Chapter 5

The Mathematics Curriculum

The first section of Chapter 5 contains information about the time provided for mathematics instruction at the fourth and eighth grades. Data are presented about the time intended for mathematics instruction as specified in curriculum guidelines, the time teachers report that they actually spend, and changes over time. The remainder of the chapter describes the coverage of the TIMSS mathematics topics in the intended curriculum for each country, as well as teachers' reports about the mathematics topics actually taught to their students, also known as the implemented curriculum.

In comparing achievement across countries, it is important to consider differences in students' curricular experiences, how these differences may affect the mathematics they have studied, and their subsequent achievement. Students' opportunities to learn the mathematics covered by the TIMSS 2007 content and cognitive domains depend initially to some degree on that mathematics being part of each country's guidelines and policies for mathematics education. Thus, participants provided information about various educational policies and the curriculum topics covered in their respective curriculum guidelines (intended curriculum). Inclusion in the country's curriculum, however, does not guarantee students' opportunity to learn. Just as important is what their teachers choose to teach them. The lessons provided by the teachers ultimately determine the mathematics students are taught (implemented curriculum).

This chapter contains information for each country about whether the TIMSS 2007 mathematics topics were in the intended curriculum,

and teachers' reports about whether the topics were taught. As might be anticipated, there is very close agreement between curriculum guidelines and teachers' reports about the topics covered. Also, there is a substantial correspondence between topics in the intended and implemented curricula in various countries and students' achievement.

How Much Instructional Time Is Spent on Mathematics?

Exhibit 5.1 presents the hours per week for mathematics instruction designated by countries in their curriculum at the fourth and eighth grades, and teachers' reports about the amount of instructional time actually provided. In each case, the total amount of instructional time is given together with the percentage of that time devoted to mathematics. For teachers' reports, changes are provided between 2003 and 2007. At the fourth grade, most of the countries reported that the curriculum prescribed a specific amount of time for instruction in all subjects and for mathematics instruction. There was some variation, but the countries averaged 23 hours of total instruction per week, with about one fifth of the time (18%) being prescribed for mathematics instruction. On average, there was very close agreement between the curriculum guidelines and teachers' reports about the implementation. On average internationally, fourth grade teachers reported a total of 24 hours of weekly instruction, with 16 percent being devoted to mathematics. Across countries, teachers reported a decrease (slight but statistically significant) in total instructional time in 10 countries and an increase in 2 countries and 1 benchmarking entity. The teachers reported increases in the percentage of instructional time per week devoted to mathematics (again slight but significant statistically) in 10 countries and 1 benchmarking entity. In 8 countries, teachers reported decreases in total instructional time accompanied with increases in the percentages of time devoted to mathematics instruction.

At the eighth grade, the average total instruction time per week was 27 hours with 14 percent being devoted to mathematics instruction. Teachers' reports of 28 hours per week in total and 12 percent devoted to mathematics instruction corresponded with the instructional time guidelines across the countries' curricula. At the eighth grade, teachers reported increases in total instructional time in 8 countries and decreases in 14 countries. They reported increases in the percentages of time devoted to mathematics instruction in 10 countries and decreases in 5 countries.

Exhibit 5.2 presents the total instructional time in mathematics per year at the fourth and eighth grades and changes from 2003 for each TIMSS 2007 country and benchmarking participant. At the fourth grade, those reporting that students averaged more than 200 hours of mathematics instruction per year included Italy and Singapore (each with 201 hours) and the benchmarking state of Massachusetts (208 hours). Singapore, the United States, Hong Kong SAR, and Chinese Taipei had increases in the yearly hours of mathematics instruction, and Lithuania, Hungary, and the Russian Federation had decreases. At the eighth grade, those reporting that students averaged more than 150 hours of mathematics instruction per year included Chinese Taipei (158), Colombia (151), and Oman (150) as well as the Canadian province of Ontario (159) and the U.S. state of Massachusetts (155).

Exhibit 5.3 shows teachers' reports about how the instructional time for mathematics is distributed across the TIMSS 2007 content areas. At the fourth grade, on average across countries, teachers reported devoting half the mathematics instructional time to the content area of number, about one fourth (24%) to geometric shapes and measures, 16 percent to data display, and 10 percent to other areas. At the eighth grade, on average internationally, teachers reported devoting 24 percent of the mathematics instructional time to number, 29 percent to algebra, 27 percent to geometry, 13 percent to data and chance, and 7 percent to other areas.

Exhibit 5.1 Weekly Intended and Implemented Instructional Time for Mathematics with Trends

TIMSS2007 Mathematics 4th Grade

Country	Intended Time Prescribed in the Curriculum		Time Implemented in Schools					
	Total Hours of Instructional Time per Week	Mathematics Instructional Time as a Percent of Total Instructional Time	Total Hours of Instructional Time per Week			Mathematics Instructional Time as a Percent of Total Instructional Time		
			2007 Hours	Difference from 2003		2007 Percent	Difference from 2003	
Algeria	32	16	30 (0.3)	◊ ◊		r 17 (0.3)	◊ ◊	
Armenia	23	20	s 27 (0.5)	–1 (0.7)	▼	15 (0.4)	– –	
Australia	27	20	25 (0.2)	0 (0.2)		r 18 (0.5)	0 (0.6)	
Austria	21	18	21 (0.1)	◊ ◊		17 (0.2)	◊ ◊	
Chinese Taipei	20	14	23 (0.4)	–1 (0.4)	▼	13 (0.3)	2 (0.4)	▲
Colombia	25	np	27 (0.4)	◊ ◊		17 (0.5)	◊ ◊	
Czech Republic	18	21	19 (0.1)	◊ ◊		19 (0.1)	◊ ◊	
Denmark	20	17	r 21 (0.2)	◊ ◊		r 15 (0.2)	◊ ◊	
El Salvador	19	20	24 (0.7)	◊ ◊		17 (0.4)	◊ ◊	
England	24	20	r 25 (0.2)	1 (0.4)	▲	19 (0.2)	– –	
Georgia	23	20	r 19 (0.3)	◊ ◊		s 19 (0.4)	◊ ◊	
Germany	21	18	22 (0.2)	◊ ◊		r 17 (0.2)	◊ ◊	
Hong Kong SAR	23	13	r 27 (0.3)	0 (0.4)		s 15 (0.4)	1 (0.5)	
Hungary	17	13	r 20 (0.3)	–4 (0.3)	▼	s 16 (0.3)	2 (0.3)	▲
Iran, Islamic Rep. of	21	16	s 21 (0.2)	–3 (0.4)	▼	15 (0.4)	– –	
Italy	30	20	r 30 (0.3)	0 (0.4)		r 19 (0.3)	0 (0.5)	
Japan	20	16	22 (0.2)	–5 (0.3)	▼	16 (0.2)	3 (0.3)	▲
Kazakhstan	20	19	22 (0.2)	◊ ◊		18 (0.3)	◊ ◊	
Kuwait	30	14	26 (0.3)	◊ ◊		s 4 (0.4)	◊ ◊	
Latvia	17	20	20 (0.4)	–3 (0.5)	▼	r 18 (0.4)	3 (0.5)	▲
Lithuania	18	19	20 (0.2)	–3 (0.3)	▼	r 18 (0.3)	2 (0.4)	▲
Mongolia	22	13	– –	◊ ◊		– –	◊ ◊	
Morocco	28	18	r 28 (0.4)	0 (0.5)		s 17 (0.3)	– –	
Netherlands	np	np	r 27 (0.1)	0 (0.1)		s 16 (0.4)	0 (0.6)	
New Zealand	np	np	24 (0.1)	0 (0.2)		16 (0.2)	1 (0.4)	▲
Norway	19	16	23 (0.0)	0 (0.0)		13 (0.3)	1 (0.4)	
Qatar	26	11	31 (0.0)	◊ ◊		s 12 (0.0)	◊ ◊	
Russian Federation	15	20	s 19 (0.2)	–4 (0.3)	▼	s 17 (0.2)	3 (0.3)	▲
Scotland	25	15	25 (0.1)	0 (0.2)		s 19 (0.3)	0 (0.5)	
Singapore	25	22	26 (0.0)	–5 (0.2)	▼	21 (0.1)	3 (0.2)	▲
Slovak Republic	20	20	21 (0.3)	◊ ◊		18 (0.2)	◊ ◊	
Slovenia	18	21	19 (0.1)	–3 (0.2)	▼	r 20 (0.2)	2 (0.3)	▲
Sweden	np	np	24 (0.3)	◊ ◊		r 12 (0.3)	◊ ◊	
Tunisia	25	20	r 29 (0.9)	0 (0.9)		r 18 (0.4)	– –	
Ukraine	16	17	18 (0.2)	◊ ◊		17 (0.3)	◊ ◊	
United States	32	16	30 (0.2)	1 (0.3)	▲	s 16 (0.4)	2 (0.5)	▲
Yemen	23	18	24 (0.4)	◊ ◊		15 (0.5)	◊ ◊	
International Avg.	23	18	24 (0.1)			16 (0.1)		
Benchmarking Participants								
Alberta, Canada	25	15	27 (0.2)	◊ ◊		15 (0.3)	◊ ◊	
British Columbia, Canada	24	np	24 (0.2)	◊ ◊		r 17 (0.3)	◊ ◊	
Dubai, UAE	24	17	r 28 (0.0)	◊ ◊		x x	◊ ◊	
Massachusetts, US	25	np	28 (0.5)	◊ ◊		r 21 (0.9)	◊ ◊	
Minnesota, US	29	4	29 (0.5)	◊ ◊		15 (0.8)	◊ ◊	
Ontario, Canada	25	np	26 (0.5)	0 (0.5)		r 18 (0.5)	2 (0.6)	▲
Quebec, Canada	25	20	25 (0.1)	1 (0.2)	▲	r 22 (0.4)	–1 (0.8)	

▲ 2007 significantly higher ▼ 2007 significantly lower

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

Intended instructional time provided by National Research Coordinators. Implemented instructional time for mathematics provided by teachers, and total instructional time 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.

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 "np" indicates not prescribed by the curriculum.

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

Note: For Norway, hours of intended instructional time is only an estimate and only prescribed for grades 1–7 and 8–10, not for single grades.

Exhibit 5.1 Weekly Intended and Implemented Instructional Time for Mathematics with Trends (Continued)

TIMSS2007 Mathematics 8th Grade

Country	Intended Time Prescribed in the Curriculum		Time Implemented in Schools					
	Total Hours of Instructional Time per Week	Mathematics Instructional Time as a Percent of Total Instructional Time	Total Hours of Instructional Time per Week			Mathematics Instructional Time as a Percent of Total Instructional Time		
			2007 Hours		Difference from 2003	2007 Percent		Difference from 2003
Algeria	30	17	r	36 (0.5)	◊ ◊	s	13 (0.4)	◊ ◊
Armenia	27	20	r	31 (0.6)	–2 (0.7) ▼		11 (0.4)	– –
Australia	25	17		26 (0.2)	0 (0.3)	r	13 (0.2)	–1 (0.4)
Bahrain	31	17		28 (0.0)	3 (0.0) ▲	r	9 (0.3)	–7 (0.3) ▼
Bosnia and Herzegovina	26	10		29 (0.9)	◊ ◊	r	11 (0.3)	◊ ◊
Botswana	30	13	s	30 (0.6)	2 (0.8) ▲	r	13 (0.3)	– –
Bulgaria	32	12		24 (0.4)	–2 (0.5) ▼	r	12 (0.3)	0 (0.4)
Chinese Taipei	25	15		29 (0.3)	1 (0.4)		14 (0.2)	1 (0.3) ▲
Colombia	30	np		31 (0.4)	◊ ◊	r	12 (0.7)	◊ ◊
Cyprus	26	8	r	26 (0.0)	–1 (0.0) ▼	s	8 (0.0)	0 (0.1)
Czech Republic	23	13		24 (0.3)	◊ ◊	r	14 (0.2)	◊ ◊
Egypt	26	14		32 (0.4)	1 (0.6) ▲		8 (0.4)	– –
El Salvador	19	20		23 (0.6)	◊ ◊		17 (0.5)	◊ ◊
England	25	12	s	26 (0.2)	0 (0.2)		12 (0.2)	– –
Georgia	23	12		24 (0.4)	◊ ◊		13 (0.2)	◊ ◊
Ghana	27	14	r	28 (0.4)	1 (0.6) ▲		13 (0.5)	– –
Hong Kong SAR	27	13		28 (0.3)	0 (0.4)	s	14 (0.4)	–1 (0.6)
Hungary	21	11	r	22 (0.3)	–7 (0.3) ▼	s	13 (0.2)	2 (0.3) ▲
Indonesia	32	10	r	34 (0.6)	0 (0.8)	s	11 (0.3)	–2 (0.4) ▼
Iran, Islamic Rep. of	31	12		27 (0.2)	–2 (0.4) ▼	s	11 (0.3)	–1 (0.5) ▼
Israel	23	17		32 (0.6)	0 (0.7)	s	12 (0.3)	– –
Italy	30	15	r	31 (0.4)	0 (0.5)	r	13 (0.2)	0 (0.2)
Japan	23	11		25 (0.2)	–3 (0.3) ▼		10 (0.1)	1 (0.2) ▲
Jordan	26	15		28 (0.3)	3 (0.4) ▲		14 (0.2)	1 (0.2) ▲
Korea, Rep. of	26	12		29 (0.4)	–7 (0.4) ▼	s	11 (0.2)	3 (0.2) ▲
Kuwait	30	14	r	26 (0.4)	◊ ◊	s	6 (0.6)	◊ ◊
Lebanon	35	16	r	30 (0.3)	– –		x x	– –
Lithuania	23	13		24 (0.3)	–3 (0.4) ▼	r	13 (0.2)	1 (0.2) ▲
Malaysia	29	11		30 (0.3)	3 (0.3) ▲		11 (0.1)	–1 (0.2) ▼
Malta	27	14		27 (0.0)	◊ ◊		13 (0.0)	◊ ◊
Mongolia	30	13		– –	◊ ◊		– –	◊ ◊
Norway	23	12		22 (0.0)	0 (0.0)		13 (0.2)	0 (0.3)
Oman	27	20		27 (0.4)	◊ ◊		15 (0.5)	◊ ◊
Palestinian Nat'l Auth.	20	14	r	26 (0.3)	–2 (0.3) ▼	s	11 (0.4)	–3 (0.5) ▼
Qatar	26	12	r	28 (0.0)	◊ ◊	s	13 (0.0)	◊ ◊
Romania	24	13		26 (0.3)	–3 (0.5) ▼	r	14 (0.3)	1 (0.4) ▲
Russian Federation	23	16		26 (0.3)	–1 (0.4) ▼	r	15 (0.2)	1 (0.4)
Saudi Arabia	–	12	r	27 (0.3)	– –	r	11 (0.3)	– –
Scotland	28	13	s	28 (0.2)	0 (0.2)	s	13 (0.2)	–1 (0.3)
Serbia	24	13	r	23 (0.3)	–1 (0.4)	s	13 (0.2)	0 (0.3)
Singapore	23	13		29 (0.0)	–5 (0.0) ▼		13 (0.1)	1 (0.2) ▲
Slovenia	23	13		23 (0.1)	–5 (0.2) ▼		13 (0.1)	2 (0.1) ▲
Sweden	np	np		26 (0.3)	–1 (0.4) ▼	r	10 (0.2)	1 (0.3) ▲
Syrian Arab Republic	30	12		24 (0.4)	◊ ◊		10 (0.4)	◊ ◊
Thailand	35	8		32 (0.3)	◊ ◊		10 (0.2)	◊ ◊
Tunisia	32	13	r	39 (0.7)	8 (0.8) ▲	r	10 (0.2)	– –
Turkey	20	13		27 (0.9)	◊ ◊		11 (0.3)	◊ ◊
Ukraine	25	12		24 (0.2)	◊ ◊		15 (0.2)	◊ ◊
United States	29	13		31 (0.2)	2 (0.3) ▲	s	13 (0.2)	0 (0.3)
‡ Morocco	28	13		37 (1.0)	– –	r	11 (0.6)	– –
International Avg.	27	14		28 (0.1)			12 (0.0)	
Benchmarking Participants								
Basque Country, Spain	30	10		30 (0.2)	0 (0.2)		12 (0.2)	0 (0.3)
British Columbia, Canada	26	np		26 (0.2)	◊ ◊	r	14 (0.4)	◊ ◊
Dubai, UAE	28	16	s	29 (0.1)	◊ ◊		x x	◊ ◊
Massachusetts, US	28	np		29 (0.3)	◊ ◊		15 (0.3)	◊ ◊
Minnesota, US	29	4		30 (0.5)	◊ ◊		13 (0.4)	◊ ◊
Ontario, Canada	25	np		26 (0.2)	0 (0.3)	r	16 (0.3)	–1 (0.6)
Quebec, Canada	25	17		26 (0.2)	0 (0.2)	r	16 (0.3)	–1 (0.5)

2007 significantly higher ▲ 2007 significantly lower ▼

Intended instructional time provided by National Research Coordinators. Implemented instructional time for mathematics provided by teachers, and total instructional time 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.

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.

An "np" indicates not prescribed by the curriculum.

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

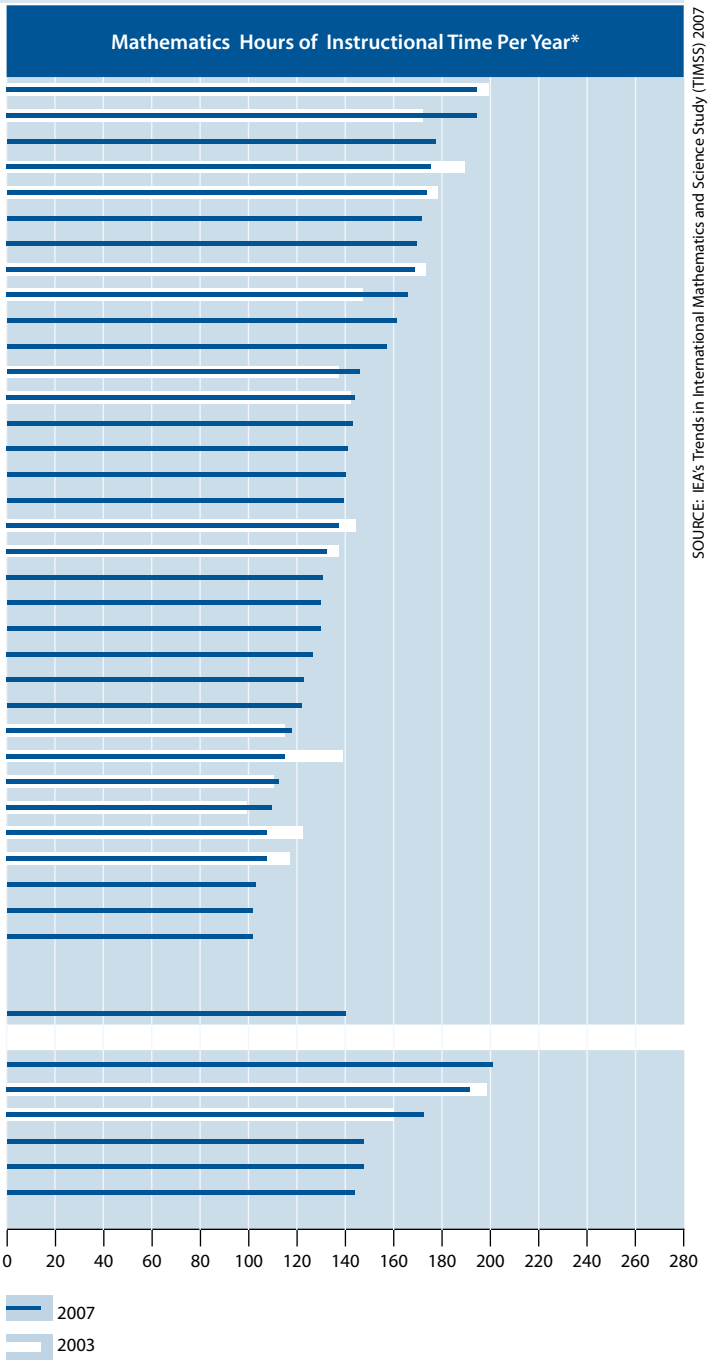
Note: Total instructional time for Thailand is only applicable to the majority of schools. For Norway, hours of intended instructional time is only an estimate and only prescribed for grades 1–7 and 8–10, not for single grades.

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

Exhibit 5.2 Yearly Hours of Implemented Instructional Time for Mathematics with Trends

TIMSS2007 Mathematics 4th Grade

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 (7.1)	◊ ◊	
Armenia		133 (3.4)	– –	
Kazakhstan		133 (1.7)	◊ ◊	
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	148 (7.8)	◊ ◊	
Dubai, UAE		x x	◊ ◊	



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

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.

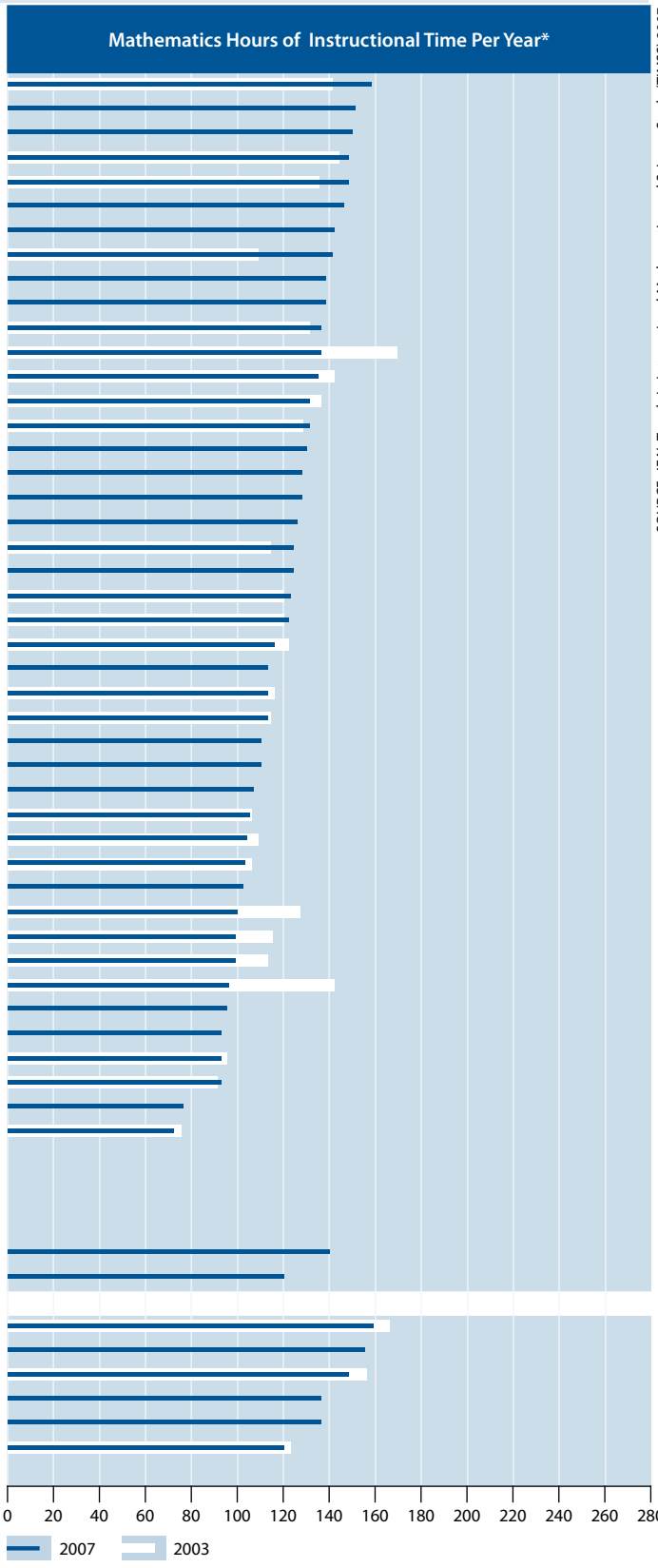
An "r" indicates data are available for at least 70 but less than 85% of the students. An "s" indicates data are available for at least 50 but less than 70% of the students. An "x" indicates data are available for less than 50% of the students.

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

Exhibit 5.2 Yearly Hours of Implemented Instructional Time for Mathematics with Trends (Continued)

TIMSS2007 Mathematics 8th Grade

Country		2007 Hours	Difference from 2003
Chinese Taipei		158 (3.5)	17 (4.0) ▲
Colombia	r	151 (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 (1.5)	– –
Italy	r	136 (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 (1.0)	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	103 (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 (4.3)	– –
Bulgaria	r	93 (2.0)	–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	◊ ◊



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

▲ 2007 significantly higher ▼ 2007 significantly lower

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.

Exhibit 5.3 Percentage of Time in Mathematics Class Devoted to TIMSS Content Domains During the School Year

TIMSS2007 Mathematics 4th Grade

Country	Number	Geometric Shapes and Measures	Data Display	Other
Algeria	r 44 (1.4)	r 26 (0.5)	r 18 (0.9)	r 13 (1.0)
Armenia	r 54 (1.8)	r 24 (0.8)	r 13 (1.0)	r 11 (0.8)
Australia	57 (1.1)	22 (0.7)	15 (0.6)	6 (0.7)
Austria	48 (1.2)	25 (0.6)	9 (0.4)	18 (1.2)
Chinese Taipei	53 (1.0)	28 (0.6)	14 (0.6)	5 (0.7)
Colombia	45 (1.5)	23 (0.8)	20 (0.8)	12 (1.6)
Czech Republic	56 (1.0)	26 (0.5)	11 (0.5)	6 (0.7)
Denmark	49 (1.2)	26 (0.6)	17 (0.6)	8 (0.8)
El Salvador	38 (1.1)	27 (0.8)	25 (0.7)	10 (1.2)
England	56 (0.9)	22 (0.5)	18 (0.5)	4 (0.7)
Georgia	41 (1.5)	27 (0.7)	17 (0.7)	16 (1.4)
Germany	54 (0.7)	21 (0.5)	13 (0.4)	12 (0.7)
Hong Kong SAR	53 (1.0)	29 (0.7)	15 (0.5)	3 (0.6)
Hungary	60 (1.1)	19 (0.7)	10 (0.4)	10 (0.9)
Iran, Islamic Rep. of	34 (0.9)	27 (0.7)	18 (0.7)	21 (1.2)
Italy	48 (0.9)	27 (0.4)	15 (0.4)	10 (0.7)
Japan	49 (1.1)	29 (0.8)	18 (0.6)	4 (0.6)
Kazakhstan	– –	– –	– –	– –
Kuwait	s 44 (1.8)	s 27 (1.2)	s 17 (1.2)	s 13 (1.4)
Latvia	52 (0.9)	20 (0.6)	15 (0.6)	13 (1.0)
Lithuania	44 (0.9)	25 (0.6)	17 (0.4)	14 (0.9)
Morocco	44 (1.1)	29 (0.8)	16 (0.8)	10 (0.7)
Netherlands	64 (1.2)	14 (0.5)	16 (0.7)	6 (0.8)
New Zealand	66 (0.8)	17 (0.4)	13 (0.3)	4 (0.4)
Norway	61 (1.1)	24 (0.7)	11 (0.5)	4 (0.7)
Qatar	s 48 (0.1)	s 24 (0.0)	s 15 (0.0)	s 13 (0.1)
Russian Federation	– –	– –	– –	– –
Scotland	r 56 (1.0)	r 21 (0.6)	r 16 (0.5)	r 7 (0.7)
Singapore	55 (0.7)	27 (0.6)	14 (0.5)	5 (0.5)
Slovak Republic	63 (0.9)	26 (0.5)	8 (0.5)	3 (0.6)
Slovenia	50 (1.0)	24 (0.5)	17 (0.5)	10 (1.0)
Sweden	56 (1.7)	21 (0.8)	13 (0.6)	10 (1.2)
Tunisia	41 (1.3)	26 (0.8)	19 (0.8)	14 (1.1)
Ukraine	36 (1.5)	24 (0.7)	18 (0.8)	22 (1.5)
United States	54 (1.0)	20 (0.4)	19 (0.5)	6 (0.6)
Yemen	r 37 (1.5)	r 28 (0.7)	r 20 (0.7)	r 15 (1.1)
International Avg.	50 (0.2)	24 (0.1)	16 (0.1)	10 (0.2)
Benchmarking Participants				
Alberta, Canada	55 (1.0)	21 (0.6)	18 (0.6)	6 (0.8)
British Columbia, Canada	r 57 (1.2)	r 19 (0.7)	r 17 (0.7)	r 6 (0.7)
Dubai, UAE	s 55 (1.4)	s 20 (1.0)	s 13 (0.7)	s 12 (1.4)
Massachusetts, US	51 (2.0)	22 (1.0)	20 (0.8)	6 (1.2)
Minnesota, US	58 (2.5)	21 (1.2)	17 (1.2)	4 (1.1)
Ontario, Canada	48 (1.2)	25 (0.7)	18 (0.6)	9 (1.1)
Quebec, Canada	53 (1.3)	23 (0.7)	14 (0.5)	10 (1.1)

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

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.

