# CHAPTER 1

Student Achievement in Science

Chapter 1 summarizes eighth-grade achievement on the TIMSS 1999 science assessment for each of the Benchmarking states, districts, and consortia, as well as for each participating country. Comparisons of participants' performance against international benchmarks, as well as gender differences in performance, are also provided.
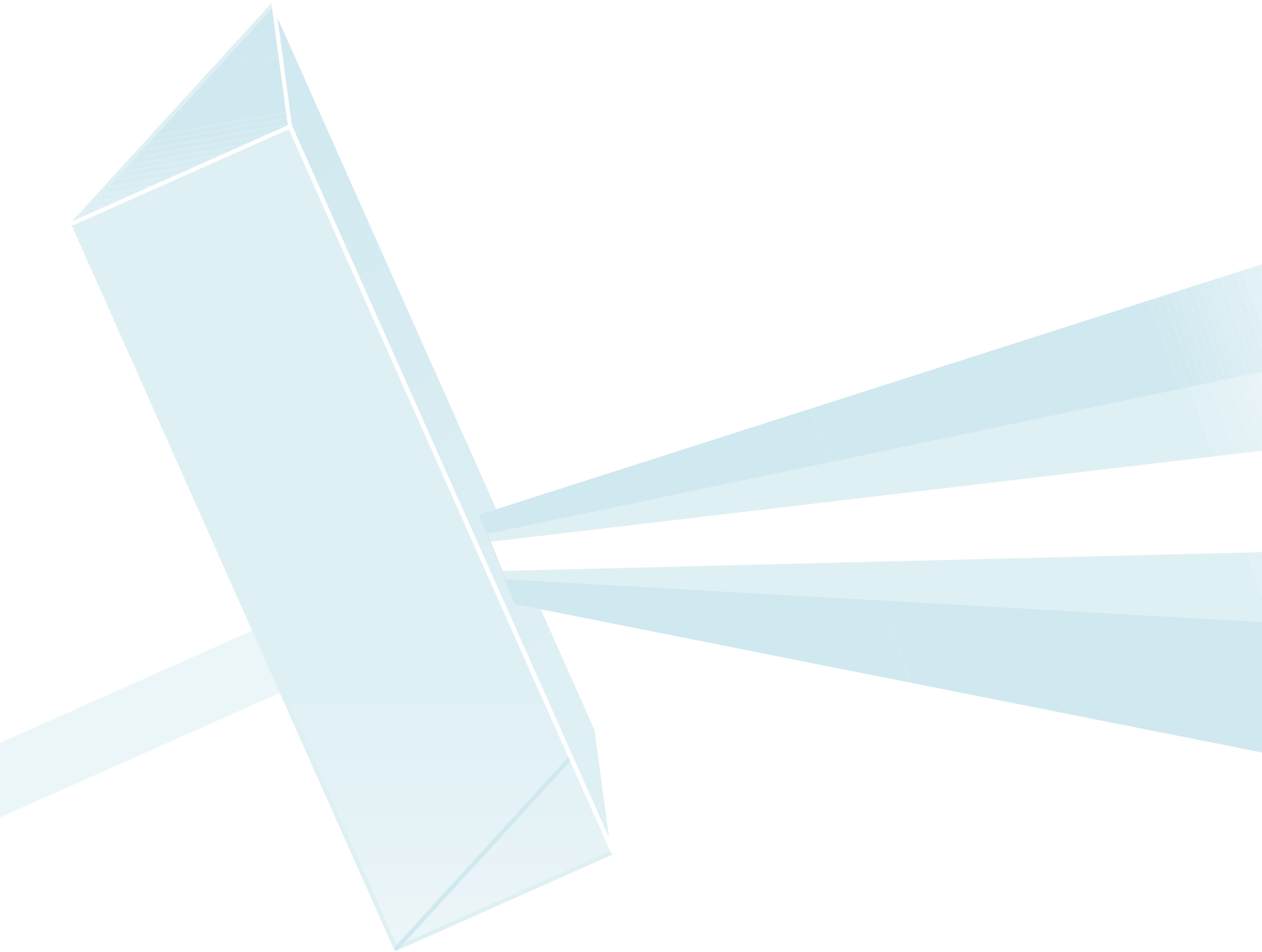
How Do Participants Differ in Science Achievement?

Exhibit 1.1 presents the distribution of student achievement for the 38 TIMSS 1999 countries and the 27 Benchmarking participants in a two-page display.[1] The left-hand page shows countries and Benchmarking participants together, in decreasing order of average (mean) scale score, and indicates whether the average for each participant is significantly higher or lower than the international average of 488. The international average was obtained by averaging across the mean scores for each of the 38 participating countries. On the right-hand page is a tabular display of average achievement, along with the number of years of formal schooling and the average age of students tested.

Many of the Benchmarking participants performed fairly well on the TIMSS 1999 science assessment. Average performance for the 13 Benchmarking states was generally clustered in the upper half of the international distribution of results for the 38 countries. All but three of the Benchmarking states performed significantly above the international average. The United States as a whole also had average science achievement just above the international average.

The Benchmarking Study underscores the extreme importance of looking beyond the averages to the range of performance found across the nation. Performance across the participating school districts and consortia reflected nearly the full range of achievement internationally. The highest-achieving Benchmarking participants were the Naperville School District, the First in the World Consortium, the Michigan Invitational Group, and the Academy School District. These were four of the Benchmarking participants with the lowest percentages of students from low-income families (Naperville, 2 percent; First in the World, 14 percent; Michigan Invitational Group, 22 percent; Academy School District, 4 percent).[2] Benchmarking participants with the lowest average science achievement included four urban school districts with high percentages of students from low-income families – the Rochester City School District (73 percent), the Chicago Public Schools (71 percent), the Jersey City Public Schools (89 percent), and the Miami-Dade County Public Schools (59 percent). Although not quite as low as the lowest-scoring countries in TIMSS 1999, the range of average performance across the Benchmarking districts and consortia was almost as broad as across all the TIMSS 1999 countries.

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[1] TIMSS used item response theory (IRT) methods to summarize the achievement results on a scale with a mean of 500 and a standard deviation of 100. Given the matrix-sampling approach, scaling averages students' responses in a way that accounts for differences in the difficulty of different subsets of items. It allows students' performance to be summarized on a common metric even though individual students responded to different items in the test. For more detailed information, see the "IRT Scaling and Data Analysis" section of Appendix A.

[2] Low-income figures are percentages of students eligible to receive free or reduced-price lunch through the National School Lunch Program, as reported by participating schools.

That achievement is distributed broadly within as well as across partici-
pating entities is graphically illustrated in Exhibit 1.1 showing the
distribution of student performance within each entity. Achievement for
each participant is shown for the 25th and 75th percentiles as well as for
the 5th and 95th percentiles.[3] Each percentile point indicates the
percentages of students performing below and above that point on the
scale. For example, 25 percent of the eighth-grade students in each
participating entity performed below the 25th percentile for that entity,
and 75 percent performed above the 25th percentile. The range between
the 25th and 75th percentiles represents performance by the middle half
of students. In most entities, the range of performance for the middle
group was between 100 and 150 scale-score points. Performance at the
5th and 95th percentiles represents the extremes in both lower and
higher achievement. The range of performance between these two score
points, which includes 90 percent of the population, is between 250 and
300 points for most participants. The dark boxes at the midpoints of the
distributions show the 95 percent confidence intervals around the average
achievement in each entity.[4]

As well as showing the wide spread of student achievement within each
entity, the percentiles also provide a perspective on the size of the differ-
ences among entities. Even though performance generally differed very
little between one participant and the next higher- or lower-performing
one, the range across participants was very large. For example, average
performance in Chinese Taipei exceeded performance at the 95th
percentile in the lower-performing countries such as the Philippines,
Morocco, and South Africa. This means that only the most proficient
students in the lower-performing countries approached the level of
achievement of students of average proficiency in Chinese Taipei.

Exhibit 1.2 compares overall mean achievement in science among
individual entities. This figure shows whether or not the differences in
average achievement between pairs of participants are statistically
significant. Selecting a participant of interest and reading across the
exhibit, a triangle pointing up indicates significantly higher performance
than the comparison participant listed across the top; a circle indicates
no significant difference in performance; and a triangle pointing down
indicates significantly lower performance.

