

Exhibit 3.7: Differences in Achievement for Science Cognitive Domains 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.

Country	Knowing Average Scale Score	Knowing		Applying Average Scale Score	Applying		Reasoning Average Scale Score	Reasoning	
		Differences Between Years			Differences Between Years			Differences Between Years	
		2011	2007		2011	2007		2011	2007
Australia									
2015	523 (3.3)	5	-9	522 (2.7)	9 ▲	0	527 (3.0)	10 ▲	-1
2011	517 (2.8)		-14 ▼	513 (3.0)		-9	518 (3.4)		-11 ▼
2007	532 (3.5)			522 (3.8)			528 (4.2)		
Bahrain									
² 2015	456 (2.5)	2		462 (3.0)	18 ▲		455 (3.0)	13 ▲	
2011	454 (3.8)			443 (3.8)			442 (4.8)		
Belgium (Flemish)									
[†] 2015	498 (2.7)	-9 ▼		513 (2.5)	2		526 (2.9)	17 ▲	
2011	507 (2.2)			511 (1.9)			508 (2.6)		
Chile									
2015	477 (3.2)	-5		476 (3.0)	-4		477 (2.5)	0	
2011	483 (2.8)			479 (2.3)			477 (2.8)		
Chinese Taipei									
2015	557 (2.5)	15 ▲	13 ▲	553 (2.6)	1	-6	558 (3.1)	-10 ▼	-16 ▼
2011	542 (2.6)		-1	552 (3.2)		-7	568 (3.1)		-6
2007	544 (2.7)			560 (2.1)			574 (3.3)		
Croatia									
2015	534 (2.9)	9 ▲		530 (2.2)	20 ▲		536 (2.4)	23 ▲	
² 2011	526 (2.0)			510 (2.4)			512 (3.5)		
Czech Republic									
2015	545 (3.0)	-6	24 ▲	528 (2.1)	-6	13 ▲	529 (2.4)	12 ▲	21 ▲
2011	551 (3.2)		30 ▲	534 (2.7)		19 ▲	516 (3.9)		9
2007	521 (3.0)			515 (3.3)			507 (3.6)		
Denmark									
² [†] 2015	524 (2.6)	0	7	529 (2.4)	-2	16 ▲	526 (2.9)	-2	1
² 2011	524 (2.6)		7	532 (2.5)		19 ▲	527 (2.9)		3
[†] 2007	517 (3.3)			513 (3.4)			524 (4.4)		
England									
2015	533 (2.6)	5	-14 ▼	538 (2.7)	5	1	539 (2.7)	12 ▲	-1
2011	529 (3.4)		-19 ▼	532 (3.2)		-4	526 (4.5)		-14 ▼
2007	547 (3.3)			537 (3.4)			540 (2.8)		
Finland									
2015	556 (3.1)	-23 ▼		553 (2.4)	-15 ▼		552 (2.3)	-8 ▼	
2011	579 (2.5)			568 (2.4)			560 (3.0)		
Georgia									
¹ 2015	460 (4.2)	-6	31 ▲	449 (4.8)	-3	35 ▲	426 (4.0)	3	46 ▲
¹ 2011	466 (3.8)		37 ▲	452 (4.3)		38 ▲	422 (4.8)		43 ▲
¹ 2007	429 (4.3)			415 (4.7)			379 (6.1)		
Germany									
2015	527 (2.8)	3	-1	529 (2.4)	-4	3	532 (2.3)	6	6
2011	524 (4.0)		-4	533 (2.5)		7 ▲	526 (3.7)		1
2007	529 (2.4)			526 (2.5)			525 (2.8)		
Hong Kong SAR									
[†] 2015	562 (3.0)	25 ▲	9	554 (3.3)	25 ▲	1	552 (4.1)	11	-10
² 2011	537 (3.7)		-16 ▼	529 (3.5)		-24 ▼	541 (4.2)		-21 ▼
2007	553 (4.0)			552 (3.5)			563 (4.9)		
Hungary									
2015	550 (3.8)	4	6	539 (3.4)	9	7	533 (3.9)	8	5
2011	547 (3.7)		2	530 (3.5)		-2	525 (4.7)		-3
2007	544 (3.5)			532 (3.9)			528 (4.1)		

▲ More recent year significantly higher
▼ More recent year significantly lower

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

- * 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.

