

Appendix 15B: TIMSS 2015 Context Questionnaire Scales, Eighth Grade

Challenges Facing Teachers Scale, Eighth Grade

The Challenges Facing Teachers (CFT) scale was created based on teachers' degree of agreement with the eight statements described below.

Items in the TIMSS 2015 Challenges Facing Teachers Scale, Eighth Grade

Indicate the extent to which you agree or disagree with each of the following statements.

	Disagree a lot	Disagree a little	Agree a little	Agree a lot
BTBG11A 1) There are too many students in the classes -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BTBG11B 2) I have too much material to cover in class -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BTBG11C 3) I have too many teaching hours -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BTBG11D 4) I need more time to prepare for class -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BTBG11E 5) I need more time to assist individual students -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BTBG11F 6) I feel too much pressure from parents -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BTBG11G 7) I have difficulty keeping up with all the changes to the curriculum-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BTBG11H 8) I have too many administrative tasks -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Few Challenges Some Challenges Many Challenges

10.3 6.7

Item Parameters for the TIMSS 2015 Challenges Facing Teachers Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BTBG11A	0.26540	-0.81039	0.24920	0.56119	1.11
BTBG11B	0.52937	-1.30760	0.16072	1.14688	1.02
BTBG11C	-0.28947	-0.97083	-0.04654	1.01737	0.99
BTBG11D	0.28900	-1.29421	0.29118	1.00303	0.92
BTBG11E	1.32631	-1.39494	0.63027	0.76467	0.97
BTBG11F	-0.97546	-1.30536	-0.17929	1.48465	1.08
BTBG11G	-0.91502	-1.36767	0.12377	1.24390	1.02
BTBG11H	-0.23013	-0.80736	0.14004	0.66732	1.04

Scale Transformation Constants for the TIMSS 2015 Challenges Facing Teachers Scale, Eighth Grade

Scale Transformation Constants	
A = 10.279046	Transformed Scale Score = 10.279046 + 2.114581 • Logit Scale Score
B = 2.114581	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Challenges Facing Teachers Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	1.29542	
1	3.81029	
2	5.08204	
3	5.97972	
4	6.69800	6.7
5	7.30575	
6	7.84015	
7	8.32300	
8	8.76809	
9	9.18765	
10	9.58747	
11	9.97417	
12	10.35346	10.3
13	10.73076	
14	11.11149	
15	11.50149	
16	11.90744	
17	12.33708	
18	12.79739	
19	13.30313	
20	13.87094	
21	14.52876	
22	15.32951	
23	16.43759	
24	18.66344	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Challenges Facing Teachers Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BTBGT1A	BTBGT1B	BTBGT1C	BTBGT1D	BTBGT1E	BTBGT1F	BTBGT1G	BTBGT1H
Australia	0.81	44	0.56	0.66	0.72	0.78	0.70	0.57	0.61	0.66
Bahrain	0.74	36	0.64	0.70	0.73	0.76	0.48	0.37	0.45	0.58
Botswana (9)	0.50	24	0.56	0.54	0.41	0.69	0.59	0.09	0.37	0.44
Canada	0.75	37	0.52	0.62	0.60	0.72	0.63	0.50	0.57	0.66
Chile	0.68	34	0.42	0.56	0.67	0.78	0.75	0.38	0.29	0.65
Chinese Taipei	0.73	36	0.62	0.66	0.67	0.69	0.58	0.67	0.42	0.40
Egypt	0.64	29	0.60	0.61	0.71	0.57	0.44	0.44	0.48	0.38
England	0.80	43	0.58	0.70	0.74	0.79	0.72	0.43	0.60	0.63
Georgia	0.66	31	0.45	0.62	0.51	0.69	0.55	0.49	0.56	0.51
Hong Kong SAR	0.69	33	0.60	0.68	0.32	0.70	0.62	0.56	0.47	0.56
Hungary	0.76	39	0.43	0.63	0.63	0.75	0.74	0.63	0.54	0.61
Iran, Islamic Rep. of	0.62	28	0.44	0.42	0.42	0.63	0.56	0.48	0.64	0.56
Ireland	0.80	42	0.59	0.68	0.71	0.75	0.67	0.51	0.58	0.68
Israel	0.72	34	0.51	0.52	0.52	0.72	0.57	0.66	0.57	0.58
Italy	0.71	34	0.56	0.75	0.32	0.68	0.47	0.46	0.70	0.57
Japan	0.76	38	0.53	0.49	0.60	0.69	0.66	0.63	0.62	0.69
Jordan	0.74	36	0.54	0.58	0.73	0.70	0.54	0.62	0.53	0.53
Kazakhstan	0.67	31	0.43	0.31	0.57	0.63	0.50	0.64	0.66	0.62
Korea, Rep. of	0.82	45	0.65	0.72	0.76	0.78	0.71	0.48	0.59	0.63
Kuwait	0.74	36	0.53	0.54	0.66	0.72	0.59	0.65	0.59	0.49
Lebanon	0.81	42	0.62	0.68	0.67	0.77	0.71	0.47	0.60	0.62
Lithuania	0.66	30	0.46	0.57	0.43	0.65	0.57	0.56	0.58	0.52
Malaysia	0.59	27	0.36	0.21	0.60	0.71	0.44	0.53	0.49	0.66
Malta	0.77	39	0.57	0.59	0.67	0.68	0.65	0.54	0.63	0.65
Morocco	0.66	30	0.58	0.66	0.76	0.61	0.49	0.38	0.42	0.34
New Zealand	0.78	40	0.50	0.56	0.70	0.79	0.72	0.54	0.51	0.68
Norway (9)	0.78	40	0.61	0.63	0.68	0.77	0.62	0.48	0.50	0.70
Oman	0.73	35	0.61	0.65	0.67	0.66	0.56	0.53	0.50	0.52
Qatar	0.74	36	0.54	0.54	0.66	0.69	0.61	0.66	0.56	0.48
Russian Federation	0.66	30	0.49	0.57	0.64	0.69	0.55	0.45	0.59	0.35
Saudi Arabia	0.71	33	0.60	0.58	0.65	0.71	0.55	0.48	0.52	0.46
Singapore	-	-	-	-	-	-	-	-	-	-
Slovenia	0.72	34	0.48	0.63	0.66	0.73	0.58	0.55	0.53	0.50
South Africa (9)	0.70	34	0.49	0.46	0.58	0.72	0.66	0.51	0.59	0.58
Sweden	0.72	35	0.47	0.53	0.73	0.77	0.63	0.52	0.42	0.55
Thailand	0.74	37	0.46	0.63	0.73	0.68	0.54	0.62	0.59	0.56
Turkey	0.72	35	0.49	0.81	0.78	0.70	0.64	0.33	0.42	0.35
United Arab Emirates	0.82	45	0.61	0.71	0.74	0.78	0.69	0.65	0.53	0.64
United States	0.80	42	0.60	0.66	0.66	0.76	0.70	0.51	0.64	0.64
Benchmarking Participants										
Buenos Aires, Argentina	0.79	41	0.58	0.53	0.58	0.83	0.80	0.57	0.51	0.65
Ontario, Canada	0.73	36	0.42	0.61	0.61	0.70	0.60	0.57	0.56	0.68
Quebec, Canada	0.71	34	0.44	0.53	0.64	0.73	0.67	0.38	0.55	0.63
Norway (8)	0.78	40	0.61	0.66	0.67	0.75	0.62	0.54	0.56	0.61
Abu Dhabi, UAE	0.78	41	0.62	0.64	0.72	0.78	0.70	0.55	0.48	0.62
Dubai, UAE	0.84	48	0.51	0.71	0.78	0.79	0.68	0.73	0.64	0.64
Florida, US	0.79	42	0.48	0.64	0.69	0.75	0.76	0.51	0.69	0.64

A dash (-) indicates comparable data not available.

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

Relationship Between the TIMSS 2015 Challenges Facing Teachers Scale, Eighth Grade, and TIMSS 2015 Achievement

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale (η^2)	
	(r)		(r ²)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.03	0.03	0.00	0.00	0.00	0.00
Bahrain	0.08	0.09	0.01	0.01	0.01	0.00
Botswana (9)	0.02	0.09	0.00	0.01	0.00	0.01
Canada	0.02	0.06	0.00	0.00	0.00	0.00
Chile	0.05	0.04	0.00	0.00	0.00	0.02
Chinese Taipei	-0.02	-0.05	0.00	0.00	0.00	0.01
Egypt	0.10	0.09	0.01	0.01	0.01	0.02
England	0.09	0.12	0.01	0.01	0.01	0.02
Georgia	-0.01	0.04	0.00	0.00	0.00	0.00
Hong Kong SAR	-0.01	-0.01	0.00	0.00	0.01	0.01
Hungary	0.01	-0.06	0.00	0.00	0.01	0.01
Iran, Islamic Rep. of	0.01	-0.09	0.00	0.01	0.01	0.01
Ireland	-0.06	0.04	0.00	0.00	0.00	0.00
Israel	-0.01	0.01	0.00	0.00	0.01	0.00
Italy	-0.02	-0.03	0.00	0.00	0.00	0.00
Japan	0.03	0.06	0.00	0.00	0.00	0.00
Jordan	0.03	0.08	0.00	0.01	0.00	0.00
Kazakhstan	0.14	0.09	0.02	0.01	0.01	0.00
Korea, Rep. of	-0.02	-0.03	0.00	0.00	0.00	0.00
Kuwait	0.05	0.07	0.00	0.00	0.01	0.00
Lebanon	0.11	0.07	0.01	0.00	0.01	0.00
Lithuania	-0.12	-0.06	0.02	0.00	0.00	0.00
Malaysia	0.04	0.03	0.00	0.00	0.01	0.01
Malta	-0.13	0.12	0.02	0.01	0.01	0.01
Morocco	0.06	0.09	0.00	0.01	0.00	0.01
New Zealand	-0.07	-0.03	0.01	0.00	0.02	0.00
Norway (9)	-0.01	-0.05	0.00	0.00	0.00	0.00
Oman	0.02	0.03	0.00	0.00	0.00	0.00
Qatar	0.08	-0.01	0.01	0.00	0.00	0.01
Russian Federation	0.06	0.02	0.00	0.00	0.00	0.00
Saudi Arabia	0.15	-0.01	0.02	0.00	0.01	0.00
Singapore	-	-	-	-	-	-
Slovenia	0.04	0.02	0.00	0.00	0.00	0.00
South Africa (9)	0.28	0.23	0.08	0.05	0.11	0.03
Sweden	-0.05	-0.06	0.00	0.00	0.00	0.00
Thailand	0.04	0.04	0.00	0.00	0.01	0.01
Turkey	0.04	0.01	0.00	0.00	0.00	0.01
United Arab Emirates	0.17	0.17	0.03	0.03	0.01	0.01
United States	-0.02	0.01	0.00	0.00	0.01	0.00
International Median	0.03	0.00	0.00	0.00	0.00	0.00
Benchmarking Participants						
Buenos Aires, Argentina	0.14	-0.08	0.02	0.01	0.04	0.01
Ontario, Canada	0.01	0.00	0.00	0.00	0.00	0.00
Quebec, Canada	0.03	0.11	0.00	0.01	0.01	0.01
Norway (8)	-0.04	-0.09	0.00	0.01	0.00	0.01
Abu Dhabi, UAE	0.16	0.16	0.03	0.03	0.00	0.01
Dubai, UAE	0.20	0.13	0.04	0.02	0.02	0.01
Florida, US	0.04	0.02	0.00	0.00	0.01	0.01

A dash (-) indicates comparable data not available.

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

Home Educational Resources Scale, Eighth Grade

The Home Educational Resources (HER) scale was created based on students' responses concerning the availability of three resources described below.

Items in the TIMSS 2015 Home Educational Resources Scale, Eighth Grade

<p>T BSBG04</p>	<p>Number of books in the home:</p> <ul style="list-style-type: none"> 1) 0-10 2) 11-25 3) 26-100 <li style="background-color: #00728f; color: white;">4) 101-200 5) More than 200 	<p>Highest level of education of either parent:</p> <ul style="list-style-type: none"> 1) Finished some primary or lower secondary or did not go to school 2) Finished lower secondary 3) Finished upper secondary 4) Finished post-secondary education <li style="background-color: #00728f; color: white;">5) Finished university or higher 	<p>T BSDGEDUP¹</p>
<p>T BSDG06S¹</p>	<p>Number of home study supports:</p> <ul style="list-style-type: none"> 1) None 2) Internet connection or own room <li style="background-color: #00728f; color: white;">3) Both 		

T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

1 Derived variable. For more details, see Supplement 3 of the User Guide for the [TIMSS 2015 International Database](#).

Item Parameters for the TIMSS 2015 Home Educational Resources Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	tau_4	Infit
BSBG04	0.83301	-1.03371	-0.22069	0.78431	0.47009	1.00
BSDG06S	-0.73962	-0.64211	0.64211			0.97
BSDGEDUP	-0.09339	-0.73961	-0.50760	0.77465	0.47256	0.97

Scale Transformation Constants for the TIMSS 2015 Home Educational Resources Scale, Eighth Grade

Scale Transformation Constants	
A = 9.211881	Transformed Scale Score = 9.211881 + 1.80992 • Logit Scale Score
B = 1.80992	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Home Educational Resources Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	4.23163	
1	6.35011	
2	7.44587	
3	8.27061	8.3
4	8.97690	
5	9.62284	
6	10.26361	
7	10.91820	
8	11.62210	
9	12.45383	12.4
10	13.88377	

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

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Home Educational Resources Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Factor Loadings for Each Item		
			BS3G04	BS0G06S	BS3G06UP
Australia	0.40	46	0.77	0.42	0.78
Bahrain	0.40	46	0.70	0.52	0.79
Botswana (9)	0.47	50	0.63	0.71	0.77
Canada	0.35	44	0.77	0.38	0.77
Chile	0.44	48	0.69	0.57	0.79
Chinese Taipei	0.46	48	0.81	0.34	0.82
Egypt	0.39	46	0.57	0.70	0.75
England	0.44	47	0.80	0.37	0.80
Georgia	0.54	53	0.79	0.58	0.79
Hong Kong SAR	0.50	51	0.75	0.56	0.80
Hungary	0.56	54	0.87	0.33	0.87
Iran, Islamic Rep. of	0.63	59	0.75	0.71	0.83
Ireland	0.42	47	0.80	0.30	0.82
Israel	0.51	68	0.82	-	0.82
Italy	0.46	48	0.80	0.37	0.82
Japan	0.34	44	0.73	0.45	0.76
Jordan	0.46	49	0.64	0.67	0.77
Kazakhstan	0.50	51	0.76	0.68	0.70
Korea, Rep. of	0.41	47	0.74	0.54	0.75
Kuwait	0.27	40	0.71	0.36	0.76
Lebanon	0.37	44	0.71	0.48	0.77
Lithuania	0.45	49	0.78	0.48	0.78
Malaysia	0.52	51	0.71	0.66	0.78
Malta	0.37	45	0.80	0.16	0.82
Morocco	0.55	54	0.73	0.69	0.77
New Zealand	0.43	48	0.77	0.57	0.73
Norway (9)	0.38	47	0.77	0.44	0.78
Oman	0.44	48	0.63	0.65	0.78
Qatar	0.34	43	0.71	0.43	0.78
Russian Federation	0.39	45	0.78	0.36	0.78
Saudi Arabia	0.38	45	0.68	0.50	0.79
Singapore	0.44	48	0.73	0.53	0.79
Slovenia	0.43	47	0.80	0.31	0.82
South Africa (9)	0.45	48	0.61	0.71	0.75
Sweden	0.39	46	0.79	0.46	0.75
Thailand	0.49	50	0.73	0.60	0.78
Turkey	0.62	58	0.78	0.70	0.80
United Arab Emirates	0.35	44	0.72	0.51	0.73
United States	0.47	49	0.73	0.55	0.80
Benchmarking Participants					
Buenos Aires, Argentina	0.58	54	0.78	0.58	0.83
Ontario, Canada	0.36	45	0.76	0.44	0.76
Quebec, Canada	0.38	45	0.80	0.27	0.80
Norway (8)	0.37	46	0.76	0.41	0.78
Abu Dhabi, UAE	0.34	43	0.72	0.48	0.74
Dubai, UAE	0.38	45	0.73	0.57	0.71
Florida, US	0.43	48	0.72	0.56	0.78

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

A dash (-) indicates comparable data not available.

Relationship Between the TIMSS 2015 Home Educational Resources Scale, Eighth Grade, and TIMSS 2015 Achievement

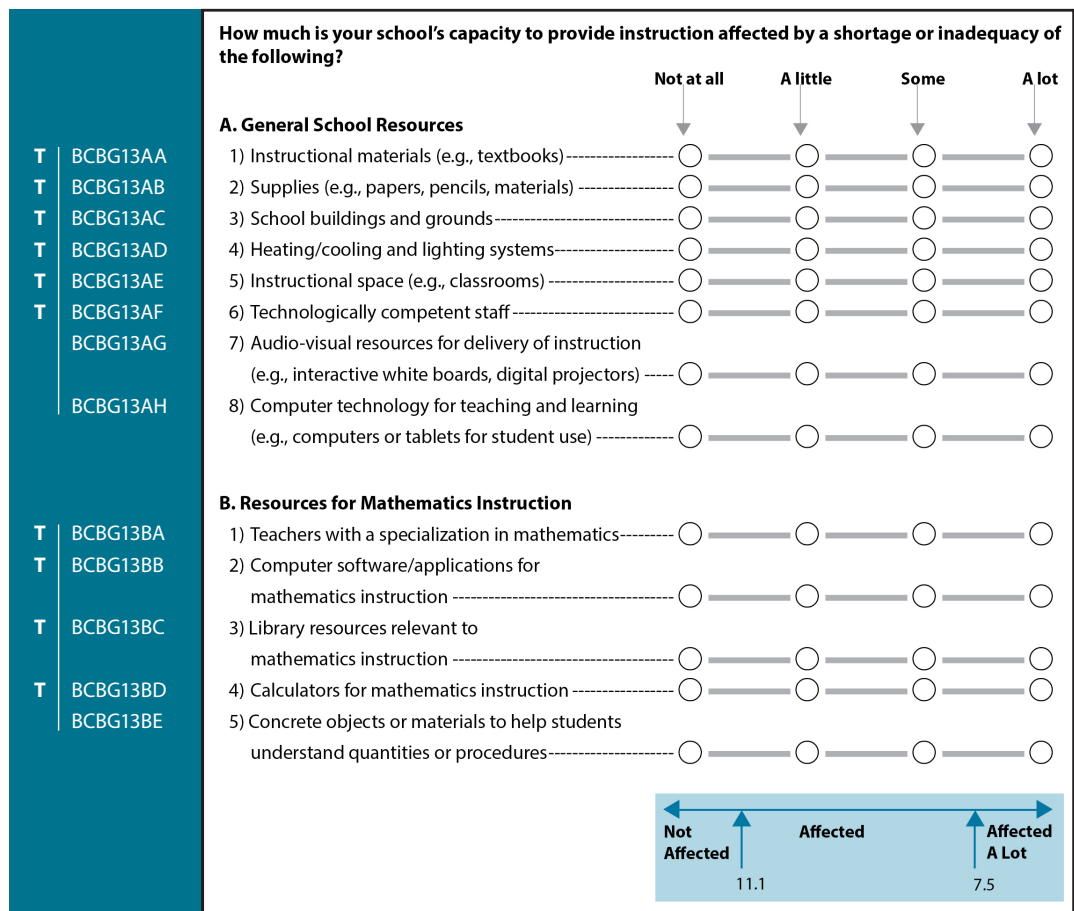
Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale (η^2)	
	(r)		(r)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.38	0.45	0.15	0.20	0.09	0.13
Bahrain	0.26	0.26	0.07	0.07	0.03	0.03
Botswana (9)	0.18	0.18	0.03	0.03	0.03	0.03
Canada	0.33	0.40	0.11	0.16	0.07	0.10
Chile	0.38	0.38	0.15	0.14	0.08	0.08
Chinese Taipei	0.44	0.47	0.19	0.22	0.14	0.15
Egypt	0.21	0.20	0.05	0.04	0.04	0.03
England	0.48	0.52	0.23	0.27	0.17	0.19
Georgia	0.35	0.36	0.12	0.13	0.07	0.09
Hong Kong SAR	0.29	0.30	0.08	0.09	0.06	0.06
Hungary	0.60	0.57	0.37	0.32	0.27	0.24
Iran, Islamic Rep. of	0.40	0.41	0.16	0.17	0.13	0.14
Ireland	0.45	0.48	0.20	0.23	0.13	0.15
Israel	0.45	0.47	0.20	0.22	0.09	0.09
Italy	0.39	0.42	0.15	0.17	0.11	0.13
Japan	0.39	0.35	0.15	0.13	0.10	0.08
Jordan	0.28	0.33	0.08	0.11	0.05	0.07
Kazakhstan	0.17	0.18	0.03	0.03	0.02	0.02
Korea, Rep. of	0.35	0.33	0.12	0.11	0.10	0.09
Kuwait	0.28	0.28	0.08	0.08	0.04	0.04
Lebanon	0.23	0.26	0.05	0.07	0.04	0.04
Lithuania	0.41	0.43	0.17	0.18	0.10	0.11
Malaysia	0.32	0.33	0.10	0.11	0.07	0.07
Malta	0.39	0.41	0.15	0.17	0.11	0.12
Morocco	0.20	0.15	0.04	0.02	0.03	0.02
New Zealand	0.47	0.50	0.22	0.25	0.13	0.15
Norway (9)	0.38	0.42	0.15	0.17	0.10	0.12
Oman	0.21	0.17	0.04	0.03	0.03	0.02
Qatar	0.40	0.37	0.16	0.14	0.09	0.08
Russian Federation	0.22	0.26	0.05	0.07	0.02	0.03
Saudi Arabia	0.23	0.25	0.05	0.06	0.03	0.03
Singapore	0.38	0.42	0.15	0.18	0.09	0.11
Slovenia	0.34	0.38	0.12	0.14	0.06	0.08
South Africa (9)	0.30	0.31	0.09	0.10	0.07	0.07
Sweden	0.42	0.45	0.17	0.21	0.11	0.15
Thailand	0.32	0.33	0.10	0.11	0.07	0.08
Turkey	0.45	0.43	0.21	0.19	0.16	0.15
United Arab Emirates	0.35	0.34	0.12	0.11	0.07	0.07
United States	0.40	0.42	0.16	0.17	0.11	0.12
International Median	0.35	0.37	0.12	0.13	0.08	0.08
Benchmarking Participants						
Buenos Aires, Argentina	0.44	0.41	0.19	0.17	0.13	0.11
Ontario, Canada	0.36	0.41	0.13	0.17	0.09	0.11
Quebec, Canada	0.36	0.42	0.13	0.17	0.07	0.10
Norway (8)	0.37	0.39	0.14	0.15	0.08	0.09
Abu Dhabi, UAE	0.35	0.34	0.12	0.11	0.08	0.07
Dubai, UAE	0.36	0.36	0.13	0.13	0.08	0.08
Florida, US	0.39	0.41	0.15	0.17	0.10	0.11

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

Instruction Affected by Mathematics Resource Shortages—Principals’ Reports Scale, Eighth Grade

The Instruction Affected by Mathematics Resource Shortages—Principals’ Reports (MRS) scale was created based on principals’ responses concerning thirteen school and classroom resources described below.

Items in the TIMSS 2015 Instruction Affected by Mathematics Resource Shortages—Principals’ Reports Scale, Eighth Grade



T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 Instruction Affected by Mathematics Resource Shortages - Principals' Reports Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BCBG13AA	-0.04723	-0.20396	0.02271	0.18125	0.88
BCBG13AB	-0.38064	-0.32518	0.24639	0.07879	0.92
BCBG13AC	0.12618	-0.78991	0.12928	0.66063	0.98
BCBG13AD	-0.12528	-0.57654	-0.01616	0.59270	0.96
BCBG13AE	0.21910	-0.43871	-0.10609	0.54480	0.95
BCBG13AF	0.07215	-1.21154	-0.05087	1.26241	0.96
BCBG13AG	0.09524	-1.07963	-0.04438	1.12401	1.00
BCBG13AH	0.28516	-1.19894	-0.00568	1.20462	1.06
BCBG13BA	0.12677	0.02370	-0.11510	0.09140	1.11
BCBG13BB	0.12244	-1.32815	-0.01581	1.34396	1.07
BCBG13BC	-0.04954	-1.36712	0.02456	1.34256	1.15
BCBG13BD	-0.46499	-0.67455	0.07619	0.59836	1.20
BCBG13BE	0.02064	-1.30083	-0.05970	1.36053	0.92

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

Scale Transformation Constants for the TIMSS 2015 Instruction Affected by Mathematics Resource Shortages - Principals' Reports Scale, Eighth Grade

Scale Transformation Constants	
A = 9.262831	Transformed Scale Score = 9.262831 + 1.251401 • Logit Scale Score
B = 1.251401	

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Instruction Affected by Mathematics Resource Shortages -
Principals' Reports Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	4.04996	
1	5.45622	
2	6.12504	
3	6.57408	
4	6.91534	
5	7.19218	
6	7.42599	7.5
7	7.62978	
8	7.81111	
9	7.97519	
10	8.12581	
11	8.26498	
12	8.39677	
13	8.52184	
14	8.64142	
15	8.75664	
16	8.86846	
17	8.97780	
18	9.08546	
19	9.19223	
20	9.30022	
21	9.40600	
22	9.51449	
23	9.62507	
24	9.73861	
25	9.85602	
26	9.97832	
27	10.10663	
28	10.24143	
29	10.38614	
30	10.54233	
31	10.71284	
32	10.90148	
33	11.11347	11.1
34	11.35656	
35	11.64345	
36	11.99552	
37	12.45578	
38	13.13639	
39	14.55441	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Instruction Affected by Mathematics Resource Shortages - Principals' Reports Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item													
			BCBG13AA	BCBG13AB	BCBG13AC	BCBG13AD	BCBG13AE	BCBG13AF	BCBG13AG	BCBG13AH	BCBG13BA	BCBG13BB	BCBG13BC	BCBG13BD	BCBG13BE	
Australia	0.92	52	0.76	0.74	0.64	0.62	0.69	0.79	0.78	0.76	0.51	0.72	0.74	0.79	0.76	
Bahrain	0.96	64	0.92	0.88	0.85	0.90	0.89	0.87	0.87	0.81	0.78	0.71	0.54	0.64	0.62	
Botswana (9)	0.76	31	0.46	0.07	0.50	0.53	0.53	0.25	0.81	0.80	-0.32	0.77	0.75	0.03	0.67	
Canada	0.90	45	0.70	0.66	0.53	0.36	0.58	0.71	0.71	0.74	0.67	0.79	0.81	0.72	0.65	
Chile	0.91	47	0.69	0.71	0.65	0.56	0.71	0.73	0.76	0.71	0.62	0.59	0.72	0.67	0.77	
Chinese Taipei	0.87	41	0.60	0.66	0.62	0.66	0.68	0.64	0.63	0.64	0.55	0.68	0.67	0.55	0.68	
Egypt	0.81	32	0.52	0.37	0.67	0.35	0.57	0.68	0.53	0.69	0.58	0.67	0.50	0.54	0.57	
England	0.89	45	0.76	0.68	0.67	0.72	0.57	0.64	0.75	0.69	0.44	0.73	0.69	0.60	0.69	
Georgia	0.88	43	0.53	0.73	0.70	0.62	0.75	0.68	0.66	0.77	0.60	0.64	0.67	0.47	0.63	
Hong Kong SAR	0.94	58	0.81	0.84	0.77	0.84	0.76	0.77	0.76	0.69	0.73	0.69	0.76	0.72	0.74	
Hungary	0.89	43	0.67	0.71	0.73	0.71	0.66	0.53	0.69	0.70	0.63	0.60	0.57	0.57	0.74	
Iran, Islamic Rep. of	0.89	44	0.75	0.74	0.71	0.75	0.76	0.74	0.66	0.60	0.67	0.57	0.50	0.50	0.60	
Ireland	0.89	44	0.67	0.70	0.60	0.63	0.63	0.62	0.77	0.62	0.57	0.76	0.50	0.70	0.79	
Israel	0.93	55	0.79	0.83	0.67	0.77	0.68	0.78	0.69	0.60	0.80	0.74	0.72	0.76	0.80	
Italy	0.82	34	0.57	-	0.53	0.44	0.48	0.54	0.65	0.67	0.51	0.73	0.56	0.59	0.68	
Japan	0.93	54	0.82	0.79	0.80	0.77	0.86	0.65	0.69	0.72	0.80	0.60	0.72	0.54	0.76	
Jordan	0.89	43	0.76	0.76	0.79	0.70	0.78	0.73	0.47	0.72	0.73	0.53	0.36	0.35	0.59	
Kazakhstan	0.94	57	0.73	0.70	0.70	0.80	0.77	0.80	0.80	0.75	0.83	0.69	0.86	0.62	0.78	
Korea, Rep. of	0.94	57	0.75	0.79	0.78	0.81	0.80	0.74	0.74	0.73	0.79	0.75	0.74	0.66	0.73	
Kuwait	0.94	56	0.82	0.79	0.79	0.85	0.85	0.78	0.70	0.69	0.87	0.64	0.48	0.70	0.70	
Lebanon	0.90	46	0.81	0.83	0.80	0.69	0.81	0.63	0.52	0.35	0.74	0.49	0.45	0.74	0.70	
Lithuania	0.90	45	0.60	0.65	0.67	0.64	0.56	0.64	0.72	0.74	0.58	0.73	0.72	0.65	0.77	
Malaysia	0.92	50	0.77	0.69	0.77	0.63	0.76	0.72	0.54	0.43	0.79	0.71	0.73	0.80	0.75	
Malta	0.89	48	0.82	0.77	0.66	0.68	0.66	0.82	0.74	0.71	0.84	0.54	0.41	0.74	0.50	
Morocco	0.69	39	-0.27	-0.14	-0.38	0.29	-0.59	0.70	0.67	0.76	-0.62	0.82	0.83	0.74	0.72	
New Zealand	0.88	41	0.71	0.60	0.56	0.66	0.48	0.63	0.65	0.71	0.54	0.68	0.65	0.70	0.72	
Norway (9)	0.83	35	0.63	0.53	0.72	0.62	0.62	0.60	0.51	0.47	0.57	0.62	0.58	0.60	0.56	
Oman	0.92	53	0.80	0.72	0.69	0.82	0.80	0.81	0.75	0.62	0.77	0.69	0.65	0.58	0.71	
Qatar	0.98	79	0.90	0.90	0.88	0.94	0.90	0.93	0.90	0.92	0.92	0.87	0.82	0.76	0.90	
Russian Federation	0.88	41	0.65	0.57	0.55	0.71	0.56	0.66	0.70	0.66	0.58	0.73	0.67	0.54	0.70	
Saudi Arabia	0.90	47	0.73	0.66	0.70	0.81	0.77	0.68	0.58	0.76	0.69	0.61	0.35	0.70	0.74	
Singapore	0.98	80	0.93	0.87	0.87	0.89	0.91	0.86	0.87	0.90	0.91	0.89	0.89	0.92	0.91	
Slovenia	0.84	35	0.53	0.60	0.49	0.54	0.54	0.51	0.73	0.72	0.11	0.68	0.68	0.58	0.72	
South Africa (9)	0.84	36	0.42	0.20	0.50	0.70	0.49	0.67	0.78	0.78	0.28	0.74	0.69	0.50	0.71	
Sweden	0.85	38	0.72	0.69	0.59	0.60	0.54	0.63	0.65	0.62	0.66	0.65	0.37	0.48	0.70	
Thailand	0.92	52	0.78	0.80	0.73	0.70	0.73	0.74	0.64	0.80	0.67	0.66	0.72	0.62	0.74	
Turkey	0.88	41	0.65	0.63	0.65	0.67	0.67	0.54	0.68	0.63	0.59	0.62	0.61	0.53	0.79	
United Arab Emirates	0.96	70	0.87	0.84	0.85	0.87	0.86	0.88	0.85	0.86	0.87	0.75	0.76	0.73	0.84	
United States	0.91	49	0.71	0.66	0.66	0.64	0.69	0.68	0.77	0.68	0.69	0.79	0.69	0.67	0.77	
Benchmarking Participants																
Buenos Aires, Argentina	0.95	62	0.84	0.82	0.77	0.83	0.79	0.79	0.66	0.73	0.68	0.74	0.89	0.83	0.81	
Ontario, Canada	0.88	43	0.63	0.65	0.59	0.22	0.56	0.67	0.69	0.77	0.54	0.76	0.82	0.70	0.70	
Quebec, Canada	0.91	49	0.79	0.72	0.66	0.74	0.74	0.66	0.66	0.68	0.75	0.69	0.67	0.77	0.56	
Norway (8)	0.84	36	0.66	0.61	0.72	0.63	0.62	0.62	0.56	0.47	0.58	0.57	0.54	0.63	0.57	
Abu Dhabi, UAE	0.96	66	0.87	0.85	0.84	0.83	0.85	0.86	0.83	0.78	0.85	0.62	0.72	0.77	0.82	
Dubai, UAE	0.97	76	0.91	0.89	0.85	0.91	0.83	0.94	0.88	0.90	0.91	0.86	0.83	0.71	0.91	
Florida, US	0.89	45	0.79	0.76	0.67	0.56	0.79	0.70	0.70	0.78	0.30	0.80	0.58	0.53	0.64	

A dash (-) indicates comparable data not available.

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

Relationship Between the TIMSS 2015 Instruction Affected by Mathematics Resource Shortages - Principals' Reports Scale, Eighth Grade, and TIMSS 2015 Mathematics Achievement

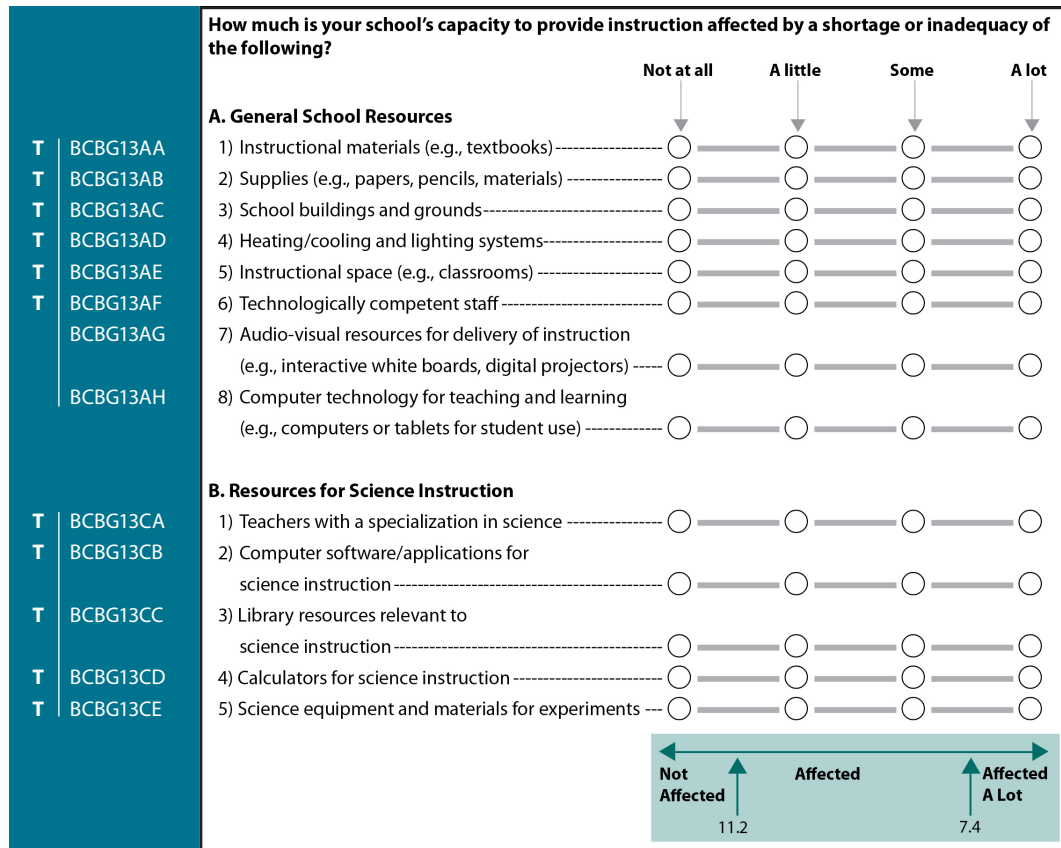
Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r ²)	
Australia	0.22	0.05	0.02
Bahrain	0.16	0.03	0.05
Botswana (9)	0.21	0.04	0.06
Cana	0.11	0.01	0.02
Chile	0.18	0.03	0.03
Chinese Taipei	0.15	0.02	0.01
Egypt	-0.14	0.02	0.01
England	0.18	0.03	0.02
Georgia	0.05	0.00	0.00
Hong Kong SAR	0.04	0.00	0.00
Hungary	0.05	0.00	0.00
Iran, Islamic Rep. of	0.13	0.02	0.03
Ireland	0.05	0.00	0.00
Israel	0.28	0.08	0.09
Italy	0.09	0.01	0.01
Japan	0.04	0.00	0.00
Jordan	-0.14	0.02	0.04
Kazakhstan	-0.05	0.00	0.01
Korea, Rep. of	-0.06	0.00	0.00
Kuwait	0.19	0.04	0.08
Lebanon	0.08	0.01	0.03
Lithuania	-0.06	0.00	0.00
Malaysia	-0.15	0.02	0.01
Malta	0.09	0.01	0.01
Morocco	-0.12	0.01	0.03
New Zealand	0.11	0.01	0.01
Norway (9)	0.06	0.00	0.00
Oman	0.00	0.00	0.01
Qatar	0.17	0.03	0.04
Russian Federation	0.07	0.00	0.01
Saudi Arabia	-0.08	0.01	0.01
Singapore	0.02	0.00	0.00
Slovenia	-0.03	0.00	0.00
South Africa (9)	0.20	0.04	0.07
Sweden	-0.05	0.00	0.00
Thailand	0.15	0.02	0.01
Turkey	0.07	0.01	0.01
United Arab Emirates	0.24	0.06	0.08
United States	0.17	0.03	0.04
International Median	0.07	0.01	0.01
Benchmarking Participants			
Buenos Aires, Argentina	0.34	0.12	0.08
Ontario, Canada	0.05	0.00	0.00
Quebec, Canada	0.11	0.01	0.01
Norway (8)	0.03	0.00	0.00
Abu Dhabi, UAE	0.09	0.01	0.06
Dubai, UAE	0.28	0.08	0.08
Florida, US	0.11	0.01	0.02

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

Instruction Affected by Science Resource Shortages—Principals’ Reports Scale, Eighth Grade

The Instruction Affected by Science Resource Shortages—Principals’ Reports (SRS) scale was created based on principals’ responses concerning thirteen school and classroom resources described below.

