

Exhibit 10.4: Students Like Learning Science

Reported by Students

The general/integrated science panel summarizes responses for countries where students are enrolled in science as a single subject. The following panels for biology, chemistry, physics, and earth science summarize responses for countries where students are taught science as separate subjects. For general/integrated science, students were scored according to their degree of agreement with nine statements on the *Students Like Learning Science* scale. Students who **Very Much Like Learning Science** had a score on the scale of at least 10.7, which corresponds to their “agreeing a lot” with five of the nine statements and “agreeing a little” with the other four, on average. Students who **Do Not Like Learning Science** had a score no higher than 8.3, which corresponds to their “disagreeing a little” with five of the nine statements and “agreeing a little” with the other four, on average. All other students **Like Learning Science**. For biology, chemistry, physics, and earth science, a comparable procedure was used.

Students Like Learning General/Integrated Science

General/Integrated Science	Very Much Like Learning Science		Like Learning Science		Do Not Like Learning Science		Average Scale Score	Difference in Average Scale Score from 2011	
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement			
Botswana (9)	57 (1.1)	432 (2.5)	36 (0.9)	353 (3.7)	7 (0.4)	333 (9.6)	11.1 (0.05)	0.1 (0.07)	
Jordan	53 (1.3)	453 (3.2)	37 (0.9)	405 (4.2)	9 (0.8)	397 (6.8)	11.0 (0.06)	0.4 (0.08)	▲
Turkey	52 (1.3)	514 (4.2)	38 (0.9)	474 (4.6)	10 (0.7)	467 (6.4)	10.8 (0.06)	0.1 (0.07)	
Malaysia	51 (1.3)	498 (3.2)	42 (1.0)	454 (5.0)	7 (0.7)	389 (10.3)	10.9 (0.06)	0.5 (0.09)	▲
Oman	51 (1.0)	480 (2.5)	41 (0.8)	434 (3.1)	8 (0.5)	423 (5.1)	10.9 (0.04)	0.2 (0.06)	▲
Egypt	49 (1.5)	416 (4.0)	43 (1.2)	336 (4.7)	8 (0.5)	322 (8.2)	10.8 (0.06)	0	◇
Kuwait	48 (1.3)	433 (5.4)	39 (1.1)	396 (7.1)	13 (0.9)	380 (8.2)	10.7 (0.06)	0	◇
Iran, Islamic Rep. of	48 (1.2)	475 (4.6)	41 (0.8)	440 (4.1)	11 (0.7)	442 (5.8)	10.7 (0.06)	-0.1 (0.07)	
South Africa (9)	46 (1.1)	382 (5.6)	42 (0.8)	341 (6.1)	12 (0.7)	345 (10.0)	10.6 (0.05)	0.2 (0.07)	▲
United Arab Emirates	42 (0.8)	515 (2.6)	43 (0.5)	456 (3.2)	16 (0.6)	441 (3.2)	10.4 (0.04)	0.1 (0.06)	
Bahrain	41 (1.1)	501 (3.0)	41 (0.9)	450 (3.2)	18 (0.9)	432 (5.6)	10.4 (0.05)	0.5 (0.07)	▲
Saudi Arabia	41 (1.7)	430 (5.1)	40 (1.0)	381 (5.6)	19 (1.3)	370 (5.5)	10.3 (0.09)	-0.1 (0.11)	
Singapore	38 (0.8)	622 (3.8)	47 (0.8)	588 (3.3)	15 (0.6)	558 (4.5)	10.3 (0.04)	0.1 (0.05)	
Qatar	38 (1.1)	507 (3.2)	43 (1.1)	439 (3.6)	19 (0.9)	411 (4.8)	10.2 (0.05)	0.1 (0.08)	
Thailand	37 (1.3)	477 (4.4)	55 (1.1)	445 (4.3)	8 (0.6)	434 (6.8)	10.3 (0.05)	0.2 (0.07)	▲
United States	36 (0.9)	556 (3.0)	42 (0.7)	524 (3.0)	21 (0.8)	504 (3.3)	10.0 (0.05)	0.4 (0.06)	▲
Ireland	33 (1.3)	565 (3.2)	41 (0.9)	534 (2.7)	26 (1.2)	493 (4.2)	9.8 (0.07)	0	◇
Canada	33 (1.0)	547 (2.7)	46 (0.8)	526 (2.2)	21 (0.8)	504 (3.1)	9.9 (0.04)	0	◇
England	31 (1.1)	569 (4.4)	44 (1.1)	536 (3.9)	25 (1.2)	504 (5.0)	9.8 (0.06)	-0.1 (0.08)	
New Zealand	31 (1.3)	542 (4.2)	47 (0.8)	509 (3.9)	22 (1.0)	484 (3.6)	9.8 (0.07)	0.5 (0.09)	▲
Hong Kong SAR	30 (1.0)	574 (3.8)	51 (0.8)	542 (4.2)	19 (1.1)	512 (5.2)	9.9 (0.06)	0.1 (0.08)	
Italy	29 (1.2)	515 (3.2)	48 (0.9)	499 (2.7)	23 (1.1)	478 (4.4)	9.7 (0.06)	0.1 (0.07)	
Israel	29 (1.2)	535 (4.5)	41 (0.9)	508 (4.6)	31 (1.3)	485 (5.1)	9.5 (0.07)	0.1 (0.10)	
Chile	29 (1.3)	475 (3.7)	49 (0.9)	448 (3.6)	22 (1.1)	444 (4.1)	9.7 (0.06)	-0.5 (0.08)	▼
Norway (9)	28 (1.2)	539 (3.7)	49 (0.9)	505 (3.2)	23 (1.1)	483 (3.8)	9.7 (0.06)	0	◇
Australia	28 (1.1)	550 (3.2)	43 (0.8)	512 (2.6)	29 (1.0)	482 (3.8)	9.6 (0.05)	0.2 (0.09)	▲
Chinese Taipei	18 (0.6)	620 (3.4)	46 (0.8)	574 (2.4)	36 (0.9)	538 (2.5)	9.2 (0.04)	0.2 (0.06)	▲
Japan	15 (0.7)	606 (2.9)	48 (1.0)	579 (1.9)	37 (1.2)	546 (2.5)	9.0 (0.05)	0.0 (0.07)	
Korea, Rep. of	10 (0.5)	622 (5.1)	41 (0.8)	572 (2.5)	49 (1.1)	528 (2.3)	8.6 (0.04)	-0.1 (0.06)	
International Avg.	37 (0.2)	516 (0.7)	44 (0.2)	475 (0.7)	19 (0.2)	453 (1.1)			

