

REFERENCE 3

Teachers and
Instruction

R

3



Exhibit R3.1 Teachers' Major Area of Study in Their BA, MA, or Teacher Training Certification

	Percentage of Students Whose Teachers Report Having the Major Area of Study ¹				
	Mathematics	Mathematics Education	Science or Science Education	Education	Other
Australia	61 (4.4)	33 (4.1)	37 (3.6)	44 (4.0)	40 (4.3)
Belgium (Flemish)	89 (2.6)	38 (3.8)	73 (3.5)	42 (2.9)	37 (3.5)
Bulgaria	94 (1.9)	0 (0.0)	20 (3.9)	10 (3.0)	9 (3.0)
Canada	22 (2.7)	19 (2.2)	24 (2.8)	49 (3.2)	68 (2.9)
Chile	74 (3.0)	51 (4.0)	39 (4.0)	72 (3.2)	41 (3.8)
Chinese Taipei	82 (3.7)	39 (4.2)	11 (2.1)	32 (3.6)	23 (3.9)
Cyprus	92 (2.3)	26 (3.2)	4 (1.1)	x x	r 13 (3.2)
Czech Republic	85 (3.8)	34 (5.6)	53 (6.0)	34 (5.5)	53 (4.9)
England	47 (3.3)	32 (2.9)	s 20 (2.6)	s 44 (3.4)	s 41 (3.5)
Finland	73 (4.4)	8 (2.0)	51 (4.6)	20 (3.6)	17 (3.3)
Hong Kong, SAR	57 (4.2)	30 (3.9)	38 (4.4)	36 (3.8)	47 (4.5)
Hungary	97 (1.3)	13 (2.6)	74 (3.0)	8 (2.2)	37 (3.7)
Indonesia	67 (4.1)	49 (4.6)	23 (4.6)	29 (4.8)	12 (2.8)
Iran, Islamic Rep.	48 (4.0)	32 (3.9)	8 (2.2)	1 (0.8)	10 (2.6)
Israel	65 (3.5)	47 (3.3)	27 (3.3)	33 (3.7)	r 30 (3.1)
Italy	22 (3.3)	0 (0.0)	66 (3.4)	0 (0.0)	16 (3.1)
Japan	79 (3.6)	27 (3.6)	4 (1.7)	15 (3.2)	21 (3.5)
Jordan	73 (3.4)	17 (3.2)	6 (1.9)	4 (1.4)	8 (2.5)
Korea, Rep. of	55 (4.2)	61 (4.0)	4 (1.5)	19 (3.2)	9 (2.2)
Latvia (LSS)	85 (3.4)	69 (4.3)	89 (2.8)	89 (3.0)	82 (3.8)
Lithuania †	92 (2.3)	0 (0.0)	--	--	--
Macedonia, Rep. of	96 (1.7)	84 (2.7)	82 (3.2)	60 (4.1)	31 (4.4)
Malaysia	57 (4.4)	32 (3.8)	35 (4.0)	30 (3.7)	38 (3.9)
Moldova	73 (2.7)	0 (0.0)	52 (4.6)	36 (4.6)	35 (4.9)
Morocco	84 (4.3)	17 (2.5)	9 (1.8)	20 (2.2)	9 (1.8)
Netherlands	68 (4.9)	16 (4.2)	25 (5.0)	12 (4.3)	14 (4.4)
New Zealand	43 (3.9)	8 (2.5)	36 (3.7)	18 (3.3)	48 (4.3)
Philippines	78 (3.7)	23 (3.6)	13 (2.5)	26 (3.6)	34 (4.0)
Romania	93 (2.0)	43 (4.8)	21 (4.0)	48 (4.8)	26 (4.3)
Russian Federation	89 (2.9)	83 (3.1)	39 (4.0)	81 (3.1)	67 (3.9)
Singapore	78 (3.6)	32 (4.0)	38 (4.2)	48 (4.8)	47 (4.3)
Slovak Republic	92 (2.0)	23 (4.1)	50 (4.8)	21 (3.9)	54 (4.6)
Slovenia	74 (3.6)	33 (3.7)	62 (4.6)	14 (2.6)	18 (3.5)
South Africa	73 (3.3)	32 (3.7)	61 (4.2)	53 (4.3)	45 (4.2)
Thailand	61 (4.2)	5 (1.6)	15 (3.5)	5 (1.8)	27 (4.1)
Tunisia	68 (3.9)	38 (3.9)	34 (4.3)	9 (2.7)	19 (3.1)
Turkey	80 (2.9)	44 (3.9)	29 (3.8)	29 (3.6)	19 (3.5)
United States	41 (3.4)	37 (3.4)	16 (2.4)	54 (3.4)	r 46 (3.6)
International Avg.	71 (0.6)	31 (0.6)	35 (0.6)	32 (0.6)	32 (0.6)

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

Background data provided by teachers.

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

† Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

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

A dash (–) indicates data are not available.

An "r" indicates teacher response data available for 70-84% of students. An "s" indicates teacher response data available for 50-69% of students. An "x" indicates teacher response data available for <50% of students.



Exhibit R3.2 Overleaf

Exhibit R3.2 Teachers' Confidence in Their Preparation to Teach Mathematics Topics

	Percentage of Students Whose Teachers Report Feeling Very Well Prepared to Teach Topic ¹					
	Fractions, decimals and percentages	Ratios, and proportions	Measurement - units, instruments, and accuracy	Perimeter, area, and volume	Geometric figures - definitions and properties	Geometric figures - symmetry, motions and transformations, congruence and similarity
Australia	90 (2.9)	80 (3.8)	85 (3.5)	92 (2.6)	80 (4.0)	72 (4.3)
Belgium (Flemish)	97 (1.4)	93 (1.7)	62 (4.1)	92 (2.0)	93 (2.1)	89 (3.1)
Bulgaria	82 (6.3)	79 (6.1)	59 (5.6)	80 (5.8)	77 (5.5)	65 (5.9)
Canada	91 (2.1)	89 (2.4)	83 (2.7)	93 (2.2)	77 (2.8)	62 (3.4)
Chile	63 (3.3)	56 (3.7)	39 (3.8)	54 (3.3)	50 (3.8)	28 (3.7)
Chinese Taipei	80 (3.3)	83 (2.9)	65 (3.8)	77 (3.4)	77 (3.1)	70 (3.5)
Cyprus	100 (0.0)	100 (0.0)	91 (2.7)	100 (0.0)	100 (0.0)	78 (3.4)
Czech Republic	99 (1.3)	98 (1.3)	74 (5.0)	99 (1.3)	96 (2.1)	96 (2.0)
England	--	--	--	--	--	--
Finland	89 (2.1)	84 (3.0)	81 (2.7)	88 (2.3)	79 (2.8)	77 (3.0)
Hong Kong, SAR	75 (3.6)	76 (3.7)	67 (4.1)	86 (3.0)	66 (4.0)	53 (4.3)
Hungary	64 (3.7)	59 (3.5)	56 (3.7)	64 (3.7)	59 (3.9)	55 (3.8)
Indonesia	97 (1.7)	78 (3.5)	66 (5.1)	93 (2.2)	68 (4.1)	70 (4.3)
Iran, Islamic Rep.	89 (2.5)	93 (2.0)	69 (3.8)	92 (2.2)	87 (2.8)	75 (3.4)
Israel	91 (2.2)	75 (3.3)	70 (2.9)	90 (2.4)	92 (2.2)	73 (3.6)
Italy	79 (3.2)	80 (3.1)	55 (3.6)	86 (2.6)	84 (2.7)	45 (3.9)
Japan	15 (3.2)	20 (3.2)	9 (2.0)	26 (3.7)	23 (3.6)	20 (3.5)
Jordan	95 (2.0)	95 (1.9)	85 (3.1)	89 (2.9)	89 (2.7)	74 (4.0)
Korea, Rep. of	57 (3.7)	52 (3.9)	38 (3.8)	63 (3.2)	72 (3.2)	63 (3.7)
Latvia (LSS)	88 (3.0)	83 (3.2)	43 (4.4)	85 (3.3)	79 (3.3)	51 (4.4)
Lithuania [‡]	--	--	--	--	--	--
Macedonia, Rep. of	99 (0.6)	99 (0.8)	92 (2.3)	99 (0.9)	97 (1.5)	93 (2.0)
Malaysia	91 (2.9)	87 (3.2)	83 (3.2)	92 (2.8)	79 (3.6)	73 (3.7)
Moldova	73 (3.7)	78 (3.5)	61 (4.3)	77 (3.9)	70 (4.0)	47 (4.2)
Morocco	91 (1.6)	91 (1.8)	56 (3.2)	65 (3.2)	90 (1.8)	80 (2.4)
Netherlands	90 (5.8)	90 (5.9)	69 (5.5)	90 (5.8)	82 (6.3)	79 (6.2)
New Zealand	94 (1.8)	84 (3.4)	91 (2.6)	97 (1.4)	82 (3.5)	80 (3.3)
Philippines	91 (2.0)	86 (3.2)	70 (4.3)	87 (2.8)	55 (4.0)	28 (4.0)
Romania	99 (0.5)	98 (1.3)	86 (3.0)	99 (0.5)	98 (1.2)	89 (2.8)
Russian Federation	--	--	--	--	--	--
Singapore	80 (3.8)	82 (3.4)	76 (4.3)	90 (2.9)	79 (3.6)	69 (4.0)
Slovak Republic	98 (1.5)	100 (0.0)	94 (2.3)	99 (0.7)	99 (0.9)	87 (3.4)
Slovenia	59 (3.7)	50 (4.2)	41 (4.2)	60 (3.7)	62 (3.8)	40 (3.9)
South Africa	83 (2.4)	75 (3.3)	59 (4.6)	68 (4.5)	82 (2.7)	62 (3.9)
Thailand	29 (3.7)	31 (3.5)	24 (4.0)	39 (3.7)	34 (4.5)	34 (4.0)
Tunisia	56 (4.4)	48 (3.9)	37 (4.1)	59 (4.2)	67 (3.5)	41 (4.1)
Turkey	91 (2.4)	94 (1.5)	60 (3.5)	93 (2.1)	88 (2.3)	72 (3.6)
United States	99 (0.8)	97 (1.1)	84 (2.0)	97 (1.1)	86 (2.7)	75 (2.9)
International Avg.	82 (0.5)	79 (0.5)	65 (0.6)	82 (0.5)	77 (0.6)	65 (0.6)

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

Background data provided by teachers.

¹ Does not include students whose teachers report that they do not teach the topic.

² Percentage of students averaged across topics.

[‡] Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

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

A dash (–) indicates data are not available.

An "r" indicates teacher response data available for 70-84% of students.

