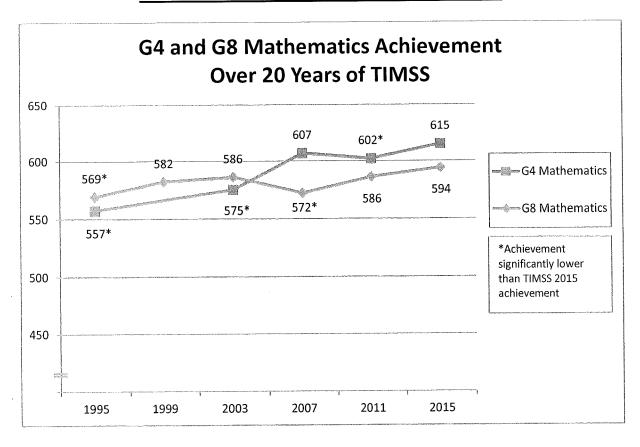
Grade 4 & Grade 8 - Mathematics



Grade 4 & Grade 8 - Science

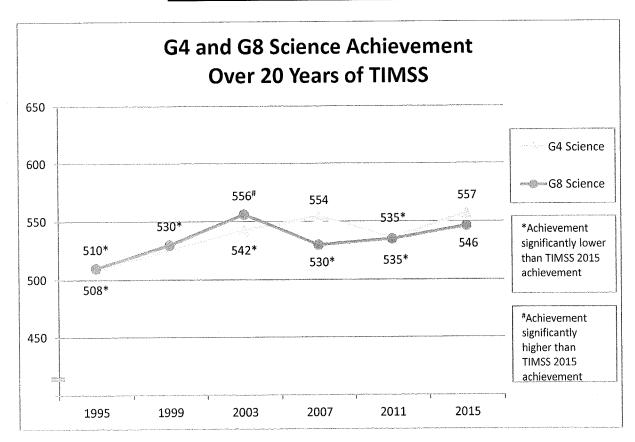
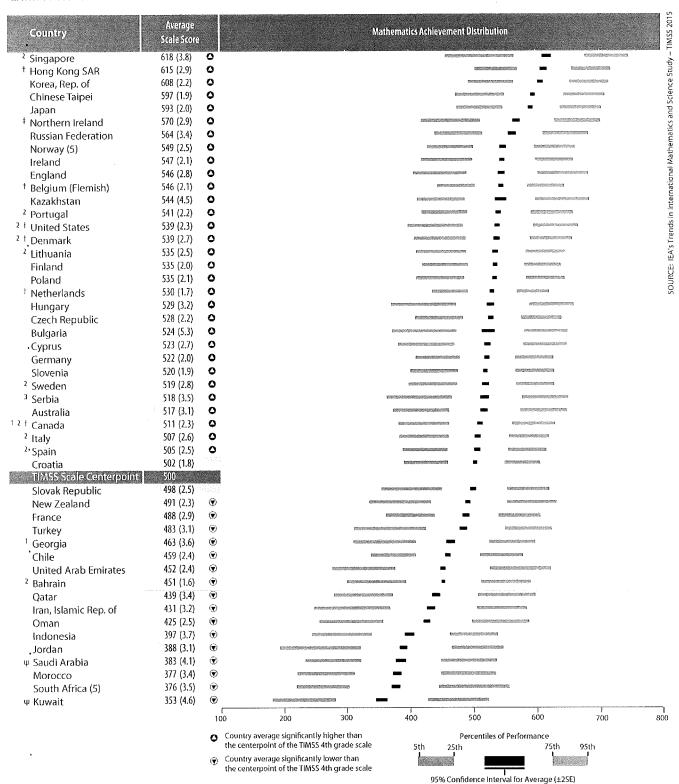






Exhibit 1.1: Distribution of Mathematics Achievement



Note: Seven countries and 1 benchmarking entity participated in the TIMSS Numeracy assessment: Bahrain, Indonesia, Iran, Jordan, Kuwait, Morocco, and South Africa as well as Buenos Aires. Except for Jordan and South Africa, they also participated in the TIMSS fourth grade assessment and their mathematics achievement results are based on an average of both assessments.

The TIMSS achievement scale was established in 1995 based on the combined achievement distribution of all countries that participated in TIMSS 1995. To provide a point of reference for country comparisons, the scale centerpoint of 500 was located at the mean of the combined achievement distribution. The units of the scale were chosen so that 100 scale score points corresponded to the standard deviation of the distribution.

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%. See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 for sampling guidelines and sampling participation notes †, ‡, and ‡.

⁽⁾ Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

Exhibit 1.1: Distribution of Mathematics Achievement (Continued)

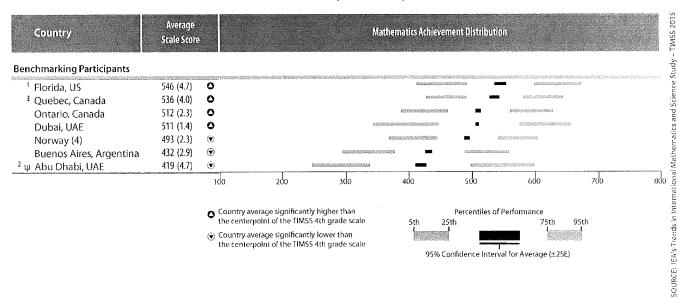
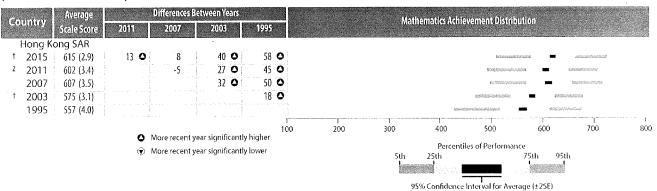




Exhibit 1.7: Differences in Mathematics Achievement Across Assessment Years

Instructions: Read across the row to determine if the performance in the row year is significantly higher () or significantly lower () than the performance in the column year.



Trend results for Kuwait do not include private schools. Trend results for Lithuania do not include students taught in Polish or in Russian.

- Ж Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%. Such annotations in exhibits with trend data began in 2011, so data from assessments prior to 2011 are not annotated for reservations.
- Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%. Such annotations in exhibits with trend data began in 2011, so data from assessments prior to 2011 are not annotated for reservations.

