

Chapter 7



Classroom Characteristics and Instruction

To place students' mathematics achievement results in instructional contexts, this chapter begins by providing information about class size and the characteristics of students in mathematics classes. The focus of the rest of the chapter is on the instructional activities used in teaching and learning mathematics and how these activities are supported with technology use, homework, and assessment.

How Do the Characteristics of Mathematics Classrooms Impact Instruction?

Because having larger or smaller classes can impact instructional choices, TIMSS asked teachers about the size of their mathematics classes. The class size data are shown in Exhibits 7.1 and 7.2. Exhibit 7.1 presents trends in average class sizes back to 1995, and across the distribution of different class sizes. Exhibit 7.2 presents the TIMSS 2007 distribution of students in different sizes of classes in relation to their mathematics achievement.

As presented in Exhibit 7.1, in TIMSS 2007 across participating countries at the fourth grade, the average size of mathematics classes was 26. This represented a decrease in class size in eight of the participating countries. Two of the benchmarking provinces, Ontario and Quebec, also had decreases. At the eighth grade, the average class size of 29 represented a decrease in class size in 19 countries. Also among the benchmarking participants, the Basque country in Spain and the Canadian province of Ontario had smaller average class sizes in TIMSS 2007 than in previous assessments.

Exhibit 7.1 Class Size for Mathematics Instruction with Trends

TIMSS2007
Mathematics 4th Grade

Country	Overall Average Class Size			1-19 Students			20-32 Students			
	2007	Difference from 2003	Difference from 1995	2007 Percent of Students	Difference in Percent from 2003	Difference in Percent from 1995	2007 Percent of Students	Difference in Percent from 2003	Difference in Percent from 1995	
Algeria	r	28 (0.8)	0 0	0 0	11 (2.8)	0 0	0 0	60 (4.3)	0 0	0 0
Armenia	s	31 (1.6)	2 (2.2)	0 0	24 (3.3)	2 (5.3)	0 0	50 (3.8)	-2 (6.3)	0 0
Australia		24 (0.4)	-1 (0.7)	-1 (0.6) ▼	19 (3.0)	2 (4.3)	6 (3.9)	80 (3.0)	-2 (4.4)	-4 (4.3)
Austria		20 (0.3)	0 0	0 (0.6)	37 (2.9)	0 0	-4 (6.2)	63 (2.9)	0 0	4 (6.2)
Chinese Taipei		31 (0.3)	-1 (0.4)	0 0	3 (1.2)	2 (1.4)	0 0	45 (3.7)	1 (5.3)	0 0
Colombia		32 (1.0)	0 0	0 0	19 (3.3)	0 0	0 0	24 (4.7)	0 0	0 0
Czech Republic		22 (0.4)	0 0	0 (0.7)	31 (3.5)	0 0	7 (5.2)	69 (3.5)	0 0	-6 (5.2)
Denmark		21 (0.3)	0 0	0 0	34 (3.9)	0 0	0 0	66 (3.9)	0 0	0 0
El Salvador		30 (0.7)	0 0	0 0	20 (2.7)	0 0	0 0	37 (4.1)	0 0	0 0
England	r	28 (0.5)	0 (0.9)	-1 (0.7)	8 (1.9)	-3 (3.3)	1 (2.9)	80 (3.0)	12 (5.6) ●	2 (5.2)
Georgia		22 (0.6)	0 0	0 0	37 (3.8)	0 0	0 0	50 (4.5)	0 0	0 0
Germany		22 (0.2)	0 0	0 0	21 (2.4)	0 0	0 0	79 (2.4)	0 0	0 0
Hong Kong SAR		35 (0.4)	1 (0.6)	-1 (0.7)	1 (0.7)	-1 (1.1)	1 (0.7)	25 (3.3)	-9 (5.4)	5 (6.6)
Hungary		22 (0.4)	-2 (0.6) ▼	0 (0.7)	33 (3.7)	14 (4.7) ●	1 (6.0)	67 (3.7)	-13 (4.8) ▼	1 (6.0)
Iran, Islamic Rep. of	s	24 (0.5)	-3 (0.8) ▼	-7 (1.4) ▼	25 (2.7)	9 (3.8) ●	10 (4.6) ●	59 (3.8)	5 (5.8)	19 (6.8) ●
Italy		20 (0.2)	0 (0.4)	--	44 (2.6)	-1 (4.3)	--	56 (2.6)	1 (4.3)	--
Japan		31 (0.4)	-1 (0.5) ▼	-2 (0.6) ▼	7 (1.5)	3 (1.7)	6 (1.6) ●	47 (2.9)	6 (4.2)	-2 (5.4)
Kazakhstan		22 (0.5)	0 0	0 0	30 (4.5)	0 0	0 0	68 (4.6)	0 0	0 0
Kuwait	s	25 (0.5)	0 0	--	7 (2.8)	0 0	--	88 (3.4)	0 0	--
Latvia		22 (0.8)	0 (0.9)	1 (1.1)	44 (2.4)	12 (4.6) ●	2 (6.3)	49 (3.0)	-12 (5.2) ▼	-8 (6.5)
Lithuania		20 (0.3)	-1 (0.5) ▼	0 0	37 (3.0)	8 (4.2)	0 0	63 (3.0)	-7 (4.2)	0 0
Morocco	r	29 (0.8)	--	0 0	17 (3.3)	--	0 0	42 (4.3)	--	0 0
Netherlands		22 (0.4)	-1 (0.6)	-1 (0.9)	27 (3.3)	3 (4.8)	0 (5.4)	71 (3.5)	-3 (5.1)	10 (5.6)
New Zealand	s	26 (0.4)	-1 (0.5) ▼	-3 (0.7) ▼	13 (2.1)	4 (2.6)	2 (3.5)	81 (2.4)	0 (3.5)	27 (5.0) ●
Norway		21 (0.5)	0 (0.6)	2 (0.8) ●	42 (3.3)	4 (4.6)	-9 (6.3)	53 (3.6)	-7 (5.0)	4 (6.5)
Qatar	r	28 (0.0)	0 0	0 0	8 (0.1)	0 0	0 0	75 (0.2)	0 0	0 0
Russian Federation		21 (0.4)	0 (0.5)	0 0	33 (2.7)	0 (4.2)	0 0	67 (2.7)	2 (4.2)	0 0
Scotland	s	25 (0.4)	-1 (0.6)	-1 (0.6)	16 (2.8)	-1 (4.4)	2 (3.6)	79 (3.0)	3 (5.1)	-2 (4.3)
Singapore		38 (0.2)	0 (0.3)	-1 (0.3)	0 (0.0)	0 (0.1)	0 (0.0)	6 (1.3)	1 (1.8)	2 (1.6)
Slovak Republic		21 (0.3)	0 0	0 0	34 (2.5)	0 0	0 0	65 (2.6)	0 0	0 0
Slovenia		19 (0.3)	0 (0.5)	-3 (0.5) ▼	46 (2.9)	1 (5.1)	20 (5.3) ●	53 (3.0)	-2 (5.1)	-21 (5.3) ▼
Sweden		22 (0.5)	0 0	0 0	36 (3.4)	0 0	0 0	60 (3.6)	0 0	0 0
Tunisia	r	25 (0.4)	-6 (0.6) ▼	0 0	20 (2.8)	15 (3.2) ●	0 0	69 (3.8)	12 (5.8) ●	0 0
Ukraine		23 (0.4)	0 0	0 0	30 (3.3)	0 0	0 0	65 (3.5)	0 0	0 0
United States	r	23 (0.4)	0 (0.5)	-1 (0.7)	26 (2.6)	3 (3.6)	8 (4.1)	69 (2.8)	-5 (3.9)	-8 (4.3)
Yemen	r	46 (1.7)	0 0	0 0	9 (2.1)	0 0	0 0	17 (4.0)	0 0	0 0
International Avg.		26 (0.1)			24 (0.5)			58 (0.6)		
Benchmarking Participants										
Alberta, Canada		22 (0.5)	0 0	0 (1.2)	25 (2.9)	0 0	0 (8.7)	70 (3.4)	0 0	-4 (8.9)
British Columbia, Canada	r	22 (0.5)	0 0	0 0	29 (3.7)	0 0	0 0	69 (3.8)	0 0	0 0
Dubai, UAE		--	0 0	0 0	--	0 0	0 0	--	0 0	0 0
Massachusetts, US		21 (0.5)	0 0	0 0	24 (5.6)	0 0	0 0	76 (5.6)	0 0	0 0
Minnesota, US	r	24 (0.7)	0 0	--	16 (4.2)	0 0	--	83 (4.3)	0 0	--
Ontario, Canada		23 (0.4)	-2 (0.6) ▼	-2 (0.7) ▼	18 (3.5)	7 (4.5)	2 (5.2)	78 (3.9)	-8 (5.2)	-2 (5.5)
Quebec, Canada		24 (0.3)	-2 (0.4) ▼	-1 (0.7)	16 (2.5)	11 (2.9) ●	8 (5.5)	83 (2.5)	-11 (3.0) ▼	-8 (5.5)

● 2007 significantly higher

▼ 2007 significantly lower

Background data provided by teachers.

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

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

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

indicates data are available for at least 50 but less than 70% of the students.

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



Exhibit 7.1 Class Size for Mathematics Instruction with Trends (Continued)

TIMSS2007
Mathematics 4th Grade

Country	33 or More Students		
	2007 Percent of Students	Difference in Percent from 2003	Difference in Percent from 1995
Algeria	r 29 (4.0)	0 0	0 0
Armenia	s 26 (3.6)	0 (6.0)	0 0
Australia	2 (1.2)	0 (2.0)	-2 (2.3)
Austria	0 (0.0)	0 0	0 (0.0)
Chinese Taipei	51 (3.4)	-3 (5.1)	0 0
Colombia	57 (4.4)	0 0	0 0
Czech Republic	0 (0.0)	0 0	-1 (0.1)
Denmark	0 (0.0)	0 0	0 0
El Salvador	43 (3.8)	0 0	0 0
England	r 12 (2.4)	-8 (5.0)	-3 (4.6)
Georgia	13 (2.2)	0 0	0 0
Germany	0 (0.0)	0 0	0 0
Hong Kong SAR	74 (3.4)	10 (5.5)	-5 (6.6)
Hungary	0 (0.0)	-1 (0.9)	-1 (1.0)
Iran, Islamic Rep. of	s 16 (2.9)	-14 (4.9)	▼ -30 (7.1)
Italy	0 (0.0)	0 (0.0)	--
Japan	45 (3.2)	-10 (4.3)	▼ -3 (5.6)
Kazakhstan	3 (1.2)	0 0	0 0
Kuwait	s 5 (1.9)	0 0	--
Latvia	6 (2.0)	-1 (3.3)	6 (2.0) ▲
Lithuania	0 (0.0)	0 (0.3)	0 0
Morocco	r 41 (3.9)	--	0 0
Netherlands	2 (1.3)	0 (1.9)	-10 (3.5)
New Zealand	s 6 (1.7)	-4 (2.8)	▼ -29 (4.7)
Norway	5 (1.9)	3 (2.3)	5 (1.9) ▲
Qatar	r 17 (0.2)	0 0	0 0
Russian Federation	0 (0.3)	-1 (0.9)	0 0
Scotland	s 5 (1.6)	-2 (3.0)	0 (2.8)
Singapore	94 (1.3)	-1 (1.8)	-2 (1.7)
Slovak Republic	1 (0.6)	0 0	0 0
Slovenia	1 (0.6)	1 (0.6)	1 (0.6)
Sweden	4 (1.6)	0 0	0 0
Tunisia	r 11 (2.7)	-27 (5.1)	▼ 0 0
Ukraine	5 (1.4)	0 0	0 0
United States	r 5 (1.3)	2 (1.7)	0 (2.2)
Yemen	r 74 (4.1)	0 0	0 0
International Avg.	18 (0.4)		
Benchmarking Participants			
Alberta, Canada	4 (1.8)	0 0	4 (1.8) ▲
British Columbia, Canada	r 1 (0.8)	0 0	0 0
Dubai, UAE	--	0 0	0 0
Massachusetts, US	0 (0.0)	0 0	0 0
Minnesota, US	r 1 (1.2)	0 0	--
Ontario, Canada	4 (1.4)	1 (2.1)	0 (2.4)
Quebec, Canada	1 (0.2)	1 (0.2)	1 (0.2)

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

▲ 2007 significantly higher

▼ 2007 significantly lower



Exhibit 7.1 Class Size for Mathematics Instruction with Trends (Continued)

TIMSS2007
Mathematics 8th Grade

Country	Overall Average Class Size				1-24 Students				
	2007	Difference from 2003	Difference from 1999	Difference from 1995	2007 Percent of Students	Difference in Percent from 2003	Difference in Percent from 1999	Difference in Percent from 1995	
Algeria	r	37 (0.7)	∅ ∅	∅ ∅	∅ ∅	5 (2.1)	∅ ∅	∅ ∅	∅ ∅
Armenia	r	25 (0.4)	-2 (1.0) ▼	∅ ∅	∅ ∅	40 (4.0)	0 (6.0)	∅ ∅	∅ ∅
Australia	r	26 (0.3)	-1 (0.5)	--	0 (0.5)	30 (2.8)	-1 (5.1)	--	0 (4.5)
Bahrain		31 (0.1)	-1 (0.2) ▼	∅ ∅	∅ ∅	6 (0.7)	1 (1.0)	∅ ∅	∅ ∅
Bosnia and Herzegovina		24 (0.4)	∅ ∅	∅ ∅	∅ ∅	48 (3.6)	∅ ∅	∅ ∅	∅ ∅
Botswana		38 (0.4)	0 (0.5)	∅ ∅	∅ ∅	1 (0.6)	0 (0.9)	∅ ∅	∅ ∅
Bulgaria		22 (0.3)	-1 (0.6)	-1 (0.6)	∅ ∅	59 (3.5)	-5 (5.5)	-2 (6.7)	--
Chinese Taipei		35 (0.5)	-2 (0.7) ▼	-4 (0.7) ▼	∅ ∅	4 (1.8)	0 (2.3)	3 (2.1)	∅ ∅
Colombia	s	35 (0.6)	∅ ∅	∅ ∅	-4 (1.6) ▼	13 (2.5)	∅ ∅	∅ ∅	-5 (5.2)
Cyprus	r	24 (0.2)	-2 (0.2) ▼	-4 (0.3) ▼	-7 (0.5) ▼	54 (2.7)	33 (3.3) ▲	44 (3.7) ▲	51 (3.2) ▲
Czech Republic	r	24 (0.3)	∅ ∅	0 (0.5)	-1 (0.6)	49 (4.3)	∅ ∅	-4 (7.1)	10 (6.7)
Egypt		39 (0.6)	1 (0.8)	∅ ∅	∅ ∅	4 (1.5)	1 (1.9)	∅ ∅	∅ ∅
El Salvador		29 (0.8)	∅ ∅	∅ ∅	∅ ∅	35 (3.7)	∅ ∅	∅ ∅	∅ ∅
England	s	26 (0.6)	0 (0.7)	--	1 (0.8)	30 (3.8)	-4 (6.4)	--	-3 (5.6)
Georgia		23 (0.6)	∅ ∅	∅ ∅	∅ ∅	52 (5.2)	∅ ∅	∅ ∅	∅ ∅
Ghana	r	46 (1.9)	9 (2.1) ▲	∅ ∅	∅ ∅	13 (2.4)	-3 (3.6)	∅ ∅	∅ ∅
Hong Kong SAR		37 (0.5)	-2 (0.6) ▼	0 (0.8)	-2 (0.8) ▼	10 (1.9)	7 (2.2) ▲	1 (2.9)	4 (3.2)
Hungary		21 (0.5)	-1 (0.6)	0 (0.7)	-1 (0.7)	72 (3.4)	8 (5.2)	1 (5.0)	5 (5.3)
Indonesia		38 (0.9)	-1 (1.0)	-16 (3.2) ▼	∅ ∅	6 (1.8)	3 (2.5)	5 (1.8) ▲	∅ ∅
Iran, Islamic Rep. of	r	26 (0.5)	-3 (0.7) ▼	-7 (0.8) ▼	-10 (1.3) ▼	35 (3.2)	13 (4.3) ▲	24 (3.9) ▲	27 (4.1) ▲
Israel	s	33 (0.4)	0 (0.6)	7 (0.8) ▲	--	5 (1.2)	-5 (2.5) ▼	-36 (3.7) ▼	--
Italy		22 (0.2)	0 (0.3)	2 (0.4) ▲	--	73 (2.9)	-5 (4.3)	-14 (4.0) ▼	--
Japan		34 (0.5)	-2 (0.6) ▼	-2 (0.6) ▼	-3 (0.6) ▼	10 (2.1)	7 (2.5) ▲	9 (2.1) ▲	8 (2.3) ▲
Jordan		35 (0.7)	1 (1.0)	-1 (1.0)	∅ ∅	13 (2.5)	-1 (3.8)	5 (3.2)	∅ ∅
Korea, Rep. of	s	37 (0.4)	0 (0.5)	-7 (0.9) ▼	-21 (3.0) ▼	4 (1.4)	3 (1.7)	4 (1.4) ▲	2 (1.9)
Kuwait	s	30 (0.5)	∅ ∅	∅ ∅	--	12 (3.3)	∅ ∅	∅ ∅	--
Lebanon		26 (0.6)	-2 (1.1)	∅ ∅	∅ ∅	38 (4.3)	7 (5.8)	∅ ∅	∅ ∅
Lithuania	r	25 (0.3)	0 (0.4)	2 (0.5) ▲	4 (0.6) ▲	35 (3.2)	-4 (4.6)	-22 (5.1) ▼	-50 (4.7) ▼
Malaysia		36 (0.4)	-1 (0.5)	-3 (1.0) ▼	∅ ∅	1 (0.8)	0 (1.0)	0 (1.1)	∅ ∅
Malta		22 (0.0)	∅ ∅	∅ ∅	∅ ∅	71 (0.2)	∅ ∅	∅ ∅	∅ ∅
Norway	r	25 (0.4)	-1 (0.5)	∅ ∅	1 (0.7)	47 (3.9)	13 (5.4) ▲	∅ ∅	6 (6.7)
Oman		32 (0.4)	∅ ∅	∅ ∅	∅ ∅	10 (2.2)	∅ ∅	∅ ∅	∅ ∅
Palestinian Nat'l Auth.		38 (0.5)	-1 (0.7)	∅ ∅	∅ ∅	8 (1.6)	1 (2.6)	∅ ∅	∅ ∅
Qatar		27 (0.0)	∅ ∅	∅ ∅	∅ ∅	20 (0.1)	∅ ∅	∅ ∅	∅ ∅
Romania		21 (0.3)	-3 (0.6) ▼	-3 (0.6) ▼	-5 (0.9) ▼	76 (2.9)	25 (5.3) ▲	27 (4.9) ▲	36 (5.9) ▲
Russian Federation		21 (0.3)	-2 (0.6) ▼	-3 (0.6) ▼	-4 (0.5) ▼	63 (2.8)	16 (5.0) ▲	23 (4.7) ▲	19 (4.6) ▲
Saudi Arabia		30 (0.8)	--	∅ ∅	∅ ∅	28 (3.6)	--	∅ ∅	∅ ∅
Scotland	r	25 (0.5)	-2 (0.7) ▼	∅ ∅	-1 (0.6)	43 (3.2)	10 (5.0) ▲	∅ ∅	17 (4.9) ▲
Serbia		24 (0.4)	-2 (0.5) ▼	∅ ∅	∅ ∅	53 (3.9)	15 (5.3) ▲	∅ ∅	∅ ∅
Singapore		38 (0.2)	0 (0.3)	1 (0.4) ▲	2 (0.4) ▲	2 (0.6)	-1 (0.9)	-2 (1.4)	-2 (1.6)
Slovenia	r	16 (0.2)	-5 (0.4) ▼	--	-9 (0.4) ▼	94 (1.0)	25 (4.2) ▲	--	54 (4.5) ▲
Sweden	s	23 (0.5)	2 (0.6) ▲	∅ ∅	3 (0.8) ▲	63 (3.6)	-8 (5.1)	∅ ∅	-11 (7.3)
Syrian Arab Republic		31 (0.6)	∅ ∅	∅ ∅	∅ ∅	24 (3.6)	∅ ∅	∅ ∅	∅ ∅
Thailand	r	38 (0.6)	∅ ∅	-8 (1.8) ▼	--	11 (2.4)	∅ ∅	5 (2.7)	--
Tunisia		32 (0.4)	-2 (0.4) ▼	-2 (0.5) ▼	∅ ∅	3 (1.2)	1 (1.6)	-1 (2.0)	∅ ∅
Turkey		33 (0.7)	∅ ∅	--	∅ ∅	18 (3.4)	∅ ∅	--	∅ ∅
Ukraine		25 (0.4)	∅ ∅	∅ ∅	∅ ∅	36 (3.2)	∅ ∅	∅ ∅	∅ ∅
United States	s	24 (0.4)	0 (0.6)	-7 (1.5) ▼	-4 (1.1) ▼	57 (2.3)	2 (3.7)	10 (4.2) ▲	11 (5.4) ▲
‡ Morocco	r	34 (0.8)	--	--	--	6 (3.3)	--	--	--
International Avg.		29 (0.1)				30 (0.4)			
Benchmarking Participants									
Basque Country, Spain		22 (0.3)	-2 (0.5) ▼	∅ ∅	∅ ∅	68 (2.7)	19 (4.5) ▲	∅ ∅	∅ ∅
British Columbia, Canada		26 (0.5)	∅ ∅	-1 (0.8)	∅ ∅	30 (4.0)	∅ ∅	11 (7.5)	∅ ∅
Dubai, UAE	s	27 (0.7)	∅ ∅	∅ ∅	∅ ∅	34 (3.2)	∅ ∅	∅ ∅	∅ ∅
Massachusetts, US	r	22 (0.6)	∅ ∅	-2 (1.5)	∅ ∅	65 (6.0)	∅ ∅	3 (8.9)	∅ ∅
Minnesota, US		27 (1.3)	∅ ∅	∅ ∅	--	32 (5.6)	∅ ∅	∅ ∅	--
Ontario, Canada	r	26 (0.4)	0 (0.6)	-1 (0.7)	-2 (0.9) ▼	36 (4.0)	5 (5.6)	9 (6.2)	13 (6.5) ▲
Quebec, Canada	r	29 (0.4)	0 (0.5)	0 (0.6)	1 (1.1)	20 (3.4)	6 (4.4)	6 (5.7)	6 (6.1)

▲ 2007 significantly higher
▼ 2007 significantly lower

Background data provided by teachers.

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

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

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

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

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

Exhibit 7.1 Class Size for Mathematics Instruction with Trends (Continued)

TIMSS2007
Mathematics 8th Grade

Country	25-40 Students				41 or More Students			
	2007 Percent of Students	Difference in Percent from 2003	Difference in Percent from 1999	Difference in Percent from 1995	2007 Percent of Students	Difference in Percent from 2003	Difference in Percent from 1999	Difference in Percent from 1995
Algeria	r 64 (4.2)	0 0	0 0	0 0	31 (3.9)	0 0	0 0	0 0
Armenia	r 60 (3.9)	10 (5.9)	0 0	0 0	0 (0.0)	-10 (2.8) ▼	0 0	0 0
Australia	r 70 (2.9)	2 (5.1)	--	-1 (4.6)	0 (0.1)	0 (0.4)	--	0 (0.1)
Bahrain	94 (0.7)	2 (1.0) ▲	0 0	0 0	0 (0.0)	-2 (0.1) ▼	0 0	0 0
Bosnia and Herzegovina	52 (3.6)	0 0	0 0	0 0	0 (0.0)	0 0	0 0	0 0
Botswana	73 (3.8)	-1 (5.6)	0 0	0 0	26 (3.7)	1 (5.5)	0 0	0 0
Bulgaria	41 (3.5)	5 (5.5)	4 (7.1)	--	0 (0.0)	-1 (0.0)	-2 (1.3)	--
Chinese Taipei	85 (3.3)	6 (4.8)	17 (4.9) ▲	0 0	11 (2.7)	-7 (4.2)	-20 (4.6) ▼	0 0
Colombia	s 66 (4.6)	0 0	0 0	29 (7.3) ▲	21 (3.9)	0 0	0 0	-23 (7.2) ▼
Cyprus	r 45 (2.7)	-34 (3.3) ▼	-44 (3.6) ▼	-51 (3.1) ▼	1 (0.0)	1 (0.0)	1 (0.0)	1 (0.0)
Czech Republic	r 51 (4.3)	0 0	4 (7.1)	-10 (6.7)	0 (0.0)	0 0	0 (0.0)	0 (0.0)
Egypt	53 (3.6)	-17 (5.3) ▼	0 0	0 0	43 (3.7)	16 (5.3) ▲	0 0	0 0
El Salvador	51 (4.0)	0 0	0 0	0 0	14 (3.2)	0 0	0 0	0 0
England	s 69 (3.7)	2 (6.3)	--	2 (5.5)	1 (1.0)	1 (1.0)	--	1 (1.0)
Georgia	47 (5.3)	0 0	0 0	0 0	1 (0.6)	0 0	0 0	0 0
Ghana	r 40 (4.2)	-7 (5.9)	0 0	0 0	47 (4.3)	10 (6.4)	0 0	0 0
Hong Kong SAR	44 (4.3)	-10 (5.9)	-8 (5.6)	-13 (7.3)	46 (4.1)	3 (5.8)	7 (5.5)	9 (6.9)
Hungary	27 (3.3)	-9 (5.1)	-2 (5.0)	-6 (5.3)	1 (0.9)	1 (0.9)	1 (0.9)	1 (0.9)
Indonesia	62 (4.7)	13 (6.4) ▲	35 (5.9) ▲	0 0	32 (4.8)	-16 (6.4) ▼	-40 (5.9) ▼	0 0
Iran, Islamic Rep. of	r 64 (3.3)	-11 (4.6) ▼	-19 (4.4) ▼	-9 (6.3)	1 (1.1)	-2 (1.8)	-5 (2.4) ▼	-18 (5.2) ▼
Israel	s 92 (2.2)	5 (3.5)	36 (4.1) ▲	--	3 (1.8)	0 (2.5)	0 (2.5)	--
Italy	27 (2.9)	5 (4.3)	14 (4.0) ▲	--	0 (0.0)	0 (0.0)	0 (0.0)	--
Japan	85 (2.7)	-11 (3.1) ▼	-11 (3.4) ▼	-6 (4.1)	5 (1.6)	5 (1.9) ▲	2 (2.5)	-3 (3.4)
Jordan	58 (4.4)	0 (6.3)	-3 (6.0)	0 0	29 (4.1)	1 (5.5)	-2 (5.6)	0 0
Korea, Rep. of	s 78 (2.6)	1 (4.4)	37 (4.2) ▲	73 (3.2) ▲	18 (2.3)	-4 (4.1)	-40 (3.9) ▼	-75 (3.2) ▼
Kuwait	s 87 (3.2)	0 0	0 0	--	1 (0.0)	0 0	0 0	--
Lebanon	58 (4.5)	-2 (6.3)	0 0	0 0	4 (1.2)	-4 (3.3)	0 0	0 0
Lithuania	r 65 (3.2)	4 (4.6)	22 (5.1) ▲	50 (4.7) ▲	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Malaysia	80 (3.2)	6 (4.8)	15 (5.2) ▲	0 0	19 (3.1)	-6 (4.6)	-15 (5.2) ▼	0 0
Malta	29 (0.2)	0 0	0 0	0 0	0 (0.0)	0 0	0 0	0 0
Norway	r 51 (4.0)	-14 (5.5) ▼	0 0	-6 (6.7)	1 (1.0)	1 (1.2)	0 0	1 (1.0)
Oman	90 (2.2)	0 0	0 0	0 0	0 (0.0)	0 0	0 0	0 0
Palestinian Nat'l Auth.	51 (4.0)	7 (5.6)	0 0	0 0	41 (3.6)	-9 (5.2)	0 0	0 0
Qatar	77 (0.2)	0 0	0 0	0 0	2 (0.0)	0 0	0 0	0 0
Romania	24 (2.9)	-25 (5.4) ▼	-27 (4.9) ▼	-34 (5.8) ▼	0 (0.0)	-1 (0.0)	0 (0.0)	-2 (1.2)
Russian Federation	37 (2.8)	-16 (5.0) ▼	-23 (4.7) ▼	-19 (4.6) ▼	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Saudi Arabia	61 (4.0)	--	0 0	0 0	11 (2.6)	--	0 0	0 0
Scotland	r 56 (3.1)	-11 (5.0) ▼	0 0	-18 (4.9) ▼	1 (0.8)	0 (1.1)	0 0	1 (0.8)
Serbia	47 (3.9)	-15 (5.3) ▼	0 0	0 0	0 (0.0)	0 (0.0)	0 0	0 0
Singapore	76 (2.5)	5 (3.6)	0 (4.7)	-3 (4.6)	22 (2.5)	-4 (3.5)	2 (4.6)	4 (4.3)
Slovenia	r 6 (1.0)	-25 (4.2) ▼	--	-54 (4.5) ▼	0 (0.0)	0 (0.0)	--	0 (0.0)
Sweden	s 35 (3.4)	6 (5.0)	0 0	9 (7.2)	2 (1.1)	2 (1.2)	0 0	2 (1.1) ▲
Syrian Arab Republic	65 (4.2)	0 0	0 0	0 0	11 (2.6)	0 0	0 0	0 0
Thailand	r 47 (3.7)	0 0	9 (5.4)	--	42 (3.1)	0 0	-14 (5.0) ▼	--
Tunisia	96 (1.6)	-1 (2.2)	-1 (2.3)	0 0	1 (1.0)	0 (1.5)	1 (1.0)	0 0
Turkey	61 (3.9)	0 0	--	0 0	20 (2.7)	0 0	--	0 0
Ukraine	63 (3.1)	0 0	0 0	0 0	1 (0.8)	0 0	0 0	0 0
United States	s 41 (2.3)	-2 (3.6)	-4 (4.4)	-9 (5.6)	2 (0.9)	0 (1.2)	-6 (2.1) ▼	-2 (1.9)
‡ Morocco	r 79 (5.3)	--	--	--	15 (4.5)	--	--	--
International Avg.	59 (0.5)				11 (0.3)			
Benchmarking Participants								
Basque Country, Spain	32 (2.7)	-19 (4.5) ▼	0 0	0 0	0 (0.0)	0 (0.0)	0 0	0 0
British Columbia, Canada	68 (4.2)	0 0	-13 (7.6)	0 0	1 (1.3)	0 0	1 (1.3)	0 0
Dubai, UAE	s 64 (3.2)	0 0	0 0	0 0	2 (0.5)	0 0	0 0	0 0
Massachusetts, US	r 34 (5.5)	0 0	-1 (8.4)	0 0	1 (1.3)	0 0	-2 (2.2)	0 0
Minnesota, US	64 (6.8)	0 0	0 0	--	4 (3.6)	0 0	0 0	--
Ontario, Canada	r 63 (4.0)	-6 (5.6)	-6 (6.4)	-13 (6.5)	1 (0.8)	1 (0.8)	-2 (2.3)	-1 (1.4)
Quebec, Canada	r 80 (3.4)	-6 (4.4)	-6 (5.7)	-7 (6.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

▲ 2007 significantly higher
▼ 2007 significantly lower

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

However, some countries averaged larger mathematics classes (usually a modest increase, but not always), including Ghana, Israel, Italy, Lithuania, Singapore, and Sweden.

The results in Exhibit 7.2 show that the majority of students are in medium-sized mathematics classes. At the fourth grade, on average internationally, 24 percent of the students were in classes with fewer than 20 students, 58 percent were in classes of 20 to 32 students, and 18 percent were in classes with 33 or more students. Notable exceptions included Singapore with almost all students (94%) in large classes, Hong Kong SAR and Yemen with about three-fourths in large classes, and Chinese Taipei, Colombia, and Japan with approximately half in large classes. In general, class sizes were larger at the eighth grade, 30 percent were in classes of 1 to 24 students, 59 percent in classes of 25 to 40 students, and 11 percent were in classes of 41 or more students. The largest percentages of students in large classes, from 41 to 47 percent, were in Egypt, Ghana, Hong Kong SAR, the Palestinian National Authority, and Thailand. The countries with more than half of their eighth grade students in small classes were Bulgaria (59%), Cyprus (54%), Georgia (52%), Hungary (72%), Italy (73%), Malta (71%), Romania (76%), the Russian Federation (63%), Serbia (53%), Slovenia (94%), Sweden (63%), and the United States (57%), as well as the benchmarking state of Massachusetts (65%) and the Basque country in Spain (68%).

Because countries have a variety of policies, practices, and realities determining class sizes, the relationship between class size and achievement is extremely difficult to disentangle. For example, in some countries the smaller classes tend to be in rural areas with fewer resource and the larger classes in urban areas with more resources. Also, countries and schools cannot always control class size. Because of this, the ability to cap class sizes can indicate the availability of more resources in general. As another complicating factor, smaller classes can be used for advanced or practical classes such as computer laboratories on one hand, and for remedial learning or students with special needs on the other. Finally, TIMSS data repeatedly show, contrary to what might be anticipated, that the high-achieving Asian

countries have some of the largest class sizes. The complexity of this issue is evidenced in the TIMSS 2007 results showing a curvilinear relationship, on average, between class size and mathematics achievement at both the eighth and fourth grades.

Mathematics teachers were asked about the instructional impact of five characteristics of their students—differing academic abilities, a wide range in backgrounds, students with special needs, uninterested students, and disruptive students. Responses were given on a four-point scale; *not at all*, *a little*, *some*, and *a lot*. TIMSS used the teachers' responses to construct an Index of Teachers' Reports on Teaching Mathematics Classes with Few or No Limitations on Instruction due to Student Factors (MCFL) and the results are presented in Exhibit 7.3. Students were placed in the high category, if, on average, teachers reported their classrooms were impacted only a little (if at all), and in the low category, if, on average, these factors impacted instruction at least somewhat. The remaining students fell in the medium category. The results show that at both grades average mathematics achievement was related to the diversity of the students in the class and the instructional challenges involved. At the fourth and eighth grades, 45 and 38 percent of the students, respectively, were in classes where teachers reported the composition had little, if any impact on instruction, and these students had the highest achievement internationally. At the eighth grade, the 23 percent of students in classes with adversely impacted instruction, had noticeably lower average achievement. In general, between 2003 and 2007, teachers in eight countries and one benchmarking participant reported increases in these more challenging types of classes whereas teachers in only three countries reported decreases.

