

# Chapter 6



## *Teachers of Science*

To help place students' science achievement in the context of their school and classroom situations, the science teachers of the students tested were asked to complete questionnaires about their experience and education. This chapter presents teachers' reports about their background characteristics, education and training in teaching science, and about how well prepared they feel to teach science. It is important to note that the data shown are the percentages of students whose teachers reported on various characteristics. That is, the student is the unit of analysis so that TIMSS can describe the classroom contexts of the students.

The teachers who completed the questionnaires were the science teachers of the students who took the TIMSS 2007 test. At the eighth grade, the general sampling procedure was to sample a mathematics class from each participating school, administer the test to those students, and ask both their mathematics and science teachers to complete the questionnaire. In countries where science is taught as separate subjects, all science subject teachers of the students in the sampled mathematics classes were asked to complete a questionnaire. At the fourth grade, students often only have one teacher for all subjects, so this teacher is their science teacher and the one who completed the questionnaire. In either grade, the information about teachers' characteristics and instruction is tied directly to the students tested.

The exhibits have special notations when relatively large percentages of students did not have teacher questionnaire information. For a country where teacher responses were available for 70 to 84 percent of the students,

an “r” is included next to its data.<sup>1</sup> Where teacher responses were available for 50 to 69 percent of students, an “s” is included. Where teacher responses were available for less than 50 percent, an “x” replaces the data.

### **What Are the Background Characteristics of Science Teachers?**

This section presents information about the background characteristics of the teachers of science, including gender, age, and years teaching experience. As shown in Exhibit 6.1, in many countries, most fourth-grade students were taught science by females (international average of 79%). This was less so at the eighth grade (international average of 59%), although the majority of students had female teachers in more than two-thirds of the countries.

Exhibit 6.1 also presents teachers’ reports about their age and teaching experience. At both the fourth and eighth grades, the majority of students were taught science by teachers in their 30s and 40s. Relatively few students, 16 to 21 percent on average internationally, were taught by younger teachers. Several countries did have the majority of their students taught by younger teachers (for example, Kuwait at the fourth grade, and Ghana and Oman at the eighth grade). Although about one-fourth of the students internationally (21–24%) were taught by teachers age 50 or older, the teaching force was older in some countries. For example, half or more of the students had teachers 50 years or older in Georgia at the fourth grade and in Italy at the eighth grade. Older teachers can have more experience and as would be expected from their ages, on average internationally, science teachers at both the fourth and eighth grades were relatively experienced, with 15 to 17 years of teaching. Increases in years of teaching experience were noted at the fourth grade in Armenia, Hungary, Latvia, and Lithuania, and at the eighth grade in Bahrain, Cyprus, Egypt, Romania, the Russian Federation, and the Basque Country in Spain. The only decreases were at the eighth grade in Singapore and the benchmarking provinces of Ontario and Quebec.

<sup>1</sup> Although countries worked hard to maximize participation by teachers, sometimes this was affected by external factors. For example, a teacher strike led to somewhat reduced teacher participation in Israel.

**Exhibit 6.1 Science Teachers' Gender, Age, and Number of Years Teaching with Trends**

**TIMSS2007**  
Science **4<sup>th</sup>**  
Grade

Country	Percentage of Students by Teacher Characteristics						Trends in Average Number of Years Teaching	
	Gender		Age				2007	Difference from 2003
	Female	Male	29 Years or Under	30–39 Years	40–49 Years	50 Years or Older		
Algeria	58 (4.5)	42 (4.5)	6 (1.9)	45 (4.6)	44 (4.4)	5 (1.8)	17 (0.6)	0 (0)
Armenia	85 (3.3)	15 (3.3)	15 (3.0)	20 (3.2)	26 (3.2)	39 (4.4)	s 22 (0.8)	7 (1.4) ▲
Australia	77 (3.7)	23 (3.7)	21 (3.8)	17 (3.0)	30 (3.9)	32 (3.3)	17 (0.9)	0 (1.2)
Austria	88 (2.2)	12 (2.2)	9 (2.1)	19 (2.5)	37 (3.0)	34 (2.9)	22 (0.7)	0 (0)
Chinese Taipei	65 (4.5)	35 (4.5)	15 (3.3)	41 (4.2)	38 (4.1)	6 (2.0)	12 (0.7)	-1 (1.2)
Colombia	77 (3.4)	23 (3.4)	18 (4.0)	28 (5.1)	33 (4.1)	22 (4.1)	18 (1.1)	0 (0)
Czech Republic	91 (2.1)	9 (2.1)	11 (2.5)	26 (2.8)	38 (3.1)	25 (3.0)	17 (0.8)	0 (0)
Denmark	45 (4.4)	55 (4.4)	9 (2.0)	30 (4.4)	27 (4.2)	33 (4.2)	15 (1.0)	0 (0)
El Salvador	72 (4.1)	28 (4.1)	14 (2.8)	38 (3.8)	39 (3.7)	9 (2.6)	14 (0.7)	0 (0)
England	70 (3.3)	30 (3.3)	31 (3.8)	28 (3.3)	25 (3.5)	16 (2.9)	r 11 (0.7)	-2 (1.2)
Georgia	99 (0.6)	1 (0.6)	7 (2.2)	16 (2.3)	27 (3.9)	50 (4.4)	25 (1.1)	0 (0)
Germany	86 (2.3)	14 (2.3)	9 (1.9)	25 (2.7)	22 (2.8)	44 (3.1)	19 (0.7)	0 (0)
Hong Kong SAR	71 (3.7)	29 (3.7)	38 (4.4)	33 (4.4)	18 (3.3)	11 (2.9)	11 (0.8)	-2 (1.3)
Hungary	95 (1.7)	5 (1.7)	5 (1.9)	20 (2.7)	45 (3.3)	30 (3.5)	23 (0.7)	3 (1.1) ▲
Iran, Islamic Rep. of	53 (2.7)	47 (2.7)	14 (2.4)	40 (4.1)	40 (3.9)	7 (1.6)	16 (0.6)	0 (0.9)
Italy	97 (0.9)	3 (0.9)	4 (1.4)	20 (2.3)	37 (3.0)	39 (3.1)	21 (0.6)	0 (0.9)
Japan	62 (3.6)	38 (3.6)	14 (2.8)	18 (3.0)	41 (3.9)	27 (3.4)	19 (0.8)	-1 (1.1)
Kazakhstan	94 (1.7)	6 (1.7)	11 (3.0)	34 (3.7)	34 (5.2)	22 (4.6)	18 (0.9)	0 (0)
Kuwait	r 88 (2.6)	12 (2.6)	r 55 (4.8)	37 (4.7)	7 (2.4)	1 (0.8)	r 7 (0.5)	0 (0)
Latvia	100 (0.0)	0 (0.0)	6 (1.7)	31 (3.6)	34 (3.1)	29 (3.4)	21 (0.8)	3 (1.3) ▲
Lithuania	98 (0.8)	2 (0.8)	1 (0.6)	34 (3.0)	39 (3.5)	26 (3.3)	21 (0.6)	2 (0.9) ▲
Morocco	47 (3.8)	53 (3.8)	16 (3.0)	29 (3.5)	36 (3.9)	18 (3.0)	s 17 (0.6)	2 (1.1) ▲
Netherlands	58 (4.1)	42 (4.1)	24 (3.5)	19 (3.1)	15 (3.0)	42 (3.9)	18 (1.0)	2 (1.5)
New Zealand	76 (2.4)	24 (2.4)	28 (2.6)	28 (2.3)	23 (2.1)	20 (2.4)	r 11 (0.6)	0 (0.9)
Norway	82 (2.4)	18 (2.4)	10 (2.0)	28 (2.8)	20 (2.6)	42 (2.9)	17 (0.8)	1 (1.3)
Qatar	92 (0.1)	8 (0.1)	30 (0.1)	50 (0.2)	17 (0.1)	3 (0.0)	10 (0.0)	0 (0)
Russian Federation	99 (0.9)	1 (0.9)	7 (2.3)	34 (3.3)	37 (3.6)	22 (2.4)	21 (0.5)	1 (0.9)
Scotland	92 (2.2)	8 (2.2)	23 (3.7)	21 (2.8)	23 (2.8)	33 (3.4)	r 15 (0.9)	0 (1.3)
Singapore	72 (2.3)	28 (2.3)	42 (3.0)	35 (3.1)	16 (2.3)	7 (1.5)	9 (0.6)	-1 (1.0)
Slovak Republic	94 (1.5)	6 (1.5)	10 (2.1)	31 (3.4)	29 (3.4)	29 (2.9)	19 (0.7)	0 (0)
Slovenia	98 (0.7)	2 (0.7)	14 (1.9)	21 (2.4)	48 (3.0)	17 (2.5)	19 (0.6)	1 (1.0)
Sweden	81 (2.8)	19 (2.8)	8 (1.8)	27 (3.1)	26 (2.7)	39 (3.1)	17 (0.8)	0 (0)
Tunisia	56 (3.9)	44 (3.9)	8 (2.0)	40 (4.2)	39 (3.6)	13 (2.7)	r 19 (0.7)	1 (1.0)
Ukraine	100 (0.0)	0 (0.0)	8 (1.8)	32 (3.7)	38 (3.9)	22 (2.8)	22 (0.6)	0 (0)
United States	88 (1.7)	12 (1.7)	19 (2.0)	31 (2.6)	21 (2.3)	29 (2.3)	13 (0.5)	0 (0.8)
Yemen	24 (3.7)	76 (3.7)	29 (4.5)	66 (4.9)	3 (1.9)	1 (0.9)	12 (0.5)	0 (0)
<b>International Avg.</b>	<b>79 (0.5)</b>	<b>21 (0.5)</b>	<b>16 (0.5)</b>	<b>30 (0.6)</b>	<b>30 (0.6)</b>	<b>24 (0.5)</b>	<b>17 (0.1)</b>	
<b>Benchmarking Participants</b>								
Alberta, Canada	81 (3.0)	19 (3.0)	16 (3.1)	27 (3.9)	29 (4.2)	28 (3.5)	14 (0.8)	0 (0)
British Columbia, Canada	r 82 (3.0)	18 (3.0)	r 10 (2.8)	33 (4.1)	21 (3.0)	35 (3.8)	r 15 (0.8)	0 (0)
Dubai, UAE	s 81 (3.4)	19 (3.4)	s 27 (4.2)	42 (3.9)	26 (4.7)	6 (2.9)	s 9 (0.8)	0 (0)
Massachusetts, US	91 (3.1)	9 (3.1)	21 (3.7)	27 (6.0)	24 (5.5)	28 (5.9)	13 (1.0)	0 (0)
Minnesota, US	75 (6.7)	25 (6.7)	13 (3.8)	24 (5.7)	23 (7.3)	40 (7.5)	18 (1.4)	0 (0)
Ontario, Canada	83 (3.3)	17 (3.3)	14 (3.2)	34 (5.0)	29 (5.0)	23 (4.3)	13 (0.8)	0 (1.3)
Quebec, Canada	88 (3.1)	12 (3.1)	14 (2.8)	30 (3.8)	33 (4.2)	23 (3.5)	r 15 (0.8)	-1 (1.3)

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

2007 significantly higher ▲  
2007 significantly lower ▼

Background data provided by teachers.

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

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

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

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

Exhibit 6.1 **Science Teachers' Gender, Age, and Number of Years Teaching with Trends (Continued)**

TIMSS2007  
Science 8<sup>th</sup> Grade

Country	Percentage of Students by Teacher Characteristics						Trends in Average Number of Years Teaching	
	Gender		Age				2007	Difference from 2003
	Female	Male	29 Years or Under	30–39 Years	40–49 Years	50 Years or Older		
Algeria	54 (3.6)	46 (3.6)	7 (1.9)	35 (3.0)	52 (3.3)	6 (1.5)	r 17 (0.6)	◇ ◇
Armenia	88 (2.3)	12 (2.3)	10 (1.6)	27 (2.2)	32 (2.5)	31 (2.0)	r 19 (0.4)	0 (0.7)
Australia	50 (3.6)	50 (3.6)	23 (2.6)	24 (3.0)	26 (2.8)	27 (2.9)	r 14 (0.7)	-1 (1.1)
Bahrain	50 (0.9)	50 (0.9)	18 (2.3)	53 (2.5)	28 (2.6)	2 (0.9)	12 (0.4)	3 (0.7) ▲
Bosnia and Herzegovina	62 (2.0)	38 (2.0)	10 (1.5)	21 (1.8)	25 (1.9)	44 (2.3)	20 (0.6)	◇ ◇
Botswana	42 (4.2)	58 (4.2)	42 (4.7)	53 (4.4)	4 (1.8)	1 (0.3)	r 7 (0.4)	1 (0.7)
Bulgaria	84 (1.7)	16 (1.7)	4 (1.5)	25 (2.6)	30 (2.5)	41 (2.5)	20 (0.6)	--
Chinese Taipei	37 (3.7)	63 (3.7)	15 (3.1)	40 (4.2)	35 (4.1)	9 (2.5)	12 (0.7)	-1 (1.1)
Colombia	64 (4.9)	36 (4.9)	15 (3.0)	29 (4.0)	29 (4.0)	27 (5.4)	18 (1.4)	◇ ◇
Cyprus	r 62 (1.3)	38 (1.3)	r 13 (0.6)	15 (0.9)	47 (0.9)	25 (0.8)	r 10 (0.2)	1 (0.4) ▲
Czech Republic	70 (2.3)	30 (2.3)	15 (1.9)	20 (1.9)	25 (1.7)	40 (2.3)	19 (0.7)	◇ ◇
Egypt	41 (4.2)	59 (4.2)	20 (3.5)	39 (3.9)	38 (4.0)	2 (1.3)	14 (0.7)	2 (0.8) ▲
El Salvador	49 (4.4)	51 (4.4)	14 (2.9)	51 (4.1)	29 (3.5)	6 (1.6)	13 (0.5)	◇ ◇
England	55 (2.9)	45 (2.9)	26 (3.0)	28 (2.5)	21 (2.1)	26 (2.7)	s 12 (0.6)	0 (1.3)
Georgia	92 (1.2)	8 (1.2)	5 (1.2)	23 (2.3)	33 (2.3)	40 (3.1)	21 (0.7)	◇ ◇
Ghana	8 (2.1)	92 (2.1)	52 (3.9)	32 (4.1)	8 (2.1)	8 (2.3)	7 (0.6)	-1 (0.9)
Hong Kong SAR	37 (4.7)	63 (4.7)	23 (4.0)	39 (4.5)	27 (4.3)	12 (3.2)	14 (0.9)	2 (1.2)
Hungary	76 (2.0)	24 (2.0)	7 (1.3)	17 (1.7)	39 (2.2)	37 (2.3)	22 (0.5)	1 (0.7)
Indonesia	56 (3.8)	44 (3.8)	20 (2.3)	44 (3.2)	31 (3.0)	5 (1.2)	12 (0.6)	0 (0.8)
Iran, Islamic Rep. of	42 (2.1)	58 (2.1)	14 (2.5)	53 (3.4)	24 (3.0)	9 (1.9)	15 (0.5)	0 (0.8)
Israel	78 (3.1)	22 (3.1)	16 (3.1)	29 (3.2)	34 (3.5)	21 (2.9)	r 16 (0.8)	0 (1.1)
Italy	81 (2.8)	19 (2.8)	2 (1.1)	10 (1.9)	22 (2.3)	67 (2.9)	23 (0.7)	0 (0.9)
Japan	16 (3.0)	84 (3.0)	19 (3.1)	25 (3.6)	32 (4.0)	25 (3.7)	17 (0.9)	-1 (1.2)
Jordan	53 (2.1)	47 (2.1)	44 (4.4)	36 (4.0)	14 (2.9)	6 (1.9)	9 (0.6)	-2 (1.0)
Korea, Rep. of	63 (3.4)	37 (3.4)	21 (3.1)	26 (3.3)	41 (3.3)	12 (2.8)	r 13 (0.7)	1 (0.9)
Kuwait	r 50 (3.0)	50 (3.0)	r 23 (3.7)	42 (4.3)	27 (3.2)	9 (2.4)	s 13 (0.8)	◇ ◇
Lebanon	64 (3.6)	36 (3.6)	42 (4.1)	33 (3.6)	17 (2.3)	9 (2.2)	11 (0.6)	1 (0.8)
Lithuania	81 (1.7)	19 (1.7)	7 (1.3)	17 (1.6)	40 (2.1)	36 (2.1)	22 (0.6)	2 (0.9)
Malaysia	75 (3.3)	25 (3.3)	23 (3.5)	49 (4.4)	23 (3.5)	6 (2.0)	11 (0.6)	0 (0.9)
Malta	57 (0.3)	43 (0.3)	47 (0.3)	30 (0.2)	14 (0.2)	8 (0.2)	10 (0.1)	◇ ◇
Norway	39 (3.2)	61 (3.2)	10 (2.5)	40 (3.6)	14 (2.3)	35 (3.1)	15 (0.8)	0 (1.3)
Oman	51 (2.4)	49 (2.4)	76 (3.5)	18 (3.2)	5 (1.6)	1 (0.8)	6 (0.5)	◇ ◇
Palestinian Nat'l Auth.	53 (2.5)	47 (2.5)	36 (3.9)	26 (3.4)	27 (3.9)	11 (2.6)	11 (0.8)	1 (1.1)
Qatar	49 (0.2)	51 (0.2)	22 (0.1)	51 (0.2)	18 (0.1)	9 (0.1)	11 (0.0)	◇ ◇
Romania	72 (2.2)	28 (2.2)	13 (1.5)	22 (1.9)	23 (1.9)	42 (2.6)	21 (0.6)	2 (0.9) ▲
Russian Federation	92 (1.1)	8 (1.1)	10 (1.3)	21 (1.4)	32 (2.0)	36 (1.9)	22 (0.4)	2 (0.7) ▲
Saudi Arabia	49 (2.0)	51 (2.0)	24 (3.3)	63 (3.8)	13 (3.0)	1 (0.7)	10 (0.4)	--
Scotland	r 51 (2.3)	49 (2.3)	r 20 (2.0)	15 (1.7)	26 (2.5)	38 (2.1)	s 17 (0.6)	-1 (0.9)
Serbia	74 (1.9)	26 (1.9)	4 (0.7)	26 (1.9)	26 (1.6)	44 (2.2)	18 (0.6)	-1 (0.7)
Singapore	64 (2.4)	36 (2.4)	44 (2.5)	29 (2.3)	13 (1.5)	14 (1.6)	10 (0.5)	-2 (0.8) ▼
Slovenia	82 (1.7)	18 (1.7)	9 (1.6)	24 (2.0)	43 (2.4)	24 (2.4)	19 (0.5)	1 (0.8)
Sweden	52 (3.0)	48 (3.0)	12 (2.0)	33 (3.0)	21 (2.1)	34 (2.7)	14 (0.7)	1 (1.0)
Syrian Arab Republic	68 (3.0)	32 (3.0)	35 (3.2)	26 (2.7)	33 (3.2)	6 (1.5)	11 (0.7)	◇ ◇
Thailand	68 (3.9)	32 (3.9)	23 (3.6)	29 (3.6)	27 (3.8)	21 (3.5)	14 (0.7)	◇ ◇
Tunisia	65 (3.9)	35 (3.9)	17 (3.2)	48 (3.7)	25 (3.1)	10 (2.6)	r 11 (0.7)	0 (1.0)
Turkey	49 (4.4)	51 (4.4)	33 (3.6)	36 (4.0)	17 (3.4)	14 (3.2)	12 (0.8)	◇ ◇
Ukraine	86 (1.7)	14 (1.7)	12 (1.7)	26 (2.2)	29 (1.9)	33 (2.1)	21 (0.5)	◇ ◇
United States	58 (3.0)	42 (3.0)	15 (2.4)	30 (2.7)	25 (2.4)	30 (3.0)	13 (0.6)	-1 (0.9)
‡ Morocco	39 (4.3)	61 (4.3)	9 (2.3)	25 (3.2)	39 (3.3)	28 (3.1)	r 17 (1.1)	--
<b>International Avg.</b>	<b>59 (0.4)</b>	<b>41 (0.4)</b>	<b>21 (0.4)</b>	<b>32 (0.4)</b>	<b>27 (0.4)</b>	<b>21 (0.3)</b>	<b>15 (0.1)</b>	
<b>Benchmarking Participants</b>								
Basque Country, Spain	56 (4.8)	44 (4.8)	5 (2.3)	20 (3.4)	47 (4.6)	28 (4.1)	20 (1.0)	3 (1.4) ▲
British Columbia, Canada	46 (4.2)	54 (4.2)	15 (2.6)	41 (3.5)	24 (3.7)	20 (3.1)	r 13 (0.7)	◇ ◇
Dubai, UAE	s 62 (4.1)	38 (4.1)	s 15 (2.9)	49 (4.6)	23 (5.5)	13 (4.3)	s 14 (0.6)	◇ ◇
Massachusetts, US	57 (5.1)	43 (5.1)	25 (5.9)	22 (6.1)	29 (6.1)	24 (6.5)	10 (1.1)	◇ ◇
Minnesota, US	42 (6.0)	58 (6.0)	30 (6.1)	16 (4.7)	26 (7.1)	28 (6.1)	13 (1.1)	◇ ◇
Ontario, Canada	55 (4.1)	45 (4.1)	24 (4.3)	45 (4.4)	20 (3.9)	12 (2.8)	9 (0.7)	-3 (1.1) ▼
Quebec, Canada	52 (4.2)	48 (4.2)	35 (4.8)	34 (5.0)	23 (4.4)	8 (2.7)	r 9 (0.8)	-3 (1.1) ▼

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

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

### What Education and Training Do Teachers Have for Teaching Science?

Exhibit 6.2 presents teachers' highest level of education. On average internationally, 70 percent of the fourth grade students and 81 percent of the eighth grade students had teachers who had completed a university degree. However, at the fourth grade, there was some variation across countries, with the majority of students in Algeria, Italy, Morocco, and Tunisia having teachers that had completed only secondary school.