Items in the TIMSS 2015 Instruction Affected by Science Resource Shortages—Principals’ Reports Scale, Eighth Grade



T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 Instruction Affected by Science Resource Shortages - Principals' Reports Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BCBG13AA	-0.07780	-0.22995	0.02106	0.20889	0.90
BCBG13AB	-0.41924	-0.35188	0.24401	0.10787	0.95
BCBG13AC	0.09925	-0.82065	0.12894	0.69171	1.01
BCBG13AD	-0.15762	-0.60587	-0.01709	0.62296	0.98
BCBG13AE	0.19292	-0.46731	-0.10673	0.57404	0.97
BCBG13AF	0.04432	-1.24596	-0.05161	1.29757	0.97
BCBG13AG	0.06683	-1.11291	-0.04548	1.15839	1.01
BCBG13AH	0.26152	-1.23259	-0.00701	1.23960	1.07
BCBG13CA	0.05892	0.12619	-0.14295	0.01676	1.07
BCBG13CB	0.17201	-1.33922	-0.06466	1.40388	1.06
BCBG13CC	-0.05514	-1.36034	0.00995	1.35039	1.06
BCBG13CD	-0.56666	-0.75165	0.04489	0.70676	1.40
BCBG13CE	0.38069	-0.81880	-0.11198	0.93078	0.85

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

Scale Transformation Constants for the TIMSS 2015 Instruction Affected by Science Resource Shortages - Principals' Reports Scale, Eighth Grade

Scale Transformation Constants	
A = 9.315269	Transformed Scale Score = 9.315269 + 1.309226 • Logit Scale Score
B = 1.309226	

Equivalence Table of Raw and Transformed Scale Scores for the TIMSS 2015 Instruction Affected by Science Resource Shortages - Principals' Reports Scale, Eighth Grade

Raw Score	Transformed Scale Score	Cutpoint
0	3.88612	
1	5.35335	
2	6.04930	
3	6.51561	
4	6.86952	
5	7.15639	
6	7.39861	7.4
7	7.60979	
8	7.79773	
9	7.96788	
10	8.12416	
11	8.26869	
12	8.40566	
13	8.53569	
14	8.66008	
15	8.77999	
16	8.89646	
17	9.01042	
18	9.12273	
19	9.23419	
20	9.34677	
21	9.45769	
22	9.57129	
23	9.68719	
24	9.80631	
25	9.92960	
26	10.05811	
27	10.19300	
28	10.33482	
29	10.48712	
30	10.65148	
31	10.83088	
32	11.02928	
33	11.25210	11.2
34	11.50748	
35	11.80866	
36	12.17806	
37	12.66071	
38	13.37405	
39	14.85907	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Instruction Affected by Science Resource Shortages - Principals' Reports Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item												
			BCBG13AA	BCBG13AB	BCBG13AC	BCBG13AD	BCBG13AE	BCBG13AF	BCBG13AG	BCBG13AH	BCBG13CA	BCBG13CB	BCBG13CC	BCBG13CD	BCBG13CE
Australia	0.92	52	0.74	0.73	0.64	0.61	0.68	0.78	0.77	0.78	0.61	0.74	0.76	0.79	0.74
Bahrain	0.96	68	0.92	0.88	0.85	0.90	0.89	0.87	0.87	0.80	0.85	0.75	0.70	0.50	0.85
Botswana (9)	0.76	31	0.47	0.12	0.50	0.54	0.53	0.29	0.79	0.78	-0.29	0.74	0.72	0.35	0.63
Canada	0.90	47	0.69	0.63	0.58	0.39	0.64	0.73	0.69	0.72	0.70	0.77	0.86	0.67	0.74
Chile	0.91	48	0.63	0.63	0.68	0.60	0.70	0.72	0.75	0.69	0.64	0.71	0.78	0.63	0.78
Chinese Taipei	0.87	40	0.59	0.65	0.64	0.65	0.70	0.65	0.63	0.65	0.53	0.65	0.60	0.52	0.72
Egypt	0.82	34	0.55	0.40	0.71	0.31	0.60	0.66	0.52	0.68	0.62	0.67	0.58	0.44	0.67
England	0.89	47	0.75	0.68	0.71	0.68	0.56	0.63	0.78	0.71	0.56	0.74	0.70	0.60	0.78
Georgia	0.87	41	0.55	0.72	0.68	0.64	0.75	0.69	0.66	0.77	0.64	0.60	0.65	0.30	0.57
Hong Kong SAR	0.94	58	0.81	0.83	0.74	0.84	0.74	0.77	0.75	0.70	0.76	0.69	0.77	0.67	0.81
Hungary	0.89	44	0.65	0.71	0.73	0.71	0.69	0.53	0.70	0.70	0.57	0.65	0.67	0.56	0.68
Iran, Islamic Rep. of	0.89	44	0.74	0.73	0.71	0.76	0.78	0.75	0.63	0.56	0.68	0.61	0.56	0.22	0.69
Ireland	0.89	45	0.66	0.70	0.63	0.64	0.65	0.61	0.79	0.61	0.56	0.77	0.46	0.74	0.79
Israel	0.93	54	0.79	0.82	0.69	0.78	0.68	0.78	0.69	0.60	0.73	0.78	0.75	0.67	0.76
Italy	0.82	34	0.55	-	0.57	0.47	0.55	0.54	0.65	0.66	0.51	0.72	0.66	0.50	0.60
Japan	0.93	55	0.83	0.79	0.81	0.77	0.87	0.64	0.68	0.72	0.81	0.64	0.74	0.53	0.79
Jordan	0.90	45	0.77	0.76	0.81	0.68	0.78	0.71	0.45	0.72	0.75	0.54	0.45	0.30	0.77
Kazakhstan	0.94	57	0.76	0.69	0.67	0.80	0.76	0.82	0.79	0.73	0.80	0.76	0.82	0.56	0.80
Korea, Rep. of	0.94	59	0.76	0.79	0.77	0.80	0.78	0.73	0.73	0.75	0.81	0.80	0.81	0.64	0.80
Kuwait	0.94	57	0.82	0.79	0.77	0.84	0.86	0.76	0.70	0.70	0.86	0.72	0.60	0.51	0.83
Lebanon	0.91	48	0.80	0.84	0.80	0.67	0.82	0.63	0.53	0.33	0.79	0.70	0.49	0.66	0.74
Lithuania	0.89	44	0.64	0.68	0.67	0.67	0.54	0.66	0.70	0.72	0.56	0.77	0.73	0.54	0.69
Malaysia	0.91	50	0.77	0.70	0.78	0.62	0.77	0.70	0.52	0.44	0.80	0.76	0.76	0.67	0.80
Malta	0.90	50	0.79	0.73	0.65	0.66	0.65	0.82	0.76	0.70	0.77	0.48	0.54	0.67	0.85
Morocco	0.69	35	-0.25	-0.09	-0.37	0.32	-0.59	0.69	0.71	0.76	-0.60	0.71	0.81	0.81	0.35
New Zealand	0.89	44	0.73	0.61	0.57	0.67	0.51	0.66	0.62	0.69	0.64	0.69	0.75	0.70	0.72
Norway (9)	0.83	33	0.60	0.50	0.71	0.59	0.60	0.60	0.54	0.49	0.55	0.59	0.58	0.45	0.67
Oman	0.99	60	0.81	0.74	0.68	0.81	0.78	0.81	0.77	0.66	0.81	0.76	0.73	0.49	1.10
Qatar	0.98	79	0.90	0.89	0.88	0.94	0.90	0.93	0.91	0.92	0.93	0.85	0.85	0.73	0.94
Russian Federation	0.88	43	0.64	0.58	0.53	0.69	0.55	0.66	0.71	0.69	0.63	0.76	0.70	0.55	0.76
Saudi Arabia	0.91	50	0.72	0.65	0.73	0.81	0.76	0.68	0.60	0.75	0.76	0.71	0.57	0.64	0.76
Singapore	0.98	80	0.93	0.87	0.87	0.90	0.90	0.86	0.87	0.89	0.91	0.90	0.87	0.91	0.93
Slovenia	0.83	34	0.49	0.59	0.50	0.52	0.56	0.50	0.73	0.74	0.12	0.67	0.69	0.52	0.72
South Africa (9)	0.86	40	0.38	0.18	0.50	0.69	0.48	0.66	0.77	0.75	0.51	0.78	0.73	0.66	0.77
Sweden	0.85	37	0.72	0.67	0.60	0.59	0.53	0.62	0.67	0.64	0.63	0.60	0.35	0.51	0.69
Thailand	0.92	53	0.77	0.79	0.73	0.72	0.73	0.61	0.80	0.71	0.77	0.75	0.57	0.74	0.74
Turkey	0.88	42	0.67	0.63	0.65	0.71	0.71	0.53	0.68	0.62	0.63	0.65	0.61	0.43	0.80
United Arab Emirates	0.97	71	0.87	0.85	0.85	0.88	0.86	0.88	0.84	0.85	0.88	0.78	0.80	0.73	0.89
United States	0.91	50	0.70	0.63	0.65	0.63	0.70	0.69	0.78	0.72	0.69	0.79	0.75	0.65	0.74
Benchmarking Participants															
Buenos Aires, Argentina	0.94	60	0.83	0.82	0.78	0.82	0.79	0.78	0.65	0.72	0.69	0.73	0.85	0.81	0.77
Ontario, Canada	0.88	42	0.62	0.63	0.62	0.26	0.63	0.70	0.66	0.74	0.56	0.72	0.83	0.65	0.70
Quebec, Canada	0.93	54	0.78	0.70	0.71	0.74	0.78	0.64	0.68	0.68	0.81	0.72	0.85	0.69	0.74
Norway (8)	0.84	35	0.63	0.57	0.72	0.61	0.61	0.62	0.58	0.49	0.56	0.56	0.55	0.47	0.68
Abu Dhabi, UAE	0.96	68	0.88	0.84	0.84	0.84	0.85	0.85	0.82	0.78	0.87	0.66	0.80	0.78	0.88
Dubai, UAE	0.98	78	0.91	0.89	0.85	0.91	0.85	0.93	0.88	0.91	0.92	0.88	0.88	0.72	0.94
Florida, US	0.91	49	0.75	0.73	0.75	0.51	0.81	0.66	0.65	0.77	0.52	0.78	0.65	0.61	0.80

A dash (-) indicates comparable data not available.

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

Relationship Between the TIMSS 2015 Instruction Affected by Science Resource Shortages - Principals' Reports Scale, Eighth Grade, and TIMSS 2015 Science Achievement

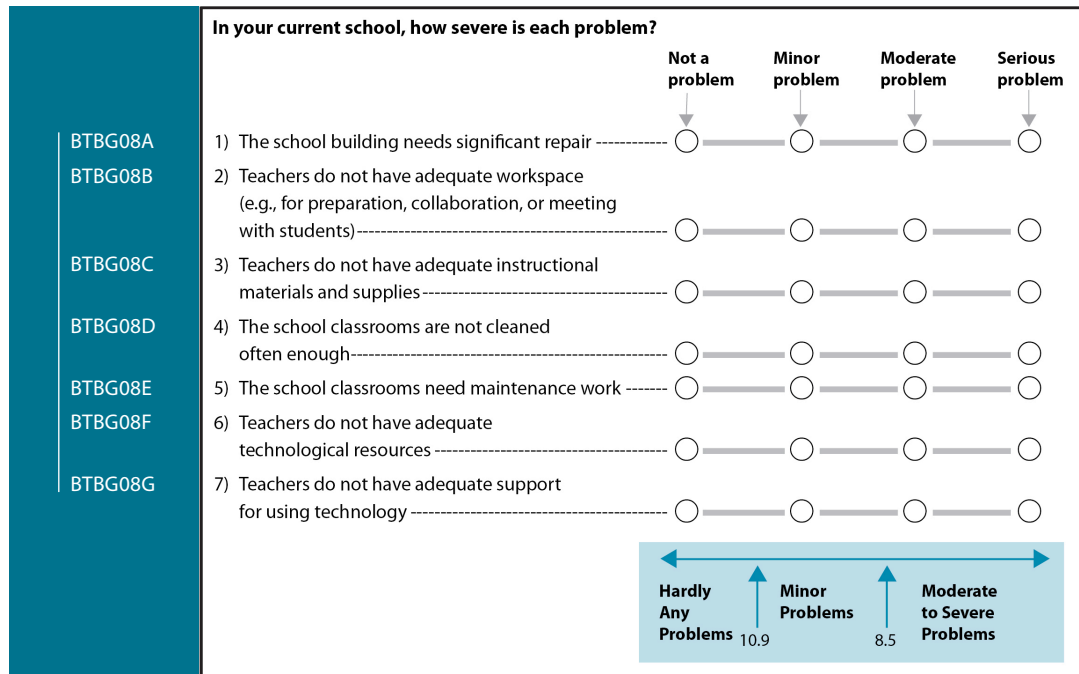
Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r ²)	
Australia	0.19	0.04	0.01
Bahrain	0.17	0.03	0.03
Botswana (9)	0.20	0.04	0.05
Canada	0.07	0.01	0.01
Chile	0.18	0.03	0.04
Chinese Taipei	0.15	0.02	0.03
Egypt	-0.12	0.02	0.02
England	0.15	0.02	0.01
Georgia	0.07	0.01	0.01
Hong Kong SAR	0.05	0.00	0.00
Hungary	0.03	0.00	0.00
Iran, Islamic Rep. of	0.13	0.02	0.03
Ireland	0.03	0.00	0.00
Israel	0.28	0.08	0.06
Italy	0.09	0.01	0.00
Japan	0.02	0.00	0.00
Jordan	-0.13	0.02	0.04
Kazakhstan	-0.08	0.01	0.01
Korea, Rep. of	-0.04	0.00	0.00
Kuwait	0.14	0.02	0.07
Lebanon	0.09	0.01	0.05
Lithuania	-0.05	0.00	0.00
Malaysia	-0.16	0.02	0.02
Malta	0.09	0.01	0.01
Morocco	-0.08	0.01	0.02
New Zealand	0.12	0.01	0.01
Norway (9)	0.09	0.01	0.01
Oman	-0.02	0.00	0.00
Qatar	0.15	0.02	0.03
Russian Federation	0.10	0.01	0.00
Saudi Arabia	-0.07	0.00	0.02
Singapore	0.02	0.00	0.00
Slovenia	-0.02	0.00	0.00
South Africa (9)	0.17	0.03	0.07
Sweden	-0.06	0.00	0.00
Thailand	0.11	0.01	0.01
Turkey	0.06	0.00	0.01
United Arab Emirates	0.21	0.04	0.07
United States	0.17	0.03	0.02
International Median	0.09	0.01	0.01
Benchmarking Participants			
Buenos Aires, Argentina	0.30	0.09	0.08
Ontario, Canada	0.02	0.00	0.00
Quebec, Canada	0.12	0.02	0.01
Norway (8)	0.05	0.00	0.00
Abu Dhabi, UAE	0.06	0.00	0.05
Dubai, UAE	0.24	0.06	0.07
Florida, US	-0.01	0.00	0.05

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

Problems with School Conditions and Resources–Teachers’ Reports Scale, Eighth Grade

The Problems with School Conditions and Resources–Teachers’ Reports (SCR) scale was created based on teachers’ responses concerning seven conditions and resources described below.

Items in the TIMSS 2015 Problems with School Conditions and Resources–Teachers’ Reports Scale, Eighth Grade



Item Parameters for the TIMSS 2015 Problems with School Conditions and Resources - Teachers' Reports Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BTBG08A	0.18329	-1.18267	-0.15059	1.33326	1.18
BTBG08B	0.10371	-1.12918	0.03675	1.09243	1.13
BTBG08C	0.06452	-1.43644	-0.01153	1.44797	0.91
BTBG08D	-0.83481	-1.03008	-0.01533	1.04541	1.16
BTBG08E	0.01912	-1.27930	-0.26537	1.54467	0.94
BTBG08F	0.31141	-1.20361	-0.08650	1.29011	0.89
BTBG08G	0.15276	-1.24345	-0.12380	1.36725	0.97

Scale Transformation Constants for the TIMSS 2015 Problems with School Conditions and Resources - Teachers' Reports Scale, Eighth Grade

Scale Transformation Constants	
A = 8.583007	Transformed Scale Score = 8.583007 + 1.253975 • Logit Scale Score
B = 1.253975	

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

Equivalence Table of Raw and Transformed Scale Scores for the TIMSS 2015 Problems with School Conditions and Resources - Teachers' Reports Scale, Eighth Grade

Raw Score	Transformed Scale Score	Cutpoint
0	3.65135	
1	5.09647	
2	5.80756	
3	6.30783	
4	6.70551	
5	7.04380	
6	7.34972	
7	7.63174	
8	7.89851	
9	8.15652	
10	8.41086	8.5
11	8.66588	
12	8.92566	
13	9.19445	
14	9.47709	
15	9.77810	
16	10.10696	
17	10.47588	
18	10.90666	10.9
19	11.44067	
20	12.19170	
21	13.67660	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Problems with School Conditions and Resources - Teachers' Reports Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item						
			BTBC08A	BTBC08B	BTBC08C	BTBC08D	BTBC08E	BTBC08F	BTBC08G
Australia	0.84	52	0.74	0.64	0.77	0.53	0.80	0.77	0.73
Bahrain	0.87	57	0.66	0.80	0.80	0.75	0.78	0.79	0.71
Botswana (9)	0.78	43	0.73	0.70	0.65	0.59	0.71	0.66	0.53
Canada	0.84	51	0.66	0.62	0.76	0.69	0.79	0.78	0.72
Chile	0.88	58	0.70	0.76	0.83	0.63	0.77	0.83	0.81
Chinese Taipei	0.85	54	0.60	0.72	0.76	0.62	0.79	0.81	0.81
Egypt	0.86	55	0.64	0.75	0.80	0.66	0.73	0.76	0.81
England	0.82	48	0.74	0.59	0.73	0.56	0.75	0.73	0.71
Georgia	0.85	52	0.73	0.70	0.75	0.62	0.77	0.79	0.69
Hong Kong SAR	0.85	54	0.59	0.73	0.76	0.73	0.75	0.80	0.75
Hungary	0.85	54	0.72	0.75	0.81	0.51	0.79	0.81	0.69
Iran, Islamic Rep. of	0.86	55	0.72	0.75	0.79	0.56	0.78	0.81	0.76
Ireland	0.83	51	0.74	0.69	0.81	0.60	0.79	0.67	0.66
Israel	0.87	56	0.70	0.71	0.80	0.67	0.78	0.79	0.79
Italy	0.85	53	0.72	0.63	0.79	0.66	0.72	0.76	0.77
Japan	0.80	46	0.69	0.69	0.72	0.47	0.72	0.73	0.71
Jordan	0.90	62	0.74	0.78	0.81	0.70	0.81	0.84	0.83
Kazakhstan	0.88	58	0.72	0.79	0.81	0.63	0.81	0.81	0.76
Korea, Rep. of	0.87	57	0.72	0.73	0.78	0.60	0.78	0.83	0.82
Kuwait	0.90	62	0.70	0.78	0.81	0.77	0.79	0.85	0.80
Lebanon	0.87	58	0.67	0.80	0.82	0.65	0.74	0.81	0.80
Lithuania	0.81	48	0.60	0.65	0.81	0.48	0.70	0.80	0.74
Malaysia	0.85	53	0.67	0.68	0.75	0.66	0.76	0.79	0.76
Malta	0.84	52	0.73	0.62	0.79	0.65	0.82	0.69	0.72
Morocco	0.83	50	0.65	0.71	0.74	0.57	0.74	0.77	0.74
New Zealand	0.84	51	0.68	0.68	0.75	0.63	0.77	0.77	0.70
Norway (9)	0.83	50	0.80	0.63	0.75	0.56	0.80	0.72	0.63
Oman	0.86	55	0.68	0.69	0.79	0.66	0.74	0.81	0.79
Qatar	0.88	58	0.62	0.67	0.76	0.75	0.82	0.84	0.85
Russian Federation	0.86	54	0.67	0.72	0.83	0.53	0.73	0.83	0.80
Saudi Arabia	0.90	62	0.74	0.76	0.79	0.72	0.82	0.85	0.83
Singapore	0.85	54	0.70	0.73	0.75	0.65	0.78	0.77	0.74
Slovenia	0.86	55	0.69	0.72	0.83	0.60	0.76	0.82	0.76
South Africa (9)	0.91	66	0.82	0.80	0.80	0.72	0.87	0.84	0.81
Sweden	0.82	49	0.68	0.67	0.72	0.61	0.78	0.75	0.68
Thailand	0.87	56	0.67	0.70	0.83	0.69	0.79	0.81	0.75
Turkey	0.88	59	0.69	0.76	0.82	0.59	0.81	0.85	0.82
United Arab Emirates	0.88	58	0.75	0.72	0.80	0.69	0.78	0.79	0.79
United States	0.84	51	0.72	0.69	0.74	0.64	0.79	0.71	0.72
Benchmarking Participants									
Buenos Aires, Argentina	0.91	65	0.77	0.82	0.74	0.73	0.87	0.84	0.86
Ontario, Canada	0.83	50	0.65	0.56	0.76	0.66	0.80	0.80	0.71
Quebec, Canada	0.86	54	0.70	0.63	0.80	0.74	0.82	0.75	0.71
Norway (8)	0.82	48	0.72	0.72	0.74	0.60	0.77	0.71	0.59
Abu Dhabi, UAE	0.87	58	0.73	0.72	0.80	0.67	0.78	0.82	0.81
Dubai, UAE	0.85	53	0.79	0.69	0.79	0.56	0.74	0.72	0.75
Florida, US	0.83	51	0.60	0.64	0.72	0.71	0.80	0.78	0.74

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

Relationship Between the TIMSS 2015 Problems with School Conditions and Resources - Teachers' Reports Scale, Eighth Grade, and TIMSS 2015 Achievement

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale (η^2)	
	(r)		(r ²)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.17	0.10	0.03	0.01	0.02	0.01
Bahrain	0.07	0.11	0.00	0.01	0.01	0.01
Botswana (9)	0.13	0.13	0.02	0.02	0.01	0.03
Canada	0.05	0.09	0.00	0.01	0.01	0.01
Chile	0.18	0.22	0.03	0.05	0.03	0.03
Chinese Taipei	0.13	0.08	0.02	0.01	0.02	0.01
Egypt	0.14	0.13	0.02	0.02	0.01	0.02
England	0.02	0.07	0.00	0.00	0.01	0.01
Georgia	0.06	0.07	0.00	0.00	0.00	0.00
Hong Kong SAR	0.10	0.01	0.01	0.00	0.01	0.01
Hungary	-0.01	-0.07	0.00	0.01	0.00	0.00
Iran, Islamic Rep. of	0.23	0.23	0.05	0.05	0.06	0.04
Ireland	0.06	0.06	0.00	0.00	0.00	0.00
Israel	0.01	0.00	0.00	0.00	0.01	0.01
Italy	0.01	0.02	0.00	0.00	0.01	0.01
Japan	0.02	0.04	0.00	0.00	0.00	0.00
Jordan	0.23	0.19	0.05	0.04	0.03	0.03
Kazakhstan	0.08	0.08	0.01	0.01	0.01	0.01
Korea, Rep. of	0.05	0.01	0.00	0.00	0.00	0.00
Kuwait	0.07	0.09	0.00	0.01	0.00	0.01
Lebanon	0.13	0.20	0.02	0.04	0.02	0.03
Lithuania	0.07	-0.02	0.00	0.00	0.01	0.00
Malaysia	0.07	0.05	0.01	0.00	0.00	0.02
Malta	0.07	0.10	0.01	0.01	0.01	0.01
Morocco	0.12	0.12	0.01	0.01	0.01	0.02
New Zealand	0.08	0.14	0.01	0.02	0.01	0.01
Norway (9)	0.06	0.02	0.00	0.00	0.00	0.00
Oman	0.04	0.07	0.00	0.00	0.00	0.00
Qatar	-0.08	-0.13	0.01	0.02	0.01	0.01
Russian Federation	0.05	0.09	0.00	0.01	0.00	0.01
Saudi Arabia	0.18	0.16	0.03	0.03	0.02	0.03
Singapore	0.07	0.12	0.00	0.01	0.00	0.02
Slovenia	0.02	0.04	0.00	0.00	0.00	0.00
South Africa (9)	0.41	0.41	0.17	0.17	0.19	0.15
Sweden	-0.01	0.01	0.00	0.00	0.01	0.00
Thailand	0.12	0.14	0.01	0.02	0.01	0.02
Turkey	0.16	0.20	0.03	0.04	0.01	0.02
United Arab Emirates	0.18	0.17	0.03	0.03	0.02	0.02
United States	0.08	0.12	0.01	0.01	0.00	0.02
International Median	0.07	0.09	0.01	0.01	0.01	0.01
Benchmarking Participants						
Buenos Aires, Argentina	0.32	0.18	0.10	0.03	0.11	0.01
Ontario, Canada	0.03	0.05	0.00	0.00	0.00	0.00
Quebec, Canada	0.03	0.12	0.00	0.02	0.01	0.02
Norway (8)	0.02	0.01	0.00	0.00	0.00	0.00
Abu Dhabi, UAE	0.10	0.02	0.01	0.00	0.00	0.00
Dubai, UAE	0.23	0.24	0.05	0.06	0.05	0.05
Florida, US	0.12	0.15	0.02	0.02	0.02	0.02

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

Safe and Orderly School–Teachers’ Reports Scale, Eighth Grade

The Safe and Orderly School–Teachers’ Reports (SOS) scale was created based on teachers’ degree of agreement with the eight statements described below.

Items in the TIMSS 2015 Safe and Orderly School–Teachers’ Reports Scale, Eighth Grade¹

		Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements.				
		Agree a lot	Agree a little	Disagree a little	Disagree a lot	
T	BTBG07A	1) This school is located in a safe neighborhood -----	○	○	○	○
T	BTBG07B	2) I feel safe at this school -----	○	○	○	○
T	BTBG07C	3) This school’s security policies and practices are sufficient -----	○	○	○	○
T	BTBG07D	4) The students behave in an orderly manner -----	○	○	○	○
T	BTBG07E	5) The students are respectful of the teachers -----	○	○	○	○
	BTBG07F	6) The students respect school property -----	○	○	○	○
	BTBG07G	7) This school has clear rules about student conduct -----	○	○	○	○
	BTBG07H	8) This school’s rules are enforced in a fair and consistent manner -----	○	○	○	○

T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

¹ For the purpose of scaling, categories in which there were very few respondents were combined. The categories “Disagree a little” and “Disagree a lot” were combined for all variables. The scale statistics that are reported herein reflect analysis of the items following collapsing.

Item Parameters for the TIMSS 2015 Safe and Orderly School - Teachers' Reports Scale, Eighth Grade

Item	delta	tau_1	tau_2	Infit
BTBG07A	-0.80503	-1.12750	1.12750	1.25
BTBG07B	-1.38913	-1.25587	1.25587	1.00
BTBG07C	-0.51907	-1.43177	1.43177	1.02
BTBG07D	0.92295	-1.81668	1.81668	0.92
BTBG07E	0.58019	-1.77905	1.77905	0.92
BTBG07F	1.54089	-1.74888	1.74888	0.94
BTBG07G	-0.48566	-1.36955	1.36955	1.13
BTBG07H	0.15486	-1.50409	1.50409	1.07

Scale Transformation Constants for the TIMSS 2015 Safe and Orderly School - Teachers' Reports Scale, Eighth Grade

Scale Transformation Constants

A = 8.92966

B = 1.031502

Transformed Scale Score = 8.92966 + 1.031502 • Logit Scale Score

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



**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Safe and Orderly School - Teachers' Reports Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	4.21352	
1	5.50950	
2	6.20806	
3	6.73583	
4	7.18910	7.2
5	7.60560	
6	8.00514	
7	8.40086	
8	8.79988	
9	9.21200	
10	9.64573	
11	10.11020	
12	10.61839	10.6
13	11.18541	
14	11.83862	
15	12.65468	
16	14.06211	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Safe and Orderly School - Teachers' Reports Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BTB007A	BTB007B	BTB007C	BTB007D	BTB007E	BTB007F	BTB007G	BTB007H
Australia	0.90	60	0.65	0.75	0.72	0.86	0.87	0.81	0.72	0.78
Bahrain	0.86	52	0.55	0.63	0.68	0.74	0.80	0.77	0.75	0.80
Botswana (9)	0.84	47	0.67	0.74	0.67	0.75	0.77	0.69	0.55	0.64
Canada	0.87	53	0.58	0.58	0.64	0.83	0.82	0.81	0.74	0.76
Chile	0.85	51	0.44	0.64	0.74	0.82	0.80	0.72	0.72	0.77
Chinese Taipei	0.89	57	0.70	0.78	0.71	0.79	0.77	0.75	0.78	0.78
Egypt	0.87	53	0.60	0.67	0.70	0.74	0.73	0.78	0.80	0.76
England	0.86	51	0.49	0.62	0.59	0.83	0.82	0.81	0.70	0.79
Georgia	0.78	41	0.60	0.67	0.75	0.63	0.68	0.53	0.57	0.65
Hong Kong SAR	0.81	44	0.48	0.59	0.58	0.74	0.78	0.75	0.65	0.65
Hungary	0.87	52	0.54	0.69	0.75	0.80	0.80	0.77	0.66	0.73
Iran, Islamic Rep. of	0.84	47	0.58	0.68	0.69	0.75	0.71	0.71	0.71	0.65
Ireland	0.86	51	0.71	0.62	0.63	0.84	0.84	0.79	0.53	0.68
Israel	0.84	48	0.49	0.62	0.60	0.79	0.77	0.76	0.72	0.74
Italy	0.85	49	0.68	0.76	0.67	0.72	0.73	0.72	0.65	0.65
Japan	0.84	48	0.65	0.70	0.62	0.79	0.76	0.78	0.56	0.67
Jordan	0.88	54	0.60	0.70	0.75	0.77	0.74	0.74	0.77	0.77
Kazakhstan	0.86	51	0.59	0.68	0.68	0.78	0.73	0.72	0.75	0.80
Korea, Rep. of	0.88	55	0.68	0.75	0.76	0.76	0.79	0.72	0.72	0.75
Kuwait	0.86	51	0.50	0.64	0.72	0.76	0.73	0.73	0.79	0.77
Lebanon	0.85	50	0.44	0.48	0.64	0.76	0.82	0.82	0.77	0.83
Lithuania	0.86	51	0.43	0.76	0.78	0.73	0.76	0.73	0.69	0.73
Malaysia	0.86	50	0.61	0.65	0.71	0.75	0.73	0.72	0.71	0.75
Malta	0.87	52	0.51	0.67	0.72	0.83	0.78	0.80	0.69	0.73
Morocco	0.89	56	0.67	0.78	0.78	0.81	0.79	0.75	0.69	0.73
New Zealand	0.88	55	0.58	0.64	0.69	0.83	0.85	0.80	0.73	0.75
Norway (9)	0.77	39	0.51	0.46	0.45	0.78	0.79	0.72	0.55	0.63
Oman	0.86	52	0.40	0.54	0.70	0.84	0.83	0.78	0.76	0.78
Qatar	0.83	46	0.33	0.61	0.57	0.76	0.75	0.76	0.76	0.78
Russian Federation	0.84	47	0.59	0.62	0.68	0.75	0.75	0.78	0.55	0.74
Saudi Arabia	0.86	51	0.59	0.66	0.73	0.76	0.74	0.79	0.67	0.74
Singapore	0.89	58	0.58	0.73	0.71	0.83	0.82	0.82	0.77	0.79
Slovenia	0.87	53	0.65	0.73	0.78	0.76	0.76	0.73	0.68	0.71
South Africa (9)	0.88	55	0.73	0.78	0.75	0.79	0.72	0.80	0.64	0.72
Sweden	0.86	51	0.56	0.62	0.75	0.78	0.77	0.76	0.67	0.77
Thailand	0.86	50	0.57	0.70	0.75	0.76	0.73	0.71	0.72	0.70
Turkey	0.88	56	0.72	0.76	0.80	0.78	0.77	0.71	0.72	0.69
United Arab Emirates	0.86	51	0.48	0.56	0.63	0.79	0.78	0.82	0.80	0.79
United States	0.90	59	0.60	0.71	0.74	0.87	0.86	0.84	0.70	0.77
Benchmarking Participants										
Buenos Aires, Argentina	0.80	45	0.31	0.70	0.78	0.74	0.73	0.70	0.56	0.69
Ontario, Canada	0.87	53	0.58	0.62	0.61	0.84	0.83	0.80	0.75	0.76
Quebec, Canada	0.85	49	0.50	0.50	0.66	0.81	0.79	0.80	0.72	0.74
Norway (8)	0.79	41	0.40	0.56	0.58	0.79	0.80	0.73	0.56	0.61
Abu Dhabi, UAE	0.86	51	0.49	0.53	0.62	0.78	0.78	0.83	0.78	0.78
Dubai, UAE	0.87	52	0.35	0.61	0.63	0.82	0.77	0.82	0.83	0.81
Florida, US	0.90	59	0.71	0.71	0.74	0.85	0.84	0.81	0.72	0.75

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

Relationship Between the TIMSS 2015 Safe and Orderly School - Teachers' Reports Scale, Eighth Grade, and TIMSS 2015 Achievement

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale (η^2)	
	(r)		(r ²)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.29	0.20	0.08	0.04	0.07	0.04
Bahrain	0.14	0.15	0.02	0.02	0.01	0.01
Botswana (9)	0.10	0.08	0.01	0.01	0.01	0.01
Canada	0.04	0.10	0.00	0.01	0.01	0.02
Chile	0.28	0.27	0.08	0.07	0.06	0.06
Chinese Taipei	0.13	0.09	0.02	0.01	0.01	0.00
Egypt	0.15	0.20	0.02	0.04	0.02	0.03
England	0.22	0.21	0.05	0.04	0.04	0.04
Georgia	0.06	0.04	0.00	0.00	0.02	0.00
Hong Kong SAR	0.25	0.13	0.06	0.02	0.03	0.01
Hungary	0.21	0.21	0.04	0.04	0.03	0.03
Iran, Islamic Rep. of	0.18	0.20	0.03	0.04	0.02	0.02
Ireland	0.25	0.20	0.06	0.04	0.07	0.05
Israel	0.20	0.08	0.04	0.01	0.03	0.01
Italy	0.17	0.15	0.03	0.02	0.03	0.02
Japan	0.07	0.12	0.01	0.01	0.00	0.01
Jordan	0.15	0.17	0.02	0.03	0.02	0.03
Kazakhstan	0.05	0.02	0.00	0.00	0.00	0.00
Korea, Rep. of	0.05	0.06	0.00	0.00	0.00	0.00
Kuwait	0.14	0.17	0.02	0.03	0.00	0.03
Lebanon	0.07	0.07	0.00	0.01	0.01	0.01
Lithuania	0.07	0.01	0.00	0.00	0.00	0.00
Malaysia	0.18	0.09	0.03	0.01	0.05	0.00
Malta	0.20	0.16	0.04	0.03	0.03	0.03
Morocco	0.13	0.12	0.02	0.01	0.01	0.01
New Zealand	0.17	0.28	0.03	0.08	0.02	0.07
Norway (9)	0.11	0.09	0.01	0.01	0.01	0.01
Oman	0.14	0.10	0.02	0.01	0.02	0.01
Qatar	0.12	0.11	0.01	0.01	0.00	0.02
Russian Federation	0.15	0.09	0.02	0.01	0.01	0.01
Saudi Arabia	0.18	0.18	0.03	0.03	0.02	0.03
Singapore	0.20	0.21	0.04	0.04	0.02	0.02
Slovenia	0.05	0.06	0.00	0.00	0.01	0.00
South Africa (9)	0.23	0.24	0.05	0.06	0.05	0.05
Sweden	0.13	0.16	0.02	0.02	0.01	0.03
Thailand	0.08	0.04	0.01	0.00	0.01	0.00
Turkey	0.19	0.20	0.04	0.04	0.05	0.02
United Arab Emirates	0.29	0.28	0.08	0.08	0.05	0.07
United States	0.28	0.22	0.08	0.05	0.07	0.05
International Median	0.15	0.15	0.02	0.02	0.02	0.02
Benchmarking Participants						
Buenos Aires, Argentina	0.06	0.17	0.00	0.03	0.00	0.01
Ontario, Canada	0.07	0.06	0.00	0.00	0.01	0.01
Quebec, Canada	0.13	0.26	0.02	0.07	0.01	0.07
Norway (8)	0.11	0.05	0.01	0.00	0.01	0.00
Abu Dhabi, UAE	0.26	0.24	0.07	0.06	0.04	0.06
Dubai, UAE	0.25	0.29	0.06	0.09	0.05	0.07
Florida, US	0.17	0.18	0.03	0.03	0.04	0.03

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

School Discipline Problems–Principals’ Reports Scale, Eighth Grade

The School Discipline Problems–Principals’ Reports (DAS) scale was created based on principals’ responses concerning the eleven potential school problems described below.

Items in the TIMSS 2015 School Discipline Problems–Principals’ Reports Scale, Eighth Grade

		To what degree is each of the following a problem among eighth grade students in your school?			
		Not a problem	Minor problem	Moderate problem	Serious problem
T	BCBG15A	1) Arriving late at school -----○	○	○	○
T	BCBG15B	2) Absenteeism (i.e., unjustified absences) -----○	○	○	○
T	BCBG15C	3) Classroom disturbance -----○	○	○	○
T	BCBG15D	4) Cheating -----○	○	○	○
T	BCBG15E	5) Profanity -----○	○	○	○
T	BCBG15F	6) Vandalism -----○	○	○	○
T	BCBG15G	7) Theft -----○	○	○	○
T	BCBG15H	8) Intimidation or verbal abuse among students (including texting, emailing, etc.) -----○	○	○	○
T	BCBG15I	9) Physical injury to other students -----○	○	○	○
T	BCBG15J	10) Intimidation or verbal abuse of teachers or staff (including texting, emailing, etc.) -----○	○	○	○
T	BCBG15K	11) Physical injury to teachers or staff -----○	○	○	○

Hardly Any Problems Minor Problems Moderate to Severe Problems

10.8 8.0

T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 School Discipline Problems - Principals' Reports Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BCBG15A	0.35543	-2.45404	-0.50450	2.95854	1.38
BCBG15B	0.81556	-1.87731	-0.68567	2.56298	1.13
BCBG15C	0.70602	-2.36267	-0.37850	2.74117	1.00
BCBG15D	-0.17898	-1.54132	-0.62883	2.17015	1.09
BCBG15E	0.40992	-1.72903	-0.46635	2.19538	0.88
BCBG15F	0.06453	-0.93256	-0.64660	1.57916	0.84
BCBG15G	-0.34720	-0.36836	-1.00450	1.37286	0.83
BCBG15H	0.40049	-1.81251	-0.70589	2.51840	0.90
BCBG15I	-0.28471	-0.92448	-0.85294	1.77742	0.78
BCBG15J	-0.70539	-0.40379	-0.86401	1.26780	0.87
BCBG15K	-1.23567	1.05912	-0.69101	-0.36811	0.86

Scale Transformation Constants for the TIMSS 2015 School Discipline Problems - Principals' Reports Scale, Eighth Grade

Scale Transformation Constants	
A = 8.418512	Transformed Scale Score = 8.418512 + 0.981214 • Logit Scale Score
B = 0.981214	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 School Discipline Problems - Principals' Reports Scale, Eighth
Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	4.07274	
1	5.16684	
2	5.67741	
3	6.01327	
4	6.26434	
5	6.46647	
6	6.63787	
7	6.78911	
8	6.92690	
9	7.05599	
10	7.17997	
11	7.30166	
12	7.42228	
13	7.54644	
14	7.67382	
15	7.80615	
16	7.94503	8.0
17	8.09232	
18	8.24902	
19	8.41762	
20	8.60012	
21	8.79847	
22	9.01619	
23	9.25431	
24	9.51506	
25	9.79961	
26	10.10915	
27	10.44316	
28	10.80339	10.8
29	11.19421	
30	11.62747	
31	12.13360	
32	12.80087	
33	14.02734	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 School Discipline Problems - Principals' Reports Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item										
			BCBG15A	BCBG15B	BCBG15C	BCBG15D	BCBG15E	BCBG15F	BCBG15G	BCBG15H	BCBG15I	BCBG15J	BCBG15K
Australia	0.87	44	0.64	0.67	0.74	0.58	0.75	0.80	0.62	0.66	0.73	0.69	0.36
Bahrain	0.97	75	0.72	0.83	0.84	0.84	0.86	0.91	0.90	0.89	0.86	0.93	0.90
Botswana (9)	0.89	47	0.57	0.63	0.63	0.74	0.72	0.68	0.80	0.75	0.75	0.67	0.55
Canada	0.87	45	0.64	0.63	0.71	0.59	0.76	0.79	0.78	0.71	0.71	0.68	0.26
Chile	0.88	48	0.57	0.63	0.68	0.65	0.83	0.78	0.76	0.74	0.77	0.71	0.37
Chinese Taipei	0.90	50	0.67	0.75	0.76	0.68	0.77	0.79	0.77	0.67	0.74	0.67	0.39
Egypt	0.95	67	0.54	0.54	0.82	0.77	0.90	0.87	0.90	0.88	0.88	0.89	0.87
England	0.81	35	0.68	0.73	0.82	0.24	0.65	0.61	0.42	0.70	0.60	0.55	0.09
Georgia	0.91	55	0.59	0.66	0.70	0.57	0.78	0.74	0.84	0.72	0.81	0.84	0.84
Hong Kong SAR	0.86	44	0.73	0.69	0.71	0.60	0.68	0.76	0.69	0.60	0.70	0.65	0.44
Hungary	0.90	51	0.58	0.58	0.78	0.68	0.75	0.80	0.72	0.83	0.84	0.76	0.42
Iran, Islamic Rep. of	0.92	58	0.69	0.74	0.71	0.69	0.81	0.76	0.80	0.79	0.80	0.78	0.76
Ireland	0.88	46	0.66	0.64	0.71	0.60	0.78	0.73	0.62	0.76	0.65	0.78	0.50
Israel	0.95	66	0.68	0.78	0.77	0.82	0.81	0.81	0.84	0.83	0.86	0.86	0.84
Italy	0.91	52	0.47	0.68	0.56	0.41	0.57	0.86	0.85	0.68	0.86	0.89	0.85
Japan	0.92	60	0.62	0.40	0.85	0.82	0.90	0.85	0.77	0.71	0.85	0.77	0.83
Jordan	0.95	68	0.67	0.70	0.73	0.80	0.87	0.86	0.89	0.88	0.90	0.87	0.86
Kazakhstan	0.97	80	0.84	0.90	0.88	0.66	0.92	0.95	0.94	0.94	0.94	0.95	0.88
Korea, Rep. of	0.94	63	0.68	0.80	0.74	0.83	0.83	0.84	0.80	0.78	0.86	0.81	0.73
Kuwait	0.95	66	0.49	0.66	0.72	0.86	0.89	0.87	0.87	0.84	0.89	0.90	0.86
Lebanon	0.97	79	0.82	0.86	0.82	0.83	0.90	0.92	0.94	0.88	0.94	0.92	0.92
Lithuania	0.85	40	0.62	0.65	0.71	0.66	0.74	0.61	0.56	0.77	0.63	0.65	0.08
Malaysia	0.88	49	0.56	0.48	0.64	0.77	0.83	0.80	0.79	0.77	0.72	0.71	0.52
Malta	0.93	60	0.64	0.86	0.80	0.77	0.83	0.83	0.80	0.73	0.84	0.84	0.52
Morocco	0.94	65	0.49	0.65	0.84	0.79	0.85	0.88	0.92	0.82	0.87	0.87	0.82
New Zealand	0.88	46	0.65	0.64	0.69	0.53	0.79	0.70	0.64	0.68	0.74	0.77	0.61
Norway (9)	0.83	38	0.60	0.57	0.69	0.63	0.71	0.65	0.47	0.70	0.68	0.69	0.33
Oman	0.97	74	0.73	0.82	0.78	0.86	0.90	0.86	0.90	0.89	0.90	0.91	0.90
Qatar	0.97	78	0.55	0.76	0.83	0.93	0.92	0.93	0.95	0.92	0.95	0.92	0.93
Russian Federation	0.81	36	0.66	0.63	0.66	0.56	0.61	0.65	0.68	0.72	0.65	0.38	0.07
Saudi Arabia	0.97	73	0.56	0.70	0.82	0.92	0.86	0.90	0.91	0.91	0.93	0.92	0.92
Singapore	0.88	50	0.65	0.69	0.68	0.68	0.75	0.71	0.80	0.76	0.69	0.64	-
Slovenia	0.90	50	0.71	0.67	0.75	0.74	0.82	0.74	0.61	0.77	0.81	0.70	0.29
South Africa (9)	0.91	51	0.73	0.81	0.69	0.70	0.74	0.80	0.78	0.77	0.76	0.64	0.38
Sweden	0.84	39	0.63	0.75	0.56	0.46	0.73	0.68	0.67	0.68	0.74	0.62	0.19
Thailand	0.89	48	0.66	0.63	0.70	0.79	0.64	0.80	0.80	0.76	0.77	0.55	0.46
Turkey	0.95	66	0.71	0.72	0.78	0.80	0.73	0.83	0.87	0.86	0.88	0.88	0.84
United Arab Emirates	0.93	60	0.67	0.73	0.77	0.78	0.84	0.84	0.78	0.79	0.82	0.81	0.68
United States	0.88	46	0.67	0.65	0.71	0.56	0.75	0.72	0.73	0.71	0.76	0.70	0.36
Benchmarking Participants													
Buenos Aires, Argentina	0.86	46	0.66	0.72	0.74	0.61	0.68	0.70	0.76	0.65	0.83	0.60	0.39
Ontario, Canada	0.88	46	0.64	0.59	0.73	0.62	0.77	0.81	0.80	0.77	0.69	0.61	0.24
Quebec, Canada	0.87	46	0.61	0.61	0.63	0.51	0.83	0.78	0.77	0.66	0.81	0.80	0.27
Norway (8)	0.79	34	0.44	0.64	0.61	0.73	0.71	0.60	0.59	0.48	0.57	0.44	0.52
Abu Dhabi, UAE	0.90	55	0.66	0.71	0.75	0.69	0.82	0.83	0.76	0.76	0.78	0.78	0.61
Dubai, UAE	0.92	57	0.55	0.62	0.77	0.82	0.84	0.82	0.79	0.72	0.82	0.74	0.75
Florida, US	0.91	53	0.80	0.76	0.76	0.71	0.83	0.49	0.81	0.75	0.83	0.82	0.25

A dash (-) indicates comparable data not available.