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

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Country	Knowing Average Scale Score	Knowing		Applying Average Scale Score	Applying		Reasoning Average Scale Score	Reasoning	
		Differences Between Years			Differences Between Years			Differences Between Years	
		2011	2007		2011	2007		2011	2007
Iran, Islamic Rep. of									
2015	416 (4.1)	-32 ▼	-15 ▼	417 (4.5)	-34 ▼	-25 ▼	422 (4.9)	-37 ▼	-5
2011	448 (4.2)		17 ▲	452 (3.8)		9	459 (3.8)		32 ▲
2007	431 (5.0)			443 (4.9)			427 (4.6)		
Ireland									
2015	529 (2.5)	11 ▲		530 (2.5)	13 ▲		526 (2.9)	17 ▲	
2011	518 (3.8)			517 (3.6)			509 (3.3)		
Italy									
² 2015	521 (3.1)	-11 ▼	-14 ▼	513 (3.1)	-10 ▼	-28 ▼	511 (3.5)	2	-12 ▼
2011	532 (3.1)		-3	523 (2.8)		-18 ▼	510 (2.9)		-14 ▼
2007	535 (4.1)			541 (3.3)			523 (3.5)		
Japan									
2015	544 (2.3)	6 ▲	9 ▲	576 (1.8)	14 ▲	31 ▲	594 (1.8)	3	21 ▲
2011	538 (1.8)		3	562 (1.6)		16 ▲	591 (1.9)		18 ▲
2007	534 (2.6)			546 (3.1)			573 (2.1)		
Kazakhstan									
2015	551 (5.0)	64 ▲		547 (4.6)	48 ▲		552 (4.5)	56 ▲	
² 2011	486 (5.4)			499 (5.2)			496 (5.8)		
Korea, Rep. of									
2015	582 (2.2)	12 ▲		594 (1.9)	0		594 (2.2)	-11 ▼	
2011	570 (2.1)			593 (2.0)			605 (3.0)		
Kuwait									
^ψ 2015	322 (5.0)	-20 ▼		304 (5.8)	-30 ▼		266 (6.2)	-69 ▼	
^{1 ψ} 2011	342 (5.6)			334 (4.9)			336 (5.2)		
Lithuania									
² 2015	526 (3.2)	18 ▲	14 ▲	529 (2.5)	8 ▲	15 ▲	541 (3.3)	26 ▲	21 ▲
^{1 2} 2011	508 (2.8)		-4	521 (2.5)		7	515 (2.7)		-5
¹ 2007	511 (2.3)			513 (3.3)			521 (2.9)		
Morocco									
^ψ 2015	331 (5.6)	94 ▲		357 (4.7)	101 ▲		354 (4.7)	114 ▲	
^Ж 2011	237 (6.0)			256 (4.9)			240 (5.1)		
Netherlands									
[†] 2015	508 (2.4)	-19 ▼	-12 ▼	519 (2.4)	-15 ▼	-6	526 (2.9)	-6	0
[†] 2011	528 (2.2)		7 ▲	534 (2.0)		10 ▲	532 (3.0)		6
[‡] 2007	521 (2.7)			525 (2.4)			526 (2.7)		
New Zealand									
2015	504 (2.8)	8 ▲	-7	502 (3.1)	5	6	514 (2.4)	17 ▲	11 ▲
2011	496 (2.7)		-15 ▼	497 (2.8)		1	497 (3.0)		-6
2007	511 (3.4)			496 (2.8)			503 (4.2)		
Northern Ireland									
[‡] 2015	518 (2.9)	1		519 (2.9)	-3		520 (2.6)	17 ▲	
[†] 2011	517 (3.1)			521 (2.8)			503 (3.2)		
Norway (4)									
2015	495 (3.0)	-7	14 ▲	494 (2.4)	7	22 ▲	482 (3.2)	-10 ▼	7
[‡] 2011	502 (3.0)		21 ▲	487 (2.8)		15 ▲	493 (3.7)		17 ▲
2007	480 (3.2)			472 (3.7)			475 (3.2)		
Oman									
2015	422 (3.2)	46 ▲		435 (2.9)	63 ▲		431 (3.0)	77 ▲	
2011	376 (4.6)			372 (4.2)			354 (4.3)		
Portugal									
² 2015	507 (2.9)	-21 ▼		508 (1.9)	-7		506 (1.9)	-19 ▼	
2011	528 (4.4)			515 (4.2)			524 (4.3)		