Exhibit 6.3 contains information about teachers' educational emphasis in science and teaching. Most countries have a national or regional science curriculum, and most countries reported that teachers received specific preparation in how to teach the science curriculum as part of pre-service education. However, in a number of countries the teachers of the fourth grade students reported little specific training or specialized education in science. Countries where 80 percent or more of the fourth grade students had teachers who studied primary/elementary education without a major or specialization in mathematics or science included Australia, Austria, Hungary, Lithuania, and the Slovak Republic as well as the benchmarking province of Quebec. In contrast, 83 percent of the fourth grade students in Kazakhstan had teachers with primary/elementary education and a major or specialization in science. In Armenia, almost all teachers had a science major or specialization (90%), but few had studied primary/elementary education. At the eighth grade, on average internationally, 81 percent of students had teachers who had studied science (biology, physics, chemistry, or earth science), but only 39 percent had teachers whose major area of study was in science education.

To provide more information about the branches of science that science teachers studied during their postsecondary education, Exhibit 6.4 presents the percentage of eighth-grade students whose teachers reported majoring in biology, physics, chemistry, or earth science. Teachers could major in more than one of these subjects, and the percentages in the exhibit reflect this. On average, biology was the most frequently reported major (42%), followed by chemistry (40%), physics (32%), and earth science (19%).

## Exhibit 6.2 Highest Educational Level of Science Teachers\*

TIMSS2007  
Science 4<sup>th</sup> Grade

Country	Percentage of Students by Their Teachers' Educational Level				
	Completed Postgraduate University Degree**	Completed University but Not a Postgraduate Degree	Completed Post-secondary Education but Not University	Completed Upper-secondary School	Did Not Complete Upper-secondary School
Algeria	0 (0.5)	19 (3.3)	5 (2.1)	69 (3.8)	7 (1.9)
Armenia	0 (0.0)	98 (1.2)	2 (1.2)	0 (0.0)	0 (0.0)
Australia	41 (4.3)	52 (4.6)	8 (1.5)	0 (0.0)	0 (0.0)
Austria	3 (1.0)	1 (0.5)	93 (1.8)	3 (1.1)	0 (0.0)
Chinese Taipei	23 (3.4)	65 (4.3)	3 (1.2)	9 (2.7)	0 (0.0)
Colombia	9 (2.5)	70 (5.0)	11 (3.7)	9 (2.8)	1 (0.0)
Czech Republic	80 (3.1)	3 (1.4)	6 (2.1)	10 (2.4)	0 (0.0)
Denmark	3 (1.4)	84 (3.5)	9 (2.8)	4 (1.5)	0 (0.0)
El Salvador	0 (0.0)	21 (3.3)	64 (4.0)	13 (3.2)	2 (1.2)
England	34 (4.2)	56 (4.6)	10 (2.2)	0 (0.0)	0 (0.0)
Georgia	90 (1.9)	9 (1.7)	0 (0.0)	1 (0.7)	0 (0.0)
Germany	0 (0.0)	100 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)
Hong Kong SAR	13 (2.5)	68 (3.8)	18 (3.5)	1 (0.8)	0 (0.0)
Hungary	--	--	--	--	--
Iran, Islamic Rep. of	1 (0.6)	27 (4.1)	44 (4.2)	28 (3.9)	0 (0.0)
Italy	2 (0.7)	19 (2.5)	6 (1.5)	73 (3.0)	0 (0.0)
Japan	3 (1.3)	90 (2.2)	7 (1.8)	0 (0.0)	0 (0.0)
Kazakhstan	24 (3.4)	40 (5.3)	35 (5.3)	0 (0.0)	0 (0.0)
Kuwait	2 (1.2)	94 (2.0)	4 (1.8)	0 (0.0)	0 (0.0)
Latvia	0 (0.0)	98 (1.0)	1 (0.0)	2 (0.8)	0 (0.0)
Lithuania	18 (2.5)	60 (3.1)	22 (2.9)	0 (0.0)	0 (0.0)
Morocco	0 (0.0)	27 (3.9)	3 (1.4)	55 (4.2)	14 (2.8)
Netherlands	2 (1.4)	96 (1.7)	0 (0.0)	1 (1.0)	0 (0.0)
New Zealand	10 (1.7)	65 (2.8)	25 (2.2)	0 (0.0)	0 (0.0)
Norway	1 (0.5)	71 (3.3)	27 (3.2)	1 (0.7)	1 (0.4)
Qatar	10 (0.1)	84 (0.2)	3 (0.1)	3 (0.1)	0 (0.0)
Russian Federation	36 (3.4)	35 (3.5)	29 (3.1)	0 (0.0)	0 (0.0)
Scotland	26 (3.5)	74 (3.5)	0 (0.0)	0 (0.0)	0 (0.0)
Singapore	4 (1.0)	54 (2.7)	40 (2.5)	2 (1.1)	0 (0.0)
Slovak Republic	96 (1.3)	0 (0.0)	0 (0.0)	3 (1.4)	0 (0.0)
Slovenia	0 (0.0)	50 (2.6)	49 (2.6)	0 (0.4)	0 (0.0)
Sweden	12 (2.2)	58 (3.8)	30 (3.4)	0 (0.0)	0 (0.0)
Tunisia	0 (0.0)	8 (2.3)	32 (3.8)	60 (3.5)	0 (0.0)
Ukraine	1 (0.6)	81 (3.1)	18 (3.1)	0 (0.0)	0 (0.0)
United States	54 (2.7)	45 (2.7)	0 (0.2)	0 (0.0)	0 (0.0)
Yemen	0 (0.0)	26 (4.1)	44 (4.9)	28 (4.7)	2 (1.7)
International Avg.	17 (0.3)	53 (0.5)	18 (0.4)	11 (0.3)	1 (0.1)
<b>Benchmarking Participants</b>					
Alberta, Canada	12 (2.4)	86 (2.7)	1 (1.0)	0 (0.0)	0 (0.0)
British Columbia, Canada	18 (2.3)	82 (2.3)	0 (0.0)	0 (0.0)	0 (0.0)
Dubai, UAE	3 (0.2)	97 (0.2)	0 (0.0)	0 (0.0)	0 (0.0)
Massachusetts, US	80 (4.5)	20 (4.5)	0 (0.0)	0 (0.0)	0 (0.0)
Minnesota, US	75 (5.1)	25 (5.1)	0 (0.0)	0 (0.0)	0 (0.0)
Ontario, Canada	29 (4.5)	69 (4.6)	2 (0.9)	1 (0.6)	0 (0.0)
Quebec, Canada	10 (2.6)	89 (2.8)	2 (1.2)	0 (0.0)	0 (0.0)

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

Background data provided by teachers.

\* Based on countries' categorizations to UNESCO's International Standard Classification of Education (Operational Manual for ISCED-1997).

\*\* For example, doctorate, master's, other postgraduate degree or diploma.

( ) 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 6.2 Highest Educational Level of Science Teachers\* (Continued)

TIMSS2007  
Science 8<sup>th</sup> Grade

Country	Percentage of Students by Their Teachers' Educational Level				
	Completed Postgraduate University Degree**	Completed University but Not a Postgraduate Degree	Completed Post-secondary Education but Not University	Completed Upper-secondary School	Did Not Complete Upper-secondary School
Algeria	1 (0.0)	17 (2.6)	62 (3.2)	17 (2.5)	3 (1.0)
Armenia	94 (1.0)	5 (0.8)	0 (0.3)	1 (0.3)	0 (0.0)
Australia	63 (3.4)	35 (3.6)	2 (1.0)	0 (0.0)	0 (0.0)
Bahrain	8 (1.0)	91 (1.1)	0 (0.0)	0 (0.0)	0 (0.0)
Bosnia and Herzegovina	0 (0.0)	19 (1.8)	79 (1.8)	1 (0.4)	1 (0.3)
Botswana	1 (0.9)	29 (3.6)	70 (3.7)	0 (0.0)	0 (0.0)
Bulgaria	70 (2.9)	15 (1.9)	14 (2.5)	0 (0.0)	0 (0.1)
Chinese Taipei	30 (3.8)	57 (4.1)	3 (1.5)	10 (2.3)	0 (0.0)
Colombia	20 (5.9)	79 (5.8)	0 (0.2)	0 (0.0)	0 (0.5)
Cyprus	r 31 (1.0)	69 (1.0)	0 (0.0)	0 (0.0)	0 (0.0)
Czech Republic	95 (1.0)	1 (0.4)	1 (0.5)	3 (0.8)	0 (0.0)
Egypt	7 (2.1)	91 (2.6)	1 (1.0)	1 (1.0)	1 (0.6)
El Salvador	1 (0.0)	32 (4.1)	60 (4.0)	7 (2.2)	0 (0.0)
England	39 (2.8)	56 (2.9)	4 (1.3)	0 (0.0)	0 (0.2)
Georgia	94 (1.4)	6 (1.3)	0 (0.0)	1 (0.2)	0 (0.0)
Ghana	0 (0.0)	10 (2.1)	76 (3.2)	13 (2.7)	1 (0.6)
Hong Kong SAR	28 (3.6)	64 (4.0)	8 (2.3)	0 (0.0)	0 (0.0)
Hungary	--	--	--	--	--
Indonesia	1 (0.7)	76 (2.8)	19 (2.6)	4 (1.3)	0 (0.0)
Iran, Islamic Rep. of	1 (0.6)	53 (4.1)	47 (4.2)	0 (0.0)	0 (0.0)
Israel	33 (3.1)	65 (3.2)	2 (0.8)	0 (0.0)	0 (0.0)
Italy	14 (2.4)	86 (2.4)	0 (0.0)	0 (0.0)	0 (0.0)
Japan	15 (2.9)	83 (2.9)	2 (1.1)	0 (0.0)	0 (0.0)
Jordan	9 (2.2)	86 (2.9)	4 (1.8)	0 (0.0)	0 (0.0)
Korea, Rep. of	29 (3.7)	71 (3.7)	0 (0.0)	0 (0.0)	0 (0.0)
Kuwait	r 6 (2.1)	94 (2.1)	0 (0.0)	0 (0.0)	0 (0.0)
Lebanon	7 (1.9)	79 (3.6)	0 (0.0)	14 (3.2)	0 (0.0)
Lithuania	40 (2.8)	47 (2.7)	12 (1.7)	1 (0.4)	0 (0.0)
Malaysia	2 (1.0)	79 (3.0)	16 (2.6)	2 (1.2)	1 (0.0)
Malta	15 (0.2)	76 (0.3)	4 (0.2)	5 (0.1)	0 (0.0)
Norway	12 (2.7)	76 (3.4)	10 (2.2)	0 (0.0)	2 (1.0)
Oman	2 (0.4)	97 (0.8)	1 (0.4)	1 (0.0)	0 (0.0)
Palestinian Nat'l Auth.	6 (2.0)	84 (3.0)	10 (2.3)	0 (0.0)	0 (0.0)
Qatar	12 (0.1)	86 (0.1)	1 (0.0)	0 (0.0)	0 (0.0)
Romania	12 (1.2)	71 (1.6)	16 (1.7)	1 (0.6)	0 (0.0)
Russian Federation	90 (1.1)	9 (1.1)	1 (0.4)	1 (0.5)	0 (0.0)
Saudi Arabia	0 (0.0)	96 (1.9)	2 (1.6)	1 (0.0)	0 (0.0)
Scotland	r 38 (2.4)	62 (2.4)	0 (0.0)	0 (0.0)	0 (0.0)
Serbia	2 (0.6)	57 (2.5)	40 (2.5)	0 (0.2)	0 (0.0)
Singapore	6 (1.0)	87 (1.6)	7 (1.4)	0 (0.0)	0 (0.0)
Slovenia	2 (0.8)	44 (2.9)	52 (2.8)	1 (0.5)	0 (0.0)
Sweden	56 (2.4)	39 (2.4)	5 (1.2)	1 (0.7)	0 (0.0)
Syrian Arab Republic	1 (0.5)	2 (0.9)	95 (1.5)	2 (0.8)	0 (0.5)
Thailand	11 (2.5)	86 (2.8)	4 (1.5)	0 (0.0)	0 (0.0)
Tunisia	13 (2.9)	70 (3.8)	17 (3.0)	0 (0.0)	1 (0.0)
Turkey	5 (2.2)	75 (3.9)	21 (3.5)	0 (0.0)	0 (0.0)
Ukraine	2 (0.6)	96 (0.8)	2 (0.5)	1 (0.3)	0 (0.0)
United States	60 (2.8)	40 (2.8)	0 (0.0)	0 (0.0)	0 (0.0)
‡ Morocco	3 (0.8)	34 (3.9)	16 (2.6)	42 (3.7)	5 (2.1)
International Avg.	23 (0.3)	58 (0.4)	16 (0.3)	3 (0.2)	0 (0.1)
<b>Benchmarking Participants</b>					
Basque Country, Spain	55 (4.3)	45 (4.3)	0 (0.0)	0 (0.0)	0 (0.0)
British Columbia, Canada	57 (3.9)	39 (4.3)	1 (1.0)	0 (0.3)	2 (0.1)
Dubai, UAE	s 4 (1.2)	90 (1.4)	5 (0.5)	0 (0.0)	1 (0.7)
Massachusetts, US	66 (7.9)	34 (7.9)	0 (0.0)	0 (0.0)	0 (0.0)
Minnesota, US	63 (6.9)	37 (6.9)	0 (0.0)	0 (0.0)	0 (0.0)
Ontario, Canada	80 (3.6)	19 (3.5)	1 (0.9)	0 (0.0)	0 (0.0)
Quebec, Canada	15 (2.9)	81 (3.4)	1 (1.0)	2 (1.9)	0 (0.0)

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

Background data provided by teachers.

\* Based on countries' categorizations to UNESCO's International Standard Classification of Education (Operational Manual for ISCED-1997).

\*\* For example, doctorate, master's, other postgraduate degree or diploma.

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

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

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

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 6.3 Teachers' Educational Emphasis on Science and Teaching

TIMSS2007  
Science 4<sup>th</sup> Grade

Country	Teachers Receive Specific Preparation in How to Teach the Science Curriculum as Part of Pre-service Education	Percentage of Students by Their Teachers' Major Area of Study in Their Post-secondary Education				
		Primary/Elementary Education with a Major or Specialization in Science	Primary/Elementary Education with a Major or Specialization in Mathematics but Not in Science	Science or Mathematics Major or Specialization Without a Major in Primary/Elementary Education	Primary/Elementary Education Without a Major or Specialization in Science or Mathematics	Other
Algeria	●	r 15 (3.5)	3 (1.3)	14 (3.4)	46 (4.9)	22 (3.8)
Armenia	○	6 (2.1)	3 (1.1)	90 (2.4)	1 (0.5)	1 (0.6)
Australia	●	12 (2.5)	2 (0.6)	2 (0.8)	82 (2.9)	2 (1.0)
Austria	●	1 (0.5)	3 (1.1)	0 (0.0)	95 (1.2)	0 (0.2)
Chinese Taipei	●	39 (4.2)	6 (2.0)	17 (2.9)	25 (3.5)	14 (2.9)
Colombia	○	20 (4.6)	5 (2.8)	14 (3.2)	40 (3.9)	20 (4.2)
Czech Republic	●	1 (1.0)	2 (1.2)	5 (1.6)	73 (3.7)	19 (3.0)
Denmark	●	r 14 (2.9)	8 (2.3)	33 (4.8)	17 (3.0)	28 (3.9)
El Salvador	○	11 (2.7)	3 (1.5)	12 (2.9)	34 (4.3)	40 (4.3)
England	●	16 (2.5)	5 (1.5)	10 (2.4)	49 (3.7)	20 (3.2)
Georgia	○	45 (4.3)	10 (3.9)	12 (3.3)	23 (3.3)	11 (2.8)
Germany	●	69 (2.8)	16 (2.2)	2 (1.0)	10 (1.7)	3 (0.9)
Hong Kong SAR	○	27 (4.1)	13 (3.0)	10 (2.4)	39 (4.6)	12 (2.6)
Hungary	●	4 (1.5)	3 (2.2)	0 (0.0)	93 (2.6)	0 (0.0)
Iran, Islamic Rep. of	●	43 (4.0)	7 (2.3)	10 (2.0)	28 (3.0)	13 (2.9)
Italy	○	0 (0.0)	0 (0.0)	2 (0.7)	4 (1.2)	94 (1.4)
Japan	●	15 (2.4)	6 (2.0)	5 (1.8)	55 (3.8)	18 (2.9)
Kazakhstan	●	83 (3.6)	7 (2.2)	3 (1.3)	6 (2.5)	1 (0.4)
Kuwait	●	r 32 (4.3)	19 (3.8)	38 (4.1)	8 (2.4)	3 (1.2)
Latvia	●	71 (3.7)	5 (1.5)	1 (0.6)	24 (3.5)	0 (0.0)
Lithuania	●	7 (1.8)	1 (1.1)	2 (0.7)	85 (2.3)	5 (1.7)
Morocco	●	r 12 (2.6)	1 (0.8)	19 (2.6)	42 (4.0)	26 (3.4)
Netherlands	●	21 (3.8)	16 (3.2)	0 (0.0)	61 (4.5)	2 (1.2)
New Zealand	●	10 (1.5)	9 (1.6)	3 (1.1)	72 (2.5)	6 (1.4)
Norway	●	--	--	--	--	--
Qatar	●	14 (0.1)	0 (0.0)	55 (0.2)	14 (0.1)	16 (0.1)
Russian Federation	●	48 (3.2)	9 (2.0)	6 (1.4)	35 (2.8)	2 (1.0)
Scotland	●	9 (2.1)	6 (1.7)	3 (1.2)	73 (3.5)	10 (2.2)
Singapore	●	41 (2.9)	15 (2.0)	13 (1.8)	16 (2.0)	15 (2.0)
Slovak Republic	●	2 (1.0)	0 (0.2)	13 (2.8)	80 (3.1)	4 (1.4)
Slovenia	●	54 (3.3)	4 (1.2)	0 (0.0)	42 (3.1)	0 (0.4)
Sweden	●	39 (3.4)	8 (1.5)	5 (1.0)	42 (3.6)	7 (1.8)
Tunisia	●	r 7 (2.1)	0 (0.0)	12 (2.8)	19 (3.9)	62 (4.9)
Ukraine	●	20 (3.2)	4 (1.4)	2 (1.3)	68 (3.6)	6 (1.7)
United States	●	9 (1.4)	4 (0.8)	3 (1.0)	70 (2.3)	13 (1.7)
Yemen	●	12 (3.6)	2 (1.2)	38 (4.8)	16 (3.5)	32 (4.4)
International Avg.		24 (0.5)	6 (0.3)	13 (0.4)	42 (0.5)	15 (0.4)
<b>Benchmarking Participants</b>						
Alberta, Canada	●	9 (2.2)	3 (1.2)	3 (1.0)	71 (3.5)	14 (3.1)
British Columbia, Canada	○	r 10 (2.6)	2 (1.6)	2 (0.8)	72 (4.2)	15 (3.4)
Dubai, UAE	●	s 18 (2.4)	1 (0.7)	69 (3.5)	7 (1.7)	5 (1.9)
Massachusetts, US	–	8 (2.6)	8 (3.5)	7 (3.0)	63 (4.9)	15 (3.7)
Minnesota, US	●	19 (7.6)	5 (2.3)	0 (0.0)	76 (7.6)	0 (0.0)
Ontario, Canada	●	6 (1.8)	5 (2.8)	3 (1.5)	65 (4.2)	21 (3.2)
Quebec, Canada	●	4 (1.6)	4 (1.7)	1 (0.7)	82 (3.3)	9 (2.7)

● Yes ○ No

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

Background data provided by National Research Coordinators and by teachers.