	Percentage of Students Whose Teachers Report Feeling Very Well Prepared to Teach Topic ¹						
	Coordinate geometry	Algebraic representation	Evaluate and perform operations on algebraic expressions	Solving linear equations and inequalities	Representation and interpretation of data in graphs, charts, and tables	Simple probabilities - understanding and calculations	Average ²
Australia	87 (3.2)	83 (3.7)	85 (3.5)	84 (3.4)	86 (3.4)	84 (3.3)	84 (2.7)
Belgium (Flemish)	71 (3.9)	85 (3.1)	86 (2.6)	83 (3.3)	64 (2.9)	30 (4.6)	80 (1.4)
Bulgaria	29 (4.7)	62 (6.0)	80 (5.8)	81 (5.7)	49 (5.6)	36 (5.4)	66 (4.8)
Canada	64 (3.6)	83 (2.5)	82 (2.5)	74 (2.8)	79 (2.9)	70 (3.3)	79 (1.7)
Chile	31 (3.6)	38 (3.8)	39 (4.1)	46 (3.8)	41 (4.0)	39 (3.4)	44 (2.8)
Chinese Taipei	81 (3.2)	82 (2.9)	85 (2.9)	84 (3.0)	74 (3.7)	73 (3.7)	78 (2.6)
Cyprus	64 (4.4)	95 (1.7)	99 (0.9)	100 (0.0)	78 (3.7)	57 (4.6)	89 (0.9)
Czech Republic	84 (4.2)	88 (3.6)	95 (2.4)	97 (1.9)	75 (5.1)	52 (5.6)	88 (1.8)
England	--	--	--	--	--	--	--
Finland	80 (3.0)	86 (2.6)	89 (2.0)	88 (1.7)	73 (3.4)	63 (4.0)	81 (1.9)
Hong Kong, SAR	82 (3.4)	85 (3.2)	87 (3.0)	74 (3.9)	58 (4.4)	58 (3.9)	72 (2.6)
Hungary	50 (4.3)	53 (4.0)	65 (3.8)	67 (3.7)	--	--	59 (3.3)
Indonesia	86 (3.6)	90 (2.6)	81 (3.5)	90 (2.6)	69 (3.9)	80 (3.1)	81 (2.1)
Iran, Islamic Rep.	78 (3.2)	87 (2.3)	89 (2.5)	81 (3.1)	77 (3.7)	47 (4.1)	81 (1.8)
Israel	84 (2.7)	84 (2.9)	94 (2.2)	96 (1.7)	86 (2.8)	74 (3.5)	84 (1.6)
Italy	64 (4.0)	62 (3.8)	79 (2.9)	71 (3.2)	70 (3.1)	53 (4.2)	69 (2.3)
Japan	25 (3.9)	28 (4.4)	33 (4.3)	37 (4.4)	19 (3.3)	19 (3.7)	23 (2.6)
Jordan	77 (3.7)	84 (3.1)	93 (2.1)	94 (2.0)	91 (2.4)	93 (2.2)	88 (1.7)
Korea, Rep. of	49 (3.4)	56 (3.9)	74 (3.3)	83 (2.9)	55 (3.8)	67 (3.9)	61 (2.5)
Latvia (LSS)	81 (3.7)	93 (2.1)	90 (2.7)	90 (2.7)	70 (3.9)	22 (3.7)	73 (2.1)
Lithuania [†]	--	--	--	--	--	--	--
Macedonia, Rep. of	82 (3.4)	99 (1.0)	100 (0.0)	99 (0.7)	81 (3.3)	65 (4.2)	92 (1.0)
Malaysia	82 (3.6)	89 (3.1)	88 (3.2)	89 (2.9)	79 (3.7)	46 (4.6)	81 (2.5)
Moldova	66 (4.3)	71 (4.2)	78 (3.8)	76 (3.8)	54 (4.6)	32 (4.8)	64 (3.2)
Morocco	72 (2.6)	72 (2.8)	74 (3.5)	91 (1.8)	59 (3.2)	59 (3.5)	75 (1.3)
Netherlands	88 (5.9)	87 (6.0)	77 (6.4)	87 (5.9)	85 (5.8)	77 (6.3)	84 (5.3)
New Zealand	87 (2.9)	91 (2.4)	87 (2.8)	87 (3.0)	87 (2.6)	86 (2.5)	88 (1.9)
Philippines	35 (4.5)	73 (3.5)	82 (3.0)	62 (3.8)	62 (3.9)	28 (4.0)	64 (2.3)
Romania	32 (5.2)	68 (4.7)	98 (1.0)	96 (1.6)	82 (3.7)	54 (4.7)	85 (1.3)
Russian Federation	--	--	--	--	--	--	--
Singapore	79 (3.6)	85 (3.3)	86 (3.1)	89 (2.9)	80 (3.6)	46 (5.2)	78 (2.7)
Slovak Republic	90 (3.1)	95 (1.8)	99 (1.0)	99 (1.0)	75 (3.7)	45 (5.2)	89 (1.5)
Slovenia	50 (4.3)	47 (4.1)	64 (4.0)	71 (3.7)	38 (3.8)	22 (4.0)	50 (2.9)
South Africa	53 (4.6)	85 (2.3)	81 (3.0)	81 (3.1)	67 (4.5)	62 (4.4)	71 (1.9)
Thailand	30 (5.4)	31 (5.0)	33 (5.0)	39 (4.5)	34 (4.2)	32 (5.1)	32 (3.0)
Tunisia	42 (4.8)	52 (5.0)	58 (3.9)	71 (3.8)	47 (4.5)	38 (4.6)	51 (2.6)
Turkey	87 (2.3)	83 (3.0)	83 (2.7)	90 (2.5)	74 (3.8)	85 (2.9)	83 (1.6)
United States	82 (2.6)	94 (1.6)	95 (1.3)	93 (1.5)	94 (1.5)	90 (2.1)	90 (1.2)
International Avg.	66 (0.7)	76 (0.6)	80 (0.6)	81 (0.5)	68 (0.7)	55 (0.7)	73 (0.4)

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

Exhibit R3.3 Shortages of Teachers Qualified to Teach Mathematics Affecting Capacity to Provide Instruction

	None		A Little		Some		A Lot	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia	60 (4.2)	533 (6.7)	32 (3.9)	513 (9.3)	5 (1.5)	520 (17.4)	3 (1.6)	484 (29.4)
Belgium (Flemish)	84 (3.6)	557 (4.5)	12 (3.3)	554 (22.4)	2 (1.2)	~ ~	1 (0.9)	~ ~
Bulgaria	25 (4.1)	497 (9.6)	4 (1.1)	491 (20.6)	6 (1.9)	495 (14.7)	65 (4.6)	519 (8.4)
Canada	54 (3.1)	536 (3.1)	27 (3.2)	531 (4.3)	16 (2.4)	514 (7.7)	3 (0.8)	525 (18.6)
Chile	34 (3.5)	418 (9.6)	39 (3.7)	383 (6.0)	20 (3.3)	378 (6.3)	7 (1.9)	366 (5.2)
Chinese Taipei	43 (4.3)	591 (5.1)	36 (4.4)	584 (7.3)	12 (3.0)	590 (11.4)	9 (2.2)	551 (13.3)
Cyprus	63 (0.2)	473 (2.4)	28 (0.2)	483 (2.9)	4 (0.0)	490 (3.7)	6 (0.1)	486 (11.6)
Czech Republic	90 (2.9)	521 (4.7)	6 (2.6)	506 (15.6)	3 (1.8)	527 (26.2)	1 (0.9)	~ ~
England	71 (4.1)	508 (5.8)	19 (3.6)	482 (7.3)	8 (2.8)	485 (17.1)	2 (1.2)	~ ~
Finland	82 (3.3)	519 (3.1)	12 (3.0)	527 (6.0)	3 (1.3)	524 (8.2)	2 (1.1)	~ ~
Hong Kong, SAR	55 (4.5)	596 (6.0)	28 (4.2)	555 (9.6)	10 (2.6)	583 (15.9)	7 (2.1)	602 (15.1)
Hungary	84 (2.7)	531 (4.0)	5 (1.8)	552 (22.2)	4 (1.4)	558 (18.1)	8 (2.0)	504 (17.3)
Indonesia	16 (3.2)	425 (16.5)	33 (4.2)	402 (8.6)	35 (4.6)	398 (9.7)	16 (3.1)	395 (20.3)
Iran, Islamic Rep.	27 (3.5)	429 (5.5)	23 (3.4)	416 (8.1)	29 (4.2)	425 (6.3)	21 (3.3)	416 (7.7)
Israel	56 (4.4)	464 (6.9)	35 (4.3)	466 (7.7)	7 (2.1)	470 (31.8)	3 (1.2)	437 (57.3)
Italy	38 (4.1)	478 (5.5)	36 (3.6)	483 (7.6)	20 (3.3)	473 (9.0)	6 (1.7)	487 (13.3)
Japan	65 (3.9)	579 (2.1)	17 (2.8)	583 (4.2)	8 (2.4)	577 (6.0)	10 (2.5)	572 (5.5)
Jordan	9 (2.5)	426 (11.2)	5 (2.1)	444 (31.8)	4 (1.7)	407 (13.2)	82 (3.4)	428 (4.0)
Korea, Rep. of	19 (3.2)	589 (5.4)	48 (3.9)	587 (2.5)	22 (3.8)	586 (4.4)	11 (2.7)	591 (4.9)
Latvia (LSS)	39 (4.7)	499 (6.7)	21 (3.8)	515 (5.5)	16 (3.9)	508 (11.7)	23 (4.2)	499 (7.8)
Lithuania [†]	91 (2.5)	483 (4.6)	3 (1.4)	467 (10.1)	3 (1.6)	453 (21.3)	3 (1.4)	495 (18.9)
Macedonia, Rep. of	78 (3.4)	452 (4.9)	5 (2.0)	433 (24.5)	10 (2.3)	413 (18.2)	7 (2.2)	431 (20.9)
Malaysia	27 (3.5)	536 (9.5)	23 (3.7)	525 (11.3)	16 (3.3)	517 (14.6)	34 (4.2)	504 (7.7)
Moldova	16 (2.7)	470 (8.4)	10 (2.6)	473 (18.6)	16 (3.1)	473 (11.7)	58 (4.0)	468 (5.1)
Morocco	23 (3.2)	339 (5.3)	29 (3.2)	334 (4.5)	27 (3.7)	334 (4.1)	21 (3.9)	343 (5.3)
Netherlands	52 (6.5)	546 (11.8)	23 (5.3)	541 (15.4)	19 (6.8)	518 (22.8)	5 (2.0)	560 (22.0)
New Zealand	58 (3.5)	497 (6.9)	26 (3.9)	476 (10.7)	12 (2.6)	465 (13.8)	4 (1.9)	530 (27.1)
Philippines	27 (3.9)	369 (14.5)	30 (3.9)	327 (9.7)	25 (3.6)	338 (12.8)	19 (3.4)	340 (9.4)
Romania	86 (2.5)	475 (6.9)	2 (1.1)	~ ~	4 (1.7)	421 (17.7)	8 (2.0)	467 (21.7)
Russian Federation	51 (3.9)	526 (7.2)	9 (2.3)	523 (24.4)	10 (2.0)	526 (15.2)	30 (3.8)	526 (10.6)
Singapore	58 (4.1)	608 (9.0)	26 (4.1)	599 (10.9)	12 (2.8)	607 (13.9)	4 (1.6)	592 (17.5)
Slovak Republic	79 (4.0)	538 (4.0)	6 (2.3)	502 (11.6)	8 (2.3)	522 (15.4)	8 (2.8)	511 (6.2)
Slovenia	36 (3.9)	526 (4.8)	7 (2.0)	525 (8.5)	15 (2.6)	534 (4.5)	42 (3.9)	533 (5.0)
South Africa	23 (3.2)	295 (15.6)	25 (3.7)	275 (12.5)	26 (3.8)	273 (10.4)	27 (3.7)	260 (14.4)
Thailand	13 (2.9)	470 (18.5)	15 (3.3)	474 (9.6)	35 (4.4)	465 (8.2)	37 (4.3)	467 (8.7)
Tunisia	7 (2.4)	467 (8.6)	7 (2.2)	457 (11.9)	9 (2.5)	448 (7.6)	76 (3.8)	446 (2.8)
Turkey	6 (1.9)	450 (21.7)	12 (2.5)	437 (16.7)	20 (3.7)	425 (6.6)	62 (4.0)	427 (5.1)
United States	62 (4.2)	514 (5.3)	23 (3.5)	497 (6.2)	13 (2.6)	461 (9.3)	3 (1.0)	446 (15.1)
International Avg.	47 (0.6)	493 (1.4)	20 (0.5)	484 (2.6)	14 (0.5)	478 (2.4)	19 (0.5)	477 (3.0)

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

Background data provided by schools.

[†] Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

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

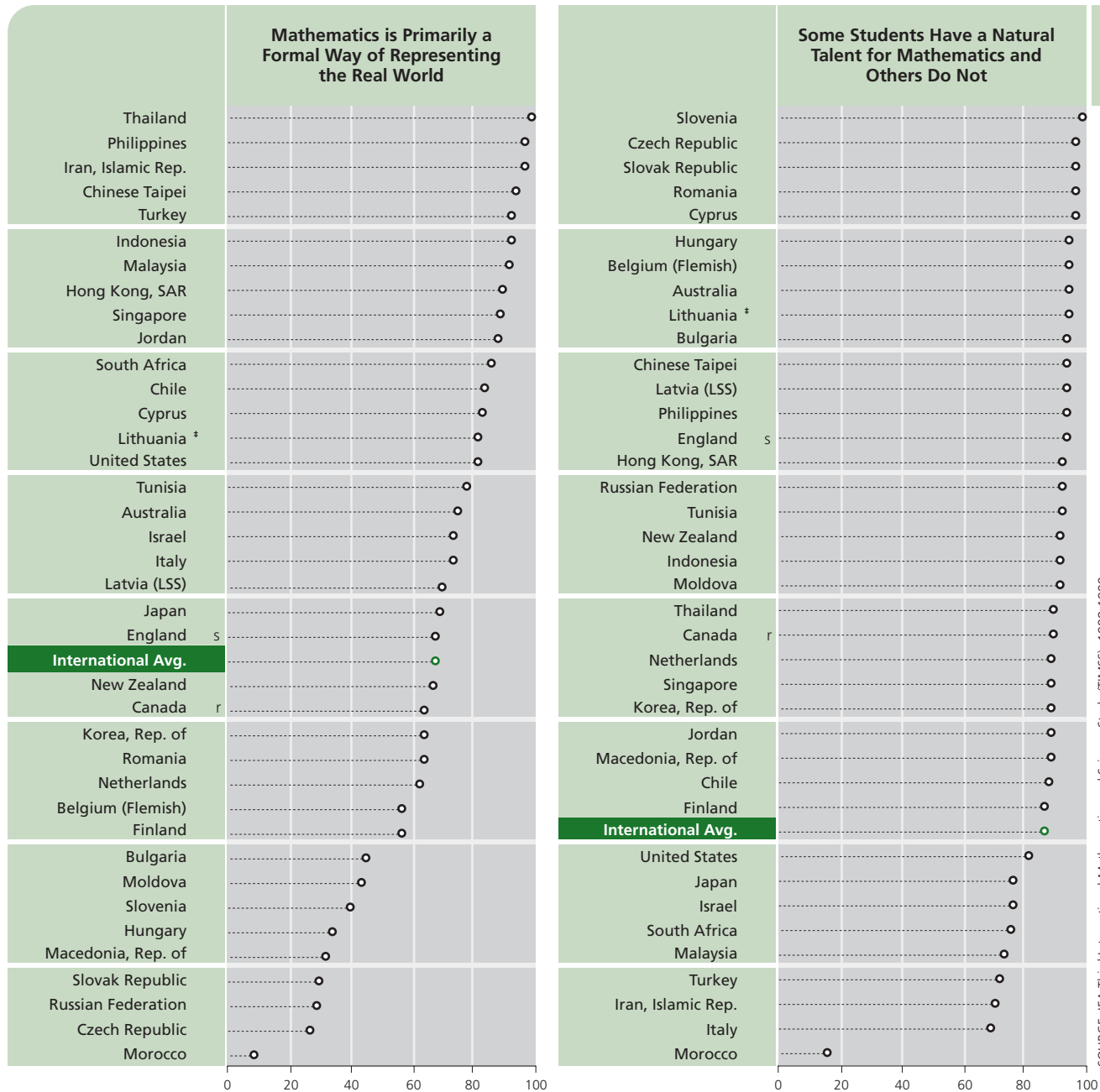
A tilde (~) indicates insufficient data to report achievement.