The data in Exhibit 1.2 reinforce the point that, when ordered by average
achievement, adjacent participants usually did not significantly differ from
each other, although the differences in achievement between the high-
performing and low-performing participants were very large.

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[3] Tables of the percentile values and standard deviations for all participants are presented in Appendix C.

[4] See the "IRT Scaling and Data Analysis" section of Appendix A for more details about calculating standard errors and confidence inter-
vals for the TIMSS statistics.

The Naperville School District, Chinese Taipei, Singapore, the First in the World Consortium, the Michigan Invitational Group, and the Academy School District had the highest average performance, closely followed by Hungary, Japan, and Korea. Naperville, First in the World, the Michigan Invitational Group, and the Academy School District all had average achievement comparable to that of high-performing Chinese Taipei and Singapore. The difference in performance from one participant to the next was often negligible. Among Benchmarking jurisdictions, Michigan, the Southwest Pennsylvania Math and Science Collaborative, the Project SMART Consortium, Oregon, Indiana, Guilford County, Massachusetts, and Connecticut were outperformed by very few entities, and had higher average achievement than almost half of them. Montgomery County, Pennsylvania, Idaho, Missouri, and Illinois also had very similar performance, each scoring above slightly more than 20 other entities and being outscored by nine or fewer. Another group with roughly similar achievement includes the Fremont/Lincoln/Westside Public Schools, South Carolina, North Carolina, Maryland, and the Delaware Science Coalition. Each of these performed better than about 20 other entities and was outperformed by about 20 entities. Texas had similar achievement, but its large standard error reduced the number of statistically significant differences. The Rochester City School District, the Chicago Public Schools, the Jersey City Public Schools, and the Miami-Dade County Public Schools had average eighth-grade science performance lower than most of the TIMSS 1999 countries and comparable to that of Jordan, Iran, Indonesia, Turkey, and Tunisia.

Exhibit 1.1 **Distribution of Science Achievement**

ISC
TIMSS 1999
Benchmarking
Boston College

8th Grade Science

Science Achievement Scale Score

Participant
Naperville Sch. Dist. #203, IL
Chinese Taipei
Singapore
First in the World Consort., IL
Michigan Invitational Group, MI
Academy School Dist. #20, CO
Hungary
Japan
Korea, Rep. of
Netherlands [†]
Michigan
SW Math/Sci. Collaborative, PA
Australia
Czech Republic
Project SMART Consortium, OH
England [†]
Oregon
Finland
Slovak Republic
Belgium (Flemish) [†]
Indiana [†]
Guilford County, NC [2]
Slovenia
Massachusetts
Canada
Montgomery County, MD [2]
Hong Kong, SAR [†]
Connecticut
Russian Federation
Pennsylvania
Idaho
Missouri
Illinois
Bulgaria
United States
Fremont/Lincoln/WestSide PS, NE
South Carolina
New Zealand
Texas
North Carolina
Maryland
Latvia (LSS) [1]
Delaware Science Coalition, DE
Italy
Malaysia
Lithuania [1‡]
Thailand
Romania
Israel [2]
Cyprus
Moldova
Macedonia, Rep. of
Rochester City Sch. Dist., NY
Jordan
Chicago Public Schools, IL
Iran, Islamic Rep.
Jersey City Public Schools, NJ
Indonesia
Turkey
Tunisia
Miami-Dade County PS, FL
Chile
Philippines
Morocco
South Africa

Scale: 0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1998-1999.

▲ Participant average significantly higher than international average

● No statistically significant difference between participant average and international average

▼ Participant average significantly lower than international average

Significance tests adjusted for multiple comparisons

Percentiles of Performance

5th   25th   75th   95th

Average and 95% Confidence Interval (±2SE)

International Average = 488 (0.7)
(Average of All Country Averages)

8th Grade Science

Countries		Average Scale Score	Years of Formal Schooling	Average Age
United States	▲	515 (4.6)	8	14.2
Australia	▲	540 (4.4)	8 or 9	14.3
Belgium (Flemish) †	▲	535 (3.1)	8	14.1
Bulgaria	▲	518 (5.4)	8	14.8
Canada	▲	533 (2.1)	8	14.0
Chile	▼	420 (3.7)	8	14.4
Chinese Taipei	▲	569 (4.4)	8	14.2
Cyprus	▼	460 (2.4)	8	13.8
Czech Republic	▲	539 (4.2)	8	14.4
England †	▲	538 (4.8)	9	14.2
Finland	▲	535 (3.5)	7	13.8
Hong Kong, SAR †	▲	530 (3.7)	8	14.2
Hungary	▲	552 (3.7)	8	14.4
Indonesia	▼	435 (4.5)	8	14.6
Iran, Islamic Rep.	▼	448 (3.8)	8	14.6
Israel [2]	▼	468 (4.9)	8	14.1
Italy	●	493 (3.9)	8	14.0
Japan	▲	550 (2.2)	8	14.4
Jordan	▼	450 (3.8)	8	14.0
Korea, Rep. of	▲	549 (2.6)	8	14.4
Latvia (LSS) [1]	●	503 (4.8)	8	14.5
Lithuania [1‡]	●	488 (4.1)	8.5	15.2
Macedonia, Rep. of	▼	458 (5.2)	8	14.6
Malaysia	●	492 (4.4)	8	14.4
Moldova	▼	459 (4.0)	9	14.4
Morocco	▼	323 (4.3)	7	14.2
Netherlands †	▲	545 (6.9)	8	14.2
New Zealand	▲	510 (4.9)	8.5 to 9.5	14.0
Philippines	▼	345 (7.5)	7	14.1
Romania	●	472 (5.8)	8	14.8
Russian Federation	▲	529 (6.4)	7 or 8	14.1
Singapore	▲	568 (8.0)	8	14.4
Slovak Republic	▲	535 (3.3)	8	14.3
Slovenia	▲	533 (3.2)	8	14.8
South Africa	▼	243 (7.8)	8	15.5
Thailand	●	482 (4.0)	8	14.5
Tunisia	▼	430 (3.4)	8	14.8
Turkey	▼	433 (4.3)	8	14.2
International Avg. (All Countries)		488 (0.7)		

States		Average Scale Score	Years of Formal Schooling	Average Age
Connecticut	▲	529 (10.4)	8	14.0
Idaho	▲	526 (6.6)	8	14.2
Illinois	▲	521 (6.5)	8	14.2
Indiana †	▲	534 (7.0)	8	14.4
Maryland	●	506 (7.7)	8	13.9
Massachusetts	▲	533 (7.4)	8	14.1
Michigan	▲	544 (8.6)	8	14.1
Missouri	▲	523 (6.5)	8	14.3
North Carolina	●	508 (6.5)	8	14.2
Oregon	▲	536 (6.1)	8	14.2
Pennsylvania	▲	529 (6.5)	8	14.2
South Carolina	▲	511 (6.7)	8	14.2
Texas	●	509 (10.4)	8	14.3

Districts and Consortia				
Academy School Dist. #20, CO	▲	559 (2.1)	8	14.2
Chicago Public Schools, IL	▼	449 (9.5)	8	14.2
Delaware Science Coalition, DE	●	500 (8.4)	8	14.1
First in the World Consort., IL	▲	565 (5.3)	8	14.2
Fremont/Lincoln/WestSide PS, NE	▲	511 (5.8)	8	14.2
Guilford County, NC [2]	▲	534 (7.1)	8	14.2
Jersey City Public Schools, NJ	▼	440 (9.8)	8	14.3
Miami-Dade County PS, FL	▼	426 (10.9)	8	14.3
Michigan Invitational Group, MI	▲	563 (6.2)	8	14.1
Montgomery County, MD [2]	▲	531 (4.3)	8	14.0
Naperville Sch. Dist. #203, IL	▲	584 (4.1)	8	14.1
Project SMART Consortium, OH	▲	539 (8.4)	8	14.2
Rochester City Sch. Dist., NY	▼	452 (7.4)	8	14.2
SW Math/Sci. Collaborative, PA	▲	543 (7.4)	8	14.2

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1998-1999.