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

Benchmarking Participants Teaching General/Integrated Science

Dubai, UAE	49 (1.0)	552 (2.2)	38 (0.8)	504 (3.2)	13 (0.6)	486 (4.1)	10.7 (0.04)	0.1 (0.06)	
Abu Dhabi, UAE	37 (2.0)	497 (6.8)	46 (1.2)	435 (6.2)	17 (1.4)	428 (7.0)	10.2 (0.10)	0.0 (0.12)	
Norway (8)	35 (1.1)	507 (3.1)	45 (1.0)	485 (2.9)	20 (0.9)	470 (3.7)	10.1 (0.05)	0.2 (0.09)	
Ontario, Canada	34 (1.1)	544 (3.5)	44 (0.9)	524 (2.6)	22 (0.9)	499 (3.5)	10.0 (0.05)	0.3 (0.08)	▲
Florida, US	33 (1.3)	537 (6.7)	45 (1.2)	505 (6.7)	22 (1.4)	481 (7.1)	9.9 (0.08)	0.4 (0.13)	▲
Quebec, Canada	30 (2.0)	554 (4.4)	51 (1.4)	529 (3.6)	19 (1.3)	512 (5.8)	9.8 (0.08)	0.4 (0.10)	▲
Buenos Aires, Argentina	22 (0.9)	404 (5.3)	47 (1.1)	388 (5.4)	31 (1.2)	379 (6.2)	9.3 (0.05)	0	◇

This TIMSS questionnaire scale was established in 2011 based on the combined response distribution of all countries that participated in TIMSS 2011. To provide a point of reference for country comparisons, the scale centerpoint of 10 was located at the mean of the combined distribution. The units of the scale were chosen so that 2 scale score points corresponded to the standard deviation of the distribution.

