

Exhibit 3.7: Differences in Achievement for Mathematics 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	509 (3.5)	-7	-2	521 (3.0)	2	-1	523 (3.0)	10 ▲	7
2011	516 (3.4)		5	519 (3.0)		-3	513 (2.7)		-3
2007	511 (4.1)			522 (3.6)			516 (3.7)		
Bahrain									
² 2015	453 (1.8)	15 ▲		450 (1.6)	19 ▲		447 (2.0)	8 ▲	
2011	438 (3.8)			431 (3.3)			439 (3.2)		
Belgium (Flemish)									
[†] 2015	554 (2.3)	-10 ▼		544 (2.2)	-2		536 (2.7)	4	
2011	564 (2.0)			546 (2.2)			532 (2.7)		
Chile									
2015	449 (2.8)	-7		462 (2.4)	0		466 (2.3)	-3	
2011	455 (2.4)			463 (2.4)			469 (2.5)		
Chinese Taipei									
2015	620 (2.3)	21 ▲	35 ▲	593 (2.1)	0	19 ▲	576 (3.1)	-2	5
2011	599 (2.0)		13 ▲	593 (2.1)		19 ▲	577 (2.5)		6
2007	586 (1.9)			574 (1.9)			571 (2.0)		
Croatia									
2015	502 (1.9)	8 ▲		499 (1.9)	15 ▲		507 (2.1)	15 ▲	
² 2011	495 (1.9)			484 (2.0)			492 (2.9)		
Czech Republic									
2015	519 (2.5)	17 ▲	48 ▲	528 (2.4)	16 ▲	35 ▲	544 (3.0)	21 ▲	52 ▲
2011	502 (2.4)		30 ▲	512 (2.8)		19 ▲	523 (2.5)		31 ▲
2007	472 (2.5)			493 (2.9)			491 (3.6)		
Denmark									
² [†] 2015	536 (3.3)	5	22 ▲	538 (2.8)	-1	11 ▲	548 (3.2)	5	22 ▲
² 2011	531 (2.7)		18 ▲	539 (2.9)		12 ▲	543 (2.7)		17 ▲
[†] 2007	514 (2.7)			527 (2.8)			525 (2.5)		
England									
2015	554 (3.3)	2	8	544 (3.2)	2	3	540 (3.2)	9	1
2011	552 (4.3)		6	542 (3.7)		0	531 (3.8)		-8
2007	546 (3.6)			542 (3.3)			539 (3.4)		
Finland									
2015	530 (2.2)	-18 ▼		536 (2.1)	-8 ▼		540 (3.1)	-5	
2011	548 (2.6)			544 (2.6)			546 (2.3)		
Georgia									
¹ 2015	466 (4.0)	16 ▲	21 ▲	461 (4.1)	14 ▲	31 ▲	452 (4.4)	1	19 ▲
¹ 2011	449 (3.7)		4	447 (3.4)		17 ▲	450 (3.3)		18 ▲
¹ 2007	445 (4.4)			430 (4.7)			433 (4.7)		
Germany									
2015	524 (2.3)	0	9 ▲	515 (2.2)	-13 ▼	-15 ▼	535 (2.4)	3	5
2011	524 (2.4)		9 ▲	528 (2.3)		-2	532 (3.0)		2
2007	515 (2.1)			530 (2.3)			530 (2.9)		
Hong Kong SAR									
[†] 2015	618 (3.1)	-1	-4	621 (3.1)	23 ▲	14 ▲	600 (3.2)	11 ▲	4
² 2011	619 (3.4)		-3	597 (3.4)		-9	589 (3.3)		-7
2007	622 (3.8)			606 (3.8)			596 (3.8)		
Hungary									
2015	532 (3.1)	13 ▲	21 ▲	526 (3.3)	13 ▲	20 ▲	529 (3.6)	15 ▲	20 ▲
2011	519 (3.8)		8	513 (3.3)		7	514 (3.7)		5
2007	511 (3.8)			506 (3.8)			510 (4.3)		

▲ 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.