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

Relationship Between the TIMSS 2015 School Discipline Problems - Principals' Reports Scale, Eighth Grade, and TIMSS 2015 Achievement

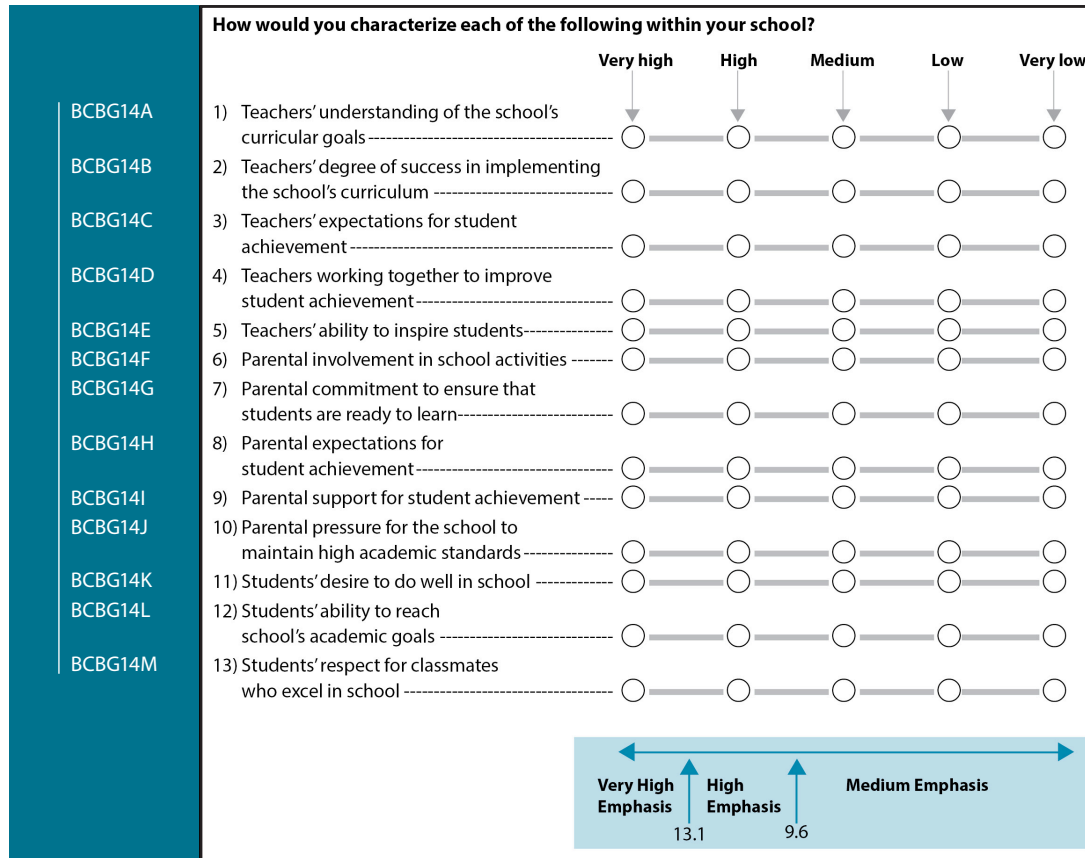
Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale (η^2)	
	(r)		(r)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.29	0.26	0.08	0.07	0.07	0.05
Bahrain	0.14	0.15	0.02	0.02	0.02	0.04
Botswana (9)	0.23	0.21	0.05	0.04	0.04	0.04
Canada	0.10	0.08	0.01	0.01	0.01	0.01
Chile	0.22	0.23	0.05	0.05	0.04	0.04
Chinese Taipei	0.24	0.23	0.06	0.06	0.06	0.05
Egypt	0.02	0.03	0.00	0.00	0.00	0.00
England	0.23	0.22	0.05	0.05	0.02	0.02
Georgia	-0.07	-0.04	0.01	-0.00	0.00	0.00
Hong Kong SAR	0.27	0.23	0.07	0.05	0.04	0.03
Hungary	0.29	0.28	0.08	0.08	0.09	0.08
Iran, Islamic Rep. of	0.11	0.09	0.01	0.01	0.01	0.01
Ireland	0.20	0.18	0.04	0.03	0.03	0.03
Israel	0.22	0.22	0.05	0.05	0.04	0.05
Italy	-0.01	0.01	0.00	0.00	0.00	0.00
Japan	0.08	0.07	0.01	0.01	0.01	0.01
Jordan	0.01	0.02	0.00	0.00	0.01	0.01
Kazakhstan	0.08	0.10	0.01	0.01	0.01	0.02
Korea, Rep. of	-0.07	-0.05	0.01	-0.00	0.00	0.00
Kuwait	0.15	0.21	0.02	0.04	0.03	0.04
Lebanon	0.05	0.03	0.00	0.00	0.01	0.01
Lithuania	0.09	0.08	0.01	0.01	0.01	0.01
Malaysia	0.17	0.18	0.03	0.03	0.02	0.02
Malta	0.26	0.27	0.07	0.07	0.09	0.10
Morocco	0.05	0.06	0.00	0.00	0.01	0.01
New Zealand	0.18	0.19	0.03	0.03	0.03	0.03
Norway (9)	0.08	0.10	0.01	0.01	0.00	0.00
Oman	0.10	0.08	0.01	0.01	0.01	0.01
Qatar	0.04	0.03	0.00	0.00	0.00	0.00
Russian Federation	0.19	0.21	0.04	0.04	0.01	0.02
Saudi Arabia	0.09	0.15	0.01	0.02	0.02	0.04
Singapore	0.26	0.24	0.07	0.06	0.03	0.03
Slovenia	0.07	0.08	0.00	0.01	0.00	0.00
South Africa (9)	0.20	0.19	0.04	0.04	0.05	0.04
Sweden	0.16	0.18	0.02	0.03	0.03	0.03
Thailand	0.11	0.12	0.01	0.01	0.01	0.02
Turkey	0.13	0.13	0.02	0.02	0.03	0.03
United Arab Emirates	0.24	0.25	0.06	0.06	0.03	0.03
United States	0.27	0.28	0.07	0.08	0.05	0.05
International Median	0.14	0.15	0.02	0.02	0.02	0.02
Benchmarking Participants						
Buenos Aires, Argentina	0.32	0.28	0.10	0.08	0.06	0.04
Ontario, Canada	0.08	0.05	0.01	0.00	0.01	0.00
Quebec, Canada	0.10	0.08	0.01	0.01	0.01	0.01
Norway (8)	0.05	0.07	0.00	0.00	0.01	0.01
Abu Dhabi, UAE	0.18	0.19	0.03	0.04	0.01	0.01
Dubai, UAE	0.30	0.31	0.09	0.10	0.05	0.06
Florida, US	0.03	0.02	0.00	0.00	0.10	0.11

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

School Emphasis on Academic Success–Principals’ Reports Scale, Eighth Grade

The School Emphasis on Academic Success–Principals’ Reports (EAS) scale was created based on teachers’ responses characterizing the thirteen aspects described below.

Items in the TIMSS 2015 School Emphasis on Academic Success–Principals’ Reports Scale, Eighth Grade¹



¹ For the purpose of scaling, categories in which there were very few respondents were combined. The categories “Low” and “Very low” were combined for all variables. The scale statistics that are reported herein reflect analysis of the items following collapsing.

Item Parameters for the TIMSS 2015 School Emphasis on Academic Success - Principals' Reports Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BCBG14A	-1.76385	-3.28017	-0.07481	3.35498	1.08
BCBG14B	-1.17365	-3.50530	0.06625	3.43905	0.96
BCBG14C	-0.88646	-3.14005	-0.04034	3.18039	0.95
BCBG14D	-0.76453	-2.71198	-0.12909	2.84107	1.08
BCBG14E	-0.49217	-3.19184	0.00480	3.18704	0.95
BCBG14F	1.62433	-2.27811	0.09269	2.18542	1.11
BCBG14G	1.38302	-2.36022	0.06460	2.29562	0.85
BCBG14H	-0.06276	-2.26101	-0.22820	2.48921	1.03
BCBG14I	1.13998	-2.47307	0.03842	2.43465	0.79
BCBG14J	0.78562	-2.02339	-0.09617	2.11956	1.23
BCBG14K	0.20569	-3.16759	0.13127	3.03632	0.87
BCBG14L	0.44841	-3.54657	0.11136	3.43521	0.81
BCBG14M	-0.44363	-2.97276	-0.18570	3.15846	1.15

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

Scale Transformation Constants for the TIMSS 2015 School Emphasis on Academic Success - Principals' Reports Scale, Eighth Grade

Scale Transformation Constants	
A = 9.587978	Transformed Scale Score = 9.587978 + 1.101886 • Logit Scale Score
B = 1.101886	

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 School Emphasis on Academic Success - Principals' Reports Scale,
Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	1.93343	
1	3.33811	
2	4.10092	
3	4.66995	
4	5.14483	
5	5.56379	
6	5.94753	
7	6.30527	
8	6.64249	
9	6.96191	
10	7.26508	
11	7.55352	
12	7.82881	
13	8.09374	
14	8.35031	
15	8.60068	
16	8.84696	
17	9.09098	
18	9.33426	
19	9.57780	9.6
20	9.82234	
21	10.06789	
22	10.31430	
23	10.56114	
24	10.80795	
25	11.05447	
26	11.30073	
27	11.54716	
28	11.79471	
29	12.04479	
30	12.29937	
31	12.56014	
32	12.83181	
33	13.11864	13.1
34	13.42815	
35	13.76917	
36	14.16268	
37	14.64698	
38	15.31745	
39	16.63263	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 School Emphasis on Academic Success - Principals' Reports Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item													
			BCBG14A	BCBG14B	BCBG14C	BCBG14D	BCBG14E	BCBG14F	BCBG14G	BCBG14H	BCBG14I	BCBG14J	BCBG14K	BCBG14L	BCBG14M	
Australia	0.94	60	0.70	0.75	0.83	0.72	0.82	0.72	0.83	0.83	0.83	0.77	0.79	0.68	0.74	
Bahrain	0.93	55	0.59	0.71	0.79	0.68	0.79	0.81	0.81	0.78	0.87	0.70	0.78	0.84	0.45	
Botswana (9)	0.86	39	0.58	0.59	0.69	0.67	0.70	0.62	0.64	0.52	0.71	0.49	0.70	0.60	0.60	
Canada	0.94	58	0.74	0.78	0.78	0.63	0.75	0.73	0.85	0.81	0.85	0.75	0.77	0.74	0.68	
Chile	0.92	51	0.74	0.79	0.73	0.62	0.76	0.68	0.75	0.76	0.69	0.70	0.75	0.70	0.64	
Chinese Taipei	0.93	56	0.64	0.73	0.77	0.68	0.77	0.82	0.83	0.80	0.79	0.70	0.78	0.82	0.58	
Egypt	0.88	42	0.50	0.61	0.44	0.53	0.50	0.73	0.69	0.76	0.76	0.69	0.71	0.74	0.60	
England	0.95	61	0.69	0.77	0.78	0.63	0.80	0.84	0.89	0.81	0.84	0.84	0.81	0.72	0.72	
Georgia	0.89	43	0.69	0.67	0.74	0.70	0.74	0.63	0.59	0.59	0.74	0.59	0.63	0.56	0.65	
Hong Kong SAR	0.92	52	0.59	0.65	0.74	0.63	0.74	0.54	0.83	0.79	0.84	0.73	0.79	0.81	0.58	
Hungary	0.89	45	0.37	0.61	0.57	0.42	0.65	0.70	0.80	0.76	0.72	0.68	0.81	0.75	0.72	
Iran, Islamic Rep. of	0.91	49	0.63	0.73	0.60	0.65	0.71	0.66	0.79	0.67	0.76	0.72	0.77	0.77	0.61	
Ireland	0.93	56	0.63	0.64	0.81	0.61	0.70	0.64	0.85	0.82	0.82	0.79	0.84	0.82	0.65	
Israel	0.89	44	0.62	0.72	0.73	0.48	0.58	0.59	0.72	0.72	0.80	0.55	0.73	0.71	0.60	
Italy	0.87	40	0.65	0.62	0.49	0.47	0.64	0.62	0.70	0.66	0.63	0.68	0.71	0.69	0.62	
Japan	0.89	44	0.60	0.63	0.75	0.55	0.53	0.55	0.73	0.70	0.77	0.54	0.78	0.76	0.67	
Jordan	0.91	49	0.65	0.65	0.55	0.73	0.72	0.69	0.78	0.71	0.71	0.69	0.73	0.77	0.66	
Kazakhstan	0.92	52	0.61	0.63	0.63	0.75	0.80	0.75	0.82	0.71	0.80	0.71	0.74	0.75	0.66	
Korea, Rep. of	0.90	46	0.44	0.57	0.77	0.60	0.62	0.77	0.81	0.75	0.81	0.59	0.67	0.79	0.52	
Kuwait	0.91	48	0.63	0.62	0.69	0.67	0.71	0.68	0.80	0.71	0.77	0.64	0.71	0.77	0.58	
Lebanon	0.90	46	0.61	0.68	0.66	0.69	0.59	0.70	0.75	0.77	0.75	0.56	0.70	0.73	0.54	
Lithuania	0.89	43	0.54	0.58	0.59	0.65	0.74	0.67	0.73	0.73	0.70	0.44	0.73	0.70	0.65	
Malaysia	0.91	49	0.44	0.63	0.60	0.61	0.68	0.72	0.79	0.79	0.80	0.63	0.80	0.77	0.70	
Malta	0.93	55	0.78	0.82	0.66	0.68	0.67	0.72	0.78	0.72	0.82	0.72	0.80	0.81	0.59	
Morocco	0.88	41	0.58	0.54	0.59	0.63	0.64	0.57	0.75	0.73	0.69	0.71	0.64	0.68	0.55	
New Zealand	0.90	48	0.65	0.69	0.71	0.61	0.74	0.62	0.76	0.66	0.79	0.73	0.76	0.70	0.48	
Norway (9)	0.88	43	0.46	0.59	0.76	0.59	0.62	0.80	0.71	0.66	0.76	0.54	0.61	0.66	0.63	
Oman	0.90	46	0.65	0.68	0.62	0.62	0.65	0.70	0.77	0.78	0.78	0.50	0.64	0.71	0.61	
Qatar	0.92	52	0.56	0.72	0.75	0.67	0.69	0.67	0.85	0.70	0.74	0.73	0.81	0.77	0.65	
Russian Federation	0.83	37	0.60	0.68	0.55	0.60	0.65	0.72	0.70	0.39	0.64	0.01	0.67	0.70	0.59	
Saudi Arabia	0.90	47	0.62	0.64	0.62	0.66	0.61	0.72	0.73	0.76	0.68	0.60	0.77	0.83	0.66	
Singapore	0.93	56	0.58	0.72	0.77	0.70	0.77	0.64	0.83	0.75	0.83	0.72	0.81	0.80	0.72	
Slovenia	0.84	36	0.72	0.76	0.71	0.76	0.79	0.50	0.55	0.27	0.56	0.40	0.54	0.54	0.48	
South Africa (9)	0.89	45	0.57	0.63	0.63	0.75	0.70	0.72	0.74	0.52	0.76	0.56	0.69	0.76	0.68	
Sweden	0.91	48	0.56	0.68	0.71	0.63	0.69	0.62	0.76	0.80	0.79	0.70	0.64	0.73	0.64	
Thailand	0.91	48	0.62	0.72	0.63	0.65	0.67	0.76	0.78	0.66	0.77	0.66	0.71	0.76	0.62	
Turkey	0.91	49	0.61	0.65	0.67	0.56	0.70	0.71	0.78	0.66	0.81	0.76	0.81	0.79	0.57	
United Arab Emirates	0.93	56	0.72	0.71	0.81	0.73	0.72	0.73	0.77	0.72	0.79	0.70	0.82	0.80	0.66	
United States	0.93	55	0.61	0.70	0.74	0.66	0.71	0.79	0.84	0.80	0.82	0.69	0.78	0.73	0.75	
Benchmarking Participants																
Buenos Aires, Argentina	0.87	42	0.70	0.62	0.67	0.58	0.61	0.60	0.66	0.64	0.74	0.70	0.60	0.62	0.62	
Ontario, Canada	0.93	56	0.74	0.77	0.79	0.48	0.65	0.70	0.85	0.80	0.85	0.78	0.79	0.76	0.65	
Quebec, Canada	0.94	58	0.76	0.73	0.72	0.79	0.79	0.79	0.83	0.77	0.82	0.69	0.71	0.72	0.73	
Norway (8)	0.88	42	0.47	0.60	0.76	0.57	0.64	0.81	0.71	0.63	0.77	0.52	0.59	0.65	0.63	
Abu Dhabi, UAE	0.92	52	0.72	0.72	0.82	0.69	0.74	0.70	0.78	0.66	0.75	0.64	0.84	0.74	0.57	
Dubai, UAE	0.94	60	0.74	0.77	0.83	0.78	0.80	0.71	0.73	0.74	0.83	0.70	0.83	0.85	0.75	
Florida, US	0.94	60	0.68	0.81	0.79	0.72	0.62	0.87	0.89	0.81	0.81	0.73	0.86	0.63	0.75	

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

Relationship Between the TIMSS 2015 School Emphasis on Academic Success - Principals' Reports Scale, Eighth Grade, and TIMSS 2015 Achievement

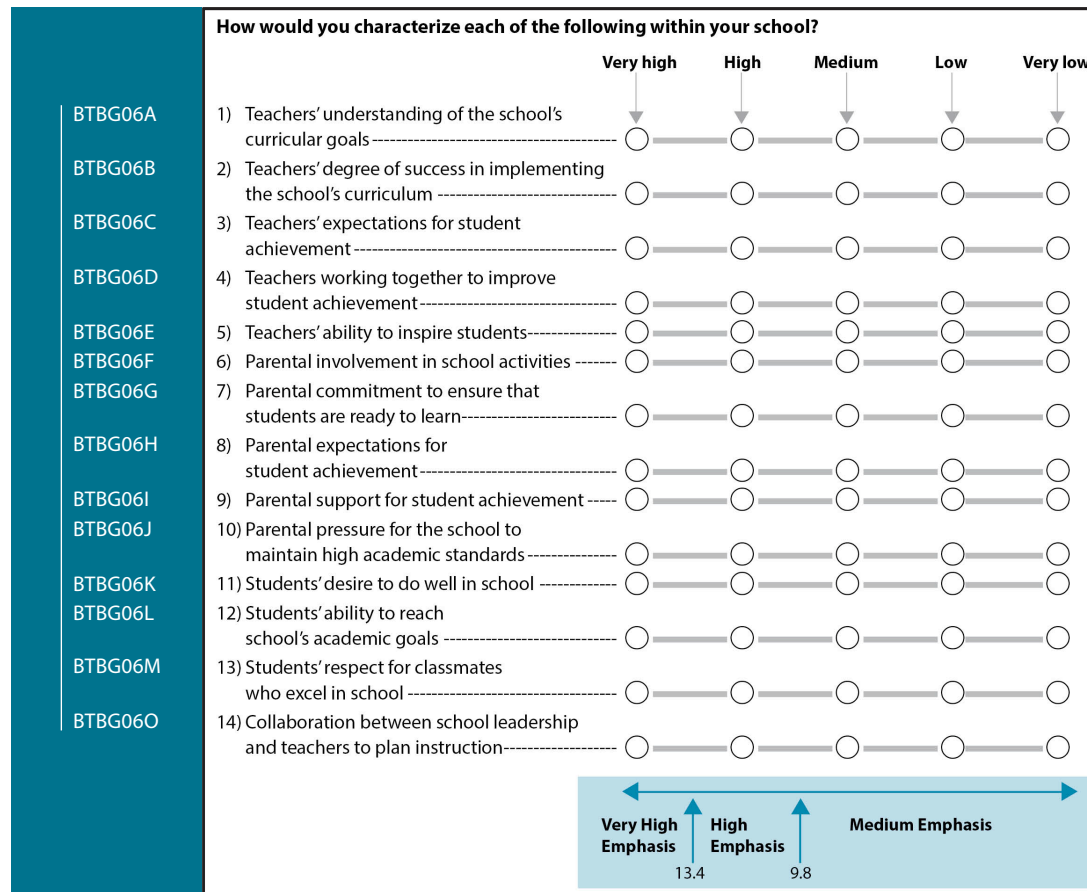
Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale (η^2)	
	(r)		(r)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.32	0.27	0.10	0.07	0.09	0.07
Bahrain	0.24	0.21	0.06	0.04	0.08	0.05
Botswana (9)	0.34	0.31	0.12	0.10	0.13	0.11
Canada	0.21	0.14	0.05	0.02	0.04	0.02
Chile	0.30	0.30	0.09	0.09	0.07	0.06
Chinese Taipei	0.36	0.35	0.13	0.12	0.10	0.10
Egypt	0.09	0.09	0.01	0.01	0.00	0.01
England	0.38	0.35	0.14	0.13	0.14	0.12
Georgia	0.06	0.06	0.00	0.00	0.00	0.00
Hong Kong SAR	0.33	0.31	0.11	0.09	0.13	0.11
Hungary	0.43	0.42	0.19	0.17	0.12	0.12
Iran, Islamic Rep. of	0.31	0.30	0.10	0.09	0.07	0.06
Ireland	0.22	0.21	0.05	0.04	0.04	0.04
Israel	0.25	0.23	0.06	0.05	0.04	0.04
Italy	0.07	0.07	0.00	0.00	0.00	0.00
Japan	0.24	0.20	0.06	0.04	0.03	0.03
Jordan	0.27	0.26	0.07	0.07	0.06	0.05
Kazakhstan	0.14	0.10	0.02	0.01	0.00	0.00
Korea, Rep. of	0.19	0.15	0.03	0.02	0.02	0.01
Kuwait	0.22	0.26	0.05	0.07	0.04	0.06
Lebanon	0.28	0.28	0.08	0.08	0.07	0.08
Lithuania	0.14	0.13	0.02	0.02	0.01	0.01
Malaysia	0.21	0.22	0.04	0.05	0.05	0.04
Malta	0.32	0.32	0.10	0.10	0.06	0.06
Morocco	0.28	0.24	0.08	0.06	0.08	0.06
New Zealand	0.26	0.25	0.07	0.06	0.06	0.06
Norway (9)	0.18	0.18	0.03	0.03	0.03	0.03
Oman	0.11	0.10	0.01	0.01	0.01	0.01
Qatar	0.21	0.23	0.05	0.05	0.03	0.04
Russian Federation	0.21	0.24	0.05	0.06	0.03	0.03
Saudi Arabia	0.17	0.21	0.03	0.04	0.04	0.05
Singapore	0.34	0.33	0.11	0.11	0.10	0.09
Slovenia	0.09	0.08	0.01	0.01	0.01	0.01
South Africa (9)	0.20	0.19	0.04	0.04	0.04	0.04
Sweden	0.22	0.23	0.05	0.05	0.04	0.05
Thailand	0.13	0.12	0.02	0.02	0.01	0.01
Turkey	0.37	0.35	0.14	0.12	0.13	0.11
United Arab Emirates	0.32	0.31	0.10	0.10	0.09	0.08
United States	0.33	0.31	0.11	0.10	0.07	0.06
International Median	0.24	0.23	0.06	0.05	0.04	0.05
Benchmarking Participants						
Buenos Aires, Argentina	0.33	0.28	0.11	0.08	0.07	0.05
Ontario, Canada	0.18	0.11	0.03	0.01	0.02	0.01
Quebec, Canada	0.15	0.16	0.02	0.03	0.02	0.03
Norway (8)	0.18	0.18	0.03	0.03	0.03	0.03
Abu Dhabi, UAE	0.30	0.27	0.09	0.07	0.06	0.04
Dubai, UAE	0.28	0.28	0.08	0.08	0.09	0.10
Florida, US	0.30	0.26	0.09	0.07	0.04	0.03

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

School Emphasis on Academic Success– Teachers’ Reports Scale, Eighth Grade

The School Emphasis on Academic Success–Teachers’ Reports (EAS) scale was created based on teachers’ responses characterizing the fourteen aspects described below.

Items in the TIMSS 2015 School Emphasis on Academic Success–Teachers’ Reports Scale, Eighth Grade¹



¹ For the purpose of scaling, categories in which there were very few respondents were combined. The categories “Low” and “Very low” were combined for all variables. The scale statistics that are reported herein reflect analysis of the items following collapsing.

Item Parameters for the TIMSS 2015 School Emphasis on Academic Success - Teachers' Reports Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BTBG06A	-1.68045	-2.66063	-0.27020	2.93083	1.09
BTBG06B	-1.23725	-3.06845	-0.05158	3.12003	1.03
BTBG06C	-0.74602	-2.64414	0.01364	2.63050	1.06
BTBG06D	-0.90371	-2.10492	-0.18604	2.29096	1.11
BTBG06E	-0.96090	-2.89984	-0.06546	2.96530	1.01
BTBG06F	1.23541	-1.97221	0.09341	1.87880	1.01
BTBG06G	1.38741	-2.14973	0.06550	2.08423	0.81
BTBG06H	0.11852	-2.02680	-0.08263	2.10943	1.03
BTBG06I	1.09297	-2.17010	0.06285	2.10725	0.84
BTBG06J	0.81054	-1.85391	-0.02340	1.87731	1.08
BTBG06K	0.44514	-2.56091	0.08041	2.48050	0.90
BTBG06L	0.78421	-2.99698	0.22187	2.77511	0.86
BTBG06M	0.06382	-2.32494	-0.24518	2.57012	1.13
BTBG06O	-0.40969	-1.72466	-0.33054	2.05520	1.28

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

Scale Transformation Constants for the TIMSS 2015 School Emphasis on Academic Success - Teachers' Reports Scale, Eighth Grade

Scale Transformation Constants	
A = 9.648219	Transformed Scale Score = 9.648219 + 1.396196 • Logit Scale Score
B = 1.396196	

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 School Emphasis on Academic Success - Teachers' Reports Scale,
Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	0.62601	
1	2.37454	
2	3.30485	
3	3.99189	
4	4.55434	
5	5.03713	
6	5.46429	
7	5.84928	
8	6.20193	
9	6.52956	
10	6.83772	
11	7.13072	
12	7.41200	
13	7.68391	
14	7.94962	
15	8.21035	
16	8.46755	
17	8.72250	
18	8.97609	
19	9.22901	
20	9.48165	
21	9.73421	9.8
22	9.98673	
23	10.23910	
24	10.49131	
25	10.74338	
26	10.99555	
27	11.24826	
28	11.50221	
29	11.75840	
30	12.01811	
31	12.28292	
32	12.55479	
33	12.83506	
34	13.12842	
35	13.43840	13.4
36	13.77078	
37	14.13422	
38	14.54168	
39	15.01763	
40	15.61090	
41	16.44334	
42	18.09479	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 School Emphasis on Academic Success - Teachers' Reports Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item													
			BTB006A	BTB006B	BTB006C	BTB006D	BTB006E	BTB006F	BTB006G	BTB006H	BTB006I	BTB006J	BTB006K	BTB006L	BTB006M	BTB006O
Australia	0.92	51	0.61	0.69	0.73	0.59	0.69	0.67	0.84	0.78	0.82	0.70	0.79	0.74	0.67	0.60
Bahrain	0.89	42	0.49	0.66	0.70	0.51	0.68	0.60	0.75	0.56	0.75	0.56	0.75	0.75	0.70	0.55
Botswana (9)	0.84	34	0.50	0.51	0.50	0.55	0.54	0.65	0.71	0.49	0.65	0.61	0.69	0.59	0.59	0.56
Canada	0.90	45	0.59	0.66	0.62	0.56	0.66	0.70	0.81	0.76	0.81	0.67	0.71	0.69	0.58	0.55
Chile	0.90	45	0.53	0.71	0.67	0.56	0.55	0.72	0.74	0.75	0.76	0.68	0.73	0.74	0.62	0.59
Chinese Taipei	0.91	47	0.51	0.40	0.68	0.59	0.71	0.74	0.75	0.80	0.81	0.69	0.79	0.77	0.55	0.64
Egypt	0.90	44	0.61	0.62	0.60	0.64	0.64	0.74	0.73	0.61	0.70	0.66	0.74	0.71	0.58	0.65
England	0.92	50	0.57	0.70	0.70	0.67	0.67	0.69	0.80	0.79	0.78	0.71	0.74	0.75	0.73	0.50
Georgia	0.88	40	0.55	0.58	0.62	0.65	0.63	0.69	0.72	0.66	0.71	0.61	0.63	0.56	0.57	0.58
Hong Kong SAR	0.90	42	0.40	0.54	0.70	0.60	0.65	0.59	0.76	0.76	0.75	0.70	0.69	0.76	0.51	0.54
Hungary	0.90	45	0.47	0.67	0.63	0.41	0.71	0.70	0.81	0.74	0.83	0.68	0.76	0.72	0.69	0.46
Iran, Islamic Rep. of	0.91	45	0.57	0.62	0.63	0.66	0.67	0.76	0.77	0.63	0.71	0.69	0.74	0.70	0.62	0.63
Ireland	0.92	48	0.57	0.68	0.77	0.55	0.63	0.69	0.83	0.76	0.80	0.76	0.77	0.71	0.65	0.51
Israel	0.87	39	0.56	0.66	0.59	0.54	0.60	0.62	0.73	0.61	0.72	0.56	0.70	0.66	0.59	0.50
Italy	0.87	38	0.62	0.72	0.62	0.57	0.56	0.67	0.67	0.55	0.61	0.62	0.58	0.70	0.45	0.59
Japan	0.87	39	0.60	0.55	0.65	0.49	0.59	0.44	0.75	0.71	0.74	0.53	0.71	0.71	0.54	0.58
Jordan	0.88	40	0.45	0.66	0.42	0.56	0.62	0.71	0.79	0.65	0.74	0.64	0.66	0.72	0.53	0.57
Kazakhstan	0.90	44	0.54	0.58	0.64	0.63	0.67	0.73	0.76	0.74	0.77	0.63	0.70	0.67	0.58	0.58
Korea, Rep. of	0.91	46	0.55	0.60	0.72	0.63	0.62	0.75	0.80	0.71	0.79	0.65	0.68	0.74	0.59	0.59
Kuwait	0.90	44	0.59	0.62	0.54	0.54	0.62	0.74	0.78	0.66	0.77	0.64	0.67	0.76	0.63	0.63
Lebanon	0.90	44	0.55	0.61	0.57	0.58	0.50	0.69	0.82	0.70	0.82	0.73	0.67	0.75	0.66	0.55
Lithuania	0.88	40	0.63	0.64	0.64	0.60	0.62	0.69	0.73	0.66	0.68	0.49	0.66	0.68	0.56	0.56
Malaysia	0.88	41	0.50	0.54	0.55	0.56	0.63	0.71	0.77	0.68	0.74	0.51	0.76	0.71	0.65	0.54
Malta	0.91	46	0.48	0.63	0.73	0.56	0.62	0.72	0.79	0.71	0.78	0.73	0.76	0.73	0.63	0.58
Morocco	0.88	41	0.50	0.59	0.54	0.61	0.62	0.70	0.78	0.64	0.74	0.73	0.68	0.67	0.48	0.66
New Zealand	0.90	45	0.59	0.64	0.70	0.53	0.66	0.63	0.78	0.74	0.74	0.74	0.75	0.66	0.62	0.56
Norway (9)	0.86	37	0.54	0.60	0.65	0.53	0.57	0.71	0.69	0.65	0.72	0.57	0.63	0.58	0.55	0.39
Oman	0.90	43	0.55	0.56	0.67	0.62	0.59	0.71	0.77	0.72	0.76	0.56	0.69	0.77	0.60	0.54
Qatar	0.89	41	0.34	0.36	0.65	0.40	0.61	0.68	0.81	0.75	0.80	0.63	0.80	0.78	0.71	0.37
Russian Federation	0.85	36	0.56	0.65	0.63	0.64	0.65	0.64	0.68	0.54	0.63	0.09	0.61	0.66	0.59	0.59
Saudi Arabia	0.90	43	0.64	0.68	0.53	0.70	0.66	0.72	0.77	0.61	0.73	0.61	0.73	0.64	0.50	0.63
Singapore	0.90	44	0.59	0.63	0.70	0.56	0.65	0.66	0.74	0.72	0.77	0.64	0.69	0.72	0.61	0.60
Slovenia	0.82	31	0.60	0.67	0.63	0.68	0.67	0.58	0.59	0.37	0.55	0.28	0.55	0.49	0.52	0.54
South Africa (9)	0.91	46	0.56	0.59	0.59	0.60	0.60	0.72	0.80	0.63	0.79	0.68	0.74	0.79	0.71	0.63
Sweden	0.86	37	0.58	0.64	0.66	0.58	0.59	0.64	0.72	0.63	0.62	0.52	0.64	0.59	0.51	0.55
Thailand	0.89	43	0.53	0.63	0.63	0.62	0.59	0.68	0.73	0.71	0.79	0.66	0.69	0.72	0.55	0.60
Turkey	0.89	41	0.46	0.58	0.64	0.50	0.53	0.73	0.78	0.71	0.78	0.70	0.72	0.75	0.51	0.50
United Arab Emirates	0.91	45	0.49	0.57	0.71	0.58	0.61	0.71	0.81	0.71	0.78	0.67	0.76	0.78	0.66	0.46
United States	0.92	49	0.51	0.64	0.67	0.54	0.67	0.77	0.84	0.79	0.84	0.75	0.77	0.68	0.66	0.49
Benchmarking Participants																
Buenos Aires, Argentina	0.88	40	0.55	0.61	0.61	0.56	0.59	0.74	0.79	0.68	0.76	0.70	0.57	0.57	0.56	0.43
Ontario, Canada	0.89	43	0.56	0.62	0.65	0.45	0.60	0.73	0.83	0.78	0.80	0.73	0.70	0.67	0.50	0.42
Quebec, Canada	0.91	47	0.60	0.70	0.53	0.61	0.73	0.69	0.80	0.70	0.81	0.62	0.71	0.72	0.68	0.67
Norway (8)	0.85	35	0.45	0.50	0.62	0.47	0.56	0.71	0.66	0.73	0.72	0.57	0.68	0.64	0.51	0.36
Abu Dhabi, UAE	0.90	43	0.42	0.53	0.70	0.50	0.59	0.66	0.80	0.66	0.78	0.69	0.80	0.79	0.65	0.39
Dubai, UAE	0.91	48	0.61	0.63	0.73	0.64	0.64	0.72	0.79	0.73	0.76	0.64	0.76	0.76	0.64	0.58
Florida, US	0.92	51	0.64	0.67	0.57	0.60	0.73	0.79	0.81	0.79	0.80	0.74	0.74	0.79	0.74	0.53

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

Relationship Between the TIMSS 2015 School Emphasis on Academic Success - Teachers' Reports Scale, Eighth Grade, and TIMSS 2015 Achievement

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale (η^2)	
	(r)		(r ²)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.26	0.24	0.07	0.06	0.07	0.03
Bahrain	0.16	0.22	0.03	0.05	0.04	0.04
Botswana (9)	0.24	0.19	0.06	0.04	0.04	0.03
Canada	0.18	0.15	0.03	0.02	0.03	0.02
Chile	0.27	0.30	0.07	0.09	0.06	0.05
Chinese Taipei	0.24	0.21	0.06	0.04	0.05	0.05
Egypt	0.18	0.20	0.03	0.04	0.02	0.04
England	0.30	0.30	0.09	0.09	0.10	0.07
Georgia	0.11	0.12	0.01	0.01	0.01	0.01
Hong Kong SAR	0.39	0.31	0.15	0.09	0.11	0.07
Hungary	0.40	0.33	0.16	0.11	0.11	0.05
Iran, Islamic Rep. of	0.32	0.33	0.10	0.11	0.08	0.08
Ireland	0.25	0.22	0.06	0.05	0.07	0.05
Israel	0.28	0.14	0.08	0.02	0.08	0.03
Italy	0.15	0.13	0.02	0.02	0.00	0.00
Japan	0.19	0.15	0.04	0.02	0.02	0.02
Jordan	0.18	0.23	0.03	0.05	0.02	0.04
Kazakhstan	0.11	0.01	0.01	0.00	0.03	0.00
Korea, Rep. of	0.12	0.11	0.02	0.01	0.02	0.01
Kuwait	0.23	0.23	0.05	0.05	0.08	0.04
Lebanon	0.18	0.19	0.03	0.03	0.04	0.02
Lithuania	0.20	0.10	0.04	0.01	0.04	0.01
Malaysia	0.24	0.15	0.06	0.02	0.03	0.02
Malta	0.26	0.21	0.07	0.05	0.03	0.03
Morocco	0.11	0.13	0.01	0.02	0.02	0.03
New Zealand	0.20	0.25	0.04	0.06	0.02	0.05
Norway (9)	0.13	0.13	0.02	0.02	0.01	0.01
Oman	0.16	0.08	0.02	0.01	0.02	0.00
Qatar	0.23	0.20	0.05	0.04	0.06	0.03
Russian Federation	0.18	0.12	0.03	0.01	0.02	0.02
Saudi Arabia	0.14	0.17	0.02	0.03	0.07	0.02
Singapore	0.29	0.32	0.08	0.10	0.06	0.11
Slovenia	0.05	0.06	0.00	0.00	0.00	0.00
South Africa (9)	0.22	0.21	0.05	0.04	0.04	0.07
Sweden	0.20	0.17	0.04	0.03	0.03	0.02
Thailand	0.20	0.17	0.04	0.03	0.04	0.03
Turkey	0.31	0.31	0.09	0.10	0.05	0.07
United Arab Emirates	0.26	0.32	0.07	0.10	0.06	0.09
United States	0.27	0.26	0.07	0.07	0.07	0.05
International Median	0.20	0.20	0.04	0.04	0.04	0.03
Benchmarking Participants						
Buenos Aires, Argentina	0.15	0.17	0.02	0.03	0.01	0.04
Ontario, Canada	0.17	0.12	0.03	0.01	0.02	0.01
Quebec, Canada	0.06	0.18	0.00	0.03	0.01	0.04
Norway (8)	0.17	0.16	0.03	0.02	0.02	0.01
Abu Dhabi, UAE	0.16	0.29	0.03	0.08	0.02	0.08
Dubai, UAE	0.29	0.26	0.08	0.07	0.10	0.06
Florida, US	0.36	0.18	0.13	0.03	0.11	0.04

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

Student Bullying Scale, Eighth Grade

The Student Bullying (SB) scale was created based on students' responses to how often they experienced the nine bullying behaviors described below.

Items in the TIMSS 2015 Student Bullying Scale, Eighth Grade

During this school year, how often have other students from your school done any of the following things to you (including through texting or the Internet)?

	Never	A few times a year	Once or twice a month	At least once a week
BSBG16A 1) Made fun of me or called me names-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBG16B 2) Left me out of their games or activities-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBG16C 3) Spread lies about me-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBG16D 4) Stole something from me-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBG16E 5) Hit or hurt me (e.g., shoving, hitting, kicking)-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBG16F 6) Made me do things I didn't want to do-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBG16G 7) Shared embarrassing information about me-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBG16H 8) Posted embarrassing things about me online-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBG16I 9) Threatened me-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Item Parameters for the TIMSS 2015 Student Bullying Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBG16A	0.89179	0.05940	-0.30863	0.24923	1.09
BSBG16B	0.19770	-0.01912	0.16738	-0.14826	1.17
BSBG16C	0.34002	-0.23740	-0.12720	0.36460	0.98
BSBG16D	0.07870	0.05469	-0.03394	-0.02075	1.10
BSBG16E	-0.01022	0.16315	-0.02603	-0.13712	1.00
BSBG16F	-0.32348	0.09818	0.17832	-0.27650	0.93
BSBG16G	-0.07434	0.01975	-0.05531	0.03556	0.91
BSBG16H	-0.65156	0.44861	0.29035	-0.73896	0.95
BSBG16I	-0.44861	0.40213	0.17194	-0.57407	0.89

Scale Transformation Constants for the TIMSS 2015 Student Bullying Scale, Eighth Grade

Scale Transformation Constants	
A = 7.415134	Transformed Scale Score = 7.415134 + 1.807351 • Logit Scale Score
B = 1.807351	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Student Bullying Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	2.46657	
1	4.10309	
2	4.76912	
3	5.19497	
4	5.51718	
5	5.78147	
6	6.01006	
7	6.21894	
8	6.41095	
9	6.59120	
10	6.76349	
11	6.93080	
12	7.09541	
13	7.25929	7.3
14	7.42473	
15	7.59182	
16	7.76410	
17	7.94315	
18	8.13155	
19	8.33231	
20	8.54672	
21	8.78408	
22	9.05164	
23	9.36313	9.3
24	9.74130	
25	10.24057	
26	11.00609	
27	12.78394	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Student Bullying Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item								
			B5BGT16A	B5BGT16B	B5BGT16C	B5BGT16D	B5BGT16E	B5BGT16F	B5BGT16G	B5BGT16H	B5BGT16I
Australia	0.87	49	0.73	0.68	0.77	0.64	0.68	0.70	0.76	0.64	0.72
Bahrain	0.86	48	0.61	0.66	0.72	0.61	0.73	0.73	0.77	0.65	0.76
Botswana (9)	0.74	33	0.49	0.50	0.63	0.41	0.59	0.63	0.68	0.58	0.61
Canada	0.84	46	0.71	0.65	0.74	0.61	0.65	0.68	0.74	0.62	0.65
Chile	0.83	46	0.63	0.65	0.70	0.57	0.70	0.70	0.78	0.67	0.68
Chinese Taipei	0.83	44	0.71	0.59	0.71	0.57	0.66	0.70	0.74	0.61	0.69
Egypt	0.85	47	0.60	0.58	0.68	0.61	0.75	0.74	0.76	0.71	0.72
England	0.85	47	0.71	0.68	0.76	0.61	0.68	0.66	0.73	0.64	0.71
Georgia	0.76	41	0.51	0.47	0.63	0.55	0.62	0.72	0.76	0.71	0.72
Hong Kong SAR	0.83	45	0.49	0.61	0.68	0.65	0.70	0.75	0.74	0.67	0.71
Hungary	0.78	38	0.68	0.62	0.65	0.49	0.62	0.60	0.70	0.56	0.62
Iran, Islamic Rep. of	0.80	41	0.59	0.55	0.65	0.55	0.69	0.69	0.73	0.54	0.72
Ireland	0.84	44	0.70	0.62	0.75	0.57	0.67	0.64	0.74	0.62	0.67
Israel	-	-	-	-	-	-	-	-	-	-	-
Italy	0.77	36	0.71	0.65	0.67	0.42	0.62	0.60	0.69	0.41	0.58
Japan	0.81	42	0.69	0.65	0.71	0.59	0.66	0.72	0.68	0.49	0.58
Jordan	0.86	49	0.62	0.62	0.69	0.60	0.77	0.74	0.77	0.70	0.76
Kazakhstan	0.77	40	0.57	0.48	0.67	0.59	0.64	0.66	0.73	0.68	0.63
Korea, Rep. of	0.76	39	0.61	0.57	0.68	0.47	0.68	0.68	0.72	0.51	0.65
Kuwait	0.81	42	0.54	0.55	0.68	0.58	0.70	0.66	0.72	0.64	0.70
Lebanon	0.88	52	0.65	0.66	0.72	0.70	0.73	0.75	0.75	0.78	0.75
Lithuania	0.83	44	0.69	0.58	0.73	0.58	0.69	0.66	0.72	0.63	0.70
Malaysia	0.81	42	0.50	0.61	0.69	0.55	0.67	0.70	0.70	0.68	0.69
Malta	0.87	50	0.67	0.68	0.74	0.66	0.72	0.71	0.76	0.69	0.74
Morocco	0.81	41	0.57	0.57	0.61	0.52	0.71	0.70	0.72	0.65	0.69
New Zealand	0.87	50	0.69	0.68	0.77	0.67	0.70	0.69	0.75	0.67	0.71
Norway (9)	0.83	43	0.73	0.63	0.71	0.58	0.62	0.65	0.71	0.62	0.61
Oman	0.81	41	0.63	0.43	0.71	0.58	0.66	0.64	0.74	0.60	0.69
Qatar	0.88	53	0.66	0.69	0.74	0.63	0.75	0.75	0.80	0.73	0.78
Russian Federation	0.79	40	0.70	0.49	0.71	0.52	0.70	0.58	0.75	0.59	0.57
Saudi Arabia	0.86	49	0.60	0.61	0.70	0.65	0.73	0.74	0.77	0.71	0.76
Singapore	0.84	45	0.64	0.62	0.73	0.61	0.68	0.67	0.75	0.63	0.68
Slovenia	0.84	45	0.68	0.68	0.75	0.57	0.64	0.62	0.79	0.59	0.65
South Africa (9)	0.78	38	0.57	0.56	0.63	0.41	0.63	0.65	0.74	0.62	0.66
Sweden	0.83	43	0.71	0.61	0.74	0.59	0.67	0.63	0.69	0.63	0.66
Thailand	0.80	40	0.53	0.55	0.65	0.56	0.66	0.71	0.75	0.61	0.63
Turkey	0.81	42	0.57	0.60	0.66	0.54	0.69	0.67	0.75	0.66	0.70
United Arab Emirates	0.85	47	0.62	0.62	0.71	0.61	0.72	0.70	0.76	0.66	0.73
United States	0.86	48	0.72	0.68	0.74	0.63	0.70	0.65	0.76	0.66	0.70
Benchmarking Participants											
Buenos Aires, Argentina	0.79	40	0.68	0.59	0.66	0.47	0.66	0.67	0.69	0.60	0.64
Ontario, Canada	0.85	46	0.72	0.65	0.77	0.60	0.66	0.68	0.75	0.61	0.66
Quebec, Canada	0.81	42	0.70	0.63	0.72	0.55	0.57	0.66	0.71	0.62	0.63
Norway (8)	0.85	46	0.74	0.68	0.77	0.57	0.62	0.72	0.71	0.66	0.65
Abu Dhabi, UAE	0.86	49	0.65	0.64	0.71	0.60	0.75	0.72	0.78	0.67	0.76
Dubai, UAE	0.84	45	0.63	0.63	0.73	0.59	0.71	0.67	0.74	0.63	0.69
Florida, US	0.85	46	0.71	0.65	0.72	0.63	0.70	0.62	0.74	0.67	0.69

A dash (-) indicates comparable data not available.