(l) 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 6.3 Teachers' Educational Emphasis on Science and Teaching (Continued)

TIMSS2007  
Science 8<sup>th</sup> Grade

Country	Teachers Receive Specific Preparation in How to Teach the Science Curriculum as Part of Pre-service Education	Percentage of Students by Their Teachers' Major Area of Study in Their Post-secondary Education <sup>1</sup>						
		Education – Science	Biology, Physics, Chemistry, or Earth Science	Education – Mathematics	Mathematics	Education – General	Other	
Algeria	○	r 26 (2.8)	83 (2.2)	r 10 (2.2)	r 15 (2.3)	r 13 (2.2)	r 16 (2.4)	
Armenia	○	37 (2.5)	99 (0.4)	22 (2.3)	47 (2.3)	49 (2.4)	42 (2.8)	
Australia	●	63 (3.3)	85 (2.4)	16 (2.3)	22 (2.6)	39 (4.1)	r 30 (3.3)	
Bahrain	●	48 (2.7)	91 (1.5)	2 (0.6)	9 (1.8)	20 (2.1)	12 (1.5)	
Bosnia and Herzegovina	●	28 (2.6)	96 (0.9)	7 (0.9)	15 (1.1)	26 (2.4)	19 (2.0)	
Botswana	●	71 (4.1)	69 (4.8)	19 (3.4)	28 (4.1)	27 (4.0)	r 16 (3.3)	
Bulgaria	○	57 (2.8)	97 (0.9)	15 (1.4)	26 (1.9)	54 (2.8)	35 (3.8)	
Chinese Taipei	●	38 (3.9)	96 (1.7)	6 (1.7)	16 (2.6)	42 (4.3)	r 9 (2.8)	
Colombia	○	42 (5.8)	93 (2.2)	2 (1.0)	14 (5.5)	34 (5.4)	r 16 (3.6)	
Cyprus	○	r 13 (0.6)	96 (0.6)	r 2 (0.3)	r 13 (0.7)	r 9 (0.5)	r 10 (0.7)	
Czech Republic	●	45 (2.4)	84 (1.8)	20 (1.6)	20 (1.8)	22 (2.0)	39 (2.0)	
Egypt	○	46 (3.9)	87 (2.4)	2 (1.1)	4 (1.5)	16 (3.1)	7 (2.3)	
El Salvador	●	41 (4.6)	58 (3.9)	19 (3.6)	34 (4.3)	48 (5.0)	47 (5.0)	
England	●	r 43 (2.8)	93 (1.4)	r 2 (0.8)	r 15 (1.7)	r 24 (2.4)	r 17 (2.2)	
Georgia	○	10 (1.4)	91 (1.6)	3 (0.8)	5 (1.0)	5 (1.3)	8 (1.5)	
Ghana	●	59 (4.4)	60 (4.2)	43 (3.9)	55 (4.0)	58 (4.0)	r 40 (4.3)	
Hong Kong SAR	○	45 (5.1)	70 (4.3)	23 (3.8)	22 (3.9)	31 (4.1)	30 (4.6)	
Hungary	●	94 (1.3)	95 (1.3)	29 (1.6)	30 (1.6)	5 (1.3)	34 (2.3)	
Indonesia	●	29 (3.2)	74 (2.9)	4 (1.0)	4 (1.2)	10 (2.2)	12 (2.3)	
Iran, Islamic Rep. of	●	84 (2.9)	35 (3.4)	3 (1.0)	7 (1.9)	7 (1.4)	12 (2.4)	
Israel	●	r 59 (3.5)	r 90 (2.1)	r 1 (0.7)	r 7 (2.0)	r 19 (2.7)	r 12 (2.3)	
Italy	○	--	67 (3.1)	--	16 (2.4)	--	17 (2.6)	
Japan	●	35 (3.9)	90 (2.6)	1 (0.7)	2 (1.3)	14 (2.9)	11 (2.6)	
Jordan	○	37 (3.9)	86 (2.8)	6 (1.9)	53 (4.1)	20 (3.7)	16 (3.2)	
Korea, Rep. of	●	13 (2.5)	92 (2.1)	0 (0.0)	0 (0.0)	1 (0.6)	6 (1.9)	
Kuwait	●	r 37 (4.6)	r 71 (4.4)	r 8 (2.8)	r 6 (1.7)	r 18 (4.0)	r 9 (2.9)	
Lebanon	●	25 (3.5)	93 (1.6)	6 (1.2)	29 (3.2)	12 (2.2)	r 11 (2.2)	
Lithuania	●	16 (1.6)	93 (1.4)	1 (0.5)	7 (1.1)	23 (2.0)	r 19 (2.2)	
Malaysia	●	49 (4.2)	64 (4.3)	18 (2.9)	36 (4.0)	28 (3.8)	29 (3.3)	
Malta	●	25 (0.2)	83 (0.2)	14 (0.2)	24 (0.2)	39 (0.3)	26 (0.3)	
Norway	●	11 (2.8)	s 49 (3.8)	7 (2.2)	39 (3.8)	44 (4.1)	r 53 (4.2)	
Oman	●	42 (4.4)	95 (1.8)	5 (2.3)	8 (2.6)	15 (3.3)	3 (1.4)	
Palestinian Nat'l Auth.	●	29 (3.9)	83 (3.1)	2 (1.1)	6 (2.0)	20 (2.8)	9 (2.5)	
Qatar	○	22 (0.1)	91 (0.1)	1 (0.0)	6 (0.1)	10 (0.1)	10 (0.1)	
Romania	●	42 (2.6)	96 (1.0)	4 (1.0)	21 (2.2)	54 (2.3)	25 (2.6)	
Russian Federation	●	50 (2.5)	97 (0.6)	8 (0.8)	14 (0.9)	47 (2.8)	20 (1.9)	
Saudi Arabia	●	31 (4.1)	89 (2.8)	1 (0.7)	0 (0.0)	16 (3.0)	3 (1.2)	
Scotland	●	r 44 (2.0)	r 98 (0.6)	r 9 (1.3)	r 27 (2.2)	r 23 (1.9)	r 14 (2.1)	
Serbia	○	24 (2.0)	99 (0.3)	1 (0.4)	6 (0.9)	18 (1.8)	12 (1.4)	
Singapore	●	49 (2.8)	94 (0.9)	31 (2.5)	58 (2.4)	40 (2.2)	r 31 (2.4)	
Slovenia	●	90 (1.2)	8 (1.3)	17 (1.4)	2 (0.5)	--	16 (2.0)	
Sweden	●	63 (2.7)	77 (2.9)	55 (2.7)	51 (3.1)	29 (2.8)	22 (2.5)	
Syrian Arab Republic	●	23 (3.3)	83 (3.1)	3 (1.2)	13 (2.3)	14 (2.4)	15 (2.7)	
Thailand	●	22 (3.3)	42 (4.5)	0 (0.0)	1 (0.0)	6 (1.9)	29 (4.3)	
Tunisia	○	9 (2.3)	99 (0.7)	1 (0.9)	6 (2.0)	6 (2.1)	5 (1.8)	
Turkey	●	53 (4.3)	59 (4.3)	3 (1.4)	16 (2.7)	25 (3.5)	9 (2.3)	
Ukraine	●	11 (2.0)	92 (1.2)	7 (0.9)	6 (0.9)	8 (1.7)	12 (1.7)	
United States	●	39 (2.5)	57 (3.1)	3 (0.9)	6 (1.3)	38 (3.2)	34 (2.7)	
‡ Morocco	●	r 12 (2.8)	r 96 (1.8)	r 2 (1.3)	r 5 (1.8)	r 5 (1.7)	r 8 (2.3)	
International Avg.		39 (0.5)	81 (0.4)	10 (0.3)	18 (0.3)	24 (0.4)	19 (0.4)	
<b>Benchmarking Participants</b>								
Basque Country, Spain	○	45 (4.4)	57 (4.6)	23 (3.9)	19 (4.3)	17 (3.8)	12 (3.3)	
British Columbia, Canada	○	47 (4.2)	r 74 (3.9)	14 (3.4)	11 (2.6)	40 (4.0)	45 (4.3)	
Dubai, UAE	●	s 48 (3.8)	s 86 (2.8)	s 5 (1.4)	s 20 (3.4)	s 12 (1.9)	s 13 (3.4)	
Massachusetts, US	●	45 (6.9)	68 (5.8)	3 (2.6)	7 (2.8)	25 (4.4)	28 (5.3)	
Minnesota, US	●	66 (8.0)	90 (4.2)	4 (2.3)	5 (2.6)	19 (5.1)	26 (5.6)	
Ontario, Canada	●	29 (4.4)	44 (4.2)	8 (2.2)	7 (2.0)	56 (4.5)	61 (4.3)	
Quebec, Canada	●	51 (4.7)	69 (4.1)	14 (3.8)	10 (3.1)	17 (3.7)	21 (3.4)	

● Yes ○ No

Background data provided by National Research Coordinators and by teachers.

<sup>1</sup> Teachers who responded that they majored in more than one area are reflected in all categories that apply.

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

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

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

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

## Exhibit 6.4 Teachers' Major Area of Study in Science

TIMSS2007  
Science 8<sup>th</sup> Grade

Country	Percentage of Students Taught by Teachers Having Major Area of Study in Sciences in Their Post-secondary Education <sup>1</sup>			
	Biology	Physics	Chemistry	Earth Science
Algeria	r 43 (2.1)	r 45 (2.6)	r 31 (3.0)	r 23 (3.1)
Armenia	43 (1.6)	52 (2.4)	51 (2.0)	24 (1.2)
Australia	61 (3.2)	23 (2.9)	51 (3.5)	21 (2.5)
Bahrain	34 (2.9)	30 (1.9)	61 (2.7)	7 (1.3)
Bosnia and Herzegovina	32 (1.1)	26 (1.1)	40 (1.4)	26 (0.6)
Botswana	63 (4.7)	40 (4.4)	51 (4.8)	7 (2.2)
Bulgaria	40 (2.0)	41 (2.2)	52 (1.5)	29 (2.0)
Chinese Taipei	20 (3.5)	64 (4.0)	72 (3.9)	22 (3.3)
Colombia	79 (3.6)	12 (2.5)	64 (3.9)	16 (3.1)
Cyprus	r 26 (0.8)	r 39 (1.0)	r 46 (0.8)	r 15 (0.7)
Czech Republic	38 (1.9)	21 (1.5)	33 (1.8)	22 (1.4)
Egypt	48 (4.7)	43 (3.6)	53 (4.5)	16 (3.0)
El Salvador	48 (3.8)	31 (4.1)	40 (4.1)	25 (3.8)
England	64 (2.6)	31 (2.7)	53 (2.8)	r 10 (2.2)
Georgia	38 (1.9)	25 (1.2)	30 (1.9)	23 (1.5)
Ghana	53 (4.2)	56 (4.1)	57 (4.1)	14 (3.1)
Hong Kong SAR	34 (4.4)	28 (3.8)	36 (4.2)	3 (1.6)
Hungary	40 (1.7)	26 (1.1)	31 (1.3)	34 (1.3)
Indonesia	43 (2.9)	32 (3.1)	10 (2.2)	2 (0.9)
Iran, Islamic Rep. of	24 (3.0)	20 (2.8)	26 (3.0)	21 (3.0)
Israel	r 76 (3.0)	r 32 (3.5)	r 54 (4.1)	r 4 (1.3)
Italy	52 (3.0)	4 (1.4)	3 (1.0)	9 (1.8)
Japan	31 (4.3)	27 (3.6)	42 (3.7)	16 (3.0)
Jordan	52 (4.0)	65 (3.8)	62 (4.1)	36 (4.2)
Korea, Rep. of	28 (3.2)	26 (3.6)	23 (3.4)	16 (2.9)
Kuwait	r 35 (4.6)	r 31 (3.8)	r 44 (4.4)	r 20 (4.5)
Lebanon	67 (3.1)	45 (3.5)	58 (3.8)	24 (3.1)
Lithuania	35 (1.3)	25 (1.1)	28 (1.4)	22 (0.7)
Malaysia	50 (4.1)	34 (4.2)	43 (4.0)	13 (2.6)
Malta	24 (0.3)	34 (0.2)	21 (0.3)	27 (0.2)
Norway	s 33 (3.6)	s 9 (2.3)	s 15 (2.9)	s 12 (3.0)
Oman	21 (3.4)	66 (4.0)	57 (4.3)	9 (2.5)
Palestinian Nat'l Auth.	34 (4.3)	27 (3.8)	35 (4.4)	8 (2.2)
Qatar	41 (0.2)	35 (0.2)	46 (0.2)	13 (0.1)
Romania	28 (1.0)	46 (1.5)	50 (1.5)	24 (0.7)
Russian Federation	49 (1.5)	27 (0.5)	40 (1.0)	29 (1.0)
Saudi Arabia	46 (4.7)	16 (3.3)	31 (4.4)	15 (2.8)
Scotland	r 48 (2.5)	r 38 (2.1)	r 50 (2.2)	r 9 (1.6)
Serbia	28 (0.7)	29 (1.0)	38 (1.2)	25 (0.4)
Singapore	50 (2.6)	47 (2.1)	62 (2.5)	12 (1.6)
Slovenia	3 (0.8)	3 (0.9)	3 (0.9)	--
Sweden	54 (3.1)	41 (2.7)	56 (3.2)	13 (2.0)
Syrian Arab Republic	50 (2.9)	52 (3.2)	52 (3.2)	17 (2.6)
Thailand	21 (3.2)	6 (2.0)	13 (3.0)	2 (1.3)
Tunisia	96 (1.3)	7 (2.1)	9 (2.4)	73 (3.4)
Turkey	24 (3.7)	33 (4.2)	36 (3.7)	5 (1.8)
Ukraine	39 (1.6)	22 (0.8)	32 (1.5)	24 (1.2)
United States	42 (2.7)	7 (1.5)	17 (2.1)	17 (2.2)
‡ Morocco	r 46 (3.1)	r 47 (3.2)	r 40 (3.7)	r 33 (3.6)
International Avg.	42 (0.4)	32 (0.4)	40 (0.4)	19 (0.3)
<b>Benchmarking Participants</b>				
Basque Country, Spain	37 (4.7)	17 (4.2)	30 (4.1)	11 (3.3)
British Columbia, Canada	r 53 (3.7)	r 10 (2.5)	r 26 (3.6)	r 14 (2.8)
Dubai, UAE	s 43 (5.6)	s 41 (6.1)	s 53 (5.1)	s 8 (1.9)
Massachusetts, US	47 (6.6)	12 (4.6)	20 (6.0)	27 (6.2)
Minnesota, US	68 (7.4)	7 (2.2)	25 (6.5)	37 (8.2)
Ontario, Canada	30 (4.1)	10 (2.8)	19 (3.7)	21 (4.1)
Quebec, Canada	46 (5.1)	25 (4.5)	24 (4.5)	14 (3.4)

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

Background data provided by teachers.

<sup>1</sup> Teachers who responded that they majored in more than one area are reflected in all categories that apply.

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

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

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

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

Exhibit 6.5 contains teachers' reports about their participation in professional development in science. At the fourth grade, one-third of the students, on average internationally, had teachers that had participated in some type of professional development during the past two years in the various science areas asked about by TIMSS, including science content (34%), science pedagogy (35%), science curriculum (31%), and/or improving students' critical thinking or inquiry skills (33%). Somewhat fewer students had teachers with such professional development in science assessment (28%) and/or integrating information technology into science (24%). At the eighth grade, the participation in professional development was somewhat higher, but the pattern was similar. Approximately one-half of the eighth grade students, on average internationally, had teachers that had participated in some type of professional development during the past two years in science content (58%), science pedagogy (57%), science curriculum (51%), science assessment (47%), improving students critical thinking or inquiry skills (46%), and integrating information technology into science (45%).

Teachers also were asked about opportunities for collaboration with other science teachers. Exhibit 6.6 contains the results in relation to students' average science achievement, with trend data from 2003. Internationally on average, the largest percentages of students at both grades (59% for both) had teachers that collaborated with other teachers about 2–3 times a month. Other than that, collaboration tended to be more frequent (27–31% at least weekly) rather than less frequent (10–14% never or almost never). Although teachers may well appreciate opportunities to benefit from the experience of their colleagues, on average internationally, the frequency of collaboration was not related to achievement at either grade. At the fourth grade, between 2003 and 2007 the frequency of collaboration (percent at least weekly) increased to some extent in Armenia, Italy, Morocco, Scotland, and Tunisia while it decreased in Lithuania. At the eighth grade, the frequency of collaboration increased between 2003 and 2007 in Armenia, Jordan, and Scotland, while it decreased in Bahrain, Cyprus, Serbia, and Sweden.