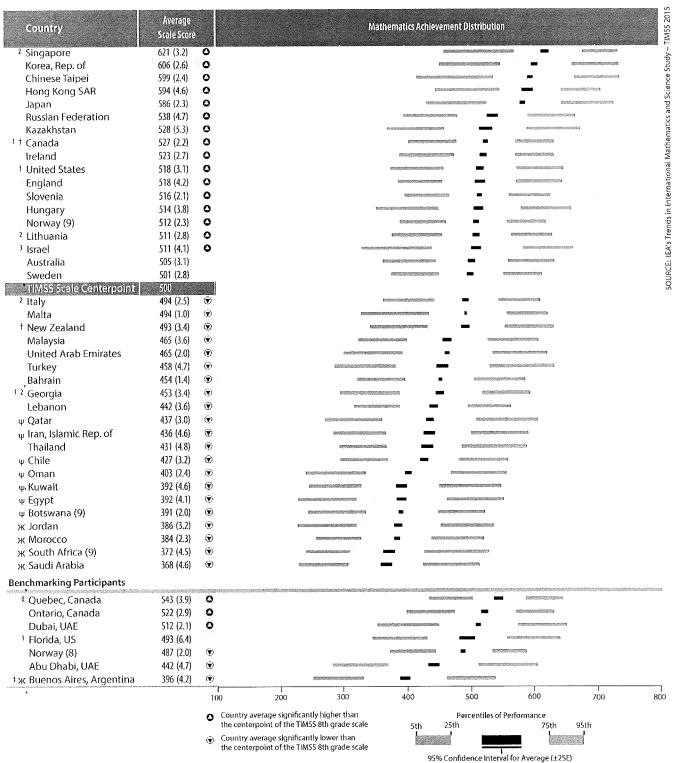
See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 for sampling guidelines and sampling participation notes †, ‡, and ‡.

** Tested the same cohort of students as other countries, but later to the assumption of the same cohort of students as other countries.

- Tested the same cohort of students as other countries, but later in the assessment year at the beginning of the next school year.
- () Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.



Exhibit 1.2: Distribution of Mathematics Achievement



The TIMSS achievement scale was established in 1995 based on the combined achievement distribution of all countries that participated in TIMSS 1995. To provide a point of reference for country comparisons, the scale centerpoint of 500 was located at the mean of the combined achievement distribution. The units of the scale were chosen so that 100 scale score points corresponded to the standard deviation of the distribution.

 $^{\,\%\,}$ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.

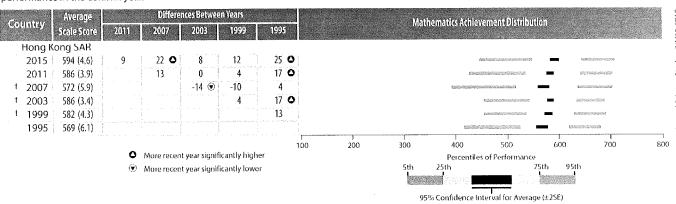
Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%. See Appendix C.2 for target population coverage notes 1, 2, and 3. See Appendix C.8 for sampling guidelines and sampling participation notes †, ‡, and ‡.

⁽⁾ Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.



Exhibit 1.8: Differences in Mathematics Achievement Across Assessment Years

Instructions: Read across the row to determine if the performance in the row year is significantly higher (**②**) or significantly lower (**②**) than the performance in the column year.



Trend results for Kuwait do not include private schools, Trend results for Lithuania do not include students taught in Polish or in Russian. South Africa (9) tested one year later.

See Appendix C.2 for target population coverage notes 1, 2, and 3. See Appendix C.8 for sampling guidelines and sampling participation notes 🕴 and 🕏

- •• Tested the same cohort of students as other countries, but later in the assessment year at the beginning of the next school year.
- () Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

^{**} Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%. Such annotations in exhibits with trend data began in 2011, so data from assessments prior to 2011 are not annotated for reservations.

Programmer Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%. Such annotations in exhibits with trend data began in 2011, so data from assessments prior to 2011 are not annotated for reservations.

SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

Exhibit 2.2: Performance at the International Benchmarks of

Mathematics Achieven	nent										
•					Advance	d l			and the state of the state of		210
		Percentages of !	Students Re	achino	O High		Advanced	High	Intermediate	low	TIMES 201
Country		Internation			Intermed	liate	Benchmark	Benchmark	Benchmark	Benchmark	Ž
					O Low		(625)	(550)	(47/5)	(400)	2
² Singapore					0-		50 (2.1)	80 (1.7)	93 (0.9)	99 (0.3)	ybidy a
Hong Kong SAR				V	- 0	- 60	45 (2.0)	84 (1.3)	98 (0.4)	100 (0.1)	5
Korea, Rep. of			. •		. 0	* O	41 (1.3)	81 (1.0)	97 (0.4)	100 (0.1)	, i
Chinese Taipei							35 (1.5)	76 (1.0)	95 (0,4)	100 (0.2)	0
Japan					0		32 (1.1)	74 (1.0)	95 (0.4)	99 (0.1)	27.40
Northern Ireland		• `				· 0	27 (1.3)	61 (1.5)	86 (1.1)	97 (0.6)	2
Russian Federation		•		- 0			20 (1.8)	59 (1.8)	89 (1.1)	98 (0.4)	45
England		•				0	17 (1.2)	49 (1.5)	80 (1.2)	96 (0.7)	-
Kazakhstan		-)		•		O	16 (1.8)	47 (2.6)	80 (1.5)	96 (0.5)	
² † United States						0	14 (0.8)	47 (1.1)	79 (1.0)	95 (0.5)	9
Ireland				0			14 (1.0)	51 (1.6)	84 (1.0)	97 (0.4)	-
Norway (5)				0		· O	14 (1.1)	50 (1.6)	86 (1.0)	98 (0.4)	-
Hungary			o_			-0	13 (0.9)	44 (1.5)	75 (1.5)	92 (0.9)	3
² Portugal		~~~~	o-				12 (0.9)	46 (1.3)	82 (1.1)	97 (0.4)	
² Denmark			-			O	12 (0.9)	46 (1.6)	80 (1.3)	96 (0.6)	<u> 1</u>
³ Serbia			-				10 (0.8)	37 (1.4)	72 (1.6)	91 (1.2)	٥
Bulgaria							10 (1.3)	40 (2.6)	75 (2.1)	92 (1.3)	3
² Lithuania							10 (1.0)	44 (1.5)	81 (1.1)	96 (0.5)	
Poland		•				 0	10 (0.7)	44 (1.4)	80 (1.0)	96 (0.4)	
† Belgium (Flemish)			_		@	-	10 (0.8)	47 (1,5)	88 (0.9)	99 (0.3)	
Cyprus			-0			<u> </u>	10 (0.7)	39 (1.5)	74 (1.3)	93 (0.6)	
Australia			-			-0	9 (0.9)	36 (1.6)	70 (1.3)	91 (0.9)	
Finland	·		· · · · · · · · · · · · · · · · · · ·			0	8 (0.7)	43 (1.3)	82 (1.0)	97 (0.4)	
Czech Republic			-o			o	8 (0.7)	38 (1.4)	78 (1.1)	96 (0.5)	
New Zealand		0					6 (0.5)	26 (0.9)	59 (1.2)	84 (0.9)	
Slovenia		c)			0	6 (0.5)	34 (1.4)	75 (1.2)	95 (0.5)	
12 † Canada		_					6 (0.5)	31 (1.1)	69 (1.2)	92 (0.8)	
Germany						0	5 (0.5)	34 (1.3)	77 (1.1)	96 (0.6)	
² Sweden		•				·- · O	5 (0.5)	34 (1.6)	75 (1.6)	95 (0.8)	
United Arab Emirates					-0		5 (0.4)	18 (0.8)	42 (1.0)	68 (0.9)	
Turkey			- 0-				5 (0.5)	25 (1.2)	57 (1.3)	81 (1.1)	
² Italy				~~		0	4 (0.6)	28 (1.3)	69 (1.4)	93 (0.8)	
Slovak Republic		- 0				-	4 (0.4)	26 (1.1)	65 (1.4)	88 (0.9)	
† Netherlands		•	0	***		0	4 (0.6)	37 (1,3)	83 (1.0)	99 (0.3)	
² Spain		0	O				3 (0.4)	27 (1.1)	67 (1.4)	93 (0.9)	
Croatia		0			-de	- 0	3 (0.4)	24 (1.1)	67 (1.2)	93 (0.6)	
Qatar	·-•o		<i>6</i> %	C		-	3 (0.5)	13 (1.1)	36 (1.4)	65 (1.4)	
France	•			· · · · · · · · · · · · · · · · · · ·	o		2 (0.3)	21 (1.3)	58 (1.8)	87 (1.0)	
¹ Georgia)		792			2 (0.6)	15 (1.4)	47 (1.7)	78 (1.6)	
Oman							2 (0.3)	11 (0,6)	32 (1.1)	60 (1.0)	
² Bahrain	•	-		*	O .		2 (0.2)	13 (0.5)	41 (0.8)	72 (0.8)	
Iran, Islamic Rep. of	•				-		1 (0.3)	11 (0.7)	36 (1.1)	65 (1.4)	
South Africa (5)	• 0		O	~			1 (0.3)	5 (0.7)	17 (1.0)	39 (1.4)	
Chile	• •				O		1 (0.2)	10 (0.7)	42 (1.4)	78 (1.5)	
ψ Saudi Arabia	, ,	2			~		0 (0.2)	3 (0.7)	16 (1.2)	43 (1.7)	
Morocco	• 0		0				0 (0.1)	3 (0.5)	17 (1.1)	41 (1.6)	
Jordan	• 0	\$		0			0 (0.1)	5 (0.6)	21 (1.1)	50 (1.2)	
Indonesia				-O			0 (0.1)	3 (0.4)	20 (1.2)	50 (1.8)	
	• 0 @	-		-			0 (0.1)	3 (0.4)	12 (1.2)	33 (1.7)	
φ Nuwan Intranantional Madage 1	- · · · · · · · · · · · · · · · · · · ·		0			O	6	3(6	12 (1.2)	(9)	South
midal-dicalitical distriction of the file		1	-	T	i						ž
	0	25		50	75	100)				