✳ 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	429 (3.2)	-6	25 ▲	435 (2.9)	7	38 ▲	426 (3.3)	4	26 ▲
2011	435 (4.0)		31 ▲	427 (3.7)		30 ▲	423 (3.2)		22 ▲
2007	404 (3.9)			397 (4.0)			401 (4.3)		
Ireland									
2015	554 (2.9)	15 ▲		549 (2.2)	20 ▲		535 (2.7)	26 ▲	
2011	539 (3.1)			529 (2.7)			510 (3.1)		
Italy									
² 2015	511 (2.9)	1	-1	504 (2.5)	-2	5	503 (3.3)	-3	-8
2011	510 (2.8)		-3	506 (2.8)		7	505 (3.2)		-5
2007	512 (3.5)			499 (3.1)			511 (3.4)		
Japan									
2015	601 (2.4)	11 ▲	35 ▲	589 (2.1)	10 ▲	19 ▲	595 (2.7)	3	26 ▲
2011	590 (1.7)		24 ▲	579 (1.6)		9 ▲	592 (1.9)		22 ▲
2007	567 (2.4)			570 (2.2)			569 (2.3)		
Kazakhstan									
2015	546 (4.4)	43 ▲		541 (4.9)	42 ▲		553 (4.6)	52 ▲	
² 2011	503 (4.7)			499 (5.0)			501 (4.7)		
Korea, Rep. of									
2015	627 (2.9)	13 ▲		595 (2.1)	-5		619 (2.5)	16 ▲	
2011	614 (2.0)			600 (2.2)			603 (2.3)		
Kuwait									
^ψ 2015	326 (3.0)	-16 ▼		322 (3.3)	-8		306 (3.4)	-23 ▼	
^{1 ж} 2011	343 (3.5)			330 (4.6)			329 (3.6)		
Lithuania									
² 2015	534 (2.8)	8 ▲	14 ▲	538 (2.9)	-2	-3	536 (3.2)	-1	7
^{1 2} 2011	525 (2.9)		5	540 (2.4)		0	536 (2.5)		8 ▲
¹ 2007	520 (2.8)			540 (2.7)			529 (2.8)		
Morocco									
2015	377 (3.7)	57 ▲		375 (3.6)	43 ▲		379 (3.6)	32 ▲	
^ж 2011	320 (4.3)			332 (3.9)			347 (4.2)		
Netherlands									
[†] 2015	521 (1.8)	-17 ▼	-8 ▼	531 (1.7)	-10 ▼	-10 ▼	543 (2.6)	0	6
[†] 2011	537 (2.0)		9 ▲	540 (1.7)		0	543 (2.7)		7
[‡] 2007	528 (2.3)			540 (2.2)			537 (2.5)		
New Zealand									
2015	475 (2.6)	-1	-8 ▼	497 (2.5)	7 ▲	4	504 (2.7)	13 ▲	2
2011	476 (3.2)		-7	490 (2.4)		-3	490 (2.5)		-12 ▼
2007	484 (2.7)			493 (2.5)			502 (2.7)		
Northern Ireland									
[‡] 2015	582 (3.9)	2		575 (3.2)	11 ▲		550 (3.3)	12 ▲	
[†] 2011	580 (3.4)			565 (2.9)			538 (3.4)		
Norway (4)									
2015	479 (2.6)	-8	20 ▲	495 (2.5)	-4	20 ▲	506 (3.0)	5	20 ▲
[‡] 2011	487 (3.2)		28 ▲	499 (2.9)		24 ▲	501 (3.2)		15 ▲
2007	459 (3.0)			475 (2.9)			486 (2.9)		
Oman									
2015	422 (2.7)	43 ▲		428 (2.4)	46 ▲		420 (2.4)	29 ▲	
^ψ 2011	380 (3.2)			382 (2.9)			391 (2.7)		
Portugal									
² 2015	548 (2.6)	17 ▲		540 (2.4)	6		532 (2.3)	1	
2011	531 (3.3)			534 (3.7)			531 (3.7)		
Qatar									
2015	444 (3.4)	33 ▲		434 (3.5)	23 ▲		431 (4.4)	15 ▲	
² 2011	411 (3.7)			411 (3.4)			416 (4.4)		