▲ Participant average significantly higher than international average

● No statistically significant difference between participant average and international average

▼ Participant average significantly lower than international average

Significance tests adjusted for multiple comparisons

States in *italics* did not fully satisfy guidelines for sample participation rates (see Appendix A for details).

† Met guidelines for sample participation rates only after replacement schools were included (see Exhibit A.6).

[1] National Desired Population does not cover all of International Desired Population (see Exhibit A.3). Because coverage falls below 65%, Latvia is annotated LSS for Latvian-Speaking Schools only.

[2] National Defined Population covers less than 90 percent of National Desired Population (see Exhibit A.3).

‡ Lithuania tested the same cohort of students as other countries, but later in 1999, 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.

8th Grade Science

Instructions: Read across the row for a participant to compare performance with the participants listed along the top of the chart. The symbols indicate whether the average achievement of the participant in the row is significantly lower than that of the comparison participant, significantly higher than that of the comparison participant, or if there is no statistically significant difference between the average achievement of the two participants.

Column headers (left to right):
Naperville Sch. Dist. #203, IL · Chinese Taipei · Singapore · First in the World Consort., IL · Michigan Invitational Group, MI · Academy School Dist. #20, CO · Hungary · Japan · Korea, Rep. of · Netherlands · Michigan · SW Math/Sci. Collaborative, PA · Australia · Czech Republic · Project SMART Consortium, OH · England · Oregon · Finland · Slovak Republic · Belgium (Flemish) · Indiana · Guilford County, NC · Slovenia · Massachusetts · Canada · Montgomery County, MD · Hong Kong, SAR · Connecticut · Russian Federation · Pennsylvania · Idaho · Missouri

Row labels (top to bottom):
Naperville Sch. Dist. #203, IL
Chinese Taipei
Singapore
First in the World Consort., IL
Michigan Invitational Group, MI
Academy School Dist. #20, CO
Hungary
Japan
Korea, Rep. of
Netherlands
Michigan
SW Math/Sci. Collaborative, PA
Australia
Czech Republic
Project SMART Consortium, OH
England
Oregon
Finland
Slovak Republic
Belgium (Flemish)
Indiana
Guilford County, NC
Slovenia
Massachusetts
Canada
Montgomery County, MD
Hong Kong, SAR
Connecticut
Russian Federation
Pennsylvania
Idaho
Missouri
Illinois
Bulgaria
United States
Fremont/Lincoln/WestSide PS, NE
South Carolina
New Zealand
Texas
North Carolina
Maryland
Latvia (LSS)
Delaware Science Coalition, DE
Italy
Malaysia
Lithuania
Thailand
Romania
Israel
Cyprus
Moldova
Macedonia, Rep. of
Rochester City Sch. Dist., NY
Jordan
Chicago Public Schools, IL
Iran, Islamic Rep.
Jersey City Public Schools, NJ
Indonesia
Turkey
Tunisia
Miami-Dade County PS, FL
Chile
Philippines
Morocco
South Africa

States in *italics* did not fully satisfy guidelines for sample participation rates (see Appendix A for details).

Exhibit 1.2
(Continued)

Multiple Comparisons of Average Science Achievement

TIMSS 1999
Benchmarking
Boston College
ISC

8th Grade Science

Column headers (top, left to right):

Illinois · Bulgaria · **United States** · **Fremont/Lincoln/WestSide PS, NE** · **South Carolina** · New Zealand · *Texas* · **North Carolina** · **Maryland** · Latvia (LSS) · **Delaware Science Coalition, DE** · Italy · Malaysia · Lithuania · Thailand · Romania · Israel · Cyprus · Moldova · Macedonia, Rep. of · **Rochester City Sch. Dist., NY** · Jordan · **Chicago Public Schools, IL** · Iran, Islamic Rep. · **Jersey City Public Schools, NJ** · Indonesia · Turkey · Tunisia · **Miami-Dade County PS, FL** · Chile · Philippines · Morocco · South Africa

Row labels (top to bottom):

Naperville Sch. Dist. #203, IL
Chinese Taipei
Singapore
First in the World Consort., IL
Michigan Invitational Group, MI
Academy School Dist. #20, CO
Hungary
Japan
Korea, Rep. of
Netherlands
Michigan
SW Math/Sci. Collaborative, PA
Australia
Czech Republic
Project SMART Consortium, OH
England
Oregon
Finland
Slovak Republic
Belgium (Flemish)
Indiana
Guilford County, NC
Slovenia
Massachusetts
Canada
Montgomery County, MD
Hong Kong, SAR
Connecticut
Russian Federation
Pennsylvania
Idaho
Missouri
Illinois
Bulgaria
United States
Fremont/Lincoln/WestSide PS, NE
South Carolina
New Zealand
Texas
North Carolina
Maryland
Latvia (LSS)
Delaware Science Coalition, DE
Italy
Malaysia
Lithuania
Thailand
Romania
Israel
Cyprus
Moldova
Macedonia, Rep. of
Rochester City Sch. Dist., NY
Jordan
Chicago Public Schools, IL
Iran, Islamic Rep.
Jersey City Public Schools, NJ
Indonesia
Turkey
Tunisia
Miami-Dade County PS, FL
Chile
Philippines
Morocco
South Africa

Legend:

▲ Average achievement significantly higher than comparison participant

● No statistically significant difference from comparison participant

▼ Average achievement significantly lower than comparison participant

Significance tests adjusted for multiple comparisons

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1998-1999.

How Do Benchmarking Participants Compare with International Benchmarks of Science Achievement?

The TIMSS science achievement scale summarizes student performance on test items designed to measure a wide range of student knowledge and proficiency. In order to provide meaningful descriptions of what performance could mean in terms of the science that students know and can do, TIMSS identified four points on the scale for use as international benchmarks[5] or reference points, and conducted an ambitious scale anchoring exercise to describe students' performance at these benchmarks. Exhibit 1.3 shows the four international benchmarks of science achievement and briefly describes what students scoring at these benchmarks typically know and can do. More detailed descriptions appear in Chapter 2, together with example test items illustrating performance at each benchmark.

The Top 10% Benchmark is defined at the 90th percentile on the TIMSS science scale, taking into account the performance of all students in all countries participating in 1999. It corresponds to a scale score of 616 and is the point above which the top 10 percent of students in the TIMSS 1999 assessment scored. Students performing at this level demonstrated a grasp of some complex and abstract science concepts in earth science, life science, physics, and chemistry, and showed an understanding of the fundamentals of scientific investigation.

The Upper Quarter Benchmark is the 75th percentile on the science scale. This point, corresponding to a scale score of 558, is the point above which the top 25 percent of students scored. Students scoring at this benchmark typically demonstrated conceptual understanding of some science cycles, systems, and principles.

The Median Benchmark, with a score of 488, corresponds to the 50th percentile, or median. This is the point above which the top half of students scored on the TIMSS 1999 assessment. Students performing at this level typically were able to recognize and communicate basic scientific information across a range of topics.

The Lower Quarter Benchmark is the 25th percentile and corresponds to a scale score of 410. This score point is reached by the top 75 percent of students and may be used as a benchmark of performance for lower-achieving students. Students scoring at this level typically could recognize some basic facts from the earth, life, and physical sciences presented in non-technical language.

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[5] Readers should be careful not to confuse the international benchmarks, which are points on the international science achievement scale chosen to describe specific achievement levels, with the benchmarking exercise itself, which is a process by which participants compare their achievement, curriculum, and instructional practices with those of the best in the world.

Exhibit 1.4 displays the percentage of students in each participating entity that reached each international benchmark, in decreasing order by the percentage reaching the Top 10% Benchmark. If student achievement in science were distributed alike in every entity, then each entity would be expected to have about 10 percent of its students reaching the Top 10% Benchmark, 25 percent the Upper Quarter Benchmark, 50 percent the Median Benchmark, and 75 percent the Lower Quarter Benchmark. Although countries such as Latvia (LSS),[6] Italy, Israel, Malaysia, and Lithuania, and Benchmarking participants such as the Delaware Science Coalition, came fairly close, no entity followed this pattern exactly. Instead, the high-performing entities generally had greater percentages of students reaching each benchmark, and the low-performing entities had lesser percentages.