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%. See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 for sampling guidelines and sampling participation notes †, ‡, and ‡.

⁽⁾ Standard errors appear in parentheses. Because of rounding some results may appear inconsistent,



Exhibit 2.2: Performance at the International Benchmarks of **Mathematics Achievement (Continued)**

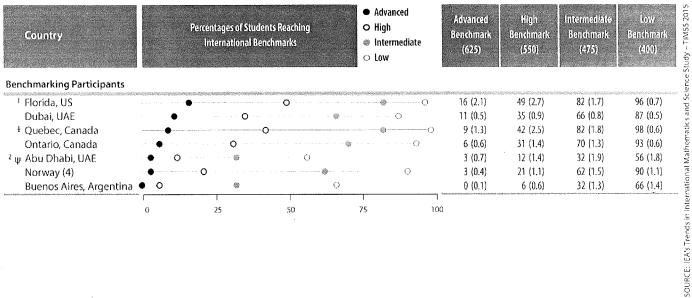




Exhibit 2.9: Performance at the International Benchmarks of Mathematics Achievement

Country	Percentages of Students Rea International Benchmari	ching ks	● Advanced ○ High ◎ Intermediate ○ Low	Advanced Benchmark (625)	High Benchmark (550)	Intermediate Benchmark (475)	Low Benchmark (400)
² Singapore			····•	54 (1.8)	81 (1.5)	94 (0.9)	99 (0.2)
Chinese Taipei	•	· · · · · · · · · · · · · · · · · · ·	O	44 (1.2)	72 (0.9)	88 (0.6)	97 (0.4)
Korea, Rep. of			·	43 (1.4)	75 (1.0)	93 (0.5)	99 (0.2)
Hong Kong SAR		C)()	37 (2.3)	75 (1.9)	92 (1.3)	98 (0.6)
Japan		o	······································	34 (1.2)	67 (1.0)	89 (0.7)	98 (0.3)
Kazakhstan			O	15 (1.7)	41 (2.6)	71 (2.1)	91 (1.1)
Russian Federation			0	14 (1,4)	46 (2.5)	78 (1.9)	95 (0.8)
³ Israel			0	13 (1,0)	38 (1.8)	65 (1.7)	84 (1.2)
Hungary				12 (1.2)	37 (1.7)	67 (1.7)	88 (1.1)
† United States				10 (0.9)	37 (1.5)	70 (1.4)	91 (0.7)
				10 (1.1)	36 (2.4)	69 (2.4)	93 (1.2)
England	• 0	West	. 0	7 (0.6)	39 (1.4)	78 (1.1)	96 (0.5)
1 1 Canada	• • •	·	0	7 (0.8)	30 (1.4)	64 (1.6)	89 (1.0)
Australia			······	7 (0.8)	38 (1.7)	76 (1.3)	94 (0.8)
Ireland		26.	0	6 (0.8)	27 (1.2)	70 (1.5) 58 (1.5)	85 (1.2)
† New Zealand			<u>0</u>	6 (0.9)	20 (1.6)	42 (1.9)	70 (1.6)
Turkey	0						92 (0.8)
² Lithuania	····• · · · · · · · · · · · · · · · · ·		O	6 (0.8)	33 (1.4)	68 (1.4)	
Slovenia	• •		0	6 (0.6)	32 (1.3)	73 (1.2)	95 (0.6)
United Arab Emirates	• • • • • •	. 0		5 (0.4)	20 (0.8)	46 (1.0)	73 (0.7)
Malta	•		O	5 (0.4)	29 (0.7)	62 (0.7)	84 (0.5)
Norway (9)	•		·····	5 (0.5)	30 (1.2)	70 (1.3)	94 (0.5)
Sweden	•		O	3 (0.6)	26 (1.5)	65 (1.6)	91 (1.1)
ψ Qatar	• • • •	<u>:</u> o		3 (0.5)	14 (0.9)	36 (1.2)	63 (1.4)
Malaysia	•	garaga, magagan magagan dan dan dan dan dan dan dan dan dan d	Q	3 (0.4)	18 (1.0)	45 (1.9)	76 (1.9)
² Italy	· • · · · · · · · · · · · · · · · · · ·	<u>:</u>	Q	3 (0.5)	24 (1.3)	62 (1.7)	89 (1.0)
Thailand	• • • • • •	·· · · · · · · · · · · · · · · · · · ·		3 (0.7)	10 (1.5)	29 (2.2)	62 (2.2)
ψ Iran, Islamic Rep. of	•	·····O		2 (0.7)	12 (1.4)	34 (1.9)	63 (1.9)
^{1 2} Georgia	• • •			2 (0.4)	15 (1.2)	42 (1.7)	72 (1.6)
Bahrain		·	>	2 (0.3)	12 (0.6)	39 (0.8)	75 (0.9)
ψ Oman	• • •	·O		1 (0.1)	6 (0.5)	23 (0.9)	52 (1.2)
Ψ Kuwait	• • • • • • • • • • • • • • • • • • • •			1 (0.3)	5 (1.2)	18 (1.9)	45 (1.9)
ψ Chile	• • • • • • • • • • • • • • • • • • • •	o		1 (0.2)	7 (0.8)	28 (1.3)	63 (2.0)
ж South Africa (9)	•0			1 (0.2)	3 (0.8)	13 (1.7)	34 (2.3)
ψ Egypt	• • • • •			0 (0.1)	5 (0.6)	21 (1.4)	47 (1.8)
Lebanon	• • • • • • • • • • • • • • • • • • • •			0 (0.2)	8 (0.8)	35 (1.9)	71 (2.0)
ж Saudi Arabia	•0	:		0 (0.2)	2 (0.7)	11 (1.3)	34 (1.8)
ж Jordan	•0	l .		0 (0.1)	3 (0.4)	18 (1.0)	45 (1.5)
ψ Botswana (9)	•0 •			0 (0.0)	2 (0.2)	16 (0.8)	47 (1.1)
ж Могоссо	◆ ○ * · · · · · · · · · · · · · · · · · ·			0 (0.0)	2 (0.3)	14 (0.7)	41 (1.1)
This is the state of the state		:	0	5 (0.0)	2(0.3)	67	324
	•	•	, O	•	2,0	"	04,
Benchmarking Participants							
Dubai, UAE	• • • • • • • • • • • • • • • • • • •	9 ·	, · · · · -O	10 (0.8)	36 (1.2)	67 (1.0)	88 (0.5)
‡ Quebec, Canada	•			9 (1.1)	47 (2.5)	86 (2.2)	98 (0.7)
¹ Florida, US	•			7 (1.4)	28 (2.7)	57 (3.4)	84 (2.2)
Ontario, Canada	· · · •		·	6 (0.7)	37 (1.7)	75 (1.4)	95 (0.6)
Abu Dhabi, UAE	- -	О		3 (0.7)	14 (1.5)	37 (2.0)	65 (1.9)
Norway (8)	• • • • • • • • • • • • • • • • • • • •		- 0	1 (0.2)	17 (1.0)	59 (1.3)	90 (0.9)
NOIWay (o)	•			1 (0.2)	,	()	- " (""-)