## Exhibit 6.5 Teachers' Participation in Professional Development in Science

TIMSS2007  
Science 4<sup>th</sup> Grade

Country	Percentage of Students by Their Teachers' Participation in Professional Development in Science in the Past 2 Years					
	Science Content	Science Pedagogy / Instruction	Science Curriculum	Integrating Information Technology into Science	Improving Students' Critical Thinking or Inquiry Skills	Science Assessment
Algeria	32 (4.3)	48 (5.1)	40 (5.3)	9 (2.6)	35 (4.4)	36 (4.2)
Armenia	15 (2.6)	17 (2.6)	23 (3.2)	16 (2.7)	18 (3.3)	17 (3.1)
Australia	22 (3.0)	16 (2.5)	24 (3.4)	20 (3.1)	36 (3.5)	15 (2.3)
Austria	35 (3.6)	24 (2.9)	8 (1.8)	13 (1.9)	20 (2.3)	4 (1.2)
Chinese Taipei	65 (3.9)	69 (3.3)	65 (3.8)	64 (4.2)	41 (4.4)	37 (3.9)
Colombia	42 (5.0)	36 (4.3)	52 (5.0)	26 (4.2)	32 (4.5)	35 (4.7)
Czech Republic	20 (3.2)	19 (2.9)	15 (2.9)	17 (3.1)	24 (3.6)	13 (3.1)
Denmark	r 21 (3.9)	r 17 (3.6)	r 13 (3.3)	r 6 (2.0)	r 6 (2.1)	r 4 (2.0)
El Salvador	23 (3.4)	14 (2.6)	10 (2.1)	9 (2.5)	27 (3.9)	15 (3.1)
England	32 (4.1)	41 (4.2)	34 (3.7)	28 (3.5)	42 (4.3)	36 (4.0)
Georgia	20 (4.7)	25 (3.5)	30 (4.2)	16 (3.2)	49 (5.0)	44 (4.7)
Germany	36 (2.8)	21 (2.6)	33 (3.2)	7 (1.6)	25 (2.5)	15 (2.2)
Hong Kong SAR	53 (4.3)	47 (4.4)	38 (4.2)	45 (4.2)	56 (4.5)	31 (3.9)
Hungary	24 (3.2)	29 (3.5)	13 (2.7)	14 (2.5)	26 (2.9)	7 (1.9)
Iran, Islamic Rep. of	28 (3.3)	36 (3.3)	25 (3.2)	12 (2.8)	28 (3.7)	25 (3.4)
Italy	16 (2.1)	10 (1.9)	8 (1.4)	17 (2.3)	12 (1.9)	6 (1.4)
Japan	37 (3.8)	45 (4.0)	14 (2.6)	23 (3.3)	11 (2.4)	15 (2.9)
Kazakhstan	65 (5.5)	68 (5.6)	70 (5.1)	53 (4.3)	69 (5.5)	67 (5.6)
Kuwait	r 39 (4.1)	r 36 (4.1)	r 19 (3.3)	r 39 (3.8)	r 43 (4.0)	r 39 (4.1)
Latvia	68 (3.6)	61 (3.8)	68 (3.9)	29 (3.7)	51 (4.3)	60 (3.9)
Lithuania	21 (3.0)	25 (3.1)	9 (1.8)	35 (3.2)	44 (4.2)	24 (2.7)
Morocco	8 (2.5)	16 (3.2)	5 (1.9)	2 (1.4)	15 (2.8)	10 (2.7)
Netherlands	5 (1.7)	4 (1.3)	r 3 (1.4)	7 (2.3)	17 (2.6)	5 (1.5)
New Zealand	14 (1.9)	12 (1.6)	17 (1.9)	19 (2.3)	47 (2.7)	11 (1.7)
Norway	8 (1.9)	4 (1.4)	12 (2.5)	4 (1.5)	4 (1.3)	0 (0.3)
Qatar	37 (0.2)	39 (0.2)	27 (0.2)	29 (0.2)	44 (0.2)	39 (0.2)
Russian Federation	58 (3.3)	62 (3.5)	62 (2.9)	48 (3.1)	41 (3.6)	52 (3.4)
Scotland	r 39 (4.1)	r 44 (4.3)	r 42 (4.2)	r 27 (3.6)	r 47 (3.9)	r 23 (3.2)
Singapore	61 (2.9)	68 (3.0)	48 (2.6)	52 (2.9)	57 (3.2)	53 (2.8)
Slovak Republic	21 (3.1)	47 (3.8)	51 (3.8)	45 (3.6)	29 (3.5)	26 (3.4)
Slovenia	63 (3.1)	57 (3.4)	43 (2.9)	29 (2.9)	23 (2.5)	57 (3.1)
Sweden	22 (2.4)	17 (2.8)	21 (2.9)	4 (1.3)	14 (2.5)	11 (2.5)
Tunisia	27 (3.1)	41 (3.5)	27 (3.6)	19 (3.2)	28 (3.9)	42 (3.9)
Ukraine	67 (3.2)	75 (2.9)	75 (3.6)	62 (3.2)	63 (3.7)	78 (3.0)
United States	42 (2.8)	29 (2.4)	44 (2.7)	28 (2.8)	36 (2.2)	24 (2.4)
Yemen	22 (4.2)	35 (5.0)	27 (4.5)	7 (2.9)	41 (5.0)	36 (5.0)
<b>International Avg.</b>	<b>34 (0.6)</b>	<b>35 (0.6)</b>	<b>31 (0.5)</b>	<b>24 (0.5)</b>	<b>33 (0.6)</b>	<b>28 (0.5)</b>
<b>Benchmarking Participants</b>						
Alberta, Canada	38 (4.0)	32 (3.8)	31 (3.9)	35 (4.2)	55 (4.0)	31 (3.9)
British Columbia, Canada	r 51 (4.2)	r 30 (4.2)	r 44 (4.7)	r 14 (2.9)	r 45 (4.3)	r 17 (3.4)
Dubai, UAE	s 60 (5.0)	x x	s 51 (5.4)	s 38 (5.4)	s 58 (5.1)	s 53 (4.9)
Massachusetts, US	45 (6.5)	41 (5.5)	51 (5.9)	35 (6.4)	38 (5.5)	21 (4.7)
Minnesota, US	35 (8.7)	33 (7.4)	45 (7.7)	27 (7.6)	41 (5.7)	20 (6.5)
Ontario, Canada	17 (3.6)	12 (2.7)	26 (4.6)	19 (4.6)	29 (4.0)	10 (2.7)
Quebec, Canada	19 (3.1)	20 (3.4)	r 15 (3.1)	11 (2.8)	11 (2.6)	10 (2.8)

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

Background data provided by teachers.

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

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



Exhibit 6.5 Teachers' Participation in Professional Development in Science (Continued)

TIMSS2007  
Science 8<sup>th</sup> Grade

Country	Percentage of Students by Their Teachers' Participation in Professional Development in Science in the Past 2 Years					
	Science Content	Science Pedagogy / Instruction	Science Curriculum	Integrating Information Technology into Science	Improving Students' Critical Thinking or Inquiry Skills	Science Assessment
Algeria	r 48 (3.2)	r 60 (3.2)	r 47 (3.5)	r 36 (3.4)	r 50 (3.6)	r 47 (3.4)
Armenia	38 (2.1)	50 (2.5)	51 (2.0)	31 (2.1)	44 (2.4)	34 (2.2)
Australia	56 (3.7)	52 (3.5)	57 (3.9)	57 (4.3)	51 (3.9)	54 (3.5)
Bahrain	45 (2.9)	50 (2.4)	35 (2.5)	68 (2.5)	58 (2.4)	50 (2.8)
Bosnia and Herzegovina	44 (2.1)	39 (2.6)	46 (2.5)	45 (2.3)	49 (2.4)	53 (2.1)
Botswana	22 (3.9)	15 (2.7)	13 (2.8)	18 (3.1)	26 (3.5)	33 (3.6)
Bulgaria	69 (2.8)	55 (3.0)	75 (2.4)	76 (2.7)	29 (2.9)	44 (3.0)
Chinese Taipei	78 (3.7)	70 (3.9)	80 (3.4)	73 (3.8)	40 (4.2)	48 (4.3)
Colombia	72 (4.2)	68 (4.4)	71 (4.8)	39 (4.6)	46 (4.9)	62 (4.5)
Cyprus	r 58 (1.0)	r 67 (0.8)	r 53 (1.0)	r 68 (1.0)	r 48 (0.9)	r 40 (1.0)
Czech Republic	61 (2.4)	43 (2.3)	30 (2.7)	55 (2.7)	31 (2.3)	22 (2.5)
Egypt	55 (4.1)	70 (3.6)	39 (4.1)	49 (4.4)	71 (3.9)	61 (4.1)
El Salvador	53 (4.2)	36 (3.9)	22 (3.5)	24 (3.7)	43 (4.5)	30 (3.7)
England	66 (2.6)	75 (2.4)	71 (2.6)	44 (3.0)	49 (3.1)	65 (2.6)
Georgia	44 (3.1)	48 (3.2)	58 (2.7)	36 (3.5)	68 (3.2)	71 (3.3)
Ghana	60 (4.5)	48 (4.3)	54 (4.5)	20 (3.4)	45 (4.1)	51 (4.5)
Hong Kong SAR	79 (3.4)	78 (3.5)	75 (4.0)	56 (4.3)	69 (4.0)	56 (4.5)
Hungary	48 (2.6)	50 (2.3)	29 (2.3)	35 (2.7)	33 (2.3)	25 (2.2)
Indonesia	64 (4.1)	68 (3.6)	75 (3.2)	25 (3.1)	51 (4.3)	71 (3.1)
Iran, Islamic Rep. of	81 (2.9)	83 (2.8)	58 (3.8)	44 (3.8)	51 (3.8)	58 (3.9)
Israel	70 (3.9)	67 (4.2)	72 (3.7)	56 (3.3)	62 (3.8)	50 (4.0)
Italy	24 (3.0)	28 (3.2)	13 (1.9)	25 (2.9)	10 (1.8)	15 (2.3)
Japan	74 (3.3)	64 (3.8)	31 (3.7)	31 (3.5)	14 (2.9)	40 (4.3)
Jordan	58 (4.2)	78 (3.4)	66 (4.0)	59 (3.8)	74 (3.7)	54 (4.2)
Korea, Rep. of	69 (3.2)	49 (3.9)	34 (3.4)	29 (3.4)	38 (4.0)	36 (3.9)
Kuwait	r 53 (4.8)	r 57 (4.7)	r 33 (4.6)	r 46 (4.5)	r 47 (4.4)	r 34 (4.9)
Lebanon	57 (3.4)	59 (3.4)	52 (3.7)	42 (4.1)	58 (3.6)	64 (3.7)
Lithuania	75 (1.9)	68 (1.9)	66 (2.2)	69 (2.2)	51 (2.4)	62 (2.0)
Malaysia	66 (3.7)	46 (4.0)	66 (3.9)	60 (4.6)	38 (3.9)	49 (3.9)
Malta	37 (0.3)	28 (0.3)	34 (0.3)	38 (0.3)	26 (0.3)	28 (0.3)
Norway	31 (3.3)	29 (3.0)	28 (3.3)	15 (2.7)	9 (2.0)	7 (1.8)
Oman	53 (4.3)	45 (4.5)	46 (4.4)	20 (3.5)	27 (3.9)	61 (3.9)
Palestinian Nat'l Auth.	49 (4.2)	50 (3.8)	36 (4.3)	38 (3.4)	50 (3.4)	40 (4.2)
Qatar	52 (0.2)	68 (0.1)	45 (0.2)	55 (0.1)	47 (0.2)	48 (0.1)
Romania	58 (2.5)	54 (2.4)	47 (2.6)	67 (2.6)	50 (2.7)	54 (2.7)
Russian Federation	63 (2.1)	72 (1.6)	70 (2.2)	67 (2.8)	49 (2.2)	54 (2.2)
Saudi Arabia	41 (4.0)	55 (3.9)	21 (3.8)	30 (3.7)	44 (4.2)	31 (4.4)
Scotland	r 73 (2.2)	r 84 (2.0)	r 68 (2.4)	r 64 (2.1)	r 63 (2.5)	r 57 (2.3)
Serbia	63 (2.4)	33 (2.2)	20 (2.2)	50 (2.5)	45 (2.3)	6 (1.1)
Singapore	78 (2.3)	85 (1.9)	78 (2.2)	70 (2.2)	72 (2.4)	65 (2.3)
Slovenia	82 (2.1)	49 (2.2)	43 (2.1)	43 (2.2)	24 (1.7)	67 (2.3)
Sweden	43 (3.3)	29 (2.5)	36 (2.6)	10 (1.9)	20 (2.4)	37 (3.1)
Syrian Arab Republic	27 (3.5)	26 (3.3)	18 (2.4)	16 (2.6)	51 (3.6)	34 (3.7)
Thailand	91 (2.5)	85 (3.1)	82 (3.2)	70 (3.4)	80 (3.1)	81 (3.3)
Tunisia	64 (4.1)	78 (3.5)	76 (3.8)	54 (4.3)	41 (4.2)	55 (4.6)
Turkey	65 (4.3)	64 (4.5)	78 (3.9)	28 (3.6)	25 (3.9)	44 (4.0)
Ukraine	80 (2.3)	84 (1.9)	85 (2.0)	81 (2.0)	80 (2.1)	84 (2.0)
United States	82 (2.3)	64 (2.8)	82 (2.3)	70 (3.1)	73 (2.9)	61 (3.0)
‡ Morocco	33 (3.2)	58 (3.1)	r 34 (3.2)	16 (2.7)	r 18 (3.1)	26 (3.5)
International Avg.	58 (0.5)	57 (0.5)	51 (0.5)	45 (0.5)	46 (0.5)	47 (0.5)
<b>Benchmarking Participants</b>						
Basque Country, Spain	30 (4.2)	28 (4.8)	25 (4.5)	41 (5.0)	18 (3.8)	13 (3.6)
British Columbia, Canada	r 84 (3.2)	r 56 (3.9)	r 70 (3.3)	r 55 (4.0)	r 64 (3.8)	r 42 (4.5)
Dubai, UAE	s 58 (3.8)	s 68 (3.3)	s 64 (3.1)	s 67 (3.9)	s 75 (3.6)	s 69 (4.2)
Massachusetts, US	85 (5.3)	76 (6.8)	90 (4.3)	72 (6.3)	69 (7.4)	61 (7.1)
Minnesota, US	89 (3.9)	77 (5.2)	87 (3.7)	66 (6.6)	68 (7.8)	61 (6.6)
Ontario, Canada	44 (4.0)	32 (4.7)	40 (4.3)	36 (4.4)	45 (5.3)	22 (3.9)
Quebec, Canada	66 (4.8)	64 (4.4)	68 (5.2)	42 (5.4)	17 (3.6)	73 (4.0)

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

Background data provided by teachers.

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

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

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 6.6 Frequency of Collaboration Among Science Teachers with Trends**
**TIMSS2007**  
**Science 4<sup>th</sup> Grade**

Country	Percentage of Students by Their Teachers' Frequency of Collaboration with Other Teachers									
	Never or Almost Never			2 or 3 Times per Month			At Least Weekly			
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	
Algeria	5 (2.0)	351 (25.8)	0 0	55 (4.6)	351 (9.4)	0 0	40 (4.4)	347 (10.2)	0 0	
Armenia	2 (1.0)	~ ~	0 (1.6)	35 (3.2)	483 (9.4)	-35 (5.9) ▾	63 (3.2)	485 (8.2)	35 (5.9) ▲	
Australia	10 (2.4)	527 (15.4)	-3 (3.2)	61 (3.3)	528 (5.0)	-1 (5.2)	29 (3.0)	526 (7.0)	4 (4.7)	
Austria	23 (2.6)	533 (4.7)	0 0	66 (3.1)	522 (3.4)	0 0	11 (2.0)	533 (5.5)	0 0	
Chinese Taipei	18 (3.6)	549 (6.0)	6 (4.6)	64 (4.3)	558 (3.0)	-7 (5.8)	17 (2.9)	560 (4.9)	1 (4.2)	
Colombia	11 (2.8)	388 (12.0)	0 0	45 (5.0)	414 (8.8)	0 0	45 (5.0)	396 (11.3)	0 0	
Czech Republic	15 (2.8)	513 (7.6)	0 0	78 (3.4)	515 (3.7)	0 0	7 (2.1)	508 (5.0)	0 0	
Denmark	22 (3.6)	520 (6.2)	0 0	68 (4.2)	519 (3.7)	0 0	10 (2.7)	520 (6.1)	0 0	
El Salvador	17 (3.6)	404 (9.4)	0 0	56 (4.7)	391 (5.6)	0 0	27 (3.8)	375 (8.8)	0 0	
England	10 (2.6)	541 (9.1)	-3 (3.9)	58 (3.9)	545 (4.0)	-2 (6.2)	32 (3.4)	535 (5.6)	5 (5.7)	
Georgia	2 (1.2)	~ ~	0 0	39 (4.5)	415 (8.1)	0 0	59 (4.6)	420 (5.0)	0 0	
Germany	21 (2.8)	532 (6.0)	0 0	73 (3.1)	528 (3.0)	0 0	6 (1.6)	505 (11.3)	0 0	
Hong Kong SAR	12 (3.1)	573 (10.6)	-8 (4.9)	76 (4.3)	553 (4.1)	2 (6.1)	13 (3.1)	555 (7.5)	6 (4.1)	
Hungary	3 (1.5)	554 (28.8)	-3 (2.3)	62 (3.8)	538 (4.7)	-1 (4.9)	34 (3.7)	531 (5.3)	3 (5.1)	
Iran, Islamic Rep. of	5 (1.7)	418 (19.6)	-1 (2.7)	65 (3.7)	437 (5.6)	11 (6.1)	30 (3.9)	431 (9.1)	-10 (6.3)	
Italy	6 (1.5)	532 (8.4)	-6 (2.8) ▾	69 (2.9)	535 (4.1)	-1 (4.2)	26 (2.5)	537 (5.8)	7 (3.5) ▲	
Japan	12 (2.2)	548 (4.8)	-2 (3.4)	74 (3.4)	547 (2.2)	6 (5.0)	14 (2.8)	552 (5.9)	-3 (4.1)	
Kazakhstan	1 (0.7)	~ ~	0 0	26 (4.2)	527 (11.8)	0 0	73 (4.3)	534 (5.6)	0 0	
Kuwait	0 (0.5)	~ ~	0 0	40 (4.4)	342 (10.0)	0 0	59 (4.4)	350 (7.9)	0 0	
Latvia	8 (1.9)	552 (5.7)	8 (1.9) ▲	78 (2.9)	543 (2.7)	-4 (5.3)	13 (2.3)	538 (5.5)	-4 (5.0)	
Lithuania	8 (1.5)	510 (6.6)	5 (2.1) ▲	71 (3.2)	515 (2.7)	13 (4.9) ▲	20 (3.0)	514 (5.5)	-18 (4.8) ▾	
Morocco	19 (3.7)	292 (21.7)	-36 (6.4) ▾	54 (4.0)	294 (8.9)	14 (6.6) ▲	27 (3.8)	296 (16.8)	22 (4.2) ▲	
Netherlands	32 (3.6)	523 (4.2)	0 (5.5)	62 (4.1)	523 (3.4)	-3 (5.8)	7 (2.3)	520 (7.7)	3 (3.1)	
New Zealand	5 (1.0)	504 (7.3)	-4 (2.2)	65 (2.5)	508 (3.6)	3 (3.9)	31 (2.6)	499 (4.6)	1 (4.0)	
Norway	8 (1.7)	466 (9.7)	-2 (3.4)	58 (3.8)	473 (4.3)	-6 (5.7)	34 (3.8)	483 (4.4)	7 (5.0)	
Qatar	5 (0.1)	314 (7.1)	0 0	45 (0.2)	312 (3.3)	0 0	50 (0.2)	271 (2.7)	0 0	
Russian Federation	0 (0.2)	~ ~	-1 (0.7)	50 (3.6)	543 (4.9)	-3 (4.8)	50 (3.5)	550 (6.9)	4 (4.7)	
Scotland	17 (3.1)	497 (7.3)	-2 (4.6)	53 (4.1)	499 (3.6)	-13 (6.1) ▾	30 (3.5)	505 (4.7)	15 (5.0) ▲	
Singapore	8 (1.6)	589 (11.2)	-4 (3.3)	79 (2.5)	589 (4.3)	-1 (4.4)	13 (2.2)	570 (10.3)	5 (3.1)	
Slovak Republic	5 (1.8)	492 (20.2)	0 0	60 (3.9)	534 (3.9)	0 0	35 (3.9)	519 (11.3)	0 0	
Slovenia	11 (1.9)	521 (6.7)	-2 (3.7)	73 (2.9)	518 (2.3)	-3 (4.8)	16 (2.5)	517 (5.4)	5 (3.6)	
Sweden	19 (3.0)	527 (4.9)	0 0	61 (3.5)	524 (3.8)	0 0	20 (3.0)	529 (5.1)	0 0	
Tunisia	11 (2.8)	300 (28.3)	-21 (5.0) ▾	51 (4.1)	321 (9.1)	2 (5.8)	38 (4.0)	304 (9.6)	19 (5.1) ▲	
Ukraine	1 (0.7)	~ ~	0 0	20 (3.2)	482 (6.0)	0 0	79 (3.3)	472 (3.5)	0 0	
United States	9 (1.6)	542 (9.4)	-3 (2.6)	65 (2.8)	541 (3.2)	4 (3.9)	25 (2.7)	529 (4.9)	-1 (3.8)	
Yemen	15 (3.6)	217 (21.8)	0 0	56 (4.6)	211 (9.3)	0 0	30 (4.5)	178 (14.7)	0 0	
International Avg.	10 (0.4)	478 (2.5)		59 (0.6)	477 (1.0)		31 (0.6)	472 (1.3)		
<b>Benchmarking Participants</b>										
Alberta, Canada	10 (3.0)	530 (15.5)	0 0	69 (3.8)	544 (4.2)	0 0	21 (2.9)	543 (5.4)	0 0	
British Columbia, Canada	23 (3.8)	543 (4.9)	0 0	63 (4.3)	536 (4.3)	0 0	14 (2.8)	522 (5.9)	0 0	
Dubai, UAE	0 (0.0)	~ ~	0 0	62 (3.3)	458 (9.3)	0 0	38 (3.3)	441 (3.8)	0 0	
Massachusetts, US	12 (3.9)	565 (13.0)	0 0	59 (5.2)	570 (5.2)	0 0	30 (5.3)	576 (7.5)	0 0	
Minnesota, US	8 (2.9)	554 (12.8)	0 0	66 (8.6)	554 (5.7)	0 0	26 (8.1)	546 (22.4)	0 0	
Ontario, Canada	14 (3.5)	537 (8.2)	-4 (5.0)	63 (5.1)	534 (5.1)	-2 (6.5)	23 (4.4)	536 (9.8)	6 (5.7)	
Quebec, Canada	18 (2.9)	522 (6.1)	0 (4.3)	67 (3.9)	518 (3.5)	-5 (5.6)	16 (3.1)	517 (7.2)	6 (4.0)	

▲ 2007 percent significantly higher

▾ 2007 percent significantly lower

Based on teachers' reports on the frequency of four types of interactions with other teachers: 1) Discussions about how to teach a particular concept; 2) Working on preparing instructional materials; 3) Visits to another teacher's classroom to observe his/her teaching; 4) Informal observation of my classroom by another teacher. Frequency is computed by averaging across four items based on a 4-point scale: 1. Never or Almost Never; 2. 2 or 3 times per month; 3. 1-3 times per week; 4. Daily or almost daily.