Among the high performers, for example, the Naperville School District, Singapore, and Chinese Taipei had more than 30 percent of their students reaching the Top 10% Benchmark, more than half reaching the Upper Quarter Benchmark, four-fifths or more reaching the Median Benchmark, and almost all (94 percent or more) reaching the Lower Quarter Benchmark.

In contrast, the four lowest-performing Benchmarking participants, all urban districts, had no more than four percent of their students reaching the Top 10% Benchmark, 10 to 12 percent reaching the Upper Quarter Benchmark, and just about one-third reaching the Median Benchmark. The lowest-performing countries of South Africa and Morocco had almost no students reaching the Top 10% Benchmark, only one or two percent reaching the Upper Quarter Benchmark, five or six percent reaching the Median Benchmark, and no more than 20 percent reaching the Lower Quarter Benchmark.

Although Exhibit 1.4 is organized to draw particular attention to the percentage of high-achieving students in each entity, it conveys information about the distribution of middle and low performers also. For example, several countries, including Belgium (Flemish),[7] Hong Kong, Malaysia, Lithuania, and Thailand, had greater percentages of students reaching the Median and Lower Quarter Benchmarks than might be expected from their percentages of high-performing students.

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[6] Because coverage of its eighth-grade population falls below 65%, Latvia is annotated LSS for Latvian-Speaking Schools only.

[7] Belgium has two separate educational systems, Flemish and French. The Flemish system participated in TIMSS 1999.

Top 10% Benchmark

Students demonstrate a grasp of some complex and abstract science concepts. They can apply understanding of earth's formation and cycles and of the complexity of living organisms. They show understanding of the principles of energy efficiency, phase change, thermal expansion, light properties, gravitational force, basic structure of matter, and chemical versus physical changes. They demonstrate detailed knowledge of environmental and resource issues. They understand some fundamentals of scientific investigation and can apply basic physical principles to solve some quantitative problems. They can provide written explanations and use diagrams to communicate scientific knowledge.

90th Percentile: 616

Upper Quarter Benchmark

Students demonstrate conceptual understanding of some science cycles, systems, and principles. They have some understanding of the earth's processes, biological systems and populations, chemical reactions, and composition of matter. They solve physics problems related to light, speed, heat, and temperature and demonstrate basic knowledge of major environmental concerns. They demonstrate some scientific inquiry skills. They can combine information to draw conclusions; interpret information in diagrams, graphs and tables to solve problems; and provide short explanations conveying scientific knowledge in the life sciences.

75th Percentile: 558

Median Benchmark

Students can recognize and communicate basic scientific knowledge across a range of topics. They recognize some characteristics of the solar system, ecosystems, animals and plants, energy sources, force and motion, light reflection and radiation, sound, electrical circuits, and human impact on the environment. They can apply and briefly communicate practical knowledge, extract tabular information, extrapolate from data presented in a simple linear graph, and interpret representational diagrams.
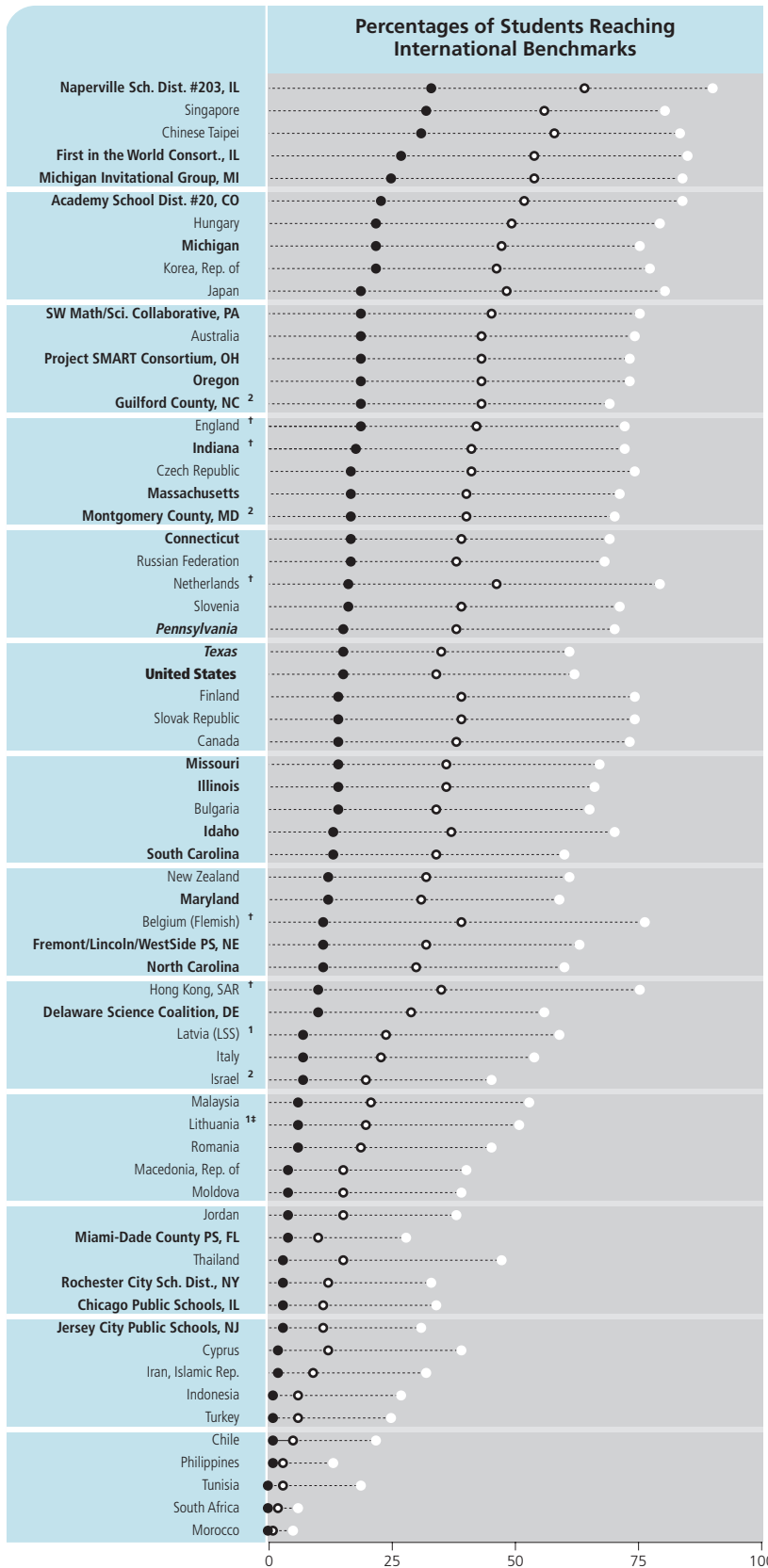
50th Percentile: 488

Lower Quarter Benchmark

Students recognize some basic facts from the earth, life, and physical sciences presented using non-technical language. They can identify some of the earth's physical features, have some knowledge of the human body, and demonstrate familiarity with everyday physical phenomena. They can interpret and use information presented in simple diagrams.

25th Percentile: 410

The international benchmarks are based on the combined data from the countries participating in 1999.

Percentages of Students Reaching International Benchmarks

Naperville Sch. Dist. #203, IL
Singapore
Chinese Taipei
First in the World Consort., IL
Michigan Invitational Group, MI
Academy School Dist. #20, CO
Hungary
Michigan
Korea, Rep. of
Japan
SW Math/Sci. Collaborative, PA
Australia
Project SMART Consortium, OH
Oregon
Guilford County, NC [2]
England [†]
Indiana [†]
Czech Republic
Massachusetts
Montgomery County, MD [2]
Connecticut
Russian Federation
Netherlands [†]
Slovenia
Pennsylvania
Texas
United States
Finland
Slovak Republic
Canada
Missouri
Illinois
Bulgaria
Idaho
South Carolina
New Zealand
Maryland
Belgium (Flemish) [†]
Fremont/Lincoln/WestSide PS, NE
North Carolina
Hong Kong, SAR [†]
Delaware Science Coalition, DE
Latvia (LSS) [1]
Italy
Israel [2]
Malaysia
Lithuania [1‡]
Romania
Macedonia, Rep. of
Moldova
Jordan
Miami-Dade County PS, FL
Thailand
Rochester City Sch. Dist., NY
Chicago Public Schools, IL
Jersey City Public Schools, NJ
Cyprus
Iran, Islamic Rep.
Indonesia
Turkey
Chile
Philippines
Tunisia
South Africa
Morocco

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1998-1999.