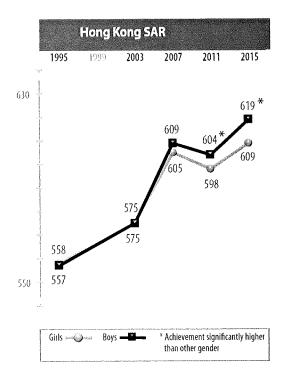
 $^{^{\}star}$ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%.

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%. See Appendix C.2 for target population coverage notes 1, 2, and 3. See Appendix C.8 for sampling guidelines and sampling participation notes †, ‡, and ‡.

 $^{(\,)\,}Standard\,errors\,appear\,in\,parentheses.\,Because\,of\,rounding\,some\,results\,may\,appear\,inconsistent.$

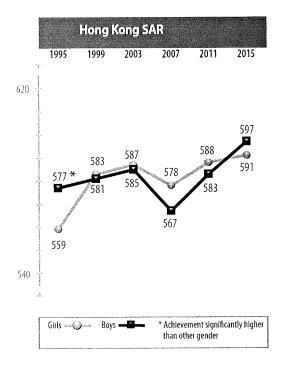


Exhibit 1.12: Trends in Mathematics Achievement by Gender $^{\Diamond}$



TIMSS Mathematics 2015 Grade

Exhibit 1.13: Trends in Mathematics Achievement by Gender



Attitudinal Results

Percentages of Students in Various Attitudinal Indices of Mathematics

P.4:

	Students Very Much Like Learning Mathematics	Students Like Learning Mathematics	Students Do Not Like Learning Mathematics
0/0	35%	38%	27%
(Scale Avg.)	(631)	(612)	(596)
Int'l Avg.	46%	35%	19%
(Scale Avg.)	(521)	(495)	(483)

	Students Very Confident in Mathematics	Students Confident in Mathematics	Students Not Confident in Mathematics
%	19%	45%	36%
(Scale Avg.)	(660)	(622)	(583)
Int'l Avg.	32%	45%	23%
(Scale Avg.)	(546)	(502)	(460)

Attitudinal Results

Percentages of Students in Various Attitudinal Indices of Mathematics

S.2:

	Students Very Much Like Learning Mathematics	Students Like Learning Mathematics	Students Do Not Like Learning Mathematics
%	15%	39%	46%
(Scale Avg.)	(638)	(605)	(572)
Int'l Avg.	22%	39%	38%
(Scale Avg.)	(518)	(485)	(462)

	Students Strongly Value Mathematics	Students Value Mathematics	Students Do Not Value Mathematics
%	19%	52%	29%
(Scale Avg.)	(617)	(602)	(567)
Int'l Avg.	42%	45%	13%
(Scale Avg.)	(498)	(477)	(449)

	Students Very Confident in Mathematics	Students Confident in Mathematics	Students Not Confident in Mathematics
%	10%	36%	54%
(Scale Avg.)	(660)	(611)	(571)
Int'l Avg.	14%	43%	43%
(Scale Avg.)	(554)	(494)	(449)