Exhibit 7.2 Achievement and Class Size for Mathematics Instruction

TIMSS2007
Mathematics 4th Grade

Country	1–19 Students		20–32 Students		33 or More Students		
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Algeria	r	11 (2.8)	388 (14.2)	60 (4.3)	378 (7.0)	29 (4.0)	383 (9.4)
Armenia	s	24 (3.3)	526 (14.1)	50 (3.8)	499 (7.3)	26 (3.6)	484 (6.0)
Australia		19 (3.0)	510 (9.0)	80 (3.0)	521 (4.3)	2 (1.2)	~ ~
Austria		37 (2.9)	506 (3.1)	63 (2.9)	505 (2.7)	0 (0.0)	~ ~
Chinese Taipei		3 (1.2)	548 (12.8)	45 (3.7)	570 (3.2)	51 (3.4)	583 (2.4)
Colombia		19 (3.3)	342 (13.7)	24 (4.7)	347 (14.0)	57 (4.4)	365 (8.1)
Czech Republic		31 (3.5)	482 (5.9)	69 (3.5)	489 (2.9)	0 (0.0)	~ ~
Denmark		34 (3.9)	529 (4.4)	66 (3.9)	521 (2.9)	0 (0.0)	~ ~
El Salvador		20 (2.7)	307 (10.7)	37 (4.1)	318 (9.1)	43 (3.8)	352 (4.2)
England		8 (1.9)	556 (9.6)	80 (3.0)	539 (3.2)	12 (2.4)	546 (9.0)
Georgia		37 (3.8)	454 (7.3)	50 (4.5)	428 (6.6)	13 (2.2)	454 (6.3)
Germany		21 (2.4)	512 (5.6)	79 (2.4)	528 (2.2)	0 (0.0)	~ ~
Hong Kong SAR		1 (0.7)	~ ~	25 (3.3)	588 (5.5)	74 (3.4)	616 (3.8)
Hungary		33 (3.7)	482 (6.5)	67 (3.7)	525 (4.7)	0 (0.0)	~ ~
Iran, Islamic Rep. of		25 (2.7)	381 (6.5)	59 (3.8)	406 (5.3)	16 (2.9)	421 (11.6)
Italy		44 (2.6)	506 (4.3)	56 (2.6)	507 (4.5)	0 (0.0)	~ ~
Japan		7 (1.5)	558 (8.5)	47 (2.9)	569 (3.4)	45 (3.2)	569 (2.9)
Kazakhstan		30 (4.5)	550 (20.2)	68 (4.6)	548 (5.5)	3 (1.2)	577 (29.4)
Kuwait	s	7 (2.8)	330 (18.1)	88 (3.4)	314 (5.0)	5 (1.9)	302 (11.9)
Latvia		44 (2.4)	525 (3.9)	49 (3.0)	550 (2.6)	6 (2.0)	551 (9.3)
Lithuania		37 (3.0)	511 (4.7)	63 (3.0)	541 (3.1)	0 (0.0)	~ ~
Morocco	r	17 (3.3)	352 (17.7)	42 (4.3)	343 (11.4)	41 (3.9)	338 (7.7)
Netherlands		27 (3.3)	531 (4.3)	71 (3.5)	535 (2.9)	2 (1.3)	~ ~
New Zealand	s	13 (2.1)	489 (8.7)	81 (2.4)	497 (3.0)	6 (1.7)	524 (11.7)
Norway		42 (3.3)	473 (4.4)	53 (3.6)	474 (3.5)	5 (1.9)	467 (10.6)
Qatar	r	8 (0.1)	301 (4.3)	75 (0.2)	296 (1.4)	17 (0.2)	316 (3.4)
Russian Federation		33 (2.7)	531 (10.5)	67 (2.7)	551 (3.8)	0 (0.3)	~ ~
Scotland	r	16 (2.8)	492 (9.4)	79 (3.0)	493 (3.1)	5 (1.6)	506 (14.0)
Singapore		0 (0.0)	~ ~	6 (1.3)	514 (13.5)	94 (1.3)	605 (3.5)
Slovak Republic		34 (2.5)	497 (6.6)	65 (2.6)	496 (5.7)	1 (0.6)	~ ~
Slovenia		46 (2.9)	497 (2.7)	53 (3.0)	506 (2.6)	1 (0.6)	~ ~
Sweden		36 (3.4)	505 (4.5)	60 (3.6)	504 (3.2)	4 (1.6)	512 (12.4)
Tunisia		20 (2.8)	303 (12.2)	69 (3.8)	334 (5.0)	11 (2.7)	354 (21.3)
Ukraine		30 (3.3)	445 (4.9)	65 (3.5)	480 (3.8)	5 (1.4)	472 (13.4)
United States		26 (2.6)	521 (4.1)	69 (2.8)	533 (3.3)	5 (1.3)	522 (8.0)
Yemen	r	9 (2.1)	262 (18.5)	17 (4.0)	227 (16.4)	74 (4.1)	219 (7.7)
International Avg.		24 (0.5)	462 (1.8)	58 (0.6)	471 (1.1)	18 (0.4)	460 (2.3)
Benchmarking Participants							
Alberta, Canada		25 (2.9)	508 (4.6)	70 (3.4)	504 (3.8)	4 (1.8)	498 (16.0)
British Columbia, Canada	r	29 (3.7)	500 (5.6)	69 (3.8)	508 (3.5)	1 (0.8)	~ ~
Dubai, UAE		--	--	--	--	--	--
Massachusetts, US		24 (5.6)	567 (10.0)	76 (5.6)	575 (4.4)	0 (0.0)	~ ~
Minnesota, US	r	16 (4.2)	548 (13.7)	83 (4.3)	557 (7.1)	1 (1.2)	~ ~
Ontario, Canada		18 (3.5)	504 (10.0)	78 (3.9)	512 (3.3)	4 (1.4)	531 (13.1)
Quebec, Canada		16 (2.5)	520 (8.4)	83 (2.5)	520 (3.2)	1 (0.2)	~ ~

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

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

Exhibit 7.2 Achievement and Class Size for Mathematics Instruction (Continued)

TIMSS2007
Mathematics 8th Grade

Country	1–24 Students		25–40 Students		41 or More Students		
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	
Algeria	r	5 (2.1)	370 (10.8)	64 (4.2)	388 (2.8)	31 (3.9)	389 (3.2)
Armenia		40 (4.0)	502 (6.2)	60 (3.9)	497 (4.2)	0 (0.0)	~ ~
Australia		30 (2.8)	471 (6.3)	70 (2.9)	511 (5.3)	0 (0.1)	~ ~
Bahrain		6 (0.7)	449 (6.3)	94 (0.7)	393 (1.8)	0 (0.0)	~ ~
Bosnia and Herzegovina		48 (3.6)	454 (3.9)	52 (3.6)	458 (4.4)	0 (0.0)	~ ~
Botswana		1 (0.6)	~ ~	73 (3.8)	367 (3.1)	26 (3.7)	355 (5.3)
Bulgaria		59 (3.5)	441 (7.2)	41 (3.5)	507 (7.1)	0 (0.0)	~ ~
Chinese Taipei		4 (1.8)	549 (29.9)	85 (3.3)	593 (4.6)	11 (2.7)	660 (11.0)
Colombia		13 (2.5)	357 (16.1)	66 (4.6)	386 (5.1)	21 (3.9)	383 (5.9)
Cyprus		54 (2.7)	466 (2.4)	45 (2.7)	462 (2.6)	1 (0.0)	~ ~
Czech Republic		49 (4.3)	494 (3.8)	51 (4.3)	514 (3.8)	0 (0.0)	~ ~
Egypt		4 (1.5)	410 (12.8)	53 (3.6)	395 (4.9)	43 (3.7)	386 (5.6)
El Salvador		35 (3.7)	323 (5.7)	51 (4.0)	348 (3.8)	14 (3.2)	348 (10.0)
England		30 (3.8)	469 (8.6)	69 (3.7)	533 (5.8)	1 (1.0)	~ ~
Georgia		52 (5.2)	412 (7.4)	47 (5.3)	408 (9.2)	1 (0.6)	~ ~
Ghana		13 (2.4)	299 (11.3)	40 (4.2)	299 (7.9)	47 (4.3)	321 (7.7)
Hong Kong SAR		10 (1.9)	513 (23.5)	44 (4.3)	555 (10.1)	46 (4.1)	604 (7.2)
Hungary		72 (3.4)	510 (4.7)	27 (3.3)	533 (8.3)	1 (0.9)	~ ~
Indonesia		6 (1.7)	374 (13.7)	61 (4.2)	400 (5.1)	33 (4.1)	396 (8.6)
Iran, Islamic Rep. of		35 (3.2)	386 (5.5)	64 (3.3)	411 (5.7)	1 (1.1)	~ ~
Israel	s	5 (1.2)	473 (22.6)	92 (2.2)	467 (4.7)	3 (1.8)	496 (42.7)
Italy		73 (2.9)	475 (3.4)	27 (2.9)	493 (5.7)	0 (0.0)	~ ~
Japan		10 (2.1)	555 (5.9)	85 (2.7)	567 (2.9)	5 (1.6)	645 (24.7)
Jordan		13 (2.5)	431 (17.4)	58 (4.4)	427 (6.2)	29 (4.1)	425 (7.8)
Korea, Rep. of		4 (1.4)	558 (15.6)	78 (2.6)	596 (3.1)	18 (2.3)	607 (7.2)
Kuwait	s	12 (3.3)	356 (9.9)	87 (3.2)	357 (2.8)	1 (0.0)	~ ~
Lebanon		38 (4.3)	426 (6.3)	58 (4.5)	464 (7.1)	4 (1.2)	423 (14.4)
Lithuania		35 (3.2)	480 (4.1)	65 (3.2)	520 (3.6)	0 (0.0)	~ ~
Malaysia		1 (0.8)	~ ~	80 (3.2)	470 (5.8)	19 (3.1)	486 (10.9)
Malta		71 (0.2)	472 (1.4)	29 (0.2)	523 (1.9)	0 (0.0)	~ ~
Norway		47 (3.9)	468 (3.4)	51 (4.0)	471 (2.4)	1 (1.0)	~ ~
Oman		10 (2.2)	363 (8.8)	90 (2.2)	373 (3.6)	0 (0.0)	~ ~
Palestinian Nat'l Auth.		8 (1.6)	383 (11.7)	51 (4.0)	367 (5.2)	41 (3.6)	364 (6.0)
Qatar		20 (0.1)	300 (3.5)	77 (0.2)	309 (1.8)	2 (0.0)	~ ~
Romania		76 (2.9)	450 (4.5)	24 (2.9)	500 (8.8)	0 (0.0)	~ ~
Russian Federation		63 (2.8)	499 (4.6)	37 (2.8)	533 (6.0)	0 (0.0)	~ ~
Saudi Arabia		28 (3.6)	330 (5.1)	61 (4.0)	329 (4.2)	11 (2.6)	322 (11.4)
Scotland		43 (3.2)	449 (6.3)	56 (3.1)	517 (4.8)	1 (0.8)	~ ~
Serbia		53 (3.9)	480 (4.8)	47 (3.9)	490 (5.1)	0 (0.0)	~ ~
Singapore		2 (0.6)	~ ~	76 (2.5)	593 (5.2)	22 (2.5)	592 (7.2)
Slovenia		94 (1.0)	500 (2.3)	6 (1.0)	513 (8.2)	0 (0.0)	~ ~
Sweden		63 (3.6)	488 (2.9)	35 (3.4)	499 (3.7)	2 (1.1)	~ ~
Syrian Arab Republic		24 (3.6)	405 (8.7)	65 (4.2)	391 (4.7)	11 (2.6)	392 (11.3)
Thailand		11 (2.4)	406 (11.2)	47 (3.7)	416 (5.7)	42 (3.1)	479 (9.3)
Tunisia		3 (1.2)	398 (6.9)	96 (1.6)	421 (2.4)	1 (1.0)	~ ~
Turkey		18 (3.4)	423 (11.7)	61 (3.9)	434 (6.5)	20 (2.7)	436 (11.3)
Ukraine		36 (3.2)	447 (6.4)	63 (3.1)	471 (4.8)	1 (0.8)	~ ~
United States		57 (2.3)	511 (4.0)	41 (2.3)	506 (5.0)	2 (0.9)	~ ~
‡ Morocco	r	6 (2.6)	404 (17.9)	79 (4.3)	381 (4.3)	14 (3.6)	364 (5.0)
International Avg.		30 (0.4)	439 (1.6)	59 (0.5)	456 (0.9)	11 (0.3)	449 (2.9)
Benchmarking Participants							
Basque Country, Spain		68 (2.7)	498 (3.6)	32 (2.7)	513 (4.0)	0 (0.0)	~ ~
British Columbia, Canada		30 (4.0)	503 (6.3)	68 (4.2)	514 (4.3)	1 (1.3)	~ ~
Dubai, UAE	s	34 (3.2)	466 (9.2)	64 (3.2)	461 (5.6)	2 (0.5)	~ ~
Massachusetts, US		65 (6.0)	531 (7.6)	34 (5.5)	577 (9.3)	1 (1.3)	~ ~
Minnesota, US		32 (5.6)	523 (13.2)	64 (6.8)	536 (6.3)	4 (3.6)	557 (7.1)
Ontario, Canada		36 (4.0)	512 (7.5)	63 (4.0)	520 (4.2)	1 (0.8)	~ ~
Quebec, Canada		20 (3.4)	517 (5.9)	80 (3.4)	531 (4.3)	0 (0.0)	~ ~

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.

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

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



Exhibit 7.3

Index of Teachers' Reports on Teaching Mathematics Classes with Few or No Limitations on Instruction Due to Student Factors (MCFL)

TIMSS2007
Mathematics **4th**
Grade

Country	High MCFL (Few or No Limitations)		Medium MCFL (Some Limitations)		Low MCFL (A Lot of Limitations)	
	2007 Percent of Students	Average Achievement	2007 Percent of Students	Average Achievement	2007 Percent of Students	Average Achievement
Netherlands	76 (3.5)	539 (2.8)	18 (3.0)	520 (5.9)	6 (1.8)	498 (9.7)
Kazakhstan	71 (4.3)	554 (8.5)	24 (4.0)	534 (11.7)	5 (1.8)	552 (14.2)
Austria	67 (3.2)	512 (2.3)	27 (3.0)	496 (3.8)	6 (1.5)	487 (9.9)
Germany	67 (3.4)	534 (2.4)	27 (3.1)	515 (3.8)	5 (1.5)	462 (12.7)
New Zealand	64 (2.2)	502 (2.8)	24 (2.2)	480 (5.9)	12 (1.7)	467 (8.0)
Scotland	60 (4.2)	499 (3.3)	32 (4.1)	492 (5.0)	8 (2.1)	469 (10.3)
Armenia	59 (4.2)	502 (6.3)	27 (3.7)	502 (9.2)	14 (2.7)	492 (9.6)
England	58 (3.7)	556 (3.8)	32 (3.7)	523 (4.5)	10 (2.0)	519 (8.8)
Hungary	57 (4.1)	530 (4.4)	35 (3.9)	494 (6.5)	8 (2.9)	435 (18.4)
Georgia	57 (4.6)	445 (5.4)	38 (4.4)	431 (7.5)	5 (1.8)	430 (22.5)
Czech Republic	57 (4.3)	494 (3.3)	32 (3.8)	481 (4.7)	12 (2.7)	466 (9.1)
Norway	55 (4.0)	480 (3.5)	37 (3.9)	465 (4.3)	7 (1.7)	461 (9.2)
Denmark	54 (4.4)	528 (2.7)	33 (4.2)	523 (4.9)	12 (2.9)	510 (7.3)
Slovenia	54 (2.9)	502 (2.4)	35 (2.4)	500 (3.1)	10 (1.7)	499 (3.1)
Japan	52 (4.0)	571 (3.4)	36 (3.4)	562 (2.9)	12 (2.7)	570 (6.1)
Sweden	51 (3.9)	511 (2.8)	34 (3.7)	498 (4.3)	15 (2.5)	490 (5.3)
Russian Federation	49 (4.1)	552 (7.0)	36 (3.5)	543 (5.9)	15 (2.2)	532 (14.5)
Australia	46 (3.7)	535 (4.8)	40 (3.7)	501 (4.6)	15 (2.5)	500 (9.4)
El Salvador	45 (4.5)	341 (7.2)	38 (4.4)	321 (7.7)	17 (3.1)	316 (10.7)
United States	45 (2.9)	540 (3.8)	33 (2.7)	529 (4.0)	22 (2.0)	505 (4.5)
Italy	43 (3.1)	516 (4.6)	44 (3.1)	501 (4.5)	13 (1.7)	497 (8.4)
Lithuania	40 (3.9)	538 (3.4)	43 (3.6)	526 (3.8)	17 (3.1)	516 (6.6)
Qatar	r 39 (0.2)	311 (2.0)	38 (0.2)	288 (1.9)	22 (0.2)	286 (2.7)
Tunisia	r 36 (3.8)	332 (8.3)	39 (3.9)	330 (8.3)	25 (3.7)	333 (10.4)
Ukraine	35 (4.0)	475 (4.8)	46 (4.1)	466 (5.0)	19 (3.5)	465 (8.1)
Colombia	32 (5.2)	364 (11.9)	40 (4.3)	346 (8.6)	28 (4.6)	360 (6.9)
Algeria	31 (4.7)	382 (9.1)	43 (4.9)	369 (10.4)	26 (4.2)	391 (7.7)
Singapore	31 (2.7)	632 (7.1)	37 (2.5)	592 (5.8)	33 (2.7)	585 (6.8)
Latvia	30 (3.7)	537 (5.3)	50 (4.0)	540 (3.0)	20 (3.1)	535 (5.2)
Hong Kong SAR	29 (4.2)	631 (5.3)	47 (4.3)	605 (4.7)	24 (3.9)	578 (4.7)
Slovak Republic	29 (3.4)	508 (5.7)	38 (4.0)	498 (5.5)	33 (3.5)	484 (9.9)
Yemen	r 28 (4.6)	231 (9.2)	59 (5.0)	223 (9.5)	13 (3.3)	226 (15.0)
Kuwait	s 27 (4.2)	334 (9.3)	42 (4.2)	302 (7.4)	31 (3.6)	297 (6.8)
Morocco	r 26 (4.3)	378 (12.5)	39 (4.8)	324 (8.1)	35 (3.7)	344 (9.9)
Iran, Islamic Rep. of	18 (2.9)	398 (10.7)	27 (3.5)	397 (8.2)	55 (4.1)	405 (5.7)
Chinese Taipei	16 (3.3)	578 (4.7)	38 (3.9)	572 (3.2)	46 (4.2)	578 (2.7)
International Avg.	45 (0.6)	483 (1.0)	36 (0.6)	466 (1.0)	18 (0.5)	459 (1.7)
Benchmarking Participants						
Ontario, Canada	52 (4.4)	517 (5.2)	29 (4.1)	512 (3.6)	19 (3.0)	495 (8.1)
Massachusetts, US	45 (3.9)	572 (5.4)	39 (5.2)	574 (5.6)	16 (4.4)	562 (12.5)
Alberta, Canada	42 (3.9)	516 (3.8)	30 (3.6)	503 (4.7)	28 (3.8)	489 (6.2)
Dubai, UAE	s 42 (5.8)	465 (8.3)	45 (5.0)	434 (9.8)	13 (3.2)	438 (11.8)
Minnesota, US	39 (6.7)	565 (11.0)	38 (6.5)	562 (8.8)	23 (6.0)	528 (10.7)
Quebec, Canada	33 (3.8)	535 (4.4)	35 (3.8)	521 (4.9)	31 (4.2)	504 (4.5)
British Columbia, Canada	r 24 (3.3)	510 (5.5)	45 (4.1)	502 (4.5)	31 (3.9)	504 (5.7)

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

Index based on teachers' responses to five statements about student factors limiting mathematics instruction: 1) Students with different academic abilities; 2) Students who come from a wide range of backgrounds; 3) Students with special needs; 4) Uninterested students; and 5) Disruptive students. Average is computed across the five statements based on a 4-point scale: 1. Not at all/Not applicable; 2. A little; 3. Some; and 4. A lot. High level indicates average is less than or equal to 2. Medium level indicates average is greater than 2 and less than 3. Low level indicates average is greater than or equal to 3.

- (i) 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.

Exhibit 7.3 Index of Teachers' Reports on Teaching Mathematics Classes with Few or No Limitations on Instruction Due to Student Factors (MCFL) (Continued)

TIMSS2007
Mathematics **8th** Grade

Country	High MCFL (Few or No Limitations)			Medium MCFL (Some Limitations)			Low MCFL (A Lot of Limitations)		
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Scotland	71 (2.9)	505 (4.6)	3 (5.3)	21 (2.3)	451 (6.7)	-5 (4.5)	8 (2.0)	435 (13.8)	2 (2.8)
England	r 64 (3.3)	541 (6.0)	13 (6.6)	31 (3.3)	476 (6.2)	-9 (6.3)	5 (1.5)	398 (10.9)	-4 (3.3)
Armenia	r 62 (3.9)	499 (4.1)	33 (5.7) ▲	25 (3.8)	502 (8.2)	-19 (5.3) ▼	13 (2.2)	492 (6.5)	-14 (4.1) ▼
Hungary	62 (3.9)	529 (4.9)	4 (5.6)	28 (3.4)	502 (6.8)	-11 (5.3) ▼	10 (2.1)	486 (10.0)	7 (2.5) ▲
Japan	55 (4.0)	580 (3.2)	-8 (5.7)	33 (3.7)	563 (3.9)	1 (5.2)	11 (2.4)	544 (9.9)	7 (3.0) ▲
Ukraine	54 (3.7)	473 (5.4)	0	32 (3.8)	452 (6.4)	0	14 (2.9)	439 (9.6)	0
Slovenia	53 (2.8)	506 (3.3)	14 (4.9) ▲	36 (2.6)	499 (3.4)	-4 (4.6)	10 (1.7)	482 (10.1)	-10 (3.7) ▼
Qatar	50 (0.2)	316 (2.0)	0	36 (0.2)	301 (1.9)	0	13 (0.1)	281 (3.5)	0
United States	49 (2.7)	531 (4.0)	0 (4.0)	35 (2.6)	489 (4.3)	3 (4.0)	15 (2.0)	477 (6.3)	-3 (2.8)
Sweden	49 (3.0)	503 (2.8)	-13 (4.5) ▼	37 (2.9)	485 (3.2)	8 (4.3)	14 (2.2)	470 (6.3)	5 (2.9)
Lebanon	48 (4.8)	452 (6.3)	10 (6.4)	35 (4.4)	453 (7.5)	-13 (6.1) ▼	17 (4.0)	427 (11.5)	3 (4.9)
Colombia	46 (5.3)	385 (5.5)	0	26 (4.2)	376 (6.4)	0	27 (3.9)	369 (6.5)	0
Saudi Arabia	45 (4.3)	333 (4.6)	-	37 (3.7)	319 (5.0)	-	18 (3.3)	335 (7.1)	-
Czech Republic	45 (4.1)	521 (4.0)	0	36 (4.2)	493 (5.2)	0	19 (2.9)	482 (3.9)	0
Georgia	43 (5.3)	418 (9.1)	0	45 (5.3)	410 (5.8)	0	12 (4.2)	383 (21.2)	0
Australia	43 (4.4)	529 (6.8)	2 (5.9)	33 (3.7)	480 (5.7)	-9 (5.4)	24 (3.2)	468 (8.0)	6 (4.6)
Egypt	42 (3.9)	403 (6.1)	-39 (4.9) ▼	41 (3.8)	387 (5.2)	23 (4.7) ▲	17 (2.7)	366 (11.1)	16 (2.7) ▲
Malaysia	41 (3.5)	503 (8.0)	-21 (5.2) ▼	37 (3.7)	454 (7.0)	5 (5.3)	22 (3.5)	452 (10.6)	16 (3.9) ▲
Norway	41 (3.6)	469 (3.5)	11 (5.4) ▲	48 (4.0)	470 (2.5)	-10 (5.9)	12 (2.0)	461 (4.3)	-1 (3.5)
Oman	40 (4.5)	383 (5.7)	0	47 (4.3)	369 (5.5)	0	13 (3.1)	350 (11.9)	0
Korea, Rep. of	s 40 (3.5)	603 (4.9)	6 (4.8)	48 (3.6)	599 (4.4)	-2 (5.1)	12 (2.4)	573 (8.0)	-4 (3.7)
Syrian Arab Republic	39 (4.0)	401 (6.0)	0	35 (4.0)	385 (7.0)	0	25 (4.0)	398 (7.5)	0
Jordan	39 (4.0)	445 (8.1)	14 (5.6) ▲	36 (4.5)	422 (7.3)	-12 (6.6)	26 (3.7)	406 (9.5)	-2 (5.4)
Malta	38 (0.2)	525 (1.8)	0	30 (0.2)	465 (1.9)	0	33 (0.2)	465 (2.0)	0
El Salvador	38 (3.8)	349 (6.3)	0	40 (4.3)	329 (5.2)	0	22 (4.1)	337 (4.7)	0
Serbia	37 (4.0)	488 (6.0)	-1 (5.7)	49 (4.1)	488 (4.6)	6 (5.9)	15 (2.6)	477 (4.7)	-5 (4.1)
Bulgaria	36 (3.4)	480 (10.2)	9 (5.0)	46 (3.1)	454 (6.7)	-1 (5.3)	18 (3.3)	454 (11.2)	-8 (5.0)
Lithuania	36 (3.4)	520 (4.9)	-32 (5.0) ▼	48 (3.6)	502 (4.0)	17 (5.1) ▲	15 (2.7)	485 (5.6)	15 (2.7) ▲
Russian Federation	36 (2.6)	524 (6.4)	4 (4.0)	36 (3.5)	513 (6.5)	-7 (5.1)	27 (3.0)	496 (6.0)	3 (4.3)
Indonesia	34 (4.5)	402 (10.1)	-1 (6.0)	40 (4.4)	410 (8.8)	-2 (6.2)	26 (4.0)	404 (8.6)	3 (5.4)
Ghana	33 (4.2)	335 (9.0)	2 (6.1)	41 (4.4)	297 (7.3)	1 (6.4)	25 (3.7)	298 (10.2)	-3 (5.5)
Singapore	33 (2.7)	636 (6.1)	-4 (3.7)	43 (3.0)	591 (6.1)	4 (4.0)	24 (2.0)	535 (11.4)	0 (3.4)
Israel	r 31 (3.5)	493 (6.8)	-9 (5.0)	45 (3.4)	464 (7.8)	10 (5.0)	25 (3.2)	438 (12.1)	0 (4.5)
Romania	30 (3.5)	470 (7.8)	-2 (5.1)	40 (4.1)	458 (7.1)	-2 (5.7)	30 (3.7)	460 (7.1)	4 (5.1)
Bosnia and Herzegovina	30 (3.3)	458 (6.2)	0	41 (3.6)	451 (3.7)	0	29 (3.7)	461 (5.6)	0
Bahrain	30 (1.9)	399 (3.2)	-43 (3.7) ▼	43 (2.6)	398 (3.1)	17 (4.1) ▲	27 (2.3)	387 (3.8)	25 (2.4) ▲
Hong Kong SAR	29 (3.8)	620 (6.7)	-4 (5.9)	39 (3.4)	575 (9.8)	2 (5.6)	32 (4.2)	521 (12.6)	2 (5.7)
Tunisia	29 (3.5)	420 (4.0)	0 (5.2)	44 (4.2)	421 (3.4)	6 (6.1)	27 (4.0)	421 (4.6)	-6 (5.8)
Palestinian Nat'l Auth.	26 (3.6)	372 (7.1)	5 (5.2)	42 (3.8)	365 (5.8)	-8 (5.8)	31 (3.5)	367 (8.2)	3 (5.3)
Kuwait	r 26 (4.1)	357 (7.6)	0	40 (4.5)	356 (4.9)	0	34 (4.3)	352 (4.5)	0
Algeria	23 (3.8)	390 (3.4)	0	48 (4.0)	385 (3.0)	0	30 (4.3)	387 (3.8)	0
Thailand	18 (2.9)	496 (13.9)	0	56 (4.4)	434 (7.3)	0	26 (3.5)	418 (8.0)	0
Cyprus	18 (2.6)	476 (4.5)	0 (3.8)	49 (2.7)	464 (2.9)	15 (3.7) ▲	33 (2.7)	460 (2.6)	-15 (3.6) ▼
Chinese Taipei	18 (3.4)	631 (8.4)	1 (4.6)	42 (3.6)	605 (6.0)	-8 (5.4)	40 (4.1)	577 (6.6)	7 (5.6)
Iran, Islamic Rep. of	16 (2.6)	423 (10.2)	-38 (4.8) ▼	39 (4.1)	412 (7.2)	-5 (5.8)	45 (3.9)	391 (5.4)	43 (4.1) ▲
Italy	14 (2.3)	493 (5.5)	-7 (4.0)	35 (2.9)	481 (4.4)	-14 (5.3) ▼	51 (3.3)	476 (4.2)	21 (4.8) ▲
Botswana	14 (2.8)	379 (7.7)	-5 (4.6)	44 (4.6)	362 (3.4)	5 (6.7)	42 (4.6)	359 (4.9)	0 (6.5)
Turkey	13 (2.4)	478 (15.8)	0	46 (4.3)	428 (7.1)	0	41 (4.3)	424 (7.4)	0
‡ Morocco	31 (6.7)	396 (9.4)	-	47 (4.7)	379 (5.0)	-	22 (6.8)	382 (9.4)	-
International Avg.	38 (0.5)	466 (1.0)		39 (0.5)	445 (0.8)		23 (0.5)	433 (1.2)	
Benchmarking Participants									
Massachusetts, US	64 (3.5)	566 (7.6)	0	22 (3.6)	524 (8.9)	0	14 (2.7)	492 (8.8)	0
Dubai, UAE	s 54 (5.2)	478 (8.8)	0	31 (5.2)	436 (9.8)	0	15 (3.8)	459 (11.9)	0
Ontario, Canada	48 (5.0)	526 (4.7)	-1 (7.0)	38 (4.9)	509 (5.6)	3 (6.7)	15 (2.9)	510 (8.1)	-2 (4.6)
British Columbia, Canada	43 (4.9)	532 (6.0)	0	41 (4.6)	498 (4.4)	0	16 (3.1)	487 (9.0)	0
Basque Country, Spain	36 (4.7)	508 (5.0)	6 (6.8)	33 (4.4)	504 (4.5)	-5 (6.9)	31 (4.3)	483 (4.5)	-1 (6.6)
Quebec, Canada	30 (3.5)	559 (8.5)	-36 (5.4) ▼	48 (3.6)	523 (6.1)	19 (5.5) ▲	23 (3.3)	503 (6.2)	17 (3.8) ▲
Minnesota, US	26 (5.9)	561 (7.7)	0	55 (6.7)	527 (8.6)	0	19 (3.9)	498 (7.5)	0

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

Index based on teachers' responses to five statements about student factors limiting mathematics instruction: 1) Students with different academic abilities; 2) Students who come from a wide range of backgrounds; 3) Students with special needs; 4) Uninterested students; and 5) Disruptive students. Average is computed across the five statements based on a 4-point scale: 1. Not at all/Not applicable; 2. A little; 3. Some; and 4. A lot. High level indicates average is less than or equal to 2. Medium level indicates average is greater than 2 and less than 3. Low level indicates average is greater than or equal to 3.

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

2007 percent significantly higher ▲ 2007 percent significantly lower ▼

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

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

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

A diamond (0) indicates the country did not participate in the assessment.

What Activities Do Students Do in Their Mathematics Lessons?

Exhibits 7.4 and 7.5 present the reports, respectively, by students and by their teachers, about the frequency of five instructional activities related to mathematics topics in the TIMSS content areas. At both grades, the same two activities were related to the number content area—practice adding, subtracting, multiplying, and dividing without using a calculator, and work on fractions and decimals. At the fourth grade, there also were two activities related to the geometric shapes and measures area, studying shapes and measuring things, and one rather encompassing data display activity—making tables, charts, or graphs. Additionally, the teachers of fourth grade students were asked about an algebra activity—writing equations for word problems. At the eighth grade, in addition to the two number activities in common with fourth grade, there was one algebra activity about writing equations and functions, one geometry activity about solving problems about geometric shapes and angles, and one data and chance activity about interpreting data in tables, charts, or graphs. The data in 7.4 are for the percentages of students reporting that these core activities occurred in at least half the lessons in mathematics class, and the data in Exhibit 7.5 are for the percentages of students whose teachers reported the activity occurred in at least half the lessons.

On average internationally, while somewhat more fourth grade students than eighth grade students, 69 compared to 59 percent, reported devoting time in at least half their lessons to practicing operations with whole numbers, there was general agreement between students at the fourth and eighth grades that about half the students spent time in at least half their lessons on fractions and decimals. In contrast, however, especially at the fourth grade, their teachers largely disagreed, reporting more time on operations with whole numbers and less emphasis on fractions and decimals than the students. At the fourth grade, on average internationally, teachers reported 81 percent of the students spent time in at least half the lessons practicing operations with whole numbers, and that only 21 percent spent time on fractions and decimals. At the eighth grade, teachers reported that 65 percent of the students practiced operations with whole numbers in at least half their lessons and that 42 percent spent time on fractions and decimals.

At the fourth grade, on average internationally, 59 percent of students reported spending time in at least half their lessons learning about geometric shapes and 41 percent making tables, charts, or graphs, while their teachers reported only 20 and 15 percent, respectively. This is possibly due to students having these experiences in lessons in other subject areas. There was closer agreement that measuring things in at least half the lessons was relatively rare: only 27 percent according to students' reports and 10 percent according to their teachers. In comparison to the low percent of students having emphasis on fractions, geometry, and data display, teachers reported that 33 percent of the fourth grade students spent time on writing equations for word problems in at least half the lessons.

At the eighth grade, a larger proportion of students than their teachers reported attention to the algebra, geometry, and data topics in at least half the lessons. For writing equations and functions, 57 percent of students reported doing this activity in at least half of their lessons but teachers reported asking only 34 percent; for solving geometry problems, students reported 58 percent and teachers 34 percent; and for interpreting data displays, students reported 45 percent and teachers 17 percent.

Because of the high interest in improving students' ability for mathematics problem-solving, TIMSS asked students and teachers about how often students were asked to do certain activities related to problem-solving. The percentages of students reporting that they did the activity in at least half of the lessons are presented in Exhibit 7.6, whereas Exhibit 7.7 shows the percentages of students whose teachers reported asking them to do the activity. At the fourth grade, the activities queried provided a comparison between an emphasis on memorizing how to work problems versus working problems independently and explaining answers. Students reported much more emphasis than teachers on memorization, with 72 percent reporting that they memorized how to work problems in at least half their mathematics lessons compared to 38 percent reported by teachers. However, students and teachers were in close agreement about students working problems on their own in at least half the lessons, 76 compared to 74 percent, and about students explaining answers, 61 compared to 66 percent.