Exhibit 5.3 **Percentage of Time in Mathematics Class Devoted to TIMSS Content Domains During the School Year (Continued)**

TIMSS2007 Mathematics 8th Grade

Country	Number	Algebra	Geometry	Data and Chance	Other
Algeria	31 (0.8)	16 (0.6)	30 (0.8)	16 (0.6)	7 (0.7)
Armenia	19 (1.0)	36 (1.0)	29 (0.6)	10 (0.5)	6 (0.8)
Australia	29 (0.8)	24 (0.6)	20 (0.5)	17 (0.7)	9 (0.9)
Bahrain	24 (0.5)	26 (0.4)	25 (0.3)	16 (0.4)	9 (0.5)
Bosnia and Herzegovina	r 20 (1.0)	r 28 (1.3)	r 35 (1.8)	r 7 (0.5)	r 10 (1.2)
Botswana	35 (1.2)	23 (0.9)	17 (0.9)	12 (0.8)	14 (1.2)
Bulgaria	13 (0.7)	37 (0.6)	41 (0.6)	6 (0.5)	3 (0.4)
Chinese Taipei	20 (1.1)	35 (1.0)	40 (1.6)	4 (0.5)	1 (0.3)
Colombia	26 (0.8)	41 (1.5)	17 (0.8)	13 (0.7)	5 (0.6)
Cyprus	r 31 (0.6)	r 34 (0.5)	r 22 (0.6)	r 3 (0.3)	s 12 (0.7)
Czech Republic	21 (0.8)	39 (0.9)	26 (0.6)	8 (0.4)	7 (0.8)
Egypt	22 (0.7)	26 (0.5)	27 (0.6)	15 (0.5)	10 (0.7)
El Salvador	26 (0.7)	36 (1.2)	16 (0.9)	18 (0.8)	3 (0.5)
England	28 (0.7)	27 (0.6)	21 (0.4)	20 (0.4)	4 (0.5)
Georgia	20 (0.9)	30 (0.8)	31 (0.7)	12 (0.5)	7 (0.9)
Ghana	23 (0.7)	23 (0.7)	23 (0.5)	21 (0.6)	10 (0.7)
Hong Kong SAR	18 (0.7)	34 (0.8)	31 (1.0)	12 (0.6)	4 (0.8)
Hungary	25 (0.8)	27 (0.6)	28 (0.7)	11 (0.5)	7 (0.8)
Indonesia	r 20 (0.7)	r 27 (1.0)	r 26 (1.1)	r 16 (0.8)	r 14 (1.3)
Iran, Islamic Rep. of	22 (0.7)	28 (0.8)	27 (0.7)	10 (0.4)	12 (0.9)
Israel	r 13 (0.7)	r 41 (0.9)	r 30 (0.7)	r 10 (0.6)	r 5 (0.6)
Italy	16 (0.7)	35 (0.6)	34 (0.6)	12 (0.4)	3 (0.4)
Japan	19 (0.9)	33 (0.8)	33 (0.7)	14 (1.1)	2 (0.4)
Jordan	26 (0.6)	26 (0.6)	23 (0.5)	16 (0.6)	10 (0.9)
Korea, Rep. of	18 (0.6)	30 (0.7)	34 (1.0)	15 (0.5)	2 (0.4)
Kuwait	s 27 (1.3)	s 21 (0.6)	s 25 (1.1)	s 19 (0.8)	s 8 (1.1)
Lebanon	21 (0.7)	27 (0.8)	35 (0.9)	12 (0.7)	r 5 (0.8)
Lithuania	22 (0.6)	37 (0.7)	24 (0.4)	11 (0.4)	6 (0.7)
Malaysia	28 (0.9)	24 (0.5)	24 (0.6)	16 (0.5)	9 (1.0)
Malta	24 (0.0)	30 (0.0)	28 (0.0)	13 (0.0)	7 (0.1)
Norway	30 (0.8)	20 (0.7)	25 (0.5)	16 (0.6)	9 (0.7)
Oman	25 (0.9)	27 (0.6)	24 (0.6)	17 (0.5)	7 (0.8)
Palestinian Nat'l Auth.	24 (1.0)	23 (0.7)	26 (0.6)	16 (0.5)	11 (0.9)
Qatar	r 22 (0.0)	r 27 (0.0)	r 27 (0.0)	r 15 (0.0)	r 10 (0.0)
Romania	18 (0.5)	29 (0.6)	36 (0.9)	10 (0.5)	8 (0.9)
Russian Federation	11 (0.8)	48 (1.1)	33 (0.6)	5 (0.6)	2 (0.4)
Saudi Arabia	r 30 (1.0)	r 23 (0.8)	r 29 (0.8)	r 12 (0.8)	r 7 (1.0)
Scotland	36 (0.8)	24 (0.7)	22 (0.6)	14 (0.5)	4 (0.5)
Serbia	18 (0.8)	26 (1.1)	37 (1.7)	7 (0.6)	13 (1.9)
Singapore	16 (0.5)	40 (0.8)	21 (0.5)	13 (0.4)	9 (0.7)
Slovenia	37 (0.7)	25 (0.6)	23 (0.6)	10 (0.3)	5 (0.6)
Sweden	35 (0.7)	24 (0.6)	23 (0.5)	14 (0.5)	5 (0.7)
Syrian Arab Republic	21 (0.8)	28 (0.9)	27 (0.7)	15 (0.7)	10 (0.6)
Thailand	28 (0.7)	25 (0.6)	24 (0.7)	16 (0.5)	7 (0.9)
Tunisia	32 (0.8)	17 (0.8)	34 (0.7)	11 (0.6)	7 (0.7)
Turkey	24 (0.9)	24 (0.8)	28 (0.9)	15 (0.5)	9 (1.1)
Ukraine	18 (0.8)	33 (0.9)	29 (0.8)	9 (0.6)	12 (1.0)
United States	23 (0.7)	47 (1.1)	16 (0.6)	12 (0.4)	2 (0.3)
‡ Morocco	r 29 (1.9)	r 22 (0.6)	r 28 (0.9)	r 12 (0.6)	r 8 (1.3)
International Avg.	24 (0.1)	29 (0.1)	27 (0.1)	13 (0.1)	7 (0.1)
Benchmarking Participants					
Basque Country, Spain	38 (1.0)	32 (0.7)	22 (0.8)	6 (0.6)	r 3 (0.7)
British Columbia, Canada	37 (1.0)	26 (0.7)	20 (0.6)	12 (0.5)	4 (0.6)
Dubai, UAE	s 20 (0.9)	s 30 (1.3)	s 29 (0.8)	s 12 (0.5)	s 9 (1.1)
Massachusetts, US	19 (1.4)	50 (2.3)	14 (0.8)	13 (0.9)	3 (1.0)
Minnesota, US	21 (1.6)	49 (2.2)	15 (1.1)	14 (1.0)	1 (0.4)
Ontario, Canada	33 (1.0)	22 (0.6)	19 (0.5)	17 (0.5)	10 (0.8)
Quebec, Canada	24 (0.9)	32 (0.8)	26 (0.7)	14 (0.6)	3 (0.7)

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

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.

Are the TIMSS Mathematics Topics Included in the Intended Curriculum Taught in School?

The mathematics content and topic areas assessed in TIMSS 2007 are elaborated in the Mathematics Framework, with each topic area for fourth and eighth grade presented as a comprehensive list of objectives. The aim was to cover goals of mathematics education that a significant number of countries regarded as important to assess. Because the topics do not represent the "least common denominator" but rather a forward-looking conception of mathematics instruction, not all TIMSS topics are in all countries' curriculum.

National Research Coordinators were asked to indicate whether each of the TIMSS 2007 mathematics topics was included in their countries' intended curriculum through fourth or eighth grade, and if so, whether the topics were intended to be taught to "all or almost all students" or "only the more able students." At the fourth grade, countries were asked about a total of 35 topics, 19 in number, 11 in geometric shapes and measures, and 5 in data display. At the eighth grade, countries were asked about 39 topics in total, with 10 in number, 8 in algebra, 14 in geometry, and 7 in data and chance. The responses for the countries are summarized in this section and the topic-by-topic data follows in the next sections.

Exhibit 5.4 shows that, for most countries, much of the mathematics content assessed by TIMSS is included in their intended curricula. On average across countries at the fourth grade, the majority of the assessment topics (22 out of 35) were intended for all or almost all students. There was variation among participants, with 34 to 35 of the topics included in the curriculum for all or almost all students in Australia, Austria, Colombia, Denmark, Italy, and the United States, and 17 or fewer of the topics (less than half) included for Georgia, Mongolia, Morocco, the Netherlands, Norway, Qatar, Scotland, the Russian Federation, the Slovak Republic, Tunisia, and the Ukraine. On average across countries, 12 out of 19 topics were included in the number domain, 7 out of 11 topics in the geometric shapes and measures domain, and 3 out of 5 topics in the data display domain.

On average across countries at the eighth grade, most of the assessment topics (31 out of 39) were intended for all or almost all students. Almost all of the countries included all of the number topics for all or almost all students—10 out of 10 topics included on average internationally. On average across countries, the coverage for the other content areas ranged from almost all the topics for algebra to fewer than half the topics for data and chance. The inclusion for algebra topics was 7 out of 8 topics, for geometry 11 out of 14 topics, and for data and chance 3 out of 7 topics (with some countries not including any of the topics).

In addition to asking national coordinators about the mathematics topics in the intended curriculum, TIMSS asked mathematics teachers about the topics actually taught in the mathematics classroom. Teachers of the students assessed in TIMSS were asked to indicate whether each of the TIMSS 2007 mathematics topics was *mostly taught before this year*, *mostly taught this year*, or *not yet taught or just introduced*. Exhibit 5.5 presents, for fourth and eighth grades, teachers' reports on students having been taught the TIMSS mathematics topics either prior to or during the year of the assessment. The exhibit shows, for each TIMSS participant, averaged across mathematics content domains, the percentage of students whose teachers reported that the students had been taught each topic.

At fourth grade, according to their teachers, 66 percent of students, on average across countries, had been taught the mathematics topics, with more than 80 percent in England, Singapore, the United States, and the U.S. states of Massachusetts and Minnesota. The percentages of students taught the three content domains were similar, although a little higher for the number topics (70%, on average) and a little lower for geometric shapes and measures and for data display (64% each). At eighth grade, an average of 72 percent of students had been taught the mathematics topics overall, and about the same for the algebra (73%) and geometry topics (71%). Almost all students, 95 percent, on average, had been taught the number topics at eighth grade, but there was much less attention to data and chance, with just 47 percent of students taught the topics in this domain. According to

Exhibit 5.4 Summary of TIMSS Mathematics Topics in the Intended Curriculum*

TIMSS2007 Mathematics 4th Grade

Country	Number of TIMSS Mathematics Topics Intended to Be Taught up to and Including Fourth Grade								
	All Mathematics (35 topics)			Number (19 topics)			Geometric Shapes and Measures (11 topics)		
	Topics for All or Almost All Students	Topics for Only the More Able Students (top track)	Not Included in the Curriculum Through Grade 4	Topics for All or Almost All Students	Topics for Only the More Able Students (top track)	Not Included in the Curriculum Through Grade 4	Topics for All or Almost All Students	Topics for Only the More Able Students (top track)	Not Included in the Curriculum Through Grade 4
Algeria	29	3	3	14	3	2	10	0	1
Armenia	21	0	14	13	0	6	8	0	3
Australia	34	0	1	19	0	0	10	0	1
Austria	35	0	0	19	0	0	11	0	0
Chinese Taipei	21	0	14	13	0	6	5	0	6
Colombia	34	0	1	19	0	0	10	0	1
Czech Republic	20	0	15	10	0	9	8	0	3
Denmark	34	0	1	18	0	1	11	0	0
El Salvador	23	2	10	14	0	5	8	2	1
England	25	6	4	13	3	3	9	2	0
Georgia	15	3	17	12	2	5	3	1	7
Germany	23	1	11	12	1	6	7	0	4
Hong Kong SAR	25	1	9	12	0	7	8	1	2
Hungary	31	0	4	17	0	2	9	0	2
Iran, Islamic Rep. of	23	0	12	16	0	3	7	0	4
Italy	35	0	0	19	0	0	11	0	0
Japan	24	0	11	14	0	5	5	0	6
Kazakhstan	19	1	15	11	1	7	7	0	4
Kuwait	18	2	15	14	2	3	4	0	7
Latvia	19	1	15	11	0	8	7	1	3
Lithuania	27	0	8	15	0	4	7	0	4
Mongolia	11	6	18	8	1	10	2	4	5
Morocco	7	2	26	5	1	13	2	1	8
Netherlands	14	0	21	8	0	11	4	0	7
New Zealand	23	5	7	11	3	5	9	1	1
Norway	10	0	25	4	0	15	5	0	6
Qatar	15	1	19	11	1	7	4	0	7
Russian Federation	10	0	25	4	0	15	6	0	5
Scotland	17	11	7	8	7	4	7	1	3
Singapore	27	0	8	15	0	4	8	0	3
Slovak Republic	14	0	21	9	0	10	5	0	6
Slovenia	21	2	12	11	2	6	6	0	5
Sweden	26	0	9	14	0	5	8	0	3
Tunisia	16	0	19	4	0	15	7	0	4
Ukraine	11	0	24	6	0	13	5	0	6
United States	34	0	1	19	0	0	10	0	1
Yemen	24	0	11	15	0	4	7	0	4
International Avg.	22	1	12	12	1	6	7	0	4
Benchmarking Participants									
Alberta, Canada	22	0	13	10	0	9	8	0	3
British Columbia, Canada	30	0	5	15	0	4	10	0	1
Dubai, UAE	28	0	7	17	0	2	7	0	4
Massachusetts, US	32	0	3	17	0	2	10	0	1
Minnesota, US	28	0	7	13	0	6	10	0	1
Ontario, Canada	28	0	7	15	0	4	10	0	1
Quebec, Canada	30	0	5	15	0	4	10	0	1

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

Background data provided by National Research Coordinators.

* See Exhibits 5.6 through 5.8 for data on individual topics.

Note: For Sweden number of mathematics topics intended to be taught up to and including fifth grade.

Exhibit 5.4 Summary of TIMSS Mathematics Topics in the Intended Curriculum* (Continued)

TIMSS2007 Mathematics 4th Grade

Country	Number of TIMSS Mathematics Topics Intended to Be Taught up to and Including Fourth Grade		
	Data Display (5 topics)		
	Topics for All or Almost All Students	Topics for Only the More Able Students (top track)	Not Included in the Curriculum Through Grade 4
Algeria	5	0	0
Armenia	0	0	5
Australia	5	0	0
Austria	5	0	0
Chinese Taipei	3	0	2
Colombia	5	0	0
Czech Republic	2	0	3
Denmark	5	0	0
El Salvador	1	0	4
England	3	1	1
Georgia	0	0	5
Germany	4	0	1
Hong Kong SAR	5	0	0
Hungary	5	0	0
Iran, Islamic Rep. of	0	0	5
Italy	5	0	0
Japan	5	0	0
Kazakhstan	1	0	4
Kuwait	0	0	5
Latvia	1	0	4
Lithuania	5	0	0
Mongolia	1	1	3
Morocco	0	0	5
Netherlands	2	0	3
New Zealand	3	1	1
Norway	1	0	4
Qatar	0	0	5
Russian Federation	0	0	5
Scotland	2	3	0
Singapore	4	0	1
Slovak Republic	0	0	5
Slovenia	4	0	1
Sweden	4	0	1
Tunisia	5	0	0
Ukraine	0	0	5
United States	5	0	0
Yemen	2	0	3
International Avg.	3	0	2
Benchmarking Participants			
Alberta, Canada	4	0	1
British Columbia, Canada	5	0	0
Dubai, UAE	4	0	1
Massachusetts, US	5	0	0
Minnesota, US	5	0	0
Ontario, Canada	3	0	2
Quebec, Canada	5	0	0

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

Exhibit 5.4 Summary of TIMSS Mathematics Topics in the Intended Curriculum* (Continued)

TIMSS2007 Mathematics 8th Grade

Country	Number of TIMSS Mathematics Topics Intended to Be Taught up to and Including Eighth Grade								
	All Mathematics (39 topics)			Number (10 topics)			Algebra (8 topics)		
	Topics for All or Almost All Students	Topics for Only the More Able Students (top track)	Not Included in the Curriculum Through Grade 8	Topics for All or Almost All Students	Topics for Only the More Able Students (top track)	Not Included in the Curriculum Through Grade 8	Topics for All or Almost All Students	Topics for Only the More Able Students (top track)	Not Included in the Curriculum Through Grade 8
Algeria	30	0	7	10	0	0	8	0	0
Armenia	32	0	7	10	0	0	8	0	0
Australia	32	7	0	10	0	0	5	3	0
Bahrain	35	0	4	10	0	0	8	0	0
Bosnia and Herzegovina	33	1	5	10	0	0	7	0	1
Botswana	26	0	13	9	0	1	6	0	2
Bulgaria	28	0	11	10	0	0	7	0	1
Chinese Taipei	35	0	4	10	0	0	8	0	0
Colombia	38	0	1	10	0	0	8	0	0
Cyprus	19	7	13	10	0	0	4	0	4
Czech Republic	31	4	4	10	0	0	6	0	2
Egypt	34	2	3	10	0	0	6	2	0
El Salvador	32	0	7	10	0	0	6	0	2
England	29	9	1	9	1	0	4	4	0
Georgia	29	8	2	10	0	0	8	0	0
Ghana	33	0	6	10	0	0	7	0	1
Hong Kong SAR	35	1	3	10	0	0	8	0	0
Hungary	35	0	4	10	0	0	8	0	0
Indonesia	20	16	3	10	0	0	5	3	0
Iran, Islamic Rep. of	35	0	4	10	0	0	7	0	1
Israel	31	0	8	10	0	0	8	0	0
Italy	37	0	2	10	0	0	8	0	0
Japan	34	0	5	10	0	0	8	0	0
Jordan	36	0	3	10	0	0	8	0	0
Korea, Rep. of	33	0	6	10	0	0	8	0	0
Kuwait	28	0	11	9	0	1	8	0	0
Lebanon	30	6	3	9	1	0	7	1	0
Lithuania	22	7	10	10	0	0	4	3	1
Malaysia	30	0	9	10	0	0	7	0	1
Malta	24	8	7	9	1	0	6	0	2
Mongolia	26	4	9	10	0	0	8	0	0
Morocco	22	0	17	10	0	0	4	0	4
Norway	23	0	16	9	0	1	3	0	5
Oman	36	0	3	10	0	0	8	0	0
Palestinian Nat'l Auth.	32	0	7	10	0	0	5	0	3
Qatar	33	1	5	10	0	0	8	0	0
Romania	32	0	7	10	0	0	7	0	1
Russian Federation	34	0	5	10	0	0	7	0	1
Saudi Arabia	27	0	11	10	0	0	7	0	1
Scotland	21	11	7	8	2	0	3	2	3
Serbia	31	2	6	10	0	0	7	1	0
Singapore	38	0	1	10	0	0	8	0	0
Slovenia	33	0	6	10	0	0	8	0	0
Sweden	34	0	5	10	0	0	8	0	0
Syrian Arab Republic	32	0	7	10	0	0	7	0	1
Thailand	31	0	8	10	0	0	6	0	2
Tunisia	26	0	13	10	0	0	5	0	3
Turkey	33	0	6	10	0	0	7	0	1
Ukraine	29	3	7	9	1	0	7	1	0
United States	38	1	0	10	0	0	7	1	0
International Avg.	31	2	6	10	0	0	7	0	1
Benchmarking Participants									
Basque Country, Spain	29	0	10	10	0	0	7	0	1
British Columbia, Canada	33	0	6	10	0	0	5	0	3
Dubai, UAE	39	0	0	10	0	0	8	0	0
Massachusetts, US	38	0	1	10	0	0	8	0	0
Minnesota, US	37	0	2	10	0	0	8	0	0
Ontario, Canada	35	0	4	10	0	0	5	0	3
Quebec, Canada	35	0	4	10	0	0	5	0	3

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

Background data provided by National Research Coordinators.

* See Exhibits 5.9 through 5.12 for data on individual topics.

Note: For Sweden number of mathematics topics intended to be taught up to and including ninth grade.

Exhibit 5.4 **Summary of TIMSS Mathematics Topics in the Intended Curriculum* (Continued)** TIMSS2007 Mathematics 8th Grade

Country	Number of TIMSS Mathematics Topics Intended to Be Taught up to and Including Eighth Grade					
	Geometry (14 topics)			Data and Chance (7 topics)		
	Topics for All or Almost All Students	Topics for Only the More Able Students (top track)	Not Included in the Curriculum Through Grade 8	Topics for All or Almost All Students	Topics for Only the More Able Students (top track)	Not Included in the Curriculum Through Grade 8
Algeria	9	0	3	3	0	4
Armenia	14	0	0	0	0	7
Australia	12	2	0	5	2	0
Bahrain	14	0	0	3	0	4
Bosnia and Herzegovina	13	1	0	3	0	4
Botswana	9	0	5	2	0	5
Bulgaria	11	0	3	0	0	7
Chinese Taipei	14	0	0	3	0	4
Colombia	13	0	1	7	0	0
Cyprus	5	0	9	0	7	0
Czech Republic	12	1	1	3	3	1
Egypt	12	0	2	6	0	1
El Salvador	11	0	3	5	0	2
England	11	2	1	5	2	0
Georgia	9	4	1	2	4	1
Ghana	12	0	2	4	0	3
Hong Kong SAR	13	1	0	4	0	3
Hungary	13	0	1	4	0	3
Indonesia	5	9	0	0	4	3
Iran, Islamic Rep. of	14	0	0	4	0	3
Israel	10	0	4	3	0	4
Italy	14	0	0	5	0	2
Japan	11	0	3	5	0	2
Jordan	13	0	1	5	0	2
Korea, Rep. of	13	0	1	2	0	5
Kuwait	9	0	5	2	0	5
Lebanon	11	3	0	3	1	3
Lithuania	7	3	4	1	1	5
Malaysia	11	0	3	2	0	5
Malta	7	3	4	2	4	1
Mongolia	8	2	4	0	2	5
Morocco	8	0	6	0	0	7
Norway	7	0	7	4	0	3
Oman	14	0	0	4	0	3
Palestinian Nat'l Auth.	12	0	2	5	0	2
Qatar	12	1	1	3	0	4
Romania	12	0	2	3	0	4
Russian Federation	12	0	2	5	0	2
Saudi Arabia	9	0	4	1	0	6
Scotland	7	3	4	3	4	0
Serbia	12	0	2	2	1	4
Singapore	14	0	0	6	0	1
Slovenia	13	0	1	2	0	5
Sweden	10	0	4	6	0	1
Syrian Arab Republic	13	0	1	2	0	5
Thailand	13	0	1	2	0	5
Tunisia	9	0	5	2	0	5
Turkey	13	0	1	3	0	4
Ukraine	11	1	2	2	0	5
United States	14	0	0	7	0	0
International Avg.	11	1	2	3	1	3
Benchmarking Participants						
Basque Country, Spain	10	0	4	2	0	5
British Columbia, Canada	11	0	3	7	0	0
Dubai, UAE	14	0	0	7	0	0
Massachusetts, US	14	0	0	6	0	1
Minnesota, US	14	0	0	5	0	2
Ontario, Canada	13	0	1	7	0	0
Quebec, Canada	13	0	1	7	0	0

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

Exhibit 5.5 Summary of Students Taught the TIMSS Mathematics Topics*

TIMSS2007 Mathematics 4th Grade

Country	Average Percentage of Students Taught** the TIMSS Mathematics Topics			
	All Mathematics (35 topics)	Number (19 topics)	Geometric Shapes and Measures (11 topics)	Data Display (5 topics)
Algeria	67 (2.3)	70 (2.2)	73 (1.7)	57 (3.9)
Armenia	70 (1.6)	73 (1.1)	73 (2.0)	64 (3.0)
Australia	77 (1.1)	75 (1.3)	81 (1.3)	76 (2.0)
Austria	55 (1.1)	67 (0.9)	67 (1.3)	32 (2.1)
Chinese Taipei	76 (1.2)	83 (1.0)	72 (1.2)	74 (2.7)
Colombia	70 (2.2)	79 (1.4)	67 (2.7)	65 (3.7)
Czech Republic	51 (1.2)	54 (0.9)	49 (1.3)	50 (2.4)
Denmark	69 (1.5)	73 (1.5)	80 (1.7)	53 (3.2)
El Salvador	76 (1.2)	76 (1.4)	71 (2.0)	81 (1.8)
England	85 (1.0)	85 (0.9)	88 (1.0)	83 (2.0)
Georgia	62 (1.5)	63 (1.4)	55 (1.6)	67 (3.5)
Germany	63 (1.1)	66 (0.6)	65 (1.2)	58 (2.2)
Hong Kong SAR	78 (0.9)	71 (1.2)	75 (1.0)	89 (1.5)
Hungary	71 (1.3)	78 (0.7)	74 (1.3)	61 (2.9)
Iran, Islamic Rep. of	56 (1.5)	54 (1.4)	63 (1.3)	50 (2.8)
Italy	75 (0.9)	81 (0.9)	67 (0.9)	76 (1.8)
Japan	58 (1.1)	67 (1.1)	50 (0.8)	56 (2.1)
Kazakhstan	– –	– –	– –	– –
Kuwait	r 53 (1.7)	r 69 (1.5)	r 59 (1.6)	r 32 (3.5)
Latvia	72 (1.1)	76 (1.0)	63 (1.3)	76 (2.0)
Lithuania	79 (1.1)	75 (1.5)	71 (1.2)	89 (1.3)
Morocco	54 (1.3)	56 (1.1)	59 (1.5)	47 (3.0)
Netherlands	60 (1.3)	64 (1.5)	45 (1.5)	71 (2.3)
New Zealand	73 (0.9)	72 (0.9)	64 (1.3)	82 (1.5)
Norway	59 (1.3)	61 (1.3)	64 (1.6)	51 (2.6)
Qatar	54 (0.1)	67 (0.1)	54 (0.1)	42 (0.1)
Russian Federation	– –	– –	– –	– –
Scotland	71 (1.1)	67 (1.3)	69 (1.4)	77 (1.9)
Singapore	87 (0.6)	91 (0.5)	82 (0.7)	88 (1.0)
Slovak Republic	55 (1.2)	69 (0.7)	51 (1.1)	46 (2.6)
Slovenia	69 (0.6)	69 (0.7)	50 (0.7)	88 (1.2)
Sweden	47 (1.4)	51 (1.2)	36 (1.3)	54 (2.7)
Tunisia	63 (1.5)	55 (1.3)	64 (1.2)	69 (2.8)
Ukraine	63 (1.4)	72 (1.0)	56 (1.2)	61 (2.9)
United States	86 (0.8)	86 (0.9)	83 (1.5)	90 (1.1)
Yemen	46 (1.9)	67 (2.1)	44 (2.2)	26 (3.0)
International Avg.	66 (0.2)	70 (0.2)	64 (0.2)	64 (0.4)
Benchmarking Participants				
Alberta, Canada	68 (1.7)	69 (1.5)	56 (2.6)	79 (3.0)
British Columbia, Canada	r 66 (1.3)	r 67 (1.3)	r 55 (2.4)	r 77 (2.7)
Dubai, UAE	s 57 (2.1)	s 71 (2.1)	s 53 (2.6)	s 49 (3.5)
Massachusetts, US	84 (1.7)	83 (1.6)	83 (2.6)	87 (2.0)
Minnesota, US	83 (2.6)	82 (3.0)	84 (2.8)	84 (3.1)
Ontario, Canada	78 (1.3)	66 (1.7)	76 (1.8)	91 (1.4)
Quebec, Canada	73 (1.6)	75 (1.4)	78 (1.6)	67 (3.0)

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

Background data provided by teachers at the time of testing.