Top 10% Benchmark (90th Percentile) = 616
Upper Quarter Benchmark (75th Percentile) = 558
Median Benchmark (50th Percentile) = 488
Lower Quarter Benchmark (25th Percentile) = 410

0   25   50   75   100
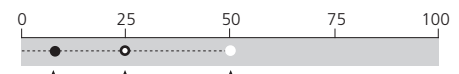
Percentage of students at or above **Top 10%** Benchmark

Percentage of students at or above **Upper Quarter** Benchmark

Percentage of students at or above **Median** Benchmark

8th Grade Science

Countries	Top 10%	Upper Quarter	Median	Lower Quarter
United States	15 (1.2)	34 (1.9)	62 (2.0)	85 (1.3)
Australia	19 (1.6)	43 (2.3)	74 (2.0)	93 (0.9)
Belgium (Flemish) †	11 (1.4)	39 (1.6)	76 (1.8)	96 (1.1)
Bulgaria	14 (2.1)	34 (2.5)	65 (2.2)	88 (1.5)
Canada	14 (0.9)	38 (1.3)	73 (1.2)	94 (0.6)
Chile	1 (0.4)	5 (1.0)	22 (1.6)	56 (1.7)
Chinese Taipei	31 (1.9)	58 (2.0)	83 (1.3)	95 (0.7)
Cyprus	2 (0.5)	12 (0.8)	39 (1.6)	74 (1.4)
Czech Republic	17 (1.7)	41 (2.2)	74 (1.8)	95 (0.8)
England †	19 (1.9)	42 (2.3)	72 (2.0)	92 (1.0)
Finland	14 (1.4)	39 (1.9)	74 (1.5)	95 (0.7)
Hong Kong, SAR †	10 (1.1)	35 (2.1)	75 (2.1)	95 (1.0)
Hungary	22 (1.4)	49 (1.7)	79 (1.4)	95 (0.8)
Indonesia	1 (0.3)	6 (0.9)	27 (1.6)	64 (2.4)
Iran, Islamic Rep.	2 (0.3)	9 (1.0)	32 (1.7)	68 (1.7)
Israel [2]	7 (0.6)	20 (1.2)	45 (1.9)	72 (2.0)
Italy	7 (0.9)	23 (1.7)	54 (2.0)	83 (1.2)
Japan	19 (1.1)	48 (1.4)	80 (1.0)	96 (0.5)
Jordan	4 (0.5)	15 (1.0)	38 (1.5)	66 (1.6)
Korea, Rep. of	22 (1.1)	46 (1.2)	77 (1.0)	94 (0.5)
Latvia (LSS) [1]	7 (1.3)	24 (2.5)	59 (2.0)	88 (1.4)
Lithuania [1‡]	6 (0.9)	20 (1.9)	51 (2.1)	83 (1.8)
Macedonia, Rep. of	4 (0.5)	15 (1.6)	40 (1.9)	70 (2.2)
Malaysia	6 (0.9)	21 (1.9)	53 (2.2)	85 (1.5)
Moldova	4 (0.5)	15 (1.2)	39 (1.8)	70 (1.6)
Morocco	0 (0.0)	1 (0.2)	5 (0.5)	20 (1.1)
Netherlands †	16 (2.3)	46 (3.8)	79 (3.5)	95 (1.6)
New Zealand	12 (1.4)	32 (2.1)	61 (2.2)	86 (1.6)
Philippines	1 (0.3)	3 (0.7)	13 (1.7)	31 (2.6)
Romania	6 (0.8)	19 (1.9)	45 (2.5)	75 (2.1)
Russian Federation	17 (2.4)	38 (2.8)	68 (2.5)	90 (1.0)
Singapore	32 (3.3)	56 (3.5)	80 (2.6)	94 (1.4)
Slovak Republic	14 (1.4)	39 (2.0)	74 (1.7)	94 (0.7)
Slovenia	16 (1.1)	39 (1.7)	71 (1.5)	93 (0.7)
South Africa	0 (0.2)	2 (0.6)	6 (1.4)	13 (2.0)
Thailand	3 (0.7)	15 (2.0)	47 (2.5)	84 (1.3)
Tunisia	0 (0.1)	3 (0.4)	19 (1.5)	62 (2.0)
Turkey	1 (0.2)	6 (0.8)	25 (1.8)	62 (2.4)

States	Top 10%	Upper Quarter	Median	Lower Quarter
Connecticut	17 (3.0)	39 (4.4)	69 (4.6)	90 (2.5)
Idaho	13 (1.8)	37 (3.2)	70 (3.3)	91 (1.8)
Illinois	14 (1.9)	36 (3.0)	66 (3.0)	88 (1.5)
Indiana †	18 (2.5)	41 (3.6)	72 (2.8)	92 (1.4)
Maryland	12 (1.3)	31 (3.0)	59 (3.5)	84 (2.5)
Massachusetts	17 (2.4)	40 (3.0)	71 (3.4)	92 (1.7)
Michigan	22 (2.6)	47 (3.6)	75 (3.4)	91 (2.2)
Missouri	14 (2.3)	36 (3.0)	67 (2.8)	89 (1.8)
North Carolina	11 (1.4)	30 (2.9)	60 (3.4)	85 (2.1)
Oregon	19 (2.3)	43 (2.7)	73 (2.6)	91 (1.9)
Pennsylvania	15 (1.5)	38 (2.5)	70 (3.2)	91 (1.6)
South Carolina	13 (1.8)	34 (2.7)	60 (3.4)	85 (1.7)
Texas	15 (2.1)	35 (3.6)	61 (4.5)	83 (3.3)

Districts and Consortia	Top 10%	Upper Quarter	Median	Lower Quarter
Academy School Dist. #20, CO	23 (1.6)	52 (1.5)	84 (1.2)	97 (0.6)
Chicago Public Schools, IL	3 (1.1)	11 (2.4)	34 (3.9)	67 (3.8)
Delaware Science Coalition, DE	10 (1.8)	29 (4.0)	56 (4.2)	83 (2.1)
First in the World Consort., IL	27 (3.7)	54 (3.6)	85 (2.0)	97 (0.9)
Fremont/Lincoln/WestSide PS, NE	11 (1.7)	32 (3.1)	63 (3.2)	86 (2.1)
Guilford County, NC [2]	19 (2.5)	43 (3.6)	69 (3.5)	90 (2.0)
Jersey City Public Schools, NJ	3 (1.5)	11 (3.1)	31 (3.6)	64 (3.5)
Miami-Dade County PS, FL	4 (1.4)	10 (2.4)	28 (3.0)	58 (3.7)
Michigan Invitational Group, MI	25 (3.1)	54 (3.0)	84 (2.1)	96 (1.1)
Montgomery County, MD [2]	17 (1.1)	40 (2.5)	70 (2.3)	91 (1.3)
Naperville Sch. Dist. #203, IL	33 (2.5)	64 (2.2)	90 (1.2)	98 (0.6)
Project SMART Consortium, OH	19 (3.6)	43 (5.0)	73 (3.3)	93 (1.1)
Rochester City Sch. Dist., NY	3 (1.3)	12 (2.5)	33 (3.7)	68 (3.0)
SW Math/Sci. Collaborative, PA	19 (3.1)	45 (3.6)	75 (3.5)	94 (1.7)

Top 10% Benchmark (90th Percentile) = 616

Upper Quarter Benchmark (75th Percentile) = 558

Median Benchmark (50th Percentile) = 488

Lower Quarter Benchmark (25th Percentile) = 410

States in *italics* did not fully satisfy guidelines for sample participation rates (see Appendix A for details).

† Met guidelines for sample participation rates only after replacement schools were included (see Exhibit A.6).

[1] National Desired Population does not cover all of International Desired Population (see Exhibit A.3). Because coverage falls below 65%, Latvia is annotated LSS for Latvian-Speaking Schools only.

