

Chapter 7



Classroom Characteristics and Instruction

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

How Do the Characteristics of Science Classrooms Impact Instruction?

Because having larger or smaller classes can impact instructional choices, TIMSS asked teachers about the size of their science 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 science achievement.

As presented in Exhibit 7.1, in TIMSS 2007 across participating countries at the fourth grade, the average size of science classes was 26. This represented a decrease in class size in eight of the participating countries and an increase in two—Norway and the United States. Two of the benchmarking provinces, Ontario and Quebec, also had decreases. At the eighth grade, the average class size of 30 represented a decrease in class size in 18 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. However, some countries averaged larger

science classes (usually a modest increase, but not always), including Ghana, Israel, Italy, Lithuania, Norway, Singapore, Sweden, the United States, and the province of Quebec.

The results in Exhibit 7.2 show that the majority of students are in medium-sized science classes. At the fourth grade, on average internationally, 23 percent of the students were in classes with fewer than 20 students, 58 percent were in classes of 20 to 32 students, and 19 percent were in classes with 33 or more students. Notable exceptions included Singapore with almost all students (95%) in large classes, Hong Kong SAR and Yemen with about three-fourths in large classes, and Chinese Taipei, Colombia, El Salvador, Japan, and Morocco with approximately half in large classes. In general, class sizes were larger at the eighth grade, 31 percent were in classes of 1 to 24 students, 58 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 (71%), Cyprus (54%), Georgia (51%), Hungary (64%), Italy (73%), Malta (81%), Romania (75%), the Russian Federation (62%), Scotland (91%), Serbia (52%), Slovenia (82%), and Sweden (60%) as well as the Basque country in Spain (66%).

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, 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 science achievement at both the eighth and fourth grades.

Science 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 Science Classes with Few or No Limitations on Instruction due to Student Factors (SCFL). 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 science achievement was related to the diversity of the students in the class and the instructional challenges involved. At the fourth and eighth grades, 53 and 37 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. In general, at the eighth grade between 2003 and 2007, teachers in six countries and one benchmarking entity reported increases in the more challenging types of classes, whereas teachers in five countries reported decreases.

Exhibit 7.1 Class Size for Science Instruction with Trends

TIMSS2007
Science 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	30 (0.7)	0 0	0 0	6 (1.8)	0 0	0 0	60 (4.4)	0 0	0 0
Armenia		27 (0.7)	--	0 0	19 (3.0)	--	0 0	60 (4.2)	--	0 0
Australia		24 (0.4)	-2 (0.6) ▼	-1 (0.6)	17 (2.8)	3 (4.1)	5 (3.8)	81 (2.9)	-2 (4.4)	-3 (4.1)
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	4 (1.5)	3 (1.6)	0 0	43 (4.0)	-1 (5.5)	0 0
Colombia		32 (1.1)	0 0	0 0	19 (3.1)	0 0	0 0	24 (4.6)	0 0	0 0
Czech Republic		22 (0.4)	0 0	0 (0.7)	29 (3.9)	0 0	5 (5.5)	71 (3.9)	0 0	-4 (5.5)
Denmark	r	21 (0.3)	0 0	0 0	34 (4.1)	0 0	0 0	66 (4.1)	0 0	0 0
El Salvador		30 (0.7)	0 0	0 0	19 (2.8)	0 0	0 0	38 (4.0)	0 0	0 0
England	r	27 (0.5)	-1 (0.9)	-1 (0.7)	8 (2.2)	0 (3.6)	1 (3.2)	81 (2.9)	7 (5.6)	4 (5.1)
Georgia		23 (0.6)	0 0	0 0	38 (3.8)	0 0	0 0	49 (4.6)	0 0	0 0
Germany		22 (0.2)	0 0	0 0	21 (2.4)	0 0	0 0	78 (2.4)	0 0	0 0
Hong Kong SAR	r	35 (0.3)	1 (0.5)	-1 (0.6)	1 (0.5)	0 (0.8)	0 (0.5)	25 (3.3)	-9 (5.8)	4 (6.6)
Hungary		22 (0.4)	-2 (0.6) ▼	0 (0.7)	35 (3.7)	16 (4.9) ▲	3 (6.2)	65 (3.7)	-15 (4.9) ▼	-1 (6.1)
Iran, Islamic Rep. of	s	24 (0.5)	-3 (0.8) ▼	-7 (1.4) ▼	25 (2.8)	9 (3.8) ▲	11 (4.7) ▲	58 (3.8)	3 (5.8)	19 (6.9) ▲
Italy		20 (0.2)	0 (0.4)	--	44 (2.6)	-1 (4.3)	--	56 (2.6)	1 (4.3)	--
Japan		31 (0.3)	-1 (0.4)	-1 (0.6) ▼	5 (0.8)	1 (1.3)	4 (1.1) ▲	47 (2.9)	7 (4.2)	-3 (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	27 (1.5)	0 0	--	11 (3.0)	0 0	--	79 (4.3)	0 0	--
Latvia		23 (0.9)	--	2 (1.3)	46 (2.7)	--	4 (6.3)	46 (2.9)	--	-10 (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 (3.2)	--	0 0	40 (5.1)	--	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) ▼	-2 (0.7) ▼	10 (2.1)	1 (2.5)	-1 (3.6)	85 (2.4)	4 (3.7)	32 (5.2) ▲
Norway		21 (0.5)	0 (0.6)	2 (0.8) ▲	42 (3.3)	4 (4.6)	-7 (6.5)	53 (3.6)	-7 (5.0)	2 (6.6)
Qatar	s	27 (0.0)	0 0	0 0	8 (0.1)	0 0	0 0	76 (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	26 (0.6)	0 (0.8)	0 (0.8)	12 (2.8)	-5 (4.6)	-2 (3.6)	81 (3.4)	6 (5.5)	0 (4.6)
Singapore		38 (0.2)	0 (0.3)	-1 (0.3)	0 (0.0)	0 (0.1)	0 (0.0)	5 (1.2)	1 (1.8)	1 (1.6)
Slovak Republic		21 (0.3)	0 0	0 0	33 (2.7)	0 0	0 0	66 (2.8)	0 0	0 0
Slovenia		19 (0.3)	0 (0.5)	-3 (0.5) ▼	46 (2.9)	1 (5.0)	20 (5.3) ▲	53 (3.0)	-2 (5.0)	-21 (5.3) ▼
Sweden		22 (0.6)	0 0	0 0	33 (3.3)	0 0	0 0	61 (3.5)	0 0	0 0
Tunisia	r	25 (0.5)	-5 (0.7) ▼	0 0	17 (2.8)	12 (3.2) ▲	0 0	72 (3.9)	14 (5.9) ▲	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	26 (0.7)	2 (0.8) ▲	1 (0.9)	22 (2.2)	-2 (3.5)	4 (3.9)	65 (2.7)	-7 (4.0)	-13 (4.3) ▼
Yemen	r	45 (1.4)	0 0	0 0	9 (2.0)	0 0	0 0	16 (3.4)	0 0	0 0
International Avg.		26 (0.1)			23 (0.5)			58 (0.6)		
Benchmarking Participants										
Alberta, Canada		22 (0.5)	0 0	0 (1.2)	23 (3.1)	0 0	1 (8.4)	73 (3.2)	0 0	-5 (8.4)
British Columbia, Canada	r	23 (0.5)	0 0	0 0	25 (3.4)	0 0	0 0	74 (3.5)	0 0	0 0
Dubai, UAE		--	0 0	0 0	--	0 0	0 0	--	0 0	0 0
Massachusetts, US	r	24 (1.0)	0 0	0 0	16 (5.3)	0 0	0 0	75 (6.2)	0 0	0 0
Minnesota, US	s	28 (2.2)	0 0	--	14 (4.5)	0 0	--	66 (7.8)	0 0	--
Ontario, Canada		24 (0.4)	-1 (0.6) ▼	-2 (0.7) ▼	16 (3.3)	2 (4.6)	-2 (5.2)	80 (3.7)	-3 (5.3)	1 (5.6)
Quebec, Canada	r	24 (0.4)	-1 (0.4) ▼	-1 (0.7) ▼	16 (2.8)	11 (3.2) ▲	7 (6.0)	84 (2.8)	-11 (3.2) ▼	-8 (6.0)

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

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

TIMSS2007
Science 4th Grade

Country	33 or More Students		
	2007 Percent of Students	Difference in Percent from 2003	Difference in Percent from 1995
Algeria	r 34 (4.6)	0 0	0 0
Armenia	22 (2.8)	--	0 0
Australia	2 (1.3)	-1 (2.1)	-2 (2.3)
Austria	0 (0.0)	0 0	0 (0.0)
Chinese Taipei	53 (3.6)	-1 (5.2)	0 0
Colombia	57 (4.4)	0 0	0 0
Czech Republic	0 (0.0)	0 0	-1 (0.1)
Denmark	r 0 (0.0)	0 0	0 0
El Salvador	43 (3.7)	0 0	0 0
England	r 11 (2.0)	-7 (4.7)	-5 (4.5)
Georgia	13 (2.4)	0 0	0 0
Germany	0 (0.0)	0 0	0 0
Hong Kong SAR	r 75 (3.4)	9 (5.8)	-4 (6.6)
Hungary	0 (0.0)	-1 (0.9)	-2 (1.1)
Iran, Islamic Rep. of	s 16 (2.9)	-12 (4.9) ▼	-29 (7.1) ▼
Italy	0 (0.0)	0 (0.0)	--
Japan	48 (2.9)	-8 (4.1)	-1 (5.5)
Kazakhstan	3 (1.2)	0 0	0 0
Kuwait	s 10 (3.3)	0 0	--
Latvia	8 (1.5)	--	6 (2.0) ▲
Lithuania	0 (0.0)	0 (0.3)	0 0
Morocco	r 43 (4.6)	--	0 0
Netherlands	2 (1.3)	0 (1.9)	-10 (3.5) ▼
New Zealand	s 5 (1.8)	-5 (3.2)	-31 (4.8) ▼
Norway	5 (1.9)	3 (2.3)	5 (1.9) ▲
Qatar	s 17 (0.2)	0 0	0 0
Russian Federation	0 (0.3)	-1 (0.9)	0 0
Scotland	s 7 (2.0)	-1 (3.3)	2 (3.1)
Singapore	95 (1.3)	-1 (1.8)	-2 (1.6)
Slovak Republic	1 (0.6)	0 0	0 0
Slovenia	1 (0.6)	1 (0.6)	1 (0.6)
Sweden	6 (1.9)	0 0	0 0
Tunisia	r 11 (2.8)	-26 (5.2) ▼	0 0
Ukraine	5 (1.4)	0 0	0 0
United States	r 14 (2.0)	9 (2.4) ▲	9 (2.7) ▲
Yemen	r 75 (3.8)	0 0	0 0
International Avg.	19 (0.4)		
Benchmarking Participants			
Alberta, Canada	4 (1.4)	0 0	4 (1.4) ▲
British Columbia, Canada	r 1 (0.8)	0 0	0 0
Dubai, UAE	--	0 0	0 0
Massachusetts, US	r 9 (4.2)	0 0	0 0
Minnesota, US	s 20 (7.1)	0 0	--
Ontario, Canada	4 (1.4)	1 (2.2)	0 (2.4)
Quebec, Canada	r 1 (0.3)	0 (0.3)	1 (0.3)

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

▲ 2007 significantly higher
▼ 2007 significantly lower

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

TIMSS2007
Science 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 (0.6)	∅ ∅	∅ ∅	∅ ∅	5 (1.5)	∅ ∅	∅ ∅	∅ ∅
Armenia	s	25 (0.4)	–6 (0.9) ▼	∅ ∅	∅ ∅	38 (3.8)	9 (4.6) ▲	∅ ∅	∅ ∅
Australia	s	25 (0.4)	–1 (0.5) ▼	--	–2 (0.5) ▼	32 (3.1)	–2 (4.9)	--	7 (5.2)
Bahrain		31 (0.2)	–1 (0.2) ▼	∅ ∅	∅ ∅	7 (0.9)	2 (1.2)	∅ ∅	∅ ∅
Bosnia and Herzegovina		24 (0.4)	∅ ∅	∅ ∅	∅ ∅	47 (3.4)	∅ ∅	∅ ∅	∅ ∅
Botswana		37 (0.3)	0 (0.5)	∅ ∅	∅ ∅	1 (0.5)	–1 (1.1)	∅ ∅	∅ ∅
Bulgaria		20 (0.5)	--	--	∅ ∅	71 (4.2)	--	--	--
Chinese Taipei		35 (0.4)	–1 (0.6) ▼	–4 (0.6) ▼	∅ ∅	2 (1.4)	–1 (2.1)	2 (1.4)	∅ ∅
Colombia	s	36 (0.9)	∅ ∅	∅ ∅	–9 (2.7) ▼	12 (2.4)	∅ ∅	∅ ∅	7 (3.8)
Cyprus	s	24 (0.1)	–1 (0.1) ▼	–5 (0.3) ▼	–7 (0.4) ▼	54 (2.1)	24 (2.5) ▲	46 (3.1) ▲	50 (3.0) ▲
Czech Republic	r	24 (0.3)	∅ ∅	0 (0.5)	–1 (0.6) ▼	50 (4.2)	∅ ∅	–4 (6.7)	14 (6.4) ▲
Egypt		39 (0.6)	0 (0.9)	∅ ∅	∅ ∅	4 (1.5)	2 (1.9)	∅ ∅	∅ ∅
El Salvador		30 (0.8)	∅ ∅	∅ ∅	∅ ∅	35 (3.7)	∅ ∅	∅ ∅	∅ ∅
England	s	26 (0.6)	0 (0.8)	--	--	32 (3.6)	–1 (5.9)	--	--
Georgia		24 (0.5)	∅ ∅	∅ ∅	∅ ∅	51 (5.1)	∅ ∅	∅ ∅	∅ ∅
Ghana	r	44 (1.9)	7 (2.2) ▲	∅ ∅	∅ ∅	14 (2.4)	–3 (3.7)	∅ ∅	∅ ∅
Hong Kong SAR		39 (0.3)	0 (0.4)	0 (0.5)	–1 (0.5)	3 (1.3)	3 (1.3) ▲	2 (1.4)	2 (1.3)
Hungary	r	23 (0.4)	–1 (0.5)	0 (0.6)	1 (0.6)	64 (3.4)	4 (5.3)	0 (5.2)	–6 (5.1)
Indonesia	r	36 (0.9)	–4 (1.0) ▼	–14 (2.3) ▼	∅ ∅	9 (2.4)	6 (2.9)	8 (2.4) ▲	∅ ∅
Iran, Islamic Rep. of	r	26 (0.5)	–3 (0.7) ▼	–7 (0.9) ▼	–11 (1.5) ▼	35 (3.2)	14 (4.3) ▲	25 (3.7) ▲	26 (4.4) ▲
Israel	r	33 (0.4)	0 (0.6)	6 (0.8) ▲	--	4 (1.2)	–6 (2.7) ▼	–28 (4.2) ▼	--
Italy		22 (0.2)	0 (0.3)	2 (0.4) ▲	--	73 (2.9)	–5 (4.3)	–14 (4.0) ▼	--
Japan		35 (0.3)	0 (0.4)	–1 (0.4) ▼	–2 (0.5) ▼	4 (1.6)	1 (1.9)	3 (1.6)	2 (1.7)
Jordan		35 (0.7)	1 (0.9)	0 (0.9)	∅ ∅	14 (2.4)	0 (3.5)	5 (3.3)	∅ ∅
Korea, Rep. of	s	37 (0.3)	1 (0.5)	–7 (0.9) ▼	–14 (1.4) ▼	2 (1.2)	1 (1.4)	2 (1.2)	–4 (2.1)
Kuwait	s	31 (0.8)	∅ ∅	∅ ∅	--	12 (3.1)	∅ ∅	∅ ∅	--
Lebanon		27 (0.7)	–1 (1.0)	∅ ∅	∅ ∅	41 (4.1)	5 (5.5)	∅ ∅	∅ ∅
Lithuania	r	25 (0.3)	0 (0.4)	2 (0.5) ▲	3 (0.6) ▲	36 (3.1)	–3 (4.1)	–19 (4.9) ▼	–47 (4.5) ▼
Malaysia		36 (0.4)	–1 (0.5)	–2 (0.6) ▼	∅ ∅	1 (0.8)	0 (1.1)	1 (0.9)	∅ ∅
Malta		20 (0.0)	∅ ∅	∅ ∅	∅ ∅	81 (0.2)	∅ ∅	∅ ∅	∅ ∅
Norway	s	25 (0.5)	0 (0.6)	∅ ∅	2 (0.9) ▲	44 (4.1)	10 (5.6)	∅ ∅	–1 (7.0)
Oman		31 (0.5)	∅ ∅	∅ ∅	∅ ∅	11 (2.4)	∅ ∅	∅ ∅	∅ ∅
Palestinian Nat'l Auth.		38 (0.5)	–1 (0.8)	∅ ∅	∅ ∅	7 (1.6)	0 (2.6)	∅ ∅	∅ ∅
Qatar	r	26 (0.0)	∅ ∅	∅ ∅	∅ ∅	18 (0.1)	∅ ∅	∅ ∅	∅ ∅
Romania		21 (0.3)	–3 (0.6) ▼	–3 (0.5) ▼	–6 (0.9) ▼	75 (3.0)	22 (5.3) ▲	27 (4.9) ▲	38 (5.6) ▲
Russian Federation		21 (0.3)	–2 (0.5) ▼	–3 (0.6) ▼	–4 (0.5) ▼	62 (2.8)	13 (4.6) ▲	23 (4.7) ▲	20 (4.6) ▲
Saudi Arabia	r	30 (1.1)	--	∅ ∅	∅ ∅	29 (4.5)	--	∅ ∅	∅ ∅
Scotland	s	20 (0.6)	0 (0.7)	∅ ∅	1 (0.9)	91 (2.0)	–4 (2.5)	∅ ∅	–9 (2.2) ▼
Serbia		24 (0.4)	–2 (0.6) ▼	∅ ∅	∅ ∅	52 (3.7)	13 (5.2) ▲	∅ ∅	∅ ∅
Singapore		38 (0.2)	0 (0.3)	1 (0.4) ▲	1 (0.4) ▲	1 (0.5)	–1 (0.8)	–3 (1.4) ▼	0 (1.0)
Slovenia	r	22 (0.3)	–1 (0.4) ▼	--	–3 (0.4) ▼	82 (2.5)	12 (4.5) ▲	--	39 (4.7) ▲
Sweden	r	24 (0.6)	3 (0.7) ▲	∅ ∅	--	60 (3.9)	–14 (5.2) ▼	∅ ∅	--
Syrian Arab Republic		32 (0.5)	∅ ∅	∅ ∅	∅ ∅	21 (2.9)	∅ ∅	∅ ∅	∅ ∅
Thailand		38 (0.6)	∅ ∅	–7 (1.7) ▼	--	11 (2.3)	∅ ∅	6 (2.9)	--
Tunisia		32 (0.4)	–2 (0.5) ▼	–2 (0.5) ▼	∅ ∅	5 (1.6)	2 (2.0)	1 (2.3)	∅ ∅
Turkey		33 (0.6)	∅ ∅	--	∅ ∅	18 (3.3)	∅ ∅	--	∅ ∅
Ukraine		25 (0.4)	∅ ∅	∅ ∅	∅ ∅	36 (3.2)	∅ ∅	∅ ∅	∅ ∅
United States	r	28 (0.9)	4 (1.0) ▲	–1 (1.3)	--	43 (3.0)	–7 (4.1)	1 (4.5)	--
‡ Morocco	r	34 (0.8)	--	--	--	7 (3.1)	--	--	--
International Avg.		30 (0.1)				31 (0.4)			
Benchmarking Participants									
Basque Country, Spain		22 (0.5)	–2 (0.6) ▼	∅ ∅	∅ ∅	66 (3.7)	16 (5.2) ▲	∅ ∅	∅ ∅
British Columbia, Canada	s	27 (0.8)	∅ ∅	2 (1.1)	∅ ∅	25 (4.0)	∅ ∅	–15 (10.4)	∅ ∅
Dubai, UAE	s	28 (0.5)	∅ ∅	∅ ∅	∅ ∅	23 (1.7)	∅ ∅	∅ ∅	∅ ∅
Massachusetts, US	r	29 (2.3)	∅ ∅	1 (3.3)	∅ ∅	50 (7.1)	∅ ∅	–12 (9.1)	∅ ∅
Minnesota, US	r	31 (1.7)	∅ ∅	∅ ∅	--	19 (6.5)	∅ ∅	∅ ∅	--
Ontario, Canada	s	26 (0.5)	0 (0.6)	–4 (2.3)	–4 (1.2) ▼	33 (4.0)	10 (5.5)	5 (6.3)	22 (5.8) ▲
Quebec, Canada	r	32 (0.9)	2 (1.0) ▲	3 (1.1) ▲	–1 (4.6)	12 (2.9)	–1 (4.1)	0 (5.4)	–12 (8.3)

▲ 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.



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

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

TIMSS2007
Science 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 61 (3.6)	0 0	0 0	0 0	34 (3.4)	0 0	0 0	0 0	
Armenia	s 61 (3.8)	13 (5.0) ▲	0 0	0 0	0 (0.0)	-22 (2.9) ▼	0 0	0 0	
Australia	s 68 (3.1)	2 (4.9)	--	-7 (5.2)	0 (0.0)	0 (0.0)	--	0 (0.0)	
Bahrain	92 (0.9)	0 (1.2)	0 0	0 0	0 (0.0)	-3 (0.1) ▼	0 0	0 0	
Bosnia and Herzegovina	53 (3.4)	0 0	0 0	0 0	0 (0.2)	0 0	0 0	0 0	
Botswana	76 (3.6)	5 (5.9)	0 0	0 0	23 (3.6)	-4 (5.8)	0 0	0 0	
Bulgaria	29 (4.2)	--	--	--	0 (0.0)	--	--	--	
Chinese Taipei	88 (3.0)	9 (4.6)	18 (4.7) ▲	0 0	10 (2.6)	-7 (4.1)	-20 (4.5) ▼	0 0	
Colombia	s 64 (4.7)	0 0	0 0	24 (7.9) ▲	24 (4.3)	0 0	0 0	-31 (7.7) ▼	
Cyprus	s 46 (2.1)	-24 (2.5) ▼	-46 (3.2) ▼	-50 (3.0) ▼	0 (0.1)	0 (0.1)	0 (0.1)	0 (0.1)	
Czech Republic	r 50 (4.2)	0 0	4 (6.7)	-14 (6.4) ▼	0 (0.0)	0 0	0 (0.0)	0 (0.0)	
Egypt	53 (3.7)	-13 (5.8) ▼	0 0	0 0	43 (3.7)	12 (5.7) ▲	0 0	0 0	
El Salvador	50 (4.0)	0 0	0 0	0 0	16 (3.3)	0 0	0 0	0 0	
England	s 65 (3.8)	0 (5.9)	--	--	3 (1.4)	1 (1.8)	--	--	
Georgia	48 (5.2)	0 0	0 0	0 0	1 (0.6)	0 0	0 0	0 0	
Ghana	r 43 (4.5)	-2 (6.3)	0 0	0 0	44 (4.7)	5 (6.9)	0 0	0 0	
Hong Kong SAR	52 (4.4)	-4 (6.2)	-9 (5.5)	-5 (7.0)	45 (4.4)	1 (6.1)	7 (5.5)	3 (7.0)	
Hungary	r 36 (3.3)	-5 (5.3)	0 (5.1)	6 (5.1)	1 (0.3)	1 (0.3)	0 (0.3)	1 (0.3)	
Indonesia	r 63 (4.6)	16 (6.4) ▲	37 (6.2) ▲	0 0	28 (4.5)	-21 (6.3) ▼	-44 (6.2) ▼	0 0	
Iran, Islamic Rep. of	r 64 (3.3)	-11 (4.7) ▼	-18 (4.2) ▼	-5 (6.4)	1 (1.1)	-2 (1.8)	-7 (2.5) ▼	-21 (5.6) ▼	
Israel	r 93 (2.3)	5 (3.6)	25 (4.5) ▲	--	3 (1.9)	1 (2.4)	3 (1.9)	--	
Italy	27 (2.9)	5 (4.3)	14 (4.0) ▲	--	0 (0.0)	0 (0.0)	0 (0.0)	--	
Japan	91 (2.2)	-6 (2.6) ▼	-4 (3.1)	0 (3.8)	5 (1.6)	4 (1.9) ▲	1 (2.6)	-3 (3.5)	
Jordan	56 (4.2)	-2 (6.1)	-5 (5.7)	0 0	30 (3.9)	1 (5.4)	1 (5.4)	0 0	
Korea, Rep. of	s 76 (2.8)	1 (4.5)	36 (4.2) ▲	71 (3.5) ▲	21 (2.5)	-2 (4.3)	-37 (4.0) ▼	-67 (3.6) ▼	
Kuwait	s 86 (3.2)	0 0	0 0	--	2 (1.1)	0 0	0 0	--	
Lebanon	53 (4.0)	-5 (5.7)	0 0	0 0	6 (1.8)	0 (3.2)	0 0	0 0	
Lithuania	r 64 (3.1)	2 (4.1)	18 (5.0) ▲	48 (4.4) ▲	1 (0.5)	1 (0.5)	1 (0.5)	-1 (1.1)	
Malaysia	79 (3.4)	3 (4.8)	12 (5.3) ▲	0 0	20 (3.3)	-2 (4.7)	-13 (5.2) ▼	0 0	
Malta	19 (0.2)	0 0	0 0	0 0	0 (0.0)	0 0	0 0	0 0	
Norway	s 54 (4.2)	-12 (5.6) ▼	0 0	-2 (7.1)	2 (1.2)	2 (1.4)	0 0	2 (1.2)	
Oman	89 (2.4)	0 0	0 0	0 0	0 (0.0)	0 0	0 0	0 0	
Palestinian Nat'l Auth.	52 (4.0)	7 (5.6)	0 0	0 0	41 (3.7)	-8 (5.1)	0 0	0 0	
Qatar	r 80 (0.2)	0 0	0 0	0 0	2 (0.1)	0 0	0 0	0 0	
Romania	25 (3.1)	-22 (5.3) ▼	-27 (4.9) ▼	-36 (5.5) ▼	0 (0.2)	-1 (0.8)	0 (0.2)	-2 (1.3)	
Russian Federation	38 (2.8)	-13 (4.6) ▼	-23 (4.7) ▼	-20 (4.6) ▼	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	
Saudi Arabia	r 62 (4.6)	--	0 0	0 0	8 (2.5)	--	0 0	0 0	
Scotland	s 7 (1.7)	1 (2.3)	0 0	7 (1.7) ▲	3 (1.1)	2 (1.2)	0 0	2 (1.1)	
Serbia	48 (3.7)	-13 (5.1) ▼	0 0	0 0	0 (0.2)	0 (0.5)	0 0	0 0	
Singapore	79 (2.2)	8 (3.4) ▲	3 (4.6)	0 (4.6)	20 (2.2)	-7 (3.3) ▼	0 (4.5)	1 (4.4)	
Slovenia	r 17 (2.5)	-12 (4.5) ▼	--	-39 (4.7) ▼	1 (0.4)	1 (0.4)	--	1 (0.4)	
Sweden	r 37 (3.7)	12 (5.0) ▲	0 0	--	3 (1.4)	1 (1.6)	0 0	--	
Syrian Arab Republic	67 (3.9)	0 0	0 0	0 0	12 (2.7)	0 0	0 0	0 0	
Thailand	46 (3.8)	0 0	6 (5.4)	--	43 (3.3)	0 0	-12 (5.0) ▼	--	
Tunisia	94 (1.9)	-3 (2.4)	-1 (2.7)	0 0	1 (1.0)	1 (1.3)	1 (1.3)	0 0	
Turkey	62 (3.9)	0 0	--	0 0	20 (2.6)	0 0	--	0 0	
Ukraine	64 (3.1)	0 0	0 0	0 0	1 (0.8)	0 0	0 0	0 0	
United States	r 46 (2.7)	-1 (3.9)	-7 (4.0)	--	11 (2.0)	8 (2.3) ▲	6 (2.4) ▲	--	
‡ Morocco	r 75 (5.3)	--	--	--	18 (4.8)	--	--	--	
International Avg.	58 (0.5)				11 (0.3)				
Benchmarking Participants									
Basque Country, Spain	34 (3.7)	-16 (5.2) ▼	0 0	0 0	0 (0.0)	0 (0.0)	0 0	0 0	
British Columbia, Canada	s 68 (4.7)	0 0	11 (11.0)	0 0	7 (2.7)	0 0	5 (3.1)	0 0	
Dubai, UAE	s 71 (2.2)	0 0	0 0	0 0	6 (2.0)	0 0	0 0	0 0	
Massachusetts, US	r 34 (7.0)	0 0	2 (8.8)	0 0	16 (6.5)	0 0	11 (7.1)	0 0	
Minnesota, US	r 68 (7.8)	0 0	0 0	--	13 (5.2)	0 0	0 0	--	
Ontario, Canada	s 65 (4.1)	-11 (5.6) ▼	0 (6.7)	-20 (6.1) ▼	2 (1.0)	2 (1.0)	-5 (2.8)	-3 (2.4)	
Quebec, Canada	r 79 (4.1)	-8 (5.0)	-9 (6.2)	9 (9.2)	9 (3.1)	9 (3.1) ▲	9 (3.1) ▲	4 (5.1)	

▲ 2007 significantly higher

▼ 2007 significantly lower

Exhibit 7.2 Achievement and Class Size for Science Instruction

TIMSS2007
Science 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	6 (1.8)	366 (25.4)	60 (4.4)	360 (7.4)	34 (4.6)	339 (14.6)
Armenia		19 (3.0)	510 (14.2)	60 (4.2)	485 (8.4)	22 (2.8)	470 (8.4)
Australia		17 (2.8)	524 (8.5)	81 (2.9)	531 (4.0)	2 (1.3)	~ ~
Austria		37 (2.9)	530 (3.3)	63 (2.9)	523 (3.5)	0 (0.0)	~ ~
Chinese Taipei		4 (1.5)	542 (9.1)	43 (4.0)	552 (3.8)	53 (3.6)	563 (2.6)
Colombia		19 (3.1)	395 (15.0)	24 (4.6)	382 (17.2)	57 (4.4)	411 (8.5)
Czech Republic		29 (3.9)	511 (6.1)	71 (3.9)	517 (3.3)	0 (0.0)	~ ~
Denmark	r	34 (4.1)	521 (5.0)	66 (4.1)	517 (3.6)	0 (0.0)	~ ~
El Salvador		19 (2.8)	357 (10.7)	38 (4.0)	378 (8.3)	43 (3.7)	414 (4.7)
England		8 (2.2)	554 (10.8)	81 (2.9)	538 (3.1)	11 (2.0)	553 (9.9)
Georgia		38 (3.8)	421 (8.5)	49 (4.6)	412 (6.8)	13 (2.4)	435 (6.6)
Germany		21 (2.4)	520 (5.6)	78 (2.4)	530 (2.5)	0 (0.0)	~ ~
Hong Kong SAR		1 (0.5)	~ ~	25 (3.3)	534 (6.4)	75 (3.4)	561 (3.8)
Hungary		35 (3.7)	510 (5.6)	65 (3.7)	549 (4.1)	0 (0.0)	~ ~
Iran, Islamic Rep. of		25 (2.8)	414 (7.9)	58 (3.8)	438 (6.3)	16 (2.9)	457 (12.5)
Italy		44 (2.6)	535 (4.7)	56 (2.6)	535 (4.2)	0 (0.0)	~ ~
Japan		5 (0.8)	531 (14.9)	47 (2.9)	549 (2.6)	48 (2.9)	548 (2.7)
Kazakhstan		30 (4.5)	533 (14.3)	68 (4.6)	532 (5.6)	3 (1.2)	563 (25.7)
Kuwait	s	11 (3.0)	355 (20.2)	79 (4.3)	349 (7.2)	10 (3.3)	356 (20.0)
Latvia		46 (2.7)	532 (3.5)	46 (2.9)	551 (3.3)	8 (1.5)	563 (5.0)
Lithuania		37 (3.0)	502 (4.1)	63 (3.0)	522 (2.6)	0 (0.0)	~ ~
Morocco	r	17 (3.2)	294 (19.0)	40 (5.1)	311 (15.5)	43 (4.6)	294 (8.9)
Netherlands		27 (3.3)	519 (4.9)	71 (3.5)	524 (3.3)	2 (1.3)	~ ~
New Zealand	s	10 (2.1)	504 (8.7)	85 (2.4)	512 (3.0)	5 (1.8)	536 (8.9)
Norway		42 (3.3)	475 (5.4)	53 (3.6)	478 (3.9)	5 (1.9)	470 (10.0)
Qatar	s	8 (0.1)	310 (6.1)	76 (0.2)	289 (2.8)	17 (0.2)	328 (6.0)
Russian Federation		33 (2.7)	536 (10.0)	67 (2.7)	552 (4.0)	0 (0.3)	~ ~
Scotland	r	12 (2.8)	516 (10.9)	81 (3.4)	497 (3.1)	7 (2.0)	520 (9.6)
Singapore		0 (0.0)	~ ~	5 (1.2)	495 (17.0)	95 (1.3)	592 (3.8)
Slovak Republic		33 (2.7)	525 (7.6)	66 (2.8)	527 (6.1)	1 (0.6)	~ ~
Slovenia		46 (2.9)	512 (3.0)	53 (3.0)	524 (2.9)	1 (0.6)	~ ~
Sweden		33 (3.3)	523 (4.5)	61 (3.5)	527 (3.5)	6 (1.9)	525 (12.9)
Tunisia		17 (2.8)	275 (14.4)	72 (3.9)	325 (7.3)	11 (2.8)	351 (26.0)
Ukraine		30 (3.3)	453 (5.5)	65 (3.5)	483 (3.5)	5 (1.4)	476 (13.2)
United States	r	22 (2.2)	537 (5.7)	65 (2.7)	540 (3.7)	14 (2.0)	539 (6.6)
Yemen	r	9 (2.0)	246 (21.4)	16 (3.4)	206 (18.6)	75 (3.8)	191 (8.7)
International Avg.		23 (0.5)	467 (2.0)	58 (0.6)	474 (1.6)	19 (0.4)	461 (2.6)
Benchmarking Participants							
Alberta, Canada		23 (3.1)	547 (5.1)	73 (3.2)	541 (4.9)	4 (1.4)	529 (18.8)
British Columbia, Canada	r	25 (3.4)	529 (5.1)	74 (3.5)	539 (3.8)	1 (0.8)	~ ~
Dubai, UAE		--	--	--	--	--	--
Massachusetts, US	r	16 (5.3)	562 (9.8)	75 (6.2)	578 (5.8)	9 (4.2)	548 (21.2)
Minnesota, US	s	14 (4.5)	536 (12.6)	66 (7.8)	560 (6.9)	20 (7.1)	552 (12.4)
Ontario, Canada		16 (3.3)	522 (13.6)	80 (3.7)	536 (3.7)	4 (1.4)	553 (12.2)
Quebec, Canada	r	16 (2.8)	513 (6.8)	84 (2.8)	520 (3.1)	1 (0.3)	~ ~