An "r" indicates school response data available for 70-84% of students.



Exhibit R3.4 Overleaf

Exhibit R3.4 Percentage of Students Whose Mathematics Teachers Agree or Strongly Agree with Statements About the Nature of Mathematics and Mathematics Teaching



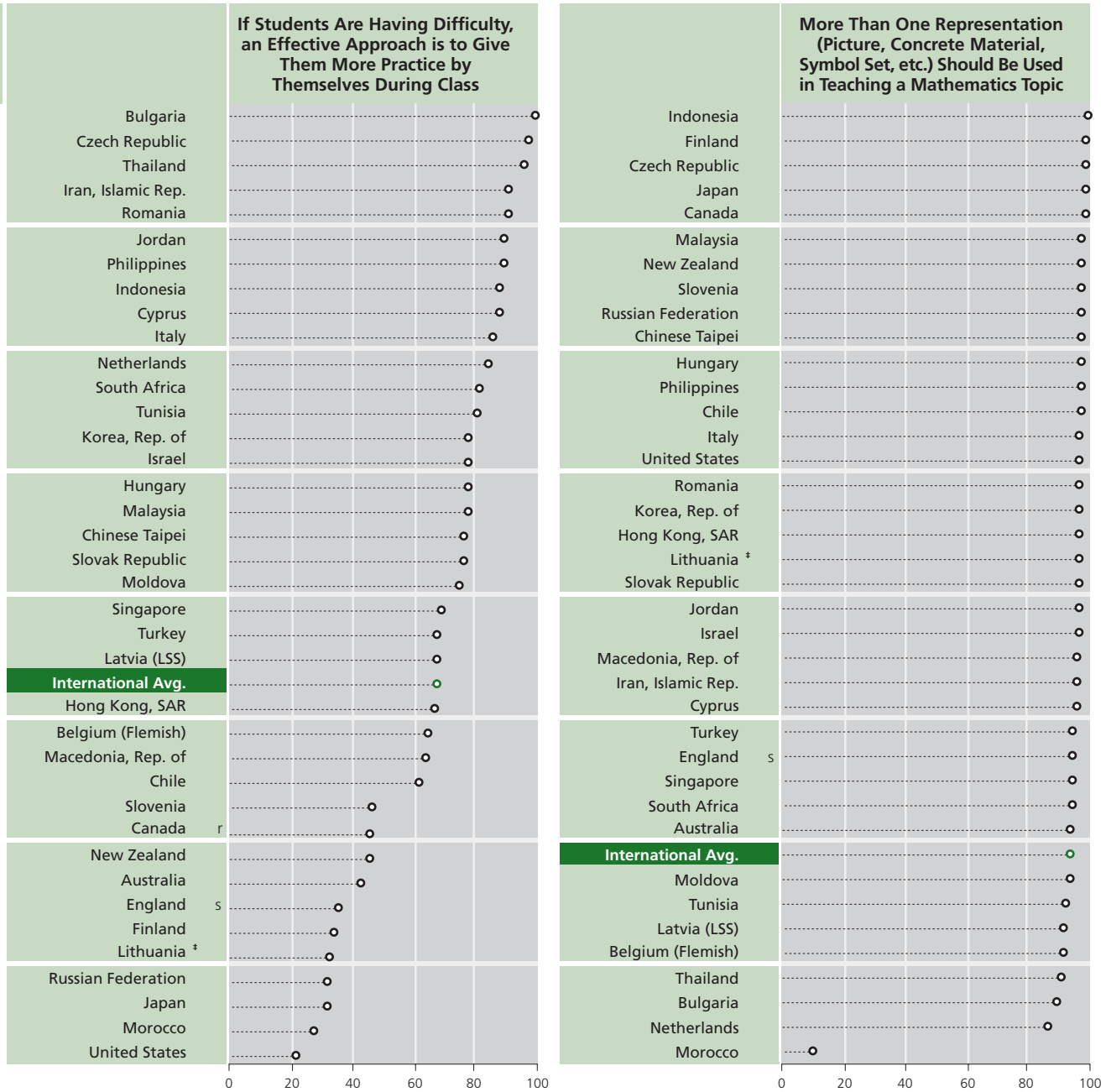
SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1998-1999.

Background data provided by teachers.

† Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

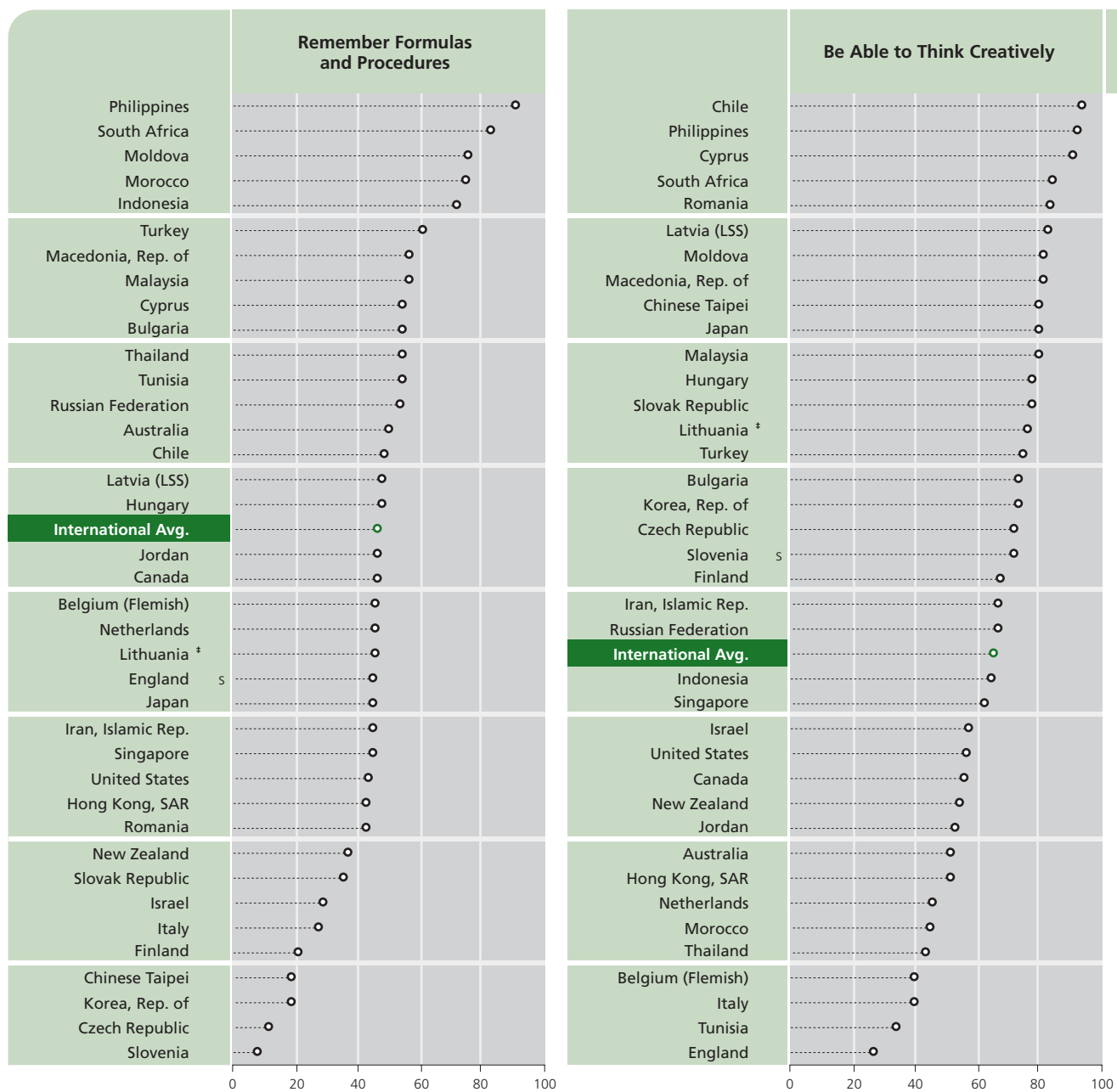
An "r" indicates teacher response data available for 70-84% of students. An "s" indicates teacher response data available for 50-69% of students.

Exhibit R3.4: Percentage of Students Whose Mathematics Teachers Agree or Strongly Agree with Statements About the Nature of Mathematics and Mathematics Teaching (Continued)



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

Exhibit R3.5 Percentage of Students Whose Mathematics Teachers Think Particular Abilities Are Very Important for Students' Success in Mathematics in School



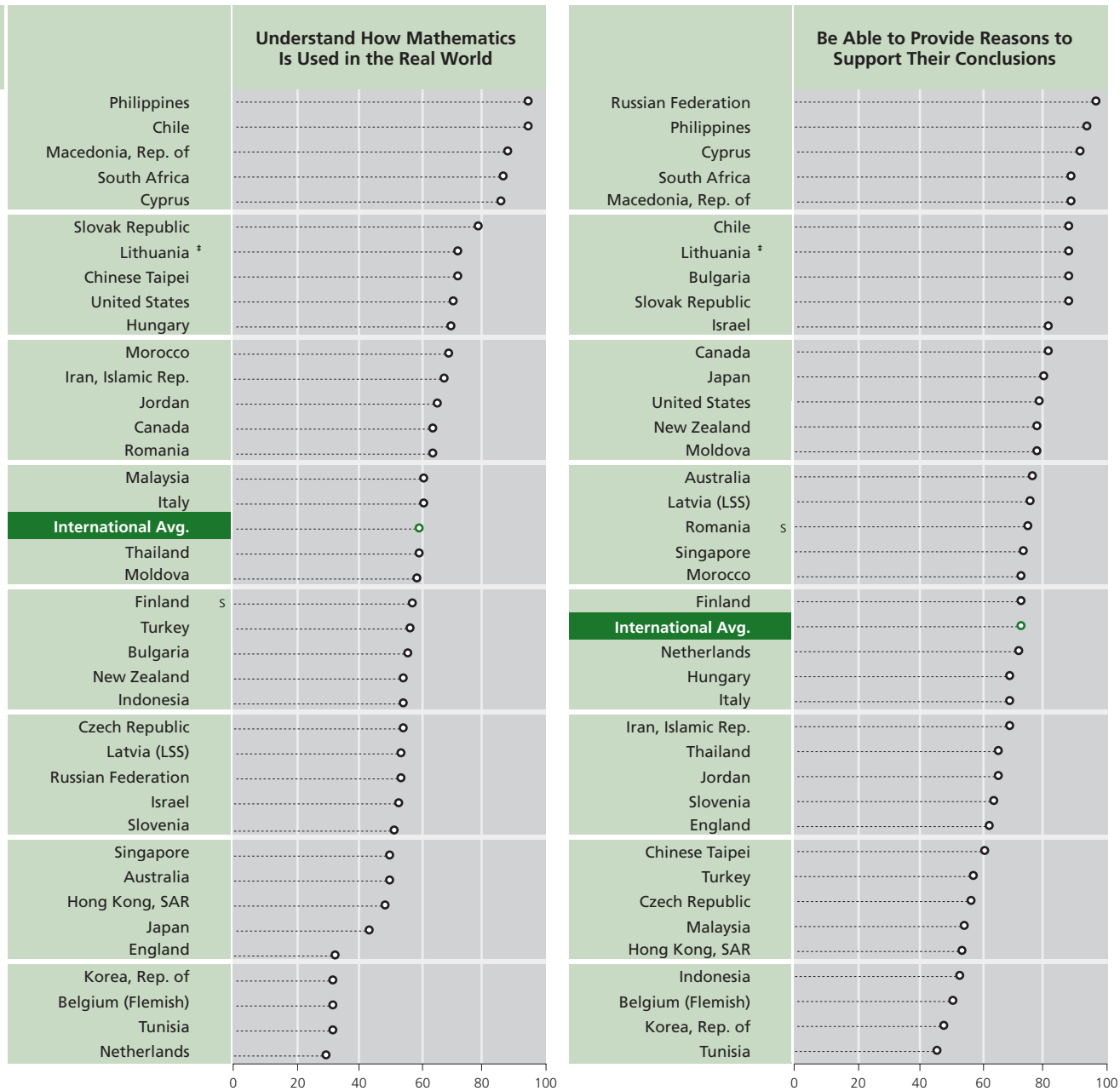
SOURCE: IEA Third International Mathematics and Science Study (TIMSS), 1998-1999.