Exhibit 7.4 Students' Reports on Mathematics Content-related Emphasis in Classroom Activities
TIMSS2007
Mathematics **4th**
Grade

Country	Percentage of Students Who Reported Doing the Activity About Half of the Lessons or More									
	Practice Adding, Subtracting, Multiplying, and Dividing Without Using Calculator	Work on Fractions and Decimals	Learn About Shapes such as Circles, Triangles, Rectangles, and Cubes	Measure Things in the Classroom and Around the School	Make Tables, Charts, or Graphs					
Algeria	61 (1.9)		60 (2.3)	33 (1.7)	51 (1.8)					
Armenia	62 (1.5)	r	64 (1.5)	r	41 (1.7)					
Australia	76 (1.2)		54 (1.6)	23 (0.9)	34 (1.3)					
Austria	73 (0.9)		64 (0.9)	24 (0.8)	29 (0.9)					
Chinese Taipei	54 (0.9)		54 (1.0)	26 (0.8)	40 (0.9)					
Colombia	60 (1.6)		82 (1.1)	57 (1.5)	72 (1.2)					
Czech Republic	69 (1.1)		54 (1.6)	13 (0.9)	13 (0.8)					
Denmark	57 (2.0)		48 (1.7)	7 (0.7)	28 (2.1)					
El Salvador	65 (1.5)		86 (0.9)	50 (1.5)	73 (1.3)					
England	65 (1.1)		34 (1.4)	9 (0.6)	38 (1.0)					
Georgia	79 (0.9)		79 (1.4)	34 (1.6)	47 (1.9)					
Germany	74 (0.8)	r	61 (1.0)	26 (0.9)	r	36 (1.2)				
Hong Kong SAR	57 (1.2)		52 (1.0)	46 (1.2)	16 (0.7)	29 (1.1)				
Hungary	75 (1.1)		32 (1.5)	53 (1.6)	13 (0.9)	16 (0.9)				
Iran, Islamic Rep. of	52 (2.2)		43 (2.2)	62 (2.3)	43 (2.0)	50 (2.4)				
Italy	57 (1.2)		64 (1.3)	69 (1.2)	19 (1.0)	46 (1.3)				
Japan	85 (0.7)		77 (1.3)	65 (1.4)	33 (1.1)	61 (1.1)				
Kazakhstan	62 (3.0)		47 (2.9)	55 (3.9)	21 (2.6)	35 (2.8)				
Kuwait	66 (1.5)		55 (2.0)	68 (1.7)	43 (1.7)	53 (1.8)				
Latvia	73 (1.0)		43 (1.3)	62 (1.4)	18 (0.9)	28 (1.2)				
Lithuania	83 (0.9)		62 (1.2)	61 (1.2)	13 (0.8)	45 (1.3)				
Morocco	66 (1.9)		63 (2.5)	66 (2.5)	48 (2.2)	57 (2.1)				
Netherlands	77 (1.0)		35 (1.6)	18 (1.0)	10 (0.6)	30 (1.3)				
New Zealand	75 (0.9)		58 (0.9)	53 (1.4)	24 (1.0)	43 (1.0)				
Norway	57 (1.0)		40 (1.5)	46 (1.3)	17 (0.9)	24 (1.0)				
Qatar	70 (0.6)		58 (0.6)	75 (0.5)	50 (0.6)	64 (0.6)				
Russian Federation	79 (1.1)		35 (2.3)	61 (2.2)	20 (1.1)	40 (2.1)				
Scotland	72 (1.1)		37 (1.4)	41 (1.2)	18 (1.0)	37 (1.4)				
Singapore	77 (0.8)		73 (0.7)	69 (0.7)	17 (0.7)	36 (0.8)				
Slovak Republic	78 (1.1)		31 (1.4)	76 (1.4)	17 (1.0)	23 (1.3)				
Slovenia	73 (1.0)		30 (1.7)	53 (1.1)	27 (1.1)	43 (1.3)				
Sweden	75 (0.9)		27 (1.6)	46 (1.6)	19 (1.0)	36 (1.4)				
Tunisia	67 (2.3)		21 (1.9)	57 (2.7)	41 (2.3)	54 (2.5)				
Ukraine	71 (1.2)		65 (1.6)	73 (1.1)	40 (1.2)	36 (1.3)				
United States	72 (0.7)		64 (0.8)	55 (1.0)	25 (0.8)	48 (0.9)				
Yemen	59 (2.9)		51 (2.7)	r	46 (2.4)	r	36 (2.7)	r	34 (2.4)	
International Avg.	69 (0.2)		49 (0.3)	59 (0.3)	27 (0.2)	41 (0.3)				
Benchmarking Participants										
Alberta, Canada	77 (1.0)		50 (2.3)	51 (1.9)	28 (1.5)	51 (1.6)				
British Columbia, Canada	77 (0.8)		47 (2.0)	48 (1.5)	23 (1.4)	47 (1.5)				
Dubai, UAE	71 (1.1)	r	62 (1.5)	r	64 (1.4)	r	26 (1.6)	r	47 (1.6)	
Massachusetts, US	75 (1.3)		64 (1.9)	54 (2.5)	20 (1.3)	51 (1.8)				
Minnesota, US	75 (1.7)		63 (2.1)	57 (2.0)	24 (1.4)	43 (2.0)				
Ontario, Canada	69 (1.1)		38 (2.0)	53 (2.1)	28 (1.8)	53 (1.7)				
Quebec, Canada	79 (1.3)		61 (1.8)	54 (1.7)	24 (1.3)	38 (1.4)				

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

Background data provided by students.

() 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.

Exhibit 7.4 Students' Reports on Mathematics Content-related Emphasis in Classroom Activities (Continued)
TIMSS2007
Mathematics 8th Grade

Country	Percentage of Students Who Reported Doing the Activity About Half of the Lessons or More				
	Practice Adding, Subtracting, Multiplying, and Dividing Without Using Calculator	Work on Fractions and Decimals	Write Equations and Functions to Represent Relationships	Solve Problems About Geometric Shapes, Lines, and Angles	Interpret Data in Tables, Charts, or Graphs
Algeria	47 (1.0)	38 (1.0)	53 (1.0)	58 (0.9)	53 (0.9)
Armenia	59 (1.2)	54 (1.0)	67 (1.1)	77 (0.8)	47 (1.3)
Australia	45 (1.3)	43 (1.1)	45 (1.4)	39 (1.2)	40 (1.3)
Bahrain	70 (0.9)	40 (0.9)	67 (0.9)	63 (1.0)	56 (0.9)
Bosnia and Herzegovina	62 (1.3)	55 (1.1)	57 (1.1)	63 (1.0)	41 (0.9)
Botswana	63 (0.8)	38 (0.8)	37 (0.9)	37 (0.9)	31 (0.9)
Bulgaria	70 (1.0)	54 (1.3)	64 (1.2)	86 (0.9)	43 (1.3)
Chinese Taipei	60 (0.9)	29 (1.0)	36 (0.9)	57 (1.2)	35 (1.0)
Colombia	69 (1.3)	67 (1.3)	70 (1.1)	55 (2.0)	57 (1.2)
Cyprus	65 (0.8)	42 (0.9)	54 (0.9)	54 (1.0)	43 (0.9)
Czech Republic	44 (1.4)	58 (1.2)	61 (1.4)	51 (2.0)	17 (1.0)
Egypt	67 (1.1)	58 (1.3)	70 (1.0)	75 (0.8)	66 (1.2)
El Salvador	64 (1.2)	66 (1.2)	58 (1.2)	49 (1.5)	47 (1.1)
England	46 (1.3)	36 (1.1)	37 (1.3)	29 (1.2)	30 (1.2)
Georgia	54 (1.5)	57 (1.4)	58 (1.3)	76 (1.2)	50 (1.3)
Ghana	61 (1.6)	57 (1.4)	53 (1.5)	51 (1.6)	49 (1.6)
Hong Kong SAR	41 (1.0)	35 (1.0)	40 (1.1)	51 (1.2)	35 (1.0)
Hungary	60 (1.3)	62 (1.5)	60 (1.4)	56 (1.4)	35 (1.4)
Indonesia	61 (1.3)	54 (1.2)	50 (1.3)	65 (1.1)	49 (1.3)
Iran, Islamic Rep. of	54 (1.7)	41 (1.2)	48 (1.3)	46 (1.2)	46 (1.5)
Israel	60 (1.2)	39 (1.2)	63 (1.2)	78 (0.9)	56 (1.4)
Italy	43 (1.4)	43 (1.2)	66 (1.4)	79 (1.0)	35 (1.8)
Japan	--	89 (0.6)	49 (1.0)	45 (1.1)	69 (1.0)
Jordan	69 (1.1)	63 (1.3)	71 (1.2)	73 (1.1)	66 (1.0)
Korea, Rep. of	82 (0.6)	35 (0.8)	44 (1.0)	54 (0.9)	27 (0.8)
Kuwait	69 (0.9)	43 (0.9)	68 (0.9)	63 (0.9)	64 (1.0)
Lebanon	62 (1.4)	59 (1.4)	66 (1.2)	74 (1.2)	48 (1.7)
Lithuania	48 (1.5)	58 (1.2)	68 (1.0)	54 (1.4)	43 (1.3)
Malaysia	60 (1.0)	56 (1.0)	41 (1.0)	54 (0.9)	42 (1.0)
Malta	35 (0.7)	26 (0.6)	41 (0.6)	34 (0.7)	22 (0.5)
Norway	24 (0.7)	26 (1.0)	25 (1.1)	31 (1.2)	27 (1.2)
Oman	53 (1.1)	49 (1.2)	67 (1.1)	57 (1.2)	56 (1.1)
Palestinian Nat'l Auth.	62 (1.3)	48 (1.5)	54 (1.6)	60 (1.4)	44 (1.3)
Qatar	77 (0.5)	60 (0.6)	69 (0.7)	53 (0.6)	57 (0.5)
Romania	74 (1.3)	65 (1.1)	73 (1.2)	82 (1.2)	42 (1.4)
Russian Federation	74 (1.0)	67 (1.1)	70 (1.2)	86 (0.8)	50 (1.1)
Saudi Arabia	57 (1.1)	40 (1.4)	62 (1.1)	62 (1.4)	53 (1.4)
Scotland	59 (1.1)	45 (1.2)	42 (1.2)	34 (1.2)	31 (1.0)
Serbia	66 (1.2)	59 (1.3)	57 (1.2)	62 (1.1)	36 (1.5)
Singapore	51 (0.9)	57 (0.9)	62 (0.9)	47 (0.8)	41 (1.0)
Slovenia	61 (1.0)	68 (1.0)	57 (1.1)	47 (1.2)	47 (1.3)
Sweden	42 (1.2)	39 (1.0)	32 (1.1)	29 (0.9)	25 (0.9)
Syrian Arab Republic	63 (0.9)	46 (1.1)	74 (1.0)	71 (1.0)	53 (1.1)
Thailand	70 (1.1)	65 (1.0)	48 (1.1)	53 (0.9)	48 (1.0)
Tunisia	59 (1.2)	64 (1.1)	61 (1.2)	58 (1.1)	45 (1.2)
Turkey	66 (1.1)	43 (1.0)	59 (1.2)	62 (1.0)	46 (1.2)
Ukraine	73 (1.0)	62 (1.2)	73 (1.0)	80 (1.1)	56 (1.1)
United States	62 (0.8)	63 (0.9)	73 (0.9)	49 (1.0)	57 (1.1)
‡ Morocco	54 (1.2)	49 (1.5)	65 (1.3)	54 (1.6)	46 (1.2)
International Avg.	59 (0.2)	51 (0.2)	57 (0.2)	58 (0.2)	45 (0.2)
Benchmarking Participants					
Basque Country, Spain	81 (1.5)	75 (1.1)	79 (1.2)	62 (2.3)	53 (1.8)
British Columbia, Canada	50 (1.8)	49 (1.5)	52 (1.3)	38 (1.4)	33 (1.2)
Dubai, UAE	63 (1.2)	55 (1.0)	66 (1.1)	57 (1.6)	r 40 (1.7)
Massachusetts, US	59 (2.0)	58 (2.2)	76 (1.8)	46 (2.5)	60 (2.2)
Minnesota, US	53 (1.7)	63 (2.0)	72 (2.2)	47 (2.3)	58 (2.5)
Ontario, Canada	42 (1.5)	43 (1.6)	51 (1.3)	37 (1.3)	45 (1.4)
Quebec, Canada	43 (1.2)	36 (1.2)	56 (1.3)	54 (1.7)	41 (1.4)

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

Background data provided by students.

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

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

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

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



Exhibit 7.5 Teachers' Reports on Mathematics Content-related Emphasis in Students' Classroom Activities
TIMSS2007
Mathematics **4th**
Grade

Country	Percentage of Students Whose Teachers Reported Students Doing the Activity About Half of the Lessons or More					
	Practice Adding, Subtracting, Multiplying, and Dividing Without Using Calculator	Work on Fractions and Decimals	Write Equations for Word Problems	Learn About Shapes such as Circles, Triangles, Rectangles, and Cubes	Measure Things in the Classroom and Around the School	Make Tables, Charts, or Graphs
Algeria	66 (4.3)	35 (4.8)	28 (5.1)	26 (4.9)	17 (4.6)	26 (5.0)
Armenia	56 (3.2)	60 (3.6)	57 (3.5)	50 (3.6)	53 (3.8)	56 (3.6)
Australia	83 (3.1)	19 (2.6)	34 (3.8)	15 (3.2)	8 (2.5)	10 (3.0)
Austria	92 (1.6)	3 (0.8)	25 (2.8)	6 (1.4)	4 (1.3)	1 (0.7)
Chinese Taipei	72 (3.5)	25 (3.6)	68 (3.3)	16 (3.1)	12 (2.9)	12 (2.9)
Colombia	83 (3.6)	36 (3.7)	26 (3.8)	27 (3.7)	26 (4.4)	30 (3.6)
Czech Republic	96 (1.7)	1 (0.4)	40 (4.3)	20 (3.0)	2 (0.7)	2 (1.1)
Denmark	69 (4.2)	17 (3.1)	3 (1.5)	14 (3.2)	3 (1.7)	6 (1.8)
El Salvador	61 (3.9)	22 (3.2)	13 (3.0)	31 (4.2)	20 (3.4)	18 (3.2)
England	81 (2.8)	23 (3.4)	36 (4.3)	2 (0.8)	1 (0.8)	4 (1.5)
Georgia	95 (1.6)	17 (3.3)	38 (4.4)	32 (4.4)	4 (1.6)	13 (3.0)
Germany	95 (1.1)	2 (0.8)	41 (3.2)	7 (1.7)	1 (0.0)	2 (1.1)
Hong Kong SAR	50 (3.6)	24 (3.7)	18 (3.0)	9 (2.3)	8 (2.2)	7 (2.1)
Hungary	96 (1.0)	3 (1.2)	58 (4.0)	2 (1.0)	4 (1.7)	1 (0.6)
Iran, Islamic Rep. of	69 (3.8)	23 (3.3)	22 (3.2)	33 (4.0)	25 (3.0)	24 (3.4)
Italy	78 (2.2)	44 (3.0)	12 (1.9)	24 (2.6)	8 (1.6)	16 (2.3)
Japan	90 (2.3)	50 (3.5)	82 (3.1)	32 (3.4)	13 (2.6)	34 (3.6)
Kazakhstan	97 (1.3)	29 (4.1)	57 (4.4)	45 (5.4)	5 (1.7)	24 (4.8)
Kuwait	r 80 (3.6)	r 26 (3.7)	r 32 (3.8)	r 29 (4.0)	r 17 (3.3)	r 10 (2.6)
Latvia	95 (1.4)	16 (3.2)	35 (3.7)	29 (3.5)	9 (2.4)	20 (3.3)
Lithuania	99 (0.9)	20 (2.9)	19 (2.7)	11 (2.3)	3 (1.1)	17 (2.8)
Morocco	72 (3.7)	16 (3.5)	21 (3.1)	27 (3.5)	18 (3.0)	24 (3.8)
Netherlands	93 (2.3)	21 (3.5)	4 (1.8)	1 (0.4)	1 (0.9)	5 (1.6)
New Zealand	84 (1.8)	21 (2.2)	37 (2.8)	4 (1.3)	3 (0.7)	5 (1.0)
Norway	66 (3.1)	5 (1.6)	3 (1.2)	4 (1.5)	1 (0.8)	1 (0.7)
Qatar	87 (0.1)	25 (0.2)	32 (0.2)	20 (0.2)	18 (0.1)	10 (0.1)
Russian Federation	97 (0.8)	14 (2.1)	17 (2.2)	47 (3.1)	3 (1.2)	45 (3.2)
Scotland	80 (3.2)	8 (2.4)	9 (2.2)	3 (1.6)	1 (0.8)	2 (1.0)
Singapore	73 (2.4)	48 (2.6)	52 (2.9)	13 (1.8)	9 (1.8)	9 (1.6)
Slovak Republic	97 (1.0)	1 (0.6)	62 (3.7)	40 (3.7)	3 (1.0)	4 (1.6)
Slovenia	86 (2.3)	2 (0.9)	16 (2.2)	5 (1.4)	5 (1.0)	6 (1.4)
Sweden	75 (3.4)	3 (1.0)	5 (1.5)	4 (1.3)	5 (1.5)	2 (0.9)
Tunisia	69 (3.5)	r 24 (3.5)	43 (3.7)	27 (3.5)	28 (3.4)	32 (3.7)
Ukraine	95 (1.4)	14 (2.6)	72 (3.7)	43 (3.7)	9 (2.4)	13 (2.8)
United States	83 (1.7)	25 (2.4)	51 (2.4)	11 (1.8)	7 (1.5)	14 (1.9)
Yemen	67 (4.4)	40 (4.5)	16 (3.2)	27 (4.4)	15 (3.2)	16 (3.6)
International Avg.	81 (0.5)	21 (0.5)	33 (0.5)	20 (0.5)	10 (0.4)	15 (0.4)

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

Benchmarking Participants

Alberta, Canada	78 (3.5)	7 (2.2)	36 (3.9)	7 (2.2)	5 (1.8)	12 (2.7)
British Columbia, Canada	r 74 (3.3)	r 7 (2.9)	r 49 (4.1)	r 3 (1.3)	r 2 (1.0)	r 9 (2.2)
Dubai, UAE	s 88 (2.3)	s 30 (6.1)	s 27 (5.6)	s 11 (2.9)	s 7 (2.4)	s 20 (3.9)
Massachusetts, US	72 (6.0)	23 (6.5)	42 (6.4)	10 (4.7)	5 (3.5)	13 (4.7)
Minnesota, US	92 (3.4)	22 (6.0)	39 (6.3)	10 (5.0)	1 (0.8)	11 (5.6)
Ontario, Canada	61 (4.0)	7 (2.0)	35 (4.1)	7 (2.2)	6 (2.0)	21 (3.8)
Quebec, Canada	77 (3.6)	23 (3.6)	56 (4.3)	10 (2.3)	3 (1.4)	8 (1.9)

Background data provided by teachers.

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

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

Exhibit 7.5 Teachers' Reports on Mathematics Content-related Emphasis in Students' Classroom Activities (Continued)

TIMSS2007
Mathematics **8th** Grade

Country	Percentage of Students Whose Teachers Reported Students Doing the Activity About Half of the Lessons or More				
	Practice Adding, Subtracting, Multiplying, and Dividing Without Using Calculator	Work on Fractions and Decimals	Write Equations and Functions to Represent Relationships	Use Knowledge of the Properties of Shapes, Lines, and Angles to Solve Problems	Interpret Data in Tables, Charts, or Graphs
Algeria	40 (4.5)	24 (3.6)	26 (3.7)	38 (4.6)	25 (3.8)
Armenia	51 (3.9)	53 (3.5)	54 (4.0)	61 (3.6)	58 (3.6)
Australia	45 (3.8)	18 (3.2)	15 (2.6)	6 (1.9)	7 (1.9)
Bahrain	82 (1.5)	32 (3.2)	26 (2.2)	26 (2.4)	17 (1.9)
Bosnia and Herzegovina	63 (4.2)	55 (4.0)	36 (3.5)	33 (3.9)	12 (2.4)
Botswana	85 (3.1)	27 (3.8)	14 (3.0)	11 (3.0)	6 (2.2)
Bulgaria	82 (3.5)	71 (3.8)	38 (3.8)	88 (3.0)	15 (2.7)
Chinese Taipei	70 (3.8)	19 (3.5)	28 (3.4)	38 (4.0)	12 (2.7)
Colombia	78 (4.1)	70 (4.5)	42 (4.9)	31 (4.3)	29 (5.3)
Cyprus	71 (2.7)	34 (2.4)	47 (2.5)	31 (2.6)	10 (1.7)
Czech Republic	68 (3.3)	62 (4.4)	24 (3.5)	25 (3.4)	4 (1.7)
Egypt	44 (3.8)	33 (4.0)	28 (3.5)	40 (4.1)	13 (2.3)
El Salvador	69 (4.0)	44 (4.1)	24 (4.0)	14 (3.1)	23 (3.5)
England	48 (4.0)	17 (3.3)	9 (2.2)	3 (1.5)	3 (1.5)
Georgia	60 (4.8)	47 (4.7)	24 (3.8)	28 (4.2)	10 (2.2)
Ghana	90 (2.5)	41 (4.5)	29 (3.7)	22 (3.4)	20 (3.1)
Hong Kong SAR	22 (3.4)	11 (2.7)	31 (3.8)	18 (3.4)	11 (2.7)
Hungary	72 (3.7)	78 (3.2)	44 (4.0)	31 (3.5)	13 (2.3)
Indonesia	64 (3.3)	31 (4.0)	50 (4.4)	34 (4.3)	26 (4.2)
Iran, Islamic Rep. of	70 (3.8)	41 (3.6)	19 (2.9)	28 (3.1)	21 (3.5)
Israel	r 51 (3.7)	r 31 (3.3)	r 44 (4.1)	r 38 (3.8)	r 12 (2.0)
Italy	58 (3.6)	65 (3.4)	27 (2.9)	74 (2.9)	20 (2.5)
Japan	53 (4.1)	16 (2.7)	63 (3.7)	54 (3.7)	23 (3.4)
Jordan	75 (3.3)	55 (4.1)	51 (4.2)	36 (3.9)	19 (3.4)
Korea, Rep. of	53 (3.5)	31 (3.4)	64 (3.4)	56 (3.8)	30 (3.6)
Kuwait	r 71 (4.5)	r 35 (4.1)	r 27 (4.2)	r 24 (4.2)	r 22 (4.1)
Lebanon	55 (3.7)	48 (4.8)	42 (4.8)	64 (4.3)	30 (3.9)
Lithuania	69 (3.1)	70 (3.4)	22 (3.2)	27 (3.1)	12 (2.4)
Malaysia	75 (3.5)	37 (4.1)	37 (3.9)	26 (3.7)	21 (3.3)
Malta	61 (0.2)	30 (0.2)	24 (0.2)	26 (0.2)	3 (0.1)
Norway	9 (2.0)	11 (2.2)	4 (1.2)	5 (1.4)	3 (1.1)
Oman	73 (3.9)	36 (4.3)	34 (4.3)	28 (3.6)	20 (3.1)
Palestinian Nat'l Auth.	76 (3.5)	44 (4.5)	30 (4.0)	37 (4.4)	11 (2.9)
Qatar	72 (0.2)	33 (0.1)	27 (0.2)	21 (0.1)	19 (0.1)
Romania	93 (1.7)	70 (3.8)	38 (3.8)	79 (2.7)	15 (2.7)
Russian Federation	85 (2.4)	77 (3.2)	56 (3.7)	76 (2.6)	26 (3.2)
Saudi Arabia	r 76 (4.0)	r 27 (3.4)	r 39 (4.7)	r 35 (4.0)	r 27 (4.0)
Scotland	73 (3.8)	37 (3.5)	8 (1.7)	6 (1.6)	5 (1.4)
Serbia	81 (3.2)	65 (3.8)	42 (3.9)	50 (3.9)	2 (0.9)
Singapore	41 (2.8)	24 (2.5)	39 (2.7)	12 (2.1)	9 (1.5)
Slovenia	73 (2.6)	64 (3.0)	13 (1.7)	23 (2.6)	14 (1.9)
Sweden	38 (3.0)	29 (3.0)	9 (1.8)	12 (2.1)	6 (1.5)
Syrian Arab Republic	69 (3.7)	33 (4.0)	53 (4.0)	53 (4.3)	27 (3.8)
Thailand	75 (3.5)	43 (4.1)	41 (4.1)	35 (4.0)	37 (4.1)
Tunisia	75 (3.6)	47 (4.1)	26 (3.8)	45 (4.2)	10 (2.6)
Turkey	72 (4.4)	35 (4.3)	48 (4.5)	26 (3.8)	18 (3.6)
Ukraine	83 (3.2)	85 (3.1)	59 (4.3)	62 (4.1)	11 (2.4)
United States	59 (2.7)	44 (3.0)	46 (2.7)	12 (1.8)	16 (2.0)
‡ Morocco	63 (4.5)	42 (5.4)	30 (5.6)	31 (5.9)	16 (5.0)
International Avg.	65 (0.5)	42 (0.5)	34 (0.5)	34 (0.5)	17 (0.4)
Benchmarking Participants					
Basque Country, Spain	76 (3.9)	62 (4.2)	35 (4.0)	12 (3.1)	12 (3.0)
British Columbia, Canada	59 (4.2)	39 (4.7)	24 (3.4)	6 (2.0)	5 (1.7)
Dubai, UAE	s 71 (5.0)	s 47 (4.0)	s 32 (4.8)	s 34 (4.9)	s 13 (3.5)
Massachusetts, US	56 (6.4)	38 (6.7)	48 (6.0)	12 (3.7)	23 (5.2)
Minnesota, US	41 (7.5)	31 (5.2)	42 (5.3)	13 (3.7)	18 (5.5)
Ontario, Canada	37 (4.0)	23 (4.1)	23 (3.6)	11 (2.2)	19 (3.1)
Quebec, Canada	22 (3.4)	42 (4.1)	48 (4.6)	20 (3.8)	14 (3.3)

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.



Exhibit 7.6 Students' Reports on Learning Activities in Mathematics Lessons

TIMSS2007
Mathematics 4th Grade

Country	Percentage of Students Who Reported Doing the Activity About Half of the Lessons or More		
	Memorize How to Work Problems	Work Problems on Their Own	Explain Answers
Algeria	72 (2.0)	72 (1.7)	72 (1.6)
Armenia	r 78 (1.2)	r 77 (1.1)	r 73 (1.3)
Australia	73 (1.2)	74 (1.2)	53 (1.3)
Austria	67 (1.0)	88 (0.5)	50 (1.0)
Chinese Taipei	71 (0.9)	69 (1.0)	47 (1.1)
Colombia	83 (0.7)	84 (0.9)	74 (1.2)
Czech Republic	57 (1.4)	76 (0.9)	44 (1.3)
Denmark	53 (1.6)	60 (1.5)	44 (1.6)
El Salvador	74 (1.1)	76 (1.0)	71 (1.2)
England	65 (1.0)	69 (1.1)	61 (1.3)
Georgia	85 (0.9)	84 (0.9)	77 (1.2)
Germany	r 74 (0.9)	89 (0.6)	64 (0.9)
Hong Kong SAR	75 (1.0)	70 (0.9)	46 (1.1)
Hungary	68 (1.0)	80 (0.8)	54 (1.3)
Iran, Islamic Rep. of	52 (2.3)	59 (2.0)	73 (1.8)
Italy	61 (1.4)	78 (0.8)	46 (1.1)
Japan	89 (0.7)	92 (0.5)	59 (1.2)
Kazakhstan	87 (1.3)	86 (1.3)	78 (1.8)
Kuwait	82 (1.2)	82 (1.0)	75 (1.6)
Latvia	71 (1.1)	87 (0.8)	60 (1.3)
Lithuania	85 (0.8)	82 (1.0)	57 (1.0)
Morocco	66 (2.4)	72 (1.9)	73 (2.0)
Netherlands	77 (1.1)	58 (1.1)	36 (1.2)
New Zealand	78 (0.9)	74 (0.8)	67 (1.0)
Norway	57 (1.2)	74 (1.0)	42 (1.2)
Qatar	86 (0.4)	82 (0.5)	77 (0.5)
Russian Federation	68 (2.1)	79 (1.4)	75 (1.2)
Scotland	64 (1.1)	78 (1.0)	45 (1.4)
Singapore	76 (0.7)	75 (0.9)	47 (0.8)
Slovak Republic	61 (1.7)	82 (1.2)	55 (1.5)
Slovenia	88 (0.6)	71 (1.0)	63 (1.0)
Sweden	62 (1.1)	77 (0.8)	66 (1.1)
Tunisia	81 (1.9)	73 (1.7)	71 (2.1)
Ukraine	73 (1.5)	82 (1.0)	80 (0.9)
United States	83 (0.5)	78 (0.6)	63 (0.8)
Yemen	r 64 (2.2)	r 60 (2.5)	r 52 (2.7)
International Avg.	72 (0.2)	76 (0.2)	61 (0.2)
Benchmarking Participants			
Alberta, Canada	78 (1.3)	80 (0.9)	69 (1.2)
British Columbia, Canada	75 (1.2)	80 (1.0)	66 (1.3)
Dubai, UAE	r 76 (1.2)	r 79 (1.0)	r 68 (1.6)
Massachusetts, US	80 (0.9)	80 (1.3)	76 (1.2)
Minnesota, US	86 (1.2)	79 (1.4)	68 (2.3)
Ontario, Canada	72 (1.2)	76 (1.3)	76 (1.2)
Quebec, Canada	75 (1.3)	82 (1.4)	67 (1.5)

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

Background data provided by students.

() 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.

Exhibit 7.6 Students' Reports on Learning Activities in Mathematics Lessons (Continued)

TIMSS2007
Mathematics 8th Grade

Country	Percentage of Students Who Reported Doing the Activity About Half of the Lessons or More				
	Memorize Formulas and Procedures	Work Problems on Their Own	Explain Answers	Relate What Is Being Learned in Mathematics to Their Daily Lives	Decide Procedures for Solving Complex Problems
Algeria	57 (1.2)	57 (0.9)	79 (0.8)	57 (1.1)	53 (1.1)
Armenia	80 (1.0)	r 70 (1.0)	r 76 (1.3)	46 (1.1)	58 (1.0)
Australia	51 (1.0)	70 (1.2)	71 (0.9)	42 (1.2)	40 (1.4)
Bahrain	70 (1.1)	68 (0.8)	73 (0.9)	60 (0.9)	61 (1.1)
Bosnia and Herzegovina	68 (1.1)	45 (1.0)	66 (1.1)	55 (1.2)	52 (1.0)
Botswana	39 (1.1)	42 (0.9)	78 (0.7)	62 (1.0)	40 (0.9)
Bulgaria	62 (1.5)	70 (0.9)	69 (1.2)	35 (1.2)	33 (1.2)
Chinese Taipei	48 (1.2)	52 (1.1)	33 (1.1)	31 (0.9)	44 (1.1)
Colombia	70 (1.1)	55 (1.2)	73 (1.1)	58 (1.5)	68 (1.1)
Cyprus	61 (0.9)	63 (0.8)	83 (0.7)	60 (0.9)	43 (0.8)
Czech Republic	60 (1.1)	82 (0.8)	63 (1.2)	43 (1.2)	42 (1.1)
Egypt	69 (1.0)	70 (1.0)	80 (0.7)	70 (0.9)	72 (1.0)
El Salvador	71 (1.0)	71 (0.8)	65 (1.1)	59 (1.0)	52 (1.1)
England	32 (1.1)	68 (1.1)	67 (1.1)	34 (1.1)	35 (1.1)
Georgia	79 (1.0)	27 (1.1)	76 (1.3)	53 (1.6)	43 (1.1)
Ghana	61 (1.5)	57 (1.2)	79 (1.0)	75 (1.0)	56 (1.4)
Hong Kong SAR	47 (1.2)	53 (1.1)	60 (0.9)	41 (1.2)	51 (1.1)
Hungary	50 (1.3)	72 (1.5)	61 (1.3)	47 (1.3)	41 (1.1)
Indonesia	68 (1.3)	66 (1.2)	56 (1.1)	47 (1.2)	37 (1.2)
Iran, Islamic Rep. of	57 (1.5)	54 (1.2)	74 (1.0)	56 (1.3)	38 (1.0)
Israel	76 (1.0)	84 (0.8)	81 (1.0)	52 (1.2)	63 (1.1)
Italy	73 (1.2)	71 (1.0)	52 (1.2)	43 (1.0)	55 (1.0)
Japan	68 (0.9)	92 (0.5)	76 (0.9)	43 (1.5)	30 (0.9)
Jordan	84 (0.8)	82 (0.9)	84 (0.8)	71 (1.2)	70 (1.0)
Korea, Rep. of	48 (0.9)	67 (0.9)	31 (0.9)	21 (0.7)	33 (0.9)
Kuwait	70 (1.0)	72 (0.8)	73 (0.8)	59 (1.0)	63 (0.9)
Lebanon	67 (1.4)	63 (1.5)	80 (1.2)	58 (1.3)	60 (1.4)
Lithuania	50 (1.3)	72 (1.2)	53 (1.4)	34 (1.1)	38 (1.3)
Malaysia	69 (1.4)	48 (1.2)	61 (1.3)	55 (1.0)	36 (1.0)
Malta	45 (0.6)	51 (0.7)	67 (0.7)	37 (0.7)	32 (0.6)
Norway	33 (0.9)	76 (0.9)	49 (1.1)	42 (0.9)	37 (0.9)
Oman	78 (0.8)	66 (1.2)	78 (0.9)	71 (0.8)	61 (1.1)
Palestinian Nat'l Auth.	67 (1.2)	57 (1.4)	79 (1.0)	60 (1.7)	56 (1.4)
Qatar	65 (0.5)	67 (0.6)	74 (0.6)	64 (0.7)	63 (0.6)
Romania	78 (1.4)	52 (1.1)	74 (1.2)	38 (1.3)	45 (1.1)
Russian Federation	83 (0.9)	75 (0.9)	85 (1.0)	48 (1.3)	60 (1.4)
Saudi Arabia	60 (1.0)	58 (1.1)	70 (1.0)	55 (1.3)	55 (1.2)
Scotland	44 (1.1)	69 (0.9)	75 (1.0)	45 (1.1)	40 (1.0)
Serbia	50 (1.5)	41 (1.0)	55 (1.2)	43 (1.3)	51 (1.4)
Singapore	72 (0.8)	60 (0.9)	60 (0.8)	46 (1.0)	50 (0.9)
Slovenia	80 (0.9)	68 (1.0)	70 (0.8)	58 (1.1)	56 (1.1)
Sweden	41 (1.0)	83 (0.6)	63 (1.0)	39 (1.1)	48 (1.0)
Syrian Arab Republic	75 (0.8)	62 (1.0)	80 (0.8)	55 (1.2)	61 (1.0)
Thailand	66 (0.9)	61 (1.1)	57 (1.0)	67 (0.9)	53 (1.0)
Tunisia	68 (1.2)	57 (1.0)	81 (0.9)	54 (1.3)	57 (1.1)
Turkey	56 (1.2)	62 (1.0)	82 (0.9)	59 (1.1)	50 (1.1)
Ukraine	82 (1.0)	72 (1.1)	89 (0.6)	51 (1.2)	54 (1.2)
United States	72 (0.8)	83 (0.6)	79 (0.7)	47 (1.0)	46 (0.8)
‡ Morocco	61 (1.0)	64 (1.5)	79 (0.9)	62 (1.2)	61 (1.1)
International Avg.	63 (0.2)	64 (0.1)	70 (0.1)	51 (0.2)	50 (0.2)
Benchmarking Participants					
Basque Country, Spain	77 (1.4)	73 (1.2)	70 (1.6)	56 (1.8)	56 (1.8)
British Columbia, Canada	62 (1.2)	77 (0.9)	79 (1.0)	42 (1.1)	41 (1.4)
Dubai, UAE	72 (1.1)	72 (0.9)	75 (1.1)	54 (1.2)	r 50 (1.2)
Massachusetts, US	67 (1.9)	80 (1.2)	84 (1.5)	48 (2.4)	48 (1.8)
Minnesota, US	68 (2.0)	82 (1.3)	77 (2.0)	51 (2.0)	43 (1.2)
Ontario, Canada	69 (1.3)	76 (1.0)	87 (1.1)	50 (1.5)	49 (1.4)
Quebec, Canada	53 (1.5)	77 (1.0)	72 (1.3)	40 (1.3)	57 (1.2)

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

Background data provided by students.

