

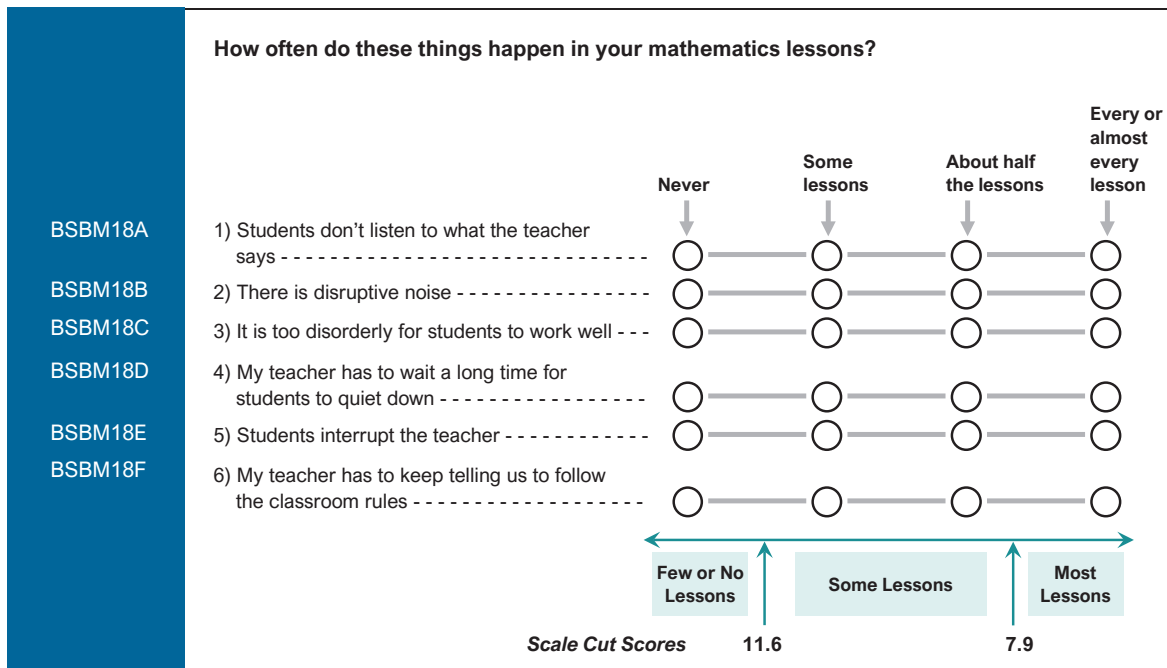
Appendix 16B: TIMSS 2019 Context Questionnaire Scales—Grade 8

Scales Based on Students' Reports

Disorderly Behavior During Mathematics Lessons – Grade 8

About the Scale

The *Disorderly Behavior During Mathematics Lessons* scale was created based on students' responses to six items listed below.



Item Parameters for the TIMSS 2019 *Disorderly Behavior During Mathematics Lessons* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBM18A	0.37476	-1.32069	-0.62479	1.94548	1.04
BSBM18B	0.31283	-1.02077	-0.64913	1.66990	0.89
BSBM18C	-0.46280	-0.91951	-0.27631	1.19582	0.95
BSBM18D	-0.13515	-0.67454	-0.57593	1.25047	0.88
BSBM18E	-0.23701	-0.67678	-0.61471	1.29149	0.90
BSBM18F	0.14737	-0.45870	-0.63749	1.09619	1.28

Scale Transformation Constants for the TIMSS 2019 *Disorderly Behavior During Mathematics Lessons* Scale – Grade 8

Scale Transformation Constants

$$A = 9.663799$$

$$B = 1.213350$$

$$\text{Transformed Scale Score} = 9.663799 + 1.213350 \cdot \text{Logit Scale Score}$$

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 *Disorderly Behavior During Mathematics Lessons* Scale – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	5.56633	
1	6.82233	
2	7.41866	
3	7.82995	7.9
4	8.15891	
5	8.44435	
6	8.70559	
7	8.95449	
8	9.19981	
9	9.45061	
10	9.71101	
11	9.99445	
12	10.31153	
13	10.67499	
14	11.10344	
15	11.61733	11.6
16	12.25252	
17	13.10820	
18	14.67370	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Disorderly Behavior During Mathematics Lessons* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item					
			BSBM18A	BSBM18B	BSBM18C	BSBM18D	BSBM18E	BSBM18F
Australia	0.92	71	0.83	0.84	0.82	0.87	0.87	0.82
Bahrain	0.84	57	0.76	0.81	0.76	0.79	0.80	0.57
Chile	0.90	67	0.76	0.82	0.81	0.85	0.87	0.78
Chinese Taipei	0.90	67	0.77	0.83	0.88	0.85	0.85	0.73
Cyprus	0.87	62	0.78	0.84	0.73	0.84	0.83	0.68
Egypt	0.77	48	0.73	0.78	0.77	0.72	0.76	0.26
England	0.92	73	0.83	0.86	0.85	0.87	0.87	0.84
Finland	0.91	70	0.78	0.84	0.87	0.88	0.86	0.79
France	0.89	65	0.76	0.82	0.84	0.83	0.79	0.80
Georgia	0.86	59	0.70	0.80	0.65	0.83	0.82	0.77
Hong Kong SAR	0.93	74	0.82	0.85	0.90	0.90	0.85	0.83
Hungary	0.90	67	0.78	0.84	0.76	0.87	0.81	0.85
Iran, Islamic Rep. of	0.86	59	0.71	0.79	0.83	0.82	0.78	0.68
Ireland	0.91	69	0.79	0.86	0.83	0.86	0.85	0.79
Israel	0.90	66	0.79	0.85	0.85	0.86	0.82	0.70
Italy	0.90	67	0.74	0.87	0.87	0.85	0.82	0.76
Japan	0.88	63	0.75	0.79	0.82	0.77	0.80	0.82
Jordan	0.83	55	0.77	0.79	0.76	0.78	0.78	0.54
Kazakhstan	0.81	54	0.72	0.82	0.77	0.76	0.79	0.50
Korea, Rep. of	0.90	67	0.83	0.86	0.88	0.83	0.87	0.60
Kuwait	0.81	53	0.75	0.82	0.77	0.77	0.78	0.40
Lebanon	0.83	54	0.70	0.78	0.73	0.78	0.78	0.62
Lithuania	0.90	67	0.81	0.86	0.83	0.86	0.80	0.75
Malaysia	0.73	44	0.68	0.75	0.75	0.71	0.69	0.28
Morocco	0.78	49	0.68	0.76	0.73	0.75	0.73	0.50
New Zealand	0.91	69	0.82	0.83	0.83	0.86	0.87	0.79
Norway (9)	0.91	69	0.77	0.85	0.83	0.87	0.85	0.82
Oman	0.82	53	0.69	0.77	0.76	0.77	0.75	0.61
Portugal	0.92	72	0.75	0.87	0.88	0.88	0.85	0.87
Qatar	0.88	62	0.77	0.82	0.77	0.82	0.81	0.71
Romania	0.87	61	0.68	0.84	0.79	0.83	0.82	0.71
Russian Federation	0.91	70	0.79	0.87	0.88	0.87	0.82	0.80
Saudi Arabia	0.82	54	0.76	0.80	0.72	0.76	0.79	0.52
Singapore	-	-	-	-	-	-	-	-
South Africa (9)	0.80	51	0.69	0.75	0.69	0.76	0.79	0.58
Sweden	0.90	66	0.77	0.84	0.83	0.86	0.83	0.75
Turkey	0.87	61	0.77	0.83	0.74	0.79	0.77	0.77
United Arab Emirates	0.89	65	0.80	0.84	0.81	0.83	0.83	0.72
United States	0.92	70	0.81	0.84	0.82	0.87	0.86	0.83

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Disorderly Behavior During Mathematics Lessons* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item					
			BSBM18A	BSBM18B	BSBM18C	BSBM18D	BSBM18E	BSBM18F
Benchmarking Participants								
Ontario, Canada	0.91	70	0.82	0.84	0.80	0.87	0.86	0.82
Quebec, Canada	0.90	66	0.78	0.78	0.84	0.85	0.82	0.80
Moscow City, Russian Fed.	0.91	70	0.81	0.87	0.88	0.86	0.80	0.79
Gauteng, RSA (9)	0.85	57	0.73	0.80	0.73	0.79	0.81	0.66
Western Cape, RSA (9)	0.88	62	0.72	0.81	0.80	0.83	0.82	0.74
Abu Dhabi, UAE	0.89	63	0.80	0.83	0.79	0.82	0.83	0.70
Dubai, UAE	0.89	65	0.79	0.82	0.80	0.83	0.83	0.77

A dash (–) indicates comparable data not available.

Relationship Between the TIMSS 2019 *Disorderly Behavior During Mathematics Lessons* Scale and TIMSS 2019 Achievement – Grade 8

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	0.07	0.01	0.00
Chile	0.07	0.00	0.00
Chinese Taipei	0.02	0.00	0.00
Cyprus	0.13	0.02	0.01
Egypt	0.13	0.02	0.01
England	0.28	0.08	0.06
Finland	0.04	0.00	0.00
France	0.06	0.00	0.00
Georgia	0.10	0.01	0.01
Hong Kong SAR	0.04	0.00	0.01
Hungary	0.17	0.03	0.02
Iran, Islamic Rep. of	0.12	0.01	0.01
Ireland	0.29	0.08	0.07
Israel	0.23	0.05	0.04
Italy	0.12	0.01	0.01
Japan	0.08	0.01	0.01
Jordan	0.16	0.02	0.02
Kazakhstan	0.10	0.01	0.01
Korea, Rep. of	-0.07	0.01	0.00
Kuwait	0.07	0.01	0.01
Lebanon	0.07	0.00	0.00
Lithuania	0.08	0.01	0.01
Malaysia	0.27	0.07	0.03
Morocco	0.10	0.01	0.01
New Zealand	0.17	0.03	0.02
Norway (9)	0.05	0.00	0.00
Oman	0.08	0.01	0.00
Portugal	0.04	0.00	0.00
Qatar	0.16	0.03	0.02
Romania	0.21	0.04	0.04
Russian Federation	0.12	0.01	0.01
Saudi Arabia	0.08	0.01	0.01
Singapore	-	-	-
South Africa (9)	0.14	0.02	0.02
Sweden	0.04	0.00	0.00
Turkey	0.10	0.01	0.01
United Arab Emirates	0.19	0.04	0.03
United States	0.25	0.06	0.05
International Median	0.10	0.01	0.01

Relationship Between the TIMSS 2019 *Disorderly Behavior During Mathematics Lessons* Scale and TIMSS 2019 Achievement – Grade 8

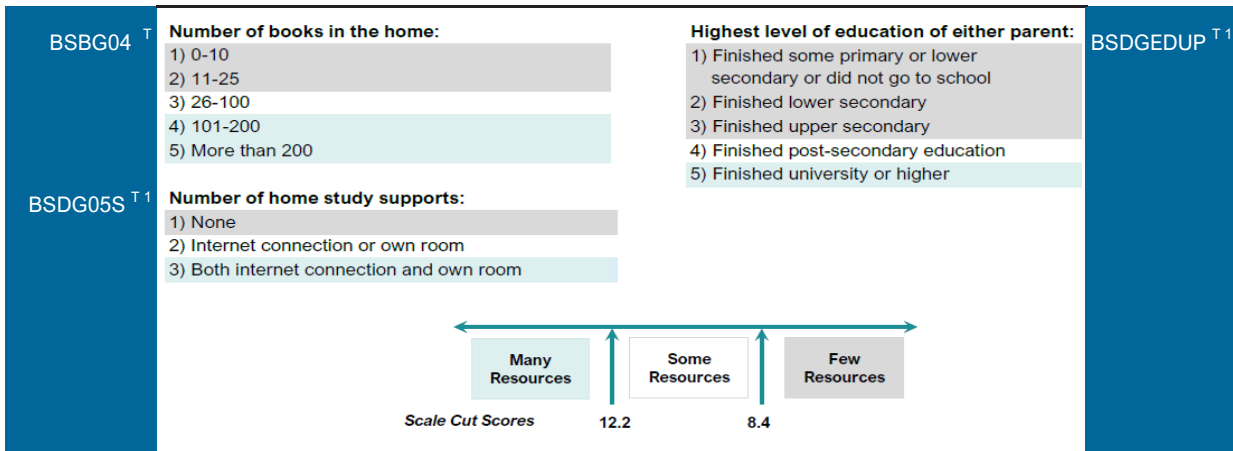
Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2	
Benchmarking Participants			
Ontario, Canada	0.18	0.03	0.03
Quebec, Canada	0.12	0.02	0.02
Moscow City, Russian Fed.	0.13	0.02	0.01
Gauteng, RSA (9)	0.25	0.06	0.05
Western Cape, RSA (9)	0.28	0.08	0.07
Abu Dhabi, UAE	0.19	0.04	0.03
Dubai, UAE	0.19	0.04	0.03

A dash (–) indicates comparable data not available.

Home Educational Resources – Grade 8

About the Scale

The *Home Educational Resources* scale was created based on students' reports regarding the availability of three resources listed below.



^T Trend item—item was included in the same scale in TIMSS 2015 and was used for linking the TIMSS 2015 and TIMSS 2019 scales.

¹ Derived variable. For details, see Supplement 3 of the *TIMSS 2019 User Guide for the International Database*.

Item Parameters for the TIMSS 2019 *Home Educational Resources* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	tau_4	Infit
BSBG04	1.03579	-0.89014	-0.25434	0.71392	0.43056	1.00
BSDG05S	-0.94808	-0.62039	0.62039			0.95
BSDGEDUP	-0.08771	-0.72810	-0.53330	0.92403	0.33737	0.99

Scale Transformation Constants for the TIMSS 2019 *Home Educational Resources* Scale – Grade 8

Scale Transformation Constants

A = 9.168781

B = 1.639257

Transformed Scale Score = 9.168781 + 1.639257 • Logit Scale Score

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 *Home Educational Resources* Scale – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	4.55208	
1	6.52207	
2	7.56439	
3	8.35810	8.4
4	9.03613	
5	9.64761	
6	10.23835	
7	10.84499	
8	11.48712	
9	12.25655	12.2
10	13.51543	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Home Educational Resources* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item		
			BSBG04	BSDG05S	BSDGEDUP
Australia	0.40	46	0.77	0.44	0.78
Bahrain	0.40	45	0.72	0.50	0.77
Chile	0.41	46	0.71	0.55	0.76
Chinese Taipei	0.48	49	0.81	0.43	0.80
Cyprus	0.47	49	0.80	0.40	0.81
Egypt	0.35	44	0.57	0.68	0.73
England	0.44	48	0.77	0.47	0.79
Finland	0.36	44	0.76	0.35	0.79
France	0.46	49	0.79	0.44	0.80
Georgia	0.48	50	0.82	0.36	0.83
Hong Kong SAR	0.49	50	0.76	0.53	0.79
Hungary	0.51	51	0.86	0.24	0.86
Iran, Islamic Rep. of	0.55	53	0.73	0.65	0.80
Ireland	0.42	47	0.79	0.34	0.81
Israel	0.43	64	0.80	-	0.80
Italy	0.44	47	0.81	0.29	0.83
Japan	0.25	41	0.76	0.22	0.77
Jordan	0.40	46	0.63	0.64	0.76
Kazakhstan	0.40	46	0.71	0.60	0.72
Korea, Rep. of	0.41	47	0.75	0.50	0.78
Kuwait	0.30	41	0.73	0.41	0.73
Lebanon	0.39	45	0.73	0.44	0.79
Lithuania	0.44	49	0.79	0.45	0.80
Malaysia	0.48	49	0.73	0.57	0.78
Morocco	0.56	54	0.75	0.66	0.78
New Zealand	0.44	48	0.79	0.46	0.78
Norway (9)	0.37	46	0.76	0.46	0.78
Oman	0.41	46	0.70	0.51	0.79
Portugal	0.48	49	0.84	0.23	0.85
Qatar	0.38	45	0.72	0.47	0.78
Romania	0.54	53	0.81	0.47	0.84
Russian Federation	0.41	46	0.77	0.40	0.79
Saudi Arabia	0.37	44	0.68	0.51	0.77
Singapore	0.43	47	0.73	0.51	0.79
South Africa (9)	0.42	47	0.65	0.69	0.71
Sweden	0.41	47	0.80	0.42	0.77
Turkey	0.64	59	0.78	0.72	0.81
United Arab Emirates	0.35	44	0.72	0.54	0.72
United States	0.45	49	0.74	0.54	0.79

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Home Educational Resources* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item		
			BSBG04	BSDG05S	BSDGEDUP
Benchmarking Participants					
Ontario, Canada	0.36	45	0.74	0.44	0.78
Quebec, Canada	0.35	44	0.79	0.27	0.80
Moscow City, Russian Fed.	0.29	42	0.71	0.44	0.76
Gauteng, RSA (9)	0.44	48	0.62	0.72	0.73
Western Cape, RSA (9)	0.59	56	0.75	0.75	0.75
Abu Dhabi, UAE	0.35	44	0.68	0.54	0.74
Dubai, UAE	0.37	45	0.74	0.58	0.68

A dash (–) indicates comparable data not available.