* See Exhibits 5.6 through 5.8 for data on individual topics.

** Includes the TIMSS topics mostly taught during or before the year of the assessment.

( ) 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.

Exhibit 5.5 Summary of Students Taught the TIMSS Mathematics Topics* (Continued)

TIMSS2007 Mathematics 8th Grade

Country	Average Percentage of Students Taught** the TIMSS Mathematics Topics									
	All Mathematics (39 topics)		Number (10 topics)		Algebra (8 topics)		Geometry (14 topics)		Data and Chance (7 topics)	
Algeria		58 (1.3)		86 (1.4)		39 (2.6)		56 (1.1)		49 (2.2)
Armenia		68 (1.7)		68 (3.5)		78 (2.0)		75 (2.2)		51 (3.1)
Australia		73 (1.0)		95 (0.6)		73 (1.7)		66 (1.2)		58 (2.0)
Bahrain		70 (0.8)		97 (0.3)		58 (1.4)		71 (0.7)		54 (1.9)
Bosnia and Herzegovina		84 (0.7)		100 (0.1)		98 (0.6)		94 (0.7)		42 (2.9)
Botswana		44 (1.5)		88 (0.7)		48 (2.6)		26 (2.2)		14 (2.3)
Bulgaria		70 (0.8)		97 (1.1)		91 (0.9)		67 (0.8)		24 (1.8)
Chinese Taipei		68 (0.7)		97 (1.1)		95 (0.9)		76 (1.1)		6 (1.5)
Colombia		72 (1.5)		96 (0.8)		74 (2.3)		68 (2.0)		48 (2.9)
Cyprus		49 (0.5)		97 (0.5)		42 (1.1)		51 (0.6)		3 (0.7)
Czech Republic		65 (0.8)		99 (0.2)		70 (1.6)		76 (1.0)		16 (1.9)
Egypt		85 (0.9)		96 (1.0)		89 (1.2)		87 (0.9)		68 (1.7)
El Salvador		69 (1.2)		95 (0.8)		68 (1.8)		47 (2.3)		68 (2.1)
England		86 (0.9)		97 (0.6)		84 (1.4)		83 (1.1)		81 (1.5)
Georgia		73 (1.1)		99 (0.7)		76 (1.4)		75 (1.4)		42 (3.1)
Ghana		73 (1.4)		91 (1.0)		78 (1.8)		62 (1.9)		61 (2.6)
Hong Kong SAR		78 (0.9)		96 (1.1)		83 (1.6)		83 (1.2)		50 (2.4)
Hungary		86 (0.8)		100 (0.1)		93 (0.7)		93 (0.7)		57 (2.5)
Indonesia		64 (1.5)		94 (1.6)		73 (1.9)		76 (1.4)		18 (2.9)
Iran, Islamic Rep. of		72 (0.9)		96 (0.6)		70 (1.4)		80 (0.9)		41 (2.0)
Israel	r	69 (1.2)	r	96 (1.0)	r	82 (1.3)	r	47 (1.4)	r	51 (2.8)
Italy		78 (0.9)		99 (0.2)		77 (1.2)		87 (0.8)		50 (2.2)
Japan		76 (0.8)		96 (1.0)		93 (0.9)		79 (0.7)		36 (2.1)
Jordan		84 (0.8)		99 (0.6)		97 (0.6)		84 (1.0)		56 (2.6)
Korea, Rep. of		84 (0.7)		97 (0.9)		92 (0.7)		81 (0.8)		65 (1.6)
Kuwait	r	66 (1.7)	r	95 (0.9)	r	54 (2.9)	r	60 (1.8)	r	55 (3.0)
Lebanon		74 (1.3)		93 (1.0)		76 (2.2)		75 (1.3)		49 (2.5)
Lithuania		78 (0.7)		98 (0.9)		77 (1.4)		81 (0.9)		57 (1.5)
Malaysia		82 (1.0)		99 (0.3)		86 (1.4)		90 (0.9)		50 (2.7)
Malta		76 (0.0)		98 (0.0)		79 (0.1)		71 (0.0)		55 (0.1)
Norway		54 (0.8)		89 (0.9)		36 (1.8)		43 (1.1)		48 (2.0)
Oman		79 (0.9)		98 (0.4)		78 (1.4)		76 (1.3)		64 (1.9)
Palestinian Nat'l Auth.		73 (0.8)		98 (0.5)		64 (1.8)		73 (0.8)		57 (1.8)
Qatar		65 (0.1)		96 (0.0)		60 (0.1)		61 (0.1)		42 (0.1)
Romania		84 (1.1)		97 (1.4)		93 (0.9)		92 (0.8)		53 (2.9)
Russian Federation		– –		– –		– –		– –		– –
Saudi Arabia		55 (1.4)		90 (1.9)		48 (2.1)		55 (1.5)		24 (2.9)
Scotland		72 (1.1)		95 (0.7)		63 (1.8)		72 (1.3)		60 (1.7)
Serbia		86 (1.1)		98 (1.2)		94 (1.4)		95 (0.7)		53 (2.8)
Singapore		82 (0.5)		100 (0.1)		95 (0.7)		71 (0.8)		62 (1.3)
Slovenia		65 (0.5)		93 (0.2)		68 (1.3)		69 (0.7)		28 (0.9)
Sweden		62 (0.8)		94 (0.4)		48 (1.6)		51 (0.9)		52 (1.6)
Syrian Arab Republic		65 (1.1)		93 (1.0)		64 (2.1)		59 (1.2)		42 (2.4)
Thailand		63 (1.3)		95 (1.2)		50 (2.6)		69 (1.6)		38 (2.0)
Tunisia		63 (1.1)		92 (1.2)		61 (1.9)		70 (1.0)		29 (2.2)
Turkey		78 (1.2)		98 (1.0)		84 (1.4)		75 (1.4)		55 (3.0)
Ukraine		74 (0.6)		99 (0.3)		85 (0.7)		81 (0.8)		30 (1.7)
United States		88 (0.6)		100 (0.1)		90 (0.9)		78 (1.4)		83 (1.1)
‡ Morocco		67 (1.7)		94 (0.8)	r	54 (2.7)		64 (1.3)	r	52 (3.2)
International Avg.		72 (0.2)		95 (0.1)		73 (0.2)		71 (0.2)		47 (0.3)
Benchmarking Participants										
Basque Country, Spain		63 (1.2)		98 (0.5)		75 (2.2)		61 (2.5)		17 (2.5)
British Columbia, Canada		62 (1.6)		97 (0.5)		68 (2.6)		43 (2.8)		39 (3.0)
Dubai, UAE	s	69 (1.7)	s	96 (1.7)	s	69 (2.4)	s	63 (2.3)	s	45 (2.4)
Massachusetts, US		91 (1.4)		99 (0.7)		92 (1.5)		81 (3.6)		90 (1.8)
Minnesota, US		83 (1.6)		100 (0.2)		85 (3.0)		69 (3.6)		78 (3.4)
Ontario, Canada		82 (1.3)		91 (1.2)		76 (2.5)		78 (2.2)		83 (1.7)
Quebec, Canada		74 (1.0)		99 (0.3)		75 (1.5)		72 (1.3)		50 (3.0)

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

Background data provided by teachers at the time of testing.

* See Exhibits 5.9 through 5.12 for data on individual topics.

** Includes the TIMSS topics mostly taught during or before the year of the assessment.

‡ 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.

their mathematics teachers, 80 percent, or more, of the students had been taught the TIMSS mathematics topics in Bosnia and Herzegovina, Egypt, England, Hungary, Jordan, Korea, Malaysia, Romania, Serbia, Singapore, and the United States, as well as the states of Massachusetts and Minnesota and the province of Ontario.

Fourth Grade: Which TIMSS Mathematics Topics Are in the Intended and Implemented Curriculum?

For the fourth grade, Exhibit 5.6 provides detailed information about each topic within the number domain, including the student population to be taught the topic, the grades within which the topics are intended to be taught, and the teachers' reports about the percent of students taught the topics. With the exception of the Ukraine, all countries and benchmarking participants included the three whole number topics in their curriculum for all or almost all students. On average across countries, teachers generally reported that these three topics were taught, with representation 86 percent, place value 96 percent, and computation 95 percent. Fewer countries included multiples and factors, but teachers reported that 83 percent of the students had been taught this topic. Most countries included estimation, with 85 percent of the students taught the topic. In comparison, only about half the countries included problems involving proportions in their curriculum and only 43 percent of the students had been taught this topic.

At the fourth grade within the number domain, TIMSS asked about five topics related to teaching fractions. On average across countries, teachers reported that 70 percent of students had been taught about fractions generally, 56 percent about equivalent fractions, 68 percent about comparing and ordering simple fractions, 70 percent about representations of fractions,

and 50 percent about adding and subtracting simple fractions. For the two topics about decimals, teachers reported that 53 percent of the students had been taught about decimal place value and 51 percent about adding and subtracting with decimals. Within the six pre-algebra topics, teachers reported that 93 percent of the students had been taught about number sentences, 71 percent to model unknown situations with number sentences, 77 percent to extend patterns, 63 percent to describe relationships between adjacent terms in a sequence, 66 percent to generate pairs of numbers following a given rule, and 56 percent to find a rule for a relationship given some pairs of numbers. In general, the emphasis reported for the topics in the intended curriculum was reflected in the implemented curriculum.

Exhibit 5.7 contains the topic-by-topic results for the fourth grade content domain of geometric shapes and measures. All countries and benchmarking participants included the topic of measuring and estimating length in the intended curriculum for all or almost all students with the exception of Mongolia that included it for the most able students, and teachers reported that 95 percent of the students had been taught this topic. Teachers reported, on average across countries, that about the same percentage of students had been taught about parallel and perpendicular lines (70%) as comparing angle size and drawing angles (71%), although lines were included in somewhat fewer curricula than angles (25 countries compared to 28). Elementary properties of geometric shapes were in nearly all curricula and, on average across countries, taught to 89 percent of the students, whereas relationships between three- and two-dimensional shapes was much less common and taught to only 46 percent of the students. Within geometric measurement, calculating perimeters and areas of squares and rectangles was commonly

Exhibit 5.6 Intended and Taught* TIMSS Number Topics

TIMSS2007 Mathematics 4th Grade

Number (19 topics)	Represent whole numbers using words, diagrams, or symbols			Whole numbers including place value and ordering			Computation with whole numbers		
Country	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	4	59 (5.1)	●	4	75 (4.9)	●	4	85 (3.3)
Armenia	●	4	83 (2.5)	●	5	77 (3.4)	●	4	72 (3.9)
Australia	●	K–6	98 (1.2)	●	K–6	100 (0.2)	●	1–2	99 (0.5)
Austria	●	3	80 (2.6)	●	3	98 (1.0)	●	1	100 (0.2)
Chinese Taipei	●	1–3	89 (2.5)	●	1–3	98 (1.1)	●	1–4	100 (0.0)
Colombia	●	1–3	87 (3.8)	●	1–3	89 (3.6)	●	1–3	83 (4.5)
Czech Republic	●	1–5	84 (3.4)	●	1–5	100 (0.4)	●	1–5	100 (0.0)
Denmark	●	4–6	90 (2.4)	●	4–6	98 (1.3)	●	4–6	100 (0.0)
El Salvador	●	K–12	86 (3.1)	●	1–12	97 (1.4)	●	1–12	94 (2.1)
England	●	K–2	93 (2.2)	●	K–2	100 (0.4)	●	K–5	96 (1.8)
Georgia	●	1–2	80 (4.8)	●	3	90 (4.0)	●	2	88 (4.2)
Germany	●	1	88 (2.3)	●	3	99 (0.9)	●	1	99 (0.7)
Hong Kong SAR	●	1	78 (3.7)	●	1	99 (0.7)	●	3	100 (0.0)
Hungary	●	1–4	99 (0.4)	●	1–4	100 (0.0)	●	1–4	99 (0.9)
Iran, Islamic Rep. of	●	4–5	76 (3.8)	●	2	100 (0.0)	●	1,3–4	92 (1.9)
Italy	●	1–5	99 (0.6)	●	2–5	100 (0.0)	●	1–6	100 (0.0)
Japan	●	1–3	92 (2.2)	●	1–4	100 (0.0)	●	1–4	100 (0.2)
Kazakhstan	●	1	– –	●	1	– –	●	1	– –
Kuwait	●	1–3	r 78 (3.8)	●	2–3	r 91 (2.3)	●	2–3	r 86 (3.1)
Latvia	●	1	97 (0.9)	●	1	100 (0.4)	●	1–4	100 (0.0)
Lithuania	●	4	96 (1.4)	●	4	97 (1.4)	●	4	100 (0.4)
Mongolia	●	1–5	– –	●	1–5	– –	●	1–5	– –
Morocco	●	1	91 (2.5)	●	3	98 (1.1)	●	2	99 (0.9)
Netherlands	●	4	81 (3.6)	●	4	99 (0.5)	●	4	99 (0.5)
New Zealand	●	K–5	98 (0.6)	●	K–5	99 (0.8)	●	K–5	98 (0.6)
Norway	●	1–4	79 (3.8)	●	3–4	99 (0.5)	●	3–7	99 (0.4)
Qatar	●	1–5	73 (0.2)	●	1–5	94 (0.1)	●	1–5	89 (0.1)
Russian Federation	●	1–4	– –	●	1–5	– –	●	1–5	– –
Scotland	●	2	r 93 (2.3)	●	3	99 (0.7)	●	3	97 (1.3)
Singapore	●	1–6	99 (0.6)	●	1–6	100 (0.0)	●	1–6	100 (0.0)
Slovak Republic	●	3–9	90 (2.4)	●	3–6	93 (2.1)	●	1–9	92 (2.2)
Slovenia	●	1–6	99 (0.5)	●	2–6	99 (0.6)	●	1–6	100 (0.0)
Sweden	●	1–5	80 (3.5)	●	1–5	99 (0.5)	●	1–5	100 (0.4)
Tunisia	●	1–5	81 (3.1)	●	1–5	93 (2.0)	●	1–5	94 (1.7)
Ukraine	○	5–6	69 (3.6)	○	5–6	89 (2.6)	○	5–6	95 (1.7)
United States	●	K–2	99 (0.5)	●	3–5	100 (0.2)	●	3–5	100 (0.0)
Yemen	●	1–6	57 (5.1)	●	1–6	84 (3.0)	●	1–6	85 (3.1)
International Avg.			86 (0.5)			96 (0.3)			95 (0.3)
Benchmarking Participants									
Alberta, Canada	●	K–5	100 (0.4)	●	2–5	100 (0.4)	●	1–5	99 (0.4)
British Columbia, Canada	●	K–1	r 100 (0.0)	●	2–3	r 100 (0.0)	●	K–1	r 100 (0.0)
Dubai, UAE	●	3	s 89 (4.1)	●	4	s 99 (0.1)	●	4	s 96 (1.5)
Massachusetts, US	●	1–6	100 (0.0)	●	1–6	100 (0.0)	●	1–6	100 (0.0)
Minnesota, US	●	K–5	99 (1.0)	●	K–5	99 (1.4)	●	K–6	100 (0.0)
Ontario, Canada	●	K–4	99 (0.9)	●	4–6	100 (0.0)	●	K–6	100 (0.0)
Quebec, Canada	●	1–8	94 (2.1)	●	1–6	98 (1.2)	●	1–6	99 (1.2)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through fourth grade

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

Background data on intended curriculum provided by National Research Coordinators, and on implemented curriculum by teachers at the time of testing.

* Includes the TIMSS topics mostly taught during or before the year of the assessment.

( ) 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.

Exhibit 5.6 Intended and Taught* TIMSS Number Topics (Continued)

TIMSS2007 Mathematics 4th Grade

Number (19 topics)	Multiples and factors of numbers			Estimation with whole numbers			Problems involving proportions		
Country	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	3	93 (2.4)	●	4	70 (4.3)	●	4	44 (4.9)
Armenia	●	4	83 (3.2)	●	4	64 (3.7)	●	4	59 (3.5)
Australia	●	3–6	86 (2.4)	●	K–6	94 (1.9)	●	3–4	50 (4.0)
Austria	●	1–2	95 (1.5)	●	3	97 (1.0)	●	2–4	80 (2.8)
Chinese Taipei	○	5	99 (0.5)	●	4	85 (2.9)	●	4	32 (4.1)
Colombia	●	1–3	96 (2.7)	●	4–5	70 (4.6)	●	4–5	34 (4.3)
Czech Republic	●	2–3	99 (0.8)	●	3–5	95 (1.8)	●	7	39 (4.2)
Denmark	●	4–6	83 (3.7)	●	4–6	90 (2.7)	●	4–6	r 57 (4.7)
El Salvador	●	3–12	86 (3.1)	●	2–12	90 (2.4)	●	1–12	62 (4.0)
England	●	3–7	98 (1.3)	●	1–6	96 (1.7)	⦿	4–10	54 (3.8)
Georgia	⦿	3	37 (4.2)	●	3–4	81 (4.6)	●	4	32 (4.0)
Germany	●	4	86 (2.3)	●	3	95 (1.4)	○	5	27 (3.2)
Hong Kong SAR	●	4	100 (0.0)	●	1–3	90 (2.6)	○	–	24 (3.7)
Hungary	●	2	93 (2.1)	●	1–4	100 (0.0)	●	4	55 (4.3)
Iran, Islamic Rep. of	●	3,6	82 (2.9)	○	5	61 (3.9)	○	5	14 (2.5)
Italy	●	2–6	86 (2.2)	●	2–3	77 (3.0)	●	4–6	29 (3.2)
Japan	○	6	9 (2.1)	●	4	82 (3.0)	○	6	14 (2.8)
Kazakhstan	●	3	– –	●	1	– –	●	1	– –
Kuwait	●	3–4	r 92 (2.3)	●	–	r 65 (4.4)	○	7–8	r 33 (4.4)
Latvia	●	–	100 (0.0)	●	–	99 (0.4)	○	7–9	39 (3.7)
Lithuania	●	4	63 (4.0)	●	4	74 (3.5)	○	5–6	27 (3.8)
Mongolia	●	1–5	– –	●	1–5	– –	○	6	– –
Morocco	○	5	87 (3.1)	○	6	84 (3.0)	○	6	23 (3.4)
Netherlands	○	6	89 (2.9)	●	4	96 (1.4)	●	4	58 (4.3)
New Zealand	○	5–6	74 (2.5)	●	K–9	89 (1.6)	○	8–10	54 (3.0)
Norway	○	3–10	72 (3.8)	●	1–7	80 (3.1)	○	–	53 (3.7)
Qatar	●	5–7	94 (0.1)	●	3–6	78 (0.1)	○	6–7	31 (0.2)
Russian Federation	○	6	– –	○	5	– –	○	6	– –
Scotland	○	6	88 (2.1)	●	3	93 (1.9)	○	8	r 27 (3.8)
Singapore	●	1–6	99 (0.4)	●	1–6	100 (0.2)	●	4–6	51 (2.5)
Slovak Republic	●	3–9	98 (1.1)	●	3,4,6	91 (2.3)	●	3–4,6	94 (2.1)
Slovenia	●	3–6	99 (0.6)	●	4–6	92 (1.8)	○	9	78 (2.8)
Sweden	●	1–5	56 (4.1)	●	1–5	88 (2.8)	○	6–9	39 (3.9)
Tunisia	○	5	87 (2.5)	○	5	91 (2.1)	○	5	20 (3.2)
Ukraine	○	6	67 (4.0)	○	5–6	58 (4.3)	○	5–6	34 (4.0)
United States	●	3–5	90 (1.5)	●	3–5	98 (0.6)	●	3–5	56 (2.9)
Yemen	●	2,4–6	66 (4.3)	●	2–3	65 (4.1)	●	6	28 (4.5)
International Avg.			83 (0.4)			85 (0.5)			43 (0.6)
Benchmarking Participants									
Alberta, Canada	○	5–7	73 (3.6)	●	1–6	96 (1.3)	○	5–6	39 (4.5)
British Columbia, Canada	○	5	r 79 (3.6)	●	2–3	r 97 (1.1)	○	6	r 36 (4.0)
Dubai, UAE	●	4	s 88 (3.7)	●	4	s 81 (4.1)	○	10–12	s 24 (4.8)
Massachusetts, US	●	3–8	97 (2.0)	●	K–8	100 (0.0)	●	4–10	39 (6.5)
Minnesota, US	○	5–6	91 (4.2)	●	1–5	97 (2.0)	○	6–8	50 (8.1)
Ontario, Canada	●	1–3,6–8	80 (3.9)	●	1–5	97 (1.5)	●	4–8	31 (4.3)
Quebec, Canada	●	3–6	88 (2.3)	●	3–6	89 (3.0)	●	1–6	53 (4.4)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through fourth grade

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

Exhibit 5.6 Intended and Taught* TIMSS Number Topics (Continued)

TIMSS2007 Mathematics 4th Grade

Number (19 topics)	Fractions			Equivalent fractions			Comparing and ordering simple fractions		
Country	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	4	87 (3.0)	●	4	62 (4.3)	○	5	87 (3.0)
Armenia	●	4	86 (2.5)	●	4	87 (3.0)	○	5	86 (2.8)
Australia	●	3–4	86 (2.3)	●	3–4	58 (3.4)	●	3–4	66 (3.2)
Austria	●	4	28 (2.8)	●	4	14 (1.6)	●	4	26 (2.5)
Chinese Taipei	●	4	93 (2.3)	○	5	62 (4.1)	●	4	98 (1.0)
Colombia	●	4–5	90 (3.0)	●	1–3	94 (1.8)	●	4–5	92 (2.5)
Czech Republic	●	4,7	9 (2.3)	○	7	3 (0.7)	○	7	5 (1.5)
Denmark	●	4–6	80 (3.6)	●	4–6	25 (3.6)	●	4–6	75 (4.0)
El Salvador	●	3–12	83 (3.5)	●	3–12	83 (3.6)	●	5–12	75 (3.0)
England	●	1–3	99 (0.6)	●	2–6	90 (2.5)	●	3–7	98 (0.8)
Georgia	●	4	57 (4.5)	○	5	22 (4.3)	●	4	80 (3.8)
Germany	○	6	18 (2.3)	○	6	1 (0.6)	○	6	18 (2.3)
Hong Kong SAR	●	3–4	98 (1.0)	●	4	99 (0.9)	●	3	98 (1.4)
Hungary	●	4	84 (3.0)	●	4	77 (3.5)	●	4	76 (3.2)
Iran, Islamic Rep. of	●	3	38 (4.3)	●	4	32 (4.1)	●	4–5	50 (4.1)
Italy	●	4	99 (0.6)	●	4–7	92 (1.9)	●	4–7	96 (1.3)
Japan	●	4	99 (0.6)	○	5	57 (3.8)	○	5–6	86 (2.5)
Kazakhstan	●	3	– –	○	5	– –	○	5	– –
Kuwait	●	3–5	r 80 (3.6)	●	4–5	r 87 (2.6)	●	4–5	r 94 (2.1)
Latvia	●	3–4	58 (4.1)	●	3–4	76 (3.5)	●	3–4	72 (3.1)
Lithuania	○	6	90 (2.3)	○	5–6	81 (3.3)	●	4	90 (2.3)
Mongolia	○	6	– –	●	1–5	– –	○	6	– –
Morocco	○	5	32 (3.9)	○	5	11 (2.6)	○	5	19 (3.5)
Netherlands	○	5	81 (3.3)	○	5	47 (4.3)	○	5	67 (3.7)
New Zealand	●	2–4	84 (2.1)	○	6–8	62 (2.7)	○	6–8	81 (2.1)
Norway	○	5–10	59 (3.8)	○	8–10	48 (4.2)	○	8–10	48 (4.2)
Qatar	●	2–4	80 (0.1)	●	3–5	82 (0.1)	●	3–4	81 (0.1)
Russian Federation	○	5–6	– –	○	6	– –	○	5–6	– –
Scotland	●	4	81 (3.6)	⦿	5	51 (4.4)	⦿	5	63 (4.5)
Singapore	●	2–6	99 (0.5)	●	3–6	100 (0.4)	●	2–6	100 (0.0)
Slovak Republic	○	6	65 (3.3)	○	6	16 (2.6)	○	6	23 (2.7)
Slovenia	⦿	4–7	65 (3.1)	○	7	14 (2.5)	○	6	53 (3.4)
Sweden	●	1–5	28 (3.2)	●	1–5	8 (1.6)	●	1–5	28 (3.0)
Tunisia	○	5	16 (2.7)	○	6	14 (2.6)	○	6	15 (2.7)
Ukraine	○	5	78 (3.1)	○	6	87 (2.5)	○	5–	88 (2.8)
United States	●	3–5	91 (1.6)	●	3–5	83 (2.1)	●	3–8	83 (2.2)
Yemen	●	1–4	60 (4.7)	●	3–4	91 (3.1)	●	3–5	92 (2.7)
International Avg.			70 (0.5)			56 (0.5)			68 (0.5)
Benchmarking Participants									
Alberta, Canada	●	2–6	73 (3.6)	○	5–7	44 (3.8)	○	5–6	55 (3.9)
British Columbia, Canada	●	K–1	r 58 (4.0)	○	5	r 42 (3.9)	●	2–3	r 45 (3.9)
Dubai, UAE	●	4	s 81 (4.3)	●	4	s 81 (5.2)	●	4	s 78 (5.0)
Massachusetts, US	●	K–8	87 (4.7)	●	3–8	81 (4.7)	●	1–5	81 (5.4)
Minnesota, US	●	3–5	86 (5.1)	●	4–7	77 (4.5)	●	3–5	77 (4.3)
Ontario, Canada	●	1–6	48 (5.6)	●	4–5	29 (4.4)	●	2, 4–7	34 (4.8)
Quebec, Canada	●	3–6	89 (2.3)	○	5–6	75 (3.2)	○	5–6	74 (3.6)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through fourth grade

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

Exhibit 5.6 Intended and Taught* TIMSS Number Topics (Continued)