Exhibit 1.1: Distribution of Science Achievement

South Hall brook to die Office College	ii oi seieii								
Country	Average Scale Score			S	cience Achievemen	t Distribution			SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015
² Singapore	590 (3.7)	٥			la de la companya de				
Korea, Rep. of	589 (2.0)	٥						900,335300000	tud
Japan	569 (1.8)	٥						19524	Se S
Russian Federation	567 (3.2)	ŏ			Sentencial Control		_	OF THE	ien
	557 (2.9)	0			*:CC:102			774	Z Sc
† Hong Kong SAR		٥			\$100,000,000		6 2000000000000000000000000000000000000	-	an
Chinese Taipei	555 (1.8)	٥						я	atics
Finland	554 (2.3)				Managera		Manager and the state of the st		Ë
Kazakhstan	550 (4.4)	0			#(S)#5/00/5000 Residence	Parama.			ath th
Poland	547 (2.4)	٥							₹
² United States	546 (2.2)	٥				500E60		Marchi.	jou
·Slovenia	543 (2.4)	٥			enzinazinerizeniaki	essensi 🖷	gridge to the constraint of the		nat
Hungary	542 (3.3)	٥					MANAGEMENT STATES	8	nter
² Sweden	540 (3.6)	٥			Brackless and the	paparanas sam			<u></u>
Norway (5)	538 (2.6)	٥			\$100 English (Annual Prin		phinopolesticalisms		gg
England	536 (2.4)	٥				estals m	for the second second		نة
Bulgaria	536 (5.9)	0		breast				100	A's
Czech Republic	534 (2.4)	٥			Noncesta contra positividas		A		.:: m
Croatia	533 (2.1)	ŏ			ALEXANDER DE LA CAMPANIA DEL CAMPANIA DEL CAMPANIA DE LA CAMPANIA	-			R.
		٥			\$0.00.000000000000000000000000000000000		Ectrolocation, and		700
`ireland	529 (2.4)				PE-03-10-10-10-10-10-10-10-10-10-10-10-10-10-	SIGNA			И
Germany	528 (2.4)	0							
² Lithuania	528 (2.5)	0							
2 Denmark	527 (2.1)	٥			presidential designation of				
12† Canada	525 (2.6)	٥				580 -			
³ Serbia	525 (3.7)	٥					PER SECURITION		
Australia	524 (2.9)	٥				908	(ST-10-25-770-0470-1710-14		
Slovak Republic	520 (2.6)	٥		F		B -			
* Northern Ireland	520 (2.2)	٥				1925 -			
² Spain	518 (2.6)	٥			peneronzonkes/soliené	RE I	paintines a montant or a final to the		
[†] Netherlands	517 (2.7)	0				618 -			
² Italy	516 (2.6)	ō							
† Belgium (Flemish)	512 (2.3)	ō				_	THE CONTROL OF THE CO		
		ŏ							
² Portugal	508 (2.2)				Brahmon und higher provin	-	epinionis composited		
New Zealand	506 (2.7)	Q		(2000)		-			
,TIMSS Scale Centerpoint									
France	487 (2.7)	•							
Turkey	483 (3.3)	•		the constant of	POLICE REPORT NO.	-	PARTICIPATE STATE OF THE PARTICIPATE OF THE PARTICI		
Cyprus	481 (2.6)	(🐨		\$10000		5 60			
Chile	478 (2.7)	•		阿斯					
² Bahrain	459 (2.6)	•		parate construction and a substantial state of the substantial state of		W200			
¹ Georgia	451 (3.7)	•		NG-SEASTERN SHIPTER					
United Arab Emirates	451 (2.8)	•	E200000		-				
•Qatar	436 (4.1)	•	Name of the last o			THE OWNER OF THE PERSON NAMED IN COLUMN 1			
Oman	431 (3.1)	⊛	9990000000		_	#2FFCMFCGF			
Iran, Islamic Rep. of	421 (4.0)	•	WORKS	namento comincidado Paris Gallanda Albinda (Albinda)		arbit consumus min	nto.c/m2n2454		
		•	POSMACO		_		E-Silva		
Indonesia	397 (4.8)	⊕	Manager State Control of the Control		_	Participation of the second	in the same of		
Saudi Arabia	390 (4.9)			spinore of the contract of the			200		
ψ Morocco	352 (4.7)	•		2025	Manufacture of the Control of the Co		name .		
ψ Kuwait	337 (6.2)	•			Recotors				
•		100	200	300	400	500	600	700	800
			intry average significantly centerpoint of the TIMSS		5th	Percentiles 25th	of Performance 75th	95th	
		_	,						
			intry average significantly centerpoint of the TIMSS			5000			
					95%	Confidence Int	terval for Average (±2	(SE)	

The TIMSS achievement scale was established in 1995 based on the combined achievement distribution of all countries that participated in TIMSS 1995. To provide a point of reference for country comparisons, the scale centerpoint of 500 was located at the mean of the combined achievement distribution. The units of the scale were chosen so that 100 scale score points corresponded to the standard deviation of the distribution.

 $[\]Psi$ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%. See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 for sampling guidelines and sampling participation notes \uparrow , \ddagger , and \ddagger .

⁽⁾ Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.



Exhibit 1.1: Distribution of Science Achievement (Continued)

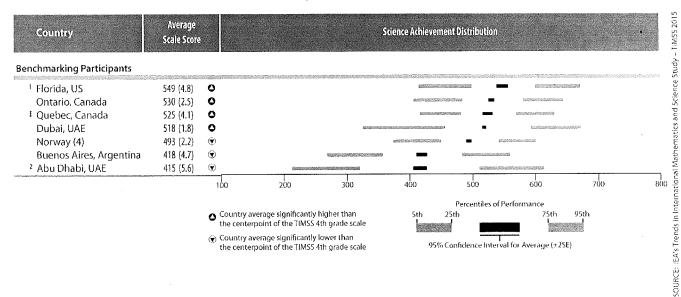




Exhibit 1.7: Differences in Science Achievement Across Assessment Years

Instructions: Read across the row to determine if the performance in the row year is significantly higher (\bullet) or significantly lower (\bullet) than the performance in the column year.

Country Average Scale Score	Differences 8 c 2011 2007	etween Years 2003	1995			cience Achievemo	int Distribu	ition		
Hong Kong SAR										ý
† 2015 557 (2.9)	22 🔷 2	14 🔷	49 🔷			poissib	SPRINGER SERVICE	WASSERVIEW OF THE PARTY OF THE		-
² 2011 535 (3.7)	-19 🐑	-8	27 🔘			Manager and a	odenski -	MODELES VID-		,
2007 554 (3.5)		12 🖸	46 🖸			\$204000	esas marciforsi	mp hydrogic and part		
1 2003 542 (3.0)			35 🖸			Roberto	04620000000	2642242542		
1995 508 (3.4)							_			
	and the second are to the extremely		100	200	300	400	500	600	700	800
	More recent y	ear significantly		200	300	Percentiles			, 55	
		ear significantly	lower		5th	25th		75th 95th		:
				95% Confidence Interval for Average (±2SE)						

Trend results for Kuwait do not include private schools. Trend results for Lithuania do not include students taught in Polish or in Russian.