Relationship Between the TIMSS 2019 *Home Educational Resources* Scale and TIMSS 2019 Achievement – Grade 8

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2		r	r^2	
Australia	0.41	0.17	0.12	0.46	0.22	0.14
Bahrain	0.15	0.02	0.01	0.28	0.08	0.05
Chile	0.40	0.16	0.11	0.38	0.15	0.10
Chinese Taipei	0.41	0.16	0.13	0.40	0.16	0.13
Cyprus	0.43	0.19	0.12	0.42	0.18	0.11
Egypt	0.18	0.03	0.03	0.18	0.03	0.03
England	0.41	0.17	0.10	0.44	0.20	0.12
Finland	0.37	0.14	0.09	0.39	0.15	0.10
France	0.46	0.22	0.13	0.49	0.24	0.14
Georgia	0.26	0.07	0.04	0.26	0.07	0.04
Hong Kong SAR	0.31	0.09	0.06	0.28	0.08	0.05
Hungary	0.56	0.32	0.24	0.54	0.30	0.22
Iran, Islamic Rep. of	0.44	0.19	0.14	0.44	0.19	0.15
Ireland	0.47	0.22	0.15	0.48	0.23	0.16
Israel	0.43	0.18	0.08	0.41	0.17	0.07
Italy	0.36	0.13	0.10	0.40	0.16	0.12
Japan	0.35	0.12	0.07	0.35	0.12	0.07
Jordan	0.22	0.05	0.03	0.24	0.06	0.04
Kazakhstan	0.25	0.06	0.03	0.25	0.06	0.03
Korea, Rep. of	0.36	0.13	0.11	0.31	0.09	0.08
Kuwait	0.17	0.03	0.02	0.17	0.03	0.02
Lebanon	0.34	0.11	0.07	0.38	0.15	0.10
Lithuania	0.46	0.21	0.12	0.44	0.19	0.12
Malaysia	0.41	0.16	0.10	0.38	0.15	0.09
Morocco	0.25	0.06	0.07	0.15	0.02	0.03
New Zealand	0.44	0.19	0.11	0.50	0.25	0.16
Norway (9)	0.35	0.12	0.09	0.39	0.15	0.10
Oman	0.32	0.10	0.06	0.30	0.09	0.05
Portugal	0.42	0.18	0.12	0.39	0.15	0.11
Qatar	0.37	0.14	0.08	0.34	0.11	0.06
Romania	0.47	0.22	0.16	0.42	0.18	0.13
Russian Federation	0.30	0.09	0.05	0.31	0.09	0.04
Saudi Arabia	0.25	0.06	0.05	0.23	0.05	0.04
Singapore	0.40	0.16	0.10	0.44	0.19	0.12
South Africa (9)	0.26	0.07	0.06	0.28	0.08	0.06
Sweden	0.46	0.22	0.14	0.50	0.25	0.16
Turkey	0.48	0.23	0.18	0.47	0.22	0.17
United Arab Emirates	0.30	0.09	0.05	0.31	0.10	0.06
United States	0.46	0.21	0.13	0.45	0.20	0.13
International Median	0.37	0.14	0.10	0.39	0.15	0.10

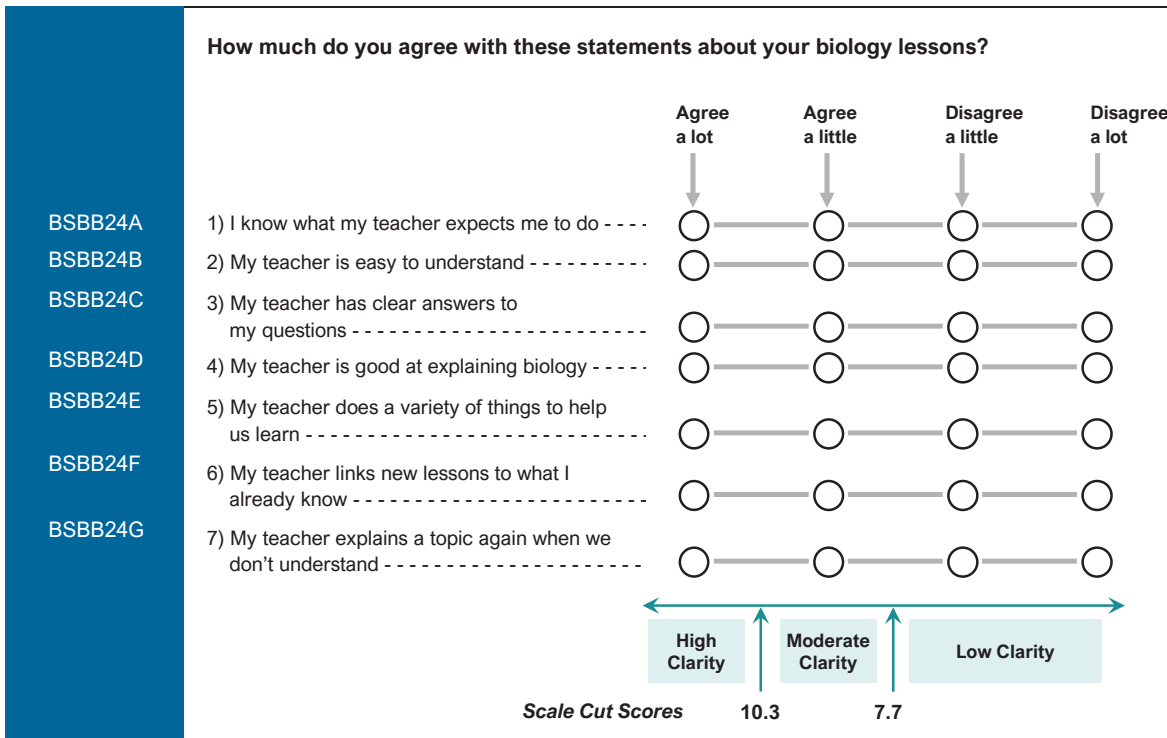
Relationship Between the TIMSS 2019 *Home Educational Resources* Scale and TIMSS 2019 Achievement – Grade 8

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2		r	r^2	
Benchmarking Participants						
Ontario, Canada	0.37	0.14	0.08	0.41	0.17	0.11
Quebec, Canada	0.35	0.12	0.07	0.40	0.16	0.10
Moscow City, Russian Fed.	0.29	0.08	0.05	0.29	0.08	0.05
Gauteng, RSA (9)	0.30	0.09	0.06	0.32	0.10	0.06
Western Cape, RSA (9)	0.47	0.22	0.18	0.47	0.22	0.19
Abu Dhabi, UAE	0.30	0.09	0.06	0.32	0.10	0.06
Dubai, UAE	0.31	0.10	0.06	0.32	0.10	0.06

Instructional Clarity in Biology Lessons – Grade 8

About the Scale

The *Instructional Clarity in Biology Lessons* scale was created based on students’ responses to seven items listed below.



Item Parameters for the TIMSS 2019 *Instructional Clarity in Biology Lessons* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBB24A	0.39375	-1.92236	-0.50414	2.42650	1.46
BSBB24B	0.12682	-1.69599	-0.52211	2.21810	0.90
BSBB24C	-0.12835	-1.55327	-0.39952	1.95279	0.82
BSBB24D	-0.42182	-1.28981	-0.57979	1.86960	0.74
BSBB24E	-0.02631	-1.65061	-0.36700	2.01761	0.92
BSBB24F	0.26751	-1.83617	-0.37156	2.20773	1.10
BSBB24G	-0.21160	-1.31757	-0.47165	1.78922	1.00

Scale Transformation Constants for the TIMSS 2019 *Instructional Clarity in Biology Lessons* Scale – Grade 8

Scale Transformation Constants

$$A = 7.994887$$

$$B = 0.979530$$

$$\text{Transformed Scale Score} = 7.994887 + 0.979530 \cdot \text{Logit Scale Score}$$

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 *Instructional Clarity in Biology Lessons* Scale – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	3.80573	
1	4.92740	
2	5.47995	
3	5.86758	
4	6.18006	
5	6.45197	
6	6.70084	
7	6.93739	
8	7.16933	
9	7.40311	
10	7.64551	7.7
11	7.90030	
12	8.17575	
13	8.47625	
14	8.80537	
15	9.16053	
16	9.53839	
17	9.93996	
18	10.37818	10.3
19	10.88385	
20	11.54787	
21	12.77607	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Instructional Clarity in Biology Lessons Scale – Grade 8*

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item						
			BSBB24A	BSBB24B	BSBB24C	BSBB24D	BSBB24E	BSBB24F	BSBB24G
Cyprus	0.92	67	0.67	0.81	0.88	0.89	0.85	0.75	0.84
Finland	0.93	71	0.69	0.88	0.89	0.90	0.87	0.81	0.86
France	0.91	66	0.66	0.87	0.88	0.89	0.82	0.73	0.82
Georgia	0.89	62	0.58	0.84	0.85	0.86	0.81	0.75	0.78
Hungary	0.92	67	0.69	0.85	0.88	0.88	0.81	0.80	0.81
Kazakhstan	0.89	62	0.62	0.80	0.86	0.85	0.82	0.76	0.78
Lebanon	0.90	62	0.65	0.83	0.86	0.85	0.83	0.74	0.74
Lithuania	0.89	62	0.69	0.83	0.84	0.84	0.82	0.73	0.75
Morocco	0.87	57	0.53	0.70	0.81	0.82	0.83	0.78	0.79
Portugal	0.90	62	0.63	0.82	0.85	0.87	0.75	0.77	0.80
Romania	0.91	67	0.66	0.85	0.86	0.86	0.84	0.78	0.86
Russian Federation	0.91	66	0.67	0.83	0.87	0.86	0.86	0.77	0.80
Sweden	0.92	68	0.64	0.86	0.82	0.88	0.88	0.84	0.80
Benchmarking Participants									
Moscow City, Russian Fed.	0.91	65	0.68	0.83	0.85	0.86	0.85	0.78	0.77

Relationship Between the TIMSS 2019 *Instructional Clarity in Biology Lessons Scale* and *TIMSS 2019 Achievement – Grade 8*

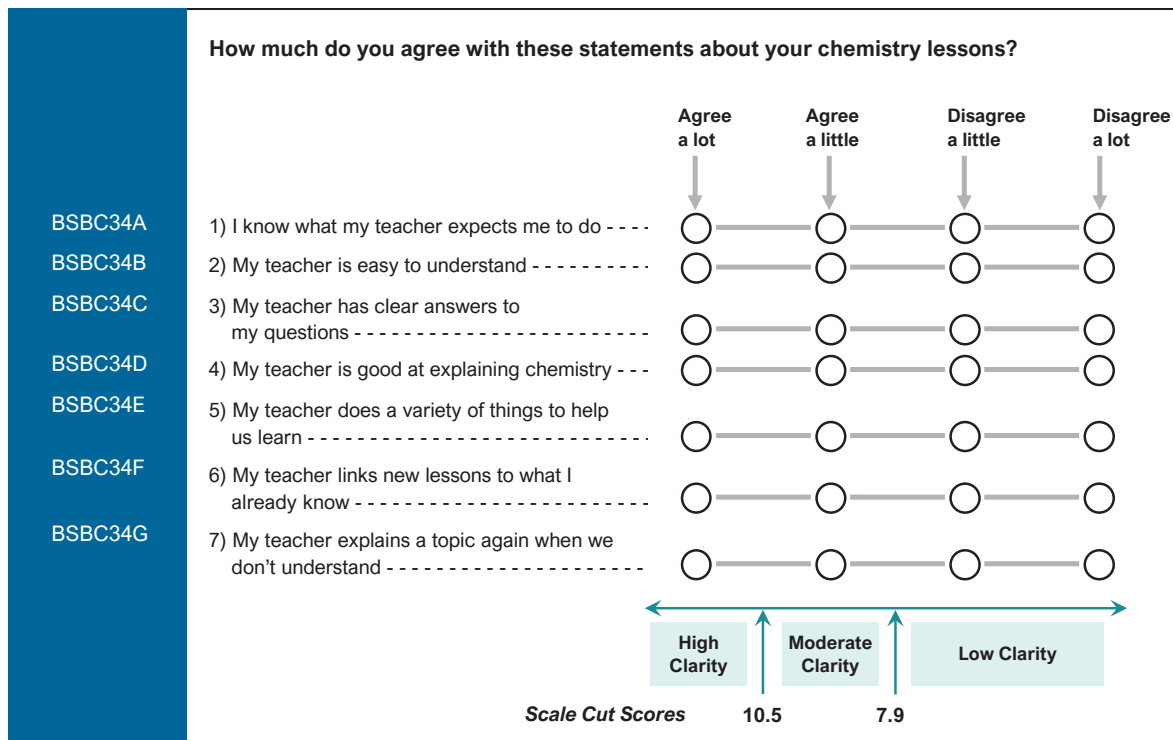
Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2	
Cyprus	0.16	0.03	0.02
Finland	0.19	0.03	0.03
France	0.04	0.00	0.00
Georgia	0.12	0.01	0.01
Hungary	0.04	0.00	0.00
Kazakhstan	0.15	0.02	0.02
Lebanon	0.18	0.03	0.03
Lithuania	0.04	0.00	0.00
Morocco	0.11	0.01	0.01
Portugal	0.06	0.00	0.01
Romania	0.01	0.00	0.00
Russian Federation	0.05	0.00	0.00
Sweden	0.09	0.01	0.01
International Median	0.09	0.01	0.01
Benchmarking Participants			
Moscow City, Russian Fed.	0.05	0.00	0.00

Scale was created for TIMSS 2019 countries where science is taught as separate subjects.

Instructional Clarity in Chemistry Lessons – Grade 8

About the Scale

The *Instructional Clarity in Chemistry Lessons* scale was created based on students' responses to seven items listed below.



Item Parameters for the TIMSS 2019 *Instructional Clarity in Chemistry Lessons* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBC34A	0.30367	-2.02142	-0.58108	2.60250	1.57
BSBC34B	0.29616	-1.88144	-0.52571	2.40715	0.89
BSBC34C	-0.06984	-1.72577	-0.53226	2.25803	0.77
BSBC34D	-0.24544	-1.52782	-0.58802	2.11584	0.76
BSBC34E	-0.10563	-1.79645	-0.47708	2.27353	0.89
BSBC34F	0.16892	-1.95437	-0.46326	2.41763	1.17
BSBC34G	-0.34784	-1.40043	-0.66098	2.06141	1.02

Scale Transformation Constants for the TIMSS 2019 *Instructional Clarity in Chemistry Lessons* Scale – Grade 8

Scale Transformation Constants

$$A = 8.258522$$

$$B = 0.859737$$

$$\text{Transformed Scale Score} = 8.258522 + 0.859737 \cdot \text{Logit Scale Score}$$

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 *Instructional Clarity in Chemistry Lessons* Scale – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	4.44982	
1	5.44094	
2	5.93238	
3	6.27893	
4	6.55867	
5	6.80233	
6	7.02593	
7	7.23849	
8	7.44984	
9	7.66458	
10	7.88907	7.9
11	8.13037	
12	8.39611	
13	8.69402	
14	9.02624	
15	9.38399	
16	9.75318	
17	10.12995	
18	10.52773	10.5
19	10.97816	
20	11.56142	
21	12.63681	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Instructional Clarity in Chemistry Lessons* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item						
			BSBC34A	BSBC34B	BSBC34C	BSBC34D	BSBC34E	BSBC34F	BSBC34G
Cyprus	0.93	71	0.73	0.85	0.90	0.90	0.88	0.76	0.86
Finland	0.94	75	0.71	0.90	0.91	0.92	0.89	0.85	0.86
France	0.93	70	0.69	0.89	0.90	0.90	0.87	0.77	0.82
Georgia	0.93	70	0.64	0.88	0.89	0.90	0.86	0.82	0.85
Hungary	0.93	71	0.72	0.86	0.89	0.90	0.86	0.81	0.84
Kazakhstan	0.92	67	0.67	0.83	0.88	0.88	0.86	0.79	0.82
Lebanon	0.92	67	0.70	0.86	0.88	0.88	0.85	0.78	0.77
Lithuania	0.92	68	0.71	0.86	0.88	0.88	0.86	0.75	0.80
Morocco	0.90	63	0.58	0.75	0.85	0.84	0.85	0.81	0.81
Portugal	0.92	68	0.67	0.86	0.88	0.89	0.83	0.82	0.81
Romania	0.93	71	0.68	0.87	0.89	0.88	0.87	0.81	0.85
Russian Federation	0.92	70	0.72	0.84	0.89	0.88	0.88	0.80	0.83
Sweden	0.94	73	0.68	0.89	0.91	0.91	0.90	0.85	0.83
Benchmarking Participants									
Moscow City, Russian Fed.	0.93	71	0.73	0.85	0.89	0.89	0.88	0.81	0.83