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

Relationship Between the TIMSS 2015 Student Bullying Scale, Eighth Grade, and TIMSS 2015 Achievement

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale (η^2)	
	(r)		(r)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.12	0.12	0.02	0.02	0.02	0.02
Bahrain	0.13	0.16	0.02	0.03	0.03	0.05
Botswana (9)	0.14	0.17	0.02	0.03	0.03	0.05
Canada	0.08	0.07	0.01	0.01	0.01	0.01
Chile	0.02	0.04	0.00	0.00	0.01	0.01
Chinese Taipei	0.02	0.02	0.00	0.00	0.00	0.00
Egypt	0.27	0.28	0.07	0.08	0.10	0.10
England	0.07	0.02	0.00	0.00	0.01	0.01
Georgia	0.11	0.12	0.01	0.01	0.01	0.03
Hong Kong SAR	-0.08	-0.09	0.01	0.01	0.00	0.01
Hungary	0.11	0.08	0.01	0.01	0.02	0.01
Iran, Islamic Rep. of	0.11	0.11	0.01	0.01	0.03	0.03
Ireland	0.03	0.04	0.00	0.00	0.01	0.01
Israel	-	-	-	-	-	-
Italy	0.05	0.04	0.00	0.00	0.00	0.01
Japan	-0.06	-0.03	0.00	0.00	0.00	0.00
Jordan	0.17	0.26	0.03	0.07	0.04	0.09
Kazakhstan	0.06	0.03	0.00	0.00	0.01	0.00
Korea, Rep. of	-0.04	-0.05	0.00	0.00	0.00	0.00
Kuwait	0.04	0.07	0.00	0.01	0.01	0.02
Lebanon	0.17	0.23	0.03	0.05	0.05	0.09
Lithuania	0.05	0.05	0.00	0.00	0.01	0.01
Malaysia	0.15	0.21	0.02	0.04	0.03	0.06
Malta	0.08	0.06	0.01	0.00	0.03	0.03
Morocco	0.06	0.08	0.00	0.01	0.01	0.01
New Zealand	0.09	0.09	0.01	0.01	0.01	0.01
Norway (9)	0.05	0.07	0.00	0.00	0.01	0.01
Oman	0.12	0.15	0.01	0.02	0.02	0.03
Qatar	0.12	0.15	0.01	0.02	0.04	0.06
Russian Federation	0.05	0.05	0.00	0.00	0.01	0.00
Saudi Arabia	0.08	0.18	0.01	0.03	0.02	0.06
Singapore	0.10	0.09	0.01	0.01	0.01	0.01
Slovenia	0.03	0.03	0.00	0.00	0.01	0.01
South Africa (9)	0.23	0.28	0.05	0.08	0.07	0.10
Sweden	0.08	0.08	0.01	0.01	0.01	0.02
Thailand	0.04	0.04	0.00	0.00	0.01	0.01
Turkey	0.14	0.14	0.02	0.02	0.03	0.03
United Arab Emirates	0.14	0.16	0.02	0.03	0.04	0.05
United States	0.05	0.06	0.00	0.00	0.01	0.01
International Median	0.08	0.08	0.01	0.01	0.01	0.01
Benchmarking Participants						
Buenos Aires, Argentina	0.03	0.04	0.00	0.00	0.00	0.01
Ontario, Canada	0.06	0.08	0.00	0.01	0.01	0.01
Quebec, Canada	0.03	0.02	0.00	0.00	0.00	0.00
Norway (8)	0.10	0.11	0.01	0.01	0.02	0.02
Abu Dhabi, UAE	0.16	0.19	0.02	0.04	0.05	0.07
Dubai, UAE	0.09	0.10	0.01	0.01	0.02	0.02
Florida, US	0.05	0.05	0.00	0.00	0.01	0.01

A dash (-) indicates comparable data not available.

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

Students Confident in Biology Scale, Eighth Grade

The Students Confident in Biology (SCB) scale was created based on students' degree of agreement with the eight statements described below.

Items in the TIMSS 2015 Students Confident in Biology Scale, Eighth Grade

		How much do you agree with these statements about biology?			
		Agree a lot	Agree a little	Disagree a little	Disagree a lot
T	BSBB24A	1) I usually do well in biology ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBB24B*	2) Biology is more difficult for me than for many of my classmates* ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBB24C*	3) Biology is not one of my strengths* ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBB24D	4) I learn things quickly in biology ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBB24E	5) I am good at working out difficult biology problems ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBB24F	6) My teacher tells me I am good at biology ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBB24G*	7) Biology is harder for me than any other subject* ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBB24H*	8) Biology makes me confused* ----- ○ ——— ○ ——— ○ ——— ○			

* Reverse coded

Very Confident Confident Not Confident

11.1 8.6

T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 Students Confident in Biology Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBB24A	-0.53880	-1.22367	-0.47664	1.70031	0.92
BSBB24B*	0.02820	-1.04634	-0.25298	1.29932	1.00
BSBB24C*	0.26502	-1.08484	-0.13799	1.22283	0.96
BSBB24D	-0.22053	-1.39570	-0.22015	1.61585	0.91
BSBB24E	0.30089	-1.62811	0.00932	1.61879	1.02
BSBB24F	0.21858	-1.53529	-0.08286	1.61815	1.09
BSBB24G*	0.03479	-0.82612	-0.35591	1.18203	1.01
BSBB24H*	-0.08815	-0.59141	-0.39757	0.98898	1.07

*Reverse coded

Scale Transformation Constants for the TIMSS 2015 Students Confident in Biology Scale, Eighth Grade

Scale Transformation Constants

A = 8.684972

B = 1.447375

Transformed Scale Score = 8.684972 + 1.447375 • Logit Scale Score

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



**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Students Confident in Biology Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	2.85186	
1	4.49062	
2	5.28824	
3	5.84050	
4	6.27693	
5	6.64380	
6	6.97197	
7	7.27080	
8	7.54690	
9	7.81493	
10	8.07299	
11	8.32835	
12	8.58506	8.6
13	8.84688	
14	9.11736	
15	9.40008	
16	9.69874	
17	10.01647	
18	10.36086	
19	10.73954	
20	11.16602	11.1
21	11.66296	
22	12.28106	
23	13.14959	
24	14.86445	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students Confident in Biology Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BSBB24A	BSBB24B*	BSBB24C*	BSBB24D	BSBB24E	BSBB24F	BSBB24G*	BSBB24H*
Georgia	0.80	42	0.67	0.63	0.69	0.70	0.65	0.62	0.60	0.62
Hungary	0.88	55	0.80	0.72	0.78	0.80	0.71	0.72	0.73	0.67
Kazakhstan	0.87	52	0.74	0.68	0.73	0.78	0.74	0.72	0.69	0.68
Lebanon	0.75	37	0.66	0.62	0.51	0.71	0.63	0.66	0.62	0.44
Lithuania	0.85	50	0.77	0.68	0.75	0.77	0.74	0.63	0.69	0.60
Malta	0.91	61	0.81	0.76	0.76	0.83	0.79	0.76	0.77	0.76
Morocco	0.67	31	0.66	0.36	0.26	0.74	0.70	0.71	0.38	0.40
Russian Federation	0.87	53	0.74	0.71	0.80	0.80	0.74	0.69	0.69	0.67
Slovenia	0.90	58	0.79	0.73	0.79	0.82	0.76	0.69	0.76	0.73
Sweden	0.87	53	0.77	0.69	0.77	0.79	0.74	0.65	0.70	0.70

*Reverse coded

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

Relationship Between the TIMSS 2015 Students Confident in Biology Scale, Eighth Grade, and TIMSS 2015 Science Achievement

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r ²)	
Georgia	0.36	0.13	0.14
Hungary	0.26	0.07	0.08
Kazakhstan	0.20	0.04	0.04
Lebanon	0.38	0.15	0.14
Lithuania	0.24	0.06	0.06
Malta	0.44	0.20	0.21
Morocco	0.32	0.10	0.09
Russian Federation	0.16	0.02	0.02
Slovenia	0.26	0.07	0.07
Sweden	0.30	0.09	0.09
International Median	0.28	0.08	0.08

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



Students Confident in Chemistry Scale, Eighth Grade

The Students Confident in Chemistry (SCC) scale was created based on students' degree of agreement with the eight statements described below.

Items in the TIMSS 2015 Students Confident in Chemistry Scale, Eighth Grade

		How much do you agree with these statements about chemistry?				
		Agree a lot	Agree a little	Disagree a little	Disagree a lot	
T	BSBC32A	1) I usually do well in chemistry -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	BSBC32B*	2) Chemistry is more difficult for me than for many of my classmates* -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	BSBC32C*	3) Chemistry is not one of my strengths* -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	BSBC32D	4) I learn things quickly in chemistry -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	BSBC32E	5) I am good at working out difficult chemistry problems --	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	BSBC32F	6) My teacher tells me I am good at chemistry -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	BSBC32G*	7) Chemistry is harder for me than any other subject* -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	BSBC32H*	8) Chemistry makes me confused* -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* Reverse coded

T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 Students Confident in Chemistry Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBC32A	-0.43252	-1.24702	-0.21914	1.46616	0.88
BSBC32B*	-0.07136	-1.07970	-0.06435	1.14405	1.02
BSBC32C*	0.20772	-1.09748	0.01172	1.08576	0.98
BSBC32D	-0.09316	-1.42123	0.01572	1.40551	0.87
BSBC32E	0.29153	-1.42513	0.11128	1.31385	1.00
BSBC32F	0.08171	-1.42824	0.02111	1.40713	1.01
BSBC32G*	0.11166	-0.94209	-0.08266	1.02475	1.07
BSBC32H*	-0.09558	-0.71550	-0.16147	0.87697	1.20

*Reverse coded

Scale Transformation Constants for the TIMSS 2015 Students Confident in Chemistry Scale, Eighth Grade

Scale Transformation Constants	
A = 9.428069	Transformed Scale Score = 9.428069 + 1.394223 • Logit Scale Score
B = 1.394223	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Students Confident in Chemistry Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.83109	
1	5.43486	
2	6.22207	
3	6.76721	
4	7.19805	
5	7.56067	
6	7.87953	
7	8.16824	
8	8.43786	
9	8.69269	
10	8.93765	
11	9.17680	
12	9.41304	9.5
13	9.65127	
14	9.89290	
15	10.14184	
16	10.40188	
17	10.67761	
18	10.97271	
19	11.29909	
20	11.66958	11.6
21	12.10853	
22	12.66162	
23	13.45723	
24	15.06951	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students Confident in Chemistry Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BS8C32A	BS8C32B*	BS8C32C*	BS8C32D	BS8C32E	BS8C32F	BS8C32G*	BS8C32H*
Georgia	0.81	43	0.70	0.61	0.69	0.75	0.69	0.65	0.57	0.54
Hungary	0.89	57	0.82	0.68	0.79	0.81	0.76	0.78	0.71	0.67
Kazakhstan	0.87	54	0.78	0.72	0.73	0.79	0.77	0.76	0.65	0.64
Lebanon	0.74	37	0.72	0.53	0.44	0.76	0.69	0.76	0.46	0.31
Lithuania	0.87	53	0.82	0.69	0.74	0.80	0.77	0.73	0.67	0.58
Malta	0.92	65	0.82	0.80	0.83	0.82	0.81	0.78	0.79	0.78
Morocco	0.63	35	0.69	-0.38	-0.42	0.72	0.77	0.77	-0.43	-0.35
Russian Federation	0.91	60	0.80	0.76	0.82	0.84	0.80	0.79	0.71	0.67
Slovenia	0.92	63	0.82	0.78	0.80	0.85	0.79	0.76	0.78	0.75
Sweden	0.89	56	0.79	0.71	0.78	0.81	0.77	0.67	0.71	0.71

*Reverse coded

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

Relationship Between the TIMSS 2015 Students Confident in Chemistry Scale, Eighth Grade, and TIMSS 2015 Science Achievement

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r ²)	
Georgia	0.34	0.11	0.14
Hungary	0.23	0.05	0.08
Kazakhstan	0.19	0.04	0.04
Lebanon	0.31	0.10	0.10
Lithuania	0.24	0.06	0.08
Malta	0.34	0.12	0.15
Morocco	0.31	0.10	0.09
Russian Federation	0.20	0.04	0.05
Slovenia	0.39	0.15	0.16
Sweden	0.31	0.10	0.11
International Median	0.31	0.10	0.10

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



Students Confident in Earth Science Scale, Eighth Grade

The Students Confident in Earth Science (SCE) scale was created based on students' degree of agreement with the eight statements described below.

Items in the TIMSS 2015 Students Confident in Earth Science Scale, Eighth Grade

		How much do you agree with these statements about earth science?			
		Agree a lot	Agree a little	Disagree a little	Disagree a lot
T	BSBE28A	1) I usually do well in earth science ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBE28B*	2) Earth science is more difficult for me than for many of my classmates* ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBE28C*	3) Earth science is not one of my strengths* ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBE28D	4) I learn things quickly in earth science ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBE28E	5) I am good at working out difficult earth science problems ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBE28F	6) My teacher tells me I am good at earth science ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBE28G*	7) Earth science is harder for me than any other subject* --- ○ ——— ○ ——— ○ ——— ○			
	BSBE28H*	8) Earth science makes me confused* ----- ○ ——— ○ ——— ○ ——— ○			

* Reverse coded

Very Confident Confident Not Confident

11.2 8.7

T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 Students Confident in Earth Science Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBE28A	-0.42005	-1.17384	-0.44817	1.62201	0.90
BSBE28B*	-0.06756	-1.01438	-0.28584	1.30022	0.97
BSBE28C*	0.19190	-1.06848	-0.14054	1.20902	0.93
BSBE28D	-0.15726	-1.36012	-0.24217	1.60229	0.89
BSBE28E	0.31769	-1.54826	0.00872	1.53954	1.01
BSBE28F	0.24063	-1.49092	-0.07339	1.56431	1.04
BSBE28G*	0.04915	-0.92539	-0.33018	1.25557	1.02
BSBE28H*	-0.15450	-0.55000	-0.43709	0.98709	1.07

*Reverse coded

Scale Transformation Constants for the TIMSS 2015 Students Confident in Earth Science Scale, Eighth Grade

Scale Transformation Constants	
A = 8.804148	Transformed Scale Score = 8.804148 + 1.447084 • Logit Scale Score
B = 1.447084	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Students Confident in Earth Science Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.05255	
1	4.68088	
2	5.46730	
3	6.00837	
4	6.43368	
5	6.79112	
6	7.11037	
7	7.39780	
8	7.66917	
9	7.92933	
10	8.18503	
11	8.43655	
12	8.69029	8.7
13	8.94985	
14	9.21859	
15	9.49991	
16	9.79733	
17	10.11386	
18	10.45693	
19	10.83407	
20	11.25874	11.2
21	11.75346	
22	12.36898	
23	13.23453	
24	14.94588	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students Confident in Earth Science Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BSBE28A	BSBE28B*	BSBE28C*	BSBE28D	BSBE28E	BSBE28F	BSBE28G*	BSBE28H*
Georgia	0.76	37	0.64	0.58	0.64	0.68	0.63	0.60	0.55	0.57
Hungary	0.89	56	0.81	0.72	0.80	0.80	0.73	0.76	0.74	0.65
Kazakhstan	0.87	52	0.76	0.70	0.75	0.78	0.74	0.74	0.65	0.64
Lebanon	-	-	-	-	-	-	-	-	-	-
Lithuania	0.84	48	0.76	0.70	0.74	0.75	0.72	0.64	0.65	0.55
Malta	0.87	52	0.78	0.66	0.69	0.80	0.76	0.73	0.67	0.69
Morocco	0.65	32	0.72	-0.24	-0.29	0.74	0.78	0.79	-0.24	-0.21
Russian Federation	0.87	52	0.75	0.71	0.79	0.79	0.74	0.71	0.64	0.63
Slovenia	0.90	58	0.81	0.76	0.79	0.80	0.75	0.70	0.76	0.72
Sweden	-	-	-	-	-	-	-	-	-	-

*Reverse coded

A dash (-) indicates comparable data not available.

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

Relationship Between the TIMSS 2015 Students Confident in Earth Science Scale, Eighth Grade, and TIMSS 2015 Science Achievement

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r^2)	
Georgia	0.38	0.14	0.15
Hungary	0.22	0.05	0.07
Kazakhstan	0.18	0.03	0.04
Lebanon	-	-	-
Lithuania	0.30	0.09	0.09
Malta	0.32	0.10	0.12
Morocco	0.30	0.09	0.08
Russian Federation	0.18	0.03	0.04
Slovenia	0.27	0.07	0.09
Sweden	-	-	-
International Median	0.28	0.08	0.08

A dash (-) indicates comparable data not available.

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

Students Confident in Mathematics Scale, Eighth Grade

The Students Confident in Mathematics (SCM) scale was created based on students' degree of agreement with the nine statements described below.

Items in the TIMSS 2015 Students Confident in Mathematics Scale, Eighth Grade

		How much do you agree with these statements about mathematics?			
		Agree a lot	Agree a little	Disagree a little	Disagree a lot
T	BSBM19A	1) I usually do well in mathematics ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBM19B*	2) Mathematics is more difficult for me than for many of my classmates* ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBM19C*	3) Mathematics is not one of my strengths* ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBM19D	4) I learn things quickly in mathematics ----- ○ ——— ○ ——— ○ ——— ○			
	BSBM19E*	5) Mathematics makes me nervous* ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBM19F	6) I am good at working out difficult mathematics problems ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBM19G	7) My teacher tells me I am good at mathematics ----- ○ ——— ○ ——— ○ ——— ○			
T	BSBM19H*	8) Mathematics is harder for me than any other subject* -- ○ ——— ○ ——— ○ ——— ○			
	BSBM19I*	9) Mathematics makes me confused* ----- ○ ——— ○ ——— ○ ——— ○			

* Reverse coded

T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 Students Confident in Mathematics Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBM19A	-0.50782	-1.09617	-0.31356	1.40973	0.93
BSBM19B*	0.02025	-1.16866	0.14633	1.02233	1.04
BSBM19C*	0.24765	-0.85950	0.16100	0.69850	0.94
BSBM19D	-0.23484	-1.26266	-0.08260	1.34526	0.94
BSBM19E*	-0.05673	-0.97126	0.06128	0.90998	1.21
BSBM19F	0.28492	-1.25325	-0.17310	1.42635	0.99
BSBM19G	0.02811	-1.08338	-0.13552	1.21890	1.11
BSBM19H*	0.11634	-0.69162	0.02593	0.66569	0.92
BSBM19I*	0.10212	-0.89145	0.10503	0.78642	0.99

*Reverse coded

Scale Transformation Constants for the TIMSS 2015 Students Confident in Mathematics Scale, Eighth Grade

Scale Transformation Constants	
A = 9.553292	Transformed Scale Score = 9.553292 + 1.590838 • Logit Scale Score
B = 1.590838	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Students Confident in Mathematics Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.19619	
1	4.99370	
2	5.86478	
3	6.46291	
4	6.92948	
5	7.32079	
6	7.66196	
7	7.96832	
8	8.24834	
9	8.51163	
10	8.76064	
11	8.99900	
12	9.22981	
13	9.45579	9.5
14	9.67949	
15	9.90347	
16	10.13034	
17	10.36309	
18	10.60515	
19	10.86066	
20	11.13293	
21	11.43104	
22	11.76507	
23	12.15148	12.1
24	12.61729	
25	13.22021	
26	14.10390	
27	15.92523	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students Confident in Mathematics Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item								
			BSBM19A	BSBM19B*	BSBM19C*	BSBM19D	BSBM19E*	BSBM19F	BSBM19G	BSBM19H*	BSBM19I*
Australia	0.90	56	0.80	0.75	0.83	0.79	0.58	0.77	0.58	0.80	0.77
Bahrain	0.80	38	0.49	0.58	0.61	0.65	0.58	0.64	0.59	0.72	0.65
Botswana (9)	0.71	32	0.71	0.38	0.49	0.68	0.10	0.71	0.66	0.49	0.53
Canada	0.92	62	0.83	0.82	0.86	0.82	0.66	0.80	0.58	0.84	0.81
Chile	0.85	46	0.76	0.53	0.66	0.78	0.48	0.75	0.67	0.70	0.73
Chinese Taipei	0.93	65	0.85	0.81	0.88	0.85	0.54	0.82	0.80	0.84	0.81
Egypt	0.70	30	0.19	0.67	0.59	0.38	0.68	0.34	0.29	0.74	0.71
England	0.89	53	0.76	0.72	0.79	0.78	0.60	0.77	0.48	0.82	0.77
Georgia	0.80	39	0.63	0.62	0.70	0.66	0.43	0.62	0.59	0.66	0.64
Hong Kong SAR	0.91	58	0.78	0.76	0.85	0.76	0.62	0.77	0.68	0.83	0.77
Hungary	0.91	59	0.83	0.73	0.83	0.83	0.57	0.79	0.78	0.76	0.74
Iran, Islamic Rep. of	0.85	46	0.75	0.53	0.63	0.73	0.65	0.69	0.69	0.71	0.72
Ireland	0.89	55	0.80	0.74	0.81	0.81	0.60	0.77	0.52	0.80	0.76
Israel	0.87	49	0.75	0.68	0.70	0.73	0.63	0.70	0.60	0.75	0.72
Italy	0.92	63	0.84	0.76	0.85	0.85	0.67	0.78	0.76	0.81	0.79
Japan	0.90	56	0.77	0.70	0.84	0.74	0.63	0.78	0.66	0.78	0.78
Jordan	0.76	34	0.33	0.63	0.62	0.54	0.65	0.52	0.51	0.70	0.68
Kazakhstan	0.89	54	0.77	0.72	0.76	0.79	0.59	0.76	0.76	0.74	0.72
Korea, Rep. of	0.91	60	0.86	0.79	0.86	0.76	0.36	0.84	0.78	0.82	0.76
Kuwait	0.82	40	0.54	0.59	0.54	0.70	0.63	0.67	0.61	0.73	0.68
Lebanon	0.77	36	0.62	0.62	0.60	0.59	0.63	0.50	0.57	0.71	0.55
Lithuania	0.88	52	0.81	0.72	0.80	0.75	0.60	0.75	0.66	0.74	0.65
Malaysia	0.81	39	0.58	0.58	0.73	0.56	0.68	0.57	0.46	0.70	0.74
Malta	0.89	53	0.78	0.66	0.76	0.77	0.63	0.73	0.63	0.78	0.77
Morocco	0.68	29	0.62	0.31	0.26	0.69	0.51	0.60	0.68	0.47	0.52
New Zealand	0.88	51	0.75	0.71	0.80	0.75	0.56	0.75	0.54	0.79	0.72
Norway (9)	0.93	63	0.83	0.77	0.86	0.83	0.73	0.83	0.71	0.81	0.74
Oman	0.78	36	0.41	0.71	0.60	0.52	0.69	0.41	0.38	0.76	0.73
Qatar	0.82	40	0.58	0.65	0.65	0.63	0.63	0.59	0.56	0.72	0.69
Russian Federation	0.91	58	0.78	0.74	0.83	0.82	0.67	0.77	0.71	0.77	0.75
Saudi Arabia	0.75	34	0.29	0.65	0.56	0.55	0.66	0.44	0.44	0.74	0.72
Singapore	0.91	59	0.84	0.76	0.85	0.78	0.65	0.78	0.64	0.82	0.77
Slovenia	0.91	59	0.81	0.73	0.82	0.81	0.67	0.79	0.73	0.78	0.77
South Africa (9)	0.80	38	0.66	0.51	0.63	0.65	0.51	0.65	0.62	0.65	0.67
Sweden	0.92	60	0.82	0.77	0.84	0.82	0.61	0.82	0.66	0.84	0.80
Thailand	0.80	39	0.59	0.62	0.75	0.58	0.52	0.51	0.55	0.71	0.70
Turkey	0.87	50	0.76	0.67	0.78	0.72	0.50	0.72	0.71	0.73	0.75
United Arab Emirates	0.85	45	0.64	0.65	0.74	0.66	0.66	0.64	0.59	0.73	0.71
United States	0.90	56	0.77	0.76	0.82	0.79	0.63	0.76	0.58	0.82	0.78
Benchmarking Participants											
Buenos Aires, Argentina	0.85	46	0.73	0.66	0.73	0.69	0.54	0.63	0.63	0.75	0.72
Ontario, Canada	0.92	61	0.81	0.82	0.85	0.81	0.65	0.80	0.56	0.84	0.81
Quebec, Canada	0.92	63	0.84	0.81	0.87	0.84	0.67	0.79	0.61	0.83	0.81
Norway (8)	0.91	60	0.81	0.77	0.84	0.82	0.71	0.81	0.64	0.79	0.74
Abu Dhabi, UAE	0.83	42	0.58	0.64	0.73	0.61	0.66	0.60	0.53	0.70	0.71
Dubai, UAE	0.88	51	0.74	0.70	0.77	0.72	0.67	0.70	0.64	0.77	0.74
Florida, US	0.89	53	0.75	0.71	0.80	0.77	0.60	0.72	0.61	0.80	0.77

*Reverse coded

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

Relationship Between the TIMSS 2015 Students Confident in Mathematics Scale, Eighth Grade, and TIMSS 2015 Mathematics Achievement

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r^2)	
Australia	0.51	0.26	0.25
Bahrain	0.40	0.16	0.15
Botswana (9)	0.26	0.07	0.09
Canada	0.55	0.30	0.29
Chile	0.43	0.18	0.18
Chinese Taipei	0.52	0.27	0.24
Egypt	0.35	0.12	0.11
England	0.46	0.21	0.18
Georgia	0.45	0.20	0.19
Hong Kong SAR	0.37	0.14	0.14
Hungary	0.53	0.28	0.28
Iran, Islamic Rep. of	0.42	0.18	0.17
Ireland	0.44	0.19	0.19
Israel	0.36	0.13	0.13
Italy	0.50	0.25	0.23
Japan	0.44	0.19	0.16
Jordan	0.37	0.14	0.14
Kazakhstan	0.25	0.06	0.07
Korea, Rep. of	0.52	0.27	0.24
Kuwait	0.30	0.09	0.09
Lebanon	0.33	0.11	0.11
Lithuania	0.54	0.29	0.29
Malaysia	0.33	0.11	0.11
Malta	0.39	0.15	0.16
Morocco	0.39	0.15	0.14
New Zealand	0.47	0.22	0.20
Norway (9)	0.61	0.37	0.34
Oman	0.35	0.12	0.11
Qatar	0.42	0.17	0.16
Russian Federation	0.44	0.19	0.18
Saudi Arabia	0.35	0.12	0.11
Singapore	0.40	0.16	0.16
Slovenia	0.54	0.29	0.28
South Africa (9)	0.24	0.06	0.08
Sweden	0.59	0.35	0.32
Thailand	0.23	0.05	0.10
Turkey	0.48	0.23	0.24
United Arab Emirates	0.37	0.14	0.14
United States	0.43	0.18	0.18
International Median	0.42	0.18	0.16
Benchmarking Participants			
Buenos Aires, Argentina	0.37	0.13	0.12
Ontario, Canada	0.59	0.35	0.35
Quebec, Canada	0.54	0.29	0.27
Norway (8)	0.57	0.33	0.30
Abu Dhabi, UAE	0.39	0.15	0.14
Dubai, UAE	0.42	0.18	0.17
Florida, US	0.33	0.11	0.10

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

Students Confident in Physics Scale, Eighth Grade

The Students Confident in Physics (SCP) scale was created based on students’ degree of agreement with the eight statements described below.

Items in the TIMSS 2015 Students Confident in Physics Scale, Eighth Grade

		How much do you agree with these statements about physics?			
		Agree a lot	Agree a little	Disagree a little	Disagree a lot
T	BSBP36A	1) I usually do well in physics ----- ○ ———— ○ ———— ○ ———— ○			
T	BSBP36B*	2) Physics is more difficult for me than for many of my classmates* ----- ○ ———— ○ ———— ○ ———— ○			
T	BSBP36C*	3) Physics is not one of my strengths* ----- ○ ———— ○ ———— ○ ———— ○			
T	BSBP36D	4) I learn things quickly in physics ----- ○ ———— ○ ———— ○ ———— ○			
T	BSBP36E	5) I am good at working out difficult physics problems ----- ○ ———— ○ ———— ○ ———— ○			
T	BSBP36F	6) My teacher tells me I am good at physics ----- ○ ———— ○ ———— ○ ———— ○			
T	BSBP36G*	7) Physics is harder for me than any other subject* ----- ○ ———— ○ ———— ○ ———— ○			
T	BSBP36H*	8) Physics makes me confused* ----- ○ ———— ○ ———— ○ ———— ○			

* Reverse coded

T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 Students Confident in Physics Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBP36A	-0.38641	-1.18505	-0.21963	1.40468	0.89
BSBP36B*	-0.06965	-1.03618	-0.08308	1.11926	1.03
BSBP36C*	0.18964	-1.07039	0.01690	1.05349	0.97
BSBP36D	-0.11066	-1.41785	0.00024	1.41761	0.89
BSBP36E	0.26746	-1.41522	0.14013	1.27509	1.00
BSBP36F	0.06832	-1.36952	0.01208	1.35744	1.00
BSBP36G*	0.11199	-0.95260	-0.05350	1.00610	1.07
BSBP36H*	-0.07069	-0.70594	-0.15808	0.86402	1.17

*Reverse coded

Scale Transformation Constants for the TIMSS 2015 Students Confident in Physics Scale, Eighth Grade

Scale Transformation Constants	
A = 9.354065	Transformed Scale Score = 9.354065 + 1.474407 • Logit Scale Score
B = 1.474407	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Students Confident in Physics Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.48271	
1	5.17467	
2	6.00291	
3	6.57512	
4	7.02652	
5	7.40595	
6	7.73926	
7	8.04083	
8	8.32236	
9	8.58833	
10	8.84388	
11	9.09326	
12	9.33953	9.4
13	9.58774	
14	9.83945	
15	10.09876	
16	10.36970	
17	10.65709	
18	10.96483	
19	11.30549	
20	11.69268	11.6
21	12.15215	
22	12.73226	
23	13.56872	
24	15.26874	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students Confident in Physics Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BS8P36A	BS8P36B*	BS8P36C*	BS8P36D	BS8P36E	BS8P36F	BS8P36G*	BS8P36H*
Georgia	0.80	42	0.73	0.58	0.63	0.75	0.72	0.69	0.52	0.51
Hungary	0.90	58	0.83	0.72	0.78	0.83	0.74	0.77	0.72	0.67
Kazakhstan	0.86	51	0.76	0.69	0.73	0.76	0.75	0.76	0.63	0.62
Lebanon	0.72	35	0.78	0.35	0.27	0.81	0.78	0.81	0.26	0.18
Lithuania	0.86	52	0.82	0.70	0.71	0.80	0.76	0.74	0.65	0.53
Malta	0.89	57	0.78	0.73	0.76	0.79	0.78	0.74	0.72	0.73
Morocco	0.63	35	0.67	-0.43	-0.46	0.66	0.73	0.74	-0.49	-0.40
Russian Federation	0.89	56	0.79	0.73	0.82	0.82	0.77	0.76	0.67	0.62
Slovenia	0.91	60	0.82	0.74	0.81	0.83	0.80	0.74	0.74	0.72
Sweden	0.89	56	0.80	0.71	0.77	0.82	0.76	0.69	0.69	0.72

*Reverse coded

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

Relationship Between the TIMSS 2015 Students Confident in Physics Scale, Eighth Grade, and TIMSS 2015 Science Achievement

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r^2)	
Georgia	0.26	0.07	0.09
Hungary	0.33	0.11	0.14
Kazakhstan	0.17	0.03	0.03
Lebanon	0.33	0.11	0.12
Lithuania	0.27	0.07	0.10
Malta	0.44	0.20	0.21
Morocco	0.31	0.10	0.09
Russian Federation	0.25	0.06	0.06
Slovenia	0.35	0.12	0.14
Sweden	0.34	0.11	0.13
International Median	0.32	0.10	0.11

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



Students Confident in Science Scale, Eighth Grade

The Students Confident in Science (SCS) scale was created based on students’ degree of agreement with the eight statements described below.

Items in the TIMSS 2015 Students Confident in Science Scale, Eighth Grade

		How much do you agree with these statements about science?			
		Agree a lot	Agree a little	Disagree a little	Disagree a lot
T	BSBS23A	1) I usually do well in science ----- ○ ———— ○ ———— ○ ———— ○			
T	BSBS23B*	2) Science is more difficult for me than for many of my classmates* ----- ○ ———— ○ ———— ○ ———— ○			
T	BSBS23C*	3) Science is not one of my strengths* ----- ○ ———— ○ ———— ○ ———— ○			
T	BSBS23D	4) I learn things quickly in science ----- ○ ———— ○ ———— ○ ———— ○			
T	BSBS23E	5) I am good at working out difficult science problems ----- ○ ———— ○ ———— ○ ———— ○			
T	BSBS23F	6) My teacher tells me I am good at science ----- ○ ———— ○ ———— ○ ———— ○			
T	BSBS23G*	7) Science is harder for me than any other subject* ----- ○ ———— ○ ———— ○ ———— ○			
T	BSBS23H*	8) Science makes me confused* ----- ○ ———— ○ ———— ○ ———— ○			

* Reverse coded

T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 Students Confident in Science Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBS23A	-0.40602	-0.90090	-0.39226	1.29316	0.92
BSBS23B*	0.02223	-1.15732	0.20137	0.95595	1.05
BSBS23C*	0.27706	-1.01187	0.22919	0.78268	1.05
BSBS23D	-0.24566	-1.21791	-0.02344	1.24135	0.90
BSBS23E	0.17088	-1.28471	0.00993	1.27478	1.02
BSBS23F	0.09152	-1.12464	0.01922	1.10542	1.10
BSBS23G*	0.03010	-0.88164	0.03964	0.84200	1.02
BSBS23H*	0.05989	-0.92434	0.16959	0.75475	1.06

*Reverse coded

Scale Transformation Constants for the TIMSS 2015 Students Confident in Science Scale, Eighth Grade

Scale Transformation Constants	
A = 9.091884	Transformed Scale Score = 9.091884 + 1.615239 • Logit Scale Score
B = 1.615239	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Students Confident in Science Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	2.82098	
1	4.65523	
2	5.54634	
3	6.15963	
4	6.64373	
5	7.05126	
6	7.40989	
7	7.73394	
8	8.03689	
9	8.32242	
10	8.59538	
11	8.85979	
12	9.12033	9.2
13	9.37683	
14	9.63617	
15	9.90101	
16	10.17585	
17	10.46634	
18	10.77961	
19	11.12175	
20	11.51463	11.5
21	11.98495	
22	12.58681	
23	13.46826	
24	15.29598	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students Confident in Science Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item								
			BS8S23A	BS8S23B*	BS8S23C*	BS8S23D	BS8S23E	BS8S23F	BS8S23G*	BS8S23H*	
Australia	0.90	58	0.79	0.73	0.79	0.80	0.78	0.67	0.75	0.75	
Bahrain	0.76	37	0.49	0.64	0.59	0.65	0.57	0.60	0.68	0.63	
Botswana (9)	0.72	34	0.69	0.43	0.46	0.68	0.68	0.66	0.46	0.51	
Canada	0.89	58	0.79	0.75	0.81	0.81	0.78	0.63	0.75	0.75	
Chile	0.81	43	0.76	0.51	0.56	0.78	0.74	0.65	0.58	0.63	
Chinese Taipei	0.93	67	0.85	0.79	0.84	0.85	0.82	0.79	0.81	0.78	
Egypt	0.68	31	0.09	0.78	0.68	0.37	0.26	0.31	0.78	0.72	
England	0.90	59	0.80	0.75	0.81	0.82	0.78	0.64	0.77	0.76	
Georgia	-	-	-	-	-	-	-	-	-	-	
Hong Kong SAR	0.88	55	0.79	0.73	0.78	0.77	0.76	0.65	0.77	0.69	
Hungary	-	-	-	-	-	-	-	-	-	-	
Iran, Islamic Rep. of	0.82	45	0.73	0.57	0.60	0.75	0.71	0.70	0.65	0.66	
Ireland	0.91	61	0.83	0.78	0.80	0.83	0.78	0.67	0.78	0.76	
Israel	0.86	51	0.78	0.68	0.69	0.78	0.75	0.69	0.68	0.68	
Italy	0.88	55	0.79	0.71	0.78	0.81	0.69	0.69	0.73	0.71	
Japan	0.89	58	0.79	0.73	0.82	0.76	0.78	0.68	0.76	0.74	
Jordan	0.72	34	0.30	0.71	0.65	0.54	0.48	0.51	0.69	0.65	
Kazakhstan	-	-	-	-	-	-	-	-	-	-	
Korea, Rep. of	0.93	66	0.86	0.79	0.84	0.81	0.84	0.81	0.80	0.76	
Kuwait	0.79	41	0.55	0.66	0.57	0.71	0.67	0.64	0.65	0.63	
Lebanon	-	-	-	-	-	-	-	-	-	-	
Lithuania	-	-	-	-	-	-	-	-	-	-	
Malaysia	0.67	30	0.60	0.48	0.57	0.56	0.57	0.40	0.59	0.59	
Malta	-	-	-	-	-	-	-	-	-	-	
Morocco	-	-	-	-	-	-	-	-	-	-	
New Zealand	0.88	54	0.78	0.72	0.77	0.78	0.75	0.64	0.74	0.69	
Norway (9)	0.90	60	0.81	0.76	0.82	0.82	0.79	0.69	0.75	0.72	
Oman	0.74	36	0.37	0.76	0.66	0.52	0.39	0.44	0.76	0.72	
Qatar	0.78	39	0.65	0.60	0.54	0.73	0.67	0.67	0.59	0.55	
Russian Federation	-	-	-	-	-	-	-	-	-	-	
Saudi Arabia	0.71	34	0.20	0.77	0.66	0.43	0.30	0.37	0.79	0.76	
Singapore	0.91	62	0.83	0.79	0.83	0.80	0.79	0.69	0.79	0.76	
Slovenia	-	-	-	-	-	-	-	-	-	-	
South Africa (9)	0.78	40	0.68	0.54	0.60	0.71	0.69	0.61	0.57	0.61	
Sweden	-	-	-	-	-	-	-	-	-	-	
Thailand	0.73	35	0.78	0.14	0.27	0.85	0.83	0.77	0.13	0.20	
Turkey	0.84	48	0.75	0.69	0.70	0.72	0.67	0.65	0.67	0.68	
United Arab Emirates	0.82	44	0.64	0.65	0.66	0.72	0.67	0.63	0.67	0.65	
United States	0.88	54	0.75	0.75	0.76	0.79	0.73	0.60	0.76	0.74	
Benchmarking Participants											
Buenos Aires, Argentina	0.78	40	0.71	0.56	0.43	0.77	0.69	0.62	0.63	0.61	
Ontario, Canada	0.90	58	0.79	0.75	0.81	0.81	0.78	0.62	0.76	0.76	
Quebec, Canada	0.90	59	0.79	0.76	0.83	0.82	0.77	0.65	0.74	0.76	
Norway (8)	0.89	57	0.81	0.75	0.80	0.81	0.78	0.65	0.71	0.71	
Abu Dhabi, UAE	0.79	40	0.61	0.60	0.63	0.70	0.65	0.64	0.61	0.62	
Dubai, UAE	0.86	51	0.72	0.71	0.71	0.77	0.72	0.65	0.73	0.69	
Florida, US	0.85	50	0.73	0.71	0.73	0.77	0.70	0.58	0.72	0.71	

*Reverse coded

A dash (-) indicates comparable data not available.