TIMSS2007 Mathematics 4th Grade

Number (19 topics)	Fractions represented by words, numbers or models			Adding and subtracting simple fractions			Decimal place value including writing decimals using words and numbers		
Country	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	4	75 (4.9)	●	4	68 (4.6)	⦿	4	72 (4.8)
Armenia	●	4	80 (2.9)	●	4	87 (2.9)	●	4	57 (3.9)
Australia	●	3–4	83 (3.2)	●	3–4	48 (3.7)	●	3–4	75 (3.5)
Austria	●	4	26 (2.4)	●	4	22 (2.3)	●	4	49 (3.3)
Chinese Taipei	●	2–4	97 (1.4)	●	3	97 (1.4)	●	3–4	97 (1.4)
Colombia	●	4–5	91 (2.5)	●	4–5	96 (1.5)	●	4–5	78 (4.6)
Czech Republic	●	4,7	15 (3.1)	○	7	3 (1.2)	○	5–6	1 (0.9)
Denmark	●	4–6	82 (3.6)	●	4–6	41 (4.3)	●	4–6	83 (3.6)
El Salvador	●	3–12	71 (3.8)	●	3–12	89 (3.1)	●	4–12	83 (3.1)
England	●	1–2	95 (1.4)	○	6–8	59 (4.0)	●	4–5	94 (1.6)
Georgia	●	4	83 (3.7)	●	4	31 (4.5)	○	5	5 (1.9)
Germany	○	5–6	21 (2.4)	○	6	6 (1.6)	⦿	5–6	76 (2.8)
Hong Kong SAR	●	3–5	94 (2.2)	●	4–5	98 (1.4)	●	4	94 (2.3)
Hungary	●	4	78 (3.2)	○	5	21 (3.2)	●	5	2 (1.2)
Iran, Islamic Rep. of	●	4	42 (3.8)	●	4	48 (3.6)	●	4	9 (2.3)
Italy	●	4–7	97 (1.1)	●	4–6	76 (2.7)	●	4–7	99 (0.6)
Japan	●	4	73 (3.3)	○	5	41 (3.8)	●	4	93 (1.9)
Kazakhstan	○	5	– –	○	5	– –	○	5	– –
Kuwait	●	3–4	r 86 (2.7)	●	3–4	r 93 (2.1)	○	5–6	r 42 (4.6)
Latvia	●	3–4	66 (4.3)	○	5	61 (3.8)	○	5	20 (3.0)
Lithuania	●	3	84 (2.5)	○	5–6	45 (3.9)	●	4	83 (2.6)
Mongolia	○	6	– –	○	6	– –	○	5	– –
Morocco	⦿	5	28 (4.0)	○	6	11 (2.6)	●	4	82 (3.3)
Netherlands	○	5	r 59 (4.2)	○	5	26 (4.3)	○	5	10 (2.4)
New Zealand	●	2–5	83 (2.1)	○	8–10	59 (2.6)	⦿	4–6	54 (2.8)
Norway	○	5–10	55 (3.8)	○	5–10	30 (3.8)	○	5–10	56 (4.1)
Qatar	●	2–4	76 (0.2)	●	4–5	77 (0.2)	○	5	42 (0.2)
Russian Federation	○	5	– –	○	5–6	– –	○	5	– –
Scotland	●	4	79 (3.4)	○	6	23 (3.3)	⦿	5	28 (4.0)
Singapore	●	2–6	98 (0.8)	●	2–6	100 (0.0)	●	4–6	99 (0.7)
Slovak Republic	○	6	70 (3.6)	○	6	6 (1.5)	○	5–6	1 (0.7)
Slovenia	⦿	4–6	74 (2.9)	○	6–7	11 (2.1)	○	6	2 (0.7)
Sweden	●	1–5	32 (3.6)	○	6–9	13 (2.7)	●	1–5	14 (2.7)
Tunisia	○	5–6	21 (2.9)	○	6	15 (2.7)	○	5	22 (3.2)
Ukraine	○	5–6	93 (2.1)	○	5–6	28 (2.9)	○	5	18 (2.7)
United States	●	3–5	90 (1.6)	●	3–5	78 (2.3)	●	3–5	80 (2.1)
Yemen	●	1–4	86 (3.2)	●	3–6	94 (2.5)	○	4–5	77 (3.7)
International Avg.			70 (0.5)			50 (0.5)			53 (0.5)
Benchmarking Participants									
Alberta, Canada	●	2–6	68 (3.7)	○	6	24 (3.4)	●	4–6	70 (3.8)
British Columbia, Canada	●	K–1	r 53 (3.8)	●	4	r 33 (4.0)	●	4	r 63 (4.1)
Dubai, UAE	●	4	s 77 (5.4)	●	4	s 63 (4.9)	●	4	s 58 (5.2)
Massachusetts, US	●	K–8	90 (4.3)	○	5–6	70 (4.8)	●	4–8	71 (6.7)
Minnesota, US	●	3–6	80 (5.5)	○	5–6	67 (7.2)	○	5–6	76 (7.3)
Ontario, Canada	●	1–4	46 (5.6)	○	7–8	19 (3.9)	●	4–6	48 (4.7)
Quebec, Canada	●	3–6	84 (3.1)	○	5–6	31 (3.9)	●	3–6	59 (4.4)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through fourth grade

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

Exhibit 5.6 Intended and Taught* TIMSS Number Topics (Continued)

TIMSS2007 Mathematics 4th Grade

Number (19 topics)	Adding and subtracting with decimals			Finding the missing number in a number sentence			Model simple situations involving unknowns with expressions or number sentences		
Country	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	○	5	85 (3.3)	●	4	95 (1.9)	●	1	73 (4.8)
Armenia	●	4	56 (4.0)	○	6	73 (3.4)	●	4	73 (3.6)
Australia	●	3–4	64 (3.7)	●	3–4	95 (1.0)	●	3–4	72 (3.6)
Austria	●	3–4	56 (3.2)	●	1	97 (1.1)	●	3	89 (1.9)
Chinese Taipei	●	3–4	96 (1.8)	●	3	97 (1.5)	●	3	82 (3.4)
Colombia	●	4–5	79 (4.4)	●	4–5	93 (2.4)	●	4–5	65 (4.6)
Czech Republic	○	5–6	1 (0.5)	●	2–5	100 (0.0)	●	2–7	82 (3.3)
Denmark	●	4–6	89 (2.6)	●	4–6	90 (2.8)	○	7–9	45 (4.0)
El Salvador	●	4–12	87 (3.0)	●	3–12	89 (2.9)	○	7–12	61 (4.2)
England	●	3–6	83 (2.6)	●	1–3	99 (0.5)	⦿	5–6	67 (4.2)
Georgia	○	5	5 (1.9)	●	3–4	95 (1.3)	●	2–3	89 (2.8)
Germany	●	4	84 (2.3)	●	1	99 (0.5)	●	2	95 (1.5)
Hong Kong SAR	○	5	34 (4.0)	●	1–2,5–6	53 (4.3)	○	5–6	20 (3.4)
Hungary	○	5	3 (1.4)	●	1–12	100 (0.4)	●	1–12	97 (1.4)
Iran, Islamic Rep. of	●	4	10 (2.0)	●	3	88 (2.3)	●	5	50 (4.0)
Italy	●	4–6	98 (0.8)	●	3–5	84 (2.4)	●	8–10	44 (3.1)
Japan	●	4	92 (2.3)	●	2–4	95 (1.7)	●	3–4	76 (3.9)
Kazakhstan	○	5	– –	●	1	– –	●	1	– –
Kuwait	○	5–6	r 37 (4.5)	●	2–3	r 92 (2.4)	●	2–4	r 75 (4.3)
Latvia	○	5	15 (2.7)	●	1–4	99 (0.5)	●	–	95 (1.3)
Lithuania	●	4	72 (3.2)	●	4	100 (0.0)	●	4	69 (3.8)
Mongolia	○	5	– –	●	1–5	– –	●	1–5	– –
Morocco	●	4	94 (1.8)	○	6	86 (2.8)	○	6	66 (4.1)
Netherlands	○	5	11 (2.5)	○	7	99 (0.7)	○	7	r 44 (4.3)
New Zealand	⦿	4–6	40 (2.5)	●	2–6	97 (1.0)	●	2–6	80 (2.2)
Norway	○	5–10	50 (4.1)	○	5–10	98 (1.2)	○	8–10	27 (3.5)
Qatar	○	5	40 (0.2)	●	1–4	94 (0.1)	○	7	66 (0.2)
Russian Federation	○	5	– –	●	1–4	– –	○	5–6	– –
Scotland	⦿	6	26 (3.2)	●	3	99 (0.7)	⦿	5	r 61 (3.6)
Singapore	●	4–6	99 (0.5)	●	2–5	100 (0.1)	○	6	90 (1.5)
Slovak Republic	○	6	1 (0.6)	●	2–4,6–9	100 (0.3)	○	7	91 (2.1)
Slovenia	○	6	1 (0.4)	●	2–6	96 (1.2)	●	4–8	91 (2.0)
Sweden	○	6–9	15 (3.0)	●	1–5	96 (2.2)	●	1–5	64 (4.1)
Tunisia	○	5	23 (3.1)	●	1–5	85 (3.0)	○	–	87 (3.1)
Ukraine	○	5	11 (2.3)	●	3–5	100 (0.0)	●	3–5	97 (1.4)
United States	●	3–5	83 (2.3)	●	1–4	99 (0.4)	●	3–5	91 (1.4)
Yemen	○	4–6	85 (3.6)	●	1–6	93 (2.9)	○	7	41 (4.7)
International Avg.			51 (0.5)			93 (0.3)			71 (0.6)
Benchmarking Participants									
Alberta, Canada	○	5–6	66 (4.2)	●	2–7	85 (2.9)	○	7	66 (3.7)
British Columbia, Canada	●	4	r 64 (4.1)	●	1	r 89 (2.5)	○	6	r 63 (4.0)
Dubai, UAE	●	4	s 56 (4.8)	●	3	s 93 (3.9)	●	4	s 71 (5.1)
Massachusetts, US	●	3–8	74 (6.8)	●	1–5	93 (2.9)	●	1–12	89 (3.2)
Minnesota, US	○	5–6	77 (6.4)	●	3–7	98 (1.4)	○	5–7	83 (5.7)
Ontario, Canada	●	4–6	55 (5.0)	●	2–5	85 (3.4)	○	5–8	70 (4.1)
Quebec, Canada	●	3–6	61 (4.1)	●	1–6	95 (1.9)	●	3–6	77 (3.9)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through fourth grade

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

Exhibit 5.6 Intended and Taught* TIMSS Number Topics (Continued)

TIMSS2007 Mathematics 4th Grade

Number (19 topics)	Extending patterns and finding missing terms in them			Describing relationships between adjacent terms in a sequence			Generating pairs of numbers following a given rule		
Country	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	⦿	4–5	64 (4.0)	⦿	4–5	32 (4.1)	●	4	59 (4.7)
Armenia	○	6	71 (3.5)	○	6	63 (3.5)	○	5	73 (3.0)
Australia	●	K–6	87 (2.4)	●	4–8	47 (4.3)	●	4–6	58 (3.5)
Austria	●	3	92 (1.8)	●	1	73 (2.9)	●	2–3	84 (2.6)
Chinese Taipei	○	5	73 (3.9)	○	5	72 (4.0)	○	6	54 (3.7)
Colombia	●	4–5	76 (3.3)	●	4–5	50 (4.1)	●	4–5	72 (4.0)
Czech Republic	○	–	94 (2.1)	○	–	80 (3.6)	○	–	68 (3.9)
Denmark	●	4–6	81 (3.6)	●	4–6	65 (4.2)	●	4–6	65 (4.1)
El Salvador	○	7–12	63 (3.3)	○	7–12	37 (4.2)	○	7–12	60 (3.9)
England	●	4–6	87 (2.7)	⦿	5–7	73 (4.0)	○	6–8	69 (3.6)
Georgia	●	2–4	92 (1.9)	○	6	86 (2.6)	⦿	4	82 (3.4)
Germany	●	2	95 (1.3)	●	2	94 (1.4)	●	2	82 (2.5)
Hong Kong SAR	○	5–6	49 (4.3)	○	5–6	43 (4.2)	○	5–6	45 (4.1)
Hungary	●	1–12	100 (0.0)	●	1–12	99 (0.7)	●	1–12	99 (0.4)
Iran, Islamic Rep. of	●	–	62 (4.2)	●	1	57 (3.7)	●	1	63 (3.6)
Italy	●	3–7	67 (2.8)	●	3–6	55 (3.7)	●	3–6	71 (3.0)
Japan	●	4	36 (3.9)	●	4	45 (3.7)	●	4	31 (3.8)
Kazakhstan	○	6	– –	●	1	– –	⦿	2	– –
Kuwait	●	3–4	r 61 (4.5)	●	2	r 39 (4.6)	⦿	7	r 48 (4.0)
Latvia	○	7–9	100 (0.4)	○	7–9	87 (2.2)	○	–	85 (3.1)
Lithuania	●	4	60 (3.4)	●	4	91 (2.1)	●	4	62 (3.8)
Mongolia	⦿	1–5	– –	○	1–5	– –	○	6	– –
Morocco	○	7	53 (4.0)	○	8	32 (4.3)	○	11	40 (4.5)
Netherlands	●	4	70 (4.3)	○	–	67 (4.4)	●	4	54 (4.3)
New Zealand	●	K–5	73 (2.6)	●	2–4	47 (2.7)	⦿	4–6	54 (2.6)
Norway	○	3–7	79 (3.1)	○	–	60 (3.4)	○	–	31 (3.6)
Qatar	⦿	2–4	r 60 (0.2)	○	7	r 35 (0.2)	○	7	47 (0.2)
Russian Federation	○	9	– –	○	9	– –	○	–	– –
Scotland	●	3	89 (2.3)	⦿	5	r 63 (3.5)	⦿	5	71 (3.3)
Singapore	●	1–6	92 (1.5)	○	–	68 (2.7)	○	–	78 (2.6)
Slovak Republic	●	1–6	96 (1.3)	●	1–6	97 (1.1)	○	7	98 (0.7)
Slovenia	●	2–4	92 (1.6)	●	4–5	91 (1.8)	●	4–6	92 (1.8)
Sweden	●	1–5	90 (1.7)	●	1–5	68 (3.9)	○	–	41 (3.5)
Tunisia	○	7	75 (3.8)	○	7	63 (4.1)	○	7	73 (3.7)
Ukraine	●	3–5	93 (2.0)	●	3–5	88 (2.5)	●	3–5	95 (1.9)
United States	●	3–5	92 (1.2)	●	3–5	62 (2.7)	●	3–5	75 (2.4)
Yemen	●	1–5	63 (4.3)	●	1–3	25 (4.4)	●	1–4	49 (4.9)
International Avg.			77 (0.5)			63 (0.6)			66 (0.6)
Benchmarking Participants									
Alberta, Canada	●	K–9	89 (2.6)	●	K–7	55 (3.9)	○	5–7	52 (4.4)
British Columbia, Canada	●	K–1	r 87 (2.6)	●	K–1	r 56 (4.4)	●	4	r 55 (4.3)
Dubai, UAE	●	4	s 76 (6.2)	○	5	s 50 (5.7)	●	2	s 52 (5.7)
Massachusetts, US	●	PK–12	93 (2.9)	●	1–12	56 (5.1)	○	5–10	78 (4.8)
Minnesota, US	●	K–8	84 (5.3)	●	K–8	60 (5.7)	●	K–8	72 (6.6)
Ontario, Canada	●	1–6	96 (1.6)	●	4–6	68 (4.7)	○	6–8	78 (3.6)
Quebec, Canada	●	1–6	87 (3.1)	●	1–6	r 56 (4.8)	●	3–6	60 (4.4)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through fourth grade

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

Exhibit 5.6 Intended and Taught* TIMSS Number Topics (Continued)

TIMSS2007 Mathematics 4th Grade

Number (19 topics)	Finding a rule for a relationship given some pairs of numbers		
Country	**Student population intended to be taught topic through 4th grade**	**Grade(s) topic is intended to be taught**	**Percent of students taught the topic**
Algeria	●	4	48 (5.2)
Armenia	○	5	63 (3.8)
Australia	●	4–6	50 (3.8)
Austria	●	2	67 (3.0)
Chinese Taipei	○	6	54 (3.9)
Colombia	●	4–5	59 (4.8)
Czech Republic	○	–	58 (4.0)
Denmark	●	4–6	46 (5.2)
El Salvador	○	7–12	39 (4.0)
England	○	7–10	60 (3.7)
Georgia	○	6	63 (4.3)
Germany	●	2	70 (2.9)
Hong Kong SAR	○	5–6	39 (4.0)
Hungary	●	1–12	95 (1.5)
Iran, Islamic Rep. of	○	9	51 (3.6)
Italy	●	3–6	70 (3.4)
Japan	●	4	55 (4.1)
Kazakhstan	●	1	– –
Kuwait	⦿	10	r 29 (4.0)
Latvia	○	–	76 (3.8)
Lithuania	●	4	46 (3.4)
Mongolia	○	6	– –
Morocco	○	11	33 (4.2)
Netherlands	●	4	r 47 (4.8)
New Zealand	●	2–6	52 (2.5)
Norway	○	–	30 (3.9)
Qatar	○	7	34 (0.2)
Russian Federation	○	–	– –
Scotland	○	7	r 54 (4.1)
Singapore	○	–	61 (2.9)
Slovak Republic	○	8	91 (1.9)
Slovenia	●	4–8	71 (2.8)
Sweden	○	–	17 (3.2)
Tunisia	○	7	71 (3.5)
Ukraine	●	3–5	85 (2.6)
United States	●	3–5	75 (2.2)
Yemen	○	–	31 (4.4)
International Avg.			56 (0.6)
Benchmarking Participants			
Alberta, Canada	○	5–6	53 (3.9)
British Columbia, Canada	●	4	r 50 (3.8)
Dubai, UAE	●	4	s 40 (4.2)
Massachusetts, US	●	3–12	80 (5.5)
Minnesota, US	●	K–8	81 (5.6)
Ontario, Canada	○	6–8	79 (3.7)
Quebec, Canada	○	7–8	r 62 (4.2)

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

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through fourth grade

included in curricula, on average, taught to 78 percent of the students, as was finding areas by covering with shapes or counting squares, taught to 75 percent of the students. In comparison, only about half the curricula included estimating areas and volumes and this was only taught to about half the students (49%). The topics within location and movement were the least common in the curricula, with using informal coordinate systems taught, on average, to 40 percent of the students, figures with line symmetry to 60 percent of the students, and reflections and rotations to only 34 percent of the students.

Exhibit 5.8 presents the information about inclusion in the intended and implemented curriculum for the five data display topics at the fourth grade. Reading data from tables and graphs was included in the intended curriculum for 27 countries, the most of any of the five topics. Three topics were included in the curriculum for about 20 countries, comparing information from related data sets (21), going beyond the data displayed to answer questions (19), and organizing and displaying data in tables and graphs (21). The topic included in the fewest curricula was comparing and matching different representations of the same data (16). Across the five topics, on average across countries, teachers reported that about three-fourths of the students (72 to 76%) had been taught each of the topics, with the exception of going beyond the data displayed to answer questions, which was 57 percent.

Exhibit 5.7 Intended and Taught* TIMSS Geometric Shapes and Measures Topics

TIMSS2007 Mathematics 4th Grade

Geometric Shapes and Measures (11 topics)	Measuring and estimating lengths			Parallel and perpendicular lines			Comparing angles by size and drawing angles		
Country	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	2	97 (1.3)	●	4	97 (1.5)	●	4	94 (2.0)
Armenia	●	4	80 (3.0)	●	4	75 (3.1)	●	4	84 (3.1)
Australia	●	K–6	100 (0.2)	●	3–6	72 (3.5)	●	K–6	74 (3.5)
Austria	●	2	99 (0.4)	●	3	89 (2.0)	●	3–4	78 (2.8)
Chinese Taipei	●	1–2	99 (0.7)	●	4	82 (3.1)	●	4	98 (1.0)
Colombia	●	1–3	82 (3.8)	●	1–3	89 (3.6)	●	4–5	90 (2.5)
Czech Republic	●	2–7	96 (1.1)	●	3–4	99 (0.6)	○	6	21 (3.7)
Denmark	●	4–6	100 (0.3)	●	4–6	91 (2.5)	●	4–6	83 (4.1)
El Salvador	●	3–12	86 (3.1)	⦿	5–12	95 (1.8)	●	3–12	92 (2.4)
England	●	K–4	98 (1.4)	●	4–6	87 (2.8)	●	1–3	94 (1.9)
Georgia	●	2–3	99 (0.9)	○	6	22 (4.0)	○	5	70 (4.5)
Germany	●	2	98 (0.9)	●	4	70 (3.1)	○	5	40 (3.4)
Hong Kong SAR	●	1–2	98 (1.3)	●	3	91 (2.6)	●	2–3	85 (3.1)
Hungary	●	1–3	100 (0.5)	●	4	93 (1.4)	●	3,5	81 (3.0)
Iran, Islamic Rep. of	●	3,5	87 (2.5)	●	3–4	100 (0.4)	●	3	100 (0.4)
Italy	●	2–4	93 (1.8)	●	3–4,6,9	100 (0.0)	●	3–4,6,9	99 (0.8)
Japan	●	1–3,6	95 (1.6)	○	5	16 (3.0)	●	4	98 (1.1)
Kazakhstan	●	1	– –	●	4	– –	●	2	– –
Kuwait	●	3–4	r 96 (1.6)	○	5	r 50 (4.3)	●	4–5	r 95 (1.4)
Latvia	●	1–3	100 (0.2)	○	6	31 (3.4)	●	2	87 (2.8)
Lithuania	●	2	100 (0.0)	○	5–6	63 (3.6)	●	4	77 (3.0)
Mongolia	⦿	4–11	– –	●	1–6	– –	●	1–6	– –
Morocco	●	4	99 (0.8)	○	5	99 (0.8)	○	5	50 (4.6)
Netherlands	●	4	89 (3.0)	○	7	6 (2.2)	○	7	2 (1.1)
New Zealand	●	K–5	90 (1.7)	●	4–6	54 (2.9)	●	4–6	32 (2.3)
Norway	●	1–4	98 (0.9)	○	5–10	42 (4.3)	○	5–10	34 (4.2)
Qatar	●	3–5	91 (0.1)	○	5	45 (0.2)	○	5	93 (0.1)
Russian Federation	●	2–4	– –	○	6	– –	●	4–6	– –
Scotland	●	3	r 95 (1.7)	○	6	22 (3.3)	●	4	73 (3.4)
Singapore	●	2–6	99 (0.6)	●	4–6	99 (0.6)	●	3–6	99 (0.6)
Slovak Republic	●	3–9	99 (0.6)	●	4–9	95 (1.6)	○	5	31 (3.6)
Slovenia	●	4	99 (0.5)	●	4	96 (1.3)	○	6	0 (0.4)
Sweden	●	1–5	96 (1.2)	●	1–5	29 (3.6)	●	1–5	31 (3.6)
Tunisia	●	1–5	96 (1.4)	●	1–5	93 (1.6)	●	1–5	86 (2.9)
Ukraine	●	1–4,5–9	98 (1.1)	○	6–7	32 (3.7)	●	4,6–7	85 (2.8)
United States	●	3–5	93 (1.3)	●	3–5,6–8	91 (1.8)	●	6–8	85 (2.2)
Yemen	●	1–3	76 (3.9)	●	4	75 (4.2)	●	3–4	76 (4.1)
International Avg.			95 (0.3)			70 (0.5)			71 (0.5)
Benchmarking Participants									
Alberta, Canada	●	1–4	76 (3.5)	●	3–4	56 (4.7)	●	4–8	48 (4.4)
British Columbia, Canada	●	K–1	r 72 (3.6)	●	2–3	r 55 (4.0)	●	4	r 60 (4.3)
Dubai, UAE	●	4	s 76 (5.7)	○	5	s 50 (4.8)	●	4	s 56 (4.7)
Massachusetts, US	●	PK–4	93 (2.3)	●	3–12	91 (3.0)	●	3–12	88 (2.9)
Minnesota, US	●	K–5	87 (5.2)	●	4–5	95 (2.7)	●	1–4	92 (4.4)
Ontario, Canada	●	1–4	91 (2.6)	●	3–4,7–8	76 (4.5)	●	3–4	83 (2.7)
Quebec, Canada	●	1–6	97 (1.1)	●	3–4	88 (2.7)	●	3–4	81 (3.5)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through fourth grade

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

Background data on intended curriculum provided by National Research Coordinators, and on implemented curriculum by teachers at the time of testing.

* Includes the TIMSS topics mostly taught during or before the year of the assessment.

( ) 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.

Exhibit 5.7 Intended and Taught* TIMSS Geometric Shapes and Measures Topics (Continued)

TIMSS2007 Mathematics 4th Grade

Geometric Shapes and Measures (11 topics)	Elementary properties of common geometric shapes			Recognizing relationships between three–dimensional shapes and their two–dimensional representations			Calculating areas and perimeters of squares and rectangles of given dimensions		
Country	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	4	94 (2.1)	●	4	36 (5.0)	●	4	92 (2.2)
Armenia	●	4	78 (3.3)	●	4	68 (3.8)	●	4	87 (3.0)
Australia	●	3–6	93 (2.0)	●	3–6	86 (2.3)	○	6–8	70 (2.7)
Austria	●	2	94 (1.6)	●	2	59 (3.1)	●	4	77 (2.6)
Chinese Taipei	●	4	96 (1.3)	○	5	66 (3.7)	○	5	99 (0.7)
Colombia	●	1–3	80 (3.9)	●	4–5	45 (5.3)	●	4–5	83 (3.7)
Czech Republic	●	3–7	97 (1.3)	●	4–8	33 (3.6)	●	3–5	43 (4.2)
Denmark	●	4–6	89 (2.8)	●	4–6	35 (4.7)	●	4–6	92 (2.4)
El Salvador	●	4–12	89 (2.9)	⊙	5–12	39 (3.8)	●	4–12	71 (3.8)
England	●	K–4	95 (1.2)	●	3–6	81 (2.9)	●	3–5	96 (1.7)
Georgia	●	1–3	90 (3.1)	⊙	3–4	23 (3.9)	●	4–5	99 (0.7)
Germany	●	2	95 (1.6)	●	3	62 (3.1)	○	5	55 (2.8)
Hong Kong SAR	●	3–4	98 (1.1)	○	5–6	51 (4.3)	●	4	99 (0.5)
Hungary	●	2–12	96 (1.6)	○	6	43 (3.9)	●	3–4	86 (2.5)
Iran, Islamic Rep. of	●	3	90 (2.0)	○	5	26 (4.0)	●	3–4	73 (3.5)
Italy	●	3–10	94 (1.5)	●	5–13	45 (3.3)	●	4–6	56 (2.9)
Japan	●	3	96 (1.6)	○	6	9 (2.4)	●	4	98 (1.2)
Kazakhstan	●	2	– –	○	9	– –	●	2–3	– –
Kuwait	○	5	r 88 (3.1)	○	5–6	r 42 (4.3)	●	4–5	r 89 (2.8)
Latvia	●	1–2	98 (0.9)	●	3	28 (3.6)	●	4–5	99 (1.0)
Lithuania	●	4	93 (1.9)	●	4	69 (3.3)	●	4	100 (0.0)
Mongolia	⊙	3–7	– –	⊙	3–10	– –	⊙	2–11	– –
Morocco	●	4	97 (1.3)	⊙	5	45 (4.1)	○	5	77 (3.9)
Netherlands	○	7	25 (3.7)	○	5	33 (3.8)	○	5	68 (4.2)
New Zealand	●	K–6	82 (2.2)	●	3–6	72 (2.6)	⊙	4–8	61 (2.7)
Norway	●	1–4	91 (2.3)	○	–	30 (4.0)	○	5–7	79 (3.5)
Qatar	●	1–3	72 (0.2)	○	6–7	r 24 (0.2)	●	4–6	79 (0.1)
Russian Federation	●	2–7	– –	○	5–9	– –	●	3–6	– –
Scotland	●	4	88 (2.7)	●	4	86 (3.0)	○	5	56 (4.5)
Singapore	●	4–6	97 (0.9)	○	6	73 (2.6)	●	3–6	99 (0.6)
Slovak Republic	●	3–9	97 (1.3)	○	6	36 (3.7)	○	5–9	89 (2.2)
Slovenia	●	2–4	98 (1.0)	●	1–4	54 (3.2)	○	5–6	2 (0.9)
Sweden	●	1–5	91 (2.0)	●	1–5	8 (2.2)	●	1–5	45 (3.4)
Tunisia	●	1–5	95 (1.5)	○	6	30 (3.8)	●	1–5	94 (1.9)
Ukraine	●	4–7	98 (1.1)	○	9–10	18 (2.9)	●	4–6,9	99 (0.6)
United States	●	3–5	91 (1.8)	●	3–5	74 (2.6)	●	3–5	90 (1.8)
Yemen	●	1–7	71 (4.2)	●	1–8	28 (4.3)	●	4	58 (4.6)
International Avg.			89 (0.4)			46 (0.6)			78 (0.5)
Benchmarking Participants									
Alberta, Canada	●	K–6	72 (4.0)	●	2–4	60 (4.3)	○	5–6	61 (3.9)
British Columbia, Canada	●	K–1	r 71 (4.0)	●	2–3	r 55 (4.4)	●	4	r 55 (3.9)
Dubai, UAE	●	1	s 76 (5.8)	○	5	s 40 (5.4)	●	4	s 72 (5.4)
Massachusetts, US	●	PK–8	95 (2.6)	○	8	72 (5.0)	●	3–10	87 (4.5)
Minnesota, US	●	K–4	95 (2.6)	●	4–12	67 (6.9)	●	3–5	92 (2.8)
Ontario, Canada	●	1–5	96 (1.8)	●	4–6	76 (4.1)	●	4–5	72 (4.7)
Quebec, Canada	●	3–6	96 (1.7)	●	3–6	65 (4.3)	●	3–4	89 (2.1)

● All or almost all students ⊙ Only the more able students ○ Not included in the curriculum through fourth grade

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

Exhibit 5.7 Intended and Taught* TIMSS Geometric Shapes and Measures Topics (Continued)