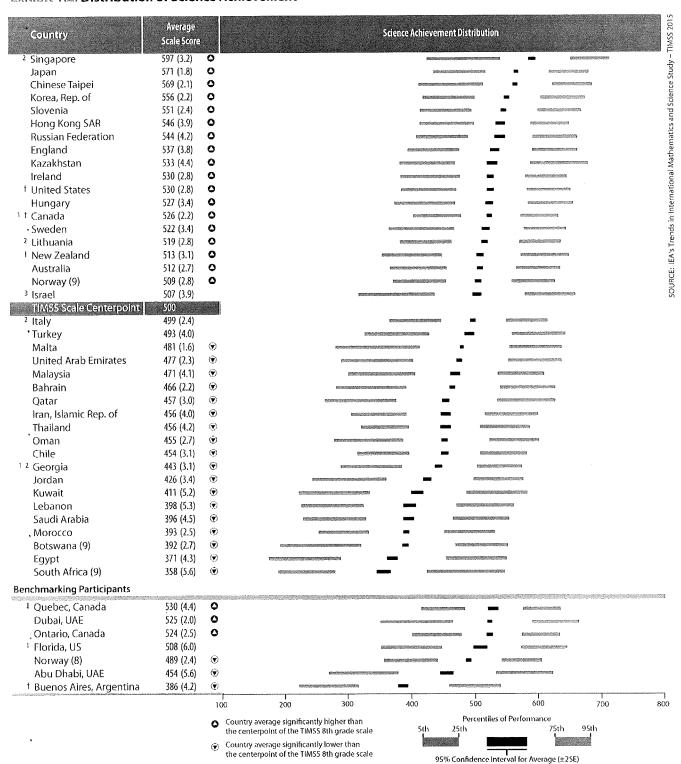
- 光 Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 25%. Such annotations in exhibits with trend data began in 2011, so data from assessments prior to 2011 are not annotated for reservations.
- ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%. Such annotations in exhibits with trend data began in 2011, so data from assessments prior to 2011 are not annotated for reservations.

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 for sampling guidelines and sampling participation notes †, ‡, and ‡.

- Tested the same cohort of students as other countries, but later in the assessment year at the beginning of the next school year.
- () Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.



Exhibit 1.2: Distribution of Science Achievement



The TIMSS achievement scale was established in 1995 based on the combined achievement distribution of all countries that participated in TIMSS 1995. To provide a point of reference for country comparisons, the scale centerpoint of 500 was located at the mean of the combined achievement distribution. The units of the scale were chosen so that 100 scale score points corresponded to the standard deviation of the distribution.

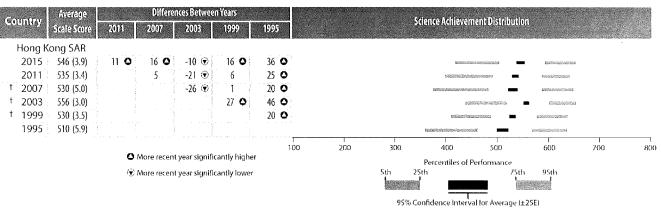
See Appendix C.2 for target population coverage notes 1, 2, and 3. See Appendix C.8 for sampling guidelines and sampling participation notes †, ‡, and ‡.

(). Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.



Exhibit 1.8: Differences in Science Achievement Across Assessment Years

Instructions: Read across the row to determine if the performance in the row year is significantly higher (\bullet) or significantly lower (\odot) than the performance in the column year.



Trend results for Kuwait do not include private schools. Trend results for Lithuania do not include students taught in Polish or in Russian. South Africa (9) tested one year later.

Ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%. Such annotations in exhibits with trend data began in 2011, so data from assessments prior to 2011 are not annotated for reservations.

See Appendix C.2 for target population coverage notes 1, 2, and 3. See Appendix C.8 for sampling guidelines and sampling participation notes †, ‡, and ‡.

- ** Tested the same cohort of students as other countries, but later in the assessment year at the beginning of the next school year.
- () Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

SOURCE: IEA's Trends in International Mathematics and Science Study - TIMSS 2015

			 Advanced 		Advanced	High	Intermediate	Low	2015
Country		of Students Reaching	O High		Benchmark	Benchmark	Benchmark	Benchmark	_TIMS\$ 201
	internatio	onal Benchmarks	 Intermedia 	ate .	(625)	(550)	(475)	(400)	1
) Cinggon and			C Low	0	37 (2.0)	71 (1,8)	90 (1.1)	97 (0.5)	1
² Singapore Korea, Rep. of				O	29 (1.6)	75 (1.0)	96 (0.5)	100 (0.1)	a
Russian Federation	•	- 0			20 (1.5)	62 (2.0)	91 (1.0)	99 (0.3)	Sci
Japan				· · · O	19 (0.9)	63 (1.3)	93 (0.5)	99 (0.2)	300
Kazakhstan	•	0	•	-0	19 (1.7)	49 (2.5)	81 (1.4)	96 (0.6)	i,te
† Hong Kong SAR	•	0		Ō	16 (1.2)	55 (1.8)	88 (1.1)	98 (0.4)	6
Bulgaria	•	•	· · · · · · · · · · · · · · · · · · ·		16 (1.5)	50 (2.5)	77 (2.2)	90 (1.5)	AAbt
² † United States	•	0		0	16 (0.8)	51 (1.1)	81 (0.9)	95 (0.5)	0
Chinese Taipei				0	14 (0.7)	56 (1.2)	88 (0.8)	98 (0.3)	, the
Hungary	•	0 0	*	0	14 (1.1)	50 (1.5)	81 (1.6)	94 (0.9)	5
Finland					13 (0.9)	54 (1.4)	89 (0.9)	99 (0.4)	,
Poland				0	12 (0.9)	51 (1.4)	85 (1.3)	97 (0.4)	ç
² Sweden		O		-0	11 (1.1)	47 (2.1)	82 (1.5)	96 (0.8)	Ě
Slovenia					11 (0.9)	49 (1.4)	84 (1.0)	97 (0.5)	0,40
England		· · · · · · · · · · · · · · · · · · ·		0	10 (0.8)	43 (1.5)	81 (1.2)	97 (0.5)	į
Slovak Republic	•	0)	9 (0.6)	40 (1.4)	74 (1.2)	91 (0.8)	/di
Czech Republic	•	0		0	9 (0.7)	43 (1.4)	81 (1.1)	96 (0.6)	Ü
³ Serbia	•	0	®	0	8 (0.7)	40 (1.5)	77 (1.7)	93 (1.1)	
Australia	•	0		0	8 (0.7)	39 (1.6)	75 (1.4)	94 (0.8)	
Germany	•	. 0		0	8 (0.6)	40 (1.7)	78 (1.3)	96 (0.6)	
1 ² † Canada				0	7 (0.5)	38 (1.2)	77 (1.4)	95 (0.7)	
Norway (5)				0	7 (0.9)	44 (1.8)	85 (1.1)	98 (0.6)	
Ireland				· O	7 (0.9)	40 (1.6)	79 (1.2)	96 (0.6)	
² Lithuania	•	0	·	0	7 (0.8)	39 (1.6)	78 (1.2)	96 (0.5)	
² † Denmark	•	0	. 🚳	0	7 (0.6)	39 (1.5)	78 (1.3)	96 (0.5)	
New Zealand	• (• 0		6 (0.6)	32 (1.1)	67 (1.4)	88 (0.9)	
United Arab Emirates	• 0	- ***	0		6 (0.4)	22 (0.9)	46 (1.0)	67 (0.9)	
Croatia	•	. 0	· · · · · · · · · · · · · · · · · · ·	. 0.	6 (0.7)	41 (1.3)	83 (1.1)	98 (0.4)	
‡ Northern Ireland		0		0	5 (0.6)	34 (1.3)	76 (1.3)	95 (0.6)	
² Spain		·O		0	5 (0.5)	34 (1.3)	74 (1.6)	95 (0.7)	
Oman					4 (0.4)	16 (0.8)	38 (1.2)	61 (1.0)	
² Bahrain	. •		0		4 (0.4)	19 (0.9)	47 (1.2)	72 (1.0)	
Turkey					4 (0.5)	24 (1.1)	58 (1.4)	82 (1.2)	
² Italy)		0	4 (0.5)	32 (1.5)	75 (1.7)	95 (0.7)	
Qatar	• • • • • • • • • • • • • • • • • • • •)		3 (0.5)	15 (1.2)	39 (1.7)	64 (1.6)	
† Netherlands				0	3 (0.4)	30 (1.5)	76 (1.4)	97 (0.6)	
[†] Belgium (Flemish)	• • • • • • • • • • • • • • • • • • • •			O	3 (0.4)	27 (1.5)	73 (1.4)	96 (0.6)	
France	•		О		2 (0.3)	20 (1.2)	58 (1.6)	88 (1.1)	
² Portugal	•			<u></u>	2 (0.3)	25 (1.2)	72 (1.5)	96 (0.6)	
Cyprus	• 0				2 (0.3)	18 (1.1)	56 (1.4)	86 (1.0)	
Chile	•		———О		2 (0.2)	16 (1.2)	53 (1.5)	85 (1.2)	
¹ Georgia	• • •	🚳	· · · · · · · · · · · · · · · · · · ·		1 (0.6)	12 (1.3)	41 (1.7)	74 (1.7)	
Saudi Arabia	•				1 (0.3)	8 (0.9)	25 (1.4)	48 (1.8)	
Iran, Islamic Rep. of	•	· · · · · · · · · · · · · · · · · · ·			1 (0.3)	9 (0.8)	33 (1.5)	61 (1.7)	
ψ Morocco	• 0 - 0 - 0	- O			1 (0.3)	5 (0.7)	17 (1.3)	35 (1.8)	
Indonesia	• • • • • • • • • • • • • • • • • • • •				1 (0.2)	6 (0.7)	24 (1.8)	51 (2.1)	
ψ Kuwait	●○ ⑩	0			1 (0.2)	4 (0.6)	15 (1.4)	33 (1.9)	
International Median	•	0 1		0_	7	39	777	95	
	0 35	F0	76	100					
	0 25	50	75	100	ı				