▲ More recent year significantly higher
▼ More recent year significantly lower

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		Differences Between Years			Differences Between Years			Differences Between Years	
		2011	2007		2011	2007		2011	2007
Qatar									
2015	437 (4.5)	49 ▲		430 (4.7)	41 ▲		433 (4.4)	29 ▲	
² 2011	388 (5.2)			389 (5.4)			404 (4.7)		
Russian Federation									
2015	569 (3.9)	15 ▲	23 ▲	568 (3.3)	12 ▲	19 ▲	561 (3.8)	19 ▲	18 ▲
2011	553 (3.8)		7	556 (3.5)		6	542 (4.3)		0
2007	546 (5.5)			550 (5.3)			542 (5.3)		
Saudi Arabia									
2015	394 (5.3)	-38 ▼		388 (4.7)	-39 ▼		365 (5.4)	-51 ▼	
2011	432 (6.1)			427 (6.1)			416 (5.8)		
Serbia									
³ 2015	527 (3.9)	3		522 (4.5)	16 ▲		521 (3.9)	1	
² 2011	524 (2.9)			506 (3.1)			519 (3.0)		
Singapore									
² 2015	574 (4.1)	4	-24 ▼	599 (4.0)	10	12 ▲	605 (3.6)	8	29 ▲
² 2011	570 (3.4)		-29 ▼	590 (4.0)		2	597 (3.8)		20 ▲
2007	599 (4.5)			587 (4.2)			576 (4.1)		
Slovak Republic									
2015	530 (3.3)	-17 ▼	-2	517 (2.8)	-11 ▼	-10	507 (3.4)	-7	-4
2011	547 (3.9)		15 ▲	528 (3.9)		1	514 (4.0)		2
2007	531 (4.9)			527 (5.0)			512 (5.4)		
Slovenia									
2015	541 (2.6)	23 ▲	31 ▲	546 (2.9)	28 ▲	21 ▲	538 (2.7)	13 ▲	13 ▲
2011	518 (2.2)		9 ▲	518 (2.8)		-7	525 (3.4)		0
2007	510 (2.0)			525 (2.5)			525 (2.1)		
Spain									
² 2015	522 (3.3)	6		514 (3.3)	15 ▲		517 (2.6)	21 ▲	
2011	516 (3.2)			499 (3.1)			496 (3.0)		
Sweden									
² 2015	538 (3.8)	3	10 ▲	540 (3.4)	9 ▲	20 ▲	542 (3.8)	5	14 ▲
2011	536 (2.8)		8	531 (3.0)		11 ▲	537 (3.0)		9
2007	528 (3.1)			520 (3.2)			528 (4.3)		
Turkey									
2015	478 (3.0)	21 ▲		486 (3.1)	23 ▲		483 (3.3)	11	
2011	457 (4.7)			463 (4.7)			472 (5.3)		
United Arab Emirates									
2015	453 (3.3)	21 ▲		452 (3.2)	31 ▲		444 (3.0)	19 ▲	
2011	433 (2.8)			421 (2.6)			426 (2.6)		
United States									
² † 2015	548 (2.5)	2	3	546 (2.2)	2	12 ▲	542 (2.7)	4	6
² 2011	546 (1.9)		1	544 (2.2)		10 ▲	537 (2.4)		2
² † 2007	546 (2.7)			534 (3.1)			535 (3.0)		

▲ More recent year significantly higher
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		Differences Between Years			Differences Between Years			Differences Between Years	
		2011	2007		2011	2007		2011	2007
Benchmarking Participants									
Ontario, Canada									
2015	527 (2.8)	-1	-15 ▼	534 (2.5)	9 ▲	6	529 (2.8)	0	-11 ▼
2011	529 (3.0)		-14 ▼	526 (3.3)		-3	529 (3.6)		-11 ▼
² 2007	542 (3.6)			529 (3.7)			540 (3.4)		
Quebec, Canada									
[‡] 2015	524 (4.3)	5	7	525 (4.5)	12 ▲	11 ▲	526 (4.6)	7	0
2011	519 (2.7)		2	514 (2.5)		-1	520 (3.8)		-6
² 2007	517 (2.8)			515 (3.0)			526 (3.6)		
Abu Dhabi, UAE									
² 2015	410 (6.6)	-4		417 (5.9)	11		412 (5.3)	-5	
2011	415 (5.7)			405 (5.3)			416 (5.2)		
Dubai, UAE									
2015	523 (2.3)	55 ▲	62 ▲	517 (2.8)	64 ▲	59 ▲	510 (2.9)	55 ▲	54 ▲
2011	467 (2.5)		7	453 (2.2)		-5	455 (3.7)		-1
^{♦♦ ‡} 2007	461 (2.8)			458 (3.7)			456 (3.1)		
Florida, US									
¹ 2015	553 (5.7)	4		550 (4.9)	7		541 (5.8)	5	
^{1 3} 2011	550 (3.9)			543 (3.8)			536 (3.9)		

▲ More recent year significantly higher
 ▼ More recent year significantly lower

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