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

Relationship Between the TIMSS 2015 Students Confident in Science Scale, Eighth Grade, and TIMSS 2015 Science Achievement

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r^2)	
Australia	0.39	0.15	0.16
Bahrain	0.38	0.15	0.16
Botswana (9)	0.26	0.07	0.08
Canada	0.35	0.12	0.12
Chile	0.24	0.06	0.08
Chinese Taipei	0.38	0.15	0.18
Egypt	0.41	0.16	0.16
England	0.39	0.15	0.15
Georgia	-	-	-
Hong Kong SAR	0.31	0.09	0.12
Hungary	-	-	-
Iran, Islamic Rep. of	0.31	0.10	0.10
Ireland	0.49	0.24	0.23
Israel	0.38	0.15	0.18
Italy	0.31	0.10	0.10
Japan	0.37	0.14	0.14
Jordan	0.39	0.15	0.15
Kazakhstan	-	-	-
Korea, Rep. of	0.45	0.20	0.23
Kuwait	0.36	0.13	0.12
Lebanon	-	-	-
Lithuania	-	-	-
Malaysia	-0.16	0.03	0.02
Malta	-	-	-
Morocco	-	-	-
New Zealand	0.33	0.11	0.13
Norway (9)	0.44	0.19	0.20
Oman	0.30	0.09	0.09
Qatar	0.39	0.15	0.17
Russian Federation	-	-	-
Saudi Arabia	0.34	0.11	0.14
Singapore	0.24	0.06	0.07
Slovenia	-	-	-
South Africa (9)	0.19	0.03	0.05
Sweden	-	-	-
Thailand	0.17	0.03	0.06
Turkey	0.39	0.15	0.16
United Arab Emirates	0.35	0.12	0.15
United States	0.34	0.11	0.13
International Median	0.35	0.12	0.14
Benchmarking Participants			
Buenos Aires, Argentina	0.20	0.04	0.06
Ontario, Canada	0.36	0.13	0.12
Quebec, Canada	0.32	0.10	0.10
Norway (8)	0.35	0.13	0.13
Abu Dhabi, UAE	0.34	0.12	0.14
Dubai, UAE	0.34	0.11	0.12
Florida, US	0.33	0.11	0.13

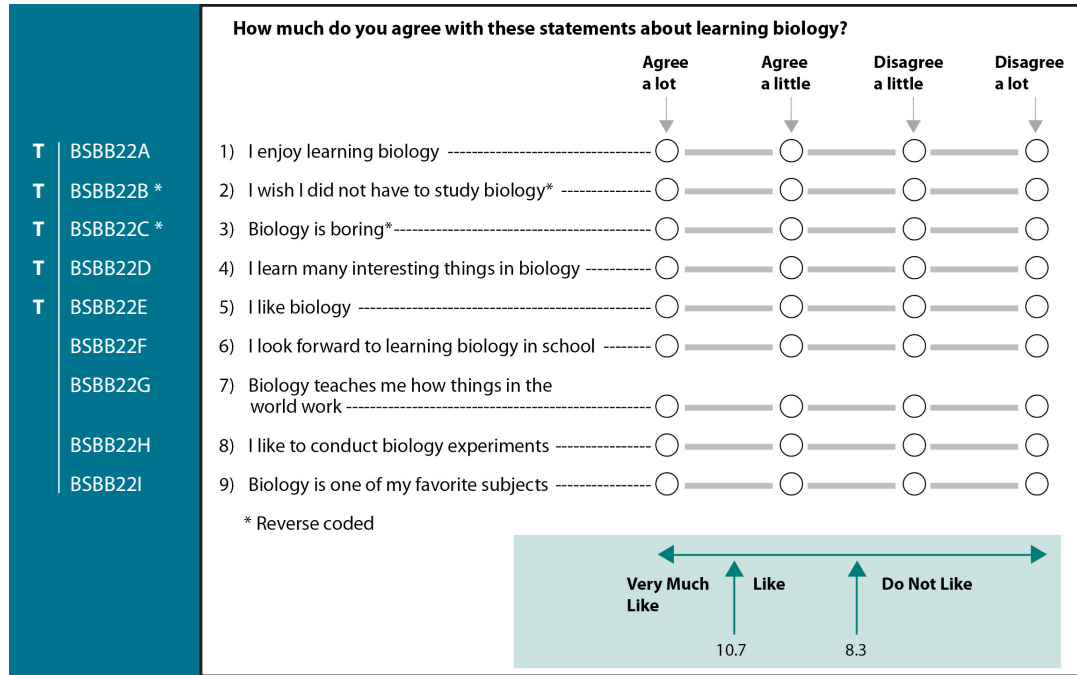
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

A dash (-) indicates comparable data not available.

Students Like Learning Biology Scale, Eighth Grade

The Students Like Learning Biology (SLB) scale was created based on students' degree of agreement with the nine statements described below.

Items in the TIMSS 2015 Students Like Learning Biology Scale, Eighth Grade



T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 Students Like Learning Biology Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBB22A	-0.21561	-1.36738	-0.38682	1.75420	0.78
BSBB22B*	0.48941	-0.97790	-0.35507	1.33297	1.53
BSBB22C*	0.32744	-1.12315	-0.37329	1.49644	1.36
BSBB22D	-0.70652	-1.04264	-0.60801	1.65065	0.86
BSBB22E	-0.08498	-1.26709	-0.29413	1.56122	0.63
BSBB22F	0.47630	-1.62094	-0.00453	1.62547	0.85
BSBB22G	-0.71956	-1.08900	-0.74172	1.83072	1.15
BSBB22H	-0.28187	-1.07022	-0.43544	1.50566	1.27
BSBB22I	0.71539	-1.35579	0.06572	1.29007	0.87

*Reverse coded

Scale Transformation Constants for the TIMSS 2015 Students Like Learning Biology Scale, Eighth Grade

Scale Transformation Constants	
A = 8.424458	Transformed Scale Score = 8.424458 + 1.150254 • Logit Scale Score
B = 1.150254	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Students Like Learning Biology Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.58422	
1	4.83770	
2	5.43659	
3	5.85367	
4	6.18434	
5	6.46579	
6	6.72147	
7	6.95733	
8	7.17826	
9	7.39267	
10	7.60305	
11	7.80935	
12	8.01503	
13	8.22181	8.3
14	8.43143	
15	8.64503	
16	8.86456	
17	9.09141	
18	9.32733	
19	9.57355	
20	9.83403	
21	10.11239	
22	10.41516	
23	10.75327	10.7
24	11.14479	
25	11.63080	
26	12.31447	
27	13.66963	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students Like Learning Biology Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item								
			BS8B22A	BS8B22B*	BS8B22C*	BS8B22D	BS8B22E	BS8B22F	BS8B22G	BS8B22H	BS8B22I
Georgia	0.85	47	0.81	0.43	0.45	0.67	0.87	0.77	0.60	0.62	0.79
Hungary	0.91	60	0.87	0.66	0.75	0.79	0.91	0.84	0.63	0.63	0.84
Kazakhstan	0.87	52	0.80	0.36	0.49	0.80	0.87	0.81	0.66	0.73	0.83
Lebanon	0.84	49	0.75	0.29	0.33	0.74	0.87	0.78	0.68	0.74	0.83
Lithuania	0.92	61	0.86	0.66	0.71	0.80	0.91	0.84	0.71	0.65	0.83
Malta	0.92	63	0.87	0.75	0.76	0.78	0.91	0.89	0.67	0.58	0.89
Morocco	0.85	50	0.75	0.35	0.46	0.77	0.85	0.83	0.68	0.71	0.79
Russian Federation	0.89	55	0.83	0.49	0.69	0.77	0.88	0.81	0.67	0.64	0.84
Slovenia	0.93	63	0.87	0.68	0.76	0.84	0.91	0.89	0.65	0.65	0.85
Sweden	0.92	62	0.87	0.70	0.77	0.83	0.91	0.89	0.66	0.58	0.80

*Reverse coded

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

Relationship Between the TIMSS 2015 Students Like Learning Biology Scale, Eighth Grade, and TIMSS 2015 Science Achievement

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r ²)	
Georgia	0.16	0.03	0.03
Hungary	0.09	0.01	0.01
Kazakhstan	0.13	0.02	0.01
Lebanon	0.30	0.09	0.09
Lithuania	0.06	0.00	0.00
Malta	0.31	0.10	0.10
Morocco	0.22	0.05	0.04
Russian Federation	0.05	0.00	0.00
Slovenia	0.05	0.00	0.00
Sweden	0.12	0.01	0.01
International Median	0.13	0.02	0.01

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

Students Like Learning Chemistry Scale, Eighth Grade

The Students Like Learning Chemistry (SLC) scale was created based on students' degree of agreement with the nine statements described below.

Items in the TIMSS 2015 Students Like Learning Chemistry Scale, Eighth Grade

		How much do you agree with these statements about learning chemistry?				
		Agree a lot	Agree a little	Disagree a little	Disagree a lot	
T	BSBC30A	1) I enjoy learning chemistry -----○	○	○	○	○
T	BSBC30B *	2) I wish I did not have to study chemistry* -----○	○	○	○	○
T	BSBC30C *	3) Chemistry is boring* -----○	○	○	○	○
T	BSBC30D	4) I learn many interesting things in chemistry -----○	○	○	○	○
T	BSBC30E	5) I like chemistry -----○	○	○	○	○
	BSBC30F	6) I look forward to learning chemistry in school -----○	○	○	○	○
	BSBC30G	7) Chemistry teaches me how things in the world work -----○	○	○	○	○
	BSBC30H	8) I like to conduct chemistry experiments -----○	○	○	○	○
	BSBC30I	9) Chemistry is one of my favorite subjects -----○	○	○	○	○

* Reverse coded

Very Much Like Like Do Not Like

11.1 9.0

T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 Students Like Learning Chemistry Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBC30A	-0.02523	-1.23109	-0.19180	1.42289	0.78
BSBC30B*	0.48146	-0.92656	-0.23159	1.15815	1.68
BSBC30C*	0.25060	-1.07638	-0.32509	1.40147	1.54
BSBC30D	-0.53330	-1.12674	-0.47727	1.60401	0.82
BSBC30E	0.04614	-1.23609	-0.14551	1.38160	0.62
BSBC30F	0.44759	-1.46092	0.09506	1.36586	0.79
BSBC30G	-0.33281	-1.19842	-0.43524	1.63366	1.09
BSBC30H	-0.88655	-0.62539	-0.71378	1.33917	1.28
BSBC30I	0.55210	-1.26474	0.09353	1.17121	0.80

*Reverse coded

Scale Transformation Constants for the TIMSS 2015 Students Like Learning Chemistry Scale, Eighth Grade

Scale Transformation Constants	
A = 9.10346	Transformed Scale Score = 9.10346 + 1.077212 • Logit Scale Score
B = 1.077212	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Students Like Learning Chemistry Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	4.69247	
1	5.86077	
2	6.41657	
3	6.79900	
4	7.10281	
5	7.36210	
6	7.59312	
7	7.80909	
8	8.01275	
9	8.20800	
10	8.39762	
11	8.58367	
12	8.76781	
13	8.95150	9.0
14	9.13676	
15	9.32284	
16	9.51333	
17	9.70911	
18	9.91208	
19	10.12367	
20	10.34801	
21	10.58902	
22	10.85319	
23	11.15104	11.1
24	11.49986	
25	11.93805	
26	12.56219	
27	13.81623	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students Like Learning Chemistry Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item								
			B58C30A	B58C30B*	B58C30C*	B58C30D	B58C30E	B58C30F	B58C30G	B58C30H	B58C30I
Georgia	0.87	52	0.83	0.39	0.42	0.78	0.89	0.81	0.69	0.64	0.83
Hungary	0.91	60	0.87	0.63	0.67	0.80	0.91	0.87	0.70	0.58	0.85
Kazakhstan	0.90	58	0.83	0.43	0.51	0.83	0.89	0.83	0.75	0.77	0.85
Lebanon	0.84	51	0.78	0.23	0.24	0.79	0.87	0.80	0.77	0.75	0.83
Lithuania	0.92	63	0.89	0.65	0.67	0.81	0.92	0.86	0.73	0.68	0.88
Malta	0.94	69	0.88	0.77	0.79	0.85	0.92	0.90	0.76	0.64	0.89
Morocco	0.85	51	0.74	0.22	0.31	0.79	0.86	0.85	0.75	0.77	0.80
Russian Federation	0.91	59	0.87	0.45	0.63	0.83	0.91	0.86	0.73	0.68	0.87
Slovenia	0.93	64	0.87	0.66	0.73	0.86	0.92	0.91	0.74	0.58	0.88
Sweden	0.93	64	0.89	0.67	0.74	0.86	0.91	0.88	0.70	0.64	0.83

*Reverse coded

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

Relationship Between the TIMSS 2015 Students Like Learning Chemistry Scale, Eighth Grade, and TIMSS 2015 Science Achievement

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r^2)	
Georgia	0.20	0.04	0.04
Hungary	0.11	0.01	0.02
Kazakhstan	0.17	0.03	0.03
Lebanon	0.20	0.04	0.05
Lithuania	0.16	0.02	0.02
Malta	0.31	0.10	0.09
Morocco	0.24	0.06	0.06
Russian Federation	0.16	0.03	0.02
Slovenia	0.24	0.06	0.05
Sweden	0.19	0.04	0.03
International Median	0.19	0.04	0.03

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



Students Like Learning Earth Science Scale, Eighth Grade

The Students Like Learning Earth Science (SLE) scale was created based on students' degree of agreement with the nine statements described below.

Items in the TIMSS 2015 Students Like Learning Earth Science Scale, Eighth Grade

		How much do you agree with these statements about learning earth science?				
		Agree a lot	Agree a little	Disagree a little	Disagree a lot	
T	BSBE26A	1) I enjoy learning earth science -----○	○	○	○	○
T	BSBE26B *	2) I wish I did not have to study earth science* -----○	○	○	○	○
T	BSBE26C *	3) Earth science is boring* -----○	○	○	○	○
T	BSBE26D	4) I learn many interesting things in earth science ---○	○	○	○	○
T	BSBE26E	5) I like earth science -----○	○	○	○	○
	BSBE26F	6) I look forward to learning earth science in school -----○	○	○	○	○
	BSBE26G	7) Earth science teaches me how things in the world work -----○	○	○	○	○
	BSBE26H	8) I like to conduct earth science experiments -----○	○	○	○	○
	BSBE26I	9) Earth science is one of my favorite subjects -----○	○	○	○	○

* Reverse coded

T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 Students Like Learning Earth Science Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBE26A	-0.23011	-1.44006	-0.28759	1.72765	0.77
BSBE26B*	0.38072	-1.07357	-0.31732	1.39089	1.61
BSBE26C*	0.15618	-1.23747	-0.35190	1.58937	1.40
BSBE26D	-0.70905	-1.24739	-0.55289	1.80028	0.86
BSBE26E	-0.12440	-1.34236	-0.29463	1.63699	0.65
BSBE26F	0.43991	-1.68433	0.08108	1.60325	0.83
BSBE26G	-0.82465	-1.18029	-0.67026	1.85055	1.09
BSBE26H	0.25967	-1.34111	-0.13343	1.47454	1.15
BSBE26I	0.65173	-1.39181	0.01682	1.37499	0.85

*Reverse coded

Scale Transformation Constants for the TIMSS 2015 Students Like Learning Earth Science Scale, Eighth Grade

Scale Transformation Constants

A = 8.692574

B = 1.090836

Transformed Scale Score = 8.692574 + 1.090836 • Logit Scale Score

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



**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Students Like Learning Earth Science Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.96247	
1	5.17563	
2	5.76426	
3	6.17484	
4	6.50371	
5	6.78595	
6	7.03864	
7	7.27438	
8	7.49669	
9	7.70979	
10	7.91683	
11	8.12025	
12	8.32207	
13	8.52407	8.6
14	8.72785	
15	8.93490	
16	9.14666	
17	9.36457	
18	9.59024	
19	9.82482	
20	10.07207	
21	10.33557	
22	10.62160	
23	10.94063	10.9
24	11.31149	
25	11.76867	
26	12.41427	
27	13.69652	

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

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students Like Learning Earth Science Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BSBE26A	BSBE26B*	BSBE26C*	BSBE26D	BSBE26E	BSBE26F	BSBE26G	BSBE26H	BSBE26I	
Georgia	0.83	46	0.77	0.26	0.27	0.73	0.85	0.76	0.70	0.71	0.76	
Hungary	0.92	61	0.87	0.63	0.71	0.81	0.90	0.86	0.67	0.71	0.84	
Kazakhstan	0.88	54	0.80	0.37	0.47	0.81	0.88	0.81	0.75	0.73	0.83	
Lebanon	-	-	-	-	-	-	-	-	-	-	-	
Lithuania	0.91	60	0.87	0.64	0.68	0.77	0.90	0.82	0.70	0.70	0.84	
Malta	0.93	65	0.88	0.64	0.71	0.82	0.92	0.90	0.71	0.75	0.85	
Morocco	0.85	51	0.76	0.27	0.37	0.78	0.86	0.84	0.72	0.76	0.79	
Russian Federation	0.89	56	0.84	0.38	0.62	0.80	0.89	0.83	0.70	0.70	0.83	
Slovenia	0.93	64	0.86	0.66	0.73	0.84	0.92	0.90	0.68	0.71	0.86	
Sweden	-	-	-	-	-	-	-	-	-	-	-	

*Reverse coded

A dash (-) indicates comparable data not available.

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

Relationship Between the TIMSS 2015 Students Like Learning Earth Science Scale, Eighth Grade, and TIMSS 2015 Science Achievement

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r ²)	
Georgia	0.18	0.03	0.03
Hungary	0.02	0.00	0.00
Kazakhstan	0.09	0.01	0.01
Lebanon	-	-	-
Lithuania	0.13	0.02	0.02
Malta	0.16	0.03	0.02
Morocco	0.20	0.04	0.04
Russian Federation	0.04	0.00	0.00
Slovenia	0.07	0.01	0.00
Sweden	-	-	-
International Median	0.11	0.01	0.01

A dash (-) indicates comparable data not available.

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



Students Like Learning Mathematics Scale, Eighth Grade

The Students Like Learning Mathematics (SLM) scale was created based on students' degree of agreement with the nine statements described below.

Items in the TIMSS 2015 Students Like Learning Mathematics Scale, Eighth Grade

		How much do you agree with these statements about learning mathematics?			
		Agree a lot	Agree a little	Disagree a little	Disagree a lot
T	BSBM17A	1) I enjoy learning mathematics -----○-----	○-----	○-----	○-----
T	BSBM17B *	2) I wish I did not have to study mathematics* -----○-----	○-----	○-----	○-----
T	BSBM17C *	3) Mathematics is boring* -----○-----	○-----	○-----	○-----
T	BSBM17D	4) I learn many interesting things in mathematics ---○-----	○-----	○-----	○-----
T	BSBM17E	5) I like mathematics -----○-----	○-----	○-----	○-----
	BSBM17F	6) I like any schoolwork that involves numbers -----○-----	○-----	○-----	○-----
	BSBM17G	7) I like to solve mathematics problems-----○-----	○-----	○-----	○-----
	BSBM17H	8) I look forward to mathematics class -----○-----	○-----	○-----	○-----
	BSBM17I	9) Mathematics is one of my favorite subjects -----○-----	○-----	○-----	○-----

* Reverse coded

T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 Students Like Learning Mathematics Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBM17A	-0.48929	-1.41673	-0.43072	1.84745	0.81
BSBM17B*	-0.07466	-1.22401	0.09794	1.12607	1.72
BSBM17C*	0.11238	-1.62447	0.14173	1.48274	1.39
BSBM17D	-0.71855	-1.68593	-0.23274	1.91867	1.10
BSBM17E	-0.22025	-1.25167	-0.34163	1.59330	0.67
BSBM17F	0.20385	-1.83417	0.00020	1.83397	1.01
BSBM17G	0.13127	-1.51555	-0.16902	1.68457	0.90
BSBM17H	0.56595	-1.67774	-0.09470	1.77244	0.92
BSBM17I	0.48930	-1.06313	-0.07995	1.14308	0.81

*Reverse coded

Scale Transformation Constants for the TIMSS 2015 Students Like Learning Mathematics Scale, Eighth Grade

Scale Transformation Constants	
A = 9.42706	Transformed Scale Score = 9.42706 + 0.987588 • Logit Scale Score
B = 0.987588	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Students Like Learning Mathematics Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	4.96789	
1	6.12033	
2	6.69346	
3	7.09477	
4	7.41571	
5	7.68894	
6	7.93203	
7	8.15498	
8	8.36376	
9	8.56346	
10	8.75617	
11	8.94416	
12	9.12922	
13	9.31285	9.4
14	9.49639	
15	9.68118	
16	9.86866	
17	10.06049	
18	10.25863	
19	10.46547	
20	10.68282	
21	10.91671	
22	11.17269	
23	11.46067	11.4
24	11.79792	
25	12.21629	
26	12.80770	
27	13.97818	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students Like Learning Mathematics Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BSBM17A	BSBM17B*	BSBM17C*	BSBM17D	BSBM17E	BSBM17F	BSBM17G	BSBM17H	BSBM17I	
Australia	0.94	67	0.88	0.71	0.74	0.74	0.91	0.81	0.85	0.86	0.85	
Bahrain	0.92	63	0.84	0.56	0.61	0.81	0.90	0.77	0.85	0.84	0.87	
Botswana (9)	0.87	50	0.76	0.52	0.60	0.64	0.83	0.68	0.77	0.70	0.78	
Canada	0.94	68	0.89	0.70	0.78	0.74	0.91	0.81	0.85	0.86	0.87	
Chile	0.93	66	0.85	0.61	0.72	0.74	0.90	0.83	0.87	0.86	0.87	
Chinese Taipei	0.95	70	0.89	0.74	0.78	0.83	0.92	0.85	0.88	0.78	0.88	
Egypt	0.88	54	0.78	0.33	0.48	0.75	0.86	0.75	0.83	0.82	0.82	
England	0.94	67	0.87	0.75	0.78	0.74	0.90	0.82	0.83	0.83	0.85	
Georgia	0.90	56	0.81	0.49	0.58	0.68	0.87	0.76	0.81	0.80	0.83	
Hong Kong SAR	0.94	69	0.89	0.67	0.73	0.82	0.92	0.84	0.88	0.81	0.89	
Hungary	0.93	65	0.87	0.67	0.72	0.76	0.91	0.82	0.83	0.82	0.84	
Iran, Islamic Rep. of	0.92	62	0.83	0.70	0.64	0.75	0.89	0.73	0.83	0.80	0.88	
Ireland	0.94	66	0.88	0.74	0.75	0.75	0.90	0.79	0.82	0.83	0.85	
Israel	0.93	65	0.85	0.64	0.73	0.80	0.90	0.78	0.85	0.80	0.87	
Italy	0.95	71	0.90	0.79	0.82	0.71	0.92	0.84	0.80	0.86	0.88	
Japan	0.94	68	0.88	0.61	0.72	0.82	0.92	0.85	0.88	0.82	0.88	
Jordan	0.91	60	0.82	0.45	0.55	0.78	0.90	0.79	0.84	0.87	0.86	
Kazakhstan	0.91	60	0.78	0.51	0.65	0.74	0.87	0.78	0.86	0.83	0.85	
Korea, Rep. of	0.94	70	0.89	0.66	0.78	0.83	0.92	0.86	0.87	0.77	0.89	
Kuwait	0.92	62	0.86	0.49	0.68	0.80	0.90	0.79	0.85	0.79	0.88	
Lebanon	0.87	52	0.77	0.45	0.42	0.66	0.87	0.74	0.81	0.75	0.85	
Lithuania	0.93	65	0.86	0.67	0.71	0.71	0.90	0.82	0.88	0.82	0.84	
Malaysia	0.89	54	0.82	0.58	0.67	0.74	0.86	0.75	0.60	0.73	0.82	
Malta	0.94	67	0.88	0.71	0.77	0.76	0.91	0.78	0.78	0.85	0.88	
Morocco	0.88	52	0.80	0.44	0.56	0.73	0.86	0.69	0.70	0.84	0.80	
New Zealand	0.93	64	0.87	0.67	0.70	0.71	0.90	0.81	0.83	0.84	0.85	
Norway (9)	0.94	70	0.88	0.71	0.78	0.80	0.92	0.84	0.89	0.86	0.85	
Oman	0.87	52	0.78	0.39	0.60	0.73	0.86	0.65	0.81	0.71	0.83	
Qatar	0.92	62	0.85	0.51	0.55	0.80	0.90	0.81	0.86	0.85	0.88	
Russian Federation	0.92	62	0.86	0.54	0.71	0.74	0.89	0.78	0.81	0.83	0.85	
Saudi Arabia	0.92	63	0.85	0.46	0.61	0.83	0.90	0.79	0.85	0.87	0.88	
Singapore	0.94	69	0.88	0.77	0.78	0.75	0.91	0.79	0.87	0.82	0.89	
Slovenia	0.93	66	0.85	0.64	0.80	0.78	0.91	0.78	0.84	0.86	0.84	
South Africa (9)	0.89	54	0.82	0.55	0.61	0.62	0.86	0.73	0.80	0.76	0.82	
Sweden	0.95	71	0.88	0.71	0.83	0.80	0.92	0.87	0.86	0.86	0.87	
Thailand	0.89	56	0.80	0.44	0.56	0.67	0.87	0.81	0.77	0.83	0.85	
Turkey	0.92	61	0.82	0.63	0.74	0.59	0.89	0.76	0.83	0.83	0.87	
United Arab Emirates	0.93	64	0.85	0.61	0.70	0.78	0.89	0.77	0.84	0.82	0.87	
United States	0.94	69	0.88	0.70	0.75	0.76	0.91	0.82	0.88	0.87	0.87	
Benchmarking Participants												
Buenos Aires, Argentina	0.92	62	0.83	0.57	0.64	0.73	0.89	0.84	0.84	0.83	0.86	
Ontario, Canada	0.95	70	0.90	0.73	0.78	0.74	0.91	0.82	0.87	0.88	0.87	
Quebec, Canada	0.93	64	0.87	0.63	0.79	0.73	0.90	0.80	0.81	0.82	0.84	
Norway (8)	0.95	71	0.88	0.73	0.81	0.79	0.92	0.84	0.88	0.86	0.85	
Abu Dhabi, UAE	0.93	64	0.85	0.56	0.68	0.79	0.89	0.80	0.85	0.84	0.88	
Dubai, UAE	0.93	65	0.86	0.71	0.75	0.76	0.89	0.76	0.83	0.82	0.87	
Florida, US	0.94	68	0.88	0.68	0.71	0.77	0.91	0.81	0.89	0.86	0.86	

*Reverse coded

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

Relationship Between the TIMSS 2015 Students Like Learning Mathematics Scale, Eighth Grade, and TIMSS 2015 Mathematics Achievement

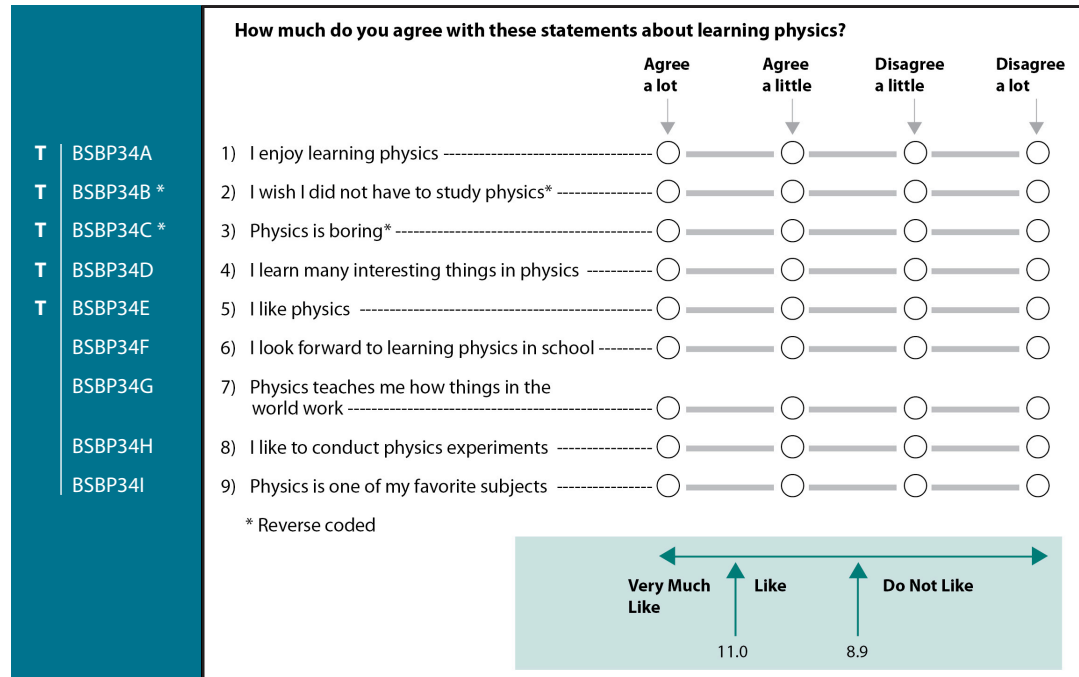
Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r ²)	
Australia	0.34	0.11	0.09
Bahrain	0.27	0.07	0.07
Botswana (9)	0.27	0.07	0.07
Canada	0.36	0.13	0.10
Chile	0.25	0.06	0.07
Chinese Taipei	0.43	0.18	0.15
Egypt	0.24	0.06	0.08
England	0.30	0.09	0.08
Georgia	0.23	0.05	0.05
Hong Kong SAR	0.33	0.11	0.09
Hungary	0.29	0.09	0.08
Iran, Islamic Rep. of	0.27	0.07	0.07
Ireland	0.32	0.10	0.08
Israel	0.11	0.01	0.01
Italy	0.34	0.11	0.11
Japan	0.35	0.13	0.11
Jordan	0.16	0.03	0.04
Kazakhstan	0.18	0.03	0.03
Korea, Rep. of	0.40	0.16	0.13
Kuwait	0.16	0.02	0.02
Lebanon	0.18	0.03	0.04
Lithuania	0.28	0.08	0.07
Malaysia	0.27	0.07	0.06
Malta	0.26	0.07	0.06
Morocco	0.30	0.09	0.08
New Zealand	0.25	0.06	0.05
Norway (9)	0.40	0.16	0.13
Oman	0.26	0.07	0.07
Qatar	0.29	0.08	0.08
Russian Federation	0.25	0.06	0.06
Saudi Arabia	0.19	0.04	0.03
Singapore	0.32	0.10	0.08
Slovenia	0.30	0.09	0.08
South Africa (9)	0.08	0.01	0.02
Sweden	0.40	0.16	0.15
Thailand	0.19	0.04	0.04
Turkey	0.19	0.04	0.05
United Arab Emirates	0.23	0.05	0.05
United States	0.27	0.07	0.06
International Median	0.27	0.07	0.07
Benchmarking Participants			
Buenos Aires, Argentina	0.16	0.03	0.02
Ontario, Canada	0.41	0.17	0.15
Quebec, Canada	0.33	0.11	0.07
Norway (8)	0.35	0.12	0.10
Abu Dhabi, UAE	0.22	0.05	0.05
Dubai, UAE	0.27	0.07	0.07
Florida, US	0.16	0.03	0.03

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

Students Like Learning Physics Scale, Eighth Grade

The Students Like Learning Physics (SLP) scale was created based on students' degree of agreement with the nine statements described below.

Items in the TIMSS 2015 Students Like Learning Physics Scale, Eighth Grade



T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 Students Like Learning Physics Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBP34A	-0.07404	-1.30547	-0.15488	1.46035	0.78
BSBP34B*	0.45993	-1.00740	-0.17183	1.17923	1.73
BSBP34C*	0.26168	-1.15919	-0.28413	1.44332	1.54
BSBP34D	-0.54501	-1.21552	-0.43870	1.65422	0.83
BSBP34E	0.07244	-1.28315	-0.11316	1.39631	0.62
BSBP34F	0.42153	-1.49755	0.11984	1.37771	0.82
BSBP34G	-0.62535	-1.08281	-0.62965	1.71246	1.12
BSBP34H	-0.57460	-0.91537	-0.50031	1.41568	1.10
BSBP34I	0.60342	-1.27446	0.09125	1.18321	0.80

*Reverse coded

Scale Transformation Constants for the TIMSS 2015 Students Like Learning Physics Scale, Eighth Grade

Scale Transformation Constants	
A = 9.037567	Transformed Scale Score = 9.037567 + 1.051045 • Logit Scale Score
B = 1.051045	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Students Like Learning Physics Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	4.64895	
1	5.80878	
2	6.36558	
3	6.74953	
4	7.05428	
5	7.31372	
6	7.54411	
7	7.75905	
8	7.96155	
9	8.15567	
10	8.34431	
11	8.52962	
12	8.71320	
13	8.89640	8.9
14	9.08040	
15	9.26639	
16	9.45564	
17	9.64960	
18	9.85004	
19	10.05832	
20	10.27840	
21	10.51415	
22	10.77194	
23	11.06214	11.0
24	11.40300	
25	11.82828	
26	12.43593	
27	13.65813	

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

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students Like Learning Physics Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BSBP34A	BSBP34B*	BSBP34C*	BSBP34D	BSBP34E	BSBP34F	BSBP34G	BSBP34H	BSBP34I	
Georgia	0.87	52	0.83	0.35	0.38	0.76	0.88	0.82	0.68	0.71	0.83	
Hungary	0.92	62	0.88	0.62	0.68	0.82	0.91	0.85	0.69	0.72	0.85	
Kazakhstan	0.89	58	0.82	0.40	0.50	0.83	0.89	0.83	0.80	0.79	0.84	
Lebanon	0.86	54	0.81	0.19	0.19	0.82	0.90	0.82	0.78	0.80	0.85	
Lithuania	0.92	61	0.88	0.60	0.64	0.81	0.91	0.84	0.73	0.73	0.85	
Malta	0.93	65	0.89	0.66	0.70	0.83	0.92	0.90	0.75	0.70	0.88	
Morocco	0.85	52	0.77	0.22	0.31	0.82	0.87	0.86	0.76	0.79	0.80	
Russian Federation	0.90	57	0.85	0.41	0.59	0.81	0.89	0.83	0.73	0.72	0.85	
Slovenia	0.93	64	0.86	0.64	0.72	0.86	0.92	0.90	0.66	0.71	0.86	
Sweden	0.93	65	0.88	0.68	0.77	0.87	0.92	0.89	0.71	0.70	0.83	

*Reverse coded

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

Relationship Between the TIMSS 2015 Students Like Learning Physics Scale, Eighth Grade, and TIMSS 2015 Science Achievement

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r^2)	
Georgia	0.14	0.02	0.03
Hungary	0.14	0.02	0.03
Kazakhstan	0.16	0.03	0.03
Lebanon	0.23	0.05	0.07
Lithuania	0.22	0.05	0.05
Malta	0.36	0.13	0.11
Morocco	0.23	0.05	0.05
Russian Federation	0.19	0.04	0.03
Slovenia	0.18	0.03	0.03
Sweden	0.22	0.05	0.04
International Median	0.21	0.04	0.03

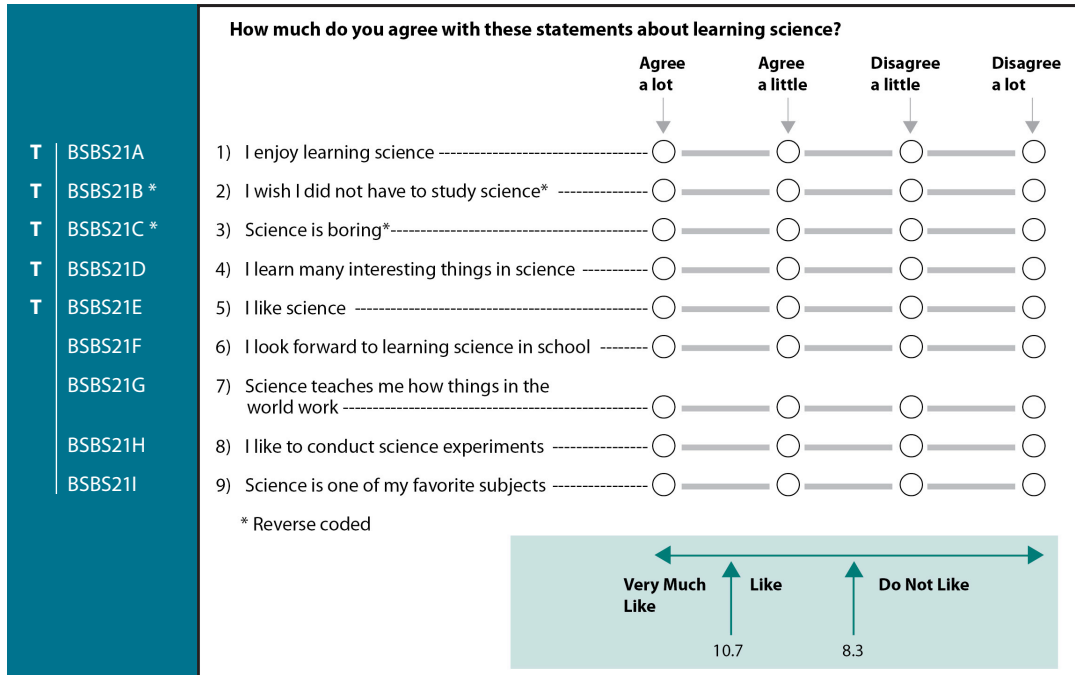
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



Students Like Learning Science Scale, Eighth Grade

The Students Like Learning Science (SLS) scale was created based on students' degree of agreement with the nine statements described below.

Items in the TIMSS 2015 Students Like Learning Science Scale, Eighth Grade



T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 Students Like Learning Science Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBS21A	-0.13142	-1.01695	-0.52680	1.54375	0.76
BSBS21B*	0.56759	-1.19007	-0.00233	1.19240	1.65
BSBS21C*	0.47515	-1.36232	0.00944	1.35288	1.42
BSBS21D	-0.52383	-0.93744	-0.51695	1.45439	0.90
BSBS21E	0.01158	-1.06294	-0.35802	1.42096	0.65
BSBS21F	0.41917	-1.45338	-0.07468	1.52806	0.83
BSBS21G	-0.64772	-0.96459	-0.57542	1.54001	1.10
BSBS21H	-0.67455	-0.78921	-0.43697	1.22618	1.33
BSBS21I	0.50403	-1.16503	-0.06851	1.23354	0.81

*Reverse coded

Scale Transformation Constants for the TIMSS 2015 Students Like Learning Science Scale, Eighth Grade

Scale Transformation Constants	
A = 8.489044	Transformed Scale Score = 8.489044 + 1.163944 • Logit Scale Score
B = 1.163944	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Students Like Learning Science Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.77142	
1	5.02704	
2	5.62048	
3	6.02909	
4	6.34989	
5	6.62088	
6	6.86531	
7	7.08748	
8	7.29855	
9	7.50187	
10	7.70183	
11	7.89809	
12	8.09428	
13	8.29197	8.3
14	8.49247	
15	8.69676	
16	8.90626	
17	9.12229	
18	9.34659	
19	9.58043	
20	9.82838	
21	10.09453	
22	10.38590	
23	10.71393	10.7
24	11.09720	
25	11.57741	
26	12.25898	
27	13.62135	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students Like Learning Science Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item								
			BS8S21A	BS8S21B*	BS8S21C*	BS8S21D	BS8S21E	BS8S21F	BS8S21G	BS8S21H	BS8S21I
Australia	0.93	65	0.89	0.71	0.75	0.81	0.92	0.91	0.73	0.61	0.87
Bahrain	0.89	56	0.83	0.37	0.45	0.83	0.89	0.86	0.78	0.68	0.87
Botswana (9)	0.83	44	0.72	0.50	0.61	0.65	0.79	0.71	0.59	0.58	0.75
Canada	0.92	61	0.88	0.65	0.74	0.79	0.91	0.88	0.68	0.59	0.87
Chile	0.89	56	0.86	0.45	0.61	0.80	0.89	0.82	0.71	0.66	0.84
Chinese Taipei	0.93	64	0.89	0.71	0.73	0.83	0.91	0.85	0.73	0.64	0.88
Egypt	0.81	45	0.69	0.25	0.35	0.73	0.82	0.80	0.71	0.70	0.77
England	0.93	65	0.89	0.77	0.78	0.80	0.92	0.90	0.71	0.57	0.87
Georgia	-	-	-	-	-	-	-	-	-	-	-
Hong Kong SAR	0.92	64	0.87	0.61	0.64	0.85	0.91	0.87	0.78	0.72	0.88
Hungary	-	-	-	-	-	-	-	-	-	-	-
Iran, Islamic Rep. of	0.89	54	0.83	0.59	0.59	0.74	0.87	0.80	0.67	0.63	0.85
Ireland	0.93	64	0.90	0.69	0.74	0.81	0.92	0.90	0.72	0.61	0.87
Israel	0.92	62	0.88	0.62	0.67	0.84	0.91	0.82	0.73	0.65	0.88
Italy	0.92	60	0.87	0.78	0.76	0.78	0.90	0.83	0.57	0.54	0.85
Japan	0.92	62	0.89	0.66	0.72	0.82	0.90	0.87	0.65	0.63	0.88
Jordan	0.86	54	0.78	0.33	0.42	0.81	0.88	0.86	0.74	0.71	0.85
Kazakhstan	-	-	-	-	-	-	-	-	-	-	-
Korea, Rep. of	0.93	65	0.89	0.71	0.76	0.82	0.91	0.83	0.72	0.66	0.89
Kuwait	0.89	56	0.83	0.49	0.62	0.79	0.89	0.85	0.66	0.62	0.86
Lebanon	-	-	-	-	-	-	-	-	-	-	-
Lithuania	-	-	-	-	-	-	-	-	-	-	-
Malaysia	0.90	56	0.83	0.55	0.61	0.80	0.87	0.74	0.77	0.69	0.82
Malta	-	-	-	-	-	-	-	-	-	-	-
Morocco	-	-	-	-	-	-	-	-	-	-	-
New Zealand	0.92	62	0.88	0.71	0.70	0.77	0.91	0.89	0.73	0.59	0.87
Norway (9)	0.92	63	0.88	0.76	0.79	0.81	0.91	0.88	0.66	0.50	0.84
Oman	0.84	49	0.75	0.31	0.46	0.76	0.85	0.78	0.74	0.68	0.81
Qatar	0.90	59	0.85	0.41	0.44	0.85	0.91	0.88	0.79	0.71	0.87
Russian Federation	-	-	-	-	-	-	-	-	-	-	-
Saudi Arabia	0.89	58	0.84	0.32	0.44	0.84	0.91	0.89	0.73	0.75	0.88
Singapore	0.92	63	0.87	0.78	0.78	0.77	0.91	0.87	0.70	0.54	0.87
Slovenia	-	-	-	-	-	-	-	-	-	-	-
South Africa (9)	0.87	51	0.79	0.49	0.58	0.67	0.86	0.80	0.64	0.68	0.81
Sweden	-	-	-	-	-	-	-	-	-	-	-
Thailand	0.86	50	0.75	0.45	0.52	0.71	0.83	0.76	0.72	0.68	0.83
Turkey	0.88	52	0.81	0.54	0.66	0.63	0.86	0.80	0.68	0.62	0.85
United Arab Emirates	0.91	60	0.84	0.55	0.63	0.82	0.89	0.86	0.76	0.65	0.86
United States	0.92	63	0.88	0.62	0.69	0.80	0.91	0.89	0.73	0.66	0.87
Benchmarking Participants											
Buenos Aires, Argentina	0.88	52	0.82	0.44	0.50	0.80	0.89	0.82	0.67	0.61	0.82
Ontario, Canada	0.92	63	0.88	0.67	0.75	0.79	0.91	0.89	0.70	0.61	0.88
Quebec, Canada	0.91	60	0.87	0.60	0.78	0.79	0.91	0.87	0.62	0.57	0.85
Norway (8)	0.93	63	0.88	0.75	0.80	0.83	0.92	0.89	0.67	0.48	0.85
Abu Dhabi, UAE	0.91	59	0.83	0.47	0.55	0.83	0.90	0.87	0.77	0.68	0.86
Dubai, UAE	0.92	61	0.86	0.67	0.74	0.79	0.89	0.85	0.72	0.56	0.87
Florida, US	0.92	61	0.88	0.56	0.64	0.82	0.91	0.88	0.76	0.65	0.86

*Reverse coded

A dash (-) indicates comparable data not available.