TIMSS2007 Mathematics 4th Grade

Geometric Shapes and Measures (11 topics)	Finding areas by covering with a given shape or counting squares			Estimating areas and volumes			Using informal coordinate systems to locate points in a plane		
Country	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	4	87 (4.5)	○	5	54 (5.1)	●	4	44 (4.8)
Armenia	●	4	84 (3.0)	●	4	79 (3.0)	○	6	51 (3.9)
Australia	●	4–7	88 (1.6)	●	3–6	63 (3.1)	●	4–6	80 (3.1)
Austria	●	4	66 (3.2)	●	4	31 (2.8)	●	3	32 (3.0)
Chinese Taipei	●	4	98 (1.2)	○	5	68 (3.5)	○	5	53 (4.0)
Colombia	●	1–3	70 (4.4)	●	4–5	69 (4.3)	○	6–7	41 (5.1)
Czech Republic	●	4	26 (3.2)	●	4–8	12 (2.8)	○	5–7	26 (3.4)
Denmark	●	4–6	97 (1.3)	●	4–6	59 (4.8)	●	4–6	72 (4.0)
El Salvador	●	2–12	65 (3.6)	●	4–12	65 (4.3)	●	3–12	78 (3.5)
England	●	3–5	94 (1.7)	⦿	5–6	72 (3.6)	●	4–5	88 (2.6)
Georgia	○	5	92 (2.5)	○	6	41 (4.7)	○	6	23 (3.9)
Germany	●	4	68 (3.0)	○	5	48 (2.9)	○	6–7	28 (3.0)
Hong Kong SAR	●	4	98 (1.2)	●	4–5	62 (4.3)	○	7–8	25 (3.6)
Hungary	●	3	84 (2.7)	○	–	45 (4.2)	●	4	29 (3.3)
Iran, Islamic Rep. of	●	5	57 (3.6)	○	5	27 (3.7)	○	7	17 (3.3)
Italy	●	4–5	45 (3.3)	●	5–10	7 (1.4)	●	3–6	59 (2.9)
Japan	○	5	94 (1.9)	○	6	16 (3.1)	●	4	28 (3.2)
Kazakhstan	●	3	– –	●	4	– –	○	6	– –
Kuwait	●	4	r 81 (3.3)	○	5,7	r 64 (4.7)	○	7	r 22 (3.9)
Latvia	●	4	92 (2.3)	⦿	4–6	71 (4.2)	○	0	17 (2.9)
Lithuania	●	4	89 (2.1)	○	5–6	48 (4.1)	○	5–6	46 (3.9)
Mongolia	○	7–11	– –	○	5–10	– –	○	6–11	– –
Morocco	○	5	80 (3.6)	○	6	40 (4.1)	○	8	33 (4.4)
Netherlands	○	5	80 (3.4)	●	4	39 (4.2)	●	4	62 (4.3)
New Zealand	●	K–6	68 (2.9)	●	K–6	50 (2.2)	○	6–8	47 (2.6)
Norway	●	3–4	89 (2.6)	○	5–10	56 (3.9)	●	3–4	62 (4.1)
Qatar	●	3–4	73 (0.2)	○	6–7	51 (0.2)	○	7–8	13 (0.1)
Russian Federation	●	3–4	– –	●	3–4	– –	○	–	– –
Scotland	●	4	85 (3.1)	⦿	6	59 (4.2)	●	4	75 (3.4)
Singapore	●	3–6	98 (0.7)	●	2	88 (1.7)	○	–	25 (2.3)
Slovak Republic	●	4–6	43 (3.6)	●	4–6	33 (3.8)	○	8	13 (2.3)
Slovenia	○	5	21 (2.4)	○	5	8 (1.9)	●	3	13 (2.3)
Sweden	○	–	32 (3.0)	●	1–5	19 (2.8)	○	6–9	23 (3.5)
Tunisia	●	1–5	83 (2.9)	○	7	62 (3.9)	●	1–5	35 (3.9)
Ukraine	●	4–6	98 (0.7)	○	7–11	57 (4.3)	○	6,8	9 (2.3)
United States	○	–	87 (1.9)	●	3–5	62 (2.8)	●	3–5	77 (2.6)
Yemen	●	4	35 (4.1)	○	–	25 (4.0)	○	7–9	14 (3.6)
International Avg.			75 (0.5)			49 (0.6)			40 (0.6)
Benchmarking Participants									
Alberta, Canada	●	1–6	62 (4.0)	●	1–6	47 (4.2)	○	5–6	46 (3.8)
British Columbia, Canada	●	K–1	r 55 (3.9)	●	4	r 43 (4.3)	●	4	r 56 (4.3)
Dubai, UAE	●	4	s 55 (5.6)	●	4	s 42 (4.3)	●	4	s 29 (4.4)
Massachusetts, US	●	PK–4	83 (5.5)	●	1–8	59 (6.1)	●	3–6	88 (3.3)
Minnesota, US	●	3–5	91 (3.0)	●	2–5	54 (7.4)	○	5–6	81 (4.7)
Ontario, Canada	●	1–4	81 (3.7)	●	1–6	54 (4.6)	○	5	67 (3.8)
Quebec, Canada	●	3–4	90 (2.2)	○	5–6	62 (4.2)	●	1–4	63 (3.7)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through fourth grade

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

Exhibit 5.7 **Intended and Taught* TIMSS Geometric Shapes and Measures Topics (Continued)**

TIMSS2007 Mathematics 4th Grade

Geometric Shapes and Measures (11 topics)	Figures with line symmetry			Reflections and rotations		
Country	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	2	86 (2.9)	●	4	18 (3.8)
Armenia	○	7	58 (3.6)	○	8	53 (3.8)
Australia	●	3–4	89 (2.3)	●	3–4	71 (3.6)
Austria	●	1	79 (2.5)	●	2	31 (2.9)
Chinese Taipei	○	5	25 (3.9)	○	5	9 (2.4)
Colombia	●	4–5	55 (5.3)	●	4–5	33 (5.4)
Czech Republic	●	4–6	67 (4.0)	○	10–12	15 (3.1)
Denmark	●	4–6	80 (3.4)	●	4–6	77 (4.5)
El Salvador	●	4–12	67 (4.3)	○	6–12	28 (3.8)
England	●	2–5	93 (2.1)	⦿	5–10	69 (3.9)
Georgia	○	6	45 (4.8)	○	7	7 (2.3)
Germany	●	2	85 (2.2)	●	4	68 (2.7)
Hong Kong SAR	●	4	98 (1.0)	⦿	7–8	18 (3.1)
Hungary	●	3	86 (2.4)	●	2–4	72 (2.8)
Iran, Islamic Rep. of	●	1	96 (1.0)	○	8	21 (3.3)
Italy	●	5–6,9,13	87 (2.2)	●	5–9,13	51 (3.3)
Japan	○	7	1 (0.6)	○	–	1 (0.8)
Kazakhstan	○	6	– –	○	8	– –
Kuwait	○	7	r 12 (3.0)	○	8–9	r 13 (3.1)
Latvia	●	1–4	63 (4.1)	○	7–9	9 (2.2)
Lithuania	●	4	82 (2.7)	○	5–6	17 (3.1)
Mongolia	○	6–11	– –	○	9–11	– –
Morocco	○	7	25 (3.8)	○	12	8 (2.3)
Netherlands	●	4	29 (4.2)	○	7	56 (3.9)
New Zealand	●	K–4	74 (2.4)	●	2–6	77 (2.3)
Norway	●	3–7	63 (4.1)	○	5–10	60 (4.2)
Qatar	○	7	27 (0.2)	○	7–10	24 (0.1)
Russian Federation	○	8–9	– –	○	8–9	– –
Scotland	●	4	92 (2.2)	○	6	34 (3.9)
Singapore	●	4	95 (1.3)	○	–	26 (2.4)
Slovak Republic	○	7	23 (3.2)	○	7	6 (1.4)
Slovenia	●	2–3	98 (1.0)	○	7	59 (3.2)
Sweden	●	1–5	17 (3.0)	○	–	7 (1.7)
Tunisia	○	5	18 (3.1)	○	12	16 (2.9)
Ukraine	○	8–9	14 (2.6)	○	8–9	6 (1.8)
United States	●	3–5	86 (2.0)	●	3–5	75 (2.5)
Yemen	○	9	15 (3.5)	○	7–10	7 (2.1)
International Avg.			60 (0.5)			34 (0.5)
Benchmarking Participants						
Alberta, Canada	●	4	57 (3.9)	○	6–7	29 (3.9)
British Columbia, Canada	●	4	r 55 (4.3)	○	5	r 29 (3.7)
Dubai, UAE	○	6	s 51 (5.8)	○	6	s 29 (4.3)
Massachusetts, US	●	1–10	87 (3.1)	●	4–12	69 (6.3)
Minnesota, US	●	1–4	87 (5.3)	●	1–4	80 (6.1)
Ontario, Canada	●	1,2,4	85 (3.3)	●	3–8	56 (5.0)
Quebec, Canada	●	3–6	83 (2.9)	●	3–4	48 (4.2)

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

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through fourth grade

Exhibit 5.8 Intended and Taught* TIMSS Data Display Topics

TIMSS2007 Mathematics 4th Grade

Data Display (5 topics)	Reading data from tables, pictographs, bar graphs, or pie charts			Comparing information from related data sets			Using information from data displays to answer questions that go beyond directly reading the data displayed		
Country	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	4	62 (4.9)	●	4	53 (5.0)	●	1	65 (5.3)
Armenia	○	–	64 (3.8)	○	–	59 (3.5)	○	–	65 (3.4)
Australia	●	2–4	94 (1.6)	●	3–4	93 (2.2)	●	4–6	59 (4.6)
Austria	●	3	47 (2.8)	●	3	31 (2.8)	●	4	43 (3.4)
Chinese Taipei	●	3	84 (3.1)	●	3	85 (3.2)	●	4	55 (3.8)
Colombia	●	4–5	69 (4.3)	●	4–5	71 (4.4)	●	4–5	65 (4.5)
Czech Republic	●	4–8	67 (4.1)	○	5–8	64 (4.3)	○	8	42 (4.2)
Denmark	●	4–6	73 (4.0)	●	4–6	63 (4.2)	●	4–6	39 (4.1)
El Salvador	●	4–12	90 (2.8)	○	6–12	95 (2.0)	○	7–12	61 (4.0)
England	●	K–8	96 (1.8)	●	4–5	96 (1.7)	⦿	5–8	73 (3.3)
Georgia	○	6	69 (4.4)	○	6	72 (4.1)	○	6	60 (4.3)
Germany	●	3	77 (2.9)	●	3	61 (3.3)	●	4	68 (2.8)
Hong Kong SAR	●	2–6	98 (1.2)	●	2–6	97 (1.4)	●	2–6	82 (3.3)
Hungary	●	3	70 (3.6)	●	3	88 (2.9)	●	4	47 (3.9)
Iran, Islamic Rep. of	○	1,5,6,10	60 (3.5)	○	5	54 (3.5)	○	5	41 (4.1)
Italy	●	3–10	89 (1.8)	●	3–10	89 (1.7)	●	4–7	64 (3.1)
Japan	●	3	76 (3.2)	●	3–4	82 (3.1)	●	3–4	34 (3.4)
Kazakhstan	●	1	– –	○	5	– –	○	6	– –
Kuwait	○	6–7	r 43 (5.0)	○	7–8	r 24 (4.1)	○	7–8	r 34 (4.5)
Latvia	●	2–3	95 (1.7)	○	–	89 (2.4)	○	–	65 (3.6)
Lithuania	●	4	97 (1.0)	●	4	94 (1.6)	●	4	82 (3.1)
Mongolia	○	6–11	– –	●	1–11	– –	○	5–11	– –
Morocco	○	–	48 (4.1)	○	–	54 (4.0)	○	–	46 (4.6)
Netherlands	●	4	95 (1.7)	○	–	84 (2.9)	○	–	51 (4.3)
New Zealand	●	K–6	92 (1.5)	●	2–8	91 (1.6)	⦿	4–8	71 (2.4)
Norway	●	1–7	77 (3.2)	○	5–7	58 (3.7)	○	5–7	33 (3.7)
Qatar	○	6–8	50 (0.2)	○	6–8	38 (0.2)	○	6–8	51 (0.2)
Russian Federation	○	5	– –	○	5–6	– –	○	5–6	– –
Scotland	●	4	96 (1.4)	●	4	96 (1.3)	⦿	5	59 (4.4)
Singapore	●	1–7	98 (0.5)	●	1–7	99 (0.5)	●	1–7	84 (2.3)
Slovak Republic	○	7	65 (3.4)	○	8	52 (3.4)	○	8–9	26 (2.8)
Slovenia	●	3–5	98 (0.8)	●	3–5	93 (1.5)	●	8–9	88 (1.9)
Sweden	●	1–5	75 (3.2)	●	1–5	74 (3.5)	○	6–9	38 (3.7)
Tunisia	●	1–5	67 (3.9)	●	1–5	65 (4.2)	●	1–5	77 (3.5)
Ukraine	○	6–9	57 (4.2)	○	6–9	58 (4.1)	○	6–9	68 (4.0)
United States	●	3–5	98 (0.7)	●	3–5	97 (0.8)	●	3–5	86 (1.8)
Yemen	●	2–6	35 (4.6)	○	6–7	17 (3.7)	○	6–7	26 (4.4)
International Avg.			76 (0.5)			72 (0.5)			57 (0.6)
Benchmarking Participants									
Alberta, Canada	●	2–6	86 (3.1)	●	K–1	86 (3.1)	●	3–6	74 (3.6)
British Columbia, Canada	●	2–3	r 88 (2.5)	●	K–1	r 84 (3.1)	●	2–3	r 70 (3.7)
Dubai, UAE	●	4	s 61 (3.6)	●	4	s 52 (4.4)	●	4	s 44 (4.7)
Massachusetts, US	●	2–12	96 (2.1)	●	K–10	98 (1.6)	●	3–12	80 (5.2)
Minnesota, US	●	2–6	99 (1.0)	●	2–6	98 (1.3)	●	3–6	76 (6.2)
Ontario, Canada	●	1–8	99 (0.5)	●	4–5	96 (1.6)	○	7–8	83 (3.0)
Quebec, Canada	●	1–6	80 (3.4)	●	1–6	81 (3.2)	●	3–6	55 (4.2)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through fourth grade

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

Background data on intended curriculum provided by National Research Coordinators, and on implemented curriculum by teachers at the time of testing.

* Includes the TIMSS topics mostly taught during or before the year of the assessment.

( ) 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.

Exhibit 5.8 **Intended and Taught* TIMSS Data Display Topics (Continued)**

TIMSS2007 Mathematics 4th Grade

Data Display (5 topics)	Comparing and matching different representations of the same data			Organizing and displaying data using tables, pictographs, bar graphs, or pie charts		
Country	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 4th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	4	52 (4.6)	●	4–5	53 (4.7)
Armenia	○	–	67 (3.7)	○	–	65 (3.4)
Australia	●	3–4	53 (3.5)	●	3–4	83 (2.2)
Austria	●	4	21 (2.6)	●	4	16 (2.4)
Chinese Taipei	○	6	66 (3.5)	○	6	79 (3.3)
Colombia	●	4–5	58 (5.4)	●	4–5	64 (5.2)
Czech Republic	○	8	39 (4.4)	●	4–8	36 (4.1)
Denmark	●	4–6	35 (4.5)	●	4–6	55 (4.7)
El Salvador	○	7–12	69 (3.8)	○	7–12	88 (2.9)
England	○	6–10	58 (3.8)	●	K–8	91 (2.5)
Georgia	○	6	70 (4.3)	○	6	65 (4.5)
Germany	○	4	39 (3.7)	●	4	47 (3.0)
Hong Kong SAR	●	2–6	70 (4.1)	●	2–6	97 (1.3)
Hungary	●	4	49 (4.2)	●	4	53 (4.0)
Iran, Islamic Rep. of	○	10	44 (4.2)	○	8	47 (4.0)
Italy	●	4–7	63 (3.2)	●	4–10	76 (3.0)
Japan	●	3	26 (3.6)	●	3	62 (4.1)
Kazakhstan	○	6	– –	○	5	– –
Kuwait	○	7	r 20 (3.8)	○	7	r 38 (4.9)
Latvia	○	–	48 (3.7)	○	–	82 (3.2)
Lithuania	●	4	80 (2.7)	●	4	93 (1.8)
Mongolia	⦿	2–11	– –	○	6–11	– –
Morocco	○	–	39 (4.0)	○	–	47 (4.4)
Netherlands	○	–	54 (4.3)	●	4	r 74 (3.8)
New Zealand	○	6–9	64 (2.6)	●	K–6	91 (1.7)
Norway	○	5–7	29 (3.6)	○	5–7	58 (4.1)
Qatar	○	7–8	26 (0.2)	○	6–8	46 (0.2)
Russian Federation	○	5–6	– –	○	5–6	– –
Scotland	⦿	6	46 (4.2)	⦿	5	90 (2.5)
Singapore	○	–	76 (2.5)	●	1–7	82 (2.3)
Slovak Republic	○	7–9	39 (3.6)	○	7–9	46 (4.0)
Slovenia	○	9	74 (2.8)	●	3–9	88 (2.2)
Sweden	●	1–5	28 (3.5)	●	1–5	52 (4.2)
Tunisia	●	1–5	76 (3.7)	●	1–5	62 (3.9)
Ukraine	○	6–9	75 (3.5)	○	6–9	47 (4.3)
United States	●	3–5	79 (2.4)	●	3–5	92 (1.3)
Yemen	●	2–6	35 (4.6)	○	6–7	17 (3.7)
International Avg.			76 (0.5)			72 (0.5)
Benchmarking Participants						
Alberta, Canada	●	2–6	86 (3.1)	●	K–1	86 (3.1)
British Columbia, Canada	●	2–3	r 88 (2.5)	●	K–1	r 84 (3.1)
Dubai, UAE	●	4	s 61 (3.6)	●	4	s 52 (4.4)
Massachusetts, US	●	2–12	96 (2.1)	●	K–10	98 (1.6)
Minnesota, US	●	2–6	99 (1.0)	●	2–6	98 (1.3)
Ontario, Canada	●	1–8	99 (0.5)	●	4–5	96 (1.6)
Quebec, Canada	●	1–6	80 (3.4)	●	1–6	81 (3.2)

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

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through fourth grade

Eighth Grade: Which TIMSS Mathematics Topics Are in the Intended and Implemented Curriculum?

For the eighth grade, Exhibit 5.9 provides detailed information about each topic within the number domain, including the student population to be taught the topic, the grades within which the topics were intended to be taught, and the teachers' reports about the percent of students taught the topics. Practically without exception, all countries and benchmarking participants included 9 of the 10 number topics in their curriculum for all or almost all students including whole numbers, computations/estimations with whole numbers, common fractions, decimals, representing fractions and decimals, computations with fractions, computations with decimals, working with integers, and conversion of percents to fractions or decimals (and vice versa). Also, on average across countries, teachers' reported that these topics were taught to 95 percent or more of the students. Although the tenth topic, ratios, was in almost all curricula, it was taught, on average, to somewhat fewer students (87%).

Exhibit 5.10 contains information about the algebra topics in the intended and implemented curricula at the eighth grade. Of the eight algebra topics, evaluating expressions for a given numeric value was in every curriculum—all countries and benchmarking participants—for all or almost all students, while sums, products, and powers of expressions containing variables, simplifying/comparing expressions, modeling situations using expressions, and evaluating functions/formulas for given values were in nearly all the curricula. On average across countries, teachers reported that 85 to 88 percent of the students had been taught the first three of these topics, but that fewer had been taught about modeling situations with expressions (70%) or evaluating functions/formulas (69%). The remaining three algebra topics—patterns and sequences, simple linear equations and inequalities, and equivalent representations of functions—were in the intended curriculum for most of the countries (all but about 8 to 10), and, on average, taught to 60 to 66% of the eighth grade students.

Exhibit 5.9 Intended and Taught* TIMSS Number Topics

TIMSS2007 Mathematics 8th Grade

Number (10 topics)	Whole numbers including place value, factorization, and the four operations			Computations, estimations, or approximations involving whole numbers			Common fractions		
Country	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	7–8	83 (3.2)	●	7–8	81 (3.6)	●	7	94 (2.0)
Armenia	●	4	69 (3.5)	●	4	67 (3.5)	●	4	68 (3.4)
Australia	●	3–10	99 (0.6)	●	3–10	97 (1.2)	●	3–8	97 (1.2)
Bahrain	●	4	100 (0.0)	●	4	98 (0.4)	●	4	100 (0.3)
Bosnia and Herzegovina	●	4–6	100 (0.0)	●	4–5	99 (0.8)	●	5–6	100 (0.0)
Botswana	●	4–12	97 (1.3)	●	8	96 (1.9)	●	4–12	100 (0.0)
Bulgaria	●	2–4,6	98 (1.0)	●	5–6	95 (1.7)	●	5–6	98 (1.2)
Chinese Taipei	●	7	98 (1.2)	●	7	96 (1.6)	●	7	98 (1.2)
Colombia	●	6–7	97 (1.3)	●	6–7	97 (1.0)	●	4–5	98 (0.6)
Cyprus	●	5–7	94 (0.9)	●	5–6	94 (1.3)	●	5–7	100 (0.4)
Czech Republic	●	1–6	100 (0.0)	●	1–5	100 (0.0)	●	7	100 (0.0)
Egypt	●	1–4	99 (0.7)	●	1–6	96 (1.5)	●	1–5	96 (1.6)
El Salvador	●	3–8	96 (1.7)	●	4–8	96 (1.5)	●	3–8	96 (1.3)
England	●	K–7	99 (0.4)	●	1–8	97 (1.5)	●	2–7	99 (0.5)
Georgia	●	7–8	99 (0.7)	●	2–3,7–8	99 (0.7)	●	5–8	99 (0.7)
Ghana	●	4–10	97 (1.4)	●	7–12	86 (3.2)	●	2–10	99 (0.6)
Hong Kong SAR	●	7	97 (1.5)	●	7	96 (1.9)	●	7	92 (2.2)
Hungary	●	5–6	100 (0.0)	●	6	100 (0.0)	●	4–5	100 (0.0)
Indonesia	●	7	97 (1.5)	●	7	92 (2.4)	●	7	97 (1.7)
Iran, Islamic Rep. of	●	6	100 (0.4)	●	5	98 (0.9)	●	4	99 (1.0)
Israel	●	1–4	r 98 (1.2)	●	1–7	r 92 (1.7)	●	4–8	r 98 (1.1)
Italy	●	2–6	100 (0.0)	●	1–6	97 (1.3)	●	4–7	100 (0.0)
Japan	●	1–4	96 (1.6)	●	4–6	96 (1.6)	●	5	98 (1.3)
Jordan	●	3–6	99 (0.5)	●	4–6	99 (0.5)	●	4–7	99 (0.5)
Korea, Rep. of	●	7	96 (1.4)	●	4	98 (0.8)	●	5	95 (1.6)
Kuwait	●	4–5	r 100 (0.0)	●	4–5	r 95 (1.6)	○	9–10	r 100 (0.0)
Lebanon	●	4	98 (1.2)	●	6	89 (2.5)	●	5	96 (1.8)
Lithuania	●	6	99 (0.9)	●	8	98 (0.8)	●	6	99 (1.0)
Malaysia	●	8	97 (1.5)	●	8	98 (1.0)	●	8	99 (0.6)
Malta	●	6	100 (0.0)	●	6	99 (0.1)	●	6	99 (0.1)
Mongolia	●	2–8	– –	●	2–8	– –	●	6–8	– –
Norway	●	1–10	100 (0.0)	●	3–10	97 (1.3)	●	5–10	93 (2.1)
Oman	●	1–4	99 (0.9)	●	1–4	100 (0.3)	●	1–5	99 (0.9)
Palestinian Nat'l Auth.	●	1–7	99 (0.8)	●	1–7	99 (0.8)	●	2–6	98 (0.9)
Qatar	●	4–7	100 (0.0)	●	4–6	94 (0.1)	●	5–7	98 (0.0)
Romania	●	1–6	97 (1.4)	●	4–6	97 (1.4)	●	5–9	97 (1.4)
Russian Federation	●	1–6	– –	●	2–5	– –	●	5–6	– –
Saudi Arabia	●	1–7	93 (2.7)	●	4	93 (1.8)	●	4–5	98 (1.1)
Scotland	●	7	99 (0.6)	●	6	100 (0.3)	●	8	95 (1.6)
Serbia	●	1–8	98 (1.3)	●	1–8	97 (1.6)	●	2–8	98 (1.2)
Singapore	●	1–7	99 (0.5)	●	1–7	99 (0.5)	●	2–7	100 (0.0)
Slovenia	●	1–6	100 (0.0)	●	2–6	100 (0.1)	●	4–8	100 (0.0)
Sweden	●	6–9	100 (0.0)	●	6–9	99 (0.6)	●	6–9	99 (0.7)
Syrian Arab Republic	●	5	100 (0.0)	●	6	95 (1.8)	●	5–6	99 (0.7)
Thailand	●	1–9	92 (2.4)	●	7	93 (2.2)	●	5–7	95 (1.9)
Tunisia	●	7–9	96 (1.6)	●	7–9	90 (2.7)	●	7–9	99 (0.9)
Turkey	●	1–6	100 (0.0)	●	1–6	98 (1.6)	●	1–6	99 (1.4)
Ukraine	●	6–7	100 (0.0)	⦿	9	98 (1.2)	●	5–6	99 (0.8)
United States	●	3–5, 6–8	100 (0.0)	●	3–5	99 (0.4)	●	3–8	100 (0.0)
‡ Morocco	●	6	96 (1.0)	●	6	93 (1.4)	●	7	99 (0.7)
International Avg.			97 (0.2)			96 (0.2)			97 (0.2)
Benchmarking Participants									
Basque Country, Spain	●	5–6	100 (0.0)	●	6–7	98 (1.3)	●	5	100 (0.0)
British Columbia, Canada	●	5	100 (0.0)	●	5	100 (0.0)	●	5	99 (1.1)
Dubai, UAE	●	6	s 98 (1.6)	●	4	s 97 (1.6)	●	1	s 98 (1.6)
Massachusetts, US	●	1–6	99 (0.9)	●	K–8	99 (0.9)	●	PK–8	99 (0.9)
Minnesota, US	●	K–7	100 (0.0)	●	K–3	100 (0.0)	●	3–5	100 (0.0)
Ontario, Canada	●	4–6	99 (0.6)	●	K–6	100 (0.2)	●	4–6	97 (1.2)
Quebec, Canada	●	7–8	97 (1.4)	●	7–8	98 (1.1)	●	7–8	100 (0.0)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through eighth grade

Background data on intended curriculum provided by National Research Coordinators, and on implemented curriculum by teachers at the time of testing.

* Includes the TIMSS topics mostly taught during or before the year of the assessment.

‡ 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.