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 Science Instruction (Continued)

TIMSS2007
Science 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 (1.5)	402 (7.9)	61 (3.6)	408 (2.4)	34 (3.4)	410 (2.7)
Armenia		38 (3.8)	497 (8.5)	61 (3.8)	482 (5.7)	0 (0.0)	~ ~
Australia		32 (3.1)	502 (6.0)	68 (3.1)	526 (5.1)	0 (0.0)	~ ~
Bahrain		7 (0.9)	486 (4.5)	92 (0.9)	464 (1.9)	0 (0.0)	~ ~
Bosnia and Herzegovina		47 (3.4)	463 (4.0)	53 (3.4)	468 (4.2)	0 (0.2)	~ ~
Botswana		1 (0.5)	~ ~	76 (3.6)	356 (4.0)	23 (3.6)	342 (8.0)
Bulgaria		71 (4.2)	461 (8.1)	29 (4.2)	490 (9.2)	0 (0.0)	~ ~
Chinese Taipei		2 (1.4)	~ ~	88 (3.0)	556 (3.7)	10 (2.6)	616 (6.6)
Colombia		12 (2.4)	393 (14.9)	64 (4.7)	422 (4.6)	24 (4.3)	415 (6.4)
Cyprus	r	54 (2.1)	453 (2.8)	46 (2.1)	447 (2.9)	0 (0.1)	~ ~
Czech Republic		50 (4.2)	531 (2.9)	50 (4.2)	546 (3.3)	0 (0.0)	~ ~
Egypt		4 (1.5)	420 (13.6)	53 (3.7)	411 (5.2)	43 (3.7)	404 (5.4)
El Salvador		35 (3.7)	368 (5.5)	50 (4.0)	394 (4.0)	16 (3.3)	402 (9.5)
England	r	32 (3.6)	515 (7.8)	65 (3.8)	555 (5.5)	3 (1.4)	543 (19.5)
Georgia		51 (5.1)	422 (5.9)	48 (5.2)	419 (7.7)	1 (0.6)	~ ~
Ghana		14 (2.4)	286 (12.0)	43 (4.5)	292 (9.5)	44 (4.7)	319 (9.7)
Hong Kong SAR		3 (1.3)	409 (7.9)	52 (4.4)	517 (7.5)	45 (4.4)	552 (7.0)
Hungary		64 (3.4)	529 (4.0)	36 (3.3)	557 (4.9)	1 (0.3)	~ ~
Indonesia		10 (2.2)	427 (14.4)	63 (4.1)	427 (4.2)	27 (3.9)	435 (7.8)
Iran, Islamic Rep. of		35 (3.2)	443 (4.7)	64 (3.3)	466 (5.1)	1 (1.1)	~ ~
Israel	r	4 (1.2)	436 (35.4)	93 (2.3)	466 (5.2)	3 (1.9)	497 (72.2)
Italy		73 (2.9)	491 (3.2)	27 (2.9)	507 (5.7)	0 (0.0)	~ ~
Japan		4 (1.6)	541 (24.3)	91 (2.2)	551 (2.2)	5 (1.6)	611 (22.1)
Jordan		14 (2.4)	486 (15.7)	56 (4.2)	481 (5.9)	30 (3.9)	483 (7.3)
Korea, Rep. of		2 (1.2)	~ ~	76 (2.8)	554 (2.1)	21 (2.5)	555 (4.2)
Kuwait	s	12 (3.1)	413 (18.0)	86 (3.2)	416 (4.0)	2 (1.1)	~ ~
Lebanon		41 (4.1)	387 (8.9)	53 (4.0)	434 (9.0)	6 (1.8)	391 (21.9)
Lithuania		36 (3.1)	496 (4.0)	64 (3.1)	531 (3.3)	1 (0.5)	~ ~
Malaysia		1 (0.8)	~ ~	79 (3.4)	468 (7.2)	20 (3.3)	479 (11.3)
Malta		81 (0.2)	443 (1.5)	19 (0.2)	490 (2.9)	0 (0.0)	~ ~
Norway		44 (4.1)	482 (3.8)	54 (4.2)	491 (2.6)	2 (1.2)	~ ~
Oman		11 (2.4)	408 (6.1)	89 (2.4)	425 (3.4)	0 (0.0)	~ ~
Palestinian Nat'l Auth.		7 (1.6)	424 (12.9)	52 (4.0)	404 (5.4)	41 (3.7)	400 (5.7)
Qatar	r	18 (0.1)	320 (3.4)	80 (0.2)	316 (1.8)	2 (0.1)	~ ~
Romania		75 (3.0)	453 (4.3)	25 (3.1)	488 (7.8)	0 (0.2)	~ ~
Russian Federation		62 (2.8)	519 (4.0)	38 (2.8)	547 (5.6)	0 (0.0)	~ ~
Saudi Arabia	r	29 (4.5)	400 (6.6)	62 (4.6)	400 (4.4)	8 (2.5)	401 (19.7)
Scotland	r	91 (2.0)	496 (3.7)	7 (1.7)	520 (12.2)	3 (1.1)	491 (11.9)
Serbia		52 (3.7)	465 (4.3)	48 (3.7)	477 (4.7)	0 (0.2)	~ ~
Singapore		1 (0.5)	~ ~	79 (2.2)	568 (5.2)	20 (2.2)	564 (8.9)
Slovenia		82 (2.5)	537 (2.6)	17 (2.5)	540 (3.2)	1 (0.4)	~ ~
Sweden	r	60 (3.9)	507 (3.7)	37 (3.7)	513 (3.4)	3 (1.4)	509 (10.6)
Syrian Arab Republic		21 (2.9)	463 (6.2)	67 (3.9)	448 (3.7)	12 (2.7)	448 (8.7)
Thailand		11 (2.3)	438 (10.3)	46 (3.8)	448 (5.2)	43 (3.3)	504 (8.1)
Tunisia		5 (1.6)	431 (6.7)	94 (1.9)	445 (2.2)	1 (1.0)	~ ~
Turkey		18 (3.3)	449 (10.4)	62 (3.9)	457 (5.1)	20 (2.6)	454 (8.8)
Ukraine		36 (3.2)	473 (6.7)	64 (3.1)	493 (4.0)	1 (0.8)	~ ~
United States	r	43 (3.0)	525 (4.8)	46 (2.7)	515 (5.1)	11 (2.0)	532 (7.3)
‡ Morocco	r	5 (2.1)	431 (18.6)	75 (4.0)	405 (4.5)	20 (3.7)	392 (5.4)
International Avg.		31 (0.4)	453 (1.6)	58 (0.5)	469 (0.9)	11 (0.3)	467 (3.5)
Benchmarking Participants							
Basque Country, Spain		66 (3.7)	490 (3.9)	34 (3.7)	511 (4.1)	0 (0.0)	~ ~
British Columbia, Canada	s	25 (4.0)	524 (4.6)	68 (4.7)	531 (4.3)	7 (2.7)	529 (16.7)
Dubai, UAE	s	23 (1.7)	494 (8.4)	71 (2.2)	493 (2.9)	6 (2.0)	469 (17.6)
Massachusetts, US		50 (7.1)	546 (9.3)	34 (7.0)	557 (12.9)	16 (6.5)	566 (15.1)
Minnesota, US	r	19 (6.5)	528 (15.0)	68 (7.8)	535 (6.0)	13 (5.2)	537 (16.3)
Ontario, Canada		33 (4.0)	527 (6.3)	65 (4.1)	527 (3.9)	2 (1.0)	~ ~
Quebec, Canada	r	12 (2.9)	496 (6.1)	79 (4.1)	517 (5.4)	9 (3.1)	517 (12.9)

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 Science Classes with Few or No Limitations on Instruction due to Student Factors (SCFL)**

TIMSS2007
Science 4th Grade

Country	High SCFL (Few or No Limitations)		Medium SCFL (Some Limitations)		Low SCFL (A Lot of Limitations)	
	2007 Percent of Students	Average Achievement	2007 Percent of Students	Average Achievement	2007 Percent of Students	Average Achievement
Netherlands	82 (3.0)	528 (3.4)	11 (2.7)	507 (12.3)	7 (2.0)	496 (7.6)
Armenia	78 (3.4)	483 (6.4)	14 (2.6)	495 (25.1)	8 (2.3)	496 (19.7)
Austria	77 (2.4)	533 (2.4)	16 (2.0)	508 (5.4)	7 (1.5)	496 (13.8)
Germany	76 (2.7)	536 (2.5)	18 (2.3)	510 (5.4)	6 (1.4)	482 (12.8)
Scotland	r 76 (3.5)	507 (2.8)	19 (3.1)	487 (7.4)	5 (1.9)	466 (10.2)
Kazakhstan	74 (4.2)	533 (6.9)	21 (3.9)	531 (11.1)	4 (1.8)	533 (12.7)
Denmark	r 71 (4.2)	524 (3.4)	21 (3.8)	511 (5.4)	8 (2.5)	498 (11.2)
Japan	70 (3.7)	549 (2.4)	26 (3.3)	546 (3.2)	4 (1.7)	541 (5.6)
New Zealand	69 (2.7)	512 (2.9)	21 (2.4)	497 (7.4)	10 (1.6)	479 (8.4)
England	67 (3.8)	549 (3.8)	25 (3.5)	525 (5.5)	9 (2.0)	530 (9.6)
Norway	67 (3.7)	479 (4.1)	26 (3.4)	475 (5.2)	7 (1.8)	468 (7.7)
Czech Republic	63 (3.9)	517 (4.1)	26 (3.6)	508 (5.2)	11 (2.3)	512 (4.6)
Hungary	63 (4.0)	553 (3.5)	27 (3.3)	521 (6.8)	10 (2.9)	472 (14.3)
Sweden	62 (3.6)	533 (3.2)	26 (3.2)	511 (5.7)	11 (2.2)	512 (7.7)
Australia	62 (3.0)	536 (4.8)	24 (2.5)	517 (5.6)	13 (2.8)	510 (12.7)
United States	53 (2.9)	548 (3.4)	29 (2.7)	534 (5.1)	17 (1.9)	516 (6.7)
Slovenia	53 (3.3)	520 (3.0)	37 (3.2)	515 (3.3)	10 (1.6)	516 (6.0)
Russian Federation	53 (3.6)	553 (5.5)	33 (3.4)	541 (6.0)	14 (2.4)	534 (14.9)
Georgia	52 (5.4)	427 (6.2)	42 (5.0)	407 (6.1)	6 (2.5)	391 (16.1)
Lithuania	50 (4.0)	519 (2.9)	36 (3.9)	508 (3.9)	14 (2.7)	509 (5.5)
El Salvador	48 (4.6)	396 (6.5)	36 (4.7)	386 (9.2)	15 (3.3)	370 (9.9)
Ukraine	44 (4.2)	478 (4.0)	37 (3.9)	470 (6.1)	19 (3.2)	472 (6.8)
Italy	43 (3.1)	542 (5.2)	37 (3.1)	530 (4.5)	20 (2.4)	530 (6.3)
Colombia	41 (5.2)	411 (10.8)	35 (4.3)	386 (10.8)	24 (4.6)	407 (9.1)
Yemen	41 (4.5)	179 (12.1)	43 (4.6)	212 (11.0)	16 (3.6)	189 (14.9)
Qatar	r 39 (0.2)	295 (3.0)	48 (0.2)	280 (3.2)	14 (0.1)	303 (5.6)
Chinese Taipei	37 (4.2)	555 (3.8)	35 (4.1)	555 (3.9)	28 (3.9)	561 (3.9)
Tunisia	36 (3.6)	322 (10.5)	35 (3.5)	318 (10.9)	29 (3.9)	326 (12.2)
Latvia	36 (3.8)	547 (4.3)	43 (4.0)	538 (3.5)	21 (3.5)	547 (4.6)
Slovak Republic	35 (4.1)	539 (5.5)	34 (3.4)	527 (6.6)	30 (3.6)	509 (10.7)
Morocco	35 (4.1)	298 (12.6)	30 (4.0)	315 (11.9)	35 (4.4)	287 (14.9)
Hong Kong SAR	35 (4.2)	566 (5.3)	48 (4.5)	547 (4.8)	18 (3.4)	545 (10.1)
Algeria	34 (4.3)	358 (8.3)	38 (4.4)	348 (13.2)	28 (3.7)	361 (9.5)
Kuwait	s 33 (4.5)	362 (11.7)	42 (4.9)	334 (10.2)	25 (4.2)	342 (12.2)
Singapore	32 (2.7)	614 (7.4)	31 (2.6)	577 (7.5)	37 (2.8)	573 (6.0)
Iran, Islamic Rep. of	21 (3.3)	439 (11.7)	30 (4.0)	428 (8.8)	49 (3.8)	439 (6.2)
International Avg.	53 (0.6)	482 (1.5)	31 (0.6)	470 (1.6)	16 (0.5)	464 (2.0)
Benchmarking Participants						
Massachusetts, US	r 60 (5.1)	572 (5.9)	30 (5.0)	572 (6.4)	10 (4.6)	566 (18.7)
Minnesota, US	r 54 (5.7)	563 (5.4)	23 (6.9)	540 (24.7)	24 (6.4)	542 (11.1)
Ontario, Canada	53 (5.2)	544 (5.1)	30 (4.6)	530 (6.4)	18 (2.9)	512 (8.7)
Quebec, Canada	r 51 (4.3)	526 (3.7)	27 (3.8)	513 (4.5)	22 (3.5)	509 (6.2)
Alberta, Canada	51 (3.8)	550 (5.4)	23 (3.1)	539 (6.2)	26 (3.8)	529 (8.2)
British Columbia, Canada	r 35 (3.8)	534 (5.8)	43 (4.7)	541 (4.6)	23 (3.5)	530 (5.9)
Dubai, UAE	x x	x x	x x	x x	x x	x x

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

Index based on teachers' responses to five statements about student factors limiting science 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. An "x" indicates data are available for less than 50% of the students.

Exhibit 7.3 Index of Teachers' Reports on Teaching Science Classes with Few or No Limitations on Instruction due to Student Factors (SCFL) (Continued)

TIMSS2007
Science **8th** Grade

Country	High SCFL (Few or No Limitations)			Medium SCFL (Some Limitations)			Low SCFL (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
Armenia	r 62 (2.0)	490 (7.6)	31 (3.8) ▲	31 (2.0)	488 (5.0)	-11 (3.3) ▼	8 (1.0)	474 (5.8)	-20 (2.5) ▼
England	s 60 (3.1)	563 (5.6)	-3 (5.3)	28 (2.9)	515 (6.1)	3 (3.9)	12 (1.9)	499 (10.0)	0 (3.9)
Japan	59 (4.0)	563 (2.4)	-4 (5.0)	36 (3.8)	542 (3.8)	0 (4.9)	6 (1.9)	535 (13.8)	4 (2.2) ▲
Hungary	57 (2.5)	549 (3.8)	-1 (3.6)	34 (2.3)	528 (4.3)	-2 (3.2)	9 (1.3)	513 (6.4)	2 (1.7)
Saudi Arabia	54 (4.0)	405 (3.7)	--	30 (3.7)	402 (7.1)	--	16 (3.4)	390 (9.5)	--
Ukraine	52 (3.1)	492 (4.7)	0 0	35 (3.0)	483 (4.6)	0 0	14 (1.9)	470 (5.3)	0 0
Slovenia	50 (2.8)	537 (2.6)	0 (4.2)	40 (2.4)	538 (3.0)	2 (3.8)	10 (1.5)	538 (3.9)	-2 (2.3)
Oman	47 (4.4)	433 (4.7)	0 0	37 (4.4)	411 (7.2)	0 0	15 (3.0)	416 (9.4)	0 0
Egypt	47 (4.2)	419 (4.7)	15 (5.8) ▲	42 (4.3)	403 (5.7)	-1 (6.0)	10 (2.8)	376 (14.0)	-14 (4.5) ▼
Russian Federation	46 (2.4)	541 (5.1)	9 (3.0) ▲	37 (1.8)	523 (4.5)	-4 (2.9)	17 (1.7)	512 (4.8)	-6 (3.2)
Georgia	46 (3.4)	426 (6.0)	0 0	42 (3.7)	418 (5.0)	0 0	11 (2.2)	417 (11.8)	0 0
Indonesia	46 (4.6)	440 (6.0)	9 (5.7)	34 (4.0)	431 (6.7)	-14 (5.3) ▼	20 (2.8)	431 (9.1)	5 (3.7)
Lebanon	45 (3.4)	423 (9.0)	9 (5.1)	38 (3.1)	410 (10.7)	-3 (4.7)	17 (2.5)	395 (10.2)	-6 (3.5)
Scotland	s 45 (3.0)	511 (4.4)	3 (4.0)	36 (2.4)	483 (4.9)	-4 (3.7)	20 (2.2)	484 (6.8)	0 (3.4)
Czech Republic	44 (2.4)	548 (2.7)	0 0	42 (2.1)	534 (2.7)	0 0	14 (1.4)	523 (2.7)	0 0
Norway	44 (3.5)	492 (3.4)	-5 (5.7)	45 (3.7)	482 (2.8)	4 (5.8)	11 (2.0)	482 (4.6)	1 (3.4)
Sweden	42 (2.9)	518 (3.8)	-16 (4.2) ▼	43 (2.9)	505 (3.7)	9 (4.1) ▲	15 (2.2)	496 (4.8)	7 (3.0) ▲
Colombia	41 (4.5)	429 (5.5)	0 0	43 (5.6)	412 (6.6)	0 0	16 (3.8)	398 (9.7)	0 0
United States	r 41 (2.8)	535 (4.6)	-2 (4.0)	34 (2.5)	516 (4.4)	-4 (3.9)	25 (2.7)	497 (6.2)	6 (3.5)
Qatar	41 (0.1)	321 (2.0)	0 0	41 (0.2)	320 (2.2)	0 0	18 (0.1)	291 (3.3)	0 0
Australia	r 40 (3.3)	532 (6.7)	-8 (5.0)	39 (4.1)	512 (7.2)	2 (5.3)	21 (3.4)	499 (6.6)	6 (4.1)
Lithuania	40 (2.4)	529 (3.3)	-32 (3.1) ▼	43 (2.2)	517 (2.9)	16 (2.9) ▲	18 (1.5)	502 (4.5)	16 (1.6) ▲
Malta	40 (0.3)	492 (1.6)	0 0	42 (0.3)	435 (1.9)	0 0	18 (0.2)	407 (3.0)	0 0
Tunisia	39 (3.9)	444 (3.5)	16 (5.3) ▲	39 (4.0)	446 (3.3)	-10 (5.5)	22 (3.4)	444 (4.1)	-6 (4.9)
Korea, Rep. of	r 38 (3.9)	557 (2.9)	2 (5.2)	51 (3.9)	550 (2.6)	-3 (4.9)	10 (2.4)	553 (5.5)	0 (3.3)
Syrian Arab Republic	37 (3.9)	454 (5.3)	0 0	40 (3.9)	448 (4.4)	0 0	23 (3.0)	451 (6.8)	0 0
Malaysia	36 (3.8)	501 (10.4)	-31 (5.6) ▼	44 (3.8)	466 (8.5)	15 (5.5) ▲	19 (3.4)	430 (9.6)	16 (3.7) ▲
Singapore	35 (1.9)	616 (4.6)	-1 (3.2)	39 (2.2)	558 (7.8)	-2 (3.2)	26 (2.1)	513 (9.0)	3 (3.1)
Bulgaria	35 (3.2)	492 (10.4)	--	44 (2.3)	461 (6.7)	--	21 (2.3)	446 (9.9)	--
Serbia	34 (2.6)	474 (4.2)	-10 (3.4) ▼	42 (2.1)	471 (3.8)	6 (3.0)	23 (2.2)	466 (4.5)	5 (3.0)
Bosnia and Herzegovina	32 (2.2)	471 (4.2)	0 0	43 (2.2)	463 (3.4)	0 0	25 (2.3)	464 (4.1)	0 0
Romania	32 (2.9)	467 (6.5)	-6 (3.9)	39 (2.9)	464 (4.2)	1 (3.8)	29 (2.3)	454 (5.9)	5 (3.3)
Jordan	31 (3.5)	492 (8.2)	13 (4.8) ▲	40 (4.0)	475 (6.7)	-14 (5.8) ▼	28 (3.7)	480 (7.8)	1 (5.3)
Bahrain	30 (2.8)	473 (4.0)	9 (3.9) ▲	48 (2.9)	461 (3.4)	2 (5.0)	22 (2.7)	471 (6.4)	-12 (4.7) ▼
Ghana	30 (3.6)	314 (11.2)	0 (5.6)	47 (3.6)	308 (8.6)	2 (5.7)	23 (3.3)	276 (11.7)	-2 (5.2)
Hong Kong SAR	29 (4.5)	557 (8.5)	3 (5.7)	41 (4.8)	537 (7.4)	-2 (6.5)	30 (4.0)	489 (10.6)	-1 (5.9)
Palestinian Nat'l Auth.	28 (4.0)	408 (8.7)	3 (5.3)	45 (4.4)	408 (5.8)	4 (6.3)	27 (3.3)	392 (8.1)	-7 (5.6)
El Salvador	28 (3.9)	392 (6.9)	0 0	43 (4.8)	385 (5.8)	0 0	29 (4.1)	386 (6.3)	0 0
Kuwait	r 25 (3.8)	412 (7.9)	0 0	49 (4.8)	417 (5.5)	0 0	26 (4.4)	416 (8.4)	0 0
Algeria	25 (3.2)	406 (2.6)	0 0	46 (3.8)	407 (2.6)	0 0	29 (3.1)	412 (3.1)	0 0
Israel	22 (3.0)	490 (9.8)	-7 (4.5)	35 (3.9)	474 (6.6)	-4 (5.1)	43 (4.1)	453 (9.0)	11 (5.0) ▲
Turkey	22 (3.6)	497 (8.9)	0 0	39 (4.2)	449 (6.3)	0 0	39 (3.9)	436 (6.7)	0 0
Cyprus	r 18 (0.8)	453 (2.8)	4 (1.2) ▲	47 (1.4)	450 (2.6)	6 (1.9) ▲	35 (1.4)	449 (2.7)	-10 (1.8) ▼
Chinese Taipei	18 (3.1)	575 (7.8)	-9 (5.2)	43 (3.8)	561 (5.6)	8 (5.4)	39 (4.0)	553 (5.6)	1 (6.0)
Thailand	18 (3.4)	495 (18.6)	0 0	54 (4.5)	477 (6.0)	0 0	29 (3.9)	444 (5.9)	0 0
Botswana	17 (3.5)	382 (9.5)	-3 (5.1)	44 (4.5)	352 (4.8)	-1 (6.6)	39 (4.7)	345 (5.4)	3 (6.3)
Iran, Islamic Rep. of	15 (2.7)	458 (7.3)	5 (3.7)	45 (3.6)	466 (5.8)	11 (5.3) ▲	39 (3.7)	451 (5.1)	-15 (5.2) ▼
Italy	14 (1.9)	504 (5.2)	-16 (4.3) ▼	41 (3.2)	499 (4.0)	-3 (5.0)	45 (3.3)	491 (4.4)	18 (4.5) ▲
‡ Morocco	22 (2.9)	427 (5.9)	--	44 (4.9)	402 (5.0)	--	34 (4.7)	394 (4.3)	--
International Avg.	37 (0.5)	477 (1.0)		41 (0.5)	462 (0.8)		22 (0.4)	451 (1.1)	
Benchmarking Participants									
Dubai, UAE	s 67 (3.8)	501 (4.8)	0 0	26 (2.8)	471 (8.5)	0 0	7 (2.5)	479 (7.9)	0 0
Ontario, Canada	54 (4.8)	536 (4.1)	7 (6.8)	29 (4.3)	520 (5.1)	-3 (6.2)	16 (3.1)	515 (9.7)	-5 (4.8)
Massachusetts, US	50 (6.1)	563 (8.3)	0 0	31 (4.3)	551 (8.0)	0 0	19 (4.5)	534 (17.7)	0 0
British Columbia, Canada	r 42 (4.6)	534 (4.8)	0 0	35 (4.3)	525 (4.8)	0 0	23 (3.0)	521 (6.3)	0 0
Basque Country, Spain	38 (4.7)	509 (4.3)	-1 (6.6)	47 (4.4)	494 (3.8)	6 (6.7)	15 (3.1)	481 (8.4)	-5 (5.2)
Quebec, Canada	r 32 (4.3)	541 (7.5)	-33 (6.1) ▼	43 (4.9)	497 (5.0)	13 (6.6)	25 (3.9)	498 (8.8)	20 (4.3) ▲
Minnesota, US	21 (5.5)	536 (12.4)	0 0	51 (8.5)	545 (6.3)	0 0	28 (6.1)	523 (7.5)	0 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 science 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.

How Is Scientific Inquiry Emphasized in Science Lessons?

Because of the high level of interest in incorporating scientific inquiry into science class, Exhibits 7.4 and 7.5 present reports, by students and by their teachers, respectively, about the frequency with which they engage in a range of inquiry-related instructional activities. The science activities were similar at both grades but were tailored to the differences in ability level between the grades. Activities included making an observation and describing what was seen, giving an explanation about what was being studied, watching the teacher demonstrate an experiment or investigation, design or plan an experiment or investigation, conduct an experiment or investigation, work in small groups, and, at eighth grade only, relate what is being learned in science to daily life. Also at eighth grade, results are presented in one panel for the 29 countries and 7 benchmarking participants that teach eighth-grade science as a single, integrated subject and in four separate panels for the 20 countries that teach the sciences separately as biology, earth science, chemistry, and physics. Exhibit 7.4 shows the percentages of students reporting that the science inquiry activities occurred in at least half the lessons in science class, whereas Exhibit 7.5 shows the percentages of students whose teachers reported the activity occurred in at least half the lessons.

According to fourth-grade students, the most frequent science investigation activities were writing or giving an explanation for something being studied and watching the teacher do a science experiment, with, respectively, an average of 69 and 67 percent of students reporting that they devoted time to these activities at least once or twice a month. Working with other students in small groups (56%) and making observations and recording what was seen (52%) were next most frequent, followed by doing a science experiment or investigation (49%) and designing an experiment or investigation (47%).

At the eighth grade among general/integrated science countries, making observations, giving explanations, and watching the teacher demonstrate an experiment or investigation were equally frequent activities, with 65–67 percent of students, on average, reporting devoting time to them in

at least half the science lessons. Designing an experiment or investigation, conducting an experiment or investigation, working in small groups, and relating what is being learned in science to daily life also were about equally frequent (50–57%). By comparison, among countries teaching the sciences as separate subjects at the eighth grade, giving explanations about what is being studied was a more frequently reported activity in all four subjects (71–75%), and designing and conducting experiments or investigations and working in small groups were less frequent in biology and earth science than in integrated science.

At both grades, teachers generally reported engaging less frequently than the students in the scientific inquiry activities. At fourth grade, the most frequent teacher-reported activity was relating what students are learning in science to their daily lives—an activity not included in the student questionnaire. The next most frequent activity was asking for explanations about something students are studying. On average, 69 percent of students had teachers who ask them for explanations in at least half of their science lessons, a percentage that agreed with students' own reports. However, only about one-fourth to one-third of fourth-grade students had teachers who reported engaging in the other scientific inquiry activities in as many as half their science lessons.

Teacher reports at eighth grade resembled those at fourth grade, regardless of whether science was taught as a single subject or as separate subjects. Like at fourth grade, eighth-grade science teachers most frequently reported asking students to give explanations for something they are studying and to relate what they are studying to their daily lives. Approximately 71–85 percent of students were taught science or a science subject by teachers who reported doing these activities in about half their lessons. The other scientific inquiry activities were less frequently reported by eighth-grade science teachers, similar to the situation at fourth grade.

Exhibit 7.4 Students' Reports on Doing Science Investigations

TIMSS2007
Science 4th Grade

Country	Percentage of Students Who Reported Doing the Activity Once or Twice a Month or More					
	Look at Something Like the Weather or a Plant Growing and Write Down What I See	Write or Give an Explanations For Something I Am Studying in Science	Watch the Teacher Do a Science Experiment	Design or Plan a Science Experiment or Investigation	Do a Science Experiment or Investigation	Work with Other Students in a Small Group on a Science Experiment or Investigation
Algeria	73 (1.6)	80 (1.0)	81 (1.1)	76 (1.3)	75 (1.4)	71 (1.3)
Armenia	52 (1.4)	r 69 (1.6)	r 63 (1.3)	r 37 (1.5)	r 33 (1.5)	r 36 (1.6)
Australia	34 (1.4)	57 (1.5)	45 (2.4)	36 (1.3)	41 (2.0)	52 (2.1)
Austria	34 (0.8)	58 (1.2)	62 (1.1)	32 (0.9)	33 (1.0)	37 (1.0)
Chinese Taipei	63 (1.0)	77 (0.9)	88 (0.7)	43 (1.2)	65 (1.1)	83 (1.0)
Colombia	75 (1.1)	81 (0.8)	71 (1.3)	74 (1.2)	76 (1.2)	71 (1.3)
Czech Republic	47 (1.3)	68 (1.0)	61 (1.8)	26 (1.3)	29 (1.2)	39 (1.6)
Denmark	30 (1.4)	55 (1.6)	48 (2.6)	29 (1.8)	27 (1.3)	60 (2.0)
El Salvador	69 (1.4)	76 (1.2)	61 (1.9)	50 (1.5)	51 (1.6)	65 (1.4)
England	45 (1.3)	77 (1.0)	73 (1.4)	71 (1.7)	76 (1.4)	80 (1.1)
Georgia	59 (1.5)	77 (1.2)	57 (1.3)	38 (1.5)	34 (1.3)	39 (1.7)
Germany	40 (1.0)	69 (0.8)	56 (1.1)	27 (0.9)	25 (0.9)	38 (1.2)
Hong Kong SAR	39 (1.0)	47 (1.0)	36 (1.5)	21 (0.8)	22 (0.8)	33 (1.4)
Hungary	55 (1.1)	67 (1.2)	73 (1.4)	31 (1.0)	24 (1.1)	29 (1.4)
Iran, Islamic Rep. of	63 (1.9)	82 (1.3)	89 (1.1)	67 (2.0)	73 (1.8)	73 (1.6)
Italy	52 (1.2)	72 (0.8)	69 (1.5)	45 (1.2)	47 (1.3)	41 (1.3)
Japan	79 (1.3)	68 (1.2)	68 (1.7)	58 (1.3)	63 (1.1)	88 (0.6)
Kazakhstan	68 (2.8)	85 (1.5)	68 (3.3)	53 (2.4)	52 (2.3)	55 (2.1)
Kuwait	71 (1.7)	83 (0.9)	84 (0.9)	77 (1.1)	77 (1.3)	81 (1.0)
Latvia	65 (1.1)	65 (1.3)	74 (1.4)	62 (1.5)	71 (1.5)	60 (1.4)
Lithuania	57 (1.2)	78 (1.1)	74 (1.1)	39 (1.1)	36 (1.3)	44 (1.2)
Morocco	63 (2.2)	80 (1.2)	78 (1.6)	66 (1.9)	65 (1.9)	67 (2.0)
Netherlands	12 (0.7)	25 (1.2)	43 (1.6)	11 (0.7)	13 (0.9)	27 (1.8)
New Zealand	39 (1.1)	54 (1.1)	47 (1.3)	39 (1.1)	40 (1.2)	53 (1.3)
Norway	33 (1.1)	55 (1.1)	61 (1.4)	38 (1.0)	45 (1.1)	49 (1.3)
Qatar	69 (0.5)	76 (0.5)	84 (0.4)	74 (0.6)	75 (0.5)	77 (0.6)
Russian Federation	58 (1.3)	86 (1.1)	57 (1.9)	40 (2.0)	36 (2.0)	33 (1.6)
Scotland	33 (1.4)	58 (1.6)	57 (2.2)	38 (1.7)	46 (1.9)	64 (1.7)
Singapore	34 (0.9)	63 (0.7)	81 (0.9)	31 (0.7)	46 (0.9)	63 (1.0)
Slovak Republic	44 (1.5)	72 (1.2)	82 (1.3)	38 (1.3)	45 (1.3)	54 (1.3)
Slovenia	61 (1.2)	86 (0.7)	86 (0.8)	70 (1.1)	71 (1.0)	78 (0.9)
Sweden	29 (1.2)	52 (1.4)	49 (2.1)	30 (1.3)	32 (1.8)	47 (2.0)
Tunisia	69 (1.9)	84 (1.1)	86 (1.1)	82 (1.6)	82 (1.3)	74 (1.6)
Ukraine	73 (1.2)	87 (0.7)	69 (1.4)	51 (1.5)	50 (1.5)	48 (1.7)
United States	39 (1.0)	67 (0.7)	63 (1.3)	43 (1.0)	56 (1.2)	62 (1.2)
Yemen	51 (3.1)	r 67 (2.3)	61 (3.0)	r 44 (2.7)	r 37 (2.6)	r 45 (2.7)
International Avg.	52 (0.2)	69 (0.2)	67 (0.3)	47 (0.2)	49 (0.2)	56 (0.3)
Benchmarking Participants						
Alberta, Canada	42 (1.7)	78 (0.9)	78 (1.2)	48 (1.5)	61 (1.5)	77 (1.1)
British Columbia, Canada	44 (1.5)	71 (1.2)	66 (1.5)	34 (1.4)	45 (1.5)	56 (1.5)
Dubai, UAE	r 50 (1.6)	r 76 (1.2)	r 77 (1.3)	r 60 (1.4)	r 64 (1.9)	r 64 (2.1)
Massachusetts, US	38 (1.9)	74 (1.6)	58 (2.1)	41 (2.0)	53 (2.7)	62 (3.3)
Minnesota, US	39 (2.4)	66 (1.3)	70 (2.5)	41 (2.6)	60 (3.0)	69 (2.6)
Ontario, Canada	35 (1.5)	75 (1.3)	62 (1.9)	40 (1.7)	50 (1.5)	65 (1.8)
Quebec, Canada	49 (1.5)	63 (1.2)	54 (2.2)	54 (1.5)	56 (1.6)	57 (1.8)