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

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

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

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



**Exhibit 6.6 Frequency of Collaboration Among Science Teachers with Trends (Continued)**

**TIMSS2007**  
Science **8<sup>th</sup>** Grade

Country	Percentage of Students by Their Teachers' Frequency of Collaboration with Other Teachers									
	Never or Almost Never			2 or 3 Times per Month			At Least Weekly			
	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	2007 Percent of Students	Average Achievement	Difference in Percent from 2003	
Algeria	5 (1.4)	410 (6.2)	0 0	56 (3.3)	409 (2.2)	0 0	40 (3.3)	408 (2.6)	0 0	
Armenia	3 (0.9)	476 (20.1)	-6 (2.1) ▼	31 (2.3)	490 (5.1)	-25 (3.7) ▼	66 (2.1)	487 (6.9)	30 (3.5) ▲	
Australia	16 (2.6)	512 (9.0)	1 (4.0)	62 (2.5)	520 (4.6)	-6 (4.2)	22 (2.4)	511 (6.0)	5 (3.5)	
Bahrain	5 (1.5)	438 (16.8)	3 (1.9)	70 (2.7)	466 (2.8)	14 (4.3) ▲	25 (2.2)	475 (4.8)	-17 (3.9) ▼	
Bosnia and Herzegovina	8 (1.1)	469 (5.5)	0 0	56 (2.5)	464 (3.3)	0 0	36 (2.6)	468 (4.0)	0 0	
Botswana	8 (2.3)	359 (7.7)	2 (3.1)	52 (4.2)	357 (4.8)	-1 (6.1)	40 (4.2)	351 (5.4)	-1 (6.0)	
Bulgaria	17 (2.5)	480 (10.0)	--	66 (2.8)	464 (7.0)	--	17 (2.6)	469 (13.8)	--	
Chinese Taipei	36 (4.2)	549 (6.3)	10 (5.6)	53 (4.4)	563 (4.3)	-13 (6.0) ▼	11 (2.7)	585 (9.8)	3 (3.4)	
Colombia	22 (4.1)	417 (6.1)	0 0	53 (4.4)	422 (4.8)	0 0	25 (3.8)	405 (8.7)	0 0	
Cyprus	9 (0.6)	456 (5.0)	1 (1.3)	67 (1.0)	451 (2.1)	12 (1.8) ▲	24 (0.8)	447 (2.9)	-13 (1.3) ▼	
Czech Republic	39 (3.0)	541 (3.3)	0 0	56 (2.8)	538 (2.7)	0 0	5 (1.1)	525 (5.3)	0 0	
Egypt	1 (0.5)	~ ~	0 (0.5)	37 (4.1)	409 (6.1)	6 (5.3)	62 (4.1)	406 (5.0)	-6 (5.4)	
El Salvador	31 (4.1)	388 (6.5)	0 0	48 (4.7)	387 (5.1)	0 0	21 (3.2)	385 (7.0)	0 0	
England	15 (2.3)	558 (11.4)	-2 (4.4)	60 (3.0)	541 (6.0)	-6 (5.5)	25 (2.7)	537 (8.3)	8 (4.5)	
Georgia	2 (0.8)	~ ~	0 0	49 (4.0)	420 (6.9)	0 0	48 (4.1)	422 (5.3)	0 0	
Ghana	10 (2.5)	313 (23.4)	-6 (4.0)	39 (4.1)	302 (7.6)	5 (6.1)	51 (4.1)	303 (8.2)	1 (6.3)	
Hong Kong SAR	19 (3.7)	525 (15.9)	-7 (5.7)	68 (4.5)	531 (5.3)	-1 (6.4)	13 (3.3)	537 (13.8)	7 (4.0)	
Hungary	14 (1.6)	530 (6.8)	4 (2.0) ▲	67 (2.5)	540 (3.0)	-7 (3.3) ▼	19 (2.4)	540 (6.0)	3 (3.1)	
Indonesia	5 (1.8)	411 (6.5)	2 (2.2)	66 (4.1)	437 (5.1)	3 (5.2)	29 (3.7)	436 (8.0)	-4 (4.9)	
Iran, Islamic Rep. of	12 (2.6)	454 (10.5)	2 (3.7)	77 (3.3)	460 (4.3)	1 (4.9)	10 (2.5)	461 (11.1)	-3 (3.7)	
Israel	10 (2.0)	489 (13.0)	-6 (2.9)	84 (2.4)	466 (5.6)	10 (3.8) ▲	6 (1.9)	476 (19.2)	-4 (3.0)	
Italy	35 (3.1)	497 (4.1)	7 (4.5)	58 (3.3)	493 (4.1)	-6 (4.8)	8 (1.7)	498 (6.9)	-1 (2.7)	
Japan	42 (4.1)	550 (3.5)	3 (5.3)	49 (4.0)	559 (4.4)	-4 (5.4)	9 (2.4)	546 (6.6)	1 (3.4)	
Jordan	6 (1.9)	458 (11.4)	4 (2.4)	50 (4.3)	482 (6.8)	-16 (6.2) ▼	44 (4.4)	485 (5.9)	12 (6.1) ▲	
Korea, Rep. of	7 (2.0)	560 (7.5)	-10 (3.7) ▼	80 (3.4)	552 (2.3)	8 (4.9)	13 (2.7)	555 (5.5)	3 (3.4)	
Kuwait	2 (1.1)	~ ~	0 0	26 (3.5)	418 (6.7)	0 0	72 (3.7)	415 (4.6)	0 0	
Lebanon	14 (2.7)	400 (11.7)	1 (3.6)	60 (3.5)	417 (7.0)	-2 (5.0)	26 (3.5)	416 (14.7)	1 (4.6)	
Lithuania	25 (2.1)	520 (3.1)	9 (2.7) ▲	65 (2.2)	517 (3.0)	-7 (3.0) ▼	11 (1.3)	525 (6.6)	-2 (2.1)	
Malaysia	3 (1.4)	518 (32.3)	-4 (2.6)	66 (3.7)	470 (7.3)	1 (5.3)	31 (3.5)	469 (10.2)	2 (5.0)	
Malta	41 (0.2)	461 (1.7)	0 0	56 (0.3)	447 (1.8)	0 0	3 (0.2)	404 (7.2)	0 0	
Norway	23 (3.0)	486 (6.0)	9 (4.4)	62 (3.6)	487 (2.5)	-4 (5.3)	15 (2.9)	487 (4.4)	-5 (4.5)	
Oman	5 (1.8)	407 (18.1)	0 0	51 (4.4)	417 (5.1)	0 0	44 (4.4)	431 (5.0)	0 0	
Palestinian Nat'l Auth.	4 (1.8)	433 (16.4)	2 (2.2)	55 (4.3)	403 (5.8)	-4 (5.9)	40 (4.2)	402 (6.5)	2 (5.8)	
Qatar	3 (0.1)	375 (5.7)	0 0	40 (0.2)	334 (2.1)	0 0	57 (0.2)	302 (2.2)	0 0	
Romania	2 (0.7)	~ ~	-1 (1.3)	45 (3.1)	460 (5.0)	5 (4.0)	53 (3.1)	462 (4.6)	-4 (4.0)	
Russian Federation	3 (0.6)	519 (10.9)	-1 (1.0)	66 (2.2)	529 (4.1)	6 (3.2)	31 (2.3)	533 (5.3)	-5 (3.3)	
Saudi Arabia	13 (3.3)	388 (9.1)	--	66 (4.4)	403 (3.4)	--	21 (3.8)	410 (6.4)	--	
Scotland	15 (1.8)	490 (7.4)	-5 (3.5)	59 (2.5)	501 (4.0)	-3 (4.2)	26 (2.4)	487 (7.1)	8 (3.6) ▲	
Serbia	13 (1.4)	474 (5.2)	2 (1.9)	69 (2.3)	468 (3.5)	7 (3.4) ▲	18 (1.9)	476 (4.4)	-10 (3.0) ▼	
Singapore	11 (1.4)	558 (8.9)	-8 (2.4) ▼	75 (2.3)	565 (5.4)	6 (3.2)	14 (1.7)	585 (9.0)	2 (2.5)	
Slovenia	32 (3.0)	536 (3.5)	-2 (3.8)	63 (3.0)	537 (2.4)	3 (4.0)	5 (1.4)	553 (7.3)	-2 (1.9)	
Sweden	22 (2.7)	509 (4.4)	4 (3.6)	68 (2.8)	509 (3.2)	4 (4.1)	10 (1.5)	517 (5.1)	-9 (3.1) ▼	
Syrian Arab Republic	11 (2.1)	434 (7.8)	0 0	65 (3.3)	453 (3.5)	0 0	24 (3.0)	453 (6.2)	0 0	
Thailand	4 (1.6)	439 (20.1)	0 0	50 (4.6)	475 (6.1)	0 0	45 (4.5)	469 (8.2)	0 0	
Tunisia	8 (2.4)	445 (7.0)	-11 (4.3) ▼	69 (4.1)	447 (2.8)	7 (6.3)	23 (3.9)	439 (4.1)	4 (5.2)	
Turkey	16 (3.5)	452 (11.8)	0 0	72 (4.3)	451 (4.7)	0 0	13 (2.8)	474 (13.4)	0 0	
Ukraine	0 (0.3)	~ ~	0 0	49 (2.7)	488 (4.4)	0 0	50 (2.8)	484 (4.1)	0 0	
United States	22 (2.8)	522 (6.0)	-3 (4.0)	58 (3.3)	520 (4.1)	1 (4.6)	20 (2.2)	507 (7.8)	2 (3.0)	
‡ Morocco	23 (3.4)	394 (4.7)	--	59 (4.5)	404 (5.0)	--	18 (3.7)	422 (9.1)	--	
International Avg.	14 (0.3)	468 (1.7)		59 (0.5)	466 (0.7)		27 (0.4)	466 (1.1)		
<b>Benchmarking Participants</b>										
Basque Country, Spain	16 (3.8)	487 (8.1)	-2 (5.8)	77 (4.3)	501 (3.3)	16 (6.8) ▲	7 (2.1)	494 (10.6)	-14 (4.8) ▼	
British Columbia, Canada	28 (3.8)	524 (4.4)	0 0	58 (4.3)	527 (4.5)	0 0	14 (2.8)	521 (10.1)	0 0	
Dubai, UAE	1 (0.7)	~ ~	0 0	74 (3.1)	492 (3.8)	0 0	25 (3.2)	474 (6.9)	0 0	
Massachusetts, US	27 (7.2)	566 (11.6)	0 0	54 (8.4)	551 (7.0)	0 0	19 (5.3)	546 (24.2)	0 0	
Minnesota, US	29 (5.1)	535 (4.4)	0 0	59 (4.9)	534 (6.4)	0 0	11 (3.5)	561 (10.6)	0 0	
Ontario, Canada	23 (3.8)	520 (7.8)	0 (5.2)	64 (4.9)	527 (5.0)	-1 (6.6)	13 (3.7)	536 (6.2)	1 (4.9)	
Quebec, Canada	13 (3.6)	516 (8.5)	-16 (5.9) ▼	77 (4.0)	511 (4.6)	10 (6.2)	10 (3.1)	513 (15.4)	6 (3.5)	

▲ 2007 percent significantly higher  
▼ 2007 percent significantly lower

Based on teachers' reports on the frequency of four types of interactions with other teachers: 1) Discussions about how to teach a particular concept; 2) Working on preparing instructional materials; 3) Visits to another teacher's classroom to observe his/her teaching; 4) Informal observation of my classroom by another teacher. Frequency is computed by averaging across four items based on a 4-point scale: 1. Never or Almost Never; 2. 2 or 3 times per month; 3. 1-3 times per week; 4. Daily or almost daily.

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

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

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

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

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



### How Well Prepared Do Teachers Feel They Are to Teach Science?

TIMSS 2007 asked the students' teachers of science how prepared they felt to teach a subset of the science topics included in the TIMSS 2007 science framework. At the fourth grade, teachers were asked about 22 topics in total, including 6 topics in life science, 9 topics in physical science, and 7 topics in earth science. At the eighth grade, teachers were asked about 23 topics in total, including 7 topics in biology, 5 topics in chemistry, 6 topics in physics, and 5 topics in earth science. The percentages of students with teachers that reported feeling "Very Well" prepared to teach the various topics are presented in Exhibits 6.7 and 6.8. In Exhibit 6.7, the results are summarized across all the science topics and by content domain, and Exhibit 6.8 presents the results for each topic.

At the fourth grade, the average across all science topics was 54 percent. The life science content domain had the highest average percent across topics internationally (59 percent), with the highest percents for the individual topics of changes in environment (66%), relationships in a living community (64%), and human health (63%). The average across the topics in the earth science content domain was 56 percent, with most of the individual topics ranging from 56 to 64 percent, however, only 31 percent of fourth-grade students were taught by teachers who reported feeling very well prepared to teach about fossils of animals and plants. The physical science content area had the lowest average percent across topics internationally (46%), with considerable variation from topic to topic.

At the eighth grade, the average across all topics was 70 percent. Chemistry had the highest percent on average across topics, with 77 percent of the students having teachers that reported being very well prepared to teach those topics. The highest percents for the individual topics were for particulate structure of matter (83%) and classification and composition of matter (81%). The average for the physics topic was 70 percent, followed by the biology topic at 67 percent, and then the earth science topic at 62 percent.



The individual topics in physics were similar, with all between 65 and 76 percent. Within the biology topics, the highest percents were for cells and their functions (76%) and major organs and organ systems in humans and other organisms (75%). In earth science, 70 percent of eighth-grade students were taught by teachers who reported feeling very well prepared to teach about environmental concerns and 68 percent on the use and conservation of earth's natural resources.

**Exhibit 6.7 Summary of Students Whose Teachers Feel “Very Well” Prepared to Teach the TIMSS Science Topics\***
**TIMSS2007**  
 Science **4<sup>th</sup>**  
 Grade

Country	Percentage of Students Whose Teachers Report Feeling Very Well Prepared to Teach the TIMSS Science Topics**			
	All Science (22 topics)	Life Science (6 topics)	Physical Science (9 topics)	Earth Science (7 topics)
Algeria	53 (2.8)	58 (3.6)	48 (2.8)	53 (3.1)
Armenia	x x	x x	x x	x x
Australia	46 (3.0)	48 (3.8)	37 (2.8)	52 (3.5)
Austria	49 (1.7)	55 (2.0)	34 (2.0)	55 (1.9)
Chinese Taipei	59 (2.7)	62 (3.1)	60 (3.0)	54 (2.8)
Colombia	68 (3.3)	78 (3.3)	55 (4.1)	69 (4.0)
Czech Republic	66 (2.5)	76 (2.6)	49 (3.1)	72 (2.7)
Denmark	r 56 (2.9)	r 57 (3.7)	r 50 (3.9)	r 60 (3.6)
El Salvador	50 (2.6)	63 (3.2)	29 (2.5)	55 (3.4)
England	68 (2.5)	71 (2.6)	70 (2.9)	63 (3.1)
Georgia	55 (3.0)	62 (3.2)	r 31 (4.0)	62 (3.8)
Germany	47 (1.7)	r 53 (2.4)	r 32 (1.9)	r 52 (2.1)
Hong Kong SAR	r 29 (3.1)	r 33 (3.8)	s 28 (3.8)	r 30 (3.6)
Hungary	59 (2.3)	62 (2.6)	s 43 (3.4)	r 66 (2.8)
Iran, Islamic Rep. of	67 (2.5)	67 (3.1)	73 (2.6)	62 (2.9)
Italy	38 (2.3)	42 (2.7)	23 (2.3)	48 (2.8)
Japan	23 (2.2)	18 (2.2)	r 29 (3.0)	r 21 (2.4)
Kazakhstan	--	--	--	--
Kuwait	r 69 (2.6)	r 73 (2.7)	r 67 (3.2)	r 67 (3.0)
Latvia	67 (1.6)	75 (1.8)	49 (2.2)	77 (1.7)
Lithuania	36 (2.3)	44 (2.8)	18 (2.0)	45 (2.9)
Morocco	52 (2.2)	57 (2.6)	r 48 (3.0)	r 53 (3.2)
Netherlands	27 (2.6)	33 (3.6)	12 (2.1)	35 (3.5)
New Zealand	42 (2.0)	44 (2.5)	35 (2.0)	48 (2.2)
Norway	52 (2.5)	62 (3.1)	31 (2.6)	61 (2.9)
Qatar	73 (0.1)	78 (0.1)	r 74 (0.1)	r 67 (0.1)
Russian Federation	--	--	--	--
Scotland	r 51 (3.0)	r 52 (3.2)	r 46 (3.2)	r 52 (3.3)
Singapore	53 (1.9)	53 (2.3)	64 (1.8)	r 40 (2.3)
Slovak Republic	78 (1.7)	88 (1.5)	65 (2.8)	79 (1.8)
Slovenia	56 (1.6)	63 (1.8)	55 (2.2)	50 (1.9)
Sweden	44 (2.7)	51 (3.1)	32 (2.9)	49 (3.2)
Tunisia	53 (2.4)	57 (2.6)	52 (2.7)	r 48 (3.3)
Ukraine	78 (1.7)	88 (1.6)	r 53 (3.2)	84 (2.0)
United States	63 (1.5)	63 (1.7)	56 (1.9)	68 (1.9)
Yemen	64 (2.6)	64 (2.9)	r 66 (2.8)	r 65 (3.2)
<b>International Avg.</b>	<b>54 (0.4)</b>	<b>59 (0.5)</b>	<b>46 (0.5)</b>	<b>56 (0.5)</b>
<b>Benchmarking Participants</b>				
Alberta, Canada	59 (2.2)	61 (2.6)	r 57 (2.6)	r 60 (2.9)
British Columbia, Canada	r 56 (2.1)	r 62 (2.7)	s 43 (2.6)	r 61 (2.7)
Dubai, UAE	x x	x x	x x	x x
Massachusetts, US	63 (4.9)	r 59 (5.1)	r 60 (6.8)	r 71 (4.6)
Minnesota, US	51 (6.8)	48 (6.5)	r 48 (7.8)	r 56 (7.3)
Ontario, Canada	59 (3.3)	r 66 (3.7)	r 43 (3.9)	r 62 (4.0)
Quebec, Canada	r 34 (2.5)	r 37 (3.3)	r 19 (2.1)	r 42 (2.9)

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

Background data provided by teachers.