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

Exhibit 5.9 Intended and Taught* TIMSS Number Topics (Continued)

TIMSS2007 Mathematics 8th Grade

Number (10 topics)	Decimal fractions			Representing decimals and fractions			Computations with fractions		
Country	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	7	78 (3.3)	●	7	75 (4.1)	●	7	98 (1.2)
Armenia	●	4	69 (3.6)	●	4	68 (3.8)	●	4	68 (3.4)
Australia	●	3–8	99 (0.6)	●	4–8	98 (0.7)	●	5–10	96 (1.1)
Bahrain	●	5	96 (0.4)	●	5	96 (1.3)	●	4	98 (0.4)
Bosnia and Herzegovina	●	5–6	100 (0.0)	●	5–6	100 (0.0)	●	5–6	100 (0.3)
Botswana	●	6–12	99 (0.7)	●	4–7	92 (2.5)	●	5–12	94 (2.1)
Bulgaria	●	5–6	98 (1.2)	●	5–6	97 (1.2)	●	5–6	98 (1.0)
Chinese Taipei	●	7	98 (1.2)	●	7	98 (1.2)	●	7	98 (1.2)
Colombia	●	6–7	96 (1.3)	●	6–7	98 (0.8)	●	4–5	98 (0.9)
Cyprus	●	5–7	97 (0.6)	●	5–7	93 (1.6)	●	5–7	99 (0.6)
Czech Republic	●	6–7	100 (0.0)	●	6–7	98 (1.2)	●	7	100 (0.0)
Egypt	●	4–6	95 (1.9)	●	4–6	96 (1.5)	●	4–6	97 (1.3)
El Salvador	●	4–7	97 (1.5)	●	4–7	97 (1.1)	●	3–7	98 (1.2)
England	●	4–8	98 (0.8)	●	4–8	98 (1.3)	⦿	6–10	94 (2.0)
Georgia	●	8–9	99 (0.7)	●	6–8	97 (2.0)	●	5–8	99 (0.7)
Ghana	●	4–10	98 (1.2)	●	3–9	95 (1.5)	●	4–9	89 (2.6)
Hong Kong SAR	●	7	94 (1.7)	●	7	93 (2.5)	●	7	99 (0.9)
Hungary	●	5–6	100 (0.0)	●	4–5	99 (0.7)	●	5–6	100 (0.0)
Indonesia	●	7	95 (2.0)	●	7	95 (1.9)	●	7	97 (1.6)
Iran, Islamic Rep. of	●	4–7	98 (1.2)	●	4–7	87 (2.7)	●	4–6	99 (0.8)
Israel	●	6–8	r 97 (1.1)	●	6–8	r 97 (1.1)	●	5–8	r 98 (1.1)
Italy	●	4–7	99 (0.6)	●	4–7	99 (0.6)	●	4–7	99 (0.6)
Japan	●	5	98 (1.3)	●	4	97 (1.5)	●	5–6	99 (1.0)
Jordan	●	4–7	99 (0.8)	●	4–7	97 (1.4)	●	4–7	99 (0.7)
Korea, Rep. of	●	6	99 (0.7)	●	4	98 (1.1)	●	6	98 (1.1)
Kuwait	●	5–6	r 98 (1.4)	●	5	r 88 (3.2)	●	6–8	r 98 (1.4)
Lebanon	●	6	96 (1.4)	⦿	7	89 (2.7)	●	6	98 (1.4)
Lithuania	●	6	98 (1.2)	●	6	98 (1.2)	●	6	98 (1.2)
Malaysia	●	8	99 (0.6)	●	8	99 (0.6)	●	7	100 (0.0)
Malta	●	6	100 (0.0)	●	6	99 (0.0)	●	6	98 (0.1)
Mongolia	●	5–8	– –	●	5–8	– –	●	5–8	– –
Norway	●	5–10	96 (1.7)	●	5–10	89 (2.5)	●	8–10	87 (2.8)
Oman	●	3–6	100 (0.1)	●	3–6	96 (1.2)	●	2–6	100 (0.0)
Palestinian Nat'l Auth.	●	4–6	100 (0.0)	●	7	96 (2.1)	●	4–6	99 (0.8)
Qatar	●	5–7	94 (0.1)	●	5–7	95 (0.1)	●	4–7	98 (0.0)
Romania	●	5–9	97 (1.4)	●	5–8	97 (1.4)	●	5–6,8	97 (1.4)
Russian Federation	●	5–6	– –	●	5–6	– –	●	6	– –
Saudi Arabia	●	4–6	86 (3.4)	●	4–6	86 (3.1)	●	4–8	92 (2.9)
Scotland	●	8	99 (0.4)	●	8	98 (1.0)	⦿	9	86 (2.1)
Serbia	●	5–8	98 (1.2)	●	5–8	98 (1.2)	●	2–8	98 (1.2)
Singapore	●	4–7	100 (0.4)	●	4–7	99 (0.5)	●	2–7	100 (0.3)
Slovenia	●	6–8	100 (0.0)	●	6–8	100 (0.0)	●	6–7	100 (0.0)
Sweden	●	6–9	100 (0.4)	●	6–9	98 (0.8)	●	6–9	96 (1.2)
Syrian Arab Republic	●	5–6	89 (2.7)	●	5–6	84 (3.2)	●	5–6	96 (1.1)
Thailand	●	5–7	96 (1.8)	●	4–7	93 (2.2)	●	4–7	97 (1.3)
Tunisia	●	7–9	97 (1.4)	●	7–9	95 (1.8)	●	7–9	99 (0.9)
Turkey	●	4–7	98 (1.6)	●	4–7	99 (1.4)	●	3–6	98 (1.6)
Ukraine	●	5–6	100 (0.0)	●	5–6	98 (1.2)	●	5–6	100 (0.0)
United States	●	–	99 (0.4)	●	–	99 (0.4)	●	6–8	100 (0.3)
‡ Morocco	●	7	95 (1.6)	●	5	r 87 (3.8)	●	7	99 (1.3)
International Avg.			97 (0.2)			95 (0.3)			97 (0.2)
Benchmarking Participants									
Basque Country, Spain	●	6	96 (1.8)	●	7	95 (2.4)	●	6	100 (0.0)
British Columbia, Canada	●	5	99 (1.0)	●	5	95 (1.9)	●	7	99 (0.6)
Dubai, UAE	●	4	s 98 (1.6)	●	4	s 96 (1.7)	●	7	s 97 (1.9)
Massachusetts, US	●	4–8	99 (0.9)	●	K–8	100 (0.0)	●	5–8	99 (0.9)
Minnesota, US	●	4–7	100 (0.0)	●	3–7	100 (0.0)	●	5–7	100 (0.0)
Ontario, Canada	●	4–6	93 (2.5)	●	2–6	93 (2.0)	●	7–8	92 (2.5)
Quebec, Canada	●	7–8	100 (0.0)	●	7–8	98 (0.8)	●	7–8	100 (0.0)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through eighth grade

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

Exhibit 5.9 Intended and Taught* TIMSS Number Topics (Continued)

TIMSS2007 Mathematics 8th Grade

Number (10 topics)	Computations with decimals			Representing, comparing, ordering, and computing with integers			Ratios		
Country	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	7	87 (3.1)	●	8	94 (1.9)	●	8	r 76 (3.4)
Armenia	●	5	68 (3.6)	●	5	70 (3.5)	●	5	68 (3.7)
Australia	●	5–10	99 (0.5)	●	7–10	95 (1.2)	●	7–10	76 (2.9)
Bahrain	●	5	93 (0.7)	●	7	100 (0.0)	●	6	95 (1.0)
Bosnia and Herzegovina	●	5–6	100 (0.3)	●	6–7	100 (0.0)	●	7–8	100 (0.0)
Botswana	●	6–12	95 (1.8)	●	7–12	91 (2.3)	○	9	18 (3.7)
Bulgaria	●	5–6	98 (1.2)	●	5–6	98 (1.0)	●	6	97 (1.2)
Chinese Taipei	●	7	97 (1.4)	●	7	97 (1.4)	●	7	98 (1.1)
Colombia	●	4–5	95 (2.4)	●	6–7	97 (1.1)	●	6–7	92 (2.3)
Cyprus	●	5–7	98 (0.8)	●	5–7	99 (0.5)	●	6–8	100 (0.0)
Czech Republic	●	6	100 (0.0)	●	7	100 (0.0)	●	7	99 (0.9)
Egypt	●	3–6	95 (1.3)	●	7–8	98 (0.9)	●	5–9	95 (1.9)
El Salvador	●	4–7	98 (1.2)	●	2–7	98 (1.0)	●	3–7	85 (3.2)
England	●	6–8	98 (1.0)	●	4–8	99 (0.5)	●	5–8	94 (1.4)
Georgia	●	6–8	99 (0.7)	●	2–4,7–8	99 (0.7)	●	6	98 (1.9)
Ghana	●	4–9	87 (3.0)	●	6–9	95 (1.6)	●	4–9	79 (3.5)
Hong Kong SAR	●	7	98 (1.2)	●	7	95 (2.0)	●	8	96 (1.8)
Hungary	●	5–6	100 (0.0)	●	5–6	100 (0.0)	●	6–7	100 (0.0)
Indonesia	●	7	98 (1.5)	●	7	96 (1.8)	●	7	76 (3.8)
Iran, Islamic Rep. of	●	4–6	100 (0.2)	●	8	99 (0.5)	●	5–8	89 (2.7)
Israel	●	6–8	r 97 (1.1)	●	7	r 98 (1.1)	●	6–8	r 89 (2.3)
Italy	●	4–7	100 (0.0)	●	6–7	100 (0.0)	●	6–8	100 (0.0)
Japan	●	4–5	98 (1.3)	●	7	100 (0.0)	●	6	87 (2.9)
Jordan	●	4–7	99 (0.5)	●	5–7	98 (1.0)	●	5–7	97 (1.3)
Korea, Rep. of	●	6	98 (1.1)	●	7	98 (1.1)	●	6	95 (1.7)
Kuwait	●	6–8	r 90 (2.9)	●	6–8	r 97 (1.6)	●	7–8	r 87 (3.5)
Lebanon	●	6	99 (1.0)	●	7	99 (0.7)	●	7	89 (3.5)
Lithuania	●	6	98 (1.2)	●	6	98 (1.2)	●	8	93 (2.1)
Malaysia	●	8	100 (0.0)	●	8	100 (0.0)	●	8	99 (0.8)
Malta	●	6	99 (0.1)	●	6	98 (0.1)	⊙	10	90 (0.1)
Mongolia	●	5–8	– –	●	6–8	– –	●	5–8	– –
Norway	●	5–10	100 (0.4)	●	1–10	97 (1.2)	○	–	41 (3.3)
Oman	●	3–6	98 (1.2)	●	7	100 (0.0)	●	6–7	96 (1.4)
Palestinian Nat'l Auth.	●	4–6	99 (0.8)	●	2–6	99 (0.6)	●	6–7	95 (2.0)
Qatar	●	5–7	95 (0.1)	●	6–8	99 (0.0)	●	6–7	89 (0.1)
Romania	●	5–6,8	97 (1.4)	●	6–9	97 (1.4)	●	6–9	97 (1.4)
Russian Federation	●	5–6	– –	●	6	– –	●	6	– –
Saudi Arabia	●	4–6	83 (3.8)	●	7	95 (2.4)	●	4–8	92 (2.9)
Scotland	●	6	98 (0.8)	●	8	93 (1.5)	●	8	83 (2.6)
Serbia	●	5–8	98 (1.2)	●	1–8	98 (1.2)	●	6–8	98 (1.2)
Singapore	●	4–7	100 (0.3)	●	7	99 (0.5)	●	6–7	100 (0.0)
Slovenia	●	6	100 (0.0)	●	8	100 (0.0)	●	8	29 (2.3)
Sweden	●	6–9	100 (0.0)	●	6–9	99 (0.5)	●	6–9	55 (2.6)
Syrian Arab Republic	●	4–6	88 (2.4)	●	7	95 (1.9)	●	5–7	93 (1.9)
Thailand	●	4–7	96 (1.7)	●	7–8	96 (1.8)	●	4–8	100 (0.0)
Tunisia	●	7–9	96 (1.7)	●	7–9	98 (1.2)	●	7–9	71 (3.6)
Turkey	●	4–7	98 (1.6)	●	7	100 (0.0)	●	6–8	99 (0.6)
Ukraine	●	5–6	100 (0.0)	●	6	100 (0.0)	●	6,9	100 (0.0)
United States	●	6–8	100 (0.1)	●	6–8	100 (0.0)	●	6–8	99 (0.3)
‡ Morocco	●	6	98 (1.1)	●	2	97 (0.2)	●	6	82 (4.8)
International Avg.			96 (0.2)			97 (0.2)			87 (0.3)
Benchmarking Participants									
Basque Country, Spain	●	6	100 (0.0)	●	5	100 (0.0)	●	7	94 (2.3)
British Columbia, Canada	●	7	99 (0.6)	●	7	97 (1.3)	●	7	93 (2.2)
Dubai, UAE	●	6	s 97 (1.6)	●	4	s 97 (1.7)	●	6	s 94 (2.1)
Massachusetts, US	●	3–8	99 (0.9)	●	5–8	100 (0.0)	●	7–8	99 (0.9)
Minnesota, US	●	5–7	100 (0.0)	●	5–8	100 (0.0)	●	6–8	98 (1.6)
Ontario, Canada	●	4–6	95 (1.9)	●	7–8	80 (4.5)	●	6–8	75 (4.1)
Quebec, Canada	●	7–8	100 (0.0)	●	7–8	98 (1.5)	●	7–8	99 (0.7)

● All or almost all students ⊙ Only the more able students ○ Not included in the curriculum through eighth grade

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

Exhibit 5.9 Intended and Taught* TIMSS Number Topics (Continued)

TIMSS2007 Mathematics 8th Grade

Number (10 topics)	Conversion of percents to fractions or decimals, and vice versa		
Country	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	7–8	93 (2.4)
Armenia	●	5	67 (3.6)
Australia	●	7–10	92 (1.9)
Bahrain	●	7	95 (1.1)
Bosnia and Herzegovina	●	7–8	99 (0.9)
Botswana	●	7–12	97 (1.3)
Bulgaria	●	5	97 (1.3)
Chinese Taipei	●	7	94 (1.9)
Colombia	●	6–7	92 (2.3)
Cyprus	●	6–8	99 (0.8)
Czech Republic	●	7	97 (1.3)
Egypt	●	5–9	95 (1.5)
El Salvador	●	6–7	88 (2.9)
England	●	6–8	95 (1.7)
Georgia	●	7–9	99 (0.7)
Ghana	●	3–10	87 (2.7)
Hong Kong SAR	●	7	96 (1.7)
Hungary	●	6–7	100 (0.0)
Indonesia	●	7	95 (2.0)
Iran, Islamic Rep. of	●	5–8	93 (2.0)
Israel	●	6–8	r 95 (1.4)
Italy	●	6–8	97 (0.9)
Japan	●	5	95 (1.9)
Jordan	●	5–7	98 (1.0)
Korea, Rep. of	●	6	97 (1.3)
Kuwait	●	7	r 95 (2.1)
Lebanon	●	6	82 (3.7)
Lithuania	●	6	98 (1.2)
Malaysia	●	8	99 (0.8)
Malta	●	6	99 (0.1)
Mongolia	●	4–8	– –
Norway	●	8–10	94 (1.9)
Oman	●	6–7	93 (2.0)
Palestinian Nat'l Auth.	●	6	100 (0.5)
Qatar	●	6–7	98 (0.0)
Romania	●	6	97 (1.4)
Russian Federation	●	5–6	– –
Saudi Arabia	●	8	86 (3.2)
Scotland	⊙	9	94 (1.4)
Serbia	●	5–8	98 (1.2)
Singapore	●	6–7	100 (0.0)
Slovenia	●	6–7	100 (0.2)
Sweden	●	6–9	97 (1.1)
Syrian Arab Republic	●	6	96 (1.8)
Thailand	●	4–6	97 (1.4)
Tunisia	●	7–9	79 (3.3)
Turkey	●	7	97 (1.8)
Ukraine	●	5–6	99 (0.9)
United States	●	6–8	100 (0.2)
‡ Morocco	●	6	90 (3.0)
International Avg.			95 (0.3)
Benchmarking Participants			
Basque Country, Spain	●	7	98 (1.2)
British Columbia, Canada	●	7	92 (2.0)
Dubai, UAE	●	5	s 94 (4.0)
Massachusetts, US	●	6–8	98 (1.3)
Minnesota, US	●	5–7	99 (0.9)
Ontario, Canada	●	6–8	89 (2.8)
Quebec, Canada	●	7–8	97 (1.5)

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

● All or almost all students ⊙ Only the more able students ○ Not included in the curriculum through eighth grade

Exhibit 5.10 Intended and Taught* TIMSS Algebra Topics

TIMSS2007 Mathematics 8th Grade

Algebra (8 topics)	Numeric, algebraic, and geometric patterns or sequences			Sums, products, and powers of expressions containing variables			Evaluating expressions for given numeric value		
Country	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	8	21 (3.3)	●	8	46 (4.9)	●	8	55 (4.7)
Armenia	●	5	85 (2.9)	●	5	80 (3.3)	●	5	70 (3.2)
Australia	⦿	7–10	91 (2.1)	●	7–12	81 (2.7)	●	8–9	86 (2.7)
Bahrain	●	7	38 (1.7)	●	8	r 88 (1.9)	●	7	85 (2.2)
Bosnia and Herzegovina	○	12	92 (2.6)	●	8–9	98 (0.9)	●	8–9	100 (0.0)
Botswana	○	11	71 (4.7)	●	8	48 (3.9)	●	8	71 (3.5)
Bulgaria	○	11	47 (4.3)	●	6–8	96 (1.6)	●	6–8	99 (0.4)
Chinese Taipei	●	8	94 (2.0)	●	8	99 (0.7)	●	8	99 (0.7)
Colombia	●	8–9	89 (3.2)	●	8–9	97 (1.6)	●	8–9	96 (2.2)
Cyprus	●	7	5 (1.5)	●	8–9	52 (2.6)	●	8–9	95 (1.7)
Czech Republic	○	–	64 (3.3)	●	8–10	98 (1.0)	●	7–10	99 (0.9)
Egypt	⦿	3–9	82 (3.2)	●	7–12	89 (2.6)	●	7–12	98 (1.3)
El Salvador	●	7–10	72 (4.3)	●	8–10	91 (2.6)	●	8–10	96 (1.8)
England	⦿	6–10	96 (1.4)	⦿	7–10	82 (2.6)	●	5–8	96 (1.2)
Georgia	●	1–3,7	15 (3.6)	●	5–6	97 (2.2)	●	5–6,10	100 (0.0)
Ghana	●	6–12	79 (3.4)	●	4–12	94 (1.8)	●	7–10	82 (3.1)
Hong Kong SAR	●	7	80 (3.4)	●	8	95 (2.0)	●	8	86 (3.5)
Hungary	●	1–12	76 (3.1)	●	7	96 (1.5)	●	7	99 (0.5)
Indonesia	●	8	22 (3.6)	●	8	85 (2.7)	●	8	58 (4.6)
Iran, Islamic Rep. of	●	7	62 (3.7)	●	7	95 (1.5)	●	7	98 (0.6)
Israel	●	7–8	r 89 (2.3)	●	7–8	r 92 (1.9)	●	7	r 92 (1.8)
Italy	●	8–9	70 (3.1)	●	8–10	95 (1.2)	●	8–10	97 (1.1)
Japan	●	7	71 (3.9)	●	7–8	92 (2.3)	●	7	100 (0.0)
Jordan	●	4–8	97 (1.5)	●	7–8	98 (1.3)	●	4–8	99 (0.9)
Korea, Rep. of	●	7	53 (3.3)	●	8	98 (1.0)	●	7	100 (0.0)
Kuwait	●	8	r 36 (4.3)	●	8	r 65 (4.4)	●	8	r 71 (4.6)
Lebanon	●	4	65 (5.0)	●	7	95 (2.3)	●	7	95 (2.1)
Lithuania	●	8	36 (4.0)	●	8	99 (0.6)	●	6	100 (0.0)
Malaysia	●	8	98 (1.1)	●	8	94 (2.2)	●	8	97 (1.5)
Malta	●	7	54 (0.3)	○	10	86 (0.2)	●	8	95 (0.1)
Mongolia	●	6–8	– –	●	6–8	– –	●	6–8	– –
Norway	●	5–10	38 (3.6)	○	8–10	38 (4.1)	●	8–10	50 (3.7)
Oman	●	1–7	70 (3.4)	●	7–8	98 (1.2)	●	7–8	99 (0.6)
Palestinian Nat'l Auth.	●	4–7,11–12	61 (4.4)	●	6–7,9	87 (2.6)	●	6–7	97 (1.3)
Qatar	●	7–8	50 (0.2)	●	7–8	80 (0.1)	●	7–8	73 (0.1)
Romania	●	6–10	70 (4.3)	●	8–10	94 (1.6)	●	8–10	100 (0.1)
Russian Federation	○	9	– –	●	7–9	– –	●	7–9	– –
Saudi Arabia	○	11	21 (3.7)	●	8	78 (3.4)	●	8	79 (3.9)
Scotland	⦿	9	86 (2.5)	○	10	67 (3.1)	●	8	87 (2.1)
Serbia	⦿	5–8	83 (3.1)	●	5–8	97 (1.6)	●	5–8	98 (1.2)
Singapore	●	1–10	97 (0.9)	●	6–10	96 (1.2)	●	7–10	100 (0.4)
Slovenia	●	4–5	58 (3.2)	●	7–9	90 (2.1)	●	7	94 (1.8)
Sweden	●	1–5	57 (2.9)	●	6–9	59 (2.8)	●	6–9	76 (2.3)
Syrian Arab Republic	●	7–9	24 (3.4)	●	8	80 (3.4)	●	7–8	72 (3.9)
Thailand	●	1–10	60 (3.6)	○	10	57 (4.2)	●	7	47 (4.2)
Tunisia	○	–	r 31 (4.4)	●	7–8,10	93 (2.0)	●	7–8,10	98 (1.2)
Turkey	○	10	77 (4.2)	●	7–8	97 (1.3)	●	7	98 (1.2)
Ukraine	⦿	9	3 (1.3)	●	7–8	100 (0.5)	●	7–8	99 (0.7)
United States	●	6–8	94 (1.1)	●	6–8	92 (1.5)	●	6–8	99 (0.6)
‡ Morocco	○	10	r 26 (5.5)	●	7	r 62 (4.2)	●	7	r 53 (4.8)
International Avg.			62 (0.5)			85 (0.3)			88 (0.3)
Benchmarking Participants									
Basque Country, Spain	●	8	73 (4.0)	●	8	91 (2.7)	●	8	94 (2.1)
British Columbia, Canada	●	8	74 (3.8)	○	9–10	74 (3.3)	●	7	82 (3.3)
Dubai, UAE	●	7	s 50 (4.4)	●	7	s 89 (3.0)	●	6	s 93 (3.0)
Massachusetts, US	●	5–12	93 (3.1)	●	7–12	91 (3.3)	●	5–12	99 (0.9)
Minnesota, US	●	K–12	86 (5.6)	●	5–12	89 (4.3)	●	5–12	98 (1.8)
Ontario, Canada	●	1–8	87 (3.4)	○	9	88 (2.6)	●	7–8	89 (3.0)
Quebec, Canada	●	7–8	93 (1.7)	●	7–8	83 (3.3)	●	7–8	96 (1.6)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through the eighth grade

Background data on intended curriculum provided by National Research Coordinators, and on implemented curriculum by teachers at the time of testing.

* Includes the TIMSS topics mostly taught during or before the year of the assessment.

‡ 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.

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

Exhibit 5.10 Intended and Taught* TIMSS Algebra Topics (Continued)

TIMSS2007 Mathematics 8th Grade

Algebra (8 topics)	Simplifying or comparing algebraic expressions			Modeling situations using expressions			Evaluating functions/formulas for given values of the variables		
Country	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	9	61 (4.5)	●	9	48 (5.0)	●	7–9	21 (3.7)
Armenia	●	5	72 (3.4)	●	5	75 (3.5)	●	5	81 (2.6)
Australia	●	7–10	81 (2.5)	⦿	8–12	69 (3.3)	●	7–10	77 (2.9)
Bahrain	●	7	93 (1.8)	●	2–8	r 51 (2.8)	●	7–8	34 (2.5)
Bosnia and Herzegovina	●	8–9	98 (1.2)	●	8–9	94 (1.8)	●	7–9	100 (0.0)
Botswana	○	9	64 (4.2)	●	8	37 (4.3)	●	8	54 (4.1)
Bulgaria	●	6–8	100 (0.2)	●	7–8	90 (2.4)	●	7–8	96 (1.6)
Chinese Taipei	●	8	100 (0.0)	●	8	99 (1.0)	●	8	85 (2.8)
Colombia	●	8–9	90 (2.4)	●	8–9	81 (3.7)	●	8–9	54 (4.6)
Cyprus	○	9	22 (2.2)	○	9	33 (2.1)	○	9	58 (2.9)
Czech Republic	●	8–10	93 (2.1)	●	8–12	87 (2.9)	●	7–12	48 (4.4)
Egypt	●	7–12	97 (1.3)	●	7–12	87 (2.6)	●	7–12	78 (3.0)
El Salvador	●	8–10	96 (1.7)	●	8–10	64 (4.7)	●	8–10	51 (4.6)
England	●	6–8	94 (1.6)	●	6–10	75 (2.8)	⦿	6–10	91 (1.8)
Georgia	●	5–6	97 (2.2)	●	4–5	56 (5.4)	●	7	80 (3.8)
Ghana	●	6–9	94 (1.9)	○	10–12	51 (3.9)	●	7–12	70 (3.9)
Hong Kong SAR	●	7	98 (1.4)	●	7–9	70 (4.5)	●	8	75 (4.0)
Hungary	●	7	98 (0.7)	●	7	83 (2.7)	●	1–12	98 (0.7)
Indonesia	●	8	78 (3.5)	⦿	8	58 (4.7)	⦿	8	91 (2.2)
Iran, Islamic Rep. of	●	7	99 (0.6)	●	7	51 (3.8)	●	8	66 (3.6)
Israel	●	7–8	r 97 (1.1)	●	7–8	r 78 (3.3)	●	8–9	r 57 (4.3)
Italy	●	8–10	94 (1.7)	●	8–10	71 (3.1)	●	8–10	71 (2.9)
Japan	●	7–8	98 (1.1)	●	7–8	94 (1.8)	●	7–8	99 (0.5)
Jordan	●	7–8	96 (1.6)	●	7–8	95 (1.7)	●	7–8	98 (1.1)
Korea, Rep. of	●	8	100 (0.0)	●	8	93 (1.8)	●	7	98 (1.0)
Kuwait	●	8	r 79 (3.9)	●	8	r 45 (4.3)	●	8	r 34 (4.5)
Lebanon	●	7	94 (2.3)	⦿	7	87 (3.7)	●	6	80 (3.7)
Lithuania	●	8	90 (2.4)	⦿	8	65 (3.9)	○	10	83 (2.8)
Malaysia	●	8	98 (1.3)	●	8	85 (3.1)	●	8	79 (3.4)
Malta	●	7	95 (0.1)	●	7–8	79 (0.2)	●	7	84 (0.2)
Mongolia	●	6–8	– –	●	6–8	– –	●	7–8	– –
Norway	○	8–10	60 (3.8)	○	–	26 (3.3)	●	8–10	38 (3.7)
Oman	●	7–9	93 (2.1)	●	7–9	58 (4.3)	●	7–9	68 (4.1)
Palestinian Nat'l Auth.	●	6–7	90 (2.4)	●	6–7,9	83 (3.4)	○	9–12	42 (4.6)
Qatar	●	7–8	88 (0.1)	●	7–8	47 (0.1)	●	7–9	49 (0.2)
Romania	●	8–10	99 (1.1)	○	9–10	84 (3.3)	●	6–10	100 (0.1)
Russian Federation	●	7–9	– –	●	6–9	– –	●	7–9	– –
Saudi Arabia	●	8	83 (3.6)	●	8	33 (3.7)	●	8	22 (3.4)
Scotland	⦿	9	78 (3.1)	●	8	52 (3.5)	●	8	72 (3.0)
Serbia	●	5–8	96 (2.0)	●	5–8	91 (2.5)	●	5–8	92 (2.4)
Singapore	●	7–10	99 (0.5)	●	7–10	92 (1.4)	●	7–10	95 (1.4)
Slovenia	●	7–9	80 (2.5)	●	4–8	96 (1.2)	●	7–8	59 (3.1)
Sweden	●	6–9	70 (3.1)	●	6–9	46 (3.2)	●	6–9	38 (2.8)
Syrian Arab Republic	●	7–9	91 (2.4)	●	7–9	44 (4.1)	●	7–9	65 (4.1)
Thailand	○	10	46 (4.2)	●	7	36 (3.6)	●	7	32 (3.9)
Tunisia	●	7–8,10	95 (1.8)	●	7–8,10	74 (4.0)	●	7–8,10	49 (3.9)
Turkey	●	7–8	100 (0.4)	●	7–8	85 (3.0)	●	7–8	65 (4.6)
Ukraine	●	7–8	99 (0.7)	●	7–9	100 (0.0)	●	7–9	92 (2.2)
United States	●	6–8	93 (1.2)	●	6–8	90 (1.6)	●	6–8	91 (1.5)
‡ Morocco	○	10	94 (2.7)	●	7	r 53 (5.0)	●	7	r 53 (4.7)
International Avg.			88 (0.3)			70 (0.5)			69 (0.5)
Benchmarking Participants									
Basque Country, Spain	●	8	86 (3.6)	○	9–10	82 (3.5)	●	8	62 (5.1)
British Columbia, Canada	●	8	78 (3.4)	●	7	68 (3.7)	●	8	74 (3.3)
Dubai, UAE	●	8	s 91 (4.1)	●	7	s 65 (4.0)	●	7	s 71 (5.1)
Massachusetts, US	●	5–12	96 (2.2)	●	1–12	98 (1.3)	●	3–12	95 (2.2)
Minnesota, US	●	7–12	83 (5.6)	●	2–12	84 (5.3)	●	7–12	90 (2.7)
Ontario, Canada	○	9	82 (3.5)	●	7–8	73 (3.9)	●	6–8	75 (3.8)
Quebec, Canada	●	7–8	98 (1.3)	●	8	89 (2.9)	○	9	69 (3.3)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through the eighth grade

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

Exhibit 5.10 Intended and Taught* TIMSS Algebra Topics (Continued)

TIMSS2007 Mathematics 8th Grade

Algebra (8 topics)	Simple linear equations and inequalities, and simultaneous (two variables) equations			Equivalent representations of functions as ordered pairs, tables, graphs, words, or equations		
Country	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	9	37 (4.3)	●	9	26 (3.4)
Armenia	●	4	82 (2.7)	●	7	79 (3.0)
Australia	⦿	8–10	40 (3.5)	●	7–10	58 (3.7)
Bahrain	●	9	41 (2.7)	●	9	29 (2.6)
Bosnia and Herzegovina	●	6–9	99 (0.6)	●	7–8	99 (0.7)
Botswana	●	8–9	21 (3.6)	●	7	19 (3.6)
Bulgaria	●	7–8	98 (0.8)	●	8	95 (1.6)
Chinese Taipei	●	7	97 (1.3)	●	7	84 (2.8)
Colombia	●	8–9	47 (5.3)	●	8–9	44 (5.3)
Cyprus	○	10	50 (2.7)	●	8	r 22 (2.1)
Czech Republic	●	8–10	53 (4.2)	○	9–12	19 (3.5)
Egypt	●	7–12	96 (1.3)	⦿	8–12	88 (2.1)
El Salvador	○	8–10	44 (4.6)	○	10	30 (4.0)
England	⦿	6–10	64 (3.3)	●	6–10	73 (3.2)
Georgia	●	7–8	92 (2.1)	●	7–9	68 (4.7)
Ghana	●	6–10	88 (2.1)	●	4–12	66 (4.2)
Hong Kong SAR	●	8	91 (2.3)	●	7	69 (4.0)
Hungary	●	7,9	97 (0.9)	●	5	93 (1.8)
Indonesia	●	8	96 (2.0)	⦿	8	91 (2.5)
Iran, Islamic Rep. of	●	8	64 (3.7)	○	10	25 (3.5)
Israel	●	7–8	r 91 (2.1)	●	9	r 58 (3.8)
Italy	●	8–10	56 (3.5)	●	8–10	59 (3.3)
Japan	●	7–8	94 (1.7)	●	7–8	91 (2.4)
Jordan	●	6–8	96 (1.6)	●	8	98 (0.9)
Korea, Rep. of	●	8	99 (0.6)	●	7	94 (1.6)
Kuwait	●	8–9	r 55 (5.0)	●	8	r 46 (4.8)
Lebanon	●	8–9	48 (4.5)	●	9	48 (4.6)
Lithuania	⦿	8	79 (3.1)	⦿	10	65 (3.9)
Malaysia	●	8–9	69 (3.3)	○	9	72 (3.7)
Malta	○	10	77 (0.2)	●	7	61 (0.2)
Mongolia	●	5–8	– –	●	6–8	– –
Norway	○	8–10	12 (1.9)	○	8–10	26 (3.4)
Oman	●	8–9	54 (4.4)	●	6–10	79 (3.2)
Palestinian Nat'l Auth.	○	9–10	36 (4.2)	○	9–12	18 (3.5)
Qatar	●	8–9	53 (0.2)	●	7–9	41 (0.2)
Romania	●	6–9	99 (0.5)	●	8–10	100 (0.3)
Russian Federation	●	6–9	– –	●	7–9	– –
Saudi Arabia	●	7–8	38 (4.4)	●	8	28 (4.2)
Scotland	○	10	27 (3.1)	○	10	31 (3.4)
Serbia	●	5–8	98 (1.7)	●	5–8	99 (1.1)
Singapore	●	7–10	90 (1.6)	●	8–10	88 (1.6)
Slovenia	●	7–8	14 (1.9)	●	8	55 (2.9)
Sweden	●	6–9	15 (2.3)	●	6–9	22 (2.4)
Syrian Arab Republic	●	7–9	90 (2.3)	○	7–9	47 (4.6)
Thailand	●	7–10	56 (4.0)	●	7–10	68 (3.6)
Tunisia	○	9	18 (3.5)	○	10	20 (3.3)
Turkey	●	7–8	95 (1.3)	●	7–8	52 (4.5)
Ukraine	●	7–8	93 (2.1)	●	7–9	90 (2.5)
United States	⦿	6–8	79 (2.2)	●	6–8	85 (1.7)
‡ Morocco	○	9	r 46 (5.1)	○	10	r 42 (4.9)
International Avg.			66 (0.4)			60 (0.5)
Benchmarking Participants						
Basque Country, Spain	●	8	68 (4.8)	●	8	40 (4.1)
British Columbia, Canada	○	10	37 (4.3)	○	9–10	55 (3.9)
Dubai, UAE	●	7	s 53 (3.8)	●	7	s 42 (3.9)
Massachusetts, US	●	7–12	76 (5.4)	●	6–12	89 (3.5)
Minnesota, US	●	5–12	69 (5.7)	●	6–12	81 (4.0)
Ontario, Canada	○	9	52 (4.2)	●	7–8,11	62 (5.1)
Quebec, Canada	○	9	19 (3.4)	○	9	56 (4.7)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through the eighth grade

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

Exhibit 5.11 reveals considerable variation across the 14 geometry topics in terms of being included in the countries' curricula. Four topics were included in nearly every curriculum, and, on average, taught to 90 percent or more of the students, including angles, relationships among angles, properties of geometric shapes, and drawing triangles and rectangles. Three topics were in most or almost every curriculum and, on average across countries, taught to 80 to 83 percent of the students, including congruent figures; measuring angle sizes, lengths, areas, and volumes; and measurement formulas for perimeters, areas, and volumes. The Pythagorean theorem was in all except 12 curricula, and taught, on average, to 65 percent of the students. The remaining 6 geometry topics were in the intended curriculum for the majority of countries, and teachers reported the topics had been taught to approximately half the students, including similar triangles (55%), relationship between two- and three-dimensional figures (48%), measures of irregular or compound areas (55%), Cartesian plane (54%), line and rotational symmetry for two-dimensional shapes (56%), and translation, reflection, and rotation (53%).

Exhibit 5.11 Intended and Taught* TIMSS Geometry Topics

TIMSS2007 Mathematics 8th Grade

Geometry (14 topics)	Angles acute, right, straight, obtuse, and reflex			Relationships for angles at a point, angles on a line, vertically opposite angles, angles associated with a transversal cutting parallel lines, and perpendicularity			Properties of geometric shapes: triangles and quadrilaterals, and other common polygons		
Country	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	7	97 (1.7)	●	8	92 (2.2)	●	7–9	99 (1.0)
Armenia	●	6	70 (3.7)	●	6	69 (3.8)	●	6	71 (3.8)
Australia	●	4–9	93 (2.0)	●	6–9	79 (2.8)	●	6–9	88 (2.6)
Bahrain	●	4–9	99 (0.3)	●	6–9	97 (1.0)	●	4–8	100 (0.0)
Bosnia and Herzegovina	●	4–6	99 (0.9)	●	6–7	99 (0.9)	●	6–7	99 (0.9)
Botswana	●	4–10	55 (4.3)	●	8	41 (4.1)	●	7–8	44 (4.3)
Bulgaria	●	4,6	98 (1.2)	●	7–8	98 (1.2)	●	6–7	99 (0.8)
Chinese Taipei	●	8	99 (0.6)	●	8	95 (1.6)	●	8	97 (1.4)
Colombia	●	6–7	92 (2.4)	●	8–9	82 (3.4)	●	6–7	83 (3.3)
Cyprus	●	7	98 (1.0)	●	7	99 (0.9)	○	9–10	95 (1.5)
Czech Republic	●	6	99 (0.5)	●	6,10	99 (0.5)	●	6–7,10	99 (0.5)
Egypt	●	1–4	98 (1.3)	●	7–8	98 (1.2)	●	4–6	98 (1.3)
El Salvador	●	3–9	66 (4.4)	○	9,11	39 (4.0)	●	6,9	68 (3.9)
England	●	6–8	99 (0.5)	●	6–8	98 (0.8)	●	6–8	99 (0.5)
Georgia	●	5,7	100 (0.0)	●	7	98 (1.9)	⊙	1,7–8	100 (0.0)
Ghana	●	4–9	95 (1.8)	●	6–12	90 (2.4)	●	7–10	85 (3.0)
Hong Kong SAR	●	7	99 (1.0)	●	7	97 (1.7)	●	7–9	85 (3.4)
Hungary	●	5	100 (0.0)	●	7	99 (0.3)	●	3–12	100 (0.0)
Indonesia	●	8	99 (0.9)	⊙	8	95 (2.0)	⊙	8	89 (2.8)
Iran, Islamic Rep. of	●	6	99 (0.5)	●	7	97 (1.4)	●	3	100 (0.5)
Israel	●	5–9	r 98 (0.9)	●	5–9	r 95 (1.4)	●	4–9	r 78 (2.9)
Italy	●	4,6,9	100 (0.4)	●	6–9	99 (0.5)	●	4–10	100 (0.0)
Japan	●	8	98 (1.2)	●	8	100 (0.2)	●	8	100 (0.2)
Jordan	●	5–7	98 (1.4)	●	5–7	99 (1.1)	●	5–7	98 (1.0)
Korea, Rep. of	●	7	99 (0.8)	●	7	98 (1.0)	●	8	100 (0.0)
Kuwait	○	9	r 96 (1.9)	●	8–9	r 81 (3.9)	●	7–8	r 91 (2.7)
Lebanon	●	5	97 (1.5)	●	5–8	98 (1.2)	●	5	99 (0.9)
Lithuania	●	6	98 (1.2)	●	8	95 (1.4)	●	8	98 (1.2)
Malaysia	●	7	96 (1.5)	●	7	90 (2.0)	●	8	96 (1.8)
Malta	●	6	100 (0.0)	●	7–8	100 (0.0)	●	6–7	99 (0.0)
Mongolia	●	7–8	– –	●	7–8	– –	●	7–8	– –
Norway	●	5–10	96 (1.4)	○	–	64 (3.6)	●	5–10	85 (2.4)
Oman	●	4–5	99 (0.6)	●	6–8	96 (1.7)	●	3–7	99 (0.6)
Palestinian Nat'l Auth.	●	3–5	100 (0.4)	●	7	92 (2.4)	●	1–7	100 (0.0)
Qatar	●	5–7	92 (0.1)	●	6–8	88 (0.1)	●	6–8	94 (0.1)
Romania	●	6–7	99 (0.6)	●	6–7	99 (0.8)	●	6–7	99 (0.8)
Russian Federation	●	7,9	– –	●	7–9	– –	●	7–9	– –
Saudi Arabia	●	4–7	95 (2.4)	●	8	85 (3.1)	●	7–8	99 (0.7)
Scotland	●	7	100 (0.0)	⊙	9	94 (1.5)	●	8	94 (1.8)
Serbia	●	4–8	99 (0.6)	●	5–7	99 (0.6)	●	5–7	99 (0.6)
Singapore	●	7–10	93 (1.4)	●	5–10	93 (1.2)	●	7–10	95 (0.9)
Slovenia	●	6	100 (0.3)	●	6	99 (0.7)	●	6–7	98 (0.8)
Sweden	●	6–9	92 (1.4)	●	6–9	58 (2.8)	●	6–9	94 (1.4)
Syrian Arab Republic	●	3	99 (0.8)	●	4–8	92 (2.2)	●	4–8	98 (1.6)
Thailand	●	1–3	87 (2.7)	●	4–6	83 (3.0)	●	4–6	92 (2.4)
Tunisia	●	7–9	99 (0.9)	●	7–9	99 (0.9)	●	7–9	98 (1.1)
Turkey	●	4–7	98 (1.3)	●	4–7	97 (1.3)	●	3–7	90 (2.6)
Ukraine	●	7–9	100 (0.0)	●	7	100 (0.0)	●	7–9	99 (0.7)
United States	●	6–8	90 (1.6)	●	6–8	73 (2.6)	●	6–8	89 (1.7)
‡ Morocco	●	7	97 (0.2)	●	7	82 (3.8)	●	7	94 (1.8)
International Avg.			95 (0.2)			90 (0.3)			93 (0.3)
Benchmarking Participants									
Basque Country, Spain	●	7	90 (2.9)	●	7	82 (3.8)	●	7	88 (3.1)
British Columbia, Canada	●	6	59 (4.2)	●	7	49 (4.0)	●	6	60 (4.6)
Dubai, UAE	●	5	s 95 (3.8)	●	6	s 97 (1.7)	●	8	s 87 (2.7)
Massachusetts, US	●	3–12	92 (3.6)	●	5–12	86 (4.7)	●	PK–8	89 (4.4)
Minnesota, US	●	4–7	85 (3.9)	●	4–12	48 (8.3)	●	2–12	77 (6.0)
Ontario, Canada	●	3–6	89 (3.5)	●	8	81 (3.6)	●	5–8	93 (3.0)
Quebec, Canada	●	7	99 (0.5)	●	7–8	93 (2.2)	●	7–8	98 (0.9)

● All or almost all students ⊙ Only the more able students ○ Not included in the curriculum through eighth grade

Background data on intended curriculum provided by National Research Coordinators, and on implemented curriculum by teachers at the time of testing.

* Includes the TIMSS topics mostly taught during or before the year of the assessment.

‡ 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.

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

Exhibit 5.11 Intended and Taught* TIMSS Geometry Topics (Continued)

TIMSS2007 Mathematics 8th Grade

Geometry (14 topics)	Construct or draw triangles and rectangles of given dimensions			Congruent figures and their corresponding measures			Similar triangles and recall their properties		
Country	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	7	99 (1.0)	●	8–9	66 (3.9)	–	–	22 (3.6)
Armenia	●	6	69 (3.8)	●	7	71 (3.7)	●	7	84 (2.1)
Australia	●	7–8	78 (3.1)	●	7–10	48 (3.3)	●	8–9	40 (4.0)
Bahrain	●	4–6	95 (1.7)	●	8	96 (1.5)	●	9	26 (1.9)
Bosnia and Herzegovina	●	6–7	99 (0.9)	●	6–7	100 (0.3)	●	9	83 (2.6)
Botswana	○	9	22 (3.6)	○	11	25 (4.0)	○	11	25 (3.7)
Bulgaria	●	7	98 (0.8)	●	7–8	98 (1.1)	○	9	7 (1.7)
Chinese Taipei	●	8	98 (1.2)	●	8	95 (1.8)	●	9	26 (4.1)
Colombia	●	8–9	88 (2.9)	●	8–9	73 (4.0)	●	8–9	60 (5.0)
Cyprus	○	9–10	89 (2.0)	○	9–10	15 (2.0)	○	9–10	3 (1.3)
Czech Republic	●	6–8,10	97 (1.3)	●	7,10	95 (1.5)	○	9–10	35 (3.7)
Egypt	●	4–6	98 (1.2)	●	7–9	99 (0.8)	●	9–11	98 (1.0)
El Salvador	●	6–9	67 (4.3)	●	6–9	57 (4.3)	○	9–12	42 (3.9)
England	●	6–8	95 (1.6)	●	7–10	68 (3.8)	⦿	8–10	47 (4.0)
Georgia	●	7	94 (2.6)	●	2,8	85 (3.6)	○	9	91 (2.8)
Ghana	●	4–10	84 (3.2)	●	7–9	70 (4.1)	●	5–9	72 (3.7)
Hong Kong SAR	⦿	8	79 (3.6)	●	7	93 (2.4)	●	7–9	88 (3.0)
Hungary	●	7	100 (0.0)	●	7	97 (1.3)	○	10	77 (3.3)
Indonesia	⦿	8	98 (1.2)	⦿	8	63 (4.4)	⦿	8	59 (4.3)
Iran, Islamic Rep. of	●	7	99 (0.7)	●	8	81 (3.3)	●	8	55 (3.8)
Israel	○	–	r 50 (3.4)	●	8	r 77 (3.1)	○	–	r 27 (3.7)
Italy	●	4–6	98 (0.9)	●	7–9	100 (0.3)	●	7–9	85 (2.5)
Japan	●	7–8	93 (2.1)	●	8	99 (0.6)	○	9	7 (1.7)
Jordan	●	4–7	97 (1.2)	●	7	95 (1.9)	●	7	88 (2.8)
Korea, Rep. of	●	7	95 (1.4)	●	8	100 (0.0)	●	8	100 (0.0)
Kuwait	●	6–7	r 89 (3.2)	●	8	r 87 (3.2)	○	9	r 44 (4.3)
Lebanon	●	6–7	98 (1.3)	●	7	99 (0.7)	●	9	50 (4.5)
Lithuania	⦿	8	97 (1.4)	○	9	96 (1.5)	○	9	47 (3.8)
Malaysia	●	8	99 (0.5)	○	9	94 (1.8)	○	9	89 (2.6)
Malta	●	7	91 (0.2)	○	10	16 (0.2)	○	10	14 (0.2)
Mongolia	⦿	6–8	– –	●	7–8	– –	⦿	9	– –
Norway	●	8–10	90 (2.2)	○	8–10	19 (2.5)	○	8–10	18 (2.5)
Oman	●	4–6	95 (1.8)	●	8–9	93 (2.2)	●	8–9	86 (3.4)
Palestinian Nat'l Auth.	●	5–6	93 (2.3)	●	7	98 (1.0)	●	7,9	97 (1.6)
Qatar	●	5–6	87 (0.1)	●	8	77 (0.2)	○	9	57 (0.1)
Romania	●	6–7	99 (0.8)	●	6–7	98 (0.9)	●	6–7	99 (0.8)
Russian Federation	●	7–8	– –	●	7–9	– –	●	8–9	– –
Saudi Arabia	●	5–8	85 (3.1)	●	8	98 (1.2)	○	9–10	55 (4.6)
Scotland	●	8	91 (1.8)	○	10	54 (3.7)	○	10	21 (3.3)
Serbia	●	6	99 (0.6)	●	6	99 (0.6)	●	6–7	99 (0.7)
Singapore	●	7–10	89 (1.4)	●	8–10	84 (2.1)	●	8–10	69 (2.4)
Slovenia	●	7	100 (0.2)	●	7	96 (1.0)	●	7	18 (2.1)
Sweden	●	6–9	95 (1.4)	●	6–9	58 (3.0)	●	6–9	53 (3.1)
Syrian Arab Republic	●	5–8	97 (1.8)	●	7	91 (2.5)	○	9	27 (3.6)
Thailand	●	4–6	88 (2.9)	●	7–9	74 (3.9)	●	7–9	67 (3.9)
Tunisia	●	7–9	99 (0.8)	○	–	98 (1.3)	○	13	60 (4.0)
Turkey	●	3,7–8	91 (2.2)	●	8	98 (1.0)	●	8	99 (0.8)
Ukraine	●	7–9	98 (1.1)	●	7–8	97 (1.2)	○	9	25 (3.7)
United States	●	6–8	69 (2.7)	●	6–8	80 (2.2)	●	6–8	77 (2.2)
‡ Morocco	●	7	93 (1.9)	●	7	r 77 (4.3)	○	9	r 10 (2.2)
International Avg.			90 (0.3)			80 (0.4)			55 (0.4)
Benchmarking Participants									
Basque Country, Spain	●	7	79 (4.0)	●	7	78 (4.3)	●	8	56 (5.6)
British Columbia, Canada	●	7	50 (4.9)	○	9	30 (3.5)	○	9	26 (3.3)
Dubai, UAE	●	6	s 91 (3.0)	●	6	s 72 (3.7)	●	7	s 43 (4.4)
Massachusetts, US	●	3–10	71 (6.7)	●	2–10	88 (4.5)	●	7–10	85 (4.3)
Minnesota, US	●	5–12	56 (7.2)	●	4–12	75 (4.4)	●	4–12	65 (7.5)
Ontario, Canada	●	5–6	87 (3.6)	●	3,7	83 (4.0)	●	7–8	86 (3.8)
Quebec, Canada	●	7–8	97 (1.4)	●	7–8	92 (2.2)	●	8	77 (3.8)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through eighth grade

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

Exhibit 5.11 Intended and Taught* TIMSS Geometry Topics (Continued)

TIMSS2007 Mathematics 8th Grade

Geometry (14 topics)	Relationships between two-dimensional and three-dimensional shapes			Pythagorean theorem to find length of a side			Measurement, drawing, and estimation of the size of angles, the lengths of lines, areas and volumes		
Country	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	–	–	33 (4.1)	●	8	14 (2.7)	●	7–8	79 (3.3)
Armenia	●	7	78 (2.8)	●	7	72 (3.2)	●	6	71 (3.2)
Australia	●	6–9	57 (3.8)	⦿	8–10	42 (2.4)	●	5–10	87 (2.4)
Bahrain	●	–	48 (2.9)	●	8	98 (0.0)	●	4–6	91 (1.2)
Bosnia and Herzegovina	●	8–9	84 (2.9)	●	7–8	99 (0.7)	●	5–7	96 (1.9)
Botswana	○	9	9 (2.5)	○	10	7 (2.3)	●	4–7	45 (4.5)
Bulgaria	●	5–6	51 (3.9)	○	9	1 (0.6)	●	5–6	91 (2.1)
Chinese Taipei	●	8	69 (3.7)	●	8	99 (0.7)	●	6	87 (2.7)
Colombia	●	8–9	37 (4.4)	●	8–9	82 (3.6)	●	8–9	83 (3.4)
Cyprus	○	11	10 (1.6)	●	7	97 (0.7)	●	6–8	82 (2.1)
Czech Republic	●	6–10, 12	48 (4.4)	●	8,10	100 (0.3)	●	6–9	99 (0.2)
Egypt	●	3–11	54 (3.9)	●	7–8	93 (1.9)	●	6–9	89 (2.7)
El Salvador	●	6–9	25 (4.1)	●	7–8	59 (4.4)	●	6–9	57 (4.7)
England	○	9–10	69 (3.8)	⦿	9–10	62 (3.6)	●	6–10	98 (0.7)
Georgia	⦿	4–6,8–9,11	16 (3.5)	●	8	86 (2.7)	●	5–6,8	86 (3.8)
Ghana	●	7–10	58 (3.9)	○	10–12	37 (3.8)	●	7–12	77 (3.6)
Hong Kong SAR	●	7	44 (4.8)	●	8	98 (1.3)	●	7	93 (2.3)
Hungary	●	6	65 (3.8)	●	8	98 (1.2)	●	5–8	99 (0.7)
Indonesia	⦿	8	49 (4.9)	●	8	98 (1.3)	●	8	87 (3.0)
Iran, Islamic Rep. of	●	5–8	23 (3.4)	●	8	100 (0.0)	●	3–8	89 (2.3)
Israel	○	–	r 15 (3.0)	●	9	r 27 (3.3)	○	–	r 49 (3.7)
Italy	●	5–13	96 (1.5)	●	7–9	100 (0.0)	●	4–8	98 (1.0)
Japan	●	7	89 (2.3)	○	9	4 (1.2)	●	2–6	95 (1.8)
Jordan	●	8	66 (3.9)	●	8	100 (0.1)	●	6–8	98 (0.9)
Korea, Rep. of	●	7	92 (1.9)	○	9	7 (1.8)	●	7	89 (2.2)
Kuwait	●	8	r 26 (4.1)	○	9	r 30 (4.5)	●	5,7	r 67 (4.3)
Lebanon	●	7–9	35 (4.4)	●	8	97 (1.1)	●	5–9	87 (3.7)
Lithuania	○	10	45 (4.3)	●	8	99 (0.8)	●	8	86 (2.8)
Malaysia	●	8	84 (2.8)	●	8	100 (0.5)	●	8	92 (1.9)
Malta	○	10	28 (0.2)	⦿	9,11	87 (0.1)	●	6–7	94 (0.1)
Mongolia	○	10	– –	●	8	– –	●	8	– –
Norway	○	–	15 (2.4)	○	8–10	7 (2.1)	●	3–10	69 (3.5)
Oman	●	11	38 (4.6)	●	7	35 (3.9)	●	3–6	92 (2.2)
Palestinian Nat'l Auth.	●	4–7	64 (3.8)	●	7	100 (0.0)	●	1–7	91 (2.2)
Qatar	●	8–9	30 (0.1)	●	8	12 (0.1)	●	7–8	58 (0.2)
Romania	●	6–8	92 (1.9)	●	7–8	99 (0.6)	●	6–8	99 (0.4)
Russian Federation	●	5–9	– –	●	8–11	– –	●	7–9,11	– –
Saudi Arabia	○	12	15 (3.4)	○	9	11 (2.7)	●	4–6	37 (4.5)
Scotland	●	8	70 (3.7)	⦿	9	49 (3.6)	●	8	94 (1.7)
Serbia	●	7	94 (1.9)	●	7	99 (0.7)	●	5–6	98 (0.9)
Singapore	●	7–8	52 (2.7)	●	8	71 (2.9)	●	2–10	85 (1.8)
Slovenia	●	1–7	10 (1.9)	○	9	25 (2.6)	●	6–8	84 (2.3)
Sweden	●	6–9	17 (2.3)	○	–	10 (1.7)	●	6–9	78 (2.6)
Syrian Arab Republic	●	5–9	26 (3.9)	●	9	38 (3.9)	●	5–8	81 (3.5)
Thailand	●	4–8	64 (3.5)	●	8	95 (1.6)	●	4–9	77 (3.9)
Tunisia	●	7–9	61 (4.1)	○	9	6 (1.7)	●	7–9	89 (2.7)
Turkey	●	–	36 (4.4)	●	8	96 (2.0)	●	3–8	72 (3.8)
Ukraine	○	10–11	17 (2.7)	●	8–9	100 (0.0)	●	5–11	89 (2.5)
United States	●	6–8	70 (2.4)	●	6–8	84 (1.8)	●	6–8	84 (2.1)
‡ Morocco	○	9	r 33 (4.8)	○	9	95 (1.8)	●	7	r 80 (3.8)
International Avg.			48 (0.5)			65 (0.3)			83 (0.4)
Benchmarking Participants									
Basque Country, Spain	○	9–10	42 (4.7)	●	7	86 (3.2)	●	8	64 (5.2)
British Columbia, Canada	●	2	40 (3.9)	●	8	66 (4.3)	●	7	51 (4.5)
Dubai, UAE	●	5	s 36 (4.0)	●	8	s 89 (3.0)	●	5	s 76 (5.2)
Massachusetts, US	●	K–10	72 (6.2)	●	8–10	84 (5.4)	●	3–8	85 (5.1)
Minnesota, US	●	4–12	54 (5.7)	●	8–12	82 (4.4)	●	4–12	78 (6.8)
Ontario, Canada	●	1–4	76 (4.0)	●	8	64 (4.8)	●	4–8	87 (2.7)
Quebec, Canada	●	7–8	48 (3.8)	○	9	10 (2.5)	●	7–8	61 (4.4)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through eighth grade

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

Exhibit 5.11 Intended and Taught* TIMSS Geometry Topics (Continued)

TIMSS2007 Mathematics 8th Grade

Geometry (14 topics)	Measurement formulas for perimeters, circumferences, areas of circles, surface areas, and volumes			Measures of irregular or compound areas			Cartesian plane – ordered pairs, equations, intercepts, intersections, and gradient		
Country	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	7–9	81 (3.5)	●	7	55 (4.4)	○	9	15 (3.1)
Armenia	●	7	82 (3.2)	●	7	80 (3.1)	●	8	78 (3.4)
Australia	●	7–8	81 (3.1)	●	6–12	69 (3.6)	●	7–12	52 (3.4)
Bahrain	●	8	87 (1.7)	●	6	64 (2.8)	●	8	45 (2.0)
Bosnia and Herzegovina	●	6–9	91 (2.4)	⦿	6–7	81 (2.6)	●	7–8	97 (1.2)
Botswana	●	8–10	28 (4.4)	●	4–7	19 (2.9)	●	8–9	9 (2.5)
Bulgaria	●	5–6	89 (2.0)	○	–	28 (3.4)	●	8	41 (3.4)
Chinese Taipei	●	8	84 (3.0)	●	8	48 (4.5)	●	7	66 (4.0)
Colombia	●	8–9	79 (3.7)	●	8–9	38 (4.1)	●	8–9	53 (4.7)
Cyprus	●	8,10–11	69 (2.5)	○	12	40 (2.5)	○	11	1 (0.5)
Czech Republic	●	3–10	88 (2.8)	●	5–7	56 (3.8)	●	7–11	29 (3.9)
Egypt	●	6–9	78 (3.0)	●	5–6	67 (3.7)	○	8–10	94 (2.1)
El Salvador	●	6–9	67 (4.0)	●	6–9	31 (4.2)	○	10	37 (4.3)
England	●	7–10	85 (2.4)	●	6–8	88 (2.5)	●	7–10	60 (3.8)
Georgia	⦿	4,8	48 (5.1)	⦿	4–6	57 (4.7)	●	5,7–11	60 (4.8)
Ghana	●	7–12	70 (3.9)	●	7–10	22 (3.1)	●	8–12	46 (4.1)
Hong Kong SAR	●	8	96 (1.8)	●	7	78 (4.1)	●	7	46 (4.6)
Hungary	●	7	98 (1.0)	●	–	86 (2.4)	●	7	94 (1.6)
Indonesia	●	8	94 (2.3)	⦿	8	50 (4.7)	⦿	8	93 (2.2)
Iran, Islamic Rep. of	●	5–8	91 (1.9)	●	8	48 (3.8)	●	7	76 (3.0)
Israel	●	5–7	r 37 (3.5)	●	5–6	r 24 (2.9)	●	7	r 36 (3.8)
Italy	●	8–10	99 (0.7)	●	7–9	79 (2.6)	●	8–13	69 (3.0)
Japan	●	4–7	96 (1.7)	●	5	56 (4.2)	●	7–8	97 (1.3)
Jordan	●	6–8	97 (1.6)	●	6–8	77 (3.5)	●	8	93 (1.9)
Korea, Rep. of	●	7	93 (1.7)	●	5	61 (3.8)	●	8	98 (1.0)
Kuwait	●	7–8	r 78 (4.3)	●	4	r 33 (3.7)	○	9	r 23 (3.9)
Lebanon	●	5–7	85 (4.1)	⦿	7	47 (4.7)	●	7–9	43 (4.9)
Lithuania	○	10	97 (1.2)	⦿	8	82 (3.3)	●	8	73 (3.3)
Malaysia	●	8	98 (1.2)	○	8	70 (3.8)	●	8,10	72 (3.8)
Malta	⦿	9–10	88 (0.1)	○	10	64 (0.3)	⦿	9–10	77 (0.2)
Mongolia	●	6–8	– –	○	10	– –	●	6–8	– –
Norway	○	8–10	63 (3.5)	●	5–10	27 (3.3)	○	5–10	24 (2.8)
Oman	●	3–9	93 (1.6)	●	2–4	74 (3.6)	●	9	52 (4.6)
Palestinian Nat'l Auth.	●	5–6	96 (2.0)	●	4–6	61 (3.8)	○	9–10	14 (3.3)
Qatar	●	7–8	69 (0.2)	●	6–7	37 (0.2)	●	7–8	44 (0.2)
Romania	●	6–8	99 (1.3)	●	7–8	84 (2.8)	●	8–10	84 (3.1)
Russian Federation	○	9,11	– –	○	9	– –	●	7–9	– –
Saudi Arabia	●	4–6	23 (3.6)	–	–	21 (4.3)	○	9–10	48 (3.9)
Scotland	○	10	70 (3.2)	●	8	77 (3.0)	○	10	26 (3.0)
Serbia	●	5–6	98 (1.1)	●	7	85 (2.8)	●	7	98 (1.0)
Singapore	●	7–10	97 (0.8)	●	3–6	44 (2.7)	●	7–10	78 (2.2)
Slovenia	●	6–7	56 (3.2)	●	6–7	83 (2.1)	●	8	18 (2.2)
Sweden	●	6–9	74 (2.9)	●	6–9	68 (2.9)	○	–	19 (2.5)
Syrian Arab Republic	●	5–8	88 (2.8)	●	4–7	31 (4.1)	●	6–7,9	10 (2.6)
Thailand	●	4–9	55 (4.1)	○	9	18 (3.5)	●	7	14 (2.8)
Tunisia	●	7–9	92 (2.3)	○	12	40 (4.1)	●	10	12 (2.5)
Turkey	●	4–8	57 (4.1)	○	–	31 (4.1)	●	7–8	62 (4.5)
Ukraine	●	5–6,9–11	88 (2.4)	⦿	9	40 (4.2)	●	8	99 (0.6)
United States	●	6–8	93 (1.4)	●	6–8	59 (2.7)	●	6–8	76 (2.3)
‡ Morocco	●	6	79 (3.0)	●	5	53 (4.1)	○	9	r 31 (5.4)
International Avg.			80 (0.4)			55 (0.5)			54 (0.5)
Benchmarking Participants									
Basque Country, Spain	●	8	70 (4.5)	●	8	46 (4.6)	○	8	29 (4.2)
British Columbia, Canada	●	5–7	56 (4.6)	●	5	38 (4.1)	○	9	33 (4.3)
Dubai, UAE	●	6	s 67 (4.6)	●	8	s 41 (4.7)	●	8	s 29 (4.5)
Massachusetts, US	●	5–12	92 (3.2)	●	4–10	64 (6.2)	●	5–12	84 (3.0)
Minnesota, US	●	3–12	85 (5.2)	●	4–12	47 (7.9)	●	6–12	83 (4.3)
Ontario, Canada	●	5–8	94 (2.2)	●	1–5	68 (4.0)	○	9	50 (4.9)
Quebec, Canada	●	7–8	85 (3.5)	●	7–8	59 (4.9)	●	7–8	54 (4.1)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through eighth grade

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

Exhibit 5.11 Intended and Taught* TIMSS Geometry Topics (Continued)

TIMSS2007 Mathematics 8th Grade

Geometry (14 topics)	Line and rotational symmetry for two-dimensional shapes			Translation, reflection, and rotation		
Country	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	○	9	15 (3.2)	○	9	15 (3.0)
Armenia	●	7	73 (3.6)	●	8	77 (2.8)
Australia	⦿	5–8	56 (3.0)	●	4–8	56 (2.5)
Bahrain	●	7	19 (2.2)	●	7	26 (2.6)
Bosnia and Herzegovina	●	6–7	97 (1.3)	●	6–7	91 (1.8)
Botswana	●	7–12	26 (3.4)	●	7–12	18 (3.0)
Bulgaria	●	8	57 (3.6)	●	8	75 (2.9)
Chinese Taipei	●	8,10	66 (3.9)	●	8	27 (3.6)
Colombia	○	10–11	48 (5.2)	●	6–7	52 (5.0)
Cyprus	○	–	9 (1.6)	○	–	1 (0.7)
Czech Republic	●	6,11	81 (3.0)	⦿	7,11	35 (3.9)
Egypt	○	7–9	61 (3.5)	●	7–9	98 (1.0)
El Salvador	●	6	24 (3.9)	●	6	21 (3.7)
England	●	7–10	97 (1.5)	●	7–10	92 (2.2)
Georgia	●	6–8	81 (4.0)	●	6–8	42 (4.7)
Ghana	●	8–12	37 (3.9)	○	8–12	27 (3.7)
Hong Kong SAR	●	7–9	84 (3.4)	●	7–9	87 (3.1)
Hungary	●	6	90 (2.3)	●	6–9	92 (2.2)
Indonesia	●	8	72 (3.9)	⦿	8	12 (2.9)
Iran, Islamic Rep. of	●	8	76 (3.4)	●	8	84 (2.9)
Israel	●	6 r	16 (2.8)	●	6 r	20 (2.9)
Italy	●	5–6,9–13	53 (3.1)	●	5–8, 9–13	48 (3.7)
Japan	●	7	99 (0.8)	○	–	79 (3.2)
Jordan	○	–	41 (3.7)	●	7	32 (3.8)
Korea, Rep. of	●	5	62 (3.2)	●	5	45 (4.2)
Kuwait	●	7,10 r	22 (4.5)	○	9–10 r	77 (3.6)
Lebanon	⦿	7–9	65 (4.2)	⦿	8–9	43 (4.6)
Lithuania	●	8	99 (0.9)	⦿	8	14 (2.6)
Malaysia	●	8	88 (2.8)	●	8	97 (1.3)
Malta	●	6–7	76 (0.2)	●	6–7	55 (0.2)
Mongolia	○	7–8	– –	○	9	– –
Norway	●	5–7	15 (2.4)	●	5–7	17 (2.4)
Oman	●	4,9	27 (4.3)	●	4,8–9	79 (3.5)
Palestinian Nat'l Auth.	●	4–5,9	13 (2.9)	○	9	3 (1.5)
Qatar	⦿	7–9	33 (0.2)	●	7–9	80 (0.1)
Romania	○	9–10	69 (3.5)	○	–	65 (3.5)
Russian Federation	●	8–9	– –	●	8–9	– –
Saudi Arabia	●	8	22 (3.6)	●	5–8	69 (4.2)
Scotland	●	8	93 (1.7)	⦿	9	72 (3.5)
Serbia	○	–	95 (1.8)	○	–	67 (4.0)
Singapore	●	8	34 (2.7)	●	8	9 (1.5)
Slovenia	●	2–3	81 (2.1)	●	7	91 (1.8)
Sweden	○	–	4 (1.0)	○	–	3 (0.8)
Syrian Arab Republic	●	7	14 (2.8)	●	7,9	36 (4.0)
Thailand	●	8	60 (4.0)	●	8	94 (1.9)
Tunisia	●	7–9	95 (1.8)	○	11	22 (3.7)
Turkey	●	7	60 (3.7)	●	7	63 (4.1)
Ukraine	●	8	89 (2.7)	●	8	87 (3.0)
United States	●	6–8	72 (2.4)	●	6–8	74 (2.3)
‡ Morocco	○	11 r	19 (4.8)	○	11 r	58 (4.0)
International Avg.			56 (0.4)			53 (0.4)
Benchmarking Participants						
Basque Country, Spain	○	9–10	19 (3.3)	○	9–10	16 (3.3)
British Columbia, Canada	●	6	26 (3.9)	●	5	24 (3.9)
Dubai, UAE	●	8 s	29 (3.9)	●	7 s	35 (2.7)
Massachusetts, US	●	5–12	68 (6.9)	●	4–12	74 (5.3)
Minnesota, US	●	2–12	66 (6.9)	●	3–12	65 (7.3)
Ontario, Canada	●	1,2,4,6	67 (4.8)	●	3–8	75 (4.5)
Quebec, Canada	●	7–8	42 (4.5)	●	7–8	89 (3.0)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through eighth grade

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

Exhibit 5.12 provides the intended and taught results for the seven data and chance topics at the eighth grade. The two data topics most commonly included in the curriculum—intended curriculum for most countries and implemented curriculum for 72 to 74 percent of the students, on average across countries—were reading data from tables/graphs and displaying data using tables/graphs. The data topic encompassing characteristics of data sets, including mean, median, range, and shape of distribution was in the curricula for the majority of countries, and teachers reported, on average internationally, covering this topic for half the students, whereas the topic of interpreting data sets was in somewhat fewer curricula and taught to 41 percent of the students. The data topic about data displays that could lead to misinterpretation was in the curricula of less than half the countries, and taught to only 27 percent of the students, on average internationally. The two topics about chance also were in less than half the curricula, including using data from experiments to predict future outcomes taught to 29 percent of the students, on average, and using the chances of a particular outcome to solve problems, taught to 34 percent of the students, on average.

Exhibit 5.12 Intended and Taught* TIMSS Data and Chance Topics

TIMSS2007 Mathematics 8th Grade

Data and Chance (7 topics)	Reading data from tables, pictographs, bar graphs, pie charts, and line graphs			Organizing and displaying data using tables, pictographs, bar graphs, pie charts, and line graphs			Characteristics of data sets including mean, median, range, and shape of distribution		
Country	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	●	7–9	81 (3.2)	●	7–9	87 (2.7)	●	8–9	28 (3.9)
Armenia	○	–	58 (4.3)	○	–	56 (4.4)	○	–	58 (3.6)
Australia	●	4–8	88 (2.1)	●	3–8	86 (2.0)	●	7–10	67 (3.1)
Bahrain	●	7	87 (2.1)	●	7	87 (2.3)	●	7,10	40 (2.7)
Bosnia and Herzegovina	●	8–9	61 (3.4)	●	8–9	57 (3.5)	●	8–9	54 (3.7)
Botswana	●	4–12	21 (3.8)	●	6–12	20 (3.4)	○	9	13 (3.0)
Bulgaria	○	9	68 (3.6)	○	9	58 (4.0)	○	11	19 (3.4)
Chinese Taipei	●	4	12 (2.9)	●	6	11 (2.8)	●	9	8 (2.3)
Colombia	●	6–7	77 (3.8)	●	6–7	76 (4.0)	●	8–9	65 (4.4)
Cyprus	⦿	12	5 (1.2)	⦿	12	2 (0.8)	⦿	12	1 (0.7)
Czech Republic	●	4–8	38 (3.8)	●	4–8	30 (3.6)	●	8,12	19 (3.2)
Egypt	●	4–10	92 (2.1)	●	4–10	93 (1.9)	●	7–9	95 (1.8)
El Salvador	●	3–10	97 (1.3)	●	4–10	98 (1.3)	●	6–10	88 (2.6)
England	●	5–8	100 (0.3)	●	5–8	99 (0.6)	●	6–10	96 (1.6)
Georgia	●	6–8	68 (5.3)	●	6–8	68 (5.4)	⦿	6–7	54 (5.3)
Ghana	●	4–9	80 (3.6)	●	6–12	83 (3.3)	●	6–10	80 (3.4)
Hong Kong SAR	●	7	93 (2.2)	●	7	91 (2.2)	●	7–9	36 (4.1)
Hungary	●	6	92 (2.7)	●	6	88 (3.0)	●	7–8	52 (3.9)
Indonesia	○	9	23 (3.6)	○	9	23 (3.8)	○	9	22 (3.9)
Iran, Islamic Rep. of	●	8	83 (2.2)	●	8	78 (3.7)	●	8	46 (4.2)
Israel	●	3,7	r 78 (3.0)	●	3,7	r 75 (3.1)	●	7	r 62 (3.8)
Italy	●	3–10	85 (2.3)	●	4–10	82 (2.2)	●	8–10	47 (3.5)
Japan	●	3–5	52 (3.9)	●	3–5	48 (4.0)	○	10–12	13 (2.6)
Jordan	●	4–7	83 (3.3)	●	4–7	81 (3.3)	●	5–7	59 (4.2)
Korea, Rep. of	●	6	90 (2.1)	●	6	88 (2.3)	○	12	52 (3.4)
Kuwait	●	7,10–11	r 87 (3.4)	●	7,10–11	r 85 (3.6)	○	10–11	r 51 (5.0)
Lebanon	●	4–9	64 (4.5)	●	5–9	59 (4.7)	●	8–9	31 (3.7)
Lithuania	●	8	97 (1.2)	○	10	96 (0.9)	○	10	86 (2.6)
Malaysia	●	8	91 (2.4)	●	8	89 (2.7)	○	9–10	31 (3.8)
Malta	●	6–7	91 (0.2)	●	6–7	85 (0.2)	⦿	9–10	84 (0.2)
Mongolia	⦿	6–8	– –	⦿	6–8	– –	○	9	– –
Norway	●	5–7	85 (2.8)	●	5–7	85 (2.7)	●	5–10	76 (3.7)
Oman	●	2	93 (2.2)	●	3–9	91 (2.5)	●	9–12	83 (3.3)
Palestinian Nat'l Auth.	●	2–12	88 (2.9)	●	3–12	88 (2.4)	●	5–7	84 (3.4)
Qatar	●	6–8	77 (0.2)	●	6–8	75 (0.1)	●	6–8	36 (0.2)
Romania	●	5–7,9	85 (2.9)	●	6–7,9	79 (3.5)	○	10–11	34 (3.6)
Russian Federation	●	5–9	– –	●	5–9	– –	●	5–11	– –
Saudi Arabia	●	5–6	39 (4.5)	○	10	40 (4.5)	○	10	21 (3.6)
Scotland	●	7	99 (0.5)	●	8	99 (0.4)	⦿	9	76 (3.1)
Serbia	●	6–8	86 (2.9)	○	–	84 (2.9)	○	–	63 (4.1)
Singapore	●	1–7	94 (1.3)	●	1–7	93 (1.4)	●	7–10	89 (1.9)
Slovenia	●	1–7	86 (1.6)	●	4–7	80 (2.3)	○	9	5 (1.1)
Sweden	●	6–9	89 (2.0)	●	6–9	84 (2.1)	●	6–9	66 (3.1)
Syrian Arab Republic	●	7,9	51 (4.0)	●	7,9	53 (4.1)	○	10–11	64 (4.0)
Thailand	●	4–6	88 (2.8)	●	8	87 (3.1)	○	9	14 (3.1)
Tunisia	●	7–9	52 (4.0)	●	7–9	48 (4.1)	○	10	24 (3.6)
Turkey	●	3–7	71 (4.2)	●	3–7	69 (4.1)	●	7	64 (3.8)
Ukraine	●	6–9	83 (3.0)	●	6–9	77 (3.4)	○	9	16 (3.0)
United States	●	6–8	97 (0.9)	●	6–8	97 (1.0)	●	6–8	96 (1.0)
‡ Morocco	○	9	r 71 (3.9)	○	9	r 68 (5.2)	○	9	r 38 (6.0)
International Avg.			74 (0.4)			72 (0.4)			50 (0.5)
Benchmarking Participants									
Basque Country, Spain	●	8	38 (4.6)	●	8	33 (4.4)	○	9–10	17 (3.6)
British Columbia, Canada	●	3	55 (3.8)	●	3	53 (4.2)	●	7	44 (4.0)
Dubai, UAE	●	4	s 79 (3.0)	●	4	s 77 (5.4)	●	7	s 61 (3.9)
Massachusetts, US	●	2–12	98 (1.5)	●	2–12	97 (2.0)	●	5–10	98 (1.2)
Minnesota, US	●	1–12	98 (2.0)	●	2–12	93 (4.1)	●	5–12	93 (4.3)
Ontario, Canada	●	1–8	96 (1.6)	●	1–8	95 (1.9)	●	5–8	93 (2.2)
Quebec, Canada	●	7–8	82 (3.7)	●	7–8	80 (3.9)	●	7–8	37 (4.7)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through eighth grade

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

Background data on intended curriculum provided by National Research Coordinators, and on implemented curriculum by teachers at the time of testing.

* Includes the TIMSS topics mostly taught during or before the year of the assessment.

‡ 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.

Exhibit 5.12 Intended and Taught* TIMSS Data and Chance Topics (Continued)

TIMSS2007 Mathematics 8th Grade

Data and Chance (7 topics)	Interpreting data sets			Data displays that could lead to misinterpretation			Using data from experiments to predict chances of future outcomes		
Country	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	○	9	44 (4.4)	○	9	34 (4.4)	○	9	36 (4.3)
Armenia	○	–	47 (3.7)	○	–	45 (4.5)	○	–	48 (3.4)
Australia	●	6–10	49 (4.2)	⦿	7–10	40 (3.6)	●	7–12	40 (3.9)
Bahrain	○	–	58 (3.2)	○	–	35 (3.0)	○	–	37 (2.7)
Bosnia and Herzegovina	○	12	48 (4.2)	○	–	29 (3.8)	○	–	22 (3.4)
Botswana	○	11–12	13 (3.0)	○	11–12	9 (2.2)	○	10	8 (2.3)
Bulgaria	○	11	8 (2.4)	○	–	4 (1.5)	○	–	6 (2.4)
Chinese Taipei	○	11	6 (2.0)	○	–	3 (1.4)	○	11	2 (1.1)
Colombia	●	8–9	54 (5.4)	●	8–9	18 (3.8)	●	8–9	25 (4.2)
Cyprus	⦿	12	8 (1.5)	⦿	12	1 (0.7)	⦿	12	1 (0.7)
Czech Republic	⦿	8,12	11 (2.2)	○	12	3 (1.3)	⦿	8,12	6 (1.8)
Egypt	●	4–10	61 (4.0)	○	–	32 (3.9)	●	7–10	38 (4.3)
El Salvador	●	6,10	72 (4.0)	○	–	45 (4.9)	●	6,11	39 (4.2)
England	●	6–10	72 (3.7)	⦿	9–12	54 (3.7)	⦿	8–12	73 (3.2)
Georgia	○	9	46 (4.9)	⦿	8	18 (4.9)	⦿	8	21 (3.7)
Ghana	●	8–12	53 (3.8)	○	10–12	29 (3.5)	○	10–12	51 (4.3)
Hong Kong SAR	●	7–11	48 (4.8)	○	10–11	57 (4.5)	○	10–11	14 (3.4)
Hungary	●	8	59 (4.4)	○	–	29 (3.6)	○	–	39 (3.5)
Indonesia	⦿	9	16 (3.5)	⦿	9	13 (3.4)	⦿	9	13 (3.3)
Iran, Islamic Rep. of	●	8	35 (3.7)	○	10	21 (3.4)	○	11	13 (2.5)
Israel	○	–	r 45 (3.8)	○	0	r 27 (3.9)	○	–	r 35 (4.0)
Italy	●	8–13	47 (3.5)	●	8–10	20 (3.1)	○	9–10	33 (3.3)
Japan	○	10–12	17 (2.7)	●	4	12 (2.2)	●	8	51 (4.0)
Jordan	○	–	50 (4.5)	○	–	31 (3.6)	●	6–7	41 (3.9)
Korea, Rep. of	○	–	42 (3.7)	○	–	35 (2.9)	○	–	68 (3.5)
Kuwait	○	10–11	r 52 (4.3)	○	11	r 30 (4.1)	○	11	r 32 (4.5)
Lebanon	⦿	9–10	32 (3.6)	○	–	39 (4.6)	○	–	51 (4.6)
Lithuania	⦿	12	59 (3.9)	○	10	29 (3.3)	○	10	14 (2.7)
Malaysia	○	9–10	43 (3.9)	○	9–10	34 (4.4)	○	9–10	32 (3.7)
Malta	⦿	9–10	30 (0.2)	○	10	18 (0.2)	⦿	9	35 (0.2)
Mongolia	○	10	– –	○	10	– –	○	10	– –
Norway	●	5–7	43 (3.7)	○	–	30 (3.8)	○	–	9 (2.1)
Oman	●	9–12	60 (4.0)	○	–	23 (3.7)	○	10–12	33 (4.3)
Palestinian Nat'l Auth.	●	6–7,9–11	42 (4.4)	●	6–7	23 (2.8)	○	10–12	32 (3.5)
Qatar	○	–	37 (0.2)	○	–	22 (0.1)	○	11	19 (0.1)
Romania	●	8–9	32 (3.8)	○	11	33 (4.0)	○	10–11	42 (4.0)
Russian Federation	●	5–11	– –	○	–	– –	●	5–11	– –
Saudi Arabia	○	8–10	20 (3.6)	○	10	14 (3.3)	○	11	15 (3.3)
Scotland	●	8	49 (3.4)	⦿	9	33 (3.1)	⦿	9	29 (3.3)
Serbia	●	6–8	54 (4.0)	○	–	34 (4.2)	○	–	26 (4.1)
Singapore	●	7–10	52 (2.4)	○	–	30 (2.2)	●	8–10	36 (2.5)
Slovenia	○	–	15 (2.2)	○	–	8 (1.7)	○	9	3 (0.9)
Sweden	●	6–9	41 (3.1)	●	6–9	34 (2.9)	●	6–9	20 (2.6)
Syrian Arab Republic	○	10–11	37 (3.7)	○	11–12	22 (3.5)	○	12	26 (3.2)
Thailand	○	9	32 (3.7)	○	10–12	13 (3.0)	○	10–12	13 (2.8)
Tunisia	○	–	33 (3.9)	○	–	18 (3.0)	○	–	14 (2.5)
Turkey	○	–	55 (4.0)	○	–	31 (3.9)	○	–	45 (4.7)
Ukraine	○	11	12 (3.0)	○	11	8 (2.7)	○	11	7 (2.4)
United States	●	6–8	86 (1.7)	●	6–8	73 (2.6)	●	6–8	68 (2.5)
‡ Morocco	○	9	r 44 (4.2)	○	10	r 34 (4.1)	○	12	r 46 (6.4)
International Avg.			41 (0.5)			27 (0.5)			29 (0.5)
Benchmarking Participants									
Basque Country, Spain	○	9–10	14 (3.5)	○	9–10	6 (2.0)	○	9–10	7 (2.5)
British Columbia, Canada	●	7	40 (4.2)	●	8	24 (3.3)	●	7	31 (3.5)
Dubai, UAE	●	8	s 39 (3.8)	●	8,10	s 22 (3.9)	●	8,11	s 20 (3.6)
Massachusetts, US	●	3–12	93 (2.6)	○	10	84 (4.6)	●	2–12	78 (5.4)
Minnesota, US	●	4–12	80 (5.1)	●	5–12	59 (9.4)	○	3–12	62 (5.2)
Ontario, Canada	●	3–8	92 (2.2)	●	7	73 (4.0)	●	3–8	66 (4.6)
Quebec, Canada	●	7–8	34 (4.6)	●	7–8	27 (4.0)	●	7–8	44 (4.5)

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through eighth grade

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

Exhibit 5.12 Intended and Taught* TIMSS Data and Chance Topics (Continued)

TIMSS2007 Mathematics 8th Grade

Data and Chance (7 topics)	Using the chances of a particular outcome to solve problems		
Country	Student population intended to be taught topic through 8th grade	Grade(s) topic is intended to be taught	Percent of students taught the topic
Algeria	○	9	33 (4.0)
Armenia	○	–	46 (3.5)
Australia	⦿	7–10	37 (3.9)
Bahrain	○	–	37 (3.1)
Bosnia and Herzegovina	○	–	26 (3.7)
Botswana	○	10	11 (2.7)
Bulgaria	○	–	8 (2.5)
Chinese Taipei	○	11	1 (1.1)
Colombia	●	8–9	23 (3.8)
Cyprus	⦿	12	1 (0.7)
Czech Republic	⦿	8,12	7 (2.1)
Egypt	●	7–10	67 (3.7)
El Salvador	○	11	38 (4.3)
England	●	7–12	73 (3.2)
Georgia	⦿	8	21 (3.7)
Ghana	○	10–12	48 (4.3)
Hong Kong SAR	○	10–11	9 (2.8)
Hungary	○	–	40 (3.8)
Indonesia	⦿	9	19 (3.5)
Iran, Islamic Rep. of	○	11	12 (2.7)
Israel	○	0	r 34 (4.0)
Italy	○	9–10	35 (3.4)
Japan	●	8	58 (3.9)
Jordan	●	6–7	46 (4.1)
Korea, Rep. of	○	–	82 (2.5)
Kuwait	○	12	r 46 (5.1)
Lebanon	○	–	64 (4.4)
Lithuania	○	10	15 (2.9)
Malaysia	○	9–10	33 (4.0)
Malta	⦿	9	43 (0.3)
Mongolia	○	10	– –
Norway	○	8–10	7 (2.0)
Oman	○	10–12	67 (4.0)
Palestinian Nat'l Auth.	○	10–12	46 (4.0)
Qatar	○	11	31 (0.1)
Romania	○	10 –11	64 (3.9)
Russian Federation	○	10–11	– –
Saudi Arabia	○	8–10	24 (3.8)
Scotland	⦿	9	31 (3.6)
Serbia	⦿	7–8	24 (3.9)
Singapore	●	8–12	38 (2.8)
Slovenia	○	9	3 (0.9)
Sweden	○	–	30 (3.4)
Syrian Arab Republic	○	12	38 (4.1)
Thailand	○	10–12	19 (3.4)
Tunisia	○	12	15 (2.8)
Turkey	○	8	49 (4.5)
Ukraine	○	11	4 (1.5)
United States	●	6–8	64 (2.3)
‡ Morocco	○	12	60 (4.5)
International Avg.			34 (0.5)
Benchmarking Participants			
Basque Country, Spain	○	9–10	7 (2.6)
British Columbia, Canada	●	7	26 (3.5)
Dubai, UAE	●	8,11	s 21 (3.8)
Massachusetts, US	●	4–10	83 (4.2)
Minnesota, US	○	5–12	59 (6.1)
Ontario, Canada	●	5–8	64 (4.6)
Quebec, Canada	●	7–8	44 (5.0)

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

● All or almost all students ⦿ Only the more able students ○ Not included in the curriculum through eighth grade