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

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

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



Exhibit 7.7 Teachers' Reports on Learning Activities in Mathematics Lessons

TIMSS2007
Mathematics 4th Grade

Country	Percentage of Students Whose Teachers Reported Students Doing the Activity About Half of the Lessons or More		
	Memorize Formulas and Procedures	Explain Answers	Relate What Is Being Learned in Mathematics to Their Daily Lives
Algeria	72 (4.2)	70 (4.5)	73 (4.9)
Armenia	54 (3.4)	61 (3.5)	53 (4.0)
Australia	16 (3.3)	73 (3.5)	60 (3.6)
Austria	10 (1.9)	43 (3.2)	53 (3.0)
Chinese Taipei	27 (3.7)	63 (3.9)	54 (3.7)
Colombia	47 (4.5)	86 (3.0)	92 (2.3)
Czech Republic	8 (2.1)	77 (3.8)	71 (3.9)
Denmark	12 (2.3)	67 (4.1)	43 (4.3)
El Salvador	43 (4.6)	66 (4.0)	74 (4.1)
England	22 (3.4)	87 (2.6)	68 (3.9)
Georgia	62 (4.8)	84 (3.2)	69 (5.0)
Germany	9 (2.1)	69 (3.2)	47 (3.1)
Hong Kong SAR	26 (3.6)	53 (4.0)	55 (4.0)
Hungary	18 (3.1)	89 (2.3)	77 (3.4)
Iran, Islamic Rep. of	35 (3.7)	76 (3.0)	67 (3.7)
Italy	54 (3.5)	80 (2.2)	72 (2.7)
Japan	72 (3.0)	77 (3.2)	42 (3.9)
Kazakhstan	74 (4.2)	96 (1.3)	82 (4.1)
Kuwait	r 56 (4.3)	r 62 (4.3)	r 64 (4.1)
Latvia	64 (3.8)	86 (2.6)	94 (1.7)
Lithuania	45 (3.9)	93 (1.9)	80 (2.7)
Morocco	70 (3.6)	76 (3.3)	74 (3.5)
Netherlands	28 (4.2)	70 (4.1)	50 (4.4)
New Zealand	13 (2.2)	91 (1.8)	72 (2.5)
Norway	9 (1.9)	46 (3.4)	46 (3.8)
Qatar	61 (0.2)	73 (0.2)	87 (0.1)
Russian Federation	46 (3.2)	100 (0.4)	71 (3.2)
Scotland	22 (3.7)	71 (3.9)	54 (3.9)
Singapore	33 (2.8)	64 (2.7)	49 (3.0)
Slovak Republic	10 (2.1)	77 (3.1)	77 (2.2)
Slovenia	28 (3.1)	78 (2.6)	73 (2.8)
Sweden	7 (1.6)	67 (3.4)	49 (3.7)
Tunisia	74 (3.4)	69 (3.6)	67 (3.6)
Ukraine	69 (3.3)	97 (1.2)	85 (2.4)
United States	35 (2.6)	81 (2.0)	65 (2.5)
Yemen	44 (4.7)	57 (4.5)	61 (4.5)
International Avg.	38 (0.6)	74 (0.5)	66 (0.6)
Benchmarking Participants			
Alberta, Canada	18 (3.5)	64 (4.2)	60 (3.7)
British Columbia, Canada	r 9 (2.0)	r 71 (3.6)	r 49 (4.4)
Dubai, UAE	s 44 (6.3)	s 79 (4.9)	s 73 (5.0)
Massachusetts, US	27 (5.8)	92 (3.2)	70 (5.7)
Minnesota, US	29 (4.9)	70 (6.6)	63 (5.7)
Ontario, Canada	18 (3.5)	81 (4.4)	62 (4.7)
Quebec, Canada	22 (2.8)	73 (3.5)	58 (3.9)

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.

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

Exhibit 7.7 Teachers' Reports on Learning Activities in Mathematics Lessons (Continued)

TIMSS2007
Mathematics 8th Grade

Country	Percentage of Students Whose Teachers Reported Students Doing the Activity About Half of the Lessons or More					
	Memorize Formulas and Procedures	Apply Facts, Concepts, and Procedures to Solve Routine Problems	Explain Answers	Relate What Is Being Learned in Mathematics to Their Daily Lives	Decide Procedures for Solving Complex Problems	Work on Problems for Which There Is No Immediately Obvious Solution
Algeria	64 (4.4)	66 (4.2)	80 (3.8)	70 (4.2)	44 (4.7)	21 (3.7)
Armenia	56 (4.1)	50 (4.2)	51 (3.9)	43 (4.1)	44 (3.4)	47 (3.6)
Australia	31 (4.2)	55 (4.2)	62 (4.0)	47 (3.6)	28 (3.3)	10 (2.5)
Bahrain	48 (3.1)	68 (3.0)	74 (2.7)	59 (2.9)	40 (2.1)	26 (2.8)
Bosnia and Herzegovina	42 (3.8)	59 (4.3)	77 (3.3)	71 (3.7)	43 (3.8)	18 (3.0)
Botswana	37 (3.9)	59 (4.7)	74 (4.0)	71 (4.0)	39 (4.5)	19 (3.1)
Bulgaria	82 (3.0)	81 (3.6)	94 (1.4)	57 (4.4)	43 (4.0)	29 (3.7)
Chinese Taipei	12 (2.8)	60 (4.1)	47 (4.2)	35 (4.2)	25 (3.9)	9 (2.4)
Colombia	31 (5.5)	83 (3.1)	92 (2.5)	88 (2.5)	66 (4.4)	33 (4.9)
Cyprus	60 (3.0)	75 (2.2)	96 (0.6)	76 (2.4)	66 (3.0)	24 (2.0)
Czech Republic	11 (2.6)	68 (3.8)	86 (2.4)	77 (3.0)	55 (3.7)	18 (2.6)
Egypt	55 (3.6)	62 (4.2)	74 (3.9)	63 (3.9)	47 (4.4)	17 (3.0)
El Salvador	56 (4.1)	67 (4.0)	78 (3.4)	73 (4.3)	47 (4.6)	23 (3.4)
England	22 (3.3)	55 (3.9)	81 (3.1)	43 (3.5)	35 (3.4)	13 (3.0)
Georgia	75 (4.2)	67 (5.0)	86 (3.2)	61 (5.8)	30 (4.1)	19 (3.8)
Ghana	58 (4.1)	80 (3.3)	72 (3.9)	67 (4.2)	36 (3.8)	20 (3.0)
Hong Kong SAR	24 (3.7)	44 (4.1)	51 (4.6)	22 (3.2)	23 (3.7)	13 (3.0)
Hungary	40 (4.4)	79 (2.8)	96 (1.3)	81 (2.8)	57 (4.2)	22 (3.6)
Indonesia	51 (4.3)	65 (4.0)	66 (4.1)	54 (3.9)	30 (3.9)	18 (3.4)
Iran, Islamic Rep. of	33 (3.6)	71 (3.8)	90 (2.4)	64 (3.6)	47 (3.9)	30 (3.8)
Israel	r 44 (3.6)	r 59 (3.6)	r 81 (3.0)	r 41 (3.4)	r 52 (3.2)	r 24 (3.5)
Italy	33 (3.2)	75 (2.8)	90 (1.9)	52 (3.4)	59 (3.2)	36 (3.3)
Japan	56 (3.6)	66 (3.8)	54 (3.6)	20 (3.0)	21 (3.2)	23 (3.4)
Jordan	76 (3.8)	82 (3.0)	85 (2.7)	74 (3.7)	46 (4.2)	25 (3.8)
Korea, Rep. of	62 (3.4)	88 (2.5)	78 (3.1)	56 (3.7)	57 (3.8)	27 (3.2)
Kuwait	r 45 (4.8)	r 65 (4.5)	r 73 (4.5)	r 55 (4.7)	r 50 (4.5)	r 22 (4.1)
Lebanon	58 (4.3)	65 (4.6)	88 (3.4)	52 (4.4)	53 (4.6)	35 (4.8)
Lithuania	76 (3.3)	73 (2.9)	87 (2.6)	56 (3.6)	49 (3.5)	11 (2.3)
Malaysia	58 (3.8)	65 (4.1)	75 (3.7)	53 (4.3)	29 (3.4)	25 (3.4)
Malta	25 (0.2)	76 (0.2)	80 (0.2)	56 (0.2)	38 (0.2)	16 (0.2)
Norway	15 (2.6)	39 (3.5)	61 (3.3)	49 (3.9)	25 (2.6)	10 (2.0)
Oman	66 (4.4)	81 (3.3)	86 (2.6)	68 (4.1)	51 (4.4)	32 (4.2)
Palestinian Nat'l Auth.	64 (4.1)	78 (3.5)	80 (3.5)	60 (4.5)	41 (4.0)	23 (3.6)
Qatar	51 (0.2)	76 (0.1)	68 (0.1)	57 (0.2)	44 (0.2)	22 (0.1)
Romania	59 (3.7)	71 (3.5)	87 (2.6)	54 (4.4)	63 (4.1)	23 (3.3)
Russian Federation	72 (3.3)	92 (1.9)	95 (1.5)	38 (3.5)	13 (2.6)	8 (2.0)
Saudi Arabia	r 65 (4.5)	r 65 (4.0)	r 70 (4.1)	r 62 (4.6)	r 45 (4.8)	r 32 (4.8)
Scotland	r 25 (3.4)	r 60 (3.4)	r 76 (2.7)	r 48 (3.6)	r 26 (3.3)	r 13 (2.4)
Serbia	47 (4.2)	67 (3.9)	81 (4.1)	56 (4.3)	40 (3.8)	16 (2.8)
Singapore	27 (2.4)	65 (2.8)	53 (2.5)	34 (2.7)	21 (2.4)	10 (1.7)
Slovenia	39 (2.8)	76 (2.6)	80 (2.2)	70 (2.7)	45 (3.0)	26 (2.2)
Sweden	10 (1.7)	44 (2.6)	73 (2.5)	53 (3.2)	48 (2.2)	14 (2.1)
Syrian Arab Republic	80 (3.2)	81 (3.4)	76 (3.3)	47 (4.1)	44 (4.2)	33 (3.9)
Thailand	65 (4.2)	64 (3.9)	74 (3.4)	69 (3.7)	56 (4.1)	39 (3.9)
Tunisia	61 (4.3)	59 (4.3)	81 (3.4)	41 (3.9)	39 (3.8)	16 (3.3)
Turkey	65 (3.8)	62 (4.3)	87 (3.4)	58 (4.4)	58 (4.5)	37 (4.3)
Ukraine	68 (4.0)	92 (2.3)	95 (1.4)	60 (4.1)	34 (3.8)	10 (2.5)
United States	37 (2.6)	81 (1.9)	77 (2.3)	57 (2.9)	44 (2.6)	25 (2.2)
‡ Morocco	54 (6.2)	58 (6.0)	85 (3.4)	58 (5.6)	36 (4.2)	20 (4.1)
International Avg.	49 (0.5)	68 (0.5)	78 (0.4)	57 (0.5)	42 (0.5)	22 (0.5)
Benchmarking Participants						
Basque Country, Spain	33 (4.2)	75 (4.2)	92 (2.6)	64 (4.1)	45 (4.3)	9 (2.5)
British Columbia, Canada	17 (3.0)	65 (4.1)	73 (3.7)	52 (4.2)	39 (4.4)	18 (3.3)
Dubai, UAE	s 61 (5.8)	s 83 (3.1)	s 84 (5.0)	s 72 (4.7)	s 49 (3.8)	s 19 (4.1)
Massachusetts, US	28 (5.8)	75 (5.7)	83 (4.5)	56 (7.8)	57 (6.5)	28 (5.0)
Minnesota, US	35 (7.2)	69 (6.5)	66 (6.6)	50 (7.0)	31 (6.4)	18 (5.3)
Ontario, Canada	35 (4.4)	71 (4.6)	87 (3.2)	67 (4.3)	57 (4.6)	36 (4.8)
Quebec, Canada	39 (3.8)	85 (3.1)	74 (3.9)	62 (4.3)	44 (4.3)	50 (3.8)

Background data provided by teachers.

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

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

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

At the eighth grade, again students reported more memorization than teachers. Sixty-three percent reported memorizing how to work problems in at least half their mathematics lessons compared to 49 percent reported by teachers. There was closer agreement about doing problem-solving, even though somewhat smaller percentages of students reported doing several of the activities in at least half the lessons than did the teachers. For routine problem-solving, the students reported 64 percent and the teachers reported 68 percent; for explaining answers, the results were 70 and 78 percent; and for relating mathematics to students' daily lives, 51 and 57 percent. Students reported more emphasis on having to decide on procedures for solving complex problems than did teachers, 50 and 42 percent, respectively. Finally, only teachers were asked about the emphasis on asking students to work on problems for which there is no immediately obvious solution, and the teachers reported that only 22 percent of the students were asked to do so in at least half the lessons.

What Instructional Strategies Are Used in Mathematics Classes?

Exhibit 7.8 presents teachers' reports on the extent of their reliance on textbooks in teaching mathematics, and changes in this use since 2003. In most countries in 2007, the textbook remains the primary basis of mathematics instruction at both the fourth and eighth grades. On average internationally, 65 percent of the students at fourth grade and 60 percent at eighth grade had teachers who reported using a textbook as the primary basis of their lessons. For another 30 percent of the fourth grade students and 34 percent of the eighth grade students, teachers reported using textbooks as a supplementary resource.

There are some interesting trends at the fourth grade. For example, Armenia and Iran have textbooks for more students (increases to 83 and 100 percent), whereas England and New Zealand appear to be working towards only supplemental use or no use at all for almost all students (decreases to 15 and 5 percent with textbook as basis for instruction). Among the benchmarking participants, using the textbook as the basis of instruction increased in the Canadian provinces of Ontario and Quebec (29% and 21%, respectively). At the eighth grade, while Botswana, Tunisia, and the Basque Country in Spain increased the percentages of students for whom the textbook was used as the basis for mathematics instruction, six countries decreased the percentage of students—Bahrain, Cyprus, Jordan, Lithuania, the Palestinian National Authority, and Singapore.

Exhibit 7.9 provides a profile of the time spent on activities commonly encountered in mathematics classes around the world, as reported by mathematics teachers. At the fourth grade, internationally on average, the most time was spent on having students work on problems with teacher guidance (21%) and having students work on solving problems independently (22%). According to teachers, considerable time also was spent on listening to lectures (16%), and clarifications of content and procedures (13%). Together, these four activities accounted for 69 to 72 percent of the class time at both the fourth and eighth grades. At the eighth grade, the distribution involved slightly more time listening to lectures (20%) and slightly less on independent problem solving (16%).

Exhibit 7.8 Textbook Use in Teaching Mathematics with Trends

TIMSS2007
Mathematics 4th Grade

Country	Percentage of Students Taught by Teachers Reporting Textbook Use					
	Use Textbook to Teach Mathematics				Do Not Use Textbook to Teach Mathematics	
	As Primary Basis for Lessons		As Supplementary Resource		Percent in 2007	Difference in Percent from 2003
	Percent in 2007	Difference in Percent from 2003	Percent in 2007	Difference in Percent from 2003		
Algeria	61 (5.1)	0 (0)	36 (5.1)	0 (0)	3 (1.6)	0 (0)
Armenia	83 (2.7)	15 (5.4) ▲	17 (2.7)	-2 (4.6)	0 (0.0)	-13 (3.3) ▼
Australia	17 (2.7)	1 (4.1)	59 (3.7)	3 (5.5)	24 (3.5)	-4 (5.3)
Austria	78 (2.4)	0 (0)	21 (2.5)	0 (0)	1 (0.4)	0 (0)
Chinese Taipei	94 (2.0)	2 (3.1)	4 (1.4)	-3 (2.5)	2 (1.4)	1 (1.8)
Colombia	37 (4.1)	0 (0)	60 (4.3)	0 (0)	3 (1.9)	0 (0)
Czech Republic	65 (3.9)	0 (0)	33 (3.9)	0 (0)	2 (0.8)	0 (0)
Denmark	89 (2.5)	0 (0)	9 (2.2)	0 (0)	2 (1.1)	0 (0)
El Salvador	14 (2.7)	0 (0)	74 (3.6)	0 (0)	12 (3.0)	0 (0)
England	15 (3.1)	-12 (5.0) ▼	64 (4.4)	2 (6.3)	21 (3.6)	10 (4.6) ▲
Georgia	77 (3.9)	0 (0)	18 (3.5)	0 (0)	6 (2.7)	0 (0)
Germany	79 (2.4)	0 (0)	21 (2.5)	0 (0)	0 (0.3)	0 (0)
Hong Kong SAR	84 (2.8)	2 (4.5)	15 (2.8)	-4 (4.5)	2 (0.6)	2 (0.6) ▲
Hungary	77 (2.9)	0 (4.8)	22 (2.9)	-1 (4.8)	1 (0.7)	1 (0.7) ▼
Iran, Islamic Rep. of	100 (0.0)	32 (4.5) ▲	0 (0.0)	-27 (4.5) ▼	0 (0.0)	-5 (1.7) ▼
Italy	20 (2.5)	9 (3.2) ▲	67 (3.0)	-11 (3.9) ▼	13 (2.1)	2 (2.9)
Japan	83 (3.0)	-2 (4.2)	16 (3.0)	2 (4.2)	1 (0.5)	0 (0.5)
Kazakhstan	97 (1.8)	0 (0)	3 (1.8)	0 (0)	0 (0.0)	0 (0)
Kuwait	28 (4.1)	0 (0)	34 (4.6)	0 (0)	38 (4.8)	0 (0)
Latvia	86 (2.4)	-7 (3.6)	14 (2.4)	8 (3.6) ▲	0 (0.0)	-1 (0.6)
Lithuania	82 (2.4)	-18 (2.4) ▼	18 (2.4)	18 (2.4) ▲	0 (0.0)	0 (0.0)
Morocco	76 (3.7)	- -	23 (3.7)	- -	1 (0.9)	- -
Netherlands	98 (1.1)	1 (1.8)	2 (1.1)	1 (1.2)	0 (0.0)	-2 (1.4)
New Zealand	5 (1.0)	-11 (3.0) ▼	91 (1.4)	18 (3.3) ▲	4 (1.0)	-7 (2.5) ▼
Norway	88 (2.2)	2 (3.8)	10 (1.9)	-3 (3.6)	2 (1.2)	1 (1.4)
Qatar	67 (0.2)	0 (0)	17 (0.1)	0 (0)	16 (0.1)	0 (0)
Russian Federation	88 (2.2)	-4 (3.0)	12 (2.2)	4 (3.0)	0 (0.0)	0 (0.0)
Scotland	72 (3.8)	-9 (5.7) ▼	28 (3.8)	9 (5.7)	0 (0.0)	0 (0.0)
Singapore	75 (2.9)	9 (4.9)	24 (2.7)	-10 (4.8) ▼	1 (0.7)	1 (0.7)
Slovak Republic	53 (3.8)	0 (0)	47 (3.8)	0 (0)	0 (0.0)	0 (0)
Slovenia	48 (3.3)	4 (5.6)	44 (3.3)	-2 (5.8)	8 (1.5)	-2 (2.9)
Sweden	93 (1.5)	0 (0)	6 (1.5)	0 (0)	1 (0.4)	0 (0)
Tunisia	27 (3.7)	-5 (5.5)	71 (3.7)	6 (5.6)	2 (1.0)	-1 (1.7)
Ukraine	77 (3.5)	0 (0)	21 (3.4)	0 (0)	1 (0.8)	0 (0)
United States	59 (2.6)	-1 (4.1)	33 (2.3)	3 (3.6)	8 (1.6)	-3 (2.6)
Yemen	57 (4.3)	0 (0)	36 (4.5)	0 (0)	7 (2.2)	0 (0)
International Avg.	65 (0.5)		30 (0.5)		5 (0.3)	
Benchmarking Participants						
Alberta, Canada	34 (3.9)	0 (0)	39 (3.7)	0 (0)	27 (3.3)	0 (0)
British Columbia, Canada	58 (4.0)	0 (0)	39 (3.9)	0 (0)	2 (1.2)	0 (0)
Dubai, UAE	44 (5.7)	0 (0)	44 (4.4)	0 (0)	12 (3.7)	0 (0)
Massachusetts, US	48 (5.8)	0 (0)	34 (5.4)	0 (0)	18 (6.1)	0 (0)
Minnesota, US	75 (5.5)	0 (0)	17 (4.5)	0 (0)	8 (4.3)	0 (0)
Ontario, Canada	68 (4.3)	29 (6.4) ▲	31 (4.3)	-23 (6.3) ▼	1 (0.2)	-6 (2.4) ▼
Quebec, Canada	76 (3.5)	21 (5.7) ▲	22 (3.2)	-19 (5.4) ▼	2 (1.4)	-3 (2.1)

▲ 2007 percent significantly higher

▼ 2007 percent significantly lower

Background data provided by teachers.

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

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

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

indicates data are available for at least 50 but less than 70% of the students.

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

Exhibit 7.8 Textbook Use in Teaching Mathematics with Trends (Continued)

TIMSS2007
Mathematics 8th Grade

Country	Percentage of Students Taught by Teachers Reporting Textbook Use					
	Use Textbook to Teach Mathematics				Do Not Use Textbook to Teach Mathematics	
	As Primary Basis for Lessons		As Supplementary Resource		Percent in 2007	Difference in Percent from 2003
	Percent in 2007	Difference in Percent from 2003	Percent in 2007	Difference in Percent from 2003		
Algeria	76 (3.8)	0 0	21 (3.8)	0 0	3 (1.4)	0 0
Armenia	73 (4.0)	1 (5.5)	20 (4.0)	0 (5.3)	7 (2.2)	-1 (2.9)
Australia	53 (4.1)	1 (6.0)	41 (4.2)	-2 (5.9)	6 (1.9)	1 (2.7)
Bahrain	50 (2.4)	-25 (3.9) ▼	29 (2.7)	5 (4.1)	21 (2.1)	21 (2.1) ▲
Bosnia and Herzegovina	62 (4.1)	0 0	38 (4.1)	0 0	0 (0.0)	0 0
Botswana	59 (4.1)	15 (5.9) ▲	36 (4.1)	-16 (5.9) ▼	4 (1.9)	1 (2.5)
Bulgaria	82 (3.1)	6 (4.8)	14 (2.7)	-8 (4.4)	4 (1.8)	2 (2.1)
Chinese Taipei	77 (3.1)	-4 (4.7)	17 (3.2)	4 (4.4)	6 (1.7)	0 (2.6)
Colombia	12 (2.5)	0 0	66 (4.2)	0 0	23 (3.5)	0 0
Cyprus	48 (2.7)	-14 (3.7) ▼	42 (3.0)	8 (3.9) ▲	9 (1.9)	6 (2.1) ▲
Czech Republic	56 (3.9)	0 0	43 (3.8)	0 0	1 (0.5)	0 0
Egypt	57 (4.4)	8 (6.1)	41 (4.5)	-10 (6.1)	2 (0.6)	2 (0.6) ▲
El Salvador	7 (2.4)	0 0	82 (3.6)	0 0	11 (2.9)	0 0
England	43 (4.1)	-3 (7.7)	46 (3.8)	5 (7.9)	12 (2.8)	-2 (4.9)
Georgia	87 (3.1)	0 0	13 (3.1)	0 0	0 (0.0)	0 0
Ghana	33 (4.1)	-10 (6.2)	65 (4.1)	11 (6.1)	2 (1.2)	-2 (1.9)
Hong Kong SAR	76 (3.8)	-7 (5.2)	24 (3.7)	7 (5.1)	1 (0.7)	0 (0.7)
Hungary	55 (4.3)	-5 (5.6)	43 (4.2)	4 (5.5)	1 (0.9)	1 (1.0)
Indonesia	57 (5.2)	-6 (6.4)	43 (5.2)	6 (6.4)	0 (0.0)	0 (0.0)
Iran, Islamic Rep. of	83 (3.4)	8 (4.7)	16 (3.1)	6 (3.8)	2 (0.1)	-14 (3.0) ▼
Israel	57 (3.9)	1 (5.3)	42 (4.0)	0 (5.4)	2 (0.7)	0 (1.1)
Italy	38 (2.9)	4 (4.8)	55 (3.0)	-6 (4.9)	6 (1.4)	2 (1.8)
Japan	77 (3.1)	1 (4.8)	21 (2.8)	-2 (4.7)	2 (0.9)	0 (1.5)
Jordan	58 (4.2)	-26 (5.2) ▼	38 (4.1)	22 (5.2) ▲	4 (1.2)	4 (1.2) ▲
Korea, Rep. of	92 (1.7)	3 (2.7)	4 (1.4)	-3 (2.1)	3 (1.0)	0 (1.7)
Kuwait	23 (4.0)	0 0	35 (4.3)	0 0	42 (4.8)	0 0
Lebanon	50 (4.8)	-2 (6.9)	32 (4.6)	-4 (6.5)	18 (3.4)	6 (4.4)
Lithuania	91 (2.0)	-9 (2.0) ▼	9 (2.0)	9 (2.0) ▲	0 (0.0)	0 (0.0)
Malaysia	66 (4.4)	2 (6.1)	28 (4.1)	3 (5.8)	6 (2.0)	-5 (3.3)
Malta	35 (0.3)	0 0	63 (0.3)	0 0	2 (0.1)	0 0
Norway	88 (2.5)	-3 (3.5)	11 (2.4)	2 (3.4)	1 (0.8)	1 (0.8)
Oman	53 (4.3)	0 0	41 (4.3)	0 0	6 (1.4)	0 0
Palestinian Nat'l Auth.	64 (3.9)	-16 (5.5) ▼	29 (4.1)	11 (5.6)	7 (2.4)	5 (2.7)
Qatar	70 (0.2)	0 0	26 (0.2)	0 0	4 (0.0)	0 0
Romania	49 (3.9)	-10 (5.8)	49 (4.0)	10 (5.8)	2 (0.8)	0 (1.6)
Russian Federation	87 (2.1)	1 (3.3)	13 (2.1)	-1 (3.3)	0 (0.0)	0 (0.4)
Saudi Arabia	77 (3.5)	--	19 (3.4)	--	4 (1.5)	--
Scotland	72 (3.2)	-7 (4.9)	27 (3.0)	11 (4.4) ▲	1 (0.0)	-3 (1.8)
Serbia	54 (4.1)	7 (5.9)	43 (4.1)	-9 (5.9)	3 (1.3)	2 (1.3)
Singapore	51 (2.6)	-23 (3.5) ▼	39 (2.7)	14 (3.5) ▲	9 (1.2)	9 (1.2) ▲
Slovenia	55 (2.7)	0 (5.3)	44 (2.7)	0 (5.3)	1 (0.3)	0 (0.4)
Sweden	95 (1.0)	5 (2.4)	4 (0.9)	-6 (2.4) ▼	1 (0.5)	1 (0.6)
Syrian Arab Republic	50 (4.4)	0 0	36 (4.2)	0 0	14 (3.1)	0 0
Thailand	59 (4.1)	0 0	25 (3.7)	0 0	15 (3.1)	0 0
Tunisia	48 (4.1)	25 (5.5) ▲	49 (4.1)	-27 (5.5) ▼	2 (1.4)	2 (1.4)
Turkey	39 (4.3)	0 0	53 (4.3)	0 0	8 (2.7)	0 0
Ukraine	62 (3.7)	0 0	38 (3.7)	0 0	0 (0.0)	0 0
United States	57 (2.7)	-7 (4.0)	36 (2.8)	2 (4.1)	7 (1.3)	5 (1.6) ▲
‡ Morocco	59 (5.0)	--	40 (4.9)	--	1 (1.1)	--
International Avg.	60 (0.5)		34 (0.5)		6 (0.3)	
Benchmarking Participants						
Basque Country, Spain	74 (3.7)	17 (6.5) ▲	22 (3.3)	-12 (6.0)	5 (1.6)	-6 (3.7)
British Columbia, Canada	42 (4.2)	0 0	50 (4.6)	0 0	8 (2.4)	0 0
Dubai, UAE	69 (3.9)	0 0	26 (3.4)	0 0	4 (1.9)	0 0
Massachusetts, US	57 (5.6)	0 0	42 (6.0)	0 0	1 (1.2)	0 0
Minnesota, US	89 (5.5)	0 0	9 (5.2)	0 0	2 (1.1)	0 0
Ontario, Canada	58 (4.3)	3 (6.6)	40 (4.1)	-3 (6.5)	2 (1.1)	0 (1.7)
Quebec, Canada	51 (4.3)	4 (6.1)	45 (4.4)	-5 (6.3)	4 (1.6)	0 (2.3)

Background data provided by teachers.

▲ 2007 percent significantly higher

▼ 2007 percent significantly lower

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

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

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

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

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



Exhibit 7.9 **Percentage of Time in Mathematics Lessons Students Spend on Various Activities in a Typical Week**

TIMSS2007
Mathematics **4th** Grade

Country	Reviewing Homework	Listening to Lecture-style Presentations	Working Problems with Teacher's Guidance	Working Problems on Their Own Without Teacher's Guidance
Algeria	r 11 (0.6)	r 15 (1.6)	r 20 (1.5)	r 20 (1.1)
Armenia	r 11 (0.4)	r 22 (0.7)	r 18 (0.7)	r 15 (0.6)
Australia	5 (0.3)	12 (0.6)	29 (0.8)	24 (1.1)
Austria	7 (0.2)	15 (0.5)	20 (0.6)	25 (0.7)
Chinese Taipei	10 (0.4)	35 (1.1)	15 (0.5)	11 (0.6)
Colombia	r 12 (0.9)	r 19 (1.5)	r 15 (0.6)	r 16 (1.0)
Czech Republic	6 (0.3)	17 (0.6)	22 (0.7)	23 (0.8)
Denmark	10 (0.5)	9 (0.7)	23 (1.3)	30 (1.4)
El Salvador	13 (0.6)	11 (0.6)	21 (0.7)	13 (0.7)
England	5 (0.3)	16 (0.9)	24 (1.0)	32 (1.1)
Georgia	11 (0.5)	19 (0.8)	15 (0.6)	16 (0.6)
Germany	10 (0.3)	12 (0.3)	19 (0.5)	26 (0.7)
Hong Kong SAR	8 (0.4)	38 (1.3)	16 (0.7)	13 (0.8)
Hungary	r 9 (0.4)	r 10 (0.7)	r 24 (0.8)	r 28 (1.0)
Iran, Islamic Rep. of	12 (0.4)	12 (0.5)	16 (0.6)	14 (0.5)
Italy	9 (0.3)	23 (0.7)	15 (0.5)	15 (0.5)
Japan	4 (0.3)	19 (0.9)	29 (1.0)	18 (1.1)
Kazakhstan	10 (0.4)	17 (0.7)	17 (0.5)	21 (0.8)
Kuwait	x x	x x	x x	x x
Latvia	6 (0.3)	7 (0.5)	24 (0.8)	30 (1.0)
Lithuania	8 (0.4)	7 (0.4)	24 (0.7)	30 (0.8)
Morocco	r 11 (0.8)	r 14 (1.1)	r 21 (1.0)	r 16 (1.0)
Netherlands	r 3 (0.4)	r 13 (0.9)	r 19 (0.9)	r 39 (1.4)
New Zealand	3 (0.2)	7 (0.4)	31 (0.8)	28 (0.7)
Norway	8 (0.4)	17 (0.6)	21 (0.9)	32 (1.3)
Qatar	s 11 (0.0)	s 18 (0.1)	s 18 (0.0)	s 12 (0.0)
Russian Federation	9 (0.3)	13 (0.9)	22 (0.5)	23 (0.8)
Scotland	r 6 (0.3)	r 22 (0.8)	r 19 (0.8)	r 30 (1.1)
Singapore	14 (0.5)	19 (0.6)	18 (0.5)	17 (0.5)
Slovak Republic	6 (0.2)	16 (0.6)	22 (0.8)	22 (0.6)
Slovenia	9 (0.3)	15 (0.4)	21 (0.5)	29 (0.8)
Sweden	5 (0.4)	11 (0.5)	25 (1.8)	38 (1.9)
Tunisia	r 10 (0.6)	r 9 (0.8)	r 24 (1.0)	r 19 (0.9)
Ukraine	10 (0.4)	10 (0.6)	19 (0.6)	19 (0.7)
United States	9 (0.3)	17 (0.6)	25 (0.7)	20 (0.5)
Yemen	r 13 (0.6)	r 17 (1.1)	r 15 (0.9)	r 11 (0.4)
International Avg.	9 (0.1)	16 (0.1)	21 (0.1)	22 (0.2)
Benchmarking Participants				
Alberta, Canada	9 (0.6)	14 (0.8)	23 (0.9)	24 (1.2)
British Columbia, Canada	r 9 (0.5)	r 15 (0.6)	r 22 (0.8)	r 25 (1.2)
Dubai, UAE	x x	x x	x x	x x
Massachusetts, US	8 (0.4)	15 (1.0)	30 (2.1)	20 (0.9)
Minnesota, US	8 (0.5)	18 (1.4)	25 (1.2)	23 (1.3)
Ontario, Canada	11 (0.8)	17 (1.1)	23 (1.1)	22 (0.9)
Quebec, Canada	7 (0.5)	29 (1.2)	17 (0.8)	14 (0.7)

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

Background data provided by teachers.