Background data provided by teachers.

An "s" indicates teacher response data available for 50-69% of students.

† Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

Exhibit R3.5: Percentage of Students Whose Mathematics Teachers Think Particular Abilities Are Very Important for Students' Success in Mathematics in School (Continued)



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

Exhibit R3.6 Average Number of Instructional Days in the School Year



Background data provided by schools.

¹ Days reported averaged across students.

† Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

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

An "r" indicates school response data available for 70-84% of students. An "s" indicates school response data available for 50-69% of students. An "x" indicates school response data available for <50% of students.

Exhibit R3.7 Instructional Time in School

	Yearly Amount of Instructional Time in Hours Averaged Across Students		Yearly Amount of Total Time in School in Hours Averaged Across Students	Percent of Total Hours Spent on Instruction ¹		
Philippines	s	1481 (28.9)	s	1551 (57.7)	x x	
Chinese Taipei		1374 (13.7)		1742 (15.0)	79 (0.8)	
Indonesia	r	1355 (35.2)	r	1586 (49.4)	r	86 (1.0)
Thailand	r	1280 (16.9)	r	1524 (18.1)	r	84 (0.8)
Italy		1124 (7.4)		1228 (9.2)		92 (0.5)
Morocco	s	1113 (24.4)	s	1178 (38.6)	s	96 (1.0)
Chile	s	1110 (20.4)	s	1277 (25.1)	s	88 (0.9)
Korea, Rep. of		1067 (17.7)		1442 (27.9)		76 (1.2)
United States	s	1061 (15.8)	s	1303 (23.1)	x x	
Japan		1057 (11.5)		1593 (27.5)		69 (1.3)
Malaysia		1057 (11.0)		1140 (9.7)		93 (0.5)
Bulgaria	s	1049 (18.3)	s	1202 (22.3)	s	88 (1.0)
Australia	r	1021 (9.2)	s	1313 (15.6)	s	78 (0.8)
Netherlands	s	1018 (15.3)	s	1269 (29.0)	s	81 (1.2)
Moldova	s	1012 (22.2)	s	1310 (24.5)	s	77 (1.4)
Jordan	r	1003 (20.7)		1196 (16.5)	r	84 (1.0)
Romania	r	1002 (10.4)	r	1165 (29.7)	r	88 (1.7)
Hong Kong, SAR	s	988 (26.7)	s	1385 (44.2)	s	71 (1.0)
Belgium (Flemish)		980 (0.0)		1120 (0.0)		87 (0.0)
Canada		979 (6.1)		1358 (13.6)		73 (0.7)
Slovak Republic	s	969 (18.8)	s	1203 (25.1)	x x	
Finland		969 (11.7)		1133 (5.7)		86 (0.9)
Tunisia	r	961 (19.7)	r	1177 (34.3)	s	85 (1.5)
New Zealand		958 (6.8)	r	1315 (12.3)	r	74 (0.7)
Hungary		956 (14.3)		1301 (22.8)		75 (1.4)
England	r	953 (4.8)	r	1271 (10.0)	r	76 (0.6)
Czech Republic		948 (10.4)		1249 (16.9)		77 (1.0)
Latvia (LSS)	s	905 (23.2)	s	1212 (24.1)	s	77 (1.4)
Lithuania [‡]		897 (0.0)		--		--
Singapore		880 (11.2)		1213 (21.1)		73 (1.4)
Russian Federation	s	870 (17.0)	s	1153 (18.5)	s	75 (1.1)
Cyprus	r	832 (0.0)	r	960 (0.0)	r	87 (0.0)
Slovenia		770 (0.0)		875 (0.0)		88 (0.0)
Macedonia, Rep. of	s	745 (17.7)	s	974 (22.6)	x x	
Iran, Islamic Rep.		x x		x x		x x
Israel		x x		x x		x x
South Africa		x x	s	1285 (31.8)		x x
Turkey		x x		x x		x x
International Avg.		1027 (2.9)		1269 (4.4)		82 (0.2)

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

Background data provided by schools.

¹ Computed as the ratio of instructional hours to total hours averaged across students.

[‡] Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

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

A dash (–) indicates data are not available.

An "r" indicates school response data available for 70-84% of students. An "s" indicates school response data available for 50-69% of students. An "x" indicates school response data available for <50% of students.

Exhibit R3.8 How Teachers Spend Their Formally Scheduled School Time

	Percentage of Formally Scheduled School Time Averaged Across Students				
	Teaching Mathematics, Science, and Other Subjects	Teaching Mathematics	Curriculum Planning ¹	Administrative Duties	Other Activities ²
Australia	80 (1.2)	61 (2.3)	3 (0.6)	5 (1.0)	12 (1.0)
Belgium (Flemish) r	85 (1.1)	r 70 (1.7)	r 3 (0.5)	r 1 (0.3)	r 10 (0.8)
Bulgaria	71 (3.6)	63 (3.2)	9 (2.1)	5 (1.0)	15 (1.2)
Canada	78 (1.0)	43 (1.3)	7 (0.4)	2 (0.5)	14 (1.0)
Chile	75 (1.3)	59 (1.6)	8 (0.6)	4 (0.6)	13 (0.7)
Chinese Taipei	55 (2.0)	55 (2.0)	9 (0.9)	4 (0.9)	32 (1.6)
Cyprus r	92 (1.3)	r 92 (1.3)	r 2 (0.4)	r 1 (0.4)	r 6 (0.8)
Czech Republic	70 (2.1)	46 (2.1)	12 (1.6)	3 (0.5)	15 (1.0)
England s	87 (0.9)	s 80 (1.3)	s 1 (0.3)	s 2 (0.3)	s 10 (0.8)
Finland	85 (0.6)	47 (1.4)	2 (0.3)	1 (0.4)	12 (0.4)
Hong Kong, SAR	x x	x x	x x	x x	x x
Hungary	68 (1.3)	46 (1.5)	9 (0.7)	5 (0.4)	17 (0.9)
Indonesia	65 (2.0)	63 (2.1)	12 (1.0)	8 (0.9)	16 (1.2)
Iran, Islamic Rep.	67 (2.0)	64 (2.0)	10 (1.2)	1 (0.2)	22 (1.7)
Israel r	80 (1.5)	r 72 (1.7)	r 8 (0.7)	r 3 (0.8)	r 9 (0.7)
Italy	87 (1.1)	52 (0.8)	7 (0.8)	0 (0.1)	6 (0.6)
Japan	68 (1.8)	63 (1.9)	7 (0.8)	4 (0.4)	21 (1.4)
Jordan	67 (1.4)	65 (1.5)	11 (0.6)	4 (0.3)	17 (0.9)
Korea, Rep. of	54 (1.3)	54 (1.3)	11 (0.6)	14 (0.8)	21 (0.9)
Latvia (LSS)	72 (2.1)	64 (2.4)	4 (0.8)	3 (0.9)	21 (1.5)
Lithuania †	65 (1.5)	61 (1.6)	10 (0.8)	5 (1.2)	20 (0.9)
Macedonia, Rep. of	52 (1.2)	48 (1.5)	21 (1.0)	5 (0.2)	22 (0.9)
Malaysia	65 (1.0)	52 (1.5)	11 (0.4)	6 (0.3)	19 (0.8)
Moldova	56 (1.8)	r 50 (2.0)	15 (1.2)	r 6 (1.0)	24 (1.2)
Morocco	88 (1.3)	88 (1.3)	2 (0.4)	1 (0.3)	9 (1.2)
Netherlands † s	88 (0.9)	s 75 (2.6)	--	--	s 12 (0.9)
New Zealand	83 (1.2)	68 (2.1)	3 (0.6)	4 (0.7)	10 (0.8)
Philippines	70 (1.9)	57 (2.2)	8 (0.9)	3 (0.6)	20 (1.4)
Romania	60 (2.0)	54 (1.8)	10 (0.8)	5 (0.9)	25 (1.5)
Russian Federation † 4	--	--	--	--	--
Singapore	73 (0.8)	55 (1.8)	--	3 (0.3)	24 (0.7)
Slovak Republic	69 (1.9)	51 (2.2)	12 (1.1)	6 (0.8)	12 (0.7)
Slovenia	65 (1.1)	58 (1.5)	16 (0.9)	5 (0.4)	13 (0.6)
South Africa r	71 (1.9)	r 52 (2.2)	r 6 (0.7)	r 7 (0.7)	r 16 (1.3)
Thailand	60 (1.3)	51 (1.4)	16 (0.8)	4 (0.6)	21 (1.0)
Tunisia	57 (1.4)	56 (1.4)	22 (1.1)	2 (0.6)	19 (1.1)
Turkey	67 (1.6)	61 (1.7)	12 (0.8)	3 (0.8)	18 (0.9)
United States	75 (1.3)	65 (1.7)	13 (0.8)	2 (0.4)	11 (0.8)
International Avg.	71 (0.3)	60 (0.3)	9 (0.2)	4 (0.1)	16 (0.2)

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

Background data provided by teachers.

- Includes individual curriculum planning and cooperative curriculum planning.
- Includes student supervision (other than teaching), student counseling/appraisal, other non-student contact time, and other activities.
- Netherlands: Data in other activities category reflects the total reported for curriculum planning, administrative duties and other activities.
- Russian Federation: Formally scheduled school time is for instruction only; teachers are not formally scheduled for other activities.

† Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

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

A dash (–) indicates data are not available.

An "r" indicates teacher response data available for 70-84% of students. An "s" indicates teacher response data available for 50-69% of students. An "x" indicates teacher response data available for <50% of students.