ψ Reservations about reliability because the percentage of students with achievement too low for estimation exceeds 15% but does not exceed 25%.

See Appendix C.1 for target population coverage notes 1, 2, and 3. See Appendix C.7 for sampling guidelines and sampling participation notes †, ‡, and ‡.

 $^{(\) \} Standard\ errors\ appear\ in\ parentheses.\ Because\ of\ rounding\ some\ results\ may\ appear\ inconsistent.$



Exhibit 2.2: Performance at the International Benchmarks of Science Achievement (Continued)

Country Benchmarking Participants			of Students Reach ional Benchmarks		• Advai • High • Inters • Low		Advanced Benchmark (625)	High Benchmark (550)	Intermediate Benchmark (475)	Low Benchmark (400)
¹ Florida, US			· · · · · · · · · · · · · · · · · · ·	eige zer én Union ez csob		O	16 (2.1)	51 (2.7)	83 (1.7)	96 (0.9)
Dubai, UAE		•	0			9	14 (0.6)	42 (1.0)	70 (0.9)	86 (0.5)
Ontario, Canada							9 (0.9)	41 (1.4)	79 (1.3)	96 (0.6)
[‡] Quebec, Canada	• -		0			0	6 (0.9)	35 (2.5)	78 (2.0)	97 (0.6)
² Abu Dhabi, UAE	•	0 1	*	0			4 (0.7)	15 (1.5)	35 (2.0)	55 (2.0)
Norway (4)	•	0		-		O	2 (0.3)	21 (0.9)	63 (1.3)	90 (0.9)
Buenos Aires, Argentina	• 0	***		0			0 (0.2)	6 (0.8)	28 (1.9)	58 (2.3)
	· r	T								SOCIOTANTONIA DE CASTINIA ANTONIA
	0	25	50		75	100				