Relationship Between the TIMSS 2019 *Instructional Clarity in Chemistry Lessons* Scale and TIMSS 2019 Achievement – Grade 8

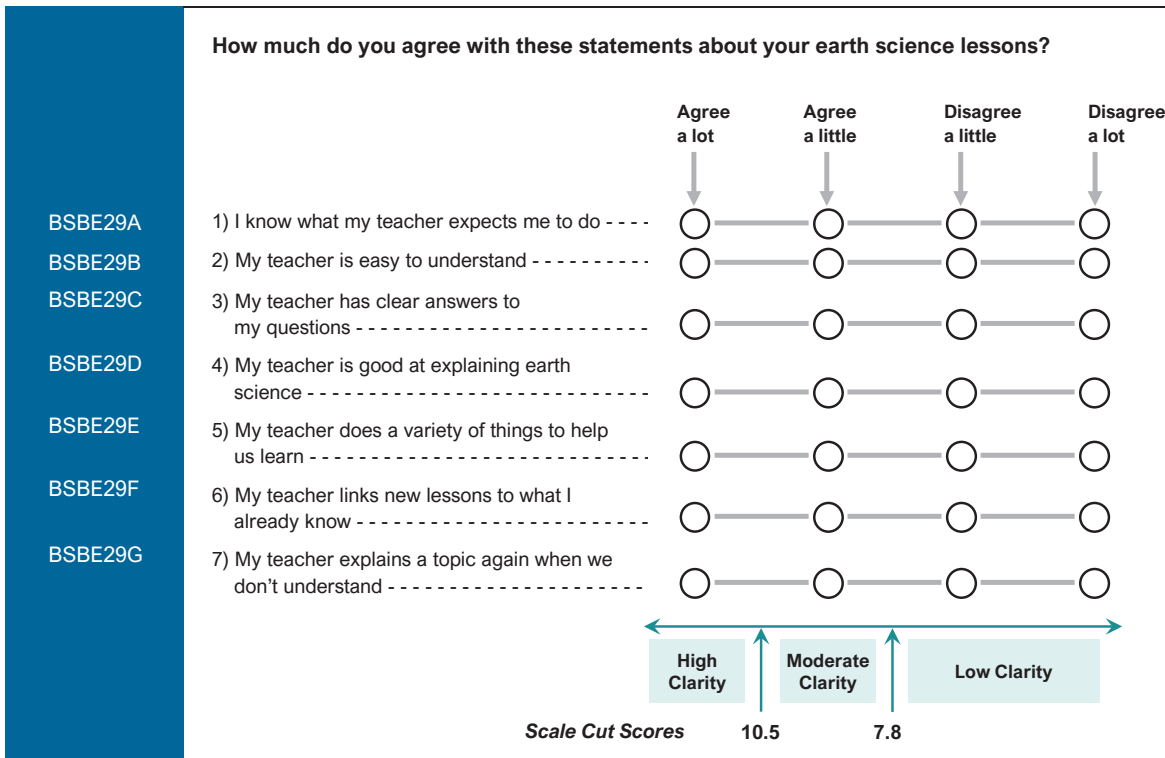
Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2	
Cyprus	0.18	0.03	0.03
Finland	0.27	0.07	0.06
France	0.05	0.00	0.00
Georgia	0.18	0.03	0.02
Hungary	0.04	0.00	0.00
Kazakhstan	0.18	0.03	0.03
Lebanon	0.19	0.03	0.03
Lithuania	0.12	0.02	0.01
Morocco	0.15	0.02	0.03
Portugal	0.12	0.01	0.01
Romania	0.10	0.01	0.01
Russian Federation	0.14	0.02	0.02
Sweden	0.12	0.01	0.01
International Median	0.14	0.02	0.02
Benchmarking Participants			
Moscow City, Russian Fed.	0.11	0.01	0.01

Scale was created for TIMSS 2019 countries where science is taught as separate subjects.

Instructional Clarity in Earth Science Lessons – Grade 8

About the Scale

The *Instructional Clarity in Earth Science Lessons* scale was created based on students’ responses to nine items listed below.



Item Parameters for the TIMSS 2019 *Instructional Clarity in Earth Science Lessons* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBE29A	0.37167	-1.95461	-0.56539	2.52000	1.52
BSBE29B	0.08286	-1.72660	-0.62489	2.35149	0.91
BSBE29C	-0.22308	-1.57867	-0.58651	2.16518	0.77
BSBE29D	-0.40135	-1.38541	-0.67655	2.06196	0.76
BSBE29E	0.04460	-1.71685	-0.45018	2.16703	0.95
BSBE29F	0.29232	-1.91852	-0.43425	2.35277	1.13
BSBE29G	-0.16702	-1.38739	-0.59333	1.98072	0.97

Scale Transformation Constants for the TIMSS 2019 *Instructional Clarity in Earth Science Lessons* Scale – Grade 8

Scale Transformation Constants

A = 8.161485

B = 0.914376

Transformed Scale Score = 8.161485 + 0.914376 • Logit Scale Score

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 *Instructional Clarity in Earth Science Lessons* Scale – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	4.19800	
1	5.23994	
2	5.75344	
3	6.11353	
4	6.40348	
5	6.65566	
6	6.88683	
7	7.10638	
8	7.32462	
9	7.54622	
10	7.77771	7.8
11	8.02627	
12	8.29947	
13	8.60494	
14	8.94504	
15	9.31254	
16	9.69531	
17	10.09005	
18	10.51012	10.5
19	10.98774	
20	11.60849	
21	12.75360	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Instructional Clarity in Earth Science Lessons Scale – Grade 8*

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item						
			BSBE29A	BSBE29B	BSBE29C	BSBE29D	BSBE29E	BSBE29F	BSBE29G
Cyprus	0.94	73	0.74	0.86	0.91	0.91	0.87	0.80	0.87
Finland	0.94	74	0.71	0.89	0.91	0.91	0.88	0.82	0.87
France	0.91	66	0.66	0.87	0.88	0.89	0.82	0.73	0.82
Georgia	0.91	66	0.61	0.84	0.87	0.87	0.83	0.80	0.85
Hungary	0.93	69	0.71	0.87	0.89	0.89	0.83	0.80	0.83
Kazakhstan	0.91	65	0.66	0.81	0.88	0.86	0.85	0.76	0.82
Lebanon	-	-	-	-	-	-	-	-	-
Lithuania	0.92	67	0.69	0.86	0.87	0.87	0.85	0.77	0.80
Morocco	0.89	60	0.55	0.73	0.84	0.84	0.83	0.80	0.80
Portugal	0.90	62	0.63	0.82	0.85	0.87	0.75	0.77	0.80
Romania	0.90	64	0.63	0.86	0.86	0.85	0.80	0.78	0.82
Russian Federation	0.92	68	0.69	0.84	0.88	0.87	0.87	0.77	0.82
Sweden	-	-	-	-	-	-	-	-	-
Benchmarking Participants									
Moscow City, Russian Fed.	0.93	70	0.73	0.85	0.88	0.89	0.88	0.80	0.81

Relationship Between the TIMSS 2019 *Instructional Clarity in Earth Science Lessons Scale* and *TIMSS 2019 Achievement – Grade 8*

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	
Cyprus	0.14	0.02	0.02
Finland	0.18	0.03	0.03
France	0.04	0.00	0.00
Georgia	0.10	0.01	0.01
Hungary	0.03	0.00	0.01
Kazakhstan	0.13	0.02	0.01
Lebanon	-	-	-
Lithuania	0.05	0.00	0.00
Morocco	0.12	0.02	0.02
Portugal	0.07	0.00	0.01
Romania	0.09	0.01	0.01
Russian Federation	0.02	0.00	0.00
Sweden	-	-	-
International Median	0.09	0.01	0.01
Benchmarking Participants			
Moscow City, Russian Fed.	0.05	0.00	0.00

Scale was created for TIMSS 2019 countries where science is taught as separate subjects.

A dash (-) indicates comparable data not available.

Instructional Clarity in Mathematics Lessons – Grade 8

About the Scale

The *Instructional Clarity in Mathematics Lessons* scale was created based on students' responses to seven items listed below.

How much do you agree with these statements about your mathematics lessons?

	Agree a lot	Agree a little	Disagree a little	Disagree a lot
BSBM17A 1) I know what my teacher expects me to do - - - -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBM17B 2) My teacher is easy to understand - - - - -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBM17C 3) My teacher has clear answers to my questions - - - - -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBM17D 4) My teacher is good at explaining mathematics -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBM17E 5) My teacher does a variety of things to help us learn - - - - -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBM17F 6) My teacher links new lessons to what I already know - - - - -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBM17G 7) My teacher explains a topic again when we don't understand - - - - -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Scale Cut Scores 10.3 7.8

Item Parameters for the TIMSS 2019 *Instructional Clarity in Mathematics Lessons* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBM17A	0.05459	-1.49723	-0.59435	2.09158	1.43
BSBM17B	0.32080	-1.45404	-0.41713	1.87117	0.92
BSBM17C	0.00334	-1.36560	-0.33731	1.70291	0.81
BSBM17D	-0.11300	-1.01045	-0.39445	1.40490	0.77
BSBM17E	-0.03564	-1.22811	-0.35992	1.58803	0.93
BSBM17F	0.11754	-1.42524	-0.44389	1.86913	1.04
BSBM17G	-0.34763	-0.88348	-0.46134	1.34482	0.99

Scale Transformation Constants for the TIMSS 2019 *Instructional Clarity in Mathematics Lessons* Scale – Grade 8

Scale Transformation Constants

$$A = 8.053331$$

$$B = 1.109981$$

$$\text{Transformed Scale Score} = 8.053331 + 1.109981 \cdot \text{Logit Scale Score}$$

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 *Instructional Clarity in Mathematics Lessons* Scale – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	3.69567	
1	4.93373	
2	5.53063	
3	5.94336	
4	6.27085	
5	6.55198	
6	6.80608	
7	7.04464	
8	7.27558	
9	7.50516	
10	7.73983	7.8
11	7.98224	
12	8.24029	
13	8.51896	
14	8.82274	
15	9.15605	
16	9.52219	
17	9.92675	
18	10.38390	10.3
19	10.92487	
20	11.65115	
21	13.01885	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Instructional Clarity in Mathematics Lessons* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item						
			BSBM17A	BSBM17B	BSBM17C	BSBM17D	BSBM17E	BSBM17F	BSBM17G
Australia	0.92	67	0.69	0.87	0.87	0.88	0.82	0.80	0.79
Bahrain	0.88	59	0.57	0.79	0.84	0.84	0.81	0.77	0.74
Chile	0.90	62	0.61	0.81	0.86	0.86	0.80	0.77	0.77
Chinese Taipei	0.91	65	0.73	0.80	0.81	0.81	0.83	0.85	0.82
Cyprus	0.90	62	0.63	0.78	0.85	0.88	0.83	0.72	0.80
Egypt	0.81	48	0.43	0.62	0.78	0.77	0.79	0.70	0.66
England	0.91	66	0.68	0.85	0.88	0.88	0.82	0.77	0.78
Finland	0.92	67	0.60	0.87	0.87	0.90	0.85	0.79	0.82
France	0.88	58	0.55	0.83	0.85	0.87	0.76	0.66	0.77
Georgia	0.87	58	0.52	0.80	0.83	0.85	0.80	0.71	0.77
Hong Kong SAR	0.94	73	0.75	0.86	0.89	0.88	0.86	0.88	0.83
Hungary	0.91	66	0.66	0.84	0.87	0.89	0.82	0.77	0.81
Iran, Islamic Rep. of	0.88	57	0.56	0.76	0.82	0.83	0.77	0.78	0.75
Ireland	0.91	64	0.63	0.87	0.86	0.89	0.80	0.76	0.77
Israel	0.89	60	0.61	0.83	0.85	0.86	0.76	0.72	0.74
Italy	0.86	54	0.46	0.73	0.84	0.84	0.77	0.73	0.72
Japan	0.90	64	0.55	0.85	0.84	0.88	0.85	0.77	0.80
Jordan	0.87	57	0.54	0.71	0.83	0.83	0.81	0.75	0.75
Kazakhstan	0.86	55	0.53	0.73	0.80	0.83	0.83	0.70	0.76
Korea, Rep. of	0.91	65	0.54	0.80	0.85	0.89	0.85	0.84	0.83
Kuwait	0.87	56	0.58	0.77	0.82	0.83	0.76	0.74	0.72
Lebanon	0.86	55	0.59	0.80	0.82	0.81	0.79	0.65	0.70
Lithuania	0.89	60	0.62	0.83	0.83	0.83	0.80	0.71	0.76
Malaysia	0.86	54	0.56	0.76	0.79	0.81	0.77	0.71	0.73
Morocco	0.88	59	0.52	0.70	0.83	0.85	0.85	0.78	0.79
New Zealand	0.92	66	0.67	0.86	0.87	0.87	0.83	0.77	0.80
Norway (9)	0.90	63	0.58	0.85	0.84	0.87	0.80	0.80	0.79
Oman	0.84	51	0.46	0.71	0.80	0.80	0.74	0.71	0.72
Portugal	0.90	64	0.63	0.83	0.85	0.88	0.79	0.78	0.81
Qatar	0.90	63	0.64	0.83	0.86	0.85	0.82	0.77	0.76
Romania	0.90	62	0.60	0.82	0.84	0.84	0.81	0.77	0.81
Russian Federation	0.87	58	0.59	0.75	0.82	0.83	0.82	0.73	0.75
Saudi Arabia	0.86	56	0.50	0.76	0.82	0.83	0.80	0.73	0.72
Singapore	0.90	62	0.67	0.84	0.85	0.86	0.76	0.76	0.75
South Africa (9)	0.83	49	0.54	0.76	0.76	0.80	0.68	0.62	0.71
Sweden	0.92	66	0.60	0.86	0.88	0.89	0.87	0.81	0.77
Turkey	0.85	54	0.57	0.78	0.78	0.82	0.72	0.73	0.70
United Arab Emirates	0.90	62	0.64	0.83	0.84	0.85	0.81	0.77	0.77
United States	0.91	66	0.67	0.86	0.86	0.88	0.82	0.77	0.80

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Instructional Clarity in Mathematics Lessons* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item						
			BSBM17A	BSBM17B	BSBM17C	BSBM17D	BSBM17E	BSBM17F	BSBM17G
Benchmarking Participants									
Ontario, Canada	0.90	63	0.64	0.85	0.84	0.85	0.80	0.77	0.76
Quebec, Canada	0.90	63	0.62	0.86	0.85	0.87	0.80	0.77	0.75
Moscow City, Russian Fed.	0.88	59	0.58	0.79	0.83	0.85	0.84	0.72	0.74
Gauteng, RSA (9)	0.86	54	0.53	0.81	0.81	0.83	0.74	0.65	0.74
Western Cape, RSA (9)	0.87	55	0.56	0.80	0.80	0.82	0.75	0.70	0.72
Abu Dhabi, UAE	0.90	62	0.64	0.83	0.83	0.84	0.81	0.76	0.76
Dubai, UAE	0.89	61	0.64	0.83	0.84	0.85	0.79	0.76	0.74

Relationship Between the TIMSS 2019 *Instructional Clarity in Mathematics Lessons* Scale and TIMSS 2019 Achievement – Grade 8

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	0.15	0.02	0.02
Chile	0.12	0.01	0.01
Chinese Taipei	0.27	0.07	0.06
Cyprus	0.23	0.05	0.04
Egypt	0.13	0.02	0.02
England	0.10	0.01	0.01
Finland	0.23	0.05	0.05
France	0.11	0.01	0.02
Georgia	0.14	0.02	0.02
Hong Kong SAR	0.17	0.03	0.03
Hungary	0.21	0.05	0.04
Iran, Islamic Rep. of	0.15	0.02	0.02
Ireland	0.04	0.00	0.00
Israel	0.09	0.01	0.01
Italy	0.09	0.01	0.01
Japan	0.19	0.04	0.03
Jordan	0.16	0.03	0.02
Kazakhstan	0.17	0.03	0.02
Korea, Rep. of	0.31	0.10	0.07
Kuwait	0.12	0.01	0.01
Lebanon	0.20	0.04	0.04
Lithuania	0.18	0.03	0.03
Malaysia	0.14	0.02	0.01
Morocco	0.11	0.01	0.01
New Zealand	0.12	0.02	0.02
Norway (9)	0.22	0.05	0.05
Oman	0.22	0.05	0.05
Portugal	0.12	0.01	0.01
Qatar	0.15	0.02	0.02
Romania	0.16	0.03	0.02
Russian Federation	0.15	0.02	0.02
Saudi Arabia	0.16	0.03	0.02
Singapore	0.18	0.03	0.03
South Africa (9)	0.07	0.00	0.00
Sweden	0.11	0.01	0.01
Turkey	0.23	0.05	0.04
United Arab Emirates	0.23	0.05	0.05
United States	0.15	0.02	0.02
International Median	0.15	0.02	0.02