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

Relationship Between the TIMSS 2015 Students Like Learning Science Scale, Eighth Grade, and TIMSS 2015 Science Achievement

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r^2)	
Australia	0.34	0.12	0.10
Bahrain	0.28	0.08	0.07
Botswana (9)	0.41	0.17	0.15
Canada	0.23	0.05	0.05
Chile	0.16	0.03	0.03
Chinese Taipei	0.38	0.14	0.12
Egypt	0.37	0.14	0.13
England	0.31	0.10	0.09
Georgia	-	-	-
Hong Kong SAR	0.32	0.10	0.09
Hungary	-	-	-
Iran, Islamic Rep. of	0.18	0.03	0.04
Ireland	0.39	0.15	0.13
Israel	0.20	0.04	0.03
Italy	0.19	0.03	0.03
Japan	0.30	0.09	0.08
Jordan	0.26	0.07	0.06
Kazakhstan	-	-	-
Korea, Rep. of	0.40	0.16	0.15
Kuwait	0.23	0.06	0.04
Lebanon	-	-	-
Lithuania	-	-	-
Malaysia	0.35	0.12	0.11
Malta	-	-	-
Morocco	-	-	-
New Zealand	0.27	0.07	0.06
Norway (9)	0.28	0.08	0.07
Oman	0.27	0.07	0.06
Qatar	0.36	0.13	0.12
Russian Federation	-	-	-
Saudi Arabia	0.27	0.07	0.07
Singapore	0.27	0.07	0.07
Slovenia	-	-	-
South Africa (9)	0.19	0.04	0.03
Sweden	-	-	-
Thailand	0.22	0.05	0.04
Turkey	0.22	0.05	0.05
United Arab Emirates	0.30	0.09	0.09
United States	0.26	0.07	0.06
International Median	0.27	0.07	0.07
Benchmarking Participants			
Buenos Aires, Argentina	0.10	0.01	0.01
Ontario, Canada	0.23	0.06	0.05
Quebec, Canada	0.25	0.06	0.05
Norway (8)	0.21	0.04	0.03
Abu Dhabi, UAE	0.29	0.08	0.08
Dubai, UAE	0.28	0.08	0.08
Florida, US	0.23	0.05	0.05

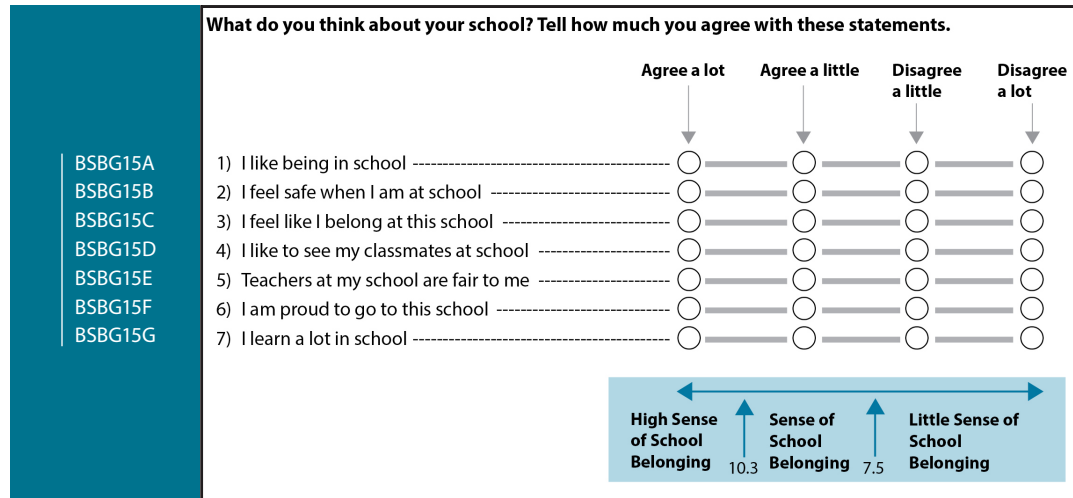
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

A dash (-) indicates comparable data not available.

Students' Sense of School Belonging Scale, Eighth Grade

The Students' Sense of School Belonging (SSB) scale was created based on students' degree of agreement with the seven statements described below.

Items in the TIMSS 2015 Students' Sense of School Belonging, Eighth Grade



Item Parameters for the TIMSS 2015 Students' Sense of School Belonging Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBG15A	0.38218	-0.95870	-0.74432	1.70302	1.01
BSBG15B	0.07288	-0.94599	-0.58632	1.53231	0.99
BSBG15C	0.21160	-0.83609	-0.55012	1.38621	0.94
BSBG15D	-0.73119	-0.52286	-0.46686	0.98972	1.17
BSBG15E	0.20067	-0.98123	-0.56256	1.54379	1.12
BSBG15F	0.26647	-0.76246	-0.50391	1.26637	0.91
BSBG15G	-0.40261	-0.89880	-0.61886	1.51766	0.98

Scale Transformation Constants for the TIMSS 2015 Students' Sense of School Belonging Scale, Eighth Grade

Scale Transformation Constants	
A = 7.847376	Transformed Scale Score = 7.847376 + 1.363355 • Logit Scale Score
B = 1.363355	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Students' Sense of School Belonging Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.04846	
1	4.43161	
2	5.08351	
3	5.53680	
4	5.89159	
5	6.19976	
6	6.47840	
7	6.73927	
8	6.99036	
9	7.23785	
10	7.48892	7.5
11	7.74446	
12	8.01437	
13	8.30564	
14	8.62531	
15	8.98361	
16	9.39043	
17	9.85678	
18	10.39858	10.3
19	11.05536	
20	11.94384	
21	13.62245	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students' Sense of School Belonging Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Factor Loadings for Each Item						
			BS8G15A	BS8G15B	BS8G15C	BS8G15D	BS8G15E	BS8G15F	BS8G15G
Australia	0.86	55	0.75	0.75	0.81	0.55	0.70	0.84	0.75
Bahrain	0.83	50	0.73	0.73	0.77	0.51	0.65	0.80	0.70
Botswana (9)	0.68	36	0.66	0.65	0.64	0.53	0.42	0.66	0.59
Canada	0.83	49	0.70	0.72	0.76	0.59	0.64	0.81	0.70
Chile	0.85	53	0.71	0.77	0.77	0.60	0.66	0.82	0.72
Chinese Taipei	0.82	49	0.71	0.72	0.77	0.62	0.59	0.75	0.69
Egypt	0.81	47	0.69	0.71	0.77	0.47	0.63	0.76	0.71
England	0.84	51	0.74	0.72	0.80	0.48	0.67	0.82	0.72
Georgia	0.76	41	0.54	0.66	0.66	0.53	0.65	0.76	0.67
Hong Kong SAR	0.87	57	0.77	0.80	0.84	0.63	0.66	0.78	0.75
Hungary	0.80	46	0.73	0.69	0.78	0.50	0.62	0.79	0.58
Iran, Islamic Rep. of	0.72	40	0.69	0.73	0.70	0.52	0.65	0.40	0.67
Ireland	0.84	51	0.71	0.72	0.79	0.55	0.67	0.80	0.73
Israel	0.85	53	0.75	0.72	0.79	0.55	0.69	0.82	0.72
Italy	0.81	46	0.71	0.71	0.74	0.48	0.63	0.80	0.65
Japan	0.87	57	0.81	0.79	0.81	0.73	0.63	0.80	0.69
Jordan	0.82	48	0.70	0.70	0.79	0.54	0.59	0.79	0.71
Kazakhstan	0.80	46	0.67	0.62	0.72	0.61	0.69	0.76	0.67
Korea, Rep. of	0.86	54	0.77	0.76	0.76	0.71	0.62	0.78	0.73
Kuwait	0.80	45	0.69	0.71	0.75	0.47	0.61	0.79	0.64
Lebanon	0.78	44	0.64	0.72	0.75	0.55	0.55	0.72	0.66
Lithuania	0.79	45	0.71	0.73	0.68	0.56	0.63	0.75	0.60
Malaysia	0.80	45	0.72	0.69	0.61	0.55	0.65	0.78	0.69
Malta	0.84	51	0.74	0.74	0.79	0.51	0.64	0.82	0.74
Morocco	0.75	41	0.63	0.65	0.70	0.45	0.57	0.75	0.68
New Zealand	0.84	51	0.75	0.69	0.80	0.58	0.66	0.81	0.71
Norway (9)	0.84	52	0.74	0.75	0.81	0.60	0.66	0.75	0.70
Oman	0.80	45	0.66	0.69	0.74	0.53	0.64	0.76	0.67
Qatar	0.87	56	0.76	0.76	0.81	0.57	0.70	0.84	0.75
Russian Federation	0.81	48	0.72	0.71	0.74	0.58	0.63	0.77	0.65
Saudi Arabia	0.82	48	0.71	0.72	0.79	0.50	0.61	0.79	0.69
Singapore	0.86	54	0.77	0.75	0.83	0.62	0.63	0.82	0.71
Slovenia	0.84	52	0.70	0.75	0.76	0.51	0.69	0.83	0.74
South Africa (9)	0.72	38	0.63	0.63	0.72	0.50	0.45	0.73	0.61
Sweden	0.83	49	0.72	0.68	0.78	0.57	0.66	0.78	0.68
Thailand	0.76	42	0.62	0.65	0.65	0.47	0.68	0.72	0.69
Turkey	0.78	44	0.70	0.73	0.69	0.55	0.52	0.74	0.68
United Arab Emirates	0.88	58	0.72	0.78	0.78	0.72	0.70	0.82	0.81
United States	0.84	52	0.70	0.71	0.79	0.59	0.69	0.82	0.71
Benchmarking Participants									
Buenos Aires, Argentina	0.80	46	0.68	0.68	0.71	0.59	0.59	0.78	0.70
Ontario, Canada	0.84	51	0.71	0.72	0.77	0.60	0.64	0.82	0.70
Quebec, Canada	0.80	45	0.68	0.72	0.71	0.57	0.59	0.76	0.67
Norway (8)	0.84	52	0.71	0.74	0.81	0.63	0.64	0.78	0.70
Abu Dhabi, UAE	0.88	57	0.73	0.78	0.77	0.71	0.69	0.81	0.79
Dubai, UAE	0.86	55	0.69	0.75	0.76	0.68	0.67	0.82	0.79
Florida, US	0.85	52	0.72	0.72	0.78	0.59	0.67	0.84	0.73

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

Relationship Between the TIMSS 2015 Students' Sense of School Belonging Scale, Eighth Grade, and TIMSS 2015 Achievement

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale (η^2)	
	(r)		(r)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.29	0.29	0.08	0.09	0.07	0.07
Bahrain	0.15	0.15	0.02	0.02	0.02	0.02
Botswana (9)	0.16	0.19	0.02	0.04	0.02	0.03
Canada	0.16	0.16	0.03	0.03	0.03	0.02
Chile	0.12	0.11	0.01	0.01	0.01	0.01
Chinese Taipei	0.15	0.15	0.02	0.02	0.02	0.02
Egypt	0.07	0.07	0.00	0.01	0.00	0.01
England	0.27	0.27	0.08	0.07	0.06	0.06
Georgia	0.08	0.09	0.01	0.01	0.01	0.01
Hong Kong SAR	0.23	0.19	0.05	0.04	0.05	0.03
Hungary	0.17	0.15	0.03	0.02	0.02	0.01
Iran, Islamic Rep. of	0.02	0.02	0.00	0.00	0.00	0.00
Ireland	0.20	0.21	0.04	0.04	0.04	0.04
Israel	0.03	0.06	0.00	0.00	0.01	0.01
Italy	0.09	0.06	0.01	0.00	0.01	0.00
Japan	0.12	0.10	0.02	0.01	0.01	0.01
Jordan	0.01	0.04	0.00	0.00	0.00	0.00
Kazakhstan	0.07	0.05	0.01	0.00	0.00	0.00
Korea, Rep. of	0.13	0.11	0.02	0.01	0.02	0.01
Kuwait	0.10	0.06	0.01	0.00	0.01	0.01
Lebanon	0.02	0.06	0.00	0.00	0.00	0.01
Lithuania	0.02	0.02	0.00	0.00	0.00	0.00
Malaysia	0.03	0.15	0.00	0.02	0.01	0.04
Malta	0.26	0.24	0.07	0.06	0.07	0.05
Morocco	-0.01	0.02	0.00	0.00	0.00	0.00
New Zealand	0.20	0.18	0.04	0.03	0.03	0.03
Norway (9)	0.16	0.16	0.03	0.02	0.03	0.03
Oman	0.10	0.11	0.01	0.01	0.01	0.01
Qatar	0.20	0.22	0.04	0.05	0.04	0.05
Russian Federation	0.07	0.03	0.01	0.00	0.00	0.00
Saudi Arabia	0.04	0.08	0.00	0.01	0.01	0.01
Singapore	0.19	0.18	0.04	0.03	0.03	0.03
Slovenia	0.12	0.14	0.02	0.02	0.01	0.02
South Africa (9)	0.03	0.03	0.00	0.00	0.00	0.00
Sweden	0.18	0.17	0.03	0.03	0.03	0.03
Thailand	0.04	0.02	0.00	0.00	0.00	0.00
Turkey	-0.01	0.01	0.00	0.00	0.00	0.00
United Arab Emirates	0.29	0.30	0.09	0.09	0.08	0.08
United States	0.23	0.21	0.05	0.05	0.05	0.04
International Median	0.12	0.11	0.02	0.01	0.01	0.01
Benchmarking Participants						
Buenos Aires, Argentina	0.12	0.11	0.02	0.01	0.01	0.01
Ontario, Canada	0.17	0.16	0.03	0.03	0.03	0.03
Quebec, Canada	0.20	0.17	0.04	0.03	0.03	0.03
Norway (8)	0.17	0.15	0.03	0.02	0.03	0.03
Abu Dhabi, UAE	0.24	0.22	0.06	0.05	0.06	0.05
Dubai, UAE	0.28	0.29	0.08	0.09	0.08	0.08
Florida, US	0.17	0.17	0.03	0.03	0.03	0.03

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

Students Value Mathematics Scale, Eighth Grade

The Students Value Mathematics (SVM) scale was created based on students' degree of agreement with the nine statements described below.

Items in the TIMSS 2015 Students Value Mathematics Scale, Eighth Grade

		How much do you agree with these statements about mathematics?			
		Agree a lot	Agree a little	Disagree a little	Disagree a lot
T	BSBM20A	1) I think learning mathematics will help me in my daily life ----- ○ ----- ○ ----- ○ ----- ○			
T	BSBM20B	2) I need mathematics to learn other school subjects ----- ○ ----- ○ ----- ○ ----- ○			
T	BSBM20C	3) I need to do well in mathematics to get into the university of my choice ----- ○ ----- ○ ----- ○ ----- ○			
T	BSBM20D	4) I need to do well in mathematics to get the job I want ----- ○ ----- ○ ----- ○ ----- ○			
T	BSBM20E	5) I would like a job that involves using mathematics ----- ○ ----- ○ ----- ○ ----- ○			
	BSBM20F	6) It is important to learn about mathematics to get ahead in the world ----- ○ ----- ○ ----- ○ ----- ○			
	BSBM20G	7) Learning mathematics will give me more job opportunities when I am an adult ----- ○ ----- ○ ----- ○ ----- ○			
	BSBM20H	8) My parents think that it is important that I do well in mathematics ----- ○ ----- ○ ----- ○ ----- ○			
	BSBM20I	9) It is important to do well in mathematics ----- ○ ----- ○ ----- ○ ----- ○			

←-----→

Strongly Value Mathematics
Value Mathematics
Do Not Value Mathematics

10.3
7.7

T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 Students Value Mathematics Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBM20A	-0.09861	-0.83768	-0.54142	1.37910	1.06
BSBM20B	0.18629	-1.33201	-0.44135	1.77336	1.09
BSBM20C	-0.25501	-0.94177	-0.29071	1.23248	0.97
BSBM20D	-0.04767	-1.09264	-0.15715	1.24979	0.90
BSBM20E	1.50538	-1.33717	-0.05987	1.39704	1.32
BSBM20F	0.03583	-1.16694	-0.36329	1.53023	0.86
BSBM20G	-0.24374	-1.00834	-0.47571	1.48405	0.85
BSBM20H	-0.52892	-0.96883	-0.41750	1.38633	1.17
BSBM20I	-0.55355	-0.78232	-0.54990	1.33222	0.91

Scale Transformation Constants for the TIMSS 2015 Students Value Mathematics Scale, Eighth Grade

Scale Transformation Constants	
A = 7.964227	Transformed Scale Score = 7.964227 + 1.234642 • Logit Scale Score
B = 1.234642	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Students Value Mathematics Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	2.99893	
1	4.33377	
2	4.96171	
3	5.38958	
4	5.72259	
5	6.00170	
6	6.24837	
7	6.47387	
8	6.68550	
9	6.88836	
10	7.08629	
11	7.28237	
12	7.48033	
13	7.67979	7.7
14	7.88500	
15	8.09804	
16	8.32084	
17	8.55527	
18	8.80299	
19	9.06690	
20	9.34984	
21	9.65639	
22	9.99387	
23	10.37453	10.3
24	10.81825	
25	11.37143	
26	12.14660	
27	13.65262	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students Value Mathematics Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item								
			BSBM20A	BSBM20B	BSBM20C	BSBM20D	BSBM20E	BSBM20F	BSBM20G	BSBM20H	BSBM20I
Australia	0.90	58	0.77	0.73	0.79	0.80	0.65	0.82	0.81	0.64	0.80
Bahrain	0.90	57	0.72	0.73	0.80	0.78	0.62	0.82	0.82	0.67	0.78
Botswana (9)	0.81	42	0.64	0.61	0.70	0.73	0.48	0.72	0.70	0.56	0.68
Canada	0.88	52	0.71	0.68	0.75	0.76	0.63	0.77	0.79	0.62	0.78
Chile	0.89	55	0.74	0.70	0.77	0.79	0.59	0.82	0.82	0.67	0.76
Chinese Taipei	0.90	56	0.68	0.67	0.78	0.82	0.70	0.80	0.84	0.61	0.79
Egypt	0.87	49	0.64	0.71	0.75	0.74	0.61	0.73	0.73	0.64	0.71
England	0.87	51	0.71	0.69	0.71	0.75	0.60	0.79	0.78	0.61	0.76
Georgia	0.88	54	0.72	0.68	0.73	0.77	0.57	0.80	0.78	0.69	0.81
Hong Kong SAR	0.91	57	0.69	0.73	0.77	0.83	0.68	0.82	0.85	0.62	0.79
Hungary	0.87	51	0.72	0.67	0.66	0.75	0.65	0.78	0.75	0.66	0.75
Iran, Islamic Rep. of	0.88	51	0.66	0.64	0.77	0.78	0.67	0.78	0.75	0.60	0.74
Ireland	0.87	51	0.68	0.66	0.74	0.77	0.63	0.79	0.77	0.59	0.75
Israel	0.88	54	0.70	0.69	0.75	0.77	0.58	0.83	0.81	0.64	0.79
Italy	0.86	47	0.71	0.63	0.68	0.74	0.65	0.79	0.78	0.56	0.61
Japan	0.86	47	0.63	0.66	0.72	0.76	0.57	0.81	0.78	0.58	0.66
Jordan	0.89	54	0.68	0.71	0.78	0.78	0.57	0.79	0.79	0.70	0.77
Kazakhstan	0.91	58	0.73	0.67	0.82	0.83	0.70	0.78	0.83	0.70	0.77
Korea, Rep. of	0.88	52	0.60	0.68	0.77	0.80	0.60	0.77	0.81	0.63	0.80
Kuwait	0.86	49	0.68	0.66	0.74	0.73	0.64	0.76	0.76	0.58	0.73
Lebanon	0.88	51	0.68	0.69	0.74	0.76	0.63	0.80	0.75	0.60	0.73
Lithuania	0.88	52	0.71	0.69	0.73	0.79	0.60	0.73	0.78	0.63	0.78
Malaysia	0.89	53	0.69	0.64	0.79	0.77	0.59	0.78	0.77	0.72	0.79
Malta	0.88	52	0.70	0.70	0.73	0.76	0.59	0.80	0.79	0.61	0.75
Morocco	0.85	47	0.64	0.67	0.74	0.75	0.60	0.71	0.72	0.60	0.72
New Zealand	0.89	56	0.74	0.72	0.77	0.78	0.59	0.81	0.81	0.68	0.79
Norway (9)	0.89	55	0.73	0.70	0.78	0.79	0.66	0.81	0.80	0.62	0.77
Oman	0.85	46	0.65	0.63	0.72	0.70	0.57	0.74	0.73	0.65	0.70
Qatar	0.91	60	0.73	0.75	0.81	0.80	0.64	0.84	0.83	0.73	0.81
Russian Federation	0.89	55	0.72	0.69	0.78	0.80	0.67	0.79	0.80	0.61	0.75
Saudi Arabia	0.89	55	0.72	0.74	0.78	0.77	0.61	0.81	0.80	0.64	0.75
Singapore	0.87	50	0.68	0.64	0.74	0.76	0.60	0.79	0.78	0.59	0.75
Slovenia	0.88	52	0.69	0.66	0.72	0.77	0.60	0.80	0.81	0.64	0.74
South Africa (9)	0.82	44	0.65	0.57	0.73	0.75	0.50	0.71	0.72	0.57	0.70
Sweden	0.88	51	0.64	0.65	0.80	0.80	0.64	0.75	0.77	0.64	0.72
Thailand	0.88	53	0.61	0.66	0.75	0.79	0.60	0.80	0.79	0.74	0.77
Turkey	0.87	50	0.63	0.68	0.74	0.77	0.65	0.81	0.77	0.55	0.73
United Arab Emirates	0.90	56	0.72	0.70	0.79	0.79	0.62	0.81	0.81	0.68	0.77
United States	0.89	54	0.72	0.70	0.73	0.77	0.60	0.83	0.82	0.65	0.78
Benchmarking Participants											
Buenos Aires, Argentina	0.86	48	0.72	0.66	0.66	0.73	0.56	0.78	0.78	0.58	0.71
Ontario, Canada	0.88	53	0.70	0.67	0.75	0.75	0.64	0.80	0.78	0.63	0.78
Quebec, Canada	0.86	50	0.67	0.64	0.74	0.77	0.61	0.71	0.80	0.64	0.75
Norway (8)	0.88	54	0.73	0.69	0.79	0.77	0.62	0.80	0.80	0.60	0.77
Abu Dhabi, UAE	0.90	57	0.73	0.72	0.80	0.80	0.62	0.81	0.82	0.70	0.78
Dubai, UAE	0.89	54	0.71	0.65	0.78	0.78	0.65	0.81	0.81	0.65	0.75
Florida, US	0.89	56	0.74	0.70	0.73	0.79	0.59	0.84	0.83	0.67	0.80

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

Relationship Between the TIMSS 2015 Students Value Mathematics Scale, Eighth Grade, and TIMSS 2015 Mathematics Achievement

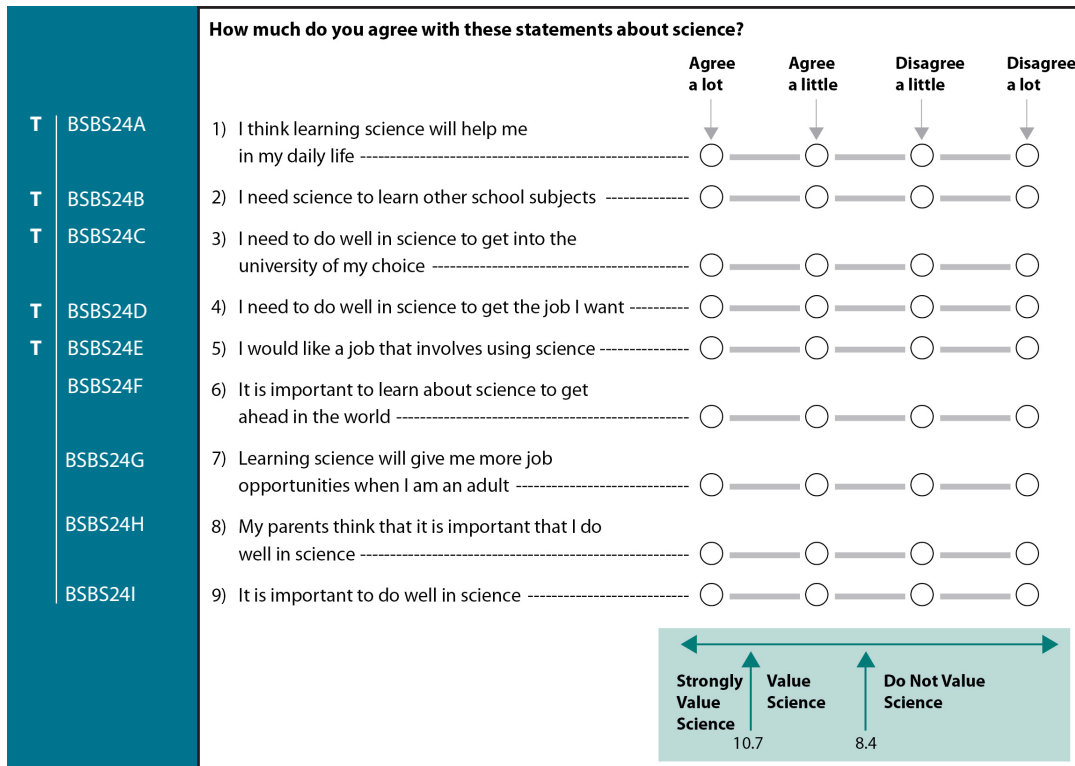
Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r^2)	
Australia	0.23	0.05	0.05
Bahrain	0.23	0.05	0.05
Botswana (9)	0.34	0.12	0.11
Canada	0.22	0.05	0.05
Chile	0.12	0.01	0.01
Chinese Taipei	0.36	0.13	0.12
Egypt	0.18	0.03	0.03
England	0.12	0.01	0.01
Georgia	0.11	0.01	0.02
Hong Kong SAR	0.24	0.06	0.06
Hungary	0.18	0.03	0.03
Iran, Islamic Rep. of	0.12	0.01	0.02
Ireland	0.15	0.02	0.02
Israel	0.16	0.02	0.03
Italy	0.19	0.04	0.03
Japan	0.24	0.06	0.04
Jordan	0.14	0.02	0.03
Kazakhstan	0.09	0.01	0.01
Korea, Rep. of	0.38	0.14	0.13
Kuwait	0.15	0.02	0.02
Lebanon	0.14	0.02	0.02
Lithuania	0.15	0.02	0.02
Malaysia	0.22	0.05	0.05
Malta	0.17	0.03	0.03
Morocco	0.19	0.03	0.03
New Zealand	0.16	0.02	0.02
Norway (9)	0.23	0.06	0.05
Oman	0.21	0.04	0.05
Qatar	0.27	0.07	0.07
Russian Federation	0.10	0.01	0.01
Saudi Arabia	0.12	0.02	0.02
Singapore	0.11	0.01	0.02
Slovenia	0.18	0.03	0.02
South Africa (9)	0.15	0.02	0.02
Sweden	0.20	0.04	0.04
Thailand	0.19	0.03	0.03
Turkey	0.14	0.02	0.02
United Arab Emirates	0.22	0.05	0.05
United States	0.17	0.03	0.02
International Median	0.18	0.03	0.03
Benchmarking Participants			
Buenos Aires, Argentina	0.02	0.00	0.00
Ontario, Canada	0.25	0.06	0.05
Quebec, Canada	0.24	0.06	0.05
Norway (8)	0.17	0.03	0.03
Abu Dhabi, UAE	0.19	0.04	0.05
Dubai, UAE	0.25	0.06	0.05
Florida, US	0.07	0.01	0.00

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

Students Value Science Scale, Eighth Grade

The Students Value Science (SVS) scale was created based on students' degree of agreement with the nine statements described below.

Items in the TIMSS 2015 Students Value Science Scale, Eighth Grade



T Trend item—item was included in the same scale in TIMSS 2011 and was used for linking the TIMSS 2011 and TIMSS 2015 scales.

Item Parameters for the TIMSS 2015 Students Value Science Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBS24A	-0.49782	-1.43829	-0.52891	1.96720	1.12
BSBS24B	0.23455	-1.99011	-0.10911	2.09922	1.17
BSBS24C	-0.05110	-1.63211	-0.09250	1.72461	0.92
BSBS24D	0.24137	-1.62498	0.02997	1.59501	0.91
BSBS24E	0.99622	-1.64483	0.11575	1.52908	1.21
BSBS24F	-0.02119	-1.69905	-0.26791	1.96696	0.92
BSBS24G	-0.07333	-1.66588	-0.23263	1.89851	0.90
BSBS24H	-0.25840	-1.75651	-0.24059	1.99710	1.28
BSBS24I	-0.57030	-1.49224	-0.39374	1.88598	1.07

Scale Transformation Constants for the TIMSS 2015 Students Value Science Scale, Eighth Grade

Scale Transformation Constants	
A = 8.556049	Transformed Scale Score = 8.556049 + 0.9487 • Logit Scale Score
B = 0.9487	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Students Value Science Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	4.14796	
1	5.24468	
2	5.78617	
3	6.16816	
4	6.47284	
5	6.73402	
6	6.97032	
7	7.18668	
8	7.39377	
9	7.59437	
10	7.79236	
11	7.98819	
12	8.18496	
13	8.38409	8.4
14	8.58656	
15	8.79310	
16	9.00422	
17	9.22038	
18	9.44187	
19	9.67007	
20	9.90677	
21	10.15530	
22	10.42118	
23	10.71378	10.7
24	11.04984	
25	11.45997	
26	12.03246	
27	13.15815	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students Value Science Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item								
			BS8S24A	BS8S24B	BS8S24C	BS8S24D	BS8S24E	BS8S24F	BS8S24G	BS8S24H	BS8S24I
Australia	0.94	67	0.82	0.79	0.86	0.85	0.79	0.85	0.86	0.72	0.83
Bahrain	0.93	63	0.77	0.78	0.83	0.83	0.76	0.83	0.83	0.72	0.79
Botswana (9)	0.86	48	0.65	0.65	0.76	0.75	0.64	0.72	0.74	0.60	0.70
Canada	0.92	63	0.79	0.76	0.84	0.83	0.76	0.82	0.83	0.70	0.78
Chile	0.93	65	0.79	0.76	0.86	0.86	0.80	0.85	0.87	0.71	0.72
Chinese Taipei	0.92	63	0.71	0.75	0.83	0.86	0.79	0.83	0.86	0.68	0.79
Egypt	0.89	53	0.64	0.71	0.78	0.77	0.71	0.76	0.76	0.70	0.73
England	0.92	63	0.79	0.75	0.82	0.83	0.75	0.85	0.84	0.70	0.81
Georgia	0.91	60	0.71	0.75	0.79	0.81	0.69	0.82	0.83	0.75	0.80
Hong Kong SAR	0.94	67	0.70	0.78	0.87	0.88	0.81	0.84	0.88	0.74	0.82
Hungary	0.91	57	0.73	0.74	0.78	0.82	0.75	0.79	0.79	0.73	0.65
Iran, Islamic Rep. of	0.91	59	0.72	0.72	0.82	0.82	0.78	0.82	0.81	0.68	0.75
Ireland	0.92	62	0.78	0.73	0.84	0.82	0.77	0.82	0.82	0.71	0.81
Israel	0.94	67	0.82	0.84	0.86	0.86	0.78	0.89	0.86	0.65	0.81
Italy	0.89	55	0.73	0.68	0.77	0.79	0.78	0.80	0.81	0.62	0.62
Japan	0.90	55	0.68	0.71	0.80	0.83	0.67	0.84	0.81	0.64	0.63
Jordan	0.92	60	0.71	0.76	0.83	0.83	0.70	0.83	0.81	0.74	0.77
Kazakhstan	0.94	66	0.75	0.79	0.86	0.86	0.78	0.84	0.86	0.82	0.77
Korea, Rep. of	0.92	61	0.73	0.77	0.84	0.83	0.67	0.78	0.84	0.71	0.84
Kuwait	0.89	54	0.69	0.67	0.79	0.78	0.71	0.79	0.79	0.64	0.71
Lebanon	0.91	58	0.67	0.72	0.80	0.81	0.76	0.80	0.81	0.73	0.74
Lithuania	0.91	59	0.71	0.74	0.81	0.82	0.71	0.76	0.82	0.73	0.80
Malaysia	0.90	56	0.71	0.68	0.81	0.80	0.66	0.78	0.79	0.75	0.77
Malta	0.94	67	0.78	0.77	0.84	0.84	0.77	0.84	0.86	0.79	0.84
Morocco	0.89	54	0.65	0.72	0.79	0.78	0.73	0.76	0.76	0.69	0.75
New Zealand	0.93	65	0.81	0.78	0.84	0.83	0.76	0.84	0.84	0.75	0.82
Norway (9)	0.92	60	0.78	0.75	0.83	0.82	0.77	0.80	0.81	0.62	0.77
Oman	0.88	52	0.67	0.68	0.76	0.77	0.69	0.76	0.78	0.69	0.68
Qatar	0.94	67	0.79	0.78	0.86	0.85	0.79	0.86	0.87	0.78	0.81
Russian Federation	0.91	59	0.71	0.73	0.82	0.83	0.74	0.79	0.81	0.70	0.78
Saudi Arabia	0.93	62	0.75	0.77	0.82	0.82	0.74	0.83	0.84	0.74	0.79
Singapore	0.90	57	0.72	0.65	0.82	0.82	0.71	0.80	0.84	0.66	0.77
Slovenia	0.93	64	0.73	0.72	0.83	0.85	0.77	0.84	0.86	0.75	0.82
South Africa (9)	0.92	60	0.73	0.71	0.84	0.84	0.78	0.78	0.81	0.69	0.76
Sweden	0.92	60	0.70	0.72	0.85	0.85	0.77	0.82	0.81	0.70	0.75
Thailand	0.91	59	0.70	0.74	0.80	0.81	0.69	0.82	0.81	0.76	0.78
Turkey	0.90	55	0.64	0.72	0.79	0.81	0.75	0.82	0.79	0.62	0.71
United Arab Emirates	0.93	64	0.79	0.74	0.85	0.84	0.77	0.84	0.84	0.74	0.79
United States	0.92	62	0.79	0.75	0.82	0.83	0.76	0.85	0.85	0.68	0.77
Benchmarking Participants											
Buenos Aires, Argentina	0.91	58	0.75	0.77	0.80	0.82	0.75	0.74	0.83	0.65	0.71
Ontario, Canada	0.93	64	0.79	0.76	0.85	0.84	0.78	0.84	0.84	0.71	0.78
Quebec, Canada	0.92	60	0.77	0.75	0.84	0.83	0.74	0.76	0.82	0.69	0.78
Norway (8)	0.92	62	0.79	0.76	0.85	0.84	0.75	0.82	0.81	0.65	0.77
Abu Dhabi, UAE	0.94	66	0.81	0.77	0.86	0.84	0.76	0.86	0.86	0.77	0.80
Dubai, UAE	0.92	62	0.77	0.71	0.84	0.84	0.79	0.82	0.85	0.70	0.78
Florida, US	0.92	63	0.79	0.76	0.83	0.82	0.75	0.85	0.85	0.70	0.79

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

Relationship Between the TIMSS 2015 Students Value Science Scale, Eighth Grade, and TIMSS 2015 Science Achievement

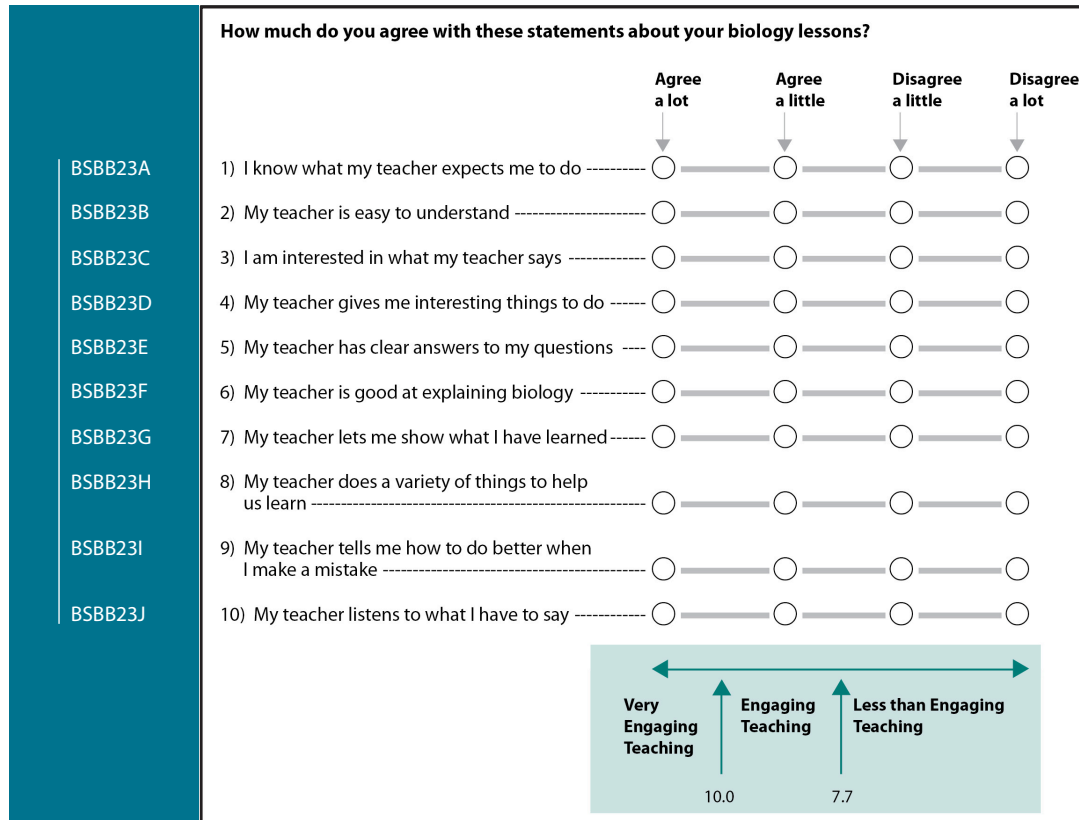
Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r^2)	
Australia	0.32	0.10	0.09
Bahrain	0.20	0.04	0.03
Botswana (9)	0.43	0.18	0.16
Canada	0.24	0.06	0.05
Chile	0.03	0.00	0.00
Chinese Taipei	0.35	0.12	0.10
Egypt	0.21	0.05	0.04
England	0.24	0.06	0.06
Georgia	0.09	0.01	0.01
Hong Kong SAR	0.21	0.04	0.04
Hungary	0.07	0.01	0.01
Iran, Islamic Rep. of	0.11	0.01	0.01
Ireland	0.31	0.10	0.08
Israel	0.17	0.03	0.03
Italy	0.15	0.02	0.01
Japan	0.32	0.10	0.07
Jordan	0.16	0.02	0.03
Kazakhstan	0.10	0.01	0.01
Korea, Rep. of	0.38	0.15	0.13
Kuwait	0.14	0.02	0.01
Lebanon	0.22	0.05	0.05
Lithuania	0.06	0.00	0.00
Malaysia	0.20	0.04	0.08
Malta	0.43	0.18	0.15
Morocco	0.09	0.01	0.01
New Zealand	0.22	0.05	0.04
Norway (9)	0.18	0.03	0.03
Oman	0.18	0.03	0.03
Qatar	0.26	0.07	0.06
Russian Federation	0.01	0.00	0.00
Saudi Arabia	0.13	0.02	0.02
Singapore	0.25	0.06	0.07
Slovenia	0.24	0.06	0.06
South Africa (9)	0.02	0.00	0.01
Sweden	0.13	0.02	0.03
Thailand	0.21	0.04	0.04
Turkey	0.10	0.01	0.01
United Arab Emirates	0.24	0.06	0.06
United States	0.21	0.04	0.05
International Median	0.20	0.04	0.04
Benchmarking Participants			
Buenos Aires, Argentina	-0.01	0.00	0.00
Ontario, Canada	0.24	0.06	0.05
Quebec, Canada	0.24	0.06	0.06
Norway (8)	0.13	0.02	0.01
Abu Dhabi, UAE	0.23	0.05	0.06
Dubai, UAE	0.23	0.05	0.05
Florida, US	0.18	0.03	0.03

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

Students' Views on Engaging Teaching in Biology Lessons Scale, Eighth Grade

The Students' Views on Engaging Teaching in Biology Lessons (EBL) scale was created based on students' degree of agreement with the ten statements described below.