[2] National Defined Population covers less than 90 percent of National Desired Population (see Exhibit A.3).

‡ Lithuania tested the same cohort of students as other countries, but later in 1999, 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.

What Are the Gender Differences in Science Achievement?

Exhibit 1.5 presents average science achievement separately for girls and boys for each of the participating entities, as well as the difference between the means, in increasing order of the difference. The gender difference for each entity is shown by a bar indicating the amount of the difference, whether its direction favored girls or boys, and whether it is statistically significant (a darkened bar).

It is disappointing that in science at the eighth grade, the TIMSS 1999 Benchmarking Study shows relatively unequal average achievement for girls and boys in many of the Benchmarking jurisdictions, and in the United States overall. Boys had significantly higher average science achievement than girls in 10 of the 13 Benchmarking states, with Massachusetts, South Carolina, and Texas the exceptions. Gender differences were less prevalent among the Benchmarking districts and consortia, with significant differences in just four jurisdictions: the First in the World Consortium, Guilford County, Naperville, and the Southwest Pennsylvania Math and Science Collaborative. On average across all TIMSS 1999 countries, there was a significant difference of 15 scale-score points favoring boys, although this varied considerably from country to country. Differences large enough to be statistically significant were found in 16 of the 38 countries, including the U.S.

Exhibit 1.6 provides information on gender differences in science achievement among students with high performance compared with those in the middle of the achievement distribution. For each entity, score levels were computed for the highest-scoring 25 percent of students, called the upper quarter level, and for the highest-scoring 50 percent, called the median level. The percentages of girls and boys in each entity reaching each of the two levels were computed. For equitable performance, 25 percent each of girls and boys should have reached the upper quarter level, and 50 percent the median level.

As may be seen from Exhibit 1.6, in all Benchmarking states but Maryland, Massachusetts, and South Carolina, the percentage of boys reaching the upper quarter level was significantly greater than the percentage of girls. There was a significantly greater percentage of boys reaching the median level in all states but Connecticut, Massachusetts, and South Carolina. Among the Benchmarking districts and consortia, significantly greater percentages of boys reached the upper quarter level in the First in the World Consortium, Guilford County, and the Southwest Pennsylvania Math and Science Collaborative. Only in the latter did a significantly greater percentage of boys reach the median level.
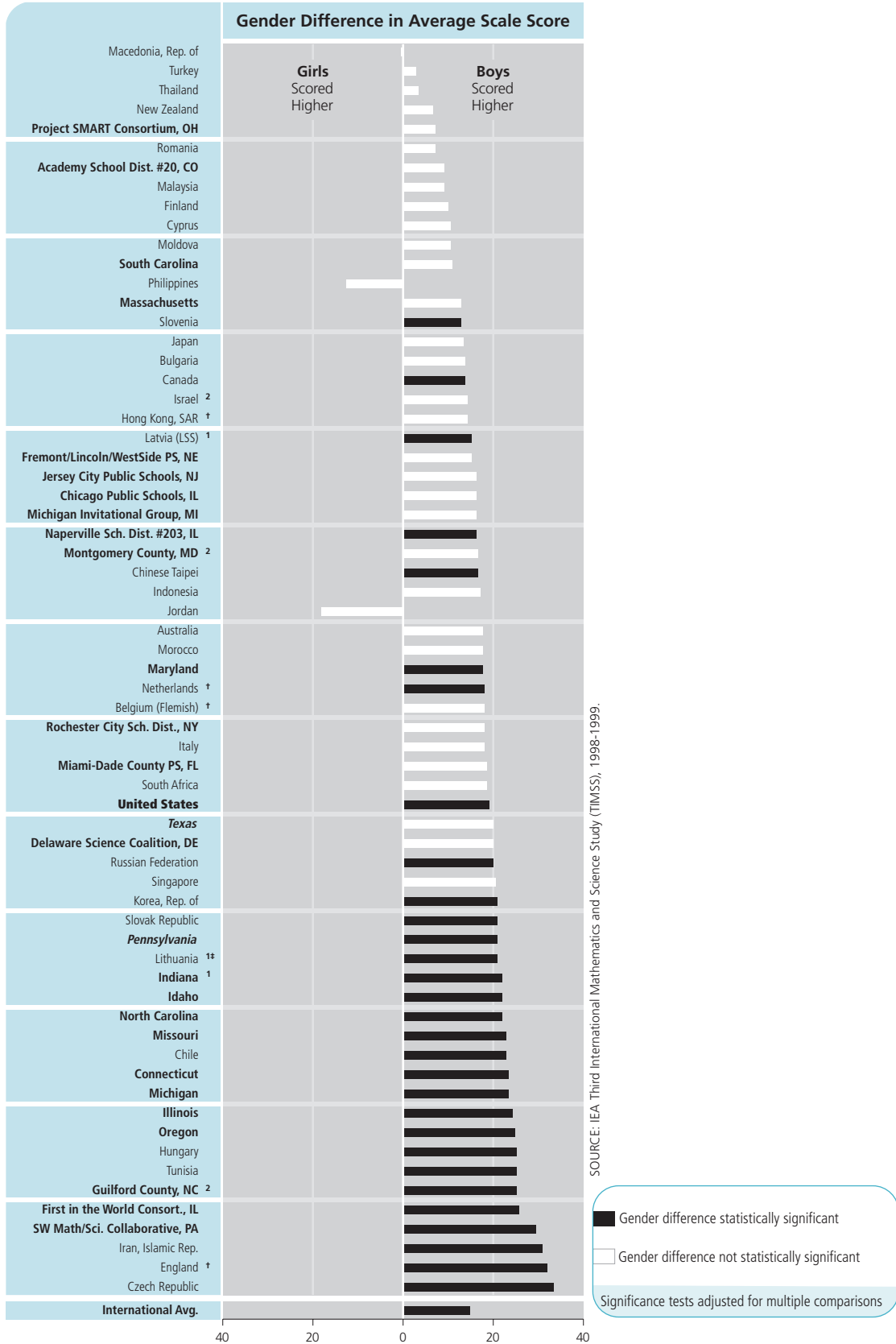
The gender difference in science at the country level is more apparent among high-performing students, although internationally it was about the same at both the upper quarter and median levels. On average across countries, 29 percent of boys reached the upper quarter level, compared with 21 percent of girls, a statistically significant difference of eight percentage points. Similarly, the international average percentage of boys reaching the median level was 54 percent and of girls 46 percent, also a significant difference of eight percentage points. Perhaps more important, however, Exhibit 1.6 shows that in 21 countries the percentage of boys reaching the upper quarter level was significantly greater than the percentage of girls, whereas this was the case in 13 countries at the median level. In no country did the percentage of girls reaching either level significantly exceed the percentage of boys.

The gender differences found among the Benchmarking states are consistent with the results of TIMSS in both 1995 and 1999, which showed a pervasive difference in science achievement favoring boys, far more evident than in mathematics.[8] They are also consistent with the results from the second IEA science study conducted in 1983-84, which for 14-year-olds found standard score differences favoring boys in all 23 of the participating countries.[9]

[8] Beaton, A.E., Mullis, I.V.S., Martin, M.O., Gonzalez, E.J., Kelly, D.L., and Smith, T.A. (1996), *Mathematics Achievement in the Middle School Years: The IEA's Third International Mathematics and Science Study (TIMSS)*, Chestnut Hill, MA: Boston College; Mullis, I.V.S., Martin, M.O., Gonzalez, E.J., Gregory, K.D., Garden, R.A., O'Connor, K.M., Chrostowski, S.J., and Smith, T.A. (2000), TIMSS *1999 International Science Report: Findings from IEA's Repeat of the Third International Mathematics and Science Study at the Eighth Grade*, Chestnut Hill, MA: Boston College.

[9] Postlethwaite, T.N. and Wiley, D.E. (1992), *The IEA Study of Science II: Science Achievement in Twenty-Three Countries*, New York, NY: Pergamon Press.