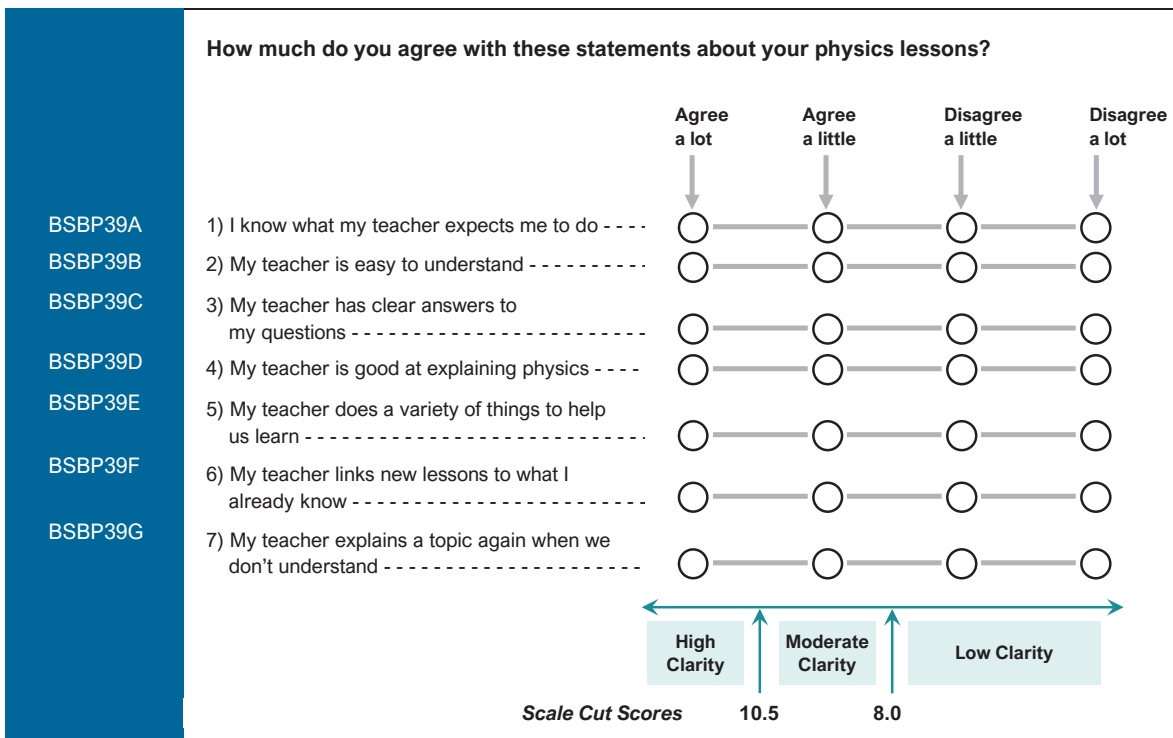
Relationship Between the TIMSS 2019 *Instructional Clarity in Mathematics Lessons* Scale and TIMSS 2019 Achievement – Grade 8

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	
Benchmarking Participants			
Ontario, Canada	0.18	0.03	0.03
Quebec, Canada	0.13	0.02	0.02
Moscow City, Russian Fed.	0.17	0.03	0.02
Gauteng, RSA (9)	0.05	0.00	0.00
Western Cape, RSA (9)	-0.01	0.00	0.00
Abu Dhabi, UAE	0.25	0.06	0.06
Dubai, UAE	0.20	0.04	0.03

Instructional Clarity in Physics Lessons – Grade 8

About the Scale

The *Instructional Clarity in Physics Lessons* scale was created based on students’ responses to seven items listed below.



Item Parameters for the TIMSS 2019 *Instructional Clarity in Physics Lessons* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBP39A	0.34432	-2.05050	-0.59666	2.64716	1.64
BSBP39B	0.27344	-1.97617	-0.55340	2.52957	0.91
BSBP39C	-0.08583	-1.79388	-0.54214	2.33602	0.76
BSBP39D	-0.22852	-1.61545	-0.60200	2.21745	0.78
BSBP39E	-0.13662	-1.86085	-0.51526	2.37611	0.89
BSBP39F	0.15357	-2.00034	-0.49510	2.49544	1.13
BSBP39G	-0.32036	-1.51653	-0.62527	2.14180	1.03

Scale Transformation Constants for the TIMSS 2019 *Instructional Clarity in Physics Lessons* Scale – Grade 8

Scale Transformation Constants

A = 8.328119

B = 0.832906

Transformed Scale Score = 8.328119 + 0.832906 • Logit Scale Score

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 *Instructional Clarity in Physics Lessons* Scale – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	4.57593	
1	5.54107	
2	6.02148	
3	6.36159	
4	6.63685	
5	6.87705	
6	7.09773	
7	7.30766	
8	7.51670	
9	7.72934	
10	7.95209	8.0
11	8.19235	
12	8.45841	
13	8.75915	
14	9.09682	
15	9.45971	
16	9.82967	
17	10.20206	
18	10.59164	10.5
19	11.03337	
20	11.59772	
21	12.64074	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Instructional Clarity in Physics Lessons* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item						
			BSBP39A	BSBP39B	BSBP39C	BSBP39D	BSBP39E	BSBP39F	BSBP39G
Cyprus	0.94	73	0.74	0.85	0.91	0.91	0.90	0.80	0.87
Finland	0.95	77	0.72	0.91	0.92	0.93	0.91	0.86	0.88
France	0.93	70	0.69	0.89	0.90	0.90	0.87	0.77	0.82
Georgia	0.92	69	0.62	0.86	0.89	0.88	0.86	0.84	0.84
Hungary	0.94	72	0.72	0.86	0.90	0.90	0.86	0.83	0.85
Kazakhstan	0.92	68	0.67	0.83	0.89	0.89	0.86	0.79	0.83
Lebanon	0.92	67	0.68	0.85	0.88	0.88	0.84	0.79	0.78
Lithuania	0.93	69	0.70	0.87	0.90	0.89	0.87	0.77	0.82
Morocco	0.90	63	0.58	0.76	0.85	0.85	0.86	0.82	0.81
Portugal	0.92	68	0.67	0.86	0.88	0.89	0.83	0.82	0.81
Romania	0.93	71	0.66	0.87	0.90	0.88	0.87	0.84	0.86
Russian Federation	0.93	71	0.72	0.86	0.89	0.89	0.88	0.80	0.84
Sweden	0.94	74	0.71	0.89	0.91	0.90	0.90	0.85	0.83
Benchmarking Participants									
Moscow City, Russian Fed.	0.94	72	0.75	0.86	0.90	0.89	0.89	0.82	0.84

Relationship Between the TIMSS 2019 *Instructional Clarity in Physics Lessons* Scale and TIMSS 2019 Achievement – Grade 8

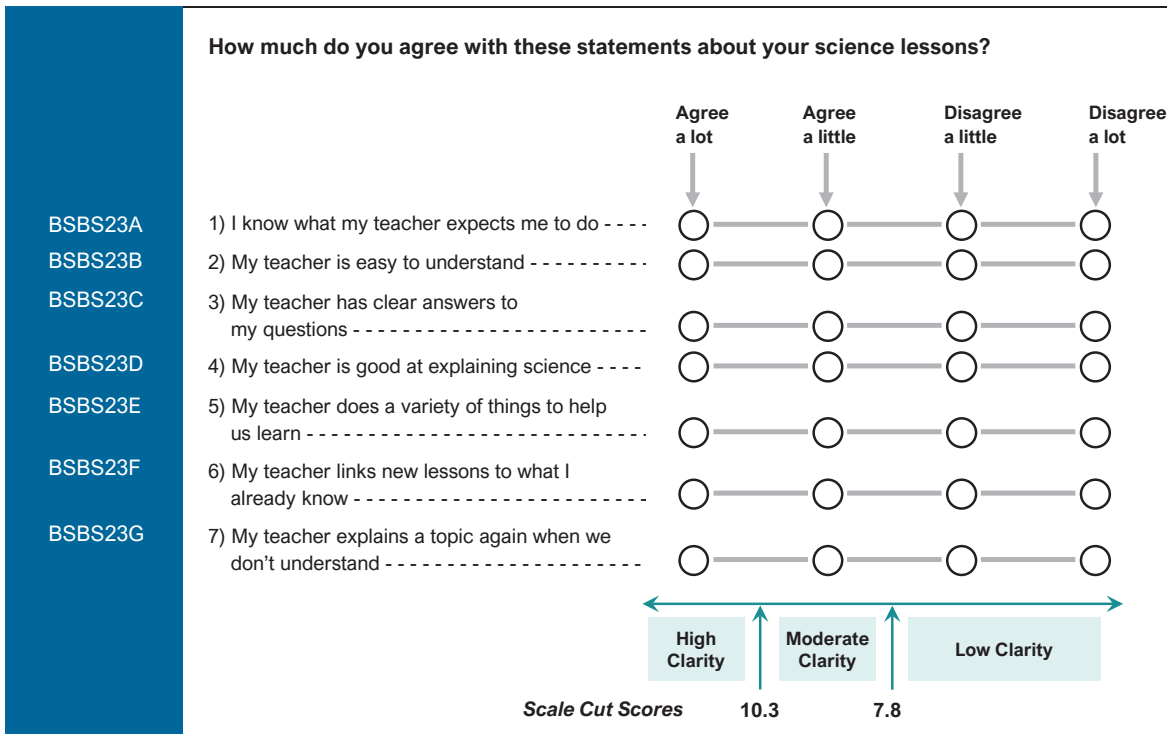
Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2	
Cyprus	0.20	0.04	0.04
Finland	0.25	0.06	0.05
France	0.05	0.00	0.00
Georgia	0.14	0.02	0.01
Hungary	0.12	0.02	0.01
Kazakhstan	0.18	0.03	0.02
Lebanon	0.17	0.03	0.03
Lithuania	0.05	0.00	0.00
Morocco	0.15	0.02	0.03
Portugal	0.12	0.01	0.01
Romania	0.09	0.01	0.01
Russian Federation	0.07	0.01	0.01
Sweden	0.13	0.02	0.02
International Median	0.13	0.02	0.01
Benchmarking Participants			
Moscow City, Russian Fed.	0.12	0.01	0.01

Scale was created for TIMSS 2019 countries where science is taught as separate subjects.

Instructional Clarity in Science Lessons – Grade 8

About the Scale

The *Instructional Clarity in Science Lessons* scale was created based on students’ responses to seven items listed below.



Item Parameters for the TIMSS 2019 *Instructional Clarity in Science Lessons* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBS23A	0.15452	-1.66449	-0.56400	2.22849	1.45
BSBS23B	0.19752	-1.56622	-0.45528	2.02150	0.89
BSBS23C	-0.05676	-1.54981	-0.33550	1.88531	0.80
BSBS23D	-0.18594	-1.24450	-0.44753	1.69203	0.78
BSBS23E	-0.08849	-1.49870	-0.38792	1.88662	0.90
BSBS23F	0.18342	-1.66061	-0.41828	2.07889	1.02
BSBS23G	-0.20427	-1.21307	-0.48440	1.69747	1.00

Scale Transformation Constants for the TIMSS 2019 *Instructional Clarity in Science Lessons* Scale – Grade 8

Scale Transformation Constants

$$A = 8.069663$$

$$B = 0.974947$$

$$\text{Transformed Scale Score} = 8.069663 + 0.974947 \cdot \text{Logit Scale Score}$$

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 *Instructional Clarity in Science Lessons* Scale – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	4.02273	
1	5.13310	
2	5.67786	
3	6.05827	
4	6.36240	
5	6.62529	
6	6.86434	
7	7.09012	
8	7.31015	
9	7.53057	
10	7.75780	7.8
11	7.99517	
12	8.25053	
13	8.52820	
14	8.83177	
15	9.16063	
16	9.51303	
17	9.89078	
18	10.30639	10.3
19	10.78969	
20	11.43106	
21	12.63386	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Instructional Clarity in Science Lessons* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item						
			BSBS23A	BSBS23B	BSBS23C	BSBS23D	BSBS23E	BSBS23F	BSBS23G
Australia	0.94	74	0.76	0.89	0.90	0.90	0.87	0.84	0.84
Bahrain	0.91	65	0.66	0.83	0.86	0.86	0.83	0.79	0.78
Chile	0.92	67	0.69	0.82	0.85	0.88	0.87	0.80	0.81
Chinese Taipei	0.92	69	0.75	0.83	0.83	0.86	0.85	0.85	0.83
Cyprus	-	-	-	-	-	-	-	-	-
Egypt	0.83	51	0.44	0.65	0.80	0.79	0.79	0.75	0.70
England	0.93	71	0.75	0.88	0.89	0.88	0.85	0.82	0.82
Finland	-	-	-	-	-	-	-	-	-
France	-	-	-	-	-	-	-	-	-
Georgia	-	-	-	-	-	-	-	-	-
Hong Kong SAR	0.95	77	0.81	0.90	0.91	0.90	0.89	0.87	0.86
Hungary	-	-	-	-	-	-	-	-	-
Iran, Islamic Rep. of	0.89	61	0.59	0.79	0.83	0.85	0.81	0.77	0.78
Ireland	0.93	71	0.71	0.89	0.89	0.90	0.85	0.82	0.81
Israel	0.93	70	0.74	0.88	0.89	0.89	0.83	0.80	0.81
Italy	0.88	58	0.49	0.78	0.86	0.83	0.79	0.76	0.76
Japan	0.91	67	0.58	0.86	0.86	0.89	0.87	0.80	0.83
Jordan	0.89	60	0.56	0.74	0.85	0.84	0.84	0.79	0.80
Kazakhstan	-	-	-	-	-	-	-	-	-
Korea, Rep. of	0.92	70	0.65	0.83	0.87	0.88	0.86	0.87	0.85
Kuwait	0.89	60	0.61	0.80	0.85	0.84	0.79	0.76	0.77
Lebanon	-	-	-	-	-	-	-	-	-
Lithuania	-	-	-	-	-	-	-	-	-
Malaysia	0.88	59	0.63	0.79	0.82	0.83	0.80	0.74	0.75
Morocco	-	-	-	-	-	-	-	-	-
New Zealand	0.93	71	0.73	0.88	0.89	0.89	0.87	0.81	0.83
Norway (9)	0.92	69	0.65	0.87	0.87	0.89	0.85	0.83	0.82
Oman	0.86	56	0.48	0.76	0.82	0.82	0.79	0.74	0.76
Portugal	-	-	-	-	-	-	-	-	-
Qatar	0.93	69	0.71	0.86	0.88	0.88	0.86	0.82	0.80
Romania	-	-	-	-	-	-	-	-	-
Russian Federation	-	-	-	-	-	-	-	-	-
Saudi Arabia	0.89	60	0.61	0.78	0.84	0.83	0.82	0.77	0.76
Singapore	0.91	65	0.71	0.86	0.86	0.86	0.79	0.77	0.78
South Africa (9)	0.86	54	0.60	0.79	0.78	0.80	0.72	0.68	0.72
Sweden	-	-	-	-	-	-	-	-	-
Turkey	0.90	63	0.65	0.84	0.85	0.86	0.80	0.78	0.77
United Arab Emirates	0.91	66	0.67	0.84	0.86	0.86	0.84	0.80	0.79
United States	0.93	71	0.73	0.87	0.89	0.90	0.86	0.81	0.83

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Instructional Clarity in Science Lessons* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item						
			BSBS23A	BSBS23B	BSBS23C	BSBS23D	BSBS23E	BSBS23F	BSBS23G
Benchmarking Participants									
Ontario, Canada	0.93	69	0.69	0.88	0.88	0.88	0.85	0.82	0.81
Quebec, Canada	0.92	69	0.65	0.87	0.89	0.88	0.85	0.81	0.82
Moscow City, Russian Fed.	-	-	-	-	-	-	-	-	-
Gauteng, RSA (9)	0.88	58	0.61	0.82	0.83	0.84	0.78	0.71	0.74
Western Cape, RSA (9)	0.89	60	0.63	0.82	0.83	0.83	0.79	0.75	0.76
Abu Dhabi, UAE	0.92	66	0.69	0.85	0.86	0.86	0.84	0.80	0.79
Dubai, UAE	0.91	65	0.68	0.85	0.86	0.86	0.82	0.79	0.79

A dash (-) indicates comparable data not available.