Significantly higher than 2011 ▲
Significantly lower than 2011 ▼

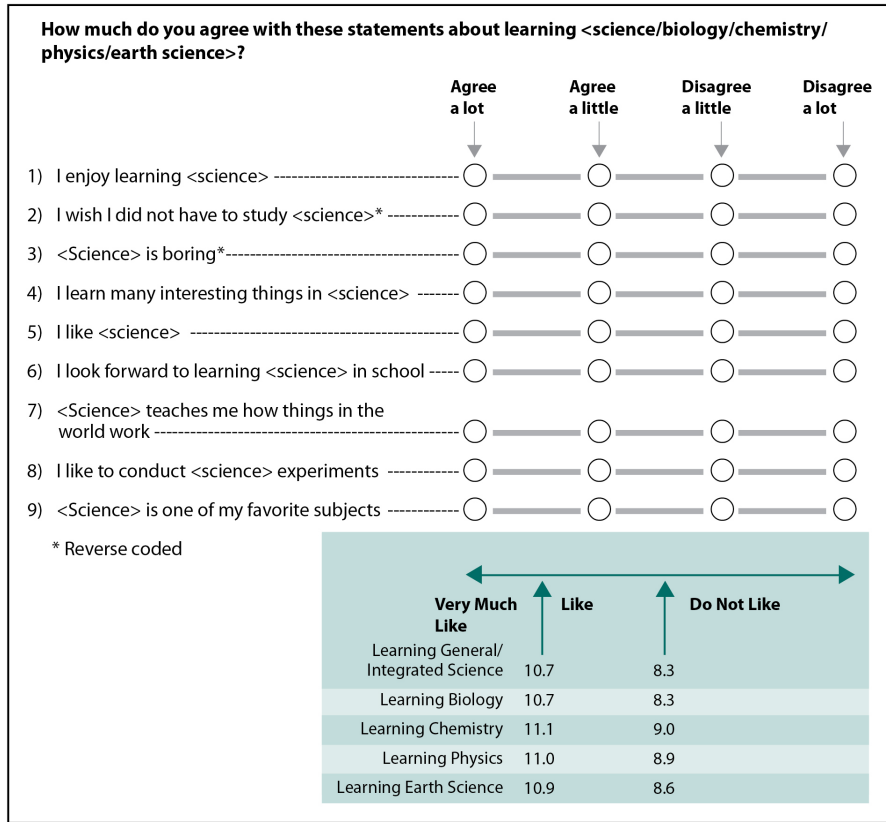
() Standard errors appear in parentheses. Because of rounding some results may appear inconsistent.

A diamond (◇) indicates the country did not participate in the 2011 assessment.

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

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

Exhibit 10.4: Students Like Learning Science (Continued)