Gender Difference in Average Scale Score

Girls Scored Higher	Boys Scored Higher

Macedonia, Rep. of
Turkey
Thailand
New Zealand
Project SMART Consortium, OH
Romania
Academy School Dist. #20, CO
Malaysia
Finland
Cyprus
Moldova
South Carolina
Philippines
Massachusetts
Slovenia
Japan
Bulgaria
Canada
Israel [2]
Hong Kong, SAR [†]
Latvia (LSS) [1]
Fremont/Lincoln/WestSide PS, NE
Jersey City Public Schools, NJ
Chicago Public Schools, IL
Michigan Invitational Group, MI
Naperville Sch. Dist. #203, IL
Montgomery County, MD [2]
Chinese Taipei
Indonesia
Jordan
Australia
Morocco
Maryland
Netherlands [†]
Belgium (Flemish) [†]
Rochester City Sch. Dist., NY
Italy
Miami-Dade County PS, FL
South Africa
United States
Texas
Delaware Science Coalition, DE
Russian Federation
Singapore
Korea, Rep. of
Slovak Republic
Pennsylvania
Lithuania [1‡]
Indiana [1]
Idaho
North Carolina
Missouri
Chile
Connecticut
Michigan
Illinois
Oregon
Hungary
Tunisia
Guilford County, NC [2]
First in the World Consort., IL
SW Math/Sci. Collaborative, PA
Iran, Islamic Rep.
England [†]
Czech Republic
International Avg.

40   20   0   20   40

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1998-1999.

■ Gender difference statistically significant

□ Gender difference not statistically significant

Significance tests adjusted for multiple comparisons

8th Grade Science

Countries	Girls' Average Scale Score	Boys' Average Scale Score		Difference (Absolute Value)
United States	505 (4.6)	524 (5.5)	▲	19 (4.1)
Australia	532 (5.1)	549 (6.0)		18 (6.8)
Belgium (Flemish) †	526 (4.6)	544 (7.2)		18 (10.3)
Bulgaria	511 (5.8)	525 (6.5)		14 (6.2)
Canada	526 (3.2)	540 (2.4)	▲	14 (3.9)
Chile	409 (4.3)	432 (5.1)	▲	23 (6.2)
Chinese Taipei	561 (3.9)	578 (5.7)	▲	17 (4.2)
Cyprus	455 (3.1)	465 (3.0)		10 (3.9)
Czech Republic	523 (4.8)	557 (4.9)	▲	33 (4.8)
England †	522 (6.2)	554 (5.3)	▲	32 (6.6)
Finland	530 (4.0)	540 (4.5)		10 (5.0)
Hong Kong, SAR †	522 (4.4)	537 (5.1)		14 (6.1)
Hungary	540 (4.0)	565 (4.5)	▲	25 (4.2)
Indonesia	427 (6.5)	444 (4.8)		17 (6.8)
Iran, Islamic Rep.	430 (5.7)	461 (4.4)	▲	31 (7.6)
Israel 2	461 (6.0)	476 (5.5)		14 (6.1)
Italy	484 (4.1)	503 (5.6)		18 (5.8)
Japan	543 (2.8)	556 (3.6)		14 (4.6)
Jordan	460 (5.0)	442 (5.9)		18 (8.2)
Korea, Rep. of	538 (4.0)	559 (3.2)	▲	21 (5.1)
Latvia (LSS) 1	495 (5.6)	510 (4.8)	▲	15 (4.0)
Lithuania 1‡	478 (4.4)	499 (5.0)	▲	21 (4.6)
Macedonia, Rep. of	458 (6.0)	458 (5.4)		1 (4.6)
Malaysia	488 (5.5)	498 (5.8)		9 (7.0)
Moldova	454 (4.4)	465 (5.4)		11 (5.4)
Morocco	312 (5.9)	330 (5.9)		18 (8.3)
Netherlands †	536 (7.1)	554 (7.3)	▲	18 (4.1)
New Zealand	506 (5.4)	513 (7.0)		7 (7.8)
Philippines	351 (8.2)	339 (8.9)		12 (8.4)
Romania	468 (6.4)	475 (6.5)		7 (5.4)
Russian Federation	519 (7.1)	540 (6.2)	▲	20 (3.9)
Singapore	557 (7.9)	578 (9.7)		20 (7.9)
Slovak Republic	525 (3.4)	546 (4.5)	▲	21 (4.5)
Slovenia	527 (3.7)	540 (3.7)	▲	13 (3.7)
South Africa	234 (9.2)	253 (7.7)		19 (6.7)
Thailand	481 (4.6)	484 (4.4)		3 (4.3)
Tunisia	417 (3.3)	442 (4.3)	▲	25 (3.4)
Turkey	431 (4.8)	434 (4.3)		3 (2.9)
International Avg. (All Countries)	480 (0.9)	495 (0.9)	▲	15 (0.8)

States	Girls' Average Scale Score	Boys' Average Scale Score		Difference (Absolute Value)
Connecticut	518 (10.2)	542 (11.4)	▲	24 (6.6)
Idaho	515 (6.4)	537 (7.5)	▲	22 (4.4)
Illinois	508 (7.5)	533 (6.7)	▲	25 (5.0)
Indiana †	523 (7.0)	545 (7.5)	▲	22 (4.3)
Maryland	498 (7.7)	516 (8.3)	▲	18 (4.1)
Massachusetts	527 (7.5)	540 (8.0)		13 (4.8)
Michigan	533 (8.9)	556 (8.9)	▲	24 (4.8)
Missouri	512 (7.0)	534 (7.2)	▲	23 (6.1)
North Carolina	498 (6.9)	520 (7.3)	▲	22 (5.0)
Oregon	524 (6.5)	549 (7.3)	▲	25 (6.5)
Pennsylvania	519 (7.1)	540 (6.9)	▲	21 (4.6)
South Carolina	506 (7.7)	517 (7.4)		11 (6.9)
Texas	499 (9.9)	519 (12.2)		20 (6.8)

Districts and Consortia	Girls' Average Scale Score	Boys' Average Scale Score		Difference (Absolute Value)
Academy School Dist. #20, CO	554 (3.6)	563 (3.4)		9 (5.6)
Chicago Public Schools, IL	442 (10.1)	458 (10.0)		16 (6.6)
Delaware Science Coalition, DE	491 (9.2)	511 (9.5)		20 (8.3)
First in the World Consort., IL	553 (6.2)	578 (6.0)	▲	26 (5.9)
Fremont/Lincoln/WestSide PS, NE	503 (6.5)	519 (7.6)		15 (8.1)
Guilford County, NC 2	522 (7.2)	547 (8.7)	▲	25 (7.3)
Jersey City Public Schools, NJ	432 (10.5)	448 (10.7)		16 (7.0)
Miami-Dade County PS, FL	416 (9.4)	435 (12.8)		18 (6.9)
Michigan Invitational Group, MI	555 (6.3)	572 (7.4)		16 (5.9)
Montgomery County, MD 2	523 (5.7)	540 (5.6)		17 (7.4)
Naperville Sch. Dist. #203, IL	576 (4.8)	592 (4.6)	▲	17 (4.9)
Project SMART Consortium, OH	536 (8.9)	543 (9.0)		7 (6.2)
Rochester City Sch. Dist., NY	443 (8.7)	461 (8.2)		18 (8.0)
SW Math/Sci. Collaborative, PA	529 (7.6)	558 (7.7)	▲	30 (3.5)

▲ Significantly higher than other gender

Significance tests adjusted for multiple comparisons

States in *italics* did not fully satisfy guidelines for sample participation rates (see Appendix A for details).

† Met guidelines for sample participation rates only after replacement schools were included (see Exhibit A.6).

1 National Desired Population does not cover all of International Desired Population (see Exhibit A.3). Because coverage falls below 65%, Latvia is annotated LSS for Latvian-Speaking Schools only.

2 National Defined Population covers less than 90 percent of National Desired Population (see Exhibit A.3).

‡ Lithuania tested the same cohort of students as other countries, but later in 1999, 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.