Relationship Between the TIMSS 2019 *Instructional Clarity in Science Lessons* Scale and TIMSS 2019 Achievement – Grade 8

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	0.03
Bahrain	0.20	0.04	0.04
Chile	0.06	0.00	0.00
Chinese Taipei	0.23	0.05	0.05
Cyprus	-	-	-
Egypt	0.24	0.06	0.06
England	0.17	0.03	0.03
Finland	-	-	-
France	-	-	-
Georgia	-	-	-
Hong Kong SAR	0.11	0.01	0.01
Hungary	-	-	-
Iran, Islamic Rep. of	0.14	0.02	0.02
Ireland	0.12	0.01	0.01
Israel	0.07	0.01	0.00
Italy	0.06	0.00	0.00
Japan	0.21	0.05	0.03
Jordan	0.20	0.04	0.04
Kazakhstan	-	-	-
Korea, Rep. of	0.31	0.09	0.09
Kuwait	0.16	0.02	0.02
Lebanon	-	-	-
Lithuania	-	-	-
Malaysia	0.22	0.05	0.04
Morocco	-	-	-
New Zealand	0.13	0.02	0.02
Norway (9)	0.15	0.02	0.03
Oman	0.24	0.06	0.06
Portugal	-	-	-
Qatar	0.14	0.02	0.02
Romania	-	-	-
Russian Federation	-	-	-
Saudi Arabia	0.17	0.03	0.03
Singapore	0.16	0.02	0.02
South Africa (9)	0.07	0.01	0.01
Sweden	-	-	-
Turkey	0.14	0.02	0.01
United Arab Emirates	0.23	0.05	0.05
United States	0.07	0.00	0.00
International Median	0.16	0.02	0.02

Relationship Between the TIMSS 2019 *Instructional Clarity in Science Lessons* Scale and TIMSS 2019 Achievement – Grade 8

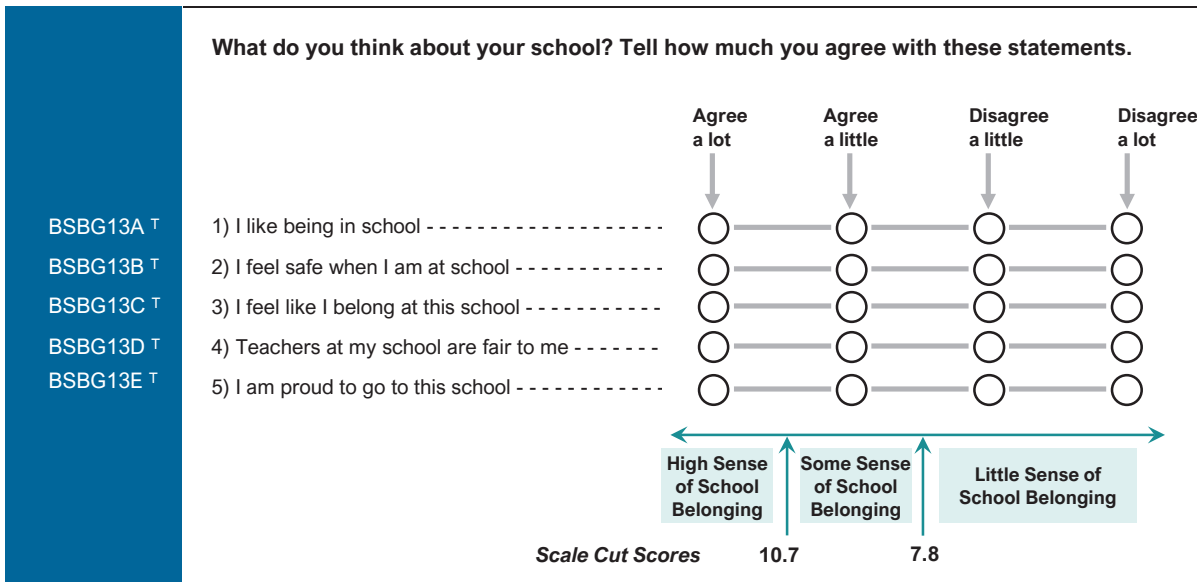
Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2	
Benchmarking Participants			
Ontario, Canada	0.09	0.01	0.01
Quebec, Canada	0.14	0.02	0.02
Moscow City, Russian Fed.	-	-	-
Gauteng, RSA (9)	0.03	0.00	0.00
Western Cape, RSA (9)	-0.02	0.00	0.00
Abu Dhabi, UAE	0.29	0.09	0.08
Dubai, UAE	0.13	0.02	0.01

A dash (–) indicates comparable data not available.

Sense of School Belonging – Grade 8

About the Scale

The *Sense of School Belonging* scale was created based on students’ responses to five items listed below.



^T Trend item—item was included in the same scale in TIMSS 2015 and was used for linking the TIMSS 2015 and TIMSS 2019 scales.

Item Parameters for the TIMSS 2019 *Sense of School Belonging* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBG13A	0.32714	-1.10477	-0.73290	1.83767	1.01
BSBG13B	-0.22817	-1.02570	-0.55000	1.57570	0.98
BSBG13C	-0.06550	-0.90206	-0.56127	1.46333	0.95
BSBG13D	-0.07279	-1.03563	-0.53608	1.57171	1.13
BSBG13E	0.03932	-0.82245	-0.53816	1.36061	0.93

Scale Transformation Constants for the TIMSS 2019 *Sense of School Belonging* Scale – Grade 8

Scale Transformation Constants

$$A = 8.156530$$

$$B = 1.281319$$

$$\text{Transformed Scale Score} = 8.156530 + 1.281319 \cdot \text{Logit Scale Score}$$

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 *Sense of School Belonging* Scale – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	3.92440	
1	5.25880	
2	5.90263	
3	6.36071	
4	6.73999	
5	7.08155	
6	7.40784	
7	7.73555	7.8
8	8.08091	
9	8.46096	
10	8.89725	
11	9.40801	
12	10.00496	
13	10.70956	10.7
14	11.62252	
15	13.27199	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Sense of School Belonging* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item				
			BSBG13A	BSBG13B	BSBG13C	BSBG13D	BSBG13E
Australia	0.85	62	0.79	0.77	0.82	0.70	0.84
Bahrain	0.80	56	0.74	0.74	0.82	0.61	0.81
Chile	0.81	58	0.73	0.79	0.81	0.66	0.80
Chinese Taipei	0.81	58	0.73	0.79	0.80	0.68	0.79
Cyprus	0.80	55	0.74	0.77	0.74	0.66	0.80
Egypt	0.78	53	0.71	0.75	0.78	0.63	0.77
England	0.82	59	0.76	0.76	0.79	0.70	0.82
Finland	0.82	58	0.79	0.76	0.80	0.70	0.77
France	0.72	47	0.73	0.68	0.59	0.63	0.77
Georgia	0.76	51	0.68	0.67	0.76	0.65	0.79
Hong Kong SAR	0.86	65	0.81	0.84	0.87	0.67	0.81
Hungary	0.82	59	0.72	0.76	0.81	0.68	0.84
Iran, Islamic Rep. of	0.71	48	0.73	0.76	0.77	0.67	0.50
Ireland	0.81	58	0.74	0.77	0.78	0.67	0.82
Israel	0.82	58	0.77	0.74	0.80	0.69	0.82
Italy	0.77	53	0.71	0.73	0.73	0.65	0.80
Japan	0.85	63	0.80	0.82	0.83	0.68	0.83
Jordan	0.80	56	0.74	0.74	0.83	0.61	0.80
Kazakhstan	0.81	57	0.75	0.69	0.78	0.72	0.81
Korea, Rep. of	0.84	61	0.79	0.81	0.80	0.68	0.81
Kuwait	0.80	56	0.76	0.73	0.80	0.64	0.79
Lebanon	0.76	51	0.71	0.73	0.77	0.59	0.76
Lithuania	0.79	54	0.75	0.73	0.73	0.66	0.79
Malaysia	0.72	47	0.72	0.67	0.64	0.67	0.74
Morocco	0.77	53	0.73	0.72	0.77	0.60	0.79
New Zealand	0.81	57	0.76	0.74	0.81	0.66	0.79
Norway (9)	0.83	60	0.76	0.77	0.83	0.68	0.82
Oman	0.76	51	0.69	0.72	0.76	0.63	0.75
Portugal	0.78	53	0.76	0.73	0.73	0.63	0.79
Qatar	0.84	60	0.77	0.78	0.82	0.70	0.82
Romania	0.80	56	0.73	0.73	0.75	0.69	0.82
Russian Federation	0.80	55	0.74	0.75	0.75	0.67	0.81
Saudi Arabia	0.78	53	0.72	0.69	0.81	0.59	0.79
Singapore	0.83	59	0.76	0.76	0.84	0.66	0.81
South Africa (9)	0.70	46	0.68	0.69	0.77	0.48	0.75
Sweden	0.80	55	0.71	0.70	0.83	0.64	0.81
Turkey	0.76	51	0.70	0.75	0.77	0.58	0.75
United Arab Emirates	0.83	59	0.76	0.77	0.81	0.68	0.81
United States	0.83	59	0.74	0.75	0.81	0.68	0.84

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Sense of School Belonging* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item				
			BSBG13A	BSBG13B	BSBG13C	BSBG13D	BSBG13E
Benchmarking Participants							
Ontario, Canada	0.82	58	0.75	0.73	0.79	0.69	0.83
Quebec, Canada	0.81	56	0.76	0.75	0.78	0.66	0.79
Moscow City, Russian Fed.	0.79	54	0.77	0.74	0.78	0.60	0.79
Gauteng, RSA (9)	0.73	49	0.67	0.69	0.80	0.53	0.78
Western Cape, RSA (9)	0.73	49	0.68	0.68	0.80	0.50	0.79
Abu Dhabi, UAE	0.81	56	0.74	0.76	0.80	0.64	0.80
Dubai, UAE	0.81	57	0.74	0.76	0.79	0.67	0.80

Relationship Between the TIMSS 2019 Sense of School Belonging Scale and TIMSS 2019 Achievement – Grade 8

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2		r	r^2	
Australia	0.30	0.09	0.08	0.29	0.09	0.08
Bahrain	0.10	0.01	0.01	0.16	0.02	0.02
Chile	0.07	0.00	0.01	0.07	0.01	0.01
Chinese Taipei	0.08	0.01	0.01	0.06	0.00	0.01
Cyprus	0.18	0.03	0.03	0.18	0.03	0.03
Egypt	0.01	0.00	0.00	0.05	0.00	0.00
England	0.29	0.08	0.08	0.32	0.10	0.10
Finland	0.21	0.04	0.04	0.21	0.04	0.04
France	0.12	0.01	0.02	0.13	0.02	0.02
Georgia	0.01	0.00	0.00	0.01	0.00	0.00
Hong Kong SAR	0.16	0.02	0.03	0.14	0.02	0.03
Hungary	0.18	0.03	0.03	0.15	0.02	0.02
Iran, Islamic Rep. of	0.05	0.00	0.01	0.04	0.00	0.00
Ireland	0.27	0.07	0.07	0.25	0.06	0.06
Israel	0.02	0.00	0.01	0.04	0.00	0.00
Italy	0.07	0.00	0.01	0.04	0.00	0.00
Japan	0.10	0.01	0.01	0.06	0.00	0.01
Jordan	0.04	0.00	0.00	0.06	0.00	0.00
Kazakhstan	0.03	0.00	0.00	0.01	0.00	0.00
Korea, Rep. of	0.14	0.02	0.02	0.13	0.02	0.02
Kuwait	0.13	0.02	0.02	0.15	0.02	0.03
Lebanon	0.13	0.02	0.02	0.14	0.02	0.02
Lithuania	0.07	0.00	0.01	0.07	0.00	0.01
Malaysia	0.01	0.00	0.00	0.06	0.00	0.00
Morocco	-0.04	0.00	0.00	0.02	0.00	0.00
New Zealand	0.23	0.06	0.05	0.21	0.04	0.04
Norway (9)	0.16	0.03	0.03	0.15	0.02	0.03
Oman	0.11	0.01	0.01	0.13	0.02	0.02
Portugal	0.10	0.01	0.01	0.10	0.01	0.01
Qatar	0.15	0.02	0.03	0.15	0.02	0.03
Romania	0.05	0.00	0.00	0.04	0.00	0.00
Russian Federation	0.07	0.00	0.00	0.02	0.00	0.00
Saudi Arabia	0.04	0.00	0.00	0.03	0.00	0.00
Singapore	0.20	0.04	0.04	0.18	0.03	0.03
South Africa (9)	-0.01	0.00	0.00	-0.04	0.00	0.00
Sweden	0.17	0.03	0.03	0.16	0.03	0.02
Turkey	0.02	0.00	0.00	0.01	0.00	0.00
United Arab Emirates	0.18	0.03	0.03	0.19	0.04	0.04
United States	0.26	0.07	0.06	0.22	0.05	0.05
International Median	0.10	0.01	0.01	0.13	0.02	0.02

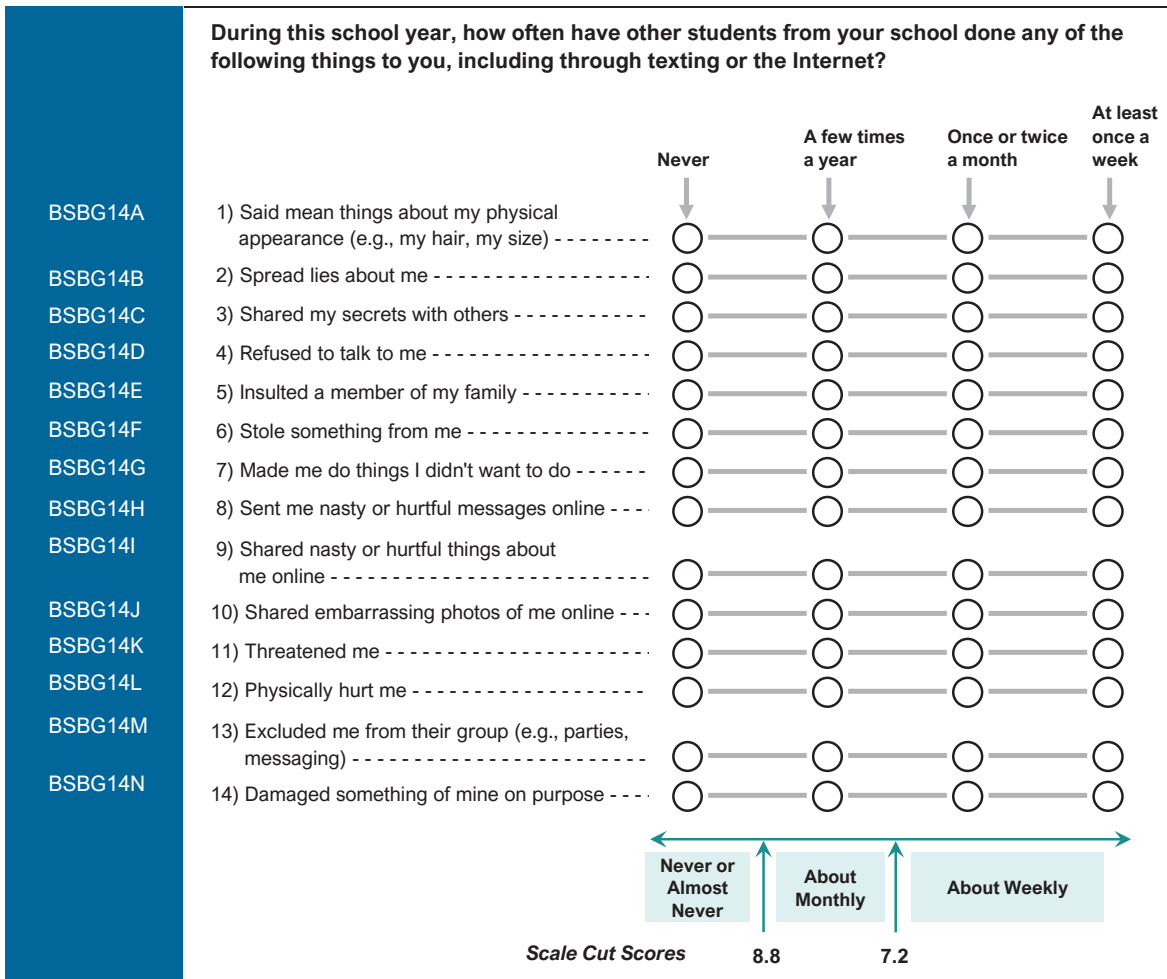
Relationship Between the TIMSS 2019 *Sense of School Belonging* Scale and TIMSS 2019 Achievement – Grade 8

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2		r	r^2	
Benchmarking Participants						
Ontario, Canada	0.18	0.03	0.03	0.18	0.03	0.03
Quebec, Canada	0.24	0.06	0.06	0.22	0.05	0.04
Moscow City, Russian Fed.	0.09	0.01	0.01	0.07	0.01	0.00
Gauteng, RSA (9)	-0.04	0.00	0.00	-0.06	0.00	0.00
Western Cape, RSA (9)	-0.01	0.00	0.00	-0.05	0.00	0.00
Abu Dhabi, UAE	0.19	0.04	0.03	0.19	0.03	0.03
Dubai, UAE	0.17	0.03	0.03	0.17	0.03	0.03

Student Bullying – Grade 8

About the Scale

The *Student Bullying* scale was created based on students’ responses to fourteen items listed below.