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

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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	
Russian Federation										
	2015	556 (3.4)	16 ▲	18 ▲	566 (3.7)	27 ▲	18 ▲	570 (4.0)	22 ▲	26 ▲
	2011	541 (3.4)		2	539 (3.9)		-9	548 (3.4)		4
	2007	539 (5.0)			549 (5.2)			544 (5.1)		
Saudi Arabia										
ψ	2015	374 (4.6)	-36 ▼		382 (4.5)	-23 ▼		383 (4.3)	-29 ▼	
	2011	409 (6.0)			405 (5.8)			412 (6.0)		
Serbia										
³	2015	513 (3.5)	-7		521 (3.4)	10 ▲		517 (3.8)	2	
²	2011	520 (3.0)			511 (3.2)			514 (3.9)		
Singapore										
²	2015	631 (4.0)	2	5	619 (4.0)	17 ▲	23 ▲	603 (4.5)	15 ▲	19 ▲
²	2011	629 (3.6)		4	602 (3.4)		5	588 (3.7)		4
	2007	625 (4.2)			597 (4.1)			584 (4.0)		
Slovak Republic										
	2015	491 (2.4)	-16 ▼	-1	497 (2.5)	-9	1	515 (2.9)	5	17 ▲
	2011	506 (3.7)		15 ▲	505 (3.9)		9	511 (3.8)		12 ▲
	2007	491 (4.4)			496 (4.4)			499 (4.8)		
Slovenia										
	2015	517 (1.9)	7 ▲	19 ▲	521 (2.1)	7 ▲	19 ▲	524 (2.2)	8 ▲	20 ▲
	2011	510 (2.7)		12 ▲	514 (2.3)		12 ▲	516 (2.6)		12 ▲
	2007	498 (2.0)			502 (2.0)			504 (2.5)		
Spain										
²	2015	505 (2.4)	23 ▲		505 (2.4)	22 ▲		502 (2.5)	19 ▲	
	2011	482 (3.4)			483 (3.1)			483 (2.9)		
Sweden										
²	2015	501 (3.4)	12 ▲	18 ▲	521 (2.7)	14 ▲	16 ▲	542 (3.3)	22 ▲	22 ▲
	2011	489 (2.2)		6	507 (2.2)		2	520 (2.9)		0
	2007	483 (2.6)			506 (2.4)			519 (2.8)		
Turkey										
	2015	491 (3.4)	17 ▲		482 (3.5)	13 ▲		466 (3.5)	5	
	2011	475 (5.3)			469 (4.7)			462 (4.3)		
United Arab Emirates										
	2015	453 (2.7)	16 ▲		452 (2.5)	22 ▲		445 (2.4)	11 ▲	
	2011	437 (2.2)			430 (2.0)			434 (2.3)		
United States										
² †	2015	547 (2.3)	-8 ▼	6	537 (2.4)	-2	13 ▲	531 (2.5)	5	6
²	2011	556 (2.1)		14 ▲	539 (2.1)		15 ▲	525 (2.1)		1
² †	2007	541 (2.8)			524 (2.8)			525 (2.4)		

▲ 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	
Benchmarking Participants										
Ontario, Canada										
	2015	505 (2.5)	-5	7	513 (2.3)	-8	0	524 (2.6)	3	-2
	2011	510 (3.4)		11 ▲	521 (3.4)		8	522 (3.1)		-5
²	2007	498 (3.5)			513 (3.3)			526 (3.1)		
Quebec, Canada										
‡	2015	542 (4.3)	6	23 ▲	533 (4.1)	3	17 ▲	536 (4.9)	2	14 ▲
	2011	536 (2.4)		18 ▲	529 (2.4)		13 ▲	534 (2.5)		12 ▲
²	2007	519 (3.3)			516 (3.1)			523 (3.2)		
Abu Dhabi, UAE										
² ψ	2015	418 (5.1)	0		422 (4.8)	9		414 (4.4)	-5	
	2011	418 (4.9)			413 (4.7)			418 (4.5)		
Dubai, UAE										
	2015	514 (2.0)	42 ▲	60 ▲	510 (1.8)	45 ▲	74 ▲	507 (1.7)	44 ▲	66 ▲
	2011	472 (2.4)		18 ▲	465 (2.3)		29 ▲	464 (2.2)		23 ▲
♦♦ ‡	2007	454 (2.5)			436 (2.2)			441 (3.0)		
Florida, US										
¹	2015	555 (5.2)	-13 ▼		545 (4.9)	3		534 (6.2)	11	
¹ ‡	2011	568 (3.7)			542 (3.6)			523 (3.9)		

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

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