SOURCE: IEA's Trends in Interr

Exhibit 2.9: Performance at the International Benchmarks of Science Achievement

						2
	• Advanced	Advanced	High	Intermediate	Low	SOURCE: IEA's Trends in International Mathematics and Science Study - TIMSS 2015
Country	Percentages of Students Reaching High	Benchmark	Benchmark	Benchmark	Benchmark	IMSS
	International Benchmarks • Intermediate	(625)	(550)	(475)	(400)	1-1
	O Low					tud
² Singapore	• • • • • • • • • • • • • • • • • • •	42 (1.4)	74 (1.7)	90 (1.1)	97 (0.5)	Se
Chinese Taipei	O	27 (1.1)	63 (1.1)	86 (0.6)	96 (0.3)	cie
Japan	• • • •	24 (1.0)	63 (1.1)	89 (0.6)	98 (0.2)	od S
Korea, Rep. of	• • • • • • • • • • • • • • • • • • • •	19 (1.0)	54 (1.2)	85 (0.8)	97 (0.4)	icsa
Slovenia	• • • • • • • • • • • • • • • • • • • •	17 (1.0)	52 (1.3)	84 (1.0)	97 (0.4)	mat
Kazakhstan	· · · · · · · · · · · · · · · · · · ·	15 (1.5)	42 (2.2)	74 (1.8)	93 (0.8)	athe
England	00	14 (1.2)	45 (2.1)	77 (1.9)	95 (0.8)	Ž
Russian Federation		14 (1.2)	49 (2.2)	81 (1.8)	96 (0.6)	ion
³ Israel		12 (1.0)	37 (1.6)	64 (1.7)	84 (1.2)	rnat
Hungary	· · · · · · · · · · · · · · · · · · ·	12 (1.1)	42 (1.6)	74 (1.7)	92 (0.9)	Inte
United States	O	12 (0.9)	43 (1.4)	75 (1.2)	93 (0.7)	ī.
Hong Kong SAR	· · · · · · · · · · · · · · · · · · ·	12 (1.3)	51 (2.1)	85 (1.5)	96 (0.8)	renc
Ireland	• • • •	10 (0.7)	43 (1.4)	77 (1.3)	94 (0.9)	Vs T
Sweden	()	10 (1.0)	40 (1.8)	73 (1.6)	92 (1.0)	Ā
† New Zealand	• • • • • • • • • • • • • • • • • • • •	10 (0.9)	36 (1.3)	67 (1.5)	88 (1.0)	R.
Turkey		8 (0.9)	29 (1.7)	59 (1.6)	83 (1.1)	SOU
² Lithuania	• • • • • • • • • • • • • • • • • • • •	8 (0.9)	36 (1.4)	72 (1.4)	93 (0.8)	0,
Australia	O	7 (0.6)	34 (1.2)	69 (1.3)	91 (0.8)	
Malta	· · · · · · · · · · · · · · · · · · ·	7 (0.6)	28 (0.7)	57 (0.8)	79 (0.7)	
1 † Canada	• • • • •	7 (0.5)	38 (1.4)	78 (1.1)	96 (0.5)	
United Arab Emirates	• • • • • • • • • • • • • • • • • • • •	7 (0.5)	26 (0.9)	53 (0.9)	76 (0.8)	
Norway (9)	• • • • • • • • • • • • • • • • • • • •	6 (0.6)	31 (1.3)	68 (1.4)	91 (0.9)	
Qatar	→ · · · · · · · · · · · · · · · · · · ·	6 (0.6)	21 (0.9)	46 (1.2)	70 (1.3)	
Bahrain	• • • • • • • • • •	6 (0.5)	22 (0.7)	49 (1.0)	73 (1.1)	
² Italy .	· · · · · · · · · · · · · · · · · · ·	4 (0.5)	26 (1.3)	64 (1.2)	89 (1.1)	
Malaysia		3 (0.3)	21 (1.2)	52 (1.9)	77 (1.9)	
Iran, Islamic Rep. of	•	3 (0.7)	15 (1.5)	42 (1.9)	73 (1.5)	
Oman		3 (0.2)	17 (0.8)	45 (1.0)	72 (1.2)	
Thailand	•	2 (0.6)	12 (1.5)	41 (2.3)	75 (1.8)	
Kuwait	• • • • • • • • • • • • • • • • • • • •	2 (0.6)	10 (1.3)	29 (1.7)	55 (1.9)	
Chile	0	1 (0.3)	12 (0.9)	40 (1.6)	75 (1.6)	
Jordan	• • • • •	1 (0.3)	9 (0.7)	34 (1.2)	63 (1.4)	
South Africa (9)	♦-O	1 (0.4)	5 (1.0)	14 (1.8)	32 (2.3)	
¹² Georgia	• O @ O	1 (0.3)	10 (0.9)	38 (1.4)	70 (1.6)	
Saudi Arabia	• • O := O := := := := := := := := := := := := :=	1 (0.3)	6 (0.9)	22 (1.5)	49 (1.9)	
Lebanon	■ 1.5 mg = 1.5 mg	1 (0.2)	7 (0.8)	24 (1.7)	50 (2.2)	
Botswana (9)	• O @ O	0 (0.1)	5 (0.4)	23 (0.9)	51 (1.1)	
Egypt	•-O	0 (0.1)	5 (0.6)	20 (1.2)	42 (1.6)	
Morocco	• • • •	0 (0.1)	3 (0.3)	17 (0.8)	47 (1.2)	
International Median	·•	7	29	64	84	
\$25 C. (2) C. (2) C. (2) C. (2) C. (2) C. (3) C. (3) C. (4) C. (4						
Benchmarking Participants						
Dubai, UAE	• • • • • • • • • • • • • • • • • • • •	14 (1.0)	43 (1.3)	72 (0.8)	89 (0.6)	
¹ Florida, US	• · · · · · · · · · · · · · · · · · · ·	9 (1.3)	35 (2.6)	65 (2.9)	87 (1.6)	
[‡] Quebec, Canada	• • • •	7 (1.1)	39 (2.4)	79 (2.4)	97 (1.0)	
Ontario, Canada	• • • • • • • • • • • • • • • • • • •	7 (0.7)	37 (1.6)	77 (1.4)	95 (0.7)	
Abu Dhabi, UAE	··· • · · · · · · · · · · · · · · · · ·	5 (0.8)	20 (1.8)	44 (2.0)	69 (1.9)	
Norway (8)	• • • • • • • • • • • • • • • • • • •	3 (0.4)	22 (1.2)	60 (1.4)	88 (0.9)	
† Buenos Aires, Argentina	• O	0 (0.1)	4 (0.5)	20 (1.4)	46 (1.9)	_
Discription of the second control of the sec	,	7		HEROTECHE KRIMERYNSESSEN EENESSASSEN LATHEE		
	0 25 50 75 1	100				

See Appendix C.2 for target population coverage notes 1, 2, and 3. See Appendix C.8 for sampling guidelines and sampling participation notes †, ‡, and ‡. () Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.



Exhibit 1.12: Trends in Science Achievement by Gender $^{\diamond}$

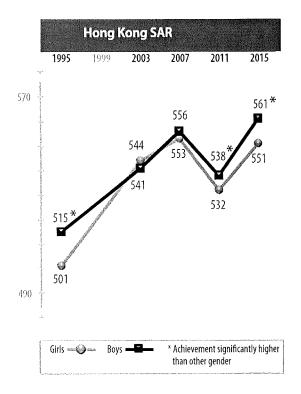
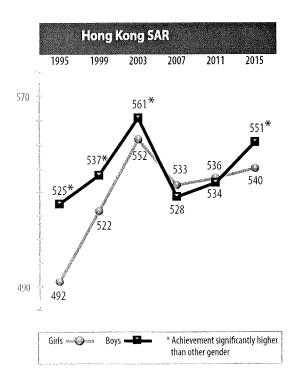




Exhibit 1.13: Trends in Science Achievement by Gender



Attitudinal Results

Percentages of Students in Various Attitudinal Indices of Science

P.4:

	Students Very Much	Students Like	Students Do Not Like
	Like Learning Science	Learning Science	Learning Science
% (Scale Avg.)	57%	32%	11%
	(569)	(543)	(533)
Int'l Avg.	56%	33%	11%
(Scale Avg.)	(518)	(492)	(483)

	Students Very	Students Confident in	Students Not
	Confident in Science	Science	Confident in Science
% (Scale Avg.)	25%	48%	27%
	(588)	(558)	(526)
Int'l Avg.	40%	42%	18%
(Scale Avg.)	(532)	(501)	(464)

Attitudinal Results

Percentages of Students in Various Attitudinal Indices of Science

S.2:

	Students Very Much Like Learning Science	Students Like Learning Science	Students Do Not Like Learning Science
%	30%	51%	19%
(Scale Avg.)	(574)	(542)	(512)
Int'l Avg.	37%	44%	19%
(Scale Avg.)	(516)	(475)	(453)

	Students Strongly Value Science	Students Value Science	Students Do Not Value Science
%	24%	46%	31%
(Scale Avg.)	(565)	(549)	(528)
Int'l Avg.	40%	41%	19%
(Scale Avg.)	(506)	(482)	(460)

	Students Very Confident in Science	Students Confident in Science	Students Not Confident in Science
%	13%	38%	49%
(Scale Avg.)	(592)	(560)	(523)
Int'l Avg.	22%	39%	40%
(Scale Avg.)	(538)	(490)	(452)