Item Parameters for the TIMSS 2019 *Student Bullying* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBG14A	0.71305	0.04645	-0.26859	0.22214	1.10
BSBG14B	0.52658	-0.41912	-0.19205	0.61117	0.98
BSBG14C	0.39392	-0.22178	-0.15770	0.37948	1.10
BSBG14D	0.23331	-0.01799	-0.12110	0.13909	1.09
BSBG14E	0.07453	0.24301	0.02265	-0.26566	1.07
BSBG14F	0.08557	0.07582	-0.11162	0.03580	1.10
BSBG14G	-0.19467	0.10093	0.07979	-0.18072	0.99
BSBG14H	-0.11689	0.33415	0.03433	-0.36848	1.05
BSBG14I	-0.43644	0.39686	0.16165	-0.55851	0.81
BSBG14J	-0.43928	0.18892	0.08301	-0.27193	1.00
BSBG14K	-0.36957	0.31464	0.10156	-0.41620	0.82
BSBG14L	-0.27648	0.24465	-0.00493	-0.23972	0.91
BSBG14M	-0.02422	0.13198	-0.17425	0.04227	1.02
BSBG14N	-0.16941	0.20537	-0.10652	-0.09885	0.88

Scale Transformation Constants for the TIMSS 2019 *Student Bullying* Scale – Grade 8

Scale Transformation Constants

$$A = 7.220866$$

$$B = 1.652921$$

$$\text{Transformed Scale Score} = 7.220866 + 1.652921 \cdot \text{Logit Scale Score}$$

**Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019
Student Bullying Scale – Grade 8**

Raw Score	Transformed Scale Score	Cutpoint
0	1.95344	
1	3.57732	
2	4.25794	
3	4.68054	
4	4.98853	
5	5.23124	
6	5.43399	
7	5.60919	
8	5.76449	
9	5.90507	
10	6.03321	
11	6.15477	
12	6.26941	
13	6.37845	
14	6.48302	
15	6.58405	
16	6.68234	
17	6.77861	
18	6.87349	
19	6.96754	
20	7.06124	
21	7.15513	7.2
22	7.25088	
23	7.34528	
24	7.44254	
25	7.54198	
26	7.64418	
27	7.74978	
28	7.85954	
29	7.97425	
30	8.09367	
31	8.22128	
32	8.35784	
33	8.50552	
34	8.66719	
35	8.84686	8.8
36	9.05015	
37	9.28593	
38	9.56975	
39	9.92809	
40	10.41803	
41	11.18784	
42	12.93736	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 Student Bullying Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item													
			BSBG14A	BSBG14B	BSBG14C	BSBG14D	BSBG14E	BSBG14F	BSBG14G	BSBG14H	BSBG14I	BSBG14J	BSBG14K	BSBG14L	BSBG14M	BSBG14N
Australia	0.91	47	0.67	0.77	0.68	0.69	0.67	0.61	0.68	0.74	0.74	0.56	0.74	0.64	0.67	0.72
Bahrain	0.90	44	0.61	0.67	0.62	0.62	0.68	0.58	0.67	0.72	0.69	0.66	0.73	0.70	0.66	0.70
Chile	0.87	40	0.64	0.65	0.63	0.62	0.63	0.51	0.64	0.73	0.62	0.54	0.68	0.68	0.58	0.68
Chinese Taipei	0.83	34	0.59	0.66	0.60	0.59	0.54	0.53	0.63	0.61	0.60	0.51	0.63	0.58	0.53	0.57
Cyprus	0.87	39	0.60	0.64	0.54	0.61	0.64	0.54	0.64	0.67	0.69	0.58	0.70	0.64	0.61	0.67
Egypt	0.92	50	0.64	0.63	0.58	0.62	0.72	0.66	0.73	0.74	0.78	0.78	0.76	0.78	0.72	0.74
England	0.90	44	0.67	0.73	0.68	0.66	0.66	0.57	0.63	0.75	0.73	0.54	0.73	0.64	0.64	0.66
Finland	0.88	43	0.67	0.70	0.63	0.62	0.61	0.61	0.61	0.72	0.72	0.58	0.70	0.64	0.62	0.68
France	0.83	33	0.63	0.68	0.43	0.59	0.62	0.49	0.53	0.62	0.56	0.39	0.65	0.63	0.56	0.59
Georgia	0.84	38	0.56	0.62	0.58	0.59	0.63	0.50	0.63	0.65	0.70	0.67	0.68	0.59	0.64	0.61
Hong Kong SAR	0.92	50	0.64	0.70	0.60	0.66	0.69	0.66	0.76	0.79	0.79	0.68	0.76	0.73	0.67	0.76
Hungary	0.84	35	0.64	0.67	0.57	0.53	0.63	0.50	0.59	0.69	0.59	0.45	0.63	0.60	0.54	0.64
Iran, Islamic Rep. of	0.85	38	0.58	0.64	0.59	0.38	0.67	0.55	0.67	0.59	0.66	0.68	0.72	0.66	0.49	0.66
Ireland	0.88	40	0.66	0.73	0.63	0.62	0.64	0.53	0.60	0.69	0.69	0.52	0.68	0.60	0.60	0.66
Israel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Italy	0.83	33	0.61	0.67	0.58	0.59	0.57	0.43	0.56	0.63	0.57	0.42	0.59	0.57	0.58	0.62
Japan	0.80	31	0.58	0.66	0.63	0.62	0.53	0.49	0.64	0.51	0.47	0.42	0.52	0.50	0.57	0.56
Jordan	0.92	51	0.65	0.63	0.60	0.67	0.74	0.64	0.75	0.70	0.79	0.76	0.78	0.78	0.75	0.75
Kazakhstan	0.78	34	0.56	0.61	0.55	0.59	0.59	0.47	0.55	0.28	0.66	0.55	0.61	0.63	0.66	0.68
Korea, Rep. of	0.82	35	0.53	0.67	0.61	0.48	0.55	0.50	-	0.69	0.66	0.57	0.63	0.60	0.57	0.62
Kuwait	0.89	44	0.62	0.61	0.63	0.62	0.67	0.56	0.65	0.67	0.72	0.65	0.73	0.72	0.69	0.69
Lebanon	0.88	41	0.62	0.59	0.43	0.58	0.64	0.58	0.64	0.69	0.72	0.67	0.72	0.71	0.63	0.65
Lithuania	0.85	35	0.66	0.67	0.60	0.60	0.63	0.45	0.52	0.65	0.57	0.48	0.63	0.64	0.56	0.58
Malaysia	0.82	30	0.46	0.56	0.46	0.48	0.53	0.51	0.58	0.63	0.64	0.50	0.58	0.54	0.56	0.58
Morocco	0.85	36	0.52	0.58	0.55	0.59	0.64	0.47	0.63	0.58	0.67	0.62	0.65	0.66	0.61	0.62
New Zealand	0.90	44	0.65	0.73	0.67	0.65	0.63	0.60	0.65	0.74	0.75	0.54	0.72	0.61	0.66	0.69
Norway (9)	0.89	42	0.68	0.73	0.67	0.63	0.59	0.55	0.62	0.72	0.72	0.58	0.68	0.59	0.61	0.64
Oman	0.88	41	0.62	0.60	0.61	0.55	0.63	0.53	0.64	0.69	0.71	0.67	0.70	0.67	0.62	0.68
Portugal	0.86	39	0.59	0.66	0.61	0.60	0.62	0.56	0.61	0.66	0.62	0.56	0.68	0.64	0.60	0.67
Qatar	0.92	52	0.66	0.70	0.67	0.68	0.72	0.65	0.72	0.74	0.78	0.73	0.78	0.75	0.70	0.75
Romania	0.90	44	0.66	0.68	0.63	0.63	0.67	0.58	0.62	0.76	0.71	0.60	0.72	0.68	0.65	0.69
Russian Federation	0.86	38	0.63	0.65	0.60	0.52	0.64	0.51	0.59	0.68	0.69	0.55	0.66	0.63	0.63	0.60
Saudi Arabia	0.90	46	0.64	0.65	0.63	0.66	0.73	0.58	0.70	0.62	0.69	0.69	0.75	0.73	0.70	0.71
Singapore	0.89	41	0.64	0.72	0.60	0.61	0.65	0.59	0.62	0.74	0.69	0.52	0.69	0.63	0.61	0.68
South Africa (9)	0.84	33	0.52	0.54	0.51	0.56	0.59	0.32	0.59	0.67	0.69	0.58	0.62	0.62	0.58	0.59
Sweden	0.89	44	0.67	0.70	0.64	0.65	0.62	0.56	0.64	0.74	0.76	0.57	0.69	0.64	0.65	0.71
Turkey	0.84	36	0.52	0.60	0.58	0.53	0.59	0.51	0.51	0.64	0.67	0.59	0.68	0.67	0.61	0.68
United Arab Emirates	0.92	51	0.67	0.70	0.64	0.66	0.72	0.66	0.72	0.76	0.76	0.70	0.77	0.74	0.70	0.75
United States	0.90	46	0.68	0.72	0.67	0.68	0.68	0.60	0.64	0.73	0.73	0.57	0.71	0.62	0.68	0.70

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 Student Bullying Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item													
			BSBG14A	BSBG14B	BSBG14C	BSBG14D	BSBG14E	BSBG14F	BSBG14G	BSBG14H	BSBG14I	BSBG14J	BSBG14K	BSBG14L	BSBG14M	BSBG14N
Benchmarking Participants																
Ontario, Canada	0.89	43	0.68	0.73	0.66	0.65	0.65	0.55	0.64	0.73	0.72	0.59	0.66	0.61	0.64	0.66
Quebec, Canada	0.87	39	0.68	0.70	0.62	0.61	0.57	0.51	0.62	0.71	0.66	0.51	0.67	0.63	0.62	0.61
Moscow City, Russian Fed.	0.85	36	0.62	0.63	0.60	0.50	0.63	0.47	0.52	0.66	0.70	0.54	0.62	0.64	0.60	0.61
Gauteng, RSA (9)	0.83	33	0.55	0.59	0.53	0.55	0.56	0.37	0.56	0.67	0.65	0.53	0.63	0.62	0.53	0.62
Western Cape, RSA (9)	0.86	38	0.58	0.62	0.58	0.61	0.61	0.42	0.60	0.72	0.72	0.57	0.67	0.62	0.59	0.64
Abu Dhabi, UAE	0.93	54	0.71	0.72	0.66	0.68	0.73	0.69	0.74	0.79	0.80	0.74	0.79	0.75	0.73	0.76
Dubai, UAE	0.90	45	0.63	0.68	0.61	0.65	0.68	0.63	0.67	0.71	0.69	0.63	0.71	0.70	0.63	0.73

A dash (-) indicates comparable data not available.

Relationship Between the TIMSS 2019 Student Bullying Scale and TIMSS 2019 Achievement – Grade 8

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2		r	r^2	
Australia	0.15	0.02	0.03	0.16	0.02	0.04
Bahrain	0.11	0.01	0.02	0.20	0.04	0.08
Chile	0.08	0.01	0.02	0.12	0.01	0.03
Chinese Taipei	-0.02	0.00	0.00	-0.01	0.00	0.00
Cyprus	0.09	0.01	0.01	0.10	0.01	0.02
Egypt	0.24	0.06	0.08	0.27	0.07	0.10
England	0.13	0.02	0.03	0.12	0.01	0.03
Finland	0.05	0.00	0.02	0.06	0.00	0.02
France	0.03	0.00	0.01	0.06	0.00	0.01
Georgia	0.04	0.00	0.01	0.04	0.00	0.02
Hong Kong SAR	0.03	0.00	0.01	0.04	0.00	0.01
Hungary	0.15	0.02	0.03	0.13	0.02	0.02
Iran, Islamic Rep. of	0.16	0.03	0.04	0.18	0.03	0.05
Ireland	0.08	0.01	0.02	0.09	0.01	0.02
Israel	-	-	-	-	-	-
Italy	0.07	0.01	0.02	0.09	0.01	0.01
Japan	-0.02	0.00	0.00	0.01	0.00	0.00
Jordan	0.20	0.04	0.06	0.27	0.07	0.11
Kazakhstan	-0.06	0.00	0.00	-0.10	0.01	0.00
Korea, Rep. of	-0.06	0.00	0.00	-0.03	0.00	0.00
Kuwait	0.07	0.00	0.02	0.12	0.01	0.05
Lebanon	0.11	0.01	0.02	0.14	0.02	0.03
Lithuania	0.03	0.00	0.01	0.02	0.00	0.01
Malaysia	0.12	0.02	0.01	0.12	0.02	0.02
Morocco	0.09	0.01	0.02	0.12	0.01	0.03
New Zealand	0.10	0.01	0.02	0.11	0.01	0.02
Norway (9)	0.06	0.00	0.02	0.05	0.00	0.02
Oman	0.17	0.03	0.06	0.21	0.04	0.08
Portugal	0.05	0.00	0.00	0.04	0.00	0.00
Qatar	0.12	0.01	0.06	0.20	0.04	0.09
Romania	0.08	0.01	0.02	0.07	0.01	0.02
Russian Federation	-0.01	0.00	0.00	-0.01	0.00	0.00
Saudi Arabia	0.14	0.02	0.04	0.21	0.04	0.08
Singapore	0.14	0.02	0.03	0.13	0.02	0.02
South Africa (9)	0.24	0.06	0.08	0.29	0.08	0.10
Sweden	0.10	0.01	0.02	0.08	0.01	0.02
Turkey	0.08	0.01	0.01	0.10	0.01	0.02
United Arab Emirates	0.20	0.04	0.09	0.26	0.07	0.13
United States	0.10	0.01	0.02	0.09	0.01	0.02
International Median	0.09	0.01	0.02	0.11	0.01	0.02

Relationship Between the TIMSS 2019 Student Bullying Scale and TIMSS 2019 Achievement – Grade 8

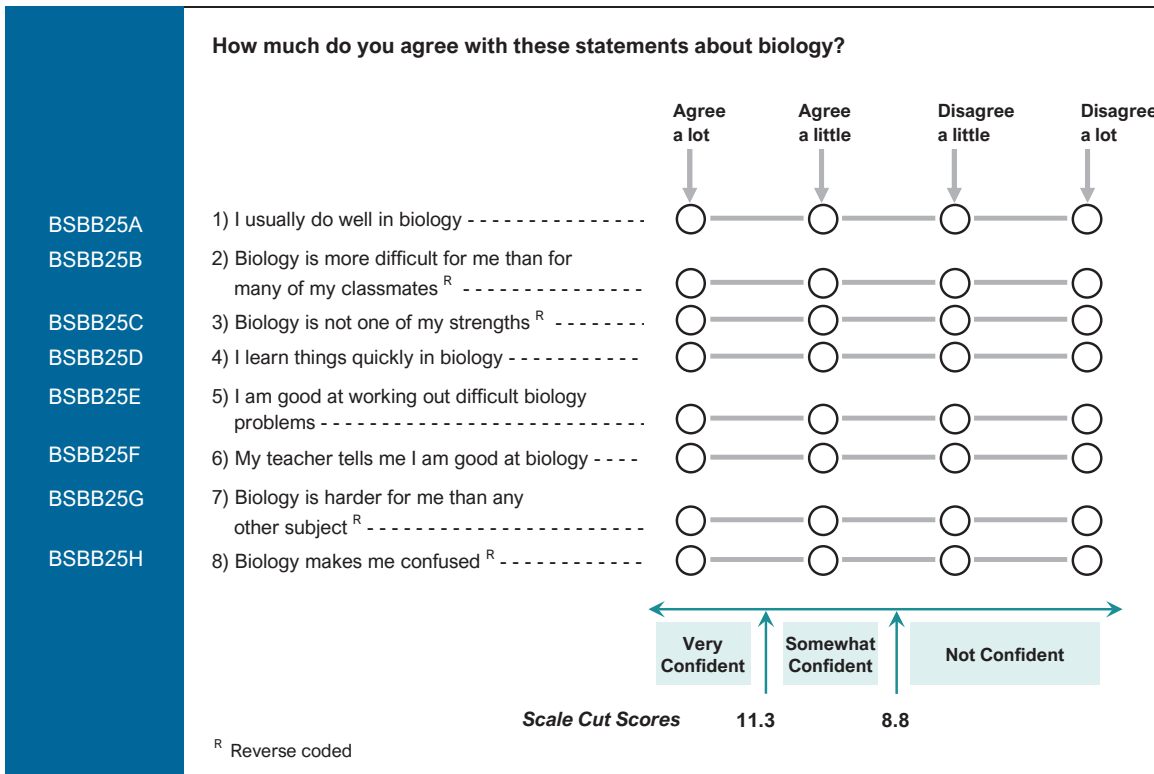
Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2		r	r^2	
Benchmarking Participants						
Ontario, Canada	0.07	0.00	0.01	0.09	0.01	0.01
Quebec, Canada	0.13	0.02	0.02	0.11	0.01	0.01
Moscow City, Russian Fed.	0.09	0.01	0.02	0.09	0.01	0.01
Gauteng, RSA (9)	0.26	0.07	0.07	0.31	0.10	0.10
Western Cape, RSA (9)	0.18	0.03	0.05	0.22	0.05	0.07
Abu Dhabi, UAE	0.27	0.07	0.13	0.31	0.10	0.18
Dubai, UAE	0.12	0.01	0.03	0.16	0.02	0.04

A dash (–) indicates comparable data not available.