	Percentage of Students Whose Teachers Report Most or Every Lesson				
	Explain Reasoning Behind an Idea	Represent and Analyze Relationships Using Tables, Charts, or Graphs	Work on Problems for Which There Is No Immediately Obvious Method of Solution	Write Equations to Represent Relationships	Practice Computational Skills
Australia	62 (4.2)	15 (2.9)	10 (2.4)	32 (4.1)	55 (4.4)
Belgium (Flemish)	67 (3.5)	2 (0.8)	5 (3.1)	12 (2.0)	76 (2.7)
Bulgaria	93 (2.1)	23 (3.7)	25 (4.3)	40 (5.3)	69 (4.9)
Canada	76 (2.7)	20 (2.6)	18 (2.8)	44 (2.8)	64 (3.3)
Chile	69 (3.5)	23 (3.2)	27 (3.1)	20 (3.2)	81 (2.8)
Chinese Taipei	54 (4.1)	39 (4.4)	11 (2.1)	57 (4.2)	54 (4.5)
Cyprus	r 91 (2.7)	r 13 (3.6)	r 8 (2.6)	r 64 (5.1)	r 57 (5.1)
Czech Republic	94 (2.6)	21 (4.0)	22 (4.2)	69 (5.4)	81 (4.4)
England	s 70 (3.0)	s 13 (2.7)	s 6 (2.1)	s 22 (3.4)	52 (3.6)
Finland	75 (3.6)	19 (3.6)	16 (3.0)	15 (3.0)	84 (3.2)
Hong Kong, SAR	33 (4.1)	17 (3.5)	18 (3.5)	60 (3.5)	78 (3.1)
Hungary	79 (3.4)	31 (3.6)	22 (3.5)	69 (3.8)	90 (2.4)
Indonesia	45 (4.4)	45 (4.1)	14 (3.2)	67 (4.5)	93 (2.4)
Iran, Islamic Rep.	55 (4.5)	26 (3.7)	31 (4.0)	23 (3.7)	71 (3.5)
Israel	75 (3.3)	35 (3.7)	17 (3.3)	59 (3.5)	56 (3.6)
Italy	84 (3.0)	44 (3.8)	45 (3.6)	30 (3.4)	65 (3.4)
Japan	82 (3.2)	62 (4.1)	41 (4.4)	80 (3.0)	62 (4.5)
Jordan	73 (3.8)	36 (4.5)	16 (3.2)	35 (3.9)	91 (2.6)
Korea, Rep. of	65 (3.2)	38 (4.0)	28 (3.5)	65 (3.9)	55 (4.3)
Latvia (LSS)	61 (4.6)	17 (3.7)	12 (2.9)	40 (4.3)	91 (2.5)
Lithuania †	73 (4.2)	23 (3.5)	17 (3.4)	41 (4.3)	92 (2.3)
Macedonia, Rep. of	79 (3.4)	32 (3.8)	26 (3.2)	49 (4.2)	80 (3.6)
Malaysia	49 (4.0)	32 (3.8)	41 (3.6)	45 (3.9)	88 (2.8)
Moldova	93 (2.2)	13 (3.1)	20 (3.4)	27 (3.4)	82 (3.4)
Morocco	57 (2.9)	5 (1.4)	11 (1.7)	53 (3.0)	74 (2.6)
Netherlands	65 (5.6)	28 (5.6)	33 (6.4)	23 (5.4)	40 (4.8)
New Zealand	56 (4.0)	10 (2.6)	10 (2.8)	17 (3.0)	67 (3.9)
Philippines	70 (3.9)	33 (3.8)	25 (3.7)	40 (4.2)	95 (1.8)
Romania	93 (2.2)	30 (4.5)	27 (4.2)	33 (4.2)	91 (2.4)
Russian Federation	84 (3.3)	11 (2.5)	13 (2.9)	40 (3.7)	88 (2.3)
Singapore	44 (4.9)	14 (3.2)	15 (3.4)	29 (3.8)	51 (4.4)
Slovak Republic	89 (3.2)	11 (2.9)	25 (4.3)	52 (4.9)	87 (3.4)
Slovenia	77 (3.3)	41 (3.6)	43 (4.0)	82 (3.0)	84 (2.8)
South Africa	63 (3.5)	27 (3.4)	28 (4.0)	44 (4.1)	30 (3.8)
Thailand	54 (3.9)	12 (2.5)	21 (3.4)	25 (3.7)	92 (2.1)
Tunisia	81 (3.4)	35 (3.8)	10 (2.5)	20 (3.7)	56 (4.2)
Turkey	69 (4.0)	55 (3.5)	24 (3.3)	63 (2.9)	79 (3.3)
United States	72 (3.1)	24 (2.6)	19 (2.6)	54 (2.8)	66 (3.7)
International Avg.	70 (0.6)	26 (0.6)	21 (0.6)	43 (0.6)	73 (0.6)

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

Background data provided by teachers.

† Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

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

An "r" indicates teacher response data available for 70-84% of students. An "s" indicates teacher response data available for 50-69% of students.

Exhibit R3.10 Trends in Asking Students to Do Problem-Solving Activities During Most or Every Mathematics Lesson

	Explain Reasoning Behind an Idea		Represent and Analyze Relationships Using Tables, Charts, or Graphs		Work on Problems for Which There Is No Immediately Obvious Method of Solution		Write Equations to Represent Relationships		Practice Computational Skills	
	Percent of Students 1999	1995-1999 Difference	Percent of Students 1999	1995-1999 Difference	Percent of Students 1999	1995-1999 Difference	Percent of Students 1999	1995-1999 Difference	Percent of Students 1999	1995-1999 Difference
Australia	62 (4.2)	r 7 (5.9) ●	15 (2.9)	r 7 (3.4) ●	10 (2.4)	r 5 (2.9) ●	32 (4.1)	r 17 (4.8) ▲	55 (4.4)	r 4 (5.5) ●
Belgium (Flemish)	67 (3.5)	-5 (5.8) ●	2 (0.8)	2 (0.8) ●	5 (3.1)	2 (3.5) ●	12 (2.0)	6 (2.8) ●	76 (2.7)	9 (4.7) ●
Canada	76 (2.7)	r 5 (5.3) ●	20 (2.6)	14 (3.3) ▲	18 (2.8)	6 (4.4) ●	44 (2.8)	16 (4.5) ●	64 (3.3)	4 (5.7) ●
Cyprus	91 (2.7)	r 2 (4.7) ●	13 (3.6)	r -12 (5.9) ●	8 (2.6)	r -11 (5.3) ●	64 (5.1)	r 15 (8.1) ●	57 (5.1)	r 0 (8.1) ●
Czech Republic	94 (2.6)	12 (5.2) ●	21 (4.0)	0 (6.3) ●	22 (4.2)	3 (5.0) ●	69 (5.4)	7 (8.0) ●	81 (4.4)	4 (6.5) ●
England	70 (3.0)	s 5 (4.4) ●	13 (2.7)	s -4 (3.8) ●	6 (2.1)	s 1 (2.5) ●	22 (3.4)	s 1 (4.4) ●	52 (3.6)	s 10 (4.5) ●
Hong Kong, SAR	33 (4.1)	0 (6.9) ●	17 (3.5)	1 (5.1) ●	18 (3.5)	8 (5.0) ●	60 (3.5)	20 (6.2) ▲	78 (3.1)	23 (6.7) ▲
Hungary	79 (3.4)	-7 (4.7) ●	31 (3.6)	8 (5.0) ●	22 (3.5)	7 (4.7) ●	69 (3.8)	1 (5.5) ●	90 (2.4)	4 (3.6) ●
Iran, Islamic Rep.	55 (4.5)	-4 (7.2) ●	26 (3.7)	r 7 (5.8) ●	31 (4.0)	15 (5.4) ●	23 (3.7)	2 (5.7) ●	71 (3.5)	28 (6.4) ▲
Israel †	74 (3.6)	r 49 (7.7) ▲	34 (4.1)	r -24 (9.6) ●	15 (3.5)	r -59 (7.2) ▼	58 (3.8)	r 14 (9.7) ●	53 (4.0)	r 8 (10.7) ●
Italy	84 (3.5)	3 (4.9) ●	42 (4.5)	3 (6.5) ●	45 (4.1)	19 (5.9) ▲	27 (4.0)	9 (5.2) ●	62 (4.4)	7 (6.4) ●
Japan	82 (3.2)	5 (4.7) ●	62 (4.1)	6 (5.9) ●	41 (4.4)	18 (5.7) ▲	80 (3.0)	9 (5.2) ●	--	--
Korea, Rep. of	65 (3.2)	-11 (4.9) ●	38 (4.0)	-2 (6.2) ●	28 (3.5)	3 (5.2) ●	65 (3.9)	10 (6.0) ●	55 (4.3)	27 (5.6) ▲
Latvia (LSS)	61 (4.6)	r -15 (5.9) ●	17 (3.7)	r -9 (5.9) ●	12 (2.9)	r -14 (5.2) ●	40 (4.3)	-1 (6.4) ●	--	--
Lithuania	73 (4.2)	0 (5.6) ●	23 (3.5)	15 (4.2) ▲	17 (3.4)	5 (4.5) ●	41 (4.3)	-2 (6.2) ●	92 (2.3)	-6 (2.5) ●
Netherlands	--	--	--	--	--	--	--	--	--	--
New Zealand	56 (4.0)	-7 (6.1) ●	10 (2.6)	3 (3.6) ●	10 (2.8)	5 (3.3) ●	17 (3.0)	7 (3.9) ●	67 (3.9)	20 (6.2) ▲
Romania	93 (2.2)	-1 (2.8) ●	30 (4.5)	6 (5.8) ●	27 (4.2)	-13 (6.0) ●	33 (4.2)	11 (5.6) ●	91 (2.4)	3 (3.6) ●
Russian Federation	84 (3.3)	-7 (4.1) ●	11 (2.5)	6 (3.1) ●	13 (2.9)	2 (3.7) ●	40 (3.7)	9 (5.9) ●	88 (2.3)	1 (3.7) ●
Singapore	44 (4.9)	2 (7.0) ●	14 (3.2)	-1 (4.5) ●	15 (3.4)	8 (4.1) ●	29 (3.8)	4 (5.4) ●	51 (4.4)	1 (6.3) ●
Slovak Republic	89 (3.2)	4 (4.6) ●	11 (2.9)	1 (3.9) ●	25 (4.3)	4 (5.5) ●	52 (4.9)	-10 (6.5) ●	87 (3.4)	24 (5.7) ▲
Slovenia	77 (3.3)	r 31 (5.9) ▲	41 (3.6)	r 19 (5.3) ▲	43 (4.0)	r -1 (6.6) ●	82 (3.0)	r 16 (5.4) ▲	84 (2.8)	r 5 (5.2) ●
Thailand †	54 (3.9)	r 23 (6.6) ▲	12 (2.5)	s 8 (3.2) ●	21 (3.4)	s 2 (6.2) ●	25 (3.7)	r 8 (5.9) ●	92 (2.1)	r 5 (4.9) ●
United States	72 (3.1)	r 5 (4.8) ●	24 (2.6)	r 12 (3.8) ▲	19 (2.6)	r 7 (3.7) ●	54 (2.8)	r 17 (5.0) ▲	66 (3.7)	r 8 (5.8) ●
International Avg. §	72 (0.8)	1 (1.2) ●	23 (0.8)	4 (1.1) ▲	21 (0.8)	4 (1.1) ▲	45 (0.8)	7 (1.2) ▲	71 (0.8)	8 (1.2) ▲

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

- ▲ 1999 significantly higher than 1995
- No significant difference between 1995 and 1999
- ▼ 1999 significantly lower than 1995

Significance tests adjusted for multiple comparisons

Background data provided by teachers.

† Countries with unapproved sampling procedures at the classroom level in 1995.

§ International average is for countries that participated and met sampling guidelines in both 1995 and 1999.

Trend notes: Because coverage fell below 65% in 1995 and 1999, Latvia is annotated LSS for Latvian-Speaking Schools only. Lithuania tested later in 1999 than in 1995, at the beginning of the next school year. In 1995, Italy and Israel were unable to cover their International Desired Population; 1999 data are based on their comparable populations.

Background data for Bulgaria and South Africa are unavailable for 1995.

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

A dash (–) indicates data are not available.

An "r" indicates teacher response data available for 70-84% of students, based on the lower response rate in either 1995 or 1999. An "s" indicates teacher response data available for 50-69% of students, based on the lower response rate in either 1995 or 1999.