Separate Science Panels

Students Like Learning Biology

Biology	Very Much Like Learning Biology		Like Learning Biology		Do Not Like Learning Biology		Average Scale Score	Difference in Average Scale Score from 2011
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement		
Malta	55 (1.3)	557 (2.7)	33 (1.0)	512 (5.6)	12 (0.9)	481 (6.0)	10.9 (0.06)	0 0
Morocco	53 (1.2)	412 (2.4)	39 (0.9)	378 (3.6)	8 (0.6)	378 (4.6)	11.0 (0.05)	0.2 (0.07) ▲
Kazakhstan	46 (1.5)	544 (4.7)	50 (1.2)	525 (5.0)	4 (0.6)	522 (9.1)	10.7 (0.07)	0.1 (0.08)
Lebanon	42 (1.5)	438 (5.0)	44 (1.4)	383 (5.9)	14 (0.9)	365 (8.6)	10.4 (0.07)	0.6 (0.09) ▲
Georgia	39 (1.4)	463 (3.8)	50 (1.2)	439 (3.6)	11 (0.9)	423 (6.4)	10.4 (0.06)	-0.5 (0.08) ▼
Russian Federation	35 (1.3)	550 (5.2)	52 (0.8)	540 (4.1)	13 (1.1)	544 (6.3)	10.1 (0.06)	0.1 (0.07)
Lithuania	31 (1.3)	526 (4.0)	46 (1.1)	515 (3.1)	23 (1.2)	518 (4.3)	9.7 (0.07)	-0.1 (0.09)
Hungary	27 (1.3)	543 (4.2)	47 (0.9)	522 (3.8)	26 (1.3)	523 (4.9)	9.6 (0.06)	0.1 (0.10)
Sweden	20 (1.1)	539 (5.3)	52 (1.0)	529 (3.9)	28 (1.5)	511 (3.8)	9.3 (0.06)	0.1 (0.08)
Slovenia	16 (1.0)	557 (3.7)	47 (1.1)	552 (3.1)	38 (1.7)	549 (3.1)	8.9 (0.07)	0.4 (0.10) ▲
International Avg.	36 (0.4)	513 (1.3)	46 (0.3)	489 (1.3)	18 (0.4)	482 (1.9)		

Significantly higher than 2011 ▲
Significantly lower than 2011 ▼

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

Exhibit 10.4: Students Like Learning Science (Continued)

Students Like Learning Chemistry

Chemistry	Very Much Like Learning Chemistry		Like Learning Chemistry		Do Not Like Learning Chemistry		Average Scale Score	Difference in Average Scale Score from 2011
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement		
Malta	51 (1.7)	589 (3.2)	31 (1.6)	551 (5.7)	17 (1.3)	522 (8.3)	11.2 (0.08)	0
Morocco	43 (1.1)	418 (3.0)	45 (0.8)	377 (3.0)	11 (0.5)	384 (3.9)	11.0 (0.04)	0.1 (0.05) ▲
Kazakhstan	40 (1.5)	552 (5.2)	53 (1.2)	524 (5.2)	8 (0.7)	511 (6.9)	10.9 (0.05)	-0.1 (0.08)
Lebanon	38 (1.7)	431 (5.9)	48 (1.5)	384 (6.2)	14 (1.3)	389 (10.0)	10.8 (0.07)	0.3 (0.09) ▲
Russian Federation	31 (1.4)	561 (5.0)	46 (0.8)	541 (4.8)	23 (1.4)	530 (5.0)	10.3 (0.07)	0.0 (0.09)
Georgia	29 (1.4)	471 (4.4)	51 (1.1)	437 (3.9)	20 (1.4)	434 (4.5)	10.4 (0.07)	-
Lithuania	26 (1.4)	536 (3.5)	42 (1.2)	518 (3.4)	33 (1.7)	507 (4.5)	9.9 (0.08)	0.1 (0.10)
Slovenia	17 (0.9)	582 (4.0)	42 (1.1)	556 (2.6)	40 (1.5)	534 (3.5)	9.6 (0.06)	0.2 (0.09) ▲
Sweden	17 (1.0)	553 (6.9)	46 (1.1)	531 (4.2)	37 (1.5)	510 (3.3)	9.7 (0.06)	0.1 (0.08)
Hungary	15 (1.0)	557 (6.6)	38 (1.0)	522 (4.2)	47 (1.5)	523 (4.0)	9.3 (0.06)	0.1 (0.09)
International Avg.	31 (0.4)	525 (1.6)	44 (0.4)	494 (1.4)	25 (0.4)	485 (1.8)		