Students Confident in Biology – Grade 8

About the Scale

The *Students Confident in Biology* scale was created based on students’ responses to eight items listed below.



Item Parameters for the TIMSS 2019 *Students Confident in Biology* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBB25A	-0.51693	-1.44764	-0.43643	1.88407	0.87
BSBB25B ^R	-0.10746	-1.36535	-0.13132	1.49667	1.08
BSBB25C ^R	0.40263	-1.44249	0.06347	1.37902	0.99
BSBB25D	-0.20096	-1.67008	-0.11982	1.78990	0.87
BSBB25E	0.43707	-1.79371	0.01706	1.77665	1.01
BSBB25F	0.49259	-1.57640	-0.09570	1.67210	1.12
BSBB25G ^R	-0.26525	-1.05911	-0.23902	1.29813	1.08
BSBB25H ^R	-0.24169	-1.02437	-0.19301	1.21738	1.06

^R Reverse coded

Scale Transformation Constants for the TIMSS 2019 *Students Confident in Biology* Scale – Grade 8

Scale Transformation Constants

A = 8.851451

B = 1.356973

Transformed Scale Score = 8.851451 + 1.356973 • Logit Scale Score

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 *Students Confident in Biology* Scale – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	3.04975	
1	4.61732	
2	5.39034	
3	5.93525	
4	6.36886	
5	6.73771	
6	7.07124	
7	7.37840	
8	7.66831	
9	7.94767	
10	8.22161	
11	8.49411	
12	8.76836	8.8
13	9.04715	
14	9.33297	
15	9.62841	
16	9.93642	
17	10.25945	
18	10.60451	
19	10.97905	
20	11.39630	11.3
21	11.87989	
22	12.47348	
23	13.30261	
24	14.92563	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 Students Confident in Biology Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BSBB25A	BSBB25B ^R	BSBB25C ^R	BSBB25D	BSBB25E	BSBB25F	BSBB25G ^R	BSBB25H ^R
Cyprus	0.89	57	0.79	0.71	0.75	0.80	0.78	0.73	0.74	0.75
Finland	0.86	51	0.81	0.71	0.77	0.80	0.71	0.67	0.65	0.55
France	0.88	55	0.80	0.66	0.76	0.83	0.76	0.60	0.71	0.80
Georgia	0.84	48	0.74	0.64	0.72	0.75	0.72	0.67	0.64	0.63
Hungary	0.89	56	0.80	0.69	0.81	0.80	0.74	0.74	0.74	0.67
Kazakhstan	0.87	53	0.76	0.67	0.78	0.77	0.77	0.69	0.69	0.67
Lebanon	0.80	42	0.69	0.59	0.51	0.76	0.74	0.71	0.61	0.53
Lithuania	0.87	54	0.81	0.71	0.76	0.79	0.75	0.60	0.74	0.66
Morocco	0.76	38	0.66	0.61	0.47	0.72	0.67	0.64	0.58	0.57
Portugal	0.84	48	0.74	0.61	0.68	0.80	0.74	0.62	0.63	0.70
Romania	0.80	43	0.73	0.62	0.66	0.73	0.58	0.62	0.60	0.67
Russian Federation	0.88	54	0.75	0.70	0.81	0.81	0.76	0.69	0.70	0.67
Sweden	0.87	53	0.78	0.72	0.76	0.80	0.74	0.66	0.69	0.70
Benchmarking Participants										
Moscow City, Russian Fed.	0.89	57	0.77	0.74	0.83	0.85	0.78	0.68	0.74	0.67

^R Reverse coded

Relationship Between the TIMSS 2019 Students Confident in Biology Scale and TIMSS 2019 Achievement – Grade 8

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	
Cyprus	0.34	0.12	0.13
Finland	0.32	0.11	0.12
France	0.33	0.11	0.11
Georgia	0.30	0.09	0.08
Hungary	0.24	0.06	0.06
Kazakhstan	0.19	0.04	0.03
Lebanon	0.34	0.12	0.12
Lithuania	0.23	0.05	0.05
Morocco	0.34	0.11	0.10
Portugal	0.36	0.13	0.13
Romania	0.20	0.04	0.05
Russian Federation	0.15	0.02	0.02
Sweden	0.33	0.11	0.11
International Median	0.32	0.11	0.10
Benchmarking Participants			
Moscow City, Russian Fed.	0.11	0.01	0.01

Scale was created for TIMSS 2019 countries where science is taught as separate subjects.

Students Confident in Chemistry – Grade 8

About the Scale

The *Students Confident in Chemistry* scale was created based on students' responses to eight items listed below.

		How much do you agree with these statements about chemistry?			
		Agree a lot	Agree a little	Disagree a little	Disagree a lot
BSBC35A	1) I usually do well in chemistry -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBC35B	2) Chemistry is more difficult for me than for many of my classmates ^R -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBC35C	3) Chemistry is not one of my strengths ^R -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBC35D	4) I learn things quickly in chemistry -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBC35E	5) I am good at working out difficult chemistry problems -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBC35F	6) My teacher tells me I am good at chemistry ---	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBC35G	7) Chemistry is harder for me than any other subject ^R -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBC35H	8) Chemistry makes me confused ^R -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

← Very Confident | Somewhat Confident | Not Confident →

Scale Cut Scores 11.5 9.3

^R Reverse coded

Item Parameters for the TIMSS 2019 Students Confident in Chemistry Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBC35A	-0.45681	-1.43599	-0.23074	1.66673	0.87
BSBC35B ^R	-0.20723	-1.36687	-0.01365	1.38052	1.11
BSBC35C ^R	0.30893	-1.38095	0.15716	1.22379	1.01
BSBC35D	-0.09496	-1.62194	0.02911	1.59283	0.87
BSBC35E	0.41467	-1.58287	0.08541	1.49746	0.97
BSBC35F	0.33594	-1.48997	-0.01839	1.50836	1.08
BSBC35G ^R	-0.12895	-1.14551	-0.09743	1.24294	1.14
BSBC35H ^R	-0.17159	-1.06641	-0.06190	1.12831	1.19

^R Reverse coded

Scale Transformation Constants for the TIMSS 2019 Students Confident in Chemistry Scale – Grade 8

Scale Transformation Constants

$$A = 9.287425$$

$$B = 1.273947$$

$$\text{Transformed Scale Score} = 9.287425 + 1.273947 \cdot \text{Logit Scale Score}$$

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 Students Confident in Chemistry Scale – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	3.89635	
1	5.37931	
2	6.11672	
3	6.63419	
4	7.04816	
5	7.40098	
6	7.71515	
7	8.00298	
8	8.27440	
9	8.53331	
10	8.78409	
11	9.03015	
12	9.27400	9.3
13	9.51933	
14	9.76754	
15	10.02173	
16	10.28517	
17	10.56193	
18	10.85539	
19	11.17623	
20	11.53629	11.5
21	11.95803	
22	12.48347	
23	13.22968	
24	14.72190	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 Students Confident in Chemistry Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BSBC35A	BSBC35B ^R	BSBC35C ^R	BSBC35D	BSBC35E	BSBC35F	BSBC35G ^R	BSBC35H ^R
Cyprus	0.89	57	0.77	0.74	0.74	0.80	0.77	0.74	0.73	0.75
Finland	0.90	59	0.85	0.75	0.82	0.84	0.80	0.74	0.72	0.56
France	0.89	57	0.83	0.68	0.80	0.84	0.79	0.63	0.67	0.78
Georgia	0.86	51	0.77	0.67	0.72	0.78	0.75	0.73	0.65	0.65
Hungary	0.90	58	0.84	0.67	0.80	0.83	0.76	0.77	0.73	0.67
Kazakhstan	0.88	54	0.80	0.67	0.78	0.80	0.80	0.76	0.63	0.64
Lebanon	0.80	42	0.70	0.61	0.51	0.75	0.73	0.72	0.59	0.55
Lithuania	0.90	59	0.85	0.74	0.78	0.83	0.82	0.68	0.77	0.65
Morocco	0.73	36	0.68	0.53	0.42	0.74	0.68	0.70	0.44	0.49
Portugal	0.89	57	0.79	0.66	0.77	0.84	0.81	0.71	0.71	0.72
Romania	0.84	47	0.78	0.56	0.59	0.79	0.75	0.75	0.59	0.63
Russian Federation	0.90	60	0.80	0.74	0.83	0.85	0.81	0.79	0.73	0.63
Sweden	0.88	54	0.79	0.68	0.76	0.82	0.76	0.68	0.68	0.69
Benchmarking Participants										
Moscow City, Russian Fed.	0.91	62	0.82	0.77	0.84	0.85	0.83	0.75	0.74	0.67

^R Reverse coded

Relationship Between the TIMSS 2019 Students Confident in Chemistry Scale and TIMSS 2019 Achievement – Grade 8

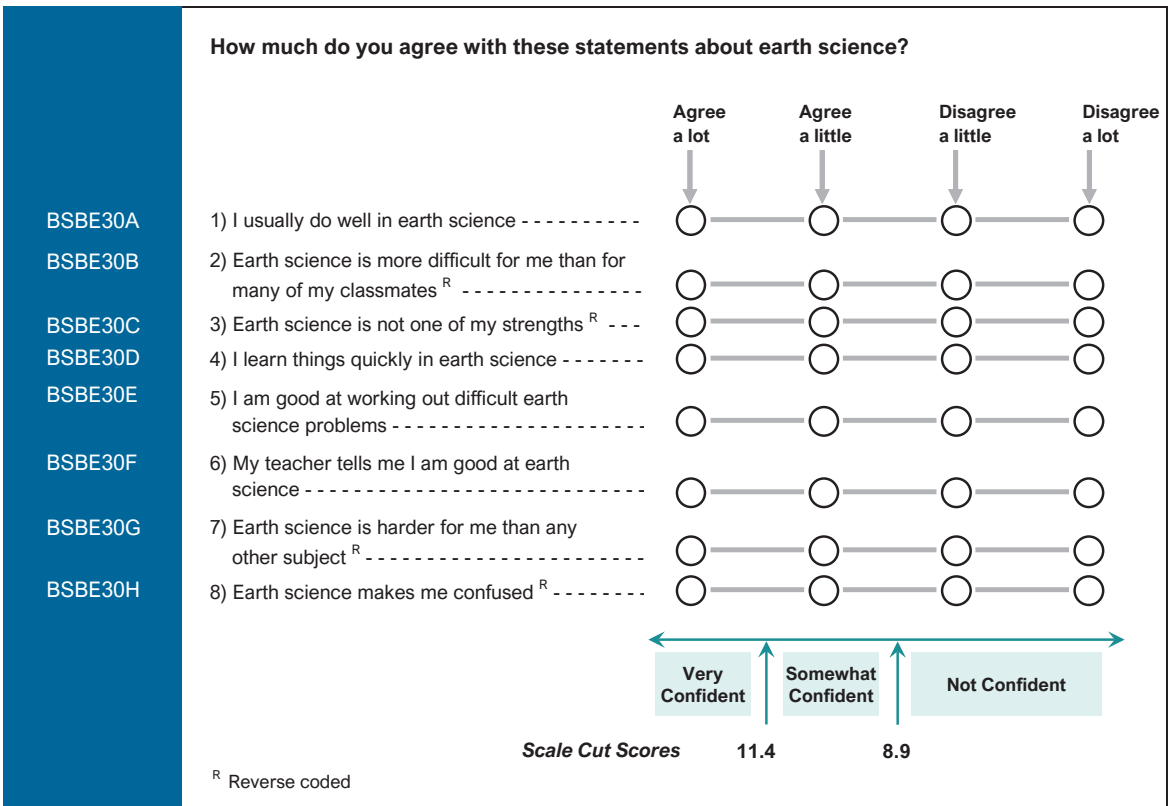
Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2	
Cyprus	0.33	0.11	0.12
Finland	0.40	0.16	0.17
France	0.34	0.11	0.13
Georgia	0.34	0.11	0.12
Hungary	0.19	0.04	0.05
Kazakhstan	0.19	0.04	0.04
Lebanon	0.32	0.10	0.10
Lithuania	0.28	0.08	0.09
Morocco	0.34	0.12	0.10
Portugal	0.37	0.14	0.14
Romania	0.20	0.04	0.07
Russian Federation	0.24	0.06	0.06
Sweden	0.34	0.11	0.11
International Median	0.33	0.11	0.10
Benchmarking Participants			
Moscow City, Russian Fed.	0.24	0.06	0.06

Scale was created for TIMSS 2019 countries where science is taught as separate subjects.

Students Confident in Earth Science – Grade 8

About the Scale

The *Students Confident in Earth Science* scale was created based on students’ responses to nine items listed below.



Item Parameters for the TIMSS 2019 *Students Confident in Earth Science* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBE30A	-0.46107	-1.41872	-0.43930	1.85802	0.87
BSBE30B ^R	-0.19875	-1.37648	-0.15004	1.52652	1.09
BSBE30C ^R	0.33686	-1.49366	0.07644	1.41722	0.96
BSBE30D	-0.12943	-1.65316	-0.17396	1.82712	0.88
BSBE30E	0.45259	-1.79586	0.02998	1.76588	1.01
BSBE30F	0.55212	-1.58204	-0.08004	1.66208	1.15
BSBE30G ^R	-0.24372	-1.06339	-0.29194	1.35533	1.10
BSBE30H ^R	-0.30860	-1.02496	-0.22507	1.25003	1.10

^R Reverse coded

Scale Transformation Constants for the TIMSS 2019 *Students Confident in Earth Science* Scale – Grade 8

Scale Transformation Constants

A = 8.904350

B = 1.335162

Transformed Scale Score = 8.904350 + 1.335162 • Logit Scale Score

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 *Students Confident in Earth Science* Scale – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	3.21094	
1	4.74712	
2	5.50216	
3	6.03282	
4	6.45453	
5	6.81430	
6	7.13915	
7	7.43625	
8	7.71978	
9	7.99591	
10	8.26570	
11	8.53520	
12	8.80751	8.9
13	9.08518	
14	9.37050	
15	9.66574	
16	9.97356	
17	10.29618	
18	10.64027	
19	11.01305	
20	11.42745	11.4
21	11.90664	
22	12.49348	
23	13.31156	
24	14.91022	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 Students Confident in Earth Science Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BSBE30A	BSBE30B ^R	BSBE30C ^R	BSBE30D	BSBE30E	BSBE30F	BSBE30G ^R	BSBE30H ^R
Cyprus	0.88	55	0.79	0.69	0.73	0.80	0.76	0.73	0.70	0.74
Finland	0.86	50	0.81	0.72	0.78	0.81	0.73	0.65	0.62	0.52
France	0.88	55	0.80	0.66	0.76	0.83	0.76	0.60	0.71	0.80
Georgia	0.83	45	0.72	0.65	0.73	0.74	0.68	0.67	0.58	0.59
Hungary	0.89	57	0.82	0.68	0.81	0.81	0.74	0.75	0.74	0.66
Kazakhstan	0.86	51	0.79	0.64	0.79	0.76	0.76	0.68	0.63	0.61
Lebanon	-	-	-	-	-	-	-	-	-	-
Lithuania	0.89	56	0.83	0.71	0.78	0.81	0.78	0.66	0.76	0.64
Morocco	0.74	36	0.66	0.56	0.43	0.72	0.68	0.68	0.49	0.51
Portugal	0.84	48	0.74	0.61	0.68	0.80	0.74	0.62	0.63	0.70
Romania	0.77	39	0.65	0.59	0.63	0.70	0.52	0.62	0.60	0.66
Russian Federation	0.87	52	0.75	0.70	0.78	0.81	0.75	0.69	0.67	0.61
Sweden	-	-	-	-	-	-	-	-	-	-
Benchmarking Participants										
Moscow City, Russian Fed.	0.89	57	0.78	0.74	0.82	0.84	0.77	0.70	0.70	0.65

^R Reverse coded

Relationship Between the TIMSS 2019 Students Confident in Earth Science Scale and TIMSS 2019 Achievement – Grade 8

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	
Cyprus	0.31	0.10	0.10
Finland	0.32	0.10	0.11
France	0.33	0.11	0.11
Georgia	0.34	0.11	0.12
Hungary	0.24	0.06	0.06
Kazakhstan	0.20	0.04	0.04
Lebanon	-	-	-
Lithuania	0.21	0.05	0.05
Morocco	0.29	0.09	0.08
Portugal	0.36	0.13	0.13
Romania	0.23	0.05	0.06
Russian Federation	0.16	0.03	0.03
Sweden	-	-	-
International Median	0.29	0.09	0.08
Benchmarking Participants			
Moscow City, Russian Fed.	0.17	0.03	0.03