Items in the TIMSS 2015 Students' Views on Engaging Teaching in Biology Lessons Scale, Eighth Grade



Item Parameters for the TIMSS 2015 Students' Views on Engaging Teaching in Biology Lessons Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBB23A	0.23712	-1.80522	-0.57382	2.37904	1.35
BSBB23B	0.09871	-1.66400	-0.60548	2.26948	0.89
BSBB23C	-0.05390	-1.55671	-0.51000	2.06671	1.04
BSBB23D	0.50295	-1.83407	-0.36609	2.20016	1.04
BSBB23E	-0.13674	-1.46308	-0.64174	2.10482	0.78
BSBB23F	-0.40148	-1.23377	-0.73035	1.96412	0.79
BSBB23G	0.15844	-1.78687	-0.61699	2.40386	1.00
BSBB23H	-0.16665	-1.62319	-0.56659	2.18978	0.88
BSBB23I	-0.01693	-1.59071	-0.58844	2.17915	0.91
BSBB23J	-0.22152	-1.30447	-0.81869	2.12316	0.93

Scale Transformation Constants for the TIMSS 2015 Students' Views on Engaging Teaching in Biology Lessons Scale, Eighth Grade

Scale Transformation Constants	
A = 7.952108	Transformed Scale Score = 7.952108 + 0.927987 • Logit Scale Score
B = 0.927987	

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

Equivalence Table of Raw and Transformed Scale Scores for the TIMSS 2015 Students' Views on Engaging Teaching in Biology Lessons Scale, Eighth Grade

Raw Score	Transformed Scale Score	Cutpoint
0	3.68279	
1	4.72056	
2	5.21810	
3	5.55682	
4	5.82253	
5	6.04443	
6	6.23952	
7	6.41702	
8	6.58151	
9	6.74042	
10	6.89504	
11	7.04799	
12	7.20164	
13	7.35828	
14	7.52021	
15	7.69015	7.7
16	7.86991	
17	8.06292	
18	8.27115	
19	8.49677	
20	8.73848	
21	8.99364	
22	9.25822	
23	9.52944	
24	9.80777	
25	10.09786	10.0
26	10.40930	
27	10.75637	
28	11.17501	
29	11.74935	
30	12.86128	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students' Views on Engaging Teaching in Biology Lessons Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BS8B23A	BS8B23B	BS8B23C	BS8B23D	BS8B23E	BS8B23F	BS8B23G	BS8B23H	BS8B23I	BS8B23J
Georgia	0.92	61	0.61	0.81	0.64	0.72	0.84	0.83	0.83	0.83	0.81	0.81
Hungary	0.92	59	0.72	0.78	0.77	0.68	0.82	0.83	0.76	0.76	0.78	0.79
Kazakhstan	0.94	66	0.66	0.79	0.84	0.82	0.85	0.83	0.83	0.81	0.84	0.82
Lebanon	0.93	61	0.64	0.79	0.78	0.78	0.81	0.80	0.78	0.81	0.81	0.79
Lithuania	0.94	65	0.73	0.83	0.80	0.79	0.85	0.84	0.74	0.82	0.82	0.82
Malta	0.95	67	0.74	0.86	0.82	0.84	0.86	0.85	0.76	0.80	0.82	0.82
Morocco	0.90	53	0.52	0.64	0.70	0.73	0.79	0.78	0.79	0.79	0.75	0.75
Russian Federation	0.93	62	0.65	0.79	0.82	0.78	0.83	0.81	0.74	0.81	0.81	0.78
Slovenia	0.95	67	0.76	0.81	0.80	0.82	0.87	0.86	0.80	0.84	0.82	0.81
Sweden	0.94	65	0.66	0.85	0.77	0.79	0.87	0.86	0.78	0.84	0.79	0.80

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

Relationship Between the TIMSS 2015 Students' Views on Engaging Teaching in Biology Lessons Scale, Eighth Grade, and TIMSS 2015 Science Achievement

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r^2)	
Georgia	0.17	0.03	0.02
Hungary	0.03	0.00	0.01
Kazakhstan	0.12	0.01	0.01
Lebanon	0.17	0.03	0.03
Lithuania	-0.06	0.00	0.00
Malta	0.21	0.04	0.05
Morocco	0.06	0.00	0.00
Russian Federation	0.03	0.00	0.00
Slovenia	0.04	0.00	0.00
Sweden	0.07	0.01	0.01
International Median	0.07	0.00	0.01

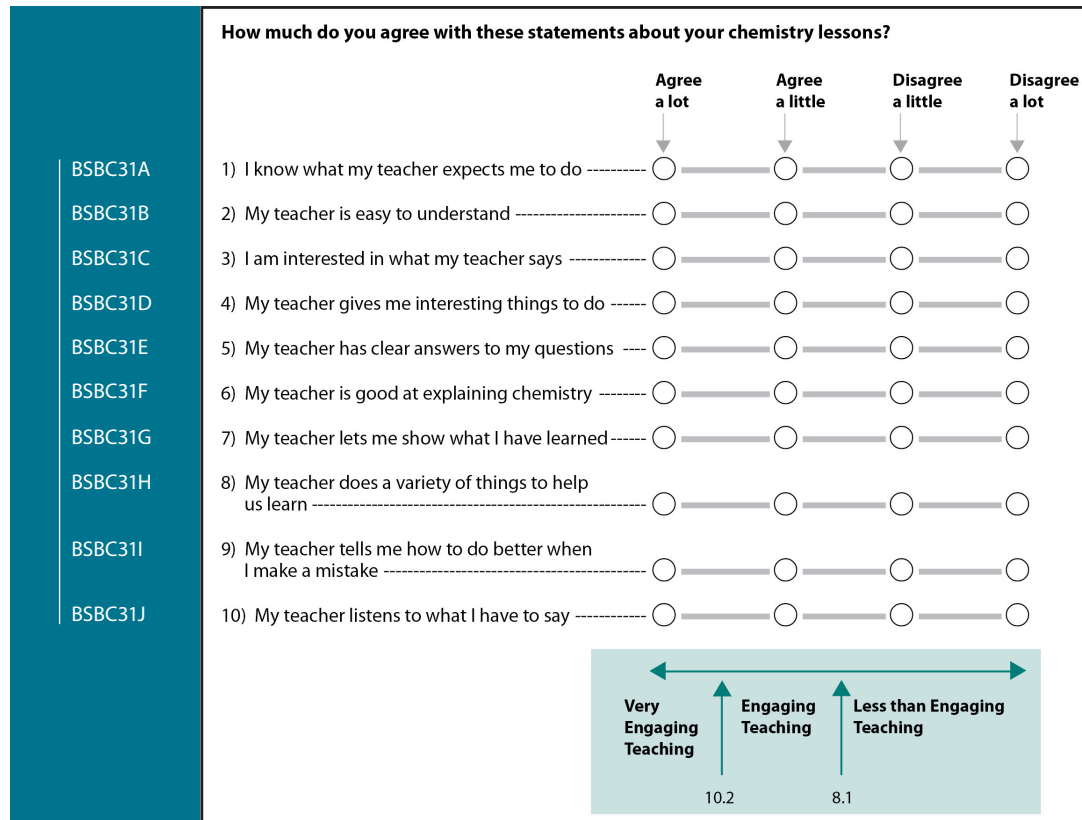
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



Students' Views on Engaging Teaching in Chemistry Lessons Scale, Eighth Grade

The Students' Views on Engaging Teaching in Chemistry Lessons (ECL) scale was created based on students' degree of agreement with the ten statements described below.

Items in the TIMSS 2015 Students' Views on Engaging Teaching in Chemistry Lessons Scale, Eighth Grade



Item Parameters for the TIMSS 2015 Students' Views on Engaging Teaching in Chemistry Lessons Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBC31A	0.07176	-1.72687	-0.68347	2.41034	1.45
BSBC31B	0.30353	-1.76760	-0.59269	2.36029	0.92
BSBC31C	0.02753	-1.65415	-0.55147	2.20562	1.06
BSBC31D	0.40206	-1.79741	-0.49080	2.28821	0.99
BSBC31E	-0.12482	-1.51666	-0.72854	2.24520	0.76
BSBC31F	-0.24239	-1.32402	-0.74195	2.06597	0.79
BSBC31G	0.09528	-1.85543	-0.68204	2.53747	0.99
BSBC31H	-0.14875	-1.57374	-0.70570	2.27944	0.91
BSBC31I	-0.13601	-1.57060	-0.74049	2.31109	0.90
BSBC31J	-0.24819	-1.29577	-0.93241	2.22818	0.98

Scale Transformation Constants for the TIMSS 2015 Students' Views on Engaging Teaching in Chemistry Lessons Scale, Eighth Grade

Scale Transformation Constants

$$A = 8.279016$$

$$B = 0.837128$$

$$\text{Transformed Scale Score} = 8.279016 + 0.837128 \cdot \text{Logit Scale Score}$$

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



Equivalence Table of Raw and Transformed Scale Scores for the TIMSS 2015 Students' Views on Engaging Teaching in Chemistry Lessons Scale, Eighth Grade

Raw Score	Transformed Scale Score	Cutpoint
0	4.41027	
1	5.34346	
2	5.78855	
3	6.09314	
4	6.32976	
5	6.52799	
6	6.70220	
7	6.86069	
8	7.00882	
9	7.15041	
10	7.28758	
11	7.42475	
12	7.56282	
13	7.70401	
14	7.85062	
15	8.00558	8.1
16	8.17066	
17	8.35004	
18	8.54624	
19	8.76229	
20	8.99643	
21	9.24435	
22	9.49933	
23	9.75669	
24	10.01650	
25	10.28369	10.2
26	10.56787	
27	10.88289	
28	11.26098	
29	11.77870	
30	12.78091	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students' Views on Engaging Teaching in Chemistry Lessons Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			B58C31A	B58C31B	B58C31C	B58C31D	B58C31E	B58C31F	B58C31G	B58C31H	B58C31I	B58C31J
Georgia	0.94	68	0.67	0.85	0.74	0.81	0.87	0.86	0.86	0.86	0.85	0.85
Hungary	0.95	67	0.75	0.83	0.80	0.82	0.86	0.86	0.81	0.81	0.84	0.79
Kazakhstan	0.95	70	0.69	0.81	0.86	0.85	0.88	0.86	0.87	0.83	0.87	0.85
Lebanon	0.94	64	0.67	0.82	0.81	0.81	0.83	0.82	0.82	0.81	0.82	0.80
Lithuania	0.95	70	0.76	0.86	0.84	0.83	0.89	0.87	0.79	0.85	0.84	0.83
Malta	0.95	70	0.74	0.87	0.82	0.85	0.88	0.87	0.81	0.83	0.86	0.80
Morocco	0.91	56	0.56	0.69	0.71	0.77	0.80	0.79	0.77	0.81	0.77	0.77
Russian Federation	0.95	69	0.72	0.83	0.85	0.84	0.88	0.87	0.82	0.84	0.85	0.82
Slovenia	0.95	69	0.78	0.81	0.81	0.83	0.88	0.86	0.83	0.86	0.83	0.83
Sweden	0.94	66	0.70	0.86	0.76	0.80	0.87	0.86	0.80	0.84	0.81	0.79

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

Relationship Between the TIMSS 2015 Students' Views on Engaging Teaching in Chemistry Lessons Scale, Eighth Grade, and TIMSS 2015 Science Achievement

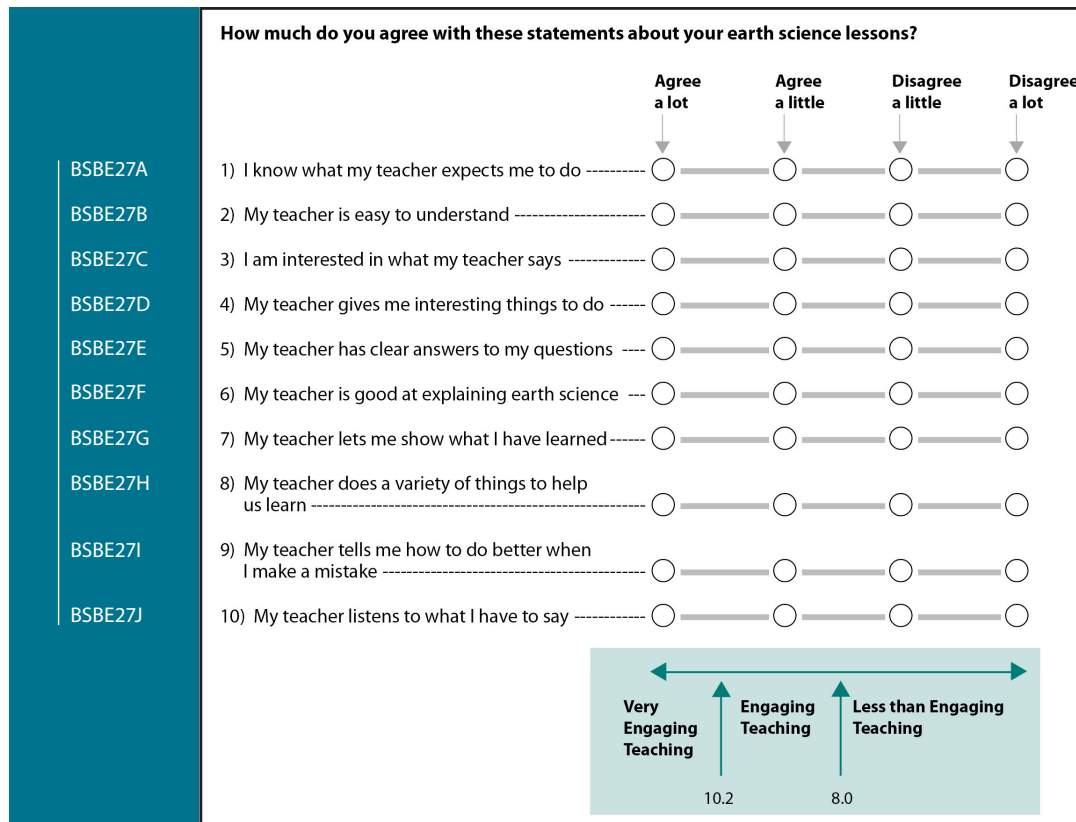
Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r ²)	
Georgia	0.17	0.03	0.03
Hungary	0.01	0.00	0.00
Kazakhstan	0.14	0.02	0.02
Lebanon	0.17	0.03	0.03
Lithuania	0.05	0.00	0.01
Malta	0.20	0.04	0.03
Morocco	0.08	0.01	0.00
Russian Federation	0.12	0.02	0.01
Slovenia	0.17	0.03	0.03
Sweden	0.09	0.01	0.01
International Median	0.13	0.02	0.02

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

Students' Views on Engaging Teaching in Earth Science Lessons Scale, Eighth Grade

The Students' Views on Engaging Teaching in Earth Science Lessons (EEL) scale was created based on students' degree of agreement with the ten statements described below.

Items in the TIMSS 2015 Students' Views on Engaging Teaching in Earth Science Lessons Scale, Eighth Grade



Item Parameters for the TIMSS 2015 Students' Views on Engaging Teaching in Earth Science Lessons Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBE27A	0.12956	-1.71093	-0.75256	2.46349	1.42
BSBE27B	0.04083	-1.71141	-0.72731	2.43872	0.93
BSBE27C	0.01333	-1.54955	-0.64003	2.18958	1.03
BSBE27D	0.54229	-1.90692	-0.45837	2.36529	1.01
BSBE27E	-0.17994	-1.42332	-0.85640	2.27972	0.78
BSBE27F	-0.40825	-1.23286	-0.88078	2.11364	0.81
BSBE27G	0.18214	-1.75319	-0.75123	2.50442	0.99
BSBE27H	-0.06175	-1.60758	-0.65571	2.26329	0.89
BSBE27I	-0.05005	-1.56783	-0.79721	2.36504	0.88
BSBE27J	-0.20816	-1.24758	-0.97820	2.22578	0.93

Scale Transformation Constants for the TIMSS 2015 Students' Views on Engaging Teaching in Earth Science Lessons Scale, Eighth Grade

Scale Transformation Constants	
A = 8.234304	Transformed Scale Score = 8.234304 + 0.852159 • Logit Scale Score
B = 0.852159	

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

Equivalence Table of Raw and Transformed Scale Scores for the TIMSS 2015 Students' Views on Engaging Teaching in Earth Science Lessons Scale, Eighth Grade

Raw Score	Transformed Scale Score	Cutpoint
0	4.33255	
1	5.27283	
2	5.71900	
3	6.02192	
4	6.25730	
5	6.45433	
6	6.62742	
7	6.78489	
8	6.93215	
9	7.07301	
10	7.20936	
11	7.34636	
12	7.48448	
13	7.62603	
14	7.77348	
15	7.93005	8.0
16	8.09752	
17	8.28072	
18	8.48271	
19	8.70699	
20	8.95182	
21	9.21199	
22	9.47927	
23	9.74797	
24	10.01797	
25	10.29453	10.2
26	10.58780	
27	10.91210	
28	11.30030	
29	11.83049	
30	12.85381	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students' Views on Engaging Teaching in Earth Science Lessons Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BS8E27A	BS8E27B	BS8E27C	BS8E27D	BS8E27E	BS8E27F	BS8E27G	BS8E27H	BS8E27I	BS8E27J
Georgia	0.93	63	0.64	0.82	0.71	0.76	0.85	0.82	0.83	0.81	0.83	0.82
Hungary	0.94	67	0.74	0.82	0.81	0.81	0.86	0.85	0.82	0.81	0.82	0.81
Kazakhstan	0.94	68	0.67	0.80	0.85	0.84	0.86	0.85	0.85	0.81	0.85	0.83
Lebanon	-	-	-	-	-	-	-	-	-	-	-	-
Lithuania	0.95	69	0.75	0.85	0.84	0.82	0.87	0.86	0.77	0.85	0.84	0.83
Malta	0.95	70	0.79	0.86	0.84	0.83	0.85	0.85	0.82	0.84	0.83	0.82
Morocco	0.91	54	0.56	0.66	0.70	0.75	0.80	0.78	0.76	0.80	0.76	0.76
Russian Federation	0.94	67	0.70	0.83	0.84	0.80	0.87	0.84	0.80	0.84	0.84	0.81
Slovenia	0.95	71	0.78	0.84	0.82	0.84	0.88	0.88	0.84	0.85	0.85	0.83
Sweden	-	-	-	-	-	-	-	-	-	-	-	-

A dash (-) indicates comparable data not available.

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

Relationship Between the TIMSS 2015 Students' Views on Engaging Teaching in Earth Science Lessons Scale, Eighth Grade, and TIMSS 2015 Science Achievement

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r ²)	
Georgia	0.14	0.02	0.02
Hungary	-0.01	0.00	0.00
Kazakhstan	0.10	0.01	0.01
Lebanon	-	-	-
Lithuania	0.08	0.01	0.01
Malta	0.11	0.01	0.01
Morocco	0.07	0.00	0.00
Russian Federation	0.03	0.00	0.00
Slovenia	0.06	0.00	0.00
Sweden	-	-	-
International Median	0.07	0.01	0.01

A dash (-) indicates comparable data not available.

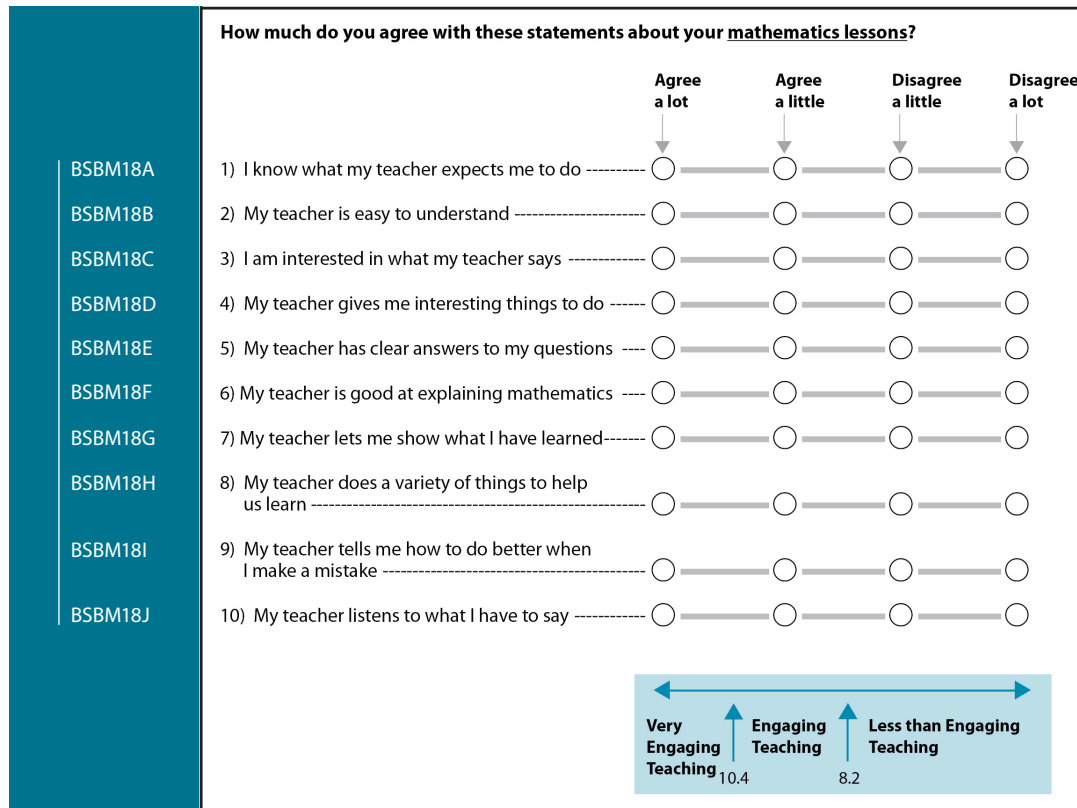
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



Students' Views on Engaging Teaching in Mathematics Lessons Scale, Eighth Grade

The Students' Views on Engaging Teaching in Mathematics Lessons (EML) scale was created based on students' degree of agreement with the ten statements described below.

Items in the TIMSS 2015 Students' Views on Engaging Teaching in Mathematics Lessons Scale, Eighth Grade



Item Parameters for the TIMSS 2015 Students' Views on Engaging Teaching in Mathematics Lessons Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBM18A	-0.20590	-1.33968	-0.59371	1.93339	1.39
BSBM18B	0.05569	-1.36981	-0.40937	1.77918	0.96
BSBM18C	0.09829	-1.52269	-0.25840	1.78109	1.06
BSBM18D	0.77545	-1.62386	-0.16029	1.78415	1.06
BSBM18E	-0.10037	-1.22616	-0.38485	1.61101	0.86
BSBM18F	-0.28381	-0.96873	-0.40509	1.37382	0.85
BSBM18G	0.25944	-1.42466	-0.37697	1.80163	1.05
BSBM18H	-0.15383	-1.17293	-0.38347	1.55640	0.94
BSBM18I	-0.30578	-1.07352	-0.46176	1.53528	0.93
BSBM18J	-0.13918	-1.03166	-0.50207	1.53373	0.99

Scale Transformation Constants for the TIMSS 2015 Students' Views on Engaging Teaching in Mathematics Lessons Scale, Eighth Grade

Scale Transformation Constants	
A = 8.296036	Transformed Scale Score = 8.296036 + 1.105518 • Logit Scale Score
B = 1.105518	

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

Equivalence Table of Raw and Transformed Scale Scores for the TIMSS 2015 Students' Views on Engaging Teaching in Mathematics Lessons Scale, Eighth Grade

Raw Score	Transformed Scale Score	Cutpoint
0	3.54710	
1	4.77380	
2	5.35650	
3	5.75348	
4	6.05996	
5	6.31688	
6	6.54073	
7	6.74318	
8	6.93105	
9	7.10903	
10	7.28056	
11	7.44836	
12	7.61467	
13	7.78151	
14	7.95117	
15	8.12401	8.2
16	8.30286	
17	8.48885	
18	8.68366	
19	8.88834	
20	9.10416	
21	9.33228	
22	9.57401	
23	9.83140	
24	10.10784	
25	10.40917	10.4
26	10.74435	
27	11.13328	
28	11.61366	
29	12.28584	
30	13.60366	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students' Views on Engaging Teaching in Mathematics Lessons Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BSBM18A	BSBM18B	BSBM18C	BSBM18D	BSBM18E	BSBM18F	BSBM18G	BSBM18H	BSBM18I	BSBM18J
Australia	0.94	64	0.68	0.84	0.80	0.79	0.85	0.86	0.75	0.81	0.82	0.80
Bahrain	0.92	59	0.64	0.79	0.71	0.77	0.82	0.82	0.74	0.80	0.80	0.78
Botswana (9)	0.86	44	0.52	0.68	0.67	0.67	0.72	0.72	0.65	0.65	0.67	0.67
Canada	0.93	61	0.66	0.83	0.76	0.76	0.83	0.85	0.75	0.79	0.78	0.78
Chile	0.94	64	0.68	0.81	0.76	0.79	0.85	0.84	0.78	0.82	0.82	0.82
Chinese Taipei	0.92	58	0.70	0.78	0.77	0.75	0.78	0.76	0.78	0.78	0.77	0.74
Egypt	0.88	48	0.49	0.62	0.70	0.73	0.76	0.74	0.68	0.72	0.71	0.71
England	0.93	61	0.67	0.82	0.77	0.78	0.83	0.85	0.73	0.79	0.78	0.78
Georgia	0.89	52	0.49	0.75	0.54	0.69	0.81	0.80	0.78	0.78	0.74	0.77
Hong Kong SAR	0.94	65	0.72	0.82	0.81	0.79	0.85	0.84	0.81	0.81	0.82	0.80
Hungary	0.91	55	0.63	0.76	0.70	0.74	0.79	0.81	0.74	0.77	0.77	0.72
Iran, Islamic Rep. of	0.90	52	0.54	0.72	0.74	0.70	0.77	0.78	0.75	0.73	0.74	0.72
Ireland	0.92	57	0.62	0.84	0.73	0.74	0.84	0.84	0.71	0.73	0.76	0.74
Israel	0.92	59	0.62	0.80	0.75	0.75	0.83	0.82	0.78	0.75	0.80	0.78
Italy	0.89	51	0.52	0.73	0.66	0.67	0.79	0.80	0.73	0.73	0.73	0.74
Japan	0.91	55	0.57	0.81	0.78	0.75	0.76	0.80	0.61	0.78	0.78	0.75
Jordan	0.89	50	0.51	0.69	0.66	0.71	0.79	0.77	0.69	0.77	0.75	0.71
Kazakhstan	0.92	59	0.57	0.76	0.79	0.78	0.81	0.79	0.80	0.78	0.80	0.79
Korea, Rep. of	0.92	58	0.61	0.77	0.78	0.77	0.78	0.80	0.65	0.81	0.82	0.81
Kuwait	0.89	49	0.52	0.71	0.67	0.72	0.79	0.77	0.68	0.73	0.69	0.71
Lebanon	0.91	55	0.56	0.76	0.74	0.72	0.80	0.77	0.75	0.77	0.78	0.76
Lithuania	0.91	56	0.60	0.80	0.73	0.72	0.81	0.80	0.67	0.78	0.76	0.77
Malaysia	0.91	55	0.62	0.78	0.78	0.73	0.77	0.79	0.70	0.77	0.75	0.72
Malta	0.93	61	0.69	0.81	0.77	0.78	0.82	0.84	0.74	0.78	0.79	0.77
Morocco	0.88	48	0.43	0.62	0.62	0.68	0.75	0.75	0.76	0.78	0.73	0.72
New Zealand	0.93	62	0.66	0.82	0.77	0.78	0.84	0.84	0.75	0.79	0.80	0.78
Norway (9)	0.92	59	0.60	0.82	0.72	0.75	0.81	0.83	0.76	0.77	0.79	0.78
Oman	0.86	45	0.44	0.66	0.69	0.61	0.74	0.73	0.68	0.71	0.71	0.69
Qatar	0.93	62	0.68	0.81	0.76	0.78	0.84	0.82	0.77	0.81	0.81	0.79
Russian Federation	0.91	56	0.57	0.75	0.77	0.74	0.81	0.80	0.73	0.80	0.77	0.75
Saudi Arabia	0.91	54	0.57	0.74	0.72	0.73	0.79	0.77	0.68	0.79	0.78	0.76
Singapore	0.92	59	0.68	0.81	0.79	0.77	0.81	0.82	0.74	0.74	0.78	0.75
Slovenia	0.91	56	0.65	0.73	0.65	0.72	0.81	0.82	0.75	0.78	0.78	0.77
South Africa (9)	0.86	44	0.49	0.70	0.67	0.69	0.68	0.73	0.68	0.64	0.68	0.68
Sweden	0.92	59	0.63	0.82	0.70	0.72	0.82	0.83	0.76	0.82	0.76	0.77
Thailand	0.90	52	0.51	0.76	0.71	0.76	0.75	0.76	0.73	0.76	0.73	0.72
Turkey	0.89	52	0.60	0.77	0.69	0.51	0.80	0.79	0.73	0.72	0.76	0.76
United Arab Emirates	0.92	59	0.62	0.80	0.74	0.76	0.82	0.81	0.77	0.76	0.78	0.77
United States	0.94	64	0.67	0.83	0.78	0.79	0.85	0.86	0.77	0.81	0.81	0.80
Benchmarking Participants												
Buenos Aires, Argentina	0.92	59	0.59	0.77	0.72	0.75	0.82	0.84	0.76	0.81	0.80	0.76
Ontario, Canada	0.93	61	0.67	0.82	0.78	0.77	0.83	0.84	0.75	0.80	0.78	0.79
Quebec, Canada	0.92	57	0.62	0.83	0.73	0.71	0.82	0.84	0.73	0.76	0.78	0.75
Norway (8)	0.91	57	0.58	0.80	0.71	0.74	0.80	0.83	0.74	0.77	0.77	0.77
Abu Dhabi, UAE	0.92	59	0.62	0.80	0.73	0.77	0.82	0.81	0.77	0.76	0.78	0.77
Dubai, UAE	0.92	59	0.63	0.80	0.76	0.78	0.82	0.82	0.75	0.75	0.78	0.77
Florida, US	0.93	62	0.65	0.83	0.78	0.77	0.84	0.84	0.75	0.79	0.81	0.78

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

Relationship Between the TIMSS 2015 Students' Views on Engaging Teaching in Mathematics Lessons Scale, Eighth Grade, and TIMSS 2015 Mathematics Achievement

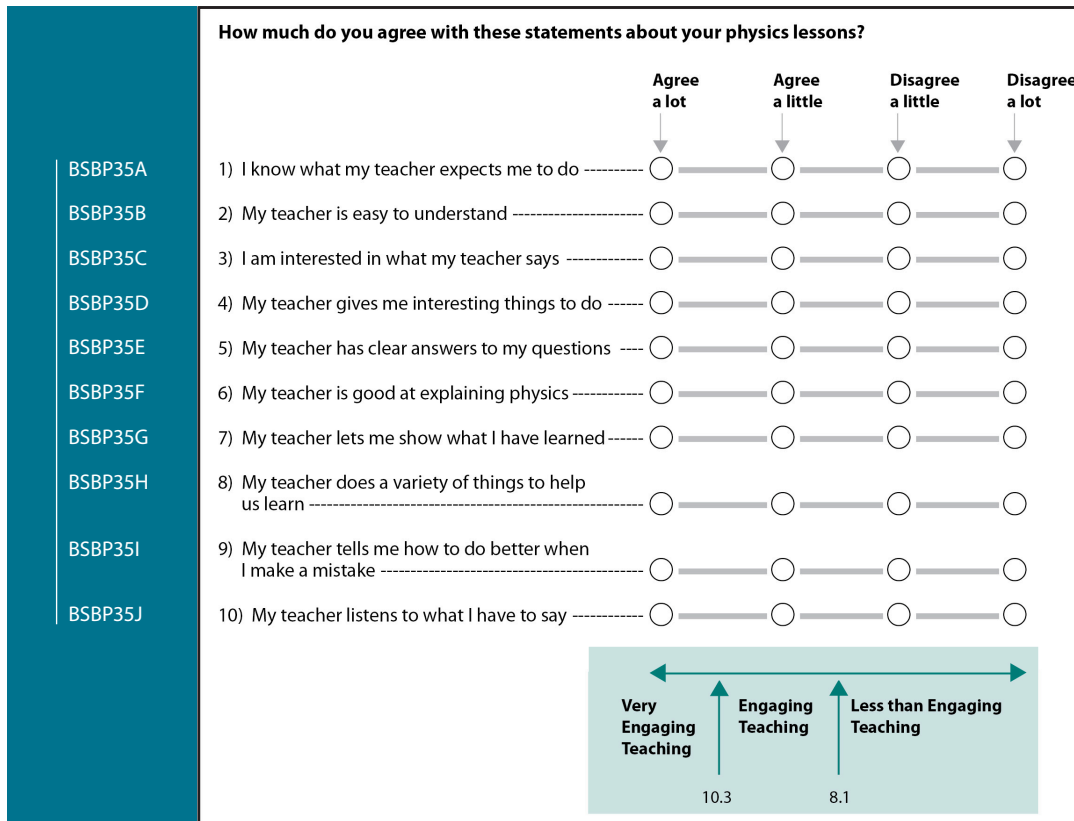
Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r ²)	
Australia	0.16	0.03	0.03
Bahrain	0.13	0.02	0.02
Botswana (9)	0.18	0.03	0.04
Canada	0.10	0.01	0.01
Chile	0.12	0.01	0.01
Chinese Taipei	0.24	0.06	0.05
Egypt	0.13	0.02	0.02
England	0.14	0.02	0.02
Georgia	0.17	0.03	0.02
Hong Kong SAR	0.13	0.02	0.01
Hungary	0.10	0.01	0.01
Iran, Islamic Rep. of	0.07	0.01	0.01
Ireland	0.04	0.00	0.00
Israel	0.03	0.00	0.00
Italy	0.08	0.01	0.01
Japan	0.18	0.03	0.02
Jordan	0.09	0.01	0.01
Kazakhstan	0.16	0.03	0.02
Korea, Rep. of	0.23	0.05	0.03
Kuwait	0.05	0.00	0.00
Lebanon	0.11	0.01	0.01
Lithuania	0.12	0.01	0.01
Malaysia	0.12	0.01	0.01
Malta	0.12	0.01	0.01
Morocco	0.07	0.01	0.01
New Zealand	0.14	0.02	0.02
Norway (9)	0.19	0.04	0.03
Oman	0.16	0.03	0.03
Qatar	0.20	0.04	0.04
Russian Federation	0.13	0.02	0.01
Saudi Arabia	0.12	0.01	0.01
Singapore	0.13	0.02	0.02
Slovenia	0.20	0.04	0.03
South Africa (9)	0.04	0.00	0.00
Sweden	0.17	0.03	0.03
Thailand	0.01	0.00	0.00
Turkey	0.14	0.02	0.02
United Arab Emirates	0.19	0.04	0.03
United States	0.12	0.01	0.02
International Median	0.13	0.02	0.02
Benchmarking Participants			
Buenos Aires, Argentina	0.05	0.00	0.00
Ontario, Canada	0.11	0.01	0.02
Quebec, Canada	0.15	0.02	0.02
Norway (8)	0.14	0.02	0.02
Abu Dhabi, UAE	0.14	0.02	0.02
Dubai, UAE	0.16	0.03	0.02
Florida, US	0.08	0.01	0.01

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

Students' Views on Engaging Teaching in Physics Lessons Scale, Eighth Grade

The Students' Views on Engaging Teaching in Physics Lessons (EPL) scale was created based on students' degree of agreement with the ten statements described below.

Items in the TIMSS 2015 Students' Views on Engaging Teaching in Physics Lessons Scale, Eighth Grade



Item Parameters for the TIMSS 2015 Students' Views on Engaging Teaching in Physics Lessons Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBP35A	0.02582	-1.84518	-0.67504	2.52022	1.46
BSBP35B	0.22966	-1.85433	-0.64159	2.49592	0.96
BSBP35C	0.05918	-1.72396	-0.58921	2.31317	1.06
BSBP35D	0.44841	-1.95198	-0.48476	2.43674	1.03
BSBP35E	-0.08867	-1.60947	-0.74617	2.35564	0.81
BSBP35F	-0.23221	-1.42369	-0.73236	2.15605	0.85
BSBP35G	0.12388	-1.89124	-0.70918	2.60042	1.06
BSBP35H	-0.15481	-1.68435	-0.69214	2.37649	0.92
BSBP35I	-0.15098	-1.72057	-0.72485	2.44542	0.92
BSBP35J	-0.26028	-1.44319	-0.89555	2.33874	1.04

Scale Transformation Constants for the TIMSS 2015 Students' Views on Engaging Teaching in Physics Lessons Scale, Eighth Grade

Scale Transformation Constants	
A = 8.36096	Transformed Scale Score = 8.36096 + 0.800724 • Logit Scale Score
B = 0.800724	

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

Equivalence Table of Raw and Transformed Scale Scores for the TIMSS 2015 Students' Views on Engaging Teaching in Physics Lessons Scale, Eighth Grade

Raw Score	Transformed Scale Score	Cutpoint
0	4.57253	
1	5.47234	
2	5.90450	
3	6.20036	
4	6.43141	
5	6.62544	
6	6.79626	
7	6.95186	
8	7.09747	
9	7.23679	
10	7.37186	
11	7.50715	
12	7.64349	
13	7.78312	
14	7.92841	
15	8.08240	8.1
16	8.24702	
17	8.42679	
18	8.62451	
19	8.84363	
20	9.08172	
21	9.33294	
22	9.58877	
23	9.84380	
24	10.09848	
25	10.35833	10.3
26	10.63329	
27	10.93727	
28	11.30073	
29	11.79730	
30	12.75728	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students' Views on Engaging Teaching in Physics Lessons Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BS8P35A	BS8P35B	BS8P35C	BS8P35D	BS8P35E	BS8P35F	BS8P35G	BS8P35H	BS8P35I	BS8P35J
Georgia	0.95	69	0.68	0.84	0.76	0.82	0.87	0.87	0.86	0.87	0.88	0.85
Hungary	0.95	68	0.75	0.83	0.81	0.84	0.87	0.86	0.82	0.82	0.84	0.81
Kazakhstan	0.95	71	0.69	0.81	0.86	0.86	0.88	0.87	0.87	0.83	0.87	0.84
Lebanon	0.95	67	0.70	0.84	0.84	0.83	0.86	0.84	0.81	0.84	0.84	0.80
Lithuania	0.95	71	0.78	0.88	0.85	0.84	0.89	0.85	0.80	0.85	0.84	0.84
Malta	0.95	70	0.78	0.87	0.84	0.83	0.89	0.88	0.80	0.84	0.84	0.81
Morocco	0.92	58	0.56	0.70	0.73	0.78	0.82	0.81	0.80	0.82	0.78	0.78
Russian Federation	0.95	70	0.72	0.84	0.86	0.82	0.88	0.86	0.82	0.86	0.86	0.83
Slovenia	0.96	71	0.78	0.82	0.82	0.84	0.88	0.87	0.85	0.87	0.86	0.83
Sweden	0.94	66	0.72	0.86	0.75	0.79	0.87	0.86	0.79	0.85	0.80	0.81

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

Relationship Between the TIMSS 2015 Students' Views on Engaging Teaching in Physics Lessons Scale, Eighth Grade, and TIMSS 2015 Science Achievement

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r ²)	
Georgia	0.13	0.02	0.02
Hungary	0.06	0.00	0.01
Kazakhstan	0.15	0.02	0.02
Lebanon	0.14	0.02	0.02
Lithuania	0.10	0.01	0.01
Malta	0.21	0.05	0.05
Morocco	0.08	0.01	0.01
Russian Federation	0.12	0.01	0.02
Slovenia	0.14	0.02	0.01
Sweden	0.09	0.01	0.01
International Median	0.12	0.02	0.01

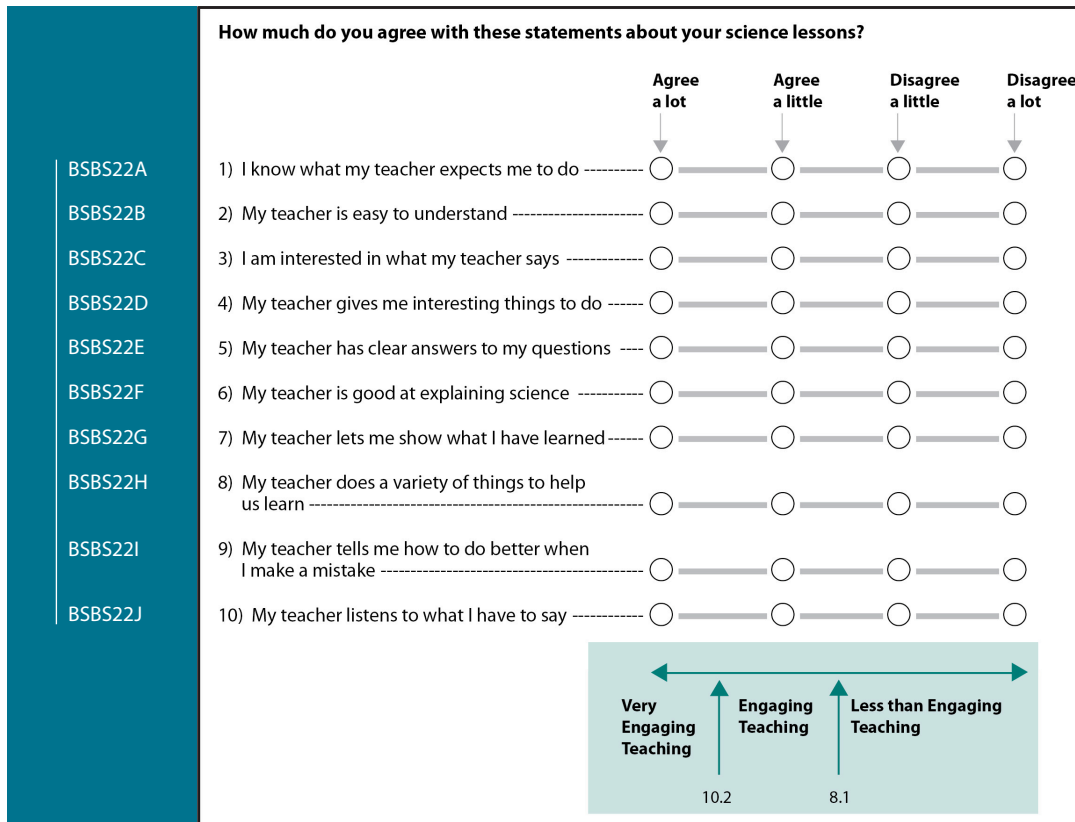
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015



Students' Views on Engaging Teaching in Science Lessons Scale, Eighth Grade

The Students' Views on Engaging Teaching in Science Lessons (ESL) scale was created based on students' degree of agreement with the ten statements described below.

Items in the TIMSS 2015 Students' Views on Engaging Teaching in Science Lessons Scale, Eighth Grade



Item Parameters for the TIMSS 2015 Students' Views on Engaging Teaching in Science Lessons Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3	Infit
BSBS22A	-0.04924	-1.64346	-0.54140	2.18486	1.40
BSBS22B	0.05145	-1.53889	-0.46940	2.00829	0.96
BSBS22C	-0.08308	-1.60569	-0.28773	1.89342	0.99
BSBS22D	0.38580	-1.67313	-0.26587	1.93900	1.04
BSBS22E	-0.12954	-1.48983	-0.40490	1.89473	0.86
BSBS22F	-0.32397	-1.28029	-0.44404	1.72433	0.85
BSBS22G	0.40041	-1.82277	-0.27075	2.09352	1.10
BSBS22H	-0.15706	-1.48381	-0.41006	1.89387	0.97
BSBS22I	-0.07063	-1.53419	-0.39286	1.92705	0.98
BSBS22J	-0.02414	-1.35914	-0.47354	1.83268	1.05

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

Scale Transformation Constants for the TIMSS 2015 Students' Views on Engaging Teaching in Science Lessons Scale, Eighth Grade

Scale Transformation Constants	
A = 8.256995	Transformed Scale Score = 8.256995 + 0.933751 • Logit Scale Score
B = 0.933751	

Equivalence Table of Raw and Transformed Scale Scores for the TIMSS 2015 Students' Views on Engaging Teaching in Science Lessons Scale, Eighth Grade

Raw Score	Transformed Scale Score	Cutpoint
0	3.99370	
1	5.05193	
2	5.56338	
3	5.91581	
4	6.19102	
5	6.42207	
6	6.62528	
7	6.81001	
8	6.98219	
9	7.14596	
10	7.30443	
11	7.46008	
12	7.61501	
13	7.77116	
14	7.93069	
15	8.09420	8.1
16	8.26433	
17	8.44227	
18	8.62934	
19	8.82641	
20	9.03371	
21	9.25114	
22	9.47855	
23	9.71647	
24	9.96698	
25	10.23475	10.2
26	10.52856	
27	10.86204	
28	11.27059	
29	11.83812	
30	12.94849	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Students' Views on Engaging Teaching in Science Lessons Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BS8S22A	BS8S22B	BS8S22C	BS8S22D	BS8S22E	BS8S22F	BS8S22G	BS8S22H	BS8S22I	BS8S22J
Australia	0.95	69	0.74	0.86	0.83	0.84	0.88	0.84	0.79	0.85	0.84	0.84
Bahrain	0.94	64	0.67	0.81	0.78	0.82	0.85	0.83	0.76	0.81	0.83	0.80
Botswana (9)	0.89	51	0.57	0.74	0.70	0.73	0.77	0.76	0.70	0.69	0.72	0.71
Canada	0.95	68	0.72	0.86	0.83	0.82	0.87	0.87	0.81	0.84	0.83	0.81
Chile	0.95	68	0.72	0.80	0.82	0.83	0.87	0.85	0.82	0.84	0.85	0.84
Chinese Taipei	0.93	61	0.74	0.80	0.81	0.80	0.80	0.78	0.78	0.80	0.79	0.74
Egypt	0.89	51	0.50	0.66	0.74	0.75	0.77	0.77	0.66	0.77	0.74	0.71
England	0.94	66	0.77	0.83	0.81	0.84	0.86	0.86	0.76	0.81	0.80	0.82
Georgia	-	-	-	-	-	-	-	-	-	-	-	-
Hong Kong SAR	0.96	72	0.79	0.86	0.85	0.86	0.88	0.87	0.84	0.85	0.85	0.83
Hungary	-	-	-	-	-	-	-	-	-	-	-	-
Iran, Islamic Rep. of	0.92	59	0.63	0.79	0.80	0.72	0.81	0.79	0.78	0.77	0.78	0.77
Ireland	0.95	67	0.73	0.87	0.83	0.82	0.86	0.87	0.78	0.80	0.80	0.80
Israel	0.95	70	0.76	0.86	0.82	0.83	0.87	0.88	0.83	0.83	0.84	0.83
Italy	0.92	58	0.57	0.77	0.71	0.76	0.84	0.81	0.77	0.77	0.78	0.78
Japan	0.93	61	0.64	0.83	0.80	0.79	0.82	0.83	0.67	0.81	0.82	0.78
Jordan	0.92	58	0.57	0.73	0.75	0.78	0.82	0.82	0.74	0.83	0.78	0.76
Kazakhstan	-	-	-	-	-	-	-	-	-	-	-	-
Korea, Rep. of	0.94	65	0.72	0.82	0.83	0.83	0.83	0.83	0.70	0.83	0.84	0.84
Kuwait	0.90	54	0.59	0.73	0.73	0.74	0.81	0.79	0.71	0.78	0.74	0.72
Lebanon	-	-	-	-	-	-	-	-	-	-	-	-
Lithuania	-	-	-	-	-	-	-	-	-	-	-	-
Malaysia	0.93	62	0.70	0.80	0.83	0.80	0.82	0.83	0.76	0.79	0.81	0.76
Malta	-	-	-	-	-	-	-	-	-	-	-	-
Morocco	-	-	-	-	-	-	-	-	-	-	-	-
New Zealand	0.94	67	0.72	0.84	0.82	0.83	0.87	0.85	0.78	0.82	0.82	0.81
Norway (9)	0.94	66	0.67	0.86	0.79	0.82	0.85	0.86	0.79	0.82	0.82	0.80
Oman	0.89	51	0.51	0.74	0.73	0.73	0.78	0.76	0.72	0.76	0.72	0.70
Qatar	0.95	70	0.76	0.86	0.82	0.85	0.88	0.88	0.81	0.85	0.85	0.80
Russian Federation	-	-	-	-	-	-	-	-	-	-	-	-
Saudi Arabia	0.93	61	0.65	0.79	0.81	0.79	0.82	0.82	0.71	0.84	0.80	0.79
Singapore	0.93	63	0.73	0.82	0.81	0.81	0.83	0.83	0.75	0.78	0.79	0.77
Slovenia	-	-	-	-	-	-	-	-	-	-	-	-
South Africa (9)	0.89	51	0.60	0.74	0.72	0.74	0.72	0.75	0.73	0.68	0.74	0.70
Sweden	-	-	-	-	-	-	-	-	-	-	-	-
Thailand	0.92	59	0.55	0.81	0.76	0.81	0.80	0.82	0.77	0.80	0.76	0.75
Turkey	0.91	58	0.65	0.80	0.75	0.58	0.83	0.83	0.79	0.74	0.81	0.80
United Arab Emirates	0.95	67	0.71	0.84	0.80	0.82	0.86	0.85	0.82	0.81	0.83	0.81
United States	0.96	71	0.76	0.86	0.83	0.85	0.88	0.89	0.82	0.85	0.84	0.83
Benchmarking Participants												
Buenos Aires, Argentina	0.94	64	0.65	0.79	0.79	0.80	0.86	0.85	0.79	0.81	0.82	0.80
Ontario, Canada	0.95	70	0.73	0.86	0.83	0.83	0.87	0.88	0.81	0.85	0.84	0.83
Quebec, Canada	0.94	65	0.69	0.84	0.81	0.80	0.87	0.86	0.80	0.82	0.80	0.78
Norway (8)	0.94	63	0.65	0.84	0.76	0.80	0.84	0.85	0.79	0.81	0.81	0.80
Abu Dhabi, UAE	0.95	68	0.72	0.84	0.81	0.83	0.87	0.86	0.84	0.82	0.84	0.81
Dubai, UAE	0.94	64	0.70	0.83	0.78	0.81	0.84	0.85	0.78	0.80	0.81	0.80
Florida, US	0.96	72	0.76	0.86	0.85	0.86	0.89	0.89	0.83	0.87	0.86	0.84

A dash (-) indicates comparable data not available.

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

Relationship Between the TIMSS 2015 Students' Views on Engaging Teaching in Science Lessons Scale, Eighth Grade, and TIMSS 2015 Science Achievement

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r ²)	
Australia	0.22	0.05	0.05
Bahrain	0.16	0.02	0.02
Botswana (9)	0.19	0.04	0.04
Canada	0.09	0.01	0.01
Chile	0.09	0.01	0.00
Chinese Taipei	0.21	0.04	0.03
Egypt	0.21	0.04	0.04
England	0.10	0.01	0.01
Georgia	-	-	-
Hong Kong SAR	0.16	0.03	0.02
Hungary	-	-	-
Iran, Islamic Rep. of	0.05	0.00	0.00
Ireland	0.19	0.04	0.03
Israel	0.12	0.01	0.01
Italy	0.03	0.00	0.00
Japan	0.21	0.04	0.04
Jordan	0.15	0.02	0.02
Kazakhstan	-	-	-
Korea, Rep. of	0.32	0.10	0.09
Kuwait	0.11	0.01	0.01
Lebanon	-	-	-
Lithuania	-	-	-
Malaysia	0.23	0.05	0.06
Malta	-	-	-
Morocco	-	-	-
New Zealand	0.15	0.02	0.02
Norway (9)	0.12	0.01	0.02
Oman	0.16	0.03	0.03
Qatar	0.20	0.04	0.04
Russian Federation	-	-	-
Saudi Arabia	0.16	0.03	0.02
Singapore	0.08	0.01	0.01
Slovenia	-	-	-
South Africa (9)	0.05	0.00	0.00
Sweden	-	-	-
Thailand	0.07	0.00	0.00
Turkey	0.17	0.03	0.03
United Arab Emirates	0.15	0.02	0.02
United States	0.11	0.01	0.01
International Median	0.15	0.02	0.02
Benchmarking Participants			
Buenos Aires, Argentina	0.03	0.00	0.00
Ontario, Canada	0.09	0.01	0.01
Quebec, Canada	0.11	0.01	0.01
Norway (8)	0.10	0.01	0.01
Abu Dhabi, UAE	0.13	0.02	0.02
Dubai, UAE	0.10	0.01	0.01
Florida, US	0.12	0.01	0.01

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

A dash (-) indicates comparable data not available.

Teacher Job Satisfaction Scale, Eighth Grade

The Teacher Job Satisfaction (TJS) scale was created based on how often teachers responded positively to the seven statements described below.

Items in the TIMSS 2015 Teacher Job Satisfaction Scale, Eighth Grade¹

		How often do you feel the following way about being a teacher?			
		Very often	Often	Sometimes	Never or almost never
BTBG10A	1) I am content with my profession as a teacher -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BTBG10B	2) I am satisfied with being a teacher at this school ---	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BTBG10C	3) I find my work full of meaning and purpose -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BTBG10D	4) I am enthusiastic about my job -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BTBG10E	5) My work inspires me-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BTBG10F	6) I am proud of the work I do -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BTBG10G	7) I am going to continue teaching for as long as I can -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

←	Very Satisfied	Satisfied	Less than Satisfied	→
	10.3		7.0	

¹ For the purpose of scaling, categories in which there were very few respondents were combined. The categories "Sometimes" and "Never or almost never" were combined for all variables. The scale statistics that are reported herein reflect analysis of the items following collapsing.

Item Parameters for the TIMSS 2015 Teacher Job Satisfaction Scale, Eighth Grade

Item	delta	tau_1	tau_2	Infit
BTBG10A	0.14816	-1.72080	1.72080	0.99
BTBG10B	0.39021	-1.65209	1.65209	1.34
BTBG10C	-0.51295	-1.72738	1.72738	1.06
BTBG10D	-0.27152	-1.81713	1.81713	0.85
BTBG10E	0.32148	-1.74038	1.74038	0.89
BTBG10F	-0.47731	-1.60579	1.60579	0.96
BTBG10G	0.40193	-1.26209	1.26209	1.27

Scale Transformation Constants for the TIMSS 2015 Teacher Job Satisfaction Scale, Eighth Grade

Scale Transformation Constants

A = 8.635655

B = 0.874431

Transformed Scale Score = 8.635655 + 0.874431 • Logit Scale Score

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



**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Teacher Job Satisfaction Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	4.73467	
1	5.83713	
2	6.44235	
3	6.91770	7.0
4	7.34908	
5	7.76911	
6	8.20415	
7	8.65502	
8	9.10176	
9	9.52415	
10	9.93219	
11	10.34781	10.3
12	10.80981	
13	11.40090	
14	12.49436	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Teacher Job Satisfaction Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item						
			BTJCS10A	BTJCS10B	BTJCS10C	BTJCS10D	BTJCS10E	BTJCS10F	BTJCS10G
Australia	0.93	72	0.87	0.79	0.89	0.91	0.90	0.78	0.78
Bahrain	0.90	65	0.84	0.72	0.74	0.85	0.87	0.80	0.80
Botswana (9)	0.87	57	0.67	0.68	0.77	0.82	0.85	0.84	0.64
Canada	0.90	63	0.83	0.75	0.78	0.86	0.85	0.70	0.77
Chile	0.87	58	0.76	0.70	0.74	0.79	0.80	0.82	0.72
Chinese Taipei	0.93	72	0.85	0.77	0.87	0.90	0.83	0.88	0.81
Egypt	0.85	55	0.82	0.63	0.70	0.82	0.68	0.80	0.70
England	0.90	62	0.78	0.70	0.81	0.84	0.85	0.76	0.74
Georgia	0.87	56	0.76	0.69	0.67	0.72	0.78	0.85	0.76
Hong Kong SAR	0.93	69	0.83	0.81	0.82	0.85	0.85	0.88	0.79
Hungary	0.90	64	0.80	0.72	0.83	0.82	0.85	0.83	0.73
Iran, Islamic Rep. of	0.86	56	0.76	0.49	0.69	0.86	0.85	0.75	0.78
Ireland	0.91	67	0.84	0.74	0.87	0.87	0.85	0.79	0.75
Israel	0.92	68	0.84	0.74	0.83	0.87	0.85	0.84	0.79
Italy	0.89	62	0.80	0.74	0.67	0.85	0.82	0.84	0.75
Japan	0.91	65	0.83	0.75	0.84	0.81	0.88	0.79	0.72
Jordan	0.90	64	0.83	0.72	0.78	0.88	0.85	0.81	0.74
Kazakhstan	0.89	60	0.78	0.74	0.75	0.82	0.80	0.77	0.78
Korea, Rep. of	0.94	73	0.84	0.81	0.87	0.86	0.90	0.89	0.81
Kuwait	0.90	64	0.81	0.73	0.79	0.86	0.81	0.79	0.80
Lebanon	0.86	55	0.73	0.74	0.75	0.74	0.77	0.75	0.73
Lithuania	0.92	67	0.83	0.81	0.78	0.87	0.87	0.85	0.74
Malaysia	0.92	69	0.82	0.78	0.83	0.88	0.87	0.85	0.78
Malta	0.94	75	0.89	0.77	0.88	0.91	0.89	0.85	0.86
Morocco	0.88	58	0.77	0.69	0.74	0.84	0.83	0.80	0.65
New Zealand	0.91	67	0.81	0.75	0.84	0.87	0.86	0.81	0.76
Norway (9)	0.92	68	0.86	0.79	0.80	0.88	0.89	0.79	0.74
Oman	0.90	64	0.80	0.69	0.71	0.87	0.86	0.81	0.83
Qatar	0.88	58	0.80	0.73	0.74	0.82	0.84	0.74	0.67
Russian Federation	0.91	65	0.81	0.79	0.78	0.84	0.85	0.81	0.74
Saudi Arabia	0.85	56	0.80	0.51	0.70	0.87	0.80	0.78	0.72
Singapore	0.95	76	0.89	0.80	0.88	0.91	0.90	0.90	0.82
Slovenia	0.91	65	0.83	0.67	0.84	0.88	0.87	0.81	0.73
South Africa (9)	0.91	66	0.77	0.73	0.85	0.86	0.89	0.81	0.77
Sweden	0.89	61	0.83	0.74	0.69	0.84	0.84	0.75	0.74
Thailand	0.90	64	0.79	0.79	0.79	0.78	0.84	0.85	0.75
Turkey	0.88	59	0.79	0.54	0.74	0.88	0.84	0.78	0.75
United Arab Emirates	0.89	62	0.79	0.75	0.74	0.83	0.84	0.79	0.75
United States	0.92	69	0.84	0.78	0.87	0.88	0.88	0.76	0.79
Benchmarking Participants									
Buenos Aires, Argentina	0.86	55	0.79	0.50	0.82	0.80	0.86	0.77	0.57
Ontario, Canada	0.91	65	0.85	0.79	0.84	0.86	0.85	0.65	0.79
Quebec, Canada	0.89	61	0.83	0.66	0.70	0.86	0.86	0.79	0.75
Norway (8)	0.91	66	0.82	0.74	0.83	0.87	0.87	0.79	0.76
Abu Dhabi, UAE	0.89	62	0.81	0.77	0.69	0.82	0.84	0.82	0.75
Dubai, UAE	0.91	65	0.81	0.75	0.79	0.86	0.86	0.79	0.77
Florida, US	0.91	66	0.85	0.68	0.87	0.87	0.88	0.67	0.82

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

Relationship Between the TIMSS 2015 Teacher Job Satisfaction Scale, Eighth Grade, and TIMSS 2015 Achievement

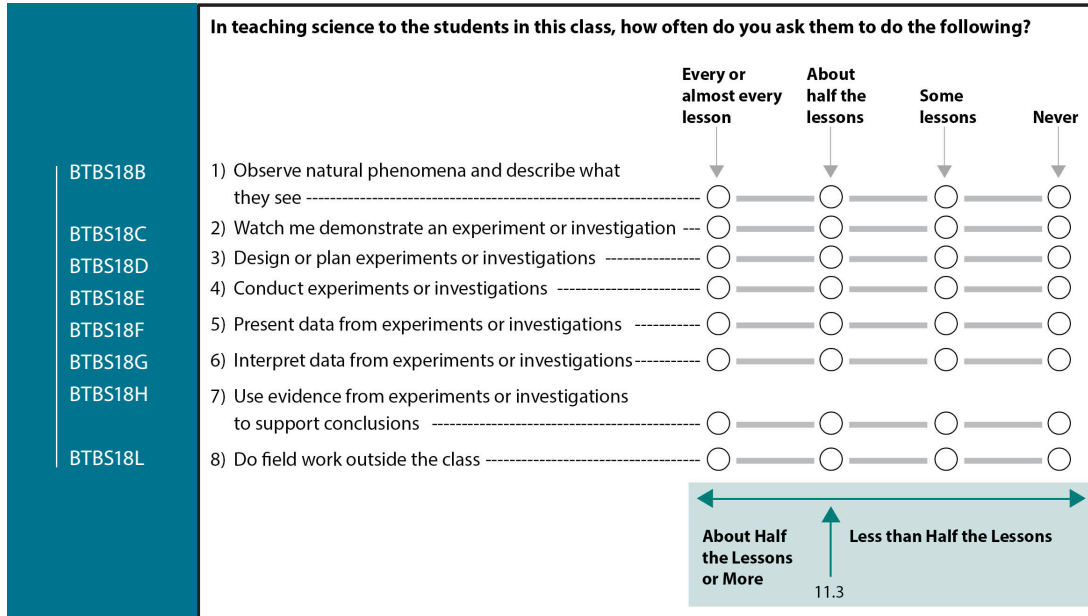
Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale (η^2)	
	(r)		(r)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.10	0.08	0.01	0.01	0.01	0.01
Bahrain	0.07	0.06	0.00	0.00	0.00	0.00
Botswana (9)	0.03	0.02	0.00	0.00	0.00	0.00
Canada	-0.03	0.01	0.00	0.00	0.02	0.00
Chile	0.11	0.05	0.01	0.00	0.01	0.01
Chinese Taipei	0.08	0.08	0.01	0.01	0.01	0.00
Egypt	0.11	0.13	0.01	0.02	0.01	0.01
England	0.09	0.10	0.01	0.01	0.01	0.02
Georgia	0.04	0.05	0.00	0.00	0.01	0.00
Hong Kong SAR	0.18	0.19	0.03	0.04	0.03	0.04
Hungary	0.15	0.17	0.02	0.03	0.01	0.02
Iran, Islamic Rep. of	0.05	0.16	0.00	0.03	0.01	0.02
Ireland	0.15	0.11	0.02	0.01	0.02	0.01
Israel	0.06	-0.01	0.00	0.00	0.00	0.01
Italy	0.06	0.04	0.00	0.00	0.01	0.01
Japan	0.02	0.08	0.00	0.01	0.00	0.01
Jordan	0.06	0.17	0.00	0.03	0.01	0.02
Kazakhstan	0.06	-0.05	0.00	0.00	0.00	0.00
Korea, Rep. of	-0.01	0.01	0.00	0.00	0.00	0.00
Kuwait	0.06	0.10	0.00	0.01	0.00	0.02
Lebanon	0.09	0.07	0.01	0.01	0.02	0.01
Lithuania	0.04	0.01	0.00	0.00	0.01	0.00
Malaysia	0.02	-0.03	0.00	0.00	0.00	0.00
Malta	0.09	0.19	0.01	0.04	0.03	0.03
Morocco	0.08	0.07	0.01	0.00	0.01	0.00
New Zealand	0.02	0.05	0.00	0.00	0.01	0.00
Norway (9)	-0.03	-0.04	0.00	0.00	0.00	0.00
Oman	0.04	0.00	0.00	0.00	0.00	0.00
Qatar	-0.01	-0.08	0.00	0.01	0.01	0.01
Russian Federation	0.14	0.01	0.02	0.00	0.02	0.00
Saudi Arabia	0.05	0.17	0.00	0.03	0.00	0.03
Singapore	0.08	0.06	0.01	0.00	0.01	0.00
Slovenia	-0.01	0.00	0.00	0.00	0.00	0.00
South Africa (9)	0.09	0.16	0.01	0.02	0.01	0.02
Sweden	-0.02	0.04	0.00	0.00	0.00	0.00
Thailand	0.05	0.08	0.00	0.01	0.00	0.01
Turkey	0.13	0.17	0.02	0.03	0.01	0.02
United Arab Emirates	-0.01	0.12	0.00	0.01	0.00	0.01
United States	0.04	0.05	0.00	0.00	0.00	0.00
International Median	0.06	0.06	0.00	0.00	0.01	0.01
Benchmarking Participants						
Buenos Aires, Argentina	-0.14	-0.09	0.02	0.01	0.02	0.01
Ontario, Canada	0.03	-0.03	0.00	0.00	0.01	0.00
Quebec, Canada	-0.09	0.11	0.01	0.01	0.02	0.01
Norway (8)	0.01	0.03	0.00	0.00	0.00	0.01
Abu Dhabi, UAE	0.00	0.07	0.00	0.01	0.00	0.01
Dubai, UAE	-0.01	0.16	0.00	0.03	0.00	0.02
Florida, US	0.04	0.15	0.00	0.02	0.02	0.04

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

Teachers Emphasize Science Investigation Scale, Eighth Grade

The Teachers Emphasize Science Investigation (ESI) scale was created based on teachers' responses to how often they used the eight instructional activities described below.

Items in the TIMSS 2015 Teachers Emphasize Science Investigation Scale, Eighth Grade¹



¹ For the purpose of scaling, categories in which there were very few respondents were combined. The categories "Some Lessons" and "Never" were combined for all variables. The scale statistics that are reported herein reflect analysis of the items following collapsing.

Item Parameters for the TIMSS 2015 Teachers Emphasize Science Investigation Scale, Eighth Grade

Item	delta	tau_1	tau_2	Infit
BTBS18B	-0.97437	-0.97800	0.97800	1.31
BTBS18C	-0.66109	-0.56569	0.56569	1.35
BTBS18D	0.26321	-0.86969	0.86969	0.88
BTBS18E	-0.08614	-1.06106	1.06106	0.91
BTBS18F	0.14856	-0.94708	0.94708	0.76
BTBS18G	-0.14686	-0.96567	0.96567	0.79
BTBS18H	-0.40814	-0.95404	0.95404	0.98
BTBS18L	1.86483	-0.38627	0.38627	1.30

Scale Transformation Constants for the TIMSS 2015 Teachers Emphasize Science Investigation Scale, Eighth Grade

Scale Transformation Constants

A = 11.333349

B = 1.121755

Transformed Scale Score = 11.333349 + 1.121755 • Logit Scale Score

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



**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Teachers Emphasize Science Investigation Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	6.89663	
1	8.25918	
2	8.96497	
3	9.47986	
4	9.90541	
5	10.28520	
6	10.63710	
7	10.97567	
8	11.31029	11.3
9	11.65165	
10	12.00438	
11	12.37727	
12	12.77796	
13	13.22328	
14	13.74474	
15	14.43167	
16	15.73375	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Teachers Emphasize Science Investigation Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BTBS18B	BTBS18C	BTBS18D	BTBS18E	BTBS18F	BTBS18G	BTBS18H	BTBS18L
Australia	0.85	49	0.60	0.60	0.76	0.73	0.83	0.84	0.77	0.36
Bahrain	0.89	58	0.59	0.56	0.83	0.86	0.88	0.87	0.83	0.55
Botswana (9)	0.87	54	0.56	0.55	0.78	0.84	0.89	0.88	0.83	0.40
Canada	0.83	48	0.55	0.45	0.74	0.83	0.86	0.84	0.81	0.16
Chile	0.87	53	0.76	0.71	0.75	0.78	0.83	0.77	0.72	0.48
Chinese Taipei	0.88	56	0.57	0.79	0.82	0.82	0.90	0.85	0.77	0.26
Egypt	0.85	51	0.51	0.54	0.80	0.82	0.87	0.82	0.73	0.49
England	0.81	44	0.39	0.45	0.67	0.79	0.87	0.85	0.79	0.13
Georgia	0.82	50	0.45	0.53	0.85	0.87	0.85	0.81	0.61	0.52
Hong Kong SAR	0.84	49	0.55	0.61	0.66	0.74	0.82	0.85	0.88	0.34
Hungary	0.83	48	0.64	0.63	0.73	0.79	0.79	0.75	0.68	0.53
Iran, Islamic Rep. of	0.85	51	0.56	0.48	0.69	0.80	0.86	0.86	0.78	0.59
Ireland	0.82	47	0.39	0.47	0.67	0.75	0.87	0.88	0.82	0.42
Israel	0.85	50	0.64	0.51	0.83	0.78	0.83	0.80	0.68	0.49
Italy	0.88	59	0.47	0.69	0.83	0.86	0.88	0.83	0.87	0.59
Japan	0.79	42	0.63	0.51	0.41	0.75	0.81	0.80	0.76	0.29
Jordan	0.85	50	0.50	0.57	0.77	0.82	0.87	0.83	0.69	0.48
Kazakhstan	0.88	55	0.62	0.66	0.79	0.86	0.81	0.79	0.66	0.67
Korea, Rep. of	0.87	55	0.69	0.69	0.84	0.84	0.87	0.83	0.51	0.58
Kuwait	0.86	52	0.61	0.48	0.83	0.79	0.87	0.86	0.78	0.42
Lebanon	0.82	46	0.56	0.65	0.74	0.82	0.79	0.70	0.57	0.50
Lithuania	0.87	57	0.59	0.63	0.83	0.88	0.88	0.85	0.72	0.55
Malaysia	0.86	53	0.45	0.55	0.72	0.77	0.85	0.87	0.89	0.60
Malta	0.81	49	0.38	0.54	0.71	0.83	0.88	0.89	0.72	0.44
Morocco	0.81	44	0.47	0.42	0.74	0.74	0.84	0.81	0.69	0.36
New Zealand	0.81	45	0.52	0.27	0.64	0.74	0.85	0.84	0.83	0.46
Norway (9)	0.86	51	0.74	0.69	0.74	0.73	0.80	0.78	0.68	0.51
Oman	0.83	47	0.59	0.61	0.71	0.80	0.80	0.79	0.65	0.41
Qatar	0.87	54	0.58	0.64	0.77	0.81	0.83	0.84	0.77	0.56
Russian Federation	0.86	53	0.55	0.61	0.78	0.87	0.86	0.85	0.79	0.39
Saudi Arabia	0.87	53	0.63	0.60	0.80	0.83	0.85	0.81	0.82	0.32
Singapore	0.82	48	0.48	0.66	0.71	0.76	0.83	0.80	0.70	0.48
Slovenia	0.87	56	0.48	0.62	0.81	0.88	0.91	0.89	0.73	0.56
South Africa (9)	0.91	63	0.64	0.75	0.85	0.88	0.86	0.88	0.84	0.58
Sweden	0.84	49	0.46	0.40	0.71	0.85	0.89	0.89	0.85	0.12
Thailand	0.90	59	0.51	0.57	0.84	0.88	0.90	0.89	0.86	0.54
Turkey	0.85	50	0.47	0.54	0.71	0.87	0.83	0.82	0.81	0.48
United Arab Emirates	0.87	54	0.56	0.61	0.78	0.85	0.86	0.85	0.82	0.40
United States	0.89	57	0.64	0.63	0.82	0.83	0.87	0.85	0.79	0.54
Benchmarking Participants										
Buenos Aires, Argentina	0.88	56	0.57	0.75	0.87	0.87	0.81	0.83	0.72	0.50
Ontario, Canada	0.84	49	0.56	0.50	0.74	0.82	0.82	0.83	0.76	0.40
Quebec, Canada	0.82	50	0.52	0.49	0.72	0.83	0.89	0.82	0.89	-0.01
Norway (8)	0.82	46	0.55	0.46	0.79	0.74	0.76	0.77	0.72	0.58
Abu Dhabi, UAE	0.88	57	0.44	0.65	0.83	0.88	0.91	0.87	0.84	0.43
Dubai, UAE	0.85	51	0.63	0.65	0.66	0.79	0.85	0.87	0.81	0.31
Florida, US	0.88	54	0.62	0.66	0.79	0.81	0.79	0.87	0.78	0.50

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

Relationship Between the TIMSS 2015 Teachers Emphasize Science Investigation Scale, Eighth Grade, and TIMSS 2015 Science Achievement

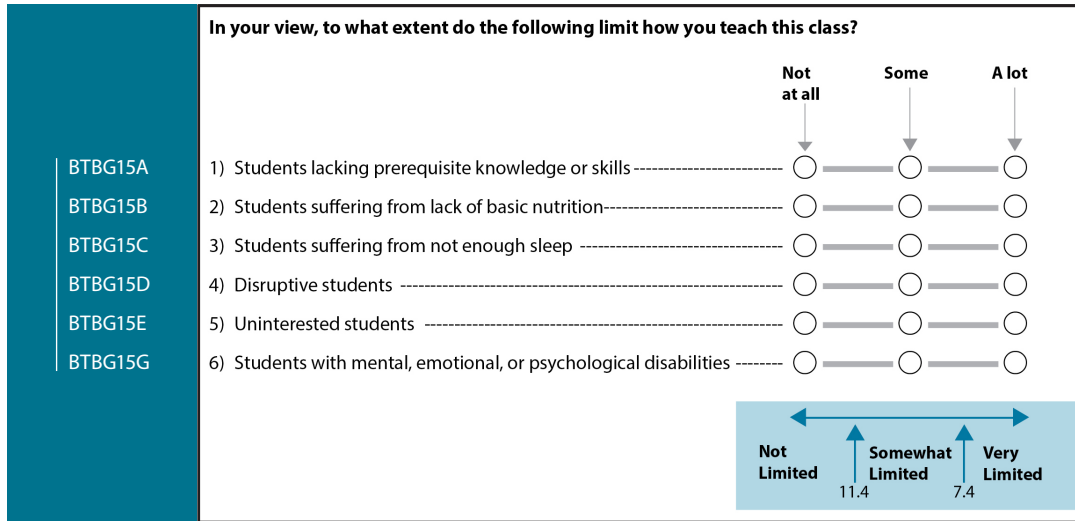
Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r^2)	
Australia	0.08	0.01	0.00
Bahrain	0.08	0.01	0.01
Botswana (9)	0.03	0.00	0.00
Canada	-0.03	0.00	0.00
Chile	-0.11	0.01	0.01
Chinese Taipei	0.08	0.01	0.00
Egypt	0.03	0.00	0.00
England	0.11	0.01	0.00
Georgia	0.01	0.00	0.00
Hong Kong SAR	0.18	0.03	0.03
Hungary	0.09	0.01	0.01
Iran, Islamic Rep. of	0.10	0.01	0.01
Ireland	0.02	0.00	0.00
Israel	-0.11	0.01	0.00
Italy	-0.03	0.00	0.00
Japan	-0.03	0.00	0.00
Jordan	0.07	0.00	0.01
Kazakhstan	-0.05	0.00	0.00
Korea, Rep. of	0.03	0.00	0.00
Kuwait	0.03	0.00	0.00
Lebanon	0.05	0.00	0.00
Lithuania	-0.04	0.00	0.00
Malaysia	0.10	0.01	0.00
Malta	0.09	0.01	0.00
Morocco	0.03	0.00	0.00
New Zealand	0.02	0.00	0.00
Norway (9)	0.04	0.00	0.00
Oman	0.02	0.00	0.00
Qatar	-0.11	0.01	0.00
Russian Federation	0.06	0.00	0.00
Saudi Arabia	0.15	0.02	0.01
Singapore	0.00	0.00	0.00
Slovenia	0.01	0.00	0.00
South Africa (9)	0.05	0.00	0.00
Sweden	0.04	0.00	0.00
Thailand	0.12	0.01	0.01
Turkey	0.06	0.00	0.00
United Arab Emirates	0.07	0.00	0.00
United States	0.06	0.00	0.00
International Median	0.04	0.00	0.00
Benchmarking Participants			
Buenos Aires, Argentina	-0.09	0.01	0.00
Ontario, Canada	-0.04	0.00	0.00
Quebec, Canada	-0.02	0.00	0.01
Norway (8)	0.02	0.00	0.00
Abu Dhabi, UAE	0.02	0.00	0.00
Dubai, UAE	0.04	0.00	0.00
Florida, US	-0.05	0.00	0.01

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

Teaching Limited by Student Needs Scale, Eighth Grade

The Teaching Limited by Student Needs (LSN) scale was created based on teachers' responses concerning six needs described below.

Items in the TIMSS 2015 Teaching Limited by Student Needs Scale, Eighth Grade



Item Parameters for the TIMSS 2015 Teaching Limited by Student Needs Scale, Eighth Grade

Item	delta	tau_1	tau_2	Infit
BTBG15A	1.14171	-1.83653	1.83653	1.03
BTBG15B	-1.14425	-1.12334	1.12334	1.09
BTBG15C	-0.16051	-1.68796	1.68796	1.04
BTBG15D	0.30396	-1.44379	1.44379	0.94
BTBG15E	0.86567	-1.84509	1.84509	0.89
BTBG15G	-1.00658	-1.45309	1.45309	1.07

Scale Transformation Constants for the TIMSS 2015 Teaching Limited by Student Needs Scale, Eighth Grade

Scale Transformation Constants	
A = 9.392409	Transformed Scale Score = 9.392409 + 1.217478 • Logit Scale Score
B = 1.217478	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS
2015 Teaching Limited by Student Needs Scale, Eighth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	4.10087	
1	5.69119	
2	6.59237	
3	7.31350	7.4
4	7.96367	
5	8.59178	
6	9.23167	
7	9.91091	
8	10.64876	
9	11.44991	11.4
10	12.32894	
11	13.37525	
12	15.08058	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2015 Teaching Limited by Student Needs Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item					
			BTBG15A	BTBG15B	BTBG15C	BTBG15D	BTBG15E	BTBG15G
Australia	0.78	48	0.66	0.55	0.73	0.75	0.77	0.66
Bahrain	0.75	44	0.67	0.58	0.62	0.77	0.74	0.58
Botswana (9)	0.61	35	0.28	0.61	0.70	0.60	0.65	0.61
Canada	0.76	46	0.64	0.65	0.74	0.64	0.72	0.67
Chile	0.75	44	0.65	0.68	0.68	0.69	0.71	0.59
Chinese Taipei	0.75	45	0.65	0.65	0.61	0.71	0.70	0.69
Egypt	0.68	39	0.55	0.56	0.58	0.75	0.75	0.53
England	0.80	50	0.64	0.67	0.74	0.74	0.76	0.68
Georgia	0.65	37	0.60	0.49	0.56	0.65	0.69	0.63
Hong Kong SAR	0.71	41	0.62	0.47	0.64	0.73	0.67	0.69
Hungary	0.80	50	0.66	0.65	0.72	0.74	0.73	0.71
Iran, Islamic Rep. of	0.74	43	0.48	0.63	0.66	0.75	0.69	0.72
Ireland	0.76	45	0.56	0.65	0.68	0.72	0.76	0.66
Israel	0.82	52	0.69	0.67	0.72	0.77	0.78	0.69
Italy	0.70	41	0.69	0.64	0.69	0.69	0.69	0.39
Japan	0.75	44	0.76	0.21	0.72	0.68	0.80	0.65
Jordan	0.61	34	0.62	0.50	0.59	0.63	0.71	0.38
Kazakhstan	0.80	51	0.70	0.63	0.76	0.82	0.72	0.65
Korea, Rep. of	0.80	50	0.64	0.55	0.74	0.78	0.79	0.70
Kuwait	0.64	36	0.64	0.50	0.64	0.70	0.70	0.37
Lebanon	0.67	38	0.63	0.54	0.63	0.63	0.63	0.62
Lithuania	0.75	44	0.62	0.55	0.62	0.76	0.76	0.66
Malaysia	0.73	43	0.67	0.52	0.56	0.76	0.78	0.62
Malta	0.77	47	0.65	0.59	0.65	0.77	0.78	0.65
Morocco	0.66	38	0.34	0.51	0.64	0.75	0.74	0.63
New Zealand	0.79	49	0.70	0.65	0.69	0.76	0.78	0.63
Norway (9)	0.73	43	0.58	0.72	0.73	0.60	0.64	0.64
Oman	0.76	45	0.66	0.59	0.66	0.69	0.76	0.67
Qatar	0.76	47	0.65	0.65	0.65	0.80	0.79	0.49
Russian Federation	0.78	47	0.61	0.65	0.72	0.73	0.68	0.72
Saudi Arabia	0.66	37	0.62	0.55	0.61	0.66	0.70	0.52
Singapore	0.73	43	0.64	0.55	0.68	0.71	0.72	0.61
Slovenia	0.76	45	0.67	0.42	0.68	0.78	0.81	0.61
South Africa (9)	0.73	42	0.66	0.57	0.60	0.70	0.72	0.62
Sweden	0.77	47	0.68	0.61	0.70	0.72	0.74	0.64
Thailand	0.69	40	0.50	0.49	0.55	0.75	0.76	0.67
Turkey	0.71	41	0.67	0.56	0.55	0.74	0.69	0.60
United Arab Emirates	0.75	45	0.64	0.62	0.72	0.75	0.79	0.46
United States	0.74	44	0.61	0.62	0.66	0.71	0.68	0.68
Benchmarking Participants								
Buenos Aires, Argentina	0.78	49	0.49	0.72	0.81	0.70	0.69	0.74
Ontario, Canada	0.74	44	0.61	0.67	0.74	0.62	0.69	0.65
Quebec, Canada	0.80	51	0.71	0.63	0.74	0.70	0.77	0.72
Norway (8)	0.73	43	0.54	0.66	0.68	0.63	0.74	0.64
Abu Dhabi, UAE	0.74	43	0.67	0.63	0.67	0.68	0.78	0.49
Dubai, UAE	0.76	46	0.63	0.55	0.75	0.79	0.78	0.52
Florida, US	0.81	52	0.74	0.68	0.77	0.69	0.77	0.67

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

Relationship Between the TIMSS 2015 Teaching Limited by Student Needs Scale, Eighth Grade, and TIMSS 2015 Achievement

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale (η^2)	
	(r)		(r ²)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.45	0.27	0.20	0.07	0.18	0.06
Bahrain	0.16	0.18	0.03	0.03	0.02	0.03
Botswana (9)	0.11	0.09	0.01	0.01	0.00	0.00
Canada	0.26	0.18	0.07	0.03	0.05	0.02
Chile	0.32	0.38	0.10	0.15	0.09	0.11
Chinese Taipei	0.20	0.19	0.04	0.04	0.03	0.04
Egypt	0.11	0.10	0.01	0.01	0.01	0.01
England	0.51	0.44	0.26	0.19	0.18	0.17
Georgia	0.07	0.06	0.00	0.00	0.01	0.00
Hong Kong SAR	0.37	0.28	0.14	0.08	0.06	0.04
Hungary	0.37	0.31	0.14	0.10	0.12	0.07
Iran, Islamic Rep. of	0.16	0.17	0.02	0.03	0.04	0.03
Ireland	0.40	0.20	0.16	0.04	0.11	0.03
Israel	0.40	0.29	0.16	0.09	0.14	0.08
Italy	0.13	0.09	0.02	0.01	0.01	0.01
Japan	0.16	0.12	0.03	0.02	0.01	0.01
Jordan	0.11	0.17	0.01	0.03	0.01	0.03
Kazakhstan	0.08	0.10	0.01	0.01	0.00	0.01
Korea, Rep. of	0.11	0.05	0.01	0.00	0.01	0.00
Kuwait	0.20	0.09	0.04	0.01	0.04	0.01
Lebanon	0.02	-0.01	0.00	0.00	0.01	0.00
Lithuania	0.20	0.17	0.04	0.03	0.03	0.02
Malaysia	0.37	0.39	0.14	0.15	0.11	0.10
Malta	0.40	0.28	0.16	0.08	0.14	0.05
Morocco	0.04	0.12	0.00	0.01	0.00	0.01
New Zealand	0.45	0.41	0.21	0.17	0.13	0.13
Norway (9)	0.12	0.15	0.01	0.02	0.01	0.02
Oman	0.11	0.08	0.01	0.01	0.02	0.01
Qatar	0.33	0.33	0.11	0.11	0.12	0.09
Russian Federation	0.07	0.08	0.00	0.01	0.01	0.01
Saudi Arabia	0.25	0.09	0.06	0.01	0.06	0.01
Singapore	0.32	0.38	0.10	0.15	0.07	0.12
Slovenia	0.17	0.09	0.03	0.01	0.03	0.01
South Africa (9)	0.10	0.12	0.01	0.01	0.01	0.03
Sweden	0.25	0.17	0.06	0.03	0.05	0.02
Thailand	0.25	0.20	0.06	0.04	0.06	0.04
Turkey	0.22	0.27	0.05	0.07	0.04	0.06
United Arab Emirates	0.30	0.30	0.09	0.09	0.08	0.08
United States	0.30	0.21	0.09	0.04	0.08	0.03
International Median	0.20	0.17	0.04	0.03	0.04	0.03
Benchmarking Participants						
Buenos Aires, Argentina	0.17	0.22	0.03	0.05	0.04	0.04
Ontario, Canada	0.21	0.17	0.04	0.03	0.04	0.03
Quebec, Canada	0.34	0.19	0.12	0.04	0.09	0.02
Norway (8)	0.19	0.13	0.04	0.02	0.03	0.02
Abu Dhabi, UAE	0.28	0.21	0.08	0.04	0.06	0.05
Dubai, UAE	0.29	0.27	0.08	0.07	0.08	0.07
Florida, US	0.41	0.15	0.16	0.02	0.16	0.02