Students Like Learning Physics

Physics	Very Much Like Learning Physics		Like Learning Physics		Do Not Like Learning Physics		Average Scale Score	Difference in Average Scale Score from 2011
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement		
Morocco	45 (1.1)	417 (2.6)	44 (0.8)	378 (3.1)	11 (0.6)	384 (4.2)	11.0 (0.05)	0.1 (0.06)
Kazakhstan	38 (1.6)	554 (5.1)	55 (1.4)	523 (4.9)	8 (0.7)	520 (6.8)	10.8 (0.05)	0.0 (0.08)
Malta	35 (0.8)	535 (2.7)	40 (0.8)	489 (3.3)	26 (0.7)	448 (3.2)	10.3 (0.04)	0
Lebanon	33 (1.5)	445 (5.4)	49 (1.4)	386 (6.3)	17 (1.2)	391 (10.1)	10.5 (0.07)	0.3 (0.09) ▲
Russian Federation	29 (1.0)	563 (5.4)	51 (0.8)	542 (4.5)	20 (1.2)	524 (4.8)	10.2 (0.05)	-0.3 (0.07) ▼
Georgia	24 (1.0)	471 (4.1)	49 (1.3)	439 (3.7)	27 (1.7)	440 (4.5)	10.0 (0.06)	-0.7 (0.09) ▼
Lithuania	19 (1.4)	554 (4.4)	42 (1.1)	518 (3.3)	39 (1.9)	503 (3.8)	9.5 (0.09)	0.1 (0.11)
Hungary	18 (1.0)	557 (5.2)	39 (1.2)	524 (4.4)	43 (1.7)	519 (3.8)	9.4 (0.07)	0.0 (0.08)
Sweden	17 (1.2)	558 (5.8)	43 (1.0)	529 (4.5)	40 (1.6)	511 (3.0)	9.5 (0.07)	0.2 (0.08)
Slovenia	11 (0.7)	585 (5.6)	37 (1.3)	557 (3.2)	53 (1.6)	542 (2.9)	9.0 (0.06)	0.6 (0.07) ▲
International Avg.	27 (0.4)	524 (1.5)	45 (0.4)	489 (1.3)	28 (0.4)	478 (1.6)		

Students Like Learning Earth Science

Earth Science	Very Much Like Learning Earth Science		Like Learning Earth Science		Do Not Like Learning Earth Science		Average Scale Score	Difference in Average Scale Score from 2011
	Percent of Students	Average Achievement	Percent of Students	Average Achievement	Percent of Students	Average Achievement		
Morocco	46 (1.0)	414 (2.5)	44 (0.8)	379 (3.2)	10 (0.6)	386 (4.9)	10.9 (0.05)	0.1 (0.06)
Kazakhstan	39 (1.4)	545 (4.5)	55 (1.2)	527 (5.4)	6 (0.5)	532 (9.3)	10.6 (0.05)	0.0 (0.08)
Georgia	32 (1.1)	468 (4.1)	55 (1.0)	437 (4.0)	14 (0.9)	431 (6.5)	10.3 (0.05)	-0.6 (0.07) ▼
Lithuania	30 (1.3)	535 (4.4)	47 (1.0)	514 (3.4)	23 (1.2)	511 (4.3)	9.9 (0.07)	-0.1 (0.10)
Russian Federation	23 (1.2)	547 (6.5)	54 (1.2)	546 (4.5)	23 (1.4)	540 (4.7)	9.8 (0.06)	-0.1 (0.08)
Malta	20 (0.9)	509 (4.7)	39 (1.0)	474 (3.5)	41 (0.9)	467 (3.0)	9.1 (0.05)	0
Hungary	16 (0.9)	540 (5.6)	40 (1.1)	523 (4.0)	45 (1.7)	528 (3.9)	9.0 (0.07)	0.0 (0.11)
Slovenia	15 (1.0)	558 (4.3)	43 (1.3)	555 (3.0)	42 (1.8)	547 (2.9)	9.0 (0.08)	0.2 (0.10)
Lebanon	--	--	--	--	--	--	--	--
Sweden	--	--	--	--	--	--	--	--
International Avg.	28 (0.4)	515 (1.7)	47 (0.4)	494 (1.4)	25 (0.4)	493 (1.9)		

▲ Significantly higher than 2011
▼ Significantly lower than 2011

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