	Almost Always		Pretty Often		Once in a While		Never	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia	16 (0.7)	512 (5.9)	37 (1.2)	525 (5.3)	38 (1.0)	535 (5.6)	10 (0.7)	515 (9.4)
Belgium (Flemish)	7 (0.7)	531 (13.8)	20 (0.8)	560 (4.4)	47 (1.1)	567 (4.0)	27 (1.1)	552 (4.8)
Bulgaria	11 (0.8)	476 (6.5)	19 (1.6)	516 (6.6)	46 (1.3)	523 (6.6)	24 (1.3)	511 (7.7)
Canada	19 (0.7)	518 (3.6)	33 (0.8)	534 (4.3)	36 (0.9)	536 (2.7)	11 (0.7)	531 (4.6)
Chile	26 (0.7)	400 (4.6)	24 (0.6)	398 (4.7)	29 (0.7)	400 (6.8)	22 (0.8)	374 (5.5)
Chinese Taipei	11 (0.5)	596 (6.2)	31 (0.8)	600 (4.0)	43 (0.8)	590 (4.4)	15 (0.7)	540 (6.5)
Cyprus	16 (1.1)	476 (6.0)	37 (1.0)	491 (2.8)	32 (1.0)	474 (2.9)	15 (0.8)	455 (5.1)
Czech Republic	11 (0.9)	522 (8.1)	36 (1.4)	530 (4.2)	37 (1.5)	519 (5.0)	16 (1.2)	499 (8.3)
England	14 (0.8)	486 (6.3)	41 (1.3)	499 (5.2)	34 (1.0)	505 (4.9)	11 (0.8)	489 (8.2)
Finland	6 (0.7)	510 (8.2)	21 (1.1)	526 (4.2)	57 (1.2)	524 (2.8)	16 (0.9)	507 (5.7)
Hong Kong, SAR	6 (0.3)	573 (8.0)	24 (0.8)	583 (6.5)	56 (0.9)	587 (4.0)	15 (0.7)	570 (6.1)
Hungary	6 (0.5)	495 (8.2)	18 (0.8)	525 (6.3)	49 (1.0)	540 (4.0)	27 (1.2)	531 (5.5)
Indonesia	4 (0.3)	380 (12.6)	15 (0.8)	385 (8.1)	46 (1.2)	424 (5.4)	35 (1.2)	388 (6.1)
Iran, Islamic Rep.	13 (0.5)	406 (8.3)	18 (0.6)	420 (4.9)	38 (0.9)	433 (4.3)	32 (1.0)	422 (4.2)
Israel	22 (1.0)	449 (7.3)	26 (1.0)	466 (5.2)	34 (0.9)	489 (4.9)	18 (0.9)	468 (5.6)
Italy	10 (0.6)	456 (7.7)	19 (0.8)	494 (6.2)	38 (1.0)	489 (4.0)	33 (1.2)	471 (4.5)
Japan	2 (0.2)	~ ~	17 (0.7)	590 (3.5)	55 (0.8)	583 (2.1)	27 (1.0)	564 (3.3)
Jordan	31 (1.1)	419 (5.8)	30 (0.9)	438 (4.6)	28 (0.9)	450 (5.7)	12 (0.6)	426 (6.9)
Korea, Rep. of	3 (0.3)	580 (7.5)	12 (0.6)	602 (3.2)	47 (0.8)	595 (2.3)	37 (0.8)	573 (2.7)
Latvia (LSS)	36 (1.1)	510 (4.2)	34 (0.9)	503 (4.9)	26 (0.8)	505 (5.1)	4 (0.4)	490 (6.9)
Lithuania †	--	--	--	--	--	--	--	--
Macedonia, Rep. of	26 (0.9)	445 (5.9)	31 (1.0)	461 (4.9)	31 (1.1)	451 (4.3)	12 (0.7)	445 (6.6)
Malaysia	6 (0.4)	522 (8.9)	17 (0.7)	522 (5.4)	40 (1.1)	526 (4.9)	37 (1.2)	511 (4.8)
Moldova	14 (1.0)	456 (7.4)	26 (1.3)	468 (5.2)	43 (1.5)	479 (4.7)	17 (0.9)	470 (6.6)
Morocco	25 (0.9)	325 (5.0)	30 (0.7)	340 (8.8)	23 (0.9)	362 (5.3)	22 (1.0)	341 (6.9)
Netherlands	7 (0.6)	544 (10.2)	20 (0.9)	549 (8.5)	49 (1.6)	542 (8.1)	23 (1.5)	530 (8.4)
New Zealand	20 (0.9)	462 (6.8)	39 (1.0)	501 (5.2)	35 (0.9)	504 (5.6)	7 (0.5)	473 (10.0)
Philippines	40 (1.1)	346 (6.3)	25 (0.8)	351 (8.2)	25 (0.7)	350 (7.1)	10 (0.5)	335 (8.9)
Romania	13 (0.8)	451 (7.7)	18 (0.9)	473 (6.1)	46 (1.3)	487 (5.8)	23 (1.0)	470 (7.7)
Russian Federation	14 (0.8)	506 (6.7)	23 (1.2)	538 (8.3)	46 (1.4)	533 (6.0)	17 (0.9)	521 (6.3)
Singapore	16 (0.8)	578 (7.8)	34 (0.9)	606 (6.9)	36 (1.1)	617 (6.3)	14 (0.8)	599 (6.1)
Slovak Republic	13 (0.7)	528 (5.5)	35 (1.3)	542 (4.4)	41 (1.1)	535 (4.4)	11 (0.8)	514 (6.2)
Slovenia	11 (0.8)	514 (6.7)	24 (1.1)	537 (4.3)	52 (1.2)	535 (3.2)	13 (0.8)	518 (5.8)
South Africa	36 (1.0)	261 (5.6)	24 (0.9)	281 (10.3)	18 (0.7)	307 (11.0)	21 (1.3)	270 (9.6)
Thailand	8 (0.4)	463 (8.7)	24 (0.9)	476 (6.5)	45 (0.9)	474 (5.0)	24 (1.0)	450 (5.5)
Tunisia	17 (0.7)	444 (3.2)	22 (0.7)	452 (4.6)	37 (0.9)	451 (3.5)	24 (0.8)	443 (2.5)
Turkey	11 (0.6)	419 (5.7)	15 (0.6)	442 (5.2)	45 (0.9)	437 (5.2)	29 (1.1)	425 (4.9)
United States	23 (0.9)	489 (5.1)	31 (0.8)	509 (3.8)	34 (0.7)	515 (4.1)	12 (0.7)	493 (6.8)
International Avg.	15 (0.1)	474 (1.4)	26 (0.2)	493 (0.9)	39 (0.2)	497 (0.9)	19 (0.2)	478 (1.0)

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

Background data provided by students.

† Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

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

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

An "r" indicates a 70-84% student response rate.

Exhibit R3.12 Students' Reports on Frequency of Calculator Use in Mathematics Class*

	Almost Always		Pretty Often		Once in a While		Never	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia	51 (2.0)	531 (5.7)	36 (1.4)	525 (5.5)	9 (1.0)	508 (10.4)	3 (1.2)	488 (25.9)
Belgium (Flemish)	16 (1.3)	553 (6.4)	30 (1.6)	567 (6.0)	49 (2.1)	560 (4.5)	5 (1.2)	528 (11.4)
Bulgaria	5 (0.6)	486 (14.2)	7 (0.8)	505 (10.4)	35 (2.0)	520 (6.2)	52 (2.3)	512 (7.3)
Canada	44 (1.9)	532 (3.2)	35 (1.2)	535 (3.0)	17 (1.5)	523 (4.1)	3 (0.9)	523 (14.8)
Chile	14 (1.3)	387 (8.1)	12 (0.8)	395 (7.8)	30 (1.3)	401 (5.8)	43 (2.2)	390 (5.2)
Chinese Taipei	2 (0.2)	~ ~	7 (0.4)	543 (7.9)	45 (1.0)	591 (4.0)	46 (1.1)	591 (5.0)
Cyprus	6 (0.6)	453 (8.2)	18 (1.0)	472 (4.8)	41 (1.1)	484 (3.1)	35 (1.8)	478 (3.0)
Czech Republic	14 (2.1)	520 (7.5)	27 (1.7)	530 (6.8)	48 (2.5)	518 (4.6)	12 (2.0)	507 (8.0)
England	30 (1.6)	518 (6.5)	53 (1.4)	500 (4.3)	16 (1.1)	460 (5.9)	1 (0.3)	~ ~
Finland	19 (2.1)	520 (6.0)	32 (1.6)	519 (3.4)	46 (2.5)	523 (3.2)	2 (0.6)	~ ~
Hong Kong, SAR	26 (1.4)	591 (5.0)	51 (1.0)	582 (4.5)	21 (1.4)	575 (5.2)	2 (0.5)	~ ~
Hungary	13 (1.2)	538 (7.5)	22 (1.4)	536 (7.7)	39 (2.0)	535 (4.5)	27 (2.5)	522 (6.3)
Indonesia	2 (0.3)	~ ~	11 (1.0)	395 (7.9)	46 (1.8)	423 (5.8)	41 (2.4)	385 (6.3)
Iran, Islamic Rep.	5 (0.3)	385 (11.0)	6 (0.4)	420 (8.6)	21 (1.0)	432 (4.5)	68 (1.3)	424 (3.8)
Israel	45 (1.8)	463 (4.9)	25 (0.9)	481 (5.0)	22 (1.2)	480 (6.6)	8 (1.0)	453 (14.8)
Italy	35 (1.9)	485 (4.4)	22 (0.9)	483 (5.3)	26 (1.5)	477 (5.6)	16 (1.7)	473 (7.6)
Japan	0 (0.1)	~ ~	3 (0.4)	545 (8.2)	28 (2.1)	580 (3.7)	68 (2.3)	580 (2.4)
Jordan	12 (0.8)	380 (5.9)	16 (0.8)	410 (6.5)	29 (1.1)	445 (4.5)	43 (1.8)	450 (4.5)
Korea, Rep. of	0 (0.1)	~ ~	1 (0.2)	~ ~	13 (0.5)	574 (5.1)	86 (0.7)	590 (2.3)
Latvia (LSS)	9 (1.2)	501 (7.4)	14 (1.2)	515 (7.8)	39 (1.8)	502 (4.8)	38 (2.5)	506 (3.8)
Lithuania †	--	--	--	--	--	--	--	--
Macedonia, Rep. of	13 (1.0)	436 (7.1)	15 (1.1)	461 (6.4)	33 (1.5)	457 (5.2)	40 (2.2)	454 (4.3)
Malaysia	1 (0.2)	~ ~	4 (0.5)	515 (14.6)	23 (1.2)	522 (5.6)	72 (1.6)	520 (4.6)
Moldova	13 (0.8)	469 (7.3)	19 (1.0)	470 (5.4)	38 (1.3)	475 (4.7)	29 (1.8)	468 (6.4)
Morocco ^r	14 (0.9)	312 (9.7)	23 (1.0)	328 (6.3)	21 (0.8)	345 (8.2)	42 (1.2)	355 (3.8)
Netherlands	67 (2.0)	547 (6.5)	29 (1.6)	533 (9.5)	4 (0.6)	494 (16.4)	0 (0.1)	~ ~
New Zealand	43 (1.8)	492 (6.6)	38 (1.5)	493 (4.8)	16 (1.6)	494 (9.4)	3 (0.9)	499 (27.5)
Philippines	9 (0.6)	297 (7.4)	14 (0.7)	324 (8.4)	28 (1.1)	354 (7.6)	49 (1.6)	359 (6.1)
Romania	4 (0.5)	422 (12.4)	6 (0.6)	456 (11.8)	23 (1.5)	483 (7.6)	67 (2.0)	479 (5.5)
Russian Federation	16 (1.2)	508 (8.7)	19 (1.0)	528 (8.4)	47 (1.3)	533 (6.3)	18 (1.7)	532 (7.6)
Singapore	36 (1.5)	610 (7.4)	50 (1.0)	610 (6.1)	14 (1.2)	572 (6.5)	1 (0.2)	~ ~
Slovak Republic	21 (1.7)	540 (6.7)	26 (1.4)	544 (6.0)	40 (2.2)	526 (4.3)	14 (1.8)	531 (7.8)
Slovenia	6 (0.8)	506 (11.1)	11 (1.0)	520 (6.4)	42 (1.9)	532 (4.1)	41 (2.6)	536 (3.3)
South Africa	45 (1.8)	261 (7.9)	21 (0.9)	296 (10.6)	15 (1.0)	306 (15.5)	19 (1.4)	268 (13.4)
Thailand	3 (0.4)	451 (16.0)	7 (0.5)	467 (9.6)	35 (1.1)	482 (6.1)	55 (1.6)	460 (5.2)
Tunisia	5 (0.4)	425 (6.0)	7 (0.4)	433 (6.3)	28 (1.2)	447 (3.1)	60 (1.5)	453 (2.9)
Turkey	5 (0.3)	385 (9.2)	5 (0.4)	404 (7.6)	27 (1.1)	432 (5.9)	63 (1.4)	439 (4.3)
United States	42 (2.3)	516 (5.1)	28 (1.1)	506 (4.6)	22 (1.5)	493 (4.8)	8 (1.2)	471 (7.4)
International Avg.	19 (0.2)	469 (2.0)	20 (0.2)	482 (1.1)	29 (0.2)	488 (1.2)	32 (0.3)	476 (2.2)

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

Background data provided by students.

* The use of calculators on TIMSS was not allowed in 1995 or in 1999.

† Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

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

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

An "r" indicates a 70-84% student response rate.