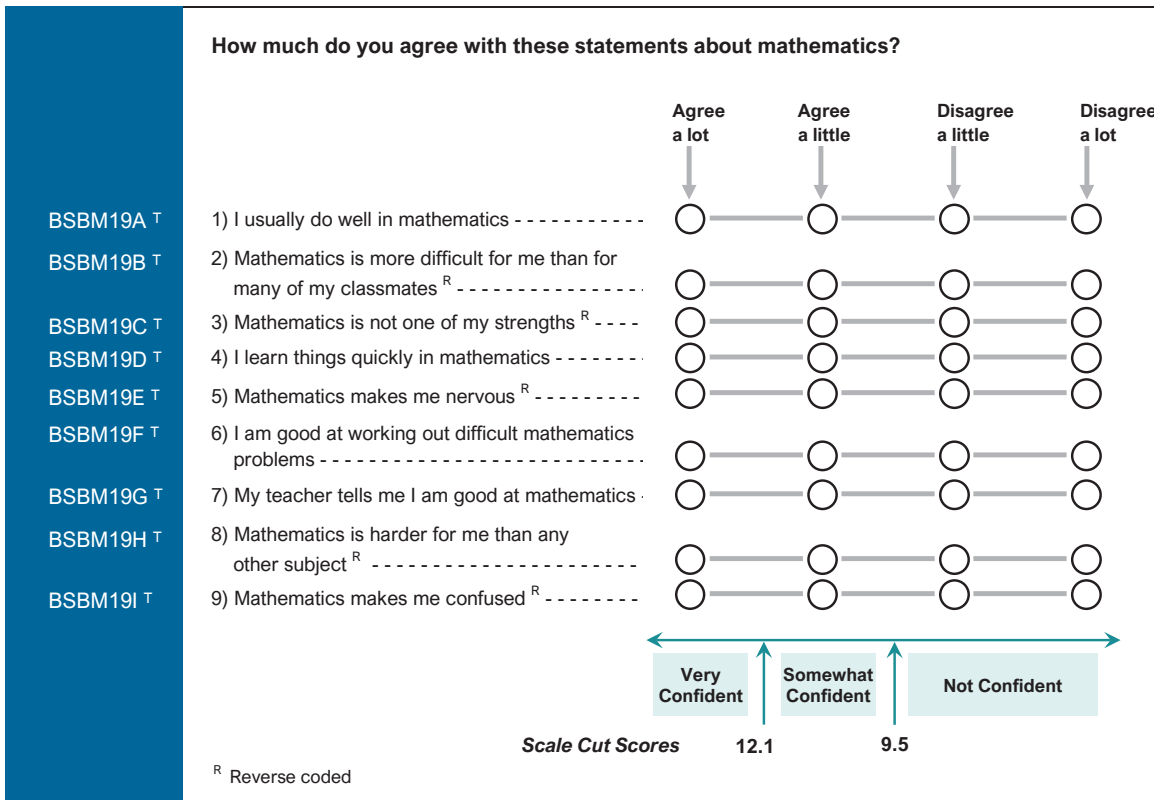
Scale was created for TIMSS 2019 countries where science is taught as separate subjects.

A dash (–) indicates comparable data not available.

Students Confident in Mathematics – Grade 8

About the Scale

The *Students Confident in Mathematics* scale was created based on students’ responses to nine items listed below.



^T Trend item—item was included in the same scale in TIMSS 2015 and was used for linking the TIMSS 2015 and TIMSS 2019 scales.

Item Parameters for the TIMSS 2019 *Students Confident in Mathematics* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBM19A	-0.50049	-1.11873	-0.29405	1.41278	0.91
BSBM19B ^R	-0.00401	-1.14715	0.08367	1.06348	1.02
BSBM19C ^R	0.30051	-0.87683	0.15214	0.72469	0.91
BSBM19D	-0.22037	-1.32473	-0.05161	1.37634	0.90
BSBM19E ^R	-0.10393	-0.97276	0.03057	0.94219	1.26
BSBM19F	0.30742	-1.30327	-0.11911	1.42238	0.95
BSBM19G	0.07317	-1.04695	-0.15298	1.19993	1.13
BSBM19H ^R	0.07380	-0.69985	-0.01041	0.71026	0.93
BSBM19I ^R	0.07390	-0.96460	0.10241	0.86219	0.97

^R Reverse coded

Scale Transformation Constants for the TIMSS 2019 *Students Confident in Mathematics* Scale – Grade 8

Scale Transformation Constants

A = 9.553292

B = 1.562014

Transformed Scale Score = 9.553292 + 1.562014 • Logit Scale Score

**Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019
Students Confident in Mathematics Scale – Grade 8**

Raw Score	Transformed Scale Score	Cutpoint
0	3.27793	
1	5.04751	
2	5.90622	
3	6.49606	
4	6.95612	
5	7.34181	
6	7.67800	
7	7.97991	
8	8.25602	
9	8.51577	
10	8.76168	
11	8.99736	
12	9.22591	
13	9.45004	9.5
14	9.67230	
15	9.89514	
16	10.12116	
17	10.35323	
18	10.59469	
19	10.84951	
20	11.12082	
21	11.41779	
22	11.75008	
23	12.13375	12.1
24	12.59517	
25	13.19086	
26	14.06165	
27	15.85188	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 Students Confident in Mathematics Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item								
			BSBM19A	BSBM19B _R	BSBM19C _R	BSBM19D	BSBM19E _R	BSBM19F	BSBM19G	BSBM19H _R	BSBM19I _R
Australia	0.90	56	0.78	0.76	0.84	0.80	0.58	0.80	0.53	0.79	0.78
Bahrain	0.85	45	0.58	0.64	0.69	0.70	0.63	0.66	0.59	0.76	0.73
Chile	0.87	49	0.75	0.61	0.72	0.76	0.54	0.75	0.64	0.73	0.75
Chinese Taipei	0.92	61	0.82	0.79	0.85	0.83	0.55	0.80	0.79	0.80	0.78
Cyprus	0.91	59	0.81	0.77	0.82	0.78	0.60	0.79	0.71	0.81	0.81
Egypt	0.75	33	0.31	0.65	0.55	0.49	0.68	0.47	0.44	0.73	0.70
England	0.88	51	0.74	0.73	0.82	0.75	0.58	0.74	0.44	0.80	0.77
Finland	0.91	58	0.84	0.76	0.86	0.82	0.63	0.79	0.67	0.77	0.66
France	0.91	59	0.84	0.72	0.84	0.84	0.57	0.76	0.67	0.80	0.85
Georgia	0.84	45	0.74	0.67	0.77	0.71	0.44	0.65	0.65	0.68	0.67
Hong Kong SAR	0.89	54	0.73	0.73	0.82	0.72	0.62	0.74	0.62	0.81	0.77
Hungary	0.91	58	0.84	0.70	0.82	0.83	0.57	0.79	0.77	0.78	0.75
Iran, Islamic Rep. of	0.87	49	0.76	0.55	0.68	0.75	0.68	0.73	0.70	0.70	0.74
Ireland	0.90	56	0.80	0.78	0.79	0.81	0.60	0.78	0.51	0.82	0.79
Israel	0.88	50	0.75	0.71	0.75	0.74	0.62	0.70	0.61	0.76	0.73
Italy	0.93	63	0.83	0.77	0.86	0.85	0.67	0.79	0.75	0.81	0.79
Japan	0.90	55	0.77	0.69	0.81	0.73	0.63	0.79	0.66	0.77	0.77
Jordan	0.79	36	0.34	0.67	0.67	0.55	0.64	0.54	0.50	0.72	0.71
Kazakhstan	0.89	54	0.79	0.73	0.79	0.81	0.54	0.76	0.73	0.71	0.72
Korea, Rep. of	0.90	56	0.85	0.77	0.78	0.75	0.38	0.83	0.78	0.77	0.72
Kuwait	0.79	37	0.45	0.62	0.61	0.62	0.61	0.64	0.55	0.68	0.69
Lebanon	0.83	42	0.69	0.59	0.57	0.70	0.60	0.68	0.66	0.68	0.62
Lithuania	0.90	57	0.83	0.73	0.82	0.81	0.66	0.79	0.66	0.80	0.68
Malaysia	0.81	39	0.62	0.53	0.67	0.58	0.62	0.66	0.57	0.66	0.71
Morocco	0.79	37	0.63	0.57	0.49	0.69	0.59	0.60	0.64	0.61	0.64
New Zealand	0.87	51	0.75	0.74	0.79	0.76	0.57	0.77	0.47	0.78	0.72
Norway (9)	0.92	61	0.81	0.78	0.87	0.84	0.69	0.82	0.63	0.81	0.76
Oman	0.79	37	0.42	0.70	0.64	0.56	0.68	0.44	0.45	0.74	0.71
Portugal	0.89	55	0.77	0.64	0.80	0.84	0.46	0.82	0.72	0.76	0.78
Qatar	0.82	40	0.61	0.64	0.66	0.63	0.60	0.61	0.55	0.73	0.67
Romania	0.84	46	0.73	0.69	0.66	0.76	0.27	0.74	0.68	0.73	0.69
Russian Federation	0.91	58	0.79	0.75	0.85	0.83	0.57	0.78	0.73	0.77	0.73
Saudi Arabia	0.81	39	0.43	0.67	0.60	0.65	0.64	0.60	0.56	0.74	0.70
Singapore	0.91	58	0.83	0.77	0.87	0.77	0.62	0.78	0.60	0.82	0.77
South Africa (9)	0.78	37	0.65	0.49	0.63	0.64	0.46	0.64	0.60	0.63	0.66
Sweden	0.91	58	0.81	0.77	0.83	0.82	0.54	0.81	0.63	0.82	0.78
Turkey	0.89	54	0.79	0.66	0.80	0.72	0.62	0.73	0.72	0.76	0.75
United Arab Emirates	0.84	43	0.64	0.67	0.70	0.64	0.62	0.63	0.55	0.74	0.69
United States	0.90	56	0.78	0.77	0.83	0.79	0.62	0.77	0.55	0.82	0.78

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Students Confident in Mathematics* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BSBM19A	BSBM19B ^R	BSBM19C ^R	BSBM19D	BSBM19E ^R	BSBM19F	BSBM19G	BSBM19H ^R	BSBM19I ^R	
Benchmarking Participants												
Ontario, Canada	0.91	60	0.81	0.81	0.86	0.81	0.64	0.78	0.52	0.85	0.81	
Quebec, Canada	0.92	62	0.85	0.81	0.89	0.84	0.65	0.81	0.59	0.81	0.83	
Moscow City, Russian Fed.	0.92	61	0.80	0.78	0.87	0.85	0.61	0.80	0.69	0.81	0.76	
Gauteng, RSA (9)	0.83	43	0.70	0.57	0.69	0.68	0.52	0.67	0.63	0.70	0.71	
Western Cape, RSA (9)	0.86	47	0.73	0.63	0.74	0.69	0.58	0.68	0.65	0.73	0.71	
Abu Dhabi, UAE	0.80	38	0.54	0.66	0.68	0.55	0.62	0.55	0.47	0.73	0.68	
Dubai, UAE	0.87	50	0.74	0.72	0.78	0.70	0.64	0.69	0.58	0.76	0.72	

^R Reverse coded

Relationship Between the TIMSS 2019 Students Confident in Mathematics Scale and TIMSS 2019 Achievement – Grade 8

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	0.49	0.24	0.23
Bahrain	0.32	0.10	0.09
Chile	0.36	0.13	0.13
Chinese Taipei	0.49	0.24	0.23
Cyprus	0.52	0.27	0.26
Egypt	0.28	0.08	0.08
England	0.43	0.18	0.16
Finland	0.55	0.30	0.29
France	0.56	0.31	0.30
Georgia	0.47	0.22	0.20
Hong Kong SAR	0.32	0.10	0.11
Hungary	0.55	0.30	0.30
Iran, Islamic Rep. of	0.43	0.19	0.18
Ireland	0.43	0.18	0.18
Israel	0.39	0.15	0.15
Italy	0.50	0.25	0.25
Japan	0.46	0.21	0.19
Jordan	0.37	0.14	0.13
Kazakhstan	0.29	0.08	0.09
Korea, Rep. of	0.49	0.24	0.22
Kuwait	0.30	0.09	0.08
Lebanon	0.37	0.14	0.13
Lithuania	0.49	0.24	0.24
Malaysia	0.23	0.05	0.07
Morocco	0.34	0.11	0.11
New Zealand	0.46	0.21	0.20
Norway (9)	0.62	0.39	0.36
Oman	0.38	0.15	0.13
Portugal	0.52	0.27	0.27
Qatar	0.35	0.12	0.13
Romania	0.46	0.21	0.21
Russian Federation	0.43	0.18	0.18
Saudi Arabia	0.37	0.14	0.12
Singapore	0.40	0.16	0.15
South Africa (9)	0.26	0.07	0.09
Sweden	0.56	0.31	0.29
Turkey	0.46	0.21	0.22
United Arab Emirates	0.31	0.10	0.10
United States	0.42	0.18	0.18
International Median	0.43	0.18	0.18

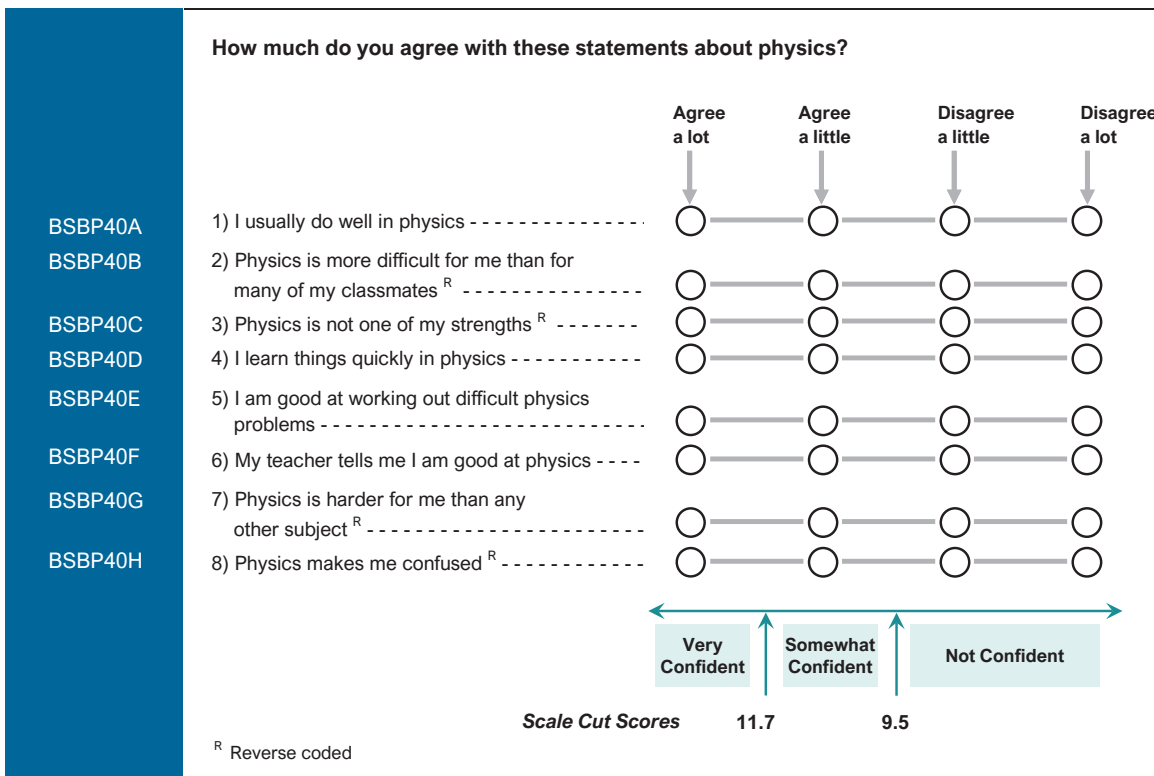
Relationship Between the TIMSS 2019 *Students Confident in Mathematics* Scale and TIMSS 2019 Achievement – Grade 8

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	
Benchmarking Participants			
Ontario, Canada	0.56	0.32	0.31
Quebec, Canada	0.54	0.29	0.26
Moscow City, Russian Fed.	0.53	0.28	0.27
Gauteng, RSA (9)	0.33	0.11	0.12
Western Cape, RSA (9)	0.36	0.13	0.17
Abu Dhabi, UAE	0.34	0.11	0.12
Dubai, UAE	0.36	0.13	0.12

Students Confident in Physics – Grade 8

About the Scale

The *Students Confident in Physics* scale was created based on students’ responses to eight items listed below.



Item Parameters for the TIMSS 2019 Students Confident in Physics Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBP40A	-0.39746	-1.37025	-0.24044	1.61069	0.88
BSBP40B ^R	-0.21128	-1.31428	-0.01234	1.32662	1.10
BSBP40C ^R	0.28620	-1.30084	0.14053	1.16031	0.98
BSBP40D	-0.07362	-1.58237	-0.00919	1.59156	0.86
BSBP40E	0.39820	-1.51916	0.09858	1.42058	0.96
BSBP40F	0.29764	-1.44459	-0.00874	1.45333	1.07
BSBP40G ^R	-0.11946	-1.11132	-0.09117	1.20249	1.14
BSBP40H ^R	-0.18022	-1.01891	-0.05197	1.07088	1.20

^R Reverse coded

Scale Transformation Constants for the TIMSS 2019 Students Confident in Physