)	– –	68 (1,7) ▼	89 (1,0)	90 (1,4)	– –	90 (1,0)
Armenia	6 (0,9)	2 (0,3) ▲	◊ ◊	◊ ◊	27 (1,9)	21 (1,3) ▲	◊ ◊	◊ ◊	63 (1,4)	54 (1,5) ▲	◊ ◊	◊ ◊	88 (0,8)	82 (1,0) ▲	◊ ◊	◊ ◊
Czech Republic	6 (0,7)	◊ ◊	9 (1,2) ▼	15 (2,0) ▼	26 (1,2)	◊ ◊	35 (2,1) ▼	47 (2,4) ▼	66 (1,4)	◊ ◊	71 (2,1) ▼	82 (1,4) ▼	92 (0,8)	◊ ◊	94 (1,1)	98 (0,5) ▼
Serbia	5 (0,8)	4 (0,4)	◊ ◊	◊ ◊	24 (1,3)	21 (1,1)	◊ ◊	◊ ◊	57 (1,8)	52 (1,4) ▲	◊ ◊	◊ ◊	83 (1,2)	80 (0,9)	◊ ◊	◊ ◊
Bulgaria	4 (0,8)	3 (0,7)	9 (2,1) ▼	17 (2,0) ▼	20 (1,5)	19 (1,8)	32 (3,0) ▼	40 (2,8) ▼	49 (1,9)	51 (2,1)	67 (2,5) ▼	69 (2,4) ▼	74 (1,7)	82 (1,6) ▼	90 (1,2) ▼	90 (1,1) ▼
Slovenia	4 (0,6)	3 (0,5)	– –	4 (0,7)	25 (1,0)	21 (1,0) ▲	– –	22 (1,3)	65 (1,4)	60 (1,3) ▲	– –	60 (1,8)	92 (0,8)	90 (0,9)	– –	90 (0,9)
Israel	4 (0,5)	6 (0,6) ▼	4 (0,5)	– –	19 (1,3)	27 (1,5) ▼	19 (1,3)	– –	48 (1,7)	60 (1,8) ▼	49 (1,9)	– –	75 (1,4)	86 (1,2) ▼	76 (2,0)	– –
Romania	4 (0,6)	4 (0,6)	4 (0,9)	4 (0,6)	20 (1,3)	21 (1,8)	20 (2,0)	21 (1,6)	46 (1,8)	52 (2,2) ▼	51 (2,6)	52 (2,2) ▼	73 (1,7)	79 (1,7) ▼	79 (2,1)	79 (1,6) ▼
Scotland	4 (0,6)	4 (0,6)	◊ ◊	5 (1,4)	23 (1,8)	25 (2,1)	◊ ◊	24 (2,7)	57 (2,2)	63 (2,4) ▼	◊ ◊	60 (2,6)	85 (1,3)	90 (1,1) ▼	◊ ◊	87 (1,4)
Thailand	3 (0,8)	◊ ◊	3 (0,7)	– –	12 (1,7)	◊ ◊	17 (1,9)	– –	34 (2,2)	◊ ◊	45 (2,6) ▼	– –	66 (2,0)	◊ ◊	79 (1,8) ▼	– –
Italy	3 (0,6)	3 (0,6)	4 (0,6)	– –	17 (1,2)	19 (1,5)	21 (1,5) ▼	– –	54 (1,5)	56 (1,7)	53 (2,1)	– –	85 (1,1)	86 (1,2)	82 (1,6)	– –
Malaysia	2 (0,5)	6 (1,0) ▼	10 (1,2) ▼	◊ ◊	18 (2,1)	30 (2,4) ▼	36 (2,4) ▼	◊ ◊	50 (2,7)	66 (2,1) ▼	70 (2,1) ▼	◊ ◊	82 (1,9)	93 (0,9) ▼	93 (0,9) ▼	◊ ◊
Cyprus	2 (0,3)	1 (0,2) ▲	2 (0,4)	3 (0,4)	17 (0,8)	13 (0,7) ▲	19 (0,9)	19 (1,0)	48 (0,9)	45 (1,0) ▲	53 (1,2) ▼	51 (1,3)	78 (0,7)	77 (1,0)	82 (0,9) ▼	77 (1,0)
Sweden	2 (0,3)	3 (0,5)	◊ ◊	12 (1,1) ▼	20 (1,0)	24 (1,2) ▼	◊ ◊	46 (2,4) ▼	60 (1,3)	64 (1,5) ▼	◊ ◊	81 (1,8) ▼	90 (0,9)	91 (1,0)	◊ ◊	96 (0,8) ▼
Jordan	1 (0,2)	1 (0,2) ▲	3 (0,5) ▼	◊ ◊	11 (0,8)	8 (1,0) ▲	12 (1,0)	◊ ◊	35 (1,7)	30 (1,9) ▲	33 (1,6)	◊ ◊	61 (1,8)	60 (1,9)	61 (1,4)	◊ ◊
Iran, Islamic Rep. of	1 (0,2)	0 (0,2)	1 (0,2)	0 (0,2)	5 (0,9)	3 (0,4)	6 (0,9)	4 (0,6)	20 (1,7)	20 (1,1)	26 (1,9) ▼	24 (1,9) ▼	51 (1,9)	55 (1,4)	61 (1,6) ▼	59 (1,8) ▼
Lebanon	1 (0,2)	0 (0,1) ▲	◊ ◊	◊ ◊	10 (1,2)	4 (0,6) ▲	◊ ◊	◊ ◊	36 (2,4)	27 (1,8) ▲	◊ ◊	◊ ◊	74 (2,3)	68 (1,9)	◊ ◊	◊ ◊
Indonesia	1 (0,2)	1 (0,2)	2 (0,3) ▼	◊ ◊	5 (0,8)	6 (0,7)	8 (0,9) ▼	◊ ◊	22 (1,8)	24 (1,7)	23 (1,4)	◊ ◊	52 (2,2)	55 (2,4)	50 (2,1)	◊ ◊
Egypt	1 (0,1)	1 (0,2)	◊ ◊	◊ ◊	5 (0,4)	6 (0,5)	◊ ◊	◊ ◊	21 (1,0)	24 (1,2)	◊ ◊	◊ ◊	47 (1,5)	52 (1,7) ▼	◊ ◊	◊ ◊
Norway	0 (0,1)	0 (0,2)	◊ ◊	4 (0,4) ▼	11 (0,7)	10 (0,6)	◊ ◊	26 (1,3) ▼	48 (1,5)	44 (1,6)	◊ ◊	64 (1,3) ▼	85 (0,8)	81 (1,2) ▲	◊ ◊	90 (0,9) ▼
Palestinian Nat'l Auth.	0 (0,1)	0 (0,1)	◊ ◊	◊ ◊	3 (0,4)	4 (0,4)	◊ ◊	◊ ◊	15 (0,9)	19 (1,2) ▼	◊ ◊	◊ ◊	39 (1,4)	46 (1,5) ▼	◊ ◊	◊ ◊
Colombia	0 (0,0)	◊ ◊	◊ ◊	0 (0,0) ▲	2 (0,3)	◊ ◊	◊ ◊	2 (0,7)	11 (1,1)	◊ ◊	◊ ◊	7 (0,9) ▲	39 (2,1)	◊ ◊	◊ ◊	20 (1,9) ▲
Bahrain	0 (0,1)	0 (0,0) ▲	◊ ◊	◊ ◊	3 (0,3)	2 (0,2)	◊ ◊	◊ ◊	19 (0,7)	17 (0,7)	◊ ◊	◊ ◊	49 (0,9)	51 (1,1)	◊ ◊	◊ ◊
Tunisia	0 (0,1)	0 (0,0)	0 (0,1)	◊ ◊	3 (0,3)	1 (0,3) ▲	5 (0,5) ▼	◊ ◊	21 (1,2)	15 (1,1) ▲	34 (1,5) ▼	◊ ◊	61 (1,5)	55 (1,6) ▲	78 (1,2) ▼	◊ ◊
Botswana	0 (0,0)	0 (0,0)	◊ ◊	◊ ◊	1 (0,1)	1 (0,2)	◊ ◊	◊ ◊	7 (0,7)	7 (0,7)	◊ ◊	◊ ◊	32 (1,3)	32 (1,5)	◊ ◊	◊ ◊
Ghana	0 (0,0)	0 (0,0)	◊ ◊	◊ ◊	0 (0,1)	0 (0,0)	◊ ◊	◊ ◊	4 (0,7)	2 (0,5) ▲	◊ ◊	◊ ◊	17 (1,4)	9 (1,3) ▲	◊ ◊	◊ ◊

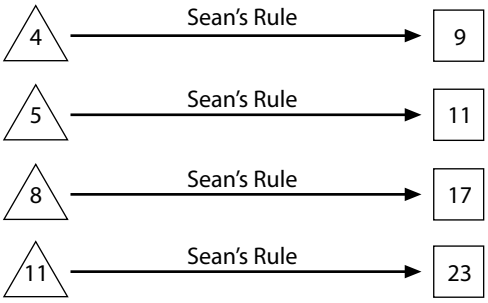
Trend notes: Data are not shown for Kuwait, Morocco, Saudi Arabia, and Turkey, because comparable data from previous cycles are not available. Data for Indonesia do not include Islamic schools.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 percent significantly higher.
▼ 2007 percent significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

EXAMPLE ITEM

Example Item 1 Advanced International Benchmark (above 625 point) of Mathematics Achievement

TIMSS 2007 Mathematics 4

Content Domain: Number
Description: Writes two-step rule for a linear relationship between pairs of numbers.



Sean used the same rule to get the number in the □ from the number in the △.
What was the rule?

Answer: *You double the number and add one.*

Example: $2 \cdot 4 = 8$
$8 + 1 = 9$

The answer shown illustrates the type of student response that was given full credit.

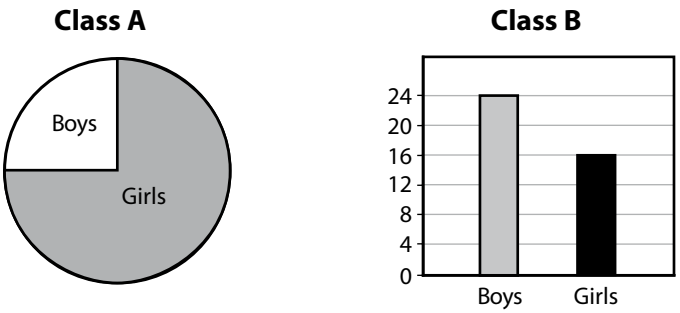
	Country	Percent Full Credit		
	Hong Kong SAR	39	(2,7)	▲
	Japan	38	(2,1)	▲
	Singapore	36	(2,1)	▲
	Chinese Taipei	33	(2,4)	▲
	England	28	(2,3)	▲
1	Kazakhstan	28	(4,2)	▲
	Hungary	28	(2,4)	▲
	Russian Federation	23	(3,1)	▲
2 †	United States	23	(1,4)	▲
1	Latvia	22	(2,3)	▲
	Italy	22	(1,7)	▲
	Australia	20	(3,1)	
†	Scotland	17	(1,7)	
†	Denmark	17	(2,1)	
	New Zealand	17	(1,6)	
	International Avg.	15	(0,3)	
	Germany	13	(1,2)	
‡	Netherlands	13	(2,0)	
1	Lithuania	13	(1,7)	
	Slovak Republic	13	(2,0)	
	Austria	11	(1,6)	▼
	Ukraine	11	(1,5)	▼
	Norway	9	(1,4)	▼
	Slovenia	8	(0,8)	▼
	Sweden	7	(1,3)	▼
	Czech Republic	6	(1,0)	▼
	Tunisia	3	(0,5)	▼
	Colombia	1	(0,4)	▼

Example Item 2 Advanced International Benchmark (above 625 point) of Mathematics Achievement

TIMSS 2007 Mathematics 4

Content Domain: Data Display
Description: Uses data from two different graph types to solve a problem.

Class A and B each have 40 students.



There are more girls in Class A than in Class B. How many more?

- (A) 14
- (B) 16l
- (C) 24
- (D) 30

	Country	Percent Full Credit		
	Singapore	63	(2,3)	▲
	Hong Kong SAR	63	(2,3)	▲
1	Kazakhstan	51	(3,7)	▲
	Chinese Taipei	47	(2,5)	▲
1	Lithuania	46	(2,1)	▲
‡	Netherlands	44	(2,6)	▲
	Russian Federation	42	(3,0)	▲
	Japan	41	(2,2)	▲
	England	40	(2,5)	▲
	Slovak Republic	39	(2,1)	▲
2 †	United States	38	(1,8)	▲
	Hungary	37	(2,9)	
	Sweden	37	(2,0)	▲
1	Latvia	37	(2,5)	
	Australia	36	(2,2)	
	Slovenia	35	(2,1)	
	Germany	35	(1,9)	
†	Denmark	34	(2,6)	
†	Scotland	34	(2,3)	
	Austria	34	(2,1)	
	International Avg.	32	(0,4)	
	Ukraine	32	(2,1)	
	New Zealand	32	(1,6)	
	Norway	31	(2,3)	
	Czech Republic	31	(2,6)	
	Italy	26	(2,2)	▼
	Tunisia	14	(1,7)	▼
	Colombia	9	(1,5)	▼

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ Percent significantly higher than international average.
▼ Percent significantly lower than international average
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Example Item 3 High International Benchmark (between 550-625 point) of Mathematics Achievement

TIMSS 2007 Mathematics 4

Content Domain: Number
Description: Determines the missing digit to give a specified difference in a three-digit subtraction problem.

$$\begin{array}{r} 942 \\ -5\bigstar7 \\ \hline 415 \end{array}$$

Mano did the subtraction problem above for homework but spilled some of his drink on it. One digit could not be read. His answer of 415 was correct. What is the missing digit?

Answer: 2

The answer shown illustrates the type of student response that was given full credit.

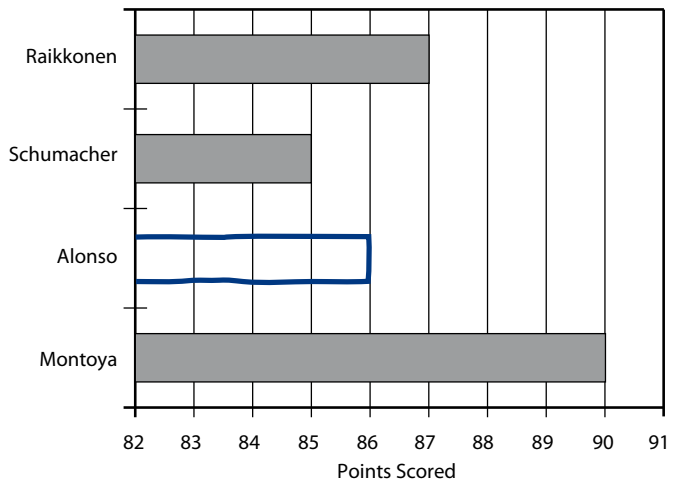
	Ország	Percent Full Credit		
	Chinese Taipei	88	(1,6)	▲
	Hong Kong SAR	85	(1,9)	▲
	Singapore	85	(1,4)	▲
	Russian Federation	84	(1,8)	▲
1	Kazakhstan	83	(3,1)	▲
	Japan	80	(1,8)	▲
1	Lithuania	71	(2,3)	▲
1	Latvia	71	(2,6)	▲
	Ukraine	68	(2,3)	▲
	Hungary	51	(2,8)	▲
	Slovak Republic	50	(2,3)	▲
	Italy	49	(2,1)	▲
	International Avg.	42	(0,4)	
	Germany	41	(2,2)	
	Czech Republic	41	(2,6)	
2 †	United States	41	(1,8)	
	Austria	41	(2,4)	
	Slovenia	31	(2,0)	▼
‡	Netherlands	31	(2,6)	▼
†	Denmark	28	(2,5)	▼
	England	28	(2,1)	▼
	Colombia	25	(2,1)	▼
†	Scotland	25	(2,2)	▼
	Australia	22	(2,6)	▼
	Sweden	18	(1,7)	▼
	New Zealand	18	(1,6)	▼
	Norway	18	(1,9)	▼
	Tunisia	18	(1,8)	▼

Example Item 4 High International Benchmark (550) of Mathematics Achievement

TIMSS 2007 Mathematics 4

Content Domain: Data Display
Description: Completes a bar graph to show a specified comparison.

This graph shows the points obtained by 4 drivers in the car racing championship. Montoya is in first place. Alonso is in third place. Draw a bar which shows how many points Alonso has scored.



The answer shown illustrates the type of student response that was given full credit.

	Country	Percent Full Credit		
	Hong Kong SAR	77	(1,9)	▲
	Chinese Taipei	72	(1,8)	▲
	Japan	71	(2,0)	▲
	Singapore	70	(2,1)	▲
1	Kazakhstan	63	(3,7)	▲
‡	Netherlands	55	(2,5)	▲
	Sweden	54	(2,5)	▲
1	Latvia	54	(2,8)	▲
	Australia	52	(3,0)	▲
	England	52	(2,5)	▲
2 †	United States	51	(1,7)	▲
	Russian Federation	50	(3,2)	▲
†	Denmark	48	(2,7)	▲
1	Lithuania	47	(2,9)	▲
	Austria	46	(2,4)	▲
	Hungary	45	(3,0)	▲
†	Scotland	44	(2,4)	▲
	New Zealand	42	(1,9)	▲
	Slovenia	41	(2,1)	
	Germany	40	(2,3)	
	Slovak Republic	38	(2,3)	
	International Avg.	38	(0,4)	
	Italy	36	(2,0)	
	Ukraine	32	(2,6)	▼
	Czech Republic	30	(2,5)	▼
	Norway	30	(2,1)	▼
	Colombia	8	(1,4)	▼
	Tunisia	4	(1,0)	▼

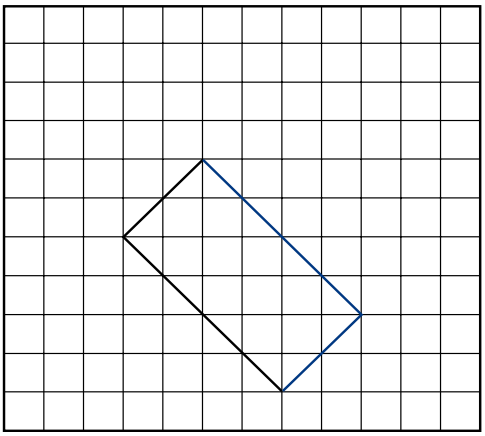
† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ Percent significantly higher than international average.
▼ Percent significantly lower than international average
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Example Item 5 Intermediate International Benchmark (between 475-550 points) of Mathematics Achievement

TIMSS 2007 Mathematics 4

Content Domain: Geometric Shapes and Measures
Description: Draws a rectangle given two adjacent sides.

Here are two sides of a rectangle. Draw the other two sides.



The answer shown illustrates the type of student response that was given full credit.

	Country	Percent Full Credit		
	Hong Kong SAR	90	(1,4)	▲
	Japan	78	(1,8)	▲
	Chinese Taipei	77	(1,9)	▲
	Russian Federation	75	(2,8)	▲
	Czech Republic	72	(2,2)	▲
	England	70	(1,9)	▲
	Singapore	69	(2,3)	▲
	Australia	68	(3,3)	▲
	Slovak Republic	67	(2,5)	▲
	Sweden	66	(2,0)	▲
†	Denmark	66	(2,6)	▲
1	Kazakhstan	65	(4,6)	▲
	Germany	62	(2,1)	▲
	Hungary	62	(2,5)	▲
	New Zealand	61	(1,8)	▲
‡	Netherlands	60	(2,6)	▲
	Austria	60	(2,2)	▲
1	Lithuania	57	(2,6)	
	Slovenia	57	(2,1)	
2 †	United States	55	(1,7)	
†	Scotland	55	(2,4)	
	International Avg.	54	(0,4)	
	Italy	54	(2,2)	
	Ukraine	50	(2,3)	
	Norway	45	(2,7)	▼
	Tunisia	31	(2,3)	▼
	Colombia	27	(3,1)	▼
1	Latvia	–	–	

Example Item 6 Intermediate International Benchmark (between 475-550 points) of Mathematics Achievement

TIMSS 2007 Mathematics 4

Content Domain: Number
Description: Solves a measurement word problem involving subtraction of two-digit numbers.

Al wanted to find how much his cat weighed. He weighed himself and noted that the scale read 57 kg. He then stepped on the scale holding his cat and found that it read 62 kg.
What was the weight of the cat in kilograms?

Answer: 5 kilograms

The answer shown illustrates the type of student response that was given full credit.

	Country	Percent Full Credit		
	Chinese Taipei	95	(1,2)	▲
	Singapore	87	(1,3)	▲
	Russian Federation	86	(1,8)	▲
	Hong Kong SAR	86	(1,7)	▲
1	Kazakhstan	85	(2,6)	▲
‡	Netherlands	85	(1,9)	▲
	Japan	83	(2,0)	▲
1	Lithuania	81	(1,8)	▲
	Austria	80	(2,1)	▲
	Germany	80	(1,6)	▲
1	Latvia	80	(2,2)	▲
	Czech Republic	76	(2,1)	▲
†	Denmark	75	(2,2)	▲
	Hungary	73	(2,4)	▲
	Slovenia	69	(2,2)	▲
	Italy	68	(2,0)	▲
	Ukraine	68	(2,4)	▲
	Norway	67	(2,4)	▲
	Sweden	66	(2,4)	▲
†	Scotland	64	(2,7)	
	England	63	(2,2)	
	Australia	61	(2,4)	
	Slovak Republic	60	(2,3)	
	International Avg.	60	(0,3)	
2 †	United States	60	(1,7)	
	New Zealand	53	(2,1)	▼
	Tunisia	28	(2,3)	▼
	Colombia	18	(2,1)	▼

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ Percent significantly higher than international average.
▼ Percent significantly lower than international average
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Example Item 7 Intermediate International Benchmark (between 475-550 points) of Mathematics Achievement

TIMSS 2007 Mathematics 4

Content Domain: Number
Description: Identifies a three-digit number described in units, tens, and hundreds.

Which number equals 3 ones + 2 tens + 4 hundreds?

(A) 432
(B) 423
(C) 324
(D) 234

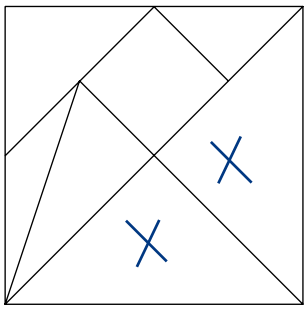
	Country	Percent Full Credit		
	Chinese Taipei	89	(1,4)	▲
‡	Netherlands	88	(1,8)	▲
	Singapore	86	(1,5)	▲
	Germany	84	(1,5)	▲
	England	84	(1,8)	▲
	Japan	83	(1,6)	▲
	Hungary	82	(2,2)	▲
	Russian Federation	82	(1,8)	▲
	Hong Kong SAR	81	(2,0)	▲
1	Latvia	81	(2,2)	▲
	Slovak Republic	81	(1,7)	▲
†	Denmark	80	(2,0)	▲
	Austria	80	(1,7)	▲
	Sweden	80	(1,6)	▲
2 †	United States	79	(1,4)	▲
1	Lithuania	73	(2,1)	
†	Scotland	73	(2,3)	
	Slovenia	73	(2,0)	
1	Kazakhstan	73	(3,3)	
	Czech Republic	71	(2,3)	
	International Avg.	71	(0,4)	
	New Zealand	70	(2,0)	
	Italy	69	(2,2)	
	Norway	68	(2,4)	
	Ukraine	67	(2,4)	
	Australia	67	(2,5)	
	Tunisia	59	(2,6)	▼
	Colombia	20	(2,0)	▼

Example Item 8 Low International Benchmark (between 400-475 points) of Mathematics Achievement

TIMSS 2007 Mathematics 4

Content Domain: Geometric Shapes and Measures
Description: Identifies two triangles with the same size and shape in a complex figure.

The square is cut into 7 pieces. Put an X on each of the 2 triangles that are the same size and shape.



	Country	Percent Full Credit		
	Hong Kong SAR	91	(1,2)	▲
	Slovenia	91	(1,3)	▲
1	Lithuania	89	(1,3)	▲
†	Denmark	88	(1,8)	▲
†	Scotland	88	(1,4)	▲
	England	88	(1,4)	▲
	Singapore	88	(1,4)	▲
	Japan	87	(1,4)	▲
	Italy	87	(1,5)	▲
	Sweden	86	(1,6)	▲
	Australia	85	(1,9)	▲
2 †	United States	85	(1,0)	▲
	Slovak Republic	84	(1,9)	▲
	Norway	84	(1,9)	▲
	Czech Republic	83	(1,8)	▲
	Austria	82	(2,1)	▲
	Chinese Taipei	81	(1,9)	▲
	Hungary	81	(2,1)	▲
1	Latvia	81	(2,1)	▲
	Russian Federation	81	(2,6)	▲
	New Zealand	81	(1,4)	▲
‡	Netherlands	79	(2,0)	▲
1	Kazakhstan	77	(2,2)	▲
	Germany	76	(1,8)	▲
	International Avg.	72	(0,3)	
	Ukraine	67	(2,3)	▼
	Colombia	59	(2,8)	▼
	Tunisia	38	(2,2)	▼

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ Percent significantly higher than international average.
▼ Percent significantly lower than international average
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Example Item 9 Advanced International Benchmark (above 625 point) of Mathematics Achievement

TIMSS 2007 Mathematics 8

Content Domain: Algebra
Description: Solves a word problem that can be expressed as two linear equations with two variables.

Joe knows that a pen costs 1 zed more than a pencil. His friend bought 2 pens and 3 pencils for 17 zeds. How many zeds will Joe need to buy 1 pen and 2 pencils?
Show your work.

Pencil: x zed
Pen: $y = x + 1$ zed
$2y + 3x = 17$
$2(x + 1) + 3x = 17$
$2x + 2 + 3x = 17 \quad /-2$
$5x = 15 \quad /:5$
$x = 3$
One pencil costs 3 zed..
$y = x + 1$
$y = 3 + 1 = 4$
One pen costs 4 zed.
$x + 2y = 4 + 2 \cdot 3 = 4 + 6 = 10$
One pen and two pencils cost 10 zeds.

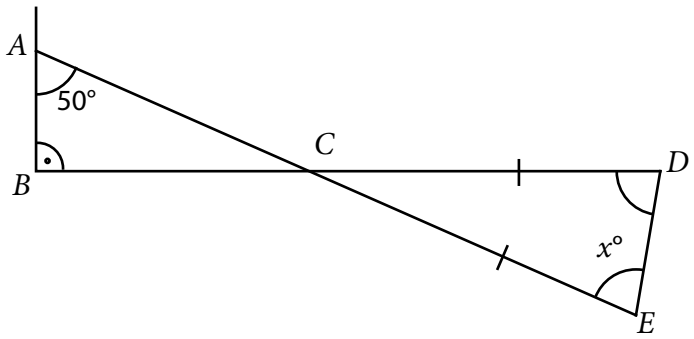
The answer shown illustrates the type of student response that was given full credit.

	Country	Percent Full Credit		
	Chinese Taipei	68	(2,3)	▲
	Korea, Rep. of	68	(2,1)	▲
	Singapore	59	(1,9)	▲
†	Hong Kong SAR	53	(2,8)	▲
	Japan	42	(1,9)	▲
2 †	United States	37	(2,0)	▲
	Australia	36	(2,6)	▲
†	England	34	(2,5)	▲
	Sweden	34	(1,8)	▲
	Slovenia	30	(2,0)	▲
†	Scotland	29	(1,9)	▲
	Czech Republic	25	(2,1)	▲
	Hungary	24	(2,2)	▲
	Malta	21	(1,6)	▲
	Italy	19	(1,9)	
	Russian Federation	19	(1,6)	
	Norway	18	(1,7)	
	Turkey	18	(2,0)	
	International Avg.	18	(0,2)	
	Bulgaria	17	(1,8)	
1	Lithuania	15	(1,7)	
1 2	Serbia	15	(1,7)	
	Romania	14	(1,8)	
	Cyprus	11	(1,4)	▼
	Ukraine	11	(1,2)	▼
	Colombia	9	(1,0)	▼
	Tunisia	6	(0,9)	▼
	Egypt	2	(0,5)	▼

Example Item 10 Advanced International Benchmark (above 625 point) of Mathematics Achievement

TIMSS 2007 Mathematics 8

Content Domain: Geometry
Description: Uses properties of isosceles and right triangles to find the measure of an angle.



In this diagram, $CD = CE$.
What is the value of x?

(A) 40
(B) 50
(C) 60
(D) 70

	Country	Percent Full Credit		
	Singapore	75	(1,7)	▲
	Chinese Taipei	73	(2,2)	▲
	Korea, Rep. of	73	(1,8)	▲
	Japan	71	(1,9)	▲
†	Hong Kong SAR	69	(2,8)	▲
†	England	42	(2,8)	▲
	Malta	40	(1,7)	▲
	Hungary	38	(2,6)	▲
	Bulgaria	36	(2,6)	
1	Lithuania	35	(2,1)	
	Norway	34	(2,3)	
	Russian Federation	34	(2,3)	
	Turkey	32	(2,1)	
	International Avg.	32	(0,3)	
	Australia	32	(2,8)	
	Italy	31	(2,3)	
	Sweden	31	(2,0)	
†	Scotland	31	(2,0)	
1 2	Serbia	30	(2,2)	
	Tunisia	28	(2,2)	
	Egypt	28	(2,2)	
	Ukraine	28	(2,0)	▼
	Cyprus	28	(2,0)	▼
	Czech Republic	27	(1,7)	▼
2 †	United States	26	(1,4)	▼
	Slovenia	25	(2,4)	▼
	Romania	24	(2,4)	▼
	Colombia	17	(1,4)	▼

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ Percent significantly higher than international average.
▼ Percent significantly lower than international average
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Example Item 11 High International Benchmark (between 550-625 point) of Mathematics Achievement

TIMSS 2007 Mathematics 8

Content Domain: Algebra
Description: Solves a linear equation given in a word problem.

In Zedland, total shipping charges to ship an item are given by the equation y = 4x + 30, where x is the weight in grams and y is the cost in zeds. If you have 150 zeds, how many grams can you ship?

(A) 630
(B) 150
(C) 120
(D) 30

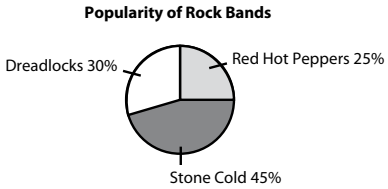
	Country	Percent Full Credit		
	Chinese Taipei	75	(2,0)	▲
	Korea, Rep. of	71	(1,8)	▲
†	Hong Kong SAR	67	(2,9)	▲
	Japan	65	(2,1)	▲
1 2	Serbia	57	(2,9)	▲
2 †	United States	57	(2,2)	▲
	Singapore	56	(1,7)	▲
	Russian Federation	53	(3,1)	▲
1	Lithuania	50	(2,5)	▲
	Bulgaria	47	(2,4)	▲
	Romania	44	(2,8)	▲
	Malta	41	(1,7)	▲
	Ukraine	39	(2,5)	▲
	Hungary	39	(2,2)	▲
	Czech Republic	39	(2,5)	▲
†	England	39	(2,8)	
	Slovenia	36	(2,2)	
	Turkey	35	(2,1)	
	Cyprus	35	(1,9)	
	International Avg.	34	(0,3)	
†	Scotland	26	(2,4)	▼
	Australia	26	(2,0)	▼
	Italy	24	(2,0)	▼
	Egypt	24	(1,9)	▼
	Sweden	23	(1,5)	▼
	Colombia	19	(1,5)	▼
	Tunisia	19	(1,8)	▼
	Norway	10	(1,1)	▼

Example Item 12 High International Benchmark (between 550-625 point) of Mathematics Achievement

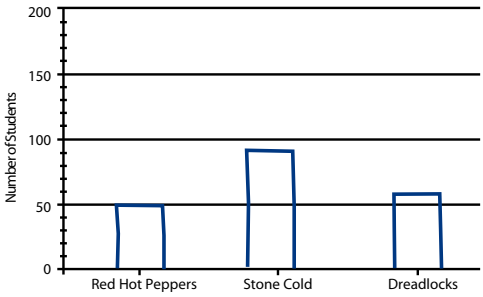
TIMSS 2007 Mathematics 8

Content Domain: Data and Chance
Description: Uses the information in a pie chart showing percentages to draw a bar chart.

The results of a survey of 200 students are shown in the pie chart.



Make a bar chart showing the number of students in each category in the pie chart.



The answer shown illustrates the type of student response that was given full credit

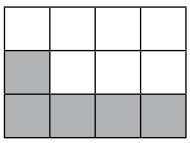
	Country	Percent Full Credit		
	Korea, Rep. of	76	(2,0)	▲
	Singapore	75	(1,7)	▲
	Chinese Taipei	70	(2,1)	▲
	Japan	68	(1,8)	▲
†	Hong Kong SAR	66	(2,6)	▲
	Sweden	56	(2,2)	▲
1	Lithuania	51	(2,4)	▲
	Hungary	48	(2,6)	▲
	Czech Republic	45	(2,4)	▲
†	England	45	(2,7)	▲
	Slovenia	44	(2,5)	▲
	Norway	41	(2,1)	▲
2 †	United States	40	(1,9)	▲
	Malta	40	(1,9)	▲
	Australia	38	(2,7)	▲
†	Scotland	38	(2,3)	▲
	Russian Federation	35	(2,5)	▲
	Cyprus	33	(2,3)	▲
	Romania	29	(2,7)	
	International Avg.	27	(0,3)	
1 2	Serbia	27	(2,8)	
	Italy	27	(1,9)	
	Ukraine	24	(2,2)	
	Bulgaria	23	(2,5)	
	Turkey	17	(1,7)	▼
	Colombia	10	(1,8)	▼
	Egypt	10	(1,3)	▼
	Tunisia	8	(1,1)	▼

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ Percent significantly higher than international average.
▼ Percent significantly lower than international average
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

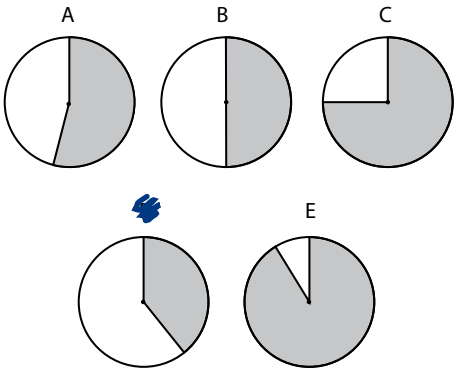
Example Item 13 Intermediate International Benchmark (between 475-550 point) of Mathematics Achievement

TIMSS 2007 Mathematics 8

Content Domain: Number
Description: Identifies a circular model of a fraction that best approximates a given rectangular model of the same fraction.



Which circle has approximately the same fraction of its area shaded as the rectangle above?

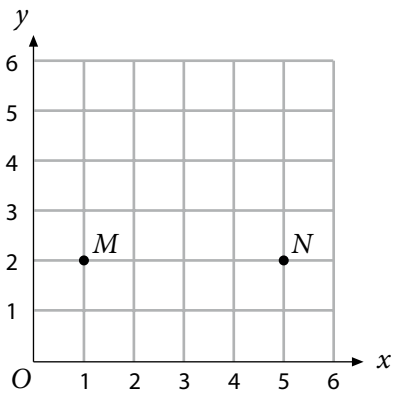


	Country	Percent Full Credit		
	Korea, Rep. of	89	(1,3)	▲
	Japan	85	(1,8)	▲
†	Hong Kong SAR	82	(2,3)	▲
	Chinese Taipei	81	(1,7)	▲
2 †	United States	81	(1,3)	▲
	Singapore	81	(1,7)	▲
	Sweden	77	(1,8)	▲
†	England	77	(2,2)	▲
	Hungary	77	(2,2)	▲
	Australia	75	(2,3)	▲
	Czech Republic	74	(1,9)	▲
1	Lithuania	74	(2,3)	▲
†	Scotland	74	(2,0)	▲
	Norway	73	(2,2)	▲
	Russian Federation	73	(2,2)	▲
	Slovenia	72	(2,2)	▲
	Malta	72	(1,6)	▲
	Italy	70	(2,3)	▲
	Cyprus	70	(2,0)	▲
	Turkey	64	(2,4)	
	Ukraine	63	(2,4)	
	International Avg.	63	(0,3)	
	Romania	62	(2,8)	
	Tunisia	61	(2,3)	
1 2	Serbia	60	(2,7)	
	Bulgaria	59	(3,0)	
	Colombia	54	(2,9)	▼
	Egypt	44	(2,3)	▼

Example Item 14 Intermediate International Benchmark (475) of Mathematics Achievement

TIMSS 2007 Mathematics 8

Content Domain: Geometry
Description: Description: Uses properties of an isosceles triangle to identify the coordinates of a point on a grid.



Two points M and N are shown in the figure above. John is looking for a point P such that MNP is an isosceles triangle. Which of these points could be point P?

- (3; 5)
- (B) (3; 2)
- (C) (1; 5)
- (D) (5; 1)

	Country	Percent Full Credit		
	Chinese Taipei	86	(1,5)	▲
	Korea, Rep. of	82	(1,6)	▲
	Japan	81	(1,6)	▲
†	Hong Kong SAR	80	(2,6)	▲
	Slovenia	80	(2,2)	▲
1	Lithuania	78	(1,9)	▲
	Singapore	77	(2,0)	▲
	Russian Federation	77	(2,3)	▲
	Hungary	74	(2,1)	▲
†	Scotland	68	(2,1)	▲
	Ukraine	68	(2,4)	▲
1	Serbia	67	(2,8)	▲
	Malta	65	(1,5)	▲
†	England	63	(2,2)	▲
	Czech Republic	63	(2,3)	▲
	Romania	62	(2,6)	▲
	Italy	61	(2,1)	
	Bulgaria	58	(2,8)	
	Egypt	58	(2,0)	
	International Avg.	57	(0,3)	
	Norway	56	(2,3)	
	Australia	51	(2,3)	▼
	Cyprus	51	(2,1)	▼
	Sweden	48	(2,0)	▼
2 †	United States	45	(1,6)	▼
	Turkey	38	(2,0)	▼
	Colombia	30	(2,1)	▼
	Tunisia	26	(1,9)	▼

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ Percent significantly higher than international average.
▼ Percent significantly lower than international average
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Example Item 15 Low International Benchmark (between 400-475 point) of Mathematics Achievement

TIMSS 2007 Mathematics 8

Content Domain: Number
Description: Solves a word problem involving a proportion with unit ratio.

On a school trip there was 1 teacher for every 12 students. If 108 students went on the trip, how many teachers were on the trip?

(A) 7
(B) 8
(C) 9
(D) 10

	Country	Percent Full Credit		
	Korea, Rep. of	97	(0,6)	▲
	Singapore	95	(1,0)	▲
1	Lithuania	95	(0,9)	▲
	Chinese Taipei	95	(1,0)	▲
	Japan	94	(1,0)	▲
†	Hong Kong SAR	94	(1,4)	▲
	Hungary	93	(1,1)	▲
	Czech Republic	93	(1,5)	▲
	Russian Federation	92	(1,5)	▲
2 †	United States	91	(1,0)	▲
1 2	Serbia	89	(1,5)	▲
	Italy	89	(1,2)	▲
	Slovenia	89	(1,2)	▲
	Australia	88	(1,6)	▲
	Sweden	87	(1,2)	▲
	Malta	86	(1,4)	▲
	Ukraine	85	(1,5)	▲
	Norway	84	(1,9)	▲
†	England	83	(1,8)	▲
	Cyprus	82	(1,6)	
†	Scotland	80	(1,9)	
	Romania	80	(2,3)	
	Bulgaria	79	(2,3)	
	International Avg.	79	(0,3)	
	Tunisia	78	(2,0)	
	Turkey	77	(2,0)	
	Egypt	72	(2,1)	▼
	Colombia	62	(1,7)	▼

Example Item 16 Low International Benchmark (400) of Mathematics Achievement

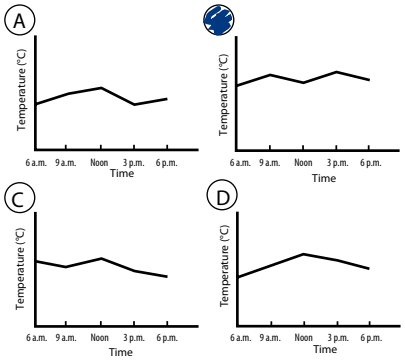
TIMSS 2007 Mathematics 8

Content Domain: Data and Chance
Description: Given a table of values for two variables, selects the line graph that could represent the given data.

The table shows the temperatures at various times on a certain day.

Time	6 a.m.	9 a.m.	Noon	3 p.m.	6 p.m.
Temperature °C	12	17	14	18	15

A graph, without a temperature scale, is drawn. Of the following, which could be the graph that shows the information given in the table?



	Country	Percent Full Credit		
	Korea, Rep. of	97	(0,7)	▲
	Japan	96	(0,8)	▲
	Singapore	93	(1,1)	▲
	Chinese Taipei	92	(1,1)	▲
1	Lithuania	90	(1,4)	▲
	Slovenia	90	(1,4)	▲
2 †	United States	89	(1,0)	▲
	Sweden	89	(1,2)	▲
	Czech Republic	88	(1,3)	▲
	Hungary	88	(1,6)	▲
†	Hong Kong SAR	87	(1,6)	▲
	Australia	87	(1,7)	▲
	Russian Federation	85	(1,8)	▲
	Italy	84	(1,4)	▲
†	Scotland	83	(1,6)	▲
	Malta	82	(1,4)	▲
†	England	81	(2,1)	▲
1 2	Serbia	81	(1,9)	▲
	Norway	77	(1,8)	▲
	Ukraine	77	(2,2)	▲
	Cyprus	74	(1,8)	
	Colombia	73	(2,2)	
	Bulgaria	72	(2,3)	
	International Avg.	72	(0,3)	
	Romania	66	(2,5)	▼
	Tunisia	63	(2,4)	▼
	Turkey	61	(2,3)	▼
	Egypt	52	(2,4)	▼

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ Percent significantly higher than international average.
▼ Percent significantly lower than international average
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

SCIENCE

OVERVIEW

The TIMSS 2007 Assessment Frameworks[8] contain the science framework summarizing the theoretical background of the construction of the science test. This chapter presents the main points of the science framework.

At both grades science assessment is organized around two dimensions, content and cognitive domains. The content dimension specifies the domains or subject matter to be assessed within science. The content domains differ for the two grades. At fourth grade, Life Science receives more emphasis. At eighth grade, physics and chemistry are assessed as separate content domains, and receive more emphasis than at fourth grade, where they are assessed as one content domain, physical science. Cognitive dimensions – specifying the domains of thinking process – are the same for both grades since they require similar cognitive processes from students participating in the assessment at eighth or fourth grade.

First, the structure of subject domains then the cognitive domains will be described shortly. For more detailed description of the framework see Appendix.

Science Content Domains

TIMSS observing the curricular differences in the participating countries, defined three science content domains which cover the science topic areas to be assessed in TIMSS 2007: Life Science, Physical Science, Earth Science.

The framework contains the topic areas of each content domain.

LIFE SCIENCE ~ Characteristics and life processes of living things; life cycles, reproduction, and heredity; interaction with the environment; ecosystems; human health.

PHYSICAL SCIENCE ~ Classification and properties of matter; physical states and changes in matter; energy sources, heat, and temperature; light and sound; electricity and magnetism; forces and motion.

EARTH SCIENCE ~ Earth's structure, physical characteristics, and resources; Earth's processes, cycles, and history; Earth in the solar system.

Table IV displays the number of items in the three content domains and the maximum scores for each item with percentages of the overall assessment.

Table IV Distribution of Test Items by Content Domains, Fourth Grade

Content Domain	Number of Items	Score to be Achieved
Life Science	74	85 (44%)
Physical Science	64	67 (35%)
Earth Science	36	42 (21%)
Total	174	194 (100%)

Four major content domains – biology, chemistry, physics, and Earth science – define the science content covered in the eighth-grade assessment. It is important to note, however, that in an international assessment such as TIMSS the organization of science topics into these domains does not correspond to the structure of science instruction in all countries. In many countries, for example, science is taught as general science or integrated science whereas in others, in Hungary for example, science is taught as separate subjects. This difference is usually considered when analysing background data or different variables so countries where science is taught as integrated subject are displayed in one group and countries where science is taught as separate subjects are shown in another group.

[8] Mullis, I.V.S.et al.:TIMMS 2007 Assessment Frameworks. TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College, 2005.

Each content domain comprises several main topic areas.

BIOLOGY ~ Characteristics, classification, and life processes of organisms; cells and their functions; life cycles, reproduction, and heredity; diversity, adaptation, and natural selection; ecosystems; human health.

CHEMISTRY ~ Classification and composition of matter; properties of matter; chemical change.

PHYSICS ~ Physical states and changes in matter; energy transformations; heat and temperature; light; sound; electricity and magnetism; forces and motion.

EARTH SCIENCE ~ Earth's structure and physical features; Earth's processes, cycles, and history; Earth's resources, their use and conservation; Earth in the solar system and the universe.

Table V shows the number of items in the four content domains and the maximum scores for each item with percentages of the overall assessment.

Table V Distribution of eTest Items by Content Domains, Eighth Grade

Content Domain	Number of Items	Score to be Achieved
Biology	76	89 (37%)
Chemistry	42	46 (19%)
Physics	55	59 (25%)
Earth Science	41	46 (19%)
Total	214	240 (100%)

Cognitive Domains

To respond correctly to TIMSS 2007 test items students needed skills which can be divided into three main domains: Knowing, Applying, Reasoning.

KNOWING ~ Recall and recognize; define; describe; illustrate with examples; use tools and procedures.

APPLYING ~ Compare, contrast, classify; use models; relate; interpret information; find solutions; explain.

REASONING ~ Analyze, solve problems; integrate, synthesize; hypothesize, predict; design, plan; draw conclusions; generalize; evaluate; justify.

Table VI displays the number of items in the three cognitive domains and the maximum scores for each item with percentages of the overall assessment.

Table VI Distribution of Test Items by Cognitive Domain

Grade	Cognitive Domains	Number of Items	Score to be Achieved
4.	Knowing	77	89 (46%)
	Applying	63	68 (35%)
	Reasoning	34	37 (19%)
	Total	174	194 (100%)
8.	Knowing	84	89 (37%)
	Applying	86	97 (40%)
	Reasoning	44	54 (23%)
	Total	214	240 (100%)

RESULTS AND TRENDS

In this chapter the results of the TIMSS 2007 Science assessment will be displayed. It contains the average achievements of students at fourth and eighth grades in the participating countries, the distribution of students' achievements, the students' achievements by content and cognitive domains, as well as the comparison of the achievements of the previous assessment cycles – in 1995, 1999 and 2003 – and the results of TIMSS 2007 assessment.

Results and Differences

53., 54. pages

Exhibits 7 and 8 display the distribution of the achievement of students from the participating countries in TIMSS 2007 assessment. Countries are shown in a descending order of their average achievements. The graph shows the average scale scores of the participating countries with its 95 percent confidence interval and the ranges in performance for the middle 50 percent of the students (25th to 75th percentiles) as well as the extremes (5th and 95th percentiles). Next to the graphically displayed distribution of achievements, the average scale scores of the countries and the standard errors are shown in the column numerically.

Although the achievements are displayed on a scale with a mean of 500 and a standard deviation of 100 for each grade, it should be noted that the results for the fourth and eighth grades are not directly comparable.

Similar to earlier TIMSS assessments, the four Far East countries, Singapore (587), Chinese Taipei (557), Hong Kong SAR (554) and Japan (548) have the best results. Singapore was the top performing country, the average achievement of its students is significantly better than that of any other participating country in the assessment.

The achievement of Hungarian students at fourth grade (536) is among the best performances. Only the four top-performing Asian countries have statistically significantly better results than Hungarian students. This result is especially remarkable in the light of considering the fact that significant part of the subject domains in the assessment are not or little covered in the Hungarian curricula compared to other countries. This achievement is among the best not only in the region but also in Europe.

Norway is the only participating country among the developed European countries with a significantly lower achievement (477 score point) than the TIMSS scale average of 500.

At eighth grade, Singapore (567) and Chinese Taipei (561) achieved the best results in the science assessment with more than 60 scale scores higher than the TIMSS average of 500. The 6-point difference between them is statistically irrelevant, their performance is equal. The achievements of Japan and South Korea are slightly lower than that of Singapore but statistically the same as that of Chinese Taipei. These four countries top the achievement table of the 59 participating countries.

The performance of Hungarian students at eighth grade is also on a high level in the science assessment. In Europe, they achieved the best results together with students from England, the Czech Republic and Slovenia (539), and similarly to fourth grades, only the top-performing four Far East countries achieved significantly better results.

The fourth and fifth columns in Exhibits 7 and 8 display the grades and average ages of students assessed in the participating countries. Although, there is a positive link between a student's age and their performance, the different achievement results of the participating countries cannot be explained by the differences of students' ages. The characteristics of education systems have bigger impact on the performance of students than students' ages do.

The TIMSS science scales for the fourth and eighth grades were established based on the performance of students in the 1995 assessments with an international mean of 500 and a standard deviation of 100. Since the ranges of the participating countries and the average achievements of the countries can be varied from one assessment cycle to another , instead of changing the scale each time, the 1995 assessment scale is used in the 1999, the 2003 and the 2007 assessments. Therefore, the TIMSS scale average of 500, which is noted several times in our report, is not equal with the international average achievement score of the participating countries in the 2007 assessment cycle.

How Has Science Achievement Changed Since 1995, 1999 and 2003?

55–58. pages

Exhibits 9 and 10 compare the TIMSS 2007 assessment results and achievements and the results of previous assessment cycles in countries which participated in any of them. Both exhibits present the countries in decreasing order of their average achievements. At fourth grade, there are 23 participating countries with comparable science data from 1995 or 2003, or from both assessment cycles. At eighth grade, there was an additional science assessment in 1999 as well. 27 countries have comparable data from all the four assessment cycles (1995, 1999, 2003 and 2007), and there are 36 countries with data from at least one previous assessment cycle which can be compared to the results of TIMSS 2007.

In addition to displaying the average scores of each assessment cycle in the second columns, Exhibits 9 and 10 also present the differences between the results of TIMSS 2007 and previous assessments in the third and the fourth columns (at eighth grade in the fifth column as well). Also in the same columns, if the TIMSS 2007 assessment result is significantly better than that of previous assessments it is indicated with an up arrow, if it is significantly lower than the result from previous cycles it is indicated with a down arrow. If there is no symbol, it means that there is no significant difference between the results of compared assessment cycles.

At fourth grade, there are seven countries showing significant improvement in achievement in 2007 compared to the first, the TIMSS 1995 assessment results. Five out of these countries – Singapore, Hong Kong SAR, Latvia, Slovenia and Iran – show a continuous improvement in the complete 12-year period, between 1995 and 2007, with reaching or outperforming the 50-point (half a standard deviation) scale scores (46-63 scale scores).

Hungary is among the 8 participating countries that show improvement in fourth-grade science assessment results in TIMSS 2007 compared to 1995. In Hungary this significant improvement can be seen between 1995 and 2003. The six-point increase between 2003 and 2007 is within the standard error, so it is insignificant.

Although to a smaller extent than the above mentioned countries show increase, five countries show decline in achievements (5-27 scale scores) – Japan, Austria, the Czech Republic, Scotland and Norway.

At eighth grade, compared to the fourth grade, there are fewer countries and with smaller degrees of change that show any changes. Between 1995 and 2007 South Korea (+7), Slovenia (+24), Hong Kong SAR (+10), Lithuania (+55) and Colombia (+52) show increase, and there are only three countries Norway (-28), the Czech Republic (-16) and Sweden (-42) showing decline.

The Hungarian students' average performance does not show significant change in the 12-year assessment period. On the other hand, the three assessment cycles show fluctuations; between 1995 and 1999 there was a 15-point increase which was followed by a 9-point decrease between 1999-2003, and there was no significant change between 2003-2007 with a 4-point decrease.

Trends Across Grades: Fourth to Eighth Grade Cohort Analysis

Because TIMSS is conducted on a four-year cycle, the cohort of students that was assessed in the fourth grade in 2003 had reached the eighth grade by 2007. This enables the 17 countries that assessed both grades in both assessments to examine how their performance relative to each other changed.

The performance of the fourth grades and the eighth grades in 2003 and 2007 cannot directly be compared since the achievement scales are different in each grade. However, the relative order of the countries' achievement can be analysed, changes and relative rankings of the participating countries within one grade and from fourth grade to eighth grade can be discussed here.

59. page

The four small tables of Table 6 show the average science achievements of the 17 countries in descending order for these grades in 2003 and 2007. Triangles pointing upward indicate that the country average is significantly higher than TIMSS scale average; triangles pointing downward indicate that the country average is significantly lower than TIMSS scale average.

It can be noted that most countries do not show significant changes in their rankings in the four tables. It should also be noted that there are countries which improved in both cycles at both grades. Logically, the cohort analysis in these countries also shows relative improvement of the performance of

the fourth grades in 2003 and the eighth grades in 2007. For example, Slovenia, which shows significant improvement in both the fourth and eighth grades, 20 and 18 scale scores, respectively. Thus, the performance at the fourth grade, which was below the average in 2003, improved significantly, and it was higher than the average at the eighth grade in 2007. It also meant a higher ranking in the relative order of the participants.

In addition to this, Slovenia is one of the education systems where the eighth grades reached better results in both assessment cycles than the fourth grades. It is likely the consequence of their curricular structure. On the contrary, in Italy the eighth grades had lower achievements in both assessment cycles.

In the case of Hungary there is only a small, statistically not relevant change in the ranking in the relative order.

Achievements in content and cognitive domains

As described in the overview, the science assessment is organized around two dimensions, the content and the cognitive domains. Every question can be associated with a content domain (Biology, Physics, Chemistry, Earth Science) and a cognitive domain (Knowing, Applying, Reasoning) according to what students need to answer the question. This association provide the possibility for both content-based and cognitive-oriented analysis of student achievement in science.

60–61. pages

Tables 7 and 8 display the average achievements of students from the participating countries by the content and cognitive domains. The countries are listed in alphabetical order in the Tables. To simplify comparisons of student achievement across domains, the content and cognitive achievement scales at each grade were placed on a scale with a mean of 500 and a standard deviation of 100 in the first cycle of the TIMSS in 1995. Triangles pointing upward indicate that the country average is significantly higher than 500-scale average; triangles pointing downward indicate that the country average is significantly lower than 500-scale average.

The average achievements in the different content and cognitive domains cannot be directly compared, i.e. it cannot be said, for example that students from a country are better in the Physics content domain than in the Biology content domain because items of each domain have different characteristics. On the other hand, the relative rankings of participating countries, i. e. the average scale scores compared to the TIMSS scale average can be analysed. Based on this the weaknesses and strengths of particular countries related to others can be seen.

It can be concluded that there are higher differences in the performances of countries in the cognitive domains than in the performances of countries in the content domains.

It is noteworthy that the high rankings of the Asian countries are based on their results in the Physical Science content domain, since Singapore, Japan, Chinese Taipei and Hong Kong SAR have the highest scale scores in this domain. However, only Singapore could reach outstanding results in all three content domains.

Hungarian students at fourth grade are among the top-performing ones, and reached the best results in the Life science content domain together with Singapore and Italy. Also, they performed above the TIMSS scale average in the two other content domains. Comparing the results in the three content domains to the overall average score, it can be noted that Hungarian students have better results in the Life science content domain than in the overall achievement scale, in the Physical science content domain the results do not differ significantly, and in the content domain of Earth Science Hungarian students' scale score is significantly lower than their overall score.

Singapore is also the best performing country concerning the three cognitive domains at fourth grades. Similarly to Physical science in the content domains, among the cognitive domains it is the Reasoning where the best performing Asian countries proved to be the strongest among all participating countries.

As expected, the Hungarian students reached the best score in the cognitive domain of Knowing.

Comparing data at the eighth grade, one can reach a similar conclusion. Outstanding performance here is based on the outstanding results in the Physics content domain and the Reasoning cognitive domain. In addition to the Far East countries, Australia, England, Lithuania, Slovenia, Sweden and the United States scored the highest in the Reasoning cognitive domain. At eighth grade Hungarian students were the only ones who reached high overall average achievement by performing best in the Applying cognitive domain.

Hungarian students' average scores are signifi cantly above the TIMSS scale average of 500 in every content domain, with the Physics content domain slightly outperform the rest.

8th grade Hungarian students were the most efficient in Applying among the cognitive domains. There is no available data as basis for comparison from previous assessment cycles, but compared to fourth grade, where recalling knowledge is the strongest suit of our students, this is an an improvement nevertheless.

SCIENCE ACHIEVEMENT SCALE, TIMSS 2007 INTERNATIONAL BENCHMARKS AND PERCENTAGE OF STUDENTS REACHING EACH INTERNATIONAL BENCHMARK

The TIMSS science achievement scale designed by the student contextual knowledge and cognitive abilities. To interpret and compare the results more easily, four benchmarks have been determined on the scale. The TIMSS has determined four benchmarks for both grades, and described the students knowledge and abilities on each benchmarks. Students reaching over 625 scale scores belong to the Advanced International Benchmark, 550 to 625 scores to the High International Benchmark, 475 to 550 to the Intermediate International Benchmark, and 400 to 475 to the Low International Benchmark.

Before describing international benchmarks TIMSS conducted a detailed scale anchoring analysis to describe science achievement at these benchmarks. Scale anchoring is a way of describing TIMSS 2007 performance at different points on the TIMSS science scale in terms of the types of items students answered correctly. In order to determine the benchmarks, beyond the data analysis component there was a judgmental component in which the SMIRC (TIMSS 2007 Science and Mathematics Item Review Committee) members examined the science content and cognitive processing dimensions assessed by each item and generalized to describe students' knowledge and understandings.

This chapter presents the four international benchmarks in science for fourth and eighth grades, also, examines the comparability of the results in the participating countries with the help of international benchmarks, then there are some example test items to complete the description of the benchmarks.

TIMSS 2007 International Benchmarks of Science Achievement

What science knowledge and problem-solving skills can be expected from students at fourth and eighth grades at the four TIMSS 2007 international benchmarks? At each grade, there was a substantial variation in performance between students achieving at the high and the low ends of the scale.

66–73. pages i.e.

TIMSS 2007 International Benchmarks of Science For Fourth Grades

Advanced International Benchmark – above 625

Students can apply knowledge and understanding of scientific processes and relationships in beginning scientific inquiry. Students communicate their understanding of characteristics and life processes of organisms as well as of factors relating to human health. They demonstrate understanding of relationships among various physical properties of common materials and have some practical knowledge of electricity. Students demonstrate some understanding of the solar system and Earth's physical features and processes. They show a developing ability to interpret the results of investigations and draw conclusions as well as a beginning ability to evaluate and support an argument.

High International Benchmark – 550-625

Students can apply knowledge and understanding to explain everyday phenomena. Students demonstrate some understanding of plant and animal structure, life processes, and the environment and some knowledge of properties of matter and physical phenomena. They show some knowledge of the solar system, and of Earth's structure, processes, and resources. Students demonstrate beginning scientific inquiry knowledge and skills, and provide brief descriptive responses combining knowledge of science concepts with information from everyday experience of physical and life processes.

Intermediate International Benchmark – 475-550

Students can apply basic knowledge and understanding to practical situations in the sciences. Students recognize some basic information related to characteristics of living things and their interaction with the environment, and show some understanding of human biology and health. They also show some understanding of familiar physical phenomena. Students know some basic facts about the solar system and have a developing understanding of Earth's resources. They demonstrate some ability to interpret information in pictorial diagrams and apply factual knowledge to practical situations.

Low International Benchmark – 400-475

Students have some elementary knowledge of life science and physical science. Students can demonstrate knowledge of some simple facts related to human health and the behavioural and physical characteristics of animals. They recognize some properties of matter, and demonstrate a beginning understanding of forces. Students interpret labelled pictures and simple diagrams, complete simple tables, and provide short written responses to questions requiring factual information.

TIMSS 2007 International Benchmarks of Science for Eighth Grades

Advanced International Benchmark – above 625

Students can demonstrate a grasp of some complex and abstract concepts in biology, chemistry, physics, and Earth science. They have an understanding of the complexity of living organisms and how they relate to their environment. They show understanding of the properties of magnets, sound, and light, as well as demonstrating understanding of structure of matter and physical and chemical properties and changes. Students apply knowledge of the solar system and of Earth's features and processes, and apply understanding of major environmental issues. They understand some fundamentals of scientific investigation and can apply basic physical principles to solve some quantitative problems. They can provide written explanations to communicate scientific knowledge.

High International Benchmark – 550-625

Students can demonstrate conceptual understanding of some science cycles, systems, and principles. They have some understanding of biological concepts including cell processes, human biology and health, and the interrelationship of plants and animals in ecosystems. They apply knowledge to situations related to light and sound, demonstrate elementary knowledge of heat and forces, and show some evidence of understanding the structure of matter, and chemical and physical properties and changes. They demonstrate some understanding of the solar system, Earth's processes and resources, and some basic understanding of major environmental issues. Students demonstrate some scientific inquiry skills. They combine information to draw conclusions, interpret tabular and graphical information, and provide short explanations conveying scientific knowledge.

Intermediate International Benchmark – 475-550

Students can recognize and communicate basic scientific knowledge across a range of topics. They demonstrate some understanding of characteristics of animals, food webs, and the effect of population changes in ecosystems. They are acquainted with some aspects of sound and force and have elementary knowledge of chemical change. They demonstrate elementary knowledge of the solar system, Earth's processes, and resources and the environment. Students extract information from tables and interpret pictorial diagrams. They can apply knowledge to practical situations and communicate their knowledge through brief descriptive responses.

Low International Benchmark – 400-475

Students can recognize some basic facts from the life and physical sciences. They have some knowledge of the human body, and demonstrate some familiarity with everyday physical phenomena. Students can interpret pictorial diagrams and apply knowledge of simple physical concepts to practical situations.

Percentage of Students Reaching Each International Benchmark of Science Achievement

62., 63. pages

Exhibits 11 and 12 display the percentages of students reaching each of the four TIMSS international benchmarks in science. The percentages illustrated graphically and shown in the table are cumulative, thus for example the number of students reaching the intermediate benchmark includes the percentage of students performing on the high benchmark and the percentage of students performing on the advanced benchmark (their score point is above 475). At each grade, the results are presented in descending order according to the percentage of students reaching the Advanced International Benchmark. Generally, the TIMSS 2007 participants with the highest average achievement had greater percentages of students reaching the advanced international benchmark, and lower achieving countries had smaller percentages. Singapore excels here as well, especially at fourth grade where percentage of students reaching the advanced international benchmark is almost twice as high as in Chinese Taipei which is the next country in order according to the average achievements. In general, it can be concluded that percentage of high-achieving students in the Asian countries is high, and according to TIMSS assessment results more than half of students in these countries reached the High International Benchmark.

Hungarian students with remarkable achievement among the European countries had similar results at the two grades. The effectiveness of the education system was among the top-performers together with England, Russia, the Czech Republic and Slovenia.

As a reference point, the exhibits also display the median for each of the four benchmarks. This is a percentage which is smaller than the percents of the students reached the given benchmark in half of the countries, and higher than the percents of the students reached the given benchmark in the other half of the countries. The median of the High International Benchmark is 7% at the fourth grade, and 3% at the eighth grade. At both grades, 13 percent of the Hungarian students achieved at this benchmark.

Although the exhibit is organized to draw particular attention to the percentage of high-achieving students in each country and benchmarking participant, it also conveys information about the distribution of middle and low performers. At the fourth grade, the median for the Low International Benchmark was 93 percent, indicating that in at least half the countries almost all of the fourth grade students had elementary knowledge and skills in science. The Hungarian result was consistent with the median, which is a slightly smaller than it can have been expected on the base of their average achievement result. There were a number of countries, which had lower average achievement results, with higher percentage of students reaching the Low International Benchmark than Hungary. According to the TIMSS assessment results, seven percent of Hungarian students did not reach the Low International Benchmark in science, i.e. did not reach 400 score points.

At eighth grades, the distribution of Hungarian students reaching each international benchmark is slightly different from the results at fourth grades. Nevertheless, this little difference becomes relatively important in international comparison. The percentage of students not reaching the lowest level is fairly low (4%), with this result Hungarian students are at the similar level as the best performer Asian countries, in fact, they outperformed Singapore (7%).

Trends

64., 65. page

Tables 9 and 10 present trends across the benchmarks, whether there have been significant changes across the previous assessments in the percentage of students reaching the benchmarks.

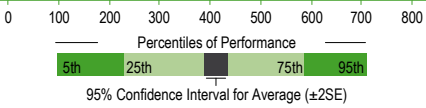
At the fourth grade, in addition to Singapore, Hong Kong SAR, and Slovenia, Hungary is the fourth country where the percentage of students achieving at each of the benchmarks increased continuously between 1995 and 2007.

At the eighth grade, countries showing the most remarkable improvement at each benchmark included Korea, Slovenia and Lithuania. Hungarian percentages do not show significant changes at any of the four benchmarks across the assessment cycles.

Figure 7 TIMSS 2007 Distribution of Science Achievement

TIMSS 2007 Science 4

		Country		Average Scale Score		Years of Formal Schooling*	Average Age at Time of Testing
		Singapore	▲	587	(4,1)	4	10,4
		Chinese Taipei	▲	557	(2,0)	4	10,2
		Hong Kong SAR	▲	554	(3,5)	4	10,2
		Japan	▲	548	(2,1)	4	10,5
		Russian Federation	▲	546	(4,8)	4	10,8
	1	Latvia	▲	542	(2,3)	4	11,0
		England	▲	542	(2,9)	5	10,2
2	†	United States	▲	539	(2,7)	4	10,3
		Hungary	▲	536	(3,3)	4	10,7
		Italy	▲	535	(3,2)	4	9,8
	1	Kazakhstan	▲	533	(5,6)	4	10,6
		Germany	▲	528	(2,4)	4	10,4
		Australia	▲	527	(3,3)	4	9,9
		Slovak Republic	▲	526	(4,8)	4	10,4
		Austria	▲	526	(2,5)	4	10,3
		Sweden	▲	525	(2,9)	4	10,8
	‡	Netherlands	▲	523	(2,6)	4	10,2
		Slovenia	▲	518	(1,9)	4	9,8
	†	Denmark	▲	517	(2,9)	4	11,0
		Czech Republic	▲	515	(3,1)	4	10,3
	1	Lithuania	▲	514	(2,4)	4	10,8
		New Zealand		504	(2,6)	4,5–5,5	10,0
	†	Scotland		500	(2,3)	5	9,8
		TIMSS Scale Avg.**		500			
		Armenia	▼	484	(5,7)	4	10,6
		Norway	▼	477	(3,5)	4	9,8
		Ukraine	▼	474	(3,1)	4	10,3
		Iran, Islamic Rep. of	▼	436	(4,3)	4	10,2
	1	Georgia	▼	418	(4,6)	4	10,1
		Colombia	▼	400	(5,4)	4	10,4
		El Salvador	▼	390	(3,4)	4	11,0
		Algeria	▼	354	(6,0)	4	10,2
	¿	Kuwait	▼	348	(4,4)	4	10,2
		Tunisia	▼	318	(5,9)	4	10,2
		Morocco	▼	297	(5,9)	4	10,6
		Qatar	▼	294	(2,6)	4	9,7
		Yemen	▼	197	(7,2)	4	11,2
Benchmarking Participants							
	2	Massachusetts, US	▲	571	(4,3)	4	10,3
2	†	Minnesota, US	▲	551	(6,1)	4	10,3
	2	Alberta, Canada	▲	543	(3,8)	4	9,8
	2	British Columbia, Canada	▲	537	(2,7)	4	9,8
	2	Ontario, Canada	▲	536	(3,7)	4	9,8
	2	Quebec, Canada	▲	517	(2,7)	4	10,1
¿	‡	Dubai, UAE	▼	460	(2,8)	4	10,0

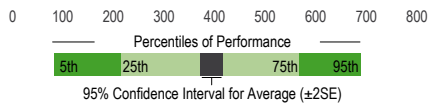


* Represents years of schooling counting from the first year of ISCED Level 1.
** Taken from United Nations Development Programme's Human Development Report 2007/2008, p.229-232, except for Chinese Taipei taken from Directorate-General of Budget, Accounting and Statistics, Executive Yuan, R.O.C. Statistical Yearbook 2007. Data for England and Scotland are for the United Kingdom.
† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
¿ Kuwait and Dubai, UAE tested the same cohort of students as other countries, but later in 2007, at the beginning of the next school year.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available. Note: See Exhibit D.1 for percentiles of achievement in science.
▲ Country average significantly higher than TIMSS scale average.
▼ Country average significantly lower than TIMSS scale average.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Figure 8 TIMSS 2007 Distribution of Science Achievement

TIMSS 2007 Science 8

		Country		Average Scale Score		Years of Formal Schooling*	Average Age at Time of Testing
		Singapore	▲	567	(4,4)	8	14,4
		Chinese Taipei	▲	561	(3,7)	8	14,2
		Japan	▲	554	(1,9)	8	14,5
		Korea, Rep. of	▲	553	(2,0)	8	14,3
	†	England	▲	542	(4,5)	9	14,2
		Hungary	▲	539	(2,9)	8	14,6
		Czech Republic	▲	539	(1,9)	8	14,4
		Slovenia	▲	538	(2,2)	7 or 8	13,8
	†	Hong Kong SAR	▲	530	(4,9)	8	14,4
		Russian Federation	▲	530	(3,9)	7 or 8	14,6
2	†	United States	▲	520	(2,9)	8	14,3
	1	Lithuania	▲	519	(2,5)	8	14,9
		Australia	▲	515	(3,6)	8	13,9
		Sweden	▲	511	(2,6)	8	14,8
		TIMSS Scale Avg.		500			
	†	Scotland		496	(3,4)	9	13,7
		Italy		495	(2,8)	8	13,9
		Armenia	▼	488	(5,8)	8	14,9
		Norway	▼	487	(2,2)	8	13,8
		Ukraine	▼	485	(3,5)	8	14,2
		Jordan	▼	482	(4,0)	8	14,0
		Malaysia	▼	471	(6,0)	8	14,3
		Thailand	▼	471	(4,3)	8	14,3
1	2	Serbia	▼	470	(3,2)	8	14,9
	3	Bulgaria	▼	470	(5,9)	8	14,9
	3	Israel	▼	468	(4,3)	8	14,0
		Bahrain	▼	467	(1,7)	8	14,1
		Bosnia and Herzegovina	▼	466	(2,8)	8 or 9	14,7
		Romania	▼	462	(3,9)	8	15,0
		Iran, Islamic Rep. of	▼	459	(3,6)	8	14,2
		Malta	▼	457	(1,4)	9	14,0
		Turkey	▼	454	(3,7)	8	14,0
		Syrian Arab Republic	▼	452	(2,9)	8	13,9
		Cyprus	▼	452	(2,0)	8	13,8
		Tunisia	▼	445	(2,1)	8	14,5
		Indonesia	▼	427	(3,4)	8	14,3
		Oman	▼	423	(3,0)	8	14,3
	1	Georgia	▼	421	(4,8)	8	14,2
	¿	Kuwait	▼	418	(2,8)	8	14,4
		Colombia	▼	417	(3,5)	8	14,5
		Lebanon	▼	414	(5,9)	8	14,4
		Egypt	▼	408	(3,6)	8	14,1
		Algeria	▼	408	(1,7)	8	14,5
		Palestinian Nat'l Auth.	▼	404	(3,5)	8	14,0
		Saudi Arabia	▼	403	(2,4)	8	14,4
		El Salvador	▼	387	(2,9)	8	15,0
		Botswana	▼	355	(3,1)	8	14,9
		Qatar	▼	319	(1,7)	8	13,9
		Ghana	▼	303	(5,4)	8	15,8
	¶	Morocco	▼	402	(2,9)	8	14,8
Benchmarking Participants							
	2	Massachusetts, US	▲	556	(4,6)	8	14,2
2	†	Minnesota, US	▲	539	(4,8)	8	14,3
	2	Ontario, Canada	▲	526	(3,6)	8	13,8
	3	British Columbia, Canada	▲	526	(2,7)	8	13,9
	3	Quebec, Canada	▲	507	(3,1)	8	14,2
		Basque Country, Spain		498	(3,0)	8	14,1
¿	‡	Dubai, UAE	▼	489	(2,8)	8	14,2



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

** Taken from United Nations Development Programme's Human Development Report 2007/2008, p.229-232, except for Chinese Taipei taken from Directorate-General of Budget, Accounting and Statistics, Executive Yuan, R.O.C. Statistical Yearbook 2007 and for Serbia taken from Human Development Analyses of Serbia 2007. Data for England and Scotland are for the United Kingdom.

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A). Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).

‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included (see Appendix A).

¶ Did not satisfy guidelines for sample participation rates (see Appendix A).

1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).

2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).

3 National Defined Population covers less than 90% of National Target Population (but at least 77%, see Appendix A).

¿ Kuwait and Dubai, UAE tested the same cohort of students as other countries, but later in 2007, at the beginning of the next school year.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

A dash (–) indicates comparable data are not available. Note: See Exhibit D.1 for percentiles of achievement in science.

▲ Country average significantly higher than TIMSS scale average.

▼ Country average significantly lower than TIMSS scale average.

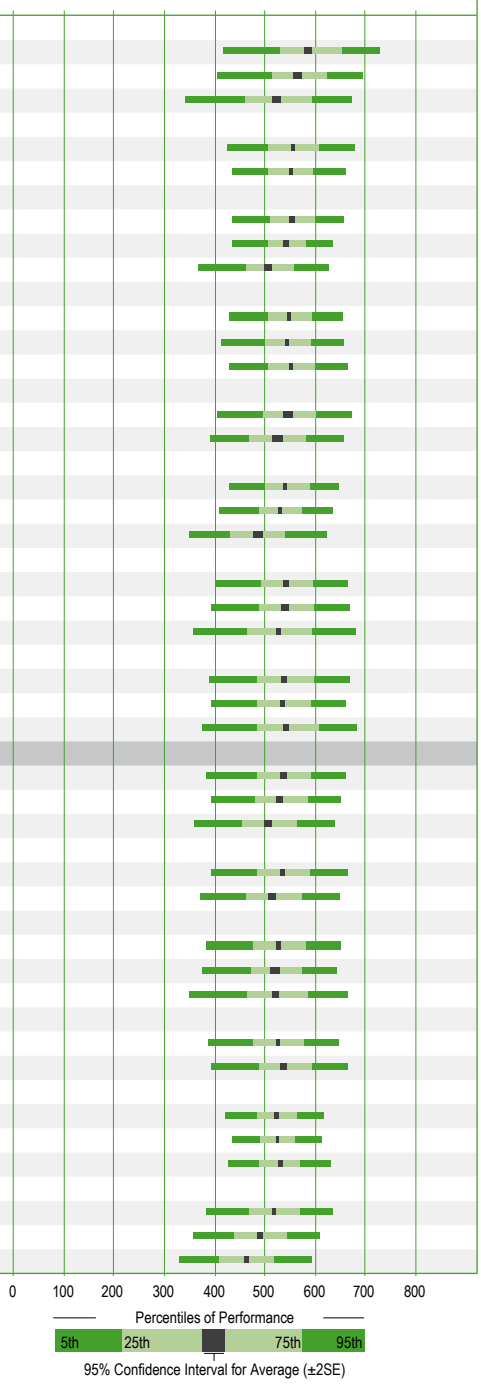
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Figure 9 Trends in Science Achievement – 1995 through 2007

TIMSS 2007 Science 4

	Country	Average Scale Score		2003 to 2007 Difference			1995 to 2007 Difference		
	Singapore								
	2007	587	(4,1)						
	2003	565	(5,5)	22	(6,8)	▲			
	1995	523	(4,8)				63	(6,4)	▲
	Chinese Taipei								
	2007	557	(2,0)						
	2003	551	(1,7)	5	(2,6)	▲			
	Hong Kong SAR								
	2007	554	(3,5)						
†	2003	542	(3,1)	12	(4,6)	▲			
	1995	508	(3,3)				46	(4,8)	▲
	Japan								
	2007	548	(2,1)						
	2003	543	(1,5)	4	(2,5)				
	1995	553	(1,8)				–5	(2,6)	▼
	Russian Federation								
	2007	546	(4,8)						
2	2003	526	(5,2)	20	(7,0)	▲			
	Latvia								
1	2007	542	(2,3)						
1	2003	530	(2,8)	12	(3,5)	▲			
1 ¶	1995	486	(4,9)				56	(5,4)	▲
	England								
	2007	542	(2,9)						
†	2003	540	(3,6)	1	(4,4)				
3 †	1995	528	(3,1)				14	(4,2)	▲
	United States								
2 †	2007	539	(2,7)						
†	2003	536	(2,5)	3	(3,5)				
	1995	542	(3,3)				–3	(4,3)	
	Hungary								
	2007	536	(3,3)						
2	2003	530	(3,0)	6	(4,5)				
	1995	508	(3,4)				28	(4,8)	▲
	Italy								
	2007	535	(3,2)						
	2003	516	(3,8)	20	(4,9)	▲			
	Australia								
	2007	527	(3,3)						
†	2003	521	(4,2)	7	(5,3)				
¶	1995	521	(3,8)				6	(4,9)	
	Austria								
	2007	526	(2,5)						
¶	1995	538	(3,6)				–12	(4,4)	▼
	Netherlands								
‡	2007	523	(2,6)						
†	2003	525	(2,0)	–2	(3,1)				
¶	1995	530	(3,2)				–7	(4,0)	
	Slovenia								
	2007	518	(1,9)						
	2003	490	(2,5)	28	(3,2)	▲			
	1995	464	(3,1)				54	(3,6)	▲

Science Achievement Distribution



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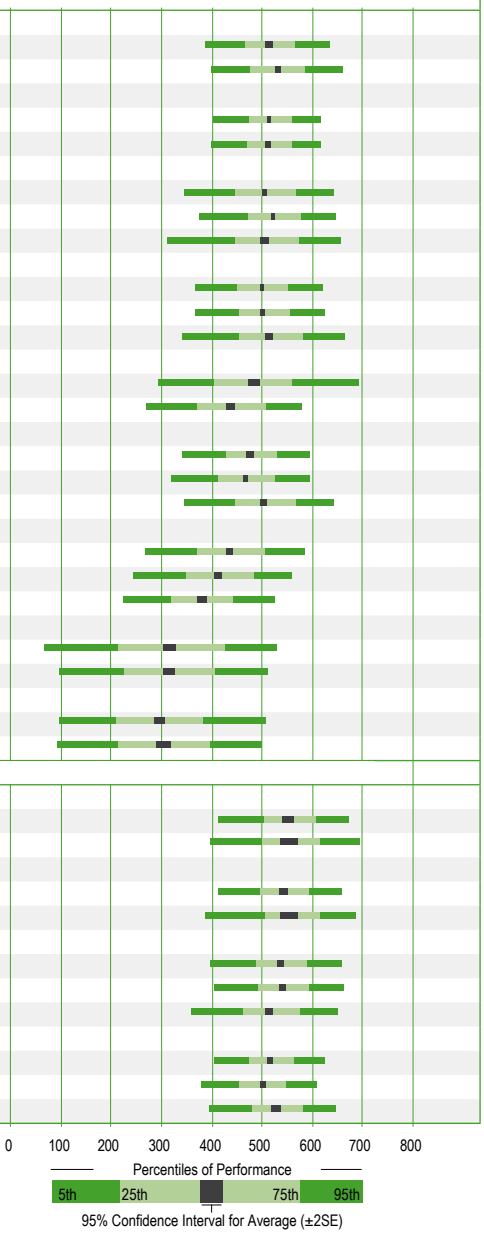
Science

	Country	Average Scale Score		2003 to 2007 Difference			1995 to 2007 Difference		
	Czech Republic								
	2007	515	(3,1)						
	1995	532	(3,0)				–17	(4,3)	▼
	Lithuania								
1	2007	514	(2,4)						
1	2003	512	(2,6)	2	(3,7)				
	New Zealand								
	2007	504	(2,6)						
	2003	522	(2,4)	–18	(3,5)	▼			
	1995	505	(5,3)				–1	(5,9)	
	Scotland								
†	2007	500	(2,3)						
†	2003	502	(2,9)	–2	(3,6)				
2 †	1995	514	(4,5)				–14	(5,0)	▼
	Armenia								
	2007	484	(5,7)						
	2003	437	(4,3)	48	(7,1)	▲			
	Norway								
	2007	477	(3,5)						
	2003	466	(2,6)	10	(3,5)	▲			
	1995	504	(3,7)				–27	(5,2)	▼
	Iran, Islamic Rep. of								
	2007	436	(4,3)						
2	2003	414	(4,1)	22	(5,9)	▲			
	1995	380	(4,6)				55	(6,3)	▲
	Tunisia								
	2007	317	(6,0)						
	2003	314	(5,7)	3	(8,1)				
	Morocco								
	2007	297	(5,9)						
	2003	304	(6,7)	–7	(9,0)				
Benchmarking Participants									
	Minnesota, US								
2 †	2007	551	(6,1)						
†	1995	553	(8,8)				–2	(10,7)	
	Alberta, Canada								
2	2007	543	(3,8)						
	1995	555	(8,4)				–13	(9,2)	
	Ontario, Canada								
2	2007	536	(3,7)						
	2003	540	(3,7)	–4	(5,0)				
2	1995	516	(3,7)				20	(5,2)	▲
	Quebec, Canada								
2	2007	517	(2,7)						
	2003	500	(2,5)	17	(3,5)	▲			
	1995	529	(4,8)				–11	(5,5)	▼

Science Achievement Distribution



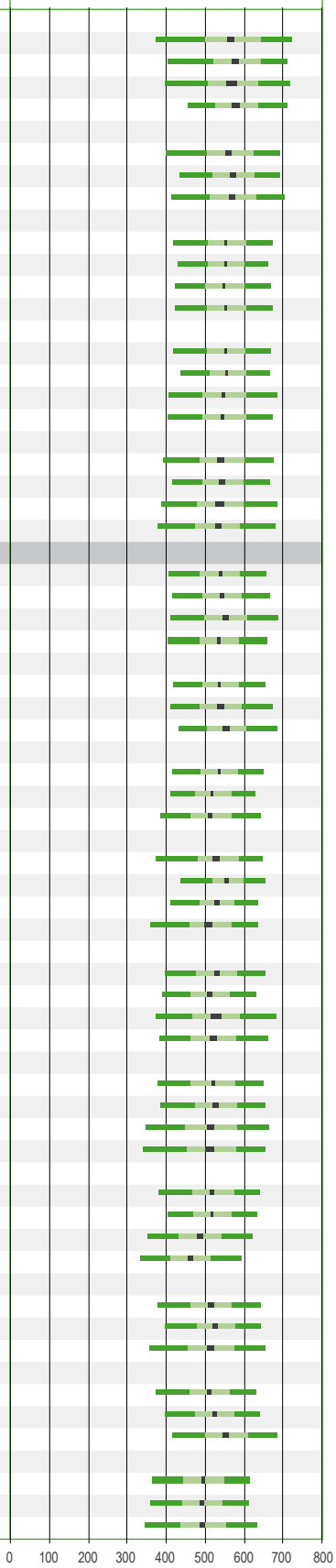
† Met guidelines for sample participation rates only after replacement schools were included.
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included.
¶ Did not satisfy guidelines for sample participation rates.
1 National Target Population does not include all of the International Target Population defined by TIMSS.
2 National Defined Population covers 90% to 95% of National Target Population.
3 National Defined Population covers less than 90% of National Target Population (but at least 77%).
Trend notes: Data are not shown for Kuwait, because comparable data from previous cycles are not available. Data for Tunisia do not include private schools.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ 2007 average significantly higher.
▼ 2007 average significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Figure 10 Trends in Science Achievement – 1995 through 2007

TIMSS 2007 Science 8

	Country	Average Scale Score		2003 to 2007 Difference			1999 to 2007 Difference			1995 to 2007 Difference		
	Singapore											
	2007	567	(4,4)									
	2003	578	(4,3)	–11	(6,2)							
	1999	568	(8,0)				–1	(9,2)				
	1995	580	(5,5)							–13	(7,1)	
	Chinese Taipei											
	2007	561	(3,7)									
	2003	571	(3,5)	–10	(5,0)	▼						
	1999	569	(4,4)				–8	(5,6)				
	Japan											
	2007	554	(1,9)									
	2003	552	(1,7)	2	(2,6)							
	1999	550	(2,2)				4	(3,0)				
	1995	554	(1,8)							–1	(2,5)	
	Korea, Rep. of											
	2007	553	(2,0)									
¿	2003	558	(1,6)	–5	(2,6)	▼						
	1999	549	(2,6)				4	(3,4)				
	1995	546	(2,0)							7	(2,9)	▲
	England											
†	2007	542	(4,5)									
¶	2003	544	(4,1)	–2	(6,1)							
†	1999	538	(4,8)				3	(6,5)				
3 †	1995	533	(3,6)							8	(5,7)	
	Hungary											
	2007	539	(2,9)									
2	2003	543	(2,8)	–4	(4,0)							
	1999	552	(3,7)				–13	(4,8)	▼			
	1995	537	(3,1)							2	(4,2)	
	Czech Republic											
	2007	539	(1,9)									
	1999	539	(4,2)				–1	(4,7)				
	1995	555	(4,5)							–16	(4,9)	▼
	Slovenia											
	2007	538	(2,2)									
	2003	520	(1,8)	17	(2,8)	▲						
	1995	514	(2,7)							24	(3,5)	▲
	Hong Kong SAR											
†	2007	530	(4,9)									
†	2003	556	(3,0)	–26	(5,9)	▼						
†	1999	530	(3,7)				1	(6,1)				
	1995	510	(5,8)							20	(7,6)	▲
	Russian Federation											
	2007	530	(3,9)									
	2003	514	(3,7)	16	(5,3)	▲						
	1999	529	(6,4)				0	(7,3)				
2	1995	523	(4,5)							7	(6,0)	
	United States											
2 †	2007	520	(2,9)									
‡	2003	527	(3,1)	–7	(4,3)							
	1999	515	(4,6)				5	(5,3)				
†	1995	513	(5,6)							7	(6,3)	
	Lithuania											
1	2007	519	(2,5)									
1	2003	519	(2,1)	–1	(3,3)							
1 ¿	1999	488	(4,1)				30	(5,0)	▲			
1 2	1995	464	(4,0)							55	(4,8)	▲
	Australia											
	2007	515	(3,6)									
	2003	527	(3,8)	–12	(5,3)	▼						
‡	1995	514	(3,9)							1	(5,3)	
	Sweden											
	2007	511	(2,6)									
	2003	524	(2,7)	–14	(3,6)	▼						
	1995	553	(4,4)							–42	(5,1)	▼
	Scotland											
†	2007	496	(3,4)									
†	2003	512	(3,4)	–16	(4,8)	▼						
‡	1995	501	(5,6)							–5	(6,5)	

Science Achievement Distribution



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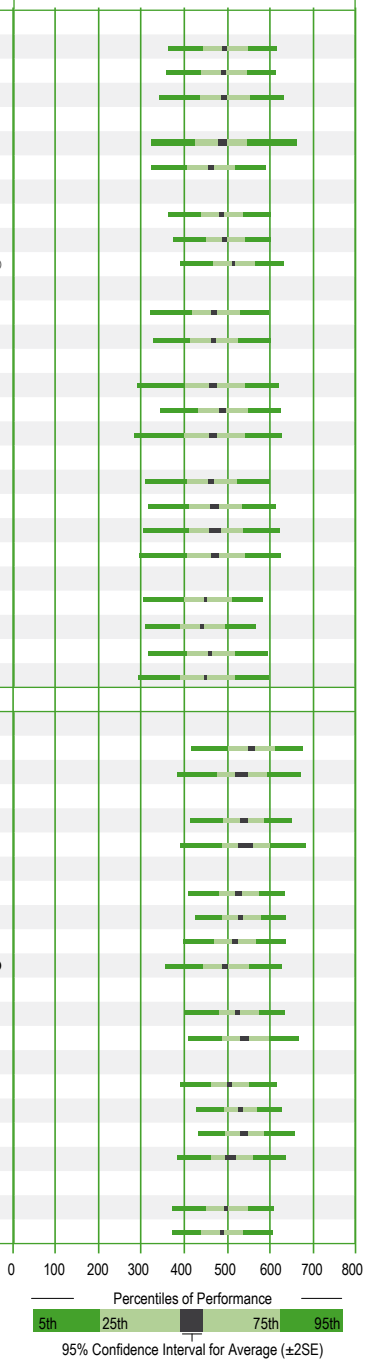
Science

	Country	Average Scale Score		2003 to 2007 Difference			1999 to 2007 Difference			1995 to 2007 Difference		
	Italy											
	2007	495	(2,8)									
	2003	491	(3,1)	4	(4,1)							
2	1999	493	(3,9)				2	(4,8)				
	Armenia											
	2007	488	(5,8)									
	2003	461	(3,5)	27	(6,7)	▲						
	Norway											
	2007	487	(2,2)									
	2003	494	(2,2)	–7	(3,0)	▼						
	1995	514	(2,4)							–28	(3,4)	▼
	Serbia											
1 2	2007	470	(3,2)									
1	2003	468	(2,5)	3	(3,9)							
	Israel											
3	2007	468	(4,3)									
3	2003	488	(3,1)	–20	(5,3)	▼						
3	1999	468	(4,9)				0	(6,5)				
	Romania											
	2007	462	(3,9)									
	2003	470	(4,9)	–8	(6,2)							
	1999	472	(5,8)				–10	(6,6)				
	1995	471	(5,1)							–9	(6,5)	
	Cyprus											
	2007	452	(2,0)									
	2003	441	(2,0)	10	(2,6)	▲						
	1999	460	(2,4)				–9	(3,3)	▼			
	1995	452	(2,1)							0	(2,9)	
Benchmarking Participants												
	Massachusetts, US											
2	2007	556	(4,6)									
	1999	533	(7,4)				23	(8,6)	▲			
	Minnesota, US											
2 †	2007	539	(4,8)									
†	1995	544	(7,9)							–5	(9,3)	
	Ontario, Canada											
2	2007	526	(3,6)									
2	2003	533	(2,7)	–7	(4,5)							
	1999	518	(3,1)				8	(4,9)				
	1995	496	(3,7)							30	(5,2)	▲
	British Columbia, Canada											
3	2007	526	(2,7)									
	1999	542	(6,2)				–16	(6,8)	▼			
	Quebec, Canada											
3	2007	507	(3,1)									
	2003	531	(3,0)	–24	(4,2)	▼						
	1999	540	(4,8)				–34	(5,7)	▼			
	1995	510	(6,9)							–3	(7,4)	
	Basque Country, Spain											
	2007	498	(3,0)									
2	2003	489	(2,7)	9	(3,9)	▲						

Science Achievement Distribution



† Met guidelines for sample participation rates only after replacement schools were included.
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included.
¶ Did not satisfy guidelines for sample participation rates.
1 National Target Population does not include all of the International Target Population defined by TIMSS.
2 National Defined Population covers 90% to 95% of National Target Population.
3 National Defined Population covers less than 90% of National Target Population (but at least 77%).
¿ Kuwait and Dubai, UAE tested the same cohort of students as other countries, but later in 2007, at the beginning of the next school year.
Trend notes: Data are not shown for Bulgaria, Kuwait, Morocco, Saudi Arabia, and Turkey, because comparable data from previous cycles are not available. Data for Indonesia do not include Islamic schools.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent. Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ 2007 average significantly higher.
▼ 2007 average significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 6 Cohort Comparison: 2003 Fourth Grade Students in Eighth Grade in 2007*

2003 - Fourth Grade			
Country	Difference From TIMSS Scale Avg.		
Singapore	65	(5,5)	▲
Chinese Taipei	51	(1,7)	▲
Japan	43	(1,5)	▲
Hong Kong SAR	42	(3,1)	▲
England	40	(3,6)	▲
United States	36	(2,5)	▲
Hungary	30	(3,0)	▲
Russian Federation	26	(5,2)	▲
Australia	21	(4,2)	▲
Italy	16	(3,8)	▲
Lithuania	12	(2,6)	▲
Scotland	2	(2,9)	
Slovenia	–10	(2,5)	▼
Norway	–34	(2,6)	▼
Armenia	–63	(4,3)	▼
Iran, Islamic Rep. of	–86	(4,1)	▼
Tunisia	–186	(5,7)	▼
TIMSS Scale Avg.	500	(0,0)	

2007 - Fourth Grade			
Country	Difference From TIMSS Scale Avg.		
Singapore	87	(4,1)	▲
Chinese Taipei	57	(2,0)	▲
Hong Kong SAR	54	(3,5)	▲
Japan	48	(2,1)	▲
Russian Federation	46	(4,8)	▲
England	42	(2,9)	▲
United States	39	(2,7)	▲
Hungary	36	(3,3)	▲
Italy	35	(3,2)	▲
Australia	27	(3,3)	▲
Slovenia	18	(1,9)	▲
Lithuania	14	(2,4)	▲
Scotland	0	(2,3)	
Armenia	–16	(5,7)	▼
Norway	–23	(3,5)	▼
Iran, Islamic Rep. of	–64	(4,3)	▼
Tunisia	–182	(5,9)	▼
TIMSS Scale Avg.	500	(0,0)	

2003 - Eighth Grade			
Country	Difference From TIMSS Scale Avg.		
Singapore	78	(4,3)	▲
Chinese Taipei	71	(3,5)	▲
Hong Kong SAR	56	(3,0)	▲
Japan	52	(1,7)	▲
England	44	(4,1)	▲
Hungary	43	(2,8)	▲
United States	27	(3,1)	▲
Australia	27	(3,8)	▲
Slovenia	20	(1,8)	▲
Lithuania	19	(2,1)	▲
Russian Federation	14	(3,7)	▲
Scotland	12	(3,4)	▲
Norway	–6	(2,2)	▼
Italy	–9	(3,1)	▼
Armenia	–39	(3,5)	▼
Iran, Islamic Rep. of	–47	(2,3)	▼
Tunisia	–96	(2,1)	▼
TIMSS Scale Avg.	500	(0,0)	

2007 - Eighth Grade			
Country	Difference From TIMSS Scale Avg.		
Singapore	67	(4,4)	▲
Chinese Taipei	61	(3,7)	▲
Japan	54	(1,9)	▲
England	42	(4,5)	▲
Hungary	39	(2,9)	▲
Slovenia	38	(2,2)	▲
Hong Kong SAR	30	(4,9)	▲
Russian Federation	30	(3,9)	▲
United States	20	(2,9)	▲
Lithuania	19	(2,5)	▲
Australia	15	(3,6)	▲
Scotland	–4	(3,4)	
Italy	–5	(2,8)	
Armenia	–12	(5,8)	▼
Norway	–13	(2,2)	▼
Iran, Islamic Rep. of	–41	(3,6)	▼
Tunisia	–55	(2,1)	▼
TIMSS Scale Avg.	500	(0,0)	

* The results of the assessment in Grade 4 and Grade 8. are not directly comparable. The Grade 4 population in the 2003 cycle is the same as the Grade 8 population in the 2007 cycle. Therefore we can compare the relative rank of the countries participating in both studies.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

▲ Country average significantly higher than TIMSS scale average

▼ Country average significantly lower than TIMSS scale average.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 7 Average Achievement in the Science Content and Cognitive Domains

TIMSS 2007 Science 4

	Country	Average Scale Scores for Science Content Domains									Average Scale Scores for Science Cognitive Domains								
		Life Science			Physical Science			Earth Science			Knowing			Applying			Reasoning		
	Algeria	351	(6,2)	▼	377	(5,3)	▼	365	(5,7)	▼	350	-5,8	▼	379	(5,7)	▼	357	(5,8)	▼
	Armenia	489	(5,9)		492	(5,1)		479	(5,5)	▼	486	-5,2	▼	487	(5,6)	▼	484	(5,3)	▼
	Australia	528	(3,4)	▲	522	(3,1)	▲	534	(3,2)	▲	529	-3,1	▲	523	(3,3)	▲	530	(3,4)	▲
	Austria	526	(2,0)	▲	514	(2,4)	▲	532	(1,9)	▲	529	-2	▲	526	(2,2)	▲	513	(2,3)	▲
	Chinese Taipei	541	(2,1)	▲	559	(2,5)	▲	553	(1,9)	▲	536	-2,5	▲	556	(2,1)	▲	571	(2,4)	▲
	Colombia	408	(5,2)	▼	411	(4,9)	▼	401	(5,6)	▼	409	-5,5	▼	404	(5,4)	▼	409	(5,1)	▼
	Czech Republic	520	(2,9)	▲	511	(2,8)	▲	518	(2,6)	▲	520	-2,7	▲	516	(3,1)	▲	510	(2,9)	▲
†	Denmark	527	(2,4)	▲	502	(2,5)		522	(2,7)	▲	516	-2,9	▲	515	(2,6)	▲	525	(3,8)	▲
	El Salvador	410	(3,6)	▼	392	(3,8)	▼	393	(3,3)	▼	410	-3,9	▼	393	(3,6)	▼	376	(4,0)	▼
	England	532	(2,7)	▲	543	(2,7)	▲	538	(2,9)	▲	543	-2,9	▲	536	(2,7)	▲	537	(2,7)	▲
1	Georgia	427	(3,5)	▼	414	(4,0)	▼	432	(5,0)	▼	434	-3,8	▼	424	(4,1)	▼	388	(4,9)	▼
	Germany	529	(2,0)	▲	524	(2,5)	▲	524	(2,4)	▲	527	-2,2	▲	526	(2,2)	▲	525	(2,3)	▲
	Hong Kong SAR	532	(3,5)	▲	558	(3,5)	▲	560	(3,2)	▲	546	-3,2	▲	549	(3,0)	▲	561	(4,4)	▲
	Hungary	548	(2,8)	▲	529	(3,3)	▲	517	(3,5)	▲	540	-3	▲	531	(3,2)	▲	529	(3,7)	▲
	Iran, Islamic Rep. of	442	(4,4)	▼	454	(4,2)	▼	433	(4,1)	▼	437	-4,3	▼	451	(4,3)	▼	436	(4,3)	▼
	Italy	549	(3,0)	▲	521	(3,1)	▲	526	(3,0)	▲	530	-3,9	▲	539	(3,1)	▲	526	(3,8)	▲
	Japan	530	(2,0)	▲	564	(2,3)	▲	529	(2,7)	▲	528	-2,2	▲	542	(2,7)	▲	567	(2,1)	▲
1	Kazakhstan	528	(5,0)	▲	528	(5,8)	▲	534	(5,2)	▲	534	-5,8	▲	536	(4,9)	▲	519	(5,3)	▲
¿	Kuwait	353	(4,9)	▼	345	(5,2)	▼	363	(3,8)	▼	360	-3,9	▼	338	(4,3)	▼	331	(5,4)	▼
1	Latvia	535	(2,1)	▲	544	(2,4)	▲	536	(2,2)	▲	540	-2,2	▲	535	(2,4)	▲	551	(2,7)	▲
1	Lithuania	516	(1,8)	▲	514	(1,4)	▲	511	(2,5)	▲	511	-1,7	▲	515	(2,8)	▲	524	(2,4)	▲
	Morocco	292	(6,8)	▼	324	(5,5)	▼	293	(6,2)	▼	291	-5,8	▼	311	(6,3)	▼	318	(5,4)	▼
‡	Netherlands	536	(2,2)	▲	503	(2,3)		524	(2,5)	▲	518	-2,5	▲	525	(2,2)	▲	525	(2,3)	▲
	New Zealand	506	(2,5)	▲	498	(2,5)		515	(2,6)	▲	511	-2,5	▲	500	(2,4)		505	(2,9)	
	Norway	487	(2,5)	▼	469	(2,7)	▼	497	(2,9)		485	-2,4	▼	478	(2,8)	▼	480	(3,2)	▼
	Qatar	291	(1,4)	▼	303	(2,1)	▼	305	(2,2)	▼	304	-2,3	▼	283	(2,7)	▼	293	(2,9)	▼
	Russian Federation	539	(4,1)	▲	547	(4,6)	▲	536	(4,3)	▲	542	-4,8	▲	546	(4,7)	▲	542	(4,6)	▲
†	Scotland	504	(2,2)		499	(1,9)		508	(2,5)	▲	511	-2	▲	494	(2,4)	▼	501	(2,2)	
	Singapore	582	(4,1)	▲	585	(3,9)	▲	554	(3,3)	▲	587	-4,1	▲	579	(3,7)	▲	568	(3,7)	▲
	Slovak Republic	532	(4,0)	▲	513	(4,6)	▲	530	(4,8)	▲	527	-4,4	▲	527	(4,4)	▲	513	(4,9)	▲
	Slovenia	511	(2,2)	▲	530	(1,6)	▲	517	(2,5)	▲	511	-1,6	▲	525	(2,1)	▲	527	(1,8)	▲
	Sweden	531	(2,5)	▲	508	(2,7)	▲	535	(2,7)	▲	526	-2,5	▲	521	(2,9)	▲	527	(3,5)	▲
	Tunisia	323	(5,6)	▼	340	(6,4)	▼	325	(5,8)	▼	316	-5,9	▼	329	(6,3)	▼	349	(5,3)	▼
	Ukraine	482	(2,5)	▼	475	(2,7)	▼	474	(3,1)	▼	476	-2,4	▼	477	(3,2)	▼	478	(3,0)	▼
2 †	United States	540	(2,5)	▲	534	(2,3)	▲	533	(2,6)	▲	541	-2,3	▲	533	(2,8)	▲	535	(2,6)	▲
	Yemen	+	+		+	+		+	+		+	+		+	+		+	+	
	TIMSS Scale Avg.	500			500			500			500			500			500		

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
¿ Kuwait and Dubai, UAE tested the same cohort of students as other countries, but later in 2007, at the beginning of the next school year.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A plus (+) sign indicates average achievement could not be accurately estimated.
▲ Country average significantly higher than TIMSS scale average.
▼ Country average significantly lower than TIMSS scale average.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 8 Average Achievement in the Science Content and Cognitive Domains

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	Country	Average Scale Scores for Science Content Domains												Average Scale Scores for Science Cognitive Domains								
		Biology			Chemistry			Physics			Earth Science			Knowing			Applying			Reasoning		
	Algeria	411	(1,9)	▼	414	(1,7)	▼	397	(2,2)	▼	413	(1,6)	▼	409	(1,9)	▼	410	-2,4	▼	414	(1,9)	▼
	Armenia	490	(5,9)		478	(6,3)	▼	503	(5,6)		475	(5,8)	▼	493	(6,4)		502	-5,4		459	(6,5)	▼
	Australia	518	(3,4)	▲	505	(3,6)		508	(4,2)		519	(3,8)	▲	501	(3,1)		510	-3,2	▲	530	(3,6)	▲
	Bahrain	473	(2,0)	▼	468	(2,4)	▼	466	(1,5)	▼	465	(2,4)	▼	469	(2,1)	▼	468	-2,1	▼	469	(2,0)	▼
	Bosnia and Herzegovina	464	(3,0)	▼	468	(2,9)	▼	463	(3,1)	▼	469	(3,4)	▼	486	(3,7)	▼	463	-2,8	▼	452	(3,1)	▼
	Botswana	359	(2,9)	▼	371	(2,4)	▼	351	(3,2)	▼	361	(4,0)	▼	361	(2,9)	▼	358	-3,2	▼	362	(2,7)	▼
3	Bulgaria	467	(6,0)	▼	472	(6,1)	▼	466	(5,6)	▼	480	(5,5)	▼	489	(5,8)		471	-6,1	▼	448	(6,1)	▼
	Chinese Taipei	549	(3,4)	▲	573	(4,2)	▲	554	(3,7)	▲	545	(2,9)	▲	565	(3,5)	▲	560	-3,4	▲	541	(3,5)	▲
	Colombia	434	(3,7)	▼	420	(3,1)	▼	407	(3,5)	▼	407	(3,9)	▼	418	(4,0)	▼	417	-3,1	▼	428	(2,7)	▼
	Cyprus	447	(1,9)	▼	452	(2,5)	▼	458	(2,8)	▼	457	(2,3)	▼	438	(2,6)	▼	456	-2	▼	460	(2,3)	▼
	Czech Republic	531	(2,1)	▲	535	(2,7)	▲	537	(2,1)	▲	534	(2,0)	▲	533	(2,1)	▲	539	-1,9	▲	534	(2,3)	▲
	Egypt	406	(3,4)	▼	413	(4,0)	▼	413	(3,3)	▼	426	(3,8)	▼	434	(3,9)	▼	404	-3,6	▼	395	(3,4)	▼
	El Salvador	398	(3,0)	▼	377	(3,2)	▼	380	(3,5)	▼	400	(2,9)	▼	394	(3,2)	▼	388	-3,2	▼	384	(3,4)	▼
†	England	541	(4,4)	▲	534	(4,0)	▲	545	(4,0)	▲	529	(4,3)	▲	530	(4,9)	▲	538	-4	▲	547	(4,0)	▲
1	Georgia	423	(3,9)	▼	418	(4,6)	▼	416	(5,8)	▼	425	(4,1)	▼	440	(5,1)	▼	422	-4,5	▼	394	(4,6)	▼
	Ghana	304	(4,9)	▼	342	(4,9)	▼	276	(5,8)	▼	294	(5,8)	▼	316	(5,7)	▼	291	-5,5	▼	+	+	
†	Hong Kong SAR	527	(4,6)	▲	517	(4,6)	▲	528	(4,8)	▲	532	(4,5)	▲	532	(4,5)	▲	522	-4,9	▲	533	(5,0)	▲
	Hungary	534	(2,7)	▲	536	(3,5)	▲	541	(3,2)	▲	531	(2,9)	▲	524	(3,0)	▲	549	-3	▲	530	(3,0)	▲
	Indonesia	428	(3,1)	▼	421	(3,4)	▼	432	(3,1)	▼	442	(3,3)	▼	426	(3,6)	▼	425	-3,1	▼	438	(3,2)	▼
	Iran, Islamic Rep. of	449	(3,6)	▼	463	(3,5)	▼	470	(3,6)	▼	476	(3,7)	▼	468	(3,9)	▼	454	-3,8	▼	462	(3,8)	▼
3	Israel	472	(4,2)	▼	467	(4,6)	▼	472	(4,6)	▼	462	(4,1)	▼	456	(5,0)	▼	472	-4,2	▼	481	(4,2)	▼
	Italy	502	(3,0)		481	(2,9)	▼	489	(3,1)	▼	503	(3,1)		494	(3,3)		498	-2,9		493	(2,6)	▼
	Japan	553	(1,9)	▲	551	(1,9)	▲	558	(1,9)	▲	533	(2,5)	▲	534	(2,2)	▲	555	-2	▲	560	(2,0)	▲
	Jordan	478	(3,8)	▼	491	(4,1)	▼	479	(4,2)	▼	484	(3,6)	▼	491	(4,5)	▼	485	-4,1	▼	471	(4,1)	▼
	Korea, Rep. of	548	(1,9)	▲	536	(2,4)	▲	571	(2,4)	▲	538	(2,2)	▲	543	(2,0)	▲	547	-2	▲	558	(2,0)	▲
¿	Kuwait	419	(2,6)	▼	418	(3,8)	▼	438	(2,8)	▼	410	(3,0)	▼	430	(2,5)	▼	417	-2,9	▼	411	(2,9)	▼
	Lebanon	405	(6,2)	▼	447	(5,5)	▼	431	(5,1)	▼	389	(6,4)	▼	403	(5,9)	▼	422	-5,8	▼	420	(5,6)	▼
1	Lithuania	527	(2,3)	▲	507	(2,3)	▲	505	(2,9)		515	(2,5)	▲	513	(2,4)	▲	512	-2,2	▲	527	(2,5)	▲
	Malaysia	469	(5,8)	▼	479	(5,0)	▼	484	(5,7)	▼	463	(5,4)	▼	458	(6,5)	▼	473	-5,9	▼	487	(4,9)	▼
	Malta	453	(1,7)	▼	461	(2,1)	▼	470	(1,7)	▼	456	(1,5)	▼	436	(1,5)	▼	462	-1,6	▼	473	(1,4)	▼
	Norway	487	(2,3)	▼	483	(2,2)	▼	475	(3,0)	▼	502	(2,5)		486	(2,0)	▼	486	-2,3	▼	491	(2,8)	▼
	Oman	414	(3,1)	▼	416	(3,6)	▼	443	(2,9)	▼	439	(2,5)	▼	428	(3,5)	▼	423	-3,2	▼	428	(3,5)	▼
	Palestinian Nat'l Auth.	402	(4,1)	▼	413	(4,2)	▼	414	(3,7)	▼	408	(3,7)	▼	407	(3,5)	▼	412	-4	▼	396	(3,8)	▼
	Qatar	318	(1,7)	▼	322	(1,8)	▼	347	(2,1)	▼	312	(1,9)	▼	325	(1,7)	▼	322	-1,5	▼	+	+	
	Romania	459	(3,2)	▼	463	(4,0)	▼	458	(3,4)	▼	471	(3,3)	▼	451	(4,2)	▼	470	-3,5	▼	460	(3,5)	▼
	Russian Federation	525	(3,6)	▲	535	(3,7)	▲	519	(4,0)	▲	525	(3,4)	▲	534	(4,3)	▲	527	-3,8	▲	520	(3,7)	▲
	Saudi Arabia	407	(2,4)	▼	390	(2,5)	▼	408	(2,3)	▼	423	(2,3)	▼	417	(2,1)	▼	403	-2,7	▼	395	(2,5)	▼
†	Scotland	495	(3,2)		497	(3,2)		494	(3,7)		498	(3,2)		480	(3,9)	▼	495	-3,1		511	(3,6)	▲
1 2	Serbia	474	(3,2)	▼	467	(3,7)	▼	467	(3,0)	▼	466	(3,8)	▼	485	(2,8)	▼	469	-3,6	▼	455	(3,5)	▼
	Singapore	564	(4,2)	▲	560	(4,1)	▲	575	(3,9)	▲	541	(4,1)	▲	554	(4,5)	▲	567	-4,2	▲	564	(4,1)	▲
	Slovenia	530	(2,3)	▲	539	(2,5)	▲	524	(2,0)	▲	542	(2,2)	▲	533	(2,0)	▲	533	-2,2	▲	538	(2,2)	▲
	Sweden	515	(2,4)	▲	499	(2,4)		506	(2,7)	▲	510	(3,0)	▲	505	(2,3)	▲	509	-2,7	▲	517	(2,6)	▲
	Syrian Arab Republic	459	(2,7)	▼	450	(2,9)	▼	447	(2,7)	▼	448	(3,2)	▼	474	(2,9)	▼	445	-3	▼	440	(2,7)	▼
	Thailand	478	(4,5)	▼	462	(4,1)	▼	458	(4,2)	▼	488	(3,8)	▼	473	(4,4)	▼	472	-4,1	▼	473	(4,0)	▼
	Tunisia	452	(2,2)	▼	458	(2,5)	▼	432	(2,5)	▼	447	(1,8)	▼	441	(2,0)	▼	445	-2,3	▼	458	(2,9)	▼
	Turkey	462	(3,4)	▼	435	(5,2)	▼	445	(4,3)	▼	466	(3,3)	▼	462	(3,6)	▼	450	-3,6	▼	462	(3,4)	▼
	Ukraine	477	(3,4)	▼	490	(3,3)	▼	492	(3,9)	▼	482	(4,0)	▼	477	(3,8)	▼	488	-3,7	▼	488	(3,9)	▼
2 †	United States	530	(2,8)	▲	510	(2,7)	▲	503	(2,7)		525	(3,1)	▲	512	(2,9)	▲	516	-2,7	▲	529	(2,9)	▲
¶	Morocco	395	(3,5)	▼	416	(3,0)	▼	405	(3,1)	▼	397	(3,8)	▼	396	(3,1)	▼	400	-3,3	▼	413	(3,0)	▼
	TIMSS Scale Avg.	500			500			500			500	(0,0)		500			500			500		

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
3 National Defined Population covers less than 90% of National Target Population (but at least 77%, see Appendix A).
¿ Kuwait and Dubai, UAE tested the same cohort of students as other countries, but later in 2007, at the beginning of the next school year.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A plus (+) sign indicates average achievement could not be accurately estimated.
▲ Country average significantly higher than TIMSS scale average.
▼ Country average significantly lower than TIMSS scale average.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Figure 11 Percentages of Students Reaching the TIMSS 2007 International Benchmarks of Science Achievement

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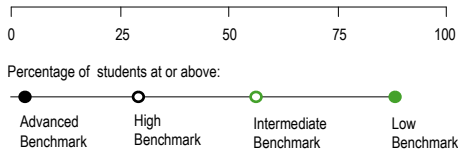
	Country	Advanced Benchmark (625)		High Benchmark (550)		ntermediate Benchmark (475)		Low Benchmark (400)	
	Singapore	36	(1,9)	68	(1,9)	88	(1,1)	96	(0,5)
	Chinese Taipei	19	(1,0)	55	(1,2)	86	(0,7)	97	(0,4)
	Russian Federation	16	(1,9)	49	(2,3)	82	(1,7)	96	(0,9)
2 †	United States	15	(0,9)	47	(1,4)	78	(1,1)	94	(0,6)
	England	14	(1,2)	48	(1,6)	81	(1,1)	95	(0,6)
	Hong Kong SAR	14	(1,4)	55	(2,2)	88	(1,2)	98	(0,4)
	Hungary	13	(1,0)	47	(1,8)	78	(1,6)	93	(0,8)
	Italy	13	(1,0)	44	(1,6)	78	(1,3)	94	(0,7)
	Japan	12	(1,0)	51	(1,1)	86	(1,0)	97	(0,4)
	Armenia	12	(1,8)	27	(1,8)	52	(1,8)	77	(1,6)
	Slovak Republic	11	(0,8)	42	(2,0)	75	(1,8)	92	(1,3)
	Australia	10	(0,7)	41	(2,2)	76	(1,6)	93	(0,8)
1	Latvia	10	(1,1)	47	(1,7)	84	(1,3)	98	(0,4)
	Germany	10	(0,7)	41	(1,3)	76	(1,2)	94	(0,6)
1	Kazakhstan	10	(1,3)	44	(3,1)	79	(2,6)	95	(1,0)
	Austria	9	(0,7)	39	(1,3)	76	(1,3)	93	(0,6)
	Sweden	8	(0,6)	37	(1,6)	76	(1,5)	95	(0,6)
	New Zealand	8	(0,5)	32	(1,0)	65	(1,2)	87	(1,0)
	Czech Republic	7	(0,7)	33	(1,9)	72	(1,4)	93	(0,8)
†	Denmark	7	(0,8)	35	(1,5)	72	(1,5)	93	(0,8)
	Slovenia	6	(0,6)	36	(1,3)	74	(1,0)	93	(0,6)
†	Scotland	4	(0,6)	26	(1,2)	65	(1,3)	90	(0,8)
‡	Netherlands	4	(0,8)	34	(1,8)	79	(1,4)	97	(0,5)
1	Lithuania	3	(0,4)	30	(1,4)	74	(1,4)	95	(0,6)
	Ukraine	2	(0,3)	17	(1,1)	52	(1,5)	82	(1,3)
	Iran, Islamic Rep. of	2	(0,3)	12	(1,0)	36	(1,7)	65	(1,9)
	Norway	1	(0,4)	17	(1,4)	54	(2,0)	84	(1,4)
	Colombia	1	(0,2)	6	(0,8)	22	(1,7)	51	(2,4)
1	Georgia	1	(0,2)	5	(0,8)	26	(2,0)	59	(2,1)
	El Salvador	0	(0,1)	4	(0,5)	18	(1,2)	47	(1,5)
¿	Kuwait	0	(0,2)	4	(0,6)	16	(1,3)	37	(1,3)
	Morocco	0	(0,2)	2	(0,5)	9	(1,4)	21	(1,9)
	Algeria	0	(0,1)	2	(0,5)	11	(1,3)	33	(2,1)
	Tunisia	0	(0,1)	3	(0,6)	14	(1,1)	32	(1,7)
	Qatar	0	(0,0)	2	(0,2)	8	(0,3)	23	(0,7)
	Yemen	0	(0,0)	0	(0,1)	2	(0,5)	8	(1,1)
	International Median	7		34		74		93	

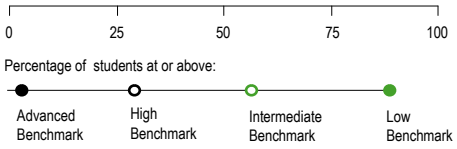


† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
¿ Kuwait and Dubai, UAE tested the same cohort of students as other countries, but later in 2007, at the beginning of the next school year.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Figure 12 Percentages of Students Reaching the TIMSS 2007 International Benchmarks of Science Achievement

TIMSS 2007 Science 8

	Country	Percentages of Students Reaching International Benchmarks	Advanced Benchmark (625)		High Benchmark (550)		ntermediate Benchmark (475)		Low Benchmark (400)	
	Singapore		32	(1,6)	61	(2,2)	80	(1,8)	93	(1,1)
	Chinese Taipei		25	(1,5)	60	(1,9)	83	(1,2)	95	(0,6)
	Japan		17	(0,9)	55	(1,1)	85	(0,8)	96	(0,4)
†	England		17	(1,6)	48	(2,3)	79	(1,9)	94	(0,9)
	Korea, Rep. of		17	(0,9)	54	(1,1)	85	(0,8)	97	(0,4)
	Hungary		13	(1,1)	46	(1,6)	80	(1,3)	96	(0,7)
	Czech Republic		11	(0,9)	44	(1,4)	82	(0,8)	97	(0,4)
	Slovenia		11	(0,7)	45	(1,2)	81	(1,1)	97	(0,5)
	Russian Federation		11	(1,0)	41	(2,1)	76	(1,6)	95	(0,7)
†	Hong Kong SAR		10	(1,0)	45	(2,6)	77	(2,2)	92	(1,3)
2 †	United States		10	(0,7)	38	(1,4)	71	(1,3)	92	(0,7)
	Armenia		8	(1,7)	23	(2,0)	55	(2,4)	83	(1,3)
	Australia		8	(1,4)	33	(1,8)	70	(1,7)	92	(0,8)
1	Lithuania		8	(0,6)	36	(1,4)	72	(1,4)	93	(0,8)
	Sweden		6	(0,6)	32	(1,2)	69	(1,4)	91	(0,8)
	Jordan		5	(0,6)	26	(1,5)	56	(1,8)	79	(1,4)
	Malta		5	(0,3)	21	(0,6)	48	(0,7)	71	(0,6)
3	Bulgaria		5	(0,9)	22	(1,8)	51	(2,4)	76	(2,1)
†	Scotland		5	(0,6)	26	(1,5)	61	(1,8)	87	(1,1)
3	Israel		5	(0,6)	21	(1,4)	51	(1,9)	75	(1,8)
	Italy		4	(0,7)	24	(1,3)	62	(1,4)	88	(1,0)
	Turkey		3	(0,5)	16	(1,2)	40	(1,7)	71	(1,5)
	Ukraine		3	(0,4)	22	(1,4)	58	(1,8)	85	(1,3)
	Thailand		3	(0,8)	17	(1,9)	48	(2,2)	80	(1,5)
	Malaysia		3	(0,7)	18	(2,2)	50	(2,7)	80	(2,2)
	Iran, Islamic Rep. of		2	(0,5)	14	(1,2)	41	(1,8)	76	(1,7)
	Bahrain		2	(0,4)	17	(0,8)	49	(0,9)	78	(0,7)
1 2	Serbia		2	(0,3)	16	(1,1)	51	(1,6)	81	(1,1)
	Romania		2	(0,3)	16	(1,2)	46	(1,9)	77	(1,6)
	Norway		2	(0,2)	20	(1,0)	58	(1,4)	87	(0,9)
	Bosnia and Herzegovina		2	(0,3)	14	(1,0)	47	(1,7)	80	(1,2)
	Cyprus		1	(0,3)	12	(0,8)	42	(1,1)	74	(1,0)
	Palestinian Nat'l Auth.		1	(0,2)	9	(0,6)	28	(1,2)	54	(1,5)
	Lebanon		1	(0,4)	8	(1,2)	28	(2,1)	55	(2,9)
	Syrian Arab Republic		1	(0,2)	9	(0,8)	39	(1,6)	76	(1,5)
	Egypt		1	(0,1)	7	(0,6)	27	(1,4)	55	(1,6)
	Oman		1	(0,2)	8	(0,6)	32	(1,2)	61	(1,4)
	Colombia		1	(0,1)	4	(0,5)	22	(1,5)	59	(2,1)
¿	Kuwait		0	(0,1)	6	(0,7)	28	(1,2)	60	(1,4)
1	Georgia		0	(0,1)	5	(0,7)	27	(1,9)	61	(2,4)
	Indonesia		0	(0,1)	4	(0,6)	27	(1,8)	65	(2,0)
	Tunisia		0	(0,1)	4	(0,5)	31	(1,3)	77	(1,2)
	Saudi Arabia		0	(0,0)	2	(0,5)	18	(1,0)	52	(1,4)
	Qatar		0	(0,0)	2	(0,2)	11	(0,5)	29	(0,6)
	Ghana		0	(0,0)	1	(0,3)	6	(0,9)	19	(1,6)
	El Salvador		0	(0,1)	1	(0,3)	11	(1,0)	42	(1,7)
	Botswana		0	(0,0)	2	(0,3)	11	(0,7)	35	(1,3)
	Algeria		0	(0,0)	1	(0,2)	14	(0,8)	55	(1,2)
¶	Morocco		0	(0,1)	3	(0,5)	18	(1,4)	51	(2,1)
	International Median		3		17		49		78	



† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
3 National Defined Population covers less than 90% of National Target Population (but at least 77%, see Appendix A).
¿ Kuwait and Dubai, UAE tested the same cohort of students as other countries, but later in 2007, at the beginning of the next school year.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 9 Trends in Percentages of Students Reaching the TIMSS 2007 International Benchmarks of Science Achievement

Country	Advanced International Benchmark (625)								High International Benchmark (550)								Intermediate International Benchmark (475)								Low International Benchmark (400)							
	2007 Percent of Students		2003 Percent of Students			1995 Percent of Students			2007 Percent of Students		2003 Percent of Students			1995 Percent of Students			2007 Percent of Students		2003 Percent of Students			1995 Percent of Students			2007 Percent of Students		2003 Percent of Students			1995 Percent of Students		
Singapore	36	(1,9)	25	(2,4)	▲	14	(1,6)	▲	68	(1,9)	61	(2,6)	▲	42	(2,2)	▲	88	(1,1)	86	(1,6)		71	(1,7)	▲	96	(0,5)	95	(0,9)		89	(0,9)	▲
Chinese Taipei	19	(1,0)	14	(1,0)	▲	◊	◊		55	(1,2)	52	(1,1)		◊	◊		86	(0,7)	87	(0,7)		◊	◊		97	(0,4)	98	(0,3)	▼	◊	◊	
Russian Federation	16	(1,9)	11	(1,4)		◊	◊		49	(2,3)	39	(2,7)	▲	◊	◊		82	(1,7)	74	(2,4)	▲	◊	◊		96	(0,9)	93	(1,1)		◊	◊	
United States	15	(0,9)	13	(0,8)		19	(1,2)	▼	47	(1,4)	45	(1,4)		50	(1,6)		78	(1,1)	78	(1,0)		78	(1,1)		94	(0,6)	94	(0,5)		92	(0,7)	
England	14	(1,2)	15	(1,4)		15	(1,1)		48	(1,6)	47	(1,8)		42	(1,7)	▲	81	(1,1)	79	(1,3)		72	(1,3)	▲	95	(0,6)	94	(0,7)		90	(0,8)	▲
Hong Kong SAR	14	(1,4)	7	(0,8)	▲	5	(0,6)	▲	55	(2,2)	47	(2,2)	▲	30	(1,6)	▲	88	(1,2)	87	(1,2)		69	(1,7)	▲	98	(0,4)	98	(0,3)		91	(1,1)	▲
Hungary	13	(1,0)	10	(0,9)	▲	7	(0,7)	▲	47	(1,8)	42	(1,6)		32	(1,7)	▲	78	(1,6)	76	(1,4)		67	(1,8)	▲	93	(0,8)	94	(0,7)		90	(1,0)	▲
Italy	13	(1,0)	9	(1,1)	▲	–	–		44	(1,6)	35	(1,9)	▲	–	–		78	(1,3)	70	(1,6)	▲	–	–		94	(0,7)	91	(0,9)	▲	–	–	
Japan	12	(1,0)	12	(0,6)		15	(0,8)	▼	51	(1,1)	49	(1,1)		54	(1,3)		86	(1,0)	84	(0,7)	▲	87	(0,7)		97	(0,4)	96	(0,4)		97	(0,4)	
Armenia	12	(1,8)	2	(0,4)	▲	◊	◊		27	(1,8)	10	(1,0)	▲	◊	◊		52	(1,8)	38	(1,7)	▲	◊	◊		77	(1,6)	66	(1,8)	▲	◊	◊	
Australia	10	(0,7)	9	(1,0)		13	(1,1)		41	(2,2)	38	(1,7)		40	(1,3)		76	(1,6)	74	(2,0)		72	(1,7)	▲	93	(0,8)	92	(1,1)		89	(1,1)	▲
Latvia	10	(1,1)	7	(0,7)	▲	5	(1,4)	▲	47	(1,7)	39	(1,9)	▲	21	(2,1)	▲	84	(1,3)	80	(1,5)	▲	55	(2,1)	▲	98	(0,4)	96	(0,6)		85	(1,4)	▲
Austria	9	(0,7)	◊	◊		13	(1,4)	▼	39	(1,3)	◊	◊		45	(1,8)	▼	76	(1,3)	◊	◊		79	(1,5)	▼	93	(0,6)	◊	◊		94	(0,7)	
New Zealand	8	(0,5)	9	(0,7)		11	(1,2)	▼	32	(1,0)	39	(1,3)	▼	35	(1,8)		65	(1,2)	74	(1,3)	▼	66	(1,8)		87	(1,0)	92	(0,7)	▼	85	(1,7)	
Czech Republic	7	(0,7)	◊	◊		12	(1,1)	▼	33	(1,9)	◊	◊		42	(1,5)	▼	72	(1,4)	◊	◊		77	(1,2)	▼	93	(0,8)	◊	◊		95	(0,6)	
Slovenia	6	(0,6)	3	(0,4)	▲	2	(0,4)	▲	36	(1,3)	22	(1,3)	▲	14	(1,1)	▲	74	(1,0)	61	(1,4)	▲	45	(1,5)	▲	93	(0,6)	87	(0,9)	▲	79	(1,4)	▲
Scotland	4	(0,6)	5	(0,5)		12	(1,1)	▼	26	(1,2)	27	(1,5)		37	(1,8)	▼	65	(1,3)	66	(1,5)		68	(1,9)		90	(0,8)	90	(0,9)		88	(1,3)	
Netherlands	4	(0,8)	3	(0,5)		6	(0,7)	▼	34	(1,8)	32	(1,5)		38	(2,1)		79	(1,4)	83	(1,2)	▼	82	(1,6)		97	(0,5)	99	(0,4)		98	(0,7)	
Lithuania	3	(0,4)	3	(0,5)		◊	◊		30	(1,4)	30	(1,3)		◊	◊		74	(1,4)	73	(1,6)		◊	◊		95	(0,6)	95	(0,7)		◊	◊	
Iran, Islamic Rep. of	2	(0,3)	1	(0,2)	▲	0	(0,1)	▲	12	(1,0)	7	(0,7)	▲	3	(0,7)	▲	36	(1,7)	28	(1,5)	▲	15	(1,5)	▲	65	(1,9)	58	(1,7)	▲	42	(2,1)	▲
Norway	1	(0,4)	2	(0,3)		8	(0,9)	▼	17	(1,4)	15	(0,9)		32	(1,6)	▼	54	(2,0)	49	(1,4)	▲	65	(1,7)	▼	84	(1,4)	79	(1,5)	▲	88	(1,1)	▼
Morocco	0	(0,2)	0	(0,0)		◊	◊		2	(0,5)	1	(0,3)		◊	◊		9	(1,4)	9	(0,8)		◊	◊		21	(1,9)	24	(1,6)		◊	◊	
Tunisia	0	(0,1)	0	(0,1)		◊	◊		3	(0,5)	2	(0,3)	▲	◊	◊		14	(1,1)	10	(1,0)	▲	◊	◊		31	(1,7)	27	(1,7)	▲	◊	◊	

Trend notes: Data are not shown for Kuwait, because comparable data from previous cycles are not available. Data for Tunisia do not include private schools.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 percent significantly higher.
▼ 2007 percent significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 10 Trends in Percentages of Students Reaching the TIMSS 2007 International Benchmarks of Science Achievement

Country	Advanced International Benchmark (625)				High International Benchmark (550)				Intermediate International Benchmark (475)				Low International Benchmark (400)			
	2007 Percent of Students	2003 Percent of Students	1999 Percent of Students	1995 Percent of Students	2007 Percent of Students	2003 Percent of Students	1999 Percent of Students	1995 Percent of Students	2007 Percent of Students	2003 Percent of Students	1999 Percent of Students	1995 Percent of Students	2007 Percent of Students	2003 Percent of Students	1999 Percent of Students	1995 Percent of Students
Singapore	32 (1,6)	33 (1,6)	29 (3,2)	29 (3,2)	61 (2,2)	66 (2,3)	60 (3,5)	64 (2,8)	80 (1,8)	85 (1,7) ▼	84 (2,4)	91 (1,3) ▼	93 (1,1)	95 (0,8) ▼	95 (1,2)	99 (0,2) ▼
Chinese Taipei	25 (1,5)	26 (1,5)	27 (1,8)	◊ ◊	60 (1,9)	63 (1,9)	61 (2,1)	◊ ◊	83 (1,2)	88 (1,1) ▼	86 (1,3)	◊ ◊	95 (0,6)	98 (0,4) ▼	96 (0,6)	◊ ◊
Japan	17 (0,9)	15 (0,7)	16 (1,0)	18 (0,9)	55 (1,1)	53 (1,1)	52 (1,3)	54 (1,1)	85 (0,8)	86 (0,8)	84 (0,9)	85 (0,7)	96 (0,4)	98 (0,3) ▼	97 (0,4)	97 (0,3)
England	17 (1,6)	15 (1,7)	17 (1,7)	15 (1,7)	48 (2,3)	48 (2,7)	45 (2,4)	43 (1,8)	79 (1,9)	81 (1,8)	76 (1,9)	75 (1,4)	94 (0,9)	96 (0,6)	94 (0,7)	93 (0,7)
Korea, Rep. of	17 (0,9)	17 (0,9)	19 (1,1)	17 (1,0)	54 (1,1)	57 (1,1)	50 (1,2) ▲	50 (1,2) ▲	85 (0,8)	88 (0,7) ▼	81 (1,0) ▲	81 (0,9) ▲	97 (0,4)	98 (0,4) ▼	96 (0,4) ▲	95 (0,5) ▲
Hungary	13 (1,1)	14 (1,1)	19 (1,3) ▼	12 (1,1)	46 (1,6)	46 (1,7)	53 (1,8) ▼	44 (1,7)	80 (1,3)	82 (1,1)	83 (1,3)	80 (1,5)	96 (0,7)	97 (0,6)	96 (0,8)	95 (0,7)
Czech Republic	11 (0,9)	◊ ◊	14 (1,4)	17 (1,8) ▼	44 (1,4)	◊ ◊	45 (2,2)	52 (2,5) ▼	82 (0,8)	◊ ◊	79 (1,7)	86 (1,3) ▼	97 (0,4)	◊ ◊	96 (0,8)	98 (0,5)
Slovenia	11 (0,7)	6 (0,5) ▲	– –	8 (0,8) ▲	45 (1,2)	33 (1,3) ▲	– –	32 (1,5) ▲	81 (1,1)	75 (1,3) ▲	– –	69 (1,6) ▲	97 (0,5)	96 (0,6)	– –	93 (0,7) ▲
Russian Federation	11 (1,0)	6 (0,8) ▲	15 (2,3)	11 (1,1)	41 (2,1)	32 (1,8) ▲	41 (2,8)	38 (2,3)	76 (1,6)	70 (1,8) ▲	73 (2,3)	71 (2,2)	95 (0,7)	93 (0,9)	92 (1,0) ▲	92 (1,1)
Hong Kong SAR	10 (1,0)	13 (1,2) ▼	7 (0,9)	7 (1,0) ▲	45 (2,6)	58 (1,9) ▼	40 (2,1)	33 (2,7) ▲	77 (2,2)	89 (1,4) ▼	80 (1,9)	70 (2,7) ▲	92 (1,3)	98 (0,7) ▼	96 (0,9) ▼	90 (1,7)
United States	10 (0,7)	11 (0,8)	12 (1,0) ▼	11 (1,1)	38 (1,4)	41 (1,7)	37 (1,9)	38 (2,0)	71 (1,3)	75 (1,4)	67 (1,9)	68 (2,2)	92 (0,7)	93 (0,8)	87 (1,3) ▲	87 (1,6) ▲
Armenia	8 (1,7)	1 (0,3) ▲	◊ ◊	◊ ◊	23 (2,0)	14 (1,3) ▲	◊ ◊	◊ ◊	55 (2,4)	45 (1,9) ▲	◊ ◊	◊ ◊	83 (1,3)	77 (1,4) ▲	◊ ◊	◊ ◊
Australia	8 (1,4)	9 (1,1)	– –	10 (1,1)	33 (1,8)	40 (2,0) ▼	– –	36 (1,7)	70 (1,7)	76 (1,9) ▼	– –	69 (1,6)	92 (0,8)	95 (0,8) ▼	– –	89 (1,0) ▲
Lithuania	8 (0,6)	6 (0,6) ▲	5 (0,9) ▲	2 (0,5) ▲	36 (1,4)	34 (1,2)	22 (1,8) ▲	14 (1,5) ▲	72 (1,4)	74 (1,3)	57 (2,0) ▲	45 (2,2) ▲	93 (0,8)	95 (0,6) ▼	86 (1,7) ▲	79 (1,6) ▲
Sweden	6 (0,6)	8 (0,8)	◊ ◊	19 (1,6) ▼	32 (1,2)	38 (1,6) ▼	◊ ◊	52 (2,4) ▼	69 (1,4)	75 (1,4) ▼	◊ ◊	83 (1,7) ▼	91 (0,8)	95 (0,7) ▼	◊ ◊	97 (0,7) ▼
Jordan	5 (0,6)	3 (0,5) ▲	4 (0,5) ▲	◊ ◊	26 (1,5)	21 (1,4) ▲	17 (1,0) ▲	◊ ◊	56 (1,8)	53 (1,8)	42 (1,4) ▲	◊ ◊	79 (1,4)	80 (1,3)	69 (1,6) ▲	◊ ◊
Scotland	5 (0,6)	6 (0,7)	◊ ◊	9 (1,4) ▼	26 (1,5)	32 (1,9) ▼	◊ ◊	30 (2,5)	61 (1,8)	70 (1,7) ▼	◊ ◊	61 (2,2)	87 (1,1)	92 (0,9) ▼	◊ ◊	86 (1,4)
Israel	5 (0,6)	5 (0,5)	5 (0,5)	– –	21 (1,4)	24 (1,3)	23 (1,4)	– –	51 (1,9)	57 (1,6) ▼	50 (2,1)	– –	75 (1,8)	85 (1,1) ▼	75 (2,0)	– –
Italy	4 (0,7)	4 (0,6)	6 (0,9) ▼	– –	24 (1,3)	23 (1,5)	26 (1,8)	– –	62 (1,4)	59 (1,5)	59 (2,0)	– –	88 (1,0)	87 (1,1)	86 (1,2)	– –
Thailand	3 (0,8)	◊ ◊	2 (0,5)	– –	17 (1,9)	◊ ◊	18 (2,1)	– –	48 (2,2)	◊ ◊	54 (2,3) ▼	– –	80 (1,5)	◊ ◊	87 (1,2) ▼	– –
Malaysia	3 (0,7)	4 (0,8)	5 (0,8)	◊ ◊	18 (2,2)	28 (2,2) ▼	24 (2,0)	◊ ◊	50 (2,7)	71 (2,0) ▼	59 (2,2) ▼	◊ ◊	80 (2,2)	95 (0,7) ▼	87 (1,4) ▼	◊ ◊
Iran, Islamic Rep. of	2 (0,5)	1 (0,2) ▲	1 (0,3)	1 (0,4)	14 (1,2)	9 (0,6) ▲	11 (1,3)	11 (1,3)	41 (1,8)	38 (1,3)	38 (1,8)	43 (2,2)	76 (1,7)	77 (1,3)	72 (1,8)	81 (1,8) ▼
Bahrain	2 (0,4)	0 (0,1) ▲	◊ ◊	◊ ◊	17 (0,8)	6 (0,6) ▲	◊ ◊	◊ ◊	49 (0,9)	33 (1,1) ▲	◊ ◊	◊ ◊	78 (0,7)	70 (1,2) ▲	◊ ◊	◊ ◊
Serbia	2 (0,3)	2 (0,3)	◊ ◊	◊ ◊	16 (1,1)	16 (1,0)	◊ ◊	◊ ◊	51 (1,6)	48 (1,3)	◊ ◊	◊ ◊	81 (1,1)	79 (1,0)	◊ ◊	◊ ◊
Romania	2 (0,3)	4 (0,8)	5 (0,8) ▼	5 (0,8) ▼	16 (1,2)	20 (1,8)	21 (2,1) ▼	22 (1,8) ▼	46 (1,9)	49 (2,2)	50 (2,6)	51 (2,2)	77 (1,6)	78 (1,9)	78 (2,0)	77 (1,7)
Norway	2 (0,2)	2 (0,3)	◊ ◊	6 (0,6) ▼	20 (1,0)	21 (1,1)	◊ ◊	32 (1,5) ▼	58 (1,4)	63 (1,3) ▼	◊ ◊	72 (1,3) ▼	87 (0,9)	91 (0,8) ▼	◊ ◊	94 (0,9) ▼
Cyprus	1 (0,3)	0 (0,2) ▲	2 (0,4)	2 (0,4)	12 (0,8)	8 (0,6) ▲	14 (0,8)	15 (1,0) ▼	42 (1,1)	35 (1,0) ▲	45 (1,5)	43 (1,3)	74 (1,0)	71 (1,2) ▲	77 (1,1) ▼	72 (1,1)
Palestinian Nat'l Auth.	1 (0,2)	1 (0,2)	◊ ◊	◊ ◊	9 (0,6)	10 (0,8)	◊ ◊	◊ ◊	28 (1,2)	36 (1,4) ▼	◊ ◊	◊ ◊	54 (1,5)	66 (1,5) ▼	◊ ◊	◊ ◊
Lebanon	1 (0,4)	0 (0,1)	◊ ◊	◊ ◊	8 (1,2)	4 (0,7) ▲	◊ ◊	◊ ◊	28 (2,1)	20 (1,5) ▲	◊ ◊	◊ ◊	55 (2,9)	48 (2,0) ▲	◊ ◊	◊ ◊
Egypt	1 (0,1)	1 (0,2) ▼	◊ ◊	◊ ◊	7 (0,6)	10 (0,7) ▼	◊ ◊	◊ ◊	27 (1,4)	33 (1,4) ▼	◊ ◊	◊ ◊	55 (1,6)	59 (1,6) ▼	◊ ◊	◊ ◊
Colombia	1 (0,1)	◊ ◊	◊ ◊	0 (0,2)	4 (0,5)	◊ ◊	◊ ◊	2 (0,4) ▲	22 (1,5)	◊ ◊	◊ ◊	9 (1,3) ▲	59 (2,1)	◊ ◊	◊ ◊	35 (2,4) ▲
Indonesia	0 (0,2)	0 (0,1)	1 (0,3) ▼	◊ ◊	5 (0,7)	4 (0,5)	8 (1,0)	◊ ◊	30 (2,1)	25 (1,8)	33 (1,7)	◊ ◊	68 (2,4)	61 (2,1) ▲	68 (2,5)	◊ ◊
Tunisia	0 (0,1)	0 (0,0)	0 (0,1)	◊ ◊	4 (0,5)	1 (0,2) ▲	3 (0,5)	◊ ◊	31 (1,3)	12 (1,0) ▲	25 (1,6) ▲	◊ ◊	77 (1,2)	52 (1,5) ▲	68 (2,1) ▲	◊ ◊
Ghana	0 (0,0)	0 (0,0)	◊ ◊	◊ ◊	1 (0,3)	0 (0,1) ▲	◊ ◊	◊ ◊	6 (0,9)	3 (0,4) ▲	◊ ◊	◊ ◊	19 (1,6)	13 (1,3) ▲	◊ ◊	◊ ◊
Botswana	0 (0,0)	0 (0,1)	◊ ◊	◊ ◊	2 (0,3)	1 (0,5)	◊ ◊	◊ ◊	11 (0,7)	10 (0,9)	◊ ◊	◊ ◊	35 (1,3)	35 (1,3)	◊ ◊	◊ ◊

Trend notes: Data are not shown for Kuwait, because comparable data from previous cycles are not available. Data for Tunisia do not include private schools.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 percent significantly higher.
▼ 2007 percent significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

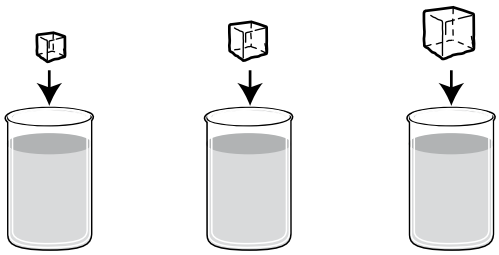
EXAMPLE ITEM

Example Item 17 Advanced International Benchmark (above 625 point) of Science Achievement

TIMSS 2007 Science 4

Content Domain: Physical Science
Description: Recognizes that, regardless of their size, ice cubes float in water.

Susie has three ice cubes of different sizes. She places each ice cube into an identical beaker containing the same volume of water, as shown in the diagram.



What happens to the ice cubes when they are placed in the water?

(A) Cubes 1, 2, and 3 will sink.
(B) Cubes 1, 2, and 3 will float.
(C) Cube 1 will float, and cubes 2 and 3 will sink.
(D) Cubes 1 and 2 will float, and cube 3 will sink.

	Country	Percent Correct		
	Chinese Taipei	60	(2,1)	▲
	Japan	58	(2,3)	▲
	Singapore	57	(1,8)	▲
	Austria	56	(2,4)	▲
	Australia	56	(2,4)	▲
	Sweden	51	(2,1)	▲
†	Denmark	50	(2,5)	▲
	Germany	49	(1,7)	▲
	Norway	49	(2,3)	▲
	Hong Kong SAR	48	(2,1)	▲
	Russian Federation	46	(2,1)	▲
2 †	United States	44	(1,6)	▲
	New Zealand	44	(2,5)	
1	Latvia	43	(2,7)	
	Czech Republic	41	(2,7)	
	Slovenia	40	(2,0)	
1	Kazakhstan	40	(2,4)	
	Italy	39	(2,1)	
	International Avg.	39	(0,4)	
	Colombia	37	(2,3)	
	England	37	(2,2)	
	Slovak Republic	36	(2,2)	
†	Scotland	36	(2,4)	
1	Lithuania	36	(2,7)	
‡	Netherlands	35	(2,5)	
	Hungary	34	(2,4)	▼
	Ukraine	27	(2,3)	▼
	Tunisia	20	(1,9)	▼

Example Item 18 Advanced International Benchmark (above 625 point) of Science Achievement

TIMSS 2007 Science 4

Content Domain: Life Science
Description: Explains that the last surviving member of a species of a turtle cannot reproduce and gives a reason.

There is a giant turtle that lives on an island. He is the only turtle left of a special type of giant turtle.
Can he reproduce so that this type of turtle does not die out?
(Check one box.)

○ Yes
● No

Give a reason for your answer.

Turtles cannot reproduce all by themselves. It is a male turtle so he needs on female.

The answer shown illustrates the type of student response that was given full credit.

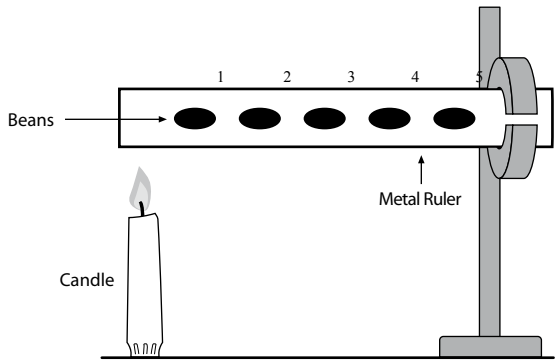
	Country	Percent Correct		
1	Lithuania	58	(2,4)	▲
1	Latvia	55	(2,4)	▲
	Germany	49	(2,1)	▲
	Australia	48	(2,5)	▲
	Czech Republic	47	(2,2)	▲
	England	47	(2,4)	▲
	Hungary	45	(2,6)	▲
	Japan	45	(2,1)	▲
	Slovak Republic	45	(2,5)	▲
	Chinese Taipei	43	(2,4)	▲
‡	Netherlands	43	(2,2)	▲
2 †	United States	42	(1,6)	▲
†	Denmark	42	(2,5)	▲
	Russian Federation	41	(2,4)	▲
	Singapore	38	(2,4)	▲
	Italy	38	(2,3)	▲
	Hong Kong SAR	36	(2,2)	▲
†	Scotland	36	(2,1)	▲
	New Zealand	35	(2,0)	▲
	Sweden	34	(2,7)	
	Slovenia	32	(2,0)	
	International Avg.	30	(0,3)	
1	Kazakhstan	25	(2,4)	▼
	Ukraine	23	(1,9)	▼
	Norway	18	(2,1)	▼
	Colombia	12	(1,7)	▼
	Tunisia	5	(0,9)	▼
	Austria	–	–	

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
A dash (–) indicates comparable data are not available.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ Percent significantly higher than international average.
▼ Percent significantly lower than international average.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Example Item 19 High International Benchmark (between 550-625 point) of Science Achievement

TIMSS 2007 Science 4

Content Domain: Physical Science
Description: From a diagram showing a metal ruler heated at one end, recognizes the direction of heat transfer starting from the heated end.



Beans are fixed on a metal ruler with butter as shown in the figure above. The ruler is heated at one end. In which order will the beans fall off?

A 1, 2, 3, 4, 5
B 5, 4, 3, 2, 1
C 1, 3, 5, 4, 2
D All at the same time

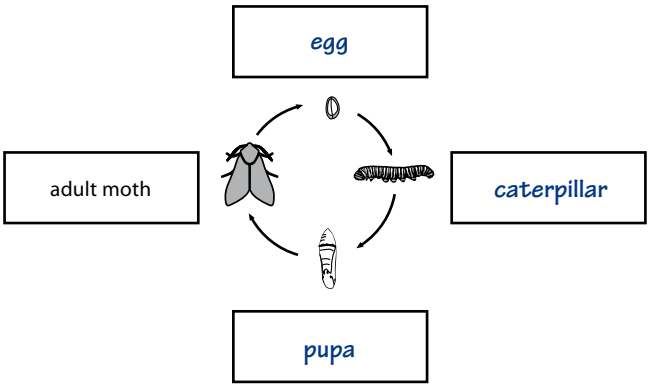
	Country	Percent Correct		
	Japan	92	(1,2)	▲
	Singapore	88	(1,4)	▲
	Hong Kong SAR	75	(2,1)	▲
	Russian Federation	70	(2,4)	▲
	Slovenia	70	(2,1)	▲
	Czech Republic	69	(2,4)	▲
1	Latvia	69	(2,3)	▲
	Hungary	67	(2,0)	▲
1	Kazakhstan	67	(2,6)	▲
	England	67	(2,3)	▲
2 †	United States	66	(1,7)	▲
‡	Netherlands	65	(2,5)	▲
	Chinese Taipei	65	(2,0)	▲
	Italy	65	(2,2)	▲
	Ukraine	65	(2,0)	▲
	Germany	64	(1,8)	▲
	Austria	63	(2,2)	▲
1	Lithuania	63	(2,8)	▲
	Slovak Republic	63	(2,4)	▲
†	Denmark	62	(2,4)	▲
	Australia	59	(2,8)	
†	Scotland	58	(2,6)	
	New Zealand	58	(2,2)	
	International Avg.	57	(0,4)	
	Sweden	55	(2,2)	
	Norway	53	(2,5)	
	Colombia	39	(2,3)	▼
	Tunisia	31	(2,2)	▼

Example Item 20 High International Benchmark (between 550-625 point) of Science Achievement

TIMSS 2007 Science 4

Content Domain: Life Science
Description: Complete a diagram showing the life cycle of a moth.

The diagram below shows the life cycle of a moth.
Write the name of each stage in the boxes provided.
One stage has been completed for you.



The answer shown illustrates the type of student response that was given full credit.

	Country	Percent Correct		
	Japan	93	(1,3)	▲
	Slovak Republic	66	(2,3)	▲
	Singapore	64	(2,0)	▲
	Chinese Taipei	61	(2,4)	▲
	Hungary	56	(2,5)	▲
	Australia	56	(2,5)	▲
	Sweden	53	(2,6)	▲
	New Zealand	52	(1,9)	▲
2 †	United States	48	(1,8)	▲
†	Denmark	45	(2,6)	▲
1	Lithuania	43	(2,8)	▲
	Czech Republic	40	(2,7)	▲
1	Latvia	39	(3,0)	▲
	Germany	38	(1,8)	▲
‡	Netherlands	37	(2,6)	
	Austria	36	(1,8)	▲
	England	36	(2,2)	
†	Scotland	33	(2,5)	
	International Avg.	33	(0,4)	
	Italy	32	(2,3)	
1	Kazakhstan	26	(4,4)	
	Slovenia	25	(2,0)	▼
	Russian Federation	23	(1,7)	▼
	Hong Kong SAR	22	(2,1)	▼
	Norway	20	(2,0)	▼
	Ukraine	18	(2,0)	▼
	Colombia	4	(1,1)	▼
	Tunisia	1	(0,3)	▼

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ Percent significantly higher than international average.
▼ Percent significantly lower than international average.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Example Item 21 Intermediate International Benchmark (between 475-550 points) of Science Achievement

TIMSS 2007 Science 4

Content Domain: Life Science
Description: In the context of an investigation of plant growth, describes a treatment that can cause one plant to grow better than another.

Carl and Jan each had a sunflower seed taken from the same plant. They took two identical pots and put potting soil in each. They then planted one seed in each pot. Carl looked after one pot in his home, and Jan looked after the other pot in her home.
After some time, they compared the plants and saw that there was a large difference in their growth, as shown in the pictures below.

Carl's plant

Jan's plant

Describe one way in which Carl may have treated his plant differently from the way Jan treated hers.

Carl night have given it more light and water.

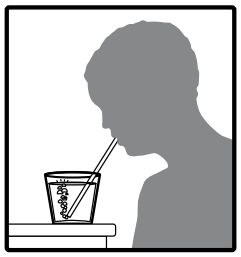
The answer shown illustrates the type of student response that was given full credit.

	Country	Percent Correct		
	Singapore	85	(1,8)	▲
1	Lithuania	85	(1,7)	▲
‡	Netherlands	84	(2,0)	▲
	Sweden	84	(1,9)	▲
	Australia	83	(2,3)	▲
	England	81	(1,8)	▲
	Slovenia	81	(1,6)	▲
	Hong Kong SAR	81	(2,0)	▲
	Austria	80	(1,9)	▲
1	Latvia	79	(2,4)	▲
	Germany	79	(1,6)	▲
†	Denmark	79	(2,3)	▲
	Italy	79	(1,7)	▲
	Norway	78	(2,0)	▲
2 †	United States	78	(1,2)	▲
	New Zealand	77	(1,6)	▲
†	Scotland	74	(2,0)	▲
	Chinese Taipei	73	(2,1)	▲
	Hungary	71	(2,9)	▲
	Czech Republic	71	(2,3)	▲
	Russian Federation	69	(2,4)	▲
	Ukraine	66	(2,3)	
	International Avg.	63	(0,4)	
1	Kazakhstan	62	(3,0)	
	Colombia	60	(3,1)	
	Slovak Republic	58	(2,4)	▼
	Japan	49	(2,3)	▼
	Tunisia	30	(2,2)	▼

Example Item 22 Intermediate International Benchmark (between 475-550 points) of Science Achievement

TIMSS 2007 Science 4

Content Domain: Physical Science
Description: From a diagram showing a person blowing into water using a straw, explains why bubbles rise to the top.



When you blow into water using a straw, bubbles are formed and rise to the top.
Why do the bubbles rise in water?

They rise because they are made from air which is lighter than water.

The answer shown illustrates the type of student response that was given full credit.

	Country	Percent Correct		
	Russian Federation	79	(2,3)	▲
	Chinese Taipei	77	(1,7)	▲
†	Denmark	74	(2,3)	▲
	Singapore	72	(1,9)	▲
1	Kazakhstan	71	(3,1)	▲
	Czech Republic	70	(2,2)	▲
	Australia	67	(2,8)	▲
	Slovenia	67	(2,3)	▲
	England	66	(2,3)	▲
	Austria	66	(2,0)	▲
	Ukraine	65	(2,0)	▲
	Japan	65	(2,0)	▲
	New Zealand	64	(1,8)	▲
	Slovak Republic	64	(2,5)	▲
	Norway	63	(2,7)	▲
2 †	United States	61	(1,7)	▲
1	Lithuania	61	(2,4)	▲
‡	Netherlands	59	(2,6)	▲
	Hungary	59	(2,2)	▲
†	Scotland	54	(2,4)	
	Germany	52	(2,0)	
	International Avg.	51	(0,4)	
	Sweden	50	(2,3)	
	Hong Kong SAR	48	(2,4)	
	Italy	47	(2,2)	▼
	Colombia	28	(2,6)	▼
	Tunisia	11	(1,5)	▼
1	Latvia	–	–	

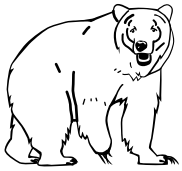
† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available.
▲ Percent significantly higher than international average.
▼ Percent significantly lower than international average.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

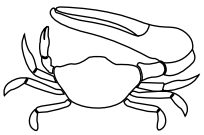
Example Item 23 Low International Benchmark (between 400-475 points) of Science Achievement

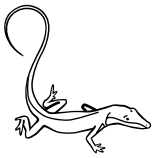
TIMSS 2007 Science 4

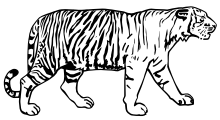
Content Domain: Life Science
Description: Recognizes from diagrams of animals which is most likely to live in a desert.

Which of these animals is most likely to live in the desert?

Ⓐ 
bear

Ⓑ 
crab


lizard

Ⓓ 
tiger

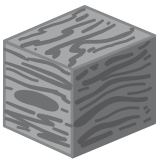
	Country	Percent Correct		
2 †	United States	92	(0,8)	▲
	Russian Federation	89	(2,2)	▲
	Australia	88	(1,8)	▲
1	Kazakhstan	86	(2,3)	▲
	England	84	(1,9)	▲
†	Denmark	84	(2,1)	▲
‡	Netherlands	83	(1,9)	▲
	New Zealand	81	(1,4)	▲
	Sweden	80	(1,7)	▲
	Germany	78	(1,4)	▲
	Austria	78	(1,7)	▲
	Norway	77	(2,3)	▲
†	Scotland	77	(1,9)	▲
	Hong Kong SAR	74	(1,8)	▲
	Singapore	71	(1,8)	
	Ukraine	71	(2,2)	
1	Lithuania	70	(2,2)	
	Hungary	69	(2,4)	
	Chinese Taipei	69	(2,1)	
	International Avg.	68	(0,4)	
1	Latvia	68	(2,8)	
	Japan	66	(2,1)	
	Slovenia	61	(2,0)	▼
	Italy	61	(2,4)	▼
	Czech Republic	53	(2,8)	▼
	Slovak Republic	46	(2,4)	▼
	Tunisia	42	(2,5)	▼
	Colombia	38	(2,4)	▼

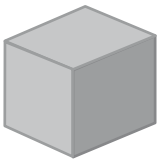
Example Item 24 Low International Benchmark (between 400-475 points) of Science Achievement

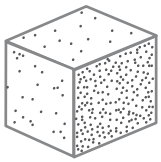
TIMSS 2007 Science 4

Content Domain: Physical Science
Description: Recognizes that an iron object is most likely to be heavier than a wood or styrofoam object of the same shape and size.

The three objects below are the same shape and size.


wood


iron


styrofoam

Which statement about the weight of the objects is most likely to be correct?

Ⓐ The wood object is the heaviest.
Ⓑ The iron object is the heaviest.
Ⓒ The styrofoam object is the heaviest.
Ⓓ All three objects weigh the same.

	Country	Percent Correct		
	Japan	94	(1,2)	▲
	Russian Federation	92	(1,3)	▲
	Chinese Taipei	91	(1,4)	▲
	Hong Kong SAR	90	(1,4)	▲
	Germany	90	(1,2)	▲
	Slovenia	89	(1,2)	▲
	England	89	(1,6)	▲
	Hungary	89	(1,4)	▲
1	Kazakhstan	89	(2,5)	▲
	Italy	88	(1,4)	▲
	Austria	88	(1,5)	▲
	Singapore	88	(1,4)	▲
	Czech Republic	87	(1,7)	▲
‡	Netherlands	86	(1,8)	▲
1	Latvia	86	(2,2)	▲
	Slovak Republic	85	(1,4)	▲
	Sweden	84	(1,8)	▲
†	Denmark	84	(1,9)	▲
1	Lithuania	83	(2,1)	
	Ukraine	82	(2,2)	
†	Scotland	82	(1,8)	
	Norway	81	(1,7)	
2 †	United States	80	(1,1)	
	International Avg.	80	(0,3)	
	Colombia	77	(2,4)	
	Australia	68	(3,1)	▼
	New Zealand	67	(2,3)	▼
	Tunisia	60	(2,5)	▼

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
‡ Nearly satisfied guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ Percent significantly higher than international average.
▼ Percent significantly lower than international average.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Example Item 25 Advanced International Benchmark (above 625 point) of Science Achievement

TIMSS 2007 Science 8

Content Domain: Chemistry
Description: Applies knowledge of conservation of mass during a chemical reaction to explain what happens to mass when a new substance is formed.

The mass of substances A and B are measured on a balance, as shown in Figure 1. Substance B is put into the beaker and substance C is formed. The empty beaker is put back on the balance, as shown in Figure 2.

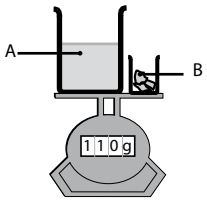


Figure 1

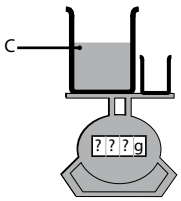


Figure 2

The scale in Figure 1 shows a mass of 110 grams. What will it show in Figure 2?
(Check one box.)

- ☐ More than 110 grams
- ☒ 110 grams
- ☐ Less than 110 grams

Explain your answer.

The mass will be the same because the mass of reactorts equals the mass of products.

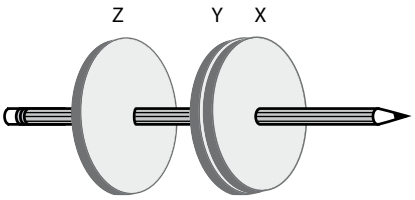
The answer shown illustrates the type of student response that was given full credit.

	Country	Percent Correct		
	Japan	65	(2,1)	▲
	Korea, Rep. of	51	(2,0)	▲
	Chinese Taipei	51	(2,3)	▲
	Italy	46	(2,4)	▲
	Czech Republic	43	(2,1)	▲
	Slovenia	39	(2,4)	▲
	Hungary	39	(2,4)	▲
	Russian Federation	39	(2,5)	▲
	Sweden	38	(2,0)	▲
	Singapore	37	(1,9)	▲
1	Lithuania	37	(2,1)	▲
†	Hong Kong SAR	30	(2,3)	▲
	Ukraine	29	(2,4)	▲
†	England	28	(2,1)	▲
	Malta	27	(1,5)	▲
	Australia	25	(2,4)	
	Norway	25	(1,9)	
2 †	United States	24	(1,6)	
	Cyprus	24	(1,6)	
	International Avg.	23	(0,3)	
†	Scotland	22	(1,9)	
	Tunisia	22	(1,9)	
	Romania	22	(2,4)	
1 2	Serbia	20	(2,1)	
3	Bulgaria	19	(2,4)	
	Colombia	16	(1,6)	▼
	Turkey	16	(1,6)	▼
	Egypt	8	(1,2)	▼

Example Item 26 Advanced International Benchmark (above 625 point) of Science Achievement

TIMSS 2007 Science 8

Content Domain: Physics
Description: From a diagram showing three magnets, explain why two of them are touching and why the third remains separated.



The diagram shows what happens to three magnets when they are placed close together on a pencil. Magnets X and Y move until they touch each other, but magnets Y and Z remain separated.

1. Explain why magnets X and Y touch each other.

Because north and south poles were facing each other.

2. Explain why magnets Y and Z remain separated.

Because they may have had south and south or north and north facing each other.

The answer shown illustrates the type of student response that was given full credit.

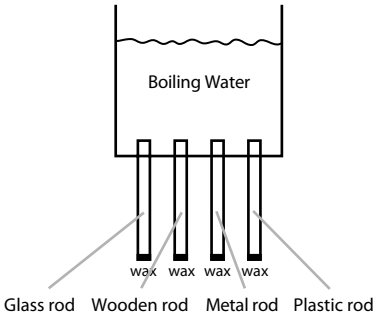
	Country	Percent Correct		
	Japan	71	(2,0)	▲
	Singapore	61	(1,8)	▲
	Korea, Rep. of	52	(2,3)	▲
	Hungary	47	(2,6)	▲
†	England	46	(2,5)	▲
	Czech Republic	45	(2,7)	▲
	Romania	43	(2,7)	▲
1 2	Serbia	43	(3,0)	▲
	Italy	36	(2,3)	▲
	Russian Federation	34	(2,7)	▲
	Egypt	27	(2,0)	▲
3	Bulgaria	24	(2,5)	
	Tunisia	24	(1,7)	
	Australia	23	(2,2)	
	Sweden	23	(2,1)	
	International Avg.	23	(0,3)	
	Ukraine	21	(2,0)	
†	Hong Kong SAR	20	(2,1)	
	Turkey	17	(1,9)	▼
2 †	United States	16	(1,6)	▼
	Malta	14	(1,0)	▼
	Norway	14	(1,8)	▼
†	Scotland	11	(1,8)	▼
	Slovenia	10	(1,3)	▼
1	Lithuania	8	(1,2)	▼
	Colombia	6	(1,1)	▼
	Cyprus	2	(0,6)	▼
	Chinese Taipei	–	–	

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
3 National Defined Population covers less than 90% of National Target Population (but at least 77%, see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available.
▲ Percent significantly higher than international average.
▼ Percent significantly lower than international average.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Example Item 27 High International Benchmark (between 550-625 point) of Science Achievement

TIMSS 2007 Science 8

Content Domain: Physics
Description: Based on a diagram demonstrating an investigation of thermal conductivity, recognizes that metal conducts heat faster than glass, wood, or plastic.



The diagram shows four identical size rods each of a different material sealed into the bottom of a container. The same amount of wax is placed on the end of each rod and then the container is filled with boiling water. On which rod will the wax melt first?

(A) Glass rod
(B) Wooden rod
(C) Metal rod
(D) Plastic rod

	Country	Percent Correct		
	Singapore	79	(1,7)	▲
	Chinese Taipei	75	(1,8)	▲
	Japan	68	(1,9)	▲
†	England	66	(2,3)	▲
	Russian Federation	63	(2,4)	▲
	Sweden	61	(2,1)	▲
†	Scotland	61	(2,4)	▲
	Australia	60	(2,5)	▲
	Korea, Rep. of	60	(2,3)	▲
2 †	United States	57	(1,8)	▲
	Cyprus	57	(2,0)	▲
	Hungary	57	(2,6)	▲
	Czech Republic	57	(2,0)	▲
†	Hong Kong SAR	55	(2,8)	▲
	Slovenia	53	(2,4)	▲
	Ukraine	51	(2,3)	
	International Avg.	47	(0,3)	
	Romania	47	(2,2)	
3	Bulgaria	47	(2,9)	
	Malta	46	(1,7)	
	Italy	45	(2,2)	
	Norway	44	(2,3)	
1 2	Serbia	44	(3,1)	
1	Lithuania	40	(2,2)	▼
	Egypt	38	(1,9)	▼
	Turkey	37	(2,1)	▼
	Tunisia	34	(2,4)	▼
	Colombia	31	(1,9)	▼

Example Item 28 High International Benchmark (between 550-625 point) of Science Achievement

TIMSS 2007 Science 8

Content Domain: Biology
Description: Given that chlorophyll is needed for photosynthesis, states two other factors that are needed.

Food and oxygen are produced during photosynthesis in green plants. Chlorophyll is one thing that is needed for photosynthesis.
Name two more factors that are needed for photosynthesis.

1. Sunlight

2. Carbon dioxide

The answer shown illustrates the type of student response that was given full credit.

	Country	Percent Correct		
†	Hong Kong SAR	81	(2,4)	▲
	Singapore	76	(1,6)	▲
	Japan	75	(2,0)	▲
	Chinese Taipei	66	(2,3)	▲
	Korea, Rep. of	65	(2,1)	▲
†	England	57	(2,4)	▲
	Slovenia	55	(2,3)	▲
2 †	United States	49	(1,5)	▲
1 2	Serbia	45	(3,0)	
	Cyprus	43	(2,1)	
	Russian Federation	43	(3,2)	
	Egypt	42	(2,1)	
	International Avg.	40	(0,3)	
	Sweden	39	(2,2)	
	Turkey	39	(2,2)	
	Italy	39	(2,4)	
	Hungary	36	(2,4)	
1	Lithuania	36	(2,3)	
	Colombia	35	(2,2)	▼
	Tunisia	35	(2,6)	▼
	Ukraine	34	(2,1)	▼
	Czech Republic	34	(2,1)	▼
	Australia	33	(2,0)	▼
†	Scotland	33	(2,2)	▼
	Romania	31	(1,9)	▼
	Norway	30	(2,2)	▼
3	Bulgaria	30	(2,9)	▼
	Malta	25	(1,4)	▼

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
3 National Defined Population covers less than 90% of National Target Population (but at least 77%, see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ Percent significantly higher than international average.
▼ Percent significantly lower than international average.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Example Item 29 Intermediate International Benchmark (between 475-550 points) of Science Achievement

TIMSS 2007 Science 8

Content Domain: Biology
Description: Recognizes a characteristic that is found only in mammals.

Which characteristic is found ONLY in mammals?

(A) eyes that detect color
(B) glands that make milk
(C) skin that absorbs oxygen
(D) bodies that are protected by scales

	Country	Percent Correct		
	Chinese Taipei	91	(1,3)	▲
†	Hong Kong SAR	86	(1,8)	▲
	Turkey	82	(1,6)	▲
	Hungary	78	(1,9)	▲
1	Lithuania	76	(1,9)	▲
	Slovenia	76	(1,9)	▲
	Japan	75	(1,8)	▲
	Czech Republic	74	(1,7)	▲
	Cyprus	72	(1,8)	▲
3	Bulgaria	70	(2,7)	▲
	Korea, Rep. of	70	(1,8)	▲
1 2	Serbia	67	(2,5)	
	Romania	66	(2,4)	
	Italy	65	(2,2)	
	Russian Federation	63	(2,0)	
	International Avg.	63	(0,3)	
	Singapore	60	(1,9)	
	Australia	56	(2,7)	▼
	Colombia	54	(1,9)	▼
	Ukraine	54	(2,3)	▼
2 †	United States	53	(1,8)	▼
	Sweden	53	(1,9)	▼
†	England	53	(2,4)	▼
	Norway	51	(2,3)	▼
	Tunisia	48	(2,3)	▼
	Malta	44	(1,7)	▼
†	Scotland	41	(2,2)	▼
	Egypt	40	(1,9)	▼

Example Item 30 Intermediate International Benchmark (between 475-550 points) of Science Achievement

TIMSS 2007 Science 8

Content Domain: Physics
Description: Applies knowledge that sound requires a medium to travel through by contrasting a situation on Earth to a situation on the Moon.

In a deep valley on Earth, a person shouting will hear an echo as the sound is reflected back off the surrounding mountains. In a similar valley on the Moon, no echo will be heard. This is because

(A) the gravitational pull on the Moon is too low
(B) the temperature on the Moon is too low
(C) there is no air on the Moon for the sound to travel through
(D) the mountains on the Moon cannot reflect sound

	Country	Percent Correct		
	Korea, Rep. of	90	(1,3)	▲
	Chinese Taipei	89	(1,3)	▲
†	Hong Kong SAR	84	(1,9)	▲
1	Lithuania	83	(1,8)	▲
	Japan	82	(1,7)	▲
	Sweden	81	(1,7)	▲
	Hungary	80	(2,0)	▲
	Slovenia	78	(2,1)	▲
	Singapore	77	(2,0)	▲
†	England	77	(2,3)	▲
	Czech Republic	74	(1,9)	▲
	Australia	73	(2,4)	▲
	Russian Federation	73	(2,0)	▲
2 †	United States	71	(1,7)	▲
1 2	Serbia	71	(2,6)	▲
	Malta	71	(1,5)	▲
†	Scotland	71	(1,9)	▲
	Romania	68	(2,6)	
	Italy	67	(2,3)	
	International Avg.	65	(0,3)	
	Norway	62	(2,1)	
	Egypt	60	(2,3)	▼
	Ukraine	59	(2,5)	▼
3	Bulgaria	57	(3,1)	▼
	Turkey	57	(2,4)	▼
	Tunisia	52	(2,1)	▼
	Cyprus	48	(2,1)	▼
	Colombia	46	(2,0)	▼

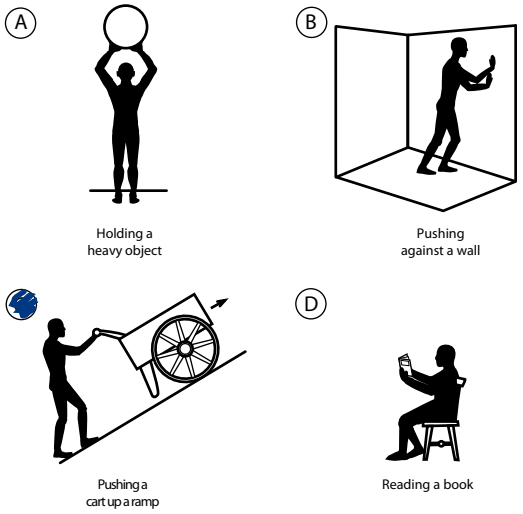
† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
3 National Defined Population covers less than 90% of National Target Population (but at least 77%, see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ Percent significantly higher than international average.
▼ Percent significantly lower than international average.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Example Item 31 Low International Benchmark (between 400-475 points) of Science Achievement

TIMSS 2007 Science 8

Content Domain: Physics
Description: Given the definition of work, identifies a diagram that shows that work is being done.

Work is done when an object is moved in the direction of an applied force. A person performed different tasks as shown in the diagrams below. In which diagram is the person doing work?



	Country	Percent Correct		
	Singapore	96	(0,9)	▲
2 †	United States	91	(1,0)	▲
3	Bulgaria	91	(2,1)	▲
	Russian Federation	91	(1,3)	▲
	Korea, Rep. of	91	(1,1)	▲
	Hungary	90	(1,6)	▲
	Ukraine	90	(1,4)	▲
1	Lithuania	89	(1,2)	▲
	Slovenia	88	(1,6)	▲
	Turkey	88	(1,8)	▲
1 2	Serbia	87	(1,8)	▲
	Italy	87	(1,5)	▲
	Czech Republic	86	(1,4)	▲
	Australia	86	(1,6)	▲
	Malta	86	(1,2)	▲
†	England	85	(1,7)	▲
†	Scotland	83	(1,7)	▲
	Sweden	82	(1,6)	▲
	Japan	82	(1,6)	▲
	Chinese Taipei	81	(1,9)	
	Romania	79	(2,4)	
	International Avg.	78	(0,3)	
	Norway	76	(1,8)	
†	Hong Kong SAR	75	(1,7)	
	Cyprus	72	(1,7)	▼
	Egypt	70	(1,9)	▼
	Colombia	70	(2,7)	▼
	Tunisia	49	(2,1)	▼

Example Item 32 Low International Benchmark (between 400-475 points) of Science Achievement

TIMSS 2007 Science 8

Content Domain: Biology
Description: Recognizes the cells that conduct messages.

Cells that conduct messages are known as

(A) skin cells
(B) nerve cells
(C) blood cells
(D) kidney cells

	Country	Percent Correct		
	Chinese Taipei	97	(0,9)	▲
	Korea, Rep. of	95	(0,8)	▲
†	Hong Kong SAR	94	(1,4)	▲
	Russian Federation	94	(1,3)	▲
	Ukraine	92	(1,4)	▲
2 †	United States	92	(1,0)	▲
	Hungary	92	(1,3)	▲
†	England	91	(1,5)	▲
	Japan	89	(1,2)	▲
	Sweden	89	(1,3)	▲
	Singapore	88	(1,4)	▲
1	Lithuania	88	(1,7)	▲
	Australia	86	(2,0)	▲
3	Bulgaria	82	(2,9)	▲
†	Scotland	81	(2,0)	▲
	Italy	80	(1,7)	▲
	Czech Republic	78	(1,8)	
	Norway	78	(2,1)	
	Egypt	77	(2,0)	
	Colombia	77	(2,0)	
	International Avg.	75	(0,3)	
1 2	Serbia	74	(2,3)	
	Slovenia	72	(2,0)	
	Tunisia	69	(2,1)	▼
	Romania	68	(2,5)	▼
	Turkey	67	(2,4)	▼
	Malta	67	(1,5)	▼
	Cyprus	60	(2,2)	▼

† Met guidelines for sample participation rates only after replacement schools were included (see Appendix A).
1 National Target Population does not include all of the International Target Population defined by TIMSS (see Appendix A).
2 National Defined Population covers 90% to 95% of National Target Population (see Appendix A).
3 National Defined Population covers less than 90% of National Target Population (but at least 77%, see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
▲ Percent significantly higher than international average.
▼ Percent significantly lower than international average.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

FACTORS INFLUENCING STUDENT ACHIEVEMENT

TIMSS 2007 did not only assess students' performance at four and eighth grades in mathematics and science but also examined home and school background factors. Students, their teachers and school principals were asked to complete questionnaires to provide information about school and home background, students' learning experiences, and teachers' practices.

This chapter presents information about factors that can have an impact on students' learning mathematics and science, as well as factors that can influence their skills in these subjects.

HOME BACKGROUND[9]

The educational level of parents

The performance of students is associated with the educational level of their parents – higher level of parents' education is associated with higher average achievement in mathematics and in science in general (Table 11).[10] This statement can be applied to all participating countries in both assessment areas.

79–80. pages

On the other hand, it can be noted, that there are significant differences across countries according to the students' average achievement whose parents have the highest level of education (university degree or above) compared to the average achievement of students with parents of the lowest level of education (below lower secondary). The higher the difference in average achievements of students with parents of different levels of education within a country, the less equal opportunity the country provides, and it can result in the polarization of knowledge. It means that students whose parents have lower educational level are put at a significant disadvantage in terms of achieving higher level of education compared to those students whose parents have higher educational level, which can conserve and determine students' status and position in the society in the long run.

As mentioned before, there were 12 countries whose students performed above the TIMSS 500 scale average in mathematics at eighth grade, including Hungary. In science, there were 14 countries above the TIMSS 500 scale average including Hungary.

In mathematics, the differences between the achievement of students with the lowest and students with the highest educational level of their parents are 42-104 score points in countries achieving significantly better results than Hungary. This difference in Hungary is significantly higher, 129 score points. Comparing the results of the participating countries it is only in Turkey where the standard deviation is above that of Hungary.

Data also show that the performance of Hungarian students in science is also more significantly influenced by their parents' educational attainment than in other participating countries. The difference between students with the lowest and the highest educational level of their parents is 112 score points. It is among the highest, only Turkey and Singapore has similar, or slightly higher deviation.

Consequently, the standard deviation of the participating countries in our region is below that of Hungary considering parents' educational attainment. In Slovenia the difference is 67 points, in the Czech Republic it is 48 points in mathematics.

The potential of the Far East countries achieving best in the TIMSS scale average is also proved by the fact that the average achievement of Hungarian students with the highest educational attainment of parents does not reach the level of the average achievement of students in these countries.

[9] Questionnaires about family background were completed by students.

[10] The educational level of the parent with more education was used in assigning students to categories; in case of single-parent families it was of the parent in question. This question was only applied to eighth grades.

Computer and Internet connection at home

Possessing computer and Internet connection at home is strongly associated with the economic development and in some case some cultural aspects of the participating countries.

81., 82. pages

According to the students responses' in most of the European countries at both fourth and eighth grades more than 80 percent of students have a computer at home, and at least 60 percent had Internet connection at home. The distribution is not homogeneous; in Western European countries almost all of the students can access Internet from home, whereas in Central and Eastern European countries only 40 to 80 percent of students have Internet access at home.

In 2007, 81 percent of Hungarian fourth graders reported having computer at home and 54 percent reported having Internet connection. At eighth grade, 90 percent reported having computer and 62 percent reported having Internet connection at home.[11]

Possessing a computer and/or Internet connection at home are among the variables which correlate with the average achievement of students in mathematics and science. This correlation can result from the use of computer applications and exploiting Internet in a positive way (checking some information, searching for some more information in relation to their studies at school). These activities can be seen as cultural background factors affecting learning. On the other hand, computer and Internet availability at home can be / is also indicative of the family's socio-economic status; families with computer and Internet connection might have economic advantage in general compared to those without such equipment and facilities.

In our view, the latter correlation plays a more important role in the effectiveness of learning, i.e. possessing computers and Internet connection reflect the better socio-economic status of families with more economic resources, and the economic advantage of families is strongly and closely related to better student achievements.

On average across countries at the fourth grade, students from homes with a computer had mathematics and science achievement 40 points above those from homes without a computer. At eighth grades, this difference is 53 points in mathematics, 46 points in science.

Students from homes with Internet connection performed better at both grades in both mathematics and science by 30-35 points on average than students without such facilities.

Data on the achievement of Hungarian students show that for those who have them, IT facilities at home increased the achievement substantially in the TIMSS achievement scale (42-67 score points), i.e. socio-economic differences have higher impacts on academic achievement. It does not relate to the results of Hungarian fourth graders in science where this advantage is equivalent to the international average.

In the region, except for Slovenia, the differences between the average achievements of students with computer and/or Internet connection at home and students without them are lower than in Hungary.

[11] These data provided by Hungarian students do not match the official Hungarian data on this field. The primary reason for this can be detected in the definition of the concept. Most students may have mixed up Internet availability at home and in the school. They likely provided answers on how much in general they can access the Internet and use computers. However, it is indifferent from the aspect of displaying the results since our primary goal was to map how much access to computers and the Internet affected test results.

Table 11 Highest Level of Education of Either Parent*

TIMSS 2007 Mathematics 8

	Country	University Degree**				Completed Post–secondary Education but Not University				Completed Upper–secondary School			
		Percent of Students		Average Achievement		Percent of Students		Average Achievement		Percent of Students		Average Achievement	
	Algeria	15	(0,9)	391	(3,6)	12	(0,6)	395	(3,7)	22	(0,7)	391	(2,9)
	Armenia	52	(1,7)	505	(4,0)	23	(0,9)	499	(3,8)	16	(1,0)	483	(5,7)
	Australia	19	(1,1)	546	(6,1)	23	(0,9)	503	(5,4)	16	(0,7)	484	(3,7)
	Bahrain	21	(0,6)	429	(3,1)	8	(0,5)	415	(6,6)	33	(0,9)	402	(2,9)
	Bosnia and Herzegovina	15	(1,0)	494	(4,4)	16	(0,6)	471	(4,2)	54	(1,1)	455	(2,6)
	Botswana	15	(0,6)	381	(4,1)	17	(0,8)	355	(4,0)	17	(0,7)	358	(3,9)
	Bulgaria	29	(1,4)	509	(6,7)	30	(1,3)	469	(4,5)	24	(1,2)	429	(8,6)
	Chinese Taipei	20	(1,4)	647	(5,2)	12	(0,7)	633	(5,2)	42	(1,0)	594	(4,1)
	Colombia	20	(1,1)	416	(5,4)	9	(0,6)	409	(6,6)	20	(0,7)	380	(4,6)
	Cyprus	30	(0,8)	493	(2,7)	12	(0,5)	488	(3,8)	37	(0,7)	461	(2,5)
	Czech Republic	17	(0,9)	547	(3,8)	11	(0,5)	512	(3,9)	57	(0,9)	499	(2,5)
	Egypt	15	(0,7)	394	(4,6)	19	(1,0)	432	(5,4)	14	(0,6)	408	(6,0)
	El Salvador	13	(1,1)	386	(6,4)	9	(0,7)	365	(5,5)	19	(0,9)	350	(3,6)
	England	–	–	–	–	–	–	–	–	–	–	–	–
	Georgia	47	(2,1)	429	(5,7)	0	(0,0)	~	~	33	(2,1)	405	(7,0)
	Ghana	11	(0,8)	341	(9,9)	20	(0,9)	321	(5,8)	24	(0,9)	314	(4,8)
	Hong Kong SAR	13	(1,0)	609	(7,8)	12	(0,6)	587	(7,2)	28	(0,8)	575	(5,6)
	Hungary	29	(1,3)	563	(4,6)	13	(0,7)	526	(4,9)	45	(1,2)	505	(3,2)
	Indonesia	9	(0,8)	460	(7,7)	6	(0,5)	439	(8,2)	25	(1,2)	412	(5,1)
	Iran, Islamic Rep. of	10	(1,0)	469	(9,5)	10	(1,0)	444	(7,7)	18	(1,0)	422	(6,1)
	Israel	38	(1,2)	499	(4,3)	10	(0,6)	464	(7,1)	17	(0,8)	441	(6,9)
	Italy	21	(1,2)	505	(3,6)	5	(0,4)	491	(6,1)	37	(1,1)	492	(2,8)
	Japan	34	(1,0)	606	(3,4)	16	(0,6)	569	(3,7)	27	(1,0)	544	(3,1)
	Jordan	29	(1,1)	461	(4,7)	18	(0,9)	455	(4,7)	28	(0,9)	415	(4,5)
	Korea, Rep. of	44	(1,4)	627	(3,2)	3	(0,3)	610	(7,1)	39	(1,2)	582	(2,9)
	Kuwait	43	(1,4)	370	(3,2)	15	(0,8)	365	(3,8)	26	(0,9)	336	(3,4)
	Lebanon	20	(1,3)	490	(5,8)	19	(1,2)	464	(5,6)	16	(1,1)	446	(4,8)
	Lithuania	14	(0,8)	549	(4,6)	34	(0,9)	517	(2,9)	23	(1,1)	495	(3,2)
	Malaysia	13	(1,0)	510	(7,3)	17	(0,8)	493	(5,4)	34	(0,9)	478	(4,7)
	Malta	11	(0,4)	525	(3,6)	11	(0,4)	514	(4,3)	13	(0,5)	513	(3,7)
	Norway	39	(1,0)	490	(1,9)	6	(0,4)	469	(5,5)	6	(0,5)	455	(5,8)
	Oman	16	(0,9)	388	(5,7)	4	(0,4)	382	(10,6)	18	(0,8)	387	(4,5)
	Palestinian Nat'l Auth.	24	(0,9)	398	(5,4)	13	(0,6)	386	(5,8)	35	(0,9)	369	(4,4)
	Qatar	48	(0,6)	332	(2,2)	4	(0,2)	310	(8,0)	19	(0,5)	289	(2,7)
	Romania	13	(1,0)	524	(5,8)	14	(0,9)	493	(5,8)	44	(1,4)	460	(4,6)
	Russian Federation	38	(1,3)	540	(4,4)	34	(1,3)	511	(5,1)	12	(1,0)	471	(6,2)
	Saudi Arabia	31	(1,2)	354	(3,6)	5	(0,5)	343	(9,4)	20	(0,9)	325	(3,9)
	Scotland	–	–	–	–	–	–	–	–	–	–	–	–
	Serbia	20	(1,2)	533	(4,6)	16	(0,8)	496	(5,0)	51	(1,3)	477	(3,8)
	Singapore	20	(0,7)	646	(3,9)	19	(0,6)	603	(4,7)	28	(0,7)	587	(4,3)
	Slovenia	24	(0,9)	532	(3,3)	35	(1,0)	503	(2,6)	15	(0,7)	486	(4,6)
	Sweden	19	(0,8)	515	(3,3)	13	(0,6)	510	(3,2)	13	(0,6)	487	(3,4)
	Syrian Arab Republic	15	(0,9)	419	(4,7)	22	(0,9)	414	(4,8)	23	(0,8)	385	(4,3)
	Thailand	12	(1,1)	522	(11,7)	5	(0,3)	481	(9,7)	14	(0,6)	455	(6,5)
	Tunisia	13	(1,1)	459	(4,6)	17	(0,9)	437	(3,9)	25	(1,0)	414	(2,9)
	Turkey	7	(0,8)	558	(8,7)	3	(0,3)	497	(8,8)	20	(1,2)	470	(5,2)
	Ukraine	40	(1,4)	494	(4,3)	34	(0,9)	465	(3,6)	12	(0,8)	417	(6,6)
	United States	44	(1,2)	531	(3,3)	7	(0,4)	503	(4,1)	21	(0,6)	495	(2,3)
¶	Morocco	20	(1,3)	407	(4,9)	0	(0,0)	~	~	18	(1,0)	394	(5,8)
	International Avg.	24	(0,2)	485	(0,9)	14	(0,1)	467	(1,0)	25	(0,1)	444	(0,9)
Benchmarking Participants													
	Basque Country, Spain	–	–	–	–	–	–	–	–	–	–	–	–
	British Columbia, Canada	39	(1,6)	532	(3,4)	15	(0,7)	499	(4,3)	15	(0,8)	499	(5,2)
	Dubai, UAE	41	(1,0)	498	(2,4)	15	(0,9)	464	(3,7)	14	(0,6)	419	(5,6)
	Massachusetts, US	56	(1,6)	571	(4,2)	6	(0,6)	524	(9,5)	16	(1,2)	512	(6,8)
	Minnesota, US	46	(1,7)	552	(5,5)	9	(0,7)	527	(4,1)	18	(1,3)	516	(3,8)
	Ontario, Canada	37	(1,9)	542	(3,6)	19	(0,9)	516	(4,5)	11	(0,8)	512	(5,5)
	Quebec, Canada	39	(1,4)	549	(5,2)	18	(0,9)	526	(4,0)	21	(1,1)	510	(4,2)

Background data provided by students.
* Based on countries' categorizations to UNESCO's International Standard Classification of Education (Operational Manual for ISCED–1997).
** Includes postgraduate degrees (e.g., doctorate, master's, other postgraduate degree or diploma).
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available. A tilde (~) indicates insufficient data to report achievement.
Note: The distribution of students' reports on parents' educational levels may not match the distribution from national population statistics, particularly where large percentages of students report that they "Do not know" (e.g., Sweden).
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

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	Country	Completed Lower-secondary School				Less than Lower-secondary School				Do Not Know			
		Percent of Students		Average Achievement		Percent of Students		Average Achievement		Percent of Students		Average Achievement	
	Algeria	26	(0,8)	379	(2,0)	19	(1,2)	385	(3,3)	6	(0,3)	386	(4,6)
	Armenia	2	(0,4)	~	~	1	(0,2)	~	~	6	(0,5)	482	(5,8)
	Australia	14	(0,9)	474	(4,5)	1	(0,2)	~	~	28	(0,9)	487	(5,0)
	Bahrain	15	(0,6)	367	(4,2)	6	(0,5)	383	(6,9)	18	(0,6)	388	(3,1)
	Bosnia and Herzegovina	12	(0,9)	411	(5,6)	1	(0,3)	~	~	3	(0,3)	421	(9,0)
	Botswana	18	(0,6)	359	(3,5)	14	(0,7)	368	(3,9)	20	(0,8)	381	(3,9)
	Bulgaria	8	(1,1)	418	(12,3)	1	(0,2)	~	~	9	(0,7)	451	(8,1)
	Chinese Taipei	14	(0,9)	554	(6,2)	3	(0,4)	543	(11,9)	9	(0,5)	554	(9,9)
	Colombia	23	(0,9)	365	(5,0)	23	(1,2)	355	(3,8)	6	(0,5)	365	(7,5)
	Cyprus	9	(0,4)	437	(4,6)	4	(0,3)	413	(6,5)	7	(0,6)	418	(6,4)
	Czech Republic	2	(0,2)	~	~	0	(0,0)	~	~	13	(0,6)	466	(3,7)
	Egypt	29	(1,1)	381	(4,6)	14	(0,8)	363	(6,3)	10	(0,7)	370	(6,2)
	El Salvador	39	(1,3)	326	(3,4)	16	(1,1)	323	(3,5)	4	(0,4)	323	(7,9)
	England	–	–	–	–	–	–	–	–	–	–	–	–
	Georgia	2	(0,3)	~	~	0	(0,1)	~	~	18	(1,2)	383	(10,6)
	Ghana	27	(1,2)	298	(5,1)	12	(0,8)	305	(7,6)	6	(0,6)	297	(8,5)
	Hong Kong SAR	29	(0,9)	563	(7,3)	3	(0,3)	567	(11,1)	16	(0,8)	547	(7,6)
	Hungary	7	(0,9)	434	(7,7)	1	(0,2)	~	~	5	(0,6)	499	(7,6)
	Indonesia	24	(0,9)	380	(4,2)	28	(1,4)	380	(4,9)	9	(0,6)	369	(6,7)
	Iran, Islamic Rep. of	28	(1,0)	392	(4,4)	31	(1,5)	376	(4,3)	3	(0,3)	356	(9,5)
	Israel	7	(0,6)	409	(9,5)	3	(0,4)	404	(12,3)	26	(1,0)	458	(5,7)
	Italy	24	(1,1)	457	(4,7)	3	(0,3)	420	(9,8)	10	(0,7)	443	(5,6)
	Japan	2	(0,2)	~	~	0	(0,1)	~	~	21	(0,8)	553	(3,4)
	Jordan	9	(0,5)	389	(8,7)	9	(0,8)	390	(8,6)	7	(0,6)	388	(11,4)
	Korea, Rep. of	3	(0,3)	548	(9,9)	1	(0,1)	~	~	10	(0,6)	545	(5,0)
	Kuwait	0	(0,0)	~	~	16	(0,9)	334	(4,3)	0	(0,0)	~	~
	Lebanon	13	(1,0)	425	(5,6)	19	(1,6)	425	(6,0)	13	(0,9)	446	(5,3)
	Lithuania	4	(0,5)	436	(6,3)	0	(0,1)	~	~	24	(1,0)	492	(4,0)
	Malaysia	19	(0,9)	454	(4,8)	7	(0,6)	450	(8,5)	11	(1,0)	441	(9,1)
	Malta	34	(0,7)	477	(2,2)	3	(0,3)	460	(9,7)	27	(0,6)	470	(3,1)
	Norway	2	(0,2)	~	~	1	(0,1)	~	~	46	(0,9)	460	(2,3)
	Oman	17	(0,7)	381	(4,3)	31	(1,1)	370	(3,4)	14	(0,9)	345	(6,8)
	Palestinian Nat'l Auth.	11	(0,6)	347	(5,7)	9	(0,7)	340	(5,7)	8	(0,6)	323	(8,9)
	Qatar	13	(0,4)	270	(3,5)	7	(0,3)	284	(3,8)	9	(0,4)	295	(4,1)
	Romania	9	(1,0)	424	(8,0)	2	(0,4)	~	~	17	(1,0)	436	(5,0)
	Russian Federation	5	(0,5)	462	(8,7)	0	(0,1)	~	~	10	(0,8)	487	(6,3)
	Saudi Arabia	17	(0,9)	315	(5,0)	23	(1,2)	310	(4,5)	5	(0,5)	335	(7,8)
	Scotland	–	–	–	–	–	–	–	–	–	–	–	–
	Serbia	7	(0,9)	421	(10,5)	0	(0,1)	~	~	5	(0,4)	456	(7,6)
	Singapore	6	(0,4)	567	(7,8)	6	(0,4)	553	(7,2)	21	(0,7)	564	(6,2)
	Slovenia	4	(0,4)	465	(7,7)	1	(0,1)	~	~	22	(0,9)	497	(2,7)
	Sweden	4	(0,3)	473	(5,1)	1	(0,2)	~	~	50	(1,1)	484	(2,9)
	Syrian Arab Republic	25	(1,0)	386	(4,8)	11	(0,8)	384	(7,2)	4	(0,4)	378	(9,7)
	Thailand	26	(0,9)	421	(4,6)	26	(1,6)	429	(7,3)	18	(1,1)	417	(4,8)
	Tunisia	25	(1,0)	402	(3,3)	12	(0,9)	411	(3,5)	8	(0,5)	423	(4,7)
	Turkey	52	(1,3)	412	(4,8)	16	(1,0)	389	(4,7)	1	(0,2)	~	~
	Ukraine	5	(0,4)	401	(7,0)	0	(0,1)	~	~	8	(0,6)	432	(7,0)
	United States	7	(0,5)	467	(4,1)	2	(0,2)	~	~	18	(0,5)	496	(3,3)
¶	Morocco	16	(1,0)	369	(4,5)	36	(1,7)	368	(3,3)	10	(0,9)	367	(7,9)
	International Avg.	15	(0,1)	418	(1,0)	9	(0,1)	396	(1,4)	13	(0,1)	431	(1,1)
Benchmarking Participants													
	Basque Country, Spain	–	–	–	–	–	–	–	–	–	–	–	–
	British Columbia, Canada	3	(0,3)	468	(10,5)	0	(0,1)	~	~	28	(0,9)	497	(3,9)
	Dubai, UAE	6	(0,4)	373	(5,8)	3	(0,4)	370	(10,8)	21	(1,1)	463	(5,1)
	Massachusetts, US	3	(0,4)	487	(11,1)	1	(0,2)	~	~	18	(0,9)	531	(9,4)
	Minnesota, US	3	(0,6)	468	(11,6)	1	(0,3)	~	~	23	(1,4)	517	(5,0)
	Ontario, Canada	2	(0,3)	~	~	0	(0,1)	~	~	31	(1,6)	497	(4,9)
	Quebec, Canada	3	(0,3)	507	(6,6)	0	(0,1)	~	~	19	(0,9)	518	(3,8)

Background data provided by students.
* Based on countries' categorizations to UNESCO's International Standard Classification of Education (Operational Manual for ISCED-1997).
** Includes postgraduate degrees (e.g., doctorate, master's, other postgraduate degree or diploma).
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available. A tilde (~) indicates insufficient data to report achievement.
Note: The distribution of students' reports on parents' educational levels may not match the distribution from national population statistics, particularly where large percentages of students report that they "Do not know" (e.g., Sweden).
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 12 Computer and Internet Connection in the Home

TIMSS 2007 Mathematics 4

Country	Have Computer				Do Not Have Computer				Have Internet Connection				Do Not Have Internet Connection			
	Percent of Students		Average Achievement		Percent of Students		Average Achievement		Percent of Students		Average Achievement		Percent of Students		Average Achievement	
Algeria	32	(1,5)	391	(6,6)	68	(1,5)	375	(5,4)	13	(1,0)	369	(7,6)	87	(1,0)	382	(5,3)
Armenia	38	(1,6)	499	(4,5)	62	(1,6)	504	(5,4)	21	(1,3)	506	(13,6)	79	(1,3)	500	(3,9)
Australia	95	(0,6)	521	(3,3)	5	(0,6)	446	(11,0)	84	(0,8)	527	(3,3)	16	(0,8)	470	(6,0)
Austria	93	(0,5)	509	(2,0)	7	(0,5)	471	(4,4)	73	(1,2)	516	(2,0)	27	(1,2)	478	(2,9)
Chinese Taipei	87	(0,6)	583	(1,7)	13	(0,6)	535	(3,9)	80	(0,7)	582	(1,8)	20	(0,7)	554	(3,7)
Colombia	39	(1,2)	379	(6,8)	61	(1,2)	346	(4,8)	16	(0,9)	382	(10,1)	84	(0,9)	354	(4,8)
Czech Republic	90	(0,7)	491	(2,5)	10	(0,7)	449	(6,0)	65	(1,2)	498	(3,0)	35	(1,2)	467	(3,6)
Denmark	95	(0,4)	526	(2,4)	5	(0,4)	482	(9,1)	93	(0,4)	527	(2,4)	7	(0,4)	483	(6,7)
El Salvador	26	(1,3)	358	(6,2)	74	(1,3)	325	(4,2)	14	(0,9)	348	(8,7)	86	(0,9)	331	(4,1)
England	95	(0,4)	545	(2,7)	5	(0,4)	489	(8,7)	86	(0,7)	549	(2,8)	14	(0,7)	499	(4,6)
Georgia	33	(1,5)	439	(4,8)	67	(1,5)	443	(5,0)	17	(1,5)	432	(6,1)	83	(1,5)	443	(4,6)
Germany	93	(0,5)	532	(2,3)	7	(0,5)	489	(5,9)	81	(0,8)	536	(2,2)	19	(0,8)	495	(4,0)
Hong Kong SAR	94	(0,5)	609	(3,6)	6	(0,5)	580	(7,2)	86	(0,8)	611	(3,6)	14	(0,8)	583	(5,0)
Hungary	81	(0,7)	525	(3,5)	19	(0,7)	462	(6,1)	54	(1,3)	531	(4,0)	46	(1,3)	488	(3,8)
Iran, Islamic Rep. of	29	(1,7)	444	(5,3)	71	(1,7)	388	(4,5)	18	(1,3)	450	(6,4)	82	(1,3)	394	(4,3)
Italy	88	(0,8)	510	(3,0)	12	(0,8)	482	(5,9)	54	(1,0)	513	(2,7)	46	(1,0)	499	(4,5)
Japan	82	(0,9)	577	(2,1)	18	(0,9)	539	(3,5)	70	(1,2)	579	(2,2)	30	(1,2)	545	(2,8)
Kazakhstan	28	(1,8)	555	(6,4)	72	(1,8)	547	(8,7)	16	(1,6)	547	(7,9)	84	(1,6)	549	(7,9)
Kuwait	82	(1,0)	331	(3,4)	18	(1,0)	281	(6,0)	64	(1,4)	328	(4,2)	36	(1,4)	310	(4,8)
Latvia	76	(1,2)	547	(2,4)	24	(1,2)	512	(4,0)	57	(1,3)	548	(2,5)	43	(1,3)	523	(3,5)
Lithuania	77	(0,9)	538	(2,4)	23	(0,9)	505	(4,8)	58	(1,4)	545	(2,4)	42	(1,4)	512	(3,3)
Morocco	32	(2,0)	370	(6,9)	68	(2,0)	336	(5,4)	26	(1,7)	361	(7,9)	74	(1,7)	342	(4,9)
Netherlands	95	(0,5)	537	(2,2)	5	(0,5)	494	(6,3)	96	(0,4)	537	(2,2)	4	(0,4)	498	(6,7)
New Zealand	91	(0,5)	499	(2,2)	9	(0,5)	445	(5,3)	77	(0,9)	507	(2,2)	23	(0,9)	449	(3,7)
Norway	95	(0,4)	478	(2,4)	5	(0,4)	413	(7,4)	95	(0,4)	477	(2,6)	5	(0,4)	429	(7,2)
Qatar	80	(0,5)	310	(1,2)	20	(0,5)	268	(2,8)	58	(0,6)	308	(1,3)	42	(0,6)	294	(2,4)
Russian Federation	51	(1,8)	558	(4,5)	49	(1,8)	532	(6,6)	26	(1,4)	560	(4,9)	74	(1,4)	540	(5,7)
Scotland	94	(0,5)	498	(2,2)	6	(0,5)	447	(8,3)	85	(0,7)	502	(2,3)	15	(0,7)	453	(4,2)
Singapore	90	(0,5)	606	(3,7)	10	(0,5)	543	(6,0)	80	(0,7)	612	(3,6)	20	(0,7)	552	(4,8)
Slovak Republic	77	(1,2)	507	(3,8)	23	(1,2)	471	(6,8)	43	(1,1)	509	(4,0)	57	(1,1)	489	(5,0)
Slovenia	85	(0,6)	512	(2,1)	15	(0,6)	463	(3,8)	75	(0,8)	508	(1,9)	25	(0,8)	486	(2,9)
Sweden	98	(0,2)	503	(2,6)	2	(0,2)	~	~	93	(0,5)	506	(2,5)	7	(0,5)	468	(6,1)
Tunisia	34	(1,3)	358	(6,6)	66	(1,3)	319	(4,1)	21	(1,1)	323	(6,8)	79	(1,1)	336	(4,7)
Ukraine	40	(1,3)	491	(3,1)	60	(1,3)	459	(3,3)	24	(1,1)	484	(4,0)	76	(1,1)	468	(3,1)
United States	90	(0,5)	534	(2,5)	10	(0,5)	489	(4,0)	78	(0,9)	541	(2,4)	22	(0,9)	492	(2,9)
Yemen	18	(1,5)	225	(8,5)	82	(1,5)	228	(6,9)	11	(1,3)	216	(7,0)	89	(1,3)	229	(6,5)
International Avg.	70	(0,2)	483	(0,7)	30	(0,2)	444	(1,2)	56	(0,2)	483	(0,8)	44	(0,2)	455	(0,8)
Benchmarking Participants																
Alberta, Canada	94	(0,5)	508	(2,8)	6	(0,5)	470	(6,8)	88	(0,9)	509	(2,8)	12	(0,9)	480	(5,5)
British Columbia, Canada	95	(0,5)	508	(2,7)	5	(0,5)	467	(7,3)	89	(0,8)	510	(2,7)	11	(0,8)	475	(6,2)
Dubai, UAE	89	(0,7)	455	(2,6)	11	(0,7)	398	(6,8)	78	(0,8)	461	(2,6)	22	(0,8)	408	(5,2)
Massachusetts, US	96	(0,7)	575	(3,3)	4	(0,7)	529	(11,5)	91	(1,1)	577	(3,3)	9	(1,1)	529	(8,2)
Minnesota, US	92	(0,9)	558	(5,9)	8	(0,9)	514	(5,8)	81	(1,6)	565	(5,3)	19	(1,6)	506	(9,1)
Ontario, Canada	96	(0,4)	514	(3,1)	4	(0,4)	475	(9,9)	89	(1,0)	518	(2,9)	11	(1,0)	470	(5,5)
Quebec, Canada	95	(0,6)	521	(3,0)	5	(0,6)	486	(6,2)	87	(1,0)	524	(2,8)	13	(1,0)	488	(5,3)

Background data provided by students.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A tilde (~) indicates insufficient data to report achievement.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 13 Computer and Internet Connection in the Home

Country	Have Computer				Do Not Have Computer				Have Internet Connection				Do Not Have Internet Connection			
	Percent of Students		Average Achievement		Percent of Students		Average Achievement		Percent of Students		Average Achievement		Percent of Students		Average Achievement	
Algeria	53	(1,7)	386	(2,4)	47	(1,7)	389	(3,0)	15	(0,9)	386	(3,2)	85	(0,9)	388	(2,2)
Armenia	34	(1,2)	508	(6,3)	66	(1,2)	495	(3,2)	17	(0,9)	513	(9,0)	83	(0,9)	497	(3,0)
Australia	97	(0,3)	499	(4,0)	3	(0,3)	425	(9,3)	89	(0,7)	503	(3,9)	11	(0,7)	443	(6,2)
Bahrain	86	(0,8)	401	(1,7)	14	(0,8)	390	(3,8)	74	(0,8)	405	(2,0)	26	(0,8)	381	(3,2)
Bosnia and Herzegovina	72	(1,1)	468	(2,7)	28	(1,1)	427	(3,7)	31	(1,3)	485	(3,3)	69	(1,3)	445	(2,7)
Botswana	26	(0,8)	371	(3,5)	74	(0,8)	364	(2,4)	13	(0,7)	357	(5,2)	87	(0,7)	367	(2,4)
Bulgaria	70	(1,3)	480	(5,1)	30	(1,3)	434	(7,3)	57	(1,3)	486	(4,8)	43	(1,3)	438	(6,8)
Chinese Taipei	94	(0,4)	605	(4,3)	6	(0,4)	505	(9,8)	89	(0,7)	605	(4,3)	11	(0,7)	542	(7,4)
Colombia	37	(1,7)	405	(4,5)	63	(1,7)	366	(3,7)	15	(1,4)	423	(7,1)	85	(1,4)	373	(3,8)
Cyprus	94	(0,3)	471	(1,5)	6	(0,3)	395	(6,9)	65	(0,9)	479	(1,9)	35	(0,9)	443	(2,8)
Czech Republic	94	(0,5)	506	(2,4)	6	(0,5)	459	(6,6)	76	(1,1)	512	(2,3)	24	(1,1)	478	(3,8)
Egypt	48	(1,2)	407	(3,9)	52	(1,2)	384	(4,3)	25	(1,2)	405	(4,4)	75	(1,2)	390	(3,8)
El Salvador	30	(1,3)	362	(4,3)	70	(1,3)	333	(2,8)	10	(0,9)	375	(6,8)	90	(0,9)	338	(2,6)
England	98	(0,2)	515	(4,9)	2	(0,2)	~	~	92	(0,6)	518	(4,8)	8	(0,6)	467	(8,8)
Georgia	26	(1,4)	420	(5,1)	74	(1,4)	408	(6,5)	14	(1,0)	423	(7,0)	86	(1,0)	409	(6,2)
Ghana	25	(1,2)	310	(6,9)	75	(1,2)	313	(4,4)	10	(0,7)	259	(7,7)	90	(0,7)	318	(4,0)
Hong Kong SAR	99	(0,3)	574	(5,7)	1	(0,3)	~	~	97	(0,4)	575	(5,7)	3	(0,4)	514	(14,1)
Hungary	90	(0,8)	525	(3,4)	10	(0,8)	458	(6,3)	62	(1,6)	538	(3,7)	38	(1,6)	484	(4,0)
Indonesia	17	(1,3)	433	(8,7)	83	(1,3)	393	(3,8)	8	(0,8)	407	(14,1)	92	(0,8)	398	(3,7)
Iran, Islamic Rep. of	39	(1,9)	440	(6,3)	61	(1,9)	384	(3,6)	25	(1,6)	450	(6,9)	75	(1,6)	389	(3,4)
Israel	95	(0,7)	469	(3,9)	5	(0,7)	391	(12,3)	84	(1,2)	474	(4,2)	16	(1,2)	421	(7,5)
Italy	95	(0,4)	482	(2,9)	5	(0,4)	435	(8,9)	70	(1,1)	491	(3,0)	30	(1,1)	453	(3,9)
Japan	88	(0,7)	577	(2,4)	12	(0,7)	529	(4,4)	77	(0,9)	581	(2,5)	23	(0,9)	534	(3,5)
Jordan	66	(1,3)	445	(3,7)	34	(1,3)	395	(5,3)	24	(1,2)	453	(5,0)	76	(1,2)	421	(4,4)
Korea, Rep. of	99	(0,2)	599	(2,7)	1	(0,2)	~	~	96	(0,3)	601	(2,6)	4	(0,3)	502	(9,7)
Kuwait	94	(0,5)	358	(2,2)	6	(0,5)	312	(7,6)	71	(0,7)	360	(2,5)	29	(0,7)	343	(2,9)
Lebanon	77	(1,4)	459	(4,4)	23	(1,4)	422	(4,0)	36	(1,6)	463	(5,6)	64	(1,6)	443	(4,1)
Lithuania	85	(0,8)	514	(2,3)	15	(0,8)	462	(4,3)	66	(1,2)	521	(2,5)	34	(1,2)	477	(3,2)
Malaysia	59	(1,7)	496	(5,5)	41	(1,7)	442	(4,5)	27	(1,7)	517	(6,3)	73	(1,7)	458	(4,6)
Malta	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Norway	99	(0,2)	471	(1,9)	1	(0,2)	~	~	97	(0,3)	471	(2,0)	3	(0,3)	427	(7,4)
Oman	67	(1,1)	388	(3,3)	33	(1,1)	348	(4,4)	35	(1,3)	393	(4,0)	65	(1,3)	365	(3,5)
Palestinian Nat'l Auth.	66	(1,3)	382	(3,5)	34	(1,3)	346	(4,9)	31	(1,2)	386	(4,5)	69	(1,2)	363	(3,9)
Qatar	92	(0,3)	313	(1,4)	8	(0,3)	252	(4,5)	74	(0,5)	315	(1,9)	26	(0,5)	289	(2,5)
Romania	64	(1,3)	481	(4,2)	36	(1,3)	436	(5,5)	33	(1,6)	498	(4,7)	67	(1,6)	447	(4,6)
Russian Federation	61	(1,8)	528	(4,4)	39	(1,8)	487	(4,5)	32	(1,4)	534	(5,1)	68	(1,4)	502	(3,9)
Saudi Arabia	81	(1,2)	335	(2,9)	19	(1,2)	313	(5,1)	41	(1,5)	350	(3,2)	59	(1,5)	318	(3,5)
Scotland	98	(0,3)	490	(3,7)	2	(0,3)	~	~	92	(0,5)	492	(3,7)	8	(0,5)	446	(6,6)
Serbia	77	(1,0)	499	(3,5)	23	(1,0)	447	(5,0)	47	(1,4)	514	(3,7)	53	(1,4)	464	(3,8)
Singapore	94	(0,5)	599	(3,5)	6	(0,5)	509	(6,6)	87	(0,7)	604	(3,5)	13	(0,7)	514	(5,7)
Slovenia	97	(0,3)	504	(2,0)	3	(0,3)	435	(7,1)	86	(0,7)	506	(2,0)	14	(0,7)	473	(4,4)
Sweden	99	(0,2)	492	(2,3)	1	(0,2)	~	~	97	(0,3)	493	(2,2)	3	(0,3)	455	(6,5)
Syrian Arab Republic	62	(1,3)	400	(3,8)	38	(1,3)	393	(4,7)	19	(1,1)	411	(5,2)	81	(1,1)	394	(3,7)
Thailand	41	(1,6)	478	(7,7)	59	(1,6)	417	(4,4)	20	(1,4)	503	(10,6)	80	(1,4)	426	(4,3)
Tunisia	39	(2,0)	444	(3,1)	61	(2,0)	409	(2,2)	18	(1,2)	444	(4,5)	82	(1,2)	417	(2,2)
Turkey	43	(1,6)	467	(5,6)	57	(1,6)	408	(4,5)	20	(1,2)	491	(7,3)	80	(1,2)	418	(4,2)
Ukraine	46	(1,6)	491	(4,0)	54	(1,6)	439	(3,8)	22	(1,2)	486	(5,3)	78	(1,2)	458	(3,5)
United States	94	(0,4)	511	(2,8)	6	(0,4)	463	(4,8)	87	(0,6)	514	(2,8)	13	(0,6)	472	(3,9)
¶ Morocco	45	(1,8)	399	(4,2)	55	(1,8)	368	(3,0)	37	(1,6)	391	(3,7)	63	(1,6)	376	(3,8)
International Avg.	70	(0,2)	462	(0,7)	30	(0,2)	409	(1,1)	50	(0,2)	466	(0,9)	50	(0,2)	429	(0,9)
Benchmarking Participants																
Basque Country, Spain	96	(0,5)	502	(2,9)	4	(0,5)	431	(10,9)	84	(1,0)	504	(2,9)	16	(1,0)	471	(5,2)
British Columbia, Canada	98	(0,2)	511	(3,1)	2	(0,2)	~	~	96	(0,5)	513	(3,1)	4	(0,5)	451	(5,9)
Dubai, UAE	95	(0,5)	469	(2,6)	5	(0,5)	396	(7,2)	84	(0,6)	473	(2,6)	16	(0,6)	415	(4,1)
Massachusetts, US	97	(0,4)	549	(4,4)	3	(0,4)	490	(11,3)	93	(0,7)	552	(4,1)	7	(0,7)	482	(10,5)
Minnesota, US	96	(0,5)	535	(4,2)	4	(0,5)	474	(12,1)	89	(1,2)	537	(4,0)	11	(1,2)	492	(8,7)
Ontario, Canada	99	(0,2)	518	(3,5)	1	(0,2)	~	~	96	(0,5)	519	(3,6)	4	(0,5)	479	(8,7)
Quebec, Canada	97	(0,4)	530	(3,5)	3	(0,4)	490	(8,1)	93	(0,6)	531	(3,5)	7	(0,6)	500	(6,2)

Background data provided by students.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available. A tilde (~) indicates insufficient data to report achievement.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

SCHOOL CONTEXT

Percentages of students coming from socially and economically disadvantaged homes

To provide information about the students' family background, TIMSS asked school principals to estimate the percentage of students in their schools from economically disadvantaged homes (based on their personal opinion and their country's economic conditions within their own framework of reference).

At fourth grade, according to school principals, in average 60 percent of students attended schools with not more than 25 percent of economically disadvantaged students, 17 percent attended schools with 26 to 50 percent economically disadvantaged students, and 23 percent attended schools where the majority were economically disadvantaged students.

At the eighth grade, the percentage of students attending schools with more economically disadvantaged students was slightly higher (52%). It is a consequence of the differences resulting from the socio-economic backgrounds of countries participating at the eighth and the fourth grade assessment. Within the particular countries data are similar at both grades.

According to the subjective estimate of school principals, the highest percentage of students live in better economic conditions in the developed countries (irrespective of geographical location) and, surprisingly, in Ukraine and Slovakia – in these countries students attended schools with lower than 10 percent of economically disadvantaged students. Countries where more than half the students attended schools where the majority of students were from disadvantaged backgrounds included Algeria, Colombia, El Salvador, Morocco, and Yemen (Table 14-17) have the students with the biggest economical disadvantage.

85–92. pages

In Hungary, principals estimated that the percentage of students attending schools with lower than 10 percent of economically disadvantaged students is a little lower than the average (12-13%), and almost one third of students attended schools with 50 percent of economically disadvantaged students.

Comparing student achievement in different schools it can be concluded that average achievement was the highest among students attending schools with the fewest economically disadvantaged students (irrespective of grades and the field of assessment). They are followed by students attending schools with 11 to 25 percent of students with economic disadvantage, then students attending mixed schools according to their socio-economic status. Students from schools with the highest economically disadvantaged student population are at the weak end on the TIMSS achievement scale.

The same findings are reflected in the Hungarian data as well. At the fourth grade, students attending schools with less than 10 percent of economically disadvantaged students reached 80 points higher in mathematics, and 70 points higher in science, at the eighth grade, 60 points higher in mathematics and 50 points higher in science in the TIMSS 2007 study than students attending schools with over 50 percent of economically disadvantaged students.

These data also provide evidence for and complement the earlier conclusion: the economic resources (financial background) of parents have a substantial impact on TIMSS results.

School Climate

TIMSS asked both school principals and teachers to characterize the climate of their school in terms of teachers and the school, parents and the school and students and the school.

An own index[12] was created in order to simplify interpretation of the results and used at teachers' and principals' answers too. According the School Climate index three categories were developed, and the schools were classified into these. The High, Medium and Low index values mean positive, average and negative school climate.

Based on the principals' and teachers' perception, internationally on average, most of the students attended schools of medium level of climate index, at fourth grade this percentage is slightly higher than at eighth grade (66-68, 58-60% respectively).

93–100. pages

By far the most students were at the high level of the index in Chinese Taipei where more than half of the students were assigned to this level. They were followed by Anglo-Saxon countries according to school climate (Table 18-25).

Hungarian students were assigned to the medium school climate level with higher percentage than the international average (at fourth grade 73%, at eighth grade 79%), and only 4-8 percent of them attended schools with high school climate level. It can also be noted that the school climate was better at fourth grade according to the answers given by both principals and teachers. In general, principals had more positive perception of school climate index than teachers. It is also true for most participating countries.

Comparing average student achievements on the TIMSS 2007 achievement scale with their school climate indices, it can be concluded that students assigned to higher school climate index level had significantly better results on the average achievement scale than students assigned to low school climate index level. On average internationally, the difference between students attending school of high index level and low index level is between 40 to 60 points on the achievement scale.

In Hungary, at fourth grade, the difference between the results of students attending schools with high level of school climate index and students at lower school climate index is higher than the international average, it is 84-97 points. This difference is somewhat smaller at eighth grade but it is still significant. In mathematics and science, the difference in the average achievement is 75 points in mathematics and 63 points in science between the results of students assigned to the high and the low school climate category based on the perception of the school principals, and 39 points and 46 points science between the results of students assigned to the high and the low school climate category based on teachers' perception.

[12] The school climate index was created by adding and averaging the ratings given by principals and teachers, high index level is 1-2, medium index level is 2-3, and low index level is above 3. Interpreting high index level with low values is a result of assigning low values to positive answers. The eight questions asked were the following: Teachers' job satisfaction, Teachers' understanding of the school's curricular goals, Teachers' degree of success in implementing the school's curriculum, Teachers' expectations for student achievement, Parental support for student achievement, Parental involvement in school activities, Students' regard for school property, Students' desire to do well in school. The answers had to be given on a five-point scale: 1- very high, 2 – high, 3 – medium, 4 – low, 5 – very low.

Table 14 Principals' Reports on the Percentages of Students in Their Schools Coming from Economically Disadvantaged Homes with Trends

TIMSS 2007 Mathematics 4

Country		Schools with Few (0-10%) Economically Disadvantaged Students							Schools with 11-25% Economically Disadvantaged Students						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Algeria		4	(1,8)	368	(14,7)	◊	◊		14	(2,8)	396	(15,0)	◊	◊	
Armenia	r	17	(3,0)	490	(7,4)	14	(3,4)	▲	32	(4,2)	499	(7,5)	11	(5,5)	▲
Australia		34	(4,5)	536	(6,1)	0	(6,3)		30	(3,0)	513	(7,1)	1	(5,0)	
Austria		54	(3,6)	512	(3,1)	◊	◊		29	(3,4)	508	(3,4)	◊	◊	
Chinese Taipei		63	(3,9)	584	(2,4)	–17	(5,2)	▼	27	(3,6)	563	(3,8)	12	(4,7)	▲
Colombia		5	(2,2)	384	(27,8)	◊	◊		6	(2,1)	378	(12,8)	◊	◊	
Czech Republic		19	(3,9)	497	(5,6)	◊	◊		41	(4,8)	495	(4,1)	◊	◊	
Denmark		49	(5,5)	533	(3,8)	◊	◊		36	(4,8)	516	(3,4)	◊	◊	
El Salvador		7	(1,6)	379	(23,9)	◊	◊		11	(2,2)	341	(14,5)	◊	◊	
England	r	38	(4,0)	564	(5,0)	0	(5,9)		31	(3,5)	544	(4,4)	6	(5,7)	
Georgia		12	(2,7)	449	(10,8)	◊	◊		26	(4,2)	440	(6,0)	◊	◊	
Germany		29	(3,2)	539	(2,7)	◊	◊		38	(3,1)	536	(2,9)	◊	◊	
Hong Kong SAR		26	(4,1)	610	(5,4)	3	(6,0)		23	(4,3)	608	(7,9)	–3	(5,5)	
Hungary		12	(2,8)	549	(12,5)	–3	(4,4)		29	(3,9)	525	(7,2)	5	(5,7)	
Iran, Islamic Rep. of		15	(2,7)	447	(10,9)	–2	(4,4)		15	(3,0)	435	(10,1)	4	(4,4)	
Italy		38	(3,7)	511	(4,3)	–7	(5,5)		37	(3,4)	514	(4,6)	0	(5,1)	
Japan		64	(3,8)	573	(2,4)	–10	(5,4)		24	(3,5)	561	(4,5)	3	(5,0)	
Kazakhstan		52	(4,2)	540	(9,2)	◊	◊		26	(4,6)	553	(11,2)	◊	◊	
Kuwait		60	(4,3)	314	(5,2)	◊	◊		20	(3,3)	318	(10,5)	◊	◊	
Latvia		38	(3,4)	551	(3,5)	13	(5,5)	▲	38	(4,1)	530	(3,3)	–2	(7,0)	
Lithuania		37	(3,2)	552	(4,0)	11	(5,0)	▲	37	(3,9)	523	(4,0)	4	(6,0)	
Morocco	r	7	(2,9)	436	(18,3)	4	(3,2)		4	(1,7)	348	(22,3)	0	(2,3)	
Netherlands	r	61	(4,0)	544	(2,7)	–2	(5,6)		16	(3,5)	524	(4,8)	–1	(5,0)	
New Zealand		44	(2,6)	521	(2,8)	0	(4,1)		20	(2,6)	503	(4,7)	–3	(4,4)	
Norway		–	–	–	–	–	–		–	–	–	–	–	–	
Qatar		41	(0,2)	311	(1,6)	◊	◊		28	(0,2)	294	(2,0)	◊	◊	
Russian Federation		28	(3,6)	567	(8,7)	10	(4,4)	▲	33	(3,0)	549	(7,3)	1	(4,7)	
Scotland	r	44	(4,3)	510	(4,0)	8	(6,2)		26	(4,4)	495	(5,4)	–5	(6,4)	
Singapore		60	(0,0)	611	(5,2)	–4	(3,7)		30	(0,0)	586	(6,3)	4	(3,2)	
Slovak Republic		41	(3,7)	511	(4,4)	◊	◊		34	(3,8)	499	(5,6)	◊	◊	
Slovenia		22	(3,6)	510	(5,0)	–2	(5,3)		43	(4,7)	503	(2,9)	0	(6,6)	
Sweden		49	(4,5)	512	(3,0)	◊	◊		30	(4,3)	498	(5,0)	◊	◊	
Tunisia		20	(3,5)	352	(11,8)	0	(4,7)		14	(2,9)	354	(11,0)	–2	(4,1)	
Ukraine		64	(4,2)	478	(3,5)	◊	◊		25	(3,6)	453	(7,2)	◊	◊	
United States		19	(2,2)	569	(5,9)	0	(3,6)		21	(2,5)	549	(3,6)	–2	(3,6)	
Yemen		5	(1,9)	242	(20,7)	◊	◊		10	(2,2)	229	(16,8)	◊	◊	
International Avg.		34	(0,6)	490	(1,7)				26	(0,6)	477	(1,4)			
Benchmarking Participants															
Alberta, Canada		45	(4,5)	522	(3,9)	◊	◊		32	(4,4)	497	(2,7)	◊	◊	
British Columbia, Canada		46	(4,7)	517	(4,3)	◊	◊		34	(4,0)	502	(4,6)	◊	◊	
Dubai, UAE		45	(0,4)	471	(3,1)	◊	◊		21	(0,2)	437	(4,6)	◊	◊	
Massachusetts, US		46	(7,2)	586	(3,7)	◊	◊		23	(7,5)	575	(6,2)	◊	◊	
Minnesota, US		14	(6,5)	591	(3,0)	◊	◊		36	(8,5)	570	(10,3)	◊	◊	
Ontario, Canada		42	(5,1)	526	(4,4)	–7	(7,5)		29	(4,7)	507	(3,7)	9	(6,2)	
Quebec, Canada		47	(4,9)	525	(4,2)	7	(6,6)		26	(3,8)	521	(6,7)	–3	(5,3)	

Continued on next page

Country		Schools with 26–50% Economically Disadvantaged Students							Schools with More than 50% Economically Disadvantaged Students						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Algeria		24	(3,6)	385	(7,3)	◊	◊		58	(4,5)	367	(9,0)	◊	◊	
Armenia	r	25	(4,0)	510	(8,8)	–3	(5,7)		25	(3,6)	497	(8,6)	–22	(5,8)	▼
Australia		22	(4,4)	510	(8,6)	1	(5,7)		14	(3,1)	475	(11,1)	–2	(5,1)	
Austria		11	(2,4)	495	(6,1)	◊	◊		6	(1,8)	465	(9,9)	◊	◊	
Chinese Taipei		7	(2,3)	566	(6,0)	4	(2,7)		3	(1,7)	553	(12,6)	2	(1,9)	
Colombia		8	(2,3)	393	(17,2)	◊	◊		82	(3,2)	345	(5,6)	◊	◊	
Czech Republic		27	(3,6)	471	(5,1)	◊	◊		13	(3,2)	471	(7,6)	◊	◊	
Denmark		8	(2,8)	507	(11,4)	◊	◊		7	(2,7)	500	(15,0)	◊	◊	
El Salvador		13	(2,9)	321	(6,9)	◊	◊		70	(3,2)	325	(5,2)	◊	◊	
England	r	15	(3,3)	520	(5,7)	4	(4,5)		16	(3,0)	499	(4,4)	–9	(5,2)	
Georgia		25	(3,8)	433	(9,9)	◊	◊		36	(4,4)	440	(8,3)	◊	◊	
Germany		19	(2,2)	522	(4,3)	◊	◊		14	(2,4)	468	(6,6)	◊	◊	
Hong Kong SAR		30	(4,5)	610	(6,7)	5	(6,7)		21	(3,7)	588	(6,3)	–4	(5,7)	
Hungary		28	(3,7)	519	(6,0)	–3	(5,4)		31	(3,8)	468	(6,6)	2	(5,3)	
Iran, Islamic Rep. of		18	(2,7)	394	(7,0)	–5	(5,1)		52	(3,7)	382	(5,8)	2	(6,0)	
Italy		14	(2,5)	499	(7,7)	4	(3,5)		11	(2,4)	482	(15,2)	3	(2,8)	
Japan		10	(2,4)	556	(5,5)	6	(2,8)	▲	1	(1,0)	~	~	1	(1,0)	
Kazakhstan		18	(4,4)	563	(18,0)	◊	◊		3	(1,3)	588	(16,2)	◊	◊	
Kuwait		16	(3,2)	316	(12,5)	◊	◊		4	(1,8)	302	(30,7)	◊	◊	
Latvia		16	(3,1)	534	(5,7)	–4	(5,7)		9	(2,0)	517	(8,7)	–7	(4,7)	
Lithuania		22	(3,0)	512	(4,9)	–9	(4,8)		5	(1,5)	505	(14,3)	–6	(3,3)	
Morocco	r	13	(2,8)	330	(10,9)	–5	(4,5)		76	(3,6)	324	(5,8)	1	(5,3)	
Netherlands	r	15	(3,8)	515	(5,2)	7	(4,5)		7	(2,1)	481	(10,9)	–3	(2,9)	
New Zealand		13	(1,6)	477	(7,4)	1	(2,8)		23	(1,7)	437	(5,1)	2	(3,0)	
Norway		–	–	–	–	–	–		–	–	–	–	–	–	
Qatar		13	(0,1)	285	(3,2)	◊	◊		18	(0,1)	278	(2,7)	◊	◊	
Russian Federation		20	(2,6)	535	(9,0)	–6	(4,0)		19	(2,3)	524	(12,1)	–4	(4,3)	
Scotland	r	16	(3,8)	476	(4,9)	–2	(5,7)		14	(2,7)	450	(6,7)	–1	(4,4)	
Singapore		9	(0,0)	564	(12,8)	3	(1,7)		1	(0,0)	~	~	–3	(1,6)	▼
Slovak Republic		13	(2,7)	465	(19,0)	◊	◊		12	(2,1)	460	(15,2)	◊	◊	
Slovenia		25	(3,7)	498	(3,0)	2	(5,5)		10	(2,7)	491	(4,4)	–1	(3,8)	
Sweden		15	(4,0)	485	(8,8)	◊	◊		6	(2,4)	461	(8,7)	◊	◊	
Tunisia		23	(3,9)	340	(8,0)	7	(4,9)		43	(3,9)	299	(7,3)	–5	(5,3)	
Ukraine		6	(2,1)	444	(16,6)	◊	◊		4	(1,8)	466	(18,6)	◊	◊	
United States		18	(2,9)	532	(4,1)	–2	(4,1)		42	(2,8)	499	(3,5)	5	(3,8)	
Yemen		22	(3,7)	223	(11,5)	◊	◊		63	(4,3)	220	(8,2)	◊	◊	
International Avg.		17	(0,5)	466	(1,6)				23	(0,5)	443	(1,9)			
Kiemelt oktatási rendszerek															
Alberta, Kanada		13	(3,2)	496	(4,1)	◊	◊		10	(2,7)	454	(12,0)	◊	◊	
Brit-Kolumbia, Kanada		15	(3,2)	490	(5,9)	◊	◊		6	(2,0)	469	(12,9)	◊	◊	
Dubai, Egyesült Arab Emirátusok	s	16	(0,2)	406	(3,6)	◊	◊		19	(0,4)	400	(13,1)	◊	◊	
Massachusetts, USA		14	(5,0)	571	(10,4)	◊	◊		17	(4,4)	534	(7,9)	◊	◊	
Minessota, USA		29	(8,5)	550	(5,6)	◊	◊		21	(7,0)	514	(15,4)	◊	◊	
Ontario, Kanada		10	(2,9)	489	(10,7)	–5	(4,8)		19	(4,1)	487	(11,8)	2	(5,8)	
Quebec, Kanada		14	(2,9)	511	(9,6)	1	(4,3)		12	(3,1)	485	(4,7)	–4	(5,4)	

Background data provided by schools.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 percent significantly higher.
▼ 2007 percent significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 15 Principals' Reports on the Percentages of Students in Their Schools Coming from Economically Disadvantaged Homes with Trends

Country		Schools with Few (0-10%) Economically Disadvantaged Students							Schools with 11-25% Economically Disadvantaged Students						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Algeria		6	(1,9)	379	(6,3)	◊	◊		22	(3,4)	388	(4,4)	◊	◊	
Armenia	r	17	(3,3)	490	(8,7)	14	(3,6)	▲	31	(4,3)	496	(6,1)	10	(5,6)	
Australia		31	(3,3)	532	(9,1)	–1	(5,6)		33	(4,0)	491	(4,8)	–2	(5,8)	
Bahrain		11	(0,2)	455	(5,0)	–5	(0,2)	▼	33	(0,3)	405	(2,9)	13	(0,3)	▲
Bosnia and Herzegovina		8	(2,2)	457	(10,3)	◊	◊		18	(3,4)	456	(6,2)	◊	◊	
Botswana		9	(2,2)	402	(11,8)	–7	(4,2)		22	(3,9)	380	(5,7)	1	(5,3)	
Bulgaria		25	(3,0)	505	(9,5)	6	(4,4)		27	(3,4)	468	(7,2)	1	(5,5)	
Chinese Taipei		59	(4,1)	611	(4,9)	–8	(5,4)		29	(3,8)	584	(7,2)	4	(5,2)	
Colombia		6	(1,8)	386	(30,9)	◊	◊		7	(3,0)	408	(12,0)	◊	◊	
Cyprus		37	(0,2)	464	(2,3)	–1	(0,3)		32	(0,2)	467	(3,2)	–3	(0,4)	▼
Czech Republic		24	(4,2)	520	(8,7)	◊	◊		39	(4,7)	511	(6,0)	◊	◊	
Egypt		10	(2,0)	417	(17,4)	–1	(3,2)		11	(2,7)	399	(11,3)	–13	(4,6)	▼
El Salvador		6	(1,5)	385	(12,4)	◊	◊		8	(2,5)	343	(18,1)	◊	◊	
England	s	38	(3,5)	540	(8,6)	5	(6,3)		27	(4,0)	492	(7,8)	–6	(7,2)	
Georgia		11	(2,9)	422	(8,4)	◊	◊		22	(4,3)	423	(11,0)	◊	◊	
Ghana		8	(2,4)	332	(16,4)	4	(2,8)		7	(2,1)	313	(17,7)	–1	(3,3)	
Hong Kong SAR		12	(2,6)	627	(10,1)	–2	(4,3)		24	(3,6)	602	(10,0)	–3	(5,4)	
Hungary		13	(2,9)	556	(11,2)	–2	(4,2)		26	(4,1)	526	(7,6)	3	(5,3)	
Indonesia		6	(1,9)	434	(29,3)	2	(2,7)		16	(2,8)	444	(14,5)	–1	(4,4)	
Iran, Islamic Rep. of		11	(2,4)	462	(11,1)	–4	(3,5)		16	(3,3)	402	(11,6)	4	(4,0)	
Israel		14	(2,8)	513	(8,1)	–1	(4,2)		25	(3,4)	494	(8,6)	–10	(5,1)	▼
Italy		40	(4,2)	493	(4,8)	–5	(5,4)		32	(4,0)	484	(4,6)	–1	(5,5)	
Japan		57	(4,0)	580	(2,8)	–15	(5,4)	▼	33	(3,9)	564	(4,8)	10	(5,1)	▲
Jordan		11	(2,5)	451	(12,6)	–3	(4,0)		19	(3,5)	450	(10,0)	–3	(5,5)	
Korea, Rep. of		24	(3,3)	622	(4,2)	–10	(4,9)	▼	34	(3,7)	596	(4,1)	–6	(5,5)	
Kuwait		52	(4,7)	357	(4,2)	◊	◊		21	(3,6)	354	(6,0)	◊	◊	
Lebanon		14	(3,0)	481	(11,7)	6	(4,0)		16	(3,2)	470	(10,1)	–1	(4,5)	
Lithuania	r	33	(3,6)	531	(4,9)	13	(5,4)	▲	40	(3,6)	498	(3,5)	–1	(6,1)	
Malaysia		17	(3,5)	493	(10,0)	10	(4,2)	▲	25	(3,6)	488	(9,5)	13	(4,5)	▲
Malta		56	(0,2)	520	(1,5)	◊	◊		20	(0,2)	466	(2,5)	◊	◊	
Norway		–	–	–	–	–	–		–	–	–	–	–	–	
Oman		12	(2,7)	372	(13,8)	◊	◊		30	(3,8)	365	(8,2)	◊	◊	
Palestinian Nat'l Auth.		6	(1,9)	388	(26,1)	–1	(2,8)		20	(3,4)	383	(7,6)	9	(4,3)	▲
Qatar		31	(0,2)	323	(2,1)	◊	◊		41	(0,2)	297	(1,9)	◊	◊	
Romania		14	(3,0)	500	(8,9)	2	(4,2)		16	(3,1)	486	(12,4)	–2	(4,5)	
Russian Federation		30	(3,4)	532	(6,0)	11	(4,5)	▲	36	(3,5)	515	(6,3)	–1	(4,7)	
Saudi Arabia		27	(3,9)	343	(5,1)	–	–		31	(4,2)	327	(4,6)	–	–	
Scotland	s	36	(3,7)	510	(7,0)	8	(6,0)		38	(4,1)	479	(6,9)	–5	(7,0)	
Serbia		5	(1,9)	531	(9,3)	–5	(2,9)		22	(3,2)	501	(7,8)	–6	(5,1)	
Singapore		52	(0,0)	614	(5,4)	–5	(0,0)	▼	30	(0,0)	572	(7,3)	3	(0,0)	▲
Slovenia		22	(3,4)	510	(5,7)	–1	(5,2)		41	(4,5)	502	(3,3)	–1	(6,4)	
Sweden	r	43	(4,7)	495	(3,9)	–3	(6,2)		41	(4,6)	485	(3,2)	9	(6,1)	
Syrian Arab Republic		12	(2,9)	387	(10,7)	◊	◊		15	(2,7)	409	(11,5)	◊	◊	
Thailand		5	(1,9)	482	(23,5)	◊	◊		15	(2,8)	509	(17,3)	◊	◊	
Tunisia		9	(2,6)	444	(9,4)	0	(3,7)		18	(3,1)	428	(5,8)	3	(4,1)	
Turkey		6	(1,9)	523	(28,0)	◊	◊		10	(2,5)	506	(15,5)	◊	◊	
Ukraine		60	(4,1)	471	(4,6)	◊	◊		28	(3,5)	451	(8,3)	◊	◊	
United States	r	16	(2,5)	550	(3,9)	–11	(3,8)	▼	23	(2,8)	534	(5,0)	–1	(4,1)	
¶ Morocco		0	(0,0)	~	~	–	–		6	(1,4)	426	(22,4)	–	–	
International Avg.		22	(0,4)	476	(1,8)				24	(0,5)	459	(1,4)			
Benchmarking Participants															
Basque Country, Spain		63	(5,3)	507	(3,5)	–1	(7,2)		15	(4,0)	491	(7,2)	–5	(5,5)	
British Columbia, Canada		40	(4,4)	521	(5,2)	◊	◊		33	(4,5)	505	(4,7)	◊	◊	
Dubai, UAE		43	(0,9)	489	(4,9)	◊	◊		19	(0,5)	447	(8,0)	◊	◊	
Massachusetts, US		32	(3,5)	577	(6,5)	◊	◊		37	(5,0)	553	(6,9)	◊	◊	
Minnesota, US		15	(5,9)	561	(13,5)	◊	◊		38	(7,9)	535	(7,0)	◊	◊	
Ontario, Canada		42	(4,2)	534	(5,1)	1	(6,3)		36	(4,6)	508	(4,8)	7	(6,4)	
Quebec, Canada		28	(3,7)	561	(6,1)	–15	(6,0)	▼	33	(3,8)	519	(7,8)	2	(6,2)	

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Country		Schools with 26–50% Economically Disadvantaged Students							Schools with More than 50% Economically Disadvantaged Students						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Algeria		20	(3,2)	389	(5,6)	◊	◊		52	(4,2)	387	(2,4)	◊	◊	
Armenia	r	26	(4,2)	508	(6,6)	–3	(6,0)		27	(3,9)	499	(6,8)	–20	(6,2)	▼
Australia		23	(4,3)	483	(7,4)	0	(5,4)		13	(2,6)	446	(12,0)	3	(3,5)	
Bahrain		31	(0,2)	386	(2,5)	–2	(0,3)	▼	24	(0,2)	378	(3,7)	–7	(0,3)	▼
Bosnia and Herzegovina		28	(4,1)	458	(6,7)	◊	◊		46	(4,6)	452	(4,0)	◊	◊	
Botswana		21	(4,2)	354	(5,7)	–4	(5,7)		47	(4,6)	346	(3,1)	10	(6,5)	
Bulgaria		19	(3,6)	436	(13,2)	–6	(5,1)		29	(3,4)	428	(11,6)	–1	(5,2)	
Chinese Taipei		5	(1,9)	586	(14,7)	0	(2,6)		7	(2,8)	564	(26,1)	4	(3,2)	
Colombia		14	(3,4)	391	(8,3)	◊	◊		73	(3,8)	367	(4,6)	◊	◊	
Cyprus		22	(0,2)	460	(3,3)	7	(0,3)	▲	9	(0,2)	472	(8,1)	–3	(0,3)	▼
Czech Republic		27	(4,3)	490	(6,3)	◊	◊		11	(2,6)	475	(6,7)	◊	◊	
Egypt		24	(3,4)	391	(5,5)	1	(4,9)		55	(4,0)	380	(4,8)	13	(5,6)	▲
El Salvador		16	(3,2)	334	(6,0)	◊	◊		70	(3,7)	338	(3,7)	◊	◊	
England	s	23	(3,8)	503	(11,6)	1	(7,3)		12	(2,6)	485	(15,7)	–1	(5,0)	
Georgia		30	(5,0)	398	(11,9)	◊	◊		37	(5,3)	410	(9,4)	◊	◊	
Ghana		15	(2,9)	322	(14,5)	–3	(4,5)		71	(3,8)	303	(6,0)	0	(5,7)	
Hong Kong SAR		24	(3,8)	553	(11,2)	0	(5,5)		40	(4,2)	542	(10,2)	5	(6,2)	
Hungary		31	(4,3)	511	(6,9)	–4	(6,1)		30	(3,8)	490	(7,3)	3	(5,4)	
Indonesia		22	(4,2)	425	(11,8)	–3	(5,4)		56	(3,9)	383	(5,7)	2	(5,7)	
Iran, Islamic Rep. of		23	(3,5)	412	(8,2)	–2	(4,9)		50	(3,8)	382	(4,7)	2	(5,6)	
Israel		32	(4,0)	455	(7,7)	6	(5,8)		30	(3,8)	427	(10,1)	5	(5,0)	
Italy		19	(3,4)	465	(5,4)	7	(4,2)		9	(2,2)	422	(10,9)	–1	(3,1)	
Japan		7	(2,4)	532	(9,8)	3	(2,9)		2	(1,0)	~	~	2	(1,0)	
Jordan		28	(3,6)	423	(9,4)	4	(5,0)		42	(4,2)	412	(7,3)	2	(6,2)	
Korea, Rep. of		26	(3,5)	583	(4,7)	10	(4,6)	▲	16	(2,7)	584	(6,2)	6	(3,7)	
Kuwait		17	(3,7)	356	(7,4)	◊	◊		11	(2,8)	331	(12,7)	◊	◊	
Lebanon		15	(3,4)	446	(9,2)	0	(4,3)		56	(4,6)	429	(6,0)	–5	(6,1)	
Lithuania	r	22	(3,5)	487	(6,7)	–8	(5,6)		5	(1,9)	483	(14,7)	–3	(3,1)	
Malaysia		20	(3,1)	483	(12,9)	3	(4,6)		38	(3,9)	451	(7,8)	–26	(5,6)	▼
Malta		19	(0,2)	460	(2,0)	◊	◊		6	(0,1)	366	(4,5)	◊	◊	
Norway		–	–	–	–	–	–		–	–	–	–	–	–	
Oman		28	(3,7)	381	(7,2)	◊	◊		30	(3,7)	371	(5,4)	◊	◊	
Palestinian Nat'l Auth.		20	(3,2)	374	(9,9)	–9	(4,9)		55	(4,0)	357	(4,9)	0	(5,5)	
Qatar		24	(0,1)	299	(2,8)	◊	◊		4	(0,1)	292	(6,6)	◊	◊	
Romania		22	(3,9)	463	(8,4)	1	(4,9)		49	(4,2)	440	(6,1)	–2	(6,0)	
Russian Federation		22	(3,2)	496	(7,3)	–2	(4,2)		12	(3,2)	483	(10,4)	–8	(4,3)	
Saudi Arabia		25	(4,1)	320	(7,2)	–	–		18	(3,4)	316	(6,5)	–	–	
Scotland	s	17	(3,6)	470	(10,2)	–6	(5,9)		9	(2,2)	451	(9,5)	3	(3,5)	
Serbia		28	(4,2)	477	(7,6)	5	(5,8)		45	(4,7)	476	(5,3)	6	(6,4)	
Singapore		9	(0,0)	556	(14,7)	–1	(0,0)		9	(0,0)	565	(13,1)	4	(0,0)	▲
Slovenia		25	(3,8)	498	(4,9)	2	(5,6)		11	(3,1)	491	(6,2)	0	(4,1)	
Sweden	r	11	(3,0)	487	(6,7)	–8	(4,8)		5	(1,8)	474	(8,7)	2	(2,1)	
Syrian Arab Republic		25	(3,8)	413	(7,0)	◊	◊		48	(4,5)	381	(5,7)	◊	◊	
Thailand		20	(3,1)	452	(10,8)	◊	◊		59	(3,6)	416	(6,1)	◊	◊	
Tunisia		21	(3,5)	432	(5,4)	5	(4,6)		52	(4,0)	408	(2,8)	–7	(5,8)	
Turkey		18	(3,4)	449	(13,5)	◊	◊		66	(3,9)	406	(4,8)	◊	◊	
Ukraine		7	(2,1)	436	(8,7)	◊	◊		6	(1,8)	453	(24,7)	◊	◊	
United States	r	26	(3,4)	509	(4,8)	1	(4,6)		35	(2,8)	471	(4,7)	11	(4,0)	▲
¶ Morocco		15	(4,6)	383	(8,5)	–	–		78	(4,8)	369	(3,9)	–	–	
International Avg.		21	(0,5)	445	(1,3)				33	(0,5)	427	(1,4)			
Benchmarking Participants															
Basque Country, Spain		15	(3,9)	490	(7,2)	6	(5,0)		7	(2,1)	449	(11,9)	0	(3,2)	
British Columbia, Canada		23	(4,0)	494	(8,2)	◊	◊		4	(1,9)	542	(42,5)	◊	◊	
Dubai, UAE		13	(0,4)	435	(11,2)	◊	◊		24	(0,6)	431	(3,4)	◊	◊	
Massachusetts, US		12	(5,1)	513	(19,0)	◊	◊		19	(3,3)	493	(17,4)	◊	◊	
Minnesota, US		29	(8,0)	524	(6,2)	◊	◊		18	(5,6)	497	(13,3)	◊	◊	
Ontario, Canada		17	(3,4)	510	(7,6)	4	(4,9)		5	(2,2)	499	(13,9)	–11	(4,0)	▼
Quebec, Canada		24	(3,9)	517	(6,3)	9	(4,9)		15	(3,2)	495	(10,8)	4	(4,1)	

Background data provided by schools.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 percent significantly higher.
▼ 2007 percent significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 16 Principals' Reports on the Percentages of Students in Their Schools Coming from Economically Disadvantaged Homes with Trends

TIMSS 2007 Science 4

Country		Schools with Few (0–10%) Economically Disadvantaged Students							Schools with 11–25% Economically Disadvantaged Students						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Algeria		4	(1,8)	345	(18,5)	◊	◊		14	(2,8)	371	(18,0)	◊	◊	
Armenia	r	17	(3,0)	473	(10,3)	14	(3,4)	▲	32	(4,2)	486	(11,1)	11	(5,5)	▲
Australia		34	(4,5)	544	(4,9)	0	(6,3)		30	(3,0)	528	(7,6)	1	(5,0)	
Austria		54	(3,6)	533	(3,6)	◊	◊		29	(3,4)	529	(3,6)	◊	◊	
Chinese Taipei		63	(3,9)	565	(2,6)	–17	(5,2)	▼	27	(3,6)	542	(3,6)	12	(4,7)	▲
Colombia		5	(2,2)	432	(30,4)	◊	◊		6	(2,1)	435	(11,5)	◊	◊	
Czech Republic		19	(3,9)	525	(7,2)	◊	◊		41	(4,8)	523	(4,2)	◊	◊	
Denmark		49	(5,5)	530	(3,9)	◊	◊		36	(4,8)	512	(4,6)	◊	◊	
El Salvador		7	(1,6)	442	(23,3)	◊	◊		11	(2,2)	404	(15,7)	◊	◊	
England	r	38	(4,0)	564	(4,7)	0	(5,9)		31	(3,5)	544	(4,3)	6	(5,7)	
Georgia		12	(2,7)	429	(11,7)	◊	◊		26	(4,2)	422	(4,6)	◊	◊	
Germany		29	(3,2)	543	(3,1)	◊	◊		38	(3,1)	540	(3,2)	◊	◊	
Hong Kong SAR		26	(4,1)	553	(5,7)	3	(6,0)		23	(4,3)	556	(8,5)	–3	(5,5)	
Hungary		12	(2,8)	569	(12,4)	–3	(4,4)		29	(3,9)	552	(6,2)	5	(5,7)	
Iran, Islamic Rep. of		15	(2,7)	492	(10,9)	–2	(4,4)		15	(3,0)	475	(10,5)	4	(4,4)	
Italy		38	(3,7)	541	(4,5)	–7	(5,5)		37	(3,4)	542	(4,5)	0	(5,1)	
Japan		64	(3,8)	551	(2,1)	–10	(5,4)		24	(3,5)	542	(4,2)	3	(5,0)	
Kazakhstan		52	(4,2)	528	(7,3)	◊	◊		26	(4,6)	531	(10,4)	◊	◊	
Kuwait		60	(4,3)	348	(7,0)	◊	◊		20	(3,3)	345	(13,1)	◊	◊	
Latvia		38	(3,4)	555	(3,6)	13	(5,5)	▲	38	(4,1)	535	(2,7)	–2	(7,0)	
Lithuania		37	(3,2)	530	(3,3)	11	(5,0)	▲	37	(3,9)	509	(3,3)	4	(6,0)	
Morocco	r	7	(2,9)	421	(20,3)	4	(3,2)		4	(1,7)	317	(32,8)	0	(2,3)	
Netherlands	r	61	(4,0)	531	(3,0)	–2	(5,6)		16	(3,5)	516	(4,3)	–1	(5,0)	
New Zealand		44	(2,6)	534	(3,1)	0	(4,1)		20	(2,6)	515	(4,8)	–3	(4,4)	
Norway		–	–	–	–	–	–		–	–	–	–	–	–	
Qatar		41	(0,2)	306	(3,3)	◊	◊		28	(0,2)	298	(3,3)	◊	◊	
Russian Federation		28	(3,6)	567	(7,4)	10	(4,4)	▲	33	(3,0)	552	(7,4)	1	(4,7)	
Scotland	r	44	(4,3)	517	(3,2)	8	(6,2)		26	(4,4)	499	(5,3)	–5	(6,4)	
Singapore		60	(0,0)	600	(5,6)	–4	(3,7)		30	(0,0)	570	(6,8)	4	(3,2)	
Slovak Republic		41	(3,7)	543	(3,9)	◊	◊		34	(3,8)	529	(5,6)	◊	◊	
Slovenia		22	(3,6)	529	(5,7)	–2	(5,3)		43	(4,7)	520	(3,2)	0	(6,6)	
Sweden		49	(4,5)	537	(2,9)	◊	◊		30	(4,3)	520	(5,8)	◊	◊	
Tunisia		20	(3,5)	354	(15,5)	0	(4,7)		14	(2,9)	344	(17,0)	–2	(4,1)	
Ukraine		64	(4,2)	483	(3,4)	◊	◊		25	(3,6)	457	(7,0)	◊	◊	
United States		19	(2,2)	581	(6,3)	0	(3,6)		21	(2,5)	564	(3,4)	–2	(3,6)	
Yemen		5	(1,9)	236	(27,6)	◊	◊		10	(2,2)	210	(20,2)	◊	◊	
International Avg.		34	(0,6)	495	(1,9)				26	(0,6)	481	(1,7)			
Benchmarking Participants															
Alberta, Canada		45	(4,5)	559	(4,9)	◊	◊		32	(4,4)	537	(4,4)	◊	◊	
British Columbia, Canada		46	(4,7)	545	(5,4)	◊	◊		34	(4,0)	536	(4,5)	◊	◊	
Dubai, UAE		45	(0,4)	479	(3,4)	◊	◊		21	(0,2)	457	(8,2)	◊	◊	
Massachusetts, US		46	(7,2)	589	(4,5)	◊	◊		23	(7,5)	579	(6,0)	◊	◊	
Minnesota, US		14	(6,5)	585	(4,2)	◊	◊		36	(8,5)	571	(10,3)	◊	◊	
Ontario, Canada		42	(5,1)	550	(4,9)	–7	(7,5)		29	(4,7)	534	(3,9)	9	(6,2)	
Quebec, Canada		47	(4,9)	522	(3,6)	7	(6,6)		26	(3,8)	519	(5,5)	–3	(5,3)	

Continued on next page

Country		Schools with 26–50% Economically Disadvantaged Students							Schools with More than 50% Economically Disadvantaged Students						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Algeria		24	(3,6)	363	(8,3)	◊	◊		58	(4,5)	342	(10,3)	◊	◊	
Armenia	r	25	(4,0)	496	(12,3)	–3	(5,7)		25	(3,6)	479	(12,6)	–22	(5,8)	▼
Australia		22	(4,4)	521	(7,5)	1	(5,7)		14	(3,1)	486	(10,5)	–2	(5,1)	
Austria		11	(2,4)	514	(8,9)	◊	◊		6	(1,8)	470	(15,4)	◊	◊	
Chinese Taipei		7	(2,3)	546	(8,1)	4	(2,7)		3	(1,7)	535	(10,6)	2	(1,9)	
Colombia		8	(2,3)	439	(20,0)	◊	◊		82	(3,2)	389	(6,2)	◊	◊	
Czech Republic		27	(3,6)	499	(5,8)	◊	◊		13	(3,2)	504	(7,6)	◊	◊	
Denmark		8	(2,8)	488	(10,1)	◊	◊		7	(2,7)	482	(15,2)	◊	◊	
El Salvador		13	(2,9)	379	(7,3)	◊	◊		70	(3,2)	384	(4,5)	◊	◊	
England	r	15	(3,3)	520	(6,6)	4	(4,5)		16	(3,0)	499	(4,1)	–9	(5,2)	
Georgia		25	(3,8)	410	(10,3)	◊	◊		36	(4,4)	418	(8,0)	◊	◊	
Germany		19	(2,2)	526	(4,2)	◊	◊		14	(2,4)	463	(7,4)	◊	◊	
Hong Kong SAR		30	(4,5)	559	(6,2)	5	(6,7)		21	(3,7)	540	(6,2)	–4	(5,7)	
Hungary		28	(3,7)	544	(5,7)	–3	(5,4)		31	(3,8)	500	(5,8)	2	(5,3)	
Iran, Islamic Rep. of		18	(2,7)	424	(7,9)	–5	(5,1)		52	(3,7)	411	(6,7)	2	(6,0)	
Italy		14	(2,5)	524	(8,8)	4	(3,5)		11	(2,4)	508	(14,8)	3	(2,8)	
Japan		10	(2,4)	539	(3,7)	6	(2,8)	▲	1	(1,0)	~	~	1	(1,0)	
Kazakhstan		18	(4,4)	542	(12,8)	◊	◊		3	(1,3)	571	(12,4)	◊	◊	
Kuwait		16	(3,2)	347	(15,9)	◊	◊		4	(1,8)	330	(34,9)	◊	◊	
Latvia		16	(3,1)	543	(5,9)	–4	(5,7)		9	(2,0)	521	(8,4)	–7	(4,7)	
Lithuania		22	(3,0)	502	(5,1)	–9	(4,8)		5	(1,5)	491	(11,5)	–6	(3,3)	
Morocco	r	13	(2,8)	290	(16,4)	–5	(4,5)		76	(3,6)	274	(7,0)	1	(5,3)	
Netherlands	r	15	(3,8)	504	(5,8)	7	(4,5)		7	(2,1)	468	(11,3)	–3	(2,9)	
New Zealand		13	(1,6)	487	(8,3)	1	(2,8)		23	(1,7)	444	(5,7)	2	(3,0)	
Norway		–	–	–	–	–	–		–	–	–	–	–	–	
Qatar		13	(0,1)	287	(5,3)	◊	◊		18	(0,1)	289	(4,0)	◊	◊	
Russian Federation		20	(2,6)	535	(9,6)	–6	(4,0)		19	(2,3)	530	(11,4)	–4	(4,3)	
Scotland	r	16	(3,8)	484	(4,7)	–2	(5,7)		14	(2,7)	456	(7,7)	–1	(4,4)	
Singapore		9	(0,0)	546	(12,7)	3	(1,7)		1	(0,0)	~	~	–3	(1,6)	▼
Slovak Republic		13	(2,7)	493	(20,8)	◊	◊		12	(2,1)	480	(17,8)	◊	◊	
Slovenia		25	(3,7)	513	(3,5)	2	(5,5)		10	(2,7)	504	(5,3)	–1	(3,8)	
Sweden		15	(4,0)	504	(7,9)	◊	◊		6	(2,4)	467	(10,5)	◊	◊	
Tunisia		23	(3,9)	333	(10,5)	7	(4,9)		43	(3,9)	284	(8,8)	–5	(5,3)	
Ukraine		6	(2,1)	454	(14,5)	◊	◊		4	(1,8)	470	(14,7)	◊	◊	
United States		18	(2,9)	545	(4,6)	–2	(4,1)		42	(2,8)	504	(4,0)	5	(3,8)	
Yemen		22	(3,7)	199	(16,7)	◊	◊		63	(4,3)	190	(8,9)	◊	◊	
International Avg.		17	(0,5)	468	(1,7)				23	(0,5)	445	(2,0)			
Benchmarking Participants															
Alberta, Canada		13	(3,2)	534	(6,3)	◊	◊		10	(2,7)	486	(11,7)	◊	◊	
British Columbia, Canada		15	(3,2)	522	(5,8)	◊	◊		6	(2,0)	504	(9,9)	◊	◊	
Dubai, UAE		16	(0,2)	415	(5,3)	◊	◊		19	(0,4)	434	(15,6)	◊	◊	
Massachusetts, US		14	(5,0)	564	(7,1)	◊	◊		17	(4,4)	519	(7,8)	◊	◊	
Minnesota, US		29	(8,5)	548	(6,9)	◊	◊		21	(7,0)	505	(15,1)	◊	◊	
Ontario, Canada		10	(2,9)	516	(12,3)	–5	(4,8)		19	(4,1)	505	(13,9)	2	(5,8)	
Quebec, Canada		14	(2,9)	513	(8,4)	1	(4,3)		12	(3,1)	484	(3,8)	–4	(4,5)	

Background data provided by schools.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 percent significantly higher.
▼ 2007 percent significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 17 Principals' Reports on the Percentages of Students in Their Schools Coming from Economically Disadvantaged Homes with Trends

TIMSS 2007 Science 8

Country		Schools with Few (0–10%) Economically Disadvantaged Students							Schools with 11–25% Economically Disadvantaged Students						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Algeria		6	(1,9)	405	(5,9)	◊	◊		22	(3,4)	407	(4,5)	◊	◊	
Armenia	r	17	(3,3)	488	(11,3)	14	(3,6)	▲	31	(4,3)	480	(8,8)	10	(5,6)	
Australia		31	(3,3)	549	(8,4)	–1	(5,6)		33	(4,0)	509	(5,1)	–2	(5,8)	
Bahrain		11	(0,2)	499	(5,9)	–5	(0,2)	▼	33	(0,3)	480	(2,8)	13	(0,3)	▲
Bosnia and Herzegovina		8	(2,2)	468	(11,6)	◊	◊		18	(3,4)	465	(6,7)	◊	◊	
Botswana		9	(2,2)	404	(15,2)	–7	(4,2)		22	(3,9)	380	(7,3)	1	(5,3)	
Bulgaria		19	(3,3)	502	(11,9)	–	–		27	(3,9)	477	(7,9)	–	–	
Chinese Taipei		59	(4,1)	571	(3,9)	–8	(5,4)		29	(3,8)	549	(6,3)	4	(5,2)	
Colombia		6	(1,8)	419	(26,5)	◊	◊		7	(3,0)	444	(10,2)	◊	◊	
Cyprus		37	(0,2)	450	(2,8)	–1	(0,3)		32	(0,2)	454	(3,4)	–3	(0,4)	▼
Czech Republic		24	(4,2)	552	(7,3)	◊	◊		39	(4,7)	544	(4,9)	◊	◊	
Egypt		10	(2,0)	430	(15,9)	–1	(3,2)		11	(2,7)	419	(11,6)	–13	(4,6)	▼
El Salvador		6	(1,5)	432	(10,0)	◊	◊		8	(2,5)	387	(18,5)	◊	◊	
England	s	38	(3,5)	570	(8,0)	5	(6,3)		27	(4,0)	522	(7,7)	–6	(7,2)	
Georgia		11	(2,9)	431	(7,5)	◊	◊		22	(4,3)	438	(10,3)	◊	◊	
Ghana		8	(2,4)	336	(22,2)	4	(2,8)		7	(2,1)	304	(21,3)	–1	(3,3)	
Hong Kong SAR		12	(2,6)	566	(9,3)	–2	(4,3)		24	(3,6)	554	(8,6)	–3	(5,4)	
Hungary		13	(2,9)	570	(8,9)	–2	(4,2)		26	(4,1)	548	(6,1)	3	(5,3)	
Indonesia		6	(1,9)	455	(24,6)	2	(2,7)		16	(2,8)	463	(11,9)	–1	(4,4)	
Iran, Islamic Rep. of		11	(2,4)	511	(9,5)	–4	(3,5)		16	(3,3)	460	(9,6)	4	(4,0)	
Israel		14	(2,8)	509	(10,1)	–1	(4,2)		25	(3,4)	493	(9,1)	–10	(5,1)	▼
Italy		40	(4,2)	510	(4,7)	–5	(5,4)		32	(4,0)	501	(4,7)	–1	(5,5)	
Japan		57	(4,0)	562	(2,2)	–15	(5,4)	▼	33	(3,9)	550	(4,0)	10	(5,1)	▲
Jordan		11	(2,5)	504	(13,0)	–3	(4,0)		19	(3,5)	502	(8,8)	–3	(5,5)	
Korea, Rep. of		24	(3,3)	569	(3,4)	–10	(4,9)	▼	34	(3,7)	553	(3,3)	–6	(5,5)	
Kuwait		52	(4,7)	423	(5,5)	◊	◊		21	(3,6)	414	(8,1)	◊	◊	
Lebanon		14	(3,0)	455	(15,5)	6	(4,0)		16	(3,2)	441	(12,9)	–1	(4,5)	
Lithuania	r	33	(3,6)	540	(4,7)	13	(5,4)	▲	40	(3,6)	511	(3,5)	–1	(6,1)	
Malaysia		17	(3,5)	488	(11,7)	10	(4,2)	▲	25	(3,6)	482	(11,1)	13	(4,5)	▲
Malta		56	(0,2)	497	(1,6)	◊	◊		20	(0,2)	434	(3,3)	◊	◊	
Norway		–	–	–	–	–	–		–	–	–	–	–	–	
Oman		12	(2,7)	426	(14,6)	◊	◊		30	(3,8)	412	(7,8)	◊	◊	
Palestinian Nat'l Auth.		6	(1,9)	429	(25,5)	–1	(2,8)		20	(3,4)	426	(8,7)	9	(4,3)	▲
Qatar		31	(0,2)	349	(2,7)	◊	◊		41	(0,2)	281	(2,6)	◊	◊	
Romania		14	(3,0)	492	(8,6)	2	(4,2)		16	(3,1)	484	(9,8)	–2	(4,5)	
Russian Federation		30	(3,4)	544	(5,0)	11	(4,5)	▲	36	(3,5)	533	(5,6)	–1	(4,7)	
Saudi Arabia		27	(3,9)	416	(4,8)	–	–		31	(4,2)	402	(5,6)	–	–	
Scotland	s	36	(3,7)	520	(6,6)	8	(6,0)		38	(4,1)	487	(6,3)	–5	(7,0)	
Serbia		5	(1,9)	514	(8,2)	–5	(2,9)		22	(3,2)	481	(7,9)	–6	(5,1)	
Singapore		52	(0,0)	593	(6,2)	–5	(0,0)	▼	30	(0,0)	544	(8,4)	3	(0,0)	▲
Slovenia		22	(3,4)	546	(6,0)	–1	(5,2)		41	(4,5)	537	(3,5)	–1	(6,4)	
Sweden	r	43	(4,7)	516	(4,5)	–3	(6,2)		41	(4,6)	504	(3,9)	9	(6,1)	
Syrian Arab Republic		12	(2,9)	451	(8,0)	◊	◊		15	(2,7)	465	(8,9)	◊	◊	
Thailand		5	(1,9)	507	(18,2)	◊	◊		15	(2,8)	527	(14,7)	◊	◊	
Tunisia		9	(2,6)	459	(6,8)	0	(3,7)		18	(3,1)	450	(5,0)	3	(4,1)	
Turkey		6	(1,9)	520	(22,0)	◊	◊		10	(2,5)	511	(10,9)	◊	◊	
Ukraine		60	(4,1)	491	(4,2)	◊	◊		28	(3,5)	479	(7,9)	◊	◊	
United States	r	16	(2,5)	566	(3,6)	–11	(3,8)	▼	23	(2,8)	549	(4,8)	–1	(4,1)	
¶ Morocco		0	(0,0)	~	~	–	–		6	(1,4)	437	(17,0)	–	–	
International Avg.		22	(0,4)	489	(1,7)				24	(0,5)	472	(1,3)			
Benchmarking Participants															
Basque Country, Spain		63	(5,3)	506	(3,6)	–1	(7,2)		15	(4,0)	494	(6,3)	–5	(5,5)	
British Columbia, Canada		40	(4,4)	538	(5,1)	◊	◊		33	(4,5)	521	(3,9)	◊	◊	
Dubai, UAE		43	(0,9)	506	(5,8)	◊	◊		19	(0,5)	478	(6,1)	◊	◊	
Massachusetts, US		32	(3,5)	588	(6,8)	◊	◊		37	(5,0)	564	(4,9)	◊	◊	
Minnesota, US		15	(5,9)	566	(13,1)	◊	◊		38	(7,9)	542	(7,3)	◊	◊	
Ontario, Canada		42	(4,2)	537	(5,3)	1	(6,3)		36	(4,6)	520	(4,8)	7	(6,4)	
Quebec, Canada		28	(3,7)	536	(5,7)	–15	(6,0)	▼	33	(3,8)	500	(6,2)	2	(6,2)	

Continued on next page

Country		Schools with 26–50% Economically Disadvantaged Students							Schools with More than 50% Economically Disadvantaged Students						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Algeria		20	(3,2)	409	(5,1)	◊	◊		52	(4,2)	409	(2,2)	◊	◊	
Armenia	r	26	(4,2)	497	(10,6)	–3	(6,0)		27	(3,9)	488	(9,4)	–20	(6,2)	▼
Australia		23	(4,3)	504	(6,7)	0	(5,4)		13	(2,6)	465	(12,0)	3	(3,5)	
Bahrain		31	(0,2)	460	(2,9)	–2	(0,3)	▼	24	(0,2)	445	(2,3)	–7	(0,3)	▼
Bosnia and Herzegovina		28	(4,1)	468	(6,3)	◊	◊		46	(4,6)	462	(4,1)	◊	◊	
Botswana		21	(4,2)	342	(7,3)	–4	(5,7)		47	(4,6)	331	(3,7)	10	(6,5)	
Bulgaria		20	(4,0)	460	(13,0)	–	–		34	(3,9)	449	(12,0)	–	–	
Chinese Taipei		5	(1,9)	555	(9,6)	0	(2,6)		7	(2,8)	535	(20,5)	4	(3,2)	
Colombia		14	(3,4)	428	(7,6)	◊	◊		73	(3,8)	406	(4,7)	◊	◊	
Cyprus		22	(0,2)	446	(4,6)	7	(0,3)	▲	9	(0,2)	460	(8,7)	–3	(0,3)	▼
Czech Republic		27	(4,3)	530	(5,6)	◊	◊		11	(2,6)	512	(5,2)	◊	◊	
Egypt		24	(3,4)	411	(6,2)	1	(4,9)		55	(4,0)	398	(4,8)	13	(5,6)	▲
El Salvador		16	(3,2)	380	(7,3)	◊	◊		70	(3,7)	385	(3,7)	◊	◊	
England	s	23	(3,8)	526	(10,9)	1	(7,3)		12	(2,6)	512	(14,0)	–1	(5,0)	
Georgia		30	(5,0)	409	(9,2)	◊	◊		37	(5,3)	419	(6,7)	◊	◊	
Ghana		15	(2,9)	315	(18,3)	–3	(4,5)		71	(3,8)	296	(7,1)	0	(5,7)	
Hong Kong SAR		24	(3,8)	516	(10,1)	0	(5,5)		40	(4,2)	507	(8,4)	5	(6,2)	
Hungary		31	(4,3)	534	(5,5)	–4	(6,1)		30	(3,8)	518	(6,2)	3	(5,4)	
Indonesia		22	(4,2)	450	(10,3)	–3	(5,4)		56	(3,9)	416	(5,2)	2	(5,7)	
Iran, Islamic Rep. of		23	(3,5)	468	(7,8)	–2	(4,9)		50	(3,8)	439	(4,1)	2	(5,6)	
Israel		32	(4,0)	461	(8,5)	6	(5,8)		30	(3,8)	437	(10,1)	5	(5,0)	
Italy		19	(3,4)	481	(5,6)	7	(4,2)		9	(2,2)	429	(10,9)	–1	(3,1)	
Japan		7	(2,4)	520	(11,1)	3	(2,9)		2	(1,0)	~	~	2	(1,0)	
Jordan		28	(3,6)	477	(8,7)	4	(5,0)		42	(4,2)	470	(7,1)	2	(6,2)	
Korea, Rep. of		26	(3,5)	543	(3,6)	10	(4,6)	▲	16	(2,7)	545	(4,9)	6	(3,7)	
Kuwait		17	(3,7)	417	(7,9)	◊	◊		11	(2,8)	399	(17,3)	◊	◊	
Lebanon		15	(3,4)	413	(12,0)	0	(4,3)		56	(4,6)	385	(9,5)	–5	(6,1)	
Lithuania	r	22	(3,5)	503	(6,3)	–8	(5,6)		5	(1,9)	498	(13,7)	–3	(3,1)	
Malaysia		20	(3,1)	479	(14,6)	3	(4,6)		38	(3,9)	451	(8,8)	–26	(5,6)	▼
Malta		19	(0,2)	421	(3,0)	◊	◊		6	(0,1)	307	(5,7)	◊	◊	
Norway		–	–	–	–	–	–		–	–	–	–	–	–	
Oman		28	(3,7)	431	(7,4)	◊	◊		30	(3,7)	422	(5,3)	◊	◊	
Palestinian Nat'l Auth.		20	(3,2)	409	(9,4)	–9	(4,9)		55	(4,0)	392	(4,8)	0	(5,5)	
Qatar		24	(0,1)	340	(2,8)	◊	◊		4	(0,1)	345	(6,3)	◊	◊	
Romania		22	(3,9)	464	(8,0)	1	(4,9)		49	(4,2)	444	(6,0)	–2	(6,0)	
Russian Federation		22	(3,2)	518	(8,0)	–2	(4,2)		12	(3,2)	505	(10,7)	–8	(4,3)	
Saudi Arabia		25	(4,1)	394	(8,7)	–	–		18	(3,4)	391	(7,8)	–	–	
Scotland	s	17	(3,6)	478	(10,3)	–6	(5,9)		9	(2,2)	461	(10,0)	3	(3,5)	
Serbia		28	(4,2)	464	(6,9)	5	(5,8)		45	(4,7)	462	(5,1)	6	(6,4)	
Singapore		9	(0,0)	519	(17,4)	–1	(0,0)		9	(0,0)	534	(14,7)	4	(0,0)	▲
Slovenia		25	(3,8)	537	(5,2)	2	(5,6)		11	(3,1)	528	(6,7)	0	(4,1)	
Sweden	r	11	(3,0)	507	(9,3)	–8	(4,8)		5	(1,8)	481	(10,9)	2	(2,1)	
Syrian Arab Republic		25	(3,8)	465	(5,0)	◊	◊		48	(4,5)	440	(4,8)	◊	◊	
Thailand		20	(3,1)	481	(9,6)	◊	◊		59	(3,6)	448	(5,6)	◊	◊	
Tunisia		21	(3,5)	454	(4,6)	5	(4,6)		52	(4,0)	436	(2,8)	–7	(5,8)	
Turkey		18	(3,4)	470	(10,4)	◊	◊		66	(3,9)	434	(4,1)	◊	◊	
Ukraine		7	(2,1)	462	(7,9)	◊	◊		6	(1,8)	477	(21,7)	◊	◊	
United States	r	26	(3,4)	521	(4,9)	1	(4,6)		35	(2,8)	480	(5,0)	11	(4,0)	▲
¶ Morocco		15	(4,6)	403	(9,7)	–	–		78	(4,8)	392	(3,6)	–	–	
International Avg.		21	(0,5)	461	(1,3)				33	(0,5)	444	(1,3)			
Benchmarking Participants															
Basque Country, Spain		15	(3,9)	489	(6,9)	6	(5,0)		7	(2,1)	458	(15,7)	0	(3,2)	
British Columbia, Canada		23	(4,0)	513	(7,3)	◊	◊		4	(1,9)	544	(30,7)	◊	◊	
Dubai, UAE		13	(0,4)	464	(10,6)	◊	◊		24	(0,6)	465	(6,4)	◊	◊	
Massachusetts, US		12	(5,1)	526	(22,4)	◊	◊		19	(3,3)	495	(17,2)	◊	◊	
Minnesota, US		29	(8,0)	531	(6,4)	◊	◊		18	(5,6)	501	(15,5)	◊	◊	
Ontario, Canada		17	(3,4)	529	(8,1)	4	(4,9)		5	(2,2)	497	(12,1)	–11	(4,0)	▼
Quebec, Canada		24	(3,9)	497	(6,0)	9	(4,9)		15	(3,2)	475	(9,7)	4	(4,1)	

Background data provided by schools.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 percent significantly higher.
▼ 2007 percent significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 18 Index of Principals' Perception of School Climate (PPSC) with Trends

TIMSS 2007 Mathematics 4

Country		High PPSC							Medium PPSC							Low PPSC						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Chinese Taipei		64	(3,7)	577	(2,4)	7	(5,3)		35	(3,6)	576	(3,2)	–6	(5,3)		1	(0,7)	~	~	–1	(1,1)	
Australia		50	(4,2)	536	(4,6)	12	(6,2)	▲	47	(3,8)	499	(4,8)	–7	(6,4)		2	(1,2)	~	~	–5	(3,8)	
New Zealand		49	(3,2)	513	(3,5)	0	(4,6)		47	(3,0)	477	(4,0)	0	(4,4)		4	(1,2)	463	(10,6)	0	(1,9)	
Scotland		48	(4,8)	500	(4,0)	–2	(6,9)		51	(4,8)	490	(4,7)	6	(6,8)		0	(0,5)	~	~	–3	(1,8)	
United States		48	(3,0)	547	(3,8)	0	(4,6)		46	(3,1)	517	(2,8)	1	(4,6)		6	(1,5)	474	(7,4)	–1	(2,2)	
England	r	45	(4,5)	550	(4,5)	11	(6,5)		47	(4,6)	538	(4,0)	–17	(6,8)	▼	8	(2,3)	513	(8,8)	6	(2,7)	▲
Austria		36	(3,1)	509	(3,7)	◊	◊		62	(3,1)	503	(2,2)	◊	◊		1	(0,6)	~	~	◊	◊	
Singapore		36	(0,0)	616	(6,1)	4	(4,1)		62	(0,0)	592	(4,5)	–1	(4,1)		2	(0,0)	~	~	–3	(1,6)	
Iran, Islamic Rep. of		31	(3,8)	416	(8,1)	7	(5,5)		64	(3,8)	396	(5,6)	–3	(5,7)		5	(1,7)	396	(11,3)	–3	(3,1)	
Kazakhstan		29	(5,4)	556	(14,6)	◊	◊		65	(5,7)	547	(7,2)	◊	◊		5	(2,3)	538	(33,4)	◊	◊	
Sweden		27	(3,6)	510	(4,6)	◊	◊		66	(4,0)	503	(2,9)	◊	◊		6	(2,6)	461	(10,7)	◊	◊	
Hong Kong SAR		27	(3,9)	608	(6,1)	–3	(6,0)		69	(4,2)	607	(4,3)	4	(6,4)		5	(2,0)	583	(15,4)	–1	(2,9)	
El Salvador		26	(4,1)	356	(11,4)	◊	◊		60	(4,4)	318	(5,0)	◊	◊		14	(3,1)	328	(10,8)	◊	◊	
Denmark		26	(3,9)	538	(4,3)	◊	◊		69	(4,1)	519	(3,2)	◊	◊		5	(2,1)	509	(15,5)	◊	◊	
Qatar		24	(0,2)	323	(2,3)	◊	◊		69	(0,2)	287	(1,5)	◊	◊		7	(0,1)	304	(3,6)	◊	◊	
Norway		21	(3,8)	481	(5,1)	–5	(5,5)		78	(3,9)	470	(3,2)	6	(5,6)		1	(1,0)	~	~	–1	(1,4)	
Kuwait		18	(2,9)	322	(10,1)	◊	◊		73	(3,5)	320	(4,6)	◊	◊		9	(2,3)	273	(10,1)	◊	◊	
Slovenia		18	(3,7)	500	(5,5)	10	(4,2)	▲	78	(3,8)	502	(2,1)	–7	(4,7)		4	(1,7)	500	(6,0)	–3	(2,7)	
Lithuania		15	(3,0)	542	(4,7)	–10	(4,6)	▼	81	(3,3)	529	(2,7)	9	(5,0)		4	(1,4)	504	(9,4)	1	(2,0)	
Morocco	r	13	(3,8)	370	(24,6)	10	(4,0)	▲	56	(5,0)	342	(6,8)	16	(6,9)	▲	31	(3,9)	323	(9,7)	–25	(6,1)	▼
Germany		13	(2,6)	536	(3,9)	◊	◊		78	(3,0)	528	(2,3)	◊	◊		9	(2,0)	491	(10,6)	◊	◊	
Hungary		12	(3,0)	553	(9,8)	4	(3,7)		78	(4,0)	511	(3,9)	–7	(5,0)		10	(3,1)	456	(13,2)	3	(3,9)	
Colombia		12	(2,6)	409	(11,2)	◊	◊		63	(5,0)	352	(6,4)	◊	◊		25	(4,8)	342	(10,8)	◊	◊	
Italy		12	(2,7)	505	(7,5)	–3	(3,9)		81	(2,9)	507	(3,4)	5	(4,4)		8	(1,8)	505	(17,7)	–2	(3,0)	
Netherlands	r	11	(2,6)	546	(11,1)	–8	(4,6)		84	(3,1)	534	(2,7)	5	(5,0)		5	(2,1)	496	(10,4)	3	(2,4)	
Yemen		11	(2,7)	249	(15,1)	◊	◊		71	(3,8)	225	(7,2)	◊	◊		18	(3,6)	204	(14,2)	◊	◊	
Japan		10	(2,6)	578	(6,2)	–8	(4,0)	▼	84	(3,0)	568	(2,3)	6	(4,5)		7	(1,9)	553	(5,3)	2	(2,6)	
Russian Federation		9	(2,0)	569	(10,6)	5	(2,3)	▲	83	(3,1)	543	(5,2)	–1	(4,1)		8	(2,5)	522	(20,3)	–4	(3,5)	
Tunisia		9	(2,5)	371	(15,8)	0	(3,5)		66	(3,9)	334	(4,7)	17	(5,5)	▲	25	(3,6)	290	(10,4)	–17	(5,3)	▼
Algeria		7	(2,1)	374	(10,7)	◊	◊		65	(4,4)	378	(7,2)	◊	◊		28	(4,1)	373	(9,8)	◊	◊	
Armenia	r	5	(1,8)	513	(23,6)	3	(2,2)		72	(3,7)	499	(5,4)	–8	(5,2)		23	(3,5)	498	(9,3)	5	(4,9)	
Slovak Republic		4	(1,5)	547	(13,0)	◊	◊		69	(3,4)	501	(3,6)	◊	◊		27	(3,4)	473	(10,7)	◊	◊	
Ukraine		3	(1,3)	469	(15,9)	◊	◊		93	(2,3)	471	(3,0)	◊	◊		5	(1,9)	437	(26,4)	◊	◊	
Latvia		2	(1,4)	~	~	–4	(3,1)		84	(3,2)	539	(2,4)	–1	(5,3)		14	(3,2)	530	(6,5)	5	(4,4)	
Georgia		2	(1,1)	~	~	◊	◊		73	(4,0)	445	(5,2)	◊	◊		26	(4,1)	421	(9,1)	◊	◊	
Czech Republic		1	(0,0)	~	~	◊	◊		79	(3,8)	489	(3,0)	◊	◊		21	(3,9)	479	(6,0)	◊	◊	
International Avg.		22	(0,5)	487	(1,8)				68	(0,6)	471	(0,7)				10	(0,4)	441	(2,4)			
Benchmarking Participants																						
Massachusetts, US		70	(7,8)	579	(4,9)	◊	◊		30	(7,9)	557	(7,4)	◊	◊		1	(0,9)	~	~	◊	◊	
Dubai, UAE	r	60	(0,4)	444	(2,4)	◊	◊		37	(0,4)	445	(5,0)	◊	◊		4	(0,3)	426	(5,6)	◊	◊	
Alberta, Canada		58	(4,4)	512	(3,5)	◊	◊		39	(4,3)	499	(3,5)	◊	◊		3	(1,6)	455	(18,0)	◊	◊	
Minnesota, US		54	(9,4)	565	(10,7)	◊	◊		46	(9,4)	549	(9,2)	◊	◊		0	(0,0)	~	~	◊	◊	
British Columbia, Canada		45	(4,6)	517	(4,4)	◊	◊		49	(4,3)	498	(3,6)	◊	◊		6	(1,8)	469	(11,6)	◊	◊	
Ontario, Canada		41	(5,0)	522	(4,3)	–2	(6,7)		50	(5,1)	510	(3,9)	–2	(6,9)		9	(2,3)	471	(10,9)	4	(3,3)	
Quebec, Canada		17	(3,1)	529	(6,9)	–8	(4,7)		82	(3,3)	517	(3,6)	12	(5,1)	▲	2	(1,0)	~	~	–4	(2,3)	

Index based on principals' responses to eight questions about their schools: teachers' job satisfaction; teachers' understanding of the school's curricular goals; teachers' degree of success in implementing the school's curriculum; teachers' expectations for student achievement; parental support for student achievement; parental involvement in school activities; students' regard for school property; and students' desire to do well in school. Average is computed based on a 5-point scale: 1 = very high; 2 = high; 3 = medium; 4 = low; and 5 = very low. High level indicates average is less than or equal to 2. Medium level indicates that average is greater than 2 and less or equal to 3. Low level indicates average is greater than 3.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 percent significantly higher.

▼ 2007 percent significantly lower.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 19 Index of Principals' Perception of School Climate (PPSC) with Trends

Country		High PPSC							Medium PPSC							Low PPSC						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Chinese Taipei		54	(4,2)	611	(5,9)	17	(5,7)	▲	42	(4,2)	587	(6,9)	–18	(5,7)	▼	4	(1,6)	548	(15,7)	1	(1,9)	
Scotland	s	35	(4,1)	503	(7,4)	–7	(5,9)		59	(4,6)	476	(5,5)	7	(6,6)		6	(2,4)	495	(31,6)	0	(3,5)	
Australia		33	(3,5)	541	(8,5)	2	(5,6)		58	(4,5)	481	(4,1)	–3	(6,5)		9	(2,4)	447	(9,4)	2	(3,6)	
Indonesia		32	(4,0)	421	(10,2)	13	(5,1)	▲	58	(4,4)	399	(6,6)	–13	(5,8)	▼	11	(3,1)	391	(12,0)	0	(4,2)	
United States		32	(3,2)	533	(4,6)	–11	(4,6)	▼	57	(3,7)	501	(3,6)	8	(4,9)		12	(2,2)	475	(9,9)	4	(2,9)	
England	s	31	(3,9)	535	(8,8)	–1	(7,0)		65	(3,9)	508	(6,3)	2	(7,3)		4	(1,7)	445	(21,1)	–1	(3,6)	
Israel		26	(3,4)	488	(9,9)	–2	(5,3)		66	(4,1)	462	(5,5)	–3	(5,8)		7	(2,3)	427	(16,7)	5	(2,6)	▲
Egypt		25	(3,4)	411	(7,3)	–1	(4,8)		65	(3,8)	385	(4,9)	3	(5,7)		10	(2,9)	369	(12,5)	–2	(4,2)	
Korea, Rep. of		25	(3,6)	601	(4,9)	9	(4,9)		66	(3,6)	597	(3,5)	–2	(5,3)		9	(2,2)	590	(9,4)	–7	(3,7)	
Jordan		25	(3,4)	456	(7,6)	7	(4,7)		67	(4,1)	423	(4,9)	–5	(5,9)		8	(2,3)	373	(12,7)	–3	(3,5)	
Singapore		24	(0,0)	644	(6,5)	–6	(0,0)	▼	70	(0,0)	579	(4,9)	4	(0,0)	▲	6	(0,0)	538	(14,4)	2	(0,0)	▲
Malaysia		23	(3,8)	504	(11,3)	7	(5,0)		70	(3,7)	463	(5,2)	0	(5,6)		6	(1,8)	477	(14,7)	–7	(3,6)	
Qatar		23	(0,1)	302	(2,7)	◊	◊		70	(0,1)	310	(1,3)	◊	◊		7	(0,1)	286	(3,7)	◊	◊	
El Salvador		23	(3,4)	359	(6,7)	◊	◊		62	(4,3)	340	(4,1)	◊	◊		15	(3,3)	317	(6,6)	◊	◊	
Thailand		22	(3,6)	462	(13,5)	◊	◊		73	(4,0)	438	(5,8)	◊	◊		5	(1,9)	406	(22,9)	◊	◊	
Malta		21	(0,2)	527	(1,6)	◊	◊		61	(0,2)	503	(1,4)	◊	◊		18	(0,2)	389	(2,7)	◊	◊	
Hong Kong SAR		21	(3,6)	621	(9,8)	9	(4,5)	▲	67	(4,4)	563	(7,4)	–3	(6,0)		12	(3,2)	528	(20,0)	–6	(4,7)	
Oman		20	(3,6)	385	(7,9)	◊	◊		69	(4,0)	372	(4,5)	◊	◊		11	(2,6)	353	(12,4)	◊	◊	
Ghana		20	(3,2)	352	(8,7)	7	(4,7)		59	(4,2)	302	(6,6)	–9	(6,1)		21	(3,9)	290	(7,7)	3	(5,1)	
Bahrain		18	(0,2)	423	(4,9)	7	(0,2)	▲	76	(0,2)	395	(1,5)	3	(0,3)	▲	6	(0,1)	366	(8,2)	–9	(0,2)	▼
Syrian Arab Republic		17	(3,1)	391	(10,2)	◊	◊		69	(3,3)	395	(4,6)	◊	◊		14	(2,8)	402	(10,7)	◊	◊	
Lebanon		17	(3,3)	478	(6,7)	–1	(4,8)		66	(4,3)	452	(4,9)	2	(6,3)		18	(3,2)	408	(10,6)	–1	(4,3)	
Iran, Islamic Rep. of		16	(2,6)	458	(11,3)	6	(3,4)		64	(3,8)	400	(4,2)	–4	(5,3)		20	(3,1)	369	(7,2)	–2	(4,3)	
Saudi Arabia		16	(3,3)	335	(6,2)	–	–		63	(4,6)	330	(3,8)	–	–		21	(3,9)	320	(7,2)	–	–	
Kuwait		15	(2,7)	366	(7,4)	◊	◊		70	(3,8)	354	(2,8)	◊	◊		15	(3,1)	340	(8,2)	◊	◊	
Colombia		14	(2,6)	408	(9,7)	◊	◊		52	(4,5)	383	(5,1)	◊	◊		34	(4,8)	364	(9,1)	◊	◊	
Sweden		13	(2,5)	510	(5,8)	–8	(4,0)		78	(3,6)	488	(2,5)	6	(5,2)		8	(2,6)	492	(9,6)	2	(3,4)	
Palestinian Nat'l Auth.		11	(2,6)	390	(7,5)	–3	(4,0)		78	(3,3)	366	(3,8)	1	(4,8)		11	(2,4)	354	(16,3)	2	(3,5)	
Cyprus		11	(0,1)	460	(4,9)	–10	(0,2)	▼	74	(0,2)	467	(2,0)	–2	(0,3)	▼	16	(0,2)	458	(3,6)	12	(0,2)	▲
Japan		10	(2,3)	623	(12,7)	–18	(4,2)	▼	77	(3,2)	568	(3,0)	8	(4,7)		13	(2,7)	543	(7,6)	10	(3,0)	▲
Hungary		9	(2,8)	571	(13,2)	3	(3,5)		79	(4,0)	514	(4,3)	–4	(5,2)		11	(3,1)	496	(7,8)	1	(4,0)	
Bulgaria		9	(2,3)	525	(19,8)	5	(2,7)		63	(4,0)	467	(6,7)	–9	(5,3)		27	(3,7)	435	(10,5)	4	(4,8)	
Turkey		8	(2,2)	498	(23,8)	◊	◊		55	(4,4)	444	(6,6)	◊	◊		36	(4,3)	398	(7,8)	◊	◊	
Romania		8	(2,1)	503	(14,5)	1	(3,1)		61	(4,2)	467	(4,9)	–8	(5,9)		31	(4,1)	442	(9,3)	8	(5,5)	
Bosnia and Herzegovina		7	(2,0)	458	(6,9)	◊	◊		80	(3,0)	456	(3,3)	◊	◊		13	(2,5)	453	(5,4)	◊	◊	
Algeria		7	(2,2)	392	(7,3)	◊	◊		60	(4,0)	387	(2,6)	◊	◊		33	(3,9)	385	(2,9)	◊	◊	
Italy		7	(2,2)	484	(9,1)	–5	(3,5)		77	(3,7)	481	(3,6)	1	(5,1)		16	(3,1)	468	(6,8)	4	(3,9)	
Slovenia		7	(2,0)	521	(8,6)	–2	(3,0)		85	(3,0)	501	(2,2)	2	(4,1)		8	(2,2)	492	(9,3)	0	(3,2)	
Serbia		7	(2,3)	476	(18,3)	4	(2,7)		81	(3,4)	489	(3,8)	9	(5,3)		13	(2,9)	473	(8,1)	–13	(4,8)	▼
Botswana		6	(2,1)	380	(14,7)	5	(2,3)	▲	58	(4,6)	366	(3,3)	27	(6,2)	▲	35	(4,8)	354	(3,7)	–32	(6,4)	▼
Norway		5	(2,0)	485	(6,6)	–8	(3,3)	▼	89	(2,9)	469	(2,3)	8	(4,5)		6	(2,2)	462	(4,6)	1	(3,1)	
Armenia	r	4	(1,7)	490	(13,7)	1	(2,2)		73	(3,8)	500	(4,5)	–6	(5,6)		23	(3,5)	497	(6,2)	5	(5,3)	
Ukraine		4	(1,6)	549	(17,1)	◊	◊		87	(2,9)	463	(3,9)	◊	◊		10	(2,4)	421	(10,0)	◊	◊	
Tunisia		3	(1,4)	468	(9,0)	1	(1,7)		44	(3,6)	428	(4,1)	14	(5,2)	▲	54	(3,5)	412	(2,9)	–15	(5,1)	▼
Czech Republic		2	(1,8)	~	~	◊	◊		58	(4,0)	515	(3,4)	◊	◊		40	(4,2)	488	(3,9)	◊	◊	
Lithuania		2	(1,4)	~	~	–6	(2,7)	▼	94	(2,1)	507	(2,5)	6	(3,7)		4	(1,6)	477	(8,2)	0	(2,5)	
Russian Federation		2	(0,9)	~	~	1	(1,1)		79	(3,0)	514	(4,4)	9	(4,2)	▲	19	(3,1)	494	(6,4)	–10	(4,2)	▼
Georgia		0	(0,0)	~	~	◊	◊		72	(4,3)	412	(7,4)	◊	◊		28	(4,3)	398	(8,8)	◊	◊	
¶ Morocco		16	(5,3)	389	(13,9)	–	–		68	(5,4)	380	(4,7)	–	–		15	(4,1)	377	(14,5)	–	–	
International Avg.		16	(0,4)	473	(1,6)				68	(0,5)	450	(0,7)				16	(0,4)	428	(1,6)			
Benchmarking Participants																						
Dubai, UAE	r	56	(0,7)	482	(4,3)	◊	◊		42	(0,7)	438	(2,7)	◊	◊		2	(0,3)	~	~	◊	◊	
Massachusetts, US		44	(7,4)	564	(5,7)	◊	◊		45	(8,1)	550	(9,1)	◊	◊		10	(3,0)	481	(14,0)	◊	◊	
Minnesota, US		44	(7,2)	529	(7,5)	◊	◊		53	(6,9)	540	(5,2)	◊	◊		3	(2,7)	442	(6,6)	◊	◊	
British Columbia, Canada		35	(4,9)	525	(5,5)	◊	◊		62	(5,0)	503	(4,7)	◊	◊		3	(1,5)	512	(51,5)	◊	◊	
Ontario, Canada		34	(4,7)	539	(5,3)	–8	(6,4)		57	(5,1)	511	(3,9)	5	(6,9)		9	(2,5)	499	(10,0)	4	(3,3)	
Basque Country, Spain		23	(4,8)	524	(5,6)	11	(5,9)		65	(4,9)	496	(3,3)	–13	(6,2)	▼	12	(2,1)	465	(7,8)	3	(3,3)	
Quebec, Canada		18	(3,5)	570	(9,7)	4	(4,1)		71	(4,3)	523	(4,5)	–7	(5,3)		12	(3,1)	496	(6,1)	4	(3,8)	

Index based on principals' responses to eight questions about their schools: teachers' job satisfaction; teachers' understanding of the school's curricular goals; teachers' degree of success in implementing the school's curriculum; teachers' expectations for student achievement; parental support for student achievement; parental involvement in school activities; students' regard for school property; and students' desire to do well in school. Average is computed based on a 5-point scale: 1 = very high; 2 = high; 3 = medium; 4 = low; and 5 = very low. High level indicates average is less than or equal to 2. Medium level indicates that average is greater than 2 and less or equal to 3. Low level indicates average is greater than 3.

¶ Did not satisfy guidelines for sample participation rates (see Appendix A).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 percent significantly higher.

▼ 2007 percent significantly lower.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 20 Index of Principals' Perception of School Climate (PPSC) with Trends

TIMSS 2007 Science 4

Country		High PPSC							Medium PPSC							Low PPSC						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Chinese Taipei		64	(3,7)	558	(2,8)	7	(5,3)		35	(3,6)	557	(3,2)	–6	(5,3)		1	(0,7)	~	~	–1	(1,1)	
Australia		50	(4,2)	545	(4,6)	12	(6,2)	▲	47	(3,8)	512	(4,4)	–7	(6,4)		2	(1,2)	~	~	–5	(3,8)	
New Zealand		49	(3,2)	525	(4,0)	0	(4,6)		47	(3,0)	487	(4,5)	0	(4,4)		4	(1,2)	478	(11,6)	0	(1,9)	
Scotland		48	(4,8)	505	(3,6)	–2	(6,9)		51	(4,8)	497	(4,3)	6	(6,8)		0	(0,5)	~	~	–3	(1,8)	
United States		48	(3,0)	559	(3,9)	0	(4,6)		46	(3,1)	525	(3,5)	1	(4,6)		6	(1,5)	474	(10,9)	–1	(2,2)	
England	r	45	(4,5)	549	(4,4)	11	(6,5)		47	(4,6)	538	(4,3)	–17	(6,8)	▼	8	(2,3)	516	(7,3)	6	(2,7)	▲
Austria		36	(3,1)	532	(4,2)	◊	◊		62	(3,1)	521	(2,8)	◊	◊		1	(0,6)	~	~	◊	◊	
Singapore		36	(0,0)	605	(6,6)	4	(4,1)		62	(0,0)	578	(4,8)	–1	(4,1)		2	(0,0)	~	~	–3	(1,6)	
Iran, Islamic Rep. of		31	(3,8)	449	(9,6)	7	(5,5)		64	(3,8)	429	(6,1)	–3	(5,7)		5	(1,7)	433	(12,8)	–3	(3,1)	
Kazakhstan		29	(5,4)	532	(10,9)	◊	◊		65	(5,7)	535	(5,7)	◊	◊		5	(2,3)	513	(37,7)	◊	◊	
Sweden		27	(3,6)	532	(4,4)	◊	◊		66	(4,0)	526	(3,5)	◊	◊		6	(2,6)	480	(9,7)	◊	◊	
Hong Kong SAR		27	(3,9)	554	(6,4)	–3	(6,0)		69	(4,2)	555	(4,1)	4	(6,4)		5	(2,0)	531	(17,7)	–1	(2,9)	
El Salvador		26	(4,1)	418	(11,4)	◊	◊		60	(4,4)	377	(4,8)	◊	◊		14	(3,1)	388	(12,2)	◊	◊	
Denmark		26	(3,9)	533	(4,5)	◊	◊		69	(4,1)	514	(3,8)	◊	◊		5	(2,1)	485	(17,4)	◊	◊	
Qatar		24	(0,2)	325	(4,1)	◊	◊		69	(0,2)	279	(2,4)	◊	◊		7	(0,1)	335	(5,2)	◊	◊	
Norway		21	(3,8)	484	(5,8)	–5	(5,5)		78	(3,9)	473	(4,0)	6	(5,6)		1	(1,0)	~	~	–1	(1,4)	
Kuwait		18	(2,9)	359	(13,6)	◊	◊		73	(3,5)	352	(5,6)	◊	◊		9	(2,3)	298	(12,5)	◊	◊	
Slovenia		18	(3,7)	517	(6,8)	10	(4,2)	▲	78	(3,8)	519	(2,2)	–7	(4,7)		4	(1,7)	522	(9,4)	–3	(2,7)	
Lithuania		15	(3,0)	524	(4,4)	–10	(4,6)	▼	81	(3,3)	514	(2,8)	9	(5,0)		4	(1,4)	493	(3,9)	1	(2,0)	
Morocco	r	13	(3,8)	337	(32,4)	10	(4,0)	▲	56	(5,0)	301	(9,1)	16	(6,9)	▲	31	(3,9)	268	(12,7)	–25	(6,1)	▼
Germany		13	(2,6)	541	(4,4)	◊	◊		78	(3,0)	531	(2,6)	◊	◊		9	(2,0)	489	(10,6)	◊	◊	
Hungary		12	(3,0)	573	(8,9)	4	(3,7)		78	(4,0)	537	(3,7)	–7	(5,0)		10	(3,1)	489	(11,2)	3	(3,9)	
Colombia		12	(2,6)	452	(10,4)	◊	◊		63	(5,0)	398	(6,8)	◊	◊		25	(4,8)	386	(13,3)	◊	◊	
Italy		12	(2,7)	534	(8,2)	–3	(3,9)		81	(2,9)	536	(3,3)	5	(4,4)		8	(1,8)	531	(16,5)	–2	(3,0)	
Netherlands	r	11	(2,6)	534	(10,6)	–8	(4,6)		84	(3,1)	522	(3,3)	5	(5,0)		5	(2,1)	483	(10,6)	3	(2,4)	
Yemen		11	(2,7)	227	(14,2)	◊	◊		71	(3,8)	199	(8,3)	◊	◊		18	(3,6)	174	(16,3)	◊	◊	
Japan		10	(2,6)	551	(5,7)	–8	(4,0)	▼	84	(3,0)	548	(2,1)	6	(4,5)		7	(1,9)	540	(5,5)	2	(2,6)	
Russian Federation		9	(2,0)	568	(9,9)	5	(2,3)	▲	83	(3,1)	546	(4,9)	–1	(4,1)		8	(2,5)	524	(20,2)	–4	(3,5)	
Tunisia		9	(2,5)	371	(22,4)	0	(3,5)		66	(3,9)	327	(6,3)	17	(5,5)	▲	25	(3,6)	273	(13,5)	–17	(5,3)	▼
Algeria		7	(2,1)	353	(12,6)	◊	◊		65	(4,4)	355	(8,3)	◊	◊		28	(4,1)	346	(10,7)	◊	◊	
Armenia	r	5	(1,8)	502	(43,1)	3	(2,2)		72	(3,7)	484	(6,7)	–8	(5,2)		23	(3,5)	482	(14,9)	5	(4,9)	
Slovak Republic		4	(1,5)	574	(9,7)	◊	◊		69	(3,4)	531	(3,8)	◊	◊		27	(3,4)	501	(11,9)	◊	◊	
Ukraine		3	(1,3)	475	(19,3)	◊	◊		93	(2,3)	475	(3,0)	◊	◊		5	(1,9)	445	(25,6)	◊	◊	
Latvia		2	(1,4)	~	~	–4	(3,1)		84	(3,2)	544	(2,5)	–1	(5,3)		14	(3,2)	537	(5,6)	5	(4,4)	
Georgia		2	(1,1)	~	~	◊	◊		73	(4,0)	424	(5,5)	◊	◊		26	(4,1)	401	(8,9)	◊	◊	
Czech Republic		1	(0,0)	~	~	◊	◊		79	(3,8)	517	(3,4)	◊	◊		21	(3,9)	508	(6,6)	◊	◊	
International Avg.		22	(0,5)	491	(2,3)				68	(0,6)	474	(0,8)				10	(0,4)	444	(2,6)			
Benchmarking Participants																						
Massachusetts, US		70	(7,8)	579	(5,8)	◊	◊		30	(7,9)	554	(9,5)	◊	◊		1	(0,9)	~	~	◊	◊	
Dubai, UAE		60	(0,4)	466	(4,0)	◊	◊		37	(0,4)	456	(6,0)	◊	◊		4	(0,3)	435	(5,6)	◊	◊	
Alberta, Canada		58	(4,4)	552	(4,5)	◊	◊		39	(4,3)	533	(4,3)	◊	◊		3	(1,6)	492	(18,7)	◊	◊	
Minnesota, US		54	(9,4)	561	(10,9)	◊	◊		46	(9,4)	548	(9,5)	◊	◊		0	(0,0)	~	~	◊	◊	
British Columbia, Canada		45	(4,6)	548	(5,2)	◊	◊		49	(4,3)	530	(3,7)	◊	◊		6	(1,8)	504	(9,8)	◊	◊	
Ontario, Canada		41	(5,0)	548	(4,9)	–2	(6,7)		50	(5,1)	533	(4,9)	–2	(6,9)		9	(2,3)	496	(15,0)	4	(3,3)	
Quebec, Canada		17	(3,1)	532	(5,1)	–8	(4,7)		82	(3,3)	514	(3,3)	12	(5,1)	▲	2	(1,0)	~	~	–4	(2,3)	

Index based on principals' responses to eight questions about their schools: teachers' job satisfaction; teachers' understanding of the school's curricular goals; teachers' degree of success in implementing the school's curriculum; teachers' expectations for student achievement; parental support for student achievement; parental involvement in school activities; students' regard for school property; and students' desire to do well in school. Average is computed based on a 5-point scale: 1 = very high; 2 = high; 3 = medium; 4 = low; and 5 = very low. High level indicates average is less than or equal to 2. Medium level indicates that average is greater than 2 and less or equal to 3. Low level indicates average is greater than 3.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 percent significantly higher.

▼ 2007 percent significantly lower.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 21 Index of Principals' Perception of School Climate (PPSC) with Trends

TIMSS 2007 Science 8

Country		High PPSC							Medium PPSC							Low PPSC						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Chinese Taipei		54	(4,2)	571	(4,8)	17	(5,7)	▲	42	(4,2)	552	(5,3)	–18	(5,7)	▼	4	(1,6)	518	(11,5)	1	(1,9)	
Scotland	s	35	(4,1)	512	(6,7)	–7	(5,9)		59	(4,6)	485	(5,1)	7	(6,6)		6	(2,4)	497	(30,3)	0	(3,5)	
Australia		33	(3,5)	557	(8,1)	2	(5,6)		58	(4,5)	501	(3,8)	–3	(6,5)		9	(2,4)	465	(10,3)	2	(3,6)	
Indonesia		32	(4,0)	445	(8,6)	13	(5,1)	▲	58	(4,4)	428	(5,6)	–13	(5,8)	▼	11	(3,1)	424	(10,7)	0	(4,2)	
United States		32	(3,2)	547	(4,4)	–11	(4,6)	▼	57	(3,7)	513	(3,8)	8	(4,9)		12	(2,2)	485	(10,6)	4	(2,9)	
England	s	31	(3,9)	563	(8,3)	–1	(7,0)		65	(3,9)	536	(5,9)	2	(7,3)		4	(1,7)	474	(19,0)	–1	(3,6)	
Israel		26	(3,4)	493	(10,2)	–2	(5,3)		66	(4,1)	465	(5,7)	–3	(5,8)		7	(2,3)	441	(16,3)	5	(2,6)	▲
Egypt		25	(3,4)	427	(7,6)	–1	(4,8)		65	(3,8)	403	(4,9)	3	(5,7)		10	(2,9)	386	(12,5)	–2	(4,2)	
Korea, Rep. of		25	(3,6)	553	(3,5)	9	(4,9)		66	(3,6)	553	(2,6)	–2	(5,3)		9	(2,2)	551	(8,3)	–7	(3,7)	
Jordan		25	(3,4)	510	(6,7)	7	(4,7)		67	(4,1)	477	(4,7)	–5	(5,9)		8	(2,3)	432	(14,9)	–3	(3,5)	
Singapore		24	(0,0)	626	(7,1)	–6	(0,0)	▼	70	(0,0)	552	(5,9)	4	(0,0)	▲	6	(0,0)	502	(17,1)	2	(0,0)	▲
Malaysia		23	(3,8)	508	(12,4)	7	(5,0)		70	(3,7)	459	(6,3)	0	(5,6)		6	(1,8)	469	(16,8)	–7	(3,6)	
Qatar		23	(0,1)	298	(3,4)	◊	◊		70	(0,1)	322	(1,6)	◊	◊		7	(0,1)	341	(4,5)	◊	◊	
El Salvador		23	(3,4)	405	(6,6)	◊	◊		62	(4,3)	387	(4,3)	◊	◊		15	(3,3)	365	(7,8)	◊	◊	
Thailand		22	(3,6)	489	(11,2)	◊	◊		73	(4,0)	467	(5,1)	◊	◊		5	(1,9)	441	(19,7)	◊	◊	
Malta		21	(0,2)	499	(2,2)	◊	◊		61	(0,2)	477	(1,8)	◊	◊		18	(0,2)	338	(3,4)	◊	◊	
Hong Kong SAR		21	(3,6)	564	(7,5)	9	(4,5)	▲	67	(4,4)	523	(6,3)	–3	(6,0)		12	(3,2)	499	(16,8)	–6	(4,7)	
Oman		20	(3,6)	434	(7,6)	◊	◊		69	(4,0)	422	(4,2)	◊	◊		11	(2,6)	403	(13,0)	◊	◊	
Ghana		20	(3,2)	351	(10,4)	7	(4,7)		59	(4,2)	295	(8,3)	–9	(6,1)		21	(3,9)	281	(9,9)	3	(5,1)	
Bahrain		18	(0,2)	492	(5,0)	7	(0,2)	▲	76	(0,2)	466	(1,7)	3	(0,3)	▲	6	(0,1)	422	(4,8)	–9	(0,2)	▼
Syrian Arab Republic		17	(3,1)	450	(8,0)	◊	◊		69	(3,3)	452	(3,6)	◊	◊		14	(2,8)	453	(8,4)	◊	◊	
Lebanon		17	(3,3)	455	(10,5)	–1	(4,8)		66	(4,3)	417	(6,5)	2	(6,3)		18	(3,2)	356	(15,8)	–1	(4,3)	
Iran, Islamic Rep. of		16	(2,6)	512	(10,0)	6	(3,4)		64	(3,8)	456	(3,7)	–4	(5,3)		20	(3,1)	425	(5,8)	–2	(4,3)	
Saudi Arabia		16	(3,3)	411	(8,2)	–	–		63	(4,6)	405	(3,6)	–	–		21	(3,9)	389	(8,2)	–	–	
Kuwait		15	(2,7)	429	(8,8)	◊	◊		70	(3,8)	418	(3,6)	◊	◊		15	(3,1)	406	(10,7)	◊	◊	
Colombia		14	(2,6)	443	(8,6)	◊	◊		52	(4,5)	420	(4,4)	◊	◊		34	(4,8)	403	(9,6)	◊	◊	
Sweden		13	(2,5)	532	(7,3)	–8	(4,0)		78	(3,6)	507	(3,1)	6	(5,2)		8	(2,6)	513	(10,3)	2	(3,4)	
Palestinian Nat'l Auth.		11	(2,6)	422	(7,2)	–3	(4,0)		78	(3,3)	403	(3,9)	1	(4,8)		11	(2,4)	392	(14,8)	2	(3,5)	
Cyprus		11	(0,1)	437	(7,3)	–10	(0,2)	▼	74	(0,2)	454	(2,2)	–2	(0,3)	▼	16	(0,2)	447	(4,5)	12	(0,2)	▲
Japan		10	(2,3)	598	(10,3)	–18	(4,2)	▼	77	(3,2)	552	(2,2)	8	(4,7)		13	(2,7)	530	(7,6)	10	(3,0)	▲
Hungary		9	(2,8)	584	(10,4)	3	(3,5)		79	(4,0)	537	(3,7)	–4	(5,2)		11	(3,1)	521	(7,5)	1	(4,0)	
Turkey		8	(2,2)	499	(19,0)	◊	◊		55	(4,4)	465	(5,1)	◊	◊		36	(4,3)	427	(6,4)	◊	◊	
Romania		8	(2,1)	496	(13,0)	1	(3,1)		61	(4,2)	464	(4,8)	–8	(5,9)		31	(4,1)	452	(8,6)	8	(5,5)	
Bosnia and Herzegovina		7	(2,0)	475	(7,4)	◊	◊		80	(3,0)	465	(3,4)	◊	◊		13	(2,5)	463	(6,3)	◊	◊	
Algeria		7	(2,2)	412	(7,5)	◊	◊		60	(4,0)	408	(2,1)	◊	◊		33	(3,9)	408	(3,0)	◊	◊	
Italy		7	(2,2)	503	(11,1)	–5	(3,5)		77	(3,7)	497	(3,4)	1	(5,1)		16	(3,1)	480	(6,9)	4	(3,9)	
Slovenia		7	(2,0)	558	(8,0)	–2	(3,0)		85	(3,0)	537	(2,4)	2	(4,1)		8	(2,2)	527	(9,5)	0	(3,2)	
Serbia		7	(2,3)	464	(16,4)	4	(2,7)		81	(3,4)	472	(3,4)	9	(5,3)		13	(2,9)	462	(8,9)	–13	(4,8)	▼
Botswana		6	(2,1)	378	(17,9)	5	(2,3)	▲	58	(4,6)	357	(4,4)	27	(6,2)	▲	35	(4,8)	342	(5,3)	–32	(6,4)	▼
Bulgaria		5	(2,1)	500	(36,7)	–	–		65	(4,2)	475	(7,6)	–	–		31	(4,2)	458	(11,1)	–	–	
Norway		5	(2,0)	504	(8,3)	–8	(3,3)	▼	89	(2,9)	486	(2,5)	8	(4,5)		6	(2,2)	477	(4,0)	1	(3,1)	
Armenia	r	4	(1,7)	461	(15,6)	1	(2,2)		73	(3,8)	491	(7,6)	–6	(5,6)		23	(3,5)	482	(8,1)	5	(5,3)	
Ukraine		4	(1,6)	550	(10,9)	◊	◊		87	(2,9)	486	(3,7)	◊	◊		10	(2,4)	449	(11,3)	◊	◊	
Tunisia		3	(1,4)	477	(7,7)	1	(1,7)		44	(3,6)	451	(3,3)	14	(5,2)	▲	54	(3,5)	439	(2,7)	–15	(5,1)	▼
Czech Republic		2	(1,8)	~	~	◊	◊		58	(4,0)	548	(2,9)	◊	◊		40	(4,2)	526	(3,2)	◊	◊	
Lithuania		2	(1,4)	~	~	–6	(2,7)	▼	94	(2,1)	519	(2,7)	6	(3,7)		4	(1,6)	495	(7,4)	0	(2,5)	
Russian Federation		2	(0,9)	~	~	1	(1,1)		79	(3,0)	532	(4,1)	9	(4,2)	▲	19	(3,1)	514	(6,1)	–10	(4,2)	▼
Georgia		0	(0,0)	~	~	◊	◊		72	(4,3)	422	(5,9)	◊	◊		28	(4,3)	414	(5,8)	◊	◊	
¶ Morocco		16	(5,3)	410	(12,5)	–	–		68	(5,4)	400	(4,0)	–	–		15	(4,1)	403	(12,6)	–	–	
International Avg.		16	(0,4)	484	(1,6)				68	(0,5)	465	(0,6)				16	(0,4)	445	(1,6)			
Benchmarking Participants																						
Dubai, UAE		56	(0,7)	506	(4,8)	◊	◊		42	(0,7)	466	(4,5)	◊	◊		2	(0,3)	~	~	◊	◊	
Massachusetts, US		44	(7,4)	571	(6,6)	◊	◊		45	(8,1)	561	(10,0)	◊	◊		10	(3,0)	491	(13,9)	◊	◊	
Minnesota, US		44	(7,2)	534	(8,1)	◊	◊		53	(6,9)	548	(4,8)	◊	◊		3	(2,7)	429	(6,0)	◊	◊	
British Columbia, Canada		35	(4,9)	539	(5,2)	◊	◊		62	(5,0)	521	(4,0)	◊	◊		3	(1,5)	527	(37,1)	◊	◊	
Ontario, Canada		34	(4,7)	545	(5,1)	–8	(6,4)		57	(5,1)	522	(4,0)	5	(6,9)		9	(2,5)	509	(10,4)	4	(3,3)	
Basque Country, Spain		23	(4,8)	520	(5,3)	11	(5,9)		65	(4,9)	495	(3,4)	–13	(6,2)	▼	12	(2,1)	468	(8,1)	3	(3,3)	
Quebec, Canada		18	(3,5)	545	(9,2)	4	(4,1)		71	(4,3)	502	(4,2)	–7	(5,3)		12	(3,1)	478	(6,0)	4	(3,8)	

Index based on principals' responses to eight questions about their schools: teachers' job satisfaction; teachers' understanding of the school's curricular goals; teachers' degree of success in implementing the school's curriculum; teachers' expectations for student achievement; parental support for student achievement; parental involvement in school activities; students' regard for school property; and students' desire to do well in school. Average is computed based on a 5-point scale: 1 = very high; 2 = high; 3 = medium; 4 = low; and 5 = very low. High level indicates average is less than or equal to 2. Medium level indicates that average is greater than 2 and less or equal to 3. Low level indicates average is greater than 3.

¶ Did not satisfy guidelines for sample participation rates (see Appendix A).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 percent significantly higher.

▼ 2007 percent significantly lower..

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 22 Index of Mathematics Teachers' Perception of School Climate (TPSC) with Trends

TIMSS 2007 Mathematics 4

Country		High TPSC							Medium TPSC							Low TPSC						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Scotland	r	48	(3,4)	505	(3,3)	7	(6,1)		49	(3,3)	487	(3,6)	–9	(6,0)		3	(1,5)	453	(27,6)	1	(1,8)	
United States		38	(2,7)	552	(3,9)	–3	(3,7)		49	(2,6)	525	(2,7)	2	(3,6)		14	(1,9)	486	(6,0)	2	(2,5)	
England	r	37	(3,9)	559	(5,4)	8	(5,9)		57	(3,9)	534	(3,5)	–5	(6,3)		6	(1,7)	501	(8,1)	–3	(2,9)	
New Zealand		36	(2,3)	514	(3,6)	–1	(3,7)		57	(2,6)	484	(3,1)	–1	(4,0)		6	(1,4)	460	(8,2)	2	(1,7)	
Australia		35	(3,5)	537	(5,7)	5	(5,0)		56	(3,3)	508	(4,9)	–3	(4,9)		9	(1,8)	491	(16,3)	–2	(3,0)	
Austria		34	(2,6)	510	(2,8)	◊	◊		62	(2,5)	505	(2,5)	◊	◊		4	(1,3)	472	(8,2)	◊	◊	
El Salvador		29	(3,9)	345	(9,7)	◊	◊		60	(4,3)	325	(6,0)	◊	◊		11	(2,5)	315	(11,8)	◊	◊	
Kazakhstan		29	(5,5)	551	(15,4)	◊	◊		67	(5,7)	548	(7,2)	◊	◊		4	(1,8)	567	(22,4)	◊	◊	
Iran, Islamic Rep. of		28	(3,8)	415	(9,9)	3	(5,5)		58	(4,0)	401	(5,5)	–2	(6,1)		15	(2,6)	385	(7,1)	–1	(4,4)	
Chinese Taipei		25	(3,7)	586	(4,0)	–10	(5,5)		71	(4,0)	572	(2,1)	10	(5,7)		4	(1,5)	560	(8,2)	0	(2,1)	
Qatar		24	(0,2)	304	(2,0)	◊	◊		60	(0,2)	296	(1,5)	◊	◊		16	(0,1)	287	(2,6)	◊	◊	
Hong Kong SAR		22	(3,8)	620	(6,6)	14	(4,5)	▲	65	(4,1)	608	(4,4)	–13	(5,6)	▼	14	(2,8)	581	(8,7)	–1	(4,3)	
Lithuania		20	(3,0)	544	(6,9)	–14	(4,5)	▼	76	(3,2)	528	(3,0)	11	(4,6)	▲	4	(1,2)	499	(15,2)	3	(1,2)	▲
Denmark		19	(3,8)	537	(5,7)	◊	◊		68	(4,2)	526	(2,8)	◊	◊		13	(3,1)	497	(8,3)	◊	◊	
Norway		18	(3,1)	490	(5,5)	0	(4,7)		80	(3,1)	470	(2,7)	3	(4,8)		3	(0,8)	448	(17,4)	–3	(2,0)	
Germany		17	(2,7)	540	(5,3)	◊	◊		70	(3,3)	528	(2,3)	◊	◊		13	(2,3)	490	(8,3)	◊	◊	
Ukraine		15	(2,9)	471	(7,9)	◊	◊		80	(3,2)	469	(3,5)	◊	◊		5	(1,7)	457	(7,9)	◊	◊	
Sweden		15	(2,3)	515	(4,7)	◊	◊		76	(3,0)	503	(3,1)	◊	◊		9	(2,2)	476	(6,8)	◊	◊	
Slovenia		15	(2,2)	503	(4,8)	–2	(4,2)		81	(2,3)	502	(1,9)	1	(4,6)		5	(1,2)	497	(7,6)	1	(2,2)	
Singapore		13	(2,1)	608	(10,4)	–8	(4,4)		77	(2,6)	601	(4,6)	5	(4,7)		10	(1,5)	579	(7,2)	3	(2,5)	
Kuwait		11	(3,2)	333	(14,4)	◊	◊		74	(4,2)	313	(4,9)	◊	◊		15	(3,1)	307	(12,7)	◊	◊	
Yemen		11	(2,6)	221	(18,9)	◊	◊		59	(4,6)	226	(8,5)	◊	◊		30	(4,2)	215	(7,5)	◊	◊	
Georgia		11	(3,1)	456	(9,0)	◊	◊		68	(4,4)	441	(5,0)	◊	◊		21	(3,9)	423	(8,7)	◊	◊	
Colombia		10	(2,6)	384	(22,2)	◊	◊		66	(4,6)	362	(6,7)	◊	◊		25	(4,1)	333	(9,5)	◊	◊	
Italy		9	(2,0)	513	(6,7)	1	(3,0)		73	(3,0)	511	(3,2)	0	(4,5)		18	(2,7)	484	(8,5)	–1	(3,8)	
Russian Federation		9	(2,0)	575	(15,3)	3	(2,7)		83	(2,7)	546	(5,4)	4	(4,3)		8	(1,9)	509	(17,5)	–7	(3,7)	
Hungary		6	(1,5)	554	(10,8)	–8	(3,2)	▼	74	(3,7)	518	(3,8)	–4	(4,9)		19	(3,6)	466	(11,0)	13	(4,1)	▲
Tunisia	r	6	(1,6)	355	(23,0)	–1	(2,7)		58	(3,7)	333	(5,9)	0	(5,3)		36	(3,8)	314	(8,1)	0	(5,3)	
Slovak Republic		5	(1,6)	513	(8,1)	◊	◊		71	(3,6)	497	(5,5)	◊	◊		24	(3,1)	488	(9,4)	◊	◊	
Algeria		5	(1,9)	391	(12,1)	◊	◊		57	(4,9)	377	(8,9)	◊	◊		38	(4,9)	374	(8,6)	◊	◊	
Netherlands		4	(1,9)	537	(8,9)	–3	(3,2)		83	(3,2)	539	(2,5)	–1	(4,8)		13	(2,6)	505	(9,0)	5	(3,6)	
Japan		4	(1,5)	591	(15,6)	–8	(3,1)	▼	74	(3,4)	569	(2,3)	–2	(4,8)		22	(3,2)	560	(3,8)	10	(4,1)	▲
Latvia		4	(1,3)	552	(11,6)	–3	(3,0)		83	(2,6)	537	(2,4)	–1	(4,5)		13	(2,5)	538	(7,2)	4	(3,8)	
Morocco	s	4	(1,7)	391	(41,2)	0	(2,2)		41	(4,1)	362	(10,0)	7	(5,7)		55	(3,7)	321	(5,3)	–7	(5,5)	
Armenia	r	4	(1,4)	498	(13,0)	–10	(3,2)	▼	52	(4,0)	499	(5,6)	–19	(5,3)	▼	45	(4,0)	501	(7,6)	29	(4,9)	▲
Czech Republic		1	(0,8)	~	~	◊	◊		69	(4,0)	491	(3,1)	◊	◊		30	(3,9)	477	(4,4)	◊	◊	
International Avg.		17	(0,5)	488	(2,1)				67	(0,6)	473	(0,8)				16	(0,5)	453	(1,8)			
Benchmarking Participants																						
Massachusetts, US		49	(7,2)	583	(5,6)	◊	◊		46	(6,6)	567	(5,4)	◊	◊		5	(3,0)	522	(19,3)	◊	◊	
Alberta, Canada		46	(4,0)	517	(3,9)	◊	◊		50	(4,1)	496	(3,8)	◊	◊		3	(1,4)	465	(37,0)	◊	◊	
Dubai, UAE	r	44	(4,6)	451	(6,5)	◊	◊		50	(4,6)	439	(4,6)	◊	◊		6	(1,1)	368	(21,6)	◊	◊	
Minnesota, US		38	(8,2)	578	(6,7)	◊	◊		56	(8,0)	545	(7,6)	◊	◊		5	(2,8)	502	(20,6)	◊	◊	
British Columbia, Canada	r	26	(3,4)	525	(5,0)	◊	◊		67	(4,1)	498	(3,3)	◊	◊		7	(2,7)	482	(4,5)	◊	◊	
Ontario, Canada		26	(4,3)	525	(5,4)	–11	(6,0)		63	(4,7)	512	(4,4)	8	(6,5)		11	(3,2)	480	(11,4)	3	(4,5)	
Quebec, Canada		14	(2,9)	535	(5,3)	0	(3,9)		71	(3,9)	521	(3,7)	–2	(5,3)		15	(2,9)	504	(7,8)	2	(4,2)	

Index based on teachers' responses to eight questions about their schools: teachers' job satisfaction; teachers' understanding of the school's curricular goals; teachers' degree of success in implementing the school's curriculum; teachers' expectations for student achievement; parental support for student achievement; parental involvement in school activities; students' regard for school property; and students' desire to do well in school. Average is computed based on a 5-point scale: 1 = very high; 2 = high; 3 = medium; 4 = low; and 5 = very low. High level indicates average is less than or equal to 2. Medium level indicates that average is greater than 2 and less or equal to 3. Low level indicates average is greater than 3.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

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

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

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 percent significantly higher.

▼ 2007 percent significantly lower.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 23 Index of Mathematics Teachers' Perception of School Climate (TPSC) with Trends

TIMSS 2007 Mathematics 8

Country		High TPSC							Medium TPSC							Low TPSC						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Indonesia		26	(4,4)	424	(12,8)	8	(5,6)		58	(4,7)	400	(6,8)	–5	(6,4)		16	(3,9)	402	(11,5)	–2	(5,4)	
Lebanon		24	(3,3)	475	(7,6)	4	(5,2)		64	(4,0)	445	(6,0)	8	(6,3)		12	(2,1)	422	(8,6)	–11	(4,0)	▼
Chinese Taipei		24	(3,8)	624	(8,2)	3	(5,1)		65	(4,1)	596	(4,8)	–3	(5,7)		11	(2,6)	554	(11,5)	1	(3,7)	
United States		21	(2,4)	534	(5,1)	–1	(3,7)		57	(2,7)	513	(3,9)	0	(4,2)		23	(2,0)	472	(5,9)	0	(3,3)	
Egypt		20	(3,3)	409	(8,0)	1	(4,7)		59	(4,4)	391	(4,5)	1	(6,1)		21	(3,5)	370	(10,0)	–2	(4,9)	
Israel	r	20	(3,2)	504	(8,0)	–7	(5,2)		60	(4,0)	467	(6,8)	0	(5,9)		20	(2,7)	421	(8,1)	7	(3,4)	▲
Australia		20	(3,2)	544	(10,2)	4	(4,1)		53	(3,9)	497	(5,8)	–4	(5,9)		27	(2,5)	465	(5,3)	0	(4,7)	
Scotland		18	(2,9)	498	(11,5)	3	(4,5)		67	(3,4)	489	(4,6)	7	(5,7)		15	(2,4)	467	(13,3)	–10	(4,5)	▼
England	r	18	(2,2)	567	(10,5)	5	(3,9)		65	(3,1)	509	(5,5)	–8	(5,9)		17	(2,5)	472	(12,7)	3	(4,9)	
Syrian Arab Republic		17	(2,8)	405	(8,4)	◊	◊		64	(3,7)	392	(5,3)	◊	◊		20	(3,2)	396	(8,7)	◊	◊	
El Salvador		16	(2,9)	338	(9,2)	◊	◊		56	(4,3)	341	(4,2)	◊	◊		28	(4,1)	336	(6,8)	◊	◊	
Bahrain		15	(1,5)	405	(3,2)	8	(2,3)	▲	59	(2,4)	403	(2,4)	10	(4,3)	▲	26	(1,8)	374	(3,7)	–18	(3,8)	▼
Ghana		15	(2,2)	353	(9,9)	–2	(4,5)		59	(4,2)	307	(6,8)	6	(6,3)		26	(3,8)	290	(7,4)	–4	(5,9)	
Oman		15	(2,7)	394	(9,6)	◊	◊		64	(3,8)	378	(4,2)	◊	◊		21	(3,3)	341	(8,3)	◊	◊	
Singapore		14	(1,6)	655	(11,2)	0	(2,0)		57	(2,4)	596	(5,2)	–4	(3,2)		29	(1,9)	553	(6,7)	4	(2,7)	
Saudi Arabia		14	(2,9)	330	(11,1)	–	–		55	(4,4)	331	(4,1)	–	–		31	(3,7)	323	(5,2)	–	–	
Malta		14	(0,2)	524	(3,1)	◊	◊		54	(0,3)	506	(1,7)	◊	◊		32	(0,3)	441	(1,9)	◊	◊	
Malaysia		13	(2,6)	506	(13,0)	–2	(3,9)		70	(3,6)	472	(5,7)	3	(5,1)		17	(2,9)	455	(13,3)	–1	(4,3)	
Qatar		12	(0,1)	316	(2,8)	◊	◊		67	(0,2)	311	(1,7)	◊	◊		21	(0,1)	289	(2,1)	◊	◊	
Colombia		12	(2,4)	421	(10,5)	◊	◊		47	(5,4)	382	(6,3)	◊	◊		42	(5,1)	367	(5,1)	◊	◊	
Palestinian Nat'l Auth.		12	(2,8)	381	(14,3)	4	(3,7)		58	(3,9)	368	(4,9)	–8	(5,4)		30	(3,0)	360	(7,2)	4	(4,4)	
Bosnia and Herzegovina		11	(2,5)	451	(12,3)	◊	◊		57	(4,3)	461	(3,9)	◊	◊		32	(3,9)	448	(4,5)	◊	◊	
Iran, Islamic Rep. of		10	(2,1)	461	(12,8)	–2	(3,4)		47	(3,9)	416	(6,3)	12	(5,3)	▲	43	(3,6)	376	(4,2)	–10	(5,3)	
Bulgaria		10	(1,8)	512	(23,5)	9	(2,0)	▲	47	(3,7)	475	(7,9)	–10	(5,6)		43	(3,5)	441	(6,9)	2	(5,4)	
Romania		10	(2,2)	492	(13,4)	0	(3,4)		57	(3,7)	467	(5,6)	–2	(5,5)		34	(3,6)	444	(7,9)	2	(5,3)	
Cyprus		9	(1,9)	458	(6,2)	–5	(2,7)		67	(2,7)	467	(2,2)	–1	(3,6)		23	(2,1)	462	(4,1)	6	(2,8)	▲
Jordan		9	(2,6)	478	(12,0)	2	(3,7)		58	(4,4)	439	(5,7)	3	(6,1)		32	(3,9)	391	(6,9)	–6	(5,7)	
Hong Kong SAR		9	(2,7)	646	(13,7)	2	(3,7)		67	(4,3)	579	(6,0)	9	(5,6)		24	(3,8)	531	(13,8)	–11	(5,1)	▼
Korea, Rep. of	s	9	(2,0)	625	(10,0)	2	(2,8)		61	(3,4)	600	(3,6)	0	(5,1)		30	(3,1)	583	(4,8)	–2	(4,7)	
Ukraine		8	(2,3)	523	(15,7)	◊	◊		80	(3,3)	459	(4,0)	◊	◊		12	(2,5)	438	(10,4)	◊	◊	
Thailand		8	(2,3)	454	(25,2)	◊	◊		69	(3,7)	445	(6,5)	◊	◊		23	(3,4)	425	(8,5)	◊	◊	
Kuwait		8	(2,4)	355	(14,0)	◊	◊		71	(3,6)	355	(3,1)	◊	◊		21	(3,1)	357	(7,4)	◊	◊	
Japan		7	(2,1)	586	(12,4)	2	(2,7)		61	(3,7)	578	(3,4)	–9	(5,3)		32	(3,7)	552	(4,3)	7	(5,2)	
Sweden		7	(1,4)	514	(6,7)	–3	(2,9)		72	(3,2)	492	(2,4)	5	(4,8)		21	(2,9)	483	(5,0)	–2	(4,3)	
Serbia		7	(1,8)	492	(10,1)	–1	(2,7)		67	(3,6)	493	(3,6)	–1	(5,4)		26	(3,5)	467	(7,1)	2	(5,1)	
Slovenia		6	(1,2)	522	(10,2)	2	(2,1)		70	(3,0)	502	(2,6)	–9	(4,7)		24	(2,9)	493	(4,9)	7	(4,4)	
Norway		5	(1,7)	473	(6,9)	–3	(2,7)		85	(2,6)	471	(2,3)	3	(4,0)		10	(2,3)	455	(3,9)	0	(3,3)	
Hungary		4	(1,4)	541	(21,2)	1	(2,0)		75	(3,3)	519	(4,3)	–7	(4,4)		20	(3,0)	502	(7,1)	6	(3,9)	
Turkey		4	(1,6)	503	(21,0)	◊	◊		42	(4,2)	453	(9,0)	◊	◊		54	(4,1)	410	(5,4)	◊	◊	
Tunisia		4	(1,6)	446	(18,4)	–2	(2,4)		37	(4,0)	428	(4,6)	–13	(5,8)	▼	59	(4,1)	415	(2,8)	15	(5,9)	▲
Botswana		4	(1,5)	417	(15,0)	0	(2,2)		42	(4,7)	374	(4,6)	13	(6,4)	▲	55	(4,7)	351	(3,0)	–13	(6,5)	▼
Lithuania		3	(1,3)	522	(16,4)	–2	(2,1)		81	(2,7)	507	(2,6)	–5	(4,0)		16	(2,5)	498	(6,4)	7	(3,4)	▲
Italy		3	(1,1)	477	(29,4)	–1	(2,1)		55	(3,6)	488	(3,9)	6	(5,6)		42	(3,7)	470	(4,4)	–5	(5,4)	
Armenia		3	(1,0)	501	(8,4)	–7	(2,4)	▼	64	(3,7)	498	(4,2)	4	(5,4)		33	(3,7)	500	(6,7)	2	(5,2)	
Algeria		2	(1,2)	~	~	◊	◊		46	(4,7)	390	(3,0)	◊	◊		52	(4,6)	384	(2,6)	◊	◊	
Russian Federation		2	(0,9)	~	~	1	(1,1)		67	(3,2)	516	(5,1)	8	(5,3)		31	(3,3)	501	(6,2)	–9	(5,2)	
Georgia		1	(0,9)	~	~	◊	◊		54	(5,2)	420	(7,6)	◊	◊		45	(5,3)	398	(9,2)	◊	◊	
Czech Republic		0	(0,5)	~	~	◊	◊		46	(3,3)	517	(4,1)	◊	◊		53	(3,2)	492	(3,3)	◊	◊	
¶ Morocco		8	(2,7)	439	(23,8)	–	–		30	(5,5)	391	(8,7)	–	–		62	(5,6)	374	(4,7)	–	–	
International Avg.		11	(0,3)	478	(2,0)				60	(0,5)	455	(0,7)				29	(0,5)	433	(1,1)			
Benchmarking Participants																						
Dubai, UAE	s	44	(4,1)	485	(6,9)	◊	◊		47	(5,0)	440	(7,7)	◊	◊		9	(2,8)	418	(20,0)	◊	◊	
Ontario, Canada		32	(4,9)	536	(4,9)	7	(6,8)		51	(5,3)	516	(4,0)	–10	(7,2)		17	(3,8)	487	(10,9)	2	(5,2)	
Massachusetts, US		32	(5,6)	576	(7,3)	◊	◊		50	(6,9)	539	(9,2)	◊	◊		18	(4,5)	511	(16,0)	◊	◊	
British Columbia, Canada		24	(3,8)	535	(6,6)	◊	◊		65	(4,0)	503	(3,7)	◊	◊		11	(2,4)	497	(13,7)	◊	◊	
Basque Country, Spain		13	(3,7)	518	(8,6)	6	(4,6)		66	(5,1)	506	(3,3)	3	(7,1)		21	(3,5)	466	(6,9)	–10	(6,0)	
Quebec, Canada		12	(3,5)	596	(14,3)	–2	(4,5)		49	(4,2)	532	(4,2)	–15	(6,1)	▼	39	(3,8)	505	(5,9)	17	(5,5)	▲
Minnesota, US		10	(3,8)	553	(16,8)	◊	◊		67	(6,7)	538	(5,0)	◊	◊		22	(6,4)	502	(15,2)	◊	◊	

Index based on teachers' responses to eight questions about their schools: teachers' job satisfaction; teachers' understanding of the school's curricular goals; teachers' degree of success in implementing the school's curriculum; teachers' expectations for student achievement; parental support for student achievement; parental involvement in school activities; students' regard for school property; and students' desire to do well in school. Average is computed based on a 5-point scale: 1 = very high; 2 = high; 3 = medium; 4 = low; and 5 = very low. High level indicates average is less than or equal to 2. Medium level indicates that average is greater than 2 and less or equal to 3. Low level indicates average is greater than 3.

¶ Did not satisfy guidelines for sample participation rates (see Appendix A).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 percent significantly higher.

▼ 2007 percent significantly lower.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 24 Index of Science Teachers' Perception of School Climate (TPSC) with Trends

TIMSS 2007 Science 4

Country		High TPSC							Medium TPSC							Low TPSC						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Scotland	r	47	(3,3)	513	(3,1)	6	(6,1)		50	(3,2)	493	(3,8)	–7	(6,0)		2	(1,3)	~	~	1	(1,7)	
New Zealand		37	(2,4)	528	(3,2)	0	(3,8)		57	(2,6)	494	(3,5)	–1	(4,1)		6	(1,4)	469	(8,5)	1	(1,8)	
Australia		37	(3,6)	546	(5,5)	6	(5,1)		54	(3,3)	520	(4,8)	–5	(5,0)		10	(1,8)	497	(12,4)	–1	(3,1)	
United States		36	(2,7)	562	(3,5)	–6	(3,9)		51	(2,9)	534	(3,1)	4	(4,0)		13	(1,8)	488	(7,0)	2	(2,4)	
England	r	35	(3,8)	556	(5,4)	6	(5,9)		59	(3,8)	536	(3,7)	–4	(6,2)		6	(1,7)	502	(8,0)	–2	(2,9)	
El Salvador		31	(4,1)	402	(9,3)	◊	◊		60	(4,5)	386	(5,9)	◊	◊		10	(2,5)	371	(12,6)	◊	◊	
Austria		29	(2,5)	535	(3,2)	◊	◊		66	(2,4)	524	(3,0)	◊	◊		4	(1,3)	477	(12,2)	◊	◊	
Kazakhstan		29	(5,5)	526	(12,0)	◊	◊		67	(5,7)	535	(5,8)	◊	◊		4	(1,8)	552	(19,1)	◊	◊	
Chinese Taipei		28	(3,8)	557	(4,6)	–6	(5,8)		65	(4,3)	557	(2,5)	2	(6,2)		7	(2,0)	545	(9,1)	4	(2,4)	
Iran, Islamic Rep. of		28	(3,8)	451	(11,0)	3	(5,5)		58	(4,0)	434	(5,9)	–2	(6,1)		15	(2,6)	415	(10,0)	–1	(4,4)	
Qatar		21	(0,1)	306	(5,0)	◊	◊		65	(0,2)	296	(2,4)	◊	◊		14	(0,1)	250	(4,9)	◊	◊	
Lithuania		20	(3,0)	525	(5,2)	–14	(4,5)	▼	76	(3,2)	512	(2,7)	11	(4,6)	▲	4	(1,2)	493	(10,3)	3	(1,2)	▲
Hong Kong SAR		19	(3,2)	575	(5,4)	8	(4,2)		67	(3,9)	555	(4,3)	–9	(5,7)		14	(3,3)	539	(8,2)	1	(4,6)	
Germany		18	(2,4)	543	(4,3)	◊	◊		69	(3,2)	533	(2,5)	◊	◊		13	(2,4)	478	(9,8)	◊	◊	
Norway		18	(3,1)	491	(6,2)	0	(4,7)		80	(3,1)	474	(3,7)	3	(4,8)		3	(0,8)	455	(18,7)	–3	(2,0)	
Kuwait		18	(3,5)	363	(12,7)	◊	◊		56	(4,1)	355	(8,2)	◊	◊		27	(3,9)	323	(11,7)	◊	◊	
Sweden		17	(2,5)	542	(5,6)	◊	◊		75	(2,9)	525	(3,4)	◊	◊		8	(2,0)	495	(11,3)	◊	◊	
Denmark		17	(3,7)	538	(4,0)	◊	◊		69	(4,7)	520	(2,9)	◊	◊		14	(3,5)	495	(9,8)	◊	◊	
Ukraine		15	(2,9)	475	(6,7)	◊	◊		80	(3,2)	474	(3,6)	◊	◊		5	(1,7)	466	(4,7)	◊	◊	
Slovenia		15	(2,2)	518	(5,0)	–2	(4,2)		81	(2,3)	519	(2,2)	1	(4,6)		5	(1,2)	510	(7,7)	1	(2,2)	
Singapore		13	(2,3)	587	(9,0)	–7	(4,2)		74	(2,9)	592	(5,0)	3	(4,8)		13	(1,8)	556	(8,3)	4	(2,8)	
Yemen		11	(3,0)	184	(25,7)	◊	◊		57	(4,3)	212	(9,2)	◊	◊		32	(3,8)	186	(13,3)	◊	◊	
Colombia		10	(2,6)	439	(22,8)	◊	◊		62	(4,7)	402	(7,1)	◊	◊		28	(4,4)	390	(11,9)	◊	◊	
Georgia		9	(2,6)	437	(12,2)	◊	◊		72	(4,3)	416	(5,2)	◊	◊		19	(3,8)	412	(10,6)	◊	◊	
Italy		9	(2,0)	545	(6,8)	1	(3,0)		73	(3,0)	539	(3,3)	0	(4,5)		18	(2,7)	515	(8,0)	–1	(3,8)	
Russian Federation		9	(2,0)	572	(16,1)	3	(2,7)		83	(2,7)	548	(5,1)	4	(4,3)		8	(1,9)	515	(15,5)	–7	(3,7)	
Tunisia	r	7	(1,9)	363	(23,0)	1	(2,9)		54	(3,5)	326	(7,9)	–4	(5,2)		38	(3,6)	298	(10,4)	2	(5,2)	
Hungary		6	(1,5)	575	(10,4)	–8	(3,2)	▼	74	(3,7)	543	(3,5)	–4	(4,9)		19	(3,6)	496	(9,6)	13	(4,1)	▲
Slovak Republic		5	(1,8)	536	(13,3)	◊	◊		67	(3,4)	532	(4,6)	◊	◊		27	(3,3)	508	(12,1)	◊	◊	
Latvia		5	(1,5)	554	(11,3)	0	(2,8)		79	(2,7)	542	(2,4)	–10	(4,3)	▼	16	(2,6)	544	(6,2)	10	(3,5)	▲
Algeria		5	(1,9)	370	(10,1)	◊	◊		57	(4,9)	356	(10,8)	◊	◊		38	(4,9)	345	(9,5)	◊	◊	
Netherlands		4	(1,9)	528	(7,9)	–3	(3,2)		83	(3,2)	527	(3,2)	–1	(4,8)		13	(2,6)	497	(9,1)	5	(3,6)	
Japan		4	(1,5)	573	(9,9)	–9	(3,1)	▼	76	(3,5)	547	(2,3)	1	(4,9)		20	(3,2)	545	(3,3)	8	(4,2)	
Armenia	s	4	(1,4)	482	(23,3)	–14	(4,2)	▼	52	(4,0)	482	(8,0)	–8	(6,9)		45	(4,0)	489	(10,0)	22	(6,8)	▲
Czech Republic		3	(1,4)	498	(7,7)	◊	◊		68	(3,7)	520	(3,7)	◊	◊		29	(3,7)	505	(4,8)	◊	◊	
Morocco	s	2	(1,3)	~	~	–4	(2,7)		39	(3,8)	319	(12,8)	11	(6,4)		58	(3,8)	276	(8,1)	–7	(6,3)	
International Avg.		17	(0,5)	494	(1,9)				66	(0,6)	477	(0,9)				17	(0,5)	454	(1,8)			
Benchmarking Participants																						
Dubai, UAE		53	(4,2)	464	(10,2)	◊	◊		40	(3,9)	446	(6,3)	◊	◊		7	(0,8)	384	(7,7)	◊	◊	
Massachusetts, US		50	(7,2)	581	(5,9)	◊	◊		47	(6,5)	566	(5,7)	◊	◊		3	(2,7)	498	(47,1)	◊	◊	
Alberta, Canada		48	(4,1)	555	(4,4)	◊	◊		48	(4,1)	533	(4,6)	◊	◊		4	(1,5)	500	(34,7)	◊	◊	
Minnesota, US		45	(8,9)	555	(13,3)	◊	◊		52	(8,9)	552	(7,2)	◊	◊		4	(1,9)	504	(14,1)	◊	◊	
Ontario, Canada		27	(4,7)	545	(6,2)	–10	(6,2)		61	(4,8)	537	(5,4)	6	(6,5)		12	(3,3)	500	(12,9)	3	(4,6)	
British Columbia, Canada		26	(3,6)	554	(4,9)	◊	◊		67	(4,3)	531	(3,5)	◊	◊		8	(2,8)	511	(14,2)	◊	◊	
Quebec, Canada		16	(3,2)	536	(5,0)	2	(4,2)		68	(4,3)	518	(3,5)	–5	(5,8)		16	(3,2)	503	(7,3)	3	(4,5)	

Index based on teachers' responses to eight questions about their schools: teachers' job satisfaction; teachers' understanding of the school's curricular goals; teachers' degree of success in implementing the school's curriculum; teachers' expectations for student achievement; parental support for student achievement; parental involvement in school activities; students' regard for school property; and students' desire to do well in school. Average is computed based on a 5-point scale: 1 = very high; 2 = high; 3 = medium; 4 = low; and 5 = very low. High level indicates average is less than or equal to 2. Medium level indicates that average is greater than 2 and less or equal to 3. Low level indicates average is greater than 3.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

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

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

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 percent significantly higher.

▼ 2007 percent significantly lower..

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 25 Index of Science Teachers' Perception of School Climate (TPSC) with Trends

TIMSS 2007 Science 8

Country		High TPSC							Medium TPSC							Low TPSC						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Indonesia		25	(3,7)	445	(9,8)	11	(4,1)	▲	57	(4,0)	435	(5,5)	–12	(5,0)	▼	18	(3,3)	424	(10,8)	1	(4,2)	
Egypt		25	(3,0)	434	(6,4)	5	(4,2)		59	(3,9)	405	(4,8)	–1	(5,6)		16	(2,7)	377	(9,9)	–4	(4,2)	
Lebanon		25	(3,2)	442	(13,2)	5	(4,3)		51	(4,1)	423	(6,3)	–4	(5,4)		25	(3,6)	369	(9,9)	0	(4,8)	
Israel	r	23	(3,7)	499	(7,6)	–2	(4,8)		64	(4,4)	469	(6,1)	2	(5,7)		13	(2,7)	416	(13,6)	0	(3,7)	
Malaysia		22	(3,5)	500	(11,3)	6	(4,6)		60	(4,1)	469	(7,6)	–11	(5,7)	▼	19	(3,3)	442	(10,2)	5	(4,7)	
Chinese Taipei		22	(3,5)	574	(6,9)	2	(4,9)		65	(4,0)	561	(4,1)	0	(5,8)		13	(2,9)	541	(10,8)	–2	(4,3)	
Scotland	s	21	(1,7)	520	(6,0)	8	(2,5)	▲	63	(2,2)	491	(4,4)	3	(3,7)		16	(2,2)	484	(10,0)	–12	(3,7)	▼
Qatar		18	(0,1)	350	(2,8)	◊	◊		55	(0,2)	320	(1,8)	◊	◊		26	(0,1)	292	(3,2)	◊	◊	
Malta		18	(0,2)	511	(2,2)	◊	◊		46	(0,3)	482	(1,9)	◊	◊		36	(0,3)	382	(2,2)	◊	◊	
England	s	18	(2,2)	584	(8,4)	6	(3,1)	▲	60	(3,1)	542	(5,7)	–10	(5,5)		22	(2,9)	510	(8,3)	3	(5,2)	
United States		18	(2,3)	545	(6,6)	–6	(3,4)		54	(3,2)	521	(3,9)	3	(4,4)		28	(2,6)	495	(5,5)	3	(3,7)	
Oman		16	(3,3)	446	(8,3)	◊	◊		68	(4,1)	426	(4,0)	◊	◊		17	(2,9)	387	(8,9)	◊	◊	
Ghana		14	(2,6)	353	(15,5)	0	(4,1)		56	(3,8)	300	(7,8)	–5	(6,0)		30	(3,6)	285	(8,3)	5	(5,3)	
Australia	r	14	(1,8)	547	(8,3)	0	(2,8)		56	(3,5)	526	(5,8)	–1	(5,3)		30	(3,4)	487	(5,8)	1	(5,2)	
Saudi Arabia		14	(3,4)	417	(5,8)	–	–		57	(4,0)	408	(3,2)	–	–		30	(3,4)	384	(5,8)	–	–	
Syrian Arab Republic		14	(2,5)	465	(5,8)	◊	◊		66	(3,5)	451	(3,4)	◊	◊		20	(3,1)	442	(8,3)	◊	◊	
Jordan		14	(3,0)	518	(11,9)	7	(3,6)		49	(4,4)	487	(5,4)	–5	(6,2)		38	(3,9)	462	(7,4)	–1	(5,5)	
Singapore		13	(1,5)	626	(11,8)	4	(2,2)	▲	64	(2,6)	568	(5,2)	–7	(3,6)		23	(1,9)	531	(10,4)	3	(2,8)	
Cyprus	r	13	(0,6)	452	(3,2)	0	(1,1)		61	(1,1)	450	(2,4)	4	(1,6)	▲	26	(0,9)	453	(3,4)	–4	(1,4)	▼
Iran, Islamic Rep. of		12	(2,4)	496	(12,1)	3	(3,3)		49	(3,8)	464	(5,1)	6	(5,5)		38	(3,9)	441	(4,7)	–10	(5,5)	
Bahrain		12	(1,2)	475	(4,2)	1	(2,4)		63	(2,3)	474	(2,5)	13	(4,2)	▲	25	(2,0)	447	(5,1)	–14	(4,1)	▼
El Salvador		12	(3,1)	404	(9,5)	◊	◊		58	(4,3)	388	(4,2)	◊	◊		30	(3,6)	379	(6,3)	◊	◊	
Thailand		10	(2,1)	505	(18,3)	◊	◊		65	(3,6)	470	(5,9)	◊	◊		25	(3,6)	457	(7,8)	◊	◊	
Hong Kong SAR		10	(2,7)	565	(10,9)	3	(3,6)		65	(4,0)	528	(6,8)	–1	(6,2)		26	(4,0)	520	(8,4)	–2	(6,0)	
Bosnia and Herzegovina		10	(1,6)	471	(10,6)	◊	◊		60	(2,3)	467	(2,8)	◊	◊		30	(2,1)	461	(3,7)	◊	◊	
Palestinian Nat'l Auth.		9	(2,2)	432	(14,5)	–1	(3,6)		62	(3,7)	408	(4,3)	–6	(5,4)		29	(3,5)	382	(7,5)	7	(5,0)	
Colombia		9	(2,4)	443	(16,1)	◊	◊		46	(5,4)	421	(6,1)	◊	◊		45	(5,0)	408	(4,8)	◊	◊	
Korea, Rep. of	r	9	(2,3)	553	(6,3)	3	(2,8)		65	(3,7)	556	(2,6)	–5	(4,9)		26	(3,2)	545	(3,3)	2	(4,4)	
Kuwait		8	(2,2)	443	(14,6)	◊	◊		67	(3,6)	412	(4,4)	◊	◊		25	(3,4)	415	(8,4)	◊	◊	
Romania		8	(1,3)	495	(9,5)	–3	(2,1)		58	(2,6)	464	(5,0)	–2	(3,8)		34	(2,8)	450	(5,8)	5	(4,0)	
Serbia		8	(1,5)	480	(7,8)	1	(1,9)		67	(2,5)	472	(3,4)	4	(3,3)		25	(2,6)	464	(5,2)	–5	(3,4)	
Turkey		7	(2,0)	525	(12,9)	◊	◊		32	(4,4)	473	(8,3)	◊	◊		60	(4,5)	435	(4,3)	◊	◊	
Japan		7	(2,0)	592	(14,5)	–2	(3,0)		51	(4,3)	558	(2,7)	–10	(5,9)		42	(4,3)	543	(3,9)	12	(5,7)	▲
Sweden		7	(1,2)	534	(7,2)	0	(2,1)		70	(2,5)	510	(3,0)	5	(4,1)		23	(2,4)	503	(5,3)	–6	(3,8)	
Hungary		7	(1,5)	567	(12,1)	2	(1,7)		73	(2,4)	541	(3,4)	–6	(3,2)		21	(2,3)	521	(4,7)	4	(3,0)	
Botswana		6	(2,1)	414	(14,3)	5	(2,3)	▲	31	(4,5)	368	(6,4)	0	(6,2)		63	(4,8)	342	(3,9)	–6	(6,4)	
Lithuania		6	(1,0)	535	(6,7)	0	(1,5)		78	(1,8)	519	(2,7)	–6	(2,4)	▼	16	(1,8)	509	(3,3)	6	(2,3)	▲
Slovenia		6	(1,3)	558	(7,8)	2	(1,9)		71	(2,6)	536	(2,6)	–6	(3,8)		23	(2,6)	538	(3,4)	4	(3,6)	
Ukraine		6	(1,6)	499	(13,1)	◊	◊		84	(2,3)	487	(3,5)	◊	◊		10	(1,8)	472	(6,3)	◊	◊	
Algeria		5	(1,5)	407	(5,6)	◊	◊		43	(3,4)	410	(2,8)	◊	◊		52	(3,3)	407	(2,3)	◊	◊	
Bulgaria		5	(1,7)	514	(31,3)	–	–		44	(3,4)	478	(7,3)	–	–		51	(3,6)	456	(7,9)	–	–	
Norway		4	(1,7)	502	(8,2)	–3	(2,7)		81	(3,0)	488	(2,4)	–4	(4,3)		14	(2,7)	473	(5,1)	7	(3,5)	
Tunisia		4	(1,7)	434	(6,5)	–2	(2,7)		47	(4,2)	446	(3,1)	–7	(6,0)		49	(4,0)	445	(3,0)	9	(5,5)	
Armenia	r	3	(0,8)	514	(17,3)	–8	(1,7)	▼	59	(2,1)	487	(6,5)	–5	(2,9)		38	(2,2)	487	(5,7)	13	(3,2)	▲
Italy		3	(1,1)	488	(26,7)	–1	(2,1)		55	(3,6)	504	(3,7)	6	(5,6)		42	(3,7)	486	(4,4)	–5	(5,4)	
Georgia		3	(0,9)	445	(6,4)	◊	◊		54	(2,8)	425	(5,9)	◊	◊		43	(2,9)	415	(5,6)	◊	◊	
Russian Federation		2	(0,7)	~	~	1	(0,9)		67	(2,1)	534	(4,7)	15	(3,3)	▲	31	(2,0)	516	(3,3)	–16	(3,3)	▼
Czech Republic		1	(0,6)	~	~	◊	◊		42	(2,7)	547	(3,4)	◊	◊		57	(2,8)	532	(2,5)	◊	◊	
¶ Morocco		7	(2,8)	445	(14,7)	–	–		30	(5,5)	421	(7,1)	–	–		63	(4,7)	393	(3,4)	–	–	
International Avg.		11	(0,3)	489	(1,7)				58	(0,5)	469	(0,7)				31	(0,4)	449	(1,0)			
Benchmarking Participants																						
Dubai, UAE		36	(3,1)	518	(6,1)	◊	◊		59	(3,2)	475	(5,6)	◊	◊		5	(0,7)	432	(9,9)	◊	◊	
Ontario, Canada		28	(5,1)	536	(4,6)	9	(6,3)		60	(5,2)	531	(4,2)	–2	(7,0)		12	(2,8)	484	(13,4)	–7	(5,0)	
Massachusetts, US		27	(7,0)	574	(11,3)	◊	◊		51	(7,6)	554	(10,2)	◊	◊		22	(5,2)	528	(13,1)	◊	◊	
British Columbia, Canada		20	(3,0)	541	(4,2)	◊	◊		67	(3,7)	525	(3,7)	◊	◊		12	(2,7)	504	(13,3)	◊	◊	
Basque Country, Spain		17	(3,4)	518	(7,4)	10	(4,3)	▲	57	(5,4)	498	(4,4)	–11	(7,2)		27	(4,5)	490	(5,9)	0	(6,2)	
Minnesota, US		17	(5,5)	549	(13,0)	◊	◊		60	(7,3)	545	(4,0)	◊	◊		23	(5,7)	508	(13,0)	◊	◊	
Quebec, Canada		9	(2,5)	571	(19,5)	1	(3,7)		52	(5,6)	516	(5,0)	–15	(7,1)	▼	39	(5,1)	493	(4,6)	14	(6,1)	▲

Index based on teachers' responses to eight questions about their schools: teachers' job satisfaction; teachers' understanding of the school's curricular goals; teachers' degree of success in implementing the school's curriculum; teachers' expectations for student achievement; parental support for student achievement; parental involvement in school activities; students' regard for school property; and students' desire to do well in school. Average is computed based on a 5-point scale: 1 = very high; 2 = high; 3 = medium; 4 = low; and 5 = very low. High level indicates average is less than or equal to 2. Medium level indicates that average is greater than 2 and less or equal to 3. Low level indicates average is greater than 3.

¶ Did not satisfy guidelines for sample participation rates (see Appendix A).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 percent significantly higher.

▼ 2007 percent significantly lower.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

TEACHERS

Students' achievement can be influenced by their family background; however the general socio-demographic indicators of their teachers' backgrounds can also have impact on it as well as other characteristics of the school environment.

Teachers' Gender, Age

On average, internationally there is a great majority of female teachers compared to males. 79 percent of fourth-grade students and nearly 60 percent of eighth-grade students were taught by female mathematics and science teachers.

This distribution of teachers' gender varies from country to country depending on geographical location, cultural characteristics, education policies and the social system. At fourth grade, more than 85 percent of students were taught by females in countries from the former communist block as well as in Italy, Scotland, Austria, Germany, Qatar, Kuwait and the USA. In three European countries and the top-performing Asian countries, the percentages of female teachers and males were more balanced. In these education systems 'only' 50 to 70 percent of students were taught by females.

At eighth grade, the gender distribution of teachers was slightly more balanced. However, in Italy and most of the former communist countries the predominance of female teachers remained. In the Western European countries, the USA, Bosnia and the best achieving Asian countries the percentage of female teachers was almost equivalent to the percentage of male teachers.

In Hungary, at fourth grade 95 percents of students were taught by female mathematics teachers, at eighth grade this percentage was 80 for mathematics and 76 for science. Hungary is among those countries where gender distribution of teachers teaching was the most unequal. Similar percentages could be found in the former communist countries, Italy and at eighth grade in Israel and Malaysia in science.

Concerning the age of teachers it can be noted that at both grades around half of the students were taught by teachers aged 40 or above, and the other half were taught by teachers younger than 40 years of age.

The percentage of students by teachers' age shows similar pattern to the percentage of students by their teachers' gender (Tables 26-29). In most of the former communist countries in Europe a significant percentage of students (60-80%) were taught both science and mathematics by teachers aged 40 or above. Whereas, in the Asian countries, except for Japan, most students were taught by teachers aged below 40. In the Western European countries the percentage does not show the same pattern at fourth grade; there were countries with similar percentages of students taught by teachers aged 40 or above (Italy, Austria, Germany) as in the countries from the former communist block, and there were countries where around half of students were taught by teachers aged below 40 and the other half by teachers aged 40 or above.

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At eighth grade, students in the former communist countries were taught mostly by teachers aged 40 or above both in mathematics and in science (60-77%). In the Asian countries the majority of eight grade students were taught by teachers aged below 40 in science and mathematics. In the Western European countries, as opposed to the fourth grade percentage, half of the students were taught by teachers aged below 40 and the other half was taught by teachers aged 40 or above in most of the countries.

In Hungary, similarly to the other former communist countries, the percentage of students taught by older teachers was high. At fourth grade the ratio of students taught by teachers aged 40 or above was 75 percent, whereas at eighth grade it was 72-76 percent.

Table 26 Mathematics Teachers' Gender, Age, and Number of Years Teaching with Trends

TIMSS 2007 Mathematics 4

Country	Percentage of Students by Teacher Characteristics														Trends in Average Number of Years Teaching					
	Gender					Age														
	Female			Male		29 Years or Under		30-39 Years		40-49 Years		50 Years or Older			2007			Difference from 2003		
Algeria		58	(4,5)	42	(4,5)		6	(1,9)	45	(4,6)	44	(4,4)	5	(1,8)		18	(0,6)	◊	◊	
Armenia		85	(3,3)	15	(3,3)		15	(3,0)	20	(3,2)	26	(3,2)	39	(4,4)		22	(0,8)	2	(1,2)	
Australia		80	(3,4)	20	(3,4)		21	(3,9)	18	(3,4)	29	(4,1)	32	(3,4)		17	(1,0)	0	(1,3)	
Austria		89	(2,0)	11	(2,0)		8	(2,1)	21	(2,7)	36	(2,8)	34	(2,8)		22	(0,7)	◊	◊	
Chinese Taipei		75	(3,7)	25	(3,7)		21	(3,6)	46	(3,9)	25	(3,2)	8	(2,3)		12	(0,7)	1	(1,0)	
Colombia		76	(4,3)	24	(4,3)		13	(3,6)	28	(4,9)	30	(4,0)	29	(4,5)		19	(1,1)	◊	◊	
Czech Republic		91	(2,5)	9	(2,5)		11	(2,5)	24	(3,1)	40	(3,4)	25	(3,2)		17	(1,0)	◊	◊	
Denmark		49	(4,0)	51	(4,0)		9	(1,9)	30	(4,2)	24	(3,9)	37	(4,3)		16	(1,1)	◊	◊	
El Salvador		70	(4,2)	30	(4,2)		14	(2,7)	38	(3,9)	40	(4,0)	8	(2,6)		14	(0,7)	◊	◊	
England		69	(3,5)	31	(3,5)		31	(3,8)	29	(3,4)	23	(3,4)	16	(3,0)	r	11	(0,8)	–2	(1,2)	
Georgia		99	(0,8)	1	(0,8)		4	(1,5)	17	(2,6)	29	(3,9)	50	(3,8)		25	(1,0)	◊	◊	
Germany		85	(2,1)	15	(2,1)		9	(1,8)	20	(2,7)	16	(2,5)	56	(3,1)		22	(0,8)	◊	◊	
Hong Kong SAR		59	(4,1)	41	(4,1)		38	(3,8)	37	(4,1)	11	(2,9)	13	(2,7)		12	(0,8)	–1	(1,3)	
Hungary		95	(1,7)	5	(1,7)		5	(1,9)	20	(2,7)	45	(3,3)	30	(3,5)		23	(0,7)	3	(1,1)	▲
Iran, Islamic Rep. of		53	(2,7)	47	(2,7)		14	(2,4)	40	(4,1)	40	(3,9)	7	(1,6)		16	(0,6)	0	(0,9)	
Italy		97	(0,9)	3	(0,9)		4	(1,4)	20	(2,3)	37	(3,0)	39	(3,1)		21	(0,6)	0	(0,9)	
Japan		65	(3,1)	35	(3,1)		13	(2,5)	20	(3,1)	39	(3,5)	28	(3,5)		19	(0,8)	0	(1,1)	
Kazakhstan		94	(1,7)	6	(1,7)		11	(3,0)	34	(3,7)	34	(5,2)	22	(4,6)		19	(0,9)	◊	◊	
Kuwait	r	88	(2,7)	12	(2,7)	r	37	(4,3)	56	(4,5)	7	(2,1)	0	(0,0)	r	8	(0,5)	◊	◊	
Latvia		100	(0,3)	0	(0,0)		5	(1,6)	27	(3,1)	39	(3,2)	29	(3,1)		22	(0,7)	2	(1,2)	▲
Lithuania		98	(0,8)	2	(0,8)		1	(0,6)	34	(3,0)	39	(3,5)	26	(3,3)		21	(0,6)	2	(0,9)	▲
Morocco		50	(4,3)	50	(4,3)		21	(3,0)	29	(3,7)	35	(3,6)	15	(2,9)	s	16	(0,6)	1	(1,0)	
Netherlands		58	(4,1)	42	(4,1)		24	(3,5)	19	(3,1)	15	(3,0)	42	(3,9)		18	(1,0)	2	(1,5)	
New Zealand		75	(2,4)	25	(2,4)		27	(2,6)	29	(2,1)	23	(2,0)	21	(2,2)		11	(0,6)	0	(0,8)	
Norway		82	(2,4)	18	(2,4)		10	(2,0)	28	(2,8)	20	(2,6)	42	(2,9)		17	(0,8)	1	(1,3)	
Qatar		92	(0,1)	8	(0,1)		39	(0,2)	42	(0,1)	18	(0,1)	1	(0,0)		9	(0,0)	◊	◊	
Russian Federation		99	(0,9)	1	(0,9)		7	(2,3)	34	(3,3)	37	(3,6)	22	(2,4)		22	(0,5)	1	(0,9)	
Scotland		92	(1,8)	8	(1,8)		23	(3,6)	21	(3,1)	23	(2,8)	33	(3,4)	r	15	(0,9)	–1	(1,3)	
Singapore		67	(2,6)	33	(2,6)		37	(2,8)	36	(3,1)	18	(2,2)	8	(1,7)		10	(0,6)	–1	(1,1)	
Slovak Republic		94	(1,7)	6	(1,7)		12	(2,4)	32	(3,5)	28	(3,3)	28	(2,7)		20	(0,7)	◊	◊	
Slovenia		98	(0,7)	2	(0,7)		14	(1,9)	21	(2,4)	48	(3,0)	17	(2,5)		19	(0,6)	1	(1,0)	
Sweden		82	(2,9)	18	(2,9)		7	(1,8)	26	(3,1)	26	(2,5)	41	(3,3)		18	(0,9)	◊	◊	
Tunisia		66	(3,4)	34	(3,4)		8	(2,0)	47	(4,2)	35	(3,4)	10	(1,8)	r	17	(0,6)	–1	(0,9)	
Ukraine		100	(0,0)	0	(0,0)		8	(1,8)	32	(3,7)	38	(3,9)	22	(2,8)		22	(0,6)	◊	◊	
United States		88	(1,7)	12	(1,7)		18	(2,0)	28	(2,3)	22	(2,1)	31	(2,1)		14	(0,5)	0	(0,7)	
Yemen		26	(3,9)	74	(3,9)		29	(4,0)	61	(4,7)	8	(2,3)	2	(1,6)		13	(0,6)	◊	◊	
International Avg.		79	(0,5)	21	(0,5)		16	(0,4)	31	(0,6)	29	(0,5)	24	(0,5)		17	(0,1)			
Benchmarking Participants																				
Alberta, Canada		80	(3,1)	20	(3,1)		16	(3,1)	28	(4,0)	29	(4,1)	27	(3,3)		14	(0,8)	◊	◊	
British Columbia, Canada		82	(2,9)	18	(2,9)	r	10	(2,7)	32	(4,0)	23	(3,1)	35	(3,8)	r	15	(0,8)	◊	◊	
Dubai, UAE	r	80	(5,2)	20	(5,2)	r	21	(3,8)	44	(5,1)	24	(4,3)	11	(3,9)	r	13	(0,9)	◊	◊	
Massachusetts, US		93	(2,9)	7	(2,9)		23	(4,2)	28	(5,5)	23	(5,6)	26	(5,7)		13	(1,0)	◊	◊	
Minnesota, US		75	(5,6)	25	(5,6)		8	(3,4)	29	(5,3)	22	(5,4)	41	(7,2)		18	(1,2)	◊	◊	
Ontario, Canada		84	(3,2)	16	(3,2)		12	(2,7)	29	(4,5)	38	(4,9)	21	(3,9)		13	(0,8)	0	(1,2)	
Quebec, Canada		87	(3,0)	13	(3,0)		12	(2,5)	30	(3,6)	33	(4,2)	25	(3,8)		16	(0,8)	–2	(1,2)	

Background data provided by teachers.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 significantly higher.
▼ 2007 significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 27 Mathematics Teachers' Gender, Age, and Number of Years Teaching with Trends

TIMSS 2007 Mathematics 8

	Country	Percentage of Students by Teacher Characteristics															Trends in Average Number of Years Teaching				
		Gender					Age														
		Female			Male			29 Years or Under		30-39 Years		40-49 Years		50 Years or Older			2007		Difference from 2003		
	Algeria		40	(4,2)	60	(4,2)		6	(1,9)	25	(3,8)	63	(4,0)	7	(2,0)		19	(0,8)	◊	◊	
	Armenia		82	(2,7)	18	(2,7)		9	(2,6)	26	(3,3)	29	(3,4)	36	(3,6)	r	20	(0,7)	1	(1,0)	
	Australia		49	(4,3)	51	(4,3)		20	(3,2)	29	(3,7)	22	(3,2)	30	(3,2)		16	(0,8)	0	(1,2)	
	Bahrain		48	(1,1)	52	(1,1)		18	(1,9)	51	(2,7)	27	(2,6)	4	(1,4)		12	(0,5)	1	(0,9)	
	Bosnia and Herzegovina		57	(4,1)	43	(4,1)		6	(2,1)	22	(3,3)	22	(3,7)	50	(3,5)		23	(0,8)	◊	◊	
	Botswana		43	(4,5)	57	(4,5)		32	(4,4)	60	(4,5)	8	(2,3)	0	(0,1)	r	8	(0,4)	1	(0,7)	
	Bulgaria		86	(2,7)	14	(2,7)		1	(0,7)	12	(2,6)	37	(4,1)	50	(4,2)		23	(0,9)	3	(1,1)	▲
	Chinese Taipei		57	(4,4)	43	(4,4)		16	(3,2)	45	(4,1)	29	(3,7)	10	(2,4)		12	(0,7)	–2	(1,1)	
	Colombia		41	(5,8)	59	(5,8)		23	(4,0)	25	(3,8)	22	(4,1)	31	(5,3)		19	(1,4)	◊	◊	
	Cyprus		69	(2,4)	31	(2,4)		6	(1,5)	32	(2,4)	36	(2,6)	26	(2,5)		13	(0,5)	1	(0,8)	
	Czech Republic		79	(3,3)	21	(3,3)		13	(2,4)	19	(3,0)	34	(3,6)	35	(3,9)		20	(0,9)	◊	◊	
	Egypt		22	(3,5)	78	(3,5)		10	(2,5)	52	(3,8)	34	(3,6)	4	(1,4)		14	(0,6)	1	(0,7)	
	El Salvador		55	(4,6)	45	(4,6)		21	(3,7)	45	(4,9)	27	(3,3)	7	(2,3)		12	(0,6)	◊	◊	
	England		52	(4,2)	48	(4,2)		18	(3,4)	25	(3,3)	26	(3,3)	31	(2,8)	r	14	(0,9)	–2	(1,7)	
	Georgia		89	(3,2)	11	(3,2)		3	(1,3)	21	(3,7)	30	(4,1)	46	(4,2)		24	(1,0)	◊	◊	
	Ghana		8	(2,2)	92	(2,2)		52	(3,9)	28	(4,2)	16	(3,1)	4	(1,1)		7	(0,4)	0	(0,7)	
	Hong Kong SAR		40	(3,8)	60	(3,8)		26	(4,0)	35	(4,4)	27	(4,3)	12	(2,7)		13	(1,0)	1	(1,2)	
	Hungary		80	(3,3)	20	(3,3)		9	(2,7)	19	(3,3)	35	(2,9)	37	(3,2)		21	(0,8)	–1	(1,1)	
	Indonesia		44	(4,3)	56	(4,3)		15	(3,2)	41	(3,9)	37	(4,3)	7	(2,3)		14	(0,7)	0	(0,9)	
	Iran, Islamic Rep. of		42	(2,0)	58	(2,0)		26	(3,2)	49	(3,5)	20	(3,1)	5	(1,3)		15	(0,5)	0	(0,7)	
	Israel		76	(3,3)	24	(3,3)		15	(2,7)	33	(3,2)	32	(3,0)	20	(2,4)	r	17	(0,8)	1	(1,0)	
	Italy		81	(2,8)	19	(2,8)		2	(1,1)	10	(1,9)	22	(2,3)	67	(2,9)		23	(0,7)	0	(0,9)	
	Japan		43	(3,7)	57	(3,7)		20	(3,1)	28	(3,3)	39	(3,7)	13	(2,7)		16	(0,8)	–1	(1,0)	
	Jordan		52	(2,6)	48	(2,6)		36	(3,9)	39	(3,8)	18	(3,0)	7	(2,0)		10	(0,6)	–1	(0,9)	
	Korea, Rep. of		64	(3,2)	36	(3,2)		25	(2,8)	29	(2,9)	34	(3,2)	12	(2,5)	s	14	(0,7)	1	(0,8)	
	Kuwait	r	51	(2,5)	49	(2,5)	r	19	(3,7)	49	(4,9)	22	(3,6)	10	(2,9)	r	12	(0,7)	◊	◊	
	Lebanon		42	(4,4)	58	(4,4)		33	(4,0)	27	(3,6)	22	(3,7)	19	(3,8)	r	14	(1,0)	–1	(1,2)	
	Lithuania		93	(1,7)	7	(1,7)		7	(1,8)	12	(2,7)	47	(4,0)	34	(3,4)		23	(0,7)	2	(1,1)	▲
	Malaysia		71	(3,7)	29	(3,7)		22	(3,7)	39	(4,1)	28	(3,8)	10	(2,5)		12	(0,7)	2	(0,9)	
	Malta		59	(0,2)	41	(0,2)		47	(0,2)	30	(0,2)	13	(0,2)	10	(0,1)		11	(0,0)	◊	◊	
	Norway		41	(3,6)	59	(3,6)		10	(2,2)	34	(3,0)	17	(2,3)	39	(2,5)		17	(0,7)	–1	(1,2)	
	Oman		52	(2,4)	48	(2,4)		83	(3,0)	14	(2,9)	3	(1,0)	0	(0,4)		5	(0,4)	◊	◊	
	Palestinian Nat'l Auth.		49	(3,1)	51	(3,1)		37	(4,4)	29	(3,7)	24	(3,4)	11	(2,4)		12	(0,9)	1	(1,1)	
	Qatar		51	(0,2)	49	(0,2)		25	(0,1)	40	(0,1)	22	(0,1)	13	(0,1)		14	(0,0)	◊	◊	
	Romania		60	(3,4)	40	(3,4)		6	(1,8)	21	(3,0)	23	(3,1)	50	(3,2)		23	(1,0)	0	(1,5)	
	Russian Federation		94	(1,8)	6	(1,8)		5	(1,0)	21	(2,8)	33	(2,9)	41	(3,4)		24	(0,7)	0	(1,1)	
	Saudi Arabia		47	(1,7)	53	(1,7)		35	(4,3)	46	(4,2)	13	(2,6)	7	(2,6)		11	(0,8)	–	–	
	Scotland		58	(3,1)	42	(3,1)		16	(2,1)	25	(3,0)	25	(2,9)	33	(3,6)	r	15	(0,8)	–1	(1,3)	
	Serbia		61	(4,4)	39	(4,4)		9	(2,4)	20	(3,0)	20	(3,5)	51	(4,0)		20	(1,0)	–2	(1,4)	
	Singapore		64	(2,7)	36	(2,7)		45	(2,5)	31	(2,3)	12	(1,8)	12	(1,3)		8	(0,4)	–4	(0,8)	▼
	Slovenia		82	(2,0)	18	(2,0)		17	(2,1)	23	(2,4)	39	(3,0)	21	(2,5)		18	(0,6)	–2	(1,0)	
	Sweden		55	(2,9)	45	(2,9)		11	(2,0)	30	(2,7)	22	(2,7)	37	(3,2)		15	(0,8)	1	(1,1)	
	Syrian Arab Republic		55	(3,8)	45	(3,8)		34	(3,8)	39	(4,0)	17	(3,0)	10	(2,8)		11	(0,7)	◊	◊	
	Thailand		64	(4,1)	36	(4,1)		19	(3,5)	29	(3,9)	26	(3,9)	25	(3,8)		15	(0,9)	◊	◊	
	Tunisia		33	(3,8)	67	(3,8)		15	(2,9)	47	(4,1)	25	(3,6)	13	(2,7)	s	13	(0,6)	0	(1,1)	
	Turkey		45	(4,2)	55	(4,2)		49	(4,0)	16	(2,8)	19	(3,3)	16	(3,4)		11	(0,8)	◊	◊	
	Ukraine		91	(2,4)	9	(2,4)		8	(2,3)	21	(3,1)	31	(4,1)	40	(4,2)		23	(0,9)	◊	◊	
	United States		69	(2,6)	31	(2,6)		20	(2,3)	29	(2,8)	26	(2,8)	25	(2,2)		14	(0,6)	–1	(0,9)	
¶	Morocco		25	(3,5)	75	(3,5)		9	(2,9)	13	(3,0)	47	(5,4)	31	(5,2)	r	20	(1,3)	–	–	
	International Avg.		57	(0,5)	43	(0,5)		21	(0,4)	30	(0,5)	26	(0,5)	23	(0,4)		16	(0,1)			
Benchmarking Participants																					
	Basque Country, Spain		51	(5,2)	49	(5,2)		2	(1,4)	23	(4,0)	34	(4,3)	41	(4,8)		22	(1,1)	1	(1,4)	
	British Columbia, Canada		45	(4,3)	55	(4,3)		16	(3,4)	39	(4,7)	24	(3,9)	21	(3,8)		13	(0,8)	◊	◊	
	Dubai, UAE	s	57	(6,2)	43	(6,2)	s	13	(1,5)	46	(5,6)	24	(4,3)	17	(4,3)	s	15	(0,6)	◊	◊	
	Massachusetts, US		56	(6,1)	44	(6,1)		23	(5,6)	29	(6,5)	23	(5,3)	25	(5,3)		12	(1,2)	◊	◊	
	Minnesota, US		50	(8,2)	50	(8,2)		33	(8,6)	32	(7,7)	19	(7,0)	16	(4,6)		12	(1,5)	◊	◊	
	Ontario, Canada		49	(3,6)	51	(3,6)		20	(3,8)	50	(5,0)	16	(3,6)	14	(3,5)		10	(0,9)	–1	(1,2)	
	Quebec, Canada		53	(4,3)	47	(4,3)		22	(3,7)	46	(4,6)	19	(3,6)	13	(2,7)		11	(0,8)	–5	(1,3)	▼

Background data provided by teachers.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available.
An "r" indicates data are available for at least 70 but less than 85% of the students. An "s" indicates data are available for at least 50 but less than 70% of the students.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 significantly higher.
▼ 2007 significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 28 Science Teachers' Gender, Age, and Number of Years Teaching with Trends

TIMSS 2007 Science 4

Country	Percentage of Students by Teacher Characteristics															Trends in Average Number of Years Teaching					
	Gender					Age															
	Female			Male		29 Years or Under		30-39 Years		40-49 Years		50 Years or Older				2007		Difference from 2003		
Algeria		58	(4,5)	42	(4,5)		6	(1,9)	45	(4,6)	44	(4,4)	5	(1,8)		18	(0,6)	◊	◊	
Armenia		85	(3,3)	15	(3,3)		15	(3,0)	20	(3,2)	26	(3,2)	39	(4,4)	s	22	(0,8)	7	(1,4)	▲
Australia		77	(3,7)	23	(3,7)		21	(3,8)	17	(3,0)	30	(3,9)	32	(3,3)		17	(0,9)	0	(1,2)	
Austria		88	(2,2)	12	(2,2)		9	(2,1)	19	(2,5)	37	(3,0)	34	(2,9)		22	(0,7)	◊	◊	
Chinese Taipei		65	(4,5)	35	(4,5)		15	(3,3)	41	(4,2)	38	(4,1)	6	(2,0)		13	(0,7)	–1	(1,2)	
Colombia		77	(3,4)	23	(3,4)		18	(4,0)	28	(5,1)	33	(4,1)	22	(4,1)		18	(1,1)	◊	◊	
Czech Republic		91	(2,1)	9	(2,1)		11	(2,5)	26	(2,8)	38	(3,1)	25	(3,0)		17	(0,8)	◊	◊	
Denmark		45	(4,4)	55	(4,4)		9	(2,0)	30	(4,4)	27	(4,2)	33	(4,2)		16	(1,1)	◊	◊	
El Salvador		72	(4,1)	28	(4,1)		14	(2,8)	38	(3,8)	39	(3,7)	9	(2,6)		14	(0,7)	◊	◊	
England		70	(3,3)	30	(3,3)		31	(3,8)	28	(3,3)	25	(3,5)	16	(2,9)	r	11	(0,7)	–2	(1,2)	
Georgia		99	(0,6)	1	(0,6)		7	(2,2)	16	(2,3)	27	(3,9)	50	(4,4)		25	(1,1)	◊	◊	
Germany		86	(2,3)	14	(2,3)		9	(1,9)	25	(2,7)	22	(2,8)	44	(3,1)		19	(0,7)	◊	◊	
Hong Kong SAR		71	(3,7)	29	(3,7)		38	(4,4)	33	(4,4)	18	(3,3)	11	(2,9)		12	(0,8)	–2	(1,3)	
Hungary		95	(1,7)	5	(1,7)		5	(1,9)	20	(2,7)	45	(3,3)	30	(3,5)		23	(0,7)	3	(1,1)	▲
Iran, Islamic Rep. of		53	(2,7)	47	(2,7)		14	(2,4)	40	(4,1)	40	(3,9)	7	(1,6)		16	(0,6)	0	(0,9)	
Italy		97	(0,9)	3	(0,9)		4	(1,4)	20	(2,3)	37	(3,0)	39	(3,1)		21	(0,6)	0	(0,9)	
Japan		62	(3,6)	38	(3,6)		14	(2,8)	18	(3,0)	41	(3,9)	27	(3,4)		19	(0,8)	–1	(1,1)	
Kazakhstan		94	(1,7)	6	(1,7)		11	(3,0)	34	(3,7)	34	(5,2)	22	(4,6)		19	(0,9)	◊	◊	
Kuwait	r	88	(2,6)	12	(2,6)	r	55	(4,8)	37	(4,7)	7	(2,4)	1	(0,8)	r	7	(0,5)	◊	◊	
Latvia		100	(0,0)	0	(0,0)		6	(1,7)	31	(3,6)	34	(3,1)	29	(3,4)		21	(0,8)	3	(1,3)	▲
Lithuania		98	(0,8)	2	(0,8)		1	(0,6)	34	(3,0)	39	(3,5)	26	(3,3)		21	(0,6)	2	(0,9)	▲
Morocco		47	(3,8)	53	(3,8)		16	(3,0)	29	(3,5)	36	(3,9)	18	(3,0)	s	17	(0,6)	2	(1,1)	
Netherlands		58	(4,1)	42	(4,1)		24	(3,5)	19	(3,1)	15	(3,0)	42	(3,9)		18	(1,0)	2	(1,5)	
New Zealand		76	(2,4)	24	(2,4)		28	(2,6)	28	(2,3)	23	(2,1)	20	(2,4)	r	11	(0,6)	0	(0,9)	
Norway		82	(2,4)	18	(2,4)		10	(2,0)	28	(2,8)	20	(2,6)	42	(2,9)		17	(0,8)	1	(1,3)	
Qatar		92	(0,1)	8	(0,1)		30	(0,1)	50	(0,2)	17	(0,1)	3	(0,0)		10	(0,0)	◊	◊	
Russian Federation		99	(0,9)	1	(0,9)		7	(2,3)	34	(3,3)	37	(3,6)	22	(2,4)		22	(0,5)	1	(0,9)	
Scotland		92	(2,2)	8	(2,2)		23	(3,7)	21	(2,8)	23	(2,8)	33	(3,4)	r	15	(0,9)	0	(1,3)	
Singapore		72	(2,3)	28	(2,3)		42	(3,0)	35	(3,1)	16	(2,3)	7	(1,5)		9	(0,6)	–1	(1,0)	
Slovak Republic		94	(1,5)	6	(1,5)		10	(2,1)	31	(3,4)	29	(3,4)	29	(2,9)		19	(0,8)	◊	◊	
Slovenia		98	(0,7)	2	(0,7)		14	(1,9)	21	(2,4)	48	(3,0)	17	(2,5)		19	(0,6)	1	(1,0)	
Sweden		81	(2,8)	19	(2,8)		8	(1,8)	27	(3,1)	26	(2,7)	39	(3,1)		17	(0,8)	◊	◊	
Tunisia		56	(3,9)	44	(3,9)		8	(2,0)	40	(4,2)	39	(3,6)	13	(2,7)	r	19	(0,7)	1	(1,0)	
Ukraine		100	(0,0)	0	(0,0)		8	(1,8)	32	(3,7)	38	(3,9)	22	(2,8)		22	(0,6)	◊	◊	
United States		88	(1,7)	12	(1,7)		19	(2,0)	31	(2,6)	21	(2,3)	29	(2,3)		13	(0,5)	0	(0,8)	
Yemen		24	(3,7)	76	(3,7)		29	(4,5)	66	(4,9)	3	(1,9)	1	(0,9)		12	(0,5)	◊	◊	
International Avg.		79	(0,5)	21	(0,5)		16	(0,5)	30	(0,6)	30	(0,6)	24	(0,5)		17	(0,1)			
Benchmarking Participants																				
Alberta, Canada		81	(3,0)	19	(3,0)		16	(3,1)	27	(3,9)	29	(4,2)	28	(3,5)		14	(0,8)	◊	◊	
British Columbia, Canada	r	82	(3,0)	18	(3,0)	r	10	(2,8)	33	(4,1)	21	(3,0)	35	(3,8)	r	15	(0,8)	◊	◊	
Dubai, UAE	s	81	(3,4)	19	(3,4)	s	27	(4,2)	42	(3,9)	26	(4,7)	6	(2,9)	s	9	(0,9)	◊	◊	
Massachusetts, US		91	(3,1)	9	(3,1)		21	(3,7)	27	(6,0)	24	(5,5)	28	(5,9)		13	(1,0)	◊	◊	
Minnesota, US		75	(6,7)	25	(6,7)		13	(3,8)	24	(5,7)	23	(7,3)	40	(7,5)		18	(1,4)	◊	◊	
Ontario, Canada		83	(3,3)	17	(3,3)		14	(3,2)	34	(5,0)	29	(5,0)	23	(4,3)		13	(0,8)	0	(1,3)	
Quebec, Canada		88	(3,1)	12	(3,1)		14	(2,8)	30	(3,8)	33	(4,2)	23	(3,5)	r	15	(0,8)	–1	(1,3)	

Background data provided by teachers.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available.
An "r" indicates data are available for at least 70 but less than 85% of the students. An "s" indicates data are available for at least 50 but less than 70% of the students.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 significantly higher.
▼ 2007 significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 29 Science Teachers' Gender, Age, and Number of Years Teaching with Trends

TIMSS 2007 Science 8

Country	Percentage of Students by Teacher Characteristics															Trends in Average Number of Years Teaching			
	Gender					Age													
	Female			Male		29 Years or Under		30-39 Years		40-49 Years		50 Years or Older		2007		Difference from 2003		
Algeria		54	(3,6)	46	(3,6)		7	(1,9)	35	(3,0)	52	(3,3)	6	(1,5)	r	17	(0,6)	◊	◊	
Armenia		88	(2,3)	12	(2,3)		10	(1,6)	27	(2,2)	32	(2,5)	31	(2,0)	r	19	(0,4)	0	(0,7)	
Australia		50	(3,6)	50	(3,6)		23	(2,6)	24	(3,0)	26	(2,8)	27	(2,9)	r	14	(0,7)	–1	(1,1)	
Bahrain		50	(0,9)	50	(0,9)		18	(2,3)	53	(2,5)	28	(2,6)	2	(0,9)		12	(0,4)	3	(0,7)	▲
Bosnia and Herzegovina		62	(2,0)	38	(2,0)		10	(1,5)	21	(1,8)	25	(1,9)	44	(2,3)		21	(0,6)	◊	◊	
Botswana		42	(4,2)	58	(4,2)		42	(4,7)	53	(4,4)	4	(1,8)	1	(0,3)	r	7	(0,4)	1	(0,7)	
Bulgaria		84	(1,7)	16	(1,7)		4	(1,5)	25	(2,6)	30	(2,5)	41	(2,5)		20	(0,6)	–	–	
Chinese Taipei		37	(3,7)	63	(3,7)		15	(3,1)	40	(4,2)	35	(4,1)	9	(2,5)		12	(0,7)	–1	(1,1)	
Colombia		64	(4,9)	36	(4,9)		15	(3,0)	29	(4,4)	29	(4,0)	27	(5,4)		18	(1,4)	◊	◊	
Cyprus	r	62	(1,3)	38	(1,3)	r	13	(0,6)	15	(0,9)	47	(0,9)	25	(0,8)	r	10	(0,2)	1	(0,4)	▲
Czech Republic		70	(2,3)	30	(2,3)		15	(1,9)	20	(1,9)	25	(1,7)	40	(2,3)		19	(0,7)	◊	◊	
Egypt		41	(4,2)	59	(4,2)		20	(3,5)	39	(3,9)	38	(4,0)	2	(1,3)		15	(0,7)	2	(0,8)	▲
El Salvador		49	(4,4)	51	(4,4)		14	(2,9)	51	(4,1)	29	(3,5)	6	(1,6)		13	(0,5)	◊	◊	
England		55	(2,9)	45	(2,9)		26	(3,0)	28	(2,5)	21	(2,1)	26	(2,7)	s	12	(0,6)	0	(1,3)	
Georgia		92	(1,2)	8	(1,2)		5	(1,2)	23	(2,3)	33	(2,3)	40	(3,1)		21	(0,7)	◊	◊	
Ghana		8	(2,1)	92	(2,1)		52	(3,9)	32	(4,1)	8	(2,1)	8	(2,3)		7	(0,6)	–1	(0,9)	
Hong Kong SAR		37	(4,7)	63	(4,7)		23	(4,0)	39	(4,5)	27	(4,3)	12	(3,2)		14	(0,9)	2	(1,2)	
Hungary		76	(2,0)	24	(2,0)		7	(1,3)	17	(1,7)	39	(2,2)	37	(2,3)		22	(0,5)	1	(0,7)	
Indonesia		56	(3,8)	44	(3,8)		20	(2,3)	44	(3,2)	31	(3,0)	5	(1,2)		12	(0,6)	0	(0,8)	
Iran, Islamic Rep. of		42	(2,1)	58	(2,1)		14	(2,5)	53	(3,4)	24	(3,0)	9	(1,9)		15	(0,6)	0	(0,8)	
Israel		78	(3,1)	22	(3,1)		16	(3,1)	29	(3,2)	34	(3,5)	21	(2,9)	r	16	(0,8)	0	(1,1)	
Italy		81	(2,8)	19	(2,8)		2	(1,1)	10	(1,9)	22	(2,3)	67	(2,9)		23	(0,7)	0	(0,9)	
Japan		16	(3,0)	84	(3,0)		19	(3,1)	25	(3,6)	32	(4,0)	25	(3,7)		17	(0,9)	–1	(1,2)	
Jordan		53	(2,1)	47	(2,1)		44	(4,4)	36	(4,0)	14	(2,9)	6	(1,9)		9	(0,6)	–2	(1,0)	
Korea, Rep. of		63	(3,4)	37	(3,4)		21	(3,1)	26	(3,3)	41	(3,3)	12	(2,8)	r	14	(0,7)	1	(0,9)	
Kuwait	r	50	(3,0)	50	(3,0)	r	23	(3,7)	42	(4,3)	27	(3,2)	9	(2,4)	s	13	(0,8)	◊	◊	
Lebanon		64	(3,6)	36	(3,6)		42	(4,1)	33	(3,6)	17	(2,3)	9	(2,2)		11	(0,6)	1	(0,8)	
Lithuania		81	(1,7)	19	(1,7)		7	(1,3)	17	(1,6)	40	(2,1)	36	(2,1)		22	(0,6)	2	(0,9)	
Malaysia		75	(3,3)	25	(3,3)		23	(3,5)	49	(4,4)	23	(3,5)	6	(2,0)		11	(0,6)	0	(0,9)	
Malta		57	(0,3)	43	(0,3)		47	(0,3)	30	(0,2)	14	(0,2)	8	(0,2)		10	(0,1)	◊	◊	
Norway		39	(3,2)	61	(3,2)		10	(2,5)	40	(3,6)	14	(2,3)	35	(3,1)		16	(0,8)	0	(1,3)	
Oman		51	(2,4)	49	(2,4)		76	(3,5)	18	(3,2)	5	(1,6)	1	(0,8)		7	(0,5)	◊	◊	
Palestinian Nat'l Auth.		53	(2,5)	47	(2,5)		36	(3,9)	26	(3,4)	27	(3,9)	11	(2,6)		11	(0,8)	1	(1,1)	
Qatar		49	(0,2)	51	(0,2)		22	(0,1)	51	(0,2)	18	(0,1)	9	(0,1)		12	(0,0)	◊	◊	
Romania		72	(2,2)	28	(2,2)		13	(1,5)	22	(1,9)	23	(1,9)	42	(2,6)		21	(0,6)	2	(0,9)	▲
Russian Federation		92	(1,1)	8	(1,1)		10	(1,3)	21	(1,4)	32	(2,0)	36	(1,9)		22	(0,4)	2	(0,7)	▲
Saudi Arabia		49	(2,0)	51	(2,0)		24	(3,3)	63	(3,8)	13	(3,0)	1	(0,7)		10	(0,4)	–	–	
Scotland	r	51	(2,3)	49	(2,3)	r	20	(2,0)	15	(1,7)	26	(2,5)	38	(2,1)	s	17	(0,6)	–1	(0,9)	
Serbia		74	(1,9)	26	(1,9)		4	(0,7)	26	(1,9)	26	(1,6)	44	(2,2)		18	(0,6)	–1	(0,7)	
Singapore		64	(2,4)	36	(2,4)		44	(2,5)	29	(2,3)	13	(1,5)	14	(1,6)		10	(0,5)	–2	(0,8)	▼
Slovenia		82	(1,7)	18	(1,7)		9	(1,6)	24	(2,0)	43	(2,4)	24	(2,4)		19	(0,5)	1	(0,8)	
Sweden		52	(3,0)	48	(3,0)		12	(2,0)	33	(3,0)	21	(2,1)	34	(2,7)		14	(0,7)	1	(1,0)	
Syrian Arab Republic		68	(3,0)	32	(3,0)		35	(3,2)	26	(2,7)	33	(3,2)	6	(1,5)		11	(0,7)	◊	◊	
Thailand		68	(3,9)	32	(3,9)		23	(3,6)	29	(3,6)	27	(3,8)	21	(3,5)		14	(0,7)	◊	◊	
Tunisia		65	(3,9)	35	(3,9)		17	(3,2)	48	(3,7)	25	(3,1)	10	(2,6)	r	11	(0,7)	0	(1,0)	
Turkey		49	(4,4)	51	(4,4)		33	(3,6)	36	(4,0)	17	(3,4)	14	(3,2)		12	(0,8)	◊	◊	
Ukraine		86	(1,7)	14	(1,7)		12	(1,7)	26	(2,2)	29	(1,9)	33	(2,1)		21	(0,5)	◊	◊	
United States		58	(3,0)	42	(3,0)		15	(2,4)	30	(2,7)	25	(2,4)	30	(3,0)		13	(0,6)	–1	(0,9)	
¶ Morocco		39	(4,3)	61	(4,3)		9	(2,3)	25	(3,2)	39	(3,3)	28	(3,1)	r	17	(1,1)	–	–	
International Avg.		59	(0,4)	41	(0,4)		21	(0,4)	32	(0,4)	27	(0,4)	21	(0,3)		15	(0,1)			
Benchmarking Participants																				
Basque Country, Spain		56	(4,8)	44	(4,8)		5	(2,3)	20	(3,4)	47	(4,6)	28	(4,1)		20	(1,0)	3	(1,4)	▲
British Columbia, Canada		46	(4,2)	54	(4,2)		15	(2,6)	41	(3,5)	24	(3,7)	20	(3,1)	r	13	(0,7)	◊	◊	
Dubai, UAE	s	62	(4,1)	38	(4,1)	s	15	(2,9)	49	(4,6)	23	(5,5)	13	(4,3)	s	14	(0,6)	◊	◊	
Massachusetts, US		57	(5,1)	43	(5,1)		25	(5,9)	22	(6,1)	29	(6,1)	24	(6,5)		10	(1,1)	◊	◊	
Minnesota, US		42	(6,0)	58	(6,0)		30	(6,1)	16	(4,7)	26	(7,1)	28	(6,1)		13	(1,1)	◊	◊	
Ontario, Canada		55	(4,1)	45	(4,1)		24	(4,3)	45	(4,4)	20	(3,9)	12	(2,8)		9	(0,7)	–3	(1,1)	▼
Quebec, Canada		52	(4,2)	48	(4,2)		35	(4,8)	34	(5,0)	23	(4,4)	8	(2,7)	r	9	(0,8)	–3	(1,1)	▼

Background data provided by teachers.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available.
An "r" indicates data are available for at least 70 but less than 85% of the students. An "s" indicates data are available for at least 50 but less than 70% of the students.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 significantly higher.
▼ 2007 significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

STUDENTS' ATTITUDE AND SELF-CONFIDENCE

Students' Attitude Towards Mathematics and Science

TIMSS conducted a survey on students' attitude towards science and mathematics, and investigated the correlation between students' attitudes and students' performances on the TIMSS achievement scale.

To examine how students feel about science and mathematics, TIMSS created an index based on students' responses to three statements about science and mathematics:

1. I enjoy learning mathematics / learning science.
2. Mathematics / Science is boring.
3. like mathematics / science.

Students were assigned to three categories based on their responses (high, medium and low index level). Students who were assigned to the highest index level had the most positive attitude towards the given subject.

Students' attitude towards science or mathematics was usually independent from or even in reverse relationship to their TIMSS 2007 achievement results. Students from the countries with weaker results had usually more positive attitude towards the subjects concerned than the others with better results (with the only exception of Kazakhstan). The negative correlation between attitude and students' achievement can be explained by the fact that students are usually more disagreeing with higher level of performance expectations whilst they are more positive when expectations are smaller (Tables 30, 31, 32, 33).

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At fourth grade, students with the greatest majority really like mathematics (78-90%) in the former Soviet States and some Arab countries, whose achievements were lower than the TIMSS scale average, except for two countries. This fact supports the negative correlation between attitude and achievement described above. There were fewer students having really positive attitude towards mathematics in the best-achieving countries (50-67%). This ratio for Hungarian students was 64 percent.

The results are directly influenced by how much students like the subject, however it is important in itself how much schools make students like the subject as further education choices depend not only on students' achievements in a particular subject but also on their attitude towards it.

On average internationally, at fourth grade high attitude index level, i.e. positive attitude towards mathematics is not necessarily accompanied with high or remarkable achievement. Students at the high level of the positive attitude index achieved on average only 26 points higher than students at the medium or low level of the index whose achievements did not differ significantly. At eighth grades, there was a slightly closer relation between positive attitude and results, the difference between the results of students with high index level and medium index level is 30 points, and between the medium and the low index level is 13 points. In science attitude indices, differences in results are lower between each attitude index level.

The impact of positive attitude indices on average achievements of students varies from country to country, but some positive effects can be detected in a number of countries'. Students at high attitude index level usually outperformed students at medium or low attitude index level on the achievement scale while the performance of the latter groups is usually similar to one another.

Relatively small percentages of Hungarian students like mathematics. At fourth grades, the ratio of students at high index level is 69 percent, which is slightly below the international average (72%), whereas the ratio of eighth grade students having a clearly positive attitude towards mathematics is only 30 percent, which is one of the lowest internationally. This value was significantly higher in 1995 and 1999, by 5 and 6 percentage points, respectively.

Results are similar for science as well. At fourth grade, the ratio of students with a positive attitude index is 69 percent, which is slightly below the international average. At eighth grade, even fewer students reported placing high value on the attitude index (53% of students had a positive attitude towards biology, 39% towards earth science index, 31% towards physics, and 29% towards chemistry).

In Hungary, there is correlation between how much students like mathematics and their results on the TIMSS achievement scale at both grades (more positive attitude was accompanied with better performance on the scale).

In Hungary the attitude index level and the TIMSS achievement scores in science do not necessarily show correlation. On the other hand, it should be noted that when interpreting the impact of attitude at eighth grade the attitude indices for the four separate science subjects and the students' overall science achievements were examined.

Index of Students' Self-confidence and effectiveness

TIMSS examined how students' self-confidence in mathematics and science correlate with their performance on the TIMSS achievement scales. To investigate how students think about their abilities in mathematics and science, TIMSS created an Index of Students' Self-Confidence.

The Index of Students' Self-Confidence was based on students' responses to four statements about their mathematics and science ability and was created by adding and averaging the ratings showing agreement or disagreement with the statements:

1. I usually do well in mathematics / science.
2. Mathematics / Science is harder for me than for many of my classmates.
3. I am just not good at mathematics / science.
4. I learn things quickly in mathematics / science.

Similarly to the mathematics and science attitude indices, the highest percentages of students at high level of self-confidence in mathematics and science were not from countries where students achieved the highest scores on the TIMSS achievement scale in both mathematics and science.

At fourth grade, the highest ratio of the students with high level of self-confidence in mathematics (70-77%) were reported in some developed European countries (Sweden, Austria, Germany, and Denmark) (Table 34). In science, there were also some less developed countries whose students were at the high level of index at a high rate (Table 36).

113., 115. pages

At eighth grade in mathematics, the highest percentages of students at high level of the index were from North African, Middle East, Anglo-Saxon and Scandinavian countries (53-59%) (Table 35), whereas in science self-confidence levels were highest in Bosnia, Serbia, the Czech Republic, Tunisia, Jordan, Colombia, Algeria, and Georgia (48-72%). (Table 37)

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In Hungary, at fourth grade, the ratio of students at high level of the index was 62 percent, at eighth grade it was 42 percent, which is about the same as the international average.

In Hungary, student self-confidence data for science were similar to those for mathematics. At eighth grade, percentages of students at the high level of the self-confidence index were close to the international average percentages, except for chemistry. For chemistry this percentage in Hungary was lower than the average.

Percentages of students at high self-confidence indices in both subjects and both grades decreased significantly compared to percentages in 2003.

On average internationally, there was a positive relation between self-confidence in learning mathematics or science and students' achievements on the TIMSS-scales. Students at the higher level of the self-confidence index had higher average achievement in mathematics and science. Difference between the average achievement of students at high level of the self-confidence index and students at the low level of the index was 42-82 scale scores on average.

This is more or less true for Hungarian students as well. In general, students with high achievement scores on the TIMSS scale in mathematics were those with high level of the self-confidence index. In science there is only one 'dividing line': between the average achievements of students with high level and medium level of self-confidence index. There is no significant difference between the average achievements of students at the medium and low levels of the index.

Table 30 Index of Students' Positive Affect Toward Mathematics (PATM) with Trends

TIMSS 2007 Mathematics 4

Country	High PATM							Medium PATM							Low PATM						
	2007 Percent of Students		Average Achievement		Difference in Percent from 1995			2007 Percent of Students		Average Achievement		Difference in Percent from 1995			2007 Percent of Students		Average Achievement		Difference in Percent from 1995		
Georgia	90	(0,9)	450	(3,7)	◊	◊		6	(0,6)	415	(9,0)	◊	◊		4	(0,5)	415	(10,2)	◊	◊	
Kazakhstan	89	(0,9)	554	(6,5)	◊	◊		8	(0,7)	518	(16,0)	◊	◊		3	(0,4)	493	(11,1)	◊	◊	
Morocco	87	(1,0)	356	(4,8)	◊	◊		8	(0,7)	301	(10,0)	◊	◊		5	(0,6)	301	(17,1)	◊	◊	
Ukraine	86	(0,7)	479	(2,9)	◊	◊		8	(0,5)	449	(5,8)	◊	◊		5	(0,5)	442	(8,3)	◊	◊	
Colombia	86	(0,8)	365	(4,6)	◊	◊		9	(0,6)	338	(10,0)	◊	◊		5	(0,5)	355	(15,9)	◊	◊	
Tunisia	85	(0,9)	349	(4,3)	◊	◊		10	(0,6)	282	(7,0)	◊	◊		5	(0,6)	273	(12,6)	◊	◊	
Algeria	84	(1,0)	389	(5,0)	◊	◊		10	(0,6)	343	(7,7)	◊	◊		5	(0,6)	339	(12,3)	◊	◊	
Iran, Islamic Rep. of r	83	(1,0)	418	(4,1)	–1	(1,6)		9	(0,8)	370	(6,6)	–5	(1,4)	▼	8	(0,7)	355	(9,9)	6	(0,8)	▲
Qatar	81	(0,5)	314	(1,3)	◊	◊		10	(0,4)	267	(3,8)	◊	◊		9	(0,3)	286	(3,9)	◊	◊	
Russian Federation	80	(1,3)	552	(5,0)	◊	◊		13	(1,0)	524	(6,9)	◊	◊		8	(0,5)	511	(8,7)	◊	◊	
Armenia	79	(1,4)	509	(4,3)	◊	◊		12	(0,9)	492	(10,0)	◊	◊		9	(0,9)	507	(12,9)	◊	◊	
Kuwait	78	(1,1)	332	(3,5)	–	–		12	(0,7)	295	(7,4)	–	–		10	(0,7)	306	(7,6)	–	–	
El Salvador	77	(0,9)	340	(4,0)	◊	◊		16	(0,8)	306	(6,4)	◊	◊		7	(0,5)	320	(9,4)	◊	◊	
Italy	75	(0,9)	514	(3,3)	–	–		13	(0,6)	494	(4,9)	–	–		12	(0,7)	490	(4,4)	–	–	
Lithuania	74	(1,2)	541	(2,3)	◊	◊		14	(0,8)	498	(4,8)	◊	◊		12	(0,8)	505	(5,0)	◊	◊	
Yemen	73	(1,4)	240	(6,5)	◊	◊		19	(1,0)	215	(8,1)	◊	◊		8	(0,6)	211	(9,6)	◊	◊	
Singapore	71	(0,8)	610	(3,5)	–15	(1,1)	▼	14	(0,6)	575	(5,9)	5	(0,8)	▲	15	(0,6)	575	(5,6)	11	(0,7)	▲
Slovenia	71	(1,1)	508	(2,0)	–10	(1,6)	▼	13	(0,6)	487	(3,8)	–1	(1,1)		16	(0,9)	490	(4,0)	11	(1,1)	▲
Germany	70	(0,9)	534	(2,7)	◊	◊		16	(0,6)	520	(3,7)	◊	◊		14	(0,7)	509	(3,6)	◊	◊	
Slovak Republic	68	(1,2)	505	(4,7)	◊	◊		14	(0,7)	484	(4,1)	◊	◊		18	(1,0)	482	(5,6)	◊	◊	
Norway	68	(1,2)	478	(3,1)	–4	(2,1)		15	(0,6)	470	(5,1)	1	(1,1)		18	(1,0)	462	(3,7)	3	(1,6)	▲
Sweden	67	(1,2)	505	(2,8)	◊	◊		16	(0,7)	501	(3,2)	◊	◊		17	(1,0)	497	(4,1)	◊	◊	
Hong Kong SAR	67	(1,3)	619	(3,5)	–5	(1,8)	▼	15	(0,7)	588	(4,2)	–2	(1,2)		19	(1,1)	579	(5,1)	7	(1,5)	▲
Australia	66	(1,4)	525	(3,6)	–7	(1,7)	▼	16	(0,8)	512	(4,6)	3	(1,0)	▲	18	(1,1)	494	(5,1)	4	(1,2)	▲
United States	66	(0,8)	535	(2,7)	–8	(1,4)	▼	16	(0,5)	526	(3,0)	3	(0,8)	▲	18	(0,6)	517	(2,5)	5	(1,0)	▲
New Zealand	66	(1,0)	499	(2,6)	–5	(1,6)	▼	18	(0,8)	485	(3,8)	3	(1,2)	▲	17	(0,8)	484	(3,3)	3	(1,2)	▲
Latvia	65	(1,1)	544	(3,0)	–6	(1,7)	▼	17	(0,8)	528	(4,8)	–1	(1,2)		17	(0,9)	527	(3,4)	7	(1,2)	▲
Hungary	64	(1,3)	522	(3,5)	–4	(2,1)		15	(0,7)	498	(6,4)	–3	(1,1)	▼	21	(1,1)	492	(5,8)	7	(1,6)	▲
Czech Republic	64	(1,3)	495	(3,1)	–9	(1,8)	▼	15	(0,7)	479	(4,3)	–1	(1,0)		21	(1,0)	471	(3,4)	10	(1,3)	▲
England	62	(1,4)	548	(3,1)	–14	(1,8)	▼	17	(0,8)	544	(4,7)	7	(1,0)	▲	21	(1,1)	524	(4,1)	7	(1,5)	▲
Austria	62	(1,0)	513	(2,0)	–5	(1,7)	▼	16	(0,7)	499	(4,1)	1	(1,1)		22	(0,9)	492	(2,9)	4	(1,3)	▲
Japan	62	(1,4)	584	(2,4)	–1	(1,8)		21	(0,8)	547	(3,3)	–1	(1,2)		17	(1,0)	543	(4,4)	3	(1,2)	▲
Scotland	59	(1,3)	497	(2,7)	–	–		18	(0,8)	496	(3,5)	–	–		24	(1,1)	490	(3,9)	–	–	
Netherlands	56	(1,4)	540	(2,7)	–5	(2,0)	▼	17	(0,9)	531	(3,6)	3	(1,2)	▲	27	(1,3)	528	(3,4)	3	(1,9)	
Denmark	55	(1,8)	526	(3,0)	◊	◊		24	(1,0)	521	(3,4)	◊	◊		21	(1,4)	523	(3,1)	◊	◊	
Chinese Taipei	50	(1,2)	595	(2,4)	◊	◊		21	(0,8)	563	(3,2)	◊	◊		29	(0,9)	555	(2,9)	◊	◊	
International Avg.	72	(0,2)	483	(0,6)				14	(0,1)	457	(1,1)				14	(0,1)	454	(1,3)			
Benchmarking Participants																					
Dubai, UAE	81	(1,0)	452	(2,3)	◊	◊		10	(0,7)	442	(7,2)	◊	◊		9	(0,8)	431	(8,3)	◊	◊	
Quebec, Canada	72	(1,3)	528	(3,1)	–10	(2,4)	▼	13	(0,9)	503	(5,9)	3	(1,4)	▲	15	(0,8)	494	(4,1)	7	(1,9)	▲
Massachusetts, US	67	(1,6)	579	(4,6)	◊	◊		16	(1,1)	570	(5,9)	◊	◊		17	(1,1)	553	(4,2)	◊	◊	
Alberta, Canada	66	(1,2)	513	(3,3)	–12	(2,2)	▼	16	(0,7)	498	(4,1)	5	(1,1)	▲	17	(1,0)	486	(4,4)	7	(1,9)	▲
Minnesota, US	64	(2,4)	561	(6,9)	–8	(3,4)	▼	19	(1,4)	550	(7,0)	4	(2,0)		18	(1,5)	536	(7,1)	4	(2,2)	
British Columbia, Canada	64	(1,3)	514	(3,2)	◊	◊		18	(0,8)	496	(3,1)	◊	◊		19	(0,9)	490	(4,1)	◊	◊	
Ontario, Canada	59	(1,5)	519	(3,6)	–21	(1,9)	▼	18	(0,9)	512	(4,2)	6	(1,1)	▲	24	(1,4)	495	(4,6)	15	(1,5)	▲

Index based on students' responses to three statements about mathematics: 1) I enjoy learning mathematics; 2) Mathematics is boring (Reversed); 3) I like mathematics. Average is computed across the three items based on a 4-point scale: 1. Agree a lot; 2. Agree a little; 3. Disagree a little; 4. Disagree a lot. Students agreeing a lot or a little on average across the three statements are assigned to the high level. Students disagreeing a little or a lot on average across the three statements are assigned to the low level. All other students are assigned to the middle level.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

A dash (–) indicates comparable data are not available.

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

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 percent significantly higher.

▼ 2007 percent significantly lower.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 31 Index of Students' Positive Affect Toward Mathematics (PATM) with Trends

TIMSS 2007 Mathematics 8

Country	High PATM							Medium PATM							Low PATM						
	2007 Percent of Students	Average Achievement	Difference in Percent from 1999	Difference in Percent from 1995				2007 Percent of Students	Average Achievement	Difference in Percent from 1999	Difference in Percent from 1995				2007 Percent of Students	Average Achievement	Difference in Percent from 1999	Difference in Percent from 1995			
Algeria	83 (0,7)	394 (2,2)	◊	◊		◊	◊	10 (0,5)	364 (3,9)	◊	◊		◊	◊	7 (0,5)	357 (3,8)	◊	◊		◊	◊
Egypt	78 (1,1)	404 (3,4)	◊	◊		◊	◊	14 (0,8)	362 (6,5)	◊	◊		◊	◊	8 (0,5)	376 (7,6)	◊	◊		◊	◊
Botswana	78 (1,0)	376 (2,3)	◊	◊		◊	◊	13 (0,6)	339 (3,8)	◊	◊		◊	◊	9 (0,7)	332 (5,0)	◊	◊		◊	◊
Oman	78 (0,9)	386 (3,3)	◊	◊		◊	◊	16 (0,8)	335 (4,7)	◊	◊		◊	◊	6 (0,4)	334 (7,5)	◊	◊		◊	◊
Tunisia	73 (1,0)	430 (2,5)	0 (1,4)			◊	◊	14 (0,6)	398 (4,2)	1 (0,8)			◊	◊	13 (0,7)	395 (4,2)	–1 (1,0)			◊	◊
Malaysia	73 (1,0)	485 (5,2)	–16 (1,2)	▼		◊	◊	18 (0,8)	445 (5,6)	9 (0,9)	▲		◊	◊	10 (0,6)	445 (6,0)	7 (0,6)	▲		◊	◊
Jordan	72 (1,4)	448 (4,0)	3 (1,9)			◊	◊	15 (0,8)	396 (5,5)	–3 (1,1)	▼		◊	◊	13 (1,0)	385 (9,2)	0 (1,3)			◊	◊
Indonesia	72 (1,3)	400 (3,9)	–10 (1,7)	▼		◊	◊	21 (1,0)	390 (4,9)	7 (1,3)	▲		◊	◊	7 (0,6)	402 (7,3)	3 (0,7)	▲		◊	◊
Turkey	71 (1,2)	450 (5,1)	–	–		◊	◊	17 (0,8)	399 (6,3)	–	–		◊	◊	11 (0,8)	386 (5,8)	–	–		◊	◊
Syrian Arab Republic	70 (1,1)	410 (3,6)	◊	◊		◊	◊	17 (0,8)	376 (5,4)	◊	◊		◊	◊	13 (0,6)	368 (4,5)	◊	◊		◊	◊
Ghana	70 (1,2)	327 (4,2)	◊	◊		◊	◊	22 (0,8)	282 (6,3)	◊	◊		◊	◊	8 (0,6)	269 (8,4)	◊	◊		◊	◊
Colombia	69 (1,3)	385 (3,5)	◊	◊		–1 (1,9)		20 (1,0)	377 (4,7)	◊	◊		–2 (1,5)		11 (0,7)	380 (6,7)	◊	◊		2 (1,1)	▲
El Salvador	68 (1,3)	351 (2,7)	◊	◊		◊	◊	22 (1,0)	327 (3,8)	◊	◊		◊	◊	10 (0,7)	327 (6,0)	◊	◊		◊	◊
Iran, Islamic Rep. of	64 (1,2)	425 (4,4)	–7 (1,5)	▼		–3 (1,8)		21 (1,0)	382 (4,5)	2 (1,2)			0 (1,4)		15 (0,9)	382 (6,6)	5 (1,1)	▲		2 (1,3)	
Lebanon	63 (1,3)	465 (4,3)	◊	◊		◊	◊	19 (0,9)	428 (5,9)	◊	◊		◊	◊	17 (0,9)	428 (4,9)	◊	◊		◊	◊
Singapore	60 (1,0)	615 (3,6)	–7 (1,5)	▼		–7 (1,6)	▼	20 (0,6)	575 (5,3)	1 (1,0)			0 (1,0)		20 (0,8)	545 (5,4)	6 (1,1)	▲		6 (1,2)	▲
Bahrain	59 (0,9)	412 (2,0)	◊	◊		◊	◊	18 (0,6)	389 (2,8)	◊	◊		◊	◊	23 (0,8)	376 (3,0)	◊	◊		◊	◊
Georgia	58 (1,7)	436 (5,0)	◊	◊		◊	◊	22 (1,0)	399 (7,8)	◊	◊		◊	◊	20 (1,2)	392 (6,5)	◊	◊		◊	◊
Qatar	57 (0,5)	321 (1,6)	◊	◊		◊	◊	19 (0,5)	299 (4,0)	◊	◊		◊	◊	24 (0,5)	296 (2,8)	◊	◊		◊	◊
Thailand	57 (1,5)	457 (5,6)	–2 (1,9)			–	–	31 (1,1)	420 (5,1)	–1 (1,4)			–	–	12 (0,7)	427 (5,8)	3 (0,9)	▲		–	–
Kuwait	57 (1,0)	367 (2,4)	◊	◊		–	–	20 (0,7)	349 (3,7)	◊	◊		–	–	24 (0,9)	338 (4,3)	◊	◊		–	–
Palestinian Nat'l Auth.	56 (1,3)	392 (4,1)	◊	◊		◊	◊	22 (0,8)	340 (5,0)	◊	◊		◊	◊	22 (1,0)	347 (4,1)	◊	◊		◊	◊
Armenia	55 (1,4)	511 (3,9)	◊	◊		◊	◊	23 (0,7)	494 (6,4)	◊	◊		◊	◊	22 (1,2)	489 (4,5)	◊	◊		◊	◊
Ukraine	54 (1,5)	485 (3,9)	◊	◊		◊	◊	23 (0,8)	456 (4,3)	◊	◊		◊	◊	23 (1,1)	440 (4,0)	◊	◊		◊	◊
Saudi Arabia	54 (1,4)	340 (3,7)	◊	◊		◊	◊	22 (0,8)	321 (4,0)	◊	◊		◊	◊	24 (1,0)	323 (4,7)	◊	◊		◊	◊
Russian Federation	53 (1,1)	533 (4,6)	0 (1,9)			5 (1,7)	▲	27 (0,8)	494 (4,7)	–5 (1,3)	▼		–7 (1,3)	▼	20 (0,8)	488 (5,7)	5 (1,3)	▲		2 (1,2)	
Israel	49 (1,1)	475 (4,8)	–12 (1,9)	▼		–	–	22 (0,8)	470 (5,3)	2 (1,2)			–	–	28 (1,1)	451 (4,8)	10 (1,4)	▲		–	–
Romania	47 (1,4)	486 (4,9)	–6 (2,1)	▼		–8 (2,0)	▼	21 (0,8)	451 (5,1)	–5 (1,4)	▼		–7 (1,3)	▼	31 (1,2)	443 (4,5)	11 (1,6)	▲		15 (1,5)	▲
Hong Kong SAR	47 (1,2)	603 (5,5)	–9 (1,6)	▼		–2 (1,9)		22 (0,9)	566 (6,4)	–2 (1,1)			–4 (1,2)	▼	31 (1,2)	532 (7,3)	11 (1,4)	▲		6 (1,7)	▲
Bulgaria	46 (1,2)	487 (5,6)	–4 (2,5)			–	–	22 (0,9)	463 (5,5)	–3 (1,4)	▼		–	–	32 (1,2)	448 (6,4)	8 (2,2)	▲		–	–
Cyprus	44 (0,9)	497 (2,4)	–23 (1,4)	▼		–21 (1,4)	▼	21 (0,6)	455 (3,4)	2 (1,0)	▲		2 (0,9)		35 (0,8)	436 (2,4)	21 (1,2)	▲		19 (1,2)	▲
Malta	42 (0,6)	517 (1,8)	◊	◊		◊	◊	21 (0,6)	474 (3,2)	◊	◊		◊	◊	37 (0,7)	465 (2,4)	◊	◊		◊	◊
United States	41 (0,8)	524 (2,9)	–11 (1,4)	▼		–9 (1,4)	▼	24 (0,5)	511 (3,3)	2 (0,8)	▲		–2 (0,9)	▼	35 (0,8)	490 (3,3)	9 (1,2)	▲		11 (1,1)	▲
Bosnia and Herzegovina	41 (1,2)	476 (3,2)	◊	◊		◊	◊	16 (0,6)	459 (4,2)	◊	◊		◊	◊	43 (1,3)	444 (3,4)	◊	◊		◊	◊
England	40 (1,4)	532 (5,7)	–25 (1,9)	▼		–27 (2,1)	▼	25 (0,9)	515 (6,1)	6 (1,2)	▲		7 (1,3)	▲	35 (1,5)	495 (4,9)	19 (1,8)	▲		20 (1,8)	▲
Sweden	39 (1,1)	517 (2,9)	◊	◊		–9 (2,1)	▼	24 (0,6)	488 (2,9)	◊	◊		–3 (1,4)		37 (1,1)	470 (2,7)	◊	◊		12 (1,7)	▲
Lithuania	38 (1,1)	531 (3,4)	–14 (1,9)	▼		5 (1,8)	▲	28 (0,8)	503 (2,7)	–1 (1,3)			–6 (1,5)	▼	34 (1,1)	481 (3,5)	14 (1,6)	▲		0 (1,8)	
Italy	38 (1,2)	506 (3,3)	–16 (1,8)	▼		–	–	23 (0,8)	482 (4,5)	1 (1,2)			–	–	39 (1,1)	455 (3,2)	15 (1,6)	▲		–	–
Chinese Taipei	37 (1,2)	657 (3,7)	–8 (1,6)	▼		◊	◊	18 (0,6)	605 (5,1)	–4 (0,8)	▼		◊	◊	45 (1,4)	547 (4,6)	12 (1,7)	▲		◊	◊
Norway	37 (1,1)	488 (2,4)	◊	◊		–12 (1,6)	▼	24 (0,6)	474 (2,6)	◊	◊		–2 (1,1)	▼	39 (1,1)	451 (2,1)	◊	◊		14 (1,5)	▲
Serbia	35 (1,4)	518 (4,3)	◊	◊		◊	◊	16 (0,7)	499 (5,7)	◊	◊		◊	◊	49 (1,6)	467 (3,7)	◊	◊		◊	◊
Australia	34 (1,3)	521 (6,2)	–	–		–10 (1,8)	▼	27 (0,8)	498 (3,7)	–	–		–1 (1,0)		39 (1,2)	476 (4,1)	–	–		11 (1,5)	▲
Scotland	33 (1,0)	502 (4,5)	◊	◊		–	–	29 (0,8)	490 (4,1)	◊	◊		–	–	38 (1,0)	476 (4,1)	◊	◊		–	–
Korea, Rep. of	33 (0,9)	650 (2,9)	3 (1,1)	▲		–2 (1,4)		23 (0,6)	600 (3,4)	–12 (0,9)	▼		–13 (1,2)	▼	44 (0,9)	558 (3,1)	8 (1,3)	▲		15 (1,4)	▲
Czech Republic	31 (1,0)	530 (3,0)	–1 (1,9)			–1 (1,6)		22 (0,6)	501 (3,6)	–10 (1,3)	▼		–8 (1,3)	▼	47 (1,1)	489 (2,7)	11 (1,9)	▲		9 (1,9)	▲
Japan	30 (1,1)	609 (3,7)	–1 (1,5)			–7 (1,8)	▼	30 (1,0)	567 (3,0)	–4 (1,2)	▼		–6 (1,2)	▼	40 (1,2)	543 (2,5)	5 (1,6)	▲		13 (1,8)	▲
Hungary	30 (1,0)	554 (4,4)	–6 (1,6)	▼		–5 (1,6)	▼	22 (1,0)	517 (4,9)	–13 (1,2)	▼		–12 (1,5)	▼	48 (1,4)	496 (3,6)	19 (2,0)	▲		16 (1,9)	▲
Slovenia	25 (1,1)	520 (4,3)	–	–		–15 (2,0)	▼	22 (0,7)	507 (3,0)	–	–		–12 (1,2)	▼	53 (1,1)	492 (2,1)	–	–		27 (1,9)	▲
¶ Morocco	84 (0,7)	387 (3,1)	–	–		–	–	10 (0,6)	353 (7,1)	–	–		–	–	6 (0,6)	353 (9,4)	–	–		–	–
International Avg.	54 (0,2)	471 (0,6)						21 (0,1)	441 (0,7)						26 (0,1)	428 (0,7)					
Benchmarking Participants																					
Dubai, UAE	54 (1,3)	480 (2,9)	◊	◊		◊	◊	22 (1,1)	451 (5,0)	◊	◊		◊	◊	24 (1,1)	442 (4,9)	◊	◊		◊	◊
Ontario, Canada	48 (1,7)	537 (3,9)	–12 (2,4)	▼		–10 (2,4)	▼	23 (0,9)	512 (4,0)	3 (1,3)	▲		–2 (1,4)		29 (1,4)	491 (4,9)	9 (1,9)	▲		12 (2,0)	▲
Quebec, Canada	47 (1,4)	544 (4,4)	4 (2,4)			–2 (2,8)		19 (0,7)	529 (4,9)	–15 (2,1)	▼		–3 (1,9)		34 (1,4)	509 (3,1)	11 (2,5)	▲		6 (2,3)	▲
Minnesota, US	43 (2,2)	551 (5,3)	◊	◊		–10 (3,6)	▼	25 (1,1)	530 (5,6)	◊	◊		2 (1,9)		32 (2,5)	509 (5,5)	◊	◊		8 (3,4)	▲
Massachusetts, US	41 (1,6)	565 (5,2)	–6 (2,9)	▼		◊	◊	26 (1,1)	549 (5,1)	1 (1,7)			◊	◊	33 (2,1)	524 (6,4)	5 (2,8)			◊	◊
Basque Country, Spain	37 (1,5)	525 (3,4)	◊	◊		◊	◊	24 (0,9)	499 (3,7)	◊	◊		◊	◊	39 (1,5)	476 (3,8)	◊	◊		◊	◊
British Columbia, Canada	35 (1,0)	532 (3,5)	–7 (2,5)	▼		◊	◊	26 (0,8)	515 (4,3)	–3 (1,5)			◊	◊	38 (1,2)	486 (3,0)	10 (2,7)	▲		◊	◊

Index based on students' responses to three statements about mathematics: 1) I enjoy learning mathematics; 2) Mathematics is boring (Reversed); 3) I like mathematics. Average is computed across the three items based on a 4-point scale: 1. Agree a lot; 2. Agree a little; 3. Disagree a little; 4. Disagree a lot. Students agreeing a lot or a little on average across the three statements are assigned to the high level. Students disagreeing a little or a lot on average across the three statements are assigned to the low level. All other students are assigned to the middle level.

¶ Did not satisfy guidelines for sample participation rates (see Appendix A).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

A dash (–) indicates comparable data are not available.

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 percent significantly higher.

▼ 2007 percent significantly lower.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 32 Index of Students' Positive Affect Toward Science (PATS) with Trends

Country	High PATS							Medium PATS							Low PATS						
	2007 Percent of Students		Average Achievement		Difference in Percent from 1995			2007 Percent of Students		Average Achievement		Difference in Percent from 1995			2007 Percent of Students		Average Achievement		Difference in Percent from 1995		
Kazakhstan	90	(1,1)	535	(5,7)	◊	◊		6	(0,9)	517	(12,8)	◊	◊		4	(0,5)	515	(10,3)	◊	◊	
Colombia	88	(0,8)	410	(5,4)	◊	◊		8	(0,7)	378	(12,6)	◊	◊		4	(0,5)	390	(14,4)	◊	◊	
Algeria	87	(0,9)	365	(5,6)	◊	◊		9	(0,5)	309	(10,6)	◊	◊		4	(0,6)	305	(15,0)	◊	◊	
Tunisia	86	(1,0)	348	(5,5)	◊	◊		10	(0,7)	238	(9,5)	◊	◊		4	(0,5)	212	(15,1)	◊	◊	
Iran, Islamic Rep. of r	86	(1,1)	452	(4,2)	3	(1,7)		8	(0,7)	393	(8,2)	–6	(1,3)	▼	6	(0,7)	377	(10,4)	3	(0,8)	▲
Kuwait	85	(0,9)	370	(4,5)	–	–		8	(0,6)	289	(8,3)	–	–		7	(0,5)	300	(10,8)	–	–	
Morocco	83	(1,1)	315	(6,0)	◊	◊		11	(0,9)	262	(14,4)	◊	◊		5	(0,6)	220	(13,1)	◊	◊	
Ukraine	83	(0,9)	483	(3,0)	◊	◊		10	(0,6)	456	(6,3)	◊	◊		7	(0,6)	457	(7,0)	◊	◊	
Georgia	82	(1,0)	428	(4,4)	◊	◊		12	(0,7)	402	(7,3)	◊	◊		6	(0,8)	414	(7,1)	◊	◊	
Japan	81	(0,9)	553	(2,1)	1	(1,4)		12	(0,6)	534	(4,1)	–1	(0,9)		7	(0,5)	523	(6,1)	1	(0,8)	
Lithuania	81	(1,0)	517	(2,6)	◊	◊		12	(0,7)	500	(4,6)	◊	◊		7	(0,6)	510	(4,6)	◊	◊	
Germany	81	(0,8)	536	(2,5)	◊	◊		11	(0,6)	514	(5,4)	◊	◊		8	(0,5)	501	(4,7)	◊	◊	
El Salvador	79	(0,9)	399	(3,7)	◊	◊		15	(0,7)	365	(5,3)	◊	◊		6	(0,5)	371	(8,8)	◊	◊	
Hong Kong SAR	79	(1,0)	562	(3,4)	–2	(2,1)		11	(0,6)	528	(5,2)	–1	(1,0)		10	(0,8)	522	(5,4)	3	(1,6)	▲
Qatar	79	(0,5)	319	(2,7)	◊	◊		12	(0,4)	257	(4,8)	◊	◊		10	(0,3)	262	(5,5)	◊	◊	
Italy	78	(0,8)	541	(3,3)	–	–		12	(0,6)	522	(4,1)	–	–		10	(0,5)	516	(5,2)	–	–	
Australia	78	(1,3)	534	(3,6)	4	(1,7)	▲	11	(0,8)	513	(5,8)	–1	(1,0)		11	(0,8)	505	(5,1)	–2	(1,1)	▼
Russian Federation	78	(1,0)	552	(4,5)	◊	◊		13	(0,8)	540	(7,2)	◊	◊		9	(0,5)	521	(8,1)	◊	◊	
Armenia	77	(1,4)	493	(5,0)	◊	◊		12	(1,1)	493	(17,4)	◊	◊		11	(0,8)	490	(14,7)	◊	◊	
Slovak Republic	76	(1,1)	531	(4,4)	◊	◊		12	(0,7)	514	(7,3)	◊	◊		12	(0,8)	525	(6,5)	◊	◊	
New Zealand	75	(0,8)	513	(2,6)	0	(1,5)		14	(0,5)	482	(5,7)	1	(1,0)		11	(0,5)	480	(5,3)	–1	(1,1)	
United States	75	(0,8)	545	(2,5)	–1	(1,3)		13	(0,4)	529	(4,1)	0	(0,8)		12	(0,6)	521	(4,4)	1	(0,9)	
Chinese Taipei	75	(1,4)	564	(2,0)	◊	◊		14	(0,7)	539	(4,2)	◊	◊		11	(0,9)	534	(4,5)	◊	◊	
Austria	75	(0,9)	530	(2,6)	6	(1,7)	▲	13	(0,6)	518	(4,1)	–4	(1,1)	▼	12	(0,7)	510	(4,2)	–2	(1,3)	
Singapore	75	(0,7)	598	(4,0)	–9	(1,1)	▼	15	(0,5)	557	(6,0)	3	(0,8)	▲	11	(0,5)	553	(5,8)	5	(0,6)	▲
Yemen	74	(1,8)	226	(8,3)	◊	◊		17	(1,2)	167	(7,6)	◊	◊		9	(0,9)	161	(11,1)	◊	◊	
Sweden	73	(1,0)	531	(3,2)	◊	◊		14	(0,7)	512	(4,0)	◊	◊		13	(0,6)	509	(4,1)	◊	◊	
Norway	71	(1,2)	484	(3,4)	1	(1,9)		14	(0,8)	468	(4,9)	–2	(1,2)		15	(0,9)	463	(6,8)	1	(1,4)	
Latvia	71	(1,1)	544	(2,5)	5	(1,8)	▲	16	(0,7)	538	(4,2)	–7	(1,3)	▼	13	(0,9)	541	(5,3)	2	(1,3)	
Scotland	70	(1,3)	505	(2,5)	–	–		14	(0,7)	498	(4,6)	–	–		16	(1,1)	483	(4,9)	–	–	
Hungary	69	(1,3)	544	(3,3)	–1	(2,0)		14	(0,6)	522	(6,7)	–4	(1,0)	▼	18	(1,1)	527	(5,5)	5	(1,5)	▲
Slovenia	69	(1,0)	523	(2,2)	–7	(1,8)	▼	14	(0,6)	510	(4,0)	–3	(1,2)	▼	17	(0,9)	509	(3,2)	10	(1,1)	▲
Netherlands	66	(1,5)	528	(2,8)	3	(2,2)		11	(0,6)	514	(4,1)	–4	(1,1)	▼	23	(1,3)	515	(4,0)	1	(1,8)	
Czech Republic	64	(1,4)	521	(3,4)	–9	(1,9)	▼	15	(0,7)	504	(5,8)	0	(1,0)		21	(1,1)	509	(3,6)	9	(1,4)	▲
England	59	(1,2)	548	(3,4)	–13	(1,9)	▼	17	(0,7)	538	(4,7)	4	(1,1)	▲	24	(1,1)	533	(4,1)	9	(1,5)	▲
Denmark	59	(1,9)	525	(3,2)	◊	◊		20	(1,1)	510	(4,3)	◊	◊		21	(1,5)	507	(4,1)	◊	◊	
International Avg.	77	(0,2)	485	(0,7)				13	(0,1)	456	(1,2)				11	(0,1)	452	(1,3)			
Benchmarking Participants																					
Dubai, UAE	84	(1,0)	474	(3,4)	◊	◊		9	(0,6)	440	(11,2)	◊	◊		8	(0,7)	415	(10,7)	◊	◊	
Minnesota, US	79	(1,9)	554	(6,6)	7	(3,1)	▲	11	(1,0)	549	(8,7)	–3	(1,6)		10	(1,2)	542	(8,6)	–4	(2,0)	▼
Quebec, Canada	78	(1,2)	522	(2,9)	9	(4,0)	▲	10	(0,8)	497	(5,2)	–5	(2,1)	▼	12	(0,8)	502	(6,1)	–5	(3,4)	
Massachusetts, US	77	(1,5)	576	(4,7)	◊	◊		12	(0,9)	563	(6,9)	◊	◊		11	(1,2)	552	(6,8)	◊	◊	
Alberta, Canada	75	(1,2)	547	(3,7)	2	(2,5)		13	(0,7)	533	(6,2)	–1	(1,4)		12	(0,7)	526	(6,4)	–1	(2,1)	
British Columbia, Canada	72	(1,2)	542	(2,9)	◊	◊		14	(0,7)	530	(4,6)	◊	◊		14	(0,9)	522	(5,0)	◊	◊	
Ontario, Canada	71	(1,4)	541	(4,0)	–4	(1,9)		14	(0,9)	531	(6,7)	0	(1,2)		15	(1,1)	523	(5,0)	3	(1,4)	▲

Index based on students' responses to three statements about science: 1) I enjoy learning science; 2) Science is boring (Reversed); 3) I like science. Average is computed across the three items based on a 4-point scale: 1. Agree a lot; 2. Agree a little; 3. Disagree a little; 4. Disagree a lot. Students agreeing a lot or a little on average across the three statements are assigned to the high level. Students disagreeing a little or a lot on average across the three statements are assigned to the low level. All other students are assigned to the middle level.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

A dash (–) indicates comparable data are not available.

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

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 percent significantly higher.

▼ 2007 percent significantly lower.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 33 Index of Students' Positive Affect Toward Science (PATS) with Trends

	Country	High PATS										Medium PATS										Low PATS									
		2007 Percent of Students		Average Achievement		Difference in Percent from 1999			Difference in Percent from 1995			2007 Percent of Students		Average Achievement		Difference in Percent from 1999			Difference in Percent from 1995			2007 Percent of Students		Average Achievement		Difference in Percent from 1999			Difference in Percent from 1995		
General/Integrated Science																															
	Tunisia	88	(0,8)	447	(2,1)	1	(1,1)		◊	◊		7	(0,5)	428	(4,7)	1	(0,7)		◊	◊		4	(0,4)	434	(7,1)	–2	(0,7)	▼	◊	◊	
	Botswana	84	(0,8)	370	(3,1)	◊	◊		◊	◊		11	(0,6)	291	(5,7)	◊	◊		◊	◊		5	(0,5)	274	(8,4)	◊	◊		◊	◊	
	Colombia	83	(1,2)	419	(3,6)	◊	◊		3	(1,7)		12	(0,9)	416	(5,1)	◊	◊		–4	(1,3)	▼	5	(0,4)	425	(8,6)	◊	◊		1	(0,7)	
	Oman	82	(0,9)	434	(2,8)	◊	◊		◊	◊		14	(0,7)	387	(5,3)	◊	◊		◊	◊		3	(0,4)	383	(13,0)	◊	◊		◊	◊	
	Egypt	82	(1,3)	421	(3,6)	◊	◊		◊	◊		13	(1,2)	373	(6,9)	◊	◊		◊	◊		5	(0,4)	363	(9,7)	◊	◊		◊	◊	
	Ghana	80	(1,0)	320	(4,7)	◊	◊		◊	◊		16	(0,8)	254	(7,7)	◊	◊		◊	◊		4	(0,3)	226	(10,7)	◊	◊		◊	◊	
	Jordan	77	(1,7)	493	(3,7)	3	(2,0)		◊	◊		13	(0,9)	455	(7,4)	–3	(1,1)	▼	◊	◊		10	(1,1)	470	(8,3)	–1	(1,3)		◊	◊	
	Turkey	77	(1,1)	461	(3,7)	–	–		◊	◊		15	(0,7)	435	(5,6)	–	–		◊	◊		8	(0,8)	429	(6,9)	–	–		◊	◊	
	El Salvador	77	(1,2)	390	(3,0)	◊	◊		◊	◊		17	(0,9)	380	(4,5)	◊	◊		◊	◊		6	(0,5)	395	(6,8)	◊	◊		◊	◊	
	Iran, Islamic Rep. of	73	(1,3)	467	(3,8)	–8	(1,5)	▼	–7	(1,8)	▼	17	(1,0)	444	(5,1)	5	(1,1)	▲	2	(1,3)		9	(0,7)	448	(6,8)	3	(0,9)	▲	5	(0,9)	▲
	Malaysia	73	(1,2)	483	(6,0)	–17	(1,4)	▼	◊	◊		18	(0,9)	438	(7,2)	12	(1,0)	▲	◊	◊		8	(0,5)	434	(9,2)	5	(0,7)	▲	◊	◊	
	Palestinian Nat'l Auth.	70	(1,2)	421	(3,8)	◊	◊		◊	◊		18	(0,8)	377	(5,5)	◊	◊		◊	◊		12	(0,7)	380	(7,6)	◊	◊		◊	◊	
	Thailand	68	(1,2)	478	(4,5)	–9	(1,6)	▼	–	–		25	(0,9)	454	(4,7)	9	(1,1)	▲	–	–		6	(0,5)	466	(7,2)	0	(0,7)		–	–	
	Bahrain	68	(1,0)	476	(1,9)	◊	◊		◊	◊		18	(0,7)	455	(3,5)	◊	◊		◊	◊		14	(0,8)	451	(4,7)	◊	◊		◊	◊	
	Singapore	68	(0,9)	586	(4,3)	–10	(1,6)	▼	–14	(1,5)	▼	19	(0,7)	535	(6,1)	7	(1,0)	▲	6	(1,1)	▲	13	(0,6)	517	(6,8)	3	(1,1)	▲	8	(0,8)	▲
	Saudi Arabia	68	(1,3)	413	(2,9)	◊	◊		◊	◊		19	(0,8)	389	(4,4)	◊	◊		◊	◊		13	(0,9)	388	(4,4)	◊	◊		◊	◊	
	Qatar	61	(0,6)	333	(1,8)	◊	◊		◊	◊		19	(0,5)	303	(3,9)	◊	◊		◊	◊		20	(0,5)	307	(3,9)	◊	◊		◊	◊	
	Hong Kong SAR	60	(1,4)	549	(4,8)	–4	(1,9)	▼	4	(2,2)		22	(0,8)	508	(5,4)	4	(1,1)	▲	–5	(1,3)	▼	19	(1,1)	498	(6,7)	0	(1,5)		0	(1,6)	
	Kuwait	60	(1,1)	428	(3,2)	◊	◊		–	–		21	(0,7)	413	(4,5)	◊	◊		–	–		20	(0,9)	408	(5,9)	◊	◊		–	–	
	Norway	59	(1,3)	495	(2,1)	◊	◊		2	(2,1)		20	(0,8)	483	(3,7)	◊	◊		–1	(1,2)		21	(1,0)	472	(3,7)	◊	◊		0	(1,6)	
	Scotland	56	(1,3)	517	(3,4)	◊	◊		–13	(2,0)	▼	22	(0,8)	482	(4,5)	◊	◊		7	(1,1)	▲	22	(1,1)	459	(4,3)	◊	◊		6	(1,5)	▲
	England	55	(1,3)	561	(4,9)	–21	(1,6)	▼	–15	(1,8)	▼	20	(0,8)	532	(4,9)	9	(1,1)	▲	4	(1,2)	▲	25	(1,1)	510	(5,0)	12	(1,3)	▲	11	(1,4)	▲
	United States	54	(1,2)	533	(2,9)	–6	(1,5)	▼	–1	(1,9)		22	(0,5)	508	(3,6)	4	(0,8)	▲	–2	(0,9)	▼	24	(0,9)	503	(3,5)	2	(1,1)		3	(1,3)	▲
	Israel	51	(1,2)	492	(4,6)	–7	(1,8)	▼	–	–		22	(0,7)	453	(5,3)	3	(1,0)	▲	–	–		28	(1,2)	452	(5,5)	4	(1,6)	▲	–	–	
	Italy	47	(1,1)	511	(3,7)	–16	(1,8)	▼	–	–		26	(0,9)	488	(3,6)	10	(1,2)	▲	–	–		26	(1,0)	475	(3,5)	7	(1,5)	▲	–	–	
	Australia	47	(1,4)	535	(4,7)	–	–		–2	(1,7)		22	(0,8)	504	(4,2)	–	–		–1	(1,1)		31	(1,1)	494	(4,3)	–	–		3	(1,4)	
	Japan	47	(1,1)	574	(2,2)	1	(1,8)		3	(1,7)	▲	28	(0,9)	545	(2,8)	5	(1,1)	▲	–2	(1,1)	▼	25	(1,1)	529	(3,5)	–6	(1,7)	▼	–1	(1,5)	
	Chinese Taipei	40	(1,3)	597	(3,9)	–22	(1,7)	▼	◊	◊		24	(0,7)	552	(4,2)	8	(0,9)	▲	◊	◊		35	(1,2)	527	(3,8)	14	(1,4)	▲	◊	◊	
	Korea, Rep. of	38	(1,1)	586	(2,4)	8	(1,5)	▲	4	(1,7)	▲	27	(0,7)	544	(2,9)	–3	(0,9)	▼	–15	(1,2)	▼	36	(1,0)	526	(2,6)	–5	(1,5)	▼	11	(1,6)	▲
	International Avg.	65	(0,2)	476	(0,7)							19	(0,1)	442	(0,9)							16	(0,2)	436	(1,3)						
Biology																															
	Indonesia	86	(0,9)	429	(3,4)	–	–		◊	◊		11	(0,7)	415	(5,3)	–	–		◊	◊		2	(0,3)	~	~	–	–		◊	◊	
	Algeria	84	(0,8)	413	(1,8)	◊	◊		◊	◊		11	(0,6)	395	(3,9)	◊	◊		◊	◊		5	(0,4)	399	(5,8)	◊	◊		◊	◊	
	Syrian Arab Republic	78	(1,0)	463	(2,8)	◊	◊		◊	◊		15	(0,7)	434	(4,8)	◊	◊		◊	◊		7	(0,5)	425	(6,5)	◊	◊		◊	◊	
r	Bulgaria	73	(1,5)	478	(6,5)	–	–		–	–		15	(1,0)	452	(8,8)	–	–		–	–		11	(1,1)	465	(9,5)	–	–		–	–	
	Georgia	73	(1,4)	436	(4,7)	◊	◊		◊	◊		16	(1,1)	400	(6,0)	◊	◊		◊	◊		11	(0,8)	412	(7,4)	◊	◊		◊	◊	
	Ukraine	72	(1,2)	490	(3,3)	◊	◊		◊	◊		17	(0,7)	480	(5,2)	◊	◊		◊	◊		11	(0,9)	488	(5,9)	◊	◊		◊	◊	
	Armenia	71	(1,0)	492	(6,5)	◊	◊		◊	◊		16	(0,7)	490	(7,8)	◊	◊		◊	◊		12	(0,6)	479	(7,1)	◊	◊		◊	◊	
	Bosnia and Herzegovina	68	(1,4)	470	(3,0)	◊	◊		◊	◊		14	(0,7)	465	(5,2)	◊	◊		◊	◊		18	(1,1)	464	(4,7)	◊	◊		◊	◊	
	Russian Federation	66	(1,4)	532	(3,7)	–9	(1,9)	▼	–4	(2,1)	▼	21	(0,9)	523	(4,7)	5	(1,2)	▲	–2	(1,5)		13	(0,8)	537	(6,7)	4	(1,1)	▲	6	(1,1)	▲
	Lebanon	61	(1,4)	436	(5,4)	◊	◊		◊	◊		23	(1,0)	392	(7,9)	◊	◊		◊	◊		16	(1,0)	381	(8,1)	◊	◊		◊	◊	
	Romania	61	(1,5)	466	(4,7)	–10	(2,0)	▼	–4	(2,1)	▼	19	(0,8)	456	(4,8)	4	(1,1)	▲	–6	(1,4)	▼	20	(1,1)	466	(5,1)	6	(1,5)	▲	10	(1,3)	▲
	Serbia	56	(1,5)	478	(3,5)	◊	◊		◊	◊		17	(0,8)	467	(5,3)	◊	◊		◊	◊		27	(1,2)	466	(4,1)	◊	◊		◊	◊	
	Lithuania	55	(1,5)	521	(2,9)	–13	(2,1)	▼	–11	(2,1)	▼	23	(0,9)	518	(3,9)	7	(1,3)	▲	0	(1,4)		22	(1,3)	516	(3,8)	6	(1,6)	▲	11	(1,6)	▲
	Czech Republic	55	(1,4)	543	(2,5)	–8	(2,6)	▼	6	(2,6)	▲	21	(0,8)	533	(3,4)	4	(1,2)	▲	–7	(1,3)	▼	24	(1,2)	537	(2,9)	4	(2,1)	▲	1	(2,2)	
	Hungary	53	(1,5)	541	(3,6)	–8	(2,0)	▼	–5	(2,2)	▼	20	(0,8)	532	(4,8)	–1	(1,2)		–6	(1,4)	▼	27	(1,3)	541	(3,9)	8	(1,7)	▲	11	(1,7)	▲
	Sweden	52	(1,3)	525	(3,0)	◊	◊		–8	(2,5)	▼	21	(0,6)	505	(3,7)	◊	◊		–2	(1,4)		27	(1,1)	498	(3,3)	◊	◊		10	(1,8)	▲
	Slovenia	46	(1,6)	543	(2,5)	–	–		–15	(2,5)	▼	20	(0,7)	537	(3,5)	–	–		–5	(1,2)	▼	34	(1,4)	533	(3,2)	–	–		20	(1,9)	▲
	Cyprus	x	x	x	x	–	–		–	–		x	x	x	x	–	–		–	–		x	x	x	x	–	–		–	–	
	Malta	x	x	x	x	◊	◊		◊	◊		x	x	x	x	◊	◊		◊	◊		x	x	x	x	◊	◊		◊	◊	
¶	Morocco	84	(1,0)	407	(3,1)	–	–		–	–		11	(0,7)	376	(6,0)	–	–		–	–		5	(0,6)	381	(8,4)	–	–		–	–	
	International Avg.	66	(0,3)	481	(0,9)							17	(0,2)	465	(1,3)							16	(0,2)	470	(1,5)						

Index based on students' responses to three statements about science: 1) I enjoy learning science; 2) Science is boring (Reversed); 3) I like science. Average is computed across the three items based on a 4-point scale: 1. Agree a lot; 2. Agree a little; 3. Disagree a little; 4. Disagree a lot. Students agreeing a lot or a little on average across the three statements are assigned to the high level. Students disagreeing a little or a lot on average across the three statements are assigned to the low level. All other students are assigned to the middle level.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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 "x" indicates data are available for less than 50% of the students.

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 percent significantly higher.

▼ 2007 percent significantly lower.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

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	Country	High PATS											Medium PATS											Low PATS										
		2007 Percent of Students		Average Achievement		Difference in Percent from 1999			Difference in Percent from 1995				2007 Percent of Students		Average Achievement		Difference in Percent from 1999			Difference in Percent from 1995				2007 Percent of Students		Average Achievement		Difference in Percent from 1999			Difference in Percent from 1995			
	Earth Science																																	
	Syrian Arab Republic	75	(0,9)	455	(3,1)	◊	◊		◊	◊			17	(0,7)	437	(4,5)	◊	◊		◊	◊			9	(0,5)	445	(5,9)	◊	◊		◊	◊		
	Romania	66	(1,6)	472	(4,0)	–7	(2,1)	▼	4	(2,2)			17	(0,9)	446	(6,2)	1	(1,2)		–9	(1,4)	▼		17	(1,1)	451	(5,6)	7	(1,4)	▲	5	(1,3)	▲	
r	Bulgaria	66	(1,4)	483	(7,3)	–	–		–	–			19	(0,9)	456	(8,4)	–	–		–	–			16	(1,2)	452	(8,8)	–	–		–	–		
	Ukraine	64	(1,3)	493	(3,6)	◊	◊		◊	◊			21	(0,8)	477	(4,3)	◊	◊		◊	◊			15	(0,8)	486	(4,3)	◊	◊		◊	◊		
	Armenia	64	(1,3)	494	(5,8)	◊	◊		◊	◊			22	(0,9)	483	(6,0)	◊	◊		◊	◊			15	(0,9)	482	(11,9)	◊	◊		◊	◊		
	Bosnia and Herzegovina	62	(1,4)	467	(3,1)	◊	◊		◊	◊			17	(0,8)	467	(5,0)	◊	◊		◊	◊			21	(1,1)	467	(3,8)	◊	◊		◊	◊		
	Georgia	61	(1,8)	433	(5,2)	◊	◊		◊	◊			23	(1,3)	420	(6,2)	◊	◊		◊	◊			16	(1,3)	409	(7,5)	◊	◊		◊	◊		
	Russian Federation	60	(1,2)	538	(4,1)	–1	(2,3)		8	(1,8)	▲		23	(0,9)	516	(5,0)	0	(1,5)		–8	(1,2)	▼		17	(0,9)	528	(5,0)	1	(1,4)		0	(1,3)		
	Lithuania	59	(1,5)	523	(2,5)	–	–		9	(2,0)	▲		23	(0,9)	512	(4,0)	–	–		–15	(1,4)	▼		18	(0,9)	514	(4,7)	–	–		6	(1,2)	▲	
	Malta	54	(0,8)	462	(2,2)	◊	◊		◊	◊			17	(0,6)	430	(5,0)	◊	◊		◊	◊			29	(0,7)	426	(3,0)	◊	◊		◊	◊		
r	Sweden	54	(1,3)	521	(2,7)	◊	◊		–5	(2,2)	▼		20	(0,6)	509	(4,5)	◊	◊		–5	(1,2)	▼		26	(1,2)	504	(4,0)	◊	◊		9	(1,7)	▲	
	Serbia	51	(1,5)	475	(3,8)	◊	◊		◊	◊			19	(0,9)	472	(4,0)	◊	◊		◊	◊			30	(1,3)	470	(4,8)	◊	◊		◊	◊		
	Cyprus	50	(1,2)	462	(2,6)	–	–		–	–			21	(0,8)	444	(4,2)	–	–		–	–			29	(1,0)	444	(3,0)	–	–		–	–		
	Slovenia	49	(1,5)	545	(3,0)	–	–		–	–			21	(0,8)	539	(3,7)	–	–		–	–			31	(1,2)	528	(2,6)	–	–		–	–		
	Czech Republic	44	(1,4)	543	(2,7)	–11	(2,3)	▼	–6	(2,8)	▼		22	(0,7)	533	(2,9)	4	(1,0)	▲	–5	(1,2)	▼		33	(1,4)	538	(2,8)	7	(2,1)	▲	12	(2,2)	▲	
	Hungary	39	(1,6)	546	(3,5)	–9	(2,1)	▼	–5	(2,3)	▼		21	(1,1)	529	(4,6)	–4	(1,4)	▼	–11	(1,6)	▼		40	(1,4)	538	(3,6)	13	(1,8)	▲	16	(1,9)	▲	
	Algeria	x	x	x	x	◊	◊		◊	◊			x	x	x	x	◊	◊		◊	◊			x	x	x	x	◊	◊		◊	◊		
	Indonesia	–	–	–	–	–	–		◊	◊			–	–	–	–	–	–		◊	◊			–	–	–	–	–	–		◊	◊		
	Lebanon	–	–	–	–	◊	◊		◊	◊			–	–	–	–	◊	◊		◊	◊			–	–	–	–	◊	◊		◊	◊		
¶	Morocco	73	(1,3)	408	(2,8)	–	–		–	–			16	(1,1)	387	(7,1)	–	–		–	–			11	(0,8)	392	(9,2)	–	–		–	–		
	International Avg.	58	(0,3)	489	(0,9)								20	(0,2)	474	(1,3)								22	(0,3)	475	(1,4)							
	Chemistry																																	
	Algeria	78	(1,1)	411	(2,4)	◊	◊		◊	◊			14	(0,8)	398	(3,7)	◊	◊		◊	◊			8	(0,6)	395	(6,3)	◊	◊		◊	◊		
	Syrian Arab Republic	68	(1,1)	461	(3,0)	◊	◊		◊	◊			19	(0,7)	440	(4,0)	◊	◊		◊	◊			13	(0,7)	450	(4,0)	◊	◊		◊	◊		
	Lebanon	62	(1,4)	427	(5,7)	◊	◊		◊	◊			24	(1,2)	394	(7,7)	◊	◊		◊	◊			14	(1,0)	409	(7,2)	◊	◊		◊	◊		
	Russian Federation	54	(1,2)	538	(4,2)	–1	(2,2)		29	(1,7)	▲		26	(0,7)	521	(5,1)	–2	(1,2)		–31	(1,3)	▼		21	(1,0)	524	(4,5)	3	(1,6)		2	(1,5)		
r	Bulgaria	52	(1,8)	486	(6,5)	–	–		–	–			21	(0,8)	457	(9,5)	–	–		–	–			27	(1,7)	460	(7,1)	–	–		–	–		
	Ukraine	51	(1,6)	497	(3,7)	◊	◊		◊	◊			24	(0,8)	478	(4,2)	◊	◊		◊	◊			25	(1,5)	483	(4,3)	◊	◊		◊	◊		
	Cyprus	48	(0,9)	469	(2,6)	–	–		–	–			21	(0,5)	438	(3,4)	–	–		–	–			31	(0,8)	437	(3,8)	–	–		–	–		
	Georgia	48	(2,0)	439	(5,4)	◊	◊		◊	◊			25	(1,1)	420	(5,8)	◊	◊		◊	◊			27	(2,0)	420	(4,9)	◊	◊		◊	◊		
	Armenia	47	(1,5)	496	(6,7)	◊	◊		◊	◊			25	(1,0)	483	(6,1)	◊	◊		◊	◊			28	(1,4)	487	(7,5)	◊	◊		◊	◊		
	Bosnia and Herzegovina	47	(1,5)	470	(3,4)	◊	◊		◊	◊			18	(0,7)	465	(3,9)	◊	◊		◊	◊			35	(1,3)	465	(3,5)	◊	◊		◊	◊		
	Czech Republic	44	(1,5)	543	(2,9)	2	(2,4)		26	(1,8)	▲		22	(0,7)	537	(3,3)	–2	(1,1)		–42	(1,4)	▼		35	(1,6)	536	(2,8)	0	(2,3)		16	(2,0)	▲	
	Romania	43	(1,4)	467	(5,4)	–8	(2,1)	▼	11	(1,8)	▲		24	(0,8)	457	(4,8)	0	(1,2)		–32	(1,3)	▼		33	(1,3)	465	(3,6)	7	(1,8)	▲	21	(1,5)	▲	
r	Sweden	42	(1,1)	533	(3,2)	◊	◊		14	(1,9)	▲		20	(0,7)	496	(4,1)	◊	◊		–38	(1,5)	▼		38	(1,1)	500	(3,4)	◊	◊		24	(1,6)	▲	
	Slovenia	42	(1,3)	552	(2,9)	–	–		22	(1,7)	▲		22	(0,7)	535	(3,0)	–	–		–37	(1,2)	▼		36	(1,3)	524	(2,8)	–	–		15	(1,6)	▲	
	Lithuania	42	(1,4)	528	(3,5)	5	(2,0)	▲	17	(1,9)	▲		26	(0,9)	514	(3,8)	–4	(1,3)	▼	–29	(1,5)	▼		32	(1,5)	512	(2,9)	–2	(1,9)		12	(1,9)	▲	
	Serbia	31	(1,3)	483	(4,6)	◊	◊		◊	◊			16	(0,9)	470	(4,7)	◊	◊		◊	◊			54	(1,3)	468	(3,6)	◊	◊		◊	◊		
	Hungary	29	(1,2)	551	(4,4)	–5	(1,9)	▼	7	(1,8)	▲		21	(0,8)	523	(4,8)	–10	(1,2)	▼	–36	(1,4)	▼		50	(1,5)	539	(2,8)	15	(2,2)	▲	29	(2,0)	▲	
	Malta	x	x	x	x	◊	◊		◊	◊			x	x	x	x	◊	◊		◊	◊			x	x	x	x	◊	◊		◊	◊		
	Indonesia	–	–	–	–	–	–		◊	◊			–	–	–	–	–	–		◊	◊			–	–	–	–	–	–		◊	◊		
¶	Morocco	76	(1,4)	412	(3,4)	–	–		–	–			14	(0,7)	377	(7,1)	–	–		–	–			10	(1,0)	376	(9,0)	–	–		–	–		
	International Avg.	50	(0,3)	487	(1,0)								21	(0,2)	467	(1,2)								29	(0,3)	469	(1,2)							
	Physics																																	
	Algeria	83	(0,9)	412	(1,9)	◊	◊		◊	◊			12	(0,6)	400	(3,1)	◊	◊		◊	◊			6	(0,4)	402	(5,0)	◊	◊		◊	◊		
	Indonesia	69	(1,5)	426	(3,6)	–	–		◊	◊			24	(1,1)	428	(4,4)	–	–		◊	◊			7	(0,6)	443	(6,2)	–	–		◊	◊		
	Syrian Arab Republic	67	(1,2)	462	(2,9)	◊	◊		◊	◊			21	(0,9)	441	(4,0)	◊	◊		◊	◊			12	(0,7)	448	(4,7)	◊	◊		◊	◊		
	Armenia	60	(1,5)	498	(5,9)	◊	◊		◊	◊			21	(0,9)	481	(7,9)	◊	◊		◊	◊			19	(1,2)	480	(8,5)	◊	◊		◊	◊		
	Russian Federation	59	(0,9)	540	(4,4)	–1	(1,7)		6	(1,6)	▲		25	(0,7)	516	(5,3)	–1	(1,1)		–6	(1,2)	▼		16	(0,7)	519	(4,8)	2	(1,1)		1	(1,4)		
	Georgia	58	(1,5)	437	(4,6)	◊	◊		◊	◊			23	(1,1)	416	(7,8)	◊	◊		◊	◊			19	(1,4)	420	(4,6)	◊	◊		◊	◊		
	Lebanon	57	(1,2)	431	(5,6)	◊	◊		◊	◊			25	(1,0)	394	(8,3)	◊	◊		◊	◊			18	(1,0)	405	(7,3)	◊	◊		◊	◊		
r	Bulgaria	55	(2,0)	485	(7,3)	–	–		–	–			23	(1,3)	459	(8,3)	–	–		–	–			22	(1,5)	460	(6,7)	–	–		–	–		
	Ukraine	52	(1,6)	499	(3,6)	◊	◊		◊	◊			26	(0,9)	478	(3,8)	◊	◊		◊	◊			22	(1,1)	481	(4,1)	◊	◊		◊	◊		
	Cyprus	49	(0,9)	474	(2,2)	–	–		–	–			21	(0,6)	436	(3,9)	–	–		–	–			29	(0,7)	432	(3,8)	–	–		–	–		
	Malta	45	(0,7)	482	(2,5)	◊	◊		◊	◊			19	(0,5)	444	(4,6)	◊	◊		◊	◊			36	(0,7)	435	(2,4)	◊	◊		◊	◊		
	Bosnia and Herzegovina	44	(1,3)	473	(3,3)	◊	◊		◊	◊			20	(0,7)	464	(4,0)	◊	◊		◊	◊			36	(1,2)	463	(4,0)	◊	◊		◊	◊		
	Romania	42	(1,4)	469	(5,0)	–5	(2,1)	▼	–6	(2,1)	▼		24	(0,8)	453	(5,5)	–2	(1,3)		–10	(1,2)	▼		34	(1,3)	467	(3,8)	7	(2,0)	▲	16	(1,8)	▲	
r	Sweden	37	(1,2)	536	(3,4)	◊	◊		–7	(2,3)	▼		22	(0,7)	503	(3,8)	◊	◊		–5	(1,5)	▼		41	(1,2)	502	(3,3)	◊	◊		12	(2,1)	▲	
	Lithuania	37	(1,3)	534	(3,6)	–11	(2,1)	▼	–2	(2,2)			28	(0,8)	510	(3,4)	2	(1,2)		–6	(1,5)	▼		35	(1,2)	511	(3,4)	9	(1,7)	▲	8	(1,9)	▲	
	Hungary	31	(1,4)	557	(4,0)	–4	(2,0)	▼	3	(1,9)			24	(0,9)	534	(4,6)	–8	(1,3)	▼	–16	(1,3)	▼		45	(1,8)	530	(3,4)	12	(2,2)	▲	12	(2,2)	▲	
	Czech Republic	31	(1,5)	549	(3,4)	–7	(2,3)	▼	2	(2,0)			23	(0,7)	538	(3,1)	0	(1,1)		–11	(1,1)	▼		46	(1,4)	534	(2,3)	8	(2,3)	▲	9	(2,0)	▲	
	Serbia	28	(1,5)	477	(4,9)	◊	◊		◊	◊			19	(0,9)	473	(4,2)	◊	◊		◊	◊			53	(1,8)	471	(3,3)	◊	◊		◊	◊		
	Slovenia	23	(1,1)	558	(4,3)	–	–		–14	(2,0)	▼		23	(0,8)	534	(3,4)	–	–		–17	(1,4)	▼		54	(1,2)	531	(2,3)	–	–		31	(1,8)	▲	
¶	Morocco	79	(1,6)	410	(3,2)	–	–		–	–			14	(1,0)	373	(4,9)	–	–		–	–			8	(1,1)	392	(10,4)	–	–		–	–		
	International Avg.	50	(0,3)	485	(0,9)								22	(0,2)	464	(1,2)								28	(0,3)	466	(1,2)							

See the legend on the next page.

Table 34 Index of Students' Self-Confidence in Learning Mathematics (SCM) with Trends

	Country	High SCM							Medium SCM							Low SCM						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
	Sweden	77	(0,9)	514	(2,4)	◊	◊		19	(0,8)	467	(4,5)	◊	◊		5	(0,4)	459	(5,2)	◊	◊	
	Austria	70	(0,8)	524	(1,9)	◊	◊		22	(0,8)	470	(2,6)	◊	◊		8	(0,5)	445	(5,5)	◊	◊	
	Germany	70	(0,9)	548	(2,1)	◊	◊		21	(0,7)	493	(3,5)	◊	◊		10	(0,5)	468	(4,5)	◊	◊	
	Denmark	70	(1,1)	540	(2,5)	◊	◊		23	(1,0)	493	(3,5)	◊	◊		7	(0,6)	469	(5,8)	◊	◊	
	Norway	69	(0,8)	490	(2,7)	5	(1,2)	▲	24	(0,8)	441	(3,8)	–3	(1,2)	▼	7	(0,4)	429	(7,1)	–1	(0,7)	
	Slovenia	68	(0,9)	522	(2,0)	–8	(1,3)	▼	25	(0,8)	467	(2,9)	7	(1,2)	▲	6	(0,4)	431	(4,5)	1	(0,6)	
	Georgia	68	(1,3)	464	(3,9)	◊	◊		25	(1,1)	412	(5,2)	◊	◊		7	(0,7)	413	(11,7)	◊	◊	
	United States	67	(0,8)	551	(2,4)	13	(1,1)	▲	22	(0,6)	493	(2,8)	–17	(0,9)	▼	10	(0,4)	478	(3,1)	3	(0,5)	▲
	Scotland	67	(1,1)	511	(2,4)	3	(1,4)	▲	24	(1,0)	472	(3,5)	–2	(1,3)		9	(0,6)	450	(5,3)	–1	(0,8)	
	Netherlands	66	(1,0)	551	(2,5)	0	(1,4)		22	(0,9)	511	(3,1)	–1	(1,3)		12	(0,7)	489	(4,2)	1	(0,9)	
	Kazakhstan	66	(1,7)	563	(6,5)	◊	◊		24	(1,7)	524	(7,9)	◊	◊		10	(1,1)	516	(12,4)	◊	◊	
	Italy	66	(0,9)	525	(3,2)	5	(1,4)	▲	27	(0,8)	481	(3,9)	–2	(1,2)		7	(0,4)	457	(5,4)	–3	(0,7)	▼
r	Iran, Islamic Rep. of	66	(1,3)	428	(3,8)	23	(2,0)	▲	28	(1,2)	377	(5,6)	–23	(2,0)	▼	7	(0,7)	330	(10,2)	0	(0,9)	
	England	64	(1,0)	566	(3,0)	5	(1,5)	▲	26	(0,8)	507	(3,7)	–4	(1,3)	▼	10	(0,7)	483	(5,0)	–1	(0,9)	
	Australia	64	(1,3)	542	(2,8)	0	(1,6)		26	(0,9)	480	(3,8)	1	(1,2)		10	(0,8)	457	(6,7)	–1	(1,1)	
	Hungary	62	(1,0)	543	(3,0)	–2	(1,3)		27	(0,8)	468	(4,6)	0	(1,1)		11	(0,5)	447	(6,0)	1	(0,7)	
	Qatar	61	(0,7)	328	(1,3)	◊	◊		33	(0,6)	273	(2,2)	◊	◊		6	(0,3)	275	(5,2)	◊	◊	
	Slovak Republic	59	(1,1)	526	(3,5)	◊	◊		28	(0,9)	464	(4,6)	◊	◊		12	(0,7)	445	(8,2)	◊	◊	
	Lithuania	57	(0,8)	562	(2,2)	–4	(1,5)	▼	33	(0,8)	495	(2,9)	3	(1,3)	▲	9	(0,6)	466	(6,6)	2	(0,9)	
	Czech Republic	56	(1,0)	512	(2,5)	◊	◊		31	(1,0)	460	(3,3)	◊	◊		12	(0,6)	442	(4,9)	◊	◊	
	Kuwait	56	(1,4)	353	(3,7)	◊	◊		39	(1,3)	296	(4,5)	◊	◊		5	(0,4)	280	(9,0)	◊	◊	
	Ukraine	55	(1,0)	505	(2,8)	◊	◊		34	(0,9)	443	(4,0)	◊	◊		11	(0,7)	432	(5,4)	◊	◊	
	Russian Federation	54	(1,2)	570	(5,0)	1	(1,9)		31	(1,0)	522	(5,5)	–1	(1,4)		15	(1,1)	505	(6,5)	–1	(1,3)	
	New Zealand	52	(0,7)	527	(2,3)	13	(1,3)	▲	37	(0,7)	465	(2,6)	–19	(1,2)	▼	11	(0,5)	438	(4,8)	7	(0,6)	▲
s	Armenia	52	(1,4)	517	(3,8)	8	(1,8)	▲	35	(1,3)	500	(9,9)	–9	(1,7)	▼	13	(0,7)	489	(5,9)	0	(1,0)	
	Latvia	50	(0,9)	568	(2,6)	1	(1,6)		36	(0,8)	515	(2,7)	1	(1,4)		15	(0,8)	493	(4,1)	–2	(1,2)	
	Colombia	49	(1,4)	389	(5,0)	◊	◊		43	(1,4)	338	(5,7)	◊	◊		7	(0,6)	329	(6,7)	◊	◊	
	Singapore	46	(1,2)	639	(3,0)	–3	(2,0)		35	(0,8)	580	(3,8)	–1	(1,3)		19	(0,8)	544	(4,9)	3	(1,2)	▲
	Hong Kong SAR	46	(1,0)	634	(3,7)	6	(1,5)	▲	38	(1,0)	588	(3,6)	–3	(1,3)	▼	16	(0,7)	574	(4,6)	–3	(1,1)	▼
r	Tunisia	46	(1,4)	383	(4,4)	–10	(2,3)	▼	46	(1,4)	305	(4,5)	9	(2,1)	▲	8	(0,6)	278	(10,0)	1	(0,9)	
r	Morocco	45	(1,5)	370	(6,1)	–9	(2,3)	▼	46	(1,6)	331	(6,1)	6	(2,2)	▲	9	(1,0)	329	(16,1)	3	(1,2)	▲
	Japan	45	(1,1)	602	(2,4)	6	(1,4)	▲	36	(0,9)	553	(2,9)	–5	(1,2)	▼	20	(0,7)	522	(3,1)	–1	(1,1)	
	Algeria	41	(1,5)	404	(5,3)	◊	◊		49	(1,3)	374	(5,6)	◊	◊		11	(0,9)	342	(8,7)	◊	◊	
	El Salvador	39	(1,3)	365	(4,5)	◊	◊		53	(1,2)	315	(4,4)	◊	◊		8	(0,6)	303	(9,0)	◊	◊	
	Chinese Taipei	36	(1,0)	612	(2,1)	–5	(1,3)	▼	37	(0,8)	566	(2,7)	–2	(1,2)		27	(0,8)	542	(2,7)	7	(1,1)	▲
	Yemen	35	(1,5)	261	(7,4)	◊	◊		52	(1,5)	225	(5,8)	◊	◊		13	(1,0)	210	(9,6)	◊	◊	
	International Avg.	57	(0,2)	500	(0,6)				32	(0,2)	449	(0,8)				11	(0,1)	429	(1,2)			
Benchmarking Participants																						
	Massachusetts, US	74	(1,4)	589	(3,6)	◊	◊		19	(1,2)	534	(5,2)	◊	◊		8	(0,8)	519	(5,7)	◊	◊	
	Minnesota, US	71	(2,2)	575	(5,3)	◊	◊		21	(1,4)	512	(6,2)	◊	◊		8	(1,1)	482	(7,9)	◊	◊	
	Alberta, Canada	68	(1,0)	523	(2,6)	◊	◊		24	(0,8)	475	(3,6)	◊	◊		8	(0,6)	451	(5,8)	◊	◊	
	Quebec, Canada	68	(1,2)	540	(3,0)	–3	(1,6)		24	(1,0)	484	(3,6)	2	(1,4)		8	(0,6)	457	(5,0)	1	(0,8)	
	Dubai, UAE	68	(1,1)	468	(2,3)	◊	◊		26	(1,1)	416	(4,3)	◊	◊		6	(0,7)	401	(7,4)	◊	◊	
	British Columbia, Canada	65	(0,9)	526	(2,9)	◊	◊		27	(0,7)	475	(3,1)	◊	◊		8	(0,7)	457	(5,7)	◊	◊	
	Ontario, Canada	63	(1,3)	534	(3,0)	–4	(1,9)	▼	27	(1,1)	484	(3,9)	4	(1,6)	▲	10	(0,8)	457	(4,9)	1	(1,1)	

Index based on students' responses to four statements about mathematics: 1) I usually do well in mathematics; 2) Mathematics is harder for me than for many of my classmates (Reversed); 3) I'm just not good at mathematics (Reversed); 4) I learn things quickly in mathematics. Average is computed across the four items based on a 4-point scale: 1. Agree a lot; 2. Agree a little; 3. Disagree a little; 4. Disagree a lot. Students agreeing a little or a lot on average across the four statements are assigned to the high level. Students disagreeing a little or a lot on average are assigned to the low level. All other students are assigned to the middle level.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 percent significantly higher.

▼ 2007 percent significantly lower.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 35 Index of Students' Self-Confidence in Learning Mathematics (SCM) with Trends

	Country	High SCM							Medium SCM							Low SCM						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
	Israel	59	(1,0)	495	(4,1)	0	(1,5)		29	(0,9)	432	(5,3)	–1	(1,3)		12	(0,7)	417	(7,2)	1	(1,0)	
	Jordan	58	(1,5)	468	(3,7)	9	(1,9)	▲	34	(1,2)	388	(4,2)	–5	(1,6)	▼	9	(0,6)	361	(6,6)	–4	(0,9)	▼
	Qatar	55	(0,6)	339	(2,3)	◊	◊		34	(0,6)	279	(2,3)	◊	◊		11	(0,3)	267	(3,4)	◊	◊	
	Egypt	55	(1,5)	422	(3,7)	–3	(1,8)		38	(1,4)	368	(3,8)	3	(1,7)		7	(0,4)	356	(8,0)	0	(0,6)	
	Kuwait	54	(0,9)	381	(2,5)	◊	◊		35	(0,9)	331	(2,6)	◊	◊		11	(0,6)	319	(5,7)	◊	◊	
	Scotland	53	(1,3)	515	(4,0)	1	(2,0)		33	(1,0)	465	(3,6)	1	(1,4)		14	(0,7)	442	(4,6)	–1	(1,2)	
	United States	53	(1,0)	537	(2,5)	2	(1,3)		28	(0,7)	487	(3,2)	–1	(0,9)		19	(0,7)	462	(3,0)	–1	(1,0)	
	England	53	(1,4)	543	(4,9)	6	(2,1)	▲	32	(1,0)	494	(4,7)	–2	(1,6)		15	(0,8)	457	(5,5)	–4	(1,3)	▼
	Bahrain	53	(0,8)	435	(2,1)	8	(1,2)	▲	33	(0,7)	366	(2,4)	–5	(1,1)	▼	15	(0,6)	350	(3,0)	–4	(0,9)	▼
	Cyprus	50	(1,0)	508	(1,7)	4	(1,3)	▲	30	(0,8)	437	(2,5)	–2	(1,1)	▼	20	(0,7)	411	(3,3)	–2	(1,0)	▼
	Norway	50	(0,8)	505	(2,1)	4	(1,4)	▲	31	(0,7)	450	(2,1)	–1	(1,1)		19	(0,7)	415	(2,2)	–2	(1,1)	▼
	Sweden	49	(1,0)	528	(2,6)	1	(1,6)		35	(0,7)	468	(2,4)	–1	(1,2)		16	(0,6)	438	(3,6)	0	(1,1)	
	Lebanon	49	(1,2)	483	(4,1)	6	(1,8)	▲	39	(1,3)	425	(4,2)	–5	(1,8)	▼	12	(0,9)	416	(4,9)	–1	(1,1)	
	Serbia	48	(1,3)	539	(3,4)	4	(1,7)	▲	25	(0,8)	464	(3,6)	–1	(1,1)		27	(1,1)	426	(3,9)	–3	(1,6)	
	Italy	48	(1,0)	514	(3,1)	2	(1,3)		28	(0,7)	462	(3,6)	–1	(1,1)		24	(0,9)	434	(3,7)	–2	(1,4)	
	Syrian Arab Republic	47	(1,1)	429	(3,5)	◊	◊		40	(0,9)	378	(4,2)	◊	◊		13	(0,7)	361	(4,7)	◊	◊	
	Saudi Arabia	47	(1,2)	361	(3,2)	–	–		42	(1,0)	310	(3,5)	–	–		11	(0,7)	294	(4,9)	–	–	
	Colombia	46	(1,3)	409	(3,6)	◊	◊		40	(1,2)	363	(3,8)	◊	◊		13	(0,7)	351	(4,5)	◊	◊	
	Algeria	46	(1,0)	412	(2,2)	◊	◊		41	(0,9)	372	(2,7)	◊	◊		12	(0,6)	358	(2,7)	◊	◊	
	Australia	45	(1,2)	539	(4,8)	–5	(2,1)	▼	35	(0,8)	472	(4,1)	5	(1,3)	▲	19	(0,9)	445	(3,7)	0	(1,5)	
	Iran, Islamic Rep. of	45	(1,2)	443	(5,0)	10	(1,5)	▲	40	(1,1)	380	(3,7)	–8	(1,4)	▼	14	(0,9)	368	(6,1)	–2	(1,1)	
	Oman	45	(1,1)	415	(3,4)	◊	◊		47	(1,1)	346	(3,7)	◊	◊		8	(0,5)	327	(5,6)	◊	◊	
	Tunisia	45	(1,3)	452	(2,8)	1	(1,6)		34	(0,8)	400	(2,6)	–2	(1,1)		21	(1,0)	391	(2,7)	1	(1,3)	
	Georgia	44	(1,8)	455	(4,9)	◊	◊		37	(1,5)	401	(7,5)	◊	◊		19	(1,0)	379	(7,0)	◊	◊	
	Ghana	44	(1,3)	341	(4,8)	0	(1,9)		46	(0,9)	292	(4,8)	1	(1,5)		11	(0,8)	285	(7,4)	–2	(1,0)	
	Palestinian Nat'l Auth.	44	(1,1)	414	(3,6)	0	(1,5)		44	(1,0)	341	(4,3)	3	(1,3)	▲	13	(0,7)	333	(5,0)	–3	(1,0)	▼
	Czech Republic	43	(0,9)	542	(2,6)	◊	◊		31	(0,7)	490	(2,8)	◊	◊		25	(0,8)	456	(3,1)	◊	◊	
	Botswana	42	(1,0)	385	(3,0)	4	(1,3)	▲	41	(0,9)	355	(2,6)	–4	(1,2)	▼	17	(0,7)	354	(3,6)	0	(1,0)	
	Hungary	42	(1,0)	566	(3,5)	–3	(1,4)		32	(0,9)	499	(4,2)	1	(1,3)		26	(1,0)	464	(3,7)	2	(1,3)	
	Singapore	41	(1,0)	638	(3,3)	2	(1,3)		34	(0,9)	572	(4,6)	0	(1,1)		25	(0,8)	547	(4,7)	–2	(1,0)	
	Bosnia and Herzegovina	41	(1,2)	502	(2,6)	◊	◊		27	(0,8)	441	(3,2)	◊	◊		32	(1,1)	422	(3,5)	◊	◊	
	Russian Federation	41	(1,1)	560	(4,3)	–2	(1,5)		31	(0,8)	496	(4,9)	1	(1,2)		28	(0,8)	466	(4,1)	1	(1,2)	
	Lithuania	41	(1,0)	556	(2,7)	4	(1,4)	▲	34	(0,9)	481	(2,9)	–3	(1,2)	▼	25	(0,9)	461	(3,1)	–1	(1,2)	
	Slovenia	40	(1,1)	541	(2,9)	–1	(1,4)		41	(0,9)	485	(2,2)	2	(1,3)		19	(0,8)	458	(3,2)	–1	(1,2)	
	Turkey	39	(1,1)	494	(6,1)	◊	◊		36	(0,8)	403	(4,7)	◊	◊		24	(1,0)	384	(4,3)	◊	◊	
	Malta	38	(0,7)	536	(2,1)	◊	◊		35	(0,7)	467	(2,0)	◊	◊		27	(0,6)	449	(2,2)	◊	◊	
	Bulgaria	37	(1,3)	516	(5,5)	4	(1,8)		38	(1,1)	452	(5,3)	–1	(1,8)		25	(1,1)	430	(7,6)	–3	(1,6)	
r	Armenia	37	(0,9)	521	(4,0)	–4	(1,5)	▼	38	(1,1)	496	(4,6)	–2	(1,5)		26	(1,0)	485	(4,7)	7	(1,4)	▲
	Ukraine	36	(1,2)	523	(3,8)	◊	◊		36	(0,9)	448	(3,5)	◊	◊		28	(1,1)	423	(3,2)	◊	◊	
	El Salvador	35	(1,1)	377	(3,2)	◊	◊		52	(1,1)	327	(2,7)	◊	◊		13	(0,8)	323	(4,5)	◊	◊	
	Romania	33	(1,2)	517	(5,3)	3	(1,7)		41	(1,1)	449	(4,6)	–4	(1,6)	▼	27	(1,2)	426	(4,4)	2	(1,5)	
	Hong Kong SAR	30	(1,1)	622	(5,1)	1	(1,4)		40	(1,0)	562	(6,7)	2	(1,2)		30	(0,7)	539	(5,8)	–2	(1,1)	▼
	Korea, Rep. of	29	(0,8)	668	(2,6)	–2	(1,1)		34	(0,7)	606	(3,1)	–2	(1,0)	▼	38	(0,8)	536	(2,8)	4	(1,2)	▲
	Indonesia	28	(1,0)	405	(5,4)	2	(1,6)		58	(1,0)	394	(3,8)	–1	(1,3)		14	(0,8)	401	(5,0)	–1	(1,2)	
	Malaysia	27	(1,4)	521	(5,3)	–11	(1,8)	▼	50	(1,2)	458	(5,1)	5	(1,5)	▲	23	(0,8)	453	(4,5)	6	(1,0)	▲
	Chinese Taipei	27	(1,1)	674	(3,7)	1	(1,5)		27	(0,7)	610	(5,0)	–3	(1,0)	▼	46	(1,2)	547	(4,4)	2	(1,6)	
	Thailand	22	(1,1)	489	(6,9)	◊	◊		60	(0,9)	428	(4,6)	◊	◊		18	(0,7)	430	(5,6)	◊	◊	
	Japan	17	(0,6)	638	(3,9)	0	(0,9)		35	(0,8)	586	(2,9)	–3	(1,1)	▼	48	(0,9)	535	(2,6)	2	(1,2)	▲
¶	Morocco	43	(1,6)	417	(3,7)	–	–		39	(1,2)	360	(3,6)	–	–		18	(0,9)	348	(5,4)	–	–	
	International Avg.	43	(0,2)	492	(0,6)				37	(0,1)	433	(0,6)				20	(0,1)	412	(0,7)			
Benchmarking Participants																						
	Massachusetts, US	60	(1,6)	577	(4,0)	◊	◊		24	(1,1)	515	(5,1)	◊	◊		17	(1,1)	489	(7,6)	◊	◊	
	Ontario, Canada	59	(1,5)	548	(2,9)	–3	(2,0)		24	(1,0)	485	(4,7)	2	(1,3)		16	(1,0)	456	(5,0)	1	(1,3)	
	Minnesota, US	59	(1,6)	560	(4,3)	◊	◊		24	(1,4)	507	(5,0)	◊	◊		17	(1,0)	476	(5,5)	◊	◊	
	British Columbia, Canada	52	(1,3)	545	(3,2)	◊	◊		28	(0,9)	486	(3,9)	◊	◊		20	(0,9)	454	(2,9)	◊	◊	
	Quebec, Canada	51	(1,2)	560	(4,2)	–8	(1,8)	▼	27	(1,0)	511	(3,6)	3	(1,3)	▲	22	(0,9)	479	(3,5)	5	(1,3)	▲
	Dubai, UAE	51	(1,1)	500	(3,1)	◊	◊		35	(0,8)	434	(3,4)	◊	◊		14	(0,9)	417	(5,9)	◊	◊	
	Basque Country, Spain	46	(1,5)	534	(3,0)	0	(2,2)		29	(1,1)	484	(3,8)	0	(1,5)		25	(1,2)	456	(4,3)	1	(1,8)	

Index based on students' responses to four statements about mathematics: 1) I usually do well in mathematics; 2) Mathematics is more difficult for me than for many of my classmates (Reversed); 3) Mathematics is not one of my strengths (Reversed); 4) I learn things quickly in mathematics. Average is computed across the four items based on a 4-point scale: 1. Agree a lot; 2. Agree a little; 3. Disagree a little; 4. Disagree a lot. Students agreeing a little or a lot on average across the four statements are assigned to the high level. Students disagreeing a little or a lot on average are assigned to the low level. All other students are assigned to the middle level.

¶ Did not satisfy guidelines for sample participation rates (see Appendix A).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

A dash (–) indicates comparable data are not available.

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

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 percent significantly higher.

▼ 2007 percent significantly lower.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 36 Index of Students' Self-Confidence in Learning Science (SCS) with Trends

TIMSS 2007 Science 4

	Country	High SCS							Medium SCS							Low SCS						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
	Austria	79	(0,9)	539	(2,4)	◊	◊		16	(0,7)	479	(4,1)	◊	◊		5	(0,5)	477	(7,2)	◊	◊	
	Germany	76	(0,8)	544	(2,5)	◊	◊		18	(0,6)	491	(4,7)	◊	◊		5	(0,4)	469	(6,5)	◊	◊	
	Sweden	76	(0,9)	534	(3,0)	◊	◊		20	(0,7)	498	(4,5)	◊	◊		4	(0,4)	484	(8,1)	◊	◊	
	Iran, Islamic Rep. of	74	(1,3)	461	(3,8)	22	(2,0)	▲	21	(1,2)	393	(5,8)	–21	(1,9)	▼	5	(0,6)	359	(13,9)	–1	(0,8)	
	Kazakhstan	71	(1,7)	542	(5,3)	◊	◊		23	(1,3)	506	(6,8)	◊	◊		6	(1,0)	520	(11,0)	◊	◊	
	Lithuania	70	(0,9)	527	(2,4)	1	(1,2)		25	(0,8)	491	(3,7)	–1	(1,2)		5	(0,5)	460	(9,3)	0	(0,6)	
	United States	69	(0,7)	556	(2,4)	14	(1,2)	▲	22	(0,5)	508	(3,8)	–17	(1,0)	▼	8	(0,4)	493	(4,7)	3	(0,5)	▲
	Italy	69	(0,9)	548	(3,4)	0	(1,4)		25	(0,7)	514	(3,6)	–1	(1,2)		6	(0,4)	496	(6,6)	0	(0,6)	
	Slovak Republic	69	(1,2)	546	(3,5)	◊	◊		24	(1,0)	492	(7,2)	◊	◊		7	(0,5)	476	(8,9)	◊	◊	
	Denmark	68	(1,4)	531	(2,8)	◊	◊		26	(1,1)	494	(4,3)	◊	◊		7	(0,6)	485	(6,3)	◊	◊	
	Norway	67	(1,3)	492	(3,1)	3	(1,7)		26	(1,0)	454	(4,8)	–3	(1,4)	▼	7	(0,5)	436	(8,4)	0	(0,7)	
	Netherlands	67	(1,3)	535	(2,7)	–4	(1,8)	▼	25	(1,1)	504	(3,8)	3	(1,4)	▲	8	(0,6)	490	(5,5)	1	(0,9)	
	Slovenia	65	(1,1)	533	(2,4)	–12	(1,4)	▼	28	(0,9)	497	(3,2)	10	(1,2)	▲	7	(0,5)	472	(6,8)	3	(0,7)	▲
	Georgia	65	(1,4)	439	(4,1)	◊	◊		28	(1,1)	403	(6,3)	◊	◊		7	(0,6)	393	(9,0)	◊	◊	
	Kuwait	65	(1,4)	388	(4,5)	◊	◊		31	(1,4)	310	(6,3)	◊	◊		4	(0,5)	285	(13,9)	◊	◊	
	Hungary	65	(1,2)	561	(2,9)	–5	(1,6)	▼	26	(1,0)	498	(5,0)	3	(1,3)	▲	10	(0,6)	494	(6,1)	2	(0,8)	▲
	Russian Federation	63	(1,2)	563	(4,1)	0	(1,8)		27	(1,1)	523	(6,9)	0	(1,6)		10	(0,7)	520	(7,8)	0	(1,1)	
	Australia	63	(1,0)	543	(3,0)	–3	(1,6)		28	(0,7)	509	(4,4)	1	(1,3)		9	(0,7)	483	(6,7)	2	(0,8)	▲
	Scotland	62	(1,2)	514	(2,6)	5	(1,8)	▲	26	(1,0)	485	(3,9)	–4	(1,5)	▼	11	(0,8)	468	(4,3)	–1	(1,0)	
	Qatar	62	(0,7)	336	(2,4)	◊	◊		33	(0,7)	264	(3,7)	◊	◊		6	(0,3)	233	(6,7)	◊	◊	
s	Armenia	59	(1,8)	503	(5,3)	0	(2,2)		31	(1,5)	486	(11,8)	–3	(1,8)		10	(0,7)	472	(17,3)	3	(1,0)	▲
	Tunisia	58	(1,6)	374	(6,5)	–2	(2,3)		37	(1,4)	283	(6,2)	3	(2,0)		5	(0,6)	222	(10,8)	–2	(0,8)	▼
	Chinese Taipei	58	(1,2)	572	(2,3)	8	(1,6)	▲	33	(0,9)	538	(2,9)	–4	(1,2)	▼	9	(0,7)	533	(4,4)	–4	(1,0)	▼
	Colombia	58	(1,4)	430	(5,2)	◊	◊		37	(1,3)	376	(6,6)	◊	◊		5	(0,6)	366	(13,0)	◊	◊	
	Ukraine	57	(1,3)	498	(3,3)	◊	◊		33	(1,0)	454	(3,6)	◊	◊		9	(0,6)	447	(6,4)	◊	◊	
	Latvia	57	(1,3)	558	(2,8)	3	(2,0)		32	(1,0)	526	(3,2)	–4	(1,6)	▼	11	(0,8)	515	(4,9)	1	(1,3)	
	Czech Republic	56	(1,3)	534	(3,3)	◊	◊		30	(1,1)	497	(3,8)	◊	◊		14	(0,7)	482	(5,0)	◊	◊	
	England	55	(1,1)	561	(3,4)	2	(1,6)		31	(0,8)	524	(3,6)	–2	(1,2)		14	(0,8)	512	(4,8)	0	(1,1)	
	Japan	53	(1,2)	562	(2,4)	8	(1,6)	▲	35	(1,0)	537	(2,8)	–6	(1,3)	▼	12	(0,6)	521	(4,2)	–2	(0,9)	
	Hong Kong SAR	52	(1,3)	571	(3,4)	–8	(1,9)	▼	38	(1,0)	539	(4,1)	6	(1,5)	▲	11	(0,7)	528	(5,4)	2	(0,8)	▲
	Algeria	51	(1,4)	378	(5,6)	◊	◊		43	(1,2)	341	(7,7)	◊	◊		6	(0,5)	315	(15,0)	◊	◊	
	New Zealand	51	(1,1)	530	(2,7)	15	(1,5)	▲	37	(1,0)	486	(4,0)	–22	(1,4)	▼	12	(0,6)	464	(4,9)	7	(0,7)	▲
r	Morocco	49	(1,6)	332	(7,2)	–3	(2,5)		42	(1,5)	281	(7,7)	3	(2,3)		8	(0,9)	259	(15,1)	0	(1,5)	
	Yemen	46	(1,8)	233	(8,3)	◊	◊		45	(1,5)	194	(7,4)	◊	◊		9	(0,7)	179	(12,5)	◊	◊	
	El Salvador	45	(1,3)	420	(3,9)	◊	◊		49	(1,1)	372	(3,8)	◊	◊		6	(0,5)	360	(9,0)	◊	◊	
	Singapore	41	(0,9)	621	(4,0)	9	(1,3)	▲	38	(0,7)	568	(4,9)	–3	(1,1)	▼	21	(0,6)	556	(5,0)	–6	(1,0)	▼
	International Avg.	61	(0,2)	497	(0,7)				30	(0,2)	453	(0,9)				8	(0,1)	437	(1,5)			
Benchmarking Participants																						
	Massachusetts, US	75	(1,4)	582	(4,1)	◊	◊		18	(1,1)	547	(6,7)	◊	◊		6	(0,7)	517	(7,1)	◊	◊	
	Minnesota, US	75	(2,1)	564	(5,7)	◊	◊		19	(1,5)	519	(10,5)	◊	◊		5	(0,9)	502	(10,6)	◊	◊	
	Quebec, Canada	72	(1,1)	530	(2,9)	3	(1,6)		21	(0,9)	489	(3,8)	–2	(1,4)		7	(0,5)	480	(6,2)	–1	(0,7)	
	Alberta, Canada	72	(1,1)	555	(3,6)	◊	◊		22	(0,8)	517	(4,5)	◊	◊		6	(0,6)	493	(8,1)	◊	◊	
	Dubai, UAE	69	(1,4)	488	(3,4)	◊	◊		25	(1,1)	427	(4,8)	◊	◊		6	(0,6)	387	(12,5)	◊	◊	
	British Columbia, Canada	69	(1,0)	551	(2,8)	◊	◊		24	(0,7)	513	(4,0)	◊	◊		7	(0,6)	495	(6,0)	◊	◊	
	Ontario, Canada	67	(1,3)	553	(3,6)	0	(1,9)		25	(1,3)	507	(6,0)	1	(1,7)		8	(0,8)	500	(6,4)	–1	(1,1)	

Index based on students' responses to four statements about science:1) I usually do well in science; 2) Science is harder for me than for many of my classmates (Reversed); 3) I am just not good at science (Reversed); 4) I learn things quickly in science. Average is computed across the four items based on a 4-point scale: 1. Agree a lot; 2. Agree a little; 3. Disagree a little; 4. Disagree a lot. Students agreeing a little or a lot on average across the four statements are assigned to the high level. Students disagreeing a little or a lot on average are assigned to the low level. All other students are assigned to the middle level.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 percent significantly higher.

▼ 2007 percent significantly lower.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 37 Index of Students' Self–Confidence in Learning Science (SCS) with Trends

	Country	High SCS							Medium SCS							Low SCS						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
General/Integrated Science																						
	Tunisia	70	(0,9)	457	(2,2)	1	(1,4)		26	(0,8)	417	(2,3)	0	(1,2)		4	(0,4)	417	(6,2)	0	(0,5)	
	Jordan	64	(1,5)	511	(3,6)	7	(1,8)	▲	30	(1,2)	446	(4,1)	–6	(1,5)	▼	5	(0,6)	419	(12,3)	–1	(0,8)	
	Colombia	62	(1,4)	434	(3,3)	◊	◊		34	(1,2)	396	(4,3)	◊	◊		5	(0,4)	390	(8,5)	◊	◊	
	Egypt	60	(1,4)	438	(3,4)	–4	(1,8)	▼	35	(1,4)	379	(4,6)	3	(1,7)		5	(0,4)	357	(9,6)	1	(0,5)	
	Saudi Arabia	59	(1,2)	427	(3,0)	–	–		36	(1,1)	378	(3,0)	–	–		5	(0,5)	364	(6,5)	–	–	
	Bahrain	58	(0,9)	496	(2,2)	2	(1,3)		35	(0,9)	433	(2,5)	–2	(1,3)		7	(0,4)	421	(6,6)	0	(0,7)	
	Iran, Islamic Rep. of	58	(1,3)	479	(3,9)	11	(1,7)	▲	35	(1,1)	437	(3,9)	–9	(1,4)	▼	7	(0,5)	432	(8,1)	–1	(0,7)	
	Norway	57	(1,2)	507	(2,0)	–3	(1,7)		32	(0,9)	467	(2,8)	1	(1,3)		11	(0,7)	447	(4,5)	2	(1,0)	
	Israel	56	(1,6)	507	(4,2)	–3	(1,9)		33	(1,2)	432	(4,9)	1	(1,5)		11	(0,7)	418	(7,0)	1	(0,9)	
	United States	56	(1,1)	543	(3,1)	0	(1,4)		29	(0,7)	498	(3,2)	–2	(1,0)		15	(0,7)	482	(3,8)	2	(0,9)	
	Ghana	54	(1,5)	334	(5,3)	–3	(2,0)		41	(1,3)	273	(5,7)	4	(1,7)	▲	5	(0,5)	268	(11,1)	–1	(0,8)	
	England	53	(1,5)	569	(4,7)	1	(2,1)		31	(1,1)	517	(5,5)	–1	(1,7)		15	(0,9)	504	(4,7)	0	(1,3)	
	Italy	53	(1,0)	517	(3,6)	–4	(1,5)	▼	33	(0,9)	476	(3,3)	1	(1,3)		14	(0,8)	460	(4,6)	3	(1,0)	▲
	Palestinian Nat'l Auth.	53	(1,3)	446	(3,7)	–4	(1,7)	▼	41	(1,1)	368	(4,2)	4	(1,5)	▲	6	(0,5)	348	(7,5)	–1	(0,7)	
	Qatar	52	(0,6)	357	(2,1)	◊	◊		40	(0,7)	288	(3,2)	◊	◊		8	(0,3)	266	(5,4)	◊	◊	
	Oman	52	(1,1)	457	(3,0)	◊	◊		44	(1,0)	393	(3,1)	◊	◊		4	(0,3)	373	(10,9)	◊	◊	
	Scotland	52	(1,4)	530	(3,2)	–7	(2,0)	▼	31	(1,1)	468	(3,6)	4	(1,5)	▲	17	(1,0)	447	(4,5)	3	(1,3)	▲
	Turkey	51	(1,3)	484	(4,0)	◊	◊		37	(1,0)	427	(4,2)	◊	◊		11	(0,6)	417	(5,3)	◊	◊	
	Botswana	49	(1,0)	381	(3,3)	3	(1,4)	▲	41	(0,9)	338	(4,2)	–3	(1,1)	▼	9	(0,5)	316	(6,9)	0	(0,7)	
	Kuwait	49	(0,9)	445	(3,4)	◊	◊		42	(0,8)	401	(3,3)	◊	◊		9	(0,5)	386	(5,8)	◊	◊	
	El Salvador	44	(1,3)	408	(3,4)	◊	◊		51	(1,2)	372	(3,3)	◊	◊		5	(0,6)	388	(6,9)	◊	◊	
	Australia	41	(1,3)	549	(4,9)	–7	(2,0)	▼	39	(1,0)	496	(3,7)	4	(1,5)	▲	20	(1,0)	483	(4,3)	3	(1,3)	▲
	Singapore	40	(1,0)	601	(4,5)	–5	(1,3)	▼	38	(0,9)	544	(5,4)	2	(1,1)		21	(0,7)	546	(6,0)	3	(0,9)	▲
	Hong Kong SAR	33	(1,3)	561	(4,9)	1	(1,7)		49	(0,9)	516	(5,1)	2	(1,2)		18	(1,0)	515	(5,9)	–2	(1,4)	
	Thailand	30	(1,2)	495	(4,9)	◊	◊		59	(1,0)	457	(4,1)	◊	◊		11	(0,8)	479	(6,8)	◊	◊	
	Malaysia	26	(1,3)	514	(6,4)	–12	(1,8)	▼	52	(1,2)	454	(6,3)	4	(1,6)	▲	22	(0,9)	461	(5,8)	8	(1,1)	▲
	Korea, Rep. of	24	(1,0)	603	(2,5)	4	(1,2)	▲	40	(0,9)	556	(2,4)	–2	(1,1)		36	(0,9)	516	(2,5)	–2	(1,3)	
	Chinese Taipei	23	(1,0)	619	(4,0)	–4	(1,4)	▼	36	(0,9)	552	(4,2)	–2	(1,2)		41	(1,2)	536	(3,3)	7	(1,6)	▲
	Japan	20	(0,7)	601	(2,8)	0	(1,1)		44	(1,0)	554	(2,4)	–2	(1,2)		36	(1,1)	529	(2,8)	2	(1,5)	
	International Avg.	48	(0,2)	492	(0,7)				38	(0,2)	439	(0,7)				13	(0,1)	427	(1,3)			
Benchmarking Participants																						
	Massachusetts, US	58	(2,9)	579	(6,3)	◊	◊		28	(1,6)	537	(4,8)	◊	◊		14	(1,7)	506	(6,4)	◊	◊	
	Dubai, UAE	57	(1,6)	521	(3,1)	◊	◊		36	(1,4)	457	(4,1)	◊	◊		8	(0,7)	452	(8,7)	◊	◊	
	British Columbia, Canada	54	(1,2)	548	(3,1)	◊	◊		32	(0,7)	507	(3,5)	◊	◊		15	(0,9)	486	(4,0)	◊	◊	
	Ontario, Canada	51	(1,4)	553	(3,3)	–1	(2,0)		33	(1,0)	507	(4,0)	0	(1,5)		16	(1,1)	483	(6,5)	1	(1,5)	
	Minnesota, US	50	(2,8)	567	(4,9)	◊	◊		32	(1,6)	520	(5,3)	◊	◊		18	(2,3)	493	(5,3)	◊	◊	
	Basque Country, Spain	50	(1,9)	526	(3,4)	–1	(2,6)		33	(1,1)	478	(3,7)	–1	(1,7)		18	(1,3)	455	(4,6)	2	(1,7)	
	Quebec, Canada	49	(1,5)	525	(3,6)	–1	(2,3)		33	(0,9)	497	(3,9)	2	(1,4)		18	(1,1)	481	(5,6)	–1	(1,6)	
Biology																						
	Bosnia and Herzegovina	74	(1,2)	479	(3,0)	◊	◊		18	(0,8)	437	(4,2)	◊	◊		8	(0,7)	437	(5,5)	◊	◊	
	Serbia	69	(1,3)	487	(3,5)	–6	(1,7)	▼	22	(1,1)	445	(5,1)	4	(1,4)	▲	9	(0,6)	431	(7,7)	2	(0,8)	▲
	Czech Republic	65	(1,5)	550	(2,3)	◊	◊		27	(1,1)	523	(2,5)	◊	◊		9	(0,7)	515	(5,0)	◊	◊	
	Lithuania	63	(1,3)	533	(2,6)	–1	(1,8)		30	(1,2)	497	(3,7)	1	(1,6)		7	(0,5)	493	(5,2)	0	(0,8)	
	Syrian Arab Republic	62	(1,1)	473	(2,8)	◊	◊		33	(1,0)	431	(3,6)	◊	◊		5	(0,4)	419	(6,1)	◊	◊	
	Georgia	61	(1,4)	448	(3,9)	◊	◊		32	(1,4)	400	(7,9)	◊	◊		7	(0,5)	382	(8,7)	◊	◊	
	Russian Federation	60	(1,3)	547	(4,1)	–9	(2,5)	▼	30	(0,9)	510	(4,7)	6	(1,8)	▲	10	(0,8)	496	(6,0)	3	(1,0)	▲
	Hungary	59	(1,6)	553	(3,2)	–1	(2,1)		30	(1,1)	519	(4,2)	0	(1,5)		11	(0,8)	518	(5,4)	1	(1,1)	
	Bulgaria	59	(1,4)	491	(6,4)	–	–		32	(1,2)	446	(7,0)	–	–		9	(0,8)	448	(15,9)	–	–	
	Sweden	57	(1,0)	531	(2,6)	–1	(1,5)		35	(0,8)	495	(3,5)	2	(1,2)		7	(0,4)	466	(5,4)	–1	(0,7)	
	Slovenia	55	(1,2)	556	(2,2)	–8	(1,7)	▼	33	(0,9)	523	(3,0)	3	(1,3)	▲	12	(0,8)	498	(5,7)	5	(1,0)	▲
	Ukraine	53	(1,3)	510	(3,2)	◊	◊		35	(1,1)	470	(3,8)	◊	◊		12	(0,7)	449	(5,4)	◊	◊	
	Algeria	53	(1,1)	422	(2,2)	◊	◊		39	(0,9)	398	(2,4)	◊	◊		8	(0,5)	392	(3,3)	◊	◊	
	Malta	51	(1,2)	549	(3,4)	◊	◊		33	(1,4)	481	(5,7)	◊	◊		16	(0,9)	454	(5,3)	◊	◊	
	Armenia	51	(1,2)	501	(5,7)	–6	(1,7)	▼	37	(1,2)	482	(6,6)	2	(1,6)		12	(0,7)	464	(8,0)	5	(0,8)	▲
	Romania	49	(1,4)	480	(4,0)	3	(1,9)		40	(1,1)	449	(4,5)	–5	(1,7)	▼	11	(0,6)	447	(6,9)	2	(0,9)	
	Lebanon	49	(1,5)	454	(5,8)	0	(2,0)		42	(1,3)	381	(5,8)	–1	(1,8)		9	(0,6)	383	(8,3)	1	(0,9)	
	Indonesia	41	(1,1)	429	(4,0)	1	(1,7)		54	(0,9)	425	(3,6)	0	(1,5)		5	(0,5)	441	(7,0)	–2	(0,7)	▼
	Cyprus	x	x	x	x	–	–		x	x	x	x	–	–		x	x	x	x	–	–	
¶	Morocco	48	(1,1)	424	(4,5)	–	–		43	(1,0)	384	(3,7)	–	–		9	(0,7)	373	(5,2)	–	–	
	International Avg.	57	(0,3)	496	(0,9)				34	(0,3)	458	(1,1)				9	(0,2)	448	(1,6)			

Continued on next page

	Country	High SCS							Medium SCS							Low SCS						
		2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Earth Science																						
	Bosnia and Herzegovina	72	(1,2)	478	(3,0)	◊	◊		20	(0,8)	439	(3,6)	◊	◊		8	(0,7)	441	(5,9)	◊	◊	
	Serbia	66	(1,2)	488	(3,1)	–3	(1,7)	▼	24	(0,9)	444	(4,1)	3	(1,3)	▲	10	(0,8)	438	(7,7)	1	(1,0)	
	Lithuania	64	(1,2)	535	(2,6)	0	(1,6)		29	(1,0)	491	(3,7)	–1	(1,3)		7	(0,6)	493	(6,2)	1	(0,8)	
	Sweden	60	(1,0)	527	(2,9)	–3	(1,6)		33	(0,9)	497	(3,4)	3	(1,4)	▲	7	(0,4)	484	(6,1)	0	(0,7)	
	Czech Republic	59	(1,2)	550	(2,4)	◊	◊		29	(0,9)	526	(2,8)	◊	◊		12	(0,7)	516	(4,2)	◊	◊	
	Cyprus	59	(0,9)	476	(2,3)	0	(1,3)		32	(0,7)	422	(2,9)	0	(1,2)		10	(0,5)	416	(4,8)	0	(0,7)	
	Russian Federation	57	(1,2)	551	(3,9)	–1	(2,1)		32	(1,0)	508	(4,7)	1	(1,7)		10	(0,6)	490	(6,7)	0	(0,9)	
	Syrian Arab Republic	56	(1,1)	468	(3,3)	◊	◊		38	(1,0)	432	(3,1)	◊	◊		5	(0,5)	427	(6,7)	◊	◊	
	Slovenia	56	(1,5)	557	(2,4)	–	–		33	(1,1)	519	(3,3)	–	–		11	(0,8)	506	(4,2)	–	–	
	Bulgaria	52	(1,6)	495	(7,1)	–	–		37	(1,4)	454	(6,1)	–	–		11	(0,9)	433	(12,9)	–	–	
	Georgia	50	(1,4)	450	(5,0)	◊	◊		41	(1,5)	405	(7,2)	◊	◊		9	(0,8)	396	(8,6)	◊	◊	
	Ukraine	50	(1,5)	515	(3,2)	◊	◊		37	(1,0)	466	(3,6)	◊	◊		13	(0,8)	452	(4,5)	◊	◊	
	Malta	50	(0,8)	481	(2,3)	◊	◊		35	(0,8)	418	(3,2)	◊	◊		15	(0,5)	399	(4,7)	◊	◊	
	Romania	49	(1,5)	488	(3,9)	8	(2,0)	▲	37	(1,2)	436	(5,0)	–9	(1,7)	▼	13	(0,9)	453	(5,3)	1	(1,2)	
	Hungary	47	(1,4)	560	(2,9)	–8	(2,0)	▼	35	(1,1)	523	(4,3)	3	(1,5)	▲	18	(0,9)	517	(4,6)	4	(1,2)	▲
	Armenia	45	(1,3)	503	(6,8)	–10	(1,7)	▼	42	(1,0)	481	(6,7)	2	(1,5)		13	(0,9)	469	(8,2)	7	(1,0)	▲
	Algeria	38	(1,6)	415	(3,9)	◊	◊		52	(1,5)	394	(3,8)	◊	◊		11	(0,8)	397	(4,9)	◊	◊	
	Indonesia	–	–	–	–	–	–		–	–	–	–	–	–		–	–	–	–	–	–	
	Lebanon	–	–	–	–	–	–		–	–	–	–	–	–		–	–	–	–	–	–	
¶	Morocco	35	(1,2)	431	(4,3)	–	–		52	(1,1)	392	(2,8)	–	–		13	(0,9)	375	(6,1)	–	–	
	International Avg.	54	(0,3)	498	(0,9)				35	(0,3)	458	(1,0)				11	(0,2)	450	(1,5)			
Chemistry																						
	Malta	52	(1,3)	580	(4,0)	◊	◊		31	(1,3)	509	(7,2)	◊	◊		17	(1,1)	512	(7,7)	◊	◊	
	Czech Republic	50	(1,5)	554	(2,4)	◊	◊		31	(1,0)	526	(2,6)	◊	◊		19	(1,0)	522	(3,6)	◊	◊	
	Bosnia and Herzegovina	50	(1,3)	483	(3,1)	◊	◊		31	(0,8)	453	(3,9)	◊	◊		19	(1,1)	450	(4,2)	◊	◊	
	Slovenia	48	(1,2)	563	(2,5)	3	(1,6)		35	(0,9)	519	(2,7)	–4	(1,4)	▼	16	(0,9)	505	(4,0)	1	(1,2)	
	Lebanon	48	(1,5)	447	(5,3)	–1	(2,0)		43	(1,3)	387	(6,1)	–2	(1,8)		9	(0,6)	400	(9,0)	2	(0,9)	▲
	Cyprus	47	(0,8)	484	(2,3)	1	(1,1)		35	(0,7)	426	(3,0)	–4	(1,1)	▼	17	(0,7)	423	(4,0)	3	(0,9)	▲
	Sweden	47	(1,0)	539	(2,6)	0	(1,5)		41	(0,9)	494	(3,4)	2	(1,4)		13	(0,7)	480	(4,7)	–2	(1,0)	
	Syrian Arab Republic	44	(0,9)	470	(3,1)	◊	◊		47	(0,9)	444	(3,0)	◊	◊		9	(0,6)	450	(4,7)	◊	◊	
	Lithuania	43	(1,5)	542	(3,5)	4	(1,9)	▲	38	(1,0)	502	(2,8)	–1	(1,3)		20	(1,0)	505	(3,7)	–3	(1,3)	▼
	Algeria	41	(1,2)	421	(2,7)	◊	◊		50	(1,1)	399	(2,7)	◊	◊		9	(0,6)	398	(4,6)	◊	◊	
	Russian Federation	38	(1,1)	555	(4,0)	–3	(1,7)	▼	36	(0,9)	521	(4,2)	0	(1,4)		26	(1,1)	510	(5,8)	4	(1,5)	▲
	Georgia	38	(1,5)	457	(4,3)	◊	◊		45	(1,4)	414	(6,3)	◊	◊		17	(1,1)	403	(5,4)	◊	◊	
	Serbia	38	(1,2)	503	(3,7)	–3	(1,8)		32	(1,3)	453	(4,3)	0	(1,5)		31	(1,3)	457	(4,0)	3	(1,9)	
	Bulgaria	36	(1,6)	505	(6,7)	–	–		42	(1,3)	459	(6,7)	–	–		22	(1,2)	448	(7,4)	–	–	
	Ukraine	32	(1,3)	521	(3,5)	◊	◊		41	(1,0)	476	(3,5)	◊	◊		27	(1,2)	471	(3,8)	◊	◊	
	Hungary	32	(1,0)	565	(3,6)	–2	(1,6)		38	(0,9)	524	(4,0)	3	(1,2)	▲	30	(1,2)	532	(2,8)	–1	(1,7)	
	Armenia	31	(0,9)	500	(5,9)	–5	(1,6)	▼	49	(0,9)	485	(6,4)	–1	(1,5)		20	(1,0)	482	(5,9)	6	(1,2)	▲
	Romania	29	(1,2)	488	(4,8)	3	(1,7)		48	(1,4)	449	(4,6)	–5	(1,8)	▼	24	(1,0)	466	(4,0)	3	(1,4)	
	Indonesia	–	–	–	–	–	–		–	–	–	–	–	–		–	–	–	–	–	–	
¶	Morocco	40	(1,5)	430	(4,9)	–	–		50	(1,3)	390	(3,7)	–	–		11	(0,6)	369	(6,6)	–	–	
	International Avg.	41	(0,3)	506	(0,9)				40	(0,2)	465	(1,0)				19	(0,2)	462	(1,2)			
Physics																						
	Algeria	48	(1,0)	421	(2,2)	◊	◊		46	(1,1)	400	(2,7)	◊	◊		6	(0,3)	399	(4,8)	◊	◊	
	Georgia	48	(1,4)	452	(4,3)	◊	◊		41	(1,2)	408	(6,0)	◊	◊		11	(0,7)	407	(6,5)	◊	◊	
	Bosnia and Herzegovina	48	(1,1)	489	(3,1)	◊	◊		34	(0,9)	449	(3,5)	◊	◊		19	(0,8)	446	(5,0)	◊	◊	
	Cyprus	47	(0,9)	489	(2,5)	4	(1,2)	▲	38	(0,8)	422	(2,3)	–4	(1,1)	▼	15	(0,6)	419	(4,6)	0	(0,9)	
	Russian Federation	46	(1,2)	558	(3,7)	–4	(1,9)	▼	37	(0,9)	515	(4,3)	2	(1,3)		17	(0,9)	490	(5,2)	2	(1,3)	
	Syrian Arab Republic	46	(1,0)	472	(3,1)	◊	◊		47	(0,8)	442	(2,9)	◊	◊		7	(0,4)	447	(6,6)	◊	◊	
	Sweden	45	(1,0)	543	(2,7)	–2	(1,6)		43	(0,9)	496	(3,5)	3	(1,3)	▲	13	(0,7)	481	(4,5)	–1	(1,1)	
	Lebanon	44	(1,4)	452	(5,7)	0	(1,9)		47	(1,2)	390	(6,2)	–2	(1,6)		9	(0,7)	397	(10,7)	2	(0,9)	▲
	Armenia	43	(1,2)	504	(6,9)	–5	(1,8)	▼	44	(1,1)	483	(6,7)	–1	(1,7)		13	(0,6)	470	(7,8)	6	(0,8)	▲
	Serbia	43	(1,3)	502	(3,5)	–7	(1,9)	▼	34	(1,0)	453	(4,0)	2	(1,4)		23	(1,1)	451	(4,6)	5	(1,5)	▲
r	Bulgaria	42	(1,6)	496	(6,7)	–	–		45	(1,4)	459	(6,6)	–	–		14	(1,1)	453	(10,7)	–	–	
	Czech Republic	41	(1,4)	561	(2,8)	◊	◊		34	(0,9)	530	(2,4)	◊	◊		25	(1,1)	516	(2,7)	◊	◊	
	Hungary	40	(1,4)	572	(3,6)	–6	(1,8)	▼	37	(0,9)	521	(3,5)	1	(1,3)		24	(1,2)	514	(3,8)	5	(1,5)	▲
	Lithuania	39	(1,0)	548	(3,6)	3	(1,6)		40	(0,8)	500	(3,1)	–2	(1,2)		21	(1,0)	502	(3,7)	–1	(1,4)	
	Ukraine	36	(1,3)	524	(3,0)	◊	◊		43	(0,9)	473	(3,8)	◊	◊		21	(1,1)	466	(3,5)	◊	◊	
	Malta	33	(0,6)	509	(2,9)	◊	◊		38	(0,8)	436	(3,0)	◊	◊		29	(0,6)	430	(2,6)	◊	◊	
	Slovenia	29	(1,2)	574	(3,1)	–4	(1,6)	▼	41	(0,9)	527	(2,9)	–3	(1,4)		30	(1,0)	519	(3,2)	7	(1,4)	▲
	Indonesia	29	(1,1)	422	(4,6)	2	(1,6)		60	(0,9)	427	(3,6)	2	(1,2)		11	(0,7)	451	(4,8)	–4	(1,1)	▼
	Romania	27	(1,1)	484	(4,4)	3	(1,4)	▲	51	(1,1)	452	(4,9)	–5	(1,5)	▼	22	(1,0)	469	(4,0)	2	(1,3)	
¶	Morocco	43	(1,8)	429	(4,2)	–	–		49	(1,5)	387	(3,4)	–	–		8	(0,8)	380	(7,9)	–	–	
	International Avg.	41	(0,3)	500	(0,9)				42	(0,2)	458	(0,9)				17	(0,2)	455	(1,3)			

See the explanation on the next page.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

INSTRUCTIONS AND LEARNING ACTIVITIES

Mathematics and science educational regulations and policies have impact on the overall effectiveness of different education systems. Curricula, the quality and use of textbooks, prescribed amount of time for instruction per year or per week, learning activities in the classroom: all have influence on students' motivation, problem-solving and cooperation skills.

This chapter presents the six characteristics TIMSS examined on mathematics and science instruction: the total amount of instructional time in each subject per year, the use of textbooks, learning activities in lessons, and types of scientific inquiry implemented in class, computer use in science class, mathematics and science homework.

Instructional Time

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TIMSS compared the instructional time that participating countries devoted to mathematics and science per year. Exhibits 13-16 also display teachers' reports about the amount of instructional time actually provided in year 2007 compared to 2003 (in this chapter and in the exhibits instructional time is given in hours which mean 60-minute hours not the 45-minute lessons in Hungary).

In Hungary, there was a decline in the total amount of instructional time devoted to both science and mathematics at both grades, except for fourth grade science. The most considerable change – even in international comparison – was reported at eighth grade science where there was a total of 44 hours decrease in annual instructional time devoted to chemistry, biology, and physics altogether.

At fourth grade, annual instructional time devoted to both mathematics and science was significantly below the international average by 34 hours less in mathematics and 13 hours less in science. On the other hand countries with high achievements on the mathematics and science scales were far above the international average of instructional time devoted to each subject per year. For example, a fourth grade student in Singapore or in England learns mathematics at school in 91 and 73 hours more than their Hungarian peers per year, but a Czech or a Slovenian student is also given one hour more instructional time in mathematics on average per week.

At eighth grade, the comparison of instructional time devoted to mathematics per year in the participating countries shows similar pattern. In Hungary 99 hours of instruction time per year is spent on mathematics, which is the lowest among the better-achieving countries on the TIMSS scale. Among the top-performing countries more instructional time is spent on mathematics in Chinese Taipei, Hong Kong SAR, the USA, Russia, Singapore, and the Czech Republic than in Hungary (additional 59, 49, 49, 32, 25, and 24 instructional hours, respectively).

Considering the instructional time devoted to science in Korea (104 hours), in Japan (103 hours) and in Hong Kong SAR (100 hours) per year and their students' average achievements on the TIMSS-scale it can be concluded that implementing general/integrated science curricula even with low level of instructional time can result in effective science education. On the other hand, two top-performing countries, Singapore and Chinese Taipei where science is taught as an integrated subject, have outstanding number of annual instructional hours devoted to science (140 and 145, respectively). In countries where science is taught as separate subjects more instructional time is spent on science in general.

Textbook use

It is a subject of debate worldwide to what extent teaching should rely on textbooks. Would not be teaching more efficient if teachers' range of activities were not limited to the use of the textbooks? On the other hand, those who support textbook use in classroom argue that using good-quality textbooks in teaching can help students feel more secure because they can rely on them. The TIMSS study did not attempt to decide on this debate, however TIMSS used teacher questionnaires to investigate to what extent students relied on textbooks use in their mathematics and science studies. Teachers could choose from three categories: the textbook remains the primary basis of instruction; the textbook is used as a supplementary resource, or no textbook is used in teaching the given subject.

The results show that the good-performing countries rely to a great extent on textbooks as the primary basis of mathematics and science instruction at fourth grade. In mathematics, the percentage is a little higher (75-98%) than in science, but the latter is also above 70 percent among the good-performing countries. On average internationally, 65 percent of the students in mathematics, and 52 percent of the students in science had teachers who reported using textbooks as the primary basis of instruction. Ratios of students with no use of textbooks in mathematics and science lessons were only a few percent (Tables 38, 39, 40, 41).

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The practice in some countries, on the other hand, is different from the average, e.g. in England, Australia, New Zealand and Scotland. These countries appear to be working towards a secondary use of textbooks in mathematics, where textbooks are used only as a supplementary resource in instruction. One-fourth or one-fifth of teachers in England and in Australia reported of using no textbooks at all in their lessons. There was very little textbook use in science, the majority of teachers reported no importance of using textbooks (82% of students in Australia, 80% in New Zealand, 68% in Scotland are taught without using textbooks in science lesson).

At eighth grade, teachers could decrease their reliance on using textbooks as their primary basis and use them as supplementary resources since their students aged between 14 and 15 have more developed skills to solve problems independently. However, this trend is reflected only in the data of the top-performing countries, mainly in science. At eighth grade in Singapore, Chinese Taipei and Japan there were 20 percent fewer students learning without using textbooks compared to fourth grade, whereas the international average of the eighth and fourth grade students were nearly the same.

At eighth grade in Hungary, the importance of textbook use decreased more significantly in mathematics (at fourth grade 77%, at eighth only 55%), whereas the percentages of using no textbooks in lessons did not change across the grades.

Learning Activities

Examining what kind of skills teachers expect from their students in mathematics and science lessons reveals key information on educational objectives of the participating countries. TIMSS asked such questions in the teacher questionnaires at both grades.

Mathematics

At fourth grade, the TIMSS questionnaire asked teachers about how often students were asked to do certain types of activities in their lessons. For fourth grade three types of activities were listed, for eighth grade – six. Tables 42 and 43 present the results.

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It can be noted that there are no national, cultural or even regional characteristics concerning learning activities in the participating countries, or best practices which specify the activities of the top-performing countries. It can only be concluded that at fourth grade teachers reported emphasis on their students' explaining answers and relating what is being learned in mathematics to their daily lives, at eighth grade, in addition to these activities, procedures to solve routine problems is also emphasised.

Science

The TIMSS questionnaire for both grades asked teachers about how often students were asked to engage in various learning activities in science class, including reading science textbooks or other resources, memorizing science facts and procedures, and, at eighth grade only, solve routine problems. Tables 44 and 45 summarize the teachers' responses. The tables display the data on how often students were engaged in the activities in percentage.

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When analysing the results at both grades, it can be concluded that reading in class received almost no emphasis or memorizing science facts has no emphasis at all in participating countries with modern science education. These two learning activities were reported to receive high emphasis in countries with more traditional, information- and theory-centred science education such as Hungary,

the former Soviet States, and the majority of Arab countries. Science education in Central European countries like Slovenia, the Czech Republic and Slovakia appeared to follow similar practice to those of the Asian countries.

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Tables 46, 47 and 48 provide profiles of the time spent on activities commonly encountered in mathematics and science classes. Teachers were asked to estimate what percentage of teaching time is taken by each of the seven activities.

The general opinion is that in Hungarian education too much time is spent on frontal instruction when students passively listen to lecture-style presentations. Data, however, show a different pattern: Hungarian teachers spend less time than the international average on this activity. On the other hand, among the top-performing Asian countries, most time, usually about half of the class time, was spent on lecture-type instruction.

In Hungary, half of the class time was spent on working on problems either independently or with teacher's guidance. The percentages of the other four activities (checking homework, listening to teacher re-teach and clarify content or procedures, taking tests or quizzes) and participating in classroom management tasks not related to the lessons content/purpose e.g. disciplining students were average, and there were no significant differences compared to other countries' data either.

At eighth grade science, Hungarian data compared to other top-performing countries show a relatively high percentage of time spent on taking tests or quizzes (in Hungary it takes about 14% of class time, the international average is 10%, in England 5%, Hong Kong SAR 8%, Korea 6%,, Japan 5%, Singapore 8%, Slovenia 5%, Chinese Taipei 9%). The same high percentage can be observed in the majority of participating countries with more traditional education systems such as Russia, Romania and Bulgaria.

Scientific Inquiry

In teaching science one of the most important elements are the scientific inquiry, observing and engaging inquiry-related activities such as designing and planning as well as conducting an experiment, an investigation.

It is important to note, that such activities should not be listed only in the curricular guidelines but should also be performed in class where students could engage in them accordingly to modern requirements.

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The study presents the educational practice of each participating country based on the questionnaires asking teachers on inquiry-related science activities. Teachers reported about how often the seven different activities occurred in their lessons. Tables 49 and 50 display the percentage of students whose teachers reported the particular activity to have occurred in at least half of the lessons.

At both grades, teachers generally reported that the most frequent activities were asking for explanations about something students were studying and relating what they were studying to their daily lives in order to have better understanding of nature. However, some culture- and education-related differences could also be observed in the data.

Countries with more traditional science instructions such as the Central and Eastern European countries, Russia, the Czech Republic, Slovakia and Hungary, place more emphasis on theory-based instructions and acquiring related knowledge, and less on practice. At fourth grades in these countries, the percentage of students who frequently design, plan or do a science experiment or investigation individually or in a small group was low. Even watching the teacher do a science experiment was common only at eighth grades.

Science education in Anglo-Saxon, Scandinavian and Asian countries differ from our more traditional science instruction in a number of aspects. Science is taught as an integrated or general subject in the first eight grades. In lessons more emphasis is placed on designing, planning experiments and working with other students in small groups on science investigations already from the fourth grade: 30-60 percent of students at this early age gain experience and knowledge on this matter. At eighth grade, even more emphasis is placed on practical scientific inquiries.

Computer Use

Computer use in classroom is one of the most debated issues in today's education policy worldwide. There are a number of educational specialists who consider the use of IT technologies for educational purposes as a revolutionary step in reforming education in the coming decades. Others, however, are more sceptical on this matter suggesting that only a limited use of IT is preferable in classroom. PISA 2006 also investigated this problem and concluded that at present, a greater extent of computer use in mathematics and science education does not necessarily result in better achievements of education systems in mathematics and in science.

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TIMSS 2007 also collected data on the role of IT in science education (Tables 51, 52). The tables show the number of countries with a policy on computer use in their national curriculum (second column), the percentages of students whose teachers reported that computers were available in the classroom (third and fourth columns), and the percentages of students being asked to use computers for various activities in about half of the science lessons or more.

At the fourth grade, mainly the Anglo-Saxon countries (England, Australia and Scotland), the Asian countries (Hong Kong SAR, Korea, Japan, Chinese Taipei and Singapore) and some developed Western European countries (Germany, Italy, and Norway) had a policy statement about computer use in their curriculum. It can be concluded, however, that computer use and its presence in the curriculum as policy a statement is not only a policy matter but due to its costs also a financial one. At eighth grade, although there were some additional countries with lower results having policy statements about computer use as part of their curriculum (Botswana, Jordan, Malaysia, Malta, Morocco, and Turkey), the percentages of students having access to computers in science classes were significantly lower than those of the above mentioned countries.

The most common application at the fourth grade was searching for ideas and information on the net. It is the same with eighth grades, but there were some countries e.g. Hong Kong SAR, Korea, Malaysia, Armenia and Turkey where a relatively higher level of computer use was reported for other purposes as well. In Armenia and Korea, the two outstanding countries, one-fifth or more percent of students used the computer in at least half of the science lessons for doing scientific procedures or experiments, studying natural phenomena through simulations, or processing and analyzing data.

In Hungary, a policy statement on computer use can only be found in the curriculum for eighth grade mainly in the context of searching for ideas and information. However, the level of computer use for different purposes in science classes was very low at both grades, only 2 to 4 percent of students used computers in science class. On the other hand, only one fourth of Hungarian students had access to computers in class at least in theory, which is half of the international average, and less than one-third of some developed countries' capacity. At eighth grade, Hungarian students' access to computers in classes is similar to the international average (43%), it is the half or two thirds of the percentages in the countries with similar achievements.

Homework

There are significant differences concerning the homework among the participating countries. TIMSS asked teachers how often they assigned homework in science and mathematics, and if homework took more or less than 30 minutes (Tables 53, 54, 55, 56). Students were also asked to report on the frequency of getting homework in science and in mathematics and how long it took to complete (Tables 57, 58, 59, and 60). There are three index categories based on the results. The student in the high index category had homework in about half the lessons or more and it took to complete more than 30 minutes. Students in the low category had homework in less than half the lessons and it took to complete less than 30 minutes. The medium level includes the two other possible combinations of responses.

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A group of participating countries place high importance on the role of assigning homework in mathematics and science. These countries include the former Soviet States (Georgia, Kazakhstan, Russia, Armenia and the Ukraine), some Islamic countries (Iran, Tunisia, Algeria, Yemen, Lebanon and Turkey) and Singapore from Asian countries, while at eighth grade Chinese Taipei and Hong Kong SAR. These countries have high percentages of students with high index level.

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Examining the eighth tables (Tables 53-60) it can be concluded that the high achievement of students in Singapore is supported by a number of extra-school activities, 25-50 percentage of students belong to the high index level. On the other hand, achieving good results on the TIMSS scale does not require hard work on home assignments from students. Although in the Anglo-Saxon countries (England, Australia, the United States, Scotland and New Zealand), in Japan, Korea, the Czech Republic, Slovenia and Sweden teachers assign less homework to their students, their achievements are among the best on the TIMSS scale.

Hungarian students were reported to have less homework than students in most of the participating countries. But there was a substantial variation on mathematics and science homework. In science, most Hungarian students spend little time on doing their homework (60-66%) similar to students in the Anglo-Saxon countries, Japan, Korea, the Czech Republic and Slovenia. However, in mathematics the great majority of students fall into the medium level of the index, and only 4 to 6 percent of students were in the low category. Hungarian students and their teachers reported almost the same in this aspect.

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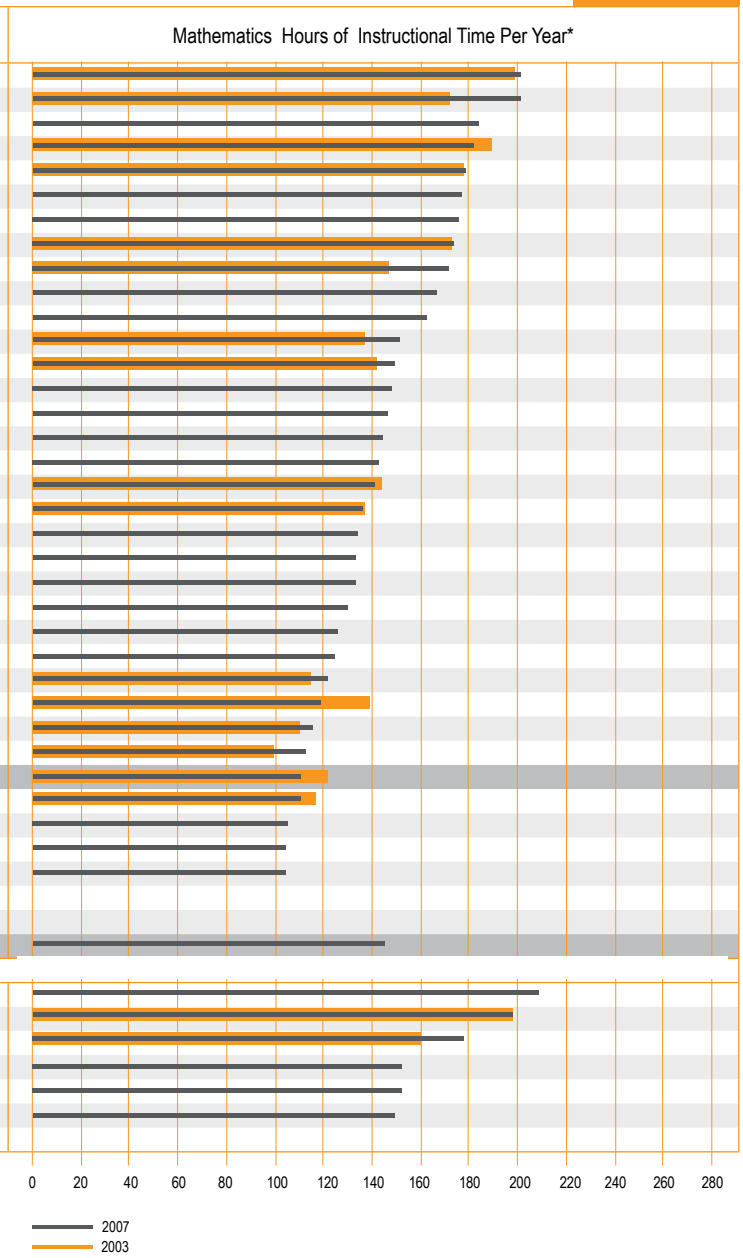
The percentages of students whose teachers always or almost always checked whether or not the homework was completed were extremely high in Hungary (87-92%), on the other hand percentages of students whose teachers corrected assignments and then gave feedback to students were lower than the international average (36% in mathematics and 43% in science). The international average was 59 percent and 63 percent, respectively, but there were countries with over 70 percent including England, Hong Kong SAR, and Singapore. Consequently, teachers in Hungary did not use homework as a basis for class discussion and there was considerably smaller percentage of Hungarian students whose homework contributed to their grades or marks than the international average.

Figure 13 Yearly Hours of Implemented Instructional Time for Mathematics with Trends

TIMSS 2007 Mathematics 4

Country		2007 Hours		Difference from 2003		
Italy	r	201	(2,8)	2	(5,2)	
Singapore		201	(0,8)	29	(1,3)	▲
England	r	183	(2,1)	–	–	
Scotland	s	181	(2,7)	–8	(4,8)	
Netherlands	s	179	(4,6)	1	(7,0)	
Algeria	s	177	(4,7)	◊	◊	
Colombia	r	175	(4,7)	◊	◊	
Australia	r	174	(5,4)	1	(6,8)	
United States	s	171	(3,7)	24	(4,9)	▲
Tunisia	s	166	(1,6)	–	–	
Morocco	s	162	(2,5)	–	–	
Hong Kong SAR	s	150	(3,4)	13	(5,1)	▲
New Zealand		148	(1,8)	6	(3,2)	
El Salvador		147	(2,6)	◊	◊	
Germany	r	145	(1,5)	◊	◊	
Czech Republic		144	(1,1)	◊	◊	
Slovak Republic	r	143	(0,6)	◊	◊	
Slovenia	r	141	(1,0)	–3	(1,6)	
Japan		136	(1,2)	–1	(1,9)	
Yemen	s	134	(7,2)	◊	◊	
Armenia		133	(3,4)	–	–	
Kazakhstan		133	(1,8)	◊	◊	
Georgia		130	(1,5)	◊	◊	
Austria		126	(1,1)	◊	◊	
Denmark	r	125	(1,2)	◊	◊	
Latvia	r	121	(3,1)	6	(3,3)	
Lithuania	r	118	(1,7)	–21	(2,3)	▼
Norway		115	(2,5)	5	(3,1)	
Chinese Taipei	s	112	(2,6)	13	(3,1)	▲
Hungary	s	110	(1,3)	–12	(2,1)	▼
Russian Federation	s	110	(1,3)	–7	(2,1)	▼
Iran, Islamic Rep. of		105	(2,6)	–	–	
Sweden	r	104	(2,3)	◊	◊	
Ukraine		104	(1,4)	◊	◊	
Kuwait		x	x	◊	◊	
Qatar		x	x	◊	◊	
International Avg.		144	(0,5)			
Benchmarking Participants						
Massachusetts, US		208	(8,4)	◊	◊	
Quebec, Canada	r	198	(3,7)	0	(6,8)	
Ontario, Canada	r	178	(4,0)	18	(5,3)	▲
Alberta, Canada		152	(2,5)	◊	◊	
British Columbia, Canada	s	152	(3,8)	◊	◊	
Minnesota, US	r	149	(7,8)	◊	◊	
Dubai, UAE		x	x	◊	◊	



Implemented instructional time for mathematics provided by teachers, and total instructional time provided by schools.

* The yearly hours of instructional time for mathematics are computed by multiplying the number of hours per week that teachers teach mathematics by the number of instructional weeks per year. The number of instructional weeks per year was computed by dividing the number of days per year a school is open for instruction by the number of instructional days in a calendar week.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

A dash (–) indicates comparable data are 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 the students.

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 significantly higher.

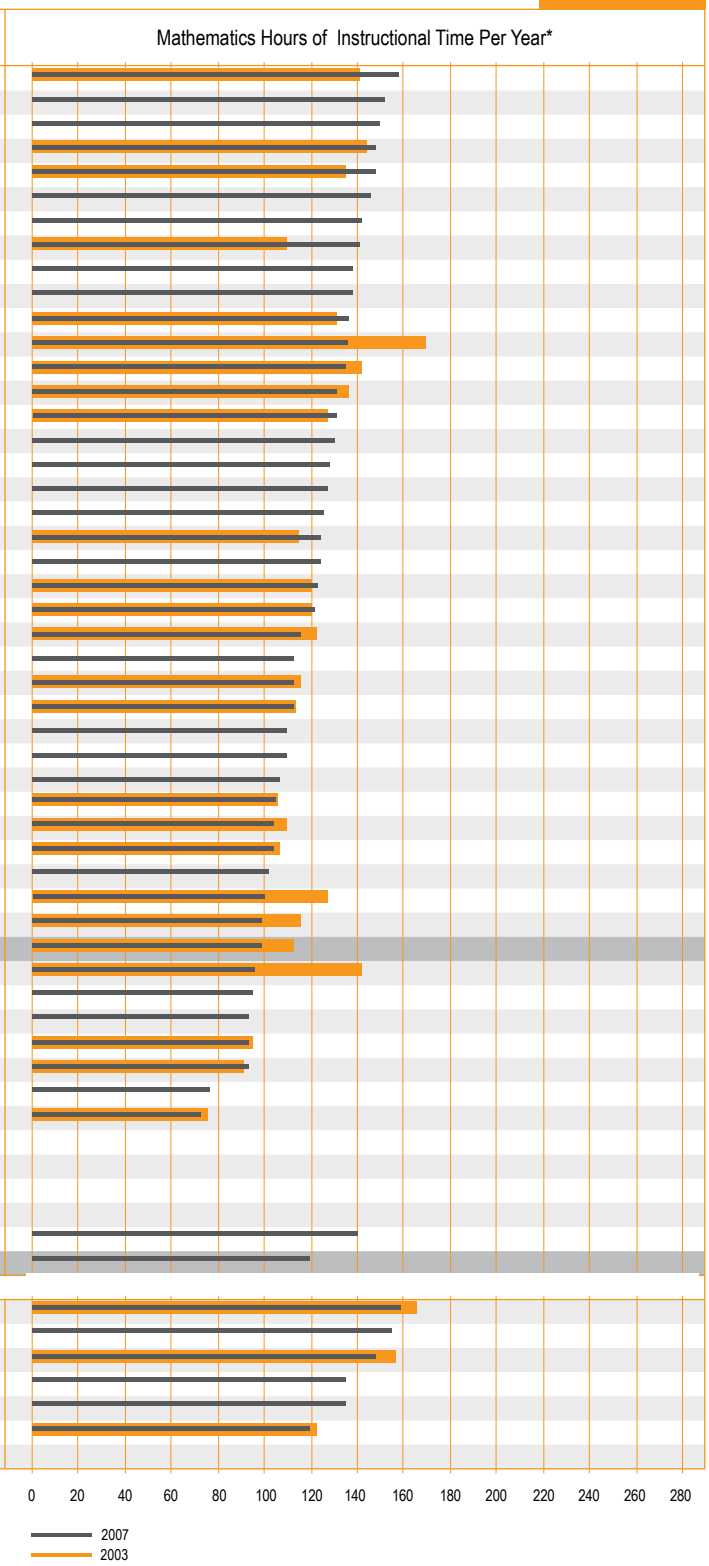
▼ 2007 significantly lower.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Figure 14 Yearly Hours of Implemented Instructional Time for Mathematics with Trends

TIMSS 2007 Mathematics 8

Country		2007 Hours		Difference from 2003		
Chinese Taipei		158	(3,5)	17	(4,0)	▲
Colombia	r	152	(4,7)	◊	◊	
Oman	s	150	(4,5)	◊	◊	
Hong Kong SAR	s	148	(3,8)	4	(6,4)	
United States	s	148	(2,3)	13	(3,2)	▲
Ghana	r	146	(5,0)	–	–	
El Salvador		142	(2,6)	◊	◊	
Jordan		141	(1,1)	32	(1,4)	▲
Qatar	s	138	(0,1)	◊	◊	
Botswana	r	138	(1,6)	–	–	
Italy	r	137	(1,5)	5	(2,2)	▲
Indonesia	s	136	(4,7)	–33	(6,4)	▼
Scotland	s	135	(2,2)	–7	(3,1)	▼
Australia	r	131	(2,0)	–5	(3,5)	
Russian Federation	r	131	(1,4)	3	(2,5)	
Ukraine		130	(2,0)	◊	◊	
Czech Republic		128	(2,1)	◊	◊	
Malta		128	(0,1)	◊	◊	
Tunisia	s	126	(2,1)	–	–	
Singapore		124	(1,1)	10	(1,9)	▲
Thailand		124	(2,3)	◊	◊	
Malaysia		123	(1,0)	3	(1,8)	
Romania	r	122	(1,9)	2	(2,8)	
Lithuania	r	116	(0,9)	–6	(1,2)	▼
England		113	(1,7)	–	–	
Slovenia		113	(0,4)	–3	(1,4)	▼
Norway		113	(1,6)	–1	(2,7)	
Georgia		110	(0,8)	◊	◊	
Armenia		110	(3,9)	–	–	
Saudi Arabia	s	107	(3,2)	–	–	
Japan		105	(1,6)	–1	(3,0)	
Korea, Rep. of	s	104	(0,7)	–5	(1,4)	▼
Serbia	s	104	(0,8)	–3	(1,7)	
Bosnia and Herzegovina	r	102	(0,9)	◊	◊	
Palestinian Nat'l Auth.	s	100	(4,0)	–27	(4,6)	▼
Iran, Islamic Rep. of	s	99	(2,3)	–16	(4,2)	▼
Hungary	s	99	(1,3)	–14	(2,3)	▼
Bahrain	s	96	(2,8)	–46	(2,9)	▼
Turkey		95	(0,4)	◊	◊	
Egypt	r	93	(4,4)	–	–	
Bulgaria	r	93	(2,1)	–2	(2,7)	
Sweden	r	93	(1,4)	2	(2,1)	
Syrian Arab Republic	r	76	(3,4)	◊	◊	
Cyprus	s	72	(0,3)	–3	(0,5)	▼
Algeria		x	x	◊	◊	
Israel		x	x	–	–	
Kuwait		x	x	◊	◊	
Lebanon		x	x	–	–	
¶ Morocco	s	140	(4,1)	–	–	
International Avg.		120	(0,4)			
Benchmarking Participants						
Ontario, Canada	r	159	(3,0)	–7	(5,2)	
Massachusetts, US		155	(3,9)	◊	◊	
Quebec, Canada	r	148	(3,0)	–8	(4,8)	
British Columbia, Canada	r	136	(2,9)	◊	◊	
Minnesota, US	r	136	(3,3)	◊	◊	
Basque Country, Spain		120	(1,9)	–3	(3,0)	
Dubai, UAE		x	x	◊	◊	



Implemented instructional time for mathematics provided by teachers, and total instructional time provided by schools.

* The yearly hours of instructional time for mathematics are computed by multiplying the number of hours per week that teachers teach mathematics by the number of instructional weeks per year. The number of instructional weeks per year was computed by dividing the number of days per year a school is open for instruction by the number of instructional days in a calendar week.

¶ Did not satisfy guidelines for sample participation rates (see Appendix A).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

A dash (–) indicates comparable data are 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 the students.

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 significantly higher

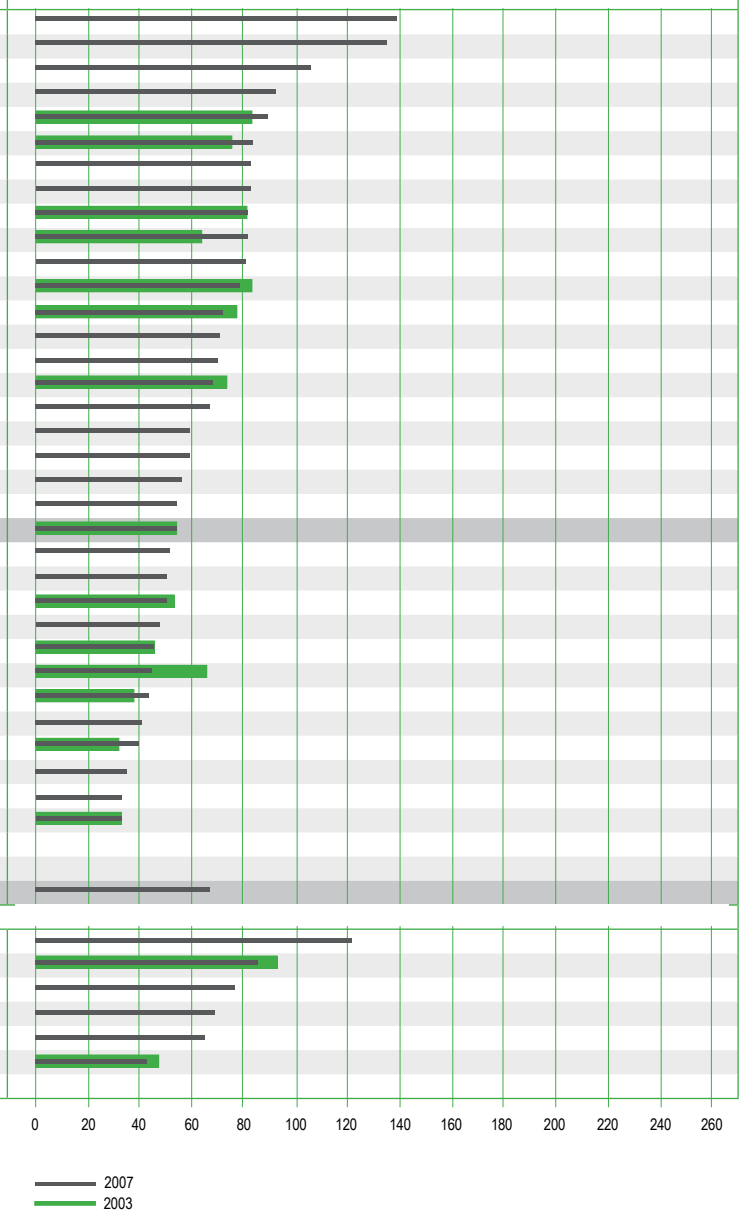
▼ 2007 significantly lower.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Figure 15 Yearly Hours of Implemented Instructional Time for Science with Trends

TIMSS 2007 Science 4

Country		2007 Hours		Difference from 2003		
Colombia	r	139	(3,9)	◊	◊	
El Salvador		135	(3,5)	◊	◊	
Germany	r	106	(2,1)	◊	◊	
Austria		92	(1,0)	◊	◊	
United States	r	89	(2,5)	6	(3,9)	
Slovenia	r	84	(0,8)	9	(2,3)	▲
Yemen	s	83	(5,7)	◊	◊	
Iran, Islamic Rep. of		83	(2,4)	–	–	
Japan		82	(1,2)	1	(1,7)	
Singapore		82	(0,9)	18	(1,1)	▲
Armenia		81	(4,0)	–	–	
Chinese Taipei	s	79	(1,5)	–4	(1,8)	▼
Hong Kong SAR	s	72	(5,2)	–5	(7,5)	
Tunisia	s	71	(2,7)	–	–	
England	r	70	(1,7)	–	–	
Italy	r	68	(1,4)	–5	(2,7)	
Algeria	s	67	(4,7)	◊	◊	
Denmark	r	59	(0,9)	◊	◊	
Slovak Republic	r	59	(0,7)	◊	◊	
Sweden	r	56	(2,5)	◊	◊	
Morocco	s	54	(4,2)	–	–	
Hungary	s	54	(1,5)	0	(1,8)	
Kazakhstan		52	(1,3)	◊	◊	
Scotland	s	51	(3,1)	–	–	
Lithuania	r	51	(0,6)	–2	(1,7)	
Latvia	r	48	(1,2)	–	–	
Australia	s	46	(2,2)	1	(3,4)	
New Zealand	s	45	(2,5)	–21	(4,3)	▼
Norway	r	44	(1,9)	6	(2,6)	▲
Czech Republic	r	41	(1,3)	◊	◊	
Russian Federation	s	40	(1,1)	8	(1,6)	▲
Georgia	r	35	(2,8)	◊	◊	
Ukraine		33	(1,1)	◊	◊	
Netherlands	s	33	(1,5)	0	(2,4)	
Kuwait		x	x	◊	◊	
Qatar		x	x	◊	◊	
International Avg.		67	(0,4)			
Benchmarking Participants						
Alberta, Canada		122	(2,6)	◊	◊	
Ontario, Canada	r	86	(4,3)	–7	(5,4)	
Massachusetts, US	r	77	(4,5)	◊	◊	
British Columbia, Canada	s	69	(2,3)	◊	◊	
Minnesota, US	r	65	(6,6)	◊	◊	
Quebec, Canada	r	43	(1,8)	–4	(3,1)	
Dubai, UAE		x	x	◊	◊	



Implemented instructional time for science provided by teachers, and total instructional time provided by schools.

* The yearly hours of instructional time for science are computed by multiplying the number of hours per week that teachers teach science by the number of instructional weeks per year. The number of instructional weeks per year was computed by dividing the number of days per year a school is open for instruction by the number of instructional days in a calendar week.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

A dash (–) indicates comparable data are not available.

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A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 significantly higher.

▼ 2007 significantly lower.

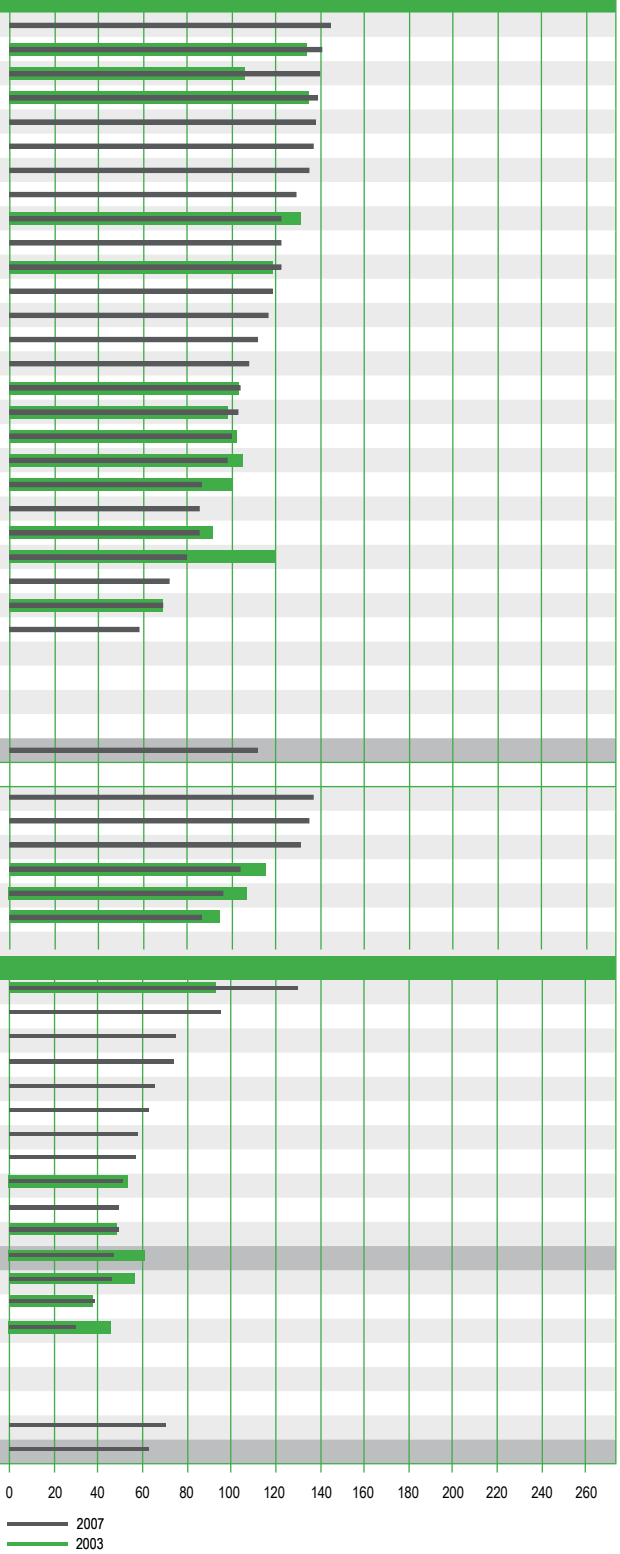
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Figure 16 Yearly Hours of Implemented Instructional Time for Science with Trends

TIMSS 2007 Science 8

	Country		2007 Hours		Difference from 2003		
	General/Integrated Science						
	Chinese Taipei		145	(3,1)	–	–	
	Jordan		141	(1,1)	6	(1,4)	▲
	Singapore		140	(1,8)	33	(2,6)	▲
	United States	s	139	(2,4)	3	(3,3)	
	Botswana	r	138	(2,1)	–	–	
	England	r	137	(6,6)	–	–	
	El Salvador		135	(2,7)	◊	◊	
	Oman	r	130	(5,7)	◊	◊	
	Australia	s	123	(1,8)	–9	(4,1)	▼
	Colombia	r	123	(5,6)	◊	◊	
	Malaysia		122	(1,3)	3	(2,2)	
	Thailand		119	(2,2)	◊	◊	
	Ghana	r	117	(6,3)	–	–	
	Israel	s	111	(5,0)	–	–	
	Scotland	s	108	(3,1)	–	–	
	Korea, Rep. of	s	104	(0,7)	1	(2,8)	
	Japan	r	103	(1,8)	5	(2,3)	▲
	Hong Kong SAR	s	100	(2,9)	–3	(4,9)	
	Iran, Islamic Rep. of	s	98	(1,9)	–8	(4,1)	
	Palestinian Nat'l Auth.	s	87	(3,5)	–14	(3,9)	▼
	Egypt	r	86	(4,1)	–	–	
	Norway		85	(1,1)	–7	(2,8)	▼
	Bahrain	s	80	(3,5)	–40	(3,7)	▼
	Turkey		72	(0,5)	◊	◊	
	Italy	s	69	(0,8)	0	(1,4)	
	Tunisia	r	58	(1,4)	–	–	
	Kuwait		x	x	◊	◊	
	Qatar		x	x	◊	◊	
	Saudi Arabia		x	x	–	–	
	Sweden		–	–	–	–	
	International Avg.		112	(0,7)			
	Benchmarking Participants						
	Minnesota, US	r	137	(7,5)	◊	◊	
	Massachusetts, US		136	(6,9)	◊	◊	
	British Columbia, Canada	s	131	(4,6)	◊	◊	
	Quebec, Canada	r	104	(2,7)	–9	(7,3)	
	Ontario, Canada	r	96	(3,2)	–12	(6,6)	
	Basque Country, Spain	r	86	(1,9)	–7	(3,4)	▼
	Dubai, UAE		x	x	◊	◊	
	Biology						
c	Indonesia	s	130	(13,8)	37	(14,2)	▲
d	Malta		96	(0,5)	◊	◊	
	Armenia		75	(3,4)	–	–	
	Georgia		74	(3,4)	◊	◊	
	Bulgaria		66	(4,0)	–	–	
	Ukraine		63	(1,4)	◊	◊	
	Bosnia and Herzegovina	r	58	(1,9)	◊	◊	
	Czech Republic		57	(0,9)	◊	◊	
	Serbia	s	52	(0,5)	–2	(1,1)	
f	Syrian Arab Republic	r	49	(2,8)	◊	◊	
	Russian Federation	r	49	(0,4)	0	(0,9)	
	Hungary	s	48	(1,2)	–14	(3,0)	▼
	Slovenia	r	47	(1,3)	–10	(1,4)	▼
	Romania	r	39	(2,4)	1	(3,6)	
	Lithuania	r	30	(0,6)	–16	(3,6)	▼
b	Algeria		x	x	◊	◊	
	Lebanon		x	x	–	–	
	Cyprus		–	–	–	–	
e ¶	Morocco	s	70	(2,4)	–	–	
	International Avg.		63	(1,0)			

Science Hours of Instructional Time Per Year*



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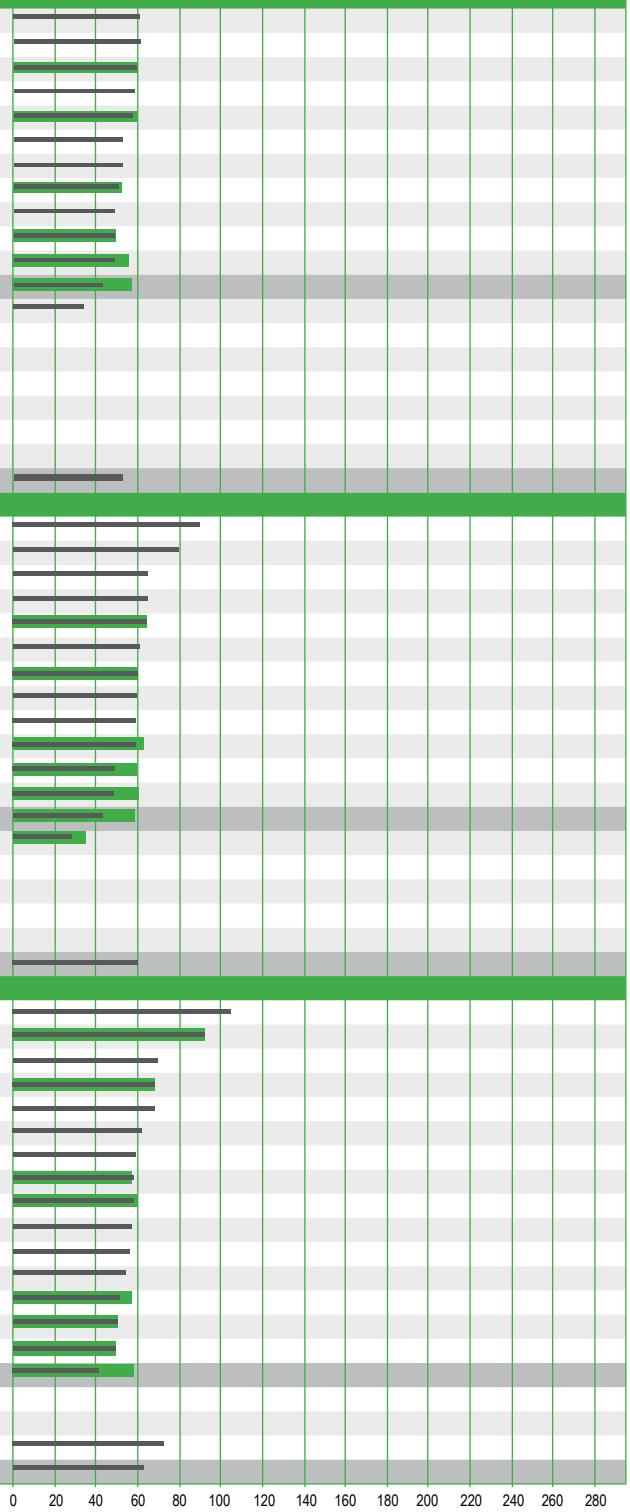
	Country		2007 Hours		Difference from 2003		
Earth Science							
	Armenia		62	(2,7)	–	–	
	Georgia		62	(2,8)	◊	◊	
	Romania	r	60	(1,5)	0	(1,8)	
	Ukraine		59	(1,0)	◊	◊	
	Lithuania	r	58	(0,6)	–1	(0,7)	
	Czech Republic		53	(1,2)	◊	◊	
	Bulgaria	r	53	(2,7)	–	–	
	Serbia	s	51	(0,4)	–2	(2,2)	
	Bosnia and Herzegovina	r	49	(0,8)	◊	◊	
	Russian Federation	r	49	(0,5)	0	(0,8)	
	Cyprus	s	49	(0,4)	–6	(3,0)	▼
	Hungary	s	43	(1,0)	–15	(2,7)	▼
d	Malta		35	(0,4)	◊	◊	
b	Algeria		–	–	◊	◊	
c	Indonesia		–	–	–	–	
	Lebanon		–	–	–	–	
	Slovenia		–	–	–	–	
f	Syrian Arab Republic		–	–	◊	◊	
e ¶	Morocco		–	–	–	–	
	International Avg.		52	(0,4)			
Chemistry							
d	Malta		90	(0,4)	◊	◊	
	Armenia		79	(3,2)	–	–	
	Bulgaria	r	69	(3,5)	–	–	
	Georgia		67	(3,7)	◊	◊	
	Romania	r	66	(2,9)	–1	(3,8)	
	Ukraine		61	(1,2)	◊	◊	
	Slovenia		60	(1,0)	0	(1,5)	
	Czech Republic		59	(1,0)	◊	◊	
	Bosnia and Herzegovina	r	58	(1,8)	◊	◊	
	Lithuania	r	58	(0,4)	–7	(1,3)	▼
	Russian Federation	r	54	(1,0)	–5	(1,5)	▼
	Serbia	s	52	(0,5)	–9	(3,8)	▼
	Hungary	s	45	(1,0)	–14	(2,3)	▼
	Cyprus	s	29	(0,8)	–5	(1,9)	▼
	Lebanon		x	x	–	–	
b	Algeria		–	–	◊	◊	
c	Indonesia		–	–	–	–	
e ¶	Morocco		–	–	–	–	
	International Avg.		60	(0,5)			
Physics							
d	Malta		106	(0,1)	◊	◊	
c	Indonesia	s	92	(6,3)	–1	(7,0)	
	Georgia		69	(4,6)	◊	◊	
	Romania	r	67	(2,9)	0	(3,8)	
	Armenia		67	(2,5)	–	–	
f	Syrian Arab Republic	r	63	(3,7)	◊	◊	
	Bulgaria		59	(3,0)	–	–	
	Slovenia	r	59	(0,8)	2	(0,9)	▲
	Lithuania	r	58	(0,6)	–2	(1,0)	
	Czech Republic		57	(0,8)	◊	◊	
	Ukraine		57	(0,4)	◊	◊	
	Bosnia and Herzegovina	r	55	(1,3)	◊	◊	
	Serbia	s	52	(0,4)	–5	(2,5)	
	Cyprus	s	51	(0,6)	–2	(1,0)	▼
	Russian Federation	r	50	(0,6)	1	(1,0)	
	Hungary	s	42	(1,0)	–16	(2,7)	▼
b	Algeria		x	x	◊	◊	
	Lebanon		x	x	–	–	
e ¶	Morocco	s	73	(2,3)	–	–	
	International Avg.		63	(0,6)			

Science Hours of Instructional Time Per Year*



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A diamond (◊) indicates the country did not participate in the assessment.

b Algeria: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.

c Indonesia: Data reported in biology and physics panels include data from integrated/general science teachers.

d Malta: Data reported in earth science panel include data from environmental studies teachers.

e Morocco: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.

f Syrian Arab Republic: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.

¶ Did not satisfy guidelines for sample participation rates (see Appendix A).

▲ 2007 significantly higher.

▼ 2007 significantly lower.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 38 Textbook Use in Teaching Mathematics with Trends

TIMSS 2007 Mathematics 4

Country		Percentage of Students Taught by Teachers Reporting Textbook Use														
		Use Textbook to Teach Mathematics										Do Not Use Textbook to Teach Mathematics				
		As Primary Basis for Lessons					As Supplementary Resource									
		Percent in 2007		Difference in Percent from 2003			Percent in 2007		Difference in Percent from 2003			Percent in 2007		Difference in Percent from 2003		
Algeria		61	(5,1)	◊	◊		36	(5,1)	◊	◊		3	(1,6)	◊	◊	
Armenia	r	83	(2,7)	15	(5,4)	▲	17	(2,7)	–2	(4,6)		0	(0,0)	–13	(3,3)	▼
Australia		17	(2,7)	1	(4,1)		59	(3,7)	3	(5,5)		24	(3,5)	–4	(5,3)	
Austria		78	(2,4)	◊	◊		21	(2,5)	◊	◊		1	(0,4)	◊	◊	
Chinese Taipei		94	(2,0)	2	(3,1)		4	(1,4)	–3	(2,5)		2	(1,4)	1	(1,8)	
Colombia		37	(4,1)	◊	◊		60	(4,3)	◊	◊		3	(1,9)	◊	◊	
Czech Republic		65	(3,9)	◊	◊		33	(3,9)	◊	◊		2	(0,8)	◊	◊	
Denmark		89	(2,5)	◊	◊		9	(2,2)	◊	◊		2	(1,1)	◊	◊	
El Salvador		14	(2,7)	◊	◊		74	(3,6)	◊	◊		12	(3,0)	◊	◊	
England	r	15	(3,1)	–12	(5,0)	▼	64	(4,4)	2	(6,3)		21	(3,6)	10	(4,6)	▲
Georgia		77	(3,9)	◊	◊		18	(3,5)	◊	◊		6	(2,7)	◊	◊	
Germany		79	(2,4)	◊	◊		21	(2,5)	◊	◊		0	(0,3)	◊	◊	
Hong Kong SAR		84	(2,8)	2	(4,5)		15	(2,8)	–4	(4,5)		2	(0,6)	2	(0,6)	▲
Hungary		77	(2,9)	0	(4,8)		22	(2,9)	–1	(4,8)		1	(0,7)	1	(0,7)	
Iran, Islamic Rep. of	r	100	(0,0)	32	(4,5)	▲	0	(0,0)	–27	(4,5)	▼	0	(0,0)	–5	(1,7)	▼
Italy		20	(2,5)	9	(3,2)	▲	67	(3,0)	–11	(3,9)	▼	13	(2,1)	2	(2,9)	
Japan		83	(3,0)	–2	(4,2)		16	(3,0)	2	(4,2)		1	(0,5)	0	(0,5)	
Kazakhstan		97	(1,8)	◊	◊		3	(1,8)	◊	◊		0	(0,0)	◊	◊	
Kuwait		28	(4,1)	◊	◊		34	(4,6)	◊	◊		38	(4,8)	◊	◊	
Latvia		86	(2,4)	–7	(3,6)		14	(2,4)	8	(3,6)	▲	0	(0,0)	–1	(0,6)	
Lithuania		82	(2,4)	–18	(2,4)	▼	18	(2,4)	18	(2,4)	▲	0	(0,0)	0	(0,0)	
Morocco		76	(3,7)	–	–		23	(3,7)	–	–		1	(0,9)	–	–	
Netherlands		98	(1,1)	1	(1,8)		2	(1,1)	1	(1,2)		0	(0,0)	–2	(1,4)	
New Zealand		5	(1,0)	–11	(3,0)	▼	91	(1,4)	18	(3,3)	▲	4	(1,0)	–7	(2,5)	▼
Norway		88	(2,2)	2	(3,8)		10	(1,9)	–3	(3,6)		2	(1,2)	1	(1,4)	
Qatar		67	(0,2)	◊	◊		17	(0,1)	◊	◊		16	(0,1)	◊	◊	
Russian Federation		88	(2,2)	–4	(3,0)		12	(2,2)	4	(3,0)		0	(0,0)	0	(0,0)	
Scotland	s	72	(3,8)	–9	(5,7)		28	(3,8)	9	(5,7)		0	(0,0)	0	(0,0)	
Singapore		75	(2,9)	9	(4,9)		24	(2,7)	–10	(4,8)	▼	1	(0,7)	1	(0,7)	
Slovak Republic		53	(3,8)	◊	◊		47	(3,8)	◊	◊		0	(0,0)	◊	◊	
Slovenia		48	(3,3)	4	(5,6)		44	(3,3)	–2	(5,8)		8	(1,5)	–2	(2,9)	
Sweden		93	(1,5)	◊	◊		6	(1,5)	◊	◊		1	(0,4)	◊	◊	
Tunisia	r	27	(3,7)	–5	(5,5)		71	(3,7)	6	(5,6)		2	(1,0)	–1	(1,7)	
Ukraine		77	(3,5)	◊	◊		21	(3,4)	◊	◊		1	(0,8)	◊	◊	
United States		59	(2,6)	–1	(4,1)		33	(2,3)	3	(3,6)		8	(1,6)	–3	(2,6)	
Yemen		57	(4,3)	◊	◊		36	(4,5)	◊	◊		7	(2,2)	◊	◊	
International Avg.		65	(0,5)				30	(0,5)				5	(0,3)			
Benchmarking Participants																
Alberta, Canada		34	(3,9)	◊	◊		39	(3,7)	◊	◊		27	(3,3)	◊	◊	
British Columbia, Canada		58	(4,0)	◊	◊		39	(3,9)	◊	◊		2	(1,2)	◊	◊	
Dubai, UAE		44	(5,7)	◊	◊		44	(4,4)	◊	◊		12	(3,7)	◊	◊	
Massachusetts, US		48	(5,8)	◊	◊		34	(5,4)	◊	◊		18	(6,1)	◊	◊	
Minnesota, US		75	(5,5)	◊	◊		17	(4,5)	◊	◊		8	(4,3)	◊	◊	
Ontario, Canada		68	(4,3)	29	(6,4)	▲	31	(4,3)	–23	(6,3)	▼	1	(0,2)	–6	(2,4)	▼
Quebec, Canada		76	(3,5)	21	(5,7)	▲	22	(3,2)	–19	(5,4)	▼	2	(1,4)	–3	(2,1)	

Background data provided by teachers.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available.
An "r" indicates data are available for at least 70 but less than 85% of the students. An "s" indicates data are available for at least 50 but less than 70% of the students.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 percent significantly higher.
▼ 2007 percent significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 39 Textbook Use in Teaching Mathematics with Trends

Country		Percentage of Students Taught by Teachers Reporting Textbook Use														
		Use Textbook to Teach Mathematics										Do Not Use Textbook to Teach Mathematics				
		As Primary Basis for Lessons					As Supplementary Resource									
		Percent in 2007		Difference in Percent from 2003			Percent in 2007		Difference in Percent from 2003			Percent in 2007		Difference in Percent from 2003		
Algeria		76	(3,8)	◊	◊		21	(3,8)	◊	◊		3	(1,4)	◊	◊	
Armenia	r	73	(4,0)	1	(5,5)		20	(4,0)	0	(5,3)		7	(2,2)	–1	(2,9)	
Australia		53	(4,1)	1	(6,0)		41	(4,2)	–2	(5,9)		6	(1,9)	1	(2,7)	
Bahrain		50	(2,4)	–25	(3,9)	▼	29	(2,7)	5	(4,1)		21	(2,1)	21	(2,1)	▲
Bosnia and Herzegovina		62	(4,1)	◊	◊		38	(4,1)	◊	◊		0	(0,0)	◊	◊	
Botswana		59	(4,1)	15	(5,9)	▲	36	(4,1)	–16	(5,9)	▼	4	(1,9)	1	(2,5)	
Bulgaria		82	(3,1)	6	(4,8)		14	(2,7)	–8	(4,4)		4	(1,8)	2	(2,1)	
Chinese Taipei		77	(3,1)	–4	(4,7)		17	(3,2)	4	(4,4)		6	(1,7)	0	(2,6)	
Colombia		12	(2,5)	◊	◊		66	(4,2)	◊	◊		23	(3,5)	◊	◊	
Cyprus		48	(2,7)	–14	(3,7)	▼	42	(3,0)	8	(3,9)	▲	9	(1,9)	6	(2,1)	▲
Czech Republic		56	(3,9)	◊	◊		43	(3,8)	◊	◊		1	(0,5)	◊	◊	
Egypt		57	(4,4)	8	(6,1)		41	(4,5)	–10	(6,1)		2	(0,6)	2	(0,6)	▲
El Salvador		7	(2,4)	◊	◊		82	(3,6)	◊	◊		11	(2,9)	◊	◊	
England	r	43	(4,1)	–3	(7,7)		46	(3,8)	5	(7,9)		12	(2,8)	–2	(4,9)	
Georgia		87	(3,1)	◊	◊		13	(3,1)	◊	◊		0	(0,0)	◊	◊	
Ghana		33	(4,1)	–10	(6,2)		65	(4,1)	11	(6,1)		2	(1,2)	–2	(1,9)	
Hong Kong SAR		76	(3,8)	–7	(5,2)		24	(3,7)	7	(5,1)		1	(0,7)	0	(0,7)	
Hungary		55	(4,3)	–5	(5,6)		43	(4,2)	4	(5,5)		1	(0,9)	1	(1,0)	
Indonesia		57	(5,2)	–6	(6,4)		43	(5,2)	6	(6,4)		0	(0,0)	0	(0,0)	
Iran, Islamic Rep. of		83	(3,4)	8	(4,7)		16	(3,1)	6	(3,8)		2	(0,1)	–14	(3,0)	▼
Israel	r	57	(3,9)	1	(5,3)		42	(4,0)	0	(5,4)		2	(0,7)	0	(1,1)	
Italy		38	(2,9)	4	(4,8)		55	(3,0)	–6	(4,9)		6	(1,4)	2	(1,8)	
Japan		77	(3,1)	1	(4,8)		21	(2,8)	–2	(4,7)		2	(0,9)	0	(1,5)	
Jordan		58	(4,2)	–26	(5,2)	▼	38	(4,1)	22	(5,2)	▲	4	(1,2)	4	(1,2)	▲
Korea, Rep. of	s	92	(1,7)	3	(2,7)		4	(1,4)	–3	(2,1)		3	(1,0)	0	(1,7)	
Kuwait		23	(4,0)	◊	◊		35	(4,3)	◊	◊		42	(4,8)	◊	◊	
Lebanon		50	(4,8)	–2	(6,9)		32	(4,6)	–4	(6,5)		18	(3,4)	6	(4,4)	
Lithuania		91	(2,0)	–9	(2,0)	▼	9	(2,0)	9	(2,0)	▲	0	(0,0)	0	(0,0)	
Malaysia		66	(4,4)	2	(6,1)		28	(4,1)	3	(5,8)		6	(2,0)	–5	(3,3)	
Malta		35	(0,3)	◊	◊		63	(0,3)	◊	◊		2	(0,1)	◊	◊	
Norway		88	(2,5)	–3	(3,5)		11	(2,4)	2	(3,4)		1	(0,8)	1	(0,8)	
Oman		53	(4,3)	◊	◊		41	(4,3)	◊	◊		6	(1,4)	◊	◊	
Palestinian Nat'l Auth.		64	(3,9)	–16	(5,5)	▼	29	(4,1)	11	(5,6)		7	(2,4)	5	(2,7)	
Qatar		70	(0,2)	◊	◊		26	(0,2)	◊	◊		4	(0,0)	◊	◊	
Romania		49	(3,9)	–10	(5,8)		49	(4,0)	10	(5,8)		2	(0,8)	0	(1,6)	
Russian Federation		87	(2,1)	1	(3,3)		13	(2,1)	–1	(3,3)		0	(0,0)	0	(0,4)	
Saudi Arabia		77	(3,5)	–	–		19	(3,4)	–	–		4	(1,5)	–	–	
Scotland		72	(3,2)	–7	(4,9)		27	(3,0)	11	(4,4)	▲	1	(0,0)	–3	(1,8)	
Serbia		54	(4,1)	7	(5,9)		43	(4,1)	–9	(5,9)		3	(1,3)	2	(1,3)	
Singapore		51	(2,6)	–23	(3,5)	▼	39	(2,7)	14	(3,5)	▲	9	(1,2)	9	(1,2)	▲
Slovenia		55	(2,7)	0	(5,3)		44	(2,7)	0	(5,3)		1	(0,3)	0	(0,4)	
Sweden		95	(1,0)	5	(2,4)		4	(0,9)	–6	(2,4)	▼	1	(0,5)	1	(0,6)	
Syrian Arab Republic		50	(4,4)	◊	◊		36	(4,2)	◊	◊		14	(3,1)	◊	◊	
Thailand		59	(4,1)	◊	◊		25	(3,7)	◊	◊		15	(3,1)	◊	◊	
Tunisia		48	(4,1)	25	(5,5)	▲	49	(4,1)	–27	(5,5)	▼	2	(1,4)	2	(1,4)	
Turkey		39	(4,3)	◊	◊		53	(4,3)	◊	◊		8	(2,7)	◊	◊	
Ukraine		62	(3,7)	◊	◊		38	(3,7)	◊	◊		0	(0,0)	◊	◊	
United States		57	(2,7)	–7	(4,0)		36	(2,8)	2	(4,1)		7	(1,3)	5	(1,6)	▲
¶ Morocco	r	59	(5,0)	–	–		40	(4,9)	–	–		1	(1,1)	–	–	
International Avg.		60	(0,5)				34	(0,5)				6	(0,3)			
Benchmarking Participants																
Basque Country, Spain		74	(3,7)	17	(6,5)	▲	22	(3,3)	–12	(6,0)		5	(1,6)	–6	(3,7)	
British Columbia, Canada		42	(4,2)	◊	◊		50	(4,6)	◊	◊		8	(2,4)	◊	◊	
Dubai, UAE		69	(3,9)	◊	◊		26	(3,4)	◊	◊		4	(1,9)	◊	◊	
Massachusetts, US		57	(5,6)	◊	◊		42	(6,0)	◊	◊		1	(1,2)	◊	◊	
Minnesota, US		89	(5,5)	◊	◊		9	(5,2)	◊	◊		2	(1,1)	◊	◊	
Ontario, Canada		58	(4,3)	3	(6,6)		40	(4,1)	–3	(6,5)		2	(1,1)	0	(1,7)	
Quebec, Canada		51	(4,3)	4	(6,1)		45	(4,4)	–5	(6,3)		4	(1,6)	0	(2,3)	

Background data provided by teachers.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available.
An "r" indicates data are available for at least 70 but less than 85% of the students. An "s" indicates data are available for at least 50 but less than 70% of the students.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 percent significantly higher.
▼ 2007 percent significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 40 Textbook Use in Teaching Science with Trends

TIMSS 2007 Science 4

Country		Percentage of Students Taught by Teachers Reporting Textbook Use														
		Use Textbook to Teach Science										Do Not Use Textbook to Teach Science				
		As Primary Basis for Lessons					As Supplementary Resource									
		Percent in 2007		Difference in Percent from 2003			Percent in 2007		Difference in Percent from 2003			Percent in 2007		Difference in Percent from 2003		
Algeria		61	(4,8)	◊	◊		35	(5,0)	◊	◊		4	(1,8)	◊	◊	
Armenia		68	(3,4)	–	–		30	(3,4)	–	–		2	(0,8)	–	–	
Australia		4	(1,1)	–5	(3,5)		14	(3,1)	1	(4,2)		82	(3,3)	3	(5,3)	
Austria		14	(2,4)	◊	◊		67	(3,2)	◊	◊		19	(2,5)	◊	◊	
Chinese Taipei		90	(2,6)	5	(3,8)		8	(2,3)	–4	(3,6)		2	(1,1)	–1	(2,0)	
Colombia		36	(5,7)	◊	◊		57	(5,8)	◊	◊		7	(2,2)	◊	◊	
Czech Republic		55	(4,4)	◊	◊		44	(4,4)	◊	◊		1	(0,6)	◊	◊	
Denmark		35	(4,4)	◊	◊		43	(4,8)	◊	◊		21	(4,0)	◊	◊	
El Salvador		15	(3,2)	◊	◊		77	(3,3)	◊	◊		8	(2,6)	◊	◊	
England	r	5	(1,3)	–1	(2,6)		63	(4,2)	5	(6,4)		32	(4,0)	–4	(6,3)	
Georgia		84	(3,0)	◊	◊		12	(2,7)	◊	◊		4	(2,0)	◊	◊	
Germany		9	(1,7)	◊	◊		58	(3,6)	◊	◊		33	(3,3)	◊	◊	
Hong Kong SAR	r	93	(1,9)	7	(4,2)		6	(1,8)	–7	(4,2)		1	(0,8)	–1	(1,4)	
Hungary		80	(2,9)	–1	(4,4)		20	(2,9)	1	(4,4)		0	(0,4)	0	(0,4)	
Iran, Islamic Rep. of	r	100	(0,0)	33	(4,7)	▲	0	(0,0)	–28	(4,7)	▼	0	(0,0)	–5	(1,3)	▼
Italy		39	(3,1)	7	(4,5)		48	(2,9)	–13	(4,5)	▼	13	(2,1)	6	(2,6)	▲
Japan		71	(3,2)	–5	(4,6)		28	(3,3)	5	(4,6)		1	(0,0)	0	(0,7)	
Kazakhstan		93	(2,4)	◊	◊		7	(2,4)	◊	◊		0	(0,0)	◊	◊	
Kuwait		44	(4,6)	◊	◊		29	(3,9)	◊	◊		27	(4,4)	◊	◊	
Latvia		79	(3,7)	–	–		21	(3,7)	–	–		0	(0,0)	–	–	
Lithuania		63	(3,6)	–37	(3,6)	▼	36	(3,6)	36	(3,6)	▲	0	(0,0)	0	(0,0)	
Morocco		69	(4,2)	–	–		30	(4,3)	–	–		1	(0,8)	–	–	
Netherlands	r	72	(4,0)	–3	(5,9)		13	(3,1)	1	(4,5)		15	(3,2)	2	(4,4)	
New Zealand	r	3	(0,9)	–1	(1,8)		18	(2,1)	4	(3,0)		80	(2,1)	–3	(3,4)	
Norway	r	49	(3,8)	–4	(6,0)		42	(3,9)	2	(5,9)		8	(2,2)	2	(3,1)	
Qatar		57	(0,2)	◊	◊		25	(0,1)	◊	◊		19	(0,2)	◊	◊	
Russian Federation		81	(2,7)	–1	(4,2)		18	(2,7)	2	(3,9)		1	(0,2)	–1	(1,3)	
Scotland	s	5	(2,0)	–34	(5,0)	▼	27	(3,8)	–8	(6,0)		68	(4,1)	42	(5,9)	▲
Singapore		75	(2,7)	0	(4,9)		24	(2,8)	–1	(4,9)		1	(0,4)	1	(0,4)	
Slovak Republic		62	(3,8)	◊	◊		37	(3,8)	◊	◊		0	(0,3)	◊	◊	
Slovenia		59	(3,1)	33	(4,7)	▲	41	(3,1)	–15	(5,2)	▼	0	(0,1)	–18	(3,4)	▼
Sweden		22	(2,7)	◊	◊		59	(3,5)	◊	◊		19	(2,7)	◊	◊	
Tunisia	r	29	(3,8)	–4	(5,7)		69	(3,9)	39	(5,7)	▲	3	(1,4)	–35	(4,5)	▼
Ukraine		67	(3,9)	◊	◊		33	(3,9)	◊	◊		0	(0,0)	◊	◊	
United States	r	43	(3,2)	–3	(4,5)		39	(3,1)	9	(4,3)	▲	17	(2,6)	–6	(3,6)	
Yemen		49	(4,1)	◊	◊		38	(4,0)	◊	◊		13	(2,8)	◊	◊	
International Avg.		52	(0,5)				34	(0,6)				14	(0,4)			
Benchmarking Participants																
Alberta, Canada		5	(1,3)	◊	◊		12	(2,5)	◊	◊		83	(2,8)	◊	◊	
British Columbia, Canada		37	(4,2)	◊	◊		44	(4,2)	◊	◊		19	(3,3)	◊	◊	
Dubai, UAE		60	(4,7)	◊	◊		35	(4,6)	◊	◊		5	(0,5)	◊	◊	
Massachusetts, US		28	(6,2)	◊	◊		32	(7,1)	◊	◊		40	(7,7)	◊	◊	
Minnesota, US		23	(6,2)	◊	◊		24	(6,6)	◊	◊		53	(6,4)	◊	◊	
Ontario, Canada		21	(3,7)	–12	(5,9)	▼	59	(4,7)	14	(6,5)	▲	20	(3,4)	–2	(5,1)	
Quebec, Canada	r	38	(4,9)	–2	(6,5)		28	(4,4)	10	(5,6)		34	(4,2)	–8	(6,3)	

Background data provided by teachers.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available.
An "r" indicates data are available for at least 70 but less than 85% of the students. An "s" indicates data are available for at least 50 but less than 70% of the students.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 percent significantly higher.
▼ 2007 percent significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 41 Textbook Use in Teaching Science with Trends

TIMSS 2007 Science 8

Country		Percentage of Students Taught by Teachers Reporting Textbook Use														
		Use Textbook to Teach Science										Do Not Use Textbook to Teach Science				
		As Primary Basis for Lessons					As Supplementary Resource									
		Percent in 2007		Difference in Percent from 2003			Percent in 2007		Difference in Percent from 2003			Percent in 2007		Difference in Percent from 2003		
Algeria		55	(3,6)	◊	◊		41	(3,5)	◊	◊		4	(1,3)	◊	◊	
Armenia	r	77	(2,0)	5	(3,3)		14	(1,5)	–9	(2,9)	▼	9	(1,3)	4	(1,7)	▲
Australia	r	28	(3,4)	–3	(5,5)		56	(3,6)	6	(5,2)		16	(3,0)	–3	(4,3)	
Bahrain		50	(3,3)	–18	(4,2)	▼	34	(2,6)	1	(3,7)		17	(2,9)	17	(2,9)	▲
Bosnia and Herzegovina		58	(2,5)	◊	◊		31	(2,4)	◊	◊		11	(1,6)	◊	◊	
Botswana		28	(3,7)	3	(5,4)		69	(3,8)	–2	(5,7)		3	(1,2)	–2	(2,3)	
Bulgaria		81	(2,4)	–	–		16	(2,2)	–	–		2	(1,2)	–	–	
Chinese Taipei		75	(3,5)	–7	(4,9)		19	(3,1)	5	(4,4)		6	(2,6)	2	(3,1)	
Colombia		14	(2,7)	◊	◊		66	(4,1)	◊	◊		20	(3,3)	◊	◊	
Cyprus	r	53	(1,2)	–9	(1,8)	▼	45	(1,2)	9	(1,6)	▲	2	(0,3)	0	(0,8)	
Czech Republic		43	(2,4)	◊	◊		56	(2,5)	◊	◊		1	(0,4)	◊	◊	
Egypt		48	(4,5)	–18	(6,0)	▼	47	(4,7)	14	(6,2)	▲	4	(1,6)	4	(1,7)	▲
El Salvador		13	(2,8)	◊	◊		76	(3,9)	◊	◊		11	(2,7)	◊	◊	
England	s	13	(2,3)	–5	(4,5)		72	(2,8)	0	(5,1)		15	(2,4)	6	(3,6)	
Georgia		79	(2,8)	◊	◊		20	(2,7)	◊	◊		1	(0,6)	◊	◊	
Ghana		34	(3,7)	0	(5,8)		65	(3,8)	7	(6,1)		1	(0,7)	–7	(2,6)	▼
Hong Kong SAR		87	(3,1)	–4	(4,1)		10	(2,6)	2	(3,7)		3	(1,6)	2	(1,8)	
Hungary		70	(2,8)	4	(3,5)		30	(2,8)	–5	(3,6)		1	(0,4)	1	(0,4)	
Indonesia	s	63	(4,4)	42	(5,9)	▲	34	(4,1)	10	(6,0)		3	(1,8)	–51	(5,0)	▼
Iran, Islamic Rep. of		85	(2,7)	4	(4,0)		8	(1,8)	–4	(3,0)		7	(2,3)	0	(3,0)	
Israel	r	46	(4,6)	2	(6,0)		52	(4,5)	2	(5,9)		1	(0,5)	–4	(1,8)	▼
Italy		62	(3,0)	–1	(4,6)		34	(2,7)	–2	(4,5)		4	(1,3)	2	(1,5)	
Japan		57	(3,5)	–5	(5,3)		38	(3,7)	1	(5,3)		5	(1,6)	3	(1,9)	
Jordan		61	(4,1)	–7	(5,7)		32	(4,0)	0	(5,6)		7	(2,2)	7	(2,2)	▲
Korea, Rep. of	s	73	(3,4)	–6	(4,5)		24	(3,3)	6	(4,4)		3	(1,3)	0	(1,9)	
Kuwait		53	(5,4)	◊	◊		26	(4,2)	◊	◊		21	(3,9)	◊	◊	
Lebanon		49	(3,8)	–1	(5,5)		37	(3,3)	–9	(5,0)		14	(2,7)	9	(3,1)	▲
Lithuania		68	(2,2)	–32	(2,2)	▼	32	(2,2)	32	(2,2)	▲	0	(0,2)	0	(0,2)	
Malaysia		65	(4,3)	21	(5,8)	▲	30	(4,1)	–13	(5,6)	▼	4	(1,6)	–8	(3,2)	▼
Malta		28	(0,2)	◊	◊		54	(0,2)	◊	◊		18	(0,2)	◊	◊	
Norway		84	(2,9)	–3	(3,7)		14	(2,7)	1	(3,6)		2	(1,0)	2	(1,0)	
Oman		49	(4,4)	◊	◊		46	(4,3)	◊	◊		5	(2,0)	◊	◊	
Palestinian Nat'l Auth.		63	(4,6)	–8	(5,9)		30	(4,2)	1	(5,6)		7	(2,2)	6	(2,2)	▲
Qatar		58	(0,2)	◊	◊		25	(0,2)	◊	◊		16	(0,1)	◊	◊	
Romania		71	(2,6)	1	(3,5)		27	(2,5)	–2	(3,4)		2	(0,7)	1	(0,8)	
Russian Federation		72	(2,2)	5	(3,9)		28	(2,2)	–4	(3,9)		0	(0,0)	0	(0,2)	
Saudi Arabia		x	x	–	–		x	x	–	–		x	x	–	–	
Scotland	s	22	(3,2)	–8	(5,4)		68	(3,2)	8	(5,2)		10	(1,8)	1	(2,7)	
Serbia		67	(2,4)	2	(3,3)		32	(2,3)	–2	(3,3)		1	(0,5)	0	(0,7)	
Singapore		44	(2,5)	–29	(3,5)	▼	41	(2,3)	14	(3,4)	▲	15	(1,5)	15	(1,5)	▲
Slovenia		53	(2,6)	–6	(4,2)		47	(2,6)	6	(4,2)		0	(0,0)	–1	(0,4)	
Sweden		51	(3,2)	11	(4,5)	▲	46	(3,3)	–11	(4,6)	▼	3	(0,8)	0	(1,4)	
Syrian Arab Republic		55	(4,0)	◊	◊		31	(3,4)	◊	◊		14	(2,5)	◊	◊	
Thailand		54	(4,3)	◊	◊		32	(3,8)	◊	◊		14	(3,0)	◊	◊	
Tunisia		28	(3,6)	15	(4,5)	▲	71	(3,6)	–13	(4,8)	▼	1	(0,0)	–2	(1,4)	
Turkey		52	(4,8)	◊	◊		45	(4,7)	◊	◊		3	(1,4)	◊	◊	
Ukraine		48	(3,0)	◊	◊		50	(3,1)	◊	◊		2	(0,5)	◊	◊	
United States	r	38	(2,7)	–2	(4,4)		58	(2,8)	3	(4,7)		5	(1,2)	–2	(2,1)	
¶ Morocco		27	(3,3)	–	–		72	(3,2)	–	–		0	(0,4)	–	–	
International Avg.		53	(0,5)				40	(0,5)				7	(0,3)			
Benchmarking Participants																
Basque Country, Spain		86	(2,8)	12	(5,6)	▲	7	(2,1)	–14	(5,0)	▼	7	(2,5)	2	(3,1)	
British Columbia, Canada		57	(4,0)	◊	◊		41	(4,0)	◊	◊		1	(0,9)	◊	◊	
Dubai, UAE		64	(2,6)	◊	◊		30	(3,0)	◊	◊		6	(3,1)	◊	◊	
Massachusetts, US		29	(5,0)	◊	◊		65	(6,0)	◊	◊		6	(3,6)	◊	◊	
Minnesota, US		27	(6,0)	◊	◊		68	(6,9)	◊	◊		5	(3,8)	◊	◊	
Ontario, Canada		43	(5,2)	0	(6,8)		54	(5,2)	1	(7,0)		4	(1,5)	0	(2,5)	
Quebec, Canada	r	38	(4,5)	0	(6,9)		48	(4,7)	–3	(6,9)		14	(3,5)	3	(4,7)	

Background data provided by teachers.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are 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 the students.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 percent significantly higher.
▼ 2007 percent significantly lower.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 42 Teachers' Reports on Learning Activities in Mathematics Lessons

TIMSS 2007 Mathematics 4

Country	Percentage of Students Whose Teachers Reported Students Doing the Activity About Half of the Lessons or More								
	Memorize Formulas and Procedures			Explain Answers			Relate What Is Being Learned in Mathematics to Their Daily Lives		
Algeria		72	(4,2)		70	(4,5)		73	(4,9)
Armenia		54	(3,4)		61	(3,5)		53	(4,0)
Australia		16	(3,3)		73	(3,5)		60	(3,6)
Austria		10	(1,9)		43	(3,2)		53	(3,0)
Chinese Taipei		27	(3,7)		63	(3,9)		54	(3,7)
Colombia		47	(4,5)		86	(3,0)		92	(2,3)
Czech Republic		8	(2,1)		77	(3,8)		71	(3,9)
Denmark		12	(2,3)		67	(4,1)		43	(4,3)
El Salvador		43	(4,6)		66	(4,0)		74	(4,1)
England		22	(3,4)		87	(2,6)		68	(3,9)
Georgia		62	(4,8)		84	(3,2)		69	(5,0)
Germany		9	(2,1)		69	(3,2)		47	(3,1)
Hong Kong SAR		26	(3,6)		53	(4,0)		55	(4,0)
Hungary		18	(3,1)		89	(2,3)		77	(3,4)
Iran, Islamic Rep. of		35	(3,7)		76	(3,0)		67	(3,7)
Italy		54	(3,5)		80	(2,2)		72	(2,7)
Japan		72	(3,0)		77	(3,2)		42	(3,9)
Kazakhstan		74	(4,2)		96	(1,3)		82	(4,1)
Kuwait	r	56	(4,3)	r	62	(4,3)	r	64	(4,1)
Latvia		64	(3,8)		86	(2,6)		94	(1,7)
Lithuania		45	(3,9)		93	(1,9)		80	(2,7)
Morocco		70	(3,6)		76	(3,3)		74	(3,5)
Netherlands		28	(4,2)		70	(4,1)		50	(4,4)
New Zealand		13	(2,2)		91	(1,8)		72	(2,5)
Norway		9	(1,9)		46	(3,4)		46	(3,8)
Qatar		61	(0,2)		73	(0,2)		87	(0,1)
Russian Federation		46	(3,2)		100	(0,4)		71	(3,2)
Scotland		22	(3,7)		71	(3,9)		54	(3,9)
Singapore		33	(2,8)		64	(2,7)		49	(3,0)
Slovak Republic		10	(2,1)		77	(3,1)		77	(2,2)
Slovenia		28	(3,1)		78	(2,6)		73	(2,8)
Sweden		7	(1,6)		67	(3,4)		49	(3,7)
Tunisia		74	(3,4)		69	(3,6)		67	(3,6)
Ukraine		69	(3,3)		97	(1,2)		85	(2,4)
United States		35	(2,6)		81	(2,0)		65	(2,5)
Yemen		44	(4,7)		57	(4,5)		61	(4,5)
International Avg.		38	(0,6)		74	(0,5)		66	(0,6)
Benchmarking Participants									
Alberta, Canada		18	(3,5)		64	(4,2)		60	(3,7)
British Columbia, Canada	r	9	(2,0)	r	71	(3,6)	r	49	(4,4)
Dubai, UAE	s	44	(6,3)	s	79	(4,9)	s	73	(5,0)
Massachusetts, US		27	(5,8)		92	(3,2)		70	(5,7)
Minnesota, US		29	(4,9)		70	(6,6)		63	(5,7)
Ontario, Canada		18	(3,5)		81	(4,4)		62	(4,7)
Quebec, Canada		22	(2,8)		73	(3,5)		58	(3,9)

Background data provided by teachers.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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) 2007.

Table 43 Teachers' Reports on Learning Activities in Mathematics Lessons

TIMSS 2007 Mathematics 8

	Country	Percentage of Students Whose Teachers Reported Students Doing the Activity About Half of the Lessons or More																	
		Memorize Formulas and Procedures			Apply Facts, Concepts, and Procedures to Solve Routine Problems			Explain Answers			Relate What Is Being Learned in Mathematics to Their Daily Lives			Decide Procedures for Solving Complex Problems			Work on Problems for Which There Is No Immediately Obvious Solution		
	Algeria		64	(4,4)		66	(4,2)		80	(3,8)		70	(4,2)		44	(4,7)		21	(3,7)
	Armenia		56	(4,1)		50	(4,2)		51	(3,9)		43	(4,1)		44	(3,4)		47	(3,6)
	Australia		31	(4,2)		55	(4,2)		62	(4,0)		47	(3,6)		28	(3,3)		10	(2,5)
	Bahrain		48	(3,1)		68	(3,0)		74	(2,7)		59	(2,9)		40	(2,1)		26	(2,8)
	Bosnia and Herzegovina		42	(3,8)		59	(4,3)		77	(3,3)		71	(3,7)		43	(3,8)		18	(3,0)
	Botswana		37	(3,9)		59	(4,7)		74	(4,0)		71	(4,0)		39	(4,5)		19	(3,1)
	Bulgaria		82	(3,0)		81	(3,6)		94	(1,4)		57	(4,4)		43	(4,0)		29	(3,7)
	Chinese Taipei		12	(2,8)		60	(4,1)		47	(4,2)		35	(4,2)		25	(3,9)		9	(2,4)
	Colombia		31	(5,5)		83	(3,1)		92	(2,5)		88	(2,5)		66	(4,4)		33	(4,9)
	Cyprus		60	(3,0)		75	(2,2)		96	(0,6)		76	(2,4)		66	(3,0)		24	(2,0)
	Czech Republic		11	(2,6)		68	(3,8)		86	(2,4)		77	(3,0)		55	(3,7)		18	(2,6)
	Egypt		55	(3,6)		62	(4,2)		74	(3,9)		63	(3,9)		47	(4,4)		17	(3,0)
	El Salvador		56	(4,1)		67	(4,0)		78	(3,4)		73	(4,3)		47	(4,6)		23	(3,4)
	England		22	(3,3)		55	(3,9)		81	(3,1)		43	(3,5)		35	(3,4)		13	(3,0)
	Georgia		75	(4,2)		67	(5,0)		86	(3,2)		61	(5,8)		30	(4,1)		19	(3,8)
	Ghana		58	(4,1)		80	(3,3)		72	(3,9)		67	(4,2)		36	(3,8)		20	(3,0)
	Hong Kong SAR		24	(3,7)		44	(4,1)		51	(4,6)		22	(3,2)		23	(3,7)		13	(3,0)
	Hungary		40	(4,4)		79	(2,8)		96	(1,3)		81	(2,8)		57	(4,2)		22	(3,6)
	Indonesia		51	(4,3)		65	(4,0)		66	(4,1)		54	(3,9)		30	(3,9)		18	(3,4)
	Iran, Islamic Rep. of		33	(3,6)		71	(3,8)		90	(2,4)		64	(3,6)		47	(3,9)		30	(3,8)
	Israel	r	44	(3,6)	r	59	(3,6)	r	81	(3,0)	r	41	(3,4)	r	52	(3,2)	r	24	(3,5)
	Italy		33	(3,2)		75	(2,8)		90	(1,9)		52	(3,4)		59	(3,2)		36	(3,3)
	Japan		56	(3,6)		66	(3,8)		54	(3,6)		20	(3,0)		21	(3,2)		23	(3,4)
	Jordan		76	(3,8)		82	(3,0)		85	(2,7)		74	(3,7)		46	(4,2)		25	(3,8)
	Korea, Rep. of		62	(3,4)		88	(2,5)		78	(3,1)		56	(3,7)		57	(3,8)		27	(3,2)
	Kuwait	r	45	(4,8)	r	65	(4,5)	r	73	(4,5)	r	55	(4,7)	r	50	(4,5)	r	22	(4,1)
	Lebanon		58	(4,3)		65	(4,6)		88	(3,4)		52	(4,4)		53	(4,6)		35	(4,8)
	Lithuania		76	(3,3)		73	(2,9)		87	(2,6)		56	(3,6)		49	(3,5)		11	(2,3)
	Malaysia		58	(3,8)		65	(4,1)		75	(3,7)		53	(4,3)		29	(3,4)		25	(3,4)
	Malta		25	(0,2)		76	(0,2)		80	(0,2)		56	(0,2)		38	(0,2)		16	(0,2)
	Norway		15	(2,6)		39	(3,5)		61	(3,3)		49	(3,9)		25	(2,6)		10	(2,0)
	Oman		66	(4,4)		81	(3,3)		86	(2,6)		68	(4,1)		51	(4,4)		32	(4,2)
	Palestinian Nat'l Auth.		64	(4,1)		78	(3,5)		80	(3,5)		60	(4,5)		41	(4,0)		23	(3,6)
	Qatar		51	(0,2)		76	(0,1)		68	(0,1)		57	(0,2)		44	(0,2)		22	(0,1)
	Romania		59	(3,7)		71	(3,5)		87	(2,6)		54	(4,4)		63	(4,1)		23	(3,3)
	Russian Federation		72	(3,3)		92	(1,9)		95	(1,5)		38	(3,5)		13	(2,6)		8	(2,0)
	Saudi Arabia	r	65	(4,5)	r	65	(4,0)	r	70	(4,1)	r	62	(4,6)	r	45	(4,8)	r	32	(4,8)
	Scotland		25	(3,4)		60	(3,4)		76	(2,7)		48	(3,6)		26	(3,3)		13	(2,4)
	Serbia		47	(4,2)		67	(3,9)		81	(4,1)		56	(4,3)		40	(3,8)		16	(2,8)
	Singapore		27	(2,4)		65	(2,8)		53	(2,5)		34	(2,7)		21	(2,4)		10	(1,7)
	Slovenia		39	(2,8)		76	(2,6)		80	(2,2)		70	(2,7)		45	(3,0)		26	(2,2)
	Sweden		10	(1,7)		44	(2,6)		73	(2,5)		53	(3,2)		48	(2,2)		14	(2,1)
	Syrian Arab Republic		80	(3,2)		81	(3,4)		76	(3,3)		47	(4,1)		44	(4,2)		33	(3,9)
	Thailand		65	(4,2)		64	(3,9)		74	(3,4)		69	(3,7)		56	(4,1)		39	(3,9)
	Tunisia		61	(4,3)		59	(4,3)		81	(3,4)		41	(3,9)		39	(3,8)		16	(3,3)
	Turkey		65	(3,8)		62	(4,3)		87	(3,4)		58	(4,4)		58	(4,5)		37	(4,3)
	Ukraine		68	(4,0)		92	(2,3)		95	(1,4)		60	(4,1)		34	(3,8)		10	(2,5)
	United States		37	(2,6)		81	(1,9)		77	(2,3)		57	(2,9)		44	(2,6)		25	(2,2)
¶	Morocco		54	(6,2)		58	(6,0)		85	(3,4)		58	(5,6)		36	(4,2)		20	(4,1)
	International Avg.		49	(0,5)		68	(0,5)		78	(0,4)		57	(0,5)		42	(0,5)		22	(0,5)
Benchmarking Participants																			
	Basque Country, Spain		33	(4,2)		75	(4,2)		92	(2,6)		64	(4,1)		45	(4,3)		9	(2,5)
	British Columbia, Canada		17	(3,0)		65	(4,1)		73	(3,7)		52	(4,2)		39	(4,4)		18	(3,3)
	Dubai, UAE	s	61	(5,8)	s	83	(3,1)	s	84	(5,0)	s	72	(4,7)	s	49	(3,8)	s	19	(4,1)
	Massachusetts, US		28	(5,8)		75	(5,7)		83	(4,5)		56	(7,8)		57	(6,5)		28	(5,0)
	Minnesota, US		35	(7,2)		69	(6,5)		66	(6,6)		50	(7,0)		31	(6,4)		18	(5,3)
	Ontario, Canada		35	(4,4)		71	(4,6)		87	(3,2)		67	(4,3)		57	(4,6)		36	(4,8)
	Quebec, Canada		39	(3,8)		85	(3,1)		74	(3,9)		62	(4,3)		44	(4,3)		50	(3,8)

Background data provided by teachers.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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) 2007.

Table 44 Teachers' Reports on Learning Activities in Science Lessons

TIMSS 2007 Science 4

Country	Percentage of Students Whose Teachers Reported Students																	
	Reading Their Textbooks and Other Resource Materials									Memorizing Facts and Principles								
	Every or Almost Every Lesson			About Half the Lessons			Some Lessons or Never			Every or Almost Every Lesson			About Half the Lessons			Some Lessons or Never		
Australia		4	(1,0)		13	(2,6)		83	(2,7)		2	(1,0)		9	(2,3)		89	(2,5)
Austria		13	(2,4)		38	(3,2)		49	(3,4)		1	(0,4)		4	(1,3)		96	(1,4)
Chinese Taipei		26	(3,9)		32	(3,8)		41	(4,0)		9	(2,4)		11	(2,9)		80	(3,4)
Colombia		44	(5,7)		19	(3,8)		37	(5,9)		12	(2,8)		13	(3,1)		75	(3,6)
Czech Republic		32	(3,6)		36	(3,5)		32	(3,5)		0	(0,0)		9	(2,5)		91	(2,5)
Denmark	r	18	(3,6)	r	38	(4,4)	r	44	(4,5)	r	2	(1,0)	r	7	(1,8)	r	91	(2,1)
El Salvador		33	(3,9)		20	(3,7)		47	(4,3)		22	(3,6)		17	(3,5)		61	(4,4)
England		2	(1,4)		14	(2,6)		83	(3,0)		4	(1,6)		7	(1,9)		90	(2,4)
Georgia		44	(4,1)		14	(3,1)		42	(4,7)		51	(4,8)		15	(3,5)		35	(4,6)
Germany		16	(2,2)		39	(3,2)		44	(3,2)		5	(1,4)		16	(2,5)		79	(2,8)
Hong Kong SAR		24	(3,7)		25	(4,0)		51	(4,3)		7	(2,2)		32	(3,8)		62	(3,9)
Hungary		69	(3,6)		16	(2,3)		15	(3,1)		39	(3,8)		28	(3,8)		33	(3,6)
Iran, Islamic Rep. of		49	(4,2)		26	(3,6)		25	(3,2)		24	(3,0)		29	(3,5)		47	(3,8)
Italy		51	(2,8)		25	(2,6)		24	(2,8)		44	(3,2)		23	(2,8)		33	(3,0)
Japan		27	(3,7)		36	(3,6)		37	(3,7)		23	(3,7)		31	(4,0)		45	(4,4)
Kazakhstan		86	(3,1)		7	(2,1)		7	(2,4)		69	(4,1)		12	(2,4)		18	(3,9)
Kuwait	r	50	(4,4)	r	14	(3,2)	r	35	(4,1)	r	62	(4,7)	r	23	(3,8)	r	15	(3,1)
Latvia		62	(3,6)		28	(3,6)		9	(2,1)		6	(1,8)		21	(2,9)		73	(3,1)
Lithuania		41	(3,5)		34	(3,3)		25	(3,1)		21	(2,7)		26	(3,3)		53	(3,4)
Morocco		54	(4,5)		16	(3,3)		31	(3,7)		56	(4,5)		15	(3,2)		29	(3,7)
Netherlands	r	41	(4,4)	r	37	(4,5)	r	21	(3,2)		3	(1,7)		14	(3,3)		82	(3,5)
New Zealand		3	(1,0)		18	(2,6)		80	(2,7)		1	(0,5)		4	(1,4)		95	(1,4)
Norway		6	(1,7)		33	(3,8)		62	(3,8)		0	(0,0)		4	(1,5)		96	(1,5)
Qatar	r	45	(0,2)	r	20	(0,1)	r	35	(0,2)	r	43	(0,2)	r	27	(0,2)	r	29	(0,2)
Russian Federation		80	(2,8)		12	(2,2)		8	(2,1)		33	(2,5)		28	(3,0)		39	(2,9)
Scotland	r	4	(1,3)	r	21	(4,0)	r	75	(4,1)	r	1	(0,1)	r	8	(2,2)	r	91	(2,4)
Singapore		23	(2,4)		29	(2,7)		48	(2,6)		14	(2,2)		26	(2,6)		60	(3,0)
Slovak Republic		39	(3,3)		37	(3,5)		24	(3,1)		8	(2,0)		9	(1,9)		83	(2,7)
Slovenia		23	(2,7)		32	(2,8)		45	(2,9)		12	(2,1)		25	(2,4)		63	(2,9)
Sweden		8	(1,5)		32	(3,5)		59	(3,6)		2	(1,3)		11	(2,4)		86	(2,7)
Tunisia		40	(4,2)		22	(3,1)		38	(3,8)		41	(4,0)		21	(3,1)		38	(4,1)
Ukraine		65	(3,6)		16	(2,8)		19	(2,9)		27	(3,6)		30	(3,8)		43	(4,0)
United States		34	(2,6)		26	(2,5)		40	(2,9)		14	(1,7)		22	(2,4)		64	(2,6)
Yemen		34	(4,3)		18	(3,7)		48	(4,2)		45	(4,9)		20	(3,6)		34	(4,7)
International Avg.		35	(0,6)		25	(0,5)		40	(0,6)		22	(0,5)		18	(0,5)		60	(0,5)
Benchmarking Participants																		
Alberta, Canada		7	(2,5)		10	(2,4)		83	(3,3)		2	(1,3)		8	(2,5)		90	(2,8)
British Columbia, Canada	r	12	(3,2)	r	39	(4,7)	r	49	(4,2)	r	2	(1,0)	r	11	(2,3)	r	87	(2,5)
Dubai, UAE	s	79	(2,6)	s	6	(2,1)	s	16	(2,5)	s	68	(3,1)	s	9	(1,6)	s	23	(2,7)
Massachusetts, US		16	(5,0)		28	(6,4)		56	(5,4)		9	(2,9)		9	(4,1)		82	(4,1)
Minnesota, US		18	(5,9)		17	(6,0)		65	(7,0)		0	(0,0)		17	(5,9)		83	(5,9)
Ontario, Canada		21	(4,4)		24	(3,8)		54	(4,6)		1	(1,3)		14	(3,3)		85	(3,5)
Quebec, Canada		19	(3,2)		27	(4,1)		54	(3,7)		5	(2,0)		13	(2,8)		82	(3,3)

Background data provided by teachers.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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) 2007.

Table 45 Teachers' Reports on Learning Activities in Science Lessons

Country	Percentage of Students Whose Teachers Reported Students																										
	Reading Their Textbooks and Other Resource Materials									Memorizing Facts and Principles									Using Scientific Formulae and Laws to Solve Routine Problems								
	Every or Almost Every Lesson			About Half the Lessons			Some Lessons or Never			Every or Almost Every Lesson			About Half the Lessons			Some Lessons or Never			Every or Almost Every Lesson			About Half the Lessons			Some Lessons or Never		
General/Integrated Science																											
Australia		12	(2,4)		30	(3,3)		59	(3,8)		4	(1,5)		14	(2,1)		82	(2,6)		1	(0,7)		11	(2,2)		87	(2,2)
Bahrain		19	(2,5)		18	(2,1)		63	(2,9)		53	(2,6)		25	(2,1)		21	(2,7)		25	(2,6)		38	(2,8)		37	(2,4)
Botswana		21	(3,1)		21	(3,1)		58	(4,2)		20	(4,1)		11	(2,9)		69	(4,0)		10	(2,5)		14	(2,9)		76	(3,5)
Chinese Taipei		20	(3,0)		15	(2,5)		65	(3,3)		10	(2,5)		16	(3,2)		75	(3,8)		15	(2,9)		23	(3,2)		62	(4,0)
Colombia		28	(3,9)		35	(4,5)		37	(4,9)		5	(1,8)		11	(2,7)		84	(3,2)		19	(3,3)		26	(4,4)		55	(4,9)
Egypt		25	(3,4)		14	(2,8)		61	(4,0)		58	(4,1)		17	(3,0)		25	(3,7)		34	(4,1)		23	(3,2)		43	(4,1)
El Salvador		25	(4,1)		25	(3,8)		51	(4,6)		15	(3,2)		25	(3,5)		59	(4,2)		10	(2,8)		22	(3,4)		68	(3,8)
England		9	(1,7)		11	(2,0)		79	(2,5)		5	(1,4)		11	(1,7)		84	(2,3)		1	(0,4)		13	(1,9)		86	(2,0)
Ghana		44	(4,6)		18	(3,8)		38	(4,3)		39	(4,4)		20	(3,2)		41	(4,3)		37	(4,3)		21	(3,1)		42	(4,2)
Hong Kong SAR		14	(2,9)		21	(3,7)		65	(4,1)		7	(2,6)		26	(3,9)		67	(4,3)		1	(0,0)		18	(3,4)		81	(3,5)
Iran, Islamic Rep. of		58	(3,8)		13	(2,7)		29	(3,7)		39	(4,2)		22	(3,1)		39	(3,8)		43	(3,7)		24	(3,6)		33	(3,7)
Israel		20	(3,4)		20	(3,2)		60	(3,8)		11	(3,0)		15	(2,8)		73	(4,0)		9	(2,5)		14	(3,1)		77	(3,9)
Italy		33	(3,0)		30	(2,8)		37	(3,2)		5	(1,4)		10	(2,0)		84	(2,4)		14	(2,2)		25	(3,0)		61	(3,4)
Japan		25	(2,9)		24	(3,4)		51	(3,6)		24	(3,2)		36	(4,1)		40	(4,1)		13	(2,6)		31	(3,9)		56	(4,1)
Jordan		35	(3,5)		28	(3,5)		37	(3,8)		42	(4,1)		37	(4,3)		21	(3,3)		41	(4,1)		41	(4,3)		17	(3,5)
Korea, Rep. of		19	(3,0)		29	(3,8)		52	(4,1)		15	(3,1)		36	(3,9)		48	(4,4)		15	(2,8)		43	(4,0)		42	(4,1)
Kuwait	r	19	(3,7)	r	23	(3,9)	r	58	(4,9)	r	51	(4,4)	r	35	(4,5)	r	14	(2,9)	r	42	(4,6)	r	28	(4,5)	r	30	(4,2)
Malaysia		40	(4,7)		26	(3,7)		34	(3,7)		22	(3,6)		38	(4,2)		39	(3,9)		10	(2,5)		27	(3,4)		64	(3,9)
Norway		8	(2,1)		26	(3,3)		66	(3,8)		1	(0,5)		5	(1,4)		94	(1,5)		1	(0,6)		6	(1,4)		94	(1,5)
Oman		13	(2,6)		20	(3,6)		67	(4,1)		40	(3,8)		23	(3,2)		37	(3,8)		23	(3,6)		36	(4,6)		41	(4,0)
Palestinian Nat'l Auth.		22	(3,3)		17	(2,9)		61	(4,2)		61	(3,6)		19	(3,3)		19	(3,3)		52	(4,1)		27	(3,8)		21	(3,7)
Qatar		17	(0,1)		20	(0,1)		63	(0,2)		42	(0,2)		29	(0,1)		29	(0,2)		25	(0,2)		25	(0,1)		50	(0,2)
Saudi Arabia		21	(3,7)		18	(3,6)		61	(4,7)		48	(4,2)		22	(3,7)		30	(4,1)		31	(4,3)		25	(4,3)		44	(4,9)
Scotland	r	19	(2,4)	r	21	(2,1)	r	60	(2,9)	r	9	(1,9)	r	15	(2,2)	r	75	(2,6)	r	2	(0,7)	r	9	(1,6)	r	89	(1,8)
Singapore		13	(1,7)		16	(2,1)		71	(2,4)		7	(1,4)		16	(2,0)		78	(2,2)		4	(0,9)		21	(2,3)		76	(2,4)
a Sweden		6	(1,8)		17	(2,2)		77	(2,7)		1	(0,6)		6	(1,9)		93	(2,0)		1	(0,6)		1	(0,8)		98	(1,3)
Thailand		23	(3,7)		43	(4,0)		34	(3,9)		24	(3,5)		45	(4,2)		31	(3,9)		13	(3,0)		40	(4,2)		47	(4,1)
Tunisia		23	(4,0)		16	(2,9)		60	(4,4)		54	(4,4)		18	(3,5)		29	(3,8)		33	(3,7)		15	(2,8)		53	(3,7)
Turkey		35	(4,3)		23	(3,5)		42	(4,8)		9	(2,8)		12	(3,0)		79	(3,9)		25	(4,0)		36	(4,2)		38	(4,1)
United States		16	(2,1)		23	(2,2)		61	(2,8)		8	(1,6)		16	(2,0)		76	(2,6)		8	(1,6)		27	(2,6)		65	(2,8)
International Avg.		23	(0,6)		22	(0,6)		55	(0,7)		24	(0,6)		21	(0,6)		55	(0,6)		19	(0,5)		24	(0,6)		58	(0,6)
Benchmarking Participants																											
Basque Country, Spain	r	22	(3,4)	r	32	(4,6)	r	46	(4,6)	r	7	(2,1)	r	19	(3,7)	r	74	(4,1)	r	2	(1,3)	r	21	(3,5)	r	77	(3,6)
British Columbia, Canada	s	32	(4,1)	s	24	(5,9)	s	44	(5,4)	s	46	(4,3)	s	9	(1,9)	s	45	(4,4)	s	29	(3,1)	s	25	(4,5)	s	46	(5,7)
Dubai, UAE		6	(2,4)		25	(5,3)		70	(5,7)		3	(2,1)		21	(6,0)		76	(6,4)		2	(1,3)		17	(4,7)		81	(4,6)
Massachusetts, US		16	(5,7)		9	(2,6)		75	(6,0)		4	(2,4)		17	(4,6)		79	(5,1)		0	(0,0)		18	(4,5)		82	(4,5)
Minnesota, US		14	(3,7)		29	(4,4)		56	(4,9)		4	(2,0)		16	(3,0)		80	(3,3)		2	(1,5)		19	(3,4)		79	(3,7)
Ontario, Canada		14	(3,7)		29	(4,4)		56	(4,9)		4	(2,0)		16	(3,0)		80	(3,3)		2	(1,5)		19	(3,4)		79	(3,7)
Quebec, Canada		13	(2,8)		21	(3,4)		66	(4,4)		10	(2,8)		20	(4,1)		69	(4,6)		5	(2,4)		16	(3,8)		79	(4,3)

Background data provided by teachers.
a Sweden: Summarizes reports from physics, biology, and chemistry teachers as well as integrated/general science teachers.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available.
An "r" indicates data are available for at least 70 but less than 85% of the students. An "s" indicates data are available for at least 50 but less than 70% of the students.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Continued on next page

	Country	Percentage of Students Whose Teachers Reported Students																											
		Reading Their Textbooks and Other Resource Materials									Memorizing Facts and Principles									Using Scientific Formulae and Laws to Solve Routine Problems									
		Every or Almost Every Lesson			About Half the Lessons			Some Lessons or Never			Every or Almost Every Lesson			About Half the Lessons			Some Lessons or Never			Every or Almost Every Lesson			About Half the Lessons			Some Lessons or Never		
Biology																													
b	Algeria		32	(4,4)		19	(3,4)		49	(4,1)		60	(4,7)		13	(3,1)		27	(4,2)		31	(4,2)		14	(3,1)		54	(4,5)
	Armenia		21	(3,5)		38	(4,0)		41	(4,5)		25	(3,9)		39	(4,2)		36	(4,0)		16	(2,9)		34	(4,2)		50	(4,2)
	Bosnia and Herzegovina		19	(2,9)		16	(3,1)		64	(3,9)		33	(3,8)		27	(3,7)		41	(3,8)		14	(2,7)		20	(3,2)		66	(3,8)
	Bulgaria		32	(4,9)		23	(4,0)		45	(5,3)		50	(4,9)		26	(4,2)		25	(4,5)		33	(4,6)		25	(4,1)		42	(4,8)
	Cyprus		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	Czech Republic		19	(3,2)		30	(4,2)		51	(4,1)		0	(0,0)		4	(1,4)		96	(1,4)		4	(1,3)		12	(2,1)		85	(2,5)
	Georgia		67	(3,9)		16	(3,8)		17	(3,1)		79	(4,0)		9	(3,0)		12	(3,3)	r	35	(5,8)	r	15	(3,3)	r	50	(6,2)
	Hungary		51	(4,3)		22	(3,5)		27	(4,0)		43	(3,7)		22	(3,2)		35	(3,9)		14	(2,9)		19	(2,8)		67	(3,8)
c	Indonesia		27	(3,9)		42	(4,1)		31	(3,5)		14	(3,5)		30	(3,9)		56	(4,2)		25	(4,3)		34	(4,6)		41	(4,8)
	Lebanon		42	(4,4)		21	(3,8)		38	(3,9)		44	(5,2)		25	(3,7)		31	(5,1)		38	(4,8)		24	(4,2)		38	(4,6)
	Lithuania		39	(3,8)		29	(4,1)		33	(3,9)		41	(3,7)		27	(3,3)		32	(3,5)		4	(1,5)		9	(2,2)		87	(2,7)
d	Malta		9	(0,5)		19	(0,7)		72	(0,9)		5	(0,3)		9	(0,8)		86	(0,8)		5	(0,4)		8	(0,5)		87	(0,6)
	Romania		48	(4,5)		17	(3,1)		35	(4,3)		28	(4,1)		13	(2,9)		60	(4,0)		19	(3,8)		11	(2,8)		69	(4,2)
	Russian Federation		38	(3,4)		28	(3,5)		34	(3,4)		37	(3,4)		21	(2,7)		42	(4,0)		11	(2,3)		21	(3,7)		68	(3,6)
	Serbia		15	(3,0)		22	(4,1)		63	(4,3)		32	(4,2)		30	(3,7)		38	(3,7)		11	(2,5)		23	(3,8)		67	(4,3)
	Slovenia		5	(1,8)		18	(3,1)		76	(3,3)		28	(3,6)		37	(3,9)		35	(3,8)		6	(1,9)		10	(2,3)		84	(3,0)
f	Syrian Arab Republic		9	(2,8)		8	(2,9)		82	(4,0)		48	(5,5)		21	(4,5)		31	(4,6)		30	(4,2)		20	(4,2)		49	(5,1)
	Ukraine		45	(4,2)		26	(3,6)		29	(4,1)		27	(3,9)		22	(3,5)		51	(3,8)		17	(3,2)		13	(2,9)		70	(3,9)
e ¶	Morocco		27	(5,6)		13	(3,4)		61	(6,2)		47	(6,3)		17	(3,3)		36	(6,1)		34	(5,0)		18	(3,4)		48	(4,8)
	International Avg.		30	(0,9)		23	(0,8)		47	(1,0)		36	(1,0)		22	(0,8)		43	(0,9)		19	(0,8)		18	(0,8)		62	(1,0)
Earth Science																													
b	Algeria		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	Armenia		24	(4,1)		38	(4,5)		38	(4,2)		25	(3,5)		39	(4,6)		36	(4,0)		19	(3,3)		49	(4,9)		33	(4,5)
	Bosnia and Herzegovina		20	(3,0)		19	(3,2)		60	(3,7)		31	(4,0)		23	(3,6)		47	(4,5)		13	(3,0)		12	(2,8)		75	(3,7)
	Bulgaria		32	(4,3)		36	(4,6)		32	(4,7)		39	(4,7)		33	(5,0)		28	(4,4)		18	(3,9)		23	(4,5)		59	(4,6)
	Cyprus	r	53	(2,0)	r	21	(2,1)	r	25	(2,0)	r	16	(0,7)	r	18	(2,0)	r	67	(2,0)	s	3	(0,7)	s	18	(1,5)	s	79	(1,6)
	Czech Republic	r	22	(3,6)	r	32	(4,7)	r	46	(4,4)	r	0	(0,0)	r	3	(2,1)	r	97	(2,1)	r	1	(1,0)	r	9	(3,1)	r	89	(3,3)
	Georgia		69	(4,9)		19	(4,5)		12	(2,8)		68	(5,0)		18	(4,9)		14	(3,9)	r	18	(4,2)	r	8	(2,2)	r	73	(4,6)
	Hungary		45	(4,1)		29	(3,9)		26	(3,4)		35	(3,8)		25	(2,9)		40	(3,6)		17	(3,0)		22	(3,5)		60	(4,4)
c	Indonesia		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	Lebanon		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	Lithuania		40	(3,8)		27	(3,2)		33	(3,7)		42	(4,0)		29	(4,1)		29	(3,7)		6	(2,0)		9	(2,4)		85	(2,7)
d	Malta		39	(0,4)		23	(0,4)		38	(0,5)		17	(0,3)		16	(0,4)		67	(0,4)		0	(0,0)		11	(0,2)		89	(0,2)
	Romania		51	(4,2)		19	(3,3)		31	(4,2)		34	(4,3)		17	(3,2)		48	(4,7)		21	(3,1)		12	(2,3)		67	(3,7)
	Russian Federation		33	(3,8)		26	(2,8)		41	(4,2)		30	(3,4)		23	(2,7)		47	(3,7)		9	(2,1)		17	(2,8)		74	(3,6)
	Serbia		10	(2,5)		23	(3,9)		67	(4,3)		31	(4,3)		24	(3,9)		45	(4,2)		6	(2,2)		15	(4,0)		78	(4,4)
	Slovenia		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–
f	Syrian Arab Republic		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	Ukraine		45	(4,6)		28	(3,9)		27	(3,7)		27	(3,9)		26	(3,8)		47	(4,4)		16	(3,4)		19	(3,5)		65	(4,3)
e ¶	Morocco		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	International Avg.		37	(1,0)		26	(1,0)		37	(1,0)		30	(1,0)		23	(1,0)		47	(1,0)		11	(0,8)		17	(0,9)		71	(1,0)

b Algeria: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
c Indonesia: Data reported in biology and physics panels include data from integrated/general science teachers.
d Malta: Data reported in earth science panel include data from environmental studies teachers.
e Morocco: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
f Syrian Arab Republic: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Continued on next page

	Country	Percentage of Students Whose Teachers Reported Students																										
		Reading Their Textbooks and Other Resource Materials									Memorizing Facts and Principles									Using Scientific Formulae and Laws to Solve Routine Problems								
			Every or Almost Every Lesson			About Half the Lessons			Some Lessons or Never			Every or Almost Every Lesson			About Half the Lessons			Some Lessons or Never			Every or Almost Every Lesson			About Half the Lessons			Some Lessons or Never	
Chemistry																												
b	Algeria		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	Armenia		13	(3,5)		40	(4,5)		47	(4,6)		21	(3,8)		40	(3,9)		39	(3,6)		33	(4,2)		19	(3,2)		48	(4,7)
	Bosnia and Herzegovina		17	(3,0)		18	(3,3)		65	(3,8)		38	(4,2)		25	(3,8)		37	(3,7)		31	(3,7)		17	(3,0)		52	(4,1)
	Bulgaria		31	(4,2)		22	(3,9)		47	(4,8)		46	(4,3)		29	(4,6)		25	(4,4)		52	(4,9)		29	(4,7)		19	(4,0)
	Cyprus	r	48	(1,6)	r	15	(0,4)	r	36	(1,5)	r	20	(1,5)	r	13	(1,0)	r	67	(1,4)	r	13	(1,1)	r	17	(1,3)	r	70	(1,4)
	Czech Republic		10	(2,8)		27	(3,4)		63	(3,9)		2	(1,4)		9	(2,3)		90	(2,7)		12	(2,8)		27	(3,5)		61	(3,9)
	Georgia		65	(4,8)		19	(4,3)		16	(3,5)		74	(5,9)		17	(5,4)		9	(2,8)		66	(5,1)		18	(3,4)		16	(3,8)
	Hungary		39	(3,9)		26	(3,7)		35	(4,1)		43	(4,2)		22	(3,5)		35	(4,3)		29	(4,0)		31	(3,9)		40	(4,5)
c	Indonesia		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	Lebanon		34	(4,3)		27	(4,4)		39	(4,5)		48	(5,1)		24	(3,7)		28	(4,5)		48	(4,8)		33	(5,3)		19	(3,4)
	Lithuania		28	(3,8)		22	(2,9)		51	(4,0)		41	(4,2)		30	(4,1)		28	(3,6)		30	(3,7)		44	(4,2)		26	(3,9)
d	Malta		5	(0,7)		8	(0,7)		88	(0,9)		2	(0,3)		10	(0,9)		88	(0,9)		9	(0,8)		19	(1,0)		72	(1,1)
	Romania		33	(3,8)		17	(3,2)		50	(4,2)		24	(3,4)		15	(2,9)		62	(4,1)		65	(4,0)		13	(3,0)		22	(3,2)
	Russian Federation		29	(3,3)		18	(2,7)		53	(3,8)		34	(3,9)		23	(2,8)		43	(3,9)		45	(3,6)		36	(3,3)		19	(2,4)
	Serbia		11	(3,2)		9	(2,2)		80	(3,7)		31	(3,7)		31	(4,3)		38	(3,7)		37	(4,2)		33	(4,1)		30	(3,9)
	Slovenia		5	(1,8)		6	(2,0)		89	(2,6)		23	(3,4)		43	(4,2)		34	(4,1)		24	(3,5)		39	(4,0)		37	(4,1)
f	Syrian Arab Republic		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	Ukraine		35	(4,4)		19	(3,3)		46	(4,0)		29	(4,1)		26	(3,5)		45	(4,2)		80	(3,4)		12	(2,5)		7	(2,2)
e ¶	Morocco		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	International Avg.		27	(0,9)		19	(0,8)		54	(1,0)		32	(1,0)		24	(0,9)		44	(0,9)		38	(1,0)		26	(0,9)		36	(0,9)
Physics																												
b	Algeria	r	28	(4,1)	r	10	(2,8)	r	63	(4,5)	r	55	(5,0)	r	14	(3,5)	r	30	(4,4)	r	40	(4,7)	r	22	(4,1)	r	38	(4,4)
	Armenia		16	(2,8)		38	(5,0)		46	(5,1)		19	(2,9)		33	(4,1)		49	(4,7)		39	(4,5)		18	(4,9)		43	(4,8)
	Bosnia and Herzegovina		11	(2,6)		20	(3,3)		68	(3,9)		38	(3,9)		28	(3,3)		34	(3,7)		53	(4,0)		28	(3,1)		19	(3,4)
	Bulgaria		27	(4,7)		24	(4,6)		49	(5,1)		54	(5,3)		27	(4,3)		19	(3,9)		70	(4,7)		27	(4,3)		4	(1,8)
	Cyprus		36	(2,1)		26	(2,3)		38	(2,2)	r	13	(1,9)	r	24	(1,7)	r	63	(2,4)	r	17	(1,2)	r	42	(2,0)	r	41	(2,0)
	Czech Republic		14	(3,0)		22	(3,4)		65	(4,4)		1	(0,9)		14	(2,8)		85	(2,9)		35	(3,8)		27	(3,5)		38	(4,0)
	Georgia		62	(4,9)		18	(3,5)		20	(3,8)		80	(4,1)		11	(3,5)		9	(2,3)		73	(4,5)		10	(2,2)		17	(4,2)
	Hungary		45	(4,3)		16	(2,6)		39	(4,4)		41	(4,0)		26	(3,9)		33	(4,0)		33	(4,2)		41	(4,3)		26	(3,9)
c	Indonesia		24	(3,8)		37	(4,3)		39	(4,1)		14	(2,8)		30	(3,3)		56	(3,9)		35	(4,1)		50	(4,2)		15	(2,9)
	Lebanon		28	(4,4)		27	(4,1)		44	(4,3)		49	(4,8)		20	(3,4)		32	(4,8)		50	(5,1)		27	(4,4)		23	(4,3)
	Lithuania		32	(3,8)		23	(3,5)		45	(4,3)		46	(4,0)		25	(4,0)		29	(3,5)		77	(3,6)		19	(3,3)		3	(1,3)
d	Malta		9	(0,2)		19	(0,4)		73	(0,4)		7	(0,2)		18	(0,3)		76	(0,4)		29	(0,4)		28	(0,4)		43	(0,5)
	Romania		38	(4,2)		15	(2,9)		48	(3,7)		29	(3,6)		21	(3,2)		50	(4,0)		66	(3,8)		19	(3,5)		16	(2,9)
	Russian Federation		23	(3,3)		17	(3,0)		60	(3,8)		36	(3,1)		16	(2,5)		48	(2,9)		77	(3,0)		19	(3,3)		4	(1,8)
	Serbia		8	(2,2)		15	(3,0)		78	(3,7)		27	(4,0)		30	(4,1)		43	(4,3)		48	(4,4)		34	(4,2)		18	(3,1)
	Slovenia		3	(0,9)		8	(2,3)		89	(2,5)		29	(3,8)		32	(3,4)		39	(3,6)		20	(3,2)		46	(4,0)		34	(4,1)
f	Syrian Arab Republic		14	(3,5)		12	(3,2)		74	(3,9)		62	(4,3)		15	(3,0)		23	(3,3)		56	(4,9)		26	(4,5)		18	(3,0)
	Ukraine		28	(3,8)		18	(3,0)		54	(4,3)		31	(3,6)		25	(3,5)		44	(4,1)		87	(3,0)		11	(2,8)		2	(1,1)
e ¶	Morocco	r	24	(5,0)	r	15	(3,9)	r	61	(5,6)	r	57	(5,9)	r	10	(3,3)	r	32	(5,1)	r	55	(5,3)	r	20	(4,9)	r	25	(4,7)
	International Avg.		25	(0,8)		20	(0,8)		56	(0,9)		36	(0,9)		22	(0,8)		42	(0,9)		51	(0,9)		27	(0,9)		22	(0,8)

b Algeria: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
c Indonesia: Data reported in biology and physics panels include data from integrated/general science teachers.
d Malta: Data reported in earth science panel include data from environmental studies teachers.
e Morocco: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
f Syrian Arab Republic: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 46 Percentage of Time in Mathematics Lessons Students Spend on Various Activities in a Typical Week

TIMSS 2007 Mathematics 4

Country	Reviewing Homework			Listening to Lecture-style Presentations			Working Problems with Teacher's Guidance			Working Problems on Their Own Without Teacher's Guidance		
Algeria	r	11	(0,6)	r	15	(1,6)	r	20	(1,5)	r	20	(1,1)
Armenia	r	11	(0,4)	r	22	(0,7)	r	18	(0,7)	r	15	(0,6)
Australia		5	(0,3)		12	(0,6)		29	(0,8)		24	(1,1)
Austria		7	(0,2)		15	(0,5)		20	(0,6)		25	(0,7)
Chinese Taipei		11	(0,4)		36	(1,1)		15	(0,5)		11	(0,6)
Colombia	r	12	(0,9)	r	19	(1,5)	r	15	(0,6)	r	16	(1,0)
Czech Republic		6	(0,3)		17	(0,6)		22	(0,7)		24	(0,8)
Denmark		10	(0,5)		9	(0,7)		23	(1,3)		30	(1,4)
El Salvador		13	(0,6)		11	(0,6)		21	(0,7)		13	(0,7)
England		5	(0,3)		17	(0,9)		24	(1,0)		32	(1,1)
Georgia		11	(0,5)		20	(0,8)		15	(0,6)		16	(0,6)
Germany		10	(0,3)		13	(0,3)		19	(0,5)		26	(0,7)
Hong Kong SAR		8	(0,4)		38	(1,3)		16	(0,7)		13	(0,8)
Hungary	r	9	(0,4)	r	10	(0,7)	r	25	(0,8)	r	28	(1,0)
Iran, Islamic Rep. of		12	(0,5)		12	(0,6)		16	(0,6)		14	(0,5)
Italy		9	(0,3)		23	(0,7)		15	(0,5)		15	(0,5)
Japan		4	(0,3)		19	(0,9)		29	(1,0)		18	(1,1)
Kazakhstan		10	(0,4)		17	(0,7)		17	(0,5)		21	(0,8)
Kuwait		x	x		x	x		x	x		x	x
Latvia		6	(0,3)		7	(0,5)		24	(0,8)		30	(1,0)
Lithuania		8	(0,4)		7	(0,4)		24	(0,7)		30	(0,8)
Morocco	r	11	(0,8)	r	14	(1,1)	r	21	(1,0)	r	16	(1,0)
Netherlands	r	3	(0,4)	r	13	(0,9)	r	19	(0,9)	r	39	(1,4)
New Zealand		3	(0,2)		7	(0,4)		31	(0,8)		28	(0,7)
Norway		8	(0,4)		17	(0,6)		21	(0,9)		33	(1,3)
Qatar	s	11	(0,1)	s	18	(0,1)	s	18	(0,0)	s	12	(0,0)
Russian Federation		9	(0,3)		13	(0,9)		22	(0,5)		24	(0,8)
Scotland	r	6	(0,3)	r	22	(0,8)	r	19	(0,8)	r	30	(1,1)
Singapore		14	(0,5)		19	(0,6)		18	(0,5)		17	(0,5)
Slovak Republic		6	(0,2)		16	(0,6)		22	(0,8)		22	(0,6)
Slovenia		9	(0,3)		15	(0,4)		21	(0,5)		30	(0,8)
Sweden		5	(0,4)		11	(0,5)		25	(1,8)		38	(1,9)
Tunisia	r	10	(0,6)	r	9	(0,8)	r	24	(1,0)	r	19	(0,9)
Ukraine		10	(0,4)		10	(0,6)		19	(0,6)		19	(0,7)
United States		9	(0,3)		17	(0,6)		26	(0,7)		20	(0,5)
Yemen	r	13	(0,6)	r	17	(1,1)	r	15	(0,9)	r	11	(0,4)
International Avg.		9	(0,1)		16	(0,1)		21	(0,1)		22	(0,2)
Benchmarking Participants												
Alberta, Canada		9	(0,6)		14	(0,8)		23	(0,9)		25	(1,2)
British Columbia, Canada	r	9	(0,5)	r	15	(0,6)	r	22	(0,8)	r	25	(1,2)
Dubai, UAE		x	x		x	x		x	x		x	x
Massachusetts, US		8	(0,4)		15	(1,0)		30	(2,1)		20	(1,0)
Minnesota, US		8	(0,5)		18	(1,4)		25	(1,2)		23	(1,3)
Ontario, Canada		11	(0,8)		17	(1,1)		23	(1,1)		22	(0,9)
Quebec, Canada		7	(0,5)		29	(1,2)		17	(0,8)		14	(0,7)

Background data provided by teachers.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
An "r" indicates data are available for at least 70 but less than 85% of the students. An "s" indicates data are available for at least 50 but less than 70% of the students. An "x" indicates data are available for less than 50% of the students.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Continued on next page

Country	Listening to Teacher Re-teach and Clarify Content/Procedures			Taking Tests or Quizzes			Participating in Classroom Management Tasks Not Related to the Lesson's Content / Purpose			Other Student Activities		
Algeria	r	13	(1,0)	r	11	(0,7)	r	4	(0,4)	r	5	(0,5)
Armenia	r	13	(0,5)	r	12	(0,6)	r	5	(0,3)	r	5	(0,3)
Australia		13	(0,5)		7	(0,4)		5	(0,3)		5	(0,6)
Austria		19	(0,5)		8	(0,2)		4	(0,2)		3	(0,3)
Chinese Taipei		11	(0,4)		9	(0,5)		4	(0,3)		3	(0,4)
Colombia	r	14	(0,9)	r	12	(0,8)	r	7	(0,5)	r	5	(0,4)
Czech Republic		10	(0,5)		11	(0,6)		4	(0,2)		6	(0,5)
Denmark		11	(0,6)		5	(0,4)		7	(0,6)		5	(0,6)
El Salvador		17	(0,7)		13	(0,5)		7	(0,4)		7	(0,5)
England		12	(0,5)		5	(0,4)		3	(0,3)	r	4	(0,4)
Georgia		12	(0,5)		15	(0,6)		5	(0,4)		8	(0,5)
Germany		17	(0,7)		8	(0,2)		5	(0,3)		3	(0,4)
Hong Kong SAR		9	(0,5)		6	(0,4)		4	(0,3)		5	(0,5)
Hungary	r	9	(0,5)	r	11	(1,2)	r	3	(0,2)	r	6	(0,7)
Iran, Islamic Rep. of		15	(0,6)		13	(0,5)		8	(0,4)		9	(0,4)
Italy		15	(0,4)		14	(0,4)		6	(0,3)		4	(0,2)
Japan		16	(0,7)		9	(0,4)		2	(0,2)		3	(0,6)
Kazakhstan		10	(0,5)		17	(0,7)		3	(0,4)		5	(0,6)
Kuwait		x	x		x	x		x	x		x	x
Latvia		12	(0,4)		12	(0,5)		3	(0,2)		6	(0,4)
Lithuania		10	(0,4)		14	(0,7)		3	(0,3)		4	(0,5)
Morocco	r	16	(0,8)	r	12	(0,6)	r	5	(0,4)	r	5	(0,4)
Netherlands	r	12	(0,7)	r	7	(0,4)	r	4	(0,3)	r	4	(0,4)
New Zealand		13	(0,4)		6	(0,3)		5	(0,3)		7	(0,6)
Norway		11	(0,5)		6	(0,3)		3	(0,3)		3	(0,4)
Qatar	s	14	(0,0)	s	13	(0,0)	s	7	(0,0)	s	8	(0,0)
Russian Federation		9	(0,4)		18	(0,6)		1	(0,2)		5	(0,4)
Scotland	r	10	(0,4)	r	5	(0,3)	r	4	(0,3)	r	6	(0,4)
Singapore		11	(0,3)		8	(0,2)		6	(0,3)		6	(0,4)
Slovak Republic		18	(0,6)		8	(0,4)		3	(0,2)		4	(0,4)
Slovenia		11	(0,4)		7	(0,3)		3	(0,2)	r	4	(0,4)
Sweden		10	(0,4)		5	(0,3)		3	(0,3)		3	(0,5)
Tunisia	r	17	(0,8)	r	13	(0,8)	r	4	(0,3)	r	5	(0,5)
Ukraine		17	(0,7)		16	(0,6)		3	(0,2)		6	(0,5)
United States		11	(0,3)		9	(0,3)		4	(0,3)		4	(0,3)
Yemen	r	14	(0,7)	r	14	(1,0)	r	7	(0,4)	r	8	(0,4)
International Avg.		13	(0,1)		10	(0,1)		4	(0,1)		5	(0,1)
Benchmarking Participants												
Alberta, Canada		10	(0,4)		7	(0,3)		5	(0,3)		7	(0,8)
British Columbia, Canada	r	11	(0,4)	r	7	(0,3)	r	5	(0,4)	r	5	(0,8)
Dubai, UAE		x	x		x	x		x	x		x	x
Massachusetts, US		12	(0,7)		7	(0,5)		4	(0,5)		5	(0,7)
Minnesota, US		11	(0,5)		7	(0,4)		5	(0,4)		4	(0,5)
Ontario, Canada		10	(0,5)		7	(0,4)		6	(0,9)		5	(0,6)
Quebec, Canada		11	(0,5)		8	(0,4)		7	(0,5)		6	(0,6)

Background data provided by teachers.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
An "r" indicates data are available for at least 70 but less than 85% of the students. An "s" indicates data are available for at least 50 but less than 70% of the students. An "x" indicates data are available for less than 50% of the students.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 47 Percentage of Time in Mathematics Lessons Students Spend on Various Activities in a Typical Week

TIMSS 2007 Mathematics 8

	Country	Reviewing Homework			Listening to Lecture-style Presentations			Working Problems with Teacher's Guidance			Working Problems on Their Own Without Teacher's Guidance		
	Algeria	s	11	(0,6)	s	15	(1,2)	s	21	(1,2)	s	15	(1,0)
	Armenia		10	(0,4)		23	(1,0)		19	(0,6)		16	(0,6)
	Australia		7	(0,3)		17	(0,8)		23	(1,0)		24	(1,2)
	Bahrain	r	11	(0,3)	r	23	(0,6)	r	18	(0,7)	r	12	(0,3)
	Bosnia and Herzegovina	r	7	(0,4)	r	29	(1,5)	r	24	(1,0)	r	15	(0,7)
	Botswana	r	13	(0,9)	r	13	(0,8)	r	20	(1,0)	r	21	(1,2)
	Bulgaria		8	(0,4)		19	(1,1)		26	(1,0)		17	(0,7)
	Chinese Taipei		13	(0,6)		41	(1,3)		13	(0,6)		7	(0,4)
	Colombia		10	(0,3)		17	(0,9)		21	(0,8)		17	(0,7)
	Cyprus	r	20	(0,6)	r	17	(0,6)	r	23	(0,6)	r	12	(0,4)
	Czech Republic		6	(0,3)		20	(0,6)		25	(0,8)		21	(0,7)
	Egypt	r	10	(0,4)	r	25	(1,2)	r	17	(0,7)	r	14	(0,8)
	El Salvador		10	(0,5)		13	(0,8)		22	(0,8)		20	(0,8)
	England		6	(0,3)		17	(0,6)		28	(1,2)		23	(1,2)
	Georgia		11	(0,5)		21	(1,0)		19	(0,6)		15	(0,7)
	Ghana	r	12	(0,6)	r	16	(1,0)	r	18	(0,7)	r	15	(0,7)
	Hong Kong SAR		11	(0,7)		35	(1,7)		16	(0,9)		13	(0,8)
	Hungary		11	(0,4)		12	(0,7)		27	(0,9)		22	(0,8)
	Indonesia	s	11	(0,5)	s	20	(1,0)	s	19	(0,9)	s	15	(0,8)
	Iran, Islamic Rep. of		11	(0,6)		16	(0,8)		19	(0,8)		14	(0,7)
	Israel	s	14	(0,5)	s	16	(1,0)	s	22	(0,7)	s	19	(0,8)
	Italy		16	(0,6)		22	(0,6)		18	(0,6)		12	(0,4)
	Japan		7	(0,4)		30	(0,8)		26	(0,9)		12	(0,9)
	Jordan		12	(0,4)		19	(0,7)		18	(0,6)		15	(0,5)
	Korea, Rep. of		6	(0,2)		33	(1,1)		18	(0,6)		17	(0,6)
	Kuwait	s	11	(0,6)	s	21	(1,6)	s	18	(0,9)	s	14	(0,8)
	Lebanon	s	22	(1,2)	s	16	(1,0)	s	20	(1,2)	s	10	(1,0)
	Lithuania		9	(0,3)		9	(0,6)		27	(0,8)		25	(0,8)
	Malaysia	r	13	(0,8)	r	22	(1,3)	r	18	(0,8)	r	13	(0,7)
	Malta		18	(0,0)		19	(0,1)		20	(0,0)		15	(0,0)
	Norway		8	(0,4)		22	(0,7)		22	(0,9)		25	(1,0)
	Oman	r	11	(0,5)	r	18	(1,1)	r	20	(0,8)	r	14	(0,6)
	Palestinian Nat'l Auth.	r	13	(0,7)	r	20	(0,9)	r	18	(0,7)	r	14	(0,8)
	Qatar	r	11	(0,0)	r	21	(0,1)	r	20	(0,0)	r	13	(0,0)
	Romania		9	(0,4)		18	(0,8)		29	(0,8)		14	(0,5)
	Russian Federation		10	(0,2)		18	(0,5)		22	(0,6)		20	(0,5)
	Saudi Arabia	r	12	(0,5)	r	22	(1,3)	r	17	(0,9)	r	11	(0,5)
	Scotland		8	(0,4)		21	(0,6)		25	(1,2)		24	(1,1)
	Serbia		6	(0,3)		24	(1,2)		26	(1,1)		20	(1,0)
	Singapore		12	(0,4)		26	(0,8)		19	(0,5)		14	(0,4)
	Slovenia		10	(0,3)		21	(0,5)		23	(0,6)		21	(0,6)
	Sweden		4	(0,2)		15	(0,6)		33	(1,3)	r	28	(1,6)
	Syrian Arab Republic	r	12	(0,6)	r	24	(1,3)	r	17	(0,8)	r	10	(0,5)
	Thailand		12	(0,6)		21	(1,0)		15	(0,7)		12	(0,5)
	Tunisia	s	15	(1,1)	s	13	(1,2)	s	25	(1,4)	s	16	(1,3)
	Turkey		8	(0,6)		21	(1,2)		20	(1,0)		13	(0,7)
	Ukraine		11	(0,4)		14	(0,7)		19	(0,6)		18	(0,6)
	United States		13	(0,4)		21	(0,6)		19	(0,5)		17	(0,6)
¶	Morocco	r	11	(0,8)	r	13	(1,1)	r	22	(1,3)	r	15	(1,2)
	International Avg.		11	(0,1)		20	(0,1)		21	(0,1)		16	(0,1)
Benchmarking Participants													
	Basque Country, Spain		21	(1,0)		18	(1,0)		18	(0,7)		18	(1,2)
	British Columbia, Canada		11	(0,4)		19	(0,6)		20	(0,8)		23	(1,0)
	Dubai, UAE	s	10	(0,7)	s	18	(1,4)	s	22	(1,0)	s	18	(1,0)
	Massachusetts, US		13	(0,9)		16	(1,0)		22	(1,3)		18	(0,9)
	Minnesota, US		12	(0,9)		21	(1,3)		20	(2,1)		20	(1,5)
	Ontario, Canada		14	(0,9)		16	(0,7)		18	(0,8)		22	(1,2)
	Quebec, Canada		14	(0,7)		25	(1,3)		19	(1,0)		14	(0,6)

Background data provided by teachers.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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) 2007.

Continued on next page

	Country	Listening to Teacher Re-teach and Clarify Content/Procedures			Taking Tests or Quizzes			Participating in Classroom Management Tasks Not Related to the Lesson's Content / Purpose			Other Student Activities		
	Algeria	s	18	(1,0)	s	10	(0,8)	s	5	(0,4)	s	5	(0,6)
	Armenia		11	(0,4)		10	(0,4)		5	(0,3)		5	(0,7)
	Australia		10	(0,5)		7	(0,3)		8	(0,5)		4	(0,4)
	Bahrain	r	15	(0,8)	r	11	(0,3)	r	6	(0,2)	r	6	(0,3)
	Bosnia and Herzegovina	r	11	(0,6)	r	7	(0,5)	r	3	(0,3)	r	4	(0,5)
	Botswana	r	10	(0,6)	r	11	(0,8)	r	6	(0,4)	r	6	(0,7)
	Bulgaria		9	(0,4)		14	(0,6)		3	(0,3)		3	(0,3)
	Chinese Taipei		10	(0,7)		8	(0,3)		5	(0,5)		3	(0,3)
	Colombia		12	(0,7)		12	(0,5)		6	(0,4)		5	(0,5)
	Cyprus	r	10	(0,3)	r	9	(0,3)	r	7	(0,2)	r	4	(0,3)
	Czech Republic		9	(0,3)		11	(0,4)		4	(0,3)		4	(0,3)
	Egypt	r	11	(0,5)	r	9	(0,4)	r	6	(0,4)	r	7	(0,4)
	El Salvador		14	(0,6)		10	(0,5)		6	(0,4)		5	(0,4)
	England		11	(0,7)		4	(0,3)		7	(0,5)		4	(0,5)
	Georgia		11	(0,4)		12	(0,5)		5	(0,4)		6	(0,4)
	Ghana	r	11	(0,6)	r	16	(0,7)	r	8	(0,5)	r	6	(0,4)
	Hong Kong SAR		10	(0,4)		8	(0,4)		4	(0,4)		3	(0,4)
	Hungary		9	(0,5)		11	(0,3)		4	(0,3)		4	(0,4)
	Indonesia	s	11	(0,6)	s	14	(0,7)	s	6	(0,3)	s	6	(0,5)
	Iran, Islamic Rep. of		16	(0,8)		11	(0,5)		7	(0,5)		7	(0,4)
	Israel	s	11	(0,4)	s	10	(0,6)	s	5	(0,3)	s	3	(0,5)
	Italy		14	(0,5)		11	(0,5)		5	(0,3)		3	(0,3)
	Japan		14	(0,6)		7	(0,4)		2	(0,3)		2	(0,4)
	Jordan		14	(0,5)		11	(0,4)		6	(0,3)		6	(0,3)
	Korea, Rep. of		11	(0,5)		7	(0,4)		5	(0,3)		4	(0,3)
	Kuwait	s	17	(1,1)	s	9	(0,6)	s	7	(0,6)	s	5	(0,5)
	Lebanon	s	12	(0,6)	s	12	(0,5)	s	5	(0,5)	s	4	(0,4)
	Lithuania		11	(0,5)		14	(0,7)		3	(0,2)		3	(0,3)
	Malaysia	r	12	(0,6)	r	9	(0,4)	r	7	(0,5)	r	6	(0,4)
	Malta		12	(0,0)		5	(0,0)		8	(0,1)		3	(0,0)
	Norway		11	(0,4)		6	(0,2)		4	(0,4)		3	(0,3)
	Oman	r	15	(0,9)	r	11	(0,6)	r	6	(0,3)	r	6	(0,4)
	Palestinian Nat'l Auth.	r	13	(0,6)	r	9	(0,5)	r	6	(0,4)	r	6	(0,5)
	Qatar	r	14	(0,0)	r	10	(0,0)	r	6	(0,0)	r	6	(0,0)
	Romania		9	(0,3)		14	(0,7)		3	(0,2)		3	(0,3)
	Russian Federation		9	(0,3)		16	(0,4)		1	(0,1)		4	(0,4)
	Saudi Arabia	r	15	(0,9)	r	10	(0,5)	r	7	(0,4)	r	7	(0,4)
	Scotland		8	(0,3)		3	(0,2)		6	(0,4)		4	(0,5)
	Serbia		10	(0,6)		8	(0,5)		3	(0,3)		3	(0,4)
	Singapore		10	(0,3)		8	(0,3)		8	(0,4)		5	(0,4)
	Slovenia		11	(0,4)		5	(0,3)		4	(0,2)		5	(0,4)
	Sweden	r	9	(0,3)	r	6	(0,2)	r	3	(0,3)	r	4	(0,5)
	Syrian Arab Republic	r	15	(0,8)	r	12	(0,6)	r	6	(0,4)	r	6	(0,6)
	Thailand		15	(0,6)		10	(0,5)		8	(0,4)		7	(0,5)
	Tunisia	s	18	(1,0)	s	9	(0,7)	s	4	(0,4)	s	3	(0,3)
	Turkey		14	(0,9)		8	(0,6)		10	(1,1)		8	(0,9)
	Ukraine		17	(0,9)		14	(0,6)		3	(0,3)		4	(0,4)
	United States		10	(0,3)		11	(0,3)		5	(0,3)		5	(0,4)
¶	Morocco	r	19	(1,4)	s	10	(0,7)	r	5	(0,5)	r	6	(0,6)
	International Avg.		12	(0,1)		10	(0,1)		5	(0,1)		5	(0,1)
Benchmarking Participants													
	Basque Country, Spain		11	(0,6)		8	(0,5)		5	(0,3)		3	(0,4)
	British Columbia, Canada		9	(0,4)		11	(0,4)		4	(0,3)		4	(0,5)
	Dubai, UAE	s	11	(0,8)	s	11	(1,1)	s	5	(0,3)		x	x
	Massachusetts, US		12	(0,5)		10	(0,5)		5	(0,8)		4	(0,6)
	Minnesota, US		8	(0,5)		11	(0,6)		5	(0,4)		3	(0,5)
	Ontario, Canada		10	(0,5)		9	(0,4)		5	(0,5)		5	(0,6)
	Quebec, Canada		9	(0,4)		9	(0,4)		8	(0,6)		3	(0,4)

Background data provided by teachers.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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) 2007.

Table 48 Percentage of Time in Science Lessons Students Spend on Various Activities in a Typical Week

TIMSS 2007 Science 8

	Country	Reviewing Homework			Listening to Lecture-style Presentations			Working Problems with Teacher's Guidance			Working Problems on Their Own Without Teacher's Guidance		
	Algeria	s	10	(0,4)	s	22	(1,5)	s	14	(0,7)	s	12	(0,8)
	Armenia		12	(0,5)		24	(0,6)		15	(0,4)		13	(0,4)
	Australia		7	(0,3)		19	(0,8)		20	(0,8)		16	(0,8)
	Bahrain	r	10	(0,3)	r	24	(0,9)	r	16	(0,4)	r	10	(0,3)
	Bosnia and Herzegovina	s	6	(0,2)	s	34	(1,2)	s	20	(0,6)	s	13	(0,5)
	Botswana	r	11	(0,5)	r	20	(1,3)	r	17	(1,0)	r	15	(0,9)
	Bulgaria	r	6	(0,3)	r	30	(1,0)	r	17	(0,6)	r	13	(0,5)
	Chinese Taipei		10	(0,6)		48	(1,5)		11	(0,6)		5	(0,4)
	Colombia		11	(0,6)		17	(1,0)		18	(1,3)		18	(1,1)
	Cyprus	s	12	(0,2)	s	24	(0,4)	s	18	(0,2)	s	10	(0,2)
	Czech Republic		5	(0,2)		31	(0,6)		18	(0,3)		15	(0,4)
	Egypt	s	11	(0,7)	s	28	(1,4)	s	13	(0,8)	s	11	(0,6)
	El Salvador		12	(0,5)		16	(0,7)		16	(0,7)		14	(0,7)
	England	r	7	(0,3)	r	16	(0,9)	r	28	(1,0)	r	20	(0,8)
	Georgia	r	12	(0,4)	r	23	(1,4)	r	12	(0,4)	r	10	(0,4)
	Ghana	r	12	(0,7)	r	16	(0,9)	r	17	(0,8)	r	14	(0,6)
	Hong Kong SAR		9	(0,6)		40	(1,6)		15	(1,0)		8	(0,9)
	Hungary	r	8	(0,2)	r	20	(0,7)	r	19	(0,5)	r	16	(0,4)
	Indonesia	s	12	(0,5)	s	24	(1,1)	s	15	(0,8)	s	11	(0,5)
	Iran, Islamic Rep. of		9	(0,3)		17	(0,7)		15	(0,6)		12	(0,5)
	Israel		x	x		x	x		x	x		x	x
	Italy		12	(0,4)		29	(0,7)		13	(0,4)		10	(0,4)
	Japan	r	3	(0,4)	r	47	(1,5)	r	15	(1,0)	r	5	(0,8)
	Jordan		13	(0,5)		20	(1,1)		17	(0,5)		12	(0,5)
	Korea, Rep. of	r	5	(0,3)	r	49	(1,6)	r	9	(0,4)	r	8	(0,4)
	Kuwait		x	x		x	x		x	x		x	x
	Lebanon	s	16	(0,8)	s	19	(1,2)	s	19	(0,8)	s	8	(0,7)
	Lithuania		8	(0,2)		12	(0,5)		22	(0,5)		23	(0,5)
	Malaysia	r	13	(0,6)	r	24	(1,4)	r	15	(0,7)	r	11	(0,6)
	Malta		10	(0,0)		31	(0,1)		15	(0,1)		10	(0,1)
	Norway		8	(0,4)		27	(0,8)		19	(0,9)		16	(0,7)
	Oman	r	10	(0,7)	r	21	(1,5)	r	16	(0,8)	r	13	(0,7)
	Palestinian Nat'l Auth.	s	11	(0,5)	s	25	(1,3)	s	16	(0,7)	s	11	(0,5)
	Qatar	s	11	(0,0)	s	25	(0,1)	s	13	(0,0)	s	12	(0,0)
	Romania		9	(0,3)		24	(0,8)		19	(0,5)		13	(0,4)
	Russian Federation		12	(0,3)		24	(0,5)		19	(0,4)		16	(0,4)
	Saudi Arabia		x	x		x	x		x	x		x	x
	Scotland	r	6	(0,2)	r	23	(0,6)	r	28	(0,7)	r	18	(0,8)
	Serbia	r	5	(0,2)	r	39	(0,8)	r	19	(0,6)	r	11	(0,4)
	Singapore		12	(0,3)		34	(0,8)		14	(0,5)		10	(0,3)
	Slovenia		6	(0,2)		28	(0,7)		22	(0,6)		16	(0,4)
	Sweden	r	6	(0,3)		25	(0,7)		29	(0,8)	r	15	(0,9)
	Syrian Arab Republic	s	12	(0,6)	s	28	(1,4)	s	14	(0,6)	s	10	(0,5)
	Thailand		11	(0,6)		21	(1,2)		14	(0,7)		11	(0,6)
	Tunisia	r	9	(0,7)	r	14	(1,2)	r	26	(1,5)	r	14	(1,0)
	Turkey		8	(0,3)		18	(0,8)		19	(0,9)		12	(0,6)
	Ukraine		12	(0,4)		16	(0,8)		15	(0,4)		15	(0,4)
	United States		9	(0,4)		20	(0,8)		18	(0,6)		15	(0,6)
¶	Morocco	s	9	(0,7)	s	15	(1,2)	s	20	(1,2)	s	13	(0,8)
	International Avg.		10	(0,1)		25	(0,2)		17	(0,1)		13	(0,1)
Benchmarking Participants													
	Basque Country, Spain		13	(0,7)		30	(1,4)		14	(0,9)		15	(1,1)
	British Columbia, Canada	r	9	(0,4)	r	23	(1,1)	r	17	(0,7)	r	17	(0,9)
	Dubai, UAE	s	10	(0,3)	s	24	(1,0)	s	17	(0,7)	s	14	(0,4)
	Massachusetts, US		10	(0,7)		19	(1,3)		18	(1,7)		16	(0,9)
	Minnesota, US		9	(0,9)		20	(1,6)		17	(2,2)		15	(1,2)
	Ontario, Canada		11	(0,6)		23	(1,0)		16	(0,8)		17	(0,9)
	Quebec, Canada		8	(0,6)		26	(1,1)		16	(1,0)		13	(0,7)

Background data provided by teachers.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
An "r" indicates data are available for at least 70 but less than 85% of the students. An "s" indicates data are available for at least 50 but less than 70% of the students. An "x" indicates data are available for less than 50% of the students.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Continued on next page

	Country	Listening to Teacher Re-teach and Clarify Content/Procedures			Taking Tests or Quizzes			Participating in Classroom Management Tasks Not Related to the Lesson's Content / Purpose			Other Student Activities		
	Algeria	s	20	(1,3)	s	10	(0,7)	s	5	(0,3)	s	7	(0,6)
	Armenia		14	(0,4)		11	(0,3)		6	(0,2)		5	(0,3)
	Australia		11	(0,5)		7	(0,4)		10	(0,7)		12	(1,1)
	Bahrain	r	13	(0,5)	r	12	(0,5)	r	8	(0,2)	r	7	(0,3)
	Bosnia and Herzegovina	s	11	(0,4)	s	8	(0,3)	s	4	(0,2)	s	5	(0,4)
	Botswana	r	13	(0,8)	r	11	(0,7)	r	6	(0,4)	r	7	(0,7)
	Bulgaria	r	8	(0,3)	r	17	(0,6)	r	4	(0,5)	r	4	(0,4)
	Chinese Taipei		9	(0,8)		9	(0,6)		4	(0,3)		3	(0,4)
	Colombia		11	(0,6)		11	(0,6)		7	(0,5)		6	(0,5)
	Cyprus	s	14	(0,2)	s	10	(0,1)	s	7	(0,2)	s	6	(0,2)
	Czech Republic		10	(0,3)		10	(0,2)		5	(0,3)		6	(0,3)
	Egypt	s	14	(0,9)	s	10	(0,5)	s	6	(0,4)	s	7	(0,5)
	El Salvador		16	(0,7)		11	(0,5)		8	(0,4)		7	(0,5)
	England	r	10	(0,4)	r	5	(0,2)	r	7	(0,4)	r	8	(0,6)
	Georgia	r	9	(0,4)	r	18	(0,6)	r	6	(0,4)	r	11	(1,2)
	Ghana	r	12	(0,7)	r	15	(0,6)	r	8	(0,5)	r	7	(0,4)
	Hong Kong SAR		8	(0,4)		8	(0,9)		5	(0,4)		8	(1,0)
	Hungary	r	13	(0,4)	r	14	(0,3)	r	4	(0,2)	r	7	(0,4)
	Indonesia	s	12	(0,5)	s	14	(0,7)	s	7	(0,3)	s	7	(0,3)
	Iran, Islamic Rep. of		15	(0,6)		14	(0,6)		8	(0,5)		9	(0,4)
	Israel		x	x		x	x		x	x		x	x
	Italy		16	(0,6)		10	(0,4)		5	(0,3)		5	(0,4)
	Japan	r	14	(0,7)	r	5	(0,5)	r	2	(0,3)	r	8	(1,3)
	Jordan		14	(0,5)		12	(0,5)		6	(0,3)		6	(0,4)
	Korea, Rep. of	r	13	(0,8)	r	6	(0,4)	r	6	(0,5)	r	5	(0,5)
	Kuwait		x	x		x	x		x	x		x	x
	Lebanon	s	14	(0,9)	s	14	(0,6)	s	6	(0,5)	s	6	(0,4)
	Lithuania		14	(0,4)		14	(0,5)		3	(0,2)	r	3	(0,3)
	Malaysia	r	13	(0,8)	r	10	(0,5)	r	9	(0,7)	r	6	(0,5)
	Malta		13	(0,1)		5	(0,0)		10	(0,1)		7	(0,1)
	Norway		12	(0,5)		6	(0,3)		4	(0,3)		9	(0,8)
	Oman	r	14	(0,8)	r	11	(0,7)	r	5	(0,3)	r	9	(0,9)
	Palestinian Nat'l Auth.	s	14	(0,8)	s	10	(0,4)	s	6	(0,4)	s	7	(0,4)
	Qatar	s	12	(0,0)	s	10	(0,0)	s	7	(0,0)	s	11	(0,0)
	Romania		11	(0,5)		14	(0,5)		5	(0,2)		5	(0,2)
	Russian Federation		9	(0,2)		15	(0,4)		2	(0,1)		4	(0,2)
	Saudi Arabia		x	x		x	x		x	x		x	x
	Scotland	r	9	(0,3)	r	4	(0,2)	r	7	(0,3)	r	5	(0,3)
	Serbia	r	11	(0,3)	r	8	(0,3)	r	3	(0,2)	r	5	(0,4)
	Singapore		9	(0,3)		8	(0,3)		7	(0,4)		5	(0,4)
	Slovenia		13	(0,4)		5	(0,3)		4	(0,2)		7	(0,5)
	Sweden	r	11	(0,3)	r	7	(0,2)	r	4	(0,2)	r	5	(0,6)
	Syrian Arab Republic	s	14	(0,8)	s	11	(0,6)	s	6	(0,3)	s	6	(0,3)
	Thailand		18	(0,8)		11	(0,5)		8	(0,4)		7	(0,4)
	Tunisia	r	18	(1,0)	r	11	(0,9)	r	5	(0,5)	r	5	(0,5)
	Turkey		16	(0,8)		10	(0,6)		9	(0,6)		8	(0,5)
	Ukraine		20	(0,8)		14	(0,4)		3	(0,1)		6	(0,4)
	United States		11	(0,4)		9	(0,3)		7	(0,3)		12	(0,9)
¶	Morocco	s	19	(1,0)	s	13	(0,9)	s	5	(0,4)	s	6	(1,1)
	International Avg.		13	(0,1)		10	(0,1)		6	(0,1)		7	(0,1)
Benchmarking Participants													
	Basque Country, Spain		9	(0,7)		8	(0,5)		6	(0,4)		6	(1,2)
	British Columbia, Canada	r	10	(0,6)	r	9	(0,4)	r	6	(0,5)	r	10	(1,1)
	Dubai, UAE	s	10	(0,5)	s	10	(0,4)	s	6	(0,5)	s	9	(0,4)
	Massachusetts, US		12	(0,6)		9	(0,5)		6	(0,7)		11	(1,7)
	Minnesota, US		11	(0,8)		8	(0,6)		7	(0,5)		12	(1,9)
	Ontario, Canada		10	(0,5)		8	(0,4)		7	(0,7)		9	(1,2)
	Quebec, Canada		10	(0,6)		9	(0,5)		10	(0,8)		10	(1,0)

Background data provided by teachers.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
An "r" indicates data are available for at least 70 but less than 85% of the students. An "s" indicates data are available for at least 50 but less than 70% of the students. An "x" indicates data are available for less than 50% of the students.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 49 Teachers' Reports on Students Doing Science Investigations

TIMSS 2007 Science 4

Country	Percentage of Students Whose Teachers Reported Students Doing the Activity About Half of the Lessons or More																				
	Observe Natural Phenomena such as the Weather or a Plant Growing and Describe What They See			Give Explanations About Something They Are Studying			Watch Me Do a Science Experiment			Design or Plan Experiments or Investigations			Do Experiments or Investigations			Work Together in Small Groups on Experiments or Investigations			Relate What Students Are Learning in Science to Their Daily Lives		
Algeria		20	(4,7)		88	(2,8)		43	(4,9)		17	(3,3)		24	(3,7)		28	(3,7)		75	(5,0)
Armenia		70	(3,4)		59	(4,0)		56	(3,9)		56	(4,5)		62	(3,7)		65	(4,0)		62	(3,7)
Australia		16	(2,4)		48	(3,1)		11	(2,7)		18	(2,9)		29	(3,3)		38	(3,5)		57	(3,5)
Austria		9	(1,9)		58	(3,1)		3	(1,0)		2	(0,9)		6	(1,6)		12	(2,3)		71	(2,9)
Chinese Taipei		21	(3,1)		59	(4,0)		37	(4,2)		44	(4,2)		64	(4,2)		69	(4,1)		65	(3,9)
Colombia		46	(5,0)		89	(3,3)		31	(4,6)		31	(4,7)		34	(4,8)		38	(3,8)		92	(2,4)
Czech Republic		21	(3,6)		82	(2,9)		9	(2,0)		3	(1,4)		7	(2,1)		7	(2,3)		89	(2,8)
Denmark	r	18	(3,1)	r	41	(4,0)	r	8	(2,4)	r	15	(3,3)	r	50	(4,6)	r	55	(4,7)	r	45	(4,6)
El Salvador		30	(3,9)		74	(3,9)		7	(2,4)		11	(2,7)		15	(3,2)		21	(3,6)		82	(3,2)
England		25	(3,6)		72	(3,5)		10	(2,5)		53	(4,0)		58	(3,9)		61	(4,0)		70	(3,5)
Georgia		32	(3,7)		86	(4,3)		17	(3,4)		11	(2,5)		8	(2,1)		19	(3,3)		74	(4,6)
Germany		12	(2,2)		64	(3,1)		3	(1,1)		7	(1,7)		14	(2,4)		19	(2,6)		70	(2,7)
Hong Kong SAR		7	(2,2)		65	(4,5)		6	(2,1)		4	(1,6)		6	(2,2)		11	(2,9)		65	(4,2)
Hungary		18	(3,0)		70	(4,0)		8	(2,0)		6	(1,9)		6	(1,7)		10	(2,3)		82	(3,5)
Iran, Islamic Rep. of		49	(4,2)		73	(3,3)		66	(3,6)		58	(4,3)		68	(3,8)		62	(3,9)		80	(2,6)
Italy		29	(3,1)		91	(1,9)		23	(2,5)		25	(2,7)		31	(3,1)		22	(2,7)		72	(3,0)
Japan		64	(3,3)		61	(4,2)		36	(4,0)		56	(3,8)		86	(2,6)		82	(3,0)		54	(4,2)
Kazakhstan		52	(5,3)		99	(0,7)		18	(3,9)		15	(3,6)		15	(4,1)		19	(4,2)		98	(0,9)
Kuwait	r	18	(3,0)	r	77	(3,9)	r	75	(3,9)	r	31	(4,0)	r	45	(4,5)	r	62	(4,2)	r	91	(2,3)
Latvia		43	(3,8)		75	(3,5)		34	(4,2)		47	(4,2)		56	(4,2)		42	(4,3)		96	(1,6)
Lithuania		25	(3,2)		44	(3,6)		9	(2,3)		6	(1,6)		4	(1,4)		16	(2,6)		83	(2,7)
Morocco		21	(3,6)		83	(2,9)		54	(3,8)		32	(4,4)		34	(4,0)		41	(4,3)		79	(3,8)
Netherlands		8	(2,5)		39	(4,0)		4	(1,9)		3	(1,5)		11	(3,2)		16	(3,5)		54	(4,7)
New Zealand		14	(1,9)		57	(3,0)		5	(1,4)		22	(2,6)		31	(2,8)		46	(3,1)		52	(3,0)
Norway		11	(2,6)		30	(3,7)		2	(0,9)		3	(1,1)		5	(1,6)		7	(1,8)		42	(3,9)
Qatar	r	27	(0,1)	r	79	(0,2)	r	64	(0,2)	r	41	(0,1)		46	(0,2)	r	68	(0,2)	r	91	(0,1)
Russian Federation		45	(4,0)		96	(0,7)		20	(2,7)		10	(1,7)		13	(2,1)		26	(3,2)		90	(2,2)
Scotland	r	18	(3,0)	r	62	(4,3)	r	16	(3,1)	r	24	(3,6)	r	46	(4,2)	r	54	(4,8)	r	66	(3,8)
Singapore		15	(2,0)		76	(2,2)		36	(2,4)		13	(1,6)		49	(3,0)		48	(2,5)		69	(2,4)
Slovak Republic		47	(3,9)		69	(3,5)		28	(3,0)		21	(3,2)		28	(3,5)		19	(2,7)		89	(2,4)
Slovenia		34	(2,9)		82	(2,5)		21	(2,4)		17	(2,3)		39	(3,2)		31	(2,8)		90	(1,9)
Sweden		12	(2,8)		36	(3,4)		5	(1,7)		12	(2,5)		24	(3,2)		29	(3,5)		50	(3,5)
Tunisia		36	(4,1)		72	(3,9)		58	(3,8)		48	(4,5)		58	(4,2)		59	(4,2)		74	(3,4)
Ukraine		82	(3,3)		96	(1,6)		26	(3,4)		14	(2,8)		14	(2,8)		26	(3,5)		90	(2,5)
United States		28	(2,6)		78	(2,3)		16	(2,2)		20	(2,5)		44	(2,9)		52	(2,8)		76	(2,2)
Yemen		13	(3,2)		64	(4,1)		37	(4,5)		24	(4,3)		16	(3,3)		23	(4,1)		77	(3,7)
International Avg.		29	(0,6)		69	(0,6)		25	(0,5)		23	(0,5)		32	(0,5)		36	(0,6)		74	(0,5)
Benchmarking Participants																					
Alberta, Canada		27	(3,4)		68	(3,5)		18	(2,6)		29	(4,2)		53	(3,9)		58	(3,8)		75	(3,6)
British Columbia, Canada	r	28	(4,2)	r	63	(4,2)	r	17	(4,0)	r	13	(2,7)	r	28	(4,1)	r	33	(3,2)	r	61	(4,4)
Dubai, UAE	s	51	(4,8)	s	88	(2,2)	s	60	(4,5)	s	66	(4,2)	s	67	(4,5)	s	60	(4,9)	s	96	(1,1)
Massachusetts, US		30	(6,1)		71	(6,8)	r	17	(3,9)		36	(6,4)		56	(7,4)		63	(7,0)		74	(5,3)
Minnesota, US		36	(7,0)		74	(5,2)		14	(4,3)		23	(7,1)		65	(6,7)		74	(5,9)		73	(7,7)
Ontario, Canada		21	(4,3)		69	(4,6)		19	(3,9)		20	(4,1)		48	(5,4)		56	(4,5)		72	(3,6)
Quebec, Canada		16	(3,4)		59	(3,8)		16	(3,3)		28	(4,0)		45	(4,1)		47	(4,3)		57	(4,0)

Background data provided by teachers.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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) 2007.

Table 50 Teachers' Reports on Students Doing Science Investigations

TIMSS 2007 Science 8

Country	Percentage of Students Whose Teachers Reported Students Doing the Activity About Half of the Lessons or More																			
	Observe Natural Phenomena and Describe What They See			Give Explanations About Something They Are Studying			Watch Me Demonstrate an Experiment or Investigation			Design or Plan Experiments or Investigations			Conduct Experiments or Investigations			Work Together in Small Groups on Experiments or Investigations			Relate What Students Are Learning in Science to Their Daily Lives		
General/Integrated Science																					
Australia		24	(3,6)		68	(2,7)		15	(2,7)		16	(2,4)		67	(3,3)		60	(3,5)		73	(3,1)
Bahrain		36	(2,4)		67	(3,1)		62	(2,5)		17	(2,4)		33	(3,0)		42	(3,1)		80	(2,9)
Botswana		23	(3,7)		75	(3,9)		39	(4,0)		22	(4,2)		36	(4,9)		48	(4,7)		88	(2,9)
Chinese Taipei		26	(3,9)		57	(3,9)		16	(3,0)		10	(2,4)		12	(2,7)		9	(2,5)		62	(4,1)
Colombia		54	(5,0)		87	(2,3)		22	(3,8)		32	(3,8)		34	(4,3)		45	(4,8)		92	(2,5)
Egypt		43	(4,2)		72	(3,3)		73	(4,0)		24	(3,4)		31	(3,7)		47	(4,0)		86	(2,4)
El Salvador		41	(4,3)		79	(3,4)		16	(3,0)		21	(3,5)		20	(3,7)		37	(3,9)		81	(3,6)
England		32	(3,1)		84	(2,1)		47	(3,5)		24	(3,2)		70	(2,9)		73	(2,8)		80	(2,5)
Ghana		48	(4,0)		89	(2,6)		57	(4,2)		44	(3,9)		40	(3,6)		33	(4,0)		89	(2,5)
Hong Kong SAR		21	(3,7)		66	(4,3)		19	(3,8)		13	(3,0)		70	(4,5)		67	(3,8)		63	(4,7)
Iran, Islamic Rep. of		41	(3,9)		73	(3,6)		64	(3,4)		52	(3,6)		62	(3,9)		45	(3,5)		79	(3,3)
Israel		26	(3,4)		83	(3,1)		50	(4,0)		30	(3,7)		31	(4,0)		25	(3,9)		82	(3,4)
Italy		48	(3,0)		89	(2,0)		8	(1,6)		8	(1,6)		9	(1,7)		9	(1,6)		69	(2,8)
Japan		42	(4,2)		30	(3,7)		28	(3,9)		18	(3,2)		68	(4,2)		69	(4,0)		47	(4,4)
Jordan		45	(4,2)		68	(3,8)		77	(3,5)		37	(3,7)		59	(4,2)		56	(3,8)		84	(3,4)
Korea, Rep. of		37	(3,7)		81	(3,1)		34	(3,6)		22	(3,3)		39	(4,2)		33	(3,5)		84	(3,3)
Kuwait	r	36	(4,2)	r	72	(4,7)	r	77	(4,3)	r	34	(4,4)	r	47	(4,3)	r	67	(4,6)	r	84	(3,2)
Malaysia		38	(3,7)		84	(3,0)		25	(3,1)		32	(4,0)		53	(4,1)		61	(4,1)		83	(3,0)
Norway		8	(2,1)		29	(3,2)		10	(1,9)		14	(2,3)		28	(3,4)		30	(3,6)		54	(3,5)
Oman		28	(3,7)		58	(4,1)		54	(4,5)		40	(4,3)		47	(3,7)		66	(4,0)		82	(3,6)
Palestinian Nat'l Auth.		51	(4,3)		65	(4,1)		76	(3,3)		43	(4,0)		47	(3,9)		42	(3,8)		87	(2,7)
Qatar		18	(0,1)		60	(0,2)		56	(0,2)		32	(0,1)		48	(0,2)		63	(0,2)		76	(0,1)
Saudi Arabia		46	(4,8)		63	(4,8)		58	(4,4)		19	(3,6)		34	(4,4)		40	(4,5)		86	(3,2)
Scotland	r	28	(2,8)	r	79	(2,6)	r	28	(2,7)	r	24	(2,6)	r	83	(2,1)	r	87	(1,8)	r	78	(2,3)
Singapore		21	(2,4)		73	(2,1)		20	(2,3)		6	(1,4)		40	(2,5)		34	(2,3)		76	(2,3)
a Sweden		19	(2,7)		65	(2,8)		28	(3,3)		21	(3,1)		66	(3,1)		67	(3,0)		81	(3,0)
Thailand		34	(4,0)		80	(3,6)		35	(3,8)		51	(3,9)		67	(3,9)		81	(2,8)		84	(3,1)
Tunisia		59	(4,0)		79	(3,8)		70	(4,0)		50	(4,0)		62	(3,7)		79	(3,2)		79	(3,7)
Turkey		51	(4,5)		79	(3,5)		54	(4,6)		36	(4,1)		50	(4,1)		30	(3,7)		89	(3,0)
United States		30	(2,9)		80	(2,1)		23	(2,2)		24	(2,9)		48	(3,2)		61	(3,3)		80	(2,3)
International Avg.		35	(0,7)		71	(0,6)		41	(0,6)		27	(0,6)		47	(0,7)		50	(0,6)		79	(0,6)
Benchmarking Participants																					
Basque Country, Spain		38	(4,9)		88	(3,3)		5	(1,9)		5	(2,0)		4	(1,6)		12	(2,5)		86	(3,4)
British Columbia, Canada	r	24	(3,7)	r	75	(3,9)	r	30	(3,9)	r	7	(2,0)	r	41	(4,7)	r	41	(4,5)	r	72	(4,3)
Dubai, UAE	s	63	(2,9)	s	88	(3,8)	s	48	(5,7)	s	37	(3,7)	s	52	(4,3)	s	55	(3,6)	s	88	(3,1)
Massachusetts, US		38	(6,2)		76	(6,8)		19	(5,1)		19	(4,7)		47	(6,8)		59	(6,6)		75	(5,2)
Minnesota, US		37	(6,2)		78	(5,8)		13	(4,8)		8	(3,7)		51	(8,5)		67	(8,1)		69	(6,5)
Ontario, Canada		19	(3,8)		71	(4,5)		18	(3,4)		21	(3,9)		38	(4,2)		49	(4,6)		74	(4,3)
Quebec, Canada		28	(3,9)		60	(4,5)		22	(4,2)		35	(4,4)		56	(5,6)		45	(5,4)		66	(4,6)

Background data provided by teachers.
a Sweden: Summarizes reports from physics, biology, and chemistry teachers as well as integrated/general science teachers.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available.
An "r" indicates data are available for at least 70 but less than 85% of the students. An "s" indicates data are available for at least 50 but less than 70% of the students.
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Continued on next page

	Country	Percentage of Students Whose Teachers Reported Students Doing the Activity About Half of the Lessons or More																				
			Observe Natural Phenomena and Describe What They See			Give Explanations About Something They Are Studying			Watch Me Demonstrate an Experiment or Investigation			Design or Plan Experiments or Investigations			Conduct Experiments or Investigations			Work Together in Small Groups on Experiments or Investigations			Relate What Students Are Learning in Science to Their Daily Lives	
Biology																						
b	Algeria		37	(4,1)		90	(2,7)		59	(4,3)		22	(3,9)		36	(4,0)		71	(3,6)		81	(3,7)
	Armenia		56	(4,6)		62	(4,2)		50	(4,3)		56	(4,4)		56	(4,4)		58	(4,6)		65	(4,1)
	Bosnia and Herzegovina		30	(3,7)		75	(3,7)		33	(3,5)		12	(2,3)		9	(2,3)		22	(3,3)		85	(2,9)
	Bulgaria		37	(5,0)		97	(1,8)		25	(4,2)		8	(2,8)		12	(3,5)		18	(3,3)		95	(2,3)
	Cyprus		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	Czech Republic		34	(3,8)		74	(3,4)		12	(2,8)		2	(1,1)		11	(2,6)		5	(1,7)		89	(2,7)
	Georgia		37	(5,5)		84	(3,9)		31	(4,8)		15	(4,6)		11	(3,1)		26	(4,4)		89	(3,4)
	Hungary		12	(2,8)		78	(3,4)		11	(2,6)		4	(1,6)		7	(2,2)		8	(2,3)		92	(2,3)
c	Indonesia		24	(3,0)		87	(2,8)		44	(3,8)		21	(4,0)		31	(4,4)		45	(3,9)		79	(3,6)
	Lebanon		50	(5,1)		77	(4,5)		39	(4,6)		38	(4,4)		34	(4,4)		32	(4,1)		82	(4,2)
	Lithuania		12	(2,3)		51	(3,7)		5	(1,2)		5	(1,9)		6	(1,9)		10	(1,9)		89	(2,5)
d	Malta		26	(0,9)		74	(0,9)		5	(0,4)		7	(0,4)		28	(0,9)		25	(0,9)		84	(0,7)
	Romania		58	(4,0)		84	(2,7)		29	(3,9)		18	(2,7)		14	(2,5)		33	(3,4)		91	(2,1)
	Russian Federation		25	(3,0)		95	(1,4)		16	(2,5)		12	(2,2)		15	(2,9)		20	(3,2)		94	(1,7)
	Serbia		23	(3,3)		81	(3,3)		17	(3,3)		5	(1,8)		4	(1,5)		14	(2,8)		84	(3,0)
	Slovenia		49	(3,9)		50	(4,0)		11	(2,6)		8	(2,4)		8	(2,1)		10	(2,2)		84	(3,0)
f	Syrian Arab Republic		31	(4,2)		80	(3,7)		69	(3,9)		14	(3,2)		25	(4,1)		20	(4,0)		85	(3,6)
	Ukraine		23	(3,6)		95	(1,6)		19	(3,2)		16	(3,2)		15	(2,9)		22	(3,2)		97	(1,2)
e ¶	Morocco		49	(5,8)		81	(5,1)		54	(6,2)		25	(4,0)	r	33	(5,9)		39	(6,1)		74	(5,6)
	International Avg.		34	(0,9)		79	(0,8)		29	(0,9)		16	(0,7)		20	(0,8)		26	(0,8)		85	(0,7)
Earth Science																						
b	Algeria		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	Armenia		49	(4,7)		56	(4,7)		43	(4,5)		40	(4,5)		39	(4,2)		43	(4,0)		64	(3,9)
	Bosnia and Herzegovina		14	(2,8)		71	(3,8)		29	(3,9)		10	(2,5)		5	(1,7)		23	(3,9)		73	(3,6)
	Bulgaria		30	(4,5)		94	(2,2)		3	(1,8)		6	(2,3)		6	(2,7)		18	(3,8)		93	(2,3)
	Cyprus	r	47	(1,9)	r	76	(1,4)	r	19	(1,0)	s	15	(0,6)	s	15	(1,0)	r	23	(1,8)	r	93	(0,7)
	Czech Republic		10	(2,2)		79	(3,6)	r	4	(1,7)	r	1	(0,8)	r	1	(0,8)	r	5	(1,7)	r	85	(3,0)
	Georgia		39	(5,3)		83	(4,8)		25	(4,3)		12	(3,4)		12	(3,4)		23	(4,0)		81	(5,3)
	Hungary		15	(3,0)		77	(4,1)		8	(2,4)		4	(1,6)		3	(1,3)		6	(1,8)		89	(2,8)
c	Indonesia		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	Lebanon		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	Lithuania		7	(2,1)		45	(3,6)		2	(1,1)		2	(0,8)		3	(1,3)		8	(2,1)		84	(3,0)
d	Malta		23	(0,4)		89	(0,3)		7	(0,2)		8	(0,2)		8	(0,3)		10	(0,2)		85	(0,3)
	Romania		50	(4,4)		83	(3,2)		25	(3,3)		14	(3,1)		14	(2,9)		32	(3,6)		83	(3,4)
	Russian Federation		21	(2,8)		94	(1,9)		10	(2,2)		10	(2,2)		12	(2,7)		21	(2,6)		85	(3,1)
	Serbia		14	(2,6)		79	(3,7)		26	(4,2)		6	(1,8)		6	(1,8)		11	(2,1)		80	(3,1)
	Slovenia		–	–		–	–		–	–		–	–		–	–		–	–		–	–
f	Syrian Arab Republic		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	Ukraine		28	(4,1)		96	(1,7)		9	(2,5)		21	(3,7)		16	(3,6)		28	(4,2)		92	(2,3)
e ¶	Morocco		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	International Avg.		27	(0,9)		79	(0,9)		16	(0,8)		11	(0,7)		11	(0,7)		19	(0,8)		84	(0,9)

b Algeria: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
c Indonesia: Data reported in biology and physics panels include data from integrated/general science teachers.
d Malta: Data reported in earth science panel include data from environmental studies teachers.
e Morocco: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
f Syrian Arab Republic: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Continued on next page

	Country	Percentage of Students Whose Teachers Reported Students Doing the Activity About Half of the Lessons or More																				
			Observe Natural Phenomena and Describe What They See			Give Explanations About Something They Are Studying			Watch Me Demonstrate an Experiment or Investigation			Design or Plan Experiments or Investigations			Conduct Experiments or Investigations			Work Together in Small Groups on Experiments or Investigations			Relate What Students Are Learning in Science to Their Daily Lives	
Chemistry																						
b	Algeria		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	Armenia		47	(4,2)		55	(4,8)		48	(4,2)		45	(4,3)		45	(4,8)		53	(4,5)		52	(4,4)
	Bosnia and Herzegovina		28	(3,7)		75	(3,4)		35	(3,9)		12	(1,9)		9	(2,2)		15	(2,9)		80	(3,2)
	Bulgaria		34	(5,0)		99	(0,9)		46	(5,0)		12	(3,1)		15	(3,6)		20	(3,5)		93	(2,4)
	Cyprus	r	39	(1,1)	r	77	(1,3)	r	60	(1,6)	r	22	(1,1)	r	34	(1,8)	r	44	(1,5)	r	81	(1,7)
	Czech Republic		46	(4,6)		70	(3,5)		48	(4,2)		5	(1,7)		13	(2,9)		10	(2,4)		91	(2,5)
	Georgia		37	(5,8)		82	(5,3)		38	(5,4)		11	(3,5)		12	(3,4)		21	(4,6)		77	(4,9)
	Hungary		12	(3,0)		80	(3,3)		74	(3,8)		11	(2,8)		18	(3,0)		9	(2,4)		94	(1,6)
c	Indonesia		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	Lebanon		50	(4,9)		75	(4,3)		51	(4,4)		44	(4,2)		49	(4,5)		29	(4,1)		85	(3,4)
	Lithuania		9	(2,4)		51	(4,2)		29	(4,1)		8	(2,4)		11	(2,6)		10	(2,3)		74	(3,2)
d	Malta		15	(0,8)		57	(1,1)		15	(0,8)		11	(0,7)		31	(1,2)		23	(0,9)		59	(1,2)
	Romania		65	(4,0)		90	(2,5)		58	(4,3)		16	(2,7)		26	(4,0)		34	(4,2)		92	(2,1)
	Russian Federation		18	(2,3)		95	(1,6)		72	(3,4)		20	(3,2)		27	(3,6)		26	(3,9)		80	(2,3)
	Serbia		21	(3,6)		83	(3,3)		36	(4,5)		8	(3,0)		6	(2,8)		6	(2,0)		78	(3,6)
	Slovenia		35	(3,8)		61	(4,1)		49	(3,7)		10	(2,7)		15	(3,3)		11	(2,8)		78	(3,5)
f	Syrian Arab Republic		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	Ukraine		28	(3,5)		97	(1,3)		62	(4,0)		25	(3,5)		21	(3,5)		16	(3,0)		88	(2,9)
e ¶	Morocco		–	–		–	–		–	–		–	–		–	–		–	–		–	–
	International Avg.		32	(1,0)		76	(0,8)		48	(1,0)		17	(0,7)		22	(0,8)		22	(0,8)		80	(0,8)
Physics																						
b	Algeria	r	41	(5,0)	r	87	(3,2)	r	77	(3,7)	r	33	(5,2)	r	56	(4,8)	r	71	(4,3)	r	77	(4,1)
	Armenia		51	(5,6)		54	(5,1)		44	(4,9)		48	(4,9)		45	(4,9)		51	(5,6)		43	(5,0)
	Bosnia and Herzegovina		29	(3,9)		84	(3,0)		37	(3,6)		9	(2,0)		9	(2,1)		13	(2,5)		84	(3,2)
	Bulgaria		55	(5,0)		99	(0,8)		57	(5,3)		12	(2,4)		19	(3,7)		16	(3,6)		95	(2,2)
	Cyprus		84	(1,4)	r	92	(1,3)	r	76	(1,7)		32	(2,0)	r	40	(2,1)		61	(2,0)		95	(0,9)
	Czech Republic		56	(4,5)		83	(2,8)		63	(4,1)		14	(2,6)		20	(3,1)		20	(3,1)		90	(2,6)
	Georgia		41	(4,8)		97	(1,4)		44	(4,9)		29	(4,8)		29	(5,4)		38	(4,3)		91	(3,0)
	Hungary		18	(3,3)		85	(2,9)		76	(3,3)		9	(2,5)		23	(3,4)		15	(3,1)		95	(2,0)
c	Indonesia		25	(3,2)		89	(2,6)		47	(4,0)		19	(3,0)		31	(3,9)		36	(4,1)		78	(3,7)
	Lebanon		53	(4,7)		80	(4,2)		48	(4,7)		42	(4,1)		41	(4,4)		30	(4,0)		83	(4,1)
	Lithuania		17	(2,7)		52	(4,4)		56	(4,2)		7	(2,0)		9	(2,4)		10	(2,3)		92	(2,3)
d	Malta		40	(0,5)		69	(0,5)		38	(0,5)		16	(0,3)		39	(0,5)		32	(0,5)		82	(0,3)
	Romania		73	(4,1)		90	(2,5)		65	(4,3)		14	(2,9)		29	(4,0)		33	(3,8)		92	(2,0)
	Russian Federation		30	(3,8)		96	(1,3)		70	(3,3)		11	(2,1)		15	(2,8)		20	(3,3)		81	(3,1)
	Serbia		29	(4,1)		77	(3,5)		42	(4,2)		6	(2,0)		9	(2,6)		6	(1,9)		88	(2,6)
	Slovenia		63	(3,9)		58	(4,3)		58	(4,2)		14	(3,1)		16	(2,8)		14	(2,6)		86	(2,7)
f	Syrian Arab Republic		35	(3,8)		79	(3,6)		69	(4,1)		19	(3,9)		30	(4,3)		19	(3,6)		81	(3,6)
	Ukraine		43	(4,1)		97	(1,3)		72	(3,9)		22	(3,5)		27	(4,1)		22	(3,2)		87	(2,5)
e ¶	Morocco	r	41	(4,6)	r	75	(4,6)	r	80	(4,1)	r	28	(5,2)	r	40	(5,7)	r	27	(5,0)	r	88	(2,9)
	International Avg.		43	(0,9)		81	(0,7)		59	(0,9)		20	(0,8)		28	(0,9)		28	(0,8)		85	(0,7)

b Algeria: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
c Indonesia: Data reported in biology and physics panels include data from integrated/general science teachers.
d Malta: Data reported in earth science panel include data from environmental studies teachers.
e Morocco: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
f Syrian Arab Republic: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 51 Computer Use in Science Class with Trends

Country	National Curriculum Contains Policies / Statements About the Use of Computers	Trends in Percentage of Students Whose Teachers Reported That Computers Are Available						Percentage of Students Whose Teachers Reported on Computer Use About Half of the Lessons or More											
		2007 Percent of Students			Difference in Percent from 2003			Doing Scientific Procedures or Experiments			Studying Natural Phenomena Through Simulations			Practicing Skills and Procedures			Looking Up Ideas and Information		
Algeria	●		5	(2,1)	◊	◊			0	(0,0)		0	(0,0)		3	(1,6)		4	(1,8)
Armenia	●		72	(3,5)	–	–			–	–		–	–		–	–		–	–
Australia	●		78	(2,8)	–6	(4,1)			2	(1,2)		3	(1,5)		6	(1,9)		29	(3,9)
Austria	○		74	(3,0)	◊	◊			0	(0,0)		1	(0,8)		3	(0,9)		11	(1,9)
Chinese Taipei	●		53	(4,1)	17	(5,7)	▲		5	(2,1)		5	(2,1)		2	(1,4)		4	(1,8)
Colombia	○		16	(3,0)	◊	◊			1	(0,8)		2	(1,1)		3	(1,3)		6	(1,8)
Czech Republic	○		54	(3,7)	◊	◊			1	(0,7)		1	(0,7)		3	(1,6)		4	(1,9)
Denmark	○		91	(2,2)	◊	◊		r	2	(1,4)	r	3	(1,1)	r	11	(3,3)	r	25	(3,9)
El Salvador	○		18	(3,5)	◊	◊			2	(1,1)		3	(1,5)		4	(1,6)		7	(2,3)
England	●	r	77	(3,7)	–11	(4,7)	▼		7	(2,5)		9	(2,5)		8	(2,6)		17	(3,1)
Georgia	○		15	(3,4)	◊	◊			0	(0,4)		1	(0,7)		2	(1,4)		0	(0,0)
Germany	●		64	(3,6)	◊	◊			1	(0,4)		1	(0,8)		2	(1,0)		13	(2,2)
Hong Kong SAR	●		71	(4,1)	7	(6,3)			3	(1,7)		7	(2,4)		10	(2,9)		32	(4,3)
Hungary	○		24	(3,7)	0	(5,4)			0	(0,0)		0	(0,3)		2	(1,2)		2	(1,2)
Iran, Islamic Rep. of	○		2	(0,7)	–2	(1,9)			1	(0,3)		0	(0,0)		0	(0,1)		0	(0,2)
Italy	●		25	(2,6)	6	(3,7)			3	(1,2)		3	(1,3)		3	(1,1)		6	(1,5)
Japan	●		84	(2,9)	–5	(4,0)			0	(0,3)		8	(2,0)		0	(0,0)		4	(1,5)
Kazakhstan	○		38	(5,0)	◊	◊			0	(0,3)		3	(1,5)		8	(3,2)		9	(3,1)
Kuwait	○		39	(4,3)	◊	◊		r	12	(3,2)	r	9	(2,7)	r	20	(3,2)	r	20	(3,6)
Latvia	○		37	(3,6)	–	–			1	(0,5)		1	(0,4)		2	(0,7)		12	(2,8)
Lithuania	●		37	(3,8)	29	(4,4)	▲		0	(0,0)		0	(0,0)		2	(1,3)		13	(2,4)
Morocco	○		17	(3,3)	–	–			1	(0,6)		3	(1,3)		2	(1,1)		6	(2,6)
Netherlands	○		62	(4,7)	24	(6,8)	▲		1	(1,0)		0	(0,2)		0	(0,2)		13	(3,0)
New Zealand	○	r	89	(1,7)	4	(3,1)			3	(0,8)		6	(1,4)		5	(1,3)		38	(2,6)
Norway	●		61	(3,8)	7	(5,7)			1	(0,7)		2	(1,1)		1	(0,0)		3	(1,3)
Qatar	○		51	(0,2)	◊	◊		r	10	(0,1)	r	14	(0,1)	r	24	(0,2)	r	26	(0,2)
Russian Federation	○		16	(2,1)	12	(2,5)	▲		1	(0,7)		2	(0,9)		1	(0,8)		4	(1,2)
Scotland	●	s	89	(2,8)	9	(5,2)		r	4	(1,5)	r	4	(1,6)	r	9	(2,7)	r	34	(3,7)
Singapore	●		80	(2,6)	3	(4,3)			12	(2,2)		8	(1,6)		17	(2,5)		19	(2,5)
Slovak Republic	○		51	(4,0)	◊	◊			1	(0,8)		1	(0,7)		6	(1,7)		14	(2,7)
Slovenia	○		53	(3,0)	30	(4,9)	▲		1	(0,9)		1	(0,8)		4	(1,1)		10	(2,0)
Sweden	○		77	(2,6)	◊	◊			2	(1,0)		0	(0,0)		2	(1,1)		8	(1,8)
Tunisia	○		31	(3,7)	16	(5,0)	▲		10	(2,3)		9	(2,2)		11	(2,3)		11	(2,4)
Ukraine	○		8	(2,3)	◊	◊			0	(0,0)		0	(0,0)		1	(0,9)		1	(0,8)
United States	○		77	(2,6)	9	(3,6)	▲		5	(1,4)		4	(1,2)		8	(1,4)		19	(2,2)
Yemen	○		24	(4,5)	◊	◊			2	(1,5)		2	(1,2)		9	(3,4)		13	(3,8)
International Avg.			49	(0,6)					3	(0,2)		3	(0,2)		6	(0,3)		12	(0,4)
Benchmarking Participants																			
Alberta, Canada	●		78	(3,1)	◊	◊			6	(1,9)		4	(1,5)		8	(1,7)		16	(2,8)
British Columbia, Canada	●		58	(4,4)	◊	◊		r	4	(2,4)	r	5	(2,7)	r	6	(2,5)	r	16	(2,8)
Dubai, UAE	○		70	(2,6)	◊	◊		s	23	(4,6)	s	20	(4,7)	s	27	(4,4)	s	51	(3,9)
Massachusetts, US	○		73	(4,5)	◊	◊			4	(2,3)		3	(0,2)		6	(2,8)		27	(4,7)
Minnesota, US	○		56	(6,7)	◊	◊			2	(1,6)		3	(2,1)		4	(2,3)		4	(2,5)
Ontario, Canada	●		62	(4,2)	0	(6,2)			6	(2,8)		8	(3,8)		7	(2,8)		19	(4,5)
Quebec, Canada	○		72	(4,5)	18	(6,4)	▲		4	(1,6)		5	(1,9)		6	(1,8)		30	(4,4)

Background data provided by National Research Coordinators and by teachers.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available.
An "r" indicates data are available for at least 70 but less than 85% of the students. An "s" indicates data are available for at least 50 but less than 70% of the students.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 percent significantly higher.
▼ 2007 percent significantly lower.
● Yes
○ No
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 52 Computer Use in Science Class with Trends

Country	National Curriculum Contains Policies / Statements About the Use of Computers	Trends in Percentage of Students Whose Teachers Reported That Computers Are Available: 2007 Percent of Students			Trends in Percentage of Students Whose Teachers Reported That Computers Are Available: Difference in Percent from 2003			Percentage of Students Whose Teachers Reported on Computer Use About Half of the Lessons or More: Doing Scientific Procedures or Experiments			Studying Natural Phenomena Through Simulations			Practicing Skills and Procedures			Looking Up Ideas and Information			Processing and Analyzing Data		
Algeria	○		37	(3,4)	◊	◊		r	6	(1,7)	r	6	(1,5)	r	8	(1,7)	r	13	(2,2)	r	12	(2,0)
Armenia	○	s	53	(3,1)	30	(4,1)	▲		25	(2,2)		26	(2,3)		28	(2,8)		26	(2,2)		28	(2,8)
Australia	●	r	61	(3,6)	–13	(5,2)	▼		4	(1,5)		2	(1,0)		5	(1,3)		10	(2,1)		5	(1,7)
Bahrain	○		35	(2,8)	–20	(4,6)	▼		3	(0,4)		7	(1,1)		11	(1,7)		11	(2,0)		8	(1,1)
Bosnia and Herzegovina	○		21	(2,3)	◊	◊			2	(0,5)		2	(0,6)		3	(0,6)		5	(0,8)		3	(0,6)
Botswana	●		14	(2,8)	9	(3,5)	▲		0	(0,0)		1	(0,0)		1	(0,0)		0	(0,0)		1	(0,0)
Bulgaria	○		56	(3,0)	–	–			0	(0,3)		1	(0,3)		5	(1,5)		10	(1,8)		4	(1,2)
Chinese Taipei	●		34	(4,0)	–10	(5,6)			1	(0,0)		2	(1,1)		1	(0,0)		3	(1,3)		3	(1,3)
Colombia	○		22	(3,9)	◊	◊			3	(1,3)		2	(1,3)		5	(1,8)		11	(2,8)		6	(2,2)
Cyprus	○	r	19	(1,0)	0	(1,3)		r	1	(0,2)	r	1	(0,2)	r	1	(0,3)	r	3	(0,4)	r	2	(0,3)
Czech Republic	○		77	(2,6)	◊	◊		r	2	(0,6)	r	3	(0,7)	r	7	(1,3)	r	10	(1,4)	r	3	(0,8)
Egypt	○		–	–	–	–			–	–		–	–		–	–		–	–		–	–
El Salvador	○		31	(3,5)	◊	◊			1	(0,0)		2	(1,3)		5	(1,8)		13	(2,6)		6	(1,5)
England	●	s	66	(3,1)	–4	(5,0)			1	(0,3)		4	(1,2)		3	(1,1)		8	(1,7)		3	(1,0)
Georgia	○		21	(2,8)	◊	◊			1	(0,3)		1	(0,4)		2	(0,6)		4	(1,0)		3	(0,7)
Ghana	○		5	(2,1)	–4	(3,6)			0	(0,0)		2	(1,4)		1	(0,0)		2	(1,1)		2	(1,1)
Hong Kong SAR	●		55	(5,3)	–1	(7,0)			13	(3,3)		7	(2,6)		6	(2,2)		12	(3,2)		8	(2,6)
Hungary	●		43	(3,2)	2	(4,3)			2	(0,9)		1	(0,6)		3	(0,7)		4	(1,0)		3	(0,8)
Indonesia	○		22	(4,0)	8	(4,7)			0	(0,0)		1	(0,5)		4	(1,7)		2	(1,3)		2	(1,1)
Iran, Islamic Rep. of	○		6	(1,7)	5	(1,9)	▲		1	(0,8)		1	(0,9)		2	(1,0)		3	(1,2)		2	(0,9)
Israel	●		57	(4,2)	6	(5,9)			6	(1,9)	r	3	(1,5)	r	8	(2,2)		8	(2,4)	r	5	(1,9)
Italy	●		37	(3,0)	2	(4,8)			3	(1,0)		2	(0,9)		3	(1,2)		4	(1,4)		3	(1,2)
Japan	●		78	(3,2)	–2	(4,7)			0	(0,0)		3	(1,4)		0	(0,0)		4	(1,7)		1	(0,8)
Jordan	●		18	(3,2)	0	(4,8)			3	(1,4)		4	(1,5)		3	(1,2)		9	(2,5)		6	(1,8)
Korea, Rep. of	●	r	77	(3,3)	–9	(4,2)	▼		25	(3,4)		22	(3,3)		13	(2,7)		22	(3,6)		16	(3,0)
Kuwait	●		36	(4,7)	◊	◊		r	10	(3,0)	r	16	(3,5)	r	17	(3,6)	r	18	(3,7)	r	15	(3,2)
Lebanon	○		32	(3,7)	15	(4,4)	▲		6	(2,8)		3	(1,2)		5	(1,4)		12	(3,2)		8	(2,8)
Lithuania	●		73	(2,2)	1	(3,5)			1	(0,5)		3	(0,8)		9	(1,2)		21	(2,0)		9	(1,2)
Malaysia	●		54	(4,4)	39	(5,4)	▲		9	(2,4)		17	(3,5)		10	(2,3)		21	(3,3)		9	(2,5)
Malta	●		30	(0,2)	◊	◊			1	(0,0)		1	(0,0)		2	(0,1)		4	(0,1)		1	(0,1)
Norway	●		77	(3,5)	16	(5,2)	▲		5	(1,6)		0	(0,3)		4	(1,8)		11	(2,3)		4	(1,2)
Oman	○		29	(3,8)	◊	◊			3	(1,5)		3	(1,3)		4	(1,6)		7	(2,0)		3	(1,5)
Palestinian Nat'l Auth.	●		25	(3,5)	–6	(5,2)			1	(0,7)		2	(1,1)		3	(1,3)		6	(1,9)		3	(1,5)
Qatar	○		27	(0,1)	◊	◊		r	5	(0,1)	r	5	(0,1)	r	8	(0,1)	r	10	(0,1)	r	10	(0,1)
Romania	○		64	(3,4)	43	(4,3)	▲		6	(1,2)		5	(1,1)		9	(1,4)		12	(1,7)		8	(1,4)
Russian Federation	○		48	(3,1)	36	(3,6)	▲		1	(0,3)		2	(0,7)		4	(1,0)		9	(1,5)		3	(0,9)
Saudi Arabia	○		23	(3,8)	–	–			3	(1,4)		3	(1,0)		8	(2,2)		9	(2,6)		5	(1,6)
Scotland	●	s	74	(2,4)	6	(4,3)		r	1	(0,6)	r	2	(0,8)	r	2	(0,6)	r	5	(1,1)	r	1	(0,3)
Serbia	○		26	(2,5)	14	(3,0)	▲		0	(0,2)		1	(0,4)		1	(0,5)		3	(0,7)		2	(0,5)
Singapore	●		66	(2,3)	–13	(3,2)	▼		3	(0,8)		3	(0,8)		5	(1,3)		9	(1,3)		3	(0,9)
Slovenia	○		64	(2,7)	14	(3,9)	▲		2	(0,8)		2	(0,6)		3	(0,8)		8	(1,5)		5	(1,1)
Sweden	○		60	(3,1)	–4	(4,5)			1	(0,5)		0	(0,0)		1	(0,4)		8	(1,6)		2	(0,7)
Syrian Arab Republic	○		23	(2,9)	◊	◊			4	(1,2)		4	(1,2)		4	(1,6)		7	(1,5)		7	(1,7)
Thailand	○		38	(4,4)	◊	◊			7	(1,9)		9	(2,4)		9	(2,5)		14	(3,1)		9	(2,5)
Tunisia	○		14	(2,7)	–22	(5,1)	▼		1	(0,9)		4	(1,5)		3	(1,4)		3	(1,4)		3	(1,4)
Turkey	●		41	(4,1)	◊	◊			6	(2,3)		14	(3,1)		14	(3,0)		19	(3,3)		15	(3,2)
Ukraine	○		17	(2,4)	◊	◊			0	(0,1)		1	(0,4)		2	(0,7)		3	(0,6)		2	(0,5)
United States	○	r	74	(2,6)	2	(3,9)			4	(1,2)		5	(1,3)		10	(2,0)		18	(2,5)		9	(1,4)
¶ Morocco	●		15	(3,8)	–	–		r	1	(0,7)	r	2	(0,9)	r	1	(0,6)	r	4	(1,8)	r	4	(1,5)
International Avg.			41	(0,5)					4	(0,2)		4	(0,2)		5	(0,2)		9	(0,3)		6	(0,2)
Benchmarking Participants																						
Basque Country, Spain	○		66	(3,7)	5	(6,0)			2	(1,2)		2	(1,2)		5	(2,3)		11	(3,2)		8	(2,8)
British Columbia, Canada	●		59	(3,8)	◊	◊		r	2	(1,4)	r	2	(1,4)	r	2	(1,3)	r	9	(2,7)	r	3	(1,8)
Dubai, UAE	○		37	(2,8)	◊	◊		s	6	(0,8)	s	7	(1,6)	s	14	(2,2)	s	22	(2,3)	s	15	(1,4)
Massachusetts, US	○		59	(7,0)	◊	◊			4	(2,6)		4	(2,5)		7	(3,5)		16	(5,7)		2	(1,2)
Minnesota, US	○		62	(7,0)	◊	◊			1	(1,0)		3	(3,0)		2	(2,1)		9	(4,9)		3	(3,1)
Ontario, Canada	●		71	(3,9)	22	(6,0)	▲		6	(2,2)		4	(1,8)		5	(2,0)		10	(2,8)		6	(2,0)
Quebec, Canada	○	r	60	(5,0)	19	(7,2)	▲		1	(0,8)		2	(1,5)		3	(1,6)		12	(3,7)		7	(3,1)

Background data provided by National Research Coordinators and by teachers.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.
A dash (–) indicates comparable data are not available.
An "r" indicates data are available for at least 70 but less than 85% of the students. An "s" indicates data are available for at least 50 but less than 70% of the students.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 percent significantly higher.
▼ 2007 percent significantly lower.
● Yes
○ No
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 53 Index of Time Students Spend Doing Mathematics Homework (TMH) in a Normal School Week

TIMSS 2007 Mathematics 4

Country		High TMH				Medium TMH				Low TMH			
		Percent of Students		Average Achievement		Percent of Students		Average Achievement		Percent of Students		Average Achievement	
Kazakhstan		42	(2,0)	549	(9,3)	56	(1,9)	552	(7,3)	2	(0,3)	–	–
Russian Federation		37	(1,4)	541	(5,7)	61	(1,3)	550	(5,0)	1	(0,3)	–	–
Ukraine		37	(1,3)	475	(3,3)	61	(1,3)	475	(3,4)	1	(0,2)	–	–
Algeria	r	35	(1,7)	397	(6,6)	54	(1,5)	385	(6,0)	11	(1,0)	373	(9,1)
Latvia		34	(1,3)	534	(3,2)	65	(1,3)	545	(2,6)	1	(0,2)	–	–
Iran, Islamic Rep. of		34	(1,7)	424	(5,8)	51	(1,6)	401	(4,5)	15	(1,4)	386	(6,9)
Singapore		34	(0,9)	607	(4,4)	52	(0,9)	603	(3,7)	15	(0,8)	581	(5,6)
Tunisia	r	33	(1,7)	362	(5,5)	53	(1,4)	352	(4,8)	14	(1,2)	342	(7,7)
Armenia	r	31	(1,5)	510	(5,3)	64	(1,4)	503	(3,7)	5	(0,7)	509	(24,8)
Yemen	s	30	(2,4)	243	(9,7)	64	(2,5)	245	(6,6)	6	(1,0)	218	(11,8)
Colombia	r	29	(1,5)	384	(5,5)	58	(1,4)	369	(4,8)	13	(1,4)	354	(6,9)
Lithuania		29	(1,3)	526	(3,5)	68	(1,3)	537	(2,5)	3	(0,5)	530	(10,7)
Georgia	r	27	(1,5)	451	(5,6)	71	(1,5)	449	(4,4)	2	(0,4)	–	–
El Salvador	r	24	(1,2)	345	(6,3)	62	(1,2)	340	(4,6)	14	(1,1)	346	(6,5)
Morocco	r	24	(1,6)	360	(9,1)	61	(1,9)	352	(5,3)	16	(1,7)	350	(12,7)
Denmark		23	(1,2)	514	(3,3)	52	(1,2)	524	(2,7)	25	(1,4)	538	(3,8)
Hungary		21	(1,0)	517	(4,3)	75	(1,1)	518	(3,5)	4	(0,7)	493	(16,6)
Qatar	s	20	(0,6)	301	(3,1)	61	(0,7)	315	(2,3)	19	(0,5)	311	(3,3)
Germany	r	19	(0,8)	517	(3,4)	76	(0,9)	534	(2,4)	5	(0,6)	496	(10,0)
Slovenia		19	(0,9)	487	(3,2)	79	(1,0)	510	(2,1)	3	(0,3)	479	(9,0)
Hong Kong SAR		18	(1,1)	599	(6,2)	78	(1,1)	613	(3,5)	4	(0,5)	562	(6,2)
Italy		18	(1,3)	498	(4,7)	62	(1,6)	508	(3,8)	19	(1,8)	515	(3,9)
Kuwait	r	17	(0,9)	313	(6,4)	63	(1,7)	336	(3,8)	20	(1,4)	350	(6,9)
Chinese Taipei		17	(0,9)	568	(4,0)	63	(1,4)	584	(1,7)	20	(1,3)	569	(3,8)
Austria		16	(0,8)	493	(3,9)	76	(1,0)	511	(2,1)	8	(0,8)	501	(5,0)
United States		12	(0,5)	522	(3,6)	65	(1,2)	535	(2,8)	23	(1,3)	528	(3,2)
Norway		12	(1,0)	465	(7,4)	53	(1,8)	478	(2,9)	35	(2,1)	487	(3,4)
Japan		11	(0,9)	542	(4,6)	64	(1,9)	573	(2,4)	25	(1,9)	572	(3,5)
Slovak Republic		10	(0,6)	481	(4,0)	79	(1,2)	508	(3,2)	11	(1,0)	496	(9,1)
Czech Republic		8	(0,6)	473	(4,7)	65	(2,0)	489	(2,9)	28	(1,9)	491	(4,6)
New Zealand		8	(0,5)	469	(5,3)	38	(1,1)	487	(3,7)	54	(1,4)	509	(2,4)
Australia		7	(0,7)	508	(10,6)	42	(1,5)	517	(3,9)	51	(1,8)	525	(4,4)
Sweden		5	(0,6)	472	(6,4)	34	(1,2)	493	(2,9)	60	(1,4)	513	(3,0)
England		3	(0,4)	525	(11,2)	31	(1,6)	547	(5,0)	66	(1,6)	544	(2,9)
Scotland		3	(0,3)	453	(10,7)	30	(1,7)	484	(3,1)	67	(1,8)	505	(2,9)
Netherlands		1	(0,2)	–	–	10	(0,9)	507	(4,7)	89	(0,9)	541	(2,3)
International Avg.		21	(0,2)	469	(1,0)	58	(0,2)	479	(0,7)	21	(0,2)	468	(1,5)
Benchmarking Participants													
Dubai, UAE	r	17	(1,2)	456	(5,9)	62	(1,8)	450	(2,8)	21	(1,7)	469	(6,9)
Massachusetts, US		16	(1,3)	573	(5,4)	75	(1,5)	574	(3,4)	9	(1,6)	569	(12,6)
British Columbia, Canada		15	(0,9)	493	(4,4)	49	(1,3)	506	(3,2)	37	(1,6)	513	(3,6)
Ontario, Canada		13	(1,1)	513	(6,7)	52	(1,8)	514	(2,9)	35	(2,2)	515	(4,4)
Alberta, Canada		11	(0,8)	499	(5,3)	45	(1,5)	502	(3,5)	44	(1,9)	512	(3,4)
Minnesota, US		11	(1,5)	543	(12,6)	59	(3,7)	560	(6,5)	31	(4,3)	555	(8,4)
Quebec, Canada		6	(0,6)	488	(5,4)	41	(1,6)	510	(3,5)	53	(1,8)	533	(3,4)

Index based on students' reports on the frequency of mathematics homework they are given and the amount of time they spend on that homework. High level indicates mathematics homework assigned at least 3 or 4 times a week and students spend more than 30 minutes on that homework. Low level indicates mathematics homework assigned no more than twice a week and students spend no more than 30 minutes on that homework. Medium level includes all other possible combinations of responses.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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) 2007.

Table 54 Index of Time Students Spend Doing Mathematics Homework (TMH) in a Normal School Week

TIMSS 2007 Mathematics 8

	Country		High TMH				Medium TMH				Low TMH			
			Percent of Students		Average Achievement		Percent of Students		Average Achievement		Percent of Students		Average Achievement	
	Romania		66	(1,3)	488	(4,0)	29	(1,3)	433	(5,1)	5	(0,5)	432	(11,4)
	Russian Federation		50	(1,3)	510	(4,4)	49	(1,2)	520	(4,2)	2	(0,3)	~	~
	El Salvador		46	(1,4)	351	(3,2)	45	(1,0)	337	(3,3)	9	(0,7)	337	(5,2)
	Tunisia		45	(1,3)	425	(2,8)	44	(1,0)	419	(2,9)	11	(0,9)	417	(4,1)
	Italy		45	(1,3)	475	(3,1)	47	(1,2)	488	(4,1)	7	(0,6)	483	(5,5)
	Syrian Arab Republic	r	44	(1,1)	408	(3,9)	48	(0,9)	399	(3,8)	8	(0,6)	409	(6,8)
	Singapore		42	(1,0)	616	(3,2)	43	(0,9)	595	(4,3)	16	(0,9)	547	(6,9)
	Malaysia		41	(1,1)	486	(5,1)	47	(1,0)	473	(5,1)	12	(0,9)	446	(9,1)
	Ukraine		40	(1,2)	468	(4,5)	53	(1,1)	467	(3,5)	7	(0,7)	466	(6,8)
	Thailand		39	(1,4)	461	(5,6)	45	(1,1)	435	(5,4)	15	(1,0)	419	(6,7)
	Colombia		36	(1,3)	386	(4,5)	48	(0,9)	379	(3,8)	16	(1,0)	378	(6,0)
	Bulgaria		36	(1,4)	475	(6,4)	48	(1,2)	472	(5,4)	15	(1,5)	458	(8,1)
	Israel		34	(1,5)	485	(4,9)	53	(1,4)	472	(4,1)	13	(0,9)	448	(9,0)
	Hong Kong SAR		34	(1,6)	589	(4,9)	48	(1,2)	576	(5,9)	18	(1,4)	555	(9,0)
	Georgia	r	34	(1,5)	432	(5,1)	62	(1,6)	414	(7,0)	4	(0,5)	372	(14,2)
	Armenia	r	32	(1,2)	501	(4,6)	64	(1,2)	502	(4,4)	4	(0,5)	499	(12,7)
	Serbia		31	(1,4)	490	(5,0)	40	(1,3)	496	(4,3)	28	(1,4)	481	(4,3)
	Chinese Taipei		31	(1,9)	628	(4,0)	46	(1,3)	613	(4,1)	23	(1,7)	563	(8,7)
	Egypt		30	(1,1)	381	(4,6)	58	(1,1)	404	(3,6)	13	(1,0)	416	(6,8)
	Botswana		29	(0,9)	383	(3,0)	50	(0,9)	365	(2,8)	20	(1,0)	356	(3,4)
	Indonesia		29	(1,1)	417	(5,0)	53	(0,9)	397	(4,0)	18	(0,8)	384	(5,1)
	Ghana		28	(1,2)	332	(5,2)	55	(1,0)	307	(4,8)	16	(1,0)	313	(5,4)
	Lithuania		27	(1,1)	498	(2,8)	69	(1,1)	515	(2,7)	4	(0,8)	481	(8,8)
	United States		26	(1,1)	522	(3,8)	62	(1,2)	510	(3,0)	12	(1,2)	484	(4,3)
	Jordan		26	(1,2)	424	(5,0)	62	(1,1)	439	(4,4)	12	(0,9)	422	(7,1)
	Norway		25	(1,5)	466	(2,6)	53	(1,3)	474	(2,0)	22	(1,6)	473	(3,5)
	Lebanon	r	25	(1,3)	445	(6,0)	67	(1,4)	460	(3,9)	8	(0,9)	434	(9,0)
	Palestinian Nat'l Auth.		24	(1,1)	374	(4,4)	68	(1,2)	378	(3,8)	7	(0,8)	345	(9,1)
	Malta		24	(0,7)	508	(2,8)	71	(0,7)	498	(1,7)	5	(0,3)	402	(7,4)
	Bosnia and Herzegovina		24	(1,2)	466	(4,0)	51	(1,2)	458	(3,2)	25	(1,4)	459	(3,8)
	Turkey		22	(1,1)	428	(5,8)	49	(1,0)	433	(5,0)	29	(1,2)	443	(5,9)
	Slovenia		20	(1,1)	503	(2,6)	64	(1,3)	505	(2,4)	16	(1,0)	498	(4,1)
	Cyprus		20	(0,9)	463	(4,1)	70	(0,9)	480	(1,8)	11	(0,7)	451	(4,8)
	Iran, Islamic Rep. of		19	(1,4)	440	(7,7)	55	(1,6)	404	(3,8)	26	(1,5)	378	(5,0)
	Hungary		16	(0,9)	517	(5,6)	78	(1,2)	524	(3,4)	6	(1,0)	488	(8,0)
	Qatar		16	(0,4)	300	(3,2)	67	(0,5)	319	(1,5)	17	(0,4)	308	(4,0)
	Bahrain		15	(0,7)	391	(4,0)	67	(1,1)	404	(1,8)	18	(1,0)	405	(5,2)
	Australia		15	(1,1)	523	(6,6)	44	(1,5)	511	(5,2)	42	(2,0)	481	(4,6)
	Kuwait		14	(0,7)	334	(5,1)	58	(1,3)	358	(2,7)	27	(1,5)	373	(3,9)
	Saudi Arabia		13	(0,8)	316	(4,8)	61	(1,8)	339	(3,3)	26	(1,8)	334	(4,4)
	Oman		12	(0,7)	374	(5,2)	73	(1,3)	383	(3,1)	15	(1,4)	367	(7,9)
	Japan		8	(1,1)	566	(10,0)	36	(1,3)	569	(3,3)	57	(2,0)	574	(3,3)
	Scotland		8	(0,7)	519	(7,2)	41	(1,8)	505	(4,4)	51	(2,1)	478	(4,3)
	Korea, Rep. of		6	(0,7)	591	(5,8)	31	(1,5)	595	(3,7)	62	(1,7)	605	(3,1)
	Czech Republic		5	(0,6)	473	(6,4)	46	(2,1)	504	(4,1)	49	(2,4)	511	(3,4)
	England		5	(0,6)	518	(11,0)	31	(1,3)	530	(6,8)	65	(1,7)	513	(4,9)
	Sweden	r	3	(0,4)	461	(7,7)	35	(1,2)	490	(3,1)	62	(1,3)	498	(2,4)
	Algeria		–	–	–	–	–	–	–	–	–	–	–	–
¶	Morocco	r	34	(1,3)	396	(5,0)	57	(1,2)	383	(4,2)	9	(0,7)	360	(7,9)
	International Avg.		27	(0,2)	458	(0,9)	53	(0,2)	457	(0,7)	20	(0,2)	441	(1,1)
Benchmarking Participants														
	British Columbia, Canada		33	(1,3)	508	(3,9)	55	(1,2)	514	(3,3)	11	(1,1)	507	(5,9)
	Basque Country, Spain		33	(1,9)	494	(3,8)	58	(2,1)	508	(3,1)	9	(1,5)	486	(12,5)
	Massachusetts, US		31	(3,0)	564	(7,3)	63	(2,8)	546	(4,5)	6	(1,3)	500	(11,3)
	Minnesota, US		30	(2,5)	542	(7,6)	62	(2,4)	535	(4,3)	8	(1,6)	495	(7,1)
	Quebec, Canada		30	(1,7)	545	(5,5)	47	(1,6)	529	(4,0)	23	(2,0)	517	(4,9)
	Ontario, Canada		29	(1,5)	508	(3,5)	59	(1,6)	526	(3,8)	12	(1,5)	505	(12,3)
	Dubai, UAE	r	29	(1,3)	461	(5,1)	57	(1,3)	463	(2,9)	15	(1,1)	488	(6,0)

Index based on students' reports on the frequency of mathematics homework they are given and the amount of time they spend on that homework. High level indicates mathematics homework assigned at least 3 or 4 times a week and students spend more than 30 minutes on that homework. Low level indicates mathematics homework assigned no more than twice a week and students spend no more than 30 minutes on that homework. Medium level includes all other possible combinations of responses.

¶ Did not satisfy guidelines for sample participation rates (see Appendix A).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 55 Index of Time Students Spend Doing Science Homework (TSH) in a Normal School Week

TIMSS 2007 Science 4

Country		High TSH				Medium TSH				Low TSH			
		Percent of Students		Average Achievement		Percent of Students		Average Achievement		Percent of Students		Average Achievement	
Colombia	r	23	(1,1)	423	(6,5)	55	(1,2)	407	(5,5)	22	(1,4)	426	(6,1)
Yemen	r	21	(2,0)	232	(11,3)	57	(2,6)	222	(7,5)	22	(2,6)	189	(15,2)
El Salvador	r	20	(1,0)	403	(5,0)	59	(1,3)	398	(4,1)	21	(1,4)	413	(4,2)
Tunisia	r	19	(1,4)	357	(9,8)	50	(1,5)	347	(6,7)	31	(1,8)	347	(8,9)
Singapore		17	(0,7)	585	(5,7)	47	(0,9)	587	(4,9)	36	(0,9)	594	(4,5)
Algeria	r	17	(1,1)	364	(9,3)	47	(1,4)	359	(9,9)	36	(1,7)	369	(6,6)
Qatar	s	16	(0,6)	287	(7,3)	54	(0,8)	306	(3,2)	30	(0,7)	327	(3,1)
Italy		15	(1,2)	525	(5,6)	48	(2,2)	535	(3,7)	36	(2,7)	546	(4,5)
Kazakhstan		15	(1,5)	512	(13,6)	45	(2,6)	529	(6,0)	41	(3,0)	545	(5,1)
Latvia		13	(1,0)	527	(5,0)	43	(1,1)	541	(2,8)	44	(1,4)	554	(3,3)
Slovenia		13	(0,8)	505	(4,9)	66	(1,2)	523	(2,2)	21	(1,2)	524	(3,4)
Morocco	r	13	(1,0)	289	(9,1)	46	(2,2)	305	(7,8)	42	(2,2)	328	(9,3)
Armenia	r	12	(0,9)	476	(8,4)	51	(1,6)	495	(7,5)	37	(1,7)	494	(6,5)
Iran, Islamic Rep. of		12	(0,9)	438	(8,7)	44	(1,5)	435	(5,4)	45	(2,0)	437	(4,7)
Kuwait	r	12	(0,8)	328	(10,1)	54	(1,5)	361	(4,5)	35	(1,5)	390	(6,7)
Georgia		10	(1,1)	415	(11,8)	45	(1,9)	415	(4,8)	46	(2,0)	440	(5,2)
Ukraine		8	(0,7)	449	(6,3)	40	(1,3)	471	(3,8)	52	(1,4)	490	(3,7)
Lithuania		8	(0,5)	496	(4,8)	35	(1,0)	511	(3,3)	57	(1,2)	524	(2,7)
Russian Federation		6	(0,7)	508	(9,6)	34	(1,3)	539	(5,2)	60	(1,6)	558	(4,9)
Hungary		6	(0,5)	520	(6,8)	33	(1,2)	532	(4,1)	61	(1,3)	549	(3,7)
Hong Kong SAR		5	(0,5)	547	(8,8)	43	(1,8)	562	(4,4)	52	(2,0)	554	(3,3)
Germany	r	4	(0,4)	512	(6,5)	30	(1,3)	527	(3,4)	66	(1,4)	536	(2,6)
Slovak Republic		3	(0,3)	498	(10,2)	24	(1,0)	513	(4,5)	73	(1,2)	540	(3,7)
New Zealand		3	(0,3)	463	(12,6)	23	(1,0)	503	(4,0)	74	(1,1)	515	(3,0)
United States		3	(0,2)	502	(8,1)	23	(1,0)	532	(3,3)	75	(1,1)	549	(2,8)
Chinese Taipei		2	(0,3)	~	~	19	(0,9)	538	(4,2)	79	(1,0)	567	(1,9)
Denmark		2	(0,3)	~	~	13	(1,0)	501	(4,8)	85	(1,0)	522	(2,9)
Austria		2	(0,3)	~	~	14	(0,9)	493	(6,0)	84	(1,0)	537	(2,7)
Norway		1	(0,3)	~	~	16	(1,2)	467	(5,4)	83	(1,3)	486	(3,4)
Czech Republic		1	(0,3)	~	~	16	(0,9)	496	(5,6)	83	(0,9)	523	(3,2)
Australia		1	(0,2)	~	~	17	(1,5)	520	(6,9)	81	(1,6)	536	(3,1)
Sweden		1	(0,2)	~	~	19	(1,1)	514	(5,4)	80	(1,2)	533	(2,7)
Japan		1	(0,2)	~	~	15	(1,1)	539	(3,9)	84	(1,2)	551	(2,2)
England		1	(0,2)	~	~	16	(1,4)	540	(8,4)	83	(1,4)	547	(2,8)
Scotland		1	(0,1)	~	~	10	(0,9)	490	(5,8)	89	(0,9)	507	(2,4)
Netherlands		1	(0,2)	~	~	9	(1,0)	509	(5,5)	91	(1,1)	527	(2,8)
International Avg.		9	(0,1)	446	(2,2)	35	(0,2)	474	(1,2)	57	(0,3)	488	(1,2)
Benchmarking Participants													
Dubai, UAE	r	10	(1,0)	450	(7,7)	37	(1,4)	461	(4,3)	53	(1,6)	488	(4,7)
Alberta, Canada		3	(0,4)	503	(11,4)	22	(1,2)	532	(4,9)	75	(1,5)	550	(3,6)
British Columbia, Canada		3	(0,4)	496	(10,2)	24	(1,4)	529	(5,3)	73	(1,5)	544	(3,0)
Ontario, Canada		3	(0,5)	527	(15,9)	26	(1,4)	522	(5,7)	71	(1,6)	544	(3,8)
Minnesota, US		2	(0,3)	~	~	16	(2,1)	537	(8,4)	83	(2,3)	560	(5,6)
Massachusetts, US		1	(0,3)	~	~	17	(1,6)	572	(10,2)	82	(1,7)	575	(3,8)
Quebec, Canada		1	(0,2)	~	~	12	(1,0)	511	(5,4)	87	(1,0)	522	(2,5)

Index based on students' reports on the frequency of science homework they are given and the amount of time they spend on that homework. High level indicates science homework assigned at least 3 or 4 times a week and students spend more than 30 minutes on that homework. Low level indicates science homework assigned no more than twice a week and students spend no more than 30 minutes on that homework. Medium level includes all other possible combinations of responses.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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) 2007.

Table 56 Index of Time Students Spend Doing Science Homework (TSH) in a Normal School Week

TIMSS 2007 Science 8

Country		High TSH				Medium TSH				Low TSH			
		Percent of Students		Average Achievement		Percent of Students		Average Achievement		Percent of Students		Average Achievement	
General/Integrated Science													
El Salvador		33	(1,2)	395	(3,2)	50	(0,9)	386	(3,3)	17	(1,0)	389	(4,6)
Colombia		30	(1,3)	419	(4,3)	50	(1,0)	420	(3,6)	21	(1,2)	411	(5,4)
Malaysia		27	(1,0)	480	(6,2)	46	(0,8)	471	(5,9)	27	(1,2)	469	(7,7)
Egypt		25	(1,0)	392	(4,8)	64	(1,2)	425	(3,4)	11	(1,0)	417	(8,4)
Ghana		23	(0,9)	321	(7,3)	54	(0,9)	302	(5,4)	23	(1,0)	318	(6,0)
Jordan		22	(1,1)	477	(5,3)	57	(1,1)	490	(3,9)	21	(1,4)	490	(6,3)
Singapore		21	(0,7)	586	(3,8)	45	(1,0)	579	(4,9)	34	(1,2)	552	(5,7)
Thailand		21	(0,9)	472	(5,5)	48	(0,8)	473	(4,6)	30	(1,2)	469	(5,2)
Turkey		18	(1,1)	458	(5,4)	45	(1,0)	456	(4,0)	37	(1,5)	456	(4,8)
Palestinian Nat'l Auth.		17	(1,2)	406	(5,1)	52	(1,5)	405	(4,4)	31	(1,8)	424	(4,9)
Botswana		15	(0,8)	364	(5,6)	45	(1,0)	359	(3,3)	40	(1,1)	364	(4,0)
Chinese Taipei		15	(1,3)	591	(5,0)	40	(1,4)	576	(3,6)	46	(2,1)	552	(4,4)
Qatar		13	(0,4)	321	(4,8)	54	(0,6)	329	(2,3)	33	(0,6)	322	(2,5)
Norway		11	(0,9)	486	(3,3)	43	(1,3)	488	(2,4)	45	(1,8)	492	(3,1)
Kuwait		11	(0,6)	403	(5,9)	47	(1,5)	427	(3,4)	41	(1,7)	427	(3,5)
Italy		11	(0,7)	485	(5,4)	42	(1,2)	496	(4,3)	47	(1,3)	501	(2,8)
Tunisia		11	(0,7)	435	(4,0)	37	(1,1)	444	(3,0)	52	(1,3)	450	(2,2)
Bahrain		11	(0,6)	465	(5,0)	50	(1,0)	470	(2,3)	39	(1,0)	477	(3,0)
Oman		10	(0,6)	408	(6,3)	69	(1,4)	433	(3,1)	21	(1,5)	421	(4,4)
Israel		10	(0,7)	456	(9,4)	40	(1,3)	465	(5,9)	50	(1,3)	490	(4,3)
Saudi Arabia		9	(0,6)	384	(8,7)	61	(1,4)	414	(2,8)	30	(1,6)	403	(4,3)
United States		9	(0,7)	503	(5,4)	41	(1,3)	526	(3,1)	50	(1,5)	524	(3,4)
Hong Kong SAR		8	(0,8)	523	(7,3)	43	(1,4)	540	(4,7)	48	(1,6)	531	(5,7)
Iran, Islamic Rep. of		8	(0,7)	476	(8,6)	45	(1,4)	462	(3,9)	47	(1,5)	454	(4,0)
England		7	(0,9)	588	(8,6)	31	(1,1)	558	(5,0)	62	(1,4)	536	(4,7)
Australia		6	(0,6)	539	(8,9)	32	(1,1)	529	(4,3)	62	(1,4)	511	(4,1)
Korea, Rep. of		2	(0,4)	~	~	20	(1,4)	556	(3,6)	77	(1,6)	556	(2,2)
Scotland		2	(0,3)	~	~	22	(0,9)	500	(4,2)	76	(1,0)	500	(3,5)
Japan		1	(0,2)	~	~	20	(1,1)	550	(3,7)	79	(1,2)	558	(2,1)
International Avg.		14	(0,2)	455	(1,2)	45	(0,2)	466	(0,8)	41	(0,3)	464	(0,9)
Benchmarking Participants													
British Columbia, Canada		27	(1,3)	523	(3,7)	46	(1,2)	529	(3,2)	27	(1,7)	533	(4,2)
Dubai, UAE	r	20	(1,1)	509	(5,4)	41	(1,7)	501	(3,5)	39	(1,8)	482	(4,6)
Basque Country, Spain		15	(1,5)	491	(5,4)	44	(2,0)	499	(3,7)	40	(2,3)	502	(3,7)
Massachusetts, US		13	(1,8)	546	(8,1)	52	(3,2)	564	(6,0)	35	(4,3)	552	(6,6)
Minnesota, US		12	(2,3)	526	(8,1)	45	(2,3)	540	(5,7)	43	(3,3)	543	(4,9)
Ontario, Canada		8	(0,9)	526	(9,2)	37	(1,7)	534	(4,1)	55	(2,1)	526	(4,2)
Quebec, Canada		3	(0,4)	511	(10,0)	20	(1,1)	519	(5,5)	77	(1,3)	508	(2,7)

Index based on students' reports on the frequency of science homework they are given and the amount of time they spend on that homework. High level indicates science homework assigned at least 3 or 4 times a week and students spend more than 30 minutes on that homework. Low level indicates science homework assigned no more than twice a week and students spend no more than 30 minutes on that homework. Medium level includes all other possible combinations of responses.

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

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

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

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Continued on next page

	Country		High TSH				Medium TSH				Low TSH			
			Percent of Students		Average Achievement		Percent of Students		Average Achievement		Percent of Students		Average Achievement	
Biology														
	Syrian Arab Republic	r	24	(1,1)	453	(4,1)	51	(1,0)	458	(2,6)	25	(1,0)	464	(3,9)
	Russian Federation		20	(1,1)	514	(7,0)	52	(0,9)	530	(4,1)	28	(1,2)	544	(4,7)
	Ukraine		18	(0,9)	481	(5,4)	49	(0,9)	489	(3,4)	33	(0,9)	494	(4,3)
	Armenia	r	15	(0,9)	484	(8,9)	49	(1,0)	488	(6,5)	36	(1,1)	494	(5,7)
	Indonesia		12	(0,7)	434	(7,1)	47	(1,3)	430	(4,0)	41	(1,4)	428	(3,7)
	Georgia	r	11	(0,9)	419	(8,0)	51	(1,9)	429	(5,7)	38	(2,3)	438	(5,3)
	Lithuania		10	(0,8)	495	(6,2)	40	(1,2)	512	(3,5)	49	(1,5)	532	(2,9)
	Serbia		10	(0,9)	455	(5,9)	24	(0,9)	468	(4,5)	66	(1,4)	479	(3,4)
	Lebanon	r	8	(0,8)	409	(12,2)	41	(1,7)	400	(5,7)	51	(1,7)	433	(6,3)
	Bulgaria	r	8	(0,9)	456	(13,4)	26	(1,5)	468	(8,0)	67	(1,9)	483	(6,1)
	Romania		8	(0,8)	430	(8,3)	22	(1,1)	449	(5,4)	70	(1,5)	476	(4,1)
	Bosnia and Herzegovina		7	(0,5)	462	(5,0)	28	(1,1)	453	(4,1)	65	(1,1)	476	(3,2)
	Hungary		6	(0,5)	521	(5,9)	35	(1,3)	528	(4,0)	59	(1,6)	549	(3,0)
	Malta	r	5	(0,3)	497	(7,3)	22	(0,7)	517	(3,9)	74	(0,7)	452	(2,0)
	Slovenia		5	(0,5)	506	(8,2)	39	(1,1)	533	(3,0)	56	(1,3)	546	(2,3)
	Cyprus	s	2	(0,3)	~	~	7	(0,6)	398	(9,0)	90	(0,8)	455	(2,2)
	Sweden		2	(0,2)	~	~	32	(1,1)	512	(3,2)	66	(1,1)	516	(2,6)
	Czech Republic		1	(0,1)	~	~	9	(0,8)	519	(4,8)	90	(0,8)	542	(2,0)
	Algeria		–	–	–	–	–	–	–	–	–	–	–	–
¶	Morocco	r	11	(0,8)	402	(6,6)	39	(1,9)	405	(3,9)	50	(2,3)	407	(3,7)
	International Avg.		10	(0,2)	464	(2,1)	35	(0,3)	473	(1,4)	55	(0,3)	485	(1,0)
Earth Science														
	Russian Federation		21	(1,2)	515	(5,9)	50	(0,9)	532	(4,2)	29	(1,3)	542	(4,8)
	Syrian Arab Republic	r	18	(1,0)	455	(4,7)	45	(1,2)	457	(2,8)	37	(1,3)	462	(3,5)
	Ukraine		16	(0,8)	477	(4,7)	47	(1,0)	489	(3,4)	36	(1,2)	495	(4,4)
	Romania		15	(1,4)	460	(7,3)	28	(1,2)	458	(4,6)	58	(2,0)	472	(4,2)
	Lithuania		13	(0,8)	498	(5,2)	41	(1,1)	512	(3,4)	46	(1,4)	533	(2,8)
	Armenia	r	13	(0,8)	482	(6,8)	43	(1,2)	490	(5,3)	44	(1,2)	494	(6,1)
	Serbia		9	(0,9)	453	(8,4)	25	(1,1)	468	(5,2)	66	(1,5)	479	(3,3)
	Georgia	r	8	(0,6)	411	(7,8)	36	(2,4)	422	(8,0)	57	(2,8)	438	(5,3)
	Bosnia and Herzegovina		7	(0,5)	443	(5,7)	25	(1,0)	454	(3,7)	68	(1,1)	477	(3,1)
	Bulgaria	r	6	(0,7)	458	(15,0)	24	(1,6)	474	(7,9)	69	(1,9)	480	(6,5)
	Cyprus		6	(0,4)	425	(6,5)	39	(0,9)	455	(3,0)	55	(1,0)	460	(2,4)
	Hungary		6	(0,5)	519	(7,1)	34	(1,7)	528	(4,0)	60	(1,9)	550	(3,1)
	Slovenia		4	(0,5)	509	(7,1)	37	(1,1)	535	(3,2)	59	(1,1)	543	(2,4)
	Malta	r	3	(0,3)	437	(11,9)	22	(0,7)	462	(4,8)	75	(0,7)	462	(1,9)
	Sweden		2	(0,3)	~	~	31	(1,2)	511	(3,4)	66	(1,2)	516	(2,6)
	Czech Republic		1	(0,2)	~	~	11	(0,8)	529	(4,9)	88	(0,9)	542	(2,1)
	Algeria		–	–	–	–	–	–	–	–	–	–	–	–
	Indonesia		–	–	–	–	–	–	–	–	–	–	–	–
	Lebanon		–	–	–	–	–	–	–	–	–	–	–	–
¶	Morocco	r	11	(1,0)	400	(6,9)	36	(1,4)	405	(3,8)	53	(2,0)	409	(4,0)
	International Avg.		9	(0,2)	463	(2,1)	34	(0,3)	481	(1,2)	57	(0,4)	491	(1,0)

Index based on students' reports on the frequency of science homework they are given and the amount of time they spend on that homework. High level indicates science homework assigned at least 3 or 4 times a week and students spend more than 30 minutes on that homework. Low level indicates science homework assigned no more than twice a week and students spend no more than 30 minutes on that homework. Medium level includes all other possible combinations of responses.

¶ Did not satisfy guidelines for sample participation rates (see Appendix A).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

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

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

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Continued on next page

	Country		High TSH				Medium TSH				Low TSH			
			Percent of Students		Average Achievement		Percent of Students		Average Achievement		Percent of Students		Average Achievement	
Chemistry														
	Russian Federation		33	(1,5)	521	(5,1)	48	(1,0)	533	(4,2)	19	(1,2)	546	(5,2)
	Syrian Arab Republic	r	24	(1,1)	455	(3,9)	48	(0,9)	458	(2,5)	28	(1,0)	464	(4,1)
	Armenia	r	23	(1,1)	487	(9,0)	48	(1,5)	496	(6,7)	29	(1,6)	489	(5,4)
	Ukraine		21	(1,1)	480	(4,9)	47	(1,0)	490	(3,2)	32	(1,1)	495	(4,5)
	Georgia	r	19	(1,1)	436	(6,2)	52	(1,2)	428	(6,1)	29	(1,5)	432	(6,8)
	Lithuania		17	(0,8)	499	(4,7)	43	(0,9)	516	(3,1)	41	(1,3)	534	(3,1)
	Serbia		11	(0,7)	463	(6,3)	29	(1,0)	472	(4,0)	60	(1,3)	478	(3,7)
	Romania		11	(0,7)	440	(6,8)	31	(1,6)	457	(5,1)	59	(2,0)	475	(4,2)
	Bulgaria	r	10	(1,1)	461	(10,6)	29	(1,4)	474	(8,0)	60	(1,7)	481	(6,1)
	Bosnia and Herzegovina		10	(0,5)	454	(5,6)	27	(1,0)	458	(4,0)	63	(1,1)	475	(3,1)
	Cyprus		9	(0,5)	431	(6,1)	38	(0,8)	452	(2,8)	53	(0,9)	462	(2,2)
	Hungary		8	(0,6)	520	(6,4)	34	(1,4)	531	(3,7)	58	(1,7)	550	(3,4)
	Lebanon	r	8	(0,8)	396	(11,1)	42	(1,5)	408	(6,7)	50	(1,6)	430	(5,6)
	Slovenia		7	(0,6)	515	(5,9)	42	(1,0)	537	(2,9)	51	(1,1)	544	(2,3)
	Malta	s	3	(0,3)	537	(10,3)	14	(0,6)	555	(4,6)	83	(0,6)	451	(1,8)
	Sweden		2	(0,3)	~	~	33	(1,0)	509	(3,5)	65	(1,1)	518	(2,6)
	Czech Republic		1	(0,2)	~	~	13	(0,9)	519	(5,6)	86	(1,0)	543	(2,1)
	Algeria		–	–	–	–	–	–	–	–	–	–	–	–
	Indonesia		–	–	–	–	–	–	–	–	–	–	–	–
¶	Morocco	r	12	(0,8)	397	(8,1)	40	(1,4)	403	(4,0)	48	(1,8)	410	(3,9)
	International Avg.		13	(0,2)	468	(1,9)	37	(0,3)	483	(1,2)	51	(0,3)	488	(1,1)
Physics														
	Russian Federation		28	(1,3)	520	(5,1)	48	(1,0)	533	(4,4)	24	(1,0)	539	(4,9)
	Armenia	r	24	(1,1)	491	(7,4)	52	(1,4)	492	(5,4)	24	(1,1)	485	(6,1)
	Syrian Arab Republic	r	22	(0,9)	453	(3,7)	48	(0,9)	456	(2,5)	30	(1,0)	465	(4,2)
	Georgia	r	20	(1,2)	432	(6,1)	52	(1,2)	428	(6,0)	28	(1,6)	431	(6,0)
	Ukraine		20	(1,1)	478	(4,5)	48	(0,8)	489	(3,6)	32	(1,1)	496	(4,1)
	Lithuania		16	(0,8)	503	(4,2)	42	(0,9)	512	(3,5)	42	(1,3)	534	(2,7)
	Indonesia		16	(0,7)	437	(5,5)	53	(1,1)	431	(3,9)	31	(1,2)	424	(4,0)
	Bosnia and Herzegovina		12	(0,7)	457	(4,5)	31	(1,1)	462	(3,8)	57	(1,2)	474	(3,2)
	Serbia		11	(0,7)	456	(6,2)	29	(1,1)	474	(4,5)	61	(1,4)	478	(3,6)
	Cyprus		11	(0,6)	430	(4,9)	40	(0,8)	455	(2,7)	50	(1,1)	461	(2,4)
	Slovenia		10	(0,8)	520	(4,4)	40	(1,0)	537	(2,9)	50	(1,2)	543	(2,5)
	Lebanon	r	9	(0,8)	395	(10,2)	42	(1,6)	412	(6,6)	49	(1,8)	429	(6,0)
	Bulgaria	r	9	(0,8)	460	(9,8)	30	(1,3)	475	(6,6)	62	(1,7)	481	(6,5)
	Malta		9	(0,5)	456	(6,0)	36	(0,8)	477	(2,7)	56	(0,8)	455	(1,9)
	Hungary		7	(0,6)	515	(6,4)	33	(1,3)	529	(3,7)	60	(1,6)	550	(3,4)
	Romania	r	5	(0,6)	439	(9,7)	27	(1,7)	451	(5,1)	68	(1,8)	474	(3,8)
	Sweden		2	(0,3)	~	~	32	(1,0)	510	(3,4)	66	(1,1)	518	(2,6)
	Czech Republic		2	(0,3)	~	~	13	(0,9)	518	(4,9)	85	(1,1)	544	(2,1)
	Algeria		–	–	–	–	–	–	–	–	–	–	–	–
¶	Morocco	r	15	(0,8)	391	(6,3)	44	(1,4)	401	(3,6)	40	(1,5)	415	(3,9)
	International Avg.		13	(0,2)	461	(1,6)	39	(0,3)	476	(1,1)	48	(0,3)	484	(1,1)

Index based on students' reports on the frequency of science homework they are given and the amount of time they spend on that homework. High level indicates science homework assigned at least 3 or 4 times a week and students spend more than 30 minutes on that homework. Low level indicates science homework assigned no more than twice a week and students spend no more than 30 minutes on that homework. Medium level includes all other possible combinations of responses.

¶ Did not satisfy guidelines for sample participation rates (see Appendix A).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals may appear inconsistent.

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

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

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 57 Index of Teachers' Emphasis on Mathematics Homework (EMH) with Trends

TIMSS 2007 Mathematics 4

Country	Have Policy to Assign Mathematics Homework	High EMH								Medium EMH								Low EMH							
			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Armenia	○	r	41	(4,3)	504	(8,6)	–6	(6,1)		49	(3,9)	496	(4,3)	–3	(5,9)		11	(2,4)	507	(8,1)	8	(2,8)	▲
Algeria	●		40	(5,0)	378	(12,3)	◊	◊		43	(4,7)	381	(7,3)	◊	◊		17	(3,4)	369	(12,4)	◊	◊	
Italy	○		35	(3,0)	501	(5,1)	3	(4,6)		35	(2,8)	508	(5,3)	2	(4,7)		29	(2,9)	512	(3,4)	–5	(4,6)	
Singapore	○		32	(2,8)	590	(6,6)	–3	(5,1)		47	(2,9)	610	(5,3)	–3	(4,8)		21	(2,5)	590	(8,3)	5	(3,7)	
Kazakhstan	○		28	(3,9)	559	(9,9)	◊	◊		70	(4,0)	545	(8,4)	◊	◊		2	(1,0)	~	~	◊	◊	
Georgia	●		28	(4,1)	437	(9,5)	◊	◊		67	(4,4)	441	(4,9)	◊	◊		5	(2,1)	424	(24,1)	◊	◊	
Hong Kong SAR	○		26	(3,6)	610	(7,2)	–7	(5,9)		63	(4,1)	611	(4,2)	0	(6,3)		11	(2,9)	576	(9,1)	7	(3,4)	▲
Russian Federation	○		24	(3,8)	545	(7,2)	–1	(5,0)		72	(4,0)	542	(6,3)	–1	(5,3)		4	(1,2)	573	(30,2)	2	(1,5)	
Iran, Islamic Rep. of	○		23	(2,9)	398	(8,5)	–9	(5,8)		36	(3,8)	411	(5,8)	3	(6,0)		41	(3,8)	397	(7,4)	6	(6,0)	
Colombia	○		22	(3,6)	370	(8,5)	◊	◊		68	(4,2)	350	(6,9)	◊	◊		10	(3,2)	360	(27,3)	◊	◊	
Morocco	●		19	(3,9)	339	(12,8)	–	–		44	(4,3)	353	(6,9)	–	–		36	(3,9)	331	(10,3)	–	–	
Chinese Taipei	○		18	(3,2)	582	(5,5)	7	(4,2)		64	(3,7)	574	(2,2)	12	(5,6)	▲	18	(2,8)	571	(3,3)	–19	(4,8)	▼
Germany	●		14	(2,0)	529	(4,4)	◊	◊		79	(2,4)	526	(2,5)	◊	◊		7	(1,6)	507	(16,0)	◊	◊	
Ukraine	●		14	(2,9)	468	(9,9)	◊	◊		83	(3,2)	468	(3,8)	◊	◊		4	(1,5)	497	(5,8)	◊	◊	
Norway	○		13	(2,5)	476	(5,9)	6	(3,2)		45	(3,5)	473	(4,4)	–1	(5,8)		42	(3,5)	472	(4,0)	–5	(5,7)	
Yemen	●		12	(3,2)	215	(12,1)	◊	◊		65	(4,1)	227	(8,4)	◊	◊		22	(3,6)	220	(9,8)	◊	◊	
Austria	●		11	(1,8)	494	(5,6)	◊	◊		73	(2,7)	508	(2,5)	◊	◊		16	(2,4)	505	(4,3)	◊	◊	
El Salvador	○		11	(2,9)	334	(12,4)	◊	◊		67	(4,1)	329	(5,7)	◊	◊		22	(3,6)	329	(7,5)	◊	◊	
Tunisia	○		11	(2,3)	308	(15,6)	–3	(4,0)		35	(4,0)	328	(7,8)	2	(5,5)		54	(4,4)	327	(6,6)	1	(6,1)	
Japan	○		9	(2,2)	574	(7,2)	5	(2,6)	▲	52	(3,8)	569	(2,7)	12	(5,8)	▲	39	(3,9)	566	(3,6)	–18	(5,9)	▼
United States	○		7	(1,4)	525	(10,8)	–1	(1,9)		68	(2,5)	531	(3,3)	0	(3,7)		25	(2,2)	525	(4,3)	0	(3,5)	
Denmark	○		5	(1,6)	527	(8,4)	◊	◊		61	(4,6)	526	(3,3)	◊	◊		35	(4,4)	521	(4,0)	◊	◊	
Australia	○		5	(2,2)	535	(15,5)	1	(2,5)		18	(3,1)	519	(10,3)	–9	(5,1)		78	(2,6)	516	(4,5)	8	(4,9)	
Qatar	●		4	(0,0)	312	(4,8)	◊	◊		29	(0,2)	301	(3,0)	◊	◊		67	(0,1)	293	(1,4)	◊	◊	
Slovenia	○		3	(1,1)	489	(17,3)	0	(2,0)		87	(2,2)	502	(1,9)	1	(3,3)		10	(1,9)	499	(7,0)	0	(2,9)	
Sweden	○		3	(0,9)	515	(12,1)	◊	◊		20	(3,3)	503	(5,9)	◊	◊		77	(3,4)	503	(2,8)	◊	◊	
England	○	r	3	(1,2)	591	(20,2)	–2	(2,8)		18	(3,2)	546	(8,9)	5	(4,5)		80	(3,2)	538	(2,9)	–3	(5,1)	
Lithuania	●		3	(1,2)	520	(12,7)	0	(1,6)		79	(3,0)	533	(2,6)	5	(3,9)		19	(2,8)	520	(6,3)	–6	(3,7)	
Scotland	○	s	1	(0,9)	~	~	1	(1,1)		11	(2,7)	507	(10,9)	–8	(5,1)		87	(2,8)	493	(2,8)	8	(5,2)	
Czech Republic	○		1	(0,7)	~	~	◊	◊		17	(3,0)	489	(4,5)	◊	◊		82	(3,0)	486	(3,2)	◊	◊	
New Zealand	○		1	(0,6)	~	~	0	(0,7)		15	(2,0)	482	(5,7)	4	(3,1)		84	(2,1)	494	(2,6)	–4	(3,3)	
Hungary	○		1	(0,6)	~	~	–7	(2,4)	▼	93	(1,6)	510	(3,6)	5	(3,2)		6	(1,5)	508	(26,2)	2	(2,3)	
Latvia	○		1	(0,4)	~	~	–6	(2,2)	▼	91	(2,1)	539	(2,3)	3	(3,9)		9	(2,1)	531	(4,5)	3	(3,1)	
Netherlands	○		1	(0,4)	~	~	1	(0,4)		3	(0,5)	511	(19,1)	0	(1,5)		97	(0,8)	535	(2,5)	–1	(1,6)	
Kuwait	–		0	(0,0)	~	~	◊	◊		18	(3,5)	308	(12,4)	◊	◊		82	(3,5)	319	(4,4)	◊	◊	
Slovak Republic	●		0	(0,0)	~	~	◊	◊		68	(3,3)	498	(4,1)	◊	◊		32	(3,3)	492	(10,0)	◊	◊	
International Avg.			13	(0,4)	472	(2,0)				51	(0,6)	474	(1,1)				36	(0,5)	469	(1,9)			
Benchmarking Participants																							
Massachusetts, US	○		17	(4,7)	583	(10,6)	◊	◊		71	(6,4)	569	(4,4)	◊	◊		12	(4,3)	577	(6,3)	◊	◊	
Dubai, UAE	○		13	(4,8)	420	(19,5)	◊	◊		70	(5,0)	437	(4,5)	◊	◊		17	(2,5)	463	(11,8)	◊	◊	
Ontario, Canada	○		6	(1,9)	508	(7,8)	1	(3,2)		43	(4,3)	512	(5,5)	1	(6,2)		50	(4,4)	512	(5,1)	–2	(6,5)	
Quebec, Canada	○	r	6	(1,9)	505	(5,1)	–2	(3,2)		15	(2,7)	503	(6,2)	–3	(4,5)		79	(3,0)	523	(3,4)	6	(5,0)	
Minnesota, US	○		4	(2,1)	568	(25,9)	◊	◊		61	(7,1)	551	(8,3)	◊	◊		34	(7,2)	561	(11,9)	◊	◊	
British Columbia, Canada	○		2	(1,1)	~	~	◊	◊		29	(3,6)	507	(5,1)	◊	◊		68	(3,6)	505	(3,8)	◊	◊	
Alberta, Canada	○		2	(0,7)	~	~	◊	◊		19	(3,4)	504	(5,4)	◊	◊		80	(3,5)	505	(3,7)	◊	◊	

Background data provided by National Research Coordinators and by teachers.
Index based on teachers' responses to two questions about how often they usually assign mathematics homework and how many minutes of mathematics homework they usually assign. High level indicates the assignment of more than 30 minutes of homework about half of the lessons or more. Low level indicates no assignment or the assignment of less than 30 minutes of homework about half of the lessons or less. Medium level includes all other possible combinations of responses.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 percent significantly higher.
▼ 2007 percent significantly lower.
● Yes
○ No
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 58 Index of Teachers' Emphasis on Mathematics Homework (EMH) with Trends

TIMSS 2007 Mathematics 8

Country	Have Policy to Assign Mathematics Homework	High EMH: 2007 Percent of Students	High EMH: Average Achievement	High EMH: Difference in Percent from 2003	Medium EMH: 2007 Percent of Students	Medium EMH: Average Achievement	Medium EMH: Difference in Percent from 2003	Low EMH: 2007 Percent of Students	Low EMH: Average Achievement	Low EMH: Difference in Percent from 2003
Romania	○	70 (4,2)	472 (4,9)	–8 (5,4)	28 (4,2)	440 (9,2)	8 (5,4)	1 (0,8)	~ ~	0 (1,0)
Italy	○	70 (3,3)	481 (3,2)	–2 (4,8)	29 (3,1)	480 (5,3)	4 (4,4)	1 (0,7)	~ ~	–2 (1,7)
Georgia	●	63 (4,4)	413 (7,8)	◊ ◊	35 (4,4)	406 (7,9)	◊ ◊	2 (1,3)	~ ~	◊ ◊
Iran, Islamic Rep. of	○	59 (3,8)	406 (5,0)	–3 (5,8)	27 (3,6)	395 (8,2)	1 (5,4)	13 (2,9)	412 (11,9)	2 (4,0)
Israel	●	r 53 (3,3)	489 (5,4)	3 (5,0)	40 (3,3)	454 (8,5)	–3 (5,3)	7 (1,4)	404 (21,7)	1 (2,2)
Colombia	○	48 (4,9)	382 (5,1)	◊ ◊	37 (5,2)	383 (7,3)	◊ ◊	16 (3,2)	366 (11,0)	◊ ◊
Syrian Arab Republic	●	47 (4,1)	396 (5,5)	◊ ◊	30 (3,9)	392 (7,8)	◊ ◊	22 (3,8)	397 (8,0)	◊ ◊
Armenia	○	r 46 (4,4)	503 (4,7)	–18 (6,4) ▼	43 (3,7)	494 (5,6)	13 (6,0) ▲	10 (2,5)	498 (12,7)	6 (3,3)
Russian Federation	○	46 (2,9)	516 (6,5)	–10 (4,5) ▼	54 (2,9)	509 (4,3)	11 (4,5) ▲	0 (0,0)	~ ~	–1 (0,5)
Lebanon	●	45 (4,4)	440 (6,0)	–4 (6,3)	45 (4,2)	456 (6,8)	1 (6,1)	10 (2,4)	438 (14,5)	3 (3,0)
Thailand	○	43 (4,3)	448 (7,8)	◊ ◊	48 (4,2)	436 (9,0)	◊ ◊	9 (2,2)	438 (14,1)	◊ ◊
Singapore	○	43 (2,8)	612 (5,7)	–17 (3,7) ▼	39 (2,7)	595 (6,5)	6 (3,7)	18 (2,3)	542 (12,8)	11 (2,6) ▲
Ukraine	●	43 (3,2)	466 (5,9)	◊ ◊	56 (3,3)	459 (5,6)	◊ ◊	1 (0,7)	~ ~	◊ ◊
Indonesia	○	41 (4,9)	403 (9,2)	–4 (6,3)	50 (4,9)	409 (7,9)	5 (6,6)	9 (2,5)	386 (13,7)	–1 (3,6)
Chinese Taipei	○	38 (4,2)	613 (8,0)	9 (5,7)	37 (4,6)	608 (5,0)	–1 (6,1)	25 (3,5)	562 (7,4)	–8 (5,3)
Ghana	●	36 (4,3)	309 (9,2)	–11 (6,7)	42 (4,3)	309 (7,8)	5 (6,6)	21 (3,4)	312 (7,6)	6 (4,5)
Turkey	●	35 (4,1)	432 (9,6)	◊ ◊	37 (4,2)	427 (8,8)	◊ ◊	28 (3,3)	433 (10,5)	◊ ◊
Norway	○	34 (3,9)	467 (3,5)	9 (5,2)	48 (3,6)	474 (3,0)	2 (5,6)	18 (3,1)	465 (5,0)	–11 (5,3) ▼
Malaysia	○	34 (4,0)	478 (8,6)	–26 (6,0) ▼	54 (4,2)	475 (6,7)	20 (5,9) ▲	11 (2,3)	458 (15,7)	6 (3,0) ▲
Tunisia	●	34 (4,1)	418 (3,3)	22 (4,8) ▲	60 (4,2)	424 (3,3)	–24 (5,2) ▼	6 (2,0)	421 (10,7)	3 (2,6)
Botswana	○	33 (3,8)	370 (4,5)	–11 (5,9)	57 (4,1)	361 (3,6)	9 (6,1)	10 (2,6)	352 (8,0)	2 (3,6)
Serbia	●	33 (3,8)	484 (6,9)	–1 (5,6)	40 (4,3)	488 (4,7)	–5 (6,1)	27 (3,9)	484 (7,0)	6 (5,3)
Hong Kong SAR	○	31 (4,5)	586 (10,9)	6 (5,9)	52 (4,6)	582 (9,0)	2 (6,5)	17 (3,5)	532 (16,1)	–8 (5,3)
Algeria	●	31 (4,0)	389 (3,3)	◊ ◊	55 (4,4)	385 (3,0)	◊ ◊	14 (2,7)	388 (4,1)	◊ ◊
Bulgaria	○	28 (3,3)	499 (8,9)	–25 (5,3) ▼	66 (3,7)	451 (6,5)	28 (5,6) ▲	6 (1,8)	452 (10,6)	–3 (3,1)
El Salvador	○	26 (4,1)	335 (7,4)	◊ ◊	50 (4,1)	345 (3,9)	◊ ◊	24 (3,9)	333 (6,6)	◊ ◊
Cyprus	○	23 (2,7)	472 (3,9)	–12 (4,1) ▼	77 (2,7)	462 (2,0)	12 (4,1) ▲	1 (0,0)	~ ~	1 (0,0)
Malta	●	20 (0,2)	510 (2,2)	◊ ◊	73 (0,2)	488 (1,3)	◊ ◊	6 (0,2)	407 (3,6)	◊ ◊
United States	○	20 (2,1)	533 (6,0)	–7 (3,2) ▼	67 (2,6)	507 (3,9)	5 (3,9)	14 (2,2)	475 (5,8)	2 (3,2)
Bosnia and Herzegovina	○	19 (3,1)	449 (8,0)	◊ ◊	56 (4,0)	463 (3,7)	◊ ◊	25 (3,4)	444 (5,3)	◊ ◊
England	○	r 18 (3,1)	552 (11,7)	–6 (6,8)	23 (3,3)	520 (11,0)	2 (5,5)	59 (4,2)	499 (6,5)	3 (7,2)
Korea, Rep. of	●	s 17 (2,8)	609 (7,7)	8 (3,5) ▲	28 (2,8)	591 (5,8)	–3 (4,6)	56 (3,3)	597 (4,0)	–4 (4,9)
Egypt	○	16 (2,8)	391 (8,5)	–7 (4,3)	52 (4,4)	390 (5,3)	–6 (5,8)	32 (4,1)	395 (6,9)	12 (5,3) ▲
Jordan	○	14 (2,7)	426 (12,0)	–16 (4,6) ▼	58 (4,2)	431 (5,8)	2 (6,1)	28 (3,9)	415 (9,0)	14 (4,8) ▲
Sweden	○	11 (1,8)	492 (8,1)	–6 (3,4)	26 (2,8)	499 (3,9)	2 (4,2)	63 (3,1)	488 (2,5)	4 (4,8)
Palestinian Nat'l Auth.	○	10 (2,7)	356 (12,7)	–21 (4,8) ▼	63 (4,0)	375 (4,8)	5 (5,8)	28 (3,6)	351 (6,5)	16 (4,4) ▲
Lithuania	●	8 (2,1)	499 (6,3)	–5 (3,4)	86 (2,7)	508 (2,6)	10 (4,5) ▲	6 (1,8)	481 (6,5)	–4 (3,2)
Japan	○	8 (2,0)	564 (7,7)	1 (3,0)	33 (3,8)	575 (4,7)	4 (5,3)	59 (3,8)	568 (3,9)	–5 (5,4)
Hungary	○	8 (2,1)	526 (13,6)	0 (2,9)	87 (2,5)	517 (3,9)	–3 (3,4)	5 (1,5)	481 (19,9)	3 (1,8)
Scotland	○	7 (1,8)	534 (15,2)	4 (2,5)	38 (3,5)	511 (6,3)	–7 (5,8)	55 (3,6)	465 (5,5)	3 (5,8)
Slovenia	○	6 (1,3)	506 (8,5)	–7 (3,2) ▼	89 (1,9)	503 (2,4)	4 (3,6)	6 (1,4)	478 (10,8)	3 (1,7)
Oman	●	6 (2,1)	382 (11,7)	◊ ◊	67 (3,7)	377 (4,4)	◊ ◊	27 (3,3)	360 (6,3)	◊ ◊
Qatar	●	5 (0,1)	290 (4,3)	◊ ◊	57 (0,2)	318 (1,7)	◊ ◊	38 (0,2)	296 (2,4)	◊ ◊
Australia	○	5 (2,0)	497 (30,8)	–5 (3,6)	46 (4,0)	520 (5,4)	–10 (5,8)	49 (4,0)	477 (5,9)	16 (5,5) ▲
Bahrain	○	5 (1,5)	373 (5,4)	–10 (2,9) ▼	49 (2,7)	402 (2,5)	–23 (4,5) ▼	47 (2,9)	391 (3,4)	33 (4,2) ▲
Czech Republic	○	4 (1,5)	578 (27,3)	◊ ◊	19 (3,2)	504 (7,8)	◊ ◊	77 (3,3)	500 (3,0)	◊ ◊
Saudi Arabia	●	3 (1,4)	321 (14,2)	– –	50 (3,9)	334 (4,0)	– –	48 (3,8)	323 (4,4)	– –
Kuwait	–	2 (1,4)	~ ~	◊ ◊	16 (3,4)	360 (8,5)	◊ ◊	81 (3,7)	356 (2,9)	◊ ◊
¶ Morocco	●	r 24 (6,2)	394 (12,2)	– –	59 (6,8)	387 (6,5)	– –	17 (4,1)	374 (9,9)	– –
International Avg.		28 (0,5)	460 (1,4)		49 (0,5)	453 (0,9)		24 (0,4)	435 (1,5)	
Benchmarking Participants										
Massachusetts, US	○	32 (5,8)	576 (10,1)	◊ ◊	59 (5,9)	537 (6,7)	◊ ◊	9 (2,7)	494 (13,3)	◊ ◊
Minnesota, US	–	23 (6,3)	563 (12,9)	◊ ◊	67 (7,1)	529 (5,0)	◊ ◊	10 (3,6)	489 (12,5)	◊ ◊
Ontario, Canada	○	21 (3,5)	519 (5,2)	–9 (5,6)	51 (5,2)	523 (4,7)	–12 (6,8)	28 (4,4)	506 (9,5)	21 (5,0) ▲
Basque Country, Spain	○	21 (4,4)	504 (6,0)	6 (6,0)	68 (4,8)	500 (3,8)	–3 (7,0)	12 (2,6)	487 (9,9)	–3 (4,2)
Quebec, Canada	○	17 (3,1)	550 (12,8)	–5 (5,1)	58 (4,1)	534 (5,7)	–3 (6,6)	24 (3,6)	506 (5,1)	8 (5,4)
British Columbia, Canada	○	17 (3,1)	521 (9,1)	◊ ◊	64 (4,0)	512 (4,1)	◊ ◊	19 (2,7)	497 (7,9)	◊ ◊
Dubai, UAE	○	8 (2,2)	456 (16,9)	◊ ◊	68 (3,9)	468 (5,5)	◊ ◊	24 (3,6)	451 (12,4)	◊ ◊

Background data provided by National Research Coordinators and by teachers.
Index based on teachers' responses to two questions about how often they usually assign mathematics homework and how many minutes of mathematics homework they usually assign. High level indicates the assignment of more than 30 minutes of homework about half of the lessons or more. Low level indicates no assignment or the assignment of less than 30 minutes of homework about half of the lessons or less. Medium level includes all other possible combinations of responses.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 percent significantly higher.
▼ 2007 percent significantly lower.
● Yes
○ No
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 59 Index of Teachers' Emphasis on Science Homework (ESH) with Trends

TIMSS 2007 Science 4

Country	Have Policy to Assign Science Homework	High ESH							Medium ESH							Low ESH						
			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Italy	○		30	(3,0)	533	(5,0)	6	(4,3)		34	(3,0)	531	(4,9)	1	(4,2)		36	(3,1)	542	(4,5)	–7	(4,8)	
Singapore	○		25	(2,6)	576	(8,9)	12	(3,9)	▲	30	(2,5)	600	(7,4)	5	(4,1)		45	(2,5)	585	(6,1)	–17	(4,9)	▼
Kazakhstan	○		24	(3,8)	534	(7,8)	◊	◊		75	(3,9)	533	(7,0)	◊	◊		1	(1,0)	~	~	◊	◊	
Colombia	○		23	(3,7)	390	(12,4)	◊	◊		49	(4,6)	397	(8,9)	◊	◊		28	(4,4)	417	(14,8)	◊	◊	
Algeria	●		19	(3,1)	357	(8,3)	◊	◊		38	(4,9)	341	(14,3)	◊	◊		43	(4,7)	364	(9,0)	◊	◊	
Armenia	○		17	(3,6)	487	(17,5)	–	–		32	(3,3)	482	(10,1)	–	–		50	(4,3)	488	(9,1)	–	–	
Russian Federation	○		16	(3,3)	527	(14,0)	0	(4,5)		79	(3,4)	552	(5,5)	–1	(4,8)		5	(1,3)	510	(10,1)	2	(1,8)	
Tunisia	○		15	(3,0)	322	(15,8)	4	(4,1)		30	(3,9)	319	(11,9)	0	(5,6)		55	(4,0)	311	(9,7)	–4	(6,1)	
Georgia	●		13	(3,1)	443	(9,9)	◊	◊		49	(5,1)	415	(6,9)	◊	◊		38	(4,6)	410	(6,0)	◊	◊	
El Salvador	○		11	(2,8)	406	(9,6)	◊	◊		56	(4,4)	384	(6,5)	◊	◊		33	(4,4)	391	(7,3)	◊	◊	
Iran, Islamic Rep. of	●		11	(2,5)	418	(13,0)	–2	(4,0)		27	(3,5)	453	(8,5)	–4	(5,9)		62	(3,7)	431	(5,9)	5	(6,2)	
Morocco	●		9	(2,6)	303	(33,9)	–	–		25	(3,6)	283	(16,9)	–	–		66	(4,3)	304	(7,9)	–	–	
Yemen	●		8	(2,9)	206	(26,0)	◊	◊		55	(4,6)	197	(10,5)	◊	◊		36	(4,4)	194	(12,5)	◊	◊	
Ukraine	●		7	(2,2)	482	(11,6)	◊	◊		89	(2,5)	473	(3,2)	◊	◊		3	(1,4)	489	(8,5)	◊	◊	
Latvia	–		3	(1,4)	548	(18,4)	–	–		56	(3,9)	545	(3,0)	–	–		40	(4,1)	541	(3,8)	–	–	
Slovenia	○		3	(1,1)	526	(18,1)	–1	(2,0)		11	(1,8)	522	(5,6)	0	(3,3)		87	(2,0)	518	(2,0)	0	(3,8)	
Kuwait	–		2	(1,5)	~	~	◊	◊		15	(3,2)	373	(14,9)	◊	◊		83	(3,0)	340	(6,2)	◊	◊	
Hungary	○		2	(0,9)	~	~	1	(1,1)		59	(4,1)	542	(4,7)	–4	(6,1)		39	(4,2)	529	(7,0)	3	(6,1)	
United States	○	r	2	(0,9)	~	~	1	(1,1)		14	(2,2)	547	(5,5)	1	(3,0)		84	(2,3)	538	(3,2)	–2	(3,2)	
Qatar	●		2	(0,0)	~	~	◊	◊		36	(0,2)	294	(3,3)	◊	◊		63	(0,2)	281	(3,1)	◊	◊	
England	○	r	2	(1,3)	~	~	–1	(1,9)		10	(2,5)	538	(8,0)	–2	(4,5)		88	(2,6)	540	(3,1)	3	(4,8)	
Slovak Republic	●		2	(0,9)	~	~	◊	◊		16	(2,9)	521	(9,8)	◊	◊		82	(2,9)	528	(5,0)	◊	◊	
Lithuania	●		2	(1,0)	~	~	0	(1,3)		21	(2,6)	519	(4,1)	3	(3,5)		77	(2,7)	513	(2,6)	–4	(3,7)	
Netherlands	○	r	1	(0,9)	~	~	1	(1,0)		10	(2,9)	518	(9,5)	2	(4,1)		89	(3,0)	523	(3,1)	–3	(4,2)	
Czech Republic	○		1	(1,0)	~	~	◊	◊		3	(1,3)	522	(16,9)	◊	◊		96	(1,6)	514	(3,1)	◊	◊	
Chinese Taipei	○		1	(0,8)	~	~	–7	(2,6)	▼	16	(3,1)	556	(4,4)	–3	(4,5)		83	(3,0)	556	(2,3)	9	(4,5)	▲
Norway	○		1	(0,7)	~	~	–2	(1,6)		5	(1,9)	483	(6,6)	2	(2,4)		94	(2,0)	476	(3,6)	0	(2,8)	
Sweden	○		0	(0,3)	~	~	◊	◊		9	(2,4)	535	(8,6)	◊	◊		90	(2,4)	524	(2,9)	◊	◊	
New Zealand	○	r	0	(0,3)	~	~	–1	(0,7)		5	(1,3)	516	(12,0)	1	(1,6)		95	(1,3)	505	(2,7)	0	(1,7)	
Scotland	○	s	0	(0,0)	~	~	0	(0,0)		4	(2,0)	472	(11,2)	1	(2,7)		95	(2,1)	502	(2,5)	–1	(2,8)	
Germany	○		0	(0,0)	~	~	◊	◊		13	(2,2)	525	(5,2)	◊	◊		87	(2,2)	528	(2,6)	◊	◊	
Hong Kong SAR	○	r	0	(0,4)	~	~	–1	(1,0)		8	(2,5)	552	(16,9)	–27	(5,2)	▼	92	(2,5)	554	(3,7)	27	(5,3)	▲
Denmark	○		0	(0,3)	~	~	◊	◊		2	(0,7)	~	~	◊	◊		98	(0,8)	518	(3,1)	◊	◊	
Australia	○	r	0	(0,0)	~	~	0	(0,4)		2	(1,2)	~	~	–3	(1,8)		98	(1,2)	527	(4,1)	3	(1,9)	
Austria	○		0	(0,0)	~	~	◊	◊		1	(0,4)	~	~	◊	◊		99	(0,4)	525	(2,8)	◊	◊	
Japan	○		0	(0,0)	~	~	0	(0,0)		8	(2,1)	559	(3,5)	–1	(3,2)		92	(2,1)	547	(2,2)	1	(3,2)	
International Avg.			7	(0,3)	441	(4,0)				28	(0,5)	473	(1,6)				65	(0,5)	473	(1,0)			
Benchmarking Participants																							
Dubai, UAE	●		2	(1,7)	~	~	◊	◊		53	(4,8)	450	(9,0)	◊	◊		45	(4,9)	445	(8,8)	◊	◊	
British Columbia, Canada	○		1	(1,1)	~	~	◊	◊		8	(2,1)	538	(12,3)	◊	◊		91	(2,4)	536	(3,3)	◊	◊	
Ontario, Canada	○		0	(0,4)	~	~	–2	(1,9)		9	(2,3)	537	(15,3)	–3	(4,2)		91	(2,3)	534	(4,1)	5	(4,6)	
Quebec, Canada	○	r	0	(0,0)	~	~	–2	(1,2)		5	(1,8)	503	(11,3)	–3	(3,1)		95	(1,8)	520	(2,9)	5	(3,3)	
Alberta, Canada	○		0	(0,0)	~	~	◊	◊		4	(1,4)	553	(9,8)	◊	◊		96	(1,4)	542	(4,1)	◊	◊	
Massachusetts, US	○		0	(0,0)	~	~	◊	◊		7	(3,6)	585	(19,4)	◊	◊		93	(3,6)	571	(4,4)	◊	◊	
Minnesota, US	○		0	(0,0)	~	~	◊	◊		3	(2,5)	564	(7,1)	◊	◊		97	(2,5)	557	(5,8)	◊	◊	

Background data provided by National Research Coordinators and by teachers.
Index based on teachers' responses to two questions about how often they usually assign science homework and how many minutes of science homework they usually assign. High level indicates the assignment of more than 30 minutes of homework about half of the lessons or more. Low level indicates no assignment or the assignment of less than 30 minutes of homework about half of the lessons or less. Medium level includes all other possible combinations of responses.
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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.
A diamond (◊) indicates the country did not participate in the assessment.
▲ 2007 percent significantly higher.
▼ 2007 percent significantly lower.
● yes
○ No
SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 60 Index of Teachers' Emphasis on Science Homework (ESH) with Trends

TIMSS 2007 Science 8

Country	Have Policy to Assign Science Homework	High ESH							Medium ESH							Low ESH						
			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003			2007 Percent of Students		Average Achievement		Difference in Percent from 2003		
Italy	○		42	(2,8)	495	(4,5)	–1	(4,9)		36	(3,3)	494	(4,9)	1	(5,0)		21	(2,8)	496	(5,8)	0	(4,1)	
Colombia	○		39	(4,6)	418	(6,1)	◊	◊		27	(4,4)	413	(6,1)	◊	◊		33	(5,0)	416	(8,1)	◊	◊	
Ghana	●		35	(3,8)	300	(9,6)	6	(5,9)		46	(4,0)	309	(9,6)	5	(6,3)		19	(3,3)	293	(15,1)	–10	(4,8)	▼
Thailand	○		28	(3,5)	458	(8,3)	◊	◊		33	(4,1)	489	(9,9)	◊	◊		39	(4,2)	464	(6,9)	◊	◊	
Iran, Islamic Rep. of	●		28	(3,1)	444	(7,2)	1	(4,9)		33	(3,6)	462	(4,9)	7	(5,1)		39	(3,7)	467	(7,5)	–8	(5,8)	
Singapore	○		27	(1,9)	588	(8,1)	–2	(3,2)		29	(2,3)	580	(8,7)	–3	(3,4)		44	(2,6)	546	(7,2)	5	(3,4)	
Indonesia	○		24	(3,4)	434	(7,6)	–3	(4,7)		47	(3,8)	444	(4,5)	5	(4,9)		30	(3,4)	427	(7,8)	–2	(4,5)	
Ukraine	●		24	(2,2)	484	(5,1)	◊	◊		74	(2,2)	486	(3,6)	◊	◊		2	(0,6)	~	~	◊	◊	
Turkey	●		23	(3,6)	450	(9,0)	◊	◊		32	(3,8)	460	(7,1)	◊	◊		44	(3,8)	451	(6,0)	◊	◊	
Georgia	●		23	(3,2)	409	(9,1)	◊	◊		54	(3,3)	425	(4,2)	◊	◊		23	(2,1)	424	(6,7)	◊	◊	
Lebanon	○		23	(3,5)	397	(10,0)	–4	(4,7)		43	(3,6)	424	(7,5)	–11	(5,3)	▼	34	(3,8)	412	(13,5)	15	(4,9)	▲
Norway	○		23	(3,3)	482	(4,6)	8	(4,4)		46	(3,7)	491	(3,1)	–5	(5,9)		31	(4,1)	484	(4,2)	–4	(6,0)	
Chinese Taipei	○		23	(3,8)	570	(7,0)	–1	(5,2)		31	(4,0)	572	(6,4)	2	(5,5)		47	(4,4)	550	(5,1)	–1	(6,2)	
Syrian Arab Republic	●		22	(3,0)	460	(5,1)	◊	◊		44	(3,8)	452	(4,7)	◊	◊		34	(3,2)	444	(4,3)	◊	◊	
Russian Federation	●		22	(1,8)	525	(6,3)	–6	(2,7)	▼	76	(1,8)	531	(3,9)	7	(2,9)	▲	2	(0,5)	~	~	–1	(1,0)	
Armenia	○	r	19	(1,7)	488	(6,5)	–7	(2,7)	▼	56	(2,8)	491	(6,5)	4	(4,1)		25	(2,3)	482	(6,7)	3	(3,2)	
England	○	s	18	(2,4)	570	(7,1)	–11	(4,8)	▼	22	(2,7)	557	(7,4)	2	(4,0)		60	(3,1)	528	(6,3)	9	(5,1)	
Malta	●		16	(0,2)	491	(2,6)	◊	◊		33	(0,2)	460	(1,8)	◊	◊		51	(0,3)	433	(1,8)	◊	◊	
El Salvador	○		16	(3,2)	406	(8,6)	◊	◊		43	(4,0)	380	(4,9)	◊	◊		40	(4,0)	388	(5,4)	◊	◊	
Malaysia	○		15	(2,7)	482	(15,6)	–24	(4,8)	▼	50	(4,3)	477	(7,8)	16	(5,8)	▲	35	(4,0)	457	(11,3)	8	(5,5)	
Botswana	○		15	(3,0)	343	(6,6)	–2	(3,8)		40	(4,7)	359	(5,3)	1	(6,5)		46	(4,8)	354	(5,5)	2	(6,7)	
Hong Kong SAR	○		14	(3,3)	543	(13,1)	2	(4,5)		38	(4,7)	531	(9,5)	–2	(6,4)		48	(5,0)	525	(6,6)	0	(7,0)	
Egypt	○		14	(3,0)	410	(9,9)	–14	(4,4)	▼	58	(4,0)	404	(5,2)	5	(5,8)		28	(3,4)	414	(7,7)	9	(5,0)	
Tunisia	●	r	14	(3,1)	444	(7,6)	7	(3,7)	▲	24	(4,0)	439	(4,5)	5	(5,5)		62	(4,6)	445	(3,1)	–12	(6,0)	▼
Algeria	●		12	(2,3)	404	(4,5)	◊	◊		42	(3,6)	409	(2,5)	◊	◊		46	(3,6)	409	(2,5)	◊	◊	
Jordan	●		11	(2,3)	470	(15,0)	–9	(4,2)	▼	45	(4,0)	489	(5,0)	10	(5,8)		45	(3,9)	478	(7,1)	–1	(5,9)	
Israel	●		11	(2,3)	451	(12,2)	–7	(3,8)		55	(3,9)	469	(6,9)	6	(5,4)		34	(3,5)	476	(8,3)	2	(5,0)	
Palestinian Nat'l Auth.	○		10	(2,7)	384	(10,4)	–4	(4,1)		49	(4,4)	403	(5,0)	–6	(6,1)		41	(4,4)	406	(6,5)	11	(6,0)	
United States	○	r	9	(1,6)	497	(8,8)	1	(2,1)		29	(2,4)	519	(5,9)	–5	(3,7)		62	(2,4)	523	(3,6)	4	(3,9)	
Australia	○	r	9	(2,5)	546	(12,9)	7	(2,7)	▲	18	(2,2)	541	(7,2)	–14	(4,2)	▼	73	(3,2)	510	(4,9)	7	(4,8)	
Sweden	○		8	(1,6)	510	(10,1)	–2	(2,8)		26	(2,9)	513	(4,4)	–8	(4,0)		66	(3,0)	508	(2,9)	10	(4,1)	▲
Cyprus	●	r	7	(0,6)	452	(4,5)	1	(1,0)		80	(0,8)	451	(2,1)	4	(1,4)	▲	13	(0,7)	446	(3,8)	–5	(1,0)	▼
Romania	○		7	(1,4)	442	(15,4)	–2	(2,1)		28	(2,0)	463	(5,4)	–3	(2,7)		65	(2,4)	463	(4,2)	5	(3,1)	
Kuwait	–		7	(2,3)	399	(19,1)	◊	◊		32	(4,6)	416	(8,0)	◊	◊		61	(4,9)	417	(4,6)	◊	◊	
Qatar	○		7	(0,1)	341	(4,3)	◊	◊		39	(0,2)	335	(2,5)	◊	◊		54	(0,2)	297	(2,2)	◊	◊	
Bulgaria	○		5	(1,5)	452	(25,5)	–	–		33	(2,6)	469	(10,0)	–	–		62	(2,9)	470	(6,5)	–	–	
Serbia	○		4	(1,0)	476	(10,7)	–3	(1,6)		15	(1,8)	473	(5,7)	0	(2,5)		80	(1,8)	469	(3,3)	3	(2,7)	
Hungary	○		4	(1,1)	546	(8,7)	2	(1,3)		53	(2,1)	541	(3,6)	8	(3,1)	▲	43	(2,1)	535	(3,7)	–9	(3,2)	▼
Lithuania	●		4	(0,9)	502	(7,8)	–5	(1,5)	▼	53	(2,2)	522	(3,0)	–4	(3,2)		43	(2,1)	516	(2,9)	9	(3,4)	▲
Korea, Rep. of	●	s	4	(1,6)	552	(13,2)	1	(2,0)		20	(3,2)	548	(3,6)	–7	(4,7)		76	(3,5)	554	(2,3)	6	(5,0)	
Bosnia and Herzegovina	○		4	(0,8)	462	(8,1)	◊	◊		23	(1,9)	459	(4,8)	◊	◊		73	(2,0)	468	(2,9)	◊	◊	
Japan	○		2	(1,1)	~	~	0	(1,7)		22	(3,2)	552	(4,9)	4	(4,5)		76	(3,3)	555	(2,8)	–4	(4,6)	
Oman	○		2	(1,0)	~	~	◊	◊		55	(4,2)	424	(4,6)	◊	◊		43	(4,3)	422	(5,2)	◊	◊	
Slovenia	○		1	(0,5)	~	~	–3	(1,1)	▼	20	(2,0)	543	(3,3)	0	(2,6)		79	(2,1)	536	(2,4)	3	(2,8)	
Scotland	○	s	1	(0,4)	~	~	–2	(1,2)		13	(1,5)	521	(9,3)	–1	(2,9)		86	(1,6)	492	(3,9)	2	(3,1)	
Bahrain	○		1	(0,1)	~	~	–4	(0,7)	▼	42	(3,1)	464	(4,1)	–29	(3,9)	▼	57	(3,1)	467	(3,7)	33	(3,9)	▲
Czech Republic	○		0	(0,2)	~	~	◊	◊		8	(1,2)	536	(5,3)	◊	◊		92	(1,2)	538	(2,0)	◊	◊	
Saudi Arabia	○		x	x	x	x	–	–		x	x	x	x	–	–		x	x	x	x	–	–	
¶ Morocco	●		16	(3,1)	409	(7,1)	–	–		41	(5,6)	399	(4,8)	–	–		43	(6,1)	409	(6,7)	–	–	
International Avg.			14	(0,4)	462	(1,6)				39	(0,5)	471	(0,8)				47	(0,5)	462	(0,9)			
Benchmarking Participants																							
Dubai, UAE	○		11	(1,5)	473	(13,4)	◊	◊		60	(2,6)	502	(3,9)	◊	◊		29	(2,7)	478	(7,2)	◊	◊	
British Columbia, Canada	○		9	(2,3)	523	(17,1)	◊	◊		39	(4,3)	529	(5,2)	◊	◊		52	(3,5)	527	(3,6)	◊	◊	
Massachusetts, US	○		8	(3,9)	555	(13,6)	◊	◊		55	(6,3)	569	(8,6)	◊	◊		36	(5,9)	530	(9,8)	◊	◊	
Ontario, Canada	○		7	(2,2)	544	(13,9)	–4	(3,6)		30	(4,8)	526	(6,3)	–4	(6,7)		63	(4,7)	527	(3,9)	8	(6,8)	
Basque Country, Spain	○		6	(2,1)	499	(16,1)	–2	(3,5)		46	(4,2)	499	(4,4)	–1	(6,6)		49	(4,2)	498	(3,8)	2	(6,5)	
Minnesota, US	○		3	(1,9)	540	(7,3)	◊	◊		33	(6,0)	541	(10,8)	◊	◊		64	(5,5)	537	(5,6)	◊	◊	
Quebec, Canada	○	r	3	(1,6)	488	(7,4)	–2	(2,3)		14	(3,5)	536	(7,8)	–12	(5,5)	▼	83	(3,4)	508	(4,2)	14	(5,7)	▲

Background data provided by National Research Coordinators and by teachers.

Index based on teachers' responses to two questions about how often they usually assign science homework and how many minutes of science homework they usually assign. High level indicates the assignment of more than 30 minutes of homework about half of the lessons or more. Low level indicates no assignment or the assignment of less than 30 minutes of homework about half of the lessons or less. Medium level includes all other possible combinations of responses.

¶ Did not satisfy guidelines for sample participation rates (see Appendix A).

( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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 the students.

A diamond (◊) indicates the country did not participate in the assessment.

▲ 2007 percent significantly higher.

▼ 2007 percent significantly lower.

● yes

○ No

SOURCE: IEA's Trends in International Mathematics and Science Study (TIMSS) 2007.

Table 61 Use of Mathematics Homework

	Country	Percentage of Students Whose Teachers Always or Almost Always														
		Monitor Whether or Not the Homework Was Completed			Correct Assignments and Then Give Feedback to Students			Have Students Correct Their Own Homework in Class			Use the Homework as a Basis for Class Discussion			Use the Homework to Contribute Towards Students' Grades/Marks		
	Algeria		81	(3,4)		74	(3,8)		42	(4,4)		45	(4,7)		57	(4,3)
	Armenia		52	(3,4)		37	(3,5)		29	(3,1)		23	(2,7)		25	(3,1)
	Australia		63	(3,3)		59	(3,9)		28	(3,8)		15	(3,3)		21	(3,2)
	Bahrain		81	(2,9)		76	(2,5)		17	(1,7)		43	(3,0)		54	(3,3)
	Bosnia and Herzegovina		73	(3,8)		37	(3,6)		15	(3,0)		25	(3,9)		15	(3,1)
	Botswana		94	(2,2)		94	(2,2)		37	(4,4)		33	(3,9)		12	(3,2)
	Bulgaria		85	(2,7)		28	(3,6)		13	(2,4)		24	(3,6)		10	(2,3)
	Chinese Taipei		66	(4,3)		50	(4,4)		58	(4,2)		53	(4,3)		59	(4,2)
	Colombia		81	(4,1)		80	(3,5)		11	(3,0)		33	(4,9)		54	(4,7)
	Cyprus		89	(1,8)		82	(2,4)		19	(2,4)		43	(3,2)		47	(3,4)
	Czech Republic		93	(2,1)		67	(3,5)		19	(3,0)		13	(2,9)		15	(2,9)
	Egypt		82	(3,3)		73	(3,6)		7	(2,1)		20	(3,0)		61	(3,8)
	El Salvador		97	(1,4)		84	(3,0)		50	(3,9)		43	(4,5)		66	(4,3)
	England		88	(2,5)		70	(4,0)		13	(2,2)		13	(2,8)		32	(3,5)
	Georgia		93	(2,6)		46	(5,5)		40	(3,8)		17	(4,4)		38	(4,6)
	Ghana		97	(1,4)		93	(2,1)		53	(4,2)		40	(4,3)		56	(3,9)
	Hong Kong SAR		82	(3,5)		77	(3,2)		18	(3,5)		24	(4,0)		29	(4,0)
	Hungary		92	(2,1)		36	(3,3)		72	(3,8)		8	(2,0)		9	(2,3)
	Indonesia		90	(2,4)		84	(2,9)		48	(4,4)		23	(3,4)		47	(3,4)
	Iran, Islamic Rep. of		74	(3,4)		49	(3,5)		46	(3,5)		41	(4,2)		38	(3,5)
	Israel	r	73	(3,5)	r	40	(3,3)	r	29	(3,5)	r	31	(3,5)	r	50	(3,7)
	Italy		77	(3,0)		52	(3,3)		57	(3,3)		51	(3,1)		11	(2,0)
	Japan		65	(3,6)		25	(2,9)		48	(4,2)		5	(1,7)		17	(2,6)
	Jordan		86	(2,9)		72	(3,4)		17	(3,3)		70	(3,5)		43	(4,3)
	Korea, Rep. of		80	(2,1)		12	(2,0)		37	(3,0)		5	(1,6)		28	(3,1)
	Kuwait	r	57	(5,2)	r	54	(4,8)	r	13	(3,0)	r	29	(4,1)	r	32	(4,4)
	Lebanon		75	(3,2)		76	(3,7)		65	(4,8)		40	(4,4)		17	(2,9)
	Lithuania		73	(3,4)		28	(3,2)		19	(3,0)		10	(2,5)		9	(2,2)
	Malaysia		81	(3,2)		68	(3,2)		33	(3,9)		38	(4,0)		13	(2,9)
	Malta		89	(0,2)		49	(0,3)		75	(0,2)		30	(0,2)		48	(0,2)
	Norway		44	(3,2)		8	(2,0)		13	(2,9)		9	(1,9)		15	(2,9)
	Oman		87	(3,2)		83	(3,1)		20	(3,6)		33	(4,0)		46	(4,7)
	Palestinian Nat'l Auth.		85	(2,9)		64	(3,9)		20	(3,2)		46	(3,8)		40	(4,4)
	Qatar		88	(0,1)		85	(0,1)		13	(0,1)		22	(0,1)		56	(0,2)
	Romania		79	(2,7)		43	(4,2)		29	(3,5)		31	(3,6)		19	(3,4)
	Russian Federation		90	(2,1)		58	(3,7)		19	(2,6)		7	(2,1)		5	(1,5)
	Saudi Arabia		89	(3,0)		80	(3,5)		31	(4,1)		33	(4,6)		56	(3,9)
	Scotland		89	(2,8)		64	(3,4)		19	(3,0)		20	(3,1)		7	(1,4)
	Serbia		71	(3,9)		38	(3,9)		17	(3,1)		24	(3,6)		13	(3,2)
	Singapore		85	(1,9)		80	(2,2)		26	(2,2)		28	(2,3)		20	(1,9)
	Slovenia		82	(2,1)		12	(2,1)		53	(2,6)		19	(2,3)		3	(0,9)
	Sweden		66	(3,2)		48	(2,9)		8	(1,7)		15	(2,1)		13	(2,1)
	Syrian Arab Republic		82	(3,4)		76	(3,9)		40	(4,4)		49	(4,0)		72	(4,0)
	Thailand		90	(2,5)		75	(3,8)		19	(3,1)		30	(3,8)		24	(3,8)
	Tunisia		70	(3,5)		77	(3,5)		82	(3,2)		52	(4,4)		25	(3,8)
	Turkey		44	(4,4)		38	(4,2)		25	(4,1)		11	(2,6)		40	(4,5)
	Ukraine		88	(2,8)		65	(3,7)		19	(3,0)		7	(2,1)		27	(3,7)
	United States		93	(1,6)		44	(2,7)		55	(3,0)		52	(2,7)		77	(2,8)
¶	Morocco		81	(3,7)		71	(5,3)		28	(4,3)		46	(5,8)		46	(6,0)
	International Avg.		80	(0,4)		59	(0,5)		32	(0,5)		29	(0,5)		33	(0,5)
Benchmarking Participants																
	Basque Country, Spain		80	(3,8)		62	(3,8)		83	(3,9)		35	(4,7)		79	(4,0)
	British Columbia, Canada		72	(4,0)		30	(3,4)		40	(3,9)		37	(3,6)		55	(4,1)
	Dubai, UAE	s	90	(1,8)	s	86	(2,8)	s	24	(5,1)	s	40	(6,9)	s	33	(4,2)
	Massachusetts, US		96	(2,0)		26	(5,6)		59	(5,8)		51	(5,6)		80	(5,9)
	Minnesota, US		99	(0,6)		46	(6,6)		64	(5,8)		45	(7,4)		87	(5,9)
	Ontario, Canada		72	(4,5)		49	(3,8)		55	(5,3)		46	(4,5)		19	(3,8)
	Quebec, Canada		66	(3,6)		70	(4,4)		48	(4,1)		19	(3,4)		9	(2,7)

Background data provided by teachers.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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) 2007.

Table 62 Use of Science Homework

TIMSS 2007 Science 8

	Country	Percentage of Students Whose Teachers Always or Almost Always														
		Monitor Whether or Not the Homework Was Completed			Correct Assignments and Then Give Feedback to Students			Have Students Correct Their Own Homework in Class			Use the Homework as a Basis for Class Discussion			Use the Homework to Contribute Towards Students' Grades/Marks		
	Algeria	r	82	(2,4)	r	71	(2,4)	r	41	(3,3)	r	37	(3,2)	r	59	(3,4)
	Armenia		52	(3,2)		37	(2,3)		27	(1,9)		25	(2,7)		24	(1,9)
	Australia		62	(3,5)		62	(3,3)		16	(2,4)		15	(2,3)		26	(3,1)
	Bahrain		79	(2,4)		76	(2,0)		11	(1,7)		46	(2,5)		59	(2,4)
	Bosnia and Herzegovina		67	(2,2)		55	(2,7)		19	(1,8)		21	(1,9)		19	(2,0)
	Botswana		98	(1,3)		89	(2,8)		27	(4,0)		26	(3,8)		13	(3,2)
	Bulgaria		83	(2,1)		51	(3,1)		33	(3,2)		23	(2,5)		16	(2,1)
	Chinese Taipei		61	(3,8)		49	(4,1)		47	(4,2)		48	(4,3)		51	(4,1)
	Colombia		80	(3,7)		82	(3,2)		11	(2,7)		39	(5,0)		62	(4,5)
	Cyprus	r	86	(0,7)	r	81	(0,9)	r	14	(0,7)	r	32	(1,0)	r	55	(1,1)
	Czech Republic		74	(2,0)		46	(2,3)		16	(1,6)		17	(1,5)		17	(1,7)
	Egypt		89	(2,7)		86	(2,7)		7	(2,1)		47	(4,4)		66	(3,5)
	El Salvador		94	(1,9)		82	(3,3)		22	(3,3)		42	(4,3)		61	(4,6)
	England		85	(2,2)		60	(2,9)		7	(1,4)		11	(1,7)		26	(2,2)
	Georgia		86	(1,7)		59	(3,2)		52	(3,6)		16	(2,3)		57	(3,3)
	Ghana		94	(2,0)		93	(2,2)		35	(4,1)		42	(4,0)		64	(4,0)
	Hong Kong SAR		72	(4,2)		56	(4,7)		20	(3,9)		15	(3,5)		24	(4,1)
	Hungary		87	(1,3)		43	(2,6)		48	(2,4)		11	(1,8)		12	(1,8)
	Indonesia		91	(1,9)		90	(2,2)		21	(2,7)		22	(3,3)		56	(3,8)
	Iran, Islamic Rep. of		59	(4,1)		46	(3,7)		21	(3,2)		16	(2,8)		39	(3,9)
	Israel		79	(3,1)	r	54	(3,5)	r	42	(3,9)		34	(3,9)		57	(3,8)
	Italy		68	(3,3)		48	(3,1)		38	(3,7)		53	(3,2)		23	(2,5)
	Japan		50	(4,2)		17	(3,1)		20	(3,3)		4	(1,4)		23	(3,7)
	Jordan		89	(2,7)		72	(3,8)		22	(3,3)		48	(4,2)		40	(4,5)
	Korea, Rep. of		74	(3,4)		25	(3,3)		22	(3,1)		6	(1,4)		44	(4,0)
	Kuwait	r	74	(4,2)	r	79	(4,0)	r	14	(3,5)	r	22	(4,0)	r	49	(4,8)
	Lebanon		78	(2,8)		75	(3,3)		60	(3,8)		40	(3,5)		21	(3,5)
	Lithuania		69	(2,0)		50	(2,2)		17	(1,6)		11	(1,4)		16	(1,6)
	Malaysia		76	(3,7)		76	(3,5)		27	(4,1)		35	(3,8)		15	(3,2)
	Malta		90	(0,2)		75	(0,3)		13	(0,2)		15	(0,2)		59	(0,3)
	Norway		40	(3,4)		13	(2,6)		6	(1,9)		21	(3,0)		24	(3,2)
	Oman		89	(2,9)		88	(2,5)		9	(2,8)		29	(4,1)		44	(3,9)
	Palestinian Nat'l Auth.		85	(2,9)		72	(4,0)		24	(3,9)		44	(4,1)		44	(4,5)
	Qatar		90	(0,1)		85	(0,1)		8	(0,1)	r	28	(0,1)	r	60	(0,2)
	Romania		76	(1,9)		60	(2,8)		32	(2,3)		24	(2,0)		21	(1,7)
	Russian Federation		93	(0,8)		70	(1,8)		27	(2,0)		14	(1,4)		44	(2,0)
	Saudi Arabia		97	(1,6)		92	(2,5)		32	(4,0)		30	(3,8)		59	(4,3)
	Scotland	r	94	(1,1)	r	77	(2,7)	r	5	(1,5)	r	13	(1,4)	r	11	(1,8)
	Serbia		67	(2,1)		57	(2,3)		23	(2,0)		23	(1,9)		20	(1,7)
	Singapore		80	(2,2)		69	(2,2)		30	(2,4)		32	(2,2)		20	(2,0)
	Slovenia		74	(2,2)		26	(2,2)		23	(2,2)		28	(2,6)		6	(1,3)
	Sweden		55	(3,3)		37	(3,0)		2	(0,7)		23	(2,1)		19	(2,3)
	Syrian Arab Republic		88	(2,0)		87	(2,3)		30	(3,2)		51	(3,5)		68	(3,3)
	Thailand		84	(2,7)		74	(3,5)		17	(3,3)		26	(3,7)		24	(3,5)
	Tunisia		76	(3,6)		68	(4,2)		35	(4,3)		42	(4,0)		37	(4,3)
	Turkey		54	(4,0)		47	(3,9)		22	(3,5)		16	(2,9)		41	(4,6)
	Ukraine		88	(1,7)		70	(2,6)		20	(1,8)		12	(1,6)		50	(2,5)
	United States		84	(2,1)		56	(3,3)		21	(2,5)		35	(3,0)		69	(2,6)
¶	Morocco	r	81	(2,5)	r	62	(4,0)	r	35	(3,8)	r	31	(4,0)	r	45	(5,0)
	International Avg.		78	(0,4)		63	(0,4)		24	(0,4)		27	(0,4)		38	(0,5)
Benchmarking Participants																
	Basque Country, Spain		77	(3,4)		69	(3,6)		78	(3,7)		19	(3,5)		75	(4,3)
	British Columbia, Canada	r	80	(3,6)	r	49	(4,7)	r	23	(3,8)	r	31	(3,9)	r	60	(3,7)
	Dubai, UAE	s	92	(3,2)	s	82	(2,7)	s	21	(1,9)	s	29	(3,1)	s	43	(3,8)
	Massachusetts, US		90	(4,6)		50	(8,9)		27	(4,8)		33	(5,0)		79	(6,5)
	Minnesota, US		78	(6,1)		56	(8,3)		15	(4,4)		42	(6,9)		80	(6,5)
	Ontario, Canada		61	(4,9)		52	(4,9)		29	(4,4)		46	(4,9)		20	(4,0)
	Quebec, Canada		48	(4,8)		50	(5,0)		25	(4,7)		19	(4,3)		8	(2,3)

Background data provided by teachers.
¶ Did not satisfy guidelines for sample participation rates (see Appendix A).
( ) Standard errors appear in parentheses. Because results are rounded to the nearest whole number, some totals 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) 2007.

SUMMARY

TIMSS has been examining average achievements of the fourth and the eighth grade students in mathematics and in science worldwide since 1995. When developing the survey, TIMSS always consider item format and content to be familiar to the majority of participating countries. In order to achieve such goals, TIMSS created the TIMSS curriculum model, affecting the design of the Assessment Frameworks with a great extent, as well as the TIMSS assessment items were developed through a collaborative process and field tested extensively in participating countries.

The Asian countries have been achieving the most successfully on the TIMSS scale since the beginning of the assessment series. In 2007, Hong Kong SAR, Singapore, Chinese Taipei, Japan and Korea, which participated only at the eighth grade assessment, outperformed the other countries in the mathematics assessment. In mathematics, at fourth grade, Hong Kong SAR, at eighth grade Chinese Taipei achieved 100 scale scores more than the TIMSS-scale average, and 60 points and 80 points more than the next best non-Asian participating countries, respectively.

There were similar results on the TIMSS achievement scale in science as well. However, the difference between the results of the best achieving Singapore at both grades, and the next best non-Asian participating countries' results were significantly lower than in mathematics: 40 scale scores at fourth grade, 25 scale scores at eighth grade.

Students in Hungary also achieved high results on the TIMSS; they had higher than the average achievement results in each assessment cycle. In mathematics and in science at fourth grade Hungarian students were usually at the end of the first one third, whereas in science at eighth grade Hungary was, as usual, among the top-performing countries. Hungary achieved similar results in the TIMSS 2007 assessments as well. Although Hungarian students had slightly lower results than in previous assessment cycles in mathematics, fourth grade students with 510 score points on the mathematics achievement scale and 536 score points on the science scale were close to the results of top-performing countries, whereas the eighth graders were only outranked significantly by the four Asian countries on the top.

Comparison of the trend results show advancement of two Baltic countries, Lithuania and Latvia. At fourth grade, Latvian students achieved 56 points more on the mathematics scale, and 38 points more on the science scale compared to the TIMSS 1995 achievement results. However, Lithuanian students improved mainly at eighth grade (55-point improvement in mathematics, 34-point in science). Considering also the good performance of Estonia in PISA (the country did not participate in the TIMSS assessment), it can be concluded that education in the Baltic States has shown a considerable level of development since they claimed independence from the Soviet Union. Slovenia also showed continuous and considerable improvement through assessment cycles in both assessment domains between 1995 and 2007. At fourth grade students improved outstandingly, in mathematics they performed 40 points higher, in science 54 points higher than their previous results on the TIMSS scale, reaching the TIMSS scale average. At eighth grade, their results showed smaller improvement, achieving 24 points higher on the science scale, 7 points higher on the mathematics scale. Students' results in Singapore and in Hong Kong SAR have shown gains specifically in one subject domain or in a grade, respectively. The former has increased achievement in science, while the latter at the fourth grade results during the 12 years. Sweden, Norway and the Czech Republic were the 'losers" of TIMSS 2007 with 40 to 50-score decline in their average achievements.

Trend data for Hungary indicate that average achievements in mathematics have slightly decreased, by 12 and 10 scale scores at each grade since 1995. In science there has been a 28-point improvement at fourth grade, whereas average achievement has remained the same at eighth grade compared to the results in 1995.

TIMSS 2007 enabled 17 participating countries to examine the cohort of their students' performance that had been assessed in the fourth grade in 2003 and reached the eighth grade by 2007. Comparing the relative performance of the countries, it can be concluded that they fall into two main categories. Curricular changes are suspected in the great majority of the countries when analysing the differences of the cohort since they show similar changes in performance within one assessment cycle between the performances of the fourth grade and the eighth grade. Due to differences between the curricula at the first four grades and at the second four grades in education,

students' relative performance on the scale has improved in both mathematics and science in Norway, Iran and Tunisia, while it declined in the USA and in Italy between 2003 and 2007. There has been significant improvement in performance only in science in countries like Chinese Taipei, Japan and Hungary, in our country it is due to the traditionally extended science curriculum at the upper grades. On the other hand, there are two countries, Slovenia and Armenia, where there may be some other, more structural reasons for the relative performance improvements, since the significant increase in performance shown by the eighth grades were also significantly better related to the performance of the eighth grades in 2003.

Comparing results on the two dimensions of the assessment (content domain and cognitive domain), it can be noted that at both grades the countries scoring highest on the overall assessment tended also to be the highest-scoring countries in each of the content and cognitive domains, and the lowest-scoring countries overall tended to be those with lowest scores in the content and cognitive domains. Countries scoring highest in the Reasoning domain tended also to be the highest-scoring countries in the overall assessment. There is a similar consistency between countries scoring the best in Physics and their results in the overall assessment.

Hungarian students' results were above the international average in all the content and cognitive domains, the majority of them were significantly better than the average. In mathematics, Hungarian eighth graders reached the best results in the Data and Chance content domain (with 24 points above the international average). In scientific domains, at fourth grade they had the best results in Life Science, and at eighth grade they achieved the best in Physics. The fourth graders achieved the second-fourth best average achievement, whereas the eighth graders were among the fifth-seventh best achieving countries with these results (with standard errors taken into account). It is noteworthy that Hungarian students at the fourth grade achieved outstanding results in the Reasoning domain showing that the Knowing domain becomes more dominant later in their studies. At eighth grade, only Hungarian students with achievement above the international average performed the highest scores in the Knowing cognitive domain.

Consistent with the results in the TIMSS2007 scale average, the Asian countries among the top-performers had also the highest percentages of students reaching the advanced international benchmark in mathematics as well as in science. The distribution of Hungarian students reaching each level of the international benchmarks shows good results, especially at eighth grade, where the percentage of students reaching the high international benchmark is among the best in Europe, whereas the percentage of students at the low international benchmark is low. It should be noted, however, that at fourth grade the percentage of students not reaching even the low international benchmark is high compared to the average achievements of students (7 % in science, 12 % in mathematics).

Hungarian students' achievements in mathematics and science are strongly determined by their parents' educational level. It is obvious that it is the most influencing background factor overall, however Hungarian students' performances were, as it can be concluded from PISA and TIMSS survey results, more influenced by this background factor than usual. In countries that participated in TIMSS 2007 and achieved high scores the differences between the results of students with the lowest and the highest educational levels of their parents were 42-104 score points. This difference in Hungary was significantly higher, 129 score points in mathematics and 112 in science. In two other countries in the Central European region these differences are lower, 48 scale scores in the Czech Republic and 67 in Slovenia.

In Hungary, the differences in the educational level of parents are usually accompanied by significant differences in the families' socio-economic status. Consequently, Hungarian students' results are more closely linked to other background factors affecting achievements, such as computer availability at home, Internet access, as they are also indicative of the parents' socio-economic status. Due to the differences in skills of students developing at a relatively young age, the students of schools with higher percentage of students from economically disadvantaged families find themselves in a more disadvantaged situation in Hungary than in many other countries. Consequently, in Hungary, partly due to early school selection, selectivity is rather dominant in secondary schools, which is shown in the results of the national assessments of competences as well as the international PISA survey.

APPENDIX

TIMSS 2007 ASSESSMENT FRAMEWORK

The TIMSS 2007 Assessment Frameworks serves as one of the basic documents for the assessment of Mathematics and Science at fourth and eighth grades.

The TIMSS Assessment Frameworks are a result of collaborative efforts of researchers and test developers in mathematics and science from all over the world. The frameworks were developed based on the curricula of the participating countries and they describe the major content and cognitive domains in mathematics and science to be tested at the fourth and eighth grades.

This appendix contains only an extract of the TIMSS 2007 Assessment Frameworks.

The complete texts of the Assessment Frameworks are available in English at http://timss.bc.edu/TIMSS2007/frameworks.html.

MATHEMATICS

Content Domains

The content domains define the specific mathematics subject matter covered by the TIMSS 2007 assessment. Each content domain has several topic areas illustrated with examples; each topic area is presented as a list of objectives covered in the mathematics curriculum in the majority of participating countries.

Fourth – Grade Content Domains

- Number
- Geometric Shapes and Measures
- Data Display

Eighth – Grade Content Domains

- Number
- Algebra
- Geometry
- Data and Chance

Fourth Grade

SZÁMOK

The *number* content domain for the fourth grade includes understanding of place value, ways of representing numbers, and the relationships between numbers. At the fourth grade, students should have developed number sense and computational fluency, understand the meanings of operations (i.e. add, subtract, multiply, and divide) to solve problems. They should be familiar with a range of number patterns, exploring the relationships between the numbers which are in the pattern or are used to derive it.

The Number domain consists of the following major topic areas

- Whole Numbers:
  1. Represent whole numbers using words, diagrams, or symbols.
  2. Demonstrate knowledge of place value, including recognizing and writing numbers in expanded form.
  3. Compare and order whole numbers.
  4. Know the four operations (+, −, ×, ÷) and compute with whole numbers.
  5. Recognize multiples and factors of numbers; read weight and temperature scales marked in multiples.

6. Estimate computations by approximating the numbers involved.
7. Solve problems, including those set in real life contexts (for example, measurement and money problems).
8. Solve problems involving proportions.

- Fractions and Decimals:
  1. Recognize fractions as parts of unit wholes, parts of a collection, locations on number lines, and divisions of whole numbers.
  2. Represent fractions using words, numbers, or models.
  3. Identify equivalent fractions; compare and order fractions.
  4. Add and subtract simple fractions.
  5. Show understanding of decimal place value including recognizing and writing decimals using words and numbers.
  6. Add and subtract decimals.
  7. Solve problems involving simple fractions or decimals.

- Number Sentences with Whole Numbers:
  1. Find the missing number or operation in a number sentence (e.g., if 17 + __ = 29, what number would go in the blank to make the number sentences true?)
  2. Model simple situations involving unknowns with expressions or number sentences.

- Patterns and Relationships:
  1. Extend patterns and find missing terms in them.
  2. Describe relationships between adjacent terms in a sequence or between the sequence number of the term and the term.
  3. Generate pairs of whole numbers following a given rule (e.g. multiply the first number by 3 and add 2 to get the second number).
  4. Write or select a rule for a relationship given some pairs of whole numbers satisfying the relationship.

GEOMETRIC SHAPES AND MEASURES

The *geometric shapes and measures* domain includes properties of geometrical figures such as lengths of sides, sizes of angles, areas, and volumes. Students should be able to identify and analyze the properties and characteristics of lines, angles, and a variety of geometric figures, including two-and three-dimensional shapes, and to provide explanations based on geometric relationships. This domain includes understanding informal coordinate systems and using spatial visualization skills to relate between two- and three-dimensional representations of the same shape.

The Geometric Shapes and Measures content domain consists of the following major topic areas

- Lines and Angles:
  1. Measure and estimate lengths.
  2. Identify and draw parallel and perpendicular lines.
  3. Compare angles by size and draw angles (e.g., a right angle, angles larher or smaller than a right angle).

- Two- and Three-dimensional Shapes:
  1. Identify common geometric shapes.
  2. Know, describe, and use elementary properties of geometric figures.
  3. Classify and compare geometric figures, (e.g., by shape, size or properties).
  4. Recognize relationships between three-dimensional shapes and their two-dimensional representations.
  5. Calculate areas and perimeters of squares and rectangles of given dimensions.
  6. Determine and estimate areas and volumes (e.g., by covering with a given shape or by recognizing that area is conversed).

- Location and Movement:
    1. Use informal coordinate systems to locate points in a plane.
    2. Recognize and draw figures with line symmetry.
    3. Recognize and draw reflections and rotations of figures.

DATA DISPLAY

The *data display* content domain includes reading and interpreting displays of data. It also includes understanding how to organize data that have been collected and how to display it in graphs and charts that will be useful in answering the questions that prompted the data collection. Students should be able to compare characteristics of data and to draw conclusions based on data display.

The Data Display content domain consists of the following major topic areas

- Reading and Interpreting:
    1. Read data from tables, pictographs, bar graphs, and pie charts.
    2. Compare information from related data sets (e.g., given data or representations of data on the favourite flavours of ice cream in four or more classes, identify the class with chocolate as the most popular flavour).
    3. Use information from data displays to answer questions that go beyond directly reading the data displayed (e.g., combine data, perform computations based on the data, draw conclusions, and make predictions).

- Organizing and Representing:
    1. Compare and match different representations of the same data.
    2. Organize and display data using tables, pictographs, and bar graphs.

Eighth Grade

NUMBER

The *number* content domain includes understanding of numbers, ways of representing numbers, relationships among numbers, and number systems. At the eighth grade, students should have developed number sense and computational fluency, understand the meanings of operations and how they relate to one another, and be able to use numbers and operations to solve problems. The emphasis within computation is on fractions and decimals rather than on whole numbers.

The Number content domain consists of the following major topic areas

- Whole Numbers:
    1. Demonstrate knowledge of place value and of the four operations.
    2. Find and use multiples or factors of numbers, read scales, and identify prime numbers.
    3. Use the principles of commutativity, associativity, and distributivity.
    4. Evaluate powers of numbers, and square roots of perfect squares to 144.
    5. Solve problems by computing, estimating, or approximating.

- Fractions and Decimals:
    1. Compare and order fractions and decimals.
    2. Demonstrate knowledge of place value for decimals.
    3. Represent decimals and fractions and operations with decimals and fractions using models (e.g., number lines); identify and use such representations.
    4. Recognize and write equivalent fractions.
    5. Convert between fractions and decimals.
    6. Compute with fractions and decimals.
    7. Solve problems by computing, estimating, and approximating.

- Integers:
    1. Represent, compare, order, and compute with integers.
    2. Solve problems using integers.

- Ratio, Proportion, and Percent:
    1. Identify and find equivalent ratios; express ratios.
    2. Divide a quantity in a given ratio.
    3. Convert between percents and fractions or decimals.
    4. Solve problems involving percents and proportions.

ALGEBRA

While functional relationships and their uses for modelling and problem solving are of prime interest, it is also important to assess how well the supporting knowledge and skills have been learned. The *algebra* content domain includes recognizing and extending patterns, using algebraic symbols to represent mathematical situations, and developing fluency in producing equivalent expressions and solving linear equations.

The Algebra content domain consists of the following major topic areas

- Patterns:
    1. Extend numeric, algebraic, and geometric patterns or sequences using numbers, words, symbols, or diagrams; find missing terms.
    2. Generalize pattern relationships in a sequence, or between adjacent terms, or between the sequence number of the term and the term, using numbers, words, or algebraic expressions.

- Algebraic Expressions:
    1. Find sums, products, and powers of expressions containing variables.
    2. Evaluate expressions for given numeric values of the variable(s).
    3. Simplify or compare algebraic expressions to determine equivalence.
    4. Model situations using expressions.

- Equations/Formulas and Functions:
    1. Evaluate equations/formulas given values of the variables.
    2. Indicate whether a value (or values) satisfies a given equation/formula.
    3. Solve simple linear equations and inequalities, and simultaneous (two variables) equations.
    4. Recognize and write linear equations, inequalities, simultaneous equations, or functions that model given situations.
    5. Recognize and generate equivalent representations of functions as ordered pairs, tables, graphs, or words.
    6. Solve problems using equations/formulas and functions.

GEOMETRY

Eighth-grade students should be able to analyze the properties and characteristics of a variety of two and three-dimensional geometric figures, including lengths of sides and sizes of angles, and to provide explanations based on geometric relationships. They should be able to apply the Pythagorean theorem to solve problems. The focus should be on using geometric properties and their relationships. Alongside their appreciation of geometric properties and relationships, students also should be competent in geometric measurement, using measuring instruments accurately, estimating where appropriate, and selecting and using formulas for perimeters, areas, and volumes. The *geometry* content area also includes understanding coordinate representations and using spatial visualization skills to move between two- and three-dimensional shapes and their representations. Students should be able to use symmetry and apply transformation to analyze mathematical situations.

The Geometry content domain consists of the following major topic areas

- Geometric Shapes:
  1. Classify angles as acute, right, straight, obtuse, and reflex (more than 180˚); draw such angles.
  2. Know and use the relationships for angles at a point, angles on a line, vertically opposite angles, angles associated with a transversal cutting parallel lines, angle bisection, and perpendicularity.
  3. Recall and use geometric properties of geometric shapes: triangles, quadrilaterals, and other common polygons.
  4. Construct or draw triangles and rectangles of given dimensions.
  5. Identify congruent triangles, quadrilaterals and their corresponding measures.
  6. Identify similar triangles and recall their properties.
  7. Recognize relationships between three-dimensional shapes and their two-dimensional representations, (e.g., nets or two-dimensional views of three-dimensional objects).
  8. Use Pythagorean theorem (not proof) to solve problems.
  9. Apply geometric properties to solve problems.

- Geometric Measurement:
  1. Measure, draw, and estimate the size of given angles.
  2. Measure, draw, and estimate the length of lines, perimeters, areas and volumes.
  3. Select and use appropriate measurement formulas for perimeters, circumferences, areas of circles, surface areas, and volumes.
  4. Find measures of irregular or compound areas (e.g., by covering with grids or dissecting and rearranging pieces).

- Location and Movement:
  1. Use ordered pairs, equations, intercepts, intersections, and gradient to locate points and lines in the Cartesian plane.
  2. Recognize and use line and rotational symmetry for two-dimensional shapes, e.g. to draw symmetrical figures.
  3. Recognize, or demonstrate by sketching, translation, reflection, and rotation.

DATA AND CHANCE

The *data and chance* content domain includes knowing how to organize data that have been collected by oneself or others and how to display data in graphs and charts that will be useful in answering questions that prompted the data collection. This content domain includes understanding issues related to misinterpretation of data.

The Data and Chance content domain consists of the following major topic areas

- Data Organization and Representation:
  1. Read data from tables, pictographs, bar graphs, pie charts, and line graphs.
  2. Organize and display data using tables, pictographs, bar graphs, pie charts, and line graphs.
  3. Compare and match different representations of the same data.

- Data Interpretation:
  1. Identify, calculate and compare characteristics of data sets, including mean, median, range, and shape of distribution (in general terms).
  2. Use and interpret data sets to answer questions and solve problems (e.g., draw conclusions, make predictions, and estimate values between and beyond given data points).
  3. Recognize and describe approaches to organizing and displaying data that could lead to misinterpretation (e.g., inappropriate grouping and misleading or distorted scales).

- Chance:
    1. Judge the chance of an outcome as certain, more likely, equally likely, less likely, or impossible.
    2. Use data from experiments to predict the chances of future outcomes.
    3. Given a context, use the chances of a particular outcome to solve problems; determine the chances of possible outcomes (e.g., a particular face has a one-sixth chance of being on top after dropping a number cube).

Mathematics Cognitive Domains

To respond correctly to TIMSS test items students need to be familiar with the mathematics content being assessed, but they also need to draw on a range of cognitive skills. These three cognitive domains are used for both grades, but the balance of testing time differs.

The three cognitive domains:

- Knowing
- Applying
- Reasoning

Knowing

The *Knowing* cognitive domain includes which mathematical facts, computational procedures and concepts students should know.

This cognitive domain covers the following behaviors

1. Recall • Recall definitions; terminology; number properties; geometric properties; and notation.
2. Recognize • Recognize mathematical objects, shapes, numbers and expressions. Recognize mathematical entities that are mathematically equivalent (e.g., equivalent familiar fractions, decimals and percents; different orientations of simple geometric figures).
3. Compute • Carry out algorithmic procedures for +, −, ×, ÷, or a combination of these with whole numbers, fractions, decimals and integers. Approximate numbers to estimate computations. Carry out routine algebraic procedures.
4. Retrieve • Retrieve information from graphs, tables or other sources; read simple scales.
5. Measure • Use measuring instruments; use units of measurement appropriately; and estimate measures.
6. Classify/Order • Classify/group objects, shapes, numbers and expressions according to common properties; make correct decisions about class membership; and order numbers and objects by attributes.

Applying

In *Applying* cognitive domain the core domains include conceptual understanding and applying knowledge in order to solve problems.

This cognitive domain covers the following behaviors

1. Select • Select an efficient/appropriate operation, method or strategy for solving problems where there is a known algorithm or method of solution.
2. Represent • Display mathematical information and data in diagrams, tables, charts, or graphs, and generate equivalent representations for a given mathematical entity or relationship.
3. Model • Generate an appropriate model, such as an equation or diagram for solving a routine problem.
4. Implement • Follow and execute a set of mathematical instructions. Given specifications, draw figures and shapes.

5. Solve routine problems • Solve routine problems (i.e., problems similar to those target students are likely to have encountered in class). For example, use geometric properties to solve problems. Compare and match different representations of data (eighth grade) and use data from charts, tables, graphs, and maps to solve routine problems.

Reasoning

Reasoning cognitive domains make cognitive demands over and above those needed for solution of routine problems. Problems requiring reasoning may do so in different ways, because of the novelty of the context or the complexity of the situation or because any solution to the problem must involve several steps.

This cognitive domain covers the following behaviors

1. Analyze • Determine and describe or use relationships between variables or objects in mathematical situations; use proportional reasoning (fourth grade); decompose geometric figures to simplify solving a problem; draw the net of a given unfamiliar solid; visualize transformations of three-dimensional figures; compare and match different representations of the same data (fourth grade); and make valid inferences from given information.
2. Generalize • Extend the domain to which the result of mathematical thinking and problem solving is applicable by restating results in more general and more widely applicable terms.
3. Synthesize/ Integrate • Combine (various) mathematical procedures to establish results, and combine results to produce a further result. Make connections between different elements of knowledge and related representations, and make linkages between related mathematical ideas.
4. Justify • Provide a justification for the truth or falsity of a statement by reference to mathematical results or properties.
5. Solve non-routine problems • Solve problems set in mathematical or real life contexts where target students are unlikely to have encountered closely similar items, and apply mathematical procedures in unfamiliar or complex contexts. Use geometric properties to solve non-routine problems.

SCIENCE

Science Content Domains

The content domains for the science assessment specify the domains or subject matter to be assessed within science. To define the science content the participating countries' curricula were used. At the eighth grade, physics and chemistry are assessed as separate content domains, and receive more emphasis than at fourth grade, where they are assessed as one content domain, physical science.

Content Domains at Fourth Grade:

- Life Science
- Physical Science
- Earth Science

Content Domains at Eighth Grade:

- Biology
- Chemistry
- Physics
- Earth Science

Fourth Grade

LIFE SCIENCE

Life science includes understandings of the characteristics and life processes of living things, the relationships between them, and their interaction with the environment.

The Life Science content domain consists of the following major topic areas

- Characteristics and Life Processes of Living Things
  1. Distinguish between living and nonliving things; identify common features of living things (movement; basic needs for air, food, water; reproduction; growth; response to stimuli).
  2. Compare and contrast physical and behavioural characteristics of major groups of organisms (e.g., insects, birds, mammals, plants), and identify or provide examples of plants and animals belonging to these groups.
  3. Relate major body structures in humans and other organisms (plants and animals) to their functions (e.g., digestion takes place in the stomach, teeth break down food, bones support the body, lungs take in oxygen, plant roots absorb water, leaves make food).

- Life Cycles, Reproduction, and Heredity
  1. Trace the general steps in the life cycle of plants germination, growth and development, reproduction, seed dispersal) and animals (birth, growth and development, reproduction, and death); know and compare life cycles of familiar organisms (e.g., humans, butterflies, frogs, plants, mosquitoes).
  2. Recognize that plants and animals reproduce with their own kind to produce offspring with features that closely resemble those of the parents.

- Interactions with the Environment
  1. Associate physical features of plants and animals with the environments in which they live; identify or provide examples of certain physical or behavioural characteristics of plants and animals that make them better suited for survival in particular environments and explain why (e.g., colour change, fur thickness, hibernation, migration).
  2. Describe bodily actions in response to outside conditions (e.g., heat, cold, danger) and activities (e.g., exercise).

- Ecosystems
  1. Understand that plants need the sun to make their own food, while animals consume plants or other animals as food; recognize that all plants and animals need food to provide energy for activity and raw material for growth and repair.
  2. Explain relationships in a given community (e.g., forest, tidepool) based on simple food chains, using common plants and animals and predator-prey relationships.
  3. Present ways in which human behaviour can have a positive or a negative effect on environments; provide general descriptions and examples of the effects of pollution on humans, plants, animals, and their environments, and ways of preventing or reducing pollution.

- Human Health
  1. Recognize ways that common communicable diseases (e.g., colds, influenza) are transmitted; identify signs of health or illness and some methods of preventing and treating illness.
  2. Describe ways of maintaining good health, including the need for a balanced diet, identification of common food sources (e.g., fruits and vegetables, grains), and the effect of personal habits on health (e.g., regular exercise, nutritious diet).

PHYSICAL SCIENCE

Physical science includes concepts related to matter and energy, and covers topics in the areas of both chemistry and physics. Since students in fourth grade have only a beginning knowledge of chemistry, the framework places more emphasis on physics concepts.

The topic areas for Physical Science include

- Classification and Properties of Matter
  1. Compare or classify objects and materials on the basis of physical properties (e.g., weight/mass, shape, volume, colour, hardness, texture, odour, taste, magnetic attraction).
  2. Identify basic properties of metals and relate them to their use (e.g., conduct heat and electricity, are hard, are shiny, can be moulded).
  3. Identify or describe mixtures on the basis of physical appearance; demonstrate understanding that mixtures can be separated based on the observable properties of their parts (e.g., particle size, shape, colour, magnetic attraction).
  4. Identify properties and common uses of water (e.g., solvent, coolant, heat source) in each of its forms.
  5. Give examples of materials that will dissolve in water and those that will not; and identify common conditions that increase the amount of material that will dissolve or the speed at which materials dissolve (hot water, stirring, small particles).

- Physical States and Changes in Matter
  1. Recognize that matter exists in three major states (solid, liquid, gas), and describe differences in the observable physical properties of solids, liquids, and gases in terms of shape and volume.
  2. Recognize that matter can be changed from one state to another by heating or cooling, and describe these changes in familiar terms (melting, freezing, boiling, evaporation, condensation).
  3. Identify some familiar changes in materials that produce other materials with different characteristics (e.g., decaying of animal or plant matter, burning, rusting, cooking).

- Energy Sources, Heat, and Temperature
  1. Identify common energy sources (e.g., wind, sun, electricity, burning fuel, moving water, food); know some practical uses of energy.
  2. Recognize that heat flows from a hot object to a cold object and causes materials to change temperature and volume; identify common materials that conduct heat better than others; recognize the relationship between temperature measurements and how hot or cold an object is.

- Light and Sound
  1. Identify common sources of light (e.g., bulb, flame, sun); and relate familiar physical phenomena to the presence or absence and the behaviour of light (e.g., appearance of rainbows; colours produced from soap bubbles; formation of shadows; visibility of objects; mirrors).
  2. Recognize that sound is produced by vibrations.

- Electricity and Magnetism
  1. Identify a complete electrical circuit using batteries, bulbs, wires, and other common components that conduct electricity.
  2. Recognize that magnets have north and south poles, that like poles repel and opposite poles attract, and that magnets can be used to attract some other materials or objects.

- Forces and Motion
    1. Identify familiar forces that cause objects to move (e.g., gravity acting on falling objects, push/pull forces).
    2. Describe how the relative weight of objects can be determined using a balance; relate the weight of different objects to their ability to float or sink.

EARTH SCIENCE

Earth science is concerned with the study of Earth and its place in the solar system. While there is no single picture of what constitutes an Earth science curriculum that applies to all countries, the TIMSS 2007 framework identifies the following topic areas that are universally considered to be important for students at the fourth grade to understand about the planet on which they live and its place in the solar system.

The topic areas for Physical Science include

- Earth's Structure, Physical Characteristics, and Resources
    1. Identify substances that make up Earth's surface (e.g., rocks, minerals, sand, and soil), know where these substances are found, and compare some of their physical characteristics and uses.
    2. Recognize that most of Earth's surface is covered with water; describe the locations and types of water found on Earth (e.g., salt water in oceans, fresh water in lakes, rivers, clouds, snow, ice caps, icebergs).
    3. Provide evidence for the existence and nature of air, including the fact that air contains water (e.g., cloud formation, dew drops, evaporation of ponds), provide or identify examples of the uses of air, and recognize the importance of air for supporting life.
    4. Identify or describe common features of Earth's landscape (e.g., mountains, plains, rivers, deserts) and relate them to human use (e.g., farming, irrigation, land development).
    5. Identify some of Earth's resources that are used in everyday life (e.g., water, soil, wood, minerals, fuel, food); explain the importance of using these resources wisely.

- Earth's Processes, Cycles, and History
    1. Describe the movement of water on Earth's surface (e.g., flowing in rivers or streams from mountains to oceans or lakes); relate the formation of clouds and rain or snow to a change of state of water.
    2. Describe changes in weather conditions from day to day or over the seasons in terms of temperature, precipitation (rain or snow), clouds, and wind.
    3. Recognize that fossils found in rocks are the remains of animals and plants that lived on Earth a long time ago.

- Earth in the Solar System
    1. Describe the solar system as a group of planets (including Earth) each revolving around the sun; recognize that the moon revolves around Earth; draw or describe the phases of the moon; and identify the sun as the source of heat and light for the solar system.
    2. Relate daily patterns observed on Earth to Earth's rotation on its axis and its relationship to the sun (e.g., day and night, appearance of shadows).

Eighth grade

Four major content domains – biology, chemistry, physics, and Earth science – define the science content covered in the eighth-grade assessment. It is important to note, however, that in an international assessment such as TIMSS the organization of science topics into these domains does not correspond to the structure of science instruction in all countries. In many countries, for example, science is taught as general science or integrated science whereas in others science is taught as separate subjects such as biology, physics, and chemistry.

Each content domain has several main topic areas to be described next.

BIOLOGY

Biology includes students' understandings of the structure, life processes, diversity, and interdependence of living organisms.

The topic areas for Biology include

- Characteristics, Classification, and Life Processes of Organisms
  1. State the defining characteristics that differentiate among the major taxonomic groups and organisms within these groups, and classify organisms on the basis of a variety of physical and behavioral characteristics.
  2. Locate major organs in the human body, identify the components of organ systems, and compare and contrast organs and organ systems in humans and other organisms.
  3. Relate the structure and function of organs and organ systems to the basic biological processes required to sustain life (sensory, digestive, skeletal and muscular, circulatory, nervous, respiratory, excretory, reproductive).
  4. Explain how biological actions in response to specific external and internal changes work to maintain stable bodily conditions (e.g., sweating in heat, shivering in cold, increased heart rate during exercise).

- Cells and Their Functions
  1. Describe the cellular make-up of all living organisms (both single-celled and multi-cellular), explain that cells carry out life functions and undergo cell division during growth and repair in organisms, and that tissues, organs, and organ systems are formed from groups of cells with specialized structures and functions.
  2. Identify cell structures and some functions of cell organelles (cell wall, cell membrane, nucleus, cytoplasm, chloroplast, mitochondria, vacuoles); compare plant and animal cells.
  3. Describe the process of photosynthesis that takes place in plant cells (the need for light, carbon dioxide, water, and chlorophyll; production of food; and release of oxygen).
  4. Describe the process of respiration that takes place in plant and animal cells (the need for oxygen, breaking down of food to produce energy, and release of carbon dioxide).

- Life Cycles, Reproduction, and Heredity
  1. Compare and contrast how different organisms grow and develop (e.g., humans, plants, birds, insects).
  2. Explain that reproduction (asexual or sexual) occurs in all living organisms and is important for the survival of species; compare and contrast biological processes in asexual and sexual reproduction in general terms (e.g., cell division producing identical offspring versus egg and sperm combination producing offspring that are similar but not identical to either parent); state advantages and disadvantages of each type of reproduction.
  3. Relate the inheritance of traits to the passing on of genetic material contained in the cells of the parent(s) to their offspring; distinguish inherited characteristics from physical or behavioral features that are acquired or learned.

- Diversity, Adaptation, and Natural Selection
  1. Relate the survival or extinction of different species to variation in physical/behavioral characteristics in a population and reproductive success in changing environments.
  2. Recognize the relative length of time major groups of organisms have existed on Earth (e.g., humans, reptiles, fish, plants); describe how similarities and differences among living species and fossils provide evidence of the changes that occur in living things over time.

- Ecosystems
  1. Describe the flow of energy in an ecosystem (the role of photosynthesis and respiration and the storage of food or energy products in organisms); identify different organisms as producers, consumers, and decomposers; draw or interpret food pyramids or food web diagrams.

2. Describe the role of organisms in the cycling of materials (e.g., oxygen, carbon dioxide, water) through Earth's surface and the decomposition of organisms and recycling of elements back into the environment.
3. Explain the interdependence of populations of organisms in an ecosystem in terms of the effects of competition and predation; identify factors that can limit population size (e.g., disease, predators, food resources, drought); predict effects of changes in an ecosystem (e.g., climate, water supply, food supply, population changes, migration) on the available resources and the balance among populations.
4. Recognize that the world's human population is growing and identify reasons why (e.g., advances in medicine, sanitation); discuss the effects of population growth on the environment.
5. Describe the impact of natural hazards (e.g., earthquakes, landslides, wildfires, volcanic eruptions, floods, storms) on humans, wild life, and the environment.

- Human Health
  1. Describe causes of common infectious diseases (e.g., influenza, measles, strep throat, AIDS), methods of infection or transmission, prevention, and the importance of the body's natural resistance (immunity) and healing capabilities.
  2. Explain the importance of diet, hygiene, exercise, and lifestyle in maintaining health and preventing illness (e.g., heart disease, diabetes, skin cancer, lung cancer); identify the dietary sources and role of nutrients in a healthy diet (vitamins, minerals, proteins, carbohydrates, fats).

CHEMISTRY

The *Chemistry* content domain includes mainly concepts of matter and chemical change.

The topic areas for Chemistry include

- Classification and Composition of Matter
  1. Classify or compare substances on the basis of characteristic physical properties that can be demonstrated or measured (e.g., density, thermal or electrical conductivity, solubility, melting or boiling point, magnetic properties).
  2. Recognize that substances may be grouped according to similar chemical and physical properties; describe properties of metals that distinguish them from nonmetals.
  3. Differentiate between pure substances (elements and compounds) and mixtures (homogeneous and heterogeneous) on the basis of their formation and composition, and provide or identify examples of each (solid, liquid, gas).
  4. Describe the structure of matter in terms of particles, including molecules as combinations of atoms (e.g., H_2O, O_2, CO_2) and atoms as being composed of subatomic particles (electrons surrounding a nucleus containing protons and neutrons).

- Properties of Matter
  1. Select or describe physical methods for separating mixtures into their components (e.g., filtration, distillation, sedimentation, magnetic separation, flotation, dissolution).
  2. Define solutions in terms of substance(s) (solid, liquid, or gas solutes) dissolved in a solvent; apply knowledge of the relationship between concentration or dilution and the amounts of solute or solvent; and of the effect of factors such as temperature, stirring, and particle size on the rate at which materials dissolve.
  3. Relate the behavior and uses of water to its physical properties (e.g., melting point and boiling point, ability to dissolve many substances, thermal properties, expansion upon freezing).
  4. Compare the properties of common acids and bases (acids have a sour taste and react with metals; bases usually have a bitter taste and slippery feel; strong acids and bases are corrosive; both acids and bases dissolve in water and react with indicators to produce different color changes; acids and bases neutralize each other).

- Chemical Change
    1. Differentiate chemical from physical changes in terms of the transformation (reaction) of one or more pure substances (reactants) into different pure substances (products); provide evidence that a chemical change has taken place based on common examples (e.g., temperature change, gas production, color change, light emission).
    2. Recognize that mass is conserved during chemical change.
    3. Recognize the need for oxygen in common oxidation reactions (combustion, rusting); compare the relative tendency of familiar substances to undergo these reactions (e.g., combustion of gasoline versus water, corrosion of steel versus aluminium).
    4. Recognize that some chemical reactions give off heat while others absorb it; classify familiar chemical transformations as either releasing or absorbing heat (e.g., burning, neutralization, cooking).

PHYSICS

In *physics,* students' understandings of concepts related to energy and physical processes will be assessed.

The topic areas for Physics include

- Halmazállapotok és az anyag változásai
    1. Szilárd, folyadék és gáznemű anyagok fizikai tulajdonságainak magyarázata a részecskék távolságával és mozgásával kapcsolatos tudás alapján (térfogat, alak, sűrűség, összenyomhatóság).
    2. Az olvadás, a fagyás, a forrás, a párolgás és a lecsapódás folyamata olyan változások, amelyek hőfelvétellel vagy -leadással járnak. E folyamatok sebessége hogyan függ össze egyszerű fizikai tényezőkkel (pl. felszín, oldott anyag, hőmérséklet, tengerszint feletti magasság illetve a nyomás).
    3. A halmazállapot-változások alatt az anyag hőmérséklete nem változik.
    4. Az anyagmegmaradás törvénye érvényes a fizikai változások esetében is.

- Energy Transformations, Heat, and Temperature
    1. Identify different forms of energy (e.g., mechanical, light, sound, electrical, thermal, chemical); describe simple energy transformations (e.g., combustion in an engine to move a car, electrical energy to power a lamp, light energy to chemical energy in photosynthesis, hydroelectric power, changes between potential and kinetic energy); and apply knowledge of the concept of conservation of total energy.
    2. Relate heat to the transfer of energy from an object at a high temperature to one at a lower temperature; compare the relative thermal conductivity of different materials; and compare and contrast methods of heat transfer (conduction, convection, and radiation).
    3. Relate temperature changes to changes in volume and/or pressure and to changes in the movement or speed of particles.

- Light
    1. Describe or identify some basic properties or behaviors of light (transmission from a source through different media; speed of light compared to sound; reflection, refraction {bending}, absorption, and transmission by different materials; splitting of white light into its component colors by prisms and other dispersive media).
    2. Relate the appearance or color of objects to the properties of reflected or absorbed light.
    3. Solve practical problems involving the reflection of light from plane mirrors and the formation of shadows; interpret ray diagrams to identify the path of light and locate reflected or projected images using lenses.

- Sound
    1. Recognize the characteristics of sound (loudness, pitch, amplitude, frequency).
    2. Describe or identify some basic properties of sound (transmission from a source through a medium, reflection and absorption by surfaces, and relative speed through different media).

- Electricity and Magnetism
    1. Describe the flow of current in an electrical circuit; draw or identify diagrams representing complete circuits (series and parallel); classify materials as electrical conductors or insulators; and recognize that there is a relationship between current and voltage in a circuit.
    2. Describe the properties of permanent magnets and the effects of magnetic force; identify essential features and practical uses of electromagnets (e.g., doorbell).

- Forces and Motion
    1. Represent the motion of an object in terms of its position, direction, and speed in a given reference frame; compute speed from time and distance using standard units; and use information in distance versus time graphs.
    2. Describe general types of forces (e.g., weight as a force due to gravity, contact force, buoyant force, friction); predict changes in motion (if any) of an object based on the forces acting on it.
    3. Demonstrate basic knowledge of work and the function of simple machines (e.g., levers) using common examples.
    4. Explain observable physical phenomena in terms of density differences (e.g., floating or sinking objects, rising balloons).
    5. Describe effects related to pressure (e.g., atmospheric pressure as a function of altitude, ocean pressure as a function of depth, evidence of gas pressure in balloons, spreading force over a large or small area, fluid levels).

EARTH SCIENCE

Earth science is concerned with the study of Earth and its place in the solar system and the universe. Topics covered in the teaching and learning of Earth science draw on the fields of geology, astronomy, meteorology, hydrology, and oceanography, and are related to concepts in biology, physics, and chemistry. Although separate courses in Earth science covering all of these topics are not taught in all countries, it is expected that understandings related to Earth science topic areas will have been included in a science curriculum covering the physical and life sciences or in separate courses such as geography and geology. While there is no single picture of what constitutes an Earth science curriculum that applies to all countries, the TIMSS 2007 framework identifies the following topic areas that are universally considered to be important for students at the eighth grade to understand about the planet on which they live and its place in the universe.

The topic areas for Earth Science include

- Earth's Structure and Physical Features
    1. Describe the structure and physical characteristics of Earth's crust, mantle, and core; use and interpret topographic maps; describe the formation, characteristics, and uses of soils, minerals, and basic rock types.
    2. Compare the physical state, movement, composition and relative distribution of water on Earth (e.g., oceans, rivers, ground water, glaciers, ice caps, clouds).
    3. Recognize that Earth's atmosphere is a mixture of gases, and identify the relative abundance of its main components; relate changes in atmospheric conditions (temperature, pressure, composition) to altitude.

- Earth's Processes, Cycles, and History
    1. Describe the general processes involved in the rock cycle (weathering/erosion, deposition, heating/compression, melting/freezing, lava flow) resulting in the continuous formation of igneous, metamorphic, and sedimentary rock.
    2. Diagram or describe the steps in Earth's water cycle (evaporation, condensation, and precipitation), referencing the sun as the source of energy and the role of cloud movement and water flow in the circulation and renewal of fresh water on Earth's surface.

3. Interpret weather data or maps, and relate changing weather patterns to global and local factors in terms of temperature, pressure, precipitation, wind speed and direction, cloud types and formation, and storm fronts.
4. Compare seasonal climates of major regions on Earth, considering effects of latitude, altitude and geography (e.g., mountains and oceans); identify or describe long- and short-term climatic changes (e.g., ice ages, global warming trends, volcanic eruptions, changes in ocean currents).
5. Identify or describe physical processes and major geological events that have occurred over millions of years (e.g., weathering, erosion, deposition, volcanic activity, earthquakes, mountain building, plate movement, continental drift); explain the formation of fossils and fossil fuels.
6. Relate some environmental concerns to their possible causes and effects (e.g., pollution, global warming, acid rain, depletion of the ozone layer, deforestation, desertification); present ways in which science and technology can be used to address these concerns.

- Earth's Resources, Their Use and Conservation
  1. Provide common examples of renewable and nonrenewable resources; discuss advantages and disadvantages of different energy sources; and describe methods of conservation and waste management (e.g., recycling).
  2. Relate effects of human use of land or soil resources (e.g., farming, tree harvesting, mining) to methods used in agriculture and land management (e.g., crop rotation, fertilization, pest control, reforesting).
  3. Discuss factors related to the supply and demand of fresh water and use of water resources (e.g., purification, desalination, irrigation, use of dams, conservation).

- Earth in the Solar System and the Universe
  1. Explain phenomena on Earth (day and night, tides, year, phases of the moon, eclipses, seasons in the northern and southern hemisphere, appearance of sun, moon, planets, and constellations) in terms of the relative movements, distances, and sizes of Earth, the moon, and other bodies in and outside the solar system.
  2. Recognize the role of gravity in the solar system (e.g., tides, keeping the planets and moons in orbit, pulling us to Earth's surface).
  3. Compare and contrast the physical features of Earth with the moon and other planets (e.g., atmosphere, temperature, water, distance from the sun, period of revolution and rotation, ability to support life).

Cognitive Domains

To respond correctly to TIMSS test items, students need to be familiar with the science content being assessed, but they also need to draw on a range of cognitive skills. This section outlines the skills and abilities associated with the cognitive dimension. The cognitive dimension is divided into three domains: Knowing, Applying, Reasoning.

Knowing

Knowing refers to students' knowledge base of science facts, information, concepts, tools, and procedures. Accurate and broad-based factual knowledge enables students to engage successfully in the more complex cognitive activities essential to the scientific enterprise. Students are expected to recall or recognize accurate science statements; possess knowledge of vocabulary, facts, information, symbols, units, and procedures; and select appropriate apparatus, equipment, measurement devices, and experimental operations to use in conducting investigations. This cognitive domain also includes the selection of illustrative examples in support of statements of facts or concepts.

Elements of Knowing cognitive domain

1. Recall/Recognize • Make or identify accurate statements about science facts, relationships, processes, and concepts; identify the characteristics or properties of specific organisms, materials, and processes.
2. Define • Provide or identify definitions of scientific terms; recognize and use scientific vocabulary, symbols, abbreviations, units, and scales in relevant contexts.
3. Describe • Describe organisms, physical materials, and science processes that demonstrate knowledge of properties, structure, function, and relationships.
4. Illustrate with examples • Support or clarify statements of facts or concepts with appropriate examples; identify or provide specific examples to illustrate knowledge of general concepts.
5. Use tools and procedures • Demonstrate knowledge of the use of science apparatus, equipment, tools, procedures, measurement devices, and scales.

Applying

The questions in this cognitive domain are designed to involve the direct application of knowledge and understanding in straightforward situations. To measure *applying,* TIMSS 2007 will include items that require students to compare, contrast, and classify, to interpret scientific information in light of a science concept or principle, and to use and apply their understanding of science concepts and principles to find a solution or develop an explanation. Items aligned with this cognitive domain will involve the direct application or demonstration of relationships, equations, and formulas in contexts likely to be familiar in the teaching and learning of science concepts. Both quantitative problems requiring a numerical solution and qualitative problems requiring a written descriptive response are included. In providing explanations, students should be able to use diagrams or models to illustrate structures and relationships and demonstrate knowledge of scientific concepts.

Elements of Applying cognitive domain

1. Compare/Contrast/Classify • Identify or describe similarities and differences between groups of organisms, materials, or processes; distinguish, classify, or order individual objects, materials, organisms, and processes based on given characteristics and properties.
2. Use models • Use a diagram or model to demonstrate understanding of a science concept, structure, relationship, process, or biological or physical system or cycle (e.g., food web, electrical circuit, water cycle, solar system, atomic structure).
3. Relate • Relate knowledge of an underlying biological or physical concept to an observed or inferred property, behavior, or use of objects, organisms, or materials.
4. Interpret information • Interpret relevant textual, tabular, or graphical information in light of a science concept or principle.
5. Find Solutions • Identify or use a science relationship, equation, or formula to find a qualitative or quantitative solution involving the direct application/demonstration of a concept.
6. Explain • Provide or identify an explanation for an observation or natural phenomenon, demonstrating understanding of the underlying science concept, principle, law, or theory.

Reasoning

Reasoning is involved in the more complex tasks related to science. A major purpose of science education is to prepare students to engage in scientific reasoning to solve problems, develop explanations, draw conclusions, make decisions, and extend their knowledge to new situations. In addition to the more direct applications of science concepts exemplified in the applying domain, some problem-solving situations involve unfamiliar or more complicated contexts that require students to reason from scientific principles to provide an answer. Some items in this cognitive domain may focus on unified concepts and major conceptual themes, requiring students to bring together knowledge

and understanding from different areas and apply it to new situations. As such, they may involve the integration of mathematics and science and/or the integration and synthesis of concepts across the domains of science.

Elements of Reasoning cognitive domain

1. Analyze/Solve problems • Analyze problems to determine the relevant relationships, concepts, and problem-solving steps; develop and explain problem-solving strategies.
2. Integrate/Synthesize • Provide solutions to problems that require consideration of a number of different factors or related concepts; make associations or connections between concepts in different areas of science; demonstrate understanding of unified concepts and themes across the domains of science; integrate mathematical concepts or procedures in the solutions to science problems.
3. Hypothesize/Predict • Combine knowledge of science concepts with information from experience or observation to formulate questions that can be answered by investigation; formulate hypotheses as testable assumptions using knowledge from observation and/ or analysis of scientific information and conceptual understanding; make predictions about the effects of changes in biological or physical conditions in light of evidence and scientific understanding.
4. Design/Plan • Design or plan investigations appropriate for answering scientific questions or testing hypotheses; describe or recognize the characteristics of well-designed investigations in terms of variables to be measured and controlled and cause-and effect relationships; make decisions about measurements or procedures to use in conducting investigations.
5. Draw conclusions • Detect patterns in data, describe or summarize data trends, and interpolate or extrapolate from data or given information; make valid inferences on the basis of evidence and/or understanding of science concepts; draw appropriate conclusions that address questions or hypotheses, and demonstrate understanding of cause and effect.
6. Generalize • Make general conclusions that go beyond the experimental or given conditions, and apply conclusions to new situations; determine general formulas for expressing physical relationships.
7. Evaluate • Weigh advantages and disadvantages to make decisions about alternative processes, materials, and sources; consider scientific and social factors to evaluate the impact of science and technology on biological and physical systems; evaluate alternative explanations and problem-solving strategies and solutions; evaluate results of investigations with respect to sufficiency of data to support conclusions.
8. Justify • Use evidence and scientific understanding to justify explanations and problem solutions; construct arguments to support the reasonableness of solutions to problems, conclusions from investigations, or scientific explanations.

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The TIMSS Studies have assessed the trends in mathematics and science achievement of 4th and 8th grade students around the world since 1995. The results from the 2007 study show that Mathematics and Science in public education in Hungary is of high quality, even in an international comparison. Only the countries to have surpassed the Hungarian 8th graders are the Asian countries with their altogether high achievement levels.

The study also shows the effects of factors influencing the public education system as a whole, such as countries with an above average performance in science are overall better in complex task solving strategies. On the other hand, Hungarian students, who are among the highest achievers, perform best in recalling information in 4th grade, applying knowledge in 8th. It is important to note that in Hungary the level of parental education, the economic and social differences between families have a stronger influence than in most European countries.

OKM Oktatási és Kulturális Minisztérium

Oktatási Hivatal

Közoktatási Mérési Értékelési Osztály