	Almost Always		Pretty Often		Once in a While		Never	
	Percent of Students 1999	1995-1999 Difference	Percent of Students 1999	1995-1999 Difference	Percent of Students 1999	1995-1999 Difference	Percent of Students 1999	1995-1999 Difference
Australia	51 (2.0)	-3 (2.7) ●	36 (1.4)	5 (1.8) ●	9 (1.0)	-1 (1.3) ●	3 (1.2)	-1 (1.6) ●
Belgium (Flemish)	16 (1.3)	6 (2.1) ●	30 (1.6)	10 (3.0) ▲	49 (2.1)	13 (3.2) ▲	5 (1.2)	-29 (4.3) ▼
Canada	44 (1.9)	6 (2.9) ●	35 (1.2)	2 (1.7) ●	17 (1.5)	-5 (2.1) ●	3 (0.9)	-3 (1.5) ●
Cyprus	6 (0.6)	-4 (1.1) ▼	18 (1.0)	-3 (1.4) ●	41 (1.1)	2 (1.7) ●	35 (1.8)	5 (2.7) ●
Czech Republic	14 (2.1)	-11 (2.8) ▼	27 (1.7)	-10 (2.7) ▼	48 (2.5)	14 (3.5) ▲	12 (2.0)	7 (2.3) ●
England	30 (1.6)	-16 (2.4) ▼	53 (1.4)	7 (2.1) ▲	16 (1.1)	7 (1.4) ▲	1 (0.3)	1 (0.3) ●
Hong Kong, SAR	26 (1.4)	-23 (2.8) ▼	51 (1.0)	18 (2.1) ▲	21 (1.4)	12 (1.8) ▲	2 (0.5)	-7 (2.3) ●
Hungary	13 (1.2)	-4 (1.8) ●	22 (1.4)	-2 (1.9) ●	39 (2.0)	0 (2.8) ●	27 (2.5)	6 (3.3) ●
Iran, Islamic Rep.	5 (0.3)	1 (0.6) ●	6 (0.4)	2 (0.6) ▲	21 (1.0)	8 (1.4) ▲	68 (1.3)	-11 (1.9) ▼
Israel †	48 (2.0)	3 (3.9) ●	25 (1.0)	-2 (1.9) ●	21 (1.4)	-1 (2.6) ●	7 (1.1)	0 (2.1) ●
Italy	37 (2.2)	7 (3.2) ●	23 (1.1)	-1 (2.0) ●	25 (1.7)	0 (2.7) ●	16 (2.2)	-6 (4.1) ●
Japan	0 (0.1)	0 (0.1) ●	3 (0.4)	0 (0.8) ●	28 (2.1)	7 (2.8) ●	68 (2.3)	-7 (3.3) ●
Korea, Rep. of	0 (0.1)	-1 (0.2) ●	1 (0.2)	0 (0.4) ●	13 (0.5)	7 (0.7) ▲	86 (0.7)	-7 (0.8) ▼
Latvia (LSS)	9 (1.2)	-14 (2.3) ▼	14 (1.2)	-21 (1.8) ▼	39 (1.8)	12 (2.3) ▲	38 (2.5)	24 (2.8) ▲
Lithuania	--	--	--	--	--	--	--	--
Netherlands	67 (2.0)	13 (2.9) ▲	29 (1.6)	-7 (2.3) ●	4 (0.6)	-5 (1.4) ▼	0 (0.1)	-1 (0.2) ●
New Zealand	43 (1.8)	8 (2.7) ●	38 (1.5)	0 (2.0) ●	16 (1.6)	-5 (2.3) ●	3 (0.9)	-3 (1.4) ●
Romania	4 (0.5)	-5 (0.9) ▼	6 (0.6)	-3 (0.8) ▼	23 (1.5)	-2 (2.0) ●	67 (2.0)	10 (2.6) ▲
Russian Federation	16 (1.2)	-13 (2.0) ▼	19 (1.0)	-6 (1.9) ●	47 (1.3)	10 (2.7) ▲	18 (1.7)	9 (2.2) ▲
Singapore	36 (1.5)	7 (2.3) ▲	50 (1.0)	-4 (1.6) ●	14 (1.2)	-3 (1.9) ●	1 (0.2)	0 (0.5) ●
Slovak Republic	21 (1.7)	-14 (2.5) ▼	26 (1.4)	-12 (2.0) ▼	40 (2.2)	15 (2.8) ▲	14 (1.8)	10 (1.9) ▲
Slovenia	6 (0.8)	-1 (1.1) ●	11 (1.0)	1 (1.4) ●	42 (1.9)	3 (2.9) ●	41 (2.6)	-3 (4.0) ●
Thailand †	3 (0.4)	1 (0.5) ●	7 (0.5)	2 (1.0) ●	35 (1.1)	2 (2.0) ●	55 (1.6)	-4 (2.7) ●
United States	42 (2.3)	-3 (3.5) ●	28 (1.1)	3 (1.6) ●	22 (1.5)	2 (2.2) ●	8 (1.2)	-2 (2.0) ●
International Avg. §	23 (0.3)	-3 (0.5) ▼	25 (0.3)	-1 (0.4) ●	27 (0.3)	4 (0.5) ▲	25 (0.4)	0 (0.5) ●

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

▲	1999 significantly higher than 1995
●	No significant difference between 1995 and 1999
▼	1999 significantly lower than 1995
Significance tests adjusted for multiple comparisons	

Background data provided by students.

* The use of calculators on TIMSS was not allowed in 1995 or in 1999.

† Countries with unapproved sampling procedures at the classroom level in 1995.

§ International average is for countries that participated and met sampling guidelines in both 1995 and 1999.

Trend notes: Because coverage fell below 65% in 1995 and 1999, Latvia is annotated LSS for Latvian-Speaking Schools only. Lithuania tested later in 1999 than in 1995, at the beginning of the next school year. In 1995, Italy and Israel were unable to cover their International Desired Population; 1999 data are based on their comparable populations.

Background data for Bulgaria and South Africa are unavailable for 1995.

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

A dash (-) indicates data are not available.

Exhibit R3.14 Ways in Which Calculators Are Used*

	Percentage of Students					
	Never or Hardly Ever Use Calculators	Ways in Which Students Use Calculators At Least Once or Twice a Week				
		Checking Answers	Tests and Exams	Routine Computations	Solving Complex Problems	Exploring Number Concepts
Australia	6 (2.1)	81 (4.0)	61 (4.0)	88 (3.0)	81 (3.3)	57 (4.7)
Belgium (Flemish)	7 (2.5)	55 (4.6)	34 (3.5)	45 (4.7)	53 (4.5)	27 (4.0)
Bulgaria	25 (3.9)	30 (4.3)	10 (2.9)	43 (5.6)	33 (5.2)	20 (5.5)
Canada	3 (1.0)	82 (2.3)	58 (2.9)	r 80 (2.8)	91 (1.8)	r 69 (3.0)
Chile	32 (3.2)	35 (3.0)	9 (2.1)	41 (3.3)	33 (3.4)	24 (2.9)
Chinese Taipei	55 (4.6)	5 (1.7)	2 (1.0)	r 9 (2.5)	r 9 (2.5)	r 8 (2.3)
Cyprus	30 (4.1)	r 44 (4.8)	r 1 (0.1)	r 43 (4.4)	r 28 (4.9)	r 14 (3.3)
Czech Republic	5 (2.3)	60 (4.9)	18 (3.6)	49 (4.9)	60 (5.0)	22 (4.6)
England	0 (0.4)	s 74 (3.6)	s 32 (3.4)	s 76 (3.0)	s 72 (3.8)	s 41 (4.1)
Finland	8 (2.3)	56 (4.3)	23 (3.8)	65 (4.5)	68 (4.1)	32 (4.1)
Hong Kong, SAR	1 (0.9)	85 (2.8)	58 (4.2)	88 (2.8)	74 (3.6)	39 (3.9)
Hungary	20 (3.1)	53 (3.5)	13 (2.8)	34 (3.7)	49 (3.9)	15 (2.9)
Indonesia	37 (4.8)	11 (2.7)	6 (2.2)	12 (3.1)	27 (4.3)	17 (2.9)
Iran, Islamic Rep.	59 (4.5)	9 (2.5)	2 (1.1)	13 (4.1)	5 (2.1)	8 (2.2)
Israel	3 (0.7)	78 (3.2)	69 (3.6)	80 (2.9)	r 66 (3.6)	r 44 (3.4)
Italy	13 (2.1)	66 (2.8)	14 (2.8)	58 (3.2)	68 (3.4)	21 (3.3)
Japan	81 (3.3)	0 (0.0)	1 (0.7)	5 (2.0)	4 (1.7)	1 (1.0)
Jordan	38 (4.4)	20 (3.9)	2 (1.1)	21 (3.7)	23 (3.8)	13 (2.8)
Korea, Rep. of	72 (3.4)	1 (0.9)	1 (0.9)	2 (1.2)	5 (1.7)	2 (1.2)
Latvia (LSS)	33 (3.5)	23 (3.5)	2 (1.0)	26 (3.8)	32 (3.9)	12 (2.8)
Lithuania †	8 (2.3)	69 (4.1)	15 (3.2)	56 (4.2)	70 (3.9)	32 (4.0)
Macedonia, Rep. of	49 (4.0)	32 (4.0)	1 (0.8)	31 (4.2)	24 (3.2)	15 (2.6)
Malaysia	67 (4.4)	9 (2.4)	0 (0.0)	7 (2.0)	11 (2.4)	4 (1.5)
Moldova	21 (3.3)	59 (4.1)	11 (3.0)	48 (4.0)	45 (3.9)	21 (3.4)
Morocco	30 (2.7)	29 (2.4)	8 (1.5)	40 (2.7)	18 (2.9)	20 (2.9)
Netherlands	1 (0.1)	91 (2.9)	68 (5.4)	97 (1.8)	90 (3.0)	65 (6.3)
New Zealand	5 (2.1)	76 (3.7)	46 (4.2)	85 (3.2)	73 (3.6)	59 (4.1)
Philippines	56 (4.1)	17 (2.7)	7 (2.2)	10 (2.8)	15 (3.1)	10 (2.2)
Romania	64 (4.4)	16 (3.1)	1 (0.0)	17 (3.5)	6 (1.9)	5 (2.1)
Russian Federation	14 (2.7)	58 (3.9)	3 (1.3)	47 (4.4)	46 (3.8)	15 (3.0)
Singapore	0 (0.0)	88 (3.0)	61 (4.5)	85 (3.5)	93 (2.5)	67 (3.9)
Slovak Republic	3 (1.7)	61 (4.3)	15 (3.5)	57 (4.5)	72 (4.6)	55 (4.7)
Slovenia	31 (4.2)	26 (4.0)	4 (1.8)	23 (3.7)	23 (3.6)	7 (2.0)
South Africa	18 (2.9)	53 (3.9)	41 (4.5)	46 (4.2)	53 (4.0)	52 (3.3)
Thailand	62 (4.1)	11 (2.0)	1 (0.9)	13 (2.9)	13 (2.6)	9 (2.4)
Tunisia	36 (3.9)	20 (3.3)	3 (1.6)	15 (3.0)	5 (1.7)	7 (1.9)
Turkey	59 (4.8)	15 (2.8)	3 (1.1)	12 (2.6)	17 (2.9)	10 (2.4)
United States	5 (1.2)	69 (3.5)	45 (3.2)	62 (3.9)	75 (3.2)	59 (3.2)
International Avg.	28 (0.5)	44 (0.6)	20 (0.4)	43 (0.6)	43 (0.6)	26 (0.5)

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

Background data provided by teachers.

* The use of calculators on TIMSS was not allowed in 1995 or in 1999.

† Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

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

An "r" indicates teacher response data available for 70-84% of students. An "s" indicates teacher response data available for 50-69% of students.