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

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

Exhibit 7.9 Percentage of Time in Mathematics Lessons Students Spend on Various Activities in a Typical Week (Continued)

TIMSS2007
Mathematics **4th**
Grade

Country	Listening to Teacher Re-teach and Clarify Content/Procedures	Taking Tests or Quizzes	Participating in Classroom Management Tasks Not Related to the Lesson's Content / Purpose	Other Student Activities
Algeria	r 13 (1.0)	r 11 (0.7)	r 4 (0.4)	r 5 (0.5)
Armenia	r 13 (0.5)	r 12 (0.6)	r 5 (0.3)	r 5 (0.3)
Australia	13 (0.5)	7 (0.4)	5 (0.3)	5 (0.6)
Austria	19 (0.5)	8 (0.2)	4 (0.2)	3 (0.2)
Chinese Taipei	11 (0.4)	9 (0.5)	4 (0.3)	3 (0.4)
Colombia	r 14 (0.9)	r 12 (0.8)	r 7 (0.5)	r 5 (0.4)
Czech Republic	10 (0.5)	11 (0.6)	4 (0.2)	6 (0.5)
Denmark	11 (0.6)	5 (0.4)	7 (0.5)	5 (0.6)
El Salvador	17 (0.6)	13 (0.5)	7 (0.4)	7 (0.5)
England	12 (0.5)	4 (0.3)	3 (0.3)	r 4 (0.4)
Georgia	12 (0.5)	15 (0.6)	5 (0.4)	8 (0.4)
Germany	17 (0.7)	8 (0.2)	5 (0.3)	3 (0.4)
Hong Kong SAR	9 (0.5)	6 (0.4)	4 (0.3)	5 (0.5)
Hungary	r 9 (0.5)	r 11 (1.2)	r 3 (0.2)	r 6 (0.7)
Iran, Islamic Rep. of	15 (0.5)	13 (0.5)	8 (0.4)	9 (0.4)
Italy	14 (0.4)	13 (0.4)	6 (0.3)	4 (0.2)
Japan	15 (0.7)	9 (0.4)	2 (0.2)	3 (0.6)
Kazakhstan	10 (0.5)	16 (0.7)	3 (0.4)	5 (0.6)
Kuwait	x x	x x	x x	x x
Latvia	12 (0.4)	12 (0.5)	3 (0.2)	6 (0.4)
Lithuania	10 (0.4)	14 (0.7)	3 (0.3)	4 (0.5)
Morocco	r 16 (0.8)	r 12 (0.5)	r 5 (0.4)	r 5 (0.4)
Netherlands	r 12 (0.7)	r 7 (0.4)	r 4 (0.3)	r 4 (0.4)
New Zealand	13 (0.4)	6 (0.3)	5 (0.3)	7 (0.6)
Norway	11 (0.5)	6 (0.3)	3 (0.3)	3 (0.4)
Qatar	s 14 (0.0)	s 12 (0.0)	s 7 (0.0)	s 8 (0.0)
Russian Federation	9 (0.4)	18 (0.6)	1 (0.2)	5 (0.4)
Scotland	r 10 (0.3)	r 5 (0.3)	r 4 (0.3)	r 6 (0.4)
Singapore	11 (0.3)	8 (0.2)	6 (0.3)	6 (0.4)
Slovak Republic	18 (0.6)	8 (0.4)	3 (0.2)	4 (0.4)
Slovenia	11 (0.4)	7 (0.3)	3 (0.2)	r 4 (0.4)
Sweden	10 (0.4)	5 (0.2)	3 (0.3)	3 (0.5)
Tunisia	r 17 (0.8)	r 13 (0.8)	r 4 (0.3)	r 5 (0.5)
Ukraine	17 (0.7)	16 (0.6)	3 (0.2)	6 (0.5)
United States	11 (0.3)	9 (0.3)	4 (0.3)	4 (0.3)
Yemen	r 14 (0.7)	r 14 (1.0)	r 7 (0.4)	r 8 (0.4)
International Avg.	13 (0.1)	10 (0.1)	4 (0.1)	5 (0.1)
Benchmarking Participants				
Alberta, Canada	10 (0.4)	7 (0.3)	5 (0.3)	6 (0.8)
British Columbia, Canada	r 11 (0.4)	r 7 (0.3)	r 5 (0.4)	r 5 (0.8)
Dubai, UAE	x x	x x	x x	x x
Massachusetts, US	12 (0.7)	7 (0.5)	4 (0.5)	5 (0.7)
Minnesota, US	11 (0.5)	7 (0.4)	5 (0.4)	4 (0.5)
Ontario, Canada	10 (0.5)	7 (0.4)	6 (0.9)	5 (0.6)
Quebec, Canada	11 (0.5)	8 (0.4)	7 (0.5)	6 (0.6)

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



Exhibit 7.9 **Percentage of Time in Mathematics Lessons Students Spend on Various Activities in a Typical Week (Continued)**

TIMSS2007
Mathematics **8th** Grade

Country	Reviewing Homework	Listening to Lecture-style Presentations	Working Problems with Teacher's Guidance	Working Problems on Their Own Without Teacher's Guidance
Algeria	s 11 (0.6)	s 15 (1.2)	s 21 (1.2)	s 15 (1.0)
Armenia	10 (0.4)	23 (0.9)	19 (0.6)	16 (0.6)
Australia	7 (0.3)	17 (0.8)	23 (1.0)	24 (1.2)
Bahrain	r 11 (0.3)	r 23 (0.6)	r 18 (0.7)	r 12 (0.3)
Bosnia and Herzegovina	r 7 (0.4)	r 29 (1.5)	r 24 (1.0)	r 15 (0.7)
Botswana	r 13 (0.9)	r 13 (0.8)	r 20 (1.0)	r 21 (1.2)
Bulgaria	8 (0.4)	19 (1.1)	26 (1.0)	17 (0.7)
Chinese Taipei	13 (0.6)	41 (1.3)	13 (0.6)	7 (0.4)
Colombia	10 (0.3)	17 (0.9)	21 (0.8)	17 (0.7)
Cyprus	r 20 (0.6)	r 17 (0.6)	r 23 (0.6)	r 12 (0.4)
Czech Republic	6 (0.3)	20 (0.6)	25 (0.8)	21 (0.7)
Egypt	r 10 (0.4)	r 25 (1.2)	r 17 (0.7)	r 14 (0.8)
El Salvador	10 (0.5)	13 (0.8)	22 (0.8)	20 (0.8)
England	6 (0.3)	17 (0.6)	28 (1.2)	23 (1.2)
Georgia	11 (0.5)	21 (1.0)	19 (0.6)	15 (0.7)
Ghana	r 12 (0.6)	r 16 (1.0)	r 18 (0.7)	r 15 (0.7)
Hong Kong SAR	11 (0.7)	35 (1.6)	16 (0.9)	13 (0.8)
Hungary	11 (0.4)	12 (0.7)	27 (0.9)	22 (0.8)
Indonesia	s 11 (0.5)	s 20 (1.0)	s 19 (0.9)	s 15 (0.8)
Iran, Islamic Rep. of	11 (0.5)	16 (0.8)	19 (0.8)	14 (0.7)
Israel	s 14 (0.5)	s 16 (1.0)	s 22 (0.7)	s 19 (0.8)
Italy	16 (0.6)	22 (0.6)	18 (0.6)	12 (0.4)
Japan	7 (0.4)	30 (0.8)	26 (0.9)	12 (0.9)
Jordan	12 (0.4)	19 (0.7)	18 (0.6)	15 (0.4)
Korea, Rep. of	6 (0.2)	33 (1.1)	18 (0.6)	17 (0.6)
Kuwait	s 11 (0.6)	s 21 (1.6)	s 18 (0.9)	s 14 (0.8)
Lebanon	s 22 (1.2)	s 16 (1.0)	s 20 (1.2)	s 10 (1.0)
Lithuania	9 (0.3)	9 (0.6)	26 (0.8)	25 (0.8)
Malaysia	r 13 (0.8)	r 22 (1.3)	r 18 (0.8)	r 13 (0.7)
Malta	18 (0.0)	19 (0.0)	20 (0.0)	15 (0.0)
Norway	8 (0.4)	22 (0.7)	22 (0.9)	25 (1.0)
Oman	r 11 (0.5)	r 18 (1.1)	r 20 (0.8)	r 14 (0.6)
Palestinian Nat'l Auth.	r 13 (0.7)	r 20 (0.9)	r 18 (0.7)	r 14 (0.8)
Qatar	r 11 (0.0)	r 21 (0.0)	r 20 (0.0)	r 13 (0.0)
Romania	9 (0.4)	18 (0.8)	29 (0.8)	14 (0.5)
Russian Federation	10 (0.2)	18 (0.5)	22 (0.6)	20 (0.5)
Saudi Arabia	r 12 (0.5)	r 22 (1.2)	r 17 (0.9)	r 11 (0.5)
Scotland	8 (0.4)	21 (0.6)	25 (1.2)	24 (1.1)
Serbia	6 (0.3)	24 (1.2)	26 (1.1)	20 (1.0)
Singapore	12 (0.4)	26 (0.8)	19 (0.5)	13 (0.4)
Slovenia	10 (0.3)	21 (0.5)	23 (0.6)	21 (0.6)
Sweden	4 (0.2)	15 (0.6)	33 (1.3)	r 28 (1.6)
Syrian Arab Republic	r 12 (0.6)	r 24 (1.3)	r 16 (0.8)	r 10 (0.5)
Thailand	12 (0.6)	21 (1.0)	15 (0.7)	12 (0.5)
Tunisia	s 15 (1.0)	s 13 (1.2)	s 25 (1.4)	s 16 (1.3)
Turkey	8 (0.6)	20 (1.2)	19 (1.0)	13 (0.7)
Ukraine	11 (0.4)	14 (0.7)	19 (0.6)	18 (0.6)
United States	13 (0.4)	21 (0.6)	19 (0.5)	17 (0.5)
‡ Morocco	r 11 (0.8)	r 13 (1.1)	r 21 (1.3)	r 15 (1.2)
International Avg.	11 (0.1)	20 (0.1)	21 (0.1)	16 (0.1)
Benchmarking Participants				
Basque Country, Spain	21 (1.0)	18 (1.0)	18 (0.7)	18 (1.2)
British Columbia, Canada	11 (0.4)	19 (0.6)	20 (0.8)	23 (1.0)
Dubai, UAE	s 10 (0.7)	s 18 (1.4)	s 22 (1.0)	s 18 (1.0)
Massachusetts, US	13 (0.9)	16 (1.0)	22 (1.3)	18 (0.9)
Minnesota, US	12 (0.9)	21 (1.3)	20 (2.1)	20 (1.5)
Ontario, Canada	14 (0.9)	16 (0.7)	18 (0.8)	22 (1.2)
Quebec, Canada	14 (0.7)	25 (1.3)	19 (1.0)	14 (0.6)

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.

Exhibit 7.9 Percentage of Time in Mathematics Lessons Students Spend on Various Activities in a Typical Week (Continued)

TIMSS2007
Mathematics **8th** Grade

Country	Listening to Teacher Re-teach and Clarify Content/Procedures	Taking Tests or Quizzes	Participating in Classroom Management Tasks Not Related to the Lesson's Content / Purpose	Other Student Activities
Algeria	s 18 (1.0)	s 10 (0.8)	s 5 (0.4)	s 5 (0.6)
Armenia	11 (0.4)	10 (0.4)	5 (0.3)	5 (0.7)
Australia	10 (0.5)	7 (0.3)	8 (0.5)	4 (0.4)
Bahrain	r 15 (0.8)	r 11 (0.3)	r 6 (0.2)	r 6 (0.3)
Bosnia and Herzegovina	r 11 (0.6)	r 7 (0.5)	r 3 (0.3)	r 4 (0.5)
Botswana	r 10 (0.6)	r 10 (0.8)	r 6 (0.4)	r 6 (0.7)
Bulgaria	9 (0.4)	14 (0.6)	3 (0.3)	3 (0.3)
Chinese Taipei	10 (0.7)	8 (0.3)	5 (0.5)	3 (0.3)
Colombia	12 (0.7)	12 (0.5)	6 (0.4)	5 (0.5)
Cyprus	r 10 (0.3)	r 9 (0.2)	r 7 (0.2)	r 4 (0.3)
Czech Republic	9 (0.3)	11 (0.4)	4 (0.3)	4 (0.3)
Egypt	r 11 (0.5)	r 9 (0.4)	r 6 (0.4)	r 7 (0.4)
El Salvador	14 (0.6)	10 (0.5)	6 (0.4)	5 (0.3)
England	11 (0.7)	4 (0.3)	7 (0.5)	4 (0.5)
Georgia	11 (0.4)	12 (0.5)	5 (0.4)	6 (0.4)
Ghana	r 11 (0.6)	r 15 (0.7)	r 8 (0.5)	r 6 (0.4)
Hong Kong SAR	10 (0.4)	8 (0.4)	4 (0.4)	3 (0.4)
Hungary	9 (0.5)	11 (0.3)	4 (0.3)	4 (0.4)
Indonesia	s 11 (0.6)	s 14 (0.7)	s 6 (0.3)	s 6 (0.5)
Iran, Islamic Rep. of	16 (0.8)	11 (0.5)	7 (0.5)	7 (0.4)
Israel	s 11 (0.4)	s 10 (0.6)	s 5 (0.3)	s 3 (0.5)
Italy	14 (0.5)	11 (0.5)	5 (0.3)	3 (0.3)
Japan	14 (0.5)	7 (0.4)	2 (0.3)	2 (0.4)
Jordan	14 (0.5)	11 (0.4)	6 (0.3)	6 (0.3)
Korea, Rep. of	11 (0.5)	7 (0.4)	5 (0.3)	4 (0.3)
Kuwait	s 16 (1.1)	s 9 (0.6)	s 7 (0.6)	s 5 (0.5)
Lebanon	s 12 (0.6)	s 11 (0.5)	s 5 (0.5)	s 4 (0.4)
Lithuania	11 (0.4)	14 (0.7)	3 (0.2)	3 (0.3)
Malaysia	r 12 (0.6)	r 9 (0.4)	r 7 (0.5)	r 5 (0.4)
Malta	12 (0.0)	5 (0.0)	8 (0.0)	3 (0.0)
Norway	11 (0.4)	6 (0.2)	4 (0.3)	3 (0.3)
Oman	r 15 (0.9)	r 11 (0.6)	r 6 (0.3)	r 6 (0.4)
Palestinian Nat'l Auth.	r 13 (0.6)	r 9 (0.5)	r 6 (0.4)	r 6 (0.5)
Qatar	r 14 (0.0)	r 10 (0.0)	r 6 (0.0)	r 6 (0.0)
Romania	9 (0.3)	14 (0.7)	3 (0.2)	3 (0.3)
Russian Federation	9 (0.2)	16 (0.4)	1 (0.1)	4 (0.4)
Saudi Arabia	r 15 (0.9)	r 10 (0.5)	r 7 (0.4)	r 7 (0.4)
Scotland	8 (0.3)	3 (0.2)	6 (0.4)	4 (0.5)
Serbia	10 (0.6)	8 (0.5)	3 (0.3)	3 (0.4)
Singapore	10 (0.3)	8 (0.3)	8 (0.4)	5 (0.4)
Slovenia	11 (0.4)	5 (0.3)	4 (0.2)	4 (0.4)
Sweden	r 9 (0.3)	r 6 (0.2)	r 3 (0.2)	r 4 (0.5)
Syrian Arab Republic	r 15 (0.8)	r 12 (0.6)	r 6 (0.4)	r 6 (0.6)
Thailand	15 (0.6)	10 (0.5)	8 (0.4)	7 (0.5)
Tunisia	s 17 (1.0)	s 8 (0.7)	s 4 (0.4)	s 3 (0.3)
Turkey	14 (0.9)	8 (0.6)	10 (1.1)	8 (0.9)
Ukraine	17 (0.9)	14 (0.6)	2 (0.3)	4 (0.4)
United States	10 (0.3)	11 (0.3)	5 (0.3)	5 (0.4)
‡ Morocco	r 19 (1.4)	s 10 (0.7)	r 5 (0.5)	r 6 (0.6)
International Avg.	12 (0.1)	10 (0.1)	5 (0.1)	5 (0.1)
Benchmarking Participants				
Basque Country, Spain	11 (0.6)	7 (0.5)	5 (0.3)	3 (0.4)
British Columbia, Canada	9 (0.4)	11 (0.4)	4 (0.3)	4 (0.5)
Dubai, UAE	s 10 (0.8)	s 11 (1.1)	s 5 (0.3)	x x
Massachusetts, US	12 (0.5)	10 (0.5)	4 (0.8)	4 (0.6)
Minnesota, US	8 (0.5)	10 (0.6)	5 (0.4)	3 (0.5)
Ontario, Canada	10 (0.5)	9 (0.4)	5 (0.5)	5 (0.6)
Quebec, Canada	8 (0.4)	9 (0.4)	8 (0.6)	3 (0.4)

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



How Are Calculators and Computers Used?

Exhibit 7.10 shows the number of countries with national policies on calculator use, changes in the percentages of students not permitted to use calculators in mathematics class, and the percentages of students using calculators for various activities in about half the lessons or more. At the fourth grade, 17 of the countries had policies about calculator use as part of their curriculum as did most of the benchmarking participants. In some countries calculator use is rare (for less than 10 percent of the students), including Austria, Hungary, Kuwait, Latvia, Singapore, Slovenia, Tunisia, and the Ukraine. In others, 90 percent or more are permitted to use calculators, including Algeria, Australia, England, New Zealand, and Scotland. Although most countries do not permit calculators in mathematics classes at the fourth grade, for at least half the students in four countries, the trend between 2003 and 2007 was for fewer students to be in such classes, including, Hong Kong SAR, Latvia, Lithuania, and the Russian Federation. In New Zealand, there was an increase from 3 to 8 percent of the students not being permitted to use calculators. In general, teachers in even the high use countries reported asking only small percentages of students to do any calculator activities in half the lessons or more. The highest percentages were in Denmark (23%) and Algeria (18%) for solving complex problems, and then Algeria and Yemen (15% each) for exploring number concepts.

At the eighth grade, many of the countries and almost all the benchmarking participants had policies about calculator use as part of their mathematics curriculum. About half the countries permit widespread usage, and almost all countries permit calculators for the majority of eighth grade students. Between 2003 and 2007, three countries had large decreases in the percentages of students not permitted to use calculators, including Jordan, Malaysia, and Slovenia. However, four countries did have modest increases, including Bahrain, Ghana, Serbia, and the United States. On average internationally, teachers asked the greatest percentages of students to use calculators in solving complex problems (31%), checking answers (26%), and

doing routine computations (25%). Only 16 percent, on average, were asked to explore number concepts.

Exhibit 7.11 presents information about whether countries have a policy about the use of computers in mathematics classes, changes in the availability of computers, and the percentages of students being asked to use computers for various activities in half the lessons or more. At the fourth grade, 16 countries and four benchmarking participants had a policy statement about computer use in their curriculum. Seven countries had increases in computer availability between 2003 and 2007, including Armenia, Chinese Taipei, Lithuania, the Russian Federation, Scotland, Slovenia, and Tunisia. In 2007, on average internationally, teachers reported availability of computers for 46 percent of the fourth grade students. However, computer use was relatively infrequent in mathematics classes at the fourth grade. The most use was for practicing skills and procedures in the Netherlands (30%), Scotland (20%), Singapore (13%), Yemen (12%), and the United States (11%) followed by England, New Zealand, and Qatar (all 10%).

At the eighth grade, on average internationally, teachers reported computer availability for about one-third of the students and there was considerable variation among countries. Six countries reported decreased availability between 2003 and 2007 compared to nine and one benchmarking entity reporting increased availability. Using computers for any activity as often as in half the lessons was rare, even in countries with relatively high availability.

Exhibit 7.10 Calculator Use in Mathematics Class with Trends

TIMSS2007
Mathematics 4th Grade

Country	National Curriculum Contains Policies / Statements About the Use of Calculators	Trends in Percentage of Students Whose Teachers Reported That Calculators Are Not Permitted		Percentage of Students Whose Teachers Reported on Calculator Use About Half of the Lessons or More			
		2007 Percent of Students	Difference in Percent from 2003	Checking Answers	Doing Routine Computations	Solving Complex Problems	Exploring Number Concepts
Algeria	●	8 (2.1)	0 0	12 (2.9)	10 (3.0)	18 (3.6)	15 (2.9)
Armenia	●	s 18 (4.3)	-56 (5.7) ▼	--	--	--	--
Australia	●	5 (1.5)	-1 (2.8)	14 (2.4)	3 (1.1)	13 (2.4)	10 (2.5)
Austria	○	94 (1.2)	0 0	0 (0.3)	0 (0.0)	0 (0.0)	0 (0.0)
Chinese Taipei	○	53 (4.6)	-1 (6.3)	2 (0.0)	2 (0.1)	2 (1.0)	2 (1.6)
Colombia	○	57 (4.6)	0 0	5 (1.8)	3 (1.1)	2 (1.1)	5 (1.6)
Czech Republic	○	33 (3.8)	0 0	5 (1.9)	2 (1.2)	2 (1.1)	3 (1.3)
Denmark	●	11 (2.6)	0 0	8 (2.6)	6 (2.0)	23 (3.9)	11 (2.7)
El Salvador	○	74 (3.9)	0 0	5 (1.8)	6 (2.1)	9 (2.5)	6 (1.9)
England	●	r 2 (1.0)	1 (1.2)	13 (2.9)	2 (0.8)	12 (2.5)	7 (2.1)
Georgia	○	62 (5.2)	0 0	2 (0.8)	1 (0.5)	r 0 (0.3)	1 (1.0)
Germany	○	72 (3.2)	0 0	1 (0.6)	0 (0.0)	0 (0.0)	0 (0.0)
Hong Kong SAR	●	52 (4.3)	-36 (5.2) ▼	2 (1.1)	2 (1.3)	3 (1.4)	3 (0.8)
Hungary	●	94 (2.0)	6 (3.5)	1 (0.5)	0 (0.0)	0 (0.0)	0 (0.0)
Iran, Islamic Rep. of	○	87 (2.8)	5 (4.8)	1 (0.7)	2 (1.0)	2 (1.4)	2 (0.9)
Italy	●	89 (0.8)	1 (2.4)	1 (0.7)	1 (0.8)	0 (0.0)	0 (0.0)
Japan	●	35 (3.4)	3 (5.0)	0 (0.0)	0 (0.0)	4 (1.6)	2 (1.0)
Kazakhstan	●	26 (5.0)	0 0	2 (1.0)	2 (1.0)	6 (2.0)	3 (1.3)
Kuwait	○	r 97 (1.5)	0 0	r 6 (2.3)	r 7 (2.4)	r 4 (1.8)	r 6 (2.3)
Latvia	○	91 (2.2)	-7 (2.8) ▼	0 (0.0)	1 (0.8)	0 (0.3)	1 (0.6)
Lithuania	○	55 (3.6)	-14 (5.1) ▼	3 (1.4)	1 (0.0)	2 (1.4)	1 (0.0)
Morocco	○	r 77 (3.6)	--	4 (1.7)	r 4 (1.5)	r 3 (1.3)	r 3 (1.5)
Netherlands	○	49 (4.3)	-12 (6.5)	0 (0.4)	0 (0.4)	1 (0.8)	0 (0.0)
New Zealand	●	8 (1.6)	5 (2.1) ▲	11 (1.8)	3 (1.1)	9 (1.7)	6 (1.4)
Norway	●	14 (2.9)	4 (4.0)	1 (0.5)	0 (0.0)	3 (1.1)	1 (0.5)
Qatar	○	r 78 (0.2)	0 0	4 (0.1)	5 (0.1)	6 (0.1)	3 (0.1)
Russian Federation	○	78 (3.3)	-11 (4.0) ▼	3 (1.2)	1 (0.6)	2 (1.0)	2 (0.8)
Scotland	●	s 9 (2.3)	0 (3.4)	3 (1.5)	1 (0.7)	5 (1.7)	4 (1.1)
Singapore	○	98 (0.9)	0 (1.7)	1 (0.7)	1 (0.7)	1 (0.6)	1 (0.7)
Slovak Republic	●	27 (3.5)	0 0	3 (1.3)	1 (0.9)	2 (1.0)	1 (0.6)
Slovenia	●	94 (1.5)	-1 (2.5)	0 (0.1)	0 (0.2)	0 (0.0)	0 (0.0)
Sweden	●	14 (2.6)	0 0	4 (1.3)	2 (0.7)	7 (1.8)	3 (1.1)
Tunisia	○	r 92 (2.2)	-4 (2.7)	7 (1.6)	8 (1.7)	7 (1.9)	7 (1.9)
Ukraine	○	96 (1.7)	0 0	0 (0.4)	0 (0.0)	1 (0.7)	1 (0.8)
United States	●	r 31 (3.2)	-1 (4.2)	7 (1.3)	3 (0.9)	12 (1.7)	6 (1.2)
Yemen	○	r 68 (4.2)	0 0	7 (2.6)	11 (3.2)	11 (3.1)	15 (3.8)
International Avg.		54 (0.5)		4 (0.3)	3 (0.2)	5 (0.3)	4 (0.2)
Benchmarking Participants							
Alberta, Canada	●	14 (2.4)	0 0	5 (1.6)	4 (1.7)	14 (2.7)	8 (2.1)
British Columbia, Canada	●	r 14 (2.3)	0 0	r 5 (1.4)	r 3 (1.1)	r 14 (2.9)	r 7 (1.9)
Dubai, UAE	●	s 68 (3.3)	0 0	s 5 (2.2)	s 4 (1.4)	s 4 (1.3)	s 5 (0.5)
Massachusetts, US	●	8 (2.7)	0 0	3 (2.2)	0 (0.1)	2 (1.5)	2 (1.5)
Minnesota, US	--	5 (2.7)	0 0	12 (5.2)	r 2 (0.1)	r 12 (5.3)	r 10 (5.0)
Ontario, Canada	●	7 (2.3)	-13 (4.5) ▼	r 5 (1.9)	5 (2.1)	19 (3.9)	14 (3.8)
Quebec, Canada	●	45 (4.5)	8 (6.3)	4 (2.0)	0 (0.2)	5 (1.6)	1 (0.4)

● Yes ○ No

▲ 2007 percent significantly higher

▼ 2007 percent significantly lower

Background data provided by National Research Coordinators and by teachers.

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

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

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

indicates data are available for at least 50 but less than 70% of the students.

A diamond (0) indicates the country did not participate in the assessment.



Exhibit 7.10 Calculator Use in Mathematics Class with Trends (Continued)

TIMSS2007
Mathematics 8th Grade

Country	National Curriculum Contains Policies / Statements About the Use of Calculators	Trends in Percentage of Students Whose Teachers Reported That Calculators Are Not Permitted		Percentage of Students Whose Teachers Reported on Calculator Use About Half of the Lessons or More			
		2007 Percent of Students	Difference in Percent from 2003	Checking Answers	Doing Routine Computations	Solving Complex Problems	Exploring Number Concepts
Algeria	●	2 (1.2)	∅ ∅	56 (4.4)	44 (4.2)	47 (4.2)	r 32 (4.0)
Armenia	●	r 11 (2.8)	3 (3.8)	37 (3.7)	50 (3.8)	36 (4.1)	35 (3.5)
Australia	●	1 (0.7)	-3 (2.3)	65 (3.8)	70 (3.6)	59 (3.6)	38 (3.0)
Bahrain	○	r 75 (2.0)	7 (3.3) ◐	7 (1.5)	5 (1.2)	8 (0.9)	r 3 (1.1)
Bosnia and Herzegovina	○	41 (4.4)	∅ ∅	18 (3.2)	19 (3.6)	15 (3.0)	r 9 (2.5)
Botswana	●	38 (4.6)	1 (6.4)	3 (1.6)	4 (1.7)	10 (2.7)	7 (2.1)
Bulgaria	○	24 (3.1)	-4 (5.2)	9 (2.3)	17 (3.1)	20 (3.6)	7 (2.0)
Chinese Taipei	●	34 (4.1)	0 (5.8)	0 (0.0)	1 (0.0)	1 (1.0)	2 (1.1)
Colombia	○	17 (3.3)	∅ ∅	18 (3.8)	12 (3.0)	24 (4.6)	12 (2.8)
Cyprus	○	r 70 (2.4)	5 (3.7)	4 (1.1)	r 2 (0.9)	r 6 (1.3)	r 1 (0.6)
Czech Republic	●	5 (2.0)	∅ ∅	36 (4.0)	36 (4.2)	61 (4.1)	12 (2.6)
Egypt	●	2 (1.0)	2 (1.0)	30 (4.0)	31 (3.8)	33 (3.8)	19 (3.2)
El Salvador	○	26 (4.3)	∅ ∅	31 (4.0)	23 (3.5)	32 (4.4)	22 (3.7)
England	●	r 1 (0.8)	1 (0.8)	28 (3.4)	32 (3.6)	43 (3.7)	19 (2.9)
Georgia	○	12 (3.5)	∅ ∅	10 (3.2)	14 (3.1)	7 (2.1)	r 6 (2.3)
Ghana	●	r 79 (3.9)	18 (6.4) ◐	3 (1.4)	5 (2.2)	5 (2.3)	4 (1.4)
Hong Kong SAR	●	1 (0.0)	-1 (1.1)	59 (4.4)	72 (4.4)	63 (4.6)	26 (4.1)
Hungary	●	27 (3.4)	8 (4.6)	23 (3.1)	24 (3.2)	32 (3.7)	6 (1.7)
Indonesia	○	22 (4.1)	-6 (5.7)	11 (3.1)	10 (2.9)	21 (3.5)	9 (2.6)
Iran, Islamic Rep. of	○	45 (4.1)	-7 (5.8)	11 (2.2)	10 (2.4)	15 (3.0)	3 (1.2)
Israel	●	r 11 (2.5)	4 (3.3)	r 57 (3.7)	r 60 (3.7)	r 47 (3.5)	r 31 (3.6)
Italy	○	16 (2.1)	0 (3.6)	36 (2.9)	41 (3.0)	53 (3.1)	12 (2.0)
Japan	●	41 (3.9)	4 (5.6)	0 (0.0)	1 (0.5)	2 (1.1)	3 (1.3)
Jordan	●	21 (3.6)	-35 (5.7) ◑	19 (3.2)	12 (2.8)	27 (3.6)	13 (2.9)
Korea, Rep. of	●	s 42 (3.5)	7 (4.8)	1 (0.2)	1 (0.6)	6 (1.3)	0 (0.0)
Kuwait	○	r 80 (4.2)	∅ ∅	r 4 (1.8)	r 7 (2.0)	r 7 (1.8)	r 6 (1.8)
Lebanon	○	6 (1.9)	1 (2.6)	53 (4.7)	34 (3.8)	36 (3.8)	39 (4.3)
Lithuania	●	3 (1.2)	1 (1.4)	61 (3.7)	63 (3.9)	69 (3.6)	23 (3.5)
Malaysia	●	0 (0.0)	-46 (3.9) ◑	68 (3.9)	49 (4.1)	59 (3.8)	40 (4.1)
Malta	●	0 (0.0)	∅ ∅	78 (0.2)	83 (0.2)	77 (0.2)	38 (0.2)
Norway	●	1 (0.8)	1 (0.8)	71 (2.9)	71 (3.1)	73 (2.9)	33 (3.6)
Oman	●	5 (1.6)	∅ ∅	41 (4.4)	20 (3.5)	52 (4.4)	23 (3.9)
Palestinian Nat'l Auth.	●	4 (1.5)	3 (1.7)	25 (3.6)	19 (3.4)	41 (4.4)	17 (3.4)
Qatar	●	r 52 (0.2)	∅ ∅	r 26 (0.1)	r 21 (0.2)	r 28 (0.2)	r 16 (0.1)
Romania	●	48 (3.6)	-3 (5.4)	8 (2.1)	7 (1.7)	3 (1.5)	3 (1.3)
Russian Federation	●	24 (3.3)	4 (4.1)	12 (2.8)	9 (2.5)	15 (2.2)	10 (2.8)
Saudi Arabia	○	r 66 (4.5)	--	10 (3.1)	r 9 (3.1)	r 9 (2.4)	r 6 (2.7)
Scotland	●	2 (1.1)	0 (1.8)	11 (2.4)	21 (3.1)	37 (3.5)	8 (2.0)
Serbia	○	53 (4.6)	17 (6.2) ◐	8 (2.6)	10 (2.0)	8 (2.6)	3 (1.3)
Singapore	●	0 (0.0)	0 (0.0)	63 (2.7)	65 (2.6)	67 (2.9)	33 (2.8)
Slovenia	●	8 (1.6)	-32 (4.7) ◑	11 (1.7)	12 (1.9)	24 (2.6)	10 (1.9)
Sweden	●	0 (0.3)	0 (0.5)	r 42 (3.0)	58 (3.5)	r 67 (2.9)	r 23 (2.6)
Syrian Arab Republic	○	r 65 (4.4)	∅ ∅	9 (2.6)	9 (2.5)	7 (2.1)	7 (2.2)
Thailand	○	61 (4.2)	∅ ∅	7 (2.1)	4 (1.6)	11 (2.6)	5 (1.7)
Tunisia	●	r 32 (4.1)	-12 (6.1)	3 (1.3)	0 (0.0)	6 (2.1)	7 (2.2)
Turkey	●	41 (3.9)	∅ ∅	6 (2.1)	3 (1.9)	5 (2.2)	2 (1.5)
Ukraine	○	15 (3.2)	∅ ∅	26 (3.9)	10 (2.2)	37 (3.8)	13 (2.4)
United States	●	11 (1.9)	5 (2.4) ◐	45 (2.7)	43 (2.6)	57 (2.8)	43 (2.9)
‡ Morocco	○	5 (3.4)	--	r 28 (5.5)	r 24 (5.4)	r 37 (5.7)	r 23 (5.2)
International Avg.		25 (0.4)		26 (0.4)	25 (0.4)	31 (0.5)	16 (0.4)

Benchmarking Participants

Basque Country, Spain	●	26 (4.4)	-1 (6.2)	21 (4.3)	14 (2.9)	35 (4.4)	17 (3.9)
British Columbia, Canada	●	9 (2.8)	∅ ∅	56 (4.2)	51 (4.2)	62 (4.4)	39 (4.7)
Dubai, UAE	●	s 36 (2.4)	∅ ∅	s 33 (4.2)	s 32 (4.5)	s 36 (4.7)	s 19 (4.2)
Massachusetts, US	●	2 (2.3)	∅ ∅	48 (7.6)	40 (7.0)	64 (6.3)	33 (6.0)
Minnesota, US	-	1 (1.2)	∅ ∅	70 (5.7)	72 (4.9)	76 (6.8)	59 (5.0)
Ontario, Canada	●	0 (0.0)	-1 (1.0)	66 (4.2)	58 (4.7)	78 (4.1)	55 (4.5)
Quebec, Canada	●	0 (0.0)	0 (0.0)	86 (2.6)	91 (2.4)	95 (2.0)	67 (3.7)

● Yes ○ No ◐ 2007 percent significantly higher ◑ 2007 percent significantly lower

Background data provided by National Research Coordinators and by teachers.

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

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

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

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

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

Exhibit 7.11 Computer Use in Mathematics Class with Trends

TIMSS2007
Mathematics 4th Grade

Country	National Curriculum Contains Policies / Statements About the Use of Computers	Trends in Percentage of Students Whose Teachers Reported That Computers Are Available		Percentage of Students Whose Teachers Reported on Computer Use About Half of the Lessons or More		
		2007 Percent of Students	Difference in Percent from 2003	Discovering Principles and Concepts	Practicing Skills and Procedures	Looking Up Ideas and Information
Algeria	●	20 (3.6)	0 (0)	3 (1.7)	4 (1.8)	4 (1.9)
Armenia	●	r 66 (3.7)	53 (4.6) ▲	--	--	--
Australia	●	78 (3.2)	2 (4.8)	3 (1.4)	8 (2.3)	4 (1.7)
Austria	○	69 (2.8)	0 (0)	0 (0.4)	3 (1.1)	2 (0.8)
Chinese Taipei	○	41 (4.1)	25 (5.2) ▲	2 (0.1)	2 (1.7)	2 (1.1)
Colombia	○	18 (3.7)	0 (0)	1 (0.9)	2 (1.0)	3 (1.4)
Czech Republic	○	59 (3.6)	0 (0)	1 (0.9)	7 (2.5)	2 (0.9)
Denmark	●	95 (1.4)	0 (0)	2 (1.3)	8 (2.3)	2 (1.3)
El Salvador	○	16 (3.0)	0 (0)	1 (1.0)	3 (1.3)	3 (1.5)
England	●	r 76 (3.4)	-6 (4.8)	7 (2.0)	10 (2.4)	3 (1.7)
Georgia	○	20 (4.0)	0 (0)	2 (1.6)	3 (1.6)	3 (1.7)
Germany	○	54 (3.5)	0 (0)	0 (0.0)	3 (1.0)	0 (0.0)
Hong Kong SAR	●	58 (3.9)	4 (5.9)	7 (2.4)	3 (1.6)	5 (1.9)
Hungary	●	23 (3.5)	9 (4.8)	1 (0.4)	1 (0.4)	1 (0.4)
Iran, Islamic Rep. of	○	3 (1.2)	1 (1.6)	1 (0.5)	0 (0.0)	0 (0.3)
Italy	●	31 (2.7)	6 (4.1)	0 (0.0)	0 (0.0)	2 (0.8)
Japan	●	79 (3.3)	-5 (4.6)	0 (0.0)	1 (0.9)	0 (0.0)
Kazakhstan	○	34 (4.5)	0 (0)	1 (0.9)	6 (2.9)	6 (2.9)
Kuwait	●	r 23 (4.1)	0 (0) r	4 (1.9) r	6 (2.3) r	5 (2.0) r
Latvia	○	22 (2.8)	9 (4.7)	0 (0.0)	0 (0.0)	0 (0.0)
Lithuania	○	39 (3.7)	26 (4.4) ▲	0 (0.0)	1 (0.7)	2 (0.7)
Morocco	○	14 (3.1)	--	2 (1.2)	2 (1.3)	3 (1.5)
Netherlands	○	84 (2.9)	8 (4.5)	6 (1.9)	30 (4.1)	6 (2.2)
New Zealand	●	77 (2.7)	7 (4.1)	4 (1.1)	10 (1.6)	3 (0.9)
Norway	●	69 (3.3)	10 (5.6)	1 (0.9)	3 (1.3)	1 (0.8)
Qatar	○	42 (0.2)	0 (0)	7 (0.1)	10 (0.1)	6 (0.1)
Russian Federation	○	14 (2.7)	10 (3.0) ▲	0 (0.0)	2 (1.1)	2 (1.1)
Scotland	●	r 93 (2.4)	12 (4.5) ▲	6 (1.9)	20 (3.7)	4 (1.6)
Singapore	●	81 (2.4)	1 (4.1)	7 (1.3)	13 (1.8)	4 (1.1)
Slovak Republic	○	47 (3.9)	0 (0)	0 (0.3)	4 (1.4)	2 (0.8)
Slovenia	●	39 (3.1)	15 (4.8) ▲	0 (0.0)	2 (0.9)	1 (0.4)
Sweden	●	67 (3.4)	0 (0)	2 (1.1)	4 (1.4)	1 (0.5)
Tunisia	○	r 25 (3.5)	13 (4.5) ▲	8 (2.1)	6 (1.8)	7 (1.9)
Ukraine	○	6 (2.0)	0 (0)	0 (0.4)	0 (0.4)	0 (0.4)
United States	○	65 (2.6)	5 (3.5)	4 (0.9)	11 (1.5)	4 (1.0)
Yemen	○	24 (4.2)	0 (0)	10 (3.2)	12 (3.5)	9 (3.2)
International Avg.		46 (0.5)		3 (0.2)	6 (0.3)	3 (0.2)
Benchmarking Participants						
Alberta, Canada	●	72 (4.1)	0 (0)	2 (0.9)	4 (1.3)	3 (1.4)
British Columbia, Canada	●	r 47 (4.2)	0 (0) r	0 (0.3) r	1 (0.9) r	0 (0.5) r
Dubai, UAE	○	s 49 (6.0)	0 (0) s	6 (2.0) s	12 (3.0) s	17 (4.6) s
Massachusetts, US	●	59 (5.7)	0 (0)	7 (2.8)	9 (2.7)	3 (2.0)
Minnesota, US	-	61 (7.0)	0 (0)	2 (0.1)	9 (4.9)	1 (0.8)
Ontario, Canada	●	64 (3.9)	7 (6.0)	7 (3.3)	3 (2.1)	3 (1.4)
Quebec, Canada	○	45 (4.2)	-1 (6.3)	0 (0.1)	1 (0.8)	2 (1.1)

● Yes ○ No

▲ 2007 percent significantly higher

▼ 2007 percent significantly lower

Background data provided by National Research Coordinators and by teachers.

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

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

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

indicates data are available for at least 50 but less than 70% of the students.

A diamond (0) indicates the country did not participate in the assessment.



Exhibit 7.11 Computer Use in Mathematics Class with Trends (Continued)

TIMSS2007
Mathematics 8th Grade

Country	National Curriculum Contains Policies / Statements About the Use of Computers	Trends in Percentage of Students Whose Teachers Reported That Computers Are Available		Percentage of Students Whose Teachers Reported on Computer Use About Half of the Lessons or More			
		2007 Percent of Students	Difference in Percent from 2003	Discovering Principles and Concepts	Practicing Skills and Procedures	Looking Up Ideas and Information	Processing and Analyzing Data
Algeria	●	r 29 (4.2)	∅ ∅	r 3 (1.5)	r 5 (2.1)	r 4 (1.8)	r 6 (2.1)
Armenia	●	r 17 (3.2)	-3 (4.6)	4 (1.0)	4 (1.1)	5 (1.2)	5 (1.1)
Australia	●	51 (4.3)	-4 (6.0)	0 (0.0)	2 (0.9)	1 (0.0)	0 (0.0)
Bahrain	○	24 (2.8)	-10 (4.5) ▼	2 (1.0)	2 (1.0)	4 (0.6)	1 (0.4)
Bosnia and Herzegovina	○	19 (3.1)	∅ ∅	2 (0.9)	2 (0.9)	3 (1.5)	2 (1.3)
Botswana	●	r 13 (3.2)	7 (4.1)	1 (0.0)	1 (0.0)	1 (0.0)	1 (0.0)
Bulgaria	○	46 (3.5)	38 (4.2) ●	1 (1.1)	1 (0.9)	6 (2.2)	3 (1.5)
Chinese Taipei	●	27 (3.4)	-3 (4.7)	3 (1.2)	2 (1.2)	2 (1.2)	1 (1.0)
Colombia	○	16 (3.1)	∅ ∅	2 (0.7)	1 (0.6)	3 (2.3)	2 (0.9)
Cyprus	○	10 (1.9)	2 (2.7)	0 (0.0)	1 (0.3)	1 (0.0)	0 (0.0)
Czech Republic	○	r 59 (4.5)	∅ ∅	r 1 (0.5)	r 4 (1.7)	r 1 (0.5)	r 1 (0.9)
Egypt	○	--	--	--	--	--	--
El Salvador	○	25 (3.8)	∅ ∅	0 (0.0)	2 (1.2)	3 (1.3)	1 (0.0)
England	●	r 58 (4.0)	-8 (7.7)	3 (1.4)	4 (1.7)	3 (1.6)	2 (1.1)
Georgia	○	30 (4.2)	∅ ∅	1 (0.8)	2 (0.9)	2 (1.2)	3 (1.4)
Ghana	○	7 (2.1)	-8 (4.1) ▼	1 (0.0)	2 (1.2)	2 (1.2)	2 (1.4)
Hong Kong SAR	●	42 (4.9)	3 (6.5)	7 (2.5)	8 (2.7)	6 (2.4)	5 (1.9)
Hungary	●	39 (3.9)	12 (5.2) ●	0 (0.0)	1 (0.8)	1 (0.8)	2 (1.2)
Indonesia	○	16 (3.4)	5 (4.2)	0 (0.0)	1 (0.6)	3 (1.7)	2 (1.7)
Iran, Islamic Rep. of	○	5 (1.6)	3 (1.8)	0 (0.0)	1 (0.7)	1 (0.7)	0 (0.0)
Israel	●	r 41 (3.6)	-6 (5.3)	r 7 (1.8)	r 8 (1.9)	r 4 (1.5)	r 7 (1.8)
Italy	●	30 (3.2)	-3 (4.9)	1 (0.8)	2 (1.0)	2 (1.1)	2 (1.0)
Japan	●	69 (3.9)	-17 (5.0) ▼	1 (0.7)	1 (0.8)	0 (0.0)	0 (0.0)
Jordan	●	24 (3.5)	14 (4.5) ●	2 (0.9)	4 (1.3)	5 (1.8)	4 (1.5)
Korea, Rep. of	●	s 56 (3.5)	-17 (4.9) ▼	7 (2.0)	4 (1.5)	3 (1.1)	5 (1.5)
Kuwait	○	r 17 (3.6)	∅ ∅	r 3 (1.7)	r 5 (2.0)	r 5 (2.0)	r 4 (1.9)
Lebanon	○	28 (3.6)	4 (5.2)	8 (2.1)	5 (2.1)	7 (2.4)	6 (1.9)
Lithuania	●	73 (3.2)	3 (4.8)	2 (0.9)	3 (1.3)	4 (1.5)	5 (1.8)
Malaysia	●	44 (4.4)	39 (4.7) ●	5 (1.7)	6 (1.8)	6 (1.9)	4 (1.6)
Malta	●	81 (0.2)	∅ ∅	7 (0.1)	8 (0.1)	3 (0.1)	1 (0.0)
Norway	●	71 (3.3)	15 (5.3) ●	2 (0.7)	4 (1.5)	2 (1.1)	4 (1.2)
Oman	●	34 (4.0)	∅ ∅	1 (0.1)	3 (1.5)	6 (2.2)	6 (2.1)
Palestinian Nat'l Auth.	●	31 (4.1)	2 (5.8)	2 (1.4)	2 (1.1)	4 (1.8)	3 (1.6)
Qatar	●	r 22 (0.1)	∅ ∅	r 8 (0.1)	r 8 (0.1)	r 7 (0.1)	r 6 (0.1)
Romania	○	50 (3.9)	37 (4.7) ●	2 (0.9)	4 (1.5)	3 (0.9)	3 (0.9)
Russian Federation	●	40 (4.0)	28 (4.8) ●	2 (0.9)	3 (1.6)	3 (1.3)	1 (0.6)
Saudi Arabia	○	24 (3.7)	--	3 (1.5)	6 (2.7)	7 (2.7)	5 (2.5)
Scotland	●	37 (3.6)	-3 (6.0)	1 (0.9)	3 (1.1)	1 (0.4)	0 (0.0)
Serbia	○	17 (3.6)	9 (4.4) ●	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Singapore	●	54 (2.5)	-12 (3.7) ▼	3 (0.8)	7 (1.4)	4 (1.0)	4 (0.9)
Slovenia	●	52 (2.6)	15 (4.9) ●	1 (1.0)	1 (1.0)	0 (0.3)	3 (1.1)
Sweden	●	40 (3.2)	-5 (4.9)	1 (0.3)	1 (0.3)	1 (0.4)	1 (0.4)
Syrian Arab Republic	○	18 (3.4)	∅ ∅	4 (1.8)	3 (1.5)	5 (1.9)	3 (1.6)
Thailand	○	20 (3.5)	∅ ∅	3 (1.3)	3 (1.3)	3 (1.4)	3 (1.5)
Tunisia	○	11 (2.1)	-12 (4.0) ▼	0 (0.0)	0 (0.0)	0 (0.0)	2 (1.2)
Turkey	●	30 (4.1)	∅ ∅	4 (1.5)	7 (2.3)	6 (2.0)	5 (1.6)
Ukraine	○	14 (3.0)	∅ ∅	1 (0.6)	1 (0.7)	1 (0.6)	1 (0.6)
United States	○	42 (2.6)	-3 (3.9)	2 (0.8)	6 (1.1)	1 (0.5)	2 (0.7)
‡ Morocco	○	r 33 (8.8)	--	r 3 (1.6)	r 2 (1.2)	r 3 (1.9)	r 1 (0.0)
International Avg.		34 (0.5)		2 (0.2)	3 (0.2)	3 (0.2)	3 (0.2)

Benchmarking Participants

Basque Country, Spain	○	40 (5.3)	5 (7.0)	1 (1.4)	0 (0.0)	0 (0.0)	0 (0.0)
British Columbia, Canada	●	38 (4.5)	∅ ∅	2 (1.5)	2 (1.5)	2 (1.4)	1 (0.0)
Dubai, UAE	○	s 50 (6.2)	∅ ∅	s 9 (5.3)	s 11 (5.4)	s 12 (5.6)	s 10 (5.5)
Massachusetts, US	●	57 (7.8)	∅ ∅	1 (0.0)	1 (0.8)	1 (0.8)	1 (0.0)
Minnesota, US	-	28 (7.9)	∅ ∅	1 (0.7)	2 (1.2)	1 (0.7)	1 (0.7)
Ontario, Canada	●	60 (4.9)	14 (7.1)	1 (0.7)	0 (0.2)	2 (1.0)	1 (0.7)
Quebec, Canada	○	27 (4.2)	16 (5.0) ●	0 (0.0)	1 (0.0)	0 (0.0)	0 (0.0)

● Yes ○ No ● 2007 percent significantly higher ▼ 2007 percent significantly lower

Background data provided by National Research Coordinators and by teachers.

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

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

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

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

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

What is the Role of Homework?

Exhibit 7.12 contains teachers' reports about their emphasis on homework. For the Index of Teachers' Emphasis on Mathematics Homework (EMH), students in the high category had teachers who reported giving relatively long homework assignments (more than 30 minutes) on a relatively frequent basis (in about half the lessons or more). Students in the low category had teachers who gave short assignments (less than 30 minutes) relatively infrequently (in about half the lessons or less). The medium level includes all other possible combinations of responses. At the fourth grade, on average internationally, homework was not very prevalent even though there was variation from country to country. Only 10 countries had a policy about assigning mathematics homework. Also, there were not many changes between 2003 and 2007, except in Japan and Chinese Taipei where fewer students were in the low category and more were in the medium and high categories. In 2007, internationally on average, more than one third of the students (36%) were in the low category and only 13 percent were in the high category. There was little relationship between teachers' emphasis on homework and mathematics achievement.

At the eighth grade, teachers placed more emphasis on mathematics homework than they did at the fourth grade, but there was still substantial variation. Seventeen countries reported having a policy about assigning mathematics homework. Countries with more than half their students in the high category included Romania (70%), Italy (70%), Georgia (63%), Iran (59%), and Israel (53%). Countries with more than half their students in the low category included England (59%), Korea (56%), Sweden (63%), Japan (59%), Scotland (55%), the Czech Republic (77%), and Kuwait (81%). There was a positive relationship between teachers assigning more homework and mathematics achievement, especially with students in the low category having lower achievement. However, a number of countries were assigning less homework in 2007 than in 2003. The following countries had smaller percentages of students in the high category: Armenia, the Russian Federation, Singapore, Malaysia, Bulgaria, Cyprus, the United States, Jordan,

the Palestinian National Authority, Slovenia, and Bahrain. The two countries with higher percentages of students in the high category were Tunisia and Korea.

For students at the eighth grade, Exhibit 7.13 presents teachers' reports about how they used homework in their mathematics instruction. Internationally on average, the teachers reported always or almost always monitoring whether the homework was completed for 80 percent of the students. Fifty-nine percent of the students, on average, had teachers who reported correcting students' assignments and giving them feedback. For only at most one-third of the students did the teachers have the students correct their own homework in class (32%), use the homework as a basis for class discussion (29%), or use the homework to contribute towards students grades or marks (33%).

For students at the eighth grade, Exhibit 7.14 shows trends in how frequently teachers assign two different types of mathematics homework. Assigning problem or question sets as homework was very common across countries and this type of homework was given to almost all students. On average internationally, 69 percent of the students had teachers who reported always or almost always assigning homework requiring students to do sets of problems and another 27 percent had teachers who sometimes assigned problem/question sets. In contrast, gathering data and reporting the results was rarely assigned on a frequent basis (5%). However, on average internationally, half the students (56%) had teachers who sometimes assigned this type of homework. In general, the tradition of giving problem/question sets as the most popular type of mathematics homework did not change much between 2003 and 2007.

Exhibit 7.12 Index of Teachers' Emphasis on Mathematics Homework (EMH) with Trends
TIMSS2007
Mathematics **4th**
Grade

Country	Have Policy to Assign Mathematics Homework	High EMH			Medium EMH			Low EMH		
		2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Armenia	○	r 41 (4.3)	504 (8.6)	-6 (6.1)	49 (3.9)	496 (4.3)	-3 (5.9)	11 (2.4)	507 (8.1)	8 (2.8) ▲
Algeria	●	40 (5.0)	378 (12.3)	0 0	43 (4.7)	381 (7.3)	0 0	17 (3.4)	369 (12.4)	0 0
Italy	○	35 (3.0)	501 (5.1)	3 (4.6)	35 (2.8)	508 (5.3)	2 (4.7)	29 (2.9)	512 (3.4)	-5 (4.6)
Singapore	○	32 (2.8)	590 (6.6)	-3 (5.1)	47 (2.9)	610 (5.3)	-3 (4.8)	21 (2.5)	590 (8.3)	5 (3.7)
Kazakhstan	○	28 (3.9)	559 (9.9)	0 0	70 (4.0)	545 (8.4)	0 0	2 (1.0)	~ ~	0 0
Georgia	●	28 (4.1)	437 (9.5)	0 0	67 (4.4)	441 (4.9)	0 0	5 (2.1)	424 (24.1)	0 0
Hong Kong SAR	○	26 (3.6)	610 (7.2)	-7 (5.9)	63 (4.1)	611 (4.2)	0 (6.3)	11 (2.9)	576 (9.1)	7 (3.4) ▲
Russian Federation	○	24 (3.8)	545 (7.2)	-1 (5.0)	72 (4.0)	542 (6.3)	-1 (5.3)	4 (1.2)	573 (30.2)	2 (1.5)
Iran, Islamic Rep. of	○	23 (2.9)	398 (8.5)	-9 (5.8)	36 (3.8)	411 (5.8)	3 (6.0)	41 (3.8)	397 (7.4)	6 (6.0)
Colombia	○	22 (3.6)	370 (8.5)	0 0	68 (4.2)	350 (6.9)	0 0	10 (3.2)	360 (27.3)	0 0
Morocco	●	19 (3.9)	339 (12.8)	- -	44 (4.3)	353 (6.9)	- -	36 (3.9)	331 (10.3)	- -
Chinese Taipei	○	18 (3.2)	582 (5.5)	7 (4.2)	64 (3.7)	574 (2.2)	12 (5.6) ▲	18 (2.8)	571 (3.3)	-19 (4.8) ▼
Germany	●	14 (2.0)	529 (4.4)	0 0	79 (2.4)	526 (2.5)	0 0	7 (1.6)	507 (16.0)	0 0
Ukraine	●	14 (2.9)	468 (9.9)	0 0	83 (3.2)	468 (3.8)	0 0	4 (1.5)	497 (5.8)	0 0
Norway	○	13 (2.5)	476 (5.9)	6 (3.2)	45 (3.5)	473 (4.4)	-1 (5.8)	42 (3.5)	472 (4.0)	-5 (5.7)
Yemen	●	12 (3.2)	215 (12.1)	0 0	65 (4.1)	227 (8.4)	0 0	22 (3.6)	220 (9.8)	0 0
Austria	●	11 (1.8)	494 (5.6)	0 0	73 (2.7)	508 (2.5)	0 0	16 (2.4)	505 (4.3)	0 0
El Salvador	○	11 (2.9)	334 (12.4)	0 0	67 (4.1)	329 (5.7)	0 0	22 (3.6)	329 (7.5)	0 0
Tunisia	○	11 (2.3)	308 (15.6)	-3 (4.0)	35 (4.0)	328 (7.8)	2 (5.5)	54 (4.4)	327 (6.6)	1 (6.1)
Japan	○	9 (2.2)	574 (7.2)	5 (2.6) ▲	52 (3.8)	569 (2.7)	12 (5.8) ▲	39 (3.9)	566 (3.6)	-18 (5.9) ▼
United States	○	7 (1.4)	525 (10.8)	-1 (1.9)	68 (2.5)	531 (3.3)	0 (3.7)	25 (2.2)	525 (4.3)	0 (3.5)
Denmark	○	5 (1.6)	527 (8.4)	0 0	61 (4.6)	526 (3.3)	0 0	35 (4.4)	521 (4.0)	0 0
Australia	○	5 (2.2)	535 (15.5)	1 (2.5)	18 (3.1)	519 (10.3)	-9 (5.1)	78 (2.6)	516 (4.5)	8 (4.9)
Qatar	●	r 4 (0.0)	312 (4.8)	0 0	29 (0.2)	301 (3.0)	0 0	67 (0.1)	293 (1.4)	0 0
Slovenia	○	3 (1.1)	489 (17.3)	0 (2.0)	87 (2.2)	502 (1.9)	1 (3.3)	10 (1.9)	499 (7.0)	0 (2.9)
Sweden	○	3 (0.9)	515 (12.1)	0 0	20 (3.3)	503 (5.9)	0 0	77 (3.4)	503 (2.8)	0 0
England	○	r 3 (1.2)	591 (20.2)	-2 (2.8)	18 (3.2)	546 (8.9)	5 (4.5)	80 (3.2)	538 (2.9)	-3 (5.1)
Lithuania	●	3 (1.2)	520 (12.7)	0 (1.6)	79 (3.0)	533 (2.6)	5 (3.9)	19 (2.8)	520 (6.3)	-6 (3.7)
Scotland	○	s 1 (0.9)	~ ~	1 (1.1)	11 (2.7)	507 (10.9)	-8 (5.1)	87 (2.8)	493 (2.8)	8 (5.2)
Czech Republic	○	1 (0.7)	~ ~	0 0	17 (3.0)	489 (4.5)	0 0	82 (3.0)	486 (3.2)	0 0
New Zealand	○	1 (0.6)	~ ~	0 (0.7)	15 (2.0)	482 (5.7)	4 (3.1)	84 (2.1)	494 (2.6)	-4 (3.3)
Hungary	○	1 (0.6)	~ ~	-7 (2.4) ▼	93 (1.6)	510 (3.6)	5 (3.2)	6 (1.5)	508 (26.2)	2 (2.3)
Latvia	○	1 (0.4)	~ ~	-6 (2.2) ▼	91 (2.1)	539 (2.3)	3 (3.9)	9 (2.1)	531 (4.5)	3 (3.1)
Netherlands	○	1 (0.4)	~ ~	1 (0.4)	3 (0.5)	511 (19.1)	0 (1.5)	97 (0.8)	535 (2.5)	-1 (1.6)
Kuwait	-	r 0 (0.0)	~ ~	0 0	18 (3.5)	308 (12.4)	0 0	82 (3.5)	319 (4.4)	0 0
Slovak Republic	●	0 (0.0)	~ ~	0 0	68 (3.3)	498 (4.1)	0 0	32 (3.3)	492 (10.0)	0 0
International Avg.		13 (0.4)	472 (2.0)		51 (0.6)	474 (1.1)		36 (0.5)	469 (1.9)	
Benchmarking Participants										
Massachusetts, US	○	17 (4.7)	583 (10.6)	0 0	71 (6.4)	569 (4.4)	0 0	12 (4.3)	577 (6.3)	0 0
Dubai, UAE	○	s 13 (4.8)	420 (19.5)	0 0	70 (5.0)	437 (4.5)	0 0	17 (2.5)	463 (11.8)	0 0
Ontario, Canada	○	6 (1.9)	508 (7.8)	1 (3.2)	43 (4.3)	512 (5.5)	1 (6.2)	50 (4.4)	512 (5.1)	-2 (6.5)
Quebec, Canada	○	r 6 (1.9)	505 (5.1)	-2 (3.2)	15 (2.7)	503 (6.2)	-3 (4.5)	79 (3.0)	523 (3.4)	6 (5.0)
Minnesota, US	○	4 (2.1)	568 (25.9)	0 0	61 (7.1)	551 (8.3)	0 0	34 (7.2)	561 (11.9)	0 0
British Columbia, Canada	○	r 2 (1.1)	~ ~	0 0	29 (3.6)	507 (5.1)	0 0	68 (3.6)	505 (3.8)	0 0
Alberta, Canada	○	2 (0.7)	~ ~	0 0	19 (3.4)	504 (5.4)	0 0	80 (3.5)	505 (3.7)	0 0

● Yes

○ No

▲ 2007 percent significantly higher

▼ 2007 percent significantly lower

Background data provided by National Research Coordinators and by teachers.

Index based on teachers' responses to two questions about how often they usually assign mathematics homework and how many minutes of mathematics homework they usually assign. High level indicates the assignment of more than 30 minutes of homework about half of the lessons or more. Low level indicates no assignment or the assignment of less than 30 minutes of homework about half of the lessons or less. Medium level includes all other possible combinations of responses.

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

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

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

A diamond (0) indicates the country did not participate in the assessment.



Exhibit 7.12 Index of Teachers' Emphasis on Mathematics Homework (EMH) with Trends (Continued)

TIMSS2007
Mathematics 8th Grade

Country	Have Policy to Assign Mathematics Homework	High EMH			Medium EMH			Low EMH		
		2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Romania	○	70 (4.2)	472 (4.9)	-8 (5.4)	28 (4.2)	440 (9.2)	8 (5.4)	1 (0.8)	~ ~	0 (1.0)
Italy	○	70 (3.3)	481 (3.2)	-2 (4.8)	29 (3.1)	480 (5.3)	4 (4.4)	1 (0.7)	~ ~	-2 (1.7)
Georgia	●	63 (4.4)	413 (7.8)	0 (0)	35 (4.4)	406 (7.9)	0 (0)	2 (1.3)	~ ~	0 (0)
Iran, Islamic Rep. of	○	59 (3.8)	406 (5.0)	-3 (5.8)	27 (3.6)	395 (8.2)	1 (5.4)	13 (2.9)	412 (11.9)	2 (4.0)
Israel	●	r 53 (3.3)	489 (5.4)	3 (5.0)	40 (3.3)	454 (8.5)	-3 (5.3)	7 (1.4)	404 (21.7)	1 (2.2)
Colombia	○	48 (4.9)	382 (5.1)	0 (0)	37 (5.2)	383 (7.3)	0 (0)	16 (3.2)	366 (11.0)	0 (0)
Syrian Arab Republic	●	47 (4.1)	396 (5.5)	0 (0)	30 (3.9)	392 (7.8)	0 (0)	22 (3.8)	397 (8.0)	0 (0)
Armenia	○	r 46 (4.4)	503 (4.7)	-18 (6.4) ▽	43 (3.7)	494 (5.6)	13 (6.0) ▲	10 (2.5)	498 (12.7)	6 (3.3)
Russian Federation	○	46 (2.9)	516 (6.5)	-10 (4.5) ▽	54 (2.9)	509 (4.3)	11 (4.5) ▲	0 (0.0)	~ ~	-1 (0.5)
Lebanon	●	45 (4.4)	440 (6.0)	-4 (6.3)	45 (4.2)	456 (6.8)	1 (6.1)	10 (2.4)	438 (14.5)	3 (3.0)
Thailand	○	43 (4.3)	448 (7.8)	0 (0)	48 (4.2)	436 (9.0)	0 (0)	9 (2.2)	438 (14.1)	0 (0)
Singapore	○	43 (2.8)	612 (5.7)	-17 (3.7) ▽	39 (2.7)	595 (6.5)	6 (3.7)	18 (2.3)	542 (12.8)	11 (2.6) ▲
Ukraine	●	43 (3.2)	466 (5.9)	0 (0)	56 (3.3)	459 (5.6)	0 (0)	1 (0.7)	~ ~	0 (0)
Indonesia	○	41 (4.9)	403 (9.2)	-4 (6.3)	50 (4.9)	409 (7.9)	5 (6.6)	9 (2.5)	386 (13.7)	-1 (3.6)
Chinese Taipei	○	38 (4.2)	613 (8.0)	9 (5.7)	37 (4.6)	608 (5.0)	-1 (6.1)	25 (3.5)	562 (7.4)	-8 (5.3)
Ghana	●	36 (4.3)	309 (9.2)	-11 (6.7)	42 (4.3)	309 (7.8)	5 (6.6)	21 (3.4)	312 (7.6)	6 (4.5)
Turkey	●	35 (4.1)	432 (9.6)	0 (0)	37 (4.2)	427 (8.8)	0 (0)	28 (3.3)	433 (10.5)	0 (0)
Norway	○	34 (3.9)	467 (3.5)	9 (5.2)	48 (3.6)	474 (3.0)	2 (5.6)	18 (3.1)	465 (5.0)	-11 (5.3) ▽
Malaysia	○	34 (4.0)	478 (8.6)	-26 (6.0) ▽	54 (4.2)	475 (6.7)	20 (5.9) ▲	11 (2.3)	458 (15.7)	6 (3.0) ▲
Tunisia	●	34 (4.1)	418 (3.3)	22 (4.8) ▲	60 (4.2)	424 (3.3)	-24 (5.2) ▽	6 (2.0)	421 (10.7)	3 (2.6)
Botswana	○	33 (3.8)	370 (4.5)	-11 (5.9)	57 (4.1)	361 (3.6)	9 (6.1)	10 (2.6)	352 (8.0)	2 (3.6)
Serbia	●	33 (3.8)	484 (6.9)	-1 (5.6)	40 (4.3)	488 (4.7)	-5 (6.1)	27 (3.9)	484 (7.0)	6 (5.3)
Hong Kong SAR	○	31 (4.5)	586 (10.9)	6 (5.9)	52 (4.6)	582 (9.0)	2 (6.5)	17 (3.5)	532 (16.1)	-8 (5.3)
Algeria	●	31 (4.0)	389 (3.3)	0 (0)	55 (4.4)	385 (3.0)	0 (0)	14 (2.7)	388 (4.1)	0 (0)
Bulgaria	○	28 (3.3)	499 (8.9)	-25 (5.3) ▽	66 (3.7)	451 (6.5)	28 (5.6) ▲	6 (1.8)	452 (10.6)	-3 (3.1)
El Salvador	○	26 (4.1)	335 (7.4)	0 (0)	50 (4.1)	345 (3.9)	0 (0)	24 (3.9)	333 (6.6)	0 (0)
Cyprus	○	23 (2.7)	472 (3.9)	-12 (4.1) ▽	77 (2.7)	462 (2.0)	12 (4.1) ▲	1 (0.0)	~ ~	1 (0.0)
Malta	●	20 (0.2)	510 (2.2)	0 (0)	73 (0.2)	488 (1.3)	0 (0)	6 (0.2)	407 (3.6)	0 (0)
United States	○	20 (2.1)	533 (6.0)	-7 (3.2) ▽	67 (2.6)	507 (3.9)	5 (3.9)	14 (2.2)	475 (5.8)	2 (3.2)
Bosnia and Herzegovina	○	19 (3.1)	449 (8.0)	0 (0)	56 (4.0)	463 (3.7)	0 (0)	25 (3.4)	444 (5.3)	0 (0)
England	○	r 18 (3.1)	552 (11.7)	-6 (6.8)	23 (3.3)	520 (11.0)	2 (5.5)	59 (4.2)	499 (6.5)	3 (7.2)
Korea, Rep. of	●	s 17 (2.8)	609 (7.7)	8 (3.5) ▲	28 (2.8)	591 (5.8)	-3 (4.6)	56 (3.3)	597 (4.0)	-4 (4.9)
Egypt	○	16 (2.8)	391 (8.5)	-7 (4.3)	52 (4.4)	390 (5.3)	-6 (5.8)	32 (4.1)	395 (6.9)	12 (5.3) ▲
Jordan	○	14 (2.7)	426 (12.0)	-16 (4.6) ▽	58 (4.2)	431 (5.8)	2 (6.1)	28 (3.9)	415 (9.0)	14 (4.8) ▲
Sweden	○	11 (1.8)	492 (8.1)	-6 (3.4)	26 (2.8)	499 (3.9)	2 (4.2)	63 (3.1)	488 (2.5)	4 (4.8)
Palestinian Nat'l Auth.	○	10 (2.7)	356 (12.7)	-21 (4.8) ▽	63 (4.0)	375 (4.8)	5 (5.8)	28 (3.6)	351 (6.5)	16 (4.4) ▲
Lithuania	●	8 (2.1)	499 (6.3)	-5 (3.4)	86 (2.7)	508 (2.6)	10 (4.5) ▲	6 (1.8)	481 (6.5)	-4 (3.2)
Japan	○	8 (2.0)	564 (7.7)	1 (3.0)	33 (3.8)	575 (4.7)	4 (5.3)	59 (3.8)	568 (3.9)	-5 (5.4)
Hungary	○	8 (2.1)	526 (13.6)	0 (2.9)	87 (2.5)	517 (3.9)	-3 (3.4)	5 (1.5)	481 (19.9)	3 (1.8)
Scotland	○	7 (1.8)	534 (15.2)	4 (2.5)	38 (3.5)	511 (6.3)	-7 (5.8)	55 (3.6)	465 (5.5)	3 (5.8)
Slovenia	○	6 (1.3)	506 (8.5)	-7 (3.2) ▽	89 (1.9)	503 (2.4)	4 (3.6)	6 (1.4)	478 (10.8)	3 (1.7)
Oman	●	6 (2.1)	382 (11.7)	0 (0)	67 (3.7)	377 (4.4)	0 (0)	27 (3.3)	360 (6.3)	0 (0)
Qatar	●	5 (0.1)	290 (4.3)	0 (0)	57 (0.2)	318 (1.7)	0 (0)	38 (0.2)	296 (2.4)	0 (0)
Australia	○	5 (2.0)	497 (30.8)	-5 (3.6)	46 (4.0)	520 (5.4)	-10 (5.8)	49 (4.0)	477 (5.9)	16 (5.5) ▲
Bahrain	○	5 (1.5)	373 (5.4)	-10 (2.9) ▽	49 (2.7)	402 (2.5)	-23 (4.5) ▽	47 (2.9)	391 (3.4)	33 (4.2) ▲
Czech Republic	○	4 (1.5)	578 (27.3)	0 (0)	19 (3.2)	504 (7.8)	0 (0)	77 (3.3)	500 (3.0)	0 (0)
Saudi Arabia	●	3 (1.4)	321 (14.2)	--	50 (3.9)	334 (4.0)	--	48 (3.8)	323 (4.4)	--
Kuwait	-	r 2 (1.4)	~ ~	0 (0)	16 (3.4)	360 (8.5)	0 (0)	81 (3.7)	356 (2.9)	0 (0)
‡ Morocco	●	r 24 (6.2)	394 (12.2)	--	59 (6.8)	387 (6.5)	--	17 (4.1)	374 (9.9)	--
International Avg.		28 (0.5)	460 (1.4)		49 (0.5)	453 (0.9)		24 (0.4)	435 (1.5)	

Benchmarking Participants

Massachusetts, US	○	32 (5.8)	576 (10.1)	0 (0)	59 (5.9)	537 (6.7)	0 (0)	9 (2.7)	494 (13.3)	0 (0)
Minnesota, US	-	23 (6.3)	563 (12.9)	0 (0)	67 (7.1)	529 (5.0)	0 (0)	10 (3.6)	489 (12.5)	0 (0)
Ontario, Canada	○	21 (3.5)	519 (5.2)	-9 (5.6)	51 (5.2)	523 (4.7)	-12 (6.8)	28 (4.4)	506 (9.5)	21 (5.0) ▲
Basque Country, Spain	○	21 (4.4)	504 (6.0)	6 (6.0)	68 (4.8)	500 (3.8)	-3 (7.0)	12 (2.6)	487 (9.9)	-3 (4.2)
Quebec, Canada	○	17 (3.1)	550 (12.8)	-5 (5.1)	58 (4.1)	534 (5.7)	-3 (6.6)	24 (3.6)	506 (5.1)	8 (5.4)
British Columbia, Canada	○	17 (3.1)	521 (9.1)	0 (0)	64 (4.0)	512 (4.1)	0 (0)	19 (2.7)	497 (7.9)	0 (0)
Dubai, UAE	○	s 8 (2.2)	456 (16.9)	0 (0)	68 (3.9)	468 (5.5)	0 (0)	24 (3.6)	451 (12.4)	0 (0)

● Yes ○ No

▲ 2007 percent significantly higher

▽ 2007 percent significantly lower

Background data provided by National Research Coordinators and by teachers.

Index based on teachers' responses to two questions about how often they usually assign mathematics homework and how many minutes of mathematics homework they usually assign. High level indicates the assignment of more than 30 minutes of homework about half of the lessons or more. Low level indicates no assignment or the assignment of less than 30 minutes of homework about half of the lessons or less. Medium level includes all other possible combinations of responses.

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

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

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

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

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

Exhibit 7.13 Use of Mathematics Homework

TIMSS2007
Mathematics 8th Grade

Country	Percentage of Students Whose Teachers Always or Almost Always				
	Monitor Whether or Not the Homework Was Completed	Correct Assignments and Then Give Feedback to Students	Have Students Correct Their Own Homework in Class	Use the Homework as a Basis for Class Discussion	Use the Homework to Contribute Towards Students' Grades/Marks
Algeria	81 (3.4)	74 (3.8)	42 (4.4)	45 (4.7)	57 (4.3)
Armenia	52 (3.4)	37 (3.5)	29 (3.1)	23 (2.7)	25 (3.1)
Australia	63 (3.3)	59 (3.9)	28 (3.8)	15 (3.3)	21 (3.2)
Bahrain	81 (2.9)	76 (2.5)	17 (1.7)	43 (3.0)	54 (3.3)
Bosnia and Herzegovina	73 (3.8)	37 (3.6)	15 (3.0)	25 (3.9)	15 (3.1)
Botswana	94 (2.2)	94 (2.2)	37 (4.4)	33 (3.9)	12 (3.2)
Bulgaria	85 (2.7)	28 (3.6)	13 (2.4)	24 (3.6)	10 (2.3)
Chinese Taipei	66 (4.3)	50 (4.4)	58 (4.2)	53 (4.3)	59 (4.2)
Colombia	81 (4.1)	80 (3.5)	11 (3.0)	33 (4.9)	54 (4.7)
Cyprus	89 (1.8)	82 (2.4)	19 (2.4)	43 (3.2)	47 (3.4)
Czech Republic	93 (2.1)	67 (3.5)	19 (3.0)	13 (2.9)	15 (2.9)
Egypt	82 (3.3)	73 (3.6)	7 (2.1)	20 (3.0)	61 (3.8)
El Salvador	97 (1.4)	84 (3.0)	50 (3.9)	43 (4.5)	66 (4.3)
England	88 (2.5)	70 (4.0)	13 (2.2)	13 (2.8)	32 (3.5)
Georgia	93 (2.6)	46 (5.5)	40 (3.8)	17 (4.4)	38 (4.6)
Ghana	97 (1.4)	93 (2.1)	53 (4.2)	40 (4.3)	56 (3.9)
Hong Kong SAR	82 (3.5)	77 (3.2)	18 (3.5)	24 (4.0)	29 (4.0)
Hungary	92 (2.1)	36 (3.3)	72 (3.8)	8 (2.0)	9 (2.3)
Indonesia	90 (2.4)	84 (2.9)	48 (4.4)	23 (3.4)	47 (3.4)
Iran, Islamic Rep. of	74 (3.4)	49 (3.5)	46 (3.5)	41 (4.2)	38 (3.5)
Israel	r 73 (3.5)	r 40 (3.3)	r 29 (3.5)	r 31 (3.5)	r 50 (3.7)
Italy	77 (3.0)	52 (3.3)	57 (3.3)	51 (3.1)	11 (2.0)
Japan	65 (3.6)	25 (2.9)	48 (4.2)	5 (1.7)	17 (2.6)
Jordan	86 (2.9)	72 (3.4)	17 (3.3)	70 (3.5)	43 (4.3)
Korea, Rep. of	80 (2.1)	12 (2.0)	37 (3.0)	5 (1.6)	28 (3.1)
Kuwait	r 57 (5.2)	r 54 (4.8)	r 13 (3.0)	r 29 (4.1)	r 32 (4.4)
Lebanon	75 (3.2)	76 (3.7)	65 (4.8)	40 (4.4)	17 (2.9)
Lithuania	73 (3.4)	28 (3.2)	19 (3.0)	10 (2.5)	9 (2.2)
Malaysia	81 (3.2)	68 (3.2)	33 (3.9)	38 (4.0)	13 (2.9)
Malta	89 (0.2)	49 (0.3)	75 (0.2)	30 (0.2)	48 (0.2)
Norway	44 (3.2)	8 (2.0)	13 (2.9)	9 (1.9)	15 (2.9)
Oman	87 (3.2)	83 (3.1)	20 (3.6)	33 (4.0)	46 (4.7)
Palestinian Nat'l Auth.	85 (2.9)	64 (3.9)	20 (3.2)	46 (3.8)	40 (4.4)
Qatar	88 (0.1)	85 (0.1)	13 (0.1)	22 (0.1)	56 (0.2)
Romania	79 (2.7)	43 (4.2)	29 (3.5)	31 (3.6)	19 (3.4)
Russian Federation	90 (2.1)	58 (3.7)	19 (2.6)	7 (2.1)	5 (1.5)
Saudi Arabia	89 (3.0)	80 (3.5)	31 (4.1)	33 (4.6)	56 (3.9)
Scotland	89 (2.8)	64 (3.4)	19 (3.0)	20 (3.1)	7 (1.4)
Serbia	71 (3.9)	38 (3.9)	17 (3.1)	24 (3.6)	13 (3.2)
Singapore	85 (1.9)	80 (2.2)	26 (2.2)	28 (2.3)	20 (1.9)
Slovenia	82 (2.1)	12 (2.1)	53 (2.6)	19 (2.3)	3 (0.9)
Sweden	66 (3.2)	48 (2.9)	8 (1.7)	15 (2.1)	13 (2.1)
Syrian Arab Republic	82 (3.4)	76 (3.9)	40 (4.4)	49 (4.0)	72 (4.0)
Thailand	90 (2.5)	75 (3.8)	19 (3.1)	30 (3.8)	24 (3.8)
Tunisia	70 (3.5)	77 (3.5)	82 (3.2)	52 (4.4)	25 (3.8)
Turkey	44 (4.4)	38 (4.2)	25 (4.1)	11 (2.6)	40 (4.5)
Ukraine	88 (2.8)	65 (3.7)	19 (3.0)	7 (2.1)	27 (3.7)
United States	93 (1.6)	44 (2.7)	55 (3.0)	52 (2.7)	77 (2.8)
‡ Morocco	81 (3.7)	71 (5.3)	28 (4.3)	46 (5.8)	46 (6.0)
International Avg.	80 (0.4)	59 (0.5)	32 (0.5)	29 (0.5)	33 (0.5)
Benchmarking Participants					
Basque Country, Spain	80 (3.8)	62 (3.8)	83 (3.9)	35 (4.7)	79 (4.0)
British Columbia, Canada	72 (4.0)	30 (3.4)	40 (3.9)	37 (3.6)	55 (4.1)
Dubai, UAE	s 90 (1.8)	s 86 (2.8)	s 24 (5.1)	s 40 (6.9)	s 33 (4.2)
Massachusetts, US	96 (2.0)	26 (5.6)	59 (5.8)	51 (5.6)	80 (5.9)
Minnesota, US	99 (0.6)	46 (6.6)	64 (5.8)	45 (7.4)	87 (5.9)
Ontario, Canada	72 (4.5)	49 (3.8)	55 (5.3)	46 (4.5)	19 (3.8)
Quebec, Canada	66 (3.6)	70 (4.4)	48 (4.1)	19 (3.4)	9 (2.7)

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.



Exhibit 7.14 Types of Mathematics Homework with Trends

TIMSS2007
Mathematics 8th Grade

Country	Percentage of Students by Types of Homework Assigned by Their Teachers								
	Doing Problem / Question Sets				Gathering Data and Reporting				
	Always or Almost Always		Sometimes		Always or Almost Always		Sometimes		
	Percent in 2007	Difference in Percent from 2003	Percent in 2007	Difference in Percent from 2003	Percent in 2007	Difference in Percent from 2003	Percent in 2007	Difference in Percent from 2003	
Algeria	58 (4.3)	0 0	41 (4.3)	0 0	14 (3.1)	0 0	52 (4.6)	0 0	
Armenia	r 52 (3.1)	-37 (4.0) ▼	22 (2.8)	12 (3.6) ▲	r 17 (2.6)	5 (4.0)	64 (3.8)	-8 (5.1)	
Australia	66 (3.6)	3 (5.8)	27 (3.3)	-9 (5.7)	1 (0.8)	0 (0.9)	53 (4.0)	-1 (6.3)	
Bahrain	60 (3.2)	-25 (4.5) ▼	36 (3.2)	22 (4.4) ▲	6 (1.2)	4 (1.8) ▲	58 (2.3)	10 (4.2) ▲	
Bosnia and Herzegovina	33 (3.7)	0 0	62 (3.7)	0 0	5 (1.9)	0 0	65 (4.0)	0 0	
Botswana	60 (5.0)	-3 (7.1)	33 (4.7)	1 (6.7)	5 (2.0)	5 (2.0) ▲	55 (4.3)	-13 (5.9) ▼	
Bulgaria	69 (3.8)	-26 (4.2) ▼	27 (3.7)	23 (4.1) ▲	1 (0.0)	-1 (1.0)	51 (3.9)	15 (5.6) ▲	
Chinese Taipei	79 (3.6)	-3 (4.8)	19 (3.5)	4 (4.6)	0 (0.0)	-1 (0.8)	35 (4.3)	-22 (6.0) ▼	
Colombia	56 (4.7)	0 0	37 (4.4)	0 0	8 (3.0)	0 0	62 (4.8)	0 0	
Cyprus	95 (1.4)	3 (2.1)	5 (1.4)	-3 (2.1)	1 (0.5)	-14 (2.1) ▼	29 (2.8)	4 (3.6)	
Czech Republic	52 (4.5)	0 0	35 (3.8)	0 0	1 (0.0)	0 0	40 (3.7)	0 0	
Egypt	40 (4.3)	-29 (5.8) ▼	55 (4.3)	28 (5.8) ▲	11 (2.6)	5 (3.2)	67 (3.9)	1 (5.7)	
El Salvador	63 (4.3)	0 0	35 (4.3)	0 0	24 (3.7)	0 0	66 (4.2)	0 0	
England	r 70 (3.7)	-7 (6.2)	26 (3.6)	3 (6.1) s	0 (0.3)	0 (0.3)	55 (4.0)	-6 (7.6)	
Georgia	88 (3.3)	0 0	12 (3.3)	0 0	1 (0.5)	0 0	89 (2.8)	0 0	
Ghana	42 (3.8)	-10 (6.1)	57 (3.7)	9 (6.2)	12 (2.6)	4 (3.5)	78 (3.5)	2 (4.9)	
Hong Kong SAR	64 (3.9)	-5 (5.5)	34 (3.8)	3 (5.4)	0 (0.0)	-1 (0.8)	40 (4.8)	2 (6.5)	
Hungary	92 (2.0)	12 (3.9) ▲	7 (1.9)	-11 (3.7) ▼	1 (0.8)	0 (1.1)	66 (3.8)	-7 (5.1)	
Indonesia	84 (3.6)	6 (5.1)	16 (3.6)	-5 (5.2)	17 (4.2)	6 (4.9)	63 (4.5)	-3 (5.9)	
Iran, Islamic Rep. of	60 (3.8)	-10 (5.1) ▼	34 (3.6)	7 (4.9)	5 (1.9)	-2 (2.8)	68 (4.2)	0 (5.6)	
Israel	r 64 (3.0)	-5 (4.3)	34 (3.0)	5 (4.2) r	4 (1.5)	0 (2.1)	47 (3.7)	-4 (5.6)	
Italy	97 (1.2)	-1 (1.7)	2 (1.0)	1 (1.4)	1 (0.6)	-1 (1.3)	66 (2.7)	-4 (4.4)	
Japan	51 (3.9)	14 (5.4) ▲	47 (3.9)	-6 (5.8)	0 (0.0)	0 (0.0)	11 (2.7)	1 (3.5)	
Jordan	75 (3.3)	-8 (4.9)	22 (3.1)	7 (4.6)	12 (2.8)	10 (3.1) ▲	50 (4.5)	-18 (6.0) ▼	
Korea, Rep. of	s 59 (3.8)	5 (5.0)	36 (3.4)	-6 (4.7) s	1 (0.7)	0 (0.7)	46 (3.7)	-7 (5.3)	
Kuwait	r 31 (3.9)	0 0	42 (4.6)	0 0	r 7 (2.6)	0 0	39 (4.7)	0 0	
Lebanon	71 (3.9)	-1 (5.8)	27 (3.8)	2 (5.4)	16 (3.4)	1 (4.5)	73 (3.6)	9 (5.9)	
Lithuania	91 (2.0)	-1 (3.0)	8 (2.0)	1 (2.9)	0 (0.0)	0 (0.0)	87 (2.8)	-4 (3.5)	
Malaysia	67 (4.2)	-6 (5.4)	33 (4.2)	6 (5.4)	7 (2.1)	3 (2.7)	63 (3.8)	4 (5.4)	
Malta	72 (0.2)	0 0	25 (0.2)	0 0	0 (0.0)	0 0	46 (0.2)	0 0	
Norway	94 (1.7)	8 (3.2) ▲	5 (1.5)	-3 (2.8)	0 (0.0)	0 (0.0)	53 (3.9)	-8 (5.6)	
Oman	69 (4.1)	0 0	30 (4.2)	0 0	4 (1.6)	0 0	78 (3.8)	0 0	
Palestinian Nat'l Auth.	73 (3.2)	-11 (4.6) ▼	26 (3.1)	12 (4.4) ▲	5 (2.0)	4 (2.2)	65 (4.3)	-12 (5.5) ▼	
Qatar	74 (0.1)	0 0	25 (0.1)	0 0	3 (0.1)	0 0	67 (0.1)	0 0	
Romania	84 (2.9)	3 (4.4)	13 (2.5)	-6 (4.1)	7 (2.1)	2 (2.7)	56 (4.2)	-11 (5.7) ▼	
Russian Federation	98 (1.2)	0 (1.5)	1 (0.9)	0 (1.5)	1 (0.8)	0 (1.2)	85 (2.1)	6 (4.1)	
Saudi Arabia	59 (4.3)	--	38 (4.2)	--	6 (2.1)	--	48 (4.8)	--	
Scotland	79 (2.5)	6 (4.7)	15 (2.2)	-9 (4.4) ▼	r 0 (0.0)	0 (0.0)	32 (3.5)	5 (5.5)	
Serbia	36 (4.2)	6 (5.8)	54 (4.2)	-2 (5.8)	1 (0.4)	-1 (1.3)	46 (4.5)	12 (5.7) ▲	
Singapore	75 (2.4)	-6 (3.4)	21 (2.3)	3 (3.3)	0 (0.0)	0 (0.0)	49 (3.1)	8 (4.1)	
Slovenia	75 (2.6)	-2 (4.4)	23 (2.5)	2 (4.3)	1 (0.7)	1 (0.7)	67 (2.8)	-3 (5.0)	
Sweden	64 (3.2)	-4 (4.7)	16 (2.1)	-3 (3.8)	0 (0.4)	0 (0.4)	34 (3.1)	-1 (4.8)	
Syrian Arab Republic	75 (4.0)	0 0	20 (3.8)	0 0	16 (3.1)	0 0	47 (3.7)	0 0	
Thailand	73 (4.1)	0 0	22 (3.9)	0 0	9 (2.4)	0 0	79 (3.6)	0 0	
Tunisia	68 (4.0)	12 (6.1) ▲	29 (3.8)	-13 (6.0) ▼	r 3 (1.3)	-1 (1.9)	43 (4.0)	14 (6.0) ▲	
Turkey	72 (3.8)	0 0	26 (3.8)	0 0	5 (2.0)	0 0	64 (4.6)	0 0	
Ukraine	99 (1.0)	0 0	1 (1.0)	0 0	1 (1.0)	0 0	75 (3.1)	0 0	
United States	81 (2.4)	-1 (3.3)	16 (2.2)	-1 (3.1)	3 (1.2)	1 (1.5)	45 (2.7)	-10 (3.9) ▼	
‡ Morocco	66 (4.0)	--	32 (4.3)	--	r 1 (0.1)	--	52 (5.4)	--	
International Avg.	69 (0.5)		27 (0.5)		5 (0.3)		56 (0.5)		
Benchmarking Participants									
Basque Country, Spain	79 (4.2)	4 (6.0)	18 (4.2)	-4 (6.0)	1 (0.9)	-1 (1.8)	40 (5.4)	-3 (7.6)	
British Columbia, Canada	75 (3.7)	0 0	23 (3.8)	0 0	0 (0.0)	0 0	48 (4.4)	0 0	
Dubai, UAE	s 76 (4.3)	0 0	23 (4.4)	0 0	s 15 (2.3)	0 0	70 (3.9)	0 0	
Massachusetts, US	81 (3.1)	0 0	17 (2.9)	0 0	1 (0.7)	0 0	54 (6.2)	0 0	
Minnesota, US	95 (2.3)	0 0	4 (2.4)	0 0	0 (0.0)	0 0	43 (7.6)	0 0	
Ontario, Canada	65 (4.5)	-13 (5.8) ▼	33 (4.4)	12 (5.7) ▲	5 (1.5)	4 (1.5) ▲	74 (3.4)	-5 (5.0)	
Quebec, Canada	84 (3.1)	0 (4.7)	15 (3.1)	2 (4.4)	2 (1.2)	0 (1.6)	33 (4.5)	4 (6.3)	

▲ 2007 percent significantly higher ▼ 2007 percent significantly lower

Background data provided by teachers.

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

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

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

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

A diamond (0) indicates the country did not participate in the assessment.

What Types of Assessments Are Used in Mathematics Classes?

This section describes assessment practices in mathematics classes at the eighth grade. As shown in Exhibit 7.15, teachers reported giving the most emphasis to classroom tests as a way of monitoring students' progress in mathematics. Teachers used classroom tests to some extent for nearly all of the students. Internationally on average, teachers reported giving major emphasis to classroom tests for 66 percent of the students and some emphasis for another 30 percent. Teachers also reported using their professional judgment to some extent for most students. Internationally on average, teachers reported giving major emphasis to their own judgment for 45 percent of the students, and some emphasis for another 42 percent. Typically, only moderate emphasis was given to national or regional achievement tests—with little or no emphasis on this source of information for 35 percent of students.

Information about trends in the frequency of mathematics testing at the eighth grade is presented in Exhibit 7.16. According to teachers' reports, 85 percent of eighth grade students were given mathematics tests at least monthly, on average internationally. Nearly half (46%) were given a mathematics test or examination every 2 weeks (or more frequently) and another 39 percent were tested about once a month. However, this varies considerably by country. For example, the majority of students were given mathematics tests or examinations a few times a year (or less frequently) in several countries, including England (53%), Scotland (62%), Slovenia (80%), and Sweden (61%). Countries with increases since 2003 in testing at least every two weeks included Jordan, Malaysia, the Russian Federation, and Serbia. Countries with changes toward testing a few times a year or less often included Armenia, Bahrain, Jordan, Korea, Singapore, Slovenia, and Tunisia.

Exhibit 7.15 Emphasis on Sources to Monitor Students' Progress in Mathematics

TIMSS2007
Mathematics 8th Grade

Country	Percentage of Students by Their Teachers' Emphasis on Various Sources to Monitor Students' Progress											
	Teacher's Own Professional Judgement			Classroom Tests			National or Regional Achievement Tests					
	Major Emphasis	Some Emphasis	Little or No Emphasis	Major Emphasis	Some Emphasis	Little or No Emphasis	Major Emphasis	Some Emphasis	Little or No Emphasis			
Algeria	r	43 (4.0)	36 (4.3)	21 (3.8)	61 (4.3)	26 (4.2)	13 (3.0)	r	38 (4.0)	25 (3.6)	37 (4.5)	
Armenia		23 (2.9)	41 (3.8)	36 (3.3)	37 (3.9)	29 (2.9)	34 (3.0)		10 (1.8)	41 (3.0)	49 (3.3)	
Australia		33 (3.7)	57 (4.2)	10 (2.0)	78 (3.2)	19 (3.3)	3 (1.1)		3 (1.3)	24 (3.3)	73 (3.6)	
Bahrain		43 (2.0)	40 (2.8)	17 (2.6)	63 (2.3)	30 (2.1)	7 (1.3)		27 (3.0)	48 (3.1)	25 (2.2)	
Bosnia and Herzegovina		54 (4.2)	41 (4.0)	4 (1.8)	59 (4.5)	40 (4.4)	2 (0.9)		17 (2.9)	44 (3.6)	39 (3.7)	
Botswana		54 (4.4)	39 (4.4)	7 (1.8)	80 (3.8)	18 (3.6)	3 (1.3)		44 (4.6)	37 (4.1)	20 (3.5)	
Bulgaria		70 (3.7)	28 (3.9)	2 (0.9)	54 (3.9)	35 (3.4)	11 (2.6)		33 (3.9)	49 (4.0)	17 (3.1)	
Chinese Taipei		17 (3.3)	54 (4.2)	29 (3.9)	44 (4.2)	48 (4.3)	7 (2.2)		6 (1.8)	24 (3.9)	70 (4.3)	
Colombia		64 (5.5)	30 (5.3)	6 (2.4)	73 (5.5)	26 (5.5)	1 (0.5)		30 (4.2)	39 (5.9)	31 (4.8)	
Cyprus		41 (2.7)	54 (2.6)	5 (1.4)	56 (2.8)	43 (2.9)	1 (0.0)		10 (1.6)	21 (2.2)	69 (2.2)	
Czech Republic		32 (4.2)	61 (4.3)	7 (2.0)	47 (4.2)	49 (4.1)	4 (1.7)		1 (0.0)	20 (3.2)	79 (3.3)	
Egypt		60 (4.1)	35 (4.0)	5 (1.9)	66 (3.8)	30 (3.9)	4 (1.5)		29 (3.3)	59 (3.5)	12 (2.6)	
El Salvador		52 (4.7)	40 (4.7)	7 (2.4)	60 (3.9)	36 (3.8)	4 (1.8)		34 (4.3)	44 (4.1)	22 (3.7)	
England		55 (3.7)	45 (3.7)	1 (0.6)	42 (3.7)	49 (3.8)	10 (2.4)		44 (3.8)	46 (3.9)	10 (1.9)	
Georgia		67 (5.0)	32 (5.0)	0 (0.3)	58 (5.8)	42 (5.8)	0 (0.0)		30 (4.5)	54 (5.4)	16 (5.2)	
Ghana		51 (4.7)	34 (4.3)	15 (3.4)	88 (2.5)	11 (2.4)	1 (0.7)		30 (4.0)	38 (3.5)	33 (4.3)	
Hong Kong SAR		34 (4.2)	46 (4.6)	19 (3.5)	81 (3.7)	18 (3.6)	1 (0.7)		6 (2.3)	21 (3.7)	74 (4.0)	
Hungary		60 (3.3)	29 (3.2)	11 (2.3)	89 (2.8)	10 (2.8)	0 (0.0)		17 (2.9)	48 (4.1)	35 (3.9)	
Indonesia		36 (4.4)	59 (4.4)	6 (2.1)	67 (4.7)	33 (4.7)	0 (0.0)		45 (4.5)	43 (4.3)	12 (3.0)	
Iran, Islamic Rep. of		39 (3.4)	46 (3.4)	15 (2.7)	66 (3.7)	32 (3.6)	2 (1.5)		30 (3.9)	43 (4.2)	27 (3.7)	
Israel	r	44 (3.9)	50 (3.8)	7 (2.0)	r	79 (2.8)	19 (2.9)	2 (1.2)	r	10 (2.5)	53 (3.7)	37 (3.6)
Italy		56 (3.2)	40 (3.3)	4 (1.1)	79 (2.6)	20 (2.6)	0 (0.3)		9 (1.8)	41 (3.1)	50 (3.2)	
Japan		7 (2.0)	32 (3.7)	61 (3.8)	71 (3.4)	28 (3.3)	1 (0.0)		5 (1.4)	16 (2.7)	80 (2.9)	
Jordan		67 (3.8)	28 (3.7)	5 (1.8)	76 (3.4)	22 (3.4)	1 (0.9)		44 (4.4)	38 (4.4)	18 (3.5)	
Korea, Rep. of	r	19 (3.2)	64 (3.7)	16 (2.8)	r	55 (3.5)	39 (3.6)	6 (1.9)	r	17 (2.8)	59 (3.8)	25 (2.9)
Kuwait	r	38 (4.7)	41 (4.7)	21 (3.9)	r	44 (4.8)	37 (4.7)	19 (3.5)	r	28 (4.0)	33 (4.3)	38 (4.2)
Lebanon		53 (5.0)	39 (5.0)	8 (2.5)	73 (4.2)	22 (3.7)	5 (2.0)		14 (3.2)	56 (4.6)	29 (4.1)	
Lithuania		31 (3.8)	51 (4.1)	18 (2.8)	54 (4.3)	41 (4.3)	5 (1.7)		18 (3.2)	51 (3.6)	31 (3.3)	
Malaysia		19 (3.7)	58 (4.4)	23 (3.4)	49 (4.4)	42 (4.6)	9 (2.4)		38 (4.2)	35 (4.1)	27 (3.9)	
Malta		43 (0.2)	46 (0.2)	11 (0.1)	63 (0.2)	33 (0.2)	4 (0.2)		34 (0.2)	35 (0.2)	31 (0.2)	
Norway		61 (3.6)	36 (3.5)	3 (1.1)	82 (2.6)	18 (2.6)	0 (0.0)		15 (2.8)	43 (4.0)	42 (3.8)	
Oman		52 (4.3)	37 (4.6)	11 (2.6)	74 (4.2)	25 (4.2)	1 (0.8)		29 (4.5)	34 (4.0)	37 (4.2)	
Palestinian Nat'l Auth.		50 (5.0)	37 (4.6)	12 (3.1)	81 (3.6)	17 (3.4)	2 (1.3)		24 (3.4)	43 (4.4)	34 (4.0)	
Qatar		39 (0.2)	41 (0.1)	21 (0.1)	61 (0.2)	32 (0.1)	7 (0.1)		31 (0.2)	29 (0.1)	40 (0.1)	
Romania		65 (3.4)	28 (3.3)	7 (1.9)	85 (3.1)	14 (3.1)	1 (0.7)		73 (3.4)	21 (2.9)	6 (1.7)	
Russian Federation		50 (3.1)	42 (2.8)	8 (1.9)	92 (2.4)	6 (2.1)	2 (1.0)		49 (3.6)	41 (3.7)	10 (2.2)	
Saudi Arabia	r	31 (4.0)	45 (4.2)	25 (4.0)	60 (4.3)	28 (3.8)	12 (3.3)		26 (3.6)	25 (3.5)	49 (3.9)	
Scotland		47 (3.4)	51 (3.6)	2 (1.1)	66 (3.1)	31 (2.9)	3 (1.1)		17 (2.9)	49 (3.5)	34 (3.0)	
Serbia		40 (4.1)	53 (4.0)	7 (2.1)	54 (3.9)	41 (4.2)	4 (1.5)		12 (2.6)	32 (4.4)	56 (4.7)	
Singapore		23 (2.3)	58 (2.6)	18 (1.9)	77 (2.4)	21 (2.3)	2 (0.8)		37 (2.5)	24 (2.3)	39 (2.9)	
Slovenia		58 (2.5)	37 (2.5)	5 (0.9)	60 (3.2)	34 (3.1)	7 (1.2)		83 (2.2)	17 (2.1)	1 (0.3)	
Sweden		73 (2.7)	27 (2.7)	1 (0.3)	57 (3.3)	41 (3.1)	2 (1.1)		--	--	--	
Syrian Arab Republic		41 (4.3)	40 (4.2)	19 (3.7)	62 (3.9)	33 (4.0)	5 (1.7)		24 (3.7)	37 (4.4)	40 (4.3)	
Thailand		6 (1.9)	37 (3.8)	56 (3.7)	67 (4.2)	27 (3.8)	6 (1.8)		15 (2.4)	40 (4.2)	45 (4.0)	
Tunisia		63 (3.6)	27 (3.7)	10 (2.5)	76 (3.6)	21 (3.5)	4 (1.6)		43 (3.7)	38 (3.8)	19 (3.2)	
Turkey		75 (3.9)	21 (3.6)	4 (2.0)	69 (3.6)	27 (3.2)	5 (1.8)		45 (4.3)	39 (4.3)	16 (3.0)	
Ukraine		23 (3.6)	65 (3.9)	11 (2.9)	51 (4.5)	47 (4.6)	2 (0.9)		15 (3.2)	53 (4.0)	33 (4.0)	
United States		49 (2.6)	42 (2.2)	9 (1.7)	77 (2.3)	21 (2.2)	1 (0.5)		21 (2.4)	45 (3.1)	34 (2.6)	
‡ Morocco	r	54 (5.2)	32 (4.6)	13 (4.5)	54 (5.7)	37 (5.5)	8 (2.5)	r	37 (4.8)	33 (5.2)	30 (4.8)	
International Avg.		45 (0.5)	42 (0.6)	13 (0.4)	66 (0.5)	30 (0.5)	5 (0.2)		27 (0.5)	38 (0.5)	35 (0.5)	
Benchmarking Participants												
Basque Country, Spain		53 (5.0)	42 (4.7)	6 (2.4)	87 (3.1)	12 (3.1)	0 (0.3)	r	4 (1.8)	21 (4.3)	75 (4.8)	
British Columbia, Canada		39 (4.2)	46 (4.4)	15 (3.2)	80 (3.4)	20 (3.4)	0 (0.0)		3 (1.0)	17 (3.3)	80 (3.5)	
Dubai, UAE	s	46 (3.9)	47 (4.0)	7 (1.3)	s	76 (3.8)	18 (3.5)	6 (2.1)	s	19 (3.2)	37 (5.1)	44 (4.9)
Massachusetts, US		39 (5.9)	50 (6.0)	11 (4.7)	71 (4.7)	26 (4.1)	3 (2.4)		17 (5.4)	36 (6.8)	47 (7.0)	
Minnesota, US		35 (7.4)	45 (7.5)	20 (4.8)	72 (5.5)	27 (5.4)	1 (1.1)		7 (3.2)	37 (6.2)	56 (6.1)	
Ontario, Canada		39 (4.7)	46 (5.0)	15 (2.7)	61 (4.6)	37 (4.5)	2 (1.3)		3 (1.5)	10 (2.6)	86 (3.0)	
Quebec, Canada		65 (3.1)	28 (3.0)	7 (1.9)	76 (3.4)	21 (3.3)	3 (1.9)		26 (3.9)	57 (4.9)	17 (3.2)	

Background data provided by teachers.