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 Doing Science Investigations (Continued)

TIMSS2007
Science 8th Grade

General/Integrated Science

Country	Percentage of Students Who Reported Doing the Activity About Half of the Lessons or More						
	Make Observations and Describe What Was Seen	Give Explanations About What Is Being Studied	Watch the Teacher Demonstrate an Experiment or Investigation	Design or Plan an Experiment or Investigation	Conduct an Experiment or Investigation	Work in Small Groups on an Experiment or Investigation	Relate What Is Being Learned in Science to Our Daily Lives
Australia	69 (1.2)	59 (1.0)	60 (1.4)	52 (1.2)	59 (1.3)	68 (1.4)	39 (1.1)
Bahrain	68 (1.0)	65 (1.0)	77 (0.8)	56 (1.1)	50 (0.8)	51 (1.0)	64 (1.0)
Botswana	54 (1.0)	72 (1.0)	60 (1.0)	39 (0.8)	43 (0.9)	47 (1.1)	72 (0.9)
Chinese Taipei	35 (1.3)	42 (1.3)	41 (1.2)	27 (1.1)	29 (1.3)	28 (1.3)	38 (1.2)
Colombia	72 (1.5)	75 (1.5)	50 (1.9)	43 (1.6)	49 (1.6)	58 (1.4)	65 (1.7)
Egypt	80 (1.0)	78 (0.8)	78 (0.8)	67 (1.1)	63 (1.3)	60 (1.1)	75 (1.0)
El Salvador	68 (1.1)	63 (1.1)	67 (1.0)	55 (1.2)	47 (1.2)	57 (1.2)	59 (1.0)
England	67 (1.2)	61 (1.1)	61 (1.2)	51 (1.3)	60 (1.4)	70 (1.2)	41 (1.0)
Ghana	70 (1.5)	84 (0.8)	73 (1.4)	54 (1.5)	54 (1.2)	51 (1.4)	81 (0.8)
Hong Kong SAR	62 (1.4)	57 (1.1)	61 (1.2)	42 (1.2)	68 (1.3)	71 (1.4)	63 (1.2)
Iran, Islamic Rep. of	74 (1.2)	76 (1.0)	85 (0.9)	52 (1.2)	66 (1.2)	58 (1.4)	62 (1.3)
Israel	53 (1.5)	70 (1.2)	69 (1.6)	48 (1.7)	52 (1.9)	42 (1.8)	51 (1.3)
Italy	41 (1.1)	78 (1.0)	22 (1.1)	12 (0.9)	11 (0.9)	10 (0.9)	32 (0.8)
Japan	66 (1.6)	38 (1.2)	62 (1.4)	45 (1.5)	72 (1.7)	76 (1.7)	29 (0.9)
Jordan	83 (1.1)	82 (1.1)	77 (1.0)	64 (1.2)	62 (1.3)	62 (1.3)	76 (1.1)
Korea, Rep. of	29 (0.9)	26 (0.7)	46 (1.2)	21 (0.8)	28 (1.1)	29 (1.0)	35 (1.0)
Kuwait	78 (0.8)	70 (0.9)	89 (0.7)	72 (1.1)	67 (1.1)	71 (1.0)	66 (0.8)
Malaysia	69 (1.2)	48 (1.2)	78 (1.0)	46 (1.4)	63 (1.7)	66 (1.6)	59 (1.2)
Norway	39 (1.3)	44 (1.1)	37 (1.5)	31 (1.4)	42 (2.0)	43 (1.8)	32 (0.9)
Oman	75 (1.1)	73 (1.1)	83 (0.8)	63 (1.1)	58 (1.2)	67 (1.3)	76 (0.8)
Palestinian Nat'l Auth.	69 (1.6)	74 (1.0)	75 (1.5)	56 (1.7)	51 (1.7)	53 (1.7)	69 (1.1)
Qatar	79 (0.4)	67 (0.6)	83 (0.5)	66 (0.6)	65 (0.6)	67 (0.5)	66 (0.6)
Saudi Arabia	64 (1.1)	65 (1.1)	74 (1.2)	49 (1.2)	48 (1.1)	45 (1.5)	66 (1.0)
Scotland	68 (1.2)	66 (0.8)	72 (1.0)	61 (1.2)	75 (1.2)	80 (0.8)	49 (0.9)
Singapore	61 (0.9)	66 (0.9)	55 (1.0)	37 (0.8)	50 (1.0)	54 (1.0)	59 (0.9)
Thailand	75 (1.0)	63 (1.0)	78 (1.0)	61 (1.1)	64 (1.3)	74 (1.1)	64 (0.9)
Tunisia	84 (1.0)	87 (0.8)	93 (0.9)	69 (1.1)	66 (1.2)	56 (1.2)	63 (1.0)
Turkey	66 (1.4)	78 (1.1)	73 (1.3)	54 (1.4)	54 (1.4)	46 (1.5)	59 (1.3)
United States	68 (1.1)	68 (0.8)	60 (1.3)	51 (1.1)	57 (1.6)	67 (1.5)	51 (0.9)
International Avg.	65 (0.2)	65 (0.2)	67 (0.2)	50 (0.2)	54 (0.2)	56 (0.2)	57 (0.2)
Benchmarking Participants							
Basque Country, Spain	46 (1.6)	78 (1.2)	38 (1.8)	23 (1.5)	25 (1.6)	35 (2.2)	50 (1.8)
British Columbia, Canada	74 (1.1)	69 (1.1)	65 (1.3)	48 (1.4)	56 (1.5)	67 (1.4)	50 (1.0)
Dubai, UAE	r 70 (1.2)	r 74 (1.0)	r 70 (1.4)	r 49 (1.0)	r 48 (2.0)	r 53 (1.6)	r 65 (1.1)
Massachusetts, US	75 (1.7)	72 (1.4)	66 (2.0)	55 (1.9)	63 (2.2)	74 (2.2)	51 (2.4)
Minnesota, US	72 (2.3)	67 (1.8)	66 (2.5)	52 (2.8)	60 (2.9)	70 (2.6)	51 (2.1)
Ontario, Canada	71 (1.5)	67 (1.4)	56 (2.0)	45 (1.8)	49 (2.1)	56 (2.2)	49 (1.3)
Quebec, Canada	57 (1.4)	59 (1.2)	53 (1.8)	56 (1.5)	59 (1.7)	61 (1.7)	43 (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.

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

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

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



Exhibit 7.4 Students' Reports on Doing Science Investigations (Continued)

TIMSS2007
Science 8th Grade

Biology

Country	Percentage of Students Who Reported Doing the Activity About Half of the Lessons or More							
	Make Observations and Describe What Was Seen	Give Explanations About What Is Being Studied	Watch the Teacher Demonstrate an Experiment or Investigation	Design or Plan an Experiment or Investigation	Conduct an Experiment or Investigation	Work in Small Groups on an Experiment or Investigation	Relate What Is Being Learned in Science to Our Daily Lives	
Algeria	65 (1.1)	84 (0.6)	82 (0.8)	53 (1.0)	51 (1.0)	49 (1.2)	59 (1.1)	
Armenia	48 (1.4)	71 (1.2)	63 (1.4)	37 (1.6)	31 (1.1)	25 (1.2)	68 (1.1)	
Bosnia and Herzegovina	57 (1.1)	81 (0.9)	41 (1.4)	24 (1.1)	20 (1.1)	22 (1.2)	73 (1.0)	
Bulgaria	39 (1.5)	r 72 (1.6)	33 (1.6)	r 27 (1.6)	r 22 (1.3)	r 23 (1.2)	r 59 (1.7)	
Cyprus	x x	x x	x x	x x	x x	x x	x x	
Czech Republic	25 (0.9)	78 (0.8)	27 (1.2)	11 (0.7)	13 (0.9)	15 (0.8)	46 (1.2)	
Georgia	46 (1.5)	71 (1.2)	63 (1.2)	24 (1.3)	21 (1.0)	28 (1.4)	56 (1.4)	
Hungary	27 (1.2)	83 (1.0)	39 (1.7)	20 (1.2)	14 (1.0)	10 (1.0)	64 (1.5)	
Indonesia	53 (1.5)	57 (1.3)	71 (1.2)	36 (1.6)	35 (1.4)	52 (1.3)	53 (1.2)	
Lebanon	76 (1.3)	78 (1.1)	72 (1.4)	57 (1.5)	52 (1.4)	46 (1.6)	70 (1.4)	
Lithuania	15 (0.9)	52 (1.7)	14 (1.0)	9 (0.8)	9 (0.8)	12 (0.8)	39 (1.2)	
Malta	65 (1.1)	r 64 (1.2)	45 (0.9)	r 42 (1.0)	r 45 (1.1)	r 53 (1.2)	r 61 (1.1)	
Romania	56 (1.6)	66 (1.1)	61 (1.8)	33 (1.8)	28 (1.6)	29 (1.6)	58 (1.3)	
Russian Federation	34 (1.2)	84 (0.9)	27 (1.2)	20 (1.0)	15 (0.6)	19 (0.8)	61 (1.1)	
Serbia	51 (1.3)	76 (1.1)	29 (1.2)	16 (0.9)	14 (0.8)	15 (1.0)	68 (1.3)	
Slovenia	50 (1.4)	76 (1.0)	42 (1.3)	31 (1.3)	29 (1.3)	30 (1.5)	65 (1.0)	
Sweden	49 (1.1)	46 (1.2)	45 (1.2)	34 (1.1)	39 (1.3)	43 (1.4)	35 (1.0)	
Syrian Arab Republic	67 (0.9)	77 (0.8)	83 (0.9)	57 (1.2)	49 (1.1)	48 (1.2)	59 (1.2)	
Ukraine	45 (1.4)	89 (0.8)	38 (1.3)	37 (1.2)	32 (1.3)	25 (1.2)	65 (1.3)	
‡ Morocco	73 (1.1)	82 (1.2)	84 (1.1)	58 (1.3)	53 (1.5)	44 (1.5)	64 (1.1)	
International Avg.	49 (0.3)	73 (0.3)	51 (0.3)	33 (0.3)	30 (0.3)	31 (0.3)	59 (0.3)	

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

Earth Science

Country	Percentage of Students Who Reported Doing the Activity About Half of the Lessons or More							
	Make Observations and Describe What Was Seen	Give Explanations About What Is Being Studied	Watch the Teacher Demonstrate an Experiment or Investigation	Design or Plan an Experiment or Investigation	Conduct an Experiment or Investigation	Work in Small Groups on an Experiment or Investigation	Relate What Is Being Learned in Science to Our Daily Lives	
Algeria	r 68 (1.7)	r 79 (1.0)	r 82 (1.1)	r 55 (1.6)	r 49 (1.7)	r 49 (1.3)	r 59 (1.3)	
Armenia	44 (1.3)	65 (1.2)	53 (1.6)	37 (1.3)	30 (1.4)	27 (0.9)	59 (1.3)	
Bosnia and Herzegovina	60 (1.3)	80 (0.9)	34 (1.1)	23 (1.0)	19 (0.9)	26 (1.2)	70 (1.1)	
Bulgaria	37 (1.7)	r 71 (1.5)	r 26 (1.6)	r 25 (1.6)	r 21 (1.4)	r 26 (1.6)	r 54 (1.5)	
Cyprus	67 (0.8)	77 (0.8)	40 (1.0)	27 (0.9)	24 (0.8)	24 (0.8)	58 (1.0)	
Czech Republic	21 (0.7)	72 (1.0)	13 (0.5)	6 (0.4)	6 (0.3)	9 (0.6)	45 (1.1)	
Georgia	48 (1.8)	r 66 (1.6)	r 56 (1.5)	r 23 (1.4)	r 21 (1.4)	r 29 (1.6)	r 53 (1.4)	
Hungary	24 (1.2)	77 (1.3)	27 (1.3)	16 (0.9)	11 (0.7)	12 (0.9)	54 (1.3)	
Indonesia	--	--	--	--	--	--	--	
Lebanon	--	--	--	--	--	--	--	
Lithuania	14 (0.7)	56 (1.6)	9 (0.7)	8 (0.7)	7 (0.5)	13 (0.7)	45 (1.1)	
Malta	35 (0.7)	48 (0.8)	20 (0.7)	14 (0.5)	11 (0.5)	13 (0.6)	48 (0.7)	
Romania	62 (1.6)	72 (1.0)	61 (1.9)	35 (1.3)	29 (1.4)	28 (1.4)	58 (1.4)	
Russian Federation	32 (1.4)	84 (0.9)	21 (1.1)	17 (1.1)	13 (0.9)	22 (1.0)	59 (0.9)	
Serbia	47 (1.5)	69 (1.2)	17 (0.9)	13 (0.8)	11 (0.7)	16 (1.0)	62 (1.2)	
Slovenia	34 (1.1)	76 (0.9)	16 (0.9)	14 (0.8)	13 (0.8)	17 (1.2)	60 (1.1)	
Sweden	42 (1.1)	47 (1.1)	26 (0.9)	20 (0.8)	18 (0.8)	29 (1.0)	44 (1.1)	
Syrian Arab Republic	70 (1.0)	77 (1.0)	81 (1.2)	57 (1.1)	51 (1.3)	48 (1.1)	60 (1.1)	
Ukraine	40 (1.3)	88 (0.8)	27 (1.2)	33 (1.3)	25 (1.1)	26 (1.3)	62 (1.2)	
‡ Morocco	74 (1.1)	r 80 (0.9)	82 (1.0)	55 (1.5)	r 53 (1.6)	42 (1.8)	r 59 (1.4)	
International Avg.	45 (0.3)	71 (0.3)	38 (0.3)	27 (0.3)	23 (0.3)	25 (0.3)	56 (0.3)	

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

Exhibit 7.4 Students' Reports on Doing Science Investigations (Continued)

TIMSS2007
Science 8th Grade

Chemistry

Country	Percentage of Students Who Reported Doing the Activity About Half of the Lessons or More						
	Make Observations and Describe What Was Seen	Give Explanations About What Is Being Studied	Watch the Teacher Demonstrate an Experiment or Investigation	Design or Plan an Experiment or Investigation	Conduct an Experiment or Investigation	Work in Small Groups on an Experiment or Investigation	Relate What Is Being Learned in Science to Our Daily Lives
Algeria	69 (1.0)	82 (0.8)	85 (0.7)	57 (1.2)	57 (1.1)	49 (1.3)	59 (1.3)
Armenia	55 (1.7)	r 71 (1.5)	63 (1.7)	46 (1.6)	40 (1.3)	r 29 (1.0)	r 56 (1.3)
Bosnia and Herzegovina	63 (1.1)	78 (0.9)	56 (1.6)	39 (1.5)	38 (1.6)	32 (1.4)	66 (1.0)
Bulgaria	54 (2.2)	r 72 (1.7)	r 52 (2.3)	r 42 (2.0)	r 41 (1.9)	r 35 (1.7)	r 48 (1.8)
Cyprus	79 (0.9)	81 (0.8)	79 (0.8)	65 (0.9)	66 (0.9)	49 (1.0)	55 (0.8)
Czech Republic	61 (1.5)	80 (0.8)	66 (1.6)	36 (1.2)	48 (1.4)	33 (1.4)	45 (1.2)
Georgia	51 (1.6)	69 (1.5)	63 (1.6)	28 (1.8)	23 (1.4)	32 (1.5)	48 (1.6)
Hungary	71 (1.7)	78 (1.2)	74 (1.8)	60 (1.5)	61 (1.7)	18 (1.1)	56 (1.5)
Indonesia	--	--	--	--	--	--	--
Lebanon	79 (1.1)	79 (1.1)	77 (1.0)	61 (1.2)	59 (1.4)	48 (1.3)	66 (1.2)
Lithuania	32 (1.4)	56 (1.4)	33 (1.7)	21 (1.2)	21 (1.2)	16 (0.9)	38 (1.0)
Malta	s 67 (1.3)	s 67 (1.5)	s 59 (1.3)	s 47 (1.3)	s 52 (1.5)	s 50 (1.4)	s 54 (1.6)
Romania	63 (1.4)	71 (1.2)	70 (1.7)	51 (1.6)	52 (1.7)	39 (1.8)	52 (1.5)
Russian Federation	64 (1.5)	89 (0.7)	67 (1.6)	48 (1.4)	38 (1.7)	34 (1.2)	54 (1.1)
Serbia	51 (1.3)	68 (1.1)	45 (1.7)	28 (1.2)	31 (1.3)	23 (1.2)	53 (1.2)
Slovenia	73 (1.0)	81 (0.9)	72 (1.1)	60 (1.2)	62 (1.1)	47 (1.6)	57 (1.2)
Sweden	57 (1.1)	51 (1.2)	59 (1.0)	50 (1.1)	59 (1.3)	54 (1.2)	34 (0.9)
Syrian Arab Republic	72 (1.1)	77 (0.9)	84 (0.8)	59 (1.1)	54 (1.2)	48 (1.1)	57 (1.3)
Ukraine	69 (1.4)	90 (0.7)	70 (1.4)	58 (1.5)	58 (1.6)	36 (1.4)	59 (1.2)
‡ Morocco	r 78 (1.8)	r 82 (1.2)	r 85 (1.0)	r 62 (2.1)	r 58 (1.8)	r 44 (2.0)	r 63 (1.9)
International Avg.	64 (0.3)	75 (0.3)	66 (0.3)	48 (0.3)	48 (0.3)	38 (0.3)	54 (0.3)

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

Physics

Country	Percentage of Students Who Reported Doing the Activity About Half of the Lessons or More						
	Make Observations and Describe What Was Seen	Give Explanations About What Is Being Studied	Watch the Teacher Demonstrate an Experiment or Investigation	Design or Plan an Experiment or Investigation	Conduct an Experiment or Investigation	Work in Small Groups on an Experiment or Investigation	Relate What Is Being Learned in Science to Our Daily Lives
Algeria	73 (0.9)	82 (0.7)	84 (0.7)	57 (0.8)	56 (1.0)	47 (1.1)	63 (1.0)
Armenia	60 (1.6)	r 73 (1.1)	64 (1.4)	r 48 (1.5)	r 45 (1.5)	r 34 (1.3)	r 63 (1.2)
Bosnia and Herzegovina	65 (1.1)	79 (1.0)	54 (1.3)	38 (1.2)	36 (1.2)	31 (1.1)	67 (1.0)
Bulgaria	49 (1.7)	r 74 (1.4)	r 48 (1.9)	r 39 (1.8)	r 38 (1.9)	r 34 (1.7)	r 53 (1.6)
Cyprus	82 (0.7)	81 (0.7)	78 (0.7)	67 (0.9)	66 (0.8)	49 (1.1)	65 (0.9)
Czech Republic	46 (1.4)	78 (1.1)	52 (1.5)	26 (1.1)	34 (1.1)	27 (1.3)	49 (1.2)
Georgia	53 (1.4)	71 (1.2)	65 (1.5)	28 (1.1)	25 (1.3)	34 (1.7)	54 (1.4)
Hungary	65 (1.8)	78 (1.3)	68 (1.9)	54 (1.7)	57 (1.9)	20 (1.6)	60 (1.4)
Indonesia	53 (1.4)	55 (1.2)	68 (1.2)	36 (1.4)	35 (1.4)	43 (1.6)	51 (1.3)
Lebanon	77 (1.2)	78 (1.2)	75 (1.2)	60 (1.1)	58 (1.5)	48 (1.3)	71 (1.2)
Lithuania	30 (1.3)	58 (1.2)	34 (1.6)	19 (0.8)	21 (1.1)	16 (0.7)	47 (1.3)
Malta	60 (0.7)	61 (0.7)	58 (0.7)	47 (0.7)	49 (0.7)	45 (0.6)	52 (0.8)
Romania	62 (1.4)	69 (1.3)	67 (1.9)	48 (1.7)	46 (1.6)	36 (1.6)	53 (1.3)
Russian Federation	59 (1.6)	88 (0.7)	63 (1.6)	43 (1.4)	40 (1.3)	36 (1.3)	58 (1.0)
Serbia	49 (1.3)	68 (1.3)	38 (1.7)	23 (1.3)	23 (1.2)	20 (1.1)	54 (1.2)
Slovenia	60 (1.3)	77 (1.0)	61 (1.3)	47 (1.3)	49 (1.3)	32 (1.3)	62 (1.1)
Sweden	52 (1.1)	48 (1.2)	53 (1.2)	44 (1.2)	52 (1.2)	49 (1.3)	38 (1.3)
Syrian Arab Republic	76 (1.0)	76 (0.8)	82 (0.9)	59 (1.2)	56 (1.1)	51 (1.2)	61 (1.0)
Ukraine	63 (1.3)	90 (0.6)	66 (1.3)	53 (1.4)	56 (1.3)	40 (1.2)	63 (1.1)
‡ Morocco	82 (1.2)	r 81 (1.3)	86 (1.0)	r 63 (1.7)	r 57 (1.8)	r 44 (1.7)	r 66 (1.4)
International Avg.	61 (0.3)	73 (0.2)	63 (0.3)	45 (0.3)	45 (0.3)	37 (0.3)	58 (0.3)

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



Exhibit 7.5 Teachers' Reports on Students Doing Science Investigations

TIMSS2007
Science 4th Grade

Country	Percentage of Students Whose Teachers Reported Students Doing the Activity About Half of the Lessons or More						
	Observe Natural Phenomena such as the Weather or a Plant Growing and Describe What They See	Give Explanations About Something They Are Studying	Watch Me Do a Science Experiment	Design or Plan Experiments or Investigations	Do Experiments or Investigations	Work Together in Small Groups on Experiments or Investigations	Relate What Students Are Learning in Science to Their Daily Lives
Algeria	20 (4.7)	88 (2.8)	43 (4.9)	17 (3.3)	24 (3.7)	28 (3.7)	75 (5.0)
Armenia	70 (3.4)	59 (4.0)	56 (3.9)	56 (4.5)	62 (3.7)	65 (4.0)	62 (3.7)
Australia	16 (2.4)	48 (3.1)	11 (2.7)	18 (2.9)	29 (3.3)	38 (3.5)	57 (3.5)
Austria	9 (1.9)	58 (3.1)	3 (1.0)	2 (0.9)	6 (1.6)	12 (2.3)	71 (2.9)
Chinese Taipei	21 (3.1)	59 (4.0)	37 (4.2)	44 (4.2)	64 (4.2)	69 (4.1)	65 (3.9)
Colombia	46 (5.0)	89 (3.3)	31 (4.6)	31 (4.7)	34 (4.8)	38 (3.8)	92 (2.4)
Czech Republic	21 (3.6)	82 (2.9)	9 (2.0)	3 (1.4)	7 (2.1)	7 (2.3)	89 (2.8)
Denmark	r 18 (3.1)	r 41 (4.0)	r 8 (2.4)	r 15 (3.3)	r 50 (4.6)	r 55 (4.7)	r 45 (4.6)
El Salvador	30 (3.9)	74 (3.9)	7 (2.4)	11 (2.7)	15 (3.2)	21 (3.6)	82 (3.2)
England	25 (3.6)	72 (3.5)	10 (2.5)	53 (4.0)	58 (3.9)	61 (4.0)	70 (3.5)
Georgia	32 (3.7)	86 (4.3)	17 (3.4)	11 (2.5)	8 (2.1)	19 (3.3)	74 (4.6)
Germany	12 (2.2)	64 (3.1)	3 (1.1)	7 (1.7)	14 (2.4)	19 (2.6)	70 (2.7)
Hong Kong SAR	7 (2.2)	65 (4.5)	6 (2.1)	4 (1.6)	6 (2.2)	11 (2.9)	65 (4.2)
Hungary	18 (3.0)	70 (4.0)	8 (2.0)	6 (1.9)	6 (1.7)	10 (2.3)	82 (3.5)
Iran, Islamic Rep. of	49 (4.2)	73 (3.3)	66 (3.6)	58 (4.3)	68 (3.8)	62 (3.9)	80 (2.6)
Italy	29 (3.1)	91 (1.9)	23 (2.5)	25 (2.7)	31 (3.1)	22 (2.7)	72 (3.0)
Japan	64 (3.3)	61 (4.2)	36 (4.0)	56 (3.8)	86 (2.6)	82 (3.0)	54 (4.2)
Kazakhstan	52 (5.3)	99 (0.7)	18 (3.9)	15 (3.6)	15 (4.1)	19 (4.2)	98 (0.9)
Kuwait	r 18 (3.0)	r 77 (3.9)	r 75 (3.9)	r 31 (4.0)	r 45 (4.5)	r 62 (4.2)	r 91 (2.3)
Latvia	43 (3.8)	75 (3.5)	34 (4.2)	47 (4.2)	56 (4.2)	42 (4.3)	96 (1.6)
Lithuania	25 (3.2)	44 (3.6)	9 (2.3)	6 (1.6)	4 (1.4)	16 (2.6)	83 (2.7)
Morocco	21 (3.6)	83 (2.9)	54 (3.8)	32 (4.4)	34 (4.0)	41 (4.3)	79 (3.8)
Netherlands	8 (2.5)	39 (4.0)	4 (1.9)	3 (1.5)	11 (3.2)	16 (3.5)	54 (4.7)
New Zealand	14 (1.9)	57 (3.0)	5 (1.4)	22 (2.6)	31 (2.8)	46 (3.1)	52 (3.0)
Norway	11 (2.6)	30 (3.7)	2 (0.9)	3 (1.1)	5 (1.6)	7 (1.8)	42 (3.9)
Qatar	r 27 (0.1)	r 79 (0.2)	r 64 (0.2)	r 41 (0.1)	46 (0.2)	r 68 (0.2)	r 91 (0.1)
Russian Federation	45 (4.0)	96 (0.7)	20 (2.7)	10 (1.7)	13 (2.1)	26 (3.2)	90 (2.2)
Scotland	r 18 (3.0)	r 62 (4.3)	r 16 (3.1)	r 24 (3.6)	r 46 (4.2)	r 54 (4.8)	r 66 (3.8)
Singapore	15 (2.0)	76 (2.2)	36 (2.4)	13 (1.6)	49 (3.0)	48 (2.5)	69 (2.4)
Slovak Republic	47 (3.9)	69 (3.5)	28 (3.0)	21 (3.2)	28 (3.5)	19 (2.7)	89 (2.4)
Slovenia	34 (2.9)	82 (2.5)	21 (2.4)	17 (2.3)	39 (3.2)	31 (2.8)	90 (1.9)
Sweden	12 (2.8)	36 (3.4)	5 (1.7)	12 (2.5)	24 (3.2)	29 (3.5)	50 (3.5)
Tunisia	36 (4.1)	72 (3.9)	58 (3.8)	48 (4.5)	58 (4.2)	59 (4.2)	74 (3.4)
Ukraine	82 (3.3)	96 (1.6)	26 (3.4)	14 (2.8)	14 (2.8)	26 (3.5)	90 (2.5)
United States	28 (2.6)	78 (2.3)	16 (2.2)	20 (2.5)	44 (2.9)	52 (2.8)	76 (2.2)
Yemen	13 (3.2)	64 (4.1)	37 (4.5)	24 (4.3)	16 (3.3)	23 (4.1)	77 (3.7)
International Avg.	29 (0.6)	69 (0.6)	25 (0.5)	23 (0.5)	32 (0.5)	36 (0.6)	74 (0.5)
Benchmarking Participants							
Alberta, Canada	27 (3.4)	68 (3.5)	18 (2.6)	29 (4.2)	53 (3.9)	58 (3.8)	75 (3.6)
British Columbia, Canada	r 28 (4.2)	r 63 (4.2)	r 17 (4.0)	r 13 (2.7)	r 28 (4.1)	r 33 (3.2)	r 61 (4.4)
Dubai, UAE	s 51 (4.8)	s 88 (2.2)	s 60 (4.5)	s 66 (4.2)	s 67 (4.5)	s 60 (4.9)	s 96 (1.1)
Massachusetts, US	30 (6.1)	71 (6.8)	r 17 (3.9)	36 (6.4)	56 (7.4)	63 (7.0)	74 (5.3)
Minnesota, US	36 (7.0)	74 (5.2)	14 (4.3)	23 (7.1)	65 (6.7)	74 (5.9)	73 (7.7)
Ontario, Canada	21 (4.3)	69 (4.6)	19 (3.9)	20 (4.1)	48 (5.4)	56 (4.5)	72 (3.6)
Quebec, Canada	16 (3.4)	59 (3.8)	16 (3.3)	28 (4.0)	45 (4.1)	47 (4.3)	57 (4.0)

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 7.5 Teachers' Reports on Students Doing Science Investigations (Continued)

TIMSS2007
Science 8th Grade

General/Integrated Science

Country	Percentage of Students Whose Teachers Reported Students Doing the Activity About Half of the Lessons or More						
	Observe Natural Phenomena and Describe What They See	Give Explanations About Something They Are Studying	Watch Me Demonstrate an Experiment or Investigation	Design or Plan Experiments or Investigations	Conduct Experiments or Investigations	Work Together in Small Groups on Experiments or Investigations	Relate What Students Are Learning in Science to Their Daily Lives
Australia	24 (3.6)	68 (2.7)	15 (2.7)	16 (2.4)	67 (3.3)	60 (3.5)	73 (3.1)
Bahrain	36 (2.4)	67 (3.1)	62 (2.5)	17 (2.4)	33 (3.0)	42 (3.1)	80 (2.9)
Botswana	23 (3.7)	75 (3.9)	39 (4.0)	22 (4.2)	36 (4.9)	48 (4.7)	88 (2.9)
Chinese Taipei	26 (3.9)	57 (3.9)	16 (3.0)	10 (2.4)	12 (2.7)	9 (2.5)	62 (4.1)
Colombia	54 (5.0)	87 (2.3)	22 (3.8)	32 (3.8)	34 (4.3)	45 (4.8)	92 (2.5)
Egypt	43 (4.2)	72 (3.3)	73 (4.0)	24 (3.4)	31 (3.7)	47 (4.0)	86 (2.4)
El Salvador	41 (4.3)	79 (3.4)	16 (3.0)	21 (3.5)	20 (3.7)	37 (3.9)	81 (3.6)
England	32 (3.1)	84 (2.1)	47 (3.5)	24 (3.2)	70 (2.9)	73 (2.8)	80 (2.5)
Ghana	48 (4.0)	89 (2.6)	57 (4.2)	44 (3.9)	40 (3.6)	33 (4.0)	89 (2.5)
Hong Kong SAR	21 (3.7)	66 (4.3)	19 (3.8)	13 (3.0)	70 (4.5)	67 (3.8)	63 (4.7)
Iran, Islamic Rep. of	41 (3.9)	73 (3.6)	64 (3.4)	52 (3.6)	62 (3.9)	45 (3.5)	79 (3.3)
Israel	26 (3.4)	83 (3.1)	50 (4.0)	30 (3.7)	31 (4.0)	25 (3.9)	82 (3.4)
Italy	48 (3.0)	89 (2.0)	8 (1.6)	8 (1.6)	9 (1.7)	9 (1.6)	69 (2.8)
Japan	42 (4.2)	30 (3.7)	28 (3.9)	18 (3.2)	68 (4.2)	69 (4.0)	47 (4.4)
Jordan	45 (4.2)	68 (3.8)	77 (3.5)	37 (3.7)	59 (4.2)	56 (3.8)	84 (3.4)
Korea, Rep. of	37 (3.7)	81 (3.1)	34 (3.6)	22 (3.3)	39 (4.2)	33 (3.5)	84 (3.3)
Kuwait	r 36 (4.2)	r 72 (4.7)	r 77 (4.3)	r 34 (4.4)	r 47 (4.3)	r 67 (4.6)	r 84 (3.2)
Malaysia	38 (3.7)	84 (3.0)	25 (3.1)	32 (4.0)	53 (4.1)	61 (4.1)	83 (3.0)
Norway	8 (2.1)	29 (3.2)	10 (1.9)	14 (2.3)	28 (3.4)	30 (3.6)	54 (3.5)
Oman	28 (3.7)	58 (4.1)	54 (4.5)	40 (4.3)	47 (3.7)	66 (4.0)	82 (3.6)
Palestinian Nat'l Auth.	51 (4.3)	65 (4.1)	76 (3.3)	43 (4.0)	47 (3.9)	42 (3.8)	87 (2.7)
Qatar	18 (0.1)	60 (0.2)	56 (0.2)	32 (0.1)	48 (0.2)	63 (0.2)	76 (0.1)
Saudi Arabia	46 (4.8)	63 (4.8)	58 (4.4)	19 (3.6)	34 (4.4)	40 (4.5)	86 (3.2)
Scotland	r 28 (2.8)	r 79 (2.6)	r 28 (2.7)	r 24 (2.6)	r 83 (2.1)	r 87 (1.8)	r 78 (2.3)
Singapore	21 (2.4)	73 (2.1)	20 (2.3)	6 (1.4)	40 (2.5)	34 (2.3)	76 (2.3)
^a Sweden	19 (2.7)	65 (2.8)	28 (3.3)	21 (3.1)	66 (3.1)	67 (3.0)	81 (3.0)
Thailand	34 (4.0)	80 (3.6)	35 (3.8)	51 (3.9)	67 (3.9)	81 (2.8)	84 (3.1)
Tunisia	59 (4.0)	79 (3.8)	70 (4.0)	50 (4.0)	62 (3.7)	79 (3.2)	79 (3.7)
Turkey	51 (4.5)	79 (3.5)	54 (4.6)	36 (4.1)	50 (4.1)	30 (3.7)	89 (3.0)
United States	30 (2.9)	80 (2.1)	23 (2.2)	24 (2.9)	48 (3.2)	61 (3.3)	80 (2.3)
International Avg.	35 (0.7)	71 (0.6)	41 (0.6)	27 (0.6)	47 (0.7)	50 (0.6)	79 (0.6)
Benchmarking Participants							
Basque Country, Spain	38 (4.9)	88 (3.3)	5 (1.9)	5 (2.0)	4 (1.6)	12 (2.5)	86 (3.4)
British Columbia, Canada	r 24 (3.7)	r 75 (3.9)	r 30 (3.9)	r 7 (2.0)	r 41 (4.7)	r 41 (4.5)	r 72 (4.3)
Dubai, UAE	s 63 (2.9)	s 88 (3.8)	s 48 (5.7)	s 37 (3.7)	s 52 (4.3)	s 55 (3.6)	s 88 (3.1)
Massachusetts, US	38 (6.2)	76 (6.8)	19 (5.1)	19 (4.7)	47 (6.8)	59 (6.6)	75 (5.2)
Minnesota, US	37 (6.2)	78 (5.8)	13 (4.8)	8 (3.7)	51 (8.5)	67 (8.1)	69 (6.5)
Ontario, Canada	19 (3.8)	71 (4.5)	18 (3.4)	21 (3.9)	38 (4.2)	49 (4.6)	74 (4.3)
Quebec, Canada	28 (3.9)	60 (4.5)	22 (4.2)	35 (4.4)	56 (5.6)	45 (5.4)	66 (4.6)

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

Background data provided by teachers.

^a Sweden: Summarizes reports from physics, biology, and chemistry teachers as well as integrated/general science teachers.

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

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

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

Exhibit 7.5 Teachers' Reports on Students Doing Science Investigations (Continued)

TIMSS2007
Science 8th Grade

Biology

Country	Percentage of Students Whose Teachers Reported Students Doing the Activity About Half of the Lessons or More						
	Observe Natural Phenomena and Describe What They See	Give Explanations About Something They Are Studying	Watch Me Demonstrate an Experiment or Investigation	Design or Plan Experiments or Investigations	Conduct Experiments or Investigations	Work Together in Small Groups on Experiments or Investigations	Relate What Students Are Learning in Science to Their Daily Lives
b Algeria	37 (4.1)	90 (2.7)	59 (4.3)	22 (3.9)	36 (4.0)	71 (3.6)	81 (3.7)
Armenia	56 (4.6)	62 (4.2)	50 (4.3)	56 (4.4)	56 (4.4)	58 (4.6)	65 (4.1)
Bosnia and Herzegovina	30 (3.7)	75 (3.7)	33 (3.5)	12 (2.3)	9 (2.3)	22 (3.3)	85 (2.9)
Bulgaria	37 (5.0)	97 (1.8)	25 (4.2)	8 (2.8)	12 (3.5)	18 (3.3)	95 (2.3)
Cyprus	--	--	--	--	--	--	--
Czech Republic	34 (3.8)	74 (3.4)	12 (2.8)	2 (1.1)	11 (2.6)	5 (1.7)	89 (2.7)
Georgia	37 (5.5)	84 (3.9)	31 (4.8)	15 (4.6)	11 (3.1)	26 (4.4)	89 (3.4)
Hungary	12 (2.8)	78 (3.4)	11 (2.6)	4 (1.6)	7 (2.2)	8 (2.3)	92 (2.3)
c Indonesia	24 (3.0)	87 (2.8)	44 (3.8)	21 (4.0)	31 (4.4)	45 (3.9)	79 (3.6)
Lebanon	50 (5.1)	77 (4.5)	39 (4.6)	38 (4.4)	34 (4.4)	32 (4.1)	82 (4.2)
Lithuania	12 (2.3)	51 (3.7)	5 (1.2)	5 (1.9)	6 (1.9)	10 (1.9)	89 (2.5)
d Malta	26 (0.9)	74 (0.9)	5 (0.4)	7 (0.4)	28 (0.9)	25 (0.9)	84 (0.7)
Romania	58 (4.0)	84 (2.7)	29 (3.9)	18 (2.7)	14 (2.5)	33 (3.4)	91 (2.1)
Russian Federation	25 (3.0)	95 (1.4)	16 (2.5)	12 (2.2)	15 (2.9)	20 (3.2)	94 (1.7)
Serbia	23 (3.3)	81 (3.3)	17 (3.3)	5 (1.8)	4 (1.5)	14 (2.8)	84 (3.0)
Slovenia	49 (3.9)	50 (4.0)	11 (2.6)	8 (2.4)	8 (2.1)	10 (2.2)	84 (3.0)
f Syrian Arab Republic	31 (4.2)	80 (3.7)	69 (3.9)	14 (3.2)	25 (4.1)	20 (4.0)	85 (3.6)
Ukraine	23 (3.6)	95 (1.6)	19 (3.2)	16 (3.2)	15 (2.9)	22 (3.2)	97 (1.2)
e ‡ Morocco	49 (5.8)	81 (5.1)	54 (6.2)	25 (4.0)	r 33 (5.9)	39 (6.1)	74 (5.6)
International Avg.	34 (0.9)	79 (0.8)	29 (0.9)	16 (0.7)	20 (0.8)	26 (0.8)	85 (0.7)

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

Earth Science

Country	Percentage of Students Whose Teachers Reported Students Doing the Activity About Half of the Lessons or More						
	Observe Natural Phenomena and Describe What They See	Give Explanations About Something They Are Studying	Watch Me Demonstrate an Experiment or Investigation	Design or Plan Experiments or Investigations	Conduct Experiments or Investigations	Work Together in Small Groups on Experiments or Investigations	Relate What Students Are Learning in Science to Their Daily Lives
b Algeria	--	--	--	--	--	--	--
Armenia	49 (4.7)	56 (4.7)	43 (4.5)	40 (4.5)	39 (4.2)	43 (4.0)	64 (3.9)
Bosnia and Herzegovina	14 (2.8)	71 (3.8)	29 (3.9)	10 (2.5)	5 (1.7)	23 (3.9)	73 (3.6)
Bulgaria	30 (4.5)	94 (2.2)	3 (1.8)	6 (2.3)	6 (2.7)	18 (3.8)	93 (2.3)
Cyprus	r 47 (1.9)	r 76 (1.4)	r 19 (1.0)	s 15 (0.6)	s 15 (1.0)	r 23 (1.8)	r 93 (0.7)
Czech Republic	10 (2.2)	79 (3.6)	r 4 (1.7)	r 1 (0.8)	r 1 (0.8)	r 5 (1.7)	r 85 (3.0)
Georgia	39 (5.3)	83 (4.8)	25 (4.3)	12 (3.4)	12 (3.4)	23 (4.0)	81 (5.3)
Hungary	15 (3.0)	77 (4.1)	8 (2.4)	4 (1.6)	3 (1.3)	6 (1.8)	89 (2.8)
c Indonesia	--	--	--	--	--	--	--
Lebanon	--	--	--	--	--	--	--
Lithuania	7 (2.1)	45 (3.6)	2 (1.1)	2 (0.8)	3 (1.3)	8 (2.1)	84 (3.0)
d Malta	23 (0.4)	89 (0.3)	7 (0.2)	8 (0.2)	8 (0.3)	10 (0.2)	85 (0.3)
Romania	50 (4.4)	83 (3.2)	25 (3.3)	14 (3.1)	14 (2.9)	32 (3.6)	83 (3.4)
Russian Federation	21 (2.8)	94 (1.9)	10 (2.2)	10 (2.2)	12 (2.7)	21 (2.6)	85 (3.1)
Serbia	14 (2.6)	79 (3.7)	26 (4.2)	6 (1.8)	6 (1.8)	11 (2.1)	80 (3.1)
Slovenia	--	--	--	--	--	--	--
f Syrian Arab Republic	--	--	--	--	--	--	--
Ukraine	28 (4.1)	96 (1.7)	9 (2.5)	21 (3.7)	16 (3.6)	28 (4.2)	92 (2.3)
e ‡ Morocco	--	--	--	--	--	--	--
International Avg.	27 (0.9)	79 (0.9)	16 (0.8)	11 (0.7)	11 (0.7)	19 (0.8)	84 (0.9)

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

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

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

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

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

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



Exhibit 7.5 Teachers' Reports on Students Doing Science Investigations (Continued)

TIMSS2007
Science 8th Grade

Chemistry

Country	Percentage of Students Whose Teachers Reported Students Doing the Activity About Half of the Lessons or More						
	Observe Natural Phenomena and Describe What They See	Give Explanations About Something They Are Studying	Watch Me Demonstrate an Experiment or Investigation	Design or Plan Experiments or Investigations	Conduct Experiments or Investigations	Work Together in Small Groups on Experiments or Investigations	Relate What Students Are Learning in Science to Their Daily Lives
^b Algeria	--	--	--	--	--	--	--
Armenia	47 (4.2)	55 (4.8)	48 (4.2)	45 (4.3)	45 (4.8)	53 (4.5)	52 (4.4)
Bosnia and Herzegovina	28 (3.7)	75 (3.4)	35 (3.9)	12 (1.9)	9 (2.2)	15 (2.9)	80 (3.2)
Bulgaria	34 (5.0)	99 (0.9)	46 (5.0)	12 (3.1)	15 (3.6)	20 (3.5)	93 (2.4)
Cyprus	^r 39 (1.1)	^r 77 (1.3)	^r 60 (1.6)	^r 22 (1.1)	^r 34 (1.8)	^r 44 (1.5)	^r 81 (1.7)
Czech Republic	46 (4.6)	70 (3.5)	48 (4.2)	5 (1.7)	13 (2.9)	10 (2.4)	91 (2.5)
Georgia	37 (5.8)	82 (5.3)	38 (5.4)	11 (3.5)	12 (3.4)	21 (4.6)	77 (4.9)
Hungary	12 (3.0)	80 (3.3)	74 (3.8)	11 (2.8)	18 (3.0)	9 (2.4)	94 (1.6)
^c Indonesia	--	--	--	--	--	--	--
Lebanon	50 (4.9)	75 (4.3)	51 (4.4)	44 (4.2)	49 (4.5)	29 (4.1)	85 (3.4)
Lithuania	9 (2.4)	51 (4.2)	29 (4.1)	8 (2.4)	11 (2.6)	10 (2.3)	74 (3.2)
^d Malta	15 (0.8)	57 (1.1)	15 (0.8)	11 (0.7)	31 (1.2)	23 (0.9)	59 (1.2)
Romania	65 (4.0)	90 (2.5)	58 (4.3)	16 (2.7)	26 (4.0)	34 (4.2)	92 (2.1)
Russian Federation	18 (2.3)	95 (1.6)	72 (3.4)	20 (3.2)	27 (3.6)	26 (3.9)	80 (2.3)
Serbia	21 (3.6)	83 (3.3)	36 (4.5)	8 (3.0)	6 (2.8)	6 (2.0)	78 (3.6)
Slovenia	35 (3.8)	61 (4.1)	49 (3.7)	10 (2.7)	15 (3.3)	11 (2.8)	78 (3.5)
^f Syrian Arab Republic	--	--	--	--	--	--	--
Ukraine	28 (3.5)	97 (1.3)	62 (4.0)	25 (3.5)	21 (3.5)	16 (3.0)	88 (2.9)
^e [‡] Morocco	--	--	--	--	--	--	--
International Avg.	32 (1.0)	76 (0.8)	48 (1.0)	17 (0.7)	22 (0.8)	22 (0.8)	80 (0.8)

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

Physics

Country	Percentage of Students Whose Teachers Reported Students Doing the Activity About Half of the Lessons or More						
	Observe Natural Phenomena and Describe What They See	Give Explanations About Something They Are Studying	Watch Me Demonstrate an Experiment or Investigation	Design or Plan Experiments or Investigations	Conduct Experiments or Investigations	Work Together in Small Groups on Experiments or Investigations	Relate What Students Are Learning in Science to Their Daily Lives
^b Algeria	^r 41 (5.0)	^r 87 (3.2)	^r 77 (3.7)	^r 33 (5.2)	^r 56 (4.8)	^r 71 (4.3)	^r 77 (4.1)
Armenia	51 (5.6)	54 (5.1)	44 (4.9)	48 (4.9)	45 (4.9)	51 (5.6)	43 (5.0)
Bosnia and Herzegovina	29 (3.9)	84 (3.0)	37 (3.6)	9 (2.0)	9 (2.1)	13 (2.5)	84 (3.2)
Bulgaria	55 (5.0)	99 (0.8)	57 (5.3)	12 (2.4)	19 (3.7)	16 (3.6)	95 (2.2)
Cyprus	84 (1.4)	^r 92 (1.3)	^r 76 (1.7)	32 (2.0)	^r 40 (2.1)	61 (2.0)	95 (0.9)
Czech Republic	56 (4.5)	83 (2.8)	63 (4.1)	14 (2.6)	20 (3.1)	20 (3.1)	90 (2.6)
Georgia	41 (4.8)	97 (1.4)	44 (4.9)	29 (4.8)	29 (5.4)	38 (4.3)	91 (3.0)
Hungary	18 (3.3)	85 (2.9)	76 (3.3)	9 (2.5)	23 (3.4)	15 (3.1)	95 (2.0)
^c Indonesia	25 (3.2)	89 (2.6)	47 (4.0)	19 (3.0)	31 (3.9)	36 (4.1)	78 (3.7)
Lebanon	53 (4.7)	80 (4.2)	48 (4.7)	42 (4.1)	41 (4.4)	30 (4.0)	83 (4.1)
Lithuania	17 (2.7)	52 (4.4)	56 (4.2)	7 (2.0)	9 (2.4)	10 (2.3)	92 (2.3)
^d Malta	40 (0.5)	69 (0.5)	38 (0.5)	16 (0.3)	39 (0.5)	32 (0.5)	82 (0.3)
Romania	73 (4.1)	90 (2.5)	65 (4.3)	14 (2.9)	29 (4.0)	33 (3.8)	92 (2.0)
Russian Federation	30 (3.8)	96 (1.3)	70 (3.3)	11 (2.1)	15 (2.8)	20 (3.3)	81 (3.1)
Serbia	29 (4.1)	77 (3.5)	42 (4.2)	6 (2.0)	9 (2.6)	6 (1.9)	88 (2.6)
Slovenia	63 (3.9)	58 (4.3)	58 (4.2)	14 (3.1)	16 (2.8)	14 (2.6)	86 (2.7)
^f Syrian Arab Republic	35 (3.8)	79 (3.6)	69 (4.1)	19 (3.9)	30 (4.3)	19 (3.6)	81 (3.6)
Ukraine	43 (4.1)	97 (1.3)	72 (3.9)	22 (3.5)	27 (4.1)	22 (3.2)	87 (2.5)
^e [‡] Morocco	^r 41 (4.6)	^r 75 (4.6)	^r 80 (4.1)	^r 28 (5.2)	^r 40 (5.7)	^r 27 (5.0)	^r 88 (2.9)
International Avg.	43 (0.9)	81 (0.7)	59 (0.9)	20 (0.8)	28 (0.9)	28 (0.8)	85 (0.7)

^b Algeria: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
^c Indonesia: Data reported in biology and physics panels include data from integrated/general science teachers.
^d Malta: Data reported in earth science panel include data from environmental studies teachers.

^e Morocco: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
^f Syrian Arab Republic: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
[‡] Did not satisfy guidelines for sample participation rates (see Appendix A).

How Are Different Learning Activities Emphasized in Science Lessons?

In addition to classroom activities related to scientific inquiry, TIMSS asked students and teachers about how often students were asked to engage in various other learning activities in science class, including reading science textbooks, memorizing science facts and procedures and using scientific formulas and laws to solve problems (eighth grade only). The percentages of students reporting that they did the activity in science lessons *at least once a week, once or twice a month, and rarely or never* are presented in Exhibit 7.6, whereas Exhibit 7.7 shows the percentages of students whose teachers reported asking them to do the activity in *every or almost every lesson, about half the lessons, and some lessons or never*. At the fourth grade, students reported about equal emphasis on reading in class and memorizing science facts, with 43 and 44 percent, respectively, reporting that they performed these activities at least once a week. At eighth grade, students in single-science countries reported about equal emphasis on reading textbooks, memorizing science facts and procedures, and using scientific formulas and laws to solve problems (32–37% of students, on average, reported doing these in every or almost every lesson). In the separate science countries, students reported more emphasis in chemistry and physics classes on using scientific formulas and laws to solve problems than in biology and earth science.

Fourth-grade teachers (Exhibit 7.7) reported relatively more emphasis on reading textbooks and less on memorizing facts and procedures, whereas at eighth grade (in single-science countries), teachers spread their emphasis equally across textbook reading, memorization, and applying formulas and laws to solve problems. In line with students' reports, teachers in countries teaching the sciences as separate subjects placed relatively more emphasis in chemistry and physics classes than in biology and earth science classes on using formulas and laws to solve science problems.

Exhibit 7.6 Students' Reports on Learning Activities in Science Lessons

TIMSS2007
Science 4th Grade

Country	Percentage of Students Who Reported					
	Reading Books About Science			Memorizing Science Facts		
	At Least Once a Week	Once or Twice a Month	Rarely or Never	At Least Once a Week	Once or Twice a Month	Rarely or Never
Australia	25 (1.1)	30 (1.1)	46 (1.2)	32 (1.3)	32 (1.1)	36 (1.4)
Austria	39 (1.0)	28 (0.9)	33 (0.9)	42 (1.1)	29 (0.9)	29 (0.9)
Chinese Taipei	40 (1.1)	32 (0.8)	28 (0.9)	53 (1.1)	28 (0.7)	19 (0.9)
Colombia	65 (1.2)	19 (0.8)	16 (0.8)	45 (1.2)	26 (0.7)	29 (1.2)
Czech Republic	40 (1.0)	23 (1.0)	37 (1.1)	58 (1.1)	22 (0.9)	19 (0.8)
Denmark	19 (1.6)	28 (1.3)	53 (1.9)	30 (1.4)	36 (1.1)	34 (1.5)
El Salvador	66 (1.2)	19 (0.9)	14 (0.8)	34 (1.2)	26 (0.9)	40 (1.6)
England	27 (1.2)	30 (1.2)	43 (1.6)	42 (1.3)	32 (1.0)	25 (1.0)
Georgia	68 (1.5)	16 (1.0)	16 (1.2)	69 (1.5)	18 (1.0)	14 (1.0)
Germany	31 (0.9)	31 (0.8)	39 (0.9)	19 (0.8)	29 (0.9)	52 (1.1)
Hong Kong SAR	29 (1.0)	33 (0.9)	37 (1.2)	42 (1.2)	31 (0.9)	26 (1.1)
Hungary	34 (1.0)	26 (1.0)	40 (1.1)	46 (1.3)	26 (0.9)	27 (1.1)
Iran, Islamic Rep. of	45 (1.5)	23 (1.0)	32 (1.9)	52 (1.9)	23 (1.6)	25 (1.6)
Italy	46 (1.1)	24 (0.8)	30 (1.1)	47 (1.3)	21 (0.9)	32 (1.3)
Japan	10 (0.6)	16 (0.8)	75 (1.1)	20 (0.9)	30 (1.1)	51 (1.5)
Kazakhstan	74 (2.2)	17 (1.4)	10 (1.3)	57 (2.6)	27 (1.9)	17 (2.0)
Kuwait	61 (1.2)	22 (1.0)	17 (0.9)	66 (1.4)	19 (1.0)	16 (0.8)
Latvia	46 (1.2)	26 (1.0)	28 (1.1)	44 (1.3)	31 (1.1)	25 (1.1)
Lithuania	45 (1.1)	28 (0.8)	27 (1.1)	56 (1.1)	28 (0.9)	16 (0.8)
Morocco	46 (1.8)	21 (1.2)	33 (2.2)	47 (2.0)	25 (1.2)	29 (1.9)
Netherlands	20 (1.1)	16 (1.0)	65 (1.4)	15 (0.8)	23 (1.3)	62 (1.5)
New Zealand	29 (0.9)	29 (0.7)	41 (0.9)	30 (0.9)	30 (0.7)	40 (0.9)
Norway	28 (1.2)	26 (0.9)	45 (1.3)	22 (1.0)	26 (0.9)	52 (1.2)
Qatar	53 (0.6)	24 (0.6)	22 (0.6)	54 (0.6)	22 (0.5)	23 (0.6)
Russian Federation	67 (1.7)	20 (1.3)	13 (1.0)	65 (2.2)	18 (1.3)	17 (2.1)
Scotland	25 (1.0)	28 (1.2)	46 (1.3)	31 (1.2)	30 (1.2)	39 (1.2)
Singapore	45 (0.9)	30 (0.7)	25 (0.9)	44 (0.9)	32 (0.7)	24 (0.8)
Slovak Republic	47 (1.3)	23 (1.0)	30 (1.4)	52 (1.6)	19 (0.8)	29 (1.4)
Slovenia	50 (1.2)	26 (0.7)	24 (1.1)	81 (0.8)	13 (0.7)	6 (0.4)
Sweden	18 (0.9)	29 (0.8)	53 (1.1)	15 (0.7)	31 (1.0)	54 (1.2)
Tunisia	57 (1.4)	21 (1.0)	22 (1.4)	61 (1.6)	21 (1.0)	18 (1.3)
Ukraine	56 (1.3)	35 (1.3)	8 (0.5)	39 (1.5)	31 (1.2)	29 (1.2)
United States	45 (0.8)	26 (0.6)	29 (0.6)	47 (0.7)	28 (0.6)	25 (0.6)
Yemen	r 30 (1.9)	r 20 (1.5)	r 50 (2.8)	r 34 (2.2)	r 25 (1.6)	r 41 (2.4)
International Avg.	43 (0.2)	25 (0.2)	33 (0.2)	44 (0.2)	26 (0.2)	30 (0.2)
Benchmarking Participants						
Alberta, Canada	32 (1.2)	32 (0.9)	36 (1.4)	45 (1.1)	34 (0.9)	20 (0.9)
British Columbia, Canada	38 (1.4)	33 (1.0)	29 (1.1)	40 (1.4)	33 (0.9)	27 (1.4)
Dubai, UAE	r 54 (1.2)	r 25 (0.9)	r 22 (1.0)	r 55 (1.4)	r 25 (1.2)	r 20 (1.0)
Massachusetts, US	35 (1.9)	34 (1.7)	31 (1.7)	41 (1.8)	33 (1.3)	26 (1.1)
Minnesota, US	29 (1.7)	29 (1.6)	41 (2.7)	41 (2.2)	30 (1.5)	29 (2.3)
Ontario, Canada	35 (1.4)	34 (1.3)	30 (1.3)	39 (1.8)	33 (1.3)	28 (1.5)
Quebec, Canada	28 (1.2)	28 (1.1)	43 (1.5)	19 (0.9)	28 (1.1)	53 (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 Science Lessons (Continued)

TIMSS2007
Science 8th Grade

General/Integrated Science

Country	Percentage of Students Who Reported									
	Reading Science Textbooks and Other Resource Materials			Memorizing Science Facts and Principles			Using Scientific Formulas and Laws to Solve Problems			
	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	
Australia	44 (2.0)	27 (1.1)	29 (1.8)	22 (1.0)	34 (1.0)	43 (1.3)	18 (1.1)	31 (1.0)	50 (1.1)	
Bahrain	31 (1.0)	22 (0.7)	47 (1.1)	49 (0.9)	25 (0.8)	26 (0.8)	36 (0.9)	25 (0.8)	39 (1.0)	
Botswana	56 (1.1)	18 (0.6)	25 (1.0)	24 (0.9)	26 (0.7)	50 (1.0)	37 (1.2)	20 (0.7)	44 (1.1)	
Chinese Taipei	24 (1.1)	23 (0.7)	52 (1.4)	22 (1.0)	30 (0.9)	48 (1.2)	24 (1.0)	31 (0.8)	45 (1.2)	
Colombia	36 (1.5)	24 (0.7)	40 (1.4)	35 (1.1)	29 (0.7)	36 (1.2)	37 (1.5)	23 (0.9)	40 (1.3)	
Egypt	40 (0.9)	25 (0.8)	35 (1.1)	56 (0.7)	25 (0.7)	19 (0.7)	49 (0.8)	27 (0.7)	24 (0.8)	
El Salvador	50 (1.5)	21 (0.8)	29 (1.4)	36 (1.1)	25 (0.8)	39 (1.1)	42 (1.2)	21 (0.7)	37 (1.3)	
England	28 (1.7)	31 (1.0)	41 (1.6)	19 (0.8)	32 (0.8)	49 (1.0)	16 (0.6)	35 (0.8)	49 (1.0)	
Ghana	57 (1.3)	21 (1.0)	22 (1.2)	38 (1.3)	31 (1.0)	31 (1.1)	46 (1.5)	22 (0.9)	31 (1.4)	
Hong Kong SAR	25 (1.1)	30 (1.0)	45 (1.1)	12 (0.8)	30 (0.9)	59 (1.3)	11 (0.7)	31 (0.9)	58 (1.2)	
Iran, Islamic Rep. of	36 (1.3)	30 (1.1)	35 (1.2)	36 (1.4)	29 (1.1)	35 (1.5)	43 (1.3)	31 (1.1)	26 (1.3)	
Israel	40 (1.3)	31 (1.0)	29 (1.0)	28 (1.0)	32 (0.9)	40 (1.1)	22 (1.0)	26 (1.1)	52 (1.4)	
Italy	52 (1.2)	23 (0.8)	25 (1.0)	29 (0.9)	26 (0.8)	44 (1.2)	26 (1.2)	21 (0.8)	53 (1.5)	
Japan	41 (1.3)	33 (0.8)	27 (1.3)	34 (0.9)	44 (0.8)	22 (0.9)	28 (0.9)	43 (0.7)	28 (1.0)	
Jordan	38 (1.3)	24 (0.9)	38 (1.2)	57 (1.5)	25 (0.8)	18 (1.1)	65 (1.3)	21 (0.8)	14 (0.8)	
Korea, Rep. of	26 (0.8)	31 (0.7)	43 (0.8)	17 (0.7)	33 (0.8)	50 (0.9)	20 (0.7)	34 (0.7)	46 (0.8)	
Kuwait	34 (0.9)	24 (0.8)	42 (1.1)	57 (0.9)	22 (0.7)	21 (0.7)	44 (0.9)	28 (0.9)	28 (0.8)	
Malaysia	35 (1.5)	35 (1.0)	31 (1.2)	24 (1.4)	35 (0.9)	41 (1.5)	24 (1.1)	36 (0.8)	40 (1.3)	
Norway	34 (1.0)	33 (0.8)	32 (1.1)	15 (0.6)	29 (0.7)	56 (0.9)	10 (0.5)	24 (0.7)	66 (0.9)	
Oman	30 (1.3)	30 (1.0)	40 (1.3)	48 (1.1)	30 (1.0)	22 (0.9)	39 (1.2)	28 (0.8)	33 (1.3)	
Palestinian Nat'l Auth.	28 (1.4)	24 (0.9)	48 (1.6)	46 (1.4)	27 (1.0)	27 (1.1)	42 (1.2)	30 (0.8)	28 (0.9)	
Qatar	29 (0.4)	28 (0.6)	44 (0.6)	44 (0.5)	28 (0.5)	28 (0.6)	39 (0.6)	31 (0.5)	30 (0.5)	
Saudi Arabia	26 (1.0)	22 (0.8)	53 (1.2)	45 (1.3)	22 (0.9)	32 (1.1)	33 (1.1)	25 (0.9)	42 (1.1)	
Scotland	40 (1.6)	31 (1.1)	30 (1.3)	25 (1.0)	34 (0.8)	41 (1.0)	22 (1.0)	32 (0.7)	46 (1.0)	
Singapore	41 (1.0)	34 (0.7)	25 (1.0)	36 (1.0)	36 (0.8)	27 (0.9)	32 (1.0)	37 (0.8)	31 (1.0)	
Thailand	23 (0.8)	40 (0.8)	37 (1.0)	25 (0.9)	42 (0.8)	34 (1.0)	19 (0.8)	37 (0.7)	44 (1.1)	
Tunisia	38 (1.2)	24 (0.8)	38 (1.1)	55 (1.1)	19 (0.8)	26 (0.9)	30 (1.2)	22 (0.8)	49 (1.2)	
Turkey	31 (1.2)	27 (0.8)	42 (1.4)	20 (1.0)	26 (0.8)	55 (1.3)	43 (1.2)	25 (0.9)	32 (1.2)	
United States	47 (1.3)	26 (0.7)	26 (1.1)	36 (1.0)	32 (0.7)	32 (0.9)	34 (1.0)	32 (0.8)	33 (1.0)	
International Avg.	37 (0.2)	27 (0.2)	36 (0.2)	34 (0.2)	30 (0.2)	36 (0.2)	32 (0.2)	29 (0.2)	39 (0.2)	
Benchmarking Participants										
Basque Country, Spain	60 (1.4)	19 (1.1)	21 (1.2)	30 (1.6)	31 (1.3)	39 (1.6)	40 (1.8)	29 (1.4)	32 (2.2)	
British Columbia, Canada	61 (1.5)	24 (0.8)	15 (1.2)	37 (1.1)	36 (0.8)	28 (0.9)	27 (1.1)	38 (0.8)	35 (1.2)	
Dubai, UAE	r 50 (1.3)	r 23 (0.9)	r 27 (0.9)	r 51 (1.3)	r 27 (1.0)	r 22 (1.1)	r 42 (1.0)	r 31 (1.2)	r 27 (1.0)	
Massachusetts, US	39 (2.9)	29 (1.7)	32 (3.2)	33 (1.6)	33 (1.1)	34 (1.7)	31 (1.5)	33 (1.3)	35 (1.9)	
Minnesota, US	45 (4.8)	28 (1.9)	28 (4.4)	28 (2.1)	33 (1.3)	39 (2.4)	22 (2.3)	35 (1.5)	43 (2.5)	
Ontario, Canada	54 (2.2)	28 (1.2)	18 (1.6)	33 (1.4)	36 (1.1)	32 (1.4)	27 (1.2)	37 (1.3)	35 (1.6)	
Quebec, Canada	29 (1.6)	35 (1.0)	36 (1.7)	14 (0.7)	28 (0.9)	58 (1.2)	12 (0.7)	29 (1.1)	59 (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.

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

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

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

TIMSS2007
Science 8th Grade

Biology

Country	Percentage of Students Who Reported								
	Reading Science Textbooks and Other Resource Materials			Memorizing Science Facts and Principles			Using Scientific Formulas and Laws to Solve Problems		
	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never
Algeria	25 (0.8)	22 (0.7)	53 (0.9)	40 (0.8)	24 (0.6)	36 (0.9)	24 (0.9)	21 (0.6)	54 (1.2)
Armenia	44 (1.1)	17 (0.8)	38 (1.2)	36 (1.2)	21 (0.9)	43 (1.1)	27 (1.3)	17 (0.9)	56 (1.4)
Bosnia and Herzegovina	52 (1.5)	20 (0.8)	29 (1.4)	49 (1.0)	24 (0.7)	27 (0.9)	25 (0.9)	16 (0.7)	59 (1.1)
Bulgaria	40 (1.5)	21 (1.2)	39 (1.3)	r 42 (1.9)	r 20 (0.9)	r 38 (1.7)	r 19 (1.2)	r 13 (1.0)	r 68 (1.6)
Cyprus	x x	x x	x x	x x	x x	x x	x x	x x	x x
Czech Republic	47 (2.2)	28 (1.0)	24 (1.8)	40 (1.2)	29 (0.7)	31 (1.2)	11 (0.7)	18 (0.8)	71 (1.1)
Georgia	43 (1.1)	20 (0.9)	37 (1.1)	52 (1.3)	19 (1.1)	30 (1.0)	24 (1.1)	16 (0.9)	60 (1.4)
Hungary	39 (1.6)	28 (1.0)	33 (1.5)	19 (1.2)	22 (0.8)	59 (1.4)	7 (0.6)	12 (0.6)	81 (1.0)
Indonesia	36 (1.2)	35 (0.8)	29 (1.1)	23 (0.9)	34 (0.9)	43 (1.2)	25 (1.4)	26 (0.8)	49 (1.5)
Lebanon	31 (1.2)	31 (0.9)	38 (1.3)	50 (1.6)	26 (1.3)	25 (1.3)	38 (1.6)	29 (1.1)	33 (1.8)
Lithuania	62 (1.2)	18 (0.9)	20 (0.9)	13 (0.8)	17 (0.8)	70 (1.1)	10 (0.6)	13 (0.8)	76 (1.1)
Malta	43 (1.0)	20 (1.0)	36 (1.0)	r 31 (1.0)	r 29 (1.1)	r 41 (1.1)	r 13 (0.8)	r 19 (1.0)	r 68 (1.2)
Romania	41 (1.5)	23 (1.1)	36 (1.3)	35 (1.3)	22 (0.8)	43 (1.5)	17 (1.2)	13 (0.8)	70 (1.4)
Russian Federation	57 (1.3)	23 (0.9)	20 (1.0)	42 (1.0)	26 (0.7)	32 (0.9)	13 (0.6)	13 (0.7)	74 (1.1)
Serbia	44 (1.6)	20 (0.8)	36 (1.3)	27 (1.3)	16 (0.7)	56 (1.5)	13 (0.8)	11 (0.7)	77 (1.1)
Slovenia	33 (1.4)	39 (1.2)	28 (1.4)	50 (0.9)	34 (0.9)	17 (0.8)	16 (0.7)	24 (0.9)	60 (1.2)
Sweden	37 (1.1)	33 (0.8)	30 (1.1)	14 (0.6)	27 (0.8)	59 (1.0)	9 (0.5)	22 (0.8)	69 (1.0)
Syrian Arab Republic	33 (1.0)	24 (0.7)	43 (1.2)	54 (1.2)	22 (0.9)	25 (0.9)	35 (1.0)	23 (0.9)	42 (1.3)
Ukraine	60 (1.1)	23 (0.7)	17 (0.9)	60 (1.4)	22 (0.9)	18 (1.1)	17 (0.8)	20 (0.9)	62 (1.3)
‡ Morocco	34 (1.3)	24 (1.3)	42 (1.4)	46 (1.6)	22 (1.2)	32 (1.2)	29 (1.4)	23 (0.7)	48 (1.4)
International Avg.	42 (0.3)	25 (0.2)	33 (0.3)	38 (0.3)	24 (0.2)	38 (0.3)	20 (0.2)	18 (0.2)	62 (0.3)

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

Earth Science

Country	Percentage of Students Who Reported								
	Reading Science Textbooks and Other Resource Materials			Memorizing Science Facts and Principles			Using Scientific Formulas and Laws to Solve Problems		
	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never
Algeria	r 29 (1.3)	r 26 (1.2)	r 45 (1.3)	r 41 (1.2)	r 25 (1.1)	r 34 (1.2)	r 28 (1.3)	r 25 (1.4)	r 47 (1.9)
Armenia	45 (1.2)	18 (0.7)	38 (1.0)	37 (1.0)	20 (0.8)	42 (1.3)	26 (1.3)	18 (1.0)	56 (1.6)
Bosnia and Herzegovina	56 (1.2)	17 (0.7)	27 (1.1)	49 (1.2)	20 (0.9)	30 (1.0)	22 (0.8)	12 (0.6)	66 (1.1)
Bulgaria	r 40 (1.7)	r 22 (1.1)	r 39 (1.6)	r 39 (1.9)	r 21 (0.9)	r 40 (1.7)	r 16 (1.0)	r 13 (1.0)	r 71 (1.5)
Cyprus	40 (0.9)	22 (0.6)	38 (1.0)	27 (0.8)	28 (0.7)	44 (1.0)	11 (0.5)	15 (0.6)	74 (0.8)
Czech Republic	43 (1.7)	26 (1.1)	31 (1.6)	35 (1.1)	27 (0.7)	38 (1.2)	10 (0.7)	14 (0.7)	76 (1.0)
Georgia	40 (1.5)	19 (1.0)	41 (1.9)	r 50 (1.8)	r 20 (1.0)	r 30 (1.7)	r 21 (1.4)	r 15 (1.1)	r 64 (2.1)
Hungary	40 (1.6)	26 (1.0)	35 (1.4)	17 (1.0)	23 (0.8)	59 (1.3)	8 (0.6)	14 (0.7)	78 (1.1)
Indonesia	--	--	--	--	--	--	--	--	--
Lebanon	--	--	--	--	--	--	--	--	--
Lithuania	65 (1.2)	17 (0.8)	18 (0.9)	21 (1.0)	19 (0.6)	61 (1.1)	9 (0.6)	11 (0.7)	80 (0.9)
Malta	54 (0.8)	19 (0.6)	27 (0.6)	11 (0.5)	18 (0.6)	71 (0.7)	5 (0.3)	9 (0.5)	86 (0.6)
Romania	43 (1.5)	21 (0.7)	36 (1.3)	39 (1.4)	20 (0.8)	41 (1.5)	16 (0.9)	13 (0.7)	71 (1.2)
Russian Federation	59 (1.0)	22 (0.8)	19 (0.9)	43 (1.1)	23 (0.8)	34 (1.1)	15 (0.8)	13 (0.7)	72 (1.3)
Serbia	43 (1.5)	19 (0.9)	38 (1.3)	25 (1.5)	15 (0.8)	60 (1.7)	10 (0.7)	9 (0.7)	80 (1.1)
Slovenia	33 (1.1)	36 (0.9)	31 (1.2)	50 (1.0)	33 (0.9)	17 (0.8)	8 (0.5)	13 (0.6)	79 (1.0)
Sweden	38 (1.3)	32 (0.7)	30 (1.1)	16 (0.8)	29 (0.7)	56 (1.0)	8 (0.6)	18 (0.9)	75 (1.0)
Syrian Arab Republic	39 (1.0)	24 (0.8)	38 (1.0)	55 (1.3)	22 (0.8)	23 (0.9)	37 (1.1)	23 (0.8)	39 (1.2)
Ukraine	61 (1.1)	23 (0.7)	17 (0.9)	58 (1.4)	24 (1.0)	19 (1.0)	19 (1.0)	20 (0.9)	61 (1.4)
‡ Morocco	r 34 (1.3)	r 25 (1.1)	r 41 (1.3)	r 41 (1.7)	r 25 (1.0)	r 34 (1.5)	r 27 (1.1)	r 23 (0.8)	r 50 (1.2)
International Avg.	45 (0.3)	23 (0.2)	33 (0.3)	36 (0.3)	23 (0.2)	41 (0.3)	16 (0.2)	15 (0.2)	68 (0.3)

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



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

TIMSS2007
Science 8th Grade

Chemistry

Country	Percentage of Students Who Reported								
	Reading Science Textbooks and Other Resource Materials			Memorizing Science Facts and Principles			Using Scientific Formulas and Laws to Solve Problems		
	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never
Algeria	26 (0.9)	23 (0.8)	51 (1.0)	39 (1.1)	25 (0.7)	36 (1.0)	31 (1.0)	25 (0.7)	44 (1.0)
Armenia	r 41 (1.2)	r 18 (0.7)	r 41 (1.2)	r 36 (1.3)	r 20 (0.7)	r 44 (1.4)	r 50 (1.4)	r 18 (0.8)	r 32 (1.1)
Bosnia and Herzegovina	51 (1.2)	18 (0.6)	31 (1.2)	50 (1.0)	21 (0.6)	28 (1.0)	55 (1.0)	19 (0.7)	26 (1.0)
Bulgaria	r 38 (1.6)	r 22 (1.0)	r 40 (1.7)	r 40 (1.6)	r 21 (1.0)	r 38 (1.8)	r 46 (1.7)	r 23 (1.3)	r 32 (1.6)
Cyprus	35 (0.9)	24 (0.7)	41 (0.8)	33 (0.7)	28 (0.6)	39 (0.7)	37 (0.9)	28 (0.9)	35 (0.9)
Czech Republic	39 (1.6)	28 (0.9)	33 (1.9)	44 (1.1)	31 (0.9)	25 (0.9)	45 (1.3)	30 (0.8)	25 (0.9)
Georgia	38 (1.4)	18 (1.0)	44 (1.7)	46 (1.2)	20 (0.8)	34 (1.3)	49 (1.5)	17 (0.9)	34 (1.4)
Hungary	34 (1.5)	25 (0.8)	41 (1.6)	23 (1.0)	28 (0.9)	49 (1.3)	28 (1.0)	25 (0.9)	47 (1.4)
Indonesia	--	--	--	--	--	--	--	--	--
Lebanon	33 (1.2)	32 (1.2)	35 (1.3)	49 (1.5)	28 (1.1)	23 (1.1)	52 (1.6)	28 (1.4)	20 (1.0)
Lithuania	58 (1.4)	19 (0.9)	23 (1.2)	27 (1.1)	24 (0.8)	49 (1.3)	55 (1.1)	26 (0.7)	19 (1.0)
Malta	s 44 (1.7)	s 23 (1.2)	s 33 (1.4)	s 40 (1.6)	s 29 (1.5)	s 31 (1.3)	s 39 (1.5)	s 28 (1.3)	s 33 (1.4)
Romania	38 (1.3)	21 (0.9)	41 (1.5)	35 (1.2)	24 (0.9)	41 (1.2)	49 (1.6)	22 (0.9)	29 (1.3)
Russian Federation	57 (0.9)	21 (0.7)	22 (0.8)	70 (1.2)	18 (0.8)	12 (0.8)	73 (1.1)	17 (0.7)	10 (0.8)
Serbia	37 (1.3)	19 (0.7)	44 (1.2)	33 (1.2)	19 (0.7)	48 (1.3)	45 (0.8)	20 (0.8)	34 (0.9)
Slovenia	29 (1.2)	34 (1.1)	37 (1.5)	48 (1.0)	34 (0.9)	18 (0.9)	48 (1.0)	29 (0.9)	23 (0.7)
Sweden	33 (1.1)	32 (0.8)	34 (1.0)	15 (0.8)	29 (0.7)	56 (1.0)	14 (0.7)	29 (0.7)	57 (1.0)
Syrian Arab Republic	40 (1.1)	24 (0.7)	36 (1.0)	53 (1.0)	23 (0.6)	24 (0.9)	49 (1.1)	24 (0.8)	26 (0.8)
Ukraine	58 (1.1)	22 (0.7)	20 (0.9)	69 (1.1)	20 (0.7)	12 (0.8)	74 (1.1)	18 (0.8)	8 (0.6)
‡ Morocco	r 35 (1.0)	r 24 (0.9)	r 40 (1.1)	r 45 (2.3)	r 22 (1.3)	r 33 (2.2)	r 39 (1.7)	r 24 (1.2)	r 37 (1.3)
International Avg.	40 (0.3)	24 (0.2)	36 (0.3)	42 (0.3)	24 (0.2)	34 (0.3)	46 (0.3)	24 (0.2)	30 (0.3)

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

Physics

Country	Percentage of Students Who Reported								
	Reading Science Textbooks and Other Resource Materials			Memorizing Science Facts and Principles			Using Scientific Formulas and Laws to Solve Problems		
	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never
Algeria	25 (0.7)	23 (0.6)	51 (0.9)	37 (0.8)	26 (0.7)	37 (0.9)	31 (0.9)	24 (0.8)	44 (0.9)
Armenia	r 44 (1.2)	r 18 (0.7)	r 38 (1.1)	r 41 (1.4)	r 21 (0.8)	r 38 (1.4)	r 58 (1.3)	r 18 (0.8)	r 24 (1.3)
Bosnia and Herzegovina	50 (1.0)	18 (0.7)	32 (0.9)	53 (1.1)	19 (0.7)	27 (1.0)	62 (1.2)	17 (0.6)	21 (0.9)
Bulgaria	r 40 (1.6)	r 18 (0.9)	r 42 (1.5)	r 42 (1.9)	r 21 (1.2)	r 37 (1.7)	r 53 (1.8)	r 21 (1.1)	r 26 (1.5)
Cyprus	35 (0.9)	24 (0.8)	40 (1.0)	36 (0.8)	27 (0.8)	36 (0.8)	39 (0.8)	27 (0.8)	33 (0.9)
Czech Republic	39 (1.6)	29 (1.1)	32 (1.8)	42 (1.0)	30 (0.7)	29 (1.0)	49 (1.3)	27 (0.8)	24 (1.0)
Georgia	41 (1.1)	20 (1.0)	39 (1.0)	47 (1.5)	21 (1.0)	32 (1.3)	57 (1.3)	17 (1.0)	26 (1.2)
Hungary	34 (1.5)	25 (0.9)	41 (1.4)	31 (1.1)	28 (0.9)	41 (1.4)	33 (1.2)	30 (0.9)	37 (1.4)
Indonesia	29 (1.1)	34 (0.8)	36 (1.3)	21 (1.0)	30 (0.9)	48 (1.3)	31 (1.1)	30 (1.0)	39 (1.3)
Lebanon	36 (1.3)	31 (1.0)	33 (1.1)	50 (1.7)	27 (1.1)	23 (1.3)	53 (1.3)	27 (1.1)	20 (1.1)
Lithuania	64 (1.2)	16 (0.7)	20 (1.0)	32 (1.1)	23 (0.7)	44 (1.1)	61 (1.3)	21 (0.9)	18 (1.0)
Malta	33 (0.7)	22 (0.7)	45 (0.7)	33 (0.7)	27 (0.8)	40 (0.7)	48 (0.6)	26 (0.6)	26 (0.6)
Romania	38 (1.4)	21 (0.8)	41 (1.5)	37 (1.4)	23 (1.0)	39 (1.6)	48 (1.5)	23 (1.0)	29 (1.6)
Russian Federation	61 (1.0)	20 (0.6)	19 (0.9)	73 (0.9)	18 (0.7)	10 (0.6)	77 (0.9)	15 (0.7)	7 (0.6)
Serbia	36 (1.3)	19 (0.8)	46 (1.5)	36 (1.2)	20 (0.7)	44 (1.3)	54 (1.0)	19 (0.8)	27 (1.0)
Slovenia	23 (0.9)	33 (1.0)	44 (1.4)	51 (0.9)	31 (0.9)	18 (0.9)	64 (1.2)	23 (0.8)	13 (0.9)
Sweden	34 (1.1)	31 (0.9)	35 (1.1)	15 (0.7)	27 (0.7)	58 (1.0)	14 (0.8)	27 (0.8)	59 (1.0)
Syrian Arab Republic	41 (1.2)	25 (0.7)	34 (1.1)	52 (1.2)	23 (0.8)	25 (0.8)	47 (1.1)	25 (0.7)	28 (1.0)
Ukraine	59 (1.1)	21 (0.7)	20 (1.1)	67 (1.0)	20 (0.7)	12 (0.7)	73 (1.0)	18 (0.8)	8 (0.7)
‡ Morocco	r 37 (1.1)	r 24 (1.2)	r 39 (1.1)	r 46 (1.6)	r 23 (1.0)	r 31 (1.5)	r 39 (1.7)	r 25 (1.1)	r 36 (1.9)
International Avg.	40 (0.3)	24 (0.2)	36 (0.3)	42 (0.3)	24 (0.2)	33 (0.3)	50 (0.3)	23 (0.2)	27 (0.3)

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

Exhibit 7.7 Teachers' Reports on Learning Activities in Science Lessons

TIMSS2007
Science 4th Grade

Country	Percentage of Students Whose Teachers Reported Students					
	Reading Their Textbooks and Other Resource Materials			Memorizing Facts and Principles		
	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never
Australia	4 (1.0)	13 (2.6)	83 (2.7)	2 (1.0)	9 (2.3)	89 (2.5)
Austria	13 (2.4)	38 (3.2)	49 (3.4)	1 (0.4)	4 (1.3)	96 (1.4)
Chinese Taipei	26 (3.9)	32 (3.8)	41 (4.0)	9 (2.4)	11 (2.9)	80 (3.4)
Colombia	44 (5.7)	19 (3.8)	37 (5.9)	12 (2.8)	13 (3.1)	75 (3.6)
Czech Republic	32 (3.6)	36 (3.5)	32 (3.5)	0 (0.0)	9 (2.5)	91 (2.5)
Denmark	r 18 (3.6)	r 38 (4.4)	r 44 (4.5)	r 2 (1.0)	r 7 (1.8)	r 91 (2.1)
El Salvador	33 (3.9)	20 (3.7)	47 (4.3)	22 (3.6)	17 (3.5)	61 (4.4)
England	2 (1.4)	14 (2.6)	83 (3.0)	4 (1.6)	7 (1.9)	90 (2.4)
Georgia	44 (4.1)	14 (3.1)	42 (4.7)	51 (4.8)	15 (3.5)	35 (4.6)
Germany	16 (2.2)	39 (3.2)	44 (3.2)	5 (1.4)	16 (2.5)	79 (2.8)
Hong Kong SAR	24 (3.7)	25 (4.0)	51 (4.3)	7 (2.2)	32 (3.8)	62 (3.9)
Hungary	69 (3.6)	16 (2.3)	15 (3.1)	39 (3.8)	28 (3.8)	33 (3.6)
Iran, Islamic Rep. of	49 (4.2)	26 (3.6)	25 (3.2)	24 (3.0)	29 (3.5)	47 (3.8)
Italy	51 (2.8)	25 (2.6)	24 (2.8)	44 (3.2)	23 (2.8)	33 (3.0)
Japan	27 (3.7)	36 (3.6)	37 (3.7)	23 (3.7)	31 (4.0)	45 (4.4)
Kazakhstan	86 (3.1)	7 (2.1)	7 (2.4)	69 (4.1)	12 (2.4)	18 (3.9)
Kuwait	r 50 (4.4)	r 14 (3.2)	r 35 (4.1)	r 62 (4.7)	r 23 (3.8)	r 15 (3.1)
Latvia	62 (3.6)	28 (3.6)	9 (2.1)	6 (1.8)	21 (2.9)	73 (3.1)
Lithuania	41 (3.5)	34 (3.3)	25 (3.1)	21 (2.7)	26 (3.3)	53 (3.4)
Morocco	54 (4.5)	16 (3.3)	31 (3.7)	56 (4.5)	15 (3.2)	29 (3.7)
Netherlands	r 41 (4.4)	r 37 (4.5)	r 21 (3.2)	3 (1.7)	14 (3.3)	82 (3.5)
New Zealand	3 (1.0)	18 (2.6)	80 (2.7)	1 (0.5)	4 (1.4)	95 (1.4)
Norway	6 (1.7)	33 (3.8)	62 (3.8)	0 (0.0)	4 (1.5)	96 (1.5)
Qatar	r 45 (0.2)	r 20 (0.1)	r 35 (0.2)	r 43 (0.2)	r 27 (0.2)	r 29 (0.2)
Russian Federation	80 (2.8)	12 (2.2)	8 (2.1)	33 (2.5)	28 (3.0)	39 (2.9)
Scotland	r 4 (1.3)	r 21 (4.0)	r 75 (4.1)	r 1 (0.1)	r 8 (2.2)	r 91 (2.4)
Singapore	23 (2.4)	29 (2.7)	48 (2.6)	14 (2.2)	26 (2.6)	60 (3.0)
Slovak Republic	39 (3.3)	37 (3.5)	24 (3.1)	8 (2.0)	9 (1.9)	83 (2.7)
Slovenia	23 (2.7)	32 (2.8)	45 (2.9)	12 (2.1)	25 (2.4)	63 (2.9)
Sweden	8 (1.5)	32 (3.5)	59 (3.6)	2 (1.3)	11 (2.4)	86 (2.7)
Tunisia	40 (4.2)	22 (3.1)	38 (3.8)	41 (4.0)	21 (3.1)	38 (4.1)
Ukraine	65 (3.6)	16 (2.8)	19 (2.9)	27 (3.6)	30 (3.8)	43 (4.0)
United States	34 (2.6)	26 (2.5)	40 (2.9)	14 (1.7)	22 (2.4)	64 (2.6)
Yemen	34 (4.3)	18 (3.7)	48 (4.2)	45 (4.9)	20 (3.6)	34 (4.7)
International Avg.	35 (0.6)	25 (0.5)	40 (0.6)	22 (0.5)	18 (0.5)	60 (0.5)
Benchmarking Participants						
Alberta, Canada	7 (2.5)	10 (2.4)	83 (3.3)	2 (1.3)	8 (2.5)	90 (2.8)
British Columbia, Canada	r 12 (3.2)	r 39 (4.7)	r 49 (4.2)	r 2 (1.0)	r 11 (2.3)	r 87 (2.5)
Dubai, UAE	s 79 (2.6)	s 6 (2.1)	s 16 (2.5)	s 68 (3.1)	s 9 (1.6)	s 23 (2.7)
Massachusetts, US	16 (5.0)	28 (6.4)	56 (5.4)	9 (2.9)	9 (4.1)	82 (4.1)
Minnesota, US	18 (5.9)	17 (6.0)	65 (7.0)	0 (0.0)	17 (5.9)	83 (5.9)
Ontario, Canada	21 (4.4)	24 (3.8)	54 (4.6)	1 (1.3)	14 (3.3)	85 (3.5)
Quebec, Canada	19 (3.2)	27 (4.1)	54 (3.7)	5 (2.0)	13 (2.8)	82 (3.3)

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 Science Lessons (Continued)

TIMSS2007
Science 8th Grade

General/Integrated Science

Country	Percentage of Students Whose Teachers Reported Students									
	Reading Their Textbooks and Other Resource Materials			Memorizing Facts and Principles			Using Scientific Formulae and Laws to Solve Routine Problems			
	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	
Australia	12 (2.4)	30 (3.3)	59 (3.8)	4 (1.5)	14 (2.1)	82 (2.6)	1 (0.7)	11 (2.2)	87 (2.2)	
Bahrain	19 (2.5)	18 (2.1)	63 (2.9)	53 (2.6)	25 (2.1)	21 (2.7)	25 (2.6)	38 (2.8)	37 (2.4)	
Botswana	21 (3.1)	21 (3.1)	58 (4.2)	20 (4.1)	11 (2.9)	69 (4.0)	10 (2.5)	14 (2.9)	76 (3.5)	
Chinese Taipei	20 (3.0)	15 (2.5)	65 (3.3)	10 (2.5)	16 (3.2)	75 (3.8)	15 (2.9)	23 (3.2)	62 (4.0)	
Colombia	28 (3.9)	35 (4.5)	37 (4.9)	5 (1.8)	11 (2.7)	84 (3.2)	19 (3.3)	26 (4.4)	55 (4.9)	
Egypt	25 (3.4)	14 (2.8)	61 (4.0)	58 (4.1)	17 (3.0)	25 (3.7)	34 (4.1)	23 (3.2)	43 (4.1)	
El Salvador	25 (4.1)	25 (3.8)	51 (4.6)	15 (3.2)	25 (3.5)	59 (4.2)	10 (2.8)	22 (3.4)	68 (3.8)	
England	9 (1.7)	11 (2.0)	79 (2.5)	5 (1.4)	11 (1.7)	84 (2.3)	1 (0.4)	13 (1.9)	86 (2.0)	
Ghana	44 (4.6)	18 (3.8)	38 (4.3)	39 (4.4)	20 (3.2)	41 (4.3)	37 (4.3)	21 (3.1)	42 (4.2)	
Hong Kong SAR	14 (2.9)	21 (3.7)	65 (4.1)	7 (2.6)	26 (3.9)	67 (4.3)	1 (0.0)	18 (3.4)	81 (3.5)	
Iran, Islamic Rep. of	58 (3.8)	13 (2.7)	29 (3.7)	39 (4.2)	22 (3.1)	39 (3.8)	43 (3.7)	24 (3.6)	33 (3.7)	
Israel	20 (3.4)	20 (3.2)	60 (3.8)	11 (3.0)	15 (2.8)	73 (4.0)	9 (2.5)	14 (3.1)	77 (3.9)	
Italy	33 (3.0)	30 (2.8)	37 (3.2)	5 (1.4)	10 (2.0)	84 (2.4)	14 (2.2)	25 (3.0)	61 (3.4)	
Japan	25 (2.9)	24 (3.4)	51 (3.6)	24 (3.2)	36 (4.1)	40 (4.1)	13 (2.6)	31 (3.9)	56 (4.1)	
Jordan	35 (3.5)	28 (3.5)	37 (3.8)	42 (4.1)	37 (4.3)	21 (3.3)	41 (4.1)	41 (4.3)	17 (3.5)	
Korea, Rep. of	19 (3.0)	29 (3.8)	52 (4.1)	15 (3.1)	36 (3.9)	48 (4.4)	15 (2.8)	43 (4.0)	42 (4.1)	
Kuwait	r 19 (3.7)	r 23 (3.9)	r 58 (4.9)	r 51 (4.4)	r 35 (4.5)	r 14 (2.9)	r 42 (4.6)	r 28 (4.5)	r 30 (4.2)	
Malaysia	40 (4.7)	26 (3.7)	34 (3.7)	22 (3.6)	38 (4.2)	39 (3.9)	10 (2.5)	27 (3.4)	64 (3.9)	
Norway	8 (2.1)	26 (3.3)	66 (3.8)	1 (0.5)	5 (1.4)	94 (1.5)	1 (0.6)	6 (1.4)	94 (1.5)	
Oman	13 (2.6)	20 (3.6)	67 (4.1)	40 (3.8)	23 (3.2)	37 (3.8)	23 (3.6)	36 (4.6)	41 (4.0)	
Palestinian Nat'l Auth.	22 (3.3)	17 (2.9)	61 (4.2)	61 (3.6)	19 (3.3)	19 (3.3)	52 (4.1)	27 (3.8)	21 (3.7)	
Qatar	17 (0.1)	20 (0.1)	63 (0.2)	42 (0.2)	29 (0.1)	29 (0.2)	25 (0.2)	25 (0.1)	50 (0.2)	
Saudi Arabia	21 (3.7)	18 (3.6)	61 (4.7)	48 (4.2)	22 (3.7)	30 (4.1)	31 (4.3)	25 (4.3)	44 (4.9)	
Scotland	r 19 (2.4)	r 21 (2.1)	r 60 (2.9)	r 9 (1.9)	r 15 (2.2)	r 75 (2.6)	r 2 (0.7)	r 9 (1.6)	r 89 (1.8)	
Singapore	13 (1.7)	16 (2.1)	71 (2.4)	7 (1.4)	16 (2.0)	78 (2.2)	4 (0.9)	21 (2.3)	76 (2.4)	
^a Sweden	6 (1.8)	17 (2.2)	77 (2.7)	1 (0.6)	6 (1.9)	93 (2.0)	1 (0.6)	1 (0.8)	98 (1.3)	
Thailand	23 (3.7)	43 (4.0)	34 (3.9)	24 (3.5)	45 (4.2)	31 (3.9)	13 (3.0)	40 (4.2)	47 (4.1)	
Tunisia	23 (4.0)	16 (2.9)	60 (4.4)	54 (4.4)	18 (3.5)	29 (3.8)	33 (3.7)	15 (2.8)	53 (3.7)	
Turkey	35 (4.3)	23 (3.5)	42 (4.8)	9 (2.8)	12 (3.0)	79 (3.9)	25 (4.0)	36 (4.2)	38 (4.1)	
United States	16 (2.1)	23 (2.2)	61 (2.8)	8 (1.6)	16 (2.0)	76 (2.6)	8 (1.6)	27 (2.6)	65 (2.8)	
International Avg.	23 (0.6)	22 (0.6)	55 (0.7)	24 (0.6)	21 (0.6)	55 (0.6)	19 (0.5)	24 (0.6)	58 (0.6)	
Benchmarking Participants										
Basque Country, Spain	r 22 (3.4)	r 32 (4.6)	r 46 (4.6)	r 7 (2.1)	r 19 (3.7)	r 74 (4.1)	r 2 (1.3)	r 21 (3.5)	r 77 (3.6)	
British Columbia, Canada	s 32 (4.1)	s 24 (5.9)	s 44 (5.4)	s 46 (4.3)	s 9 (1.9)	s 45 (4.4)	s 29 (3.1)	s 25 (4.5)	s 46 (5.7)	
Dubai, UAE	6 (2.4)	25 (5.3)	70 (5.7)	3 (2.1)	21 (6.0)	76 (6.4)	2 (1.3)	17 (4.7)	81 (4.6)	
Massachusetts, US	16 (5.7)	9 (2.6)	75 (6.0)	4 (2.4)	17 (4.6)	79 (5.1)	0 (0.0)	18 (4.5)	82 (4.5)	
Minnesota, US	14 (3.7)	29 (4.4)	56 (4.9)	4 (2.0)	16 (3.0)	80 (3.3)	2 (1.5)	19 (3.4)	79 (3.7)	
Ontario, Canada	14 (3.7)	29 (4.4)	56 (4.9)	4 (2.0)	16 (3.0)	80 (3.3)	2 (1.5)	19 (3.4)	79 (3.7)	
Quebec, Canada	13 (2.8)	21 (3.4)	66 (4.4)	10 (2.8)	20 (4.1)	69 (4.6)	5 (2.4)	16 (3.8)	79 (4.3)	

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

Background data provided by teachers.

^a Sweden: Summarizes reports from physics, biology, and chemistry teachers as well as integrated/general science teachers.

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

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

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



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

TIMSS2007
Science 8th Grade

Biology

Country	Percentage of Students Whose Teachers Reported Students								
	Reading Their Textbooks and Other Resource Materials			Memorizing Facts and Principles			Using Scientific Formulae and Laws to Solve Routine Problems		
	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never
^b Algeria	32 (4.4)	19 (3.4)	49 (4.1)	60 (4.7)	13 (3.1)	27 (4.2)	31 (4.2)	14 (3.1)	54 (4.5)
Armenia	21 (3.5)	38 (4.0)	41 (4.5)	25 (3.9)	39 (4.2)	36 (4.0)	16 (2.9)	34 (4.2)	50 (4.2)
Bosnia and Herzegovina	19 (2.9)	16 (3.1)	64 (3.9)	33 (3.8)	27 (3.7)	41 (3.8)	14 (2.7)	20 (3.2)	66 (3.8)
Bulgaria	32 (4.9)	23 (4.0)	45 (5.3)	50 (4.9)	26 (4.2)	25 (4.5)	33 (4.6)	25 (4.1)	42 (4.8)
Cyprus	--	--	--	--	--	--	--	--	--
Czech Republic	19 (3.2)	30 (4.2)	51 (4.1)	0 (0.0)	4 (1.4)	96 (1.4)	4 (1.3)	12 (2.1)	85 (2.5)
Georgia	67 (3.9)	16 (3.8)	17 (3.1)	79 (4.0)	9 (3.0)	12 (3.3)	r 35 (5.8)	r 15 (3.3)	r 50 (6.2)
Hungary	51 (4.3)	22 (3.5)	27 (4.0)	43 (3.7)	22 (3.2)	35 (3.9)	14 (2.9)	19 (2.8)	67 (3.8)
^c Indonesia	27 (3.9)	42 (4.1)	31 (3.5)	14 (3.5)	30 (3.9)	56 (4.2)	25 (4.3)	34 (4.6)	41 (4.8)
Lebanon	42 (4.4)	21 (3.8)	38 (3.9)	44 (5.2)	25 (3.7)	31 (5.1)	38 (4.8)	24 (4.2)	38 (4.6)
Lithuania	39 (3.8)	29 (4.1)	33 (3.9)	41 (3.7)	27 (3.3)	32 (3.5)	4 (1.5)	9 (2.2)	87 (2.7)
^d Malta	9 (0.5)	19 (0.7)	72 (0.9)	5 (0.3)	9 (0.8)	86 (0.8)	5 (0.4)	8 (0.5)	87 (0.6)
Romania	48 (4.5)	17 (3.1)	35 (4.3)	28 (4.1)	13 (2.9)	60 (4.0)	19 (3.8)	11 (2.8)	69 (4.2)
Russian Federation	38 (3.4)	28 (3.5)	34 (3.4)	37 (3.4)	21 (2.7)	42 (4.0)	11 (2.3)	21 (3.7)	68 (3.6)
Serbia	15 (3.0)	22 (4.1)	63 (4.3)	32 (4.2)	30 (3.7)	38 (3.7)	11 (2.5)	23 (3.8)	67 (4.3)
Slovenia	5 (1.8)	18 (3.1)	76 (3.3)	28 (3.6)	37 (3.9)	35 (3.8)	6 (1.9)	10 (2.3)	84 (3.0)
^f Syrian Arab Republic	9 (2.8)	8 (2.9)	82 (4.0)	48 (5.5)	21 (4.5)	31 (4.6)	30 (4.2)	20 (4.2)	49 (5.1)
Ukraine	45 (4.2)	26 (3.6)	29 (4.1)	27 (3.9)	22 (3.5)	51 (3.8)	17 (3.2)	13 (2.9)	70 (3.9)
^e [‡] Morocco	27 (5.6)	13 (3.4)	61 (6.2)	47 (6.3)	17 (3.3)	36 (6.1)	34 (5.0)	18 (3.4)	48 (4.8)
International Avg.	30 (0.9)	23 (0.8)	47 (1.0)	36 (1.0)	22 (0.8)	43 (0.9)	19 (0.8)	18 (0.8)	62 (1.0)

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

Earth Science

Country	Percentage of Students Whose Teachers Reported Students								
	Reading Their Textbooks and Other Resource Materials			Memorizing Facts and Principles			Using Scientific Formulae and Laws to Solve Routine Problems		
	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never
^b Algeria	--	--	--	--	--	--	--	--	--
Armenia	24 (4.1)	38 (4.5)	38 (4.2)	25 (3.5)	39 (4.6)	36 (4.0)	19 (3.3)	49 (4.9)	33 (4.5)
Bosnia and Herzegovina	20 (3.0)	19 (3.2)	60 (3.7)	31 (4.0)	23 (3.6)	47 (4.5)	13 (3.0)	12 (2.8)	75 (3.7)
Bulgaria	32 (4.3)	36 (4.6)	32 (4.7)	39 (4.7)	33 (5.0)	28 (4.4)	18 (3.9)	23 (4.5)	59 (4.6)
Cyprus	r 53 (2.0)	r 21 (2.1)	r 25 (2.0)	r 16 (0.7)	r 18 (2.0)	r 67 (2.0)	s 3 (0.7)	s 18 (1.5)	s 79 (1.6)
Czech Republic	r 22 (3.6)	r 32 (4.7)	r 46 (4.4)	r 0 (0.0)	r 3 (2.1)	r 97 (2.1)	r 1 (1.0)	r 9 (3.1)	r 89 (3.3)
Georgia	69 (4.9)	19 (4.5)	12 (2.8)	68 (5.0)	18 (4.9)	14 (3.9)	r 18 (4.2)	r 8 (2.2)	r 73 (4.6)
Hungary	45 (4.1)	29 (3.9)	26 (3.4)	35 (3.8)	25 (2.9)	40 (3.6)	17 (3.0)	22 (3.5)	60 (4.4)
^c Indonesia	--	--	--	--	--	--	--	--	--
Lebanon	--	--	--	--	--	--	--	--	--
Lithuania	40 (3.8)	27 (3.2)	33 (3.7)	42 (4.0)	29 (4.1)	29 (3.7)	6 (2.0)	9 (2.4)	85 (2.7)
^d Malta	39 (0.4)	23 (0.4)	38 (0.5)	17 (0.3)	16 (0.4)	67 (0.4)	0 (0.0)	11 (0.2)	89 (0.2)
Romania	51 (4.2)	19 (3.3)	31 (4.2)	34 (4.3)	17 (3.2)	48 (4.7)	21 (3.1)	12 (2.3)	67 (3.7)
Russian Federation	33 (3.8)	26 (2.8)	41 (4.2)	30 (3.4)	23 (2.7)	47 (3.7)	9 (2.1)	17 (2.8)	74 (3.6)
Serbia	10 (2.5)	23 (3.9)	67 (4.3)	31 (4.3)	24 (3.9)	45 (4.2)	6 (2.2)	15 (4.0)	78 (4.4)
Slovenia	--	--	--	--	--	--	--	--	--
^f Syrian Arab Republic	--	--	--	--	--	--	--	--	--
Ukraine	45 (4.6)	28 (3.9)	27 (3.7)	27 (3.9)	26 (3.8)	47 (4.4)	16 (3.4)	19 (3.5)	65 (4.3)
^e [‡] Morocco	--	--	--	--	--	--	--	--	--
International Avg.	37 (1.0)	26 (1.0)	37 (1.0)	30 (1.0)	23 (1.0)	47 (1.0)	11 (0.8)	17 (0.9)	71 (1.0)

- ^b Algeria: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
- ^c Indonesia: Data reported in biology and physics panels include data from integrated/general science teachers.
- ^d Malta: Data reported in earth science panel include data from environmental studies teachers.

- ^e Morocco: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
- ^f Syrian Arab Republic: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
- [‡] Did not satisfy guidelines for sample participation rates (see Appendix A).