\* See Exhibit 6.8 for data on individual topics.

\*\* The TIMSS topics were summarized to reduce teachers' response burden.

( ) 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 6.7 Summary of Students Whose Teachers Feel “Very Well” Prepared to Teach the TIMSS Science Topics\* (Continued)**

**TIMSS2007**  
Science **8<sup>th</sup>** Grade

Country	Percentage of Students Whose Teachers Report Feeling Very Well Prepared to Teach the TIMSS Science Topics**				
	All Science (23 topics)	Biology (7 topics)	Chemistry (5 topics)	Physics (6 topics)	Earth Science (5 topics)
Algeria	60 (2.1)	62 (3.0)	r 60 (3.4)	73 (3.0)	r 47 (4.2)
Armenia	50 (1.9)	53 (3.3)	75 (3.8)	36 (3.0)	39 (3.6)
Australia	73 (1.9)	76 (2.4)	79 (2.4)	69 (2.7)	70 (2.4)
Bahrain	77 (1.3)	70 (1.5)	90 (1.6)	77 (2.0)	69 (1.9)
Bosnia and Herzegovina	87 (1.2)	81 (2.1)	91 (1.6)	91 (1.8)	87 (2.4)
Botswana	76 (1.6)	82 (1.9)	86 (1.7)	71 (2.7)	62 (2.7)
Bulgaria	89 (1.0)	86 (1.8)	94 (1.5)	95 (1.5)	83 (2.6)
Chinese Taipei	63 (2.2)	26 (3.6)	86 (2.8)	83 (3.0)	45 (3.9)
Colombia	71 (1.8)	82 (2.3)	84 (2.7)	45 (3.1)	70 (2.6)
Cyprus	r 84 (0.7)	--	r 92 (0.9)	r 88 (1.4)	r 72 (1.1)
Czech Republic	85 (1.0)	78 (2.0)	95 (1.3)	93 (1.3)	76 (2.3)
Egypt	73 (1.6)	62 (2.7)	85 (2.2)	78 (2.5)	68 (2.8)
El Salvador	50 (2.9)	59 (3.0)	42 (3.5)	42 (3.5)	56 (3.4)
England	79 (1.0)	81 (1.7)	84 (1.6)	76 (2.0)	71 (1.4)
Georgia	86 (1.6)	82 (2.5)	87 (3.1)	89 (2.3)	86 (2.5)
Ghana	80 (1.8)	80 (2.1)	87 (1.7)	82 (2.3)	70 (2.5)
Hong Kong SAR	52 (2.8)	49 (4.0)	60 (4.0)	55 (3.9)	r 33 (2.7)
Hungary	r 85 (1.4)	r 72 (3.1)	93 (2.5)	92 (1.9)	r 80 (2.4)
Indonesia	80 (2.0)	78 (3.0)	--	80 (3.1)	--
Iran, Islamic Rep. of	76 (1.9)	72 (2.4)	83 (2.3)	76 (2.3)	71 (2.2)
Israel	68 (1.6)	r 80 (1.9)	r 87 (1.9)	r 61 (2.6)	r 39 (2.6)
Italy	52 (2.0)	56 (2.5)	54 (2.6)	45 (2.6)	54 (2.6)
Japan	41 (2.1)	29 (2.5)	60 (2.8)	47 (2.8)	30 (2.7)
Jordan	70 (2.3)	67 (3.0)	76 (2.6)	74 (2.9)	64 (3.0)
Korea, Rep. of	53 (2.2)	42 (2.5)	62 (3.1)	57 (2.8)	52 (2.9)
Kuwait	r 66 (2.1)	r 65 (3.2)	r 75 (2.8)	r 67 (3.2)	r 61 (3.5)
Lebanon	85 (1.4)	77 (1.9)	95 (1.9)	83 (2.1)	--
Lithuania	r 59 (1.6)	49 (3.7)	70 (3.0)	s 64 (4.0)	r 52 (3.2)
Malaysia	65 (2.3)	71 (2.7)	70 (3.0)	63 (3.3)	r 45 (3.2)
Malta	88 (0.1)	88 (0.3)	91 (0.2)	90 (0.2)	86 (0.2)
Norway	64 (1.9)	72 (2.2)	55 (2.9)	58 (2.7)	69 (2.2)
Oman	70 (1.7)	61 (2.8)	85 (1.9)	80 (2.8)	57 (2.7)
Palestinian Nat'l Auth.	74 (1.9)	72 (2.6)	86 (2.0)	76 (2.7)	62 (3.1)
Qatar	65 (0.1)	64 (0.1)	74 (0.1)	r 65 (0.1)	r 63 (0.1)
Romania	85 (1.3)	76 (2.5)	92 (1.5)	91 (1.6)	79 (2.5)
Russian Federation	--	--	--	--	--
Saudi Arabia	58 (2.1)	68 (3.1)	56 (3.8)	r 51 (3.6)	r 57 (3.6)
Scotland	r 68 (1.2)	r 63 (2.1)	r 77 (1.8)	r 71 (1.8)	r 54 (2.1)
Serbia	91 (1.3)	85 (2.1)	96 (1.0)	94 (1.5)	88 (2.2)
Singapore	59 (1.5)	46 (2.1)	74 (1.8)	64 (2.1)	r 18 (1.9)
Slovenia	80 (1.4)	64 (2.5)	90 (2.1)	85 (1.7)	--
Sweden	67 (1.6)	59 (2.5)	67 (2.7)	68 (2.8)	45 (3.9)
Syrian Arab Republic	77 (1.7)	72 (2.7)	86 (2.5)	79 (2.4)	62 (3.6)
Thailand	46 (2.2)	51 (2.7)	45 (3.1)	32 (2.7)	59 (3.0)
Tunisia	49 (2.0)	66 (2.2)	s 19 (3.7)	s 14 (3.7)	59 (2.7)
Turkey	71 (2.4)	70 (3.2)	79 (2.9)	r 72 (2.6)	62 (3.2)
Ukraine	94 (0.7)	91 (1.7)	96 (1.4)	95 (1.1)	92 (1.3)
United States	72 (1.5)	r 74 (1.8)	r 73 (2.0)	r 60 (2.3)	78 (2.0)
‡ Morocco	r 69 (2.5)	r 62 (4.0)	r 82 (3.4)	r 77 (3.2)	r 57 (4.0)
<b>International Avg.</b>	<b>70 (0.3)</b>	<b>67 (0.4)</b>	<b>77 (0.4)</b>	<b>70 (0.4)</b>	<b>62 (0.4)</b>
<b>Benchmarking Participants</b>					
Basque Country, Spain	68 (2.5)	65 (3.4)	68 (3.1)	65 (3.5)	74 (3.1)
British Columbia, Canada	r 69 (2.3)	r 68 (3.0)	r 78 (2.8)	r 65 (2.8)	r 64 (3.3)
Dubai, UAE	s 79 (1.5)	x x	s 85 (2.0)	s 80 (2.0)	x x
Massachusetts, US	66 (3.3)	67 (4.6)	67 (4.4)	52 (4.5)	76 (5.0)
Minnesota, US	68 (4.2)	78 (5.6)	57 (6.3)	45 (4.4)	84 (5.2)
Ontario, Canada	54 (2.6)	65 (3.7)	44 (3.2)	47 (2.8)	60 (3.5)
Quebec, Canada	61 (2.3)	65 (3.6)	64 (4.0)	51 (4.2)	61 (3.5)

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

Background data provided by teachers.

Does not include students whose teachers report that they do not teach the content domain.

\* See Exhibit 6.8 for data on individual topics.

\*\* The TIMSS topics were summarized to reduce teachers' response burden.

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

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

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

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

**Exhibit 6.8 Students Whose Teachers Feel “Very Well” Prepared to Teach the TIMSS Science Topics**
**TIMSS2007**  
**Science** **4<sup>th</sup>**  
**Grade**

Country	Percentage of Students Whose Teachers Report Feeling Very Well Prepared to Teach the TIMSS Science Topics*									
	Life Science (6 topics)						Physical Science (9 topics)			
	Major Body Structures and Their Functions in Humans and Other Organisms	Reproduction and Development in Plants and Animals	Physical Features, Behavior, and Survival of Organisms Living in Different Environments	Relationships in a Living Community	Changes in Environments	Human Health	Classification of Objects / Materials Based on Physical Properties	Forming and Separating Mixtures	States of Matter and Differences in Their Physical Properties, Including Changes in State of Matter by Heating and Cooling	Familiar Changes in Materials
Algeria	62 (4.7)	57 (4.4)	42 (4.7)	70 (5.1)	66 (4.3)	53 (5.0)	45 (4.5)	33 (4.1)	73 (4.4)	47 (5.0)
Armenia	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x
Australia	41 (4.5)	42 (4.6)	40 (4.9)	55 (4.7)	61 (4.4)	49 (4.6)	38 (4.0)	19 (3.2)	44 (3.6)	40 (3.7)
Austria	66 (3.0)	35 (2.7)	39 (3.1)	51 (3.2)	65 (2.9)	74 (2.9)	28 (3.2)	14 (2.5)	41 (3.2)	25 (3.0)
Chinese Taipei	63 (3.9)	54 (4.1)	54 (4.1)	67 (3.7)	70 (3.7)	65 (3.9)	51 (4.2)	40 (4.1)	71 (3.8)	70 (3.5)
Colombia	78 (4.9)	78 (4.6)	74 (5.0)	88 (3.6)	86 (3.8)	66 (4.2)	72 (4.6)	63 (5.4)	72 (4.9)	56 (5.0)
Czech Republic	80 (3.4)	52 (4.4)	74 (3.3)	79 (3.2)	82 (2.9)	85 (3.2)	55 (4.5)	22 (4.0)	73 (3.7)	60 (4.1)
Denmark	r 55 (4.8)	r 48 (5.4)	r 47 (4.6)	r 66 (5.2)	r 59 (5.1)	r 66 (4.4)	r 48 (5.0)	r 33 (4.7)	r 50 (5.0)	r 51 (4.6)
El Salvador	57 (3.7)	58 (4.0)	55 (4.1)	67 (4.1)	72 (3.8)	71 (4.2)	35 (4.0)	19 (3.8)	50 (4.5)	32 (3.6)
England	68 (3.2)	71 (3.5)	63 (3.4)	76 (3.3)	69 (3.8)	79 (3.3)	74 (3.8)	68 (3.9)	85 (3.2)	72 (3.7)
Georgia	57 (5.1)	52 (5.2)	51 (5.3)	54 (4.9)	79 (4.1)	73 (4.3)	33 (5.4)	22 (5.4)	44 (5.1)	37 (5.2)
Germany	45 (3.3)	44 (3.5)	44 (3.7)	54 (3.6)	60 (3.2)	67 (3.4)	23 (2.7)	17 (2.8)	50 (2.9)	24 (3.4)
Hong Kong SAR	33 (4.7)	24 (4.8)	23 (4.3)	35 (5.3)	42 (4.9)	43 (4.3)	26 (4.4)	15 (3.8)	40 (5.0)	32 (4.0)
Hungary	57 (3.3)	58 (3.6)	34 (3.1)	66 (3.7)	77 (3.1)	72 (3.5)	44 (3.5)	29 (4.1)	69 (3.4)	48 (3.8)
Iran, Islamic Rep. of	71 (3.9)	62 (4.5)	57 (4.2)	68 (3.9)	77 (3.2)	68 (4.1)	61 (4.3)	80 (3.0)	87 (3.0)	68 (4.1)
Italy	42 (3.2)	45 (3.2)	37 (3.3)	48 (2.9)	47 (3.3)	37 (3.4)	25 (3.5)	19 (2.8)	48 (3.0)	29 (3.5)
Japan	17 (2.9)	23 (3.3)	14 (2.8)	19 (3.2)	21 (3.4)	17 (3.0)	29 (4.2)	10 (2.7)	47 (4.4)	15 (3.2)
Kazakhstan	--	--	--	--	--	--	--	--	--	--
Kuwait	r 78 (3.8)	r 74 (4.1)	r 60 (4.3)	r 87 (2.9)	r 71 (4.4)	r 70 (4.0)	r 60 (5.2)	r 47 (5.5)	r 76 (4.1)	r 61 (4.9)
Latvia	81 (2.7)	60 (3.6)	66 (3.4)	85 (2.3)	82 (2.9)	74 (2.9)	51 (3.6)	28 (3.2)	75 (3.4)	48 (4.1)
Lithuania	36 (3.5)	36 (3.3)	37 (3.2)	47 (3.2)	52 (3.3)	54 (4.0)	14 (2.5)	2 (1.0)	23 (3.0)	17 (2.6)
Morocco	55 (4.4)	54 (4.0)	34 (4.2)	67 (4.0)	68 (4.3)	61 (4.5)	58 (4.2)	29 (4.3)	74 (3.6)	50 (4.6)
Netherlands	28 (4.3)	28 (4.0)	25 (3.7)	36 (4.3)	39 (4.2)	42 (4.6)	9 (2.5)	5 (1.8)	18 (3.5)	8 (2.3)
New Zealand	36 (2.9)	37 (2.9)	38 (2.9)	51 (3.1)	52 (3.2)	47 (2.3)	36 (2.5)	21 (2.3)	40 (2.6)	38 (2.6)
Norway	60 (4.1)	56 (4.2)	48 (3.9)	69 (3.6)	66 (3.6)	76 (3.3)	21 (2.9)	11 (2.2)	41 (3.5)	38 (3.8)
Qatar	85 (0.2)	82 (0.1)	69 (0.2)	86 (0.1)	73 (0.2)	75 (0.2)	67 (0.2)	53 (0.2)	85 (0.1)	70 (0.1)
Russian Federation	--	--	--	--	--	--	--	--	--	--
Scotland	r 51 (3.7)	r 46 (4.1)	r 41 (4.0)	r 55 (4.1)	r 59 (4.4)	r 58 (4.2)	r 47 (3.9)	r 38 (3.8)	r 54 (4.0)	r 46 (4.4)
Singapore	50 (2.7)	54 (2.7)	49 (2.7)	59 (2.8)	62 (2.7)	43 (2.7)	74 (2.4)	44 (2.9)	83 (2.1)	59 (3.0)
Slovak Republic	95 (1.4)	79 (2.8)	86 (2.7)	94 (1.7)	92 (2.0)	83 (2.4)	73 (3.6)	32 (4.8)	83 (2.9)	73 (3.8)
Slovenia	76 (2.8)	36 (2.9)	36 (2.9)	62 (3.2)	83 (2.0)	84 (2.2)	53 (3.2)	50 (3.1)	68 (3.1)	50 (2.8)
Sweden	51 (3.6)	41 (3.8)	40 (3.6)	65 (3.7)	48 (4.2)	59 (4.1)	25 (3.6)	22 (3.6)	43 (4.0)	37 (3.7)
Tunisia	58 (3.4)	56 (3.7)	44 (3.4)	60 (3.1)	62 (3.6)	60 (3.6)	54 (3.5)	35 (4.3)	67 (3.1)	53 (3.8)
Ukraine	89 (2.5)	86 (3.0)	82 (3.2)	93 (1.9)	93 (1.7)	88 (2.5)	45 (4.7)	35 (4.5)	71 (3.9)	79 (3.7)
United States	55 (2.6)	54 (2.9)	69 (2.2)	77 (2.3)	73 (2.4)	52 (2.6)	62 (2.8)	37 (3.0)	71 (2.5)	53 (3.1)
Yemen	67 (4.4)	61 (4.9)	49 (5.4)	66 (4.6)	64 (4.8)	72 (4.3)	65 (4.4)	38 (5.3)	77 (4.5)	69 (4.5)
<b>International Avg.</b>	<b>59 (0.6)</b>	<b>53 (0.7)</b>	<b>49 (0.7)</b>	<b>64 (0.6)</b>	<b>66 (0.6)</b>	<b>63 (0.6)</b>	<b>45 (0.7)</b>	<b>31 (0.6)</b>	<b>60 (0.6)</b>	<b>47 (0.7)</b>
<b>Benchmarking Participants</b>										
Alberta, Canada	42 (3.9)	57 (4.2)	52 (4.6)	75 (2.9)	81 (3.0)	59 (4.1)	54 (4.3)	40 (4.2)	58 (4.0)	66 (3.7)
British Columbia, Canada	r 56 (4.4)	r 41 (3.8)	r 72 (3.8)	r 79 (3.3)	r 71 (4.0)	r 50 (4.3)	r 40 (4.9)	r 20 (3.0)	r 57 (4.1)	r 36 (3.8)
Dubai, UAE	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x
Massachusetts, US	48 (6.5)	53 (7.3)	68 (6.3)	70 (5.3)	69 (5.7)	47 (8.2)	59 (8.2)	40 (7.1)	65 (7.7)	54 (8.3)
Minnesota, US	41 (7.2)	36 (9.1)	42 (9.1)	59 (8.7)	58 (7.9)	50 (6.9)	53 (8.6)	32 (9.2)	60 (8.5)	44 (9.2)
Ontario, Canada	53 (5.2)	51 (4.8)	71 (4.7)	84 (3.5)	75 (4.0)	59 (5.4)	44 (4.6)	22 (4.1)	57 (5.1)	44 (4.8)
Quebec, Canada	35 (4.4)	r 30 (4.3)	r 22 (3.2)	r 41 (4.7)	r 53 (4.8)	r 45 (4.7)	r 24 (3.5)	r 16 (3.4)	r 35 (4.3)	r 16 (3.3)

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

Background data provided by teachers.

\* The TIMSS topics were summarized to reduce teachers' response burden.

(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.

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



**Exhibit 6.8 Students Whose Teachers Feel “Very Well” Prepared to Teach the TIMSS Science Topics (Continued)**

**TIMSS2007**  
Science **4<sup>th</sup>** Grade

Country	Percentage of Students Whose Teachers Report Feeling Very Well Prepared to Teach the TIMSS Science Topics*											
	Physical Science (9 topics) (Continued)					Earth Science (7 topics)						
	Common Energy Sources / Forms and Their Practical Uses	Light	Electrical Circuits	Properties of Magnets	Forces that Cause Objects to Move	Features of the Earth's Landscape	Water on Earth	Air	Common Features of the Earth's Landscape and Relationship to Human Use	Weather Conditions from Day to Day or Over the Seasons	Fossils of Animals and Plants	Earth's Solar System
Algeria	48 (4.9)	44 (5.0)	55 (5.3)	39 (5.1)	45 (5.1)	68 (4.5)	67 (4.5)	58 (4.1)	64 (4.8)	58 (4.8)	20 (3.5)	31 (4.5)
Armenia	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x
Australia	48 (3.6)	33 (4.1)	30 (4.4)	33 (4.0)	44 (4.4)	64 (4.0)	57 (4.6)	40 (4.5)	58 (4.5)	60 (4.0)	22 (3.1)	63 (4.5)
Austria	46 (3.1)	37 (3.2)	30 (2.9)	53 (3.5)	27 (3.2)	67 (3.0)	79 (2.6)	51 (3.3)	45 (3.3)	69 (2.8)	23 (2.8)	51 (3.0)
Chinese Taipei	75 (3.6)	56 (3.9)	51 (4.5)	64 (3.7)	63 (4.0)	61 (3.6)	59 (3.5)	60 (3.6)	60 (4.0)	58 (4.0)	29 (3.7)	49 (4.2)
Colombia	55 (5.3)	55 (5.4)	30 (4.5)	40 (5.4)	52 (5.2)	80 (4.7)	75 (5.0)	76 (4.9)	70 (4.8)	71 (4.7)	36 (4.2)	80 (4.5)
Czech Republic	64 (4.0)	43 (4.5)	29 (4.3)	53 (4.5)	36 (4.2)	79 (3.6)	86 (2.9)	81 (3.2)	76 (3.4)	74 (3.9)	32 (4.2)	70 (4.1)
Denmark	r 65 (4.6)	r 41 (5.1)	r 50 (5.1)	r 61 (4.7)	r 53 (5.0)	r 67 (4.7)	r 61 (4.6)	r 60 (5.0)	r 61 (5.3)	r 67 (5.0)	r 37 (4.8)	r 66 (4.0)
El Salvador	29 (3.3)	35 (3.8)	16 (3.4)	18 (3.6)	27 (3.7)	64 (4.1)	49 (4.6)	48 (4.4)	60 (4.2)	62 (4.0)	35 (4.2)	66 (4.4)
England	67 (3.7)	69 (3.9)	60 (4.1)	65 (3.8)	68 (4.3)	67 (4.4)	70 (4.1)	60 (4.2)	63 (4.1)	72 (3.8)	34 (4.2)	79 (3.7)
Georgia	38 (4.7)	38 (4.8)	13 (3.6)	27 (5.3)	24 (4.5)	73 (4.5)	73 (4.2)	68 (4.6)	66 (4.8)	59 (5.1)	29 (4.0)	60 (4.8)
Germany	38 (3.3)	25 (3.2)	45 (3.2)	44 (3.2)	15 (2.9)	62 (3.2)	68 (2.7)	57 (3.5)	44 (3.2)	67 (3.1)	18 (3.3)	39 (3.9)
Hong Kong SAR	31 (4.7)	32 (4.7)	21 (4.4)	24 (4.3)	26 (4.8)	38 (4.1)	28 (4.3)	44 (4.8)	31 (4.2)	34 (4.4)	11 (3.5)	26 (4.8)
Hungary	45 (3.8)	38 (5.4)	r 12 (4.3)	48 (4.3)	15 (4.3)	79 (3.0)	71 (4.1)	60 (4.5)	77 (3.6)	76 (3.4)	24 (4.4)	38 (4.5)
Iran, Islamic Rep. of	70 (3.8)	73 (3.8)	68 (4.1)	83 (3.2)	69 (4.2)	76 (3.4)	61 (4.2)	56 (4.5)	69 (4.1)	60 (3.8)	40 (4.1)	71 (3.6)
Italy	26 (2.9)	19 (2.8)	10 (2.0)	12 (2.3)	16 (2.5)	57 (3.2)	53 (3.2)	53 (3.0)	55 (3.0)	46 (3.3)	31 (3.8)	39 (3.3)
Japan	21 (3.5)	29 (4.1)	46 (4.3)	49 (4.3)	19 (3.7)	16 (3.3)	21 (3.4)	23 (3.6)	13 (3.1)	31 (3.9)	19 (3.3)	22 (3.5)
Kazakhstan	--	--	--	--	--	--	--	--	--	--	--	--
Kuwait	r 69 (4.4)	r 74 (4.5)	r 64 (4.6)	r 77 (3.6)	r 73 (3.9)	r 67 (4.0)	r 75 (3.9)	r 74 (3.8)	r 67 (4.4)	r 66 (4.4)	r 49 (4.9)	r 69 (4.7)
Latvia	73 (3.5)	70 (3.5)	16 (3.1)	49 (4.1)	28 (3.9)	90 (1.9)	86 (2.3)	79 (2.8)	83 (2.9)	80 (2.9)	36 (3.8)	79 (2.9)
Lithuania	37 (3.6)	28 (3.2)	16 (2.7)	9 (2.1)	7 (1.7)	50 (3.9)	48 (3.6)	38 (3.4)	46 (3.3)	59 (3.5)	20 (2.9)	49 (3.6)
Morocco	46 (4.5)	41 (4.0)	62 (4.1)	36 (4.1)	36 (5.1)	65 (4.7)	59 (4.2)	60 (4.3)	63 (4.5)	52 (4.4)	22 (3.6)	45 (5.2)
Netherlands	24 (3.7)	12 (2.7)	8 (2.1)	15 (2.9)	r 12 (3.1)	47 (4.6)	39 (4.9)	31 (4.4)	46 (4.6)	46 (4.6)	17 (3.3)	18 (3.2)
New Zealand	44 (2.6)	37 (2.6)	34 (2.7)	31 (2.6)	33 (2.6)	54 (2.7)	53 (2.6)	37 (2.8)	49 (2.6)	54 (2.6)	32 (2.6)	57 (2.8)
Norway	50 (3.7)	36 (3.7)	19 (2.9)	29 (3.4)	30 (3.1)	69 (3.7)	56 (3.8)	55 (3.7)	66 (3.8)	72 (2.7)	37 (3.4)	71 (3.1)
Qatar	70 (0.2)	77 (0.1)	79 (0.2)	82 (0.1)	73 (0.2)	66 (0.2)	75 (0.2)	78 (0.1)	62 (0.2)	69 (0.1)	46 (0.2)	76 (0.1)
Russian Federation	--	--	--	--	--	--	--	--	--	--	--	--
Scotland	r 54 (4.3)	r 46 (4.5)	r 47 (4.1)	r 42 (4.2)	r 41 (4.3)	r 63 (4.0)	r 55 (4.2)	r 37 (4.2)	r 57 (4.5)	r 66 (4.0)	r 22 (3.8)	r 64 (3.7)
Singapore	69 (2.6)	73 (2.2)	43 (2.7)	76 (2.2)	57 (2.7)	35 (3.1)	44 (2.5)	62 (2.5)	35 (3.1)	38 (2.8)	25 (2.8)	41 (2.8)
Slovak Republic	79 (3.6)	62 (4.4)	52 (3.8)	64 (4.1)	65 (4.1)	84 (3.1)	83 (2.9)	87 (2.8)	86 (2.2)	77 (3.5)	38 (4.2)	89 (2.3)
Slovenia	59 (3.3)	50 (3.2)	68 (3.0)	56 (3.2)	35 (3.1)	51 (2.9)	66 (2.5)	64 (2.9)	44 (3.0)	62 (3.0)	21 (2.7)	36 (2.8)
Sweden	44 (3.9)	30 (3.6)	27 (3.8)	40 (3.5)	26 (3.7)	61 (3.8)	53 (4.0)	50 (3.8)	46 (4.0)	55 (4.1)	27 (3.5)	53 (4.5)
Tunisia	62 (3.4)	49 (4.0)	51 (4.3)	41 (4.2)	62 (3.2)	54 (4.3)	49 (4.5)	65 (3.7)	56 (4.2)	52 (4.3)	28 (3.8)	36 (4.2)
Ukraine	79 (3.6)	62 (4.3)	18 (4.3)	36 (4.8)	42 (4.8)	90 (2.4)	92 (2.2)	81 (3.2)	86 (2.5)	91 (2.4)	58 (4.4)	81 (3.2)
United States	64 (2.8)	49 (2.6)	53 (2.9)	58 (2.7)	60 (2.9)	78 (2.2)	70 (2.2)	59 (3.2)	74 (2.3)	73 (2.5)	54 (2.9)	70 (2.4)
Yemen	75 (3.9)	78 (4.2)	50 (5.2)	59 (5.0)	69 (4.8)	73 (4.3)	74 (4.5)	75 (4.5)	63 (5.3)	62 (4.7)	40 (5.6)	67 (4.5)
<b>International Avg.</b>	<b>53 (0.7)</b>	<b>47 (0.7)</b>	<b>39 (0.7)</b>	<b>46 (0.7)</b>	<b>41 (0.7)</b>	<b>64 (0.6)</b>	<b>62 (0.6)</b>	<b>58 (0.7)</b>	<b>59 (0.7)</b>	<b>62 (0.7)</b>	<b>31 (0.6)</b>	<b>56 (0.7)</b>
<b>Benchmarking Participants</b>												
Alberta, Canada	72 (3.5)	80 (3.3)	36 (4.7)	45 (4.4)	56 (4.0)	73 (4.0)	56 (4.4)	53 (4.1)	72 (3.6)	69 (3.8)	47 (3.9)	51 (4.4)
British Columbia, Canada	r 52 (3.9)	r 60 (4.3)	r 33 (4.6)	r 40 (4.3)	r 48 (4.9)	r 74 (3.6)	r 68 (3.5)	r 58 (4.4)	r 69 (3.8)	r 75 (3.3)	r 25 (3.5)	r 58 (4.7)
Dubai, UAE	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x	x x
Massachusetts, US	66 (7.7)	56 (8.1)	66 (7.3)	64 (7.8)	64 (7.9)	84 (3.8)	74 (5.6)	60 (7.2)	76 (4.9)	71 (7.6)	48 (8.1)	71 (6.2)
Minnesota, US	49 (9.0)	35 (9.0)	50 (7.1)	56 (8.6)	48 (8.7)	66 (7.8)	66 (7.3)	45 (9.1)	67 (7.5)	58 (8.4)	39 (9.8)	52 (8.3)
Ontario, Canada	51 (4.8)	65 (4.9)	18 (4.1)	39 (5.6)	50 (5.0)	76 (4.1)	62 (4.7)	53 (4.8)	63 (5.3)	68 (4.9)	51 (4.7)	58 (5.4)
Quebec, Canada	r 27 (4.0)	r 16 (3.4)	r 8 (2.3)	r 13 (2.9)	r 14 (3.0)	r 58 (4.2)	r 33 (3.8)	r 42 (4.1)	r 52 (4.3)	r 50 (4.4)	r 18 (3.6)	r 44 (4.1)

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

Exhibit 6.8 **Students Whose Teachers Feel “Very Well” Prepared to Teach the TIMSS Science Topics (Continued)**

TIMSS2007  
Science **8<sup>th</sup>**  
Grade

Country	Percentage of Students Whose Teachers Report Feeling Very Well Prepared to Teach the TIMSS Science Topics*						
	Biology (7 topics)						
	Major Organs and Organ Systems in Humans and Other Organisms	Cells and Their Functions, Including Respiration and Photosynthesis as Cellular Processes	Reproduction and Heredity	Role of Variation and Adaptation in Survival/Extinction of Species in a Changing Environment	Interaction with Living Organisms and the Physical Environment in the Ecosystem	Trends in Human Population and its Effects on the Environment	Impact of Natural Hazards on Humans, Wildlife, and the Environment
Algeria	70 (4.3)	71 (4.5)	52 (4.1)	52 (5.0)	68 (4.1)	53 (4.6)	65 (3.9)
Armenia	53 (4.5)	50 (4.7)	56 (4.3)	55 (4.3)	50 (4.3)	49 (4.2)	57 (3.9)
Australia	83 (2.5)	79 (3.2)	80 (2.5)	78 (2.9)	80 (3.0)	63 (3.7)	72 (3.7)
Bahrain	75 (2.0)	82 (1.8)	72 (2.1)	67 (2.6)	72 (1.9)	56 (2.4)	67 (2.0)
Bosnia and Herzegovina	93 (2.1)	94 (1.9)	87 (2.9)	68 (3.6)	90 (2.2)	67 (3.6)	68 (3.7)
Botswana	90 (2.5)	97 (1.6)	74 (3.9)	66 (4.3)	91 (2.0)	69 (4.3)	80 (3.7)
Bulgaria	96 (2.1)	97 (1.3)	90 (3.3)	85 (3.7)	97 (1.4)	56 (5.0)	77 (3.9)
Chinese Taipei	20 (3.6)	24 (3.8)	22 (3.6)	24 (4.0)	25 (4.1)	28 (4.3)	31 (4.3)
Colombia	92 (2.2)	94 (2.6)	85 (3.8)	74 (4.8)	90 (3.1)	60 (4.7)	81 (5.0)
Cyprus	--	--	--	--	--	--	--
Czech Republic	94 (1.9)	86 (2.6)	77 (3.7)	71 (3.6)	75 (3.4)	68 (3.9)	71 (3.9)
Egypt	70 (4.0)	64 (4.0)	70 (3.7)	59 (4.2)	61 (4.2)	47 (4.1)	61 (4.1)
El Salvador	55 (3.9)	59 (4.2)	62 (4.0)	52 (4.2)	53 (4.1)	61 (4.0)	70 (3.9)
England	82 (2.1)	85 (1.6)	84 (2.1)	85 (2.0)	84 (2.0)	74 (2.3)	76 (2.3)
Georgia	91 (2.6)	91 (2.8)	86 (3.3)	73 (4.4)	83 (3.0)	62 (5.7)	84 (4.1)
Ghana	83 (2.9)	92 (2.2)	88 (2.7)	59 (4.5)	81 (3.5)	78 (3.9)	78 (3.9)
Hong Kong SAR	46 (4.9)	54 (4.6)	49 (4.7)	47 (4.8)	54 (4.1)	45 (4.6)	44 (4.2)
Hungary	91 (2.9)	78 (4.2)	76 (4.6)	73 (4.1)	79 (3.4)	52 (4.7)	66 (3.9)
Indonesia	86 (3.1)	80 (3.6)	81 (3.3)	78 (3.8)	85 (3.4)	79 (3.9)	63 (5.4)
Iran, Islamic Rep. of	83 (2.9)	71 (3.5)	88 (2.5)	66 (3.8)	67 (3.8)	66 (3.8)	67 (3.8)
Israel	r 84 (2.6)	r 90 (1.9)	90 (1.9)	r 75 (3.1)	r 82 (2.9)	r 69 (3.4)	r 74 (2.9)
Italy	63 (2.9)	69 (2.9)	70 (2.9)	54 (3.4)	53 (3.7)	31 (3.3)	51 (3.4)
Japan	40 (3.6)	46 (3.8)	37 (4.1)	18 (3.2)	33 (3.6)	13 (2.9)	16 (3.1)
Jordan	66 (4.3)	68 (4.2)	70 (4.0)	63 (4.3)	75 (3.4)	62 (4.1)	68 (4.1)
Korea, Rep. of	41 (3.9)	63 (3.6)	50 (4.1)	32 (3.3)	40 (3.8)	29 (3.5)	35 (3.6)
Kuwait	r 75 (4.1)	r 68 (4.8)	r 54 (4.9)	r 62 (5.2)	r 67 (5.0)	r 63 (4.8)	r 64 (4.5)
Lebanon	91 (2.0)	96 (1.2)	93 (1.7)	57 (5.1)	67 (4.0)	61 (4.1)	66 (4.2)
Lithuania	59 (4.7)	59 (5.0)	54 (4.6)	36 (4.5)	53 (4.3)	42 (4.3)	38 (3.9)
Malaysia	70 (4.0)	84 (3.1)	66 (3.9)	61 (3.8)	87 (2.9)	66 (3.8)	70 (3.9)
Malta	96 (0.4)	100 (0.0)	96 (0.4)	75 (0.9)	91 (0.5)	80 (0.6)	77 (0.9)
Norway	73 (3.4)	81 (3.2)	79 (3.0)	73 (3.4)	70 (3.4)	66 (3.3)	65 (3.1)
Oman	68 (4.2)	71 (3.9)	62 (3.8)	51 (4.4)	62 (4.2)	53 (4.0)	56 (4.4)
Palestinian Nat'l Auth.	78 (3.4)	87 (2.9)	76 (3.6)	59 (4.5)	67 (4.1)	63 (4.1)	72 (4.2)
Qatar	79 (0.1)	76 (0.1)	65 (0.1)	50 (0.2)	64 (0.2)	54 (0.2)	60 (0.2)
Romania	90 (2.5)	88 (2.9)	76 (3.5)	67 (3.9)	84 (3.1)	68 (4.0)	59 (4.5)
Russian Federation	--	--	--	--	--	--	--
Saudi Arabia	76 (3.8)	78 (4.0)	62 (4.5)	61 (4.3)	72 (4.0)	59 (4.2)	67 (4.1)
Scotland	r 66 (2.4)	r 70 (2.2)	r 66 (2.2)	r 62 (2.5)	r 68 (2.5)	r 55 (2.8)	r 58 (2.5)
Serbia	98 (1.7)	94 (2.7)	88 (3.2)	78 (4.0)	92 (2.4)	73 (3.9)	74 (3.9)
Singapore	50 (2.7)	58 (2.7)	52 (2.5)	39 (2.6)	50 (2.8)	30 (2.4)	40 (2.4)
Slovenia	81 (3.4)	76 (3.4)	58 (4.2)	54 (3.9)	77 (3.2)	53 (4.1)	45 (4.0)
Sweden	67 (2.4)	68 (2.5)	71 (2.6)	56 (3.1)	63 (2.8)	36 (3.1)	35 (3.1)
Syrian Arab Republic	84 (3.8)	88 (2.9)	75 (4.3)	59 (5.5)	67 (4.2)	55 (5.0)	70 (5.1)
Thailand	56 (4.1)	52 (4.2)	47 (4.0)	43 (4.2)	48 (4.2)	51 (3.9)	61 (3.9)
Tunisia	85 (2.9)	91 (2.0)	85 (2.9)	51 (4.5)	57 (3.8)	40 (4.1)	53 (4.0)
Turkey	74 (4.3)	78 (3.8)	79 (3.8)	64 (4.1)	63 (4.3)	65 (4.6)	61 (4.7)
Ukraine	97 (1.5)	92 (2.4)	91 (2.6)	87 (3.1)	91 (2.5)	94 (2.0)	86 (3.0)
United States	r 73 (2.7)	r 78 (2.6)	r 75 (2.6)	r 75 (2.9)	r 80 (2.4)	r 68 (2.9)	r 72 (2.8)
‡ Morocco	r 74 (3.9)	r 65 (5.9)	r 69 (6.0)	r 49 (5.1)	r 69 (4.3)	r 53 (6.6)	r 60 (5.0)
International Avg.	75 (0.5)	76 (0.5)	71 (0.5)	60 (0.6)	70 (0.5)	57 (0.6)	62 (0.6)
<b>Benchmarking Participants</b>							
Basque Country, Spain	69 (4.4)	76 (4.4)	66 (4.3)	63 (4.2)	66 (3.8)	57 (4.6)	57 (4.3)
British Columbia, Canada	r 83 (3.4)	r 79 (3.8)	r 73 (4.3)	r 68 (4.3)	r 71 (4.2)	r 48 (4.4)	r 57 (4.4)
Dubai, UAE	s 62 (3.0)	s 76 (2.2)	s 62 (4.3)	s 56 (3.9)	s 74 (4.1)	s 63 (2.8)	s 60 (3.4)
Massachusetts, US	57 (4.1)	72 (5.2)	66 (6.8)	69 (7.0)	77 (7.3)	61 (7.5)	69 (6.6)
Minnesota, US	77 (6.8)	76 (5.8)	76 (8.0)	80 (7.5)	82 (6.4)	77 (6.6)	76 (6.3)
Ontario, Canada	69 (4.3)	72 (4.6)	59 (5.3)	60 (5.0)	73 (4.3)	57 (4.9)	63 (5.1)
Quebec, Canada	63 (5.1)	70 (4.9)	72 (4.5)	61 (5.0)	64 (5.0)	60 (5.0)	65 (5.2)

Background data provided by teachers.

Does not include students whose teachers report that they do not teach the content domain.

\* The TIMSS topics were summarized to reduce teachers' response burden.

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

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

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

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

**Exhibit 6.8 Students Whose Teachers Feel “Very Well” Prepared to Teach the TIMSS Science Topics (Continued)**

**TIMSS2007**  
Science **8<sup>th</sup>** Grade

Country	Percentage of Students Whose Teachers Report Feeling Very Well Prepared to Teach the TIMSS Science Topics*										
	Chemistry (5 topics)					Physics (6 topics)					
	Classification and Composition of Matter	Particulate Structure of Matter	Solutions	Properties and Uses of Common Acids and Bases	Chemical Change	Physical States and Changes in Matter	Energy Forms, Transformations, Heat, and Temperature	Basic Properties / Behaviors of Light	Electric Circuits	Properties of Permanent Magnets and Electro-magnets	Forces and Motion
Algeria	r 62 (5.1)	77 (4.1)	r 72 (4.5)	r 39 (4.5)	r 46 (4.9)	68 (4.1)	77 (4.0)	58 (4.7)	79 (3.9)	82 (3.5)	72 (4.2)
Armenia	77 (4.2)	76 (4.2)	75 (4.0)	72 (4.2)	74 (4.5)	33 (4.4)	32 (3.9)	33 (4.1)	37 (4.5)	49 (5.7)	37 (5.9)
Australia	82 (2.8)	85 (2.4)	82 (2.9)	79 (2.8)	70 (3.2)	71 (3.2)	75 (3.2)	68 (3.0)	69 (3.2)	63 (3.4)	71 (3.2)
Bahrain	94 (1.5)	95 (1.5)	90 (1.6)	87 (2.4)	83 (2.5)	68 (2.7)	79 (2.2)	78 (2.4)	67 (2.8)	89 (2.0)	78 (2.6)
Bosnia and Herzegovina	95 (1.6)	96 (1.5)	82 (2.7)	90 (2.5)	93 (1.9)	89 (2.6)	91 (2.3)	91 (2.3)	92 (2.1)	90 (2.5)	93 (2.0)
Botswana	93 (2.4)	85 (2.7)	90 (2.9)	93 (2.3)	72 (3.7)	67 (4.4)	79 (3.3)	82 (3.1)	80 (3.8)	59 (5.2)	52 (4.5)
Bulgaria	98 (1.2)	99 (0.8)	87 (3.4)	96 (1.7)	91 (2.7)	94 (2.2)	97 (1.5)	96 (1.9)	92 (2.5)	95 (2.0)	95 (1.9)
Chinese Taipei	85 (3.0)	88 (2.8)	86 (2.9)	86 (2.9)	83 (3.5)	84 (3.4)	84 (3.4)	82 (3.5)	81 (3.3)	85 (3.1)	83 (3.6)
Colombia	93 (2.0)	95 (1.9)	77 (4.5)	74 (4.4)	79 (3.9)	66 (4.5)	71 (3.9)	33 (4.8)	19 (4.0)	32 (4.9)	42 (5.1)
Cyprus	r 90 (0.8)	r 93 (0.8)	r 90 (0.9)	r 93 (0.9)	r 90 (0.9)	r 92 (1.6)	r 91 (1.7)	r 86 (1.7)	r 87 (2.0)	r 79 (2.2)	r 94 (1.6)
Czech Republic	95 (1.7)	97 (1.3)	95 (1.8)	93 (1.9)	91 (2.4)	97 (1.6)	94 (2.1)	90 (1.9)	92 (2.0)	92 (1.8)	94 (1.3)
Egypt	86 (2.6)	93 (2.2)	86 (3.3)	80 (3.2)	82 (3.2)	76 (3.6)	83 (3.0)	86 (2.8)	83 (3.3)	71 (4.3)	68 (3.4)
El Salvador	48 (4.6)	50 (4.5)	46 (4.2)	33 (4.1)	34 (4.2)	37 (4.3)	56 (4.5)	42 (4.5)	33 (4.3)	39 (4.3)	47 (4.7)
England	87 (1.8)	86 (1.8)	86 (1.8)	83 (2.1)	78 (2.2)	83 (2.1)	81 (2.4)	75 (2.9)	74 (2.7)	73 (2.6)	73 (2.8)
Georgia	91 (3.2)	93 (2.9)	82 (4.3)	91 (3.0)	80 (4.6)	94 (2.5)	89 (3.7)	90 (2.9)	90 (2.3)	83 (3.8)	92 (2.8)
Ghana	92 (2.2)	88 (2.9)	95 (1.9)	81 (3.1)	77 (3.4)	80 (3.6)	94 (2.0)	82 (3.6)	80 (3.3)	79 (3.6)	78 (3.5)
Hong Kong SAR	55 (4.8)	61 (4.7)	62 (4.4)	72 (4.3)	53 (4.7)	56 (4.4)	59 (4.4)	51 (4.5)	61 (4.7)	50 (4.6)	55 (4.4)
Hungary	93 (2.7)	94 (2.5)	93 (2.7)	92 (2.7)	93 (2.6)	92 (2.6)	92 (2.4)	84 (3.0)	94 (2.1)	94 (2.1)	96 (1.6)
Indonesia	--	--	--	--	--	84 (3.0)	87 (2.8)	82 (3.0)	76 (3.9)	84 (3.5)	83 (3.0)
Iran, Islamic Rep. of	87 (2.8)	92 (2.2)	87 (2.9)	76 (3.5)	73 (3.7)	87 (2.9)	79 (3.5)	72 (4.1)	74 (3.2)	83 (3.2)	62 (3.7)
Israel	r 94 (1.8)	r 95 (1.5)	r 90 (2.3)	r 77 (3.0)	r 81 (3.1)	r 91 (2.0)	r 74 (4.0)	r 38 (3.5)	r 72 (3.7)	r 46 (4.3)	r 47 (3.7)
Italy	61 (3.0)	68 (2.6)	59 (3.0)	42 (3.1)	41 (3.0)	59 (3.5)	53 (3.4)	33 (3.2)	36 (3.2)	35 (3.1)	55 (3.5)
Japan	63 (3.6)	50 (3.7)	53 (3.7)	62 (3.2)	71 (3.3)	40 (3.7)	29 (3.8)	50 (3.8)	67 (3.5)	46 (4.0)	49 (3.9)
Jordan	79 (3.4)	90 (2.6)	71 (4.0)	60 (4.2)	78 (3.5)	78 (3.5)	82 (3.1)	71 (3.6)	71 (3.8)	73 (3.8)	69 (3.9)
Korea, Rep. of	68 (3.6)	58 (3.5)	69 (3.3)	55 (3.9)	57 (4.0)	61 (3.7)	58 (3.9)	39 (3.4)	74 (3.5)	46 (4.2)	65 (3.7)
Kuwait	r 83 (3.4)	r 87 (3.5)	r 72 (3.6)	r 62 (4.4)	r 65 (5.0)	r 64 (4.3)	r 78 (3.7)	r 75 (4.1)	r 55 (4.9)	r 69 (4.4)	r 60 (4.7)
Lebanon	97 (1.7)	97 (1.5)	96 (1.7)	92 (3.5)	93 (3.3)	88 (2.8)	87 (3.8)	87 (3.3)	92 (2.3)	55 (4.8)	90 (2.9)
Lithuania	73 (3.5)	80 (3.2)	65 (3.9)	63 (4.9)	63 (4.0)	70 (4.5)	65 (4.3)	55 (4.5)	68 (5.3)	52 (5.2)	72 (3.6)
Malaysia	79 (3.8)	59 (4.4)	82 (3.6)	78 (3.7)	51 (4.6)	65 (4.4)	72 (4.2)	68 (4.2)	44 (4.4)	49 (4.6)	70 (4.2)
Malta	95 (0.1)	100 (0.0)	90 (0.4)	91 (0.3)	80 (0.5)	88 (0.3)	94 (0.2)	94 (0.2)	83 (0.3)	81 (0.3)	95 (0.1)
Norway	61 (3.2)	75 (3.4)	42 (3.8)	64 (3.5)	35 (3.4)	62 (3.6)	67 (3.6)	60 (3.6)	58 (3.8)	43 (3.6)	61 (3.5)
Oman	93 (2.0)	93 (1.7)	76 (3.4)	83 (2.9)	78 (3.2)	88 (3.0)	90 (2.7)	75 (4.3)	78 (4.0)	73 (3.9)	74 (4.2)
Palestinian Nat'l Auth.	96 (1.8)	96 (1.5)	84 (3.2)	80 (3.4)	76 (3.5)	78 (3.8)	89 (2.8)	88 (3.0)	74 (3.9)	67 (4.0)	60 (4.6)
Qatar	84 (0.1)	86 (0.1)	69 (0.1)	67 (0.1)	67 (0.1)	72 (0.1)	73 (0.1)	61 (0.2)	59 (0.2)	64 (0.1)	63 (0.2)
Romania	95 (1.9)	97 (1.6)	92 (2.4)	93 (2.0)	85 (3.1)	88 (3.0)	94 (1.5)	89 (2.3)	94 (1.9)	91 (2.2)	92 (2.1)
Russian Federation	--	--	--	--	--	--	--	--	--	--	--
Saudi Arabia	64 (4.6)	64 (4.4)	53 (4.7)	31 (4.4)	60 (4.7)	56 (4.8)	65 (4.6)	58 (4.9)	32 (4.6)	42 (4.8)	42 (4.9)
Scotland	r 81 (1.9)	r 83 (1.8)	r 80 (1.9)	r 72 (2.4)	r 68 (2.6)	r 77 (2.0)	r 81 (2.0)	r 69 (2.3)	r 78 (2.2)	r 60 (2.5)	r 64 (2.5)
Serbia	99 (0.6)	98 (1.1)	93 (2.3)	95 (1.7)	94 (2.3)	90 (2.9)	95 (1.7)	92 (2.4)	96 (1.5)	92 (2.5)	98 (1.1)
Singapore	78 (2.2)	80 (2.1)	76 (2.2)	75 (2.1)	63 (2.4)	69 (2.7)	65 (2.5)	64 (2.4)	66 (2.3)	56 (2.5)	62 (2.5)
Slovenia	91 (2.5)	93 (2.3)	92 (2.3)	87 (3.0)	86 (3.1)	83 (2.8)	93 (2.0)	76 (3.6)	89 (2.4)	71 (3.3)	97 (1.3)
Sweden	67 (2.6)	81 (2.1)	63 (2.8)	66 (2.4)	50 (2.9)	58 (2.9)	68 (2.8)	60 (2.9)	62 (3.0)	55 (2.9)	64 (2.9)
Syrian Arab Republic	88 (3.4)	91 (2.6)	84 (3.5)	83 (3.8)	84 (3.0)	80 (3.7)	87 (2.9)	75 (3.6)	81 (3.2)	78 (3.5)	74 (3.7)
Thailand	50 (4.3)	48 (4.0)	44 (4.3)	55 (3.9)	26 (4.0)	24 (2.9)	43 (4.0)	29 (3.7)	31 (4.2)	34 (4.2)	34 (4.3)
Tunisia	r 26 (5.1)	r 14 (4.3)	r 19 (4.5)	r 14 (4.3)	r 18 (4.6)	r 11 (3.9)	r 15 (4.0)	r 14 (4.1)	s 12 (4.6)	s 10 (4.6)	r 13 (3.9)
Turkey	85 (3.4)	87 (3.1)	65 (4.1)	81 (3.7)	75 (3.8)	81 (3.5)	67 (4.4)	49 (5.1)	77 (3.7)	70 (4.3)	82 (3.3)
Ukraine	97 (1.4)	98 (1.2)	96 (1.6)	96 (1.6)	94 (2.1)	97 (0.9)	95 (1.0)	91 (2.2)	97 (1.5)	92 (2.4)	96 (1.7)
United States	85 (2.0)	89 (1.8)	67 (3.0)	61 (2.8)	67 (2.9)	72 (3.2)	r 69 (2.8)	57 (3.3)	43 (3.1)	46 (3.2)	73 (2.8)
‡ Morocco	r 77 (4.8)	r 86 (3.7)	r 87 (3.4)	r 82 (3.5)	r 76 (5.5)	r 71 (5.4)	r 86 (2.5)	r 66 (5.4)	r 82 (3.2)	r 75 (4.5)	r 79 (4.8)
<b>International Avg.</b>	<b>81 (0.4)</b>	<b>83 (0.4)</b>	<b>76 (0.5)</b>	<b>74 (0.5)</b>	<b>71 (0.5)</b>	<b>72 (0.5)</b>	<b>76 (0.5)</b>	<b>68 (0.5)</b>	<b>69 (0.5)</b>	<b>65 (0.5)</b>	<b>70 (0.5)</b>
<b>Benchmarking Participants</b>											
Basque Country, Spain	76 (4.1)	82 (3.4)	78 (3.7)	45 (4.6)	60 (4.5)	65 (4.5)	81 (3.4)	69 (4.9)	56 (4.9)	39 (5.2)	76 (4.1)
British Columbia, Canada	r 85 (2.9)	r 83 (3.2)	r 79 (3.4)	r 68 (4.0)	r 71 (3.7)	r 86 (2.9)	r 81 (3.7)	r 68 (4.5)	r 44 (3.8)	r 43 (4.4)	r 64 (4.2)
Dubai, UAE	s 94 (2.1)	s 94 (1.8)	s 82 (3.1)	s 80 (2.5)	s 78 (3.1)	s 85 (2.1)	s 74 (2.2)	s 76 (2.9)	s 84 (3.0)	s 67 (2.9)	s 84 (2.1)
Massachusetts, US	83 (5.2)	81 (5.2)	68 (5.9)	51 (7.1)	53 (6.2)	75 (6.3)	79 (5.6)	25 (6.1)	28 (6.0)	28 (7.1)	79 (5.8)
Minnesota, US	70 (6.2)	72 (7.3)	46 (7.6)	47 (7.2)	48 (7.8)	60 (7.3)	63 (8.4)	39 (7.5)	33 (6.2)	26 (6.8)	51 (6.3)
Ontario, Canada	47 (3.7)	48 (4.3)	57 (4.1)	34 (3.8)	35 (4.2)	58 (4.1)	65 (4.3)	55 (4.6)	22 (4.0)	23 (3.8)	55 (3.4)
Quebec, Canada	66 (5.0)	69 (4.5)	79 (4.1)	55 (5.3)	50 (5.6)	70 (5.0)	68 (5.3)	35 (5.1)	49 (5.2)	42 (5.3)	48 (5.6)

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



Exhibit 6.8 **Students Whose Teachers Feel “Very Well” Prepared to Teach the TIMSS Science Topics (Continued)**

TIMSS2007  
Science **8<sup>th</sup>**  
Grade

Country	Percentage of Students Whose Teachers Report Feeling Very Well Prepared to Teach the TIMSS Science Topics*					
	Earth Science (5 topics)					
	Earth's Structure and Physical Features	Earth's Processes, Cycles, and History	Environmental Concerns	Use and Conservation of Earth's Natural Resources	Earth in the Solar System and the Universe	
Algeria	48 (4.9)	r 45 (5.2)	r 46 (4.8)	r 53 (5.5)	r 34 (4.9)	
Armenia	41 (4.6)	36 (4.3)	40 (4.6)	34 (4.3)	44 (4.6)	
Australia	64 (2.9)	67 (3.3)	78 (3.1)	70 (2.9)	68 (2.9)	
Bahrain	60 (2.5)	58 (2.9)	72 (2.1)	73 (2.5)	79 (2.3)	
Bosnia and Herzegovina	89 (2.8)	91 (2.7)	84 (2.8)	81 (3.5)	91 (2.7)	
Botswana	29 (5.0)	52 (4.7)	83 (3.3)	86 (3.1)	50 (5.0)	
Bulgaria	86 (3.5)	76 (4.2)	83 (3.2)	80 (3.5)	87 (2.7)	
Chinese Taipei	39 (4.2)	39 (4.2)	57 (4.7)	52 (4.5)	36 (4.4)	
Colombia	57 (5.0)	59 (4.5)	90 (2.5)	88 (3.0)	57 (4.8)	
Cyprus	r 72 (1.4)	r 58 (2.0)	r 85 (1.0)	r 78 (1.3)	r 62 (1.8)	
Czech Republic	81 (3.1)	56 (4.0)	81 (3.3)	77 (3.6)	83 (2.9)	
Egypt	57 (3.7)	56 (4.3)	70 (4.1)	82 (3.1)	77 (3.3)	
El Salvador	48 (4.2)	44 (4.0)	70 (4.2)	69 (4.2)	50 (4.3)	
England	57 (2.7)	63 (2.5)	88 (1.5)	80 (1.8)	70 (2.5)	
Georgia	87 (3.4)	81 (4.4)	89 (3.0)	91 (3.3)	75 (4.6)	
Ghana	57 (4.8)	46 (4.5)	80 (3.2)	79 (4.0)	84 (2.8)	
Hong Kong SAR	15 (3.8)	19 (3.5)	58 (4.1)	49 (4.6)	25 (4.7)	
Hungary	91 (2.7)	88 (2.8)	75 (3.5)	77 (3.7)	67 (5.1)	
Indonesia	--	--	--	--	--	
Iran, Islamic Rep. of	74 (3.3)	62 (3.7)	79 (3.4)	81 (3.3)	60 (3.8)	
Israel	r 27 (3.6)	r 22 (3.0)	r 60 (4.1)	r 55 (4.2)	r 29 (3.4)	
Italy	56 (3.2)	42 (3.1)	61 (3.2)	57 (3.4)	56 (3.1)	
Japan	22 (3.6)	28 (3.6)	34 (4.2)	20 (3.5)	44 (4.3)	
Jordan	51 (4.0)	60 (4.3)	77 (3.3)	75 (3.6)	58 (4.2)	
Korea, Rep. of	66 (3.5)	52 (4.4)	56 (3.8)	33 (3.4)	50 (4.3)	
Kuwait	r 54 (4.8)	r 53 (4.8)	r 49 (4.6)	r 68 (4.2)	r 68 (4.5)	
Lebanon	--	--	--	--	--	
Lithuania	60 (4.0)	32 (3.8)	60 (3.8)	67 (3.5)	43 (4.9)	
Malaysia	28 (4.5)	28 (4.5)	70 (4.0)	71 (3.6)	38 (4.4)	
Malta	98 (0.3)	84 (0.3)	100 (0.0)	99 (0.1)	52 (0.4)	
Norway	57 (3.9)	57 (3.3)	82 (2.4)	78 (3.0)	69 (3.3)	
Oman	33 (4.0)	41 (4.1)	69 (3.8)	67 (4.0)	72 (3.6)	
Palestinian Nat'l Auth.	49 (4.6)	54 (4.5)	65 (4.2)	72 (4.1)	68 (4.3)	
Qatar	46 (0.2)	53 (0.2)	68 (0.2)	71 (0.1)	67 (0.2)	
Romania	82 (2.7)	72 (3.4)	79 (3.9)	76 (3.4)	88 (2.6)	
Russian Federation	--	--	--	--	--	
Saudi Arabia	55 (4.4)	41 (4.5)	54 (4.8)	54 (4.7)	67 (4.2)	
Scotland	r 32 (3.0)	r 42 (2.9)	r 75 (2.1)	r 71 (2.6)	r 49 (2.5)	
Serbia	94 (2.7)	90 (2.9)	77 (4.0)	84 (3.4)	93 (2.5)	
Singapore	7 (2.2)	5 (1.7)	43 (3.1)	29 (3.0)	15 (2.5)	
Slovenia	--	--	--	--	--	
Sweden	r 20 (2.9)	r 30 (3.2)	r 65 (2.8)	r 45 (3.1)	r 53 (3.0)	
Syrian Arab Republic	62 (4.5)	61 (5.2)	69 (4.7)	67 (5.0)	52 (5.6)	
Thailand	62 (3.8)	63 (4.1)	62 (3.7)	61 (4.0)	41 (4.5)	
Tunisia	74 (3.8)	73 (3.5)	51 (3.9)	59 (3.9)	34 (3.9)	
Turkey	38 (5.0)	48 (5.0)	76 (4.5)	73 (4.2)	64 (4.7)	
Ukraine	94 (1.6)	91 (2.4)	94 (1.9)	95 (1.7)	87 (3.0)	
United States	83 (2.4)	80 (2.4)	75 (2.6)	78 (2.6)	75 (3.1)	
‡ Morocco	r 82 (3.3)	r 54 (6.0)	r 56 (5.7)	r 54 (4.4)	r 42 (6.7)	
<b>International Avg.</b>	<b>57 (0.5)</b>	<b>55 (0.6)</b>	<b>70 (0.5)</b>	<b>68 (0.5)</b>	<b>59 (0.6)</b>	
<b>Benchmarking Participants</b>						
Basque Country, Spain	75 (4.1)	60 (4.2)	81 (3.4)	76 (3.5)	78 (3.8)	
British Columbia, Canada	r 67 (3.6)	r 66 (4.5)	r 66 (4.3)	r 61 (4.4)	r 59 (4.1)	
Dubai, UAE	s 44 (3.5)	s 59 (4.3)	s 75 (4.5)	s 83 (2.3)	s 58 (4.2)	
Massachusetts, US	80 (4.9)	76 (6.4)	75 (6.2)	71 (6.4)	81 (5.4)	
Minnesota, US	86 (5.4)	84 (5.8)	82 (6.2)	84 (5.5)	84 (5.9)	
Ontario, Canada	59 (4.7)	58 (4.8)	67 (4.2)	65 (3.9)	49 (4.5)	
Quebec, Canada	52 (5.1)	47 (4.8)	80 (4.2)	66 (5.5)	61 (5.0)	

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