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

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

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

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

Exhibit 7.16 Frequency of Teachers Giving Mathematics Tests with Trends

TIMSS2007
Mathematics 8th Grade

Country	Percentage of Students Whose Teachers Give a Mathematics Test or Examination					
	Every 2 Weeks or More		About Once a Month		A Few Times a Year or Less	
	Percent in 2007	Difference in Percent from 2003	Percent in 2007	Difference in Percent from 2003	Percent in 2007	Difference in Percent from 2003
Algeria	35 (4.4)	0 0	48 (4.3)	0 0	17 (3.4)	0 0
Armenia	34 (3.6)	-5 (5.1)	29 (3.1)	-24 (5.0) ▼	37 (4.0)	29 (4.4) ▲
Australia	25 (3.2)	6 (4.8)	61 (4.1)	-3 (6.2)	14 (2.8)	-2 (4.4)
Bahrain	77 (1.9)	-7 (2.5) ▼	17 (1.4)	1 (2.2)	6 (1.4)	6 (1.4) ▲
Bosnia and Herzegovina	13 (2.5)	0 0	50 (3.8)	0 0	37 (4.2)	0 0
Botswana	10 (2.1)	-8 (4.2)	90 (2.1)	9 (4.4) ▲	0 (0.0)	-1 (1.3)
Bulgaria	32 (3.9)	1 (5.8)	46 (4.5)	0 (6.1)	22 (3.4)	-1 (4.6)
Chinese Taipei	99 (1.2)	0 (1.5)	1 (1.2)	0 (1.3)	0 (0.2)	0 (0.2)
Colombia	93 (1.8)	0 0	6 (1.6)	0 0	1 (0.8)	0 0
Cyprus	8 (1.6)	-1 (2.6)	80 (1.8)	1 (3.3)	11 (0.8)	0 (1.9)
Czech Republic	97 (1.5)	0 0	1 (0.8)	0 0	2 (1.3)	0 0
Egypt	60 (4.7)	--	37 (4.5)	--	3 (1.4)	--
El Salvador	63 (4.1)	0 0	32 (3.9)	0 0	5 (2.0)	0 0
England	9 (2.2)	1 (3.4)	38 (3.3)	0 (7.0)	53 (3.7)	0 (7.4)
Georgia	50 (5.5)	0 0	34 (4.9)	0 0	16 (4.9)	0 0
Ghana	79 (3.5)	5 (5.2)	18 (3.4)	-6 (5.1)	2 (1.1)	2 (1.1)
Hong Kong SAR	56 (4.3)	13 (6.5)	34 (4.0)	-5 (6.2)	10 (2.7)	-8 (4.5)
Hungary	73 (3.8)	6 (5.6)	25 (3.7)	-5 (5.4)	2 (1.1)	0 (1.6)
Indonesia	54 (4.8)	10 (6.3)	41 (4.4)	-6 (6.2)	5 (2.2)	-4 (3.4)
Iran, Islamic Rep. of	29 (3.6)	-5 (5.1)	61 (3.9)	27 (5.5) ▲	10 (1.8)	-22 (4.8) ▼
Israel	50 (4.0)	-7 (5.7)	42 (3.9)	7 (5.3)	8 (2.0)	-1 (2.8)
Italy	27 (2.9)	-3 (4.5)	71 (2.9)	4 (4.5)	2 (0.8)	-1 (1.5)
Japan	24 (3.3)	7 (4.7)	37 (3.7)	-1 (5.7)	38 (3.8)	-6 (5.7)
Jordan	70 (4.1)	40 (5.5) ▲	27 (3.9)	-43 (5.4) ▼	3 (1.3)	3 (1.3) ▲
Korea, Rep. of	54 (3.6)	-8 (4.9)	31 (3.3)	-1 (4.5)	14 (2.2)	10 (2.6) ▲
Kuwait	53 (4.7)	0 0	22 (3.5)	0 0	25 (4.0)	0 0
Lebanon	89 (3.5)	6 (4.9)	11 (3.5)	-6 (4.9)	0 (0.4)	0 (0.4)
Lithuania	73 (3.6)	-7 (4.8)	27 (3.6)	8 (4.8)	0 (0.0)	0 (0.0)
Malaysia	13 (2.8)	8 (3.1) ▲	39 (4.2)	-9 (5.7)	48 (3.8)	1 (5.5)
Malta	14 (0.2)	0 0	46 (0.2)	0 0	40 (0.2)	0 0
Norway	6 (1.8)	0 (3.1)	72 (3.6)	8 (5.7)	21 (3.2)	-8 (5.2)
Oman	57 (3.8)	0 0	41 (3.7)	0 0	1 (0.8)	0 0
Palestinian Nat'l Auth.	52 (3.9)	-10 (4.7) ▼	46 (3.8)	8 (4.7)	2 (1.2)	2 (1.2)
Qatar	82 (0.1)	0 0	15 (0.1)	0 0	3 (0.1)	0 0
Romania	70 (3.6)	-3 (5.3)	27 (3.4)	2 (5.0)	2 (1.2)	0 (1.7)
Russian Federation	95 (1.6)	7 (2.9) ▲	5 (1.6)	-6 (2.8) ▼	1 (0.5)	-1 (1.0)
Saudi Arabia	45 (4.0)	--	47 (4.3)	--	9 (3.0)	--
Scotland	7 (1.6)	-7 (3.6)	31 (3.4)	0 (5.6)	62 (3.7)	7 (5.9)
Serbia	25 (4.0)	10 (4.9) ▲	57 (4.4)	-9 (6.0)	18 (3.3)	-1 (4.6)
Singapore	35 (2.5)	4 (3.1)	47 (2.6)	-10 (3.5) ▼	18 (1.7)	6 (2.3) ▲
Slovenia	3 (0.9)	1 (1.4)	17 (2.3)	-30 (4.4) ▼	80 (2.5)	28 (4.6) ▲
Sweden	0 (0.3)	-1 (1.0)	39 (3.1)	11 (4.7) ▲	61 (3.1)	-10 (4.6) ▼
Syrian Arab Republic	39 (4.4)	0 0	41 (4.2)	0 0	19 (3.4)	0 0
Thailand	66 (4.0)	0 0	29 (3.9)	0 0	4 (1.6)	0 0
Tunisia	12 (2.9)	-9 (5.3)	71 (3.8)	-2 (6.3)	17 (3.0)	11 (3.9) ▲
Turkey	19 (3.8)	0 0	79 (3.8)	0 0	2 (1.3)	0 0
Ukraine	80 (3.0)	0 0	18 (2.9)	0 0	2 (1.0)	0 0
United States	69 (2.4)	-5 (3.6)	28 (2.6)	4 (3.7)	3 (0.9)	0 (1.4)
‡ Morocco	21 (5.3)	--	76 (5.6)	--	3 (1.7)	--
International Avg.	46 (0.5)		39 (0.5)		16 (0.3)	
Benchmarking Participants						
Basque Country, Spain	37 (4.8)	-14 (6.7) ▼	56 (5.0)	9 (6.8)	6 (2.3)	5 (2.7)
British Columbia, Canada	68 (3.9)	0 0	32 (3.9)	0 0	0 (0.0)	0 0
Dubai, UAE	71 (5.3)	0 0	27 (5.4)	0 0	3 (1.1)	0 0
Massachusetts, US	60 (7.0)	0 0	38 (6.6)	0 0	2 (1.3)	0 0
Minnesota, US	74 (6.2)	0 0	25 (6.1)	0 0	0 (0.2)	0 0
Ontario, Canada	85 (3.5)	0 (4.8)	14 (3.4)	0 (4.5)	1 (1.0)	0 (1.4)
Quebec, Canada	54 (3.9)	-7 (5.8)	43 (4.0)	10 (5.8)	3 (1.7)	-3 (2.9)

▲ 2007 percent significantly higher ▼ 2007 percent significantly lower

Background data provided by teachers.

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

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

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

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

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



Exhibit 7.17 provides information about the item formats eighth grade students are most likely to see in their mathematics tests. In general, mostly constructed-response and about half constructed-response and half multiple-choice were reported to be about equally common test formats, with mostly multiple-choice the least common. On average internationally, 44 percent of the students were taught by teachers who reported testing them with only or mostly constructed-response items, another 41 percent by teachers who reported using about half constructed-response and half multiple-choice items, and only 15 percent by teachers who reported using only or mostly multiple-choice items. Between 2003 and 2007 there were increases and decreases in each testing approach. Teachers in six countries and one benchmarking entity reported using less constructed-response testing and in four countries they reported more. Teachers in six countries and one benchmarking entity reported increased use of the half and half format, while teachers in three countries reported decreased use. Four countries reported more use of multiple-choice testing and two reported less. The biggest shift was in Armenia, from primarily using constructed-response items to primarily multiple-choice testing.

Exhibit 7.17 Item Formats Used by Teachers in Mathematics Tests or Examinations with Trends
TIMSS2007
Mathematics **8th Grade**

Country	Only or Mostly Constructed-response			About Half Constructed-response and Half Multiple-choice			Only or Mostly Multiple-choice		
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Algeria	16 (2.8)	394 (5.5)	◇ ◇	51 (4.2)	388 (3.0)	◇ ◇	33 (4.2)	383 (3.0)	◇ ◇
Armenia	r 3 (1.3)	493 (10.2)	-73 (4.0) ▼	30 (4.0)	500 (7.4)	12 (5.2) ▲	68 (4.0)	499 (3.8)	61 (4.7) ▲
Australia	61 (3.9)	498 (5.0)	-8 (5.5)	30 (3.4)	501 (8.0)	8 (4.3)	9 (2.3)	489 (20.0)	0 (3.8)
Bahrain	42 (2.7)	405 (2.6)	1 (4.0)	50 (2.9)	390 (3.0)	-2 (4.3)	8 (1.6)	386 (5.8)	1 (2.5)
Bosnia and Herzegovina	17 (2.8)	463 (6.0)	◇ ◇	26 (3.2)	445 (5.8)	◇ ◇	57 (3.9)	461 (3.7)	◇ ◇
Botswana	27 (4.7)	370 (5.7)	5 (6.3)	48 (4.6)	360 (3.8)	0 (6.4)	24 (3.8)	362 (5.8)	-5 (5.3)
Bulgaria	44 (3.9)	467 (6.1)	-8 (6.2)	39 (3.7)	458 (10.6)	12 (5.2) ▲	17 (3.0)	470 (15.8)	-4 (5.0)
Chinese Taipei	22 (3.5)	607 (10.4)	-3 (5.0)	72 (4.0)	598 (4.9)	2 (5.4)	6 (1.9)	568 (13.3)	1 (2.7)
Colombia	29 (4.3)	385 (7.8)	◇ ◇	52 (5.2)	379 (5.6)	◇ ◇	19 (3.7)	375 (12.1)	◇ ◇
Cyprus	39 (2.9)	470 (3.3)	1 (3.8)	30 (2.8)	461 (3.4)	7 (3.7)	31 (2.4)	462 (2.8)	-8 (3.1) ▼
Czech Republic	78 (2.9)	507 (2.9)	◇ ◇	10 (2.4)	486 (8.3)	◇ ◇	12 (2.5)	499 (6.6)	◇ ◇
Egypt	7 (2.3)	389 (14.4)	--	79 (3.8)	389 (4.3)	--	15 (3.3)	402 (10.7)	--
El Salvador	18 (3.4)	343 (6.8)	◇ ◇	65 (4.1)	336 (3.8)	◇ ◇	17 (3.3)	350 (4.9)	◇ ◇
England	s 94 (1.8)	515 (4.9)	-3 (2.7)	5 (1.7)	507 (27.5)	3 (2.6)	1 (0.6)	~ ~	1 (0.6)
Georgia	11 (2.9)	439 (8.1)	◇ ◇	60 (5.4)	416 (7.7)	◇ ◇	29 (4.9)	389 (13.2)	◇ ◇
Ghana	30 (3.8)	311 (8.5)	6 (5.4)	66 (4.1)	307 (5.7)	-9 (5.7)	4 (1.7)	344 (68.6)	3 (1.8)
Hong Kong SAR	65 (4.1)	570 (8.1)	-7 (5.4)	34 (4.1)	580 (10.5)	7 (5.4)	0 (0.0)	~ ~	0 (0.8)
Hungary	84 (2.3)	518 (3.9)	-2 (3.4)	15 (2.4)	509 (11.5)	3 (3.6)	1 (0.6)	~ ~	-1 (1.1)
Indonesia	65 (4.5)	399 (6.7)	13 (6.2) ●	27 (3.8)	424 (9.5)	-13 (5.9) ▼	8 (2.8)	405 (23.9)	0 (3.4)
Iran, Islamic Rep. of	s 45 (4.1)	400 (5.5)	-2 (6.7)	49 (3.8)	404 (6.0)	3 (6.2)	6 (2.0)	392 (20.7)	-1 (3.3)
Israel	r 76 (2.9)	476 (5.7)	18 (4.6) ●	19 (2.6)	440 (10.1)	-15 (4.5) ▼	5 (1.6)	451 (25.4)	-3 (2.7)
Italy	40 (3.1)	481 (3.4)	-8 (5.2)	45 (3.4)	475 (5.2)	2 (5.4)	15 (2.6)	498 (5.4)	5 (3.2)
Japan	83 (3.0)	570 (2.7)	-6 (3.7)	13 (2.7)	563 (8.7)	4 (3.5)	4 (1.2)	614 (26.2)	2 (1.5)
Jordan	21 (3.4)	420 (9.6)	-17 (5.6) ▼	75 (3.6)	431 (5.4)	16 (6.0) ●	5 (1.7)	403 (19.0)	1 (2.4)
Korea, Rep. of	s 16 (2.6)	601 (8.5)	-12 (4.2) ▼	35 (2.7)	596 (5.5)	1 (4.8)	49 (3.1)	598 (3.7)	12 (4.7) ●
Kuwait	s 6 (2.0)	352 (15.2)	◇ ◇	79 (3.9)	356 (2.8)	◇ ◇	15 (3.5)	352 (10.3)	◇ ◇
Lebanon	31 (4.3)	457 (9.4)	6 (6.0)	41 (5.1)	448 (6.8)	-4 (6.9)	28 (4.5)	438 (9.8)	-2 (6.3)
Lithuania	96 (1.5)	505 (2.4)	11 (3.4) ●	4 (1.5)	522 (9.2)	-11 (3.4) ▼	0 (0.0)	~ ~	0 (0.0)
Malaysia	13 (2.9)	478 (16.4)	5 (3.7)	83 (3.1)	473 (5.0)	-6 (4.2)	4 (1.6)	477 (33.3)	1 (2.2)
Malta	77 (0.2)	489 (1.3)	◇ ◇	10 (0.1)	471 (2.4)	◇ ◇	13 (0.2)	496 (2.6)	◇ ◇
Norway	80 (2.9)	469 (2.4)	9 (4.8)	17 (2.6)	470 (4.0)	-8 (4.7)	3 (1.2)	472 (4.8)	-1 (2.2)
Oman	8 (2.2)	364 (13.9)	◇ ◇	81 (3.2)	375 (3.8)	◇ ◇	11 (2.3)	359 (13.2)	◇ ◇
Palestinian Nat'l Auth.	14 (3.0)	350 (13.6)	-10 (4.5) ▼	72 (3.9)	373 (3.4)	3 (5.5)	14 (2.6)	361 (10.9)	7 (3.3) ●
Qatar	14 (0.1)	302 (2.7)	◇ ◇	78 (0.1)	312 (1.6)	◇ ◇	8 (0.1)	286 (4.0)	◇ ◇
Romania	37 (3.5)	466 (6.4)	2 (5.3)	46 (3.9)	451 (6.2)	0 (5.6)	17 (2.8)	485 (10.4)	-2 (4.0)
Russian Federation	61 (3.6)	516 (4.5)	-17 (6.3) ▼	34 (3.0)	510 (6.8)	13 (6.0) ●	4 (2.0)	479 (13.4)	4 (2.1)
Saudi Arabia	4 (1.4)	295 (17.0)	--	76 (3.7)	330 (3.6)	--	20 (3.6)	327 (7.3)	--
Scotland	100 (0.1)	488 (3.9)	1 (1.1)	0 (0.1)	~ ~	-1 (1.1)	0 (0.0)	~ ~	0 (0.0)
Serbia	60 (4.2)	493 (4.7)	-28 (5.1) ▼	29 (4.0)	476 (6.5)	18 (4.9) ●	11 (2.3)	477 (6.9)	9 (2.5) ●
Singapore	83 (1.7)	594 (4.4)	-3 (2.6)	3 (0.8)	587 (18.1)	-1 (1.4)	14 (1.6)	585 (11.5)	4 (2.2)
Slovenia	81 (2.5)	502 (2.4)	-6 (3.4)	17 (2.3)	501 (5.3)	5 (3.4)	1 (0.8)	~ ~	1 (0.8)
Sweden	86 (2.1)	492 (2.5)	2 (3.5)	8 (1.8)	475 (6.6)	-3 (3.1)	6 (1.3)	511 (7.4)	1 (2.1)
Syrian Arab Republic	12 (2.5)	418 (9.5)	◇ ◇	68 (4.0)	390 (4.5)	◇ ◇	20 (3.6)	397 (9.2)	◇ ◇
Thailand	39 (4.0)	448 (7.6)	◇ ◇	49 (3.9)	438 (8.8)	◇ ◇	12 (2.8)	436 (16.4)	◇ ◇
Tunisia	s 18 (3.3)	416 (4.2)	10 (4.4) ●	44 (4.0)	428 (4.8)	24 (5.9) ●	38 (3.8)	417 (3.8)	-34 (5.9) ▼
Turkey	58 (4.3)	428 (6.4)	◇ ◇	27 (3.6)	439 (9.3)	◇ ◇	15 (2.9)	433 (15.1)	◇ ◇
Ukraine	62 (4.3)	464 (4.5)	◇ ◇	38 (4.3)	458 (6.8)	◇ ◇	0 (0.0)	~ ~	◇ ◇
United States	50 (2.5)	521 (4.5)	-5 (4.2)	34 (2.6)	497 (4.7)	2 (4.0)	16 (2.0)	495 (8.2)	2 (2.8)
‡ Morocco	25 (4.1)	381 (8.0)	--	39 (7.2)	384 (8.8)	--	36 (7.7)	389 (9.8)	--
International Avg.	44 (0.4)	453 (1.1)		41 (0.5)	448 (1.2)		15 (0.4)	440 (2.6)	

Benchmarking Participants

Basque Country, Spain	34 (4.8)	506 (5.0)	2 (6.6)	8 (2.9)	513 (12.8)	-9 (4.9)	57 (4.4)	494 (3.4)	7 (7.0)
British Columbia, Canada	66 (3.5)	511 (4.5)	◇ ◇	26 (3.0)	509 (6.2)	◇ ◇	8 (2.5)	515 (12.1)	◇ ◇
Dubai, UAE	s 43 (4.9)	479 (8.0)	◇ ◇	45 (4.8)	443 (7.9)	◇ ◇	12 (3.0)	475 (19.2)	◇ ◇
Massachusetts, US	57 (5.7)	554 (8.3)	◇ ◇	30 (5.8)	536 (8.9)	◇ ◇	13 (3.9)	536 (18.1)	◇ ◇
Minnesota, US	60 (9.2)	541 (7.0)	◇ ◇	24 (7.5)	522 (8.0)	◇ ◇	16 (5.7)	509 (12.6)	◇ ◇
Ontario, Canada	r 67 (4.8)	520 (3.9)	-15 (6.2) ▼	29 (4.4)	514 (7.9)	13 (5.9) ●	4 (1.9)	510 (14.4)	3 (1.9)
Quebec, Canada	91 (1.9)	529 (4.2)	--	9 (1.9)	535 (11.1)	--	0 (0.3)	~ ~	--

● 2007 percent significantly higher

▼ 2007 percent significantly lower

Background data provided by teachers.

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

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

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

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

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



Exhibit 7.18 presents information about the cognitive demands teachers emphasize in the mathematics tests given to eighth grade students. Teachers were asked how often they gave students each of four different types of questions: recall of facts and procedures, application of procedures, searching for patterns and relationships, and providing explanations/justifications. On average internationally, most eighth grade students were tested at least sometimes with each type of question, with application questions the most prevalent. Nearly three-fourths (74%) had teachers that gave application questions almost always, and the remaining one-fourth (24%) had teachers that gave them sometimes. About half (52%) the students had teachers that almost always gave recall questions, and 42 percent had teachers that sometimes did. Only 22 percent of the students were almost always asked to search for patterns and relationships in their mathematics tests, but 68 percent were asked to do so sometimes. Similarly, although only one-third of the students (32%) were almost always given questions requiring explanations or justification, 57 percent were given such questions at least sometimes.

Exhibit 7.18 Types of Questions on Mathematics Tests

TIMSS2007
Mathematics 8th Grade

Country	Percentage of Students by Types of Questions on Mathematics Tests Given by Their Teachers											
	Questions Based on Recall of Facts and Procedures			Questions Involving Application of Mathematical Procedures			Questions Involving Searching for Patterns and Relationships					
	Always or Almost Always	Sometimes	Never or Almost Never	Always or Almost Always	Sometimes	Never or Almost Never	Always or Almost Always	Sometimes	Never or Almost Never			
Algeria	r	41 (4.5)	56 (4.6)	4 (1.8)	75 (4.2)	23 (3.9)	2 (1.3)	r	22 (3.4)	67 (4.0)	11 (2.7)	
Armenia		39 (3.7)	42 (3.6)	20 (2.9)	46 (3.9)	25 (3.9)	29 (3.3)		15 (3.1)	74 (3.9)	11 (2.2)	
Australia		59 (4.5)	38 (4.4)	3 (1.0)	72 (2.9)	28 (2.9)	0 (0.1)		21 (3.5)	73 (3.8)	6 (2.0)	
Bahrain		46 (2.4)	49 (2.5)	5 (0.7)	76 (2.3)	23 (2.2)	2 (0.4)		17 (1.9)	72 (2.5)	11 (1.8)	
Bosnia and Herzegovina		22 (3.7)	66 (4.4)	12 (3.1)	84 (3.1)	16 (3.1)	0 (0.0)		26 (3.9)	67 (4.4)	6 (2.1)	
Botswana		60 (4.4)	38 (4.4)	3 (1.5)	77 (3.4)	23 (3.4)	0 (0.0)		33 (4.0)	62 (4.2)	5 (2.0)	
Bulgaria		45 (3.9)	49 (4.0)	6 (2.0)	75 (3.6)	24 (3.5)	1 (0.9)		26 (3.5)	62 (3.9)	12 (2.1)	
Chinese Taipei		25 (3.7)	68 (4.1)	7 (2.1)	59 (4.0)	40 (4.1)	1 (1.0)		31 (3.6)	68 (3.7)	1 (1.0)	
Colombia		7 (2.6)	53 (5.3)	40 (5.1)	79 (4.8)	21 (4.8)	0 (0.0)		27 (3.9)	67 (4.4)	6 (2.1)	
Cyprus		82 (1.9)	17 (1.9)	1 (0.6)	85 (2.2)	15 (2.2)	0 (0.0)		8 (1.9)	58 (2.5)	33 (2.2)	
Czech Republic		66 (3.3)	32 (3.2)	2 (1.0)	70 (4.0)	29 (4.0)	2 (0.9)		24 (3.6)	63 (3.7)	13 (2.5)	
Egypt		55 (4.2)	44 (4.1)	1 (0.9)	72 (3.6)	28 (3.5)	1 (0.4)		22 (3.2)	70 (3.7)	8 (2.5)	
El Salvador		53 (4.8)	39 (4.8)	8 (2.6)	81 (3.6)	17 (3.4)	1 (0.8)		24 (3.9)	64 (4.3)	12 (2.8)	
England		54 (3.8)	43 (4.0)	3 (1.3)	67 (3.5)	33 (3.5)	1 (0.4)		25 (3.5)	72 (3.7)	3 (1.4)	
Georgia		43 (5.3)	56 (5.3)	1 (0.4)	76 (4.8)	24 (4.8)	0 (0.0)		21 (4.0)	74 (4.1)	5 (2.4)	
Ghana		55 (4.1)	44 (4.1)	1 (0.8)	68 (3.9)	32 (3.9)	0 (0.0)		17 (3.0)	76 (3.5)	7 (2.1)	
Hong Kong SAR		39 (4.4)	51 (4.5)	10 (2.5)	68 (4.3)	32 (4.3)	0 (0.2)		12 (3.1)	65 (4.3)	23 (4.3)	
Hungary		51 (3.9)	45 (4.0)	4 (1.4)	82 (2.7)	16 (2.5)	2 (0.9)		49 (3.9)	47 (4.0)	4 (1.5)	
Indonesia		57 (3.9)	42 (4.0)	1 (0.0)	67 (3.8)	33 (3.8)	1 (0.5)		28 (3.7)	69 (3.9)	3 (1.4)	
Iran, Islamic Rep. of		61 (4.1)	38 (4.0)	2 (1.1)	68 (4.1)	30 (4.0)	2 (1.1)		28 (3.2)	60 (3.5)	12 (2.4)	
Israel	r	47 (4.3)	43 (4.0)	10 (2.3)	r	67 (3.4)	31 (3.4)	2 (1.0)	r	25 (3.2)	62 (3.3)	12 (2.2)
Italy		48 (3.5)	46 (3.3)	6 (1.8)	90 (1.9)	8 (1.7)	2 (0.9)		35 (2.9)	55 (2.8)	11 (1.8)	
Japan		56 (4.1)	41 (4.1)	3 (1.1)	63 (4.0)	35 (3.9)	2 (1.2)		30 (3.7)	62 (3.9)	9 (2.3)	
Jordan		52 (4.2)	45 (4.2)	3 (1.5)	87 (2.5)	12 (2.5)	1 (0.8)		24 (3.3)	71 (3.4)	5 (1.8)	
Korea, Rep. of		58 (4.2)	41 (4.1)	1 (0.4)	66 (3.6)	33 (3.6)	1 (0.6)		35 (3.2)	61 (3.2)	4 (1.2)	
Kuwait	r	47 (4.7)	39 (4.8)	14 (3.4)	r	52 (4.7)	34 (4.4)	14 (3.3)	r	14 (3.3)	59 (4.3)	27 (3.6)
Lebanon		38 (5.0)	57 (5.1)	6 (1.6)	75 (4.2)	25 (4.2)	1 (0.5)		23 (4.1)	71 (4.4)	7 (2.1)	
Lithuania		81 (3.0)	19 (3.0)	0 (0.0)	80 (3.4)	18 (3.3)	1 (0.9)		21 (3.2)	72 (3.3)	7 (2.2)	
Malaysia		59 (4.4)	39 (4.3)	2 (1.2)	59 (4.0)	39 (4.1)	1 (1.0)		15 (2.9)	82 (3.2)	2 (1.4)	
Malta		57 (0.2)	41 (0.2)	2 (0.1)	80 (0.2)	19 (0.2)	1 (0.1)		9 (0.2)	76 (0.2)	15 (0.2)	
Norway		39 (3.7)	55 (3.7)	7 (1.7)	61 (2.7)	39 (2.7)	0 (0.0)		8 (1.8)	81 (2.5)	11 (1.9)	
Oman		68 (3.5)	32 (3.5)	0 (0.0)	80 (3.6)	20 (3.6)	0 (0.0)		16 (3.3)	74 (4.1)	10 (3.0)	
Palestinian Nat'l Auth.		66 (4.1)	33 (4.0)	1 (0.9)	84 (3.1)	15 (3.0)	1 (0.0)		18 (3.3)	76 (3.6)	6 (2.1)	
Qatar		58 (0.2)	40 (0.2)	3 (0.1)	85 (0.1)	15 (0.1)	0 (0.0)		19 (0.1)	62 (0.1)	19 (0.1)	
Romania		61 (3.6)	37 (3.6)	2 (1.0)	87 (2.5)	11 (2.4)	2 (0.9)		35 (4.3)	60 (4.3)	5 (1.2)	
Russian Federation		64 (3.1)	33 (3.1)	2 (1.0)	79 (2.9)	20 (2.9)	1 (0.5)		29 (3.1)	68 (3.2)	3 (1.2)	
Saudi Arabia		54 (4.5)	45 (4.6)	1 (0.8)	67 (3.7)	32 (4.0)	1 (1.1)		12 (3.2)	62 (3.8)	27 (3.8)	
Scotland		78 (3.0)	21 (2.9)	1 (0.7)	73 (2.9)	27 (2.9)	0 (0.1)		21 (3.0)	74 (3.1)	4 (1.4)	
Serbia		16 (3.2)	59 (4.4)	25 (4.0)	92 (2.1)	8 (2.1)	0 (0.0)		20 (3.4)	73 (3.8)	8 (1.9)	
Singapore		37 (2.5)	56 (2.8)	8 (1.1)	75 (2.4)	25 (2.4)	0 (0.4)		12 (1.9)	81 (2.3)	7 (1.4)	
Slovenia		65 (2.8)	33 (2.8)	2 (0.5)	85 (2.1)	15 (2.1)	0 (0.3)		15 (2.0)	73 (2.6)	12 (1.8)	
Sweden		26 (2.9)	52 (2.9)	22 (2.3)	73 (2.4)	26 (2.4)	1 (0.7)		16 (2.3)	74 (2.7)	10 (1.7)	
Syrian Arab Republic		56 (4.0)	41 (4.1)	2 (1.2)	81 (3.3)	19 (3.3)	0 (0.4)		30 (3.8)	56 (4.0)	15 (2.7)	
Thailand		62 (4.4)	37 (4.3)	1 (0.0)	30 (3.8)	70 (3.8)	0 (0.0)		13 (2.8)	78 (3.5)	9 (2.6)	
Tunisia		59 (3.8)	35 (3.5)	7 (1.9)	73 (3.8)	26 (3.7)	1 (0.8)		21 (3.5)	62 (3.8)	17 (2.8)	
Turkey		76 (3.9)	22 (4.0)	2 (1.1)	91 (2.7)	6 (2.1)	3 (1.7)		28 (4.1)	62 (4.4)	9 (2.1)	
Ukraine		78 (3.4)	20 (3.4)	2 (1.3)	82 (3.0)	18 (3.0)	0 (0.0)		32 (3.5)	66 (3.6)	1 (0.6)	
United States		52 (2.8)	41 (2.7)	7 (1.3)	76 (2.4)	24 (2.4)	1 (0.4)		20 (2.0)	70 (2.2)	10 (1.8)	
‡ Morocco		45 (6.2)	50 (6.1)	5 (2.0)	77 (5.8)	18 (4.5)	4 (3.8)		21 (4.4)	60 (6.1)	20 (5.4)	
International Avg.		52 (0.5)	42 (0.6)	6 (0.3)	74 (0.5)	24 (0.5)	2 (0.2)		22 (0.5)	68 (0.5)	10 (0.3)	
Benchmarking Participants												
Basque Country, Spain		48 (5.3)	47 (5.3)	5 (2.0)	88 (3.1)	11 (3.1)	0 (0.0)		12 (3.5)	68 (4.9)	20 (4.1)	
British Columbia, Canada		47 (4.1)	43 (4.2)	10 (2.1)	79 (3.8)	21 (3.8)	0 (0.0)		22 (3.5)	72 (3.9)	7 (1.7)	
Dubai, UAE	s	49 (5.1)	51 (5.1)	0 (0.0)	s	70 (4.8)	28 (4.6)	1 (0.0)	s	11 (2.4)	81 (4.1)	9 (3.4)
Massachusetts, US		56 (6.5)	41 (5.9)	4 (2.1)	79 (4.9)	21 (4.9)	0 (0.1)		27 (6.0)	69 (6.8)	5 (3.5)	
Minnesota, US		44 (6.4)	51 (4.9)	5 (3.5)	81 (6.5)	19 (6.5)	0 (0.2)		13 (5.4)	79 (5.7)	8 (2.8)	
Ontario, Canada		56 (4.7)	38 (5.0)	6 (2.3)	86 (3.3)	13 (3.1)	1 (1.1)		31 (3.8)	65 (3.7)	4 (2.2)	
Quebec, Canada		25 (4.0)	52 (4.2)	23 (3.6)	94 (1.8)	6 (1.8)	0 (0.0)		18 (3.9)	64 (3.9)	18 (2.8)	

Background data provided by teachers.

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

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

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



Exhibit 7.18 Types of Questions on Mathematics Tests (Continued)

TIMSS2007
Mathematics 8th Grade

Country	Percentage of Students by Types of Questions on Mathematics Tests Given by Their Teachers		
	Questions Requiring Explanations or Justifications		
	Always or Almost Always	Sometimes	Never or Almost Never
Algeria	45 (4.7)	48 (4.5)	8 (2.4)
Armenia	23 (2.4)	54 (3.3)	22 (3.0)
Australia	29 (3.9)	58 (4.3)	13 (3.1)
Bahrain	32 (2.5)	60 (2.7)	9 (1.2)
Bosnia and Herzegovina	22 (3.4)	70 (3.8)	8 (1.8)
Botswana	15 (3.0)	67 (4.2)	18 (3.2)
Bulgaria	56 (3.8)	38 (3.8)	6 (2.1)
Chinese Taipei	17 (3.1)	72 (4.0)	11 (2.6)
Colombia	62 (4.9)	36 (4.9)	2 (0.9)
Cyprus	35 (2.5)	59 (2.7)	5 (1.1)
Czech Republic	29 (4.0)	59 (4.2)	12 (2.6)
Egypt	20 (3.2)	63 (4.2)	17 (3.8)
El Salvador	36 (3.6)	55 (4.1)	9 (2.5)
England	30 (3.5)	64 (3.6)	6 (1.4)
Georgia	38 (4.9)	57 (5.1)	6 (1.8)
Ghana	33 (4.0)	62 (4.2)	5 (1.8)
Hong Kong SAR	21 (3.8)	69 (3.8)	11 (2.9)
Hungary	13 (2.9)	72 (3.6)	15 (2.6)
Indonesia	37 (4.0)	55 (4.0)	7 (2.4)
Iran, Islamic Rep. of	21 (3.2)	69 (3.7)	10 (2.1)
Israel	r 39 (3.3)	55 (3.0)	6 (1.4)
Italy	35 (2.8)	57 (2.9)	8 (1.5)
Japan	27 (3.5)	71 (3.6)	2 (0.9)
Jordan	20 (2.9)	58 (3.7)	22 (3.0)
Korea, Rep. of	20 (2.9)	61 (3.3)	19 (2.8)
Kuwait	r 15 (2.8)	56 (4.8)	30 (4.2)
Lebanon	77 (3.8)	23 (3.7)	0 (0.5)
Lithuania	36 (3.9)	59 (4.0)	5 (1.6)
Malaysia	9 (2.4)	67 (3.9)	25 (3.6)
Malta	9 (0.1)	72 (0.2)	20 (0.2)
Norway	37 (3.0)	59 (3.4)	5 (1.5)
Oman	20 (3.3)	67 (4.1)	13 (3.0)
Palestinian Nat'l Auth.	19 (3.3)	71 (3.5)	10 (2.4)
Qatar	15 (0.1)	69 (0.2)	16 (0.1)
Romania	70 (3.7)	28 (3.6)	2 (1.0)
Russian Federation	61 (3.1)	37 (3.1)	2 (0.8)
Saudi Arabia	13 (2.5)	68 (4.3)	19 (3.7)
Scotland	19 (3.2)	68 (3.4)	12 (2.4)
Serbia	23 (3.9)	67 (4.2)	10 (2.4)
Singapore	8 (1.6)	70 (2.7)	22 (2.3)
Slovenia	13 (1.8)	65 (2.6)	22 (2.3)
Sweden	76 (2.6)	23 (2.6)	1 (0.4)
Syrian Arab Republic	40 (4.0)	50 (4.0)	10 (2.4)
Thailand	37 (4.0)	60 (3.9)	2 (0.8)
Tunisia	62 (4.3)	35 (4.3)	2 (1.4)
Turkey	9 (2.7)	46 (4.9)	45 (4.7)
Ukraine	72 (3.9)	28 (3.9)	0 (0.5)
United States	30 (2.7)	54 (2.9)	16 (2.0)
‡ Morocco	47 (4.1)	41 (4.1)	12 (1.8)
International Avg.	32 (0.5)	57 (0.5)	11 (0.3)
Benchmarking Participants			
Basque Country, Spain	42 (5.5)	52 (5.4)	7 (2.4)
British Columbia, Canada	23 (3.3)	57 (3.9)	21 (3.3)
Dubai, UAE	s 33 (4.2)	59 (3.7)	8 (2.7)
Massachusetts, US	41 (6.5)	59 (6.5)	0 (0.1)
Minnesota, US	25 (6.8)	52 (8.2)	24 (5.9)
Ontario, Canada	61 (5.1)	37 (5.0)	2 (1.4)
Quebec, Canada	51 (4.3)	44 (4.3)	5 (2.0)

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