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

TIMSS2007
Science 8th Grade

Chemistry

Country	Percentage of Students Whose Teachers Reported Students								
	Reading Their Textbooks and Other Resource Materials			Memorizing Facts and Principles			Using Scientific Formulae and Laws to Solve Routine Problems		
	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never
b Algeria	--	--	--	--	--	--	--	--	--
Armenia	13 (3.5)	40 (4.5)	47 (4.6)	21 (3.8)	40 (3.9)	39 (3.6)	33 (4.2)	19 (3.2)	48 (4.7)
Bosnia and Herzegovina	17 (3.0)	18 (3.3)	65 (3.8)	38 (4.2)	25 (3.8)	37 (3.7)	31 (3.7)	17 (3.0)	52 (4.1)
Bulgaria	31 (4.2)	22 (3.9)	47 (4.8)	46 (4.3)	29 (4.6)	25 (4.4)	52 (4.9)	29 (4.7)	19 (4.0)
Cyprus	r 48 (1.6)	r 15 (0.4)	r 36 (1.5)	r 20 (1.5)	r 13 (1.0)	r 67 (1.4)	r 13 (1.1)	r 17 (1.3)	r 70 (1.4)
Czech Republic	10 (2.8)	27 (3.4)	63 (3.9)	2 (1.4)	9 (2.3)	90 (2.7)	12 (2.8)	27 (3.5)	61 (3.9)
Georgia	65 (4.8)	19 (4.3)	16 (3.5)	74 (5.9)	17 (5.4)	9 (2.8)	66 (5.1)	18 (3.4)	16 (3.8)
Hungary	39 (3.9)	26 (3.7)	35 (4.1)	43 (4.2)	22 (3.5)	35 (4.3)	29 (4.0)	31 (3.9)	40 (4.5)
c Indonesia	--	--	--	--	--	--	--	--	--
Lebanon	34 (4.3)	27 (4.4)	39 (4.5)	48 (5.1)	24 (3.7)	28 (4.5)	48 (4.8)	33 (5.3)	19 (3.4)
Lithuania	28 (3.8)	22 (2.9)	51 (4.0)	41 (4.2)	30 (4.1)	28 (3.6)	30 (3.7)	44 (4.2)	26 (3.9)
d Malta	5 (0.7)	8 (0.7)	88 (0.9)	2 (0.3)	10 (0.9)	88 (0.9)	9 (0.8)	19 (1.0)	72 (1.1)
Romania	33 (3.8)	17 (3.2)	50 (4.2)	24 (3.4)	15 (2.9)	62 (4.1)	65 (4.0)	13 (3.0)	22 (3.2)
Russian Federation	29 (3.3)	18 (2.7)	53 (3.8)	34 (3.9)	23 (2.8)	43 (3.9)	45 (3.6)	36 (3.3)	19 (2.4)
Serbia	11 (3.2)	9 (2.2)	80 (3.7)	31 (3.7)	31 (4.3)	38 (3.7)	37 (4.2)	33 (4.1)	30 (3.9)
Slovenia	5 (1.8)	6 (2.0)	89 (2.6)	23 (3.4)	43 (4.2)	34 (4.1)	24 (3.5)	39 (4.0)	37 (4.1)
f Syrian Arab Republic	--	--	--	--	--	--	--	--	--
Ukraine	35 (4.4)	19 (3.3)	46 (4.0)	29 (4.1)	26 (3.5)	45 (4.2)	80 (3.4)	12 (2.5)	7 (2.2)
e ‡ Morocco	--	--	--	--	--	--	--	--	--
International Avg.	27 (0.9)	19 (0.8)	54 (1.0)	32 (1.0)	24 (0.9)	44 (0.9)	38 (1.0)	26 (0.9)	36 (0.9)

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

Physics

Country	Percentage of Students Whose Teachers Reported Students								
	Reading Their Textbooks and Other Resource Materials			Memorizing Facts and Principles			Using Scientific Formulae and Laws to Solve Routine Problems		
	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never	Every or Almost Every Lesson	About Half the Lessons	Some Lessons or Never
b Algeria	r 28 (4.1)	r 10 (2.8)	r 63 (4.5)	r 55 (5.0)	r 14 (3.5)	r 30 (4.4)	r 40 (4.7)	r 22 (4.1)	r 38 (4.4)
Armenia	16 (2.8)	38 (5.0)	46 (5.1)	19 (2.9)	33 (4.1)	49 (4.7)	39 (4.5)	18 (4.9)	43 (4.8)
Bosnia and Herzegovina	11 (2.6)	20 (3.3)	68 (3.9)	38 (3.9)	28 (3.3)	34 (3.7)	53 (4.0)	28 (3.1)	19 (3.4)
Bulgaria	27 (4.7)	24 (4.6)	49 (5.1)	54 (5.3)	27 (4.3)	19 (3.9)	70 (4.7)	27 (4.3)	4 (1.8)
Cyprus	36 (2.1)	26 (2.3)	38 (2.2)	r 13 (1.9)	r 24 (1.7)	r 63 (2.4)	r 17 (1.2)	r 42 (2.0)	r 41 (2.0)
Czech Republic	14 (3.0)	22 (3.4)	65 (4.4)	1 (0.9)	14 (2.8)	85 (2.9)	35 (3.8)	27 (3.5)	38 (4.0)
Georgia	62 (4.9)	18 (3.5)	20 (3.8)	80 (4.1)	11 (3.5)	9 (2.3)	73 (4.5)	10 (2.2)	17 (4.2)
Hungary	45 (4.3)	16 (2.6)	39 (4.4)	41 (4.0)	26 (3.9)	33 (4.0)	33 (4.2)	41 (4.3)	26 (3.9)
c Indonesia	24 (3.8)	37 (4.3)	39 (4.1)	14 (2.8)	30 (3.3)	56 (3.9)	35 (4.1)	50 (4.2)	15 (2.9)
Lebanon	28 (4.4)	27 (4.1)	44 (4.3)	49 (4.8)	20 (3.4)	32 (4.8)	50 (5.1)	27 (4.4)	23 (4.3)
Lithuania	32 (3.8)	23 (3.5)	45 (4.3)	46 (4.0)	25 (4.0)	29 (3.5)	77 (3.6)	19 (3.3)	3 (1.3)
d Malta	9 (0.2)	19 (0.4)	73 (0.4)	7 (0.2)	18 (0.3)	76 (0.4)	29 (0.4)	28 (0.4)	43 (0.5)
Romania	38 (4.2)	15 (2.9)	48 (3.7)	29 (3.6)	21 (3.2)	50 (4.0)	66 (3.8)	19 (3.5)	16 (2.9)
Russian Federation	23 (3.3)	17 (3.0)	60 (3.8)	36 (3.1)	16 (2.5)	48 (2.9)	77 (3.0)	19 (3.3)	4 (1.8)
Serbia	8 (2.2)	15 (3.0)	78 (3.7)	27 (4.0)	30 (4.1)	43 (4.3)	48 (4.4)	34 (4.2)	18 (3.1)
Slovenia	3 (0.9)	8 (2.3)	89 (2.5)	29 (3.8)	32 (3.4)	39 (3.6)	20 (3.2)	46 (4.0)	34 (4.1)
f Syrian Arab Republic	14 (3.5)	12 (3.2)	74 (3.9)	62 (4.3)	15 (3.0)	23 (3.3)	56 (4.9)	26 (4.5)	18 (3.0)
Ukraine	28 (3.8)	18 (3.0)	54 (4.3)	31 (3.6)	25 (3.5)	44 (4.1)	87 (3.0)	11 (2.8)	2 (1.1)
e ‡ Morocco	r 24 (5.0)	r 15 (3.9)	r 61 (5.6)	r 57 (5.9)	r 10 (3.3)	r 32 (5.1)	r 55 (5.3)	r 20 (4.9)	r 25 (4.7)
International Avg.	25 (0.8)	20 (0.8)	56 (0.9)	36 (0.9)	22 (0.8)	42 (0.9)	51 (0.9)	27 (0.9)	22 (0.8)

- b Algeria: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
- c Indonesia: Data reported in biology and physics panels include data from integrated/general science teachers.
- d Malta: Data reported in earth science panel include data from environmental studies teachers.

- e Morocco: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
- f Syrian Arab Republic: Data reported in biology panel are for biology/earth science teachers and data reported in physics panel are for physics/chemistry teachers.
- ‡ Did not satisfy guidelines for sample participation rates (see Appendix A).

What Instructional Strategies Are Used in Science Classes?

Exhibit 7.8 presents teachers' reports on the extent of their reliance on textbooks in teaching science, and changes in this use since 2003. In most countries in 2007, the textbook remains the primary basis of science instruction at both the fourth and eighth grades. On average internationally, 52 percent of the students at fourth grade and 53 percent at eighth grade had teachers who reported using a textbook as the primary basis of their lessons. For another 34 percent of the fourth-grade students and 40 percent of the eighth-grade students, teachers reported using textbooks as a supplementary resource. There was very little textbook use in teaching fourth-grade science in Australia, New Zealand, Scotland, and Alberta, Canada.

There are some interesting trends at the fourth grade. For example, Iran and Slovenia have increases since 2003 in the use of textbooks as the primary basis for science teaching (by 33 percentage points in both) whereas Lithuania, Scotland, and the province of Ontario have reduced reliance on textbooks for science teaching. At the eighth grade, while Indonesia, Malaysia, Sweden, Tunisia, and the Basque Country in Spain increased the percentages of students for whom the textbook was used as the basis for science instruction, five countries had decreases in the percentage of students—Bahrain, Cyprus, Egypt, Lithuania, and Singapore.

Exhibit 7.9 provides a profile of the time spent on activities commonly encountered in eighth-grade science classes around the world, as reported by science teachers. Internationally on average, most time was spent on having students listen to lecture-style presentations (25%) and working on problems with teacher guidance (17%). Considerable time also was spent having students work on solving problems independently (13%), and listening to the teacher re-teach and clarify content or procedures (13%). Together, these four activities accounted for 68 percent of the class time at the eighth grade. A further 9 percent of class time was spent reviewing homework and 10 percent was spent taking tests or quizzes.

Exhibit 7.8 Textbook Use in Teaching Science with Trends

TIMSS2007
Science 4th Grade

Country	Percentage of Students Taught by Teachers Reporting Textbook Use					
	Use Textbook to Teach Science				Do Not Use Textbook to Teach Science	
	As Primary Basis for Lessons		As Supplementary Resource		Percent in 2007	Difference in Percent from 2003
	Percent in 2007	Difference in Percent from 2003	Percent in 2007	Difference in Percent from 2003		
Algeria	61 (4.8)	0 0	35 (5.0)	0 0	4 (1.8)	0 0
Armenia	68 (3.4)	--	30 (3.4)	--	2 (0.8)	--
Australia	4 (1.1)	-5 (3.5)	14 (3.1)	1 (4.2)	82 (3.3)	3 (5.3)
Austria	14 (2.4)	0 0	67 (3.2)	0 0	19 (2.5)	0 0
Chinese Taipei	90 (2.6)	5 (3.8)	8 (2.3)	-4 (3.6)	2 (1.1)	-1 (2.0)
Colombia	36 (5.7)	0 0	57 (5.8)	0 0	7 (2.2)	0 0
Czech Republic	55 (4.4)	0 0	44 (4.4)	0 0	1 (0.6)	0 0
Denmark	r 35 (4.4)	0 0	43 (4.8)	0 0	21 (4.0)	0 0
El Salvador	15 (3.2)	0 0	77 (3.3)	0 0	8 (2.6)	0 0
England	r 5 (1.3)	-1 (2.6)	63 (4.2)	5 (6.4)	32 (4.0)	-4 (6.3)
Georgia	84 (3.0)	0 0	12 (2.7)	0 0	4 (2.0)	0 0
Germany	9 (1.7)	0 0	58 (3.6)	0 0	33 (3.3)	0 0
Hong Kong SAR	r 93 (1.9)	7 (4.2)	6 (1.8)	-7 (4.2)	1 (0.8)	-1 (1.4)
Hungary	80 (2.9)	-1 (4.4)	20 (2.9)	1 (4.4)	0 (0.4)	0 (0.4)
Iran, Islamic Rep. of	r 100 (0.0)	33 (4.7) ▲	0 (0.0)	-28 (4.7) ▼	0 (0.0)	-5 (1.3) ▼
Italy	39 (3.1)	7 (4.5)	48 (2.9)	-13 (4.5) ▼	13 (2.1)	6 (2.6) ▲
Japan	71 (3.2)	-5 (4.6)	28 (3.3)	5 (4.6)	1 (0.0)	0 (0.7)
Kazakhstan	93 (2.4)	0 0	7 (2.4)	0 0	0 (0.0)	0 0
Kuwait	r 44 (4.6)	0 0	29 (3.9)	0 0	27 (4.4)	0 0
Latvia	79 (3.7)	--	21 (3.7)	--	0 (0.0)	--
Lithuania	63 (3.6)	-37 (3.6) ▼	36 (3.6)	36 (3.6) ▲	0 (0.0)	0 (0.0)
Morocco	69 (4.2)	--	30 (4.3)	--	1 (0.8)	--
Netherlands	r 72 (4.0)	-3 (5.9)	13 (3.1)	1 (4.5)	15 (3.2)	2 (4.4)
New Zealand	r 3 (0.9)	-1 (1.8)	18 (2.1)	4 (3.0)	80 (2.1)	-3 (3.4)
Norway	r 49 (3.8)	-4 (6.0)	42 (3.9)	2 (5.9)	8 (2.2)	2 (3.1)
Qatar	r 57 (0.2)	0 0	25 (0.1)	0 0	19 (0.2)	0 0
Russian Federation	81 (2.7)	-1 (4.2)	18 (2.7)	2 (3.9)	1 (0.2)	-1 (1.3)
Scotland	s 5 (2.0)	-34 (5.0) ▼	27 (3.8)	-8 (6.0)	68 (4.1)	42 (5.9) ▲
Singapore	75 (2.7)	0 (4.9)	24 (2.8)	-1 (4.9)	1 (0.4)	1 (0.4)
Slovak Republic	62 (3.8)	0 0	37 (3.8)	0 0	0 (0.3)	0 0
Slovenia	59 (3.1)	33 (4.7) ▲	41 (3.1)	-15 (5.2) ▼	0 (0.1)	-18 (3.4) ▼
Sweden	22 (2.7)	0 0	59 (3.5)	0 0	19 (2.7)	0 0
Tunisia	r 29 (3.8)	-4 (5.7)	69 (3.9)	39 (5.7) ▲	3 (1.4)	-35 (4.5) ▼
Ukraine	67 (3.9)	0 0	33 (3.9)	0 0	0 (0.0)	0 0
United States	r 43 (3.2)	-3 (4.5)	39 (3.1)	9 (4.3) ▲	17 (2.6)	-6 (3.6)
Yemen	49 (4.1)	0 0	38 (4.0)	0 0	13 (2.8)	0 0
International Avg.	52 (0.5)		34 (0.6)		14 (0.4)	
Benchmarking Participants						
Alberta, Canada	5 (1.3)	0 0	12 (2.5)	0 0	83 (2.8)	0 0
British Columbia, Canada	r 37 (4.2)	0 0	44 (4.2)	0 0	19 (3.3)	0 0
Dubai, UAE	s 60 (4.7)	0 0	35 (4.6)	0 0	5 (0.5)	0 0
Massachusetts, US	28 (6.2)	0 0	32 (7.1)	0 0	40 (7.7)	0 0
Minnesota, US	23 (6.2)	0 0	24 (6.6)	0 0	53 (6.4)	0 0
Ontario, Canada	21 (3.7)	-12 (5.9) ▼	59 (4.7)	14 (6.5) ▲	20 (3.4)	-2 (5.1)
Quebec, Canada	r 38 (4.9)	-2 (6.5)	28 (4.4)	10 (5.6)	34 (4.2)	-8 (6.3)

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



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

TIMSS2007
Science 8th Grade

Country	Percentage of Students Taught by Teachers Reporting Textbook Use						
	Use Textbook to Teach Science				Do Not Use Textbook to Teach Science		
	As Primary Basis for Lessons		As Supplementary Resource				
	Percent in 2007	Difference in Percent from 2003	Percent in 2007	Difference in Percent from 2003	Percent in 2007	Difference in Percent from 2003	
Algeria	r	55 (3.6)	0 0	41 (3.5)	0 0	4 (1.3)	0 0
Armenia	r	77 (2.0)	5 (3.3)	14 (1.5)	-9 (2.9) ▼	9 (1.3)	4 (1.7) ▲
Australia	r	28 (3.4)	-3 (5.5)	56 (3.6)	6 (5.2)	16 (3.0)	-3 (4.3)
Bahrain		50 (3.3)	-18 (4.2) ▼	34 (2.6)	1 (3.7)	17 (2.9)	17 (2.9) ▲
Bosnia and Herzegovina	r	58 (2.5)	0 0	31 (2.4)	0 0	11 (1.6)	0 0
Botswana		28 (3.7)	3 (5.4)	69 (3.8)	-2 (5.7)	3 (1.2)	-2 (2.3)
Bulgaria		81 (2.4)	--	16 (2.2)	--	2 (1.2)	--
Chinese Taipei		75 (3.5)	-7 (4.9)	19 (3.1)	5 (4.4)	6 (2.6)	2 (3.1)
Colombia		14 (2.7)	0 0	66 (4.1)	0 0	20 (3.3)	0 0
Cyprus	r	53 (1.2)	-9 (1.8) ▼	45 (1.2)	9 (1.6) ▲	2 (0.3)	0 (0.8)
Czech Republic		43 (2.4)	0 0	56 (2.5)	0 0	1 (0.4)	0 0
Egypt		48 (4.5)	-18 (6.0) ▼	47 (4.7)	14 (6.2) ▲	4 (1.6)	4 (1.7) ▲
El Salvador		13 (2.8)	0 0	76 (3.9)	0 0	11 (2.7)	0 0
England	s	13 (2.3)	-5 (4.5)	72 (2.8)	0 (5.1)	15 (2.4)	6 (3.6)
Georgia		79 (2.8)	0 0	20 (2.7)	0 0	1 (0.6)	0 0
Ghana		34 (3.7)	0 (5.8)	65 (3.8)	7 (6.1)	1 (0.7)	-7 (2.6) ▼
Hong Kong SAR		87 (3.1)	-4 (4.1)	10 (2.6)	2 (3.7)	3 (1.6)	2 (1.8)
Hungary		70 (2.8)	4 (3.5)	30 (2.8)	-5 (3.6)	1 (0.4)	1 (0.4)
Indonesia	s	63 (4.4)	42 (5.9) ▲	34 (4.1)	10 (6.0)	3 (1.8)	-51 (5.0) ▼
Iran, Islamic Rep. of		85 (2.7)	4 (4.0)	8 (1.8)	-4 (3.0)	7 (2.3)	0 (3.0)
Israel	r	46 (4.6)	2 (6.0)	52 (4.5)	2 (5.9)	1 (0.5)	-4 (1.8) ▼
Italy		62 (3.0)	-1 (4.6)	34 (2.7)	-2 (4.5)	4 (1.3)	2 (1.5)
Japan		57 (3.5)	-5 (5.3)	38 (3.7)	1 (5.3)	5 (1.6)	3 (1.9)
Jordan		61 (4.1)	-7 (5.7)	32 (4.0)	0 (5.6)	7 (2.2)	7 (2.2) ▲
Korea, Rep. of	s	73 (3.4)	-6 (4.5)	24 (3.3)	6 (4.4)	3 (1.3)	0 (1.9)
Kuwait	r	53 (5.4)	0 0	26 (4.2)	0 0	21 (3.9)	0 0
Lebanon		49 (3.8)	-1 (5.5)	37 (3.3)	-9 (5.0)	14 (2.7)	9 (3.1) ▲
Lithuania		68 (2.2)	-32 (2.2) ▼	32 (2.2)	32 (2.2) ▲	0 (0.2)	0 (0.2)
Malaysia		65 (4.3)	21 (5.8) ▲	30 (4.1)	-13 (5.6) ▼	4 (1.6)	-8 (3.2) ▼
Malta		28 (0.2)	0 0	54 (0.2)	0 0	18 (0.2)	0 0
Norway		84 (2.9)	-3 (3.7)	14 (2.7)	1 (3.6)	2 (1.0)	2 (1.0)
Oman		49 (4.4)	0 0	46 (4.3)	0 0	5 (2.0)	0 0
Palestinian Nat'l Auth.		63 (4.6)	-8 (5.9)	30 (4.2)	1 (5.6)	7 (2.2)	6 (2.2) ▲
Qatar	r	58 (0.2)	0 0	25 (0.2)	0 0	16 (0.1)	0 0
Romania		71 (2.6)	1 (3.5)	27 (2.5)	-2 (3.4)	2 (0.7)	1 (0.8)
Russian Federation		72 (2.2)	5 (3.9)	28 (2.2)	-4 (3.9)	0 (0.0)	0 (0.2)
Saudi Arabia	x x	--	--	x x	--	x x	--
Scotland	s	22 (3.2)	-8 (5.4)	68 (3.2)	8 (5.2)	10 (1.8)	1 (2.7)
Serbia		67 (2.4)	2 (3.3)	32 (2.3)	-2 (3.3)	1 (0.5)	0 (0.7)
Singapore		44 (2.5)	-29 (3.5) ▼	41 (2.3)	14 (3.4) ▲	15 (1.5)	15 (1.5) ▲
Slovenia		53 (2.6)	-6 (4.2)	47 (2.6)	6 (4.2)	0 (0.0)	-1 (0.4)
Sweden		51 (3.2)	11 (4.5) ▲	46 (3.3)	-11 (4.6) ▼	3 (0.8)	0 (1.4)
Syrian Arab Republic		55 (4.0)	0 0	31 (3.4)	0 0	14 (2.5)	0 0
Thailand		54 (4.3)	0 0	32 (3.8)	0 0	14 (3.0)	0 0
Tunisia		28 (3.6)	15 (4.5) ▲	71 (3.6)	-13 (4.8) ▼	1 (0.0)	-2 (1.4)
Turkey		52 (4.8)	0 0	45 (4.7)	0 0	3 (1.4)	0 0
Ukraine		48 (3.0)	0 0	50 (3.1)	0 0	2 (0.5)	0 0
United States	r	38 (2.7)	-2 (4.4)	58 (2.8)	3 (4.7)	5 (1.2)	-2 (2.1)
‡ Morocco		27 (3.3)	--	72 (3.2)	--	0 (0.4)	--
International Avg.		53 (0.5)		40 (0.5)		7 (0.3)	

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

Benchmarking Participants

Basque Country, Spain		86 (2.8)	12 (5.6) ▲	7 (2.1)	-14 (5.0) ▼	7 (2.5)	2 (3.1)
British Columbia, Canada	r	57 (4.0)	0 0	41 (4.0)	0 0	1 (0.9)	0 0
Dubai, UAE	s	64 (2.6)	0 0	30 (3.0)	0 0	6 (3.1)	0 0
Massachusetts, US		29 (5.0)	0 0	65 (6.0)	0 0	6 (3.6)	0 0
Minnesota, US		27 (6.0)	0 0	68 (6.9)	0 0	5 (3.8)	0 0
Ontario, Canada		43 (5.2)	0 (6.8)	54 (5.2)	1 (7.0)	4 (1.5)	0 (2.5)
Quebec, Canada	r	38 (4.5)	0 (6.9)	48 (4.7)	-3 (6.9)	14 (3.5)	3 (4.7)

Background data provided by teachers.

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

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

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

▲ 2007 percent significantly higher

▼ 2007 percent significantly lower

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

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



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

TIMSS2007
Science **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 10 (0.4)	s 22 (1.5)	s 14 (0.7)	s 12 (0.7)
Armenia	12 (0.5)	24 (0.6)	15 (0.4)	13 (0.4)
Australia	7 (0.3)	19 (0.8)	20 (0.8)	15 (0.7)
Bahrain	r 10 (0.3)	r 24 (0.9)	r 16 (0.4)	r 10 (0.3)
Bosnia and Herzegovina	s 6 (0.2)	s 34 (1.1)	s 20 (0.6)	s 13 (0.5)
Botswana	r 11 (0.5)	r 20 (1.3)	r 17 (1.0)	r 15 (0.9)
Bulgaria	r 6 (0.3)	r 30 (1.0)	r 17 (0.6)	r 13 (0.5)
Chinese Taipei	10 (0.5)	48 (1.5)	11 (0.6)	5 (0.4)
Colombia	11 (0.6)	17 (1.0)	18 (1.3)	18 (1.1)
Cyprus	s 12 (0.2)	s 23 (0.4)	s 18 (0.2)	s 10 (0.2)
Czech Republic	5 (0.2)	31 (0.6)	18 (0.3)	15 (0.4)
Egypt	s 11 (0.7)	s 28 (1.4)	s 13 (0.8)	s 11 (0.6)
El Salvador	12 (0.5)	16 (0.7)	16 (0.7)	14 (0.7)
England	r 7 (0.3)	r 16 (0.9)	r 28 (1.0)	r 20 (0.8)
Georgia	r 12 (0.4)	r 23 (1.4)	r 12 (0.4)	r 9 (0.4)
Ghana	r 11 (0.7)	r 16 (0.9)	r 17 (0.8)	r 14 (0.6)
Hong Kong SAR	9 (0.6)	39 (1.6)	15 (1.0)	8 (0.9)
Hungary	r 8 (0.2)	r 20 (0.7)	r 19 (0.5)	r 16 (0.4)
Indonesia	s 12 (0.5)	s 24 (1.1)	s 15 (0.8)	s 11 (0.5)
Iran, Islamic Rep. of	9 (0.3)	17 (0.7)	15 (0.6)	12 (0.5)
Israel	x x	x x	x x	x x
Italy	12 (0.4)	29 (0.7)	13 (0.4)	10 (0.4)
Japan	r 3 (0.3)	r 47 (1.5)	r 15 (1.0)	r 5 (0.8)
Jordan	13 (0.5)	20 (1.1)	17 (0.5)	12 (0.5)
Korea, Rep. of	r 5 (0.3)	r 49 (1.6)	r 9 (0.4)	r 8 (0.4)
Kuwait	x x	x x	x x	x x
Lebanon	s 16 (0.8)	s 18 (1.2)	s 19 (0.8)	s 8 (0.7)
Lithuania	8 (0.2)	12 (0.5)	22 (0.5)	23 (0.5)
Malaysia	r 13 (0.6)	r 24 (1.4)	r 15 (0.7)	r 11 (0.6)
Malta	10 (0.0)	31 (0.1)	15 (0.0)	10 (0.1)
Norway	8 (0.4)	27 (0.8)	18 (0.9)	16 (0.7)
Oman	r 10 (0.7)	r 21 (1.5)	r 16 (0.8)	r 13 (0.6)
Palestinian Nat'l Auth.	s 11 (0.5)	s 25 (1.3)	s 16 (0.7)	s 11 (0.5)
Qatar	s 11 (0.0)	s 25 (0.1)	s 13 (0.0)	s 12 (0.0)
Romania	9 (0.3)	24 (0.8)	19 (0.5)	13 (0.4)
Russian Federation	12 (0.3)	23 (0.5)	19 (0.4)	16 (0.4)
Saudi Arabia	x x	x x	x x	x x
Scotland	r 6 (0.2)	r 23 (0.6)	r 28 (0.7)	r 18 (0.8)
Serbia	r 5 (0.2)	r 39 (0.8)	r 19 (0.6)	r 11 (0.4)
Singapore	12 (0.3)	34 (0.8)	14 (0.5)	10 (0.3)
Slovenia	6 (0.2)	28 (0.7)	22 (0.6)	16 (0.4)
Sweden	r 5 (0.3)	25 (0.7)	29 (0.8)	r 15 (0.9)
Syrian Arab Republic	s 12 (0.6)	s 28 (1.4)	s 14 (0.6)	s 10 (0.5)
Thailand	11 (0.6)	21 (1.2)	14 (0.7)	11 (0.6)
Tunisia	r 9 (0.7)	r 14 (1.2)	r 26 (1.5)	r 14 (1.0)
Turkey	8 (0.3)	18 (0.8)	19 (0.9)	12 (0.6)
Ukraine	12 (0.3)	16 (0.8)	15 (0.4)	15 (0.4)
United States	9 (0.4)	20 (0.8)	18 (0.6)	15 (0.6)
‡ Morocco	s 9 (0.7)	s 15 (1.2)	s 20 (1.2)	s 13 (0.8)
International Avg.	9 (0.1)	25 (0.2)	17 (0.1)	13 (0.1)
Benchmarking Participants				
Basque Country, Spain	13 (0.7)	30 (1.4)	14 (0.9)	15 (1.1)
British Columbia, Canada	r 9 (0.4)	r 23 (1.1)	r 17 (0.7)	r 17 (0.9)
Dubai, UAE	s 10 (0.3)	s 24 (0.9)	s 17 (0.7)	s 14 (0.4)
Massachusetts, US	10 (0.7)	19 (1.3)	18 (1.7)	16 (0.9)
Minnesota, US	9 (0.9)	20 (1.6)	17 (2.2)	15 (1.2)
Ontario, Canada	11 (0.6)	23 (1.0)	16 (0.8)	17 (0.9)
Quebec, Canada	7 (0.6)	26 (1.1)	16 (1.0)	13 (0.7)

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

Background data provided by teachers.

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

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

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

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

TIMSS2007
Science **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 20 (1.3)	s 10 (0.7)	s 5 (0.3)	s 7 (0.6)
Armenia	13 (0.4)	11 (0.3)	6 (0.2)	5 (0.3)
Australia	11 (0.5)	7 (0.3)	10 (0.7)	12 (1.1)
Bahrain	r 13 (0.4)	r 12 (0.5)	r 8 (0.2)	r 7 (0.3)
Bosnia and Herzegovina	s 11 (0.4)	s 8 (0.3)	s 4 (0.2)	s 5 (0.4)
Botswana	r 13 (0.8)	r 11 (0.7)	r 6 (0.4)	r 7 (0.7)
Bulgaria	r 8 (0.3)	r 17 (0.6)	r 4 (0.4)	r 4 (0.4)
Chinese Taipei	9 (0.8)	8 (0.6)	4 (0.3)	3 (0.4)
Colombia	11 (0.6)	11 (0.6)	7 (0.5)	6 (0.5)
Cyprus	s 14 (0.2)	s 10 (0.1)	s 7 (0.2)	s 6 (0.2)
Czech Republic	10 (0.3)	10 (0.2)	5 (0.3)	6 (0.3)
Egypt	s 14 (0.8)	s 10 (0.5)	s 6 (0.4)	s 7 (0.5)
El Salvador	16 (0.7)	11 (0.5)	8 (0.4)	7 (0.5)
England	r 10 (0.4)	r 5 (0.2)	r 7 (0.4)	r 8 (0.6)
Georgia	r 9 (0.4)	r 18 (0.6)	r 6 (0.4)	r 10 (1.2)
Ghana	r 12 (0.7)	r 15 (0.6)	r 8 (0.5)	r 7 (0.4)
Hong Kong SAR	8 (0.4)	8 (0.9)	5 (0.4)	8 (1.0)
Hungary	r 13 (0.4)	r 14 (0.3)	r 4 (0.2)	r 7 (0.4)
Indonesia	s 12 (0.5)	s 13 (0.7)	s 7 (0.3)	s 7 (0.3)
Iran, Islamic Rep. of	15 (0.6)	14 (0.6)	8 (0.5)	9 (0.4)
Israel	xx	xx	xx	xx
Italy	16 (0.6)	10 (0.4)	5 (0.3)	5 (0.4)
Japan	r 14 (0.7)	r 5 (0.5)	r 2 (0.3)	r 8 (1.3)
Jordan	14 (0.5)	12 (0.5)	6 (0.3)	6 (0.4)
Korea, Rep. of	r 13 (0.8)	r 6 (0.4)	r 6 (0.5)	r 5 (0.5)
Kuwait	xx	xx	xx	xx
Lebanon	s 14 (0.9)	s 14 (0.6)	s 6 (0.4)	s 6 (0.4)
Lithuania	14 (0.4)	14 (0.5)	3 (0.2)	r 3 (0.3)
Malaysia	r 13 (0.8)	r 10 (0.5)	r 9 (0.7)	r 6 (0.5)
Malta	13 (0.1)	5 (0.0)	9 (0.1)	7 (0.0)
Norway	12 (0.4)	6 (0.3)	4 (0.3)	9 (0.8)
Oman	r 14 (0.8)	r 11 (0.7)	r 5 (0.3)	r 9 (0.9)
Palestinian Nat'l Auth.	s 14 (0.8)	s 10 (0.4)	s 6 (0.4)	s 7 (0.4)
Qatar	s 12 (0.0)	s 10 (0.0)	s 7 (0.0)	s 11 (0.0)
Romania	11 (0.5)	14 (0.5)	5 (0.2)	5 (0.2)
Russian Federation	9 (0.2)	15 (0.4)	1 (0.1)	4 (0.2)
Saudi Arabia	xx	xx	xx	xx
Scotland	r 9 (0.3)	r 4 (0.2)	r 7 (0.3)	r 5 (0.3)
Serbia	r 11 (0.3)	r 8 (0.3)	r 3 (0.2)	r 5 (0.4)
Singapore	9 (0.3)	8 (0.3)	7 (0.4)	5 (0.4)
Slovenia	13 (0.4)	5 (0.3)	4 (0.2)	7 (0.5)
Sweden	r 11 (0.3)	r 7 (0.2)	r 4 (0.2)	r 5 (0.6)
Syrian Arab Republic	s 14 (0.8)	s 11 (0.5)	s 6 (0.3)	s 6 (0.3)
Thailand	18 (0.8)	11 (0.5)	8 (0.4)	7 (0.4)
Tunisia	r 18 (1.0)	r 11 (0.9)	r 5 (0.4)	r 5 (0.5)
Turkey	15 (0.8)	9 (0.6)	9 (0.6)	8 (0.4)
Ukraine	20 (0.8)	14 (0.4)	3 (0.1)	6 (0.4)
United States	11 (0.4)	9 (0.3)	7 (0.3)	12 (0.9)
‡ Morocco	s 19 (1.0)	s 13 (0.9)	s 5 (0.4)	s 6 (1.1)
International Avg.	13 (0.1)	10 (0.1)	6 (0.1)	7 (0.1)
Benchmarking Participants				
Basque Country, Spain	9 (0.7)	8 (0.5)	6 (0.4)	6 (1.2)
British Columbia, Canada	r 10 (0.6)	r 9 (0.4)	r 5 (0.5)	r 10 (1.1)
Dubai, UAE	s 10 (0.5)	s 10 (0.4)	s 6 (0.5)	s 9 (0.3)
Massachusetts, US	12 (0.6)	9 (0.5)	6 (0.7)	11 (1.7)
Minnesota, US	11 (0.8)	8 (0.6)	7 (0.5)	12 (1.9)
Ontario, Canada	10 (0.5)	8 (0.4)	7 (0.7)	9 (1.2)
Quebec, Canada	9 (0.6)	8 (0.5)	10 (0.8)	10 (1.0)

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



How Are Computers Used in Science Classes?

Exhibit 7.10 shows the number of countries with a policy on computer use in their national curriculum, changes in the percentages of students whose teachers reported that computers were available, and the percentages of students being asked to use computers for various activities in about half the science lessons or more. At the fourth grade, 13 of the countries had policies about computer use as part of their curriculum as did three of the benchmarking participants. On average, about half (49%) of students had teachers who reported that computers were available for science class. However, in some countries, including Algeria, Iran, and the Ukraine, computers were available for less than 10 percent of the students, whereas in countries such as Denmark, Japan, New Zealand, Scotland, and Singapore, at least 80 percent of students had access to computers in science class.