Exhibit 1.6 Percentages of Girls and Boys Reaching Each Participant's Own Upper Quarter and Median Levels of Science Achievement

ISC TIMSS 1999 Benchmarking Boston College

8th Grade Science

Countries	Upper Quarter		Median		
	Percent of Girls	Percent of Boys	Percent of Girls	Percent of Boys	
United States	20 (1.6)	30 (2.0) ▲	46 (2.1)	54 (2.2) ▲	
Australia	20 (1.8)	30 (2.4) ▲	46 (2.9)	55 (3.0)	
Belgium (Flemish) †	20 (1.7)	30 (2.5)	44 (2.6)	56 (3.5)	
Bulgaria	21 (2.6)	29 (2.9)	47 (2.8)	53 (3.2)	
Canada	21 (1.5)	29 (1.3) ▲	46 (1.7)	54 (1.7)	
Chile	19 (1.6)	31 (2.3) ▲	45 (2.2)	55 (2.3)	
Chinese Taipei	20 (1.6)	30 (2.1) ▲	46 (2.0)	54 (2.4) ▲	
Cyprus	21 (1.4)	29 (1.3) ▲	47 (1.4)	53 (1.4)	
Czech Republic	18 (1.8)	32 (2.4) ▲	42 (2.5)	58 (2.5) ▲	
England †	19 (2.5)	31 (2.4) ▲	43 (3.0)	56 (2.3) ▲	
Finland	22 (2.0)	28 (2.1)	47 (2.3)	53 (2.3)	
Hong Kong, SAR †	20 (2.5)	30 (2.4)	45 (2.8)	55 (2.6)	
Hungary	19 (1.6)	31 (1.9) ▲	44 (2.0)	56 (2.1) ▲	
Indonesia	22 (1.7)	28 (2.0)	46 (2.6)	55 (3.1)	
Iran, Islamic Rep.	18 (2.4)	30 (2.1) ▲	40 (2.9)	57 (2.1) ▲	
Israel [2]	21 (1.5)	29 (1.8) ▲	48 (2.4)	53 (2.3)	
Italy	21 (1.8)	30 (2.0) ▲	45 (2.1)	55 (2.1) ▲	
Japan	21 (1.3)	29 (1.4) ▲	46 (2.0)	54 (1.7)	
Jordan	26 (1.8)	24 (1.6)	53 (1.9)	47 (2.3)	
Korea, Rep. of	21 (1.4)	29 (1.4) ▲	44 (1.7)	55 (1.5) ▲	
Latvia (LSS) [1]	21 (1.7)	29 (2.0) ▲	46 (2.3)	54 (2.2)	
Lithuania [1‡]	20 (2.0)	30 (2.4) ▲	46 (2.4)	54 (2.4) ▲	
Macedonia, Rep. of	25 (1.9)	25 (1.8)	51 (2.6)	49 (2.2)	
Malaysia	23 (2.2)	27 (3.0)	48 (2.6)	52 (3.0)	
Moldova	23 (1.6)	28 (1.8)	47 (2.4)	53 (2.4)	
Morocco	22 (1.8)	27 (1.3)	45 (2.3)	53 (1.9)	
Netherlands †	21 (2.5)	30 (3.4) ▲	45 (4.1)	56 (4.0)	
New Zealand	23 (2.1)	27 (2.9)	48 (2.7)	52 (3.3)	
Philippines	26 (2.7)	24 (2.4)	52 (2.9)	47 (2.6)	
Romania	24 (2.2)	26 (2.4)	49 (2.6)	51 (2.6)	
Russian Federation	21 (2.7)	29 (2.8) ▲	45 (3.1)	55 (2.6) ▲	
Singapore	20 (2.9)	30 (4.0)	45 (3.9)	55 (4.2)	
Slovak Republic	19 (1.7)	31 (2.1) ▲	44 (2.0)	56 (2.2) ▲	
Slovenia	21 (1.3)	29 (1.4) ▲	47 (1.7)	53 (2.0) ▲	
South Africa	23 (2.7)	27 (2.5)	47 (2.5)	53 (2.1)	
Thailand	24 (2.5)	26 (2.3)	49 (2.7)	51 (2.4)	
Tunisia	19 (1.4)	31 (1.7) ▲	42 (1.6)	58 (1.6) ▲	
Turkey	23 (1.9)	26 (1.6)	48 (2.1)	51 (2.0)	
International Avg. (All Countries)	21 (0.3)	29 (0.4) ▲	46 (0.4)	54 (0.4) ▲	

▲ Significantly greater percentage than other gender

Significance tests adjusted for multiple comparisons

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1998-1999.

States in *italics* did not fully satisfy guidelines for sample participation rates (see Appendix A for details).

† Met guidelines for sample participation rates only after replacement schools were included (see Exhibit A.6).

1 National Desired Population does not cover all of International Desired Population (see Exhibit A.3). Because coverage falls below 65%, Latvia is annotated LSS for Latvian-Speaking Schools only.

2 National Defined Population covers less than 90 percent of National Desired Population (see Exhibit A.3).

‡ Lithuania tested the same cohort of students as other countries, but later in 1999, 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.

Exhibit 1.6
(Continued)

Percentages of Girls and Boys Reaching Each Participant's Own Upper Quarter and Median Levels of Science Achievement

ISC

TIMSS 1999
Benchmarking
Boston College

8th Grade Science

	Upper Quarter				Median			
	Percent of Girls		Percent of Boys		Percent of Girls		Percent of Boys	
States								
Connecticut	20 (2.7)		30 (4.5)	▲	45 (4.7)		55 (5.0)	
Idaho	19 (2.4)		31 (3.2)	▲	44 (3.6)		56 (3.2)	▲
Illinois	20 (2.5)		30 (3.3)	▲	46 (3.4)		55 (3.2)	▲
Indiana [†]	19 (2.7)		31 (3.3)	▲	45 (3.4)		55 (4.0)	▲
Maryland	21 (2.3)		29 (2.7)		46 (3.4)		54 (3.3)	▲
Massachusetts	21 (2.9)		29 (2.8)		46 (3.7)		54 (3.3)	
Michigan	19 (2.8)		31 (3.2)	▲	44 (3.6)		56 (3.5)	▲
Missouri	19 (2.9)		31 (2.8)	▲	44 (3.6)		56 (2.5)	▲
North Carolina	20 (2.6)		30 (3.0)	▲	45 (3.4)		55 (3.0)	▲
Oregon	19 (2.3)		31 (2.8)	▲	44 (2.9)		56 (3.3)	▲
Pennsylvania	20 (2.2)		31 (2.2)	▲	45 (4.4)		56 (3.0)	▲
South Carolina	21 (2.6)		29 (3.0)		48 (3.9)		52 (3.4)	
Texas	20 (2.6)		30 (3.7)	▲	45 (4.2)		55 (4.9)	▲
Districts and Consortia								
Academy School Dist. #20, CO	22 (1.9)		28 (2.0)		46 (2.3)		54 (2.4)	
Chicago Public Schools, IL	22 (3.7)		28 (4.3)		47 (4.9)		54 (5.1)	
Delaware Science Coalition, DE	21 (3.7)		30 (4.3)		46 (4.9)		54 (4.5)	
First in the World Consort., IL	18 (3.2)		33 (2.9)	▲	43 (3.4)		57 (4.2)	
Fremont/Lincoln/WestSide PS, NE	21 (2.2)		29 (2.7)		47 (3.9)		53 (4.1)	
Guilford County, NC [2]	19 (2.3)		32 (3.4)	▲	44 (4.2)		57 (4.0)	
Jersey City Public Schools, NJ	22 (3.8)		28 (4.2)		46 (3.9)		54 (4.2)	
Miami-Dade County PS, FL	22 (3.3)		28 (3.5)		47 (4.4)		53 (4.2)	
Michigan Invitational Group, MI	21 (2.5)		30 (3.3)		46 (3.3)		54 (4.6)	
Montgomery County, MD [2]	22 (1.4)		28 (2.8)		46 (2.6)		54 (2.3)	
Naperville Sch. Dist. #203, IL	22 (2.8)		28 (2.6)		46 (3.3)		54 (3.0)	
Project SMART Consortium, OH	22 (4.1)		28 (4.4)		47 (5.4)		53 (4.6)	
Rochester City Sch. Dist., NY	21 (3.2)		29 (3.9)		47 (4.6)		54 (3.7)	
SW Math/Sci. Collaborative, PA	18 (2.6)		32 (3.4)	▲	43 (3.6)		58 (4.2)	▲

SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1998-1999.

▲ Significantly greater percentage than other gender

Significance tests adjusted for multiple comparisons