Exhibit R3.15 Amount of Mathematics Homework

	Percentage of Students Taught By Teachers						
	Assigning Homework Three Times A Week or More Often		Assigning Homework Once or Twice A Week		Assigning Homework Less Than Once a Week		Never Assigning Homework
	30 Minutes or Less	More Than 30 Minutes	30 Minutes or Less	More Than 30 Minutes	30 Minutes or Less	More Than 30 Minutes	
Australia	60 (3.9)	6 (2.0)	25 (3.6)	6 (2.0)	2 (1.1)	1 (0.9)	1 (0.6)
Belgium (Flemish)	15 (2.7)	2 (0.9)	48 (4.9)	9 (2.0)	18 (3.3)	3 (1.2)	5 (3.2)
Bulgaria	31 (4.5)	44 (5.6)	16 (3.5)	6 (1.7)	1 (0.6)	1 (0.5)	1 (1.0)
Canada	58 (3.5)	16 (2.6)	22 (2.8)	3 (1.5)	1 (0.7)	0 (0.0)	0 (0.0)
Chile	16 (2.6)	7 (2.2)	39 (3.9)	13 (2.8)	19 (2.9)	2 (1.0)	4 (1.7)
Chinese Taipei	21 (3.1)	25 (3.6)	27 (3.4)	23 (3.4)	2 (1.1)	2 (1.1)	0 (0.0)
Cyprus	55 (5.1)	44 (4.9)	2 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Czech Republic	15 (3.7)	0 (0.2)	69 (5.1)	2 (1.3)	13 (3.8)	0 (0.0)	0 (0.0)
England	3 (1.4)	1 (0.6)	48 (3.9)	46 (4.1)	2 (0.8)	1 (0.3)	0 (0.0)
Finland	79 (3.0)	9 (2.3)	11 (2.2)	1 (0.8)	0 (0.0)	0 (0.0)	0 (0.0)
Hong Kong, SAR	30 (4.0)	19 (3.1)	26 (3.1)	23 (3.7)	2 (1.2)	1 (0.0)	0 (0.0)
Hungary	81 (2.9)	17 (3.0)	2 (1.0)	1 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Indonesia	23 (4.1)	36 (4.2)	15 (3.2)	25 (4.2)	0 (0.0)	1 (0.8)	0 (0.0)
Iran, Islamic Rep. ^s	2 (1.5)	23 (4.0)	6 (1.9)	67 (4.5)	1 (0.0)	2 (0.9)	0 (0.0)
Israel	35 (3.6)	53 (3.4)	6 (1.8)	2 (1.0)	1 (0.5)	1 (0.3)	1 (0.9)
Italy	15 (2.6)	68 (3.8)	5 (1.7)	12 (2.5)	0 (0.0)	0 (0.0)	0 (0.0)
Japan	14 (2.7)	3 (1.4)	27 (4.0)	8 (2.1)	34 (4.3)	6 (2.0)	9 (2.3)
Jordan	61 (4.0)	28 (3.7)	8 (2.4)	4 (1.2)	0 (0.0)	0 (0.0)	0 (0.0)
Korea, Rep. of	24 (3.3)	9 (2.3)	29 (3.4)	15 (2.7)	14 (2.6)	6 (2.0)	2 (0.7)
Latvia (LSS)	70 (3.9)	20 (3.7)	7 (2.5)	1 (0.9)	2 (1.4)	0 (0.0)	0 (0.0)
Lithuania [†]	73 (4.0)	24 (3.6)	2 (1.5)	1 (0.6)	0 (0.0)	0 (0.0)	0 (0.0)
Macedonia, Rep. of	44 (4.3)	36 (4.4)	16 (3.1)	4 (1.7)	1 (0.6)	0 (0.0)	0 (0.0)
Malaysia	24 (3.5)	66 (3.9)	3 (1.5)	6 (2.0)	1 (0.0)	0 (0.0)	0 (0.0)
Moldova	38 (4.3)	54 (4.2)	2 (1.2)	4 (2.1)	0 (0.0)	2 (1.3)	0 (0.0)
Morocco	21 (2.6)	11 (1.9)	8 (1.5)	9 (2.1)	11 (1.8)	40 (3.5)	1 (0.4)
Netherlands	73 (4.4)	9 (2.6)	13 (3.3)	3 (1.3)	1 (0.6)	0 (0.0)	1 (0.6)
New Zealand	58 (3.9)	2 (1.4)	32 (3.5)	3 (1.2)	2 (1.1)	0 (0.0)	1 (0.8)
Philippines	74 (3.2)	14 (3.0)	10 (2.6)	0 (0.0)	2 (1.1)	0 (0.0)	0 (0.0)
Romania	21 (3.7)	73 (3.9)	1 (1.0)	4 (1.2)	0 (0.0)	1 (0.5)	0 (0.0)
Russian Federation	42 (4.5)	57 (4.6)	0 (0.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Singapore	26 (4.2)	54 (4.3)	8 (2.1)	12 (2.4)	0 (0.0)	0 (0.0)	0 (0.0)
Slovak Republic	81 (3.5)	2 (1.5)	12 (3.2)	1 (0.0)	3 (1.8)	0 (0.0)	1 (0.0)
Slovenia	79 (3.1)	17 (2.8)	3 (1.5)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
South Africa	64 (4.1)	22 (3.2)	10 (2.6)	4 (1.4)	0 (0.0)	0 (0.0)	0 (0.0)
Thailand	23 (3.6)	57 (4.4)	4 (1.5)	16 (3.3)	0 (0.0)	0 (0.0)	0 (0.0)
Tunisia	35 (4.2)	24 (3.9)	3 (1.2)	8 (2.3)	3 (1.5)	26 (3.6)	2 (1.3)
Turkey	10 (2.4)	12 (2.4)	35 (4.1)	39 (4.3)	4 (1.4)	0 (0.3)	0 (0.0)
United States	63 (2.8)	27 (2.4)	7 (1.6)	1 (0.6)	1 (0.7)	0 (0.0)	1 (0.7)
International Avg.	41 (0.6)	26 (0.5)	16 (0.5)	10 (0.4)	4 (0.2)	2 (0.2)	1 (0.1)

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

Background data provided by teachers.

[†] Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

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

An "s" indicates teacher response data available for 50-69% of students.

	Sometimes or Always		Never or Rarely	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia	27 (4.1)	526 (7.2)	73 (4.1)	527 (6.1)
Belgium (Flemish)	3 (1.1)	567 (19.0)	97 (1.1)	567 (3.9)
Bulgaria	7 (2.1)	544 (28.1)	93 (2.1)	510 (6.4)
Canada	24 (2.9)	531 (4.9)	76 (2.9)	535 (3.4)
Chile	28 (3.6)	397 (8.0)	72 (3.6)	390 (5.5)
Chinese Taipei	4 (1.6)	577 (22.9)	96 (1.6)	585 (4.1)
Cyprus	16 (3.7)	488 (5.6)	84 (3.7)	475 (2.3)
Czech Republic	3 (1.7)	537 (9.7)	97 (1.7)	520 (4.6)
England	14 (2.5)	518 (9.1)	86 (2.5)	509 (5.6)
Finland	10 (2.6)	542 (10.7)	90 (2.6)	518 (2.6)
Hong Kong, SAR	3 (1.4)	636 (14.9)	97 (1.4)	581 (4.4)
Hungary	5 (1.8)	509 (8.4)	95 (1.8)	532 (3.9)
Indonesia	23 (3.5)	418 (12.0)	77 (3.5)	399 (6.7)
Iran, Islamic Rep.	10 (2.2)	422 (12.5)	90 (2.2)	422 (3.5)
Israel	18 (3.0)	469 (9.9)	82 (3.0)	469 (5.1)
Italy	30 (3.5)	468 (6.9)	70 (3.5)	484 (4.7)
Japan	1 (0.7)	~ ~	99 (0.7)	579 (1.8)
Jordan	28 (3.9)	423 (7.7)	72 (3.9)	428 (4.6)
Korea, Rep. of	16 (2.9)	586 (5.6)	84 (2.9)	588 (2.3)
Latvia (LSS)	6 (2.0)	525 (20.7)	94 (2.0)	504 (3.6)
Lithuania †	12 (2.8)	503 (11.8)	88 (2.8)	479 (4.9)
Macedonia, Rep. of	13 (3.0)	422 (15.2)	87 (3.0)	450 (4.8)
Malaysia	18 (3.3)	514 (11.1)	82 (3.3)	520 (5.0)
Moldova	29 (4.3)	483 (9.1)	71 (4.3)	462 (4.9)
Morocco	24 (3.0)	344 (7.1)	76 (3.0)	335 (2.7)
Netherlands	10 (5.3)	510 (44.2)	90 (5.3)	540 (6.9)
New Zealand	27 (3.5)	529 (10.0)	73 (3.5)	481 (5.9)
Philippines	46 (4.5)	345 (9.0)	54 (4.5)	343 (8.4)
Romania	24 (4.3)	474 (13.7)	76 (4.3)	473 (7.0)
Russian Federation	34 (3.7)	539 (8.4)	66 (3.7)	520 (6.9)
Singapore	20 (3.6)	616 (14.5)	80 (3.6)	602 (6.8)
Slovak Republic	6 (2.2)	562 (16.5)	94 (2.2)	530 (3.9)
Slovenia	11 (2.8)	526 (10.4)	89 (2.8)	531 (2.7)
South Africa	40 (3.7)	252 (6.6)	60 (3.7)	291 (9.2)
Thailand	43 (3.8)	476 (9.2)	57 (3.8)	461 (6.5)
Tunisia	15 (3.1)	445 (6.3)	85 (3.1)	446 (2.7)
Turkey	27 (3.3)	434 (9.1)	73 (3.3)	426 (4.9)
United States	24 (2.8)	499 (8.3)	76 (2.8)	504 (4.9)
International Avg.	18 (0.5)	491 (2.2)	82 (0.5)	487 (0.8)

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

Background data provided by teachers.

* Based on average response to questions about assigning homework based on small investigation(s) or gathering data, working individually on long term projects or experiments, and working as a small group on long term projects or experiments.

† Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

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

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

An "r" indicates teacher response data available for 70-84% of students. An "s" indicates teacher response data available for 50-69% of students.

	Almost Always		Pretty Often		Once in a While or Never	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement
Australia	18 (1.1)	506 (7.2)	40 (1.1)	531 (5.4)	42 (1.6)	529 (5.8)
Belgium (Flemish)	19 (0.9)	534 (4.1)	56 (1.7)	568 (4.1)	25 (1.6)	558 (8.8)
Bulgaria	10 (0.7)	484 (8.5)	20 (1.5)	532 (10.4)	70 (1.6)	512 (5.0)
Canada	25 (1.6)	516 (3.9)	50 (1.4)	534 (2.9)	25 (1.1)	541 (4.1)
Chile	47 (1.1)	392 (4.2)	32 (0.8)	399 (5.6)	21 (0.9)	389 (6.0)
Chinese Taipei	27 (1.2)	589 (5.1)	46 (1.0)	590 (4.2)	27 (1.5)	576 (6.5)
Cyprus	16 (0.8)	459 (4.9)	65 (1.0)	487 (1.9)	19 (1.0)	461 (4.1)
Czech Republic	7 (1.2)	494 (10.9)	33 (1.7)	522 (4.9)	60 (2.3)	522 (4.5)
England	14 (0.9)	463 (5.6)	46 (1.6)	500 (4.8)	40 (1.9)	507 (5.4)
Finland	9 (0.8)	494 (6.0)	30 (1.2)	515 (3.7)	61 (1.4)	527 (2.8)
Hong Kong, SAR	9 (0.7)	569 (7.3)	37 (1.6)	579 (4.9)	54 (2.2)	587 (5.2)
Hungary	7 (0.5)	508 (8.3)	18 (0.9)	533 (4.6)	75 (1.1)	534 (4.0)
Indonesia	13 (0.7)	415 (6.6)	42 (1.3)	408 (5.6)	45 (1.5)	396 (5.5)
Iran, Islamic Rep.	23 (0.9)	411 (5.1)	27 (0.9)	421 (5.1)	49 (1.3)	430 (3.5)
Israel	23 (0.9)	439 (5.3)	39 (1.0)	473 (4.3)	39 (1.3)	486 (5.5)
Italy	9 (0.8)	452 (8.7)	19 (0.9)	476 (6.3)	72 (1.3)	485 (3.7)
Japan	12 (1.4)	571 (6.1)	30 (1.5)	582 (3.2)	58 (2.1)	579 (2.6)
Jordan	30 (1.1)	427 (5.3)	35 (1.0)	432 (5.6)	35 (1.1)	441 (4.5)
Korea, Rep. of	7 (0.5)	587 (6.9)	18 (0.8)	601 (4.5)	75 (1.2)	584 (1.9)
Latvia (LSS)	3 (0.4)	476 (13.2)	11 (0.8)	502 (7.5)	86 (0.9)	507 (3.6)
Lithuania [†]	--	--	--	--	--	--
Macedonia, Rep. of	17 (0.7)	417 (6.4)	34 (1.1)	463 (4.8)	49 (1.2)	457 (4.8)
Malaysia	12 (0.5)	522 (6.1)	31 (1.0)	527 (5.9)	56 (1.3)	515 (4.5)
Moldova	30 (1.5)	471 (5.4)	40 (1.3)	475 (5.2)	30 (1.2)	464 (4.1)
Morocco	33 (1.5)	333 (4.2)	32 (1.1)	335 (4.6)	35 (1.3)	353 (4.4)
Netherlands	14 (1.5)	510 (10.5)	47 (1.9)	538 (6.7)	39 (1.7)	555 (8.2)
New Zealand	24 (1.6)	466 (7.8)	35 (1.2)	503 (6.1)	41 (1.7)	499 (5.6)
Philippines	44 (1.3)	350 (7.2)	30 (1.0)	360 (6.9)	27 (1.1)	329 (6.4)
Romania	30 (1.3)	467 (6.6)	39 (1.3)	486 (6.4)	30 (1.5)	474 (7.5)
Russian Federation	26 (1.1)	517 (6.6)	50 (1.3)	541 (6.5)	24 (1.3)	510 (6.5)
Singapore	19 (0.9)	597 (8.3)	45 (1.0)	609 (6.5)	36 (1.4)	602 (6.4)
Slovak Republic	8 (0.7)	496 (7.2)	49 (1.6)	540 (4.3)	43 (1.7)	535 (4.3)
Slovenia	26 (1.1)	508 (4.0)	47 (1.1)	536 (3.3)	27 (1.3)	544 (4.6)
South Africa	42 (1.6)	261 (6.6)	31 (1.0)	287 (11.0)	27 (1.1)	287 (10.0)
Thailand	32 (1.2)	464 (5.8)	33 (0.7)	467 (5.1)	36 (1.1)	472 (6.5)
Tunisia	55 (1.1)	449 (2.9)	36 (0.9)	449 (3.1)	9 (0.6)	441 (5.0)
Turkey	13 (0.7)	411 (7.2)	11 (0.6)	423 (7.2)	76 (1.0)	437 (4.2)
United States	40 (1.6)	491 (3.7)	46 (1.3)	520 (4.3)	14 (0.9)	493 (6.1)
International Avg.	21 (0.2)	473 (1.2)	36 (0.2)	493 (0.9)	43 (0.2)	490 (0.9)

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

Background data provided by students.

[†] Lithuania tested the same cohort of students as other countries, but later in 1999, at the beginning of the next school year.

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

A dash (–) indicates data are not available.

An "*" indicates a 70-84% student response rate.