The percentage of students with access to computers increased since 2003 in seven countries—Chinese Taipei, Lithuania, the Netherlands, the Russian Federation, Slovenia, Tunisia, the United States—and the province of Quebec. There was a decrease only in England. Despite the relatively high level of availability of computers in science class, fourth-grade teachers reported little usage for instructional purposes. The most common application at the fourth grade was looking up ideas and information, with 12 percent of students using a computer for this in about half of the science lessons, according to their teachers. The highest percentages were in Australia (29%), Denmark (25%), Hong Kong SAR (32%), Kuwait (20%), New Zealand (38%), Qatar (26%), Scotland (34%), as well as the benchmarking participants of Dubai (51%), Massachusetts (27%), and Quebec (30%).

At the eighth grade, 21 countries and 2 benchmarking participants had a policy statement about computer use in their curriculum. Ten countries had increases in computer availability between 2003 and 2007, including Armenia, Botswana, Iran, Lebanon, Malaysia, Norway, Romania, the Russian Federation, Serbia, and Slovenia, together with the provinces of Ontario and Quebec. In 2007, on average internationally, teachers reported availability of computers for 41 percent of the eighth-grade students. As at

fourth grade, computer use in eighth-grade science classes was relatively infrequent. Highest level of use was reported in Armenia, where more than 20 percent of students used the computer in at least half the science lessons for doing scientific procedures or experiments, studying natural phenomena through simulations, practicing skills and procedures, looking up ideas and information, and processing and analyzing data.

Exhibit 7.10 Computer Use in Science Class with Trends

TIMSS2007
Science 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	Doing Scientific Procedures or Experiments	Studying Natural Phenomena Through Simulations	Practicing Skills and Procedures	Looking Up Ideas and Information
Algeria	●	5 (2.1)	∅ ∅	0 (0.0)	0 (0.0)	3 (1.6)	4 (1.8)
Armenia	●	72 (3.5)	--	--	--	--	--
Australia	●	78 (2.8)	-6 (4.1)	2 (1.2)	3 (1.5)	6 (1.9)	29 (3.9)
Austria	○	74 (3.0)	∅ ∅	0 (0.0)	1 (0.8)	3 (0.9)	11 (1.9)
Chinese Taipei	●	53 (4.1)	17 (5.7) ▲	5 (2.1)	5 (2.1)	2 (1.4)	4 (1.8)
Colombia	○	16 (3.0)	∅ ∅	1 (0.8)	2 (1.1)	3 (1.3)	6 (1.8)
Czech Republic	○	54 (3.7)	∅ ∅	1 (0.7)	1 (0.7)	3 (1.6)	4 (1.9)
Denmark	○	r 91 (2.2)	∅ ∅	r 2 (1.4)	r 3 (1.1)	r 11 (3.3)	r 25 (3.9)
El Salvador	○	18 (3.5)	∅ ∅	2 (1.1)	3 (1.5)	4 (1.6)	7 (2.3)
England	●	r 77 (3.7)	-11 (4.7) ▼	7 (2.5)	9 (2.5)	8 (2.6)	17 (3.1)
Georgia	○	15 (3.4)	∅ ∅	0 (0.4)	1 (0.7)	2 (1.4)	0 (0.0)
Germany	●	64 (3.6)	∅ ∅	1 (0.4)	1 (0.8)	2 (1.0)	13 (2.2)
Hong Kong SAR	●	71 (4.1)	7 (6.3)	3 (1.7)	7 (2.4)	10 (2.9)	32 (4.3)
Hungary	○	24 (3.7)	0 (5.4)	0 (0.0)	0 (0.3)	2 (1.2)	2 (1.2)
Iran, Islamic Rep. of	○	2 (0.7)	-2 (1.9)	1 (0.3)	0 (0.0)	0 (0.1)	0 (0.2)
Italy	●	25 (2.6)	6 (3.7)	3 (1.2)	3 (1.3)	3 (1.1)	6 (1.5)
Japan	●	84 (2.9)	-5 (4.0)	0 (0.3)	8 (2.0)	0 (0.0)	4 (1.5)
Kazakhstan	○	38 (5.0)	∅ ∅	0 (0.3)	3 (1.5)	8 (3.2)	9 (3.1)
Kuwait	○	r 39 (4.3)	∅ ∅	r 12 (3.2)	r 9 (2.7)	r 20 (3.2)	r 20 (3.6)
Latvia	○	37 (3.6)	--	1 (0.5)	1 (0.4)	2 (0.7)	12 (2.8)
Lithuania	●	37 (3.8)	29 (4.4) ▲	0 (0.0)	0 (0.0)	2 (1.3)	13 (2.4)
Morocco	○	17 (3.3)	--	1 (0.6)	3 (1.3)	2 (1.1)	6 (2.6)
Netherlands	○	62 (4.7)	24 (6.8) ▲	1 (1.0)	0 (0.2)	0 (0.2)	13 (3.0)
New Zealand	○	r 89 (1.7)	4 (3.1)	3 (0.8)	6 (1.4)	5 (1.3)	38 (2.6)
Norway	●	61 (3.8)	7 (5.7)	1 (0.7)	2 (1.1)	1 (0.0)	3 (1.3)
Qatar	○	r 51 (0.2)	∅ ∅	r 10 (0.1)	r 14 (0.1)	r 24 (0.2)	r 26 (0.2)
Russian Federation	○	16 (2.1)	12 (2.5) ▲	1 (0.7)	2 (0.9)	1 (0.8)	4 (1.2)
Scotland	●	s 89 (2.8)	9 (5.2)	r 4 (1.5)	r 4 (1.6)	r 9 (2.7)	r 34 (3.7)
Singapore	●	80 (2.6)	3 (4.3)	12 (2.2)	8 (1.6)	17 (2.5)	19 (2.5)
Slovak Republic	○	51 (4.0)	∅ ∅	1 (0.8)	1 (0.7)	6 (1.7)	14 (2.7)
Slovenia	○	53 (3.0)	30 (4.9) ▲	1 (0.9)	1 (0.8)	4 (1.1)	10 (2.0)
Sweden	○	77 (2.6)	∅ ∅	2 (1.0)	0 (0.0)	2 (1.1)	8 (1.8)
Tunisia	○	31 (3.7)	16 (5.0) ▲	10 (2.3)	9 (2.2)	11 (2.3)	11 (2.4)
Ukraine	○	8 (2.3)	∅ ∅	0 (0.0)	0 (0.0)	1 (0.9)	1 (0.8)
United States	○	77 (2.6)	9 (3.6) ▲	5 (1.4)	4 (1.2)	8 (1.4)	19 (2.2)
Yemen	○	24 (4.5)	∅ ∅	2 (1.5)	2 (1.2)	9 (3.4)	13 (3.8)
International Avg.		49 (0.6)		3 (0.2)	3 (0.2)	6 (0.3)	12 (0.4)

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

Benchmarking Participants

Alberta, Canada	●	78 (3.1)	∅ ∅	6 (1.9)	4 (1.5)	8 (1.7)	16 (2.8)
British Columbia, Canada	●	r 58 (4.4)	∅ ∅	r 4 (2.4)	r 5 (2.7)	r 6 (2.5)	r 16 (2.8)
Dubai, UAE	○	s 70 (2.6)	∅ ∅	s 23 (4.6)	s 20 (4.7)	s 27 (4.4)	s 51 (3.9)
Massachusetts, US	○	73 (4.5)	∅ ∅	4 (2.3)	3 (2.1)	6 (2.8)	27 (4.7)
Minnesota, US	○	56 (6.7)	∅ ∅	2 (1.6)	3 (2.1)	4 (2.3)	4 (2.5)
Ontario, Canada	●	62 (4.2)	0 (6.2)	6 (2.8)	8 (3.8)	7 (2.8)	19 (4.5)
Quebec, Canada	○	72 (4.5)	18 (6.4) ▲	4 (1.6)	5 (1.9)	6 (1.8)	30 (4.4)

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



Exhibit 7.10 Computer Use in Science Class with Trends (Continued)

TIMSS2007
Science 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	Doing Scientific Procedures or Experiments	Studying Natural Phenomena Through Simulations	Practicing Skills and Procedures	Looking Up Ideas and Information	Processing and Analyzing Data	
Algeria	○	r 37 (3.4)	◇ 0	r 6 (1.7)	r 6 (1.5)	r 8 (1.7)	r 13 (2.2)	r 12 (2.0)	
Armenia	○	s 53 (3.1)	30 (4.1) ▲	r 25 (2.2)	r 26 (2.3)	r 28 (2.8)	r 26 (2.2)	r 28 (2.8)	
Australia	●	r 61 (3.6)	-13 (5.2) ▼	r 4 (1.5)	r 2 (1.0)	r 5 (1.3)	r 10 (2.1)	r 5 (1.7)	
Bahrain	○	s 35 (2.8)	-20 (4.6) ▼	r 3 (0.4)	r 7 (1.1)	r 11 (1.7)	r 11 (2.0)	r 8 (1.1)	
Bosnia and Herzegovina	○	s 21 (2.3)	◇ 0	r 2 (0.5)	r 2 (0.6)	r 3 (0.6)	r 5 (0.8)	r 3 (0.6)	
Botswana	●	s 14 (2.8)	9 (3.5) ▲	r 0 (0.0)	r 1 (0.0)	r 1 (0.0)	r 0 (0.0)	r 1 (0.0)	
Bulgaria	○	s 56 (3.0)	--	r 0 (0.3)	r 1 (0.3)	r 5 (1.5)	r 10 (1.8)	r 4 (1.2)	
Chinese Taipei	●	s 34 (4.0)	-10 (5.6)	r 1 (0.0)	r 2 (1.1)	r 1 (0.0)	r 3 (1.3)	r 3 (1.3)	
Colombia	○	s 22 (3.9)	◇ 0	r 3 (1.3)	r 2 (1.3)	r 5 (1.8)	r 11 (2.8)	r 6 (2.2)	
Cyprus	○	r 19 (1.0)	0 (1.3)	r 1 (0.2)	r 1 (0.2)	r 1 (0.3)	r 3 (0.4)	r 2 (0.3)	
Czech Republic	○	r 77 (2.6)	◇ 0	r 2 (0.6)	r 3 (0.7)	r 7 (1.3)	r 10 (1.4)	r 3 (0.8)	
Egypt	○	--	--	--	--	--	--	--	
El Salvador	○	s 31 (3.5)	◇ 0	r 1 (0.0)	r 2 (1.3)	r 5 (1.8)	r 13 (2.6)	r 6 (1.5)	
England	●	s 66 (3.1)	-4 (5.0)	r 1 (0.3)	r 4 (1.2)	r 3 (1.1)	r 8 (1.7)	r 3 (1.0)	
Georgia	○	s 21 (2.8)	◇ 0	r 1 (0.3)	r 1 (0.4)	r 2 (0.6)	r 4 (1.0)	r 3 (0.7)	
Ghana	○	s 5 (2.1)	-4 (3.6)	r 0 (0.0)	r 2 (1.4)	r 1 (0.0)	r 2 (1.1)	r 2 (1.1)	
Hong Kong SAR	●	s 55 (5.3)	-1 (7.0)	r 13 (3.3)	r 7 (2.6)	r 6 (2.2)	r 12 (3.2)	r 8 (2.6)	
Hungary	●	s 43 (3.2)	2 (4.3)	r 2 (0.9)	r 1 (0.6)	r 3 (0.7)	r 4 (1.0)	r 3 (0.8)	
Indonesia	○	s 22 (4.0)	8 (4.7)	r 0 (0.0)	r 1 (0.5)	r 4 (1.7)	r 2 (1.3)	r 2 (1.1)	
Iran, Islamic Rep. of	○	s 6 (1.7)	5 (1.9) ▲	r 1 (0.8)	r 1 (0.9)	r 2 (1.0)	r 3 (1.2)	r 2 (0.9)	
Israel	●	s 57 (4.2)	6 (5.9)	r 6 (1.9)	r 3 (1.5)	r 8 (2.2)	r 8 (2.4)	r 5 (1.9)	
Italy	●	s 37 (3.0)	2 (4.8)	r 3 (1.0)	r 2 (0.9)	r 3 (1.2)	r 4 (1.4)	r 3 (1.2)	
Japan	●	s 78 (3.2)	-2 (4.7)	r 0 (0.0)	r 3 (1.4)	r 0 (0.0)	r 4 (1.7)	r 1 (0.8)	
Jordan	●	s 18 (3.2)	0 (4.8)	r 3 (1.4)	r 4 (1.5)	r 3 (1.2)	r 9 (2.5)	r 6 (1.8)	
Korea, Rep. of	●	r 77 (3.3)	-9 (4.2) ▼	r 25 (3.4)	r 22 (3.3)	r 13 (2.7)	r 22 (3.6)	r 16 (3.0)	
Kuwait	●	r 36 (4.7)	◇ 0	r 10 (3.0)	r 16 (3.5)	r 17 (3.6)	r 18 (3.7)	r 15 (3.2)	
Lebanon	○	s 32 (3.7)	15 (4.4) ▲	r 6 (2.8)	r 3 (1.2)	r 5 (1.4)	r 12 (3.2)	r 8 (2.8)	
Lithuania	●	s 73 (2.2)	1 (3.5)	r 1 (0.5)	r 3 (0.8)	r 9 (1.2)	r 21 (2.0)	r 9 (1.2)	
Malaysia	●	s 54 (4.4)	39 (5.4) ▲	r 9 (2.4)	r 17 (3.5)	r 10 (2.3)	r 21 (3.3)	r 9 (2.5)	
Malta	●	s 30 (0.2)	◇ 0	r 1 (0.0)	r 1 (0.0)	r 2 (0.1)	r 4 (0.1)	r 1 (0.1)	
Norway	●	s 77 (3.5)	16 (5.2) ▲	r 5 (1.6)	r 0 (0.3)	r 4 (1.8)	r 11 (2.3)	r 4 (1.2)	
Oman	○	s 29 (3.8)	◇ 0	r 3 (1.5)	r 3 (1.3)	r 4 (1.6)	r 7 (2.0)	r 3 (1.5)	
Palestinian Nat'l Auth.	●	s 25 (3.5)	-6 (5.2)	r 1 (0.7)	r 2 (1.1)	r 3 (1.3)	r 6 (1.9)	r 3 (1.5)	
Qatar	○	s 27 (0.1)	◇ 0	r 5 (0.1)	r 5 (0.1)	r 8 (0.1)	r 10 (0.1)	r 10 (0.1)	
Romania	○	s 64 (3.4)	43 (4.3) ▲	r 6 (1.2)	r 5 (1.1)	r 9 (1.4)	r 12 (1.7)	r 8 (1.4)	
Russian Federation	○	s 48 (3.1)	36 (3.6) ▲	r 1 (0.3)	r 2 (0.7)	r 4 (1.0)	r 9 (1.5)	r 3 (0.9)	
Saudi Arabia	○	s 23 (3.8)	--	r 3 (1.4)	r 3 (1.0)	r 8 (2.2)	r 9 (2.6)	r 5 (1.6)	
Scotland	●	s 74 (2.4)	6 (4.3)	r 1 (0.6)	r 2 (0.8)	r 2 (0.6)	r 5 (1.1)	r 1 (0.3)	
Serbia	○	s 26 (2.5)	14 (3.0) ▲	r 0 (0.2)	r 1 (0.4)	r 1 (0.5)	r 3 (0.7)	r 2 (0.5)	
Singapore	●	s 66 (2.3)	-13 (3.2) ▼	r 3 (0.8)	r 3 (0.8)	r 5 (1.3)	r 9 (1.3)	r 3 (0.9)	
Slovenia	○	s 64 (2.7)	14 (3.9) ▲	r 2 (0.8)	r 2 (0.6)	r 3 (0.8)	r 8 (1.5)	r 5 (1.1)	
Sweden	○	s 60 (3.1)	-4 (4.5)	r 1 (0.5)	r 0 (0.0)	r 1 (0.4)	r 8 (1.6)	r 2 (0.7)	
Syrian Arab Republic	○	s 23 (2.9)	◇ 0	r 4 (1.2)	r 4 (1.2)	r 4 (1.6)	r 7 (1.5)	r 7 (1.7)	
Thailand	○	s 38 (4.4)	◇ 0	r 7 (1.9)	r 9 (2.4)	r 9 (2.5)	r 14 (3.1)	r 9 (2.5)	
Tunisia	○	s 14 (2.7)	-22 (5.1) ▼	r 1 (0.9)	r 4 (1.5)	r 3 (1.4)	r 3 (1.4)	r 3 (1.4)	
Turkey	●	s 41 (4.1)	◇ 0	r 6 (2.3)	r 14 (3.1)	r 14 (3.0)	r 19 (3.3)	r 15 (3.2)	
Ukraine	○	s 17 (2.4)	◇ 0	r 0 (0.1)	r 1 (0.4)	r 2 (0.7)	r 3 (0.6)	r 2 (0.5)	
United States	○	r 74 (2.6)	2 (3.9)	r 4 (1.2)	r 5 (1.3)	r 10 (2.0)	r 18 (2.5)	r 9 (1.4)	
‡ Morocco	●	s 15 (3.8)	--	r 1 (0.7)	r 2 (0.9)	r 1 (0.6)	r 4 (1.8)	r 4 (1.5)	
International Avg.		41 (0.5)		4 (0.2)	4 (0.2)	5 (0.2)	9 (0.3)	6 (0.2)	
Benchmarking Participants									
Basque Country, Spain	○	s 66 (3.7)	5 (6.0)	r 2 (1.2)	r 2 (1.2)	r 5 (2.3)	r 11 (3.2)	r 8 (2.8)	
British Columbia, Canada	●	r 59 (3.8)	◇ 0	r 2 (1.4)	r 2 (1.4)	r 2 (1.3)	r 9 (2.7)	r 3 (1.8)	
Dubai, UAE	○	s 37 (2.8)	◇ 0	s 6 (0.8)	s 7 (1.6)	s 14 (2.2)	s 22 (2.3)	s 15 (1.4)	
Massachusetts, US	○	s 59 (7.0)	◇ 0	r 4 (2.6)	r 4 (2.5)	r 7 (3.5)	r 16 (5.7)	r 2 (1.2)	
Minnesota, US	○	s 62 (7.0)	◇ 0	r 1 (1.0)	r 3 (3.0)	r 2 (2.1)	r 9 (4.9)	r 3 (3.1)	
Ontario, Canada	●	s 71 (3.9)	22 (6.0) ▲	r 6 (2.2)	r 4 (1.8)	r 5 (2.0)	r 10 (2.8)	r 6 (2.0)	
Quebec, Canada	○	r 60 (5.0)	19 (7.2) ▲	r 1 (0.8)	r 2 (1.5)	r 3 (1.6)	r 12 (3.7)	r 7 (3.1)	

● 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 7.11 presents teachers' reports about their emphasis on homework. For the Index of Teachers' Emphasis on Science Homework (ESH), 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 nine countries and one benchmarking participant had a policy about assigning science homework. Also, there were not many changes between 2003 and 2007, except in Singapore where fewer students were in the low category and more were in the high category, and Chinese Taipei, where the pattern was reversed. In 2007, internationally on average, almost two-thirds of the students (65%) were in the low category and only 7 percent were in the high category. Only 14 countries had more than a few percent of their fourth-grade students at the high level of the index, and these students had lower average science achievement than students at the other two levels, perhaps because in these countries teachers mainly assigned homework as a remedial exercise to the weaker students.

At the eighth grade, teachers placed more emphasis on science homework than they did at the fourth grade, but there was still substantial variation. Sixteen countries reported having a policy about assigning science homework. Countries with most students in the high category included Italy (42%), Colombia (39%), and Ghana (35%). Eighteen countries and four benchmarking participants had more than half their students in the low category. Only two countries were assigning more homework in 2007 than in 2003—Tunisia and Australia—whereas less homework was assigned in

nine countries—the Russian Federation, Armenia, England, Malaysia, Egypt, Jordan, Lithuania, Slovenia, and Bahrain. There was a curvilinear relationship between teachers assigning science homework and science achievement, with students in the medium category having higher average achievement, across countries, than students in the high or low category.

For students at the eighth grade, Exhibit 7.12 presents teachers' reports about how they used homework in their science instruction. Internationally on average, the teachers reported always or almost always monitoring whether the homework was completed for 78 percent of the students. Sixty-three percent of the students, on average, had teachers who reported correcting students' assignments and giving them feedback. Among less frequent uses, teachers reported using homework to contribute to grades or marks for 38 percent of the students, use homework as a basis for class discussion for 27 percent, and have the students correct their own homework in class for 24 percent.

For students at the eighth grade, Exhibit 7.13 shows trends in how frequently teachers assign four different types of science homework. Assigning problem or question sets and reading from a textbook were the most common form of homework, with 38 percent and 35 percent of students, respectively, having teachers who always use that type when they assign homework. Short writing assignments (23%) or work on small investigations (10%) were less common.

Exhibit 7.11 Index of Teachers' Emphasis on Science Homework (ESH) with Trends
TIMSS2007
Science 4th Grade

Country	Have Policy to Assign Science Homework	High ESH			Medium ESH			Low ESH		
		2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003
Italy	○	30 (3.0)	533 (5.0)	6 (4.3)	34 (3.0)	531 (4.9)	1 (4.2)	36 (3.1)	542 (4.5)	-7 (4.8)
Singapore	○	25 (2.6)	576 (8.9)	12 (3.9) ▲	30 (2.5)	600 (7.4)	5 (4.1)	45 (2.5)	585 (6.1)	-17 (4.9) ▼
Kazakhstan	○	24 (3.8)	534 (7.8)	0 0	75 (3.9)	533 (7.0)	0 0	1 (1.0)	~ ~	0 0
Colombia	○	23 (3.7)	390 (12.4)	0 0	49 (4.6)	397 (8.9)	0 0	28 (4.4)	417 (14.8)	0 0
Algeria	●	19 (3.1)	357 (8.3)	0 0	38 (4.9)	341 (14.3)	0 0	43 (4.7)	364 (9.0)	0 0
Armenia	○	17 (3.6)	487 (17.5)	--	32 (3.3)	482 (10.1)	--	50 (4.3)	488 (9.1)	--
Russian Federation	○	16 (3.3)	527 (14.0)	0 (4.5)	79 (3.4)	552 (5.5)	-1 (4.8)	5 (1.3)	510 (10.1)	2 (1.8)
Tunisia	○	15 (3.0)	322 (15.8)	4 (4.1)	30 (3.9)	319 (11.9)	0 (5.6)	55 (4.0)	311 (9.7)	-4 (6.1)
Georgia	●	13 (3.1)	443 (9.9)	0 0	49 (5.1)	415 (6.9)	0 0	38 (4.6)	410 (6.0)	0 0
El Salvador	○	11 (2.8)	406 (9.6)	0 0	56 (4.4)	384 (6.5)	0 0	33 (4.4)	391 (7.3)	0 0
Iran, Islamic Rep. of	●	11 (2.5)	418 (13.0)	-2 (4.0)	27 (3.5)	453 (8.5)	-4 (5.9)	62 (3.7)	431 (5.9)	5 (6.2)
Morocco	●	9 (2.6)	303 (33.9)	--	25 (3.6)	283 (16.9)	--	66 (4.3)	304 (7.9)	--
Yemen	●	8 (2.9)	206 (26.0)	0 0	55 (4.6)	197 (10.5)	0 0	36 (4.4)	194 (12.5)	0 0
Ukraine	●	7 (2.2)	482 (11.6)	0 0	89 (2.5)	473 (3.2)	0 0	3 (1.4)	489 (8.5)	0 0
Latvia	-	3 (1.4)	548 (18.4)	--	56 (3.9)	545 (3.0)	--	40 (4.1)	541 (3.8)	--
Slovenia	○	3 (1.1)	526 (18.1)	-1 (2.0)	11 (1.8)	522 (5.6)	0 (3.3)	87 (2.0)	518 (2.0)	0 (3.8)
Kuwait	-	r 2 (1.5)	~ ~	0 0	15 (3.2)	373 (14.9)	0 0	83 (3.0)	340 (6.2)	0 0
Hungary	○	2 (0.9)	~ ~	1 (1.1)	59 (4.1)	542 (4.7)	-4 (6.1)	39 (4.2)	529 (7.0)	3 (6.1)
United States	○	r 2 (0.9)	~ ~	1 (1.1)	14 (2.2)	547 (5.5)	1 (3.0)	84 (2.3)	538 (3.2)	-2 (3.2)
Qatar	●	r 2 (0.0)	~ ~	0 0	36 (0.2)	294 (3.3)	0 0	63 (0.2)	281 (3.1)	0 0
England	○	r 2 (1.3)	~ ~	-1 (1.9)	10 (2.5)	538 (8.0)	-2 (4.5)	88 (2.6)	540 (3.1)	3 (4.8)
Slovak Republic	●	2 (0.9)	~ ~	0 0	16 (2.9)	521 (9.8)	0 0	82 (2.9)	528 (5.0)	0 0
Lithuania	●	2 (1.0)	~ ~	0 (1.3)	21 (2.6)	519 (4.1)	3 (3.5)	77 (2.7)	513 (2.6)	-4 (3.7)
Netherlands	○	r 1 (0.9)	~ ~	1 (1.0)	10 (2.9)	518 (9.5)	2 (4.1)	89 (3.0)	523 (3.1)	-3 (4.2)
Czech Republic	○	1 (1.0)	~ ~	0 0	3 (1.3)	522 (16.9)	0 0	96 (1.6)	514 (3.1)	0 0
Chinese Taipei	○	1 (0.8)	~ ~	-7 (2.6) ▼	16 (3.1)	556 (4.4)	-3 (4.5)	83 (3.0)	556 (2.3)	9 (4.5) ▲
Norway	○	1 (0.7)	~ ~	-2 (1.6)	5 (1.9)	483 (6.6)	2 (2.4)	94 (2.0)	476 (3.6)	0 (2.8)
Sweden	○	0 (0.3)	~ ~	0 0	9 (2.4)	535 (8.6)	0 0	90 (2.4)	524 (2.9)	0 0
New Zealand	○	r 0 (0.3)	~ ~	-1 (0.7)	5 (1.3)	516 (12.0)	1 (1.6)	95 (1.3)	505 (2.7)	0 (1.7)
Scotland	○	s 0 (0.0)	~ ~	0 (0.0)	4 (2.0)	472 (11.2)	1 (2.7)	95 (2.1)	502 (2.5)	-1 (2.8)
Germany	○	0 (0.0)	~ ~	0 0	13 (2.2)	525 (5.2)	0 0	87 (2.2)	528 (2.6)	0 0
Hong Kong SAR	○	r 0 (0.4)	~ ~	-1 (1.0)	8 (2.5)	552 (16.9)	-27 (5.2) ▼	92 (2.5)	554 (3.7)	27 (5.3) ▲
Denmark	○	r 0 (0.3)	~ ~	0 0	2 (0.7)	~ ~	0 0	98 (0.8)	518 (3.1)	0 0
Australia	○	r 0 (0.0)	~ ~	0 (0.4)	2 (1.2)	~ ~	-3 (1.8)	98 (1.2)	527 (4.1)	3 (1.9)
Austria	○	0 (0.0)	~ ~	0 0	1 (0.4)	~ ~	0 0	99 (0.4)	525 (2.8)	0 0
Japan	○	0 (0.0)	~ ~	0 (0.0)	8 (2.1)	559 (3.5)	-1 (3.2)	92 (2.1)	547 (2.2)	1 (3.2)
International Avg.		7 (0.3)	441 (4.0)		28 (0.5)	473 (1.6)		65 (0.5)	473 (1.0)	
Benchmarking Participants										
Dubai, UAE	●	s 2 (1.7)	~ ~	0 0	53 (4.8)	450 (9.0)	0 0	45 (4.9)	445 (8.8)	0 0
British Columbia, Canada	○	r 1 (1.1)	~ ~	0 0	8 (2.1)	538 (12.3)	0 0	91 (2.4)	536 (3.3)	0 0
Ontario, Canada	○	0 (0.4)	~ ~	-2 (1.9)	9 (2.3)	537 (15.3)	-3 (4.2)	91 (2.3)	534 (4.1)	5 (4.6)
Quebec, Canada	○	r 0 (0.0)	~ ~	-2 (1.2)	5 (1.8)	503 (11.3)	-3 (3.1)	95 (1.8)	520 (2.9)	5 (3.3)
Alberta, Canada	○	0 (0.0)	~ ~	0 0	4 (1.4)	553 (9.8)	0 0	96 (1.4)	542 (4.1)	0 0
Massachusetts, US	○	0 (0.0)	~ ~	0 0	7 (3.6)	585 (19.4)	0 0	93 (3.6)	571 (4.4)	0 0
Minnesota, US	○	r 0 (0.0)	~ ~	0 0	3 (2.5)	564 (7.1)	0 0	97 (2.5)	557 (5.8)	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 science homework and how many minutes of science homework they usually assign. High level indicates the assignment of more than 30 minutes of homework about half of the lessons or more. Low level indicates no assignment or the assignment of less than 30 minutes of homework about half of the lessons or less. Medium level includes all other possible combinations of responses.

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



Exhibit 7.12 Use of Science Homework

TIMSS2007
Science 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	r	82 (2.4)	r	71 (2.4)	r	41 (3.3)	r	37 (3.2)	r	59 (3.4)
Armenia		52 (3.2)		37 (2.3)		27 (1.9)		25 (2.7)		24 (1.9)
Australia		62 (3.5)		62 (3.3)		16 (2.4)		15 (2.3)		26 (3.1)
Bahrain		79 (2.4)		76 (2.0)		11 (1.7)		46 (2.5)		59 (2.4)
Bosnia and Herzegovina		67 (2.2)		55 (2.7)		19 (1.8)		21 (1.9)		19 (2.0)
Botswana		98 (1.3)		89 (2.8)		27 (4.0)		26 (3.8)		13 (3.2)
Bulgaria		83 (2.1)		51 (3.1)		33 (3.2)		23 (2.5)		16 (2.1)
Chinese Taipei		61 (3.8)		49 (4.1)		47 (4.2)		48 (4.3)		51 (4.1)
Colombia		80 (3.7)		82 (3.2)		11 (2.7)		39 (5.0)		62 (4.5)
Cyprus	r	86 (0.7)	r	81 (0.9)	r	14 (0.7)	r	32 (1.0)	r	55 (1.1)
Czech Republic		74 (2.0)		46 (2.3)		16 (1.6)		17 (1.5)		17 (1.7)
Egypt		89 (2.7)		86 (2.7)		7 (2.1)		47 (4.4)		66 (3.5)
El Salvador		94 (1.9)		82 (3.3)		22 (3.3)		42 (4.3)		61 (4.6)
England		85 (2.2)		60 (2.9)		7 (1.4)		11 (1.7)		26 (2.2)
Georgia		86 (1.7)		59 (3.2)		52 (3.6)		16 (2.3)		57 (3.3)
Ghana		94 (2.0)		93 (2.2)		35 (4.1)		42 (4.0)		64 (4.0)
Hong Kong SAR		72 (4.2)		56 (4.7)		20 (3.9)		15 (3.5)		24 (4.1)
Hungary		87 (1.3)		43 (2.6)		48 (2.4)		11 (1.8)		12 (1.8)
Indonesia		91 (1.9)		90 (2.2)		21 (2.7)		22 (3.3)		56 (3.8)
Iran, Islamic Rep. of		59 (4.1)		46 (3.7)		21 (3.2)		16 (2.8)		39 (3.9)
Israel		79 (3.1)	r	54 (3.5)	r	42 (3.9)		34 (3.9)		57 (3.8)
Italy		68 (3.3)		48 (3.1)		38 (3.7)		53 (3.2)		23 (2.5)
Japan		50 (4.2)		17 (3.1)		20 (3.3)		4 (1.4)		23 (3.7)
Jordan		89 (2.7)		72 (3.8)		22 (3.3)		48 (4.2)		40 (4.5)
Korea, Rep. of		74 (3.4)		25 (3.3)		22 (3.1)		6 (1.4)		44 (4.0)
Kuwait	r	74 (4.2)	r	79 (4.0)	r	14 (3.5)	r	22 (4.0)	r	49 (4.8)
Lebanon		78 (2.8)		75 (3.3)		60 (3.8)		40 (3.5)		21 (3.5)
Lithuania		69 (2.0)		50 (2.2)		17 (1.6)		11 (1.4)		16 (1.6)
Malaysia		76 (3.7)		76 (3.5)		27 (4.1)		35 (3.8)		15 (3.2)
Malta		90 (0.2)		75 (0.3)		13 (0.2)		15 (0.2)		59 (0.3)
Norway		40 (3.4)		13 (2.6)		6 (1.9)		21 (3.0)		24 (3.2)
Oman		89 (2.9)		88 (2.5)		9 (2.8)		29 (4.1)		44 (3.9)
Palestinian Nat'l Auth.		85 (2.9)		72 (4.0)		24 (3.9)		44 (4.1)		44 (4.5)
Qatar		90 (0.1)		85 (0.1)		8 (0.1)	r	28 (0.1)	r	60 (0.2)
Romania		76 (1.9)		60 (2.8)		32 (2.3)		24 (2.0)		21 (1.7)
Russian Federation		93 (0.8)		70 (1.8)		27 (2.0)		14 (1.4)		44 (2.0)
Saudi Arabia		97 (1.6)		92 (2.5)		32 (4.0)		30 (3.8)		59 (4.3)
Scotland	r	94 (1.1)	r	77 (2.7)	r	5 (1.5)	r	13 (1.4)	r	11 (1.8)
Serbia		67 (2.1)		57 (2.3)		23 (2.0)		23 (1.9)		20 (1.7)
Singapore		80 (2.2)		69 (2.2)		30 (2.4)		32 (2.2)		20 (2.0)
Slovenia		74 (2.2)		26 (2.2)		23 (2.2)		28 (2.6)		6 (1.3)
Sweden		55 (3.3)		37 (3.0)		2 (0.7)		23 (2.1)		19 (2.3)
Syrian Arab Republic		88 (2.0)		87 (2.3)		30 (3.2)		51 (3.5)		68 (3.3)
Thailand		84 (2.7)		74 (3.5)		17 (3.3)		26 (3.7)		24 (3.5)
Tunisia		76 (3.6)		68 (4.2)		35 (4.3)		42 (4.0)		37 (4.3)
Turkey		54 (4.0)		47 (3.9)		22 (3.5)		16 (2.9)		41 (4.6)
Ukraine		88 (1.7)		70 (2.6)		20 (1.8)		12 (1.6)		50 (2.5)
United States		84 (2.1)		56 (3.3)		21 (2.5)		35 (3.0)		69 (2.6)
‡ Morocco	r	81 (2.5)	r	62 (4.0)	r	35 (3.8)	r	31 (4.0)	r	45 (5.0)
International Avg.		78 (0.4)		63 (0.4)		24 (0.4)		27 (0.4)		38 (0.5)
Benchmarking Participants										
Basque Country, Spain		77 (3.4)		69 (3.6)		78 (3.7)		19 (3.5)		75 (4.3)
British Columbia, Canada	r	80 (3.6)	r	49 (4.7)	r	23 (3.8)	r	31 (3.9)	r	60 (3.7)
Dubai, UAE	s	92 (3.2)	s	82 (2.7)	s	21 (1.9)	s	29 (3.1)	s	43 (3.8)
Massachusetts, US		90 (4.6)		50 (8.9)		27 (4.8)		33 (5.0)		79 (6.5)
Minnesota, US		78 (6.1)		56 (8.3)		15 (4.4)		42 (6.9)		80 (6.5)
Ontario, Canada		61 (4.9)		52 (4.9)		29 (4.4)		46 (4.9)		20 (4.0)
Quebec, Canada		48 (4.8)		50 (5.0)		25 (4.7)		19 (4.3)		8 (2.3)

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 7.13 Types of Science Homework with Trends

TIMSS2007
Science 8th Grade

Country	Percentage of Students by Types of Homework Assigned by Their Teachers									
	Doing Problem/Question Sets				Reading from a Textbook or Supplementary Materials					
	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	r	39 (2.9)	0	58 (3.1)	0	r	59 (3.4)	0	36 (3.6)	0
Armenia	r	42 (3.1)	-19 (3.8)	29 (2.4)	-7 (3.2)	r	33 (2.5)	-19 (3.9)	40 (3.2)	-4 (4.2)
Australia	r	18 (2.6)	-6 (4.6)	63 (3.8)	-1 (5.7)	r	9 (2.0)	3 (2.7)	47 (3.7)	-7 (5.1)
Bahrain		32 (2.9)	-5 (4.7)	61 (2.9)	3 (5.1)		38 (2.8)	7 (4.2)	46 (2.9)	-11 (4.7)
Bosnia and Herzegovina		13 (1.5)	0	66 (2.3)	0		31 (2.4)	0	50 (2.5)	0
Botswana		30 (4.3)	-2 (6.2)	67 (4.4)	3 (6.4)		47 (4.2)	6 (6.2)	52 (4.3)	-3 (6.1)
Bulgaria	r	40 (2.3)	8 (3.3)	51 (2.4)	-6 (3.6)	r	41 (3.2)	24 (3.9)	47 (3.1)	-25 (4.0)
Chinese Taipei		59 (4.5)	-3 (6.1)	34 (4.3)	3 (6.0)		26 (3.9)	7 (5.0)	57 (4.4)	-5 (6.0)
Colombia		29 (3.9)	0	57 (5.1)	0		40 (4.6)	0	51 (5.4)	0
Cyprus	r	46 (1.2)	-4 (2.0)	46 (1.2)	8 (1.7)	r	49 (1.0)	-19 (1.5)	42 (1.0)	15 (1.5)
Czech Republic		11 (1.6)	0	56 (2.3)	0		9 (1.5)	0	54 (2.3)	0
Egypt		51 (4.3)	0 (6.0)	46 (4.3)	-1 (6.0)		43 (4.5)	-14 (5.6)	51 (4.6)	13 (5.6)
El Salvador		29 (3.7)	0	65 (4.1)	0		32 (4.2)	0	61 (4.4)	0
England	s	30 (2.8)	1 (5.3)	64 (3.2)	-7 (5.4)	s	1 (0.4)	0 (0.9)	32 (2.6)	-13 (5.5)
Georgia		47 (2.8)	0	38 (3.3)	0		63 (2.9)	0	35 (2.8)	0
Ghana		52 (4.5)	11 (6.2)	45 (4.3)	-12 (6.3)		41 (4.5)	2 (6.7)	55 (4.6)	4 (6.9)
Hong Kong SAR		28 (4.4)	0 (6.2)	68 (4.5)	3 (6.3)		29 (4.5)	-4 (6.2)	62 (5.0)	5 (6.5)
Hungary		54 (2.6)	6 (3.5)	38 (2.5)	-5 (3.4)		50 (2.6)	16 (3.5)	42 (2.4)	-15 (3.5)
Indonesia		60 (4.3)	-2 (5.5)	38 (4.2)	1 (5.5)		67 (4.0)	-7 (4.8)	30 (4.1)	7 (4.9)
Iran, Islamic Rep. of		21 (3.3)	-12 (5.0)	68 (3.7)	22 (5.4)		60 (3.8)	15 (5.4)	30 (3.3)	-2 (4.6)
Israel	r	37 (4.1)	-2 (5.6)	55 (4.3)	5 (5.9)	r	19 (2.9)	-4 (4.6)	71 (3.2)	4 (4.8)
Italy		25 (3.0)	-1 (4.4)	64 (3.2)	0 (4.7)		79 (2.5)	5 (3.8)	14 (2.2)	-3 (3.4)
Japan		11 (2.7)	-2 (3.8)	53 (4.0)	2 (5.6)		3 (1.4)	0 (2.2)	15 (2.9)	-11 (4.8)
Jordan		63 (4.4)	6 (5.8)	29 (4.0)	-12 (5.5)		36 (4.0)	-4 (6.1)	50 (4.0)	0 (6.1)
Korea, Rep. of	s	13 (2.7)	-3 (4.0)	64 (3.8)	1 (5.2)	s	16 (3.3)	3 (4.3)	42 (4.1)	-11 (5.8)
Kuwait	r	28 (4.3)	0	59 (5.4)	0	r	20 (3.7)	0	52 (4.8)	0
Lebanon		58 (4.1)	-7 (5.6)	36 (4.5)	5 (5.8)		17 (2.7)	-4 (4.3)	64 (3.9)	2 (5.5)
Lithuania		31 (1.7)	-8 (2.9)	56 (2.0)	3 (3.2)		39 (1.9)	3 (3.0)	52 (1.8)	-6 (2.9)
Malaysia		40 (4.0)	11 (5.5)	57 (4.0)	1 (5.8)		46 (4.0)	-14 (5.7)	49 (4.0)	15 (5.6)
Malta		41 (0.3)	0	50 (0.3)	0		12 (0.2)	0	55 (0.3)	0
Norway		46 (3.4)	3 (5.9)	48 (3.6)	-2 (5.7)		43 (3.5)	4 (5.5)	46 (3.4)	-5 (5.6)
Oman		32 (4.0)	0	67 (4.0)	0		33 (4.5)	0	59 (4.6)	0
Palestinian Nat'l Auth.		65 (3.9)	13 (5.7)	33 (4.0)	-14 (5.8)		21 (3.3)	-31 (5.5)	62 (3.9)	17 (6.0)
Qatar	r	31 (0.2)	0	64 (0.2)	0	r	37 (0.2)	0	50 (0.2)	0
Romania		30 (1.9)	-6 (3.0)	55 (2.1)	3 (3.2)		39 (2.5)	14 (3.2)	45 (2.5)	-17 (3.1)
Russian Federation		72 (1.8)	1 (2.5)	27 (1.8)	0 (2.4)		80 (1.7)	7 (2.7)	20 (1.7)	-5 (2.6)
Saudi Arabia		53 (4.5)	--	45 (4.5)	--		--	--	--	--
Scotland	s	45 (2.9)	-5 (4.2)	52 (2.9)	5 (4.2)	s	3 (0.8)	-2 (1.7)	34 (2.4)	-1 (4.5)
Serbia		12 (1.4)	0 (2.0)	54 (2.5)	2 (3.7)		30 (2.1)	-1 (3.1)	48 (2.2)	7 (3.2)
Singapore		45 (2.4)	-8 (3.6)	50 (2.4)	7 (3.6)		20 (2.3)	-5 (3.3)	56 (2.0)	-3 (3.4)
Slovenia		36 (2.8)	1 (3.6)	48 (2.7)	-5 (3.9)		7 (1.3)	-7 (2.1)	40 (2.7)	-25 (3.8)
Sweden		15 (2.0)	1 (3.1)	61 (2.9)	-10 (4.3)		27 (2.4)	1 (3.8)	53 (2.9)	-3 (4.6)
Syrian Arab Republic		73 (2.7)	0	20 (2.5)	0		26 (3.4)	0	50 (3.7)	0
Thailand		49 (4.4)	0	48 (4.4)	0		36 (4.1)	0	61 (4.3)	0
Tunisia		21 (3.4)	0 (5.1)	69 (4.0)	6 (5.7)		33 (4.3)	21 (5.1)	52 (4.6)	-7 (6.2)
Turkey		30 (3.5)	0	61 (3.3)	0		50 (4.1)	0	37 (4.0)	0
Ukraine		52 (1.5)	0	41 (1.8)	0		86 (1.3)	0	12 (1.2)	0
United States	r	16 (2.1)	-1 (3.0)	64 (2.7)	-3 (4.0)	r	20 (2.6)	1 (3.6)	53 (3.6)	-2 (4.8)
‡ Morocco	r	40 (4.1)	--	54 (5.1)	--	r	46 (4.4)	--	47 (4.1)	--
International Avg.		38 (0.5)		52 (0.5)			35 (0.5)		46 (0.5)	

Benchmarking Participants

Basque Country, Spain		52 (4.8)	11 (6.8)	40 (4.4)	-11 (6.6)		28 (4.3)	21 (5.1)	48 (5.0)	-9 (7.2)
British Columbia, Canada	r	22 (3.6)	0	68 (3.9)	0	r	12 (2.0)	0	68 (3.2)	0
Dubai, UAE	s	43 (4.4)	0	56 (4.4)	0	s	36 (2.4)	0	54 (1.9)	0
Massachusetts, US		9 (3.9)	0	83 (5.2)	0		13 (3.6)	0	68 (4.7)	0
Minnesota, US		14 (3.6)	0	74 (5.1)	0		19 (5.0)	0	47 (7.9)	0
Ontario, Canada		23 (3.2)	0 (4.8)	54 (4.7)	-15 (6.3)		15 (3.3)	0 (4.2)	44 (4.8)	-8 (6.9)
Quebec, Canada	r	24 (4.2)	-23 (6.3)	45 (5.2)	0 (6.9)	r	11 (2.7)	2 (3.4)	43 (5.2)	-1 (6.9)

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

Exhibit 7.13 Types of Science Homework with Trends (Continued)

TIMSS2007
Science 8th Grade

Country	Percentage of Students by Types of Homework Assigned by Their Teachers									
	Writing Definitions or Other Short Writing Assignments					Working on Small Investigations or Gathering Data				
	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	r	42 (3.5)	0 0	47 (3.8)	0 0	r	16 (2.6)	0 0	76 (3.1)	0 0
Armenia	r	31 (2.1)	-26 (3.3) ▼	43 (2.7)	5 (3.6)	r	10 (1.4)	0 (2.2)	71 (2.4)	-5 (3.4)
Australia	r	6 (1.9)	1 (2.8)	58 (3.6)	-9 (5.3)	r	7 (2.0)	1 (2.9)	62 (3.8)	0 (5.6)
Bahrain		38 (2.5)	-17 (4.8) ▼	47 (2.5)	10 (4.8) ▲		16 (2.0)	-8 (3.8) ▼	63 (2.0)	2 (4.0)
Bosnia and Herzegovina		15 (1.8)	0 0	53 (2.4)	0 0		6 (0.9)	0 0	66 (2.0)	0 0
Botswana		28 (4.0)	-3 (5.5)	70 (4.1)	7 (6.1)		4 (1.7)	1 (2.4)	80 (3.1)	13 (5.3) ▲
Bulgaria	r	10 (1.8)	6 (2.0) ▲	46 (2.6)	-9 (4.0) ▼	r	2 (0.7)	0 (0.9)	61 (3.0)	-1 (4.2)
Chinese Taipei		5 (2.0)	-3 (3.2)	39 (3.5)	-18 (5.5) ▼		1 (1.0)	-1 (1.6)	34 (4.1)	-14 (5.9) ▼
Colombia		17 (3.7)	0 0	57 (4.8)	0 0		25 (3.3)	0 0	55 (4.8)	0 0
Cyprus	r	9 (0.4)	-8 (1.4) ▼	75 (0.9)	7 (1.7) ▲	r	7 (0.5)	4 (0.7) ▲	69 (1.1)	29 (1.6) ▲
Czech Republic		1 (0.4)	0 0	32 (2.5)	0 0		1 (0.3)	0 0	59 (2.3)	0 0
Egypt		50 (4.2)	27 (5.6) ▲	44 (4.0)	-21 (5.8) ▼		17 (3.1)	-3 (4.5)	67 (3.9)	-4 (5.5)
El Salvador		41 (4.0)	0 0	56 (4.1)	0 0		33 (3.9)	0 0	62 (4.2)	0 0
England	s	2 (0.7)	0 (0.9)	68 (2.6)	-3 (4.0)	s	2 (0.9)	0 (1.4)	56 (2.9)	-5 (5.1)
Georgia		43 (3.4)	0 0	51 (3.6)	0 0		4 (1.1)	0 0	83 (1.9)	0 0
Ghana		58 (4.0)	-1 (5.6)	41 (4.0)	3 (5.3)		8 (2.2)	0 (3.3)	77 (3.4)	6 (5.4)
Hong Kong SAR		20 (3.9)	-6 (5.7)	59 (4.6)	-3 (6.1)		2 (1.2)	-3 (2.3)	73 (4.5)	1 (6.1)
Hungary		19 (1.9)	4 (2.5)	48 (2.6)	-3 (3.6)		6 (0.9)	2 (1.2)	80 (1.7)	0 (2.6)
Indonesia		38 (4.3)	5 (5.4)	58 (4.0)	-1 (5.4)		5 (1.7)	0 (2.3)	79 (3.3)	5 (4.4)
Iran, Islamic Rep. of		28 (3.4)	13 (4.3) ▲	47 (3.8)	6 (4.8)		25 (3.4)	6 (4.7)	64 (3.6)	6 (5.2)
Israel	r	22 (3.1)	4 (4.4)	57 (4.2)	-7 (5.5)	r	12 (2.7)	1 (3.8)	72 (3.4)	0 (4.8)
Italy		17 (2.4)	-1 (3.7)	56 (3.3)	-4 (5.1)		2 (1.0)	0 (1.5)	66 (2.9)	2 (4.3)
Japan		0 (0.0)	-2 (1.1)	10 (2.6)	-7 (3.9)		1 (0.9)	1 (0.9)	22 (3.4)	-7 (5.1)
Jordan		48 (3.8)	14 (5.6) ▲	32 (3.6)	-28 (5.7) ▼		24 (3.6)	7 (4.8)	58 (4.6)	-9 (6.3)
Korea, Rep. of	s	7 (1.9)	0 (2.6)	39 (4.0)	-5 (5.5)	s	1 (0.8)	-1 (1.1)	60 (4.0)	-5 (5.4)
Kuwait	r	36 (4.6)	0 0	44 (5.1)	0 0	r	13 (3.5)	0 0	67 (5.2)	0 0
Lebanon		28 (3.9)	6 (5.1)	46 (3.7)	-12 (5.0) ▼		13 (2.3)	4 (3.2)	64 (3.6)	-5 (5.2)
Lithuania		13 (1.5)	-1 (2.1)	53 (2.0)	-1 (2.9)		2 (0.4)	-1 (1.2)	77 (1.7)	-6 (2.3) ▼
Malaysia		19 (2.9)	-20 (5.2) ▼	65 (3.7)	12 (5.5) ▲		7 (2.1)	-2 (3.3)	74 (3.1)	5 (4.9)
Malta		7 (0.1)	0 0	51 (0.3)	0 0		4 (0.1)	0 0	50 (0.3)	0 0
Norway		10 (2.1)	1 (3.4)	58 (3.7)	-5 (5.7)		2 (0.9)	0 (1.4)	72 (3.4)	0 (4.7)
Oman		40 (3.6)	0 0	49 (4.0)	0 0		12 (3.2)	0 0	79 (3.5)	0 0
Palestinian Nat'l Auth.		52 (4.3)	6 (6.1)	40 (4.4)	-11 (6.2)		21 (3.4)	-4 (5.3)	68 (4.1)	3 (6.0)
Qatar	r	47 (0.2)	0 0	45 (0.2)	0 0	r	29 (0.2)	0 0	58 (0.2)	0 0
Romania		11 (1.8)	2 (2.2)	37 (2.4)	-14 (3.3) ▼		6 (1.1)	-2 (1.6)	70 (2.1)	2 (3.0)
Russian Federation		28 (1.7)	0 (2.6)	65 (1.7)	5 (3.2)		4 (1.0)	1 (1.1)	86 (1.6)	4 (2.4)
Saudi Arabia		--	--	--	--		--	--	--	--
Scotland	s	3 (0.9)	-1 (1.6)	51 (2.7)	2 (4.2)	s	1 (0.5)	1 (0.6)	48 (3.0)	4 (4.4)
Serbia		10 (1.3)	3 (1.8)	41 (2.1)	1 (3.2)		5 (1.1)	0 (1.6)	61 (2.1)	5 (3.2)
Singapore		10 (1.4)	-5 (2.3) ▼	54 (2.4)	-5 (3.6)		3 (0.7)	-3 (1.4)	59 (2.6)	3 (3.6)
Slovenia		0 (0.3)	-3 (1.3) ▼	28 (2.5)	-14 (3.7) ▼		3 (0.9)	1 (1.3)	69 (2.6)	-1 (3.9)
Sweden	r	2 (0.7)	-1 (1.3)	45 (2.9)	-5 (4.4) ▼		1 (0.7)	-1 (1.1)	46 (3.3)	-6 (4.6)
Syrian Arab Republic		54 (4.0)	0 0	32 (3.5)	0 0		4 (1.5)	0 0	64 (3.5)	0 0
Thailand		28 (3.7)	0 0	62 (4.2)	0 0		23 (3.6)	0 0	67 (3.8)	0 0
Tunisia	r	10 (2.5)	0 (3.4)	58 (4.2)	6 (5.7)		21 (3.3)	-5 (5.0)	74 (3.5)	6 (5.4)
Turkey		17 (3.3)	0 0	58 (3.6)	0 0		40 (4.3)	0 0	47 (4.6)	0 0
Ukraine		31 (2.4)	0 0	63 (2.3)	0 0		2 (0.7)	0 0	84 (1.7)	0 0
United States	r	13 (2.2)	-2 (3.1)	55 (3.0)	-8 (4.2)	r	8 (1.5)	-4 (2.6)	65 (2.4)	-2 (3.8)
‡ Morocco	r	19 (3.0)	--	60 (5.0)	--		15 (2.9)	--	77 (3.8)	--
International Avg.		23 (0.4)		50 (0.5)			10 (0.3)		65 (0.5)	
Benchmarking Participants										
Basque Country, Spain		18 (3.9)	-1 (5.5)	59 (4.7)	-5 (6.9)		1 (0.0)	-1 (1.5)	60 (5.3)	-17 (6.9) ▼
British Columbia, Canada	r	8 (2.1)	0 0	71 (4.0)	0 0	r	8 (2.8)	0 0	61 (4.6)	0 0
Dubai, UAE	s	45 (1.8)	0 0	44 (2.3)	0 0	s	18 (2.0)	0 0	73 (2.3)	0 0
Massachusetts, US		14 (4.4)	0 0	67 (6.3)	0 0		3 (2.5)	0 0	82 (5.3)	0 0
Minnesota, US		10 (3.6)	0 0	61 (5.0)	0 0		4 (3.2)	0 0	71 (7.3)	0 0
Ontario, Canada		7 (1.8)	-1 (3.3)	56 (5.1)	-13 (6.9)		7 (1.7)	1 (2.6)	61 (4.9)	-17 (6.0) ▼
Quebec, Canada	r	2 (1.1)	-4 (2.5)	42 (4.5)	-3 (6.8)	r	6 (1.2)	2 (2.2)	63 (4.5)	15 (6.6) ▲

▲ 2007 percent significantly higher

▼ 2007 percent significantly lower

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

What Types of Assessments Are Used in Science Classes?

This section describes assessment practices in science classes at the eighth grade. As shown in Exhibit 7.14, teachers reported giving the most emphasis to classroom tests as a way of monitoring students' progress in science. 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 62 percent of the students and some emphasis for another 33 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, 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 37 percent of students.

Information about trends in the frequency of science testing at the eighth grade is presented in Exhibit 7.15. According to teachers' reports, 76 percent of eighth-grade students were given science tests at least monthly, on average internationally. About one-third (34%) were given a science test or examination every 2 weeks (or more frequently) and another 42 percent were tested about once a month. However, this varied considerably by country. Whereas the majority of students were given a science test at least every two weeks in 16 countries and 3 benchmarking entities, there also were several countries where the majority of students were given science tests or examinations no more often than a few times a year, including Bosnia and Herzegovina (75%), Japan (52%), Malta (69%), Serbia (79%), Slovenia (96%), and Sweden (66%). Countries with increases since 2003 in testing at least every two weeks included Armenia, Jordan, Malaysia, the Palestinian National Authority, and the Russian Federation. Countries with increases in testing a few times a year or less often included Bahrain, Egypt, Singapore, and Tunisia, as well as the province of Quebec.

Exhibit 7.16 provides information about the item formats eighth-grade students are most likely to see in their science tests. In general, about half constructed-response and half multiple-choice were reported to be the

Exhibit 7.15 Frequency of Teachers Giving Science Tests with Trends

TIMSS2007
Science 8th Grade

Country	Percentage of Students Whose Teachers Give a Science 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	r	15 (2.3)	0 0	53 (3.7)	0 0	32 (3.2)	0 0
Armenia	r	27 (2.0)	15 (2.5) ▲	43 (2.5)	-4 (3.5)	29 (2.3)	-11 (3.4) ▼
Australia	r	10 (1.9)	3 (2.7)	63 (3.3)	-1 (4.9)	27 (3.2)	-1 (4.5)
Bahrain		72 (2.3)	-11 (3.2) ▼	23 (2.4)	6 (3.3)	5 (1.8)	5 (1.8) ▲
Bosnia and Herzegovina		4 (0.9)	0 0	21 (1.6)	0 0	75 (1.7)	0 0
Botswana		14 (2.8)	2 (4.0)	86 (2.8)	-1 (4.1)	0 (0.0)	-1 (0.0)
Bulgaria		11 (2.1)	--	41 (3.0)	--	48 (3.3)	--
Chinese Taipei		98 (1.0)	1 (1.8)	2 (1.0)	-2 (1.7)	0 (0.3)	0 (0.3)
Colombia		86 (3.0)	0 0	13 (2.9)	0 0	1 (0.0)	0 0
Cyprus	r	4 (0.4)	1 (0.7)	51 (1.0)	3 (1.9)	46 (1.0)	-3 (1.9)
Czech Republic		82 (1.7)	0 0	16 (1.7)	0 0	2 (0.6)	0 0
Egypt		57 (4.0)	-32 (4.7) ▼	40 (3.9)	29 (4.6) ▲	4 (1.8)	4 (1.8) ▲
El Salvador		57 (4.2)	0 0	39 (4.0)	0 0	4 (1.8)	0 0
England	s	15 (2.4)	0 (4.4)	51 (3.0)	-7 (5.6)	34 (2.8)	6 (5.2)
Georgia		37 (3.1)	0 0	50 (3.4)	0 0	13 (1.5)	0 0
Ghana		74 (3.5)	0 (5.1)	23 (3.2)	-1 (5.0)	2 (1.7)	1 (2.1)
Hong Kong SAR		18 (3.7)	-2 (4.9)	44 (4.8)	16 (6.2) ▲	38 (4.2)	-14 (5.7) ▼
Hungary		37 (2.5)	-2 (3.7)	56 (2.7)	6 (3.8)	7 (1.5)	-4 (2.2)
Indonesia		45 (4.1)	10 (5.2)	48 (4.0)	-4 (5.4)	7 (2.2)	-6 (3.3)
Iran, Islamic Rep. of		40 (3.6)	-9 (5.5)	47 (4.3)	2 (5.9)	13 (3.0)	6 (3.7)
Israel		15 (2.7)	6 (3.4)	47 (3.6)	20 (4.8) ▲	38 (3.4)	-25 (4.6) ▼
Italy		14 (2.1)	-4 (3.6)	58 (3.5)	6 (5.1)	28 (3.0)	-2 (4.3)
Japan		13 (2.4)	2 (3.6)	34 (3.7)	0 (5.3)	52 (3.9)	-2 (5.7)
Jordan		66 (4.1)	33 (6.0) ▲	31 (3.9)	-20 (6.0) ▼	3 (1.5)	-13 (4.1) ▼
Korea, Rep. of	s	39 (3.6)	-10 (5.6)	44 (4.2)	11 (5.8)	17 (2.6)	0 (4.1)
Kuwait	r	60 (4.8)	0 0	30 (4.6)	0 0	10 (2.8)	0 0
Lebanon		72 (3.5)	--	26 (3.5)	--	1 (0.6)	--
Lithuania		14 (1.6)	-9 (2.5) ▼	74 (2.0)	8 (3.0) ▲	12 (1.5)	1 (2.2)
Malaysia		18 (3.1)	11 (3.7) ▲	39 (4.3)	-5 (5.9)	43 (4.4)	-5 (5.9)
Malta		3 (0.1)	0 0	28 (0.3)	0 0	69 (0.3)	0 0
Norway		1 (0.5)	-2 (1.5)	56 (3.9)	14 (6.2) ▲	44 (3.8)	-12 (6.2) ▼
Oman		34 (4.1)	0 0	61 (4.4)	0 0	6 (2.0)	0 0
Palestinian Nat'l Auth.	r	51 (3.7)	22 (5.7) ▲	46 (3.7)	13 (5.2) ▲	3 (1.3)	-35 (4.7) ▼
Qatar		71 (0.1)	0 0	24 (0.1)	0 0	4 (0.1)	0 0
Romania		45 (3.2)	0 (4.0)	46 (2.9)	-3 (3.8)	9 (1.3)	3 (1.7)
Russian Federation		70 (1.7)	9 (3.0) ▲	25 (1.5)	-6 (2.7) ▼	6 (0.8)	-4 (1.5) ▼
Saudi Arabia		54 (4.6)	--	40 (4.5)	--	6 (1.7)	--
Scotland	s	4 (1.2)	0 (1.6)	50 (3.6)	-9 (5.3)	47 (3.4)	8 (5.2)
Serbia		3 (0.6)	0 (1.0)	19 (2.0)	0 (2.5)	79 (2.2)	0 (2.8)
Singapore		25 (1.7)	0 (2.7)	52 (2.1)	-9 (3.5) ▼	23 (1.9)	9 (2.8) ▲
Slovenia		1 (0.5)	1 (0.5)	3 (1.1)	-4 (1.8) ▼	96 (1.2)	3 (1.9)
Sweden		1 (0.5)	-1 (1.2)	33 (3.3)	-3 (4.6)	66 (3.2)	4 (4.6)
Syrian Arab Republic		47 (3.4)	0 0	34 (3.5)	0 0	19 (3.0)	0 0
Thailand		60 (4.1)	0 0	33 (4.2)	0 0	6 (2.1)	0 0
Tunisia		7 (2.0)	-3 (2.9)	48 (4.6)	-25 (5.7) ▼	45 (4.4)	27 (5.4) ▲
Turkey		17 (3.2)	0 0	79 (3.6)	0 0	4 (1.6)	0 0
Ukraine		9 (1.4)	0 0	79 (2.1)	0 0	11 (1.6)	0 0
United States	r	61 (3.0)	-6 (4.6)	32 (2.7)	5 (4.3)	7 (1.3)	1 (2.0)
‡ Morocco		8 (3.3)	--	81 (4.0)	--	12 (3.3)	--
International Avg.		34 (0.4)		42 (0.5)		24 (0.3)	
Benchmarking Participants							
Basque Country, Spain		19 (3.7)	-14 (6.1) ▼	69 (4.8)	11 (6.8)	12 (3.1)	3 (4.2)
British Columbia, Canada	r	45 (4.5)	0 0	51 (4.5)	0 0	5 (1.8)	0 0
Dubai, UAE	s	53 (4.2)	0 0	45 (4.1)	0 0	2 (0.7)	0 0
Massachusetts, US		57 (7.1)	0 0	31 (5.7)	0 0	12 (4.5)	0 0
Minnesota, US		58 (4.8)	0 0	34 (6.2)	0 0	8 (4.3)	0 0
Ontario, Canada		31 (4.7)	-1 (6.5)	58 (5.2)	5 (7.3)	12 (3.1)	-4 (4.6)
Quebec, Canada	r	33 (4.7)	-24 (7.1) ▼	52 (4.7)	14 (7.0) ▲	15 (3.1)	10 (3.6) ▲

▲ 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.



most common test formats. On average internationally, 62 percent of the students were taught by teachers who reported testing them with about half constructed-response and half multiple-choice items, another 23 percent of the students by teachers who reported using only or mostly constructed-response items, and only 14 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 seven countries reported using less constructed-response testing and in four countries they reported more. Teachers in nine countries reported increased use of the half and half format, while teachers in three countries reported decreased use. Five countries reported more use of multiple-choice testing and five reported less. The biggest shift was in Armenia, from primarily using constructed-response items to greater reliance on multiple-choice testing.

Exhibit 7.17 presents information about the cognitive demands teachers emphasize in the science tests given to eighth-grade students. Teachers were asked how often they gave students each of four different types of questions: knowing facts and procedures, application of knowledge and understanding, developing hypotheses and designing investigations, and providing explanations or 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 (72%) had teachers that gave application questions almost always, and the remaining one fourth (26%) had teachers that gave them sometimes. Almost two-thirds (64%) of students had teachers that almost always gave knowing facts and concepts questions, and 34 percent had teachers that sometimes did. Almost half the students (47%) were almost always given questions requiring explanations or justification, and a further 47 percent were given such questions at least sometimes. Although only 19 percent of the students were almost always asked to develop hypotheses or design investigations in their science tests, another 60 percent were asked to do so at least sometimes.

Exhibit 7.17 Types of Questions on Science Tests (Continued)

TIMSS2007
Science 8th Grade

Country	Percentage of Students by Types of Questions on Science Tests Given by Their Teachers			
	Questions Requiring Explanations or Justifications			
	Always or Almost Always	Sometimes	Never or Almost Never	
Algeria	r	39 (3.1)	58 (3.1)	3 (1.2)
Armenia		21 (1.9)	57 (2.2)	22 (2.0)
Australia		48 (3.1)	50 (3.1)	2 (0.3)
Bahrain		59 (2.9)	32 (3.0)	9 (2.1)
Bosnia and Herzegovina		34 (1.9)	61 (2.1)	5 (0.9)
Botswana		59 (4.2)	40 (4.1)	2 (1.3)
Bulgaria		59 (3.6)	36 (3.4)	4 (1.2)
Chinese Taipei		16 (2.8)	61 (3.8)	23 (3.3)
Colombia		54 (5.4)	42 (5.0)	4 (1.7)
Cyprus	r	66 (1.3)	32 (1.2)	2 (0.3)
Czech Republic		41 (2.1)	56 (2.1)	2 (0.6)
Egypt		67 (3.7)	31 (3.7)	2 (1.0)
El Salvador		50 (4.5)	43 (4.2)	7 (2.4)
England		44 (2.9)	55 (2.9)	1 (0.5)
Georgia		57 (3.3)	41 (3.1)	2 (0.6)
Ghana		51 (4.7)	46 (4.8)	3 (1.4)
Hong Kong SAR		31 (4.4)	67 (4.6)	2 (1.4)
Hungary		58 (2.4)	40 (2.3)	2 (0.6)
Indonesia		28 (3.0)	59 (3.5)	13 (2.5)
Iran, Islamic Rep. of		40 (4.1)	55 (4.0)	5 (1.8)
Israel		61 (3.6)	37 (3.7)	2 (0.8)
Italy		46 (2.7)	45 (2.8)	9 (2.1)
Japan		52 (4.3)	42 (4.0)	6 (1.8)
Jordan		34 (4.1)	59 (4.1)	7 (2.1)
Korea, Rep. of		16 (2.9)	62 (3.8)	22 (2.9)
Kuwait	r	55 (4.8)	40 (4.8)	5 (1.7)
Lebanon		75 (3.1)	25 (3.2)	0 (0.2)
Lithuania		56 (2.1)	42 (2.1)	2 (0.6)
Malaysia		24 (3.5)	73 (3.5)	4 (1.6)
Malta		33 (0.3)	53 (0.3)	14 (0.2)
Norway		47 (3.4)	51 (3.4)	2 (1.1)
Oman		70 (4.0)	29 (3.9)	1 (1.0)
Palestinian Nat'l Auth.		67 (4.2)	30 (4.3)	3 (1.4)
Qatar	r	39 (0.2)	53 (0.2)	8 (0.1)
Romania		63 (2.8)	35 (2.7)	2 (0.6)
Russian Federation		57 (2.3)	42 (2.3)	1 (0.5)
Saudi Arabia		40 (4.7)	53 (4.6)	7 (2.4)
Scotland	r	45 (2.4)	54 (2.4)	1 (0.6)
Serbia		39 (2.5)	53 (2.8)	9 (1.2)
Singapore		44 (2.4)	52 (2.5)	4 (1.1)
Slovenia		37 (2.6)	56 (2.6)	7 (1.3)
Sweden		50 (2.8)	42 (3.0)	7 (1.6)
Syrian Arab Republic		57 (3.5)	38 (3.5)	5 (1.3)
Thailand		53 (4.5)	44 (4.4)	2 (1.2)
Tunisia		48 (4.1)	50 (4.0)	2 (1.2)
Turkey		32 (3.8)	46 (4.2)	22 (3.7)
Ukraine		87 (1.1)	13 (1.1)	0 (0.0)
United States		40 (3.0)	53 (2.9)	7 (1.4)
‡ Morocco	r	40 (3.4)	56 (3.3)	3 (1.1)
International Avg.		47 (0.5)	47 (0.5)	6 (0.2)
Benchmarking Participants				
Basque Country, Spain		50 (4.7)	47 (4.9)	4 (1.7)
British Columbia, Canada	r	46 (3.9)	53 (4.0)	1 (0.8)
Dubai, UAE	s	47 (3.3)	47 (4.1)	6 (2.1)
Massachusetts, US		59 (6.6)	36 (5.8)	4 (3.4)
Minnesota, US		32 (7.6)	56 (6.4)	12 (5.3)
Ontario, Canada		65 (4.4)	34 (4.2)	1 (1.3)
Quebec, Canada		54 (4.6)	45 (4.7)	1 (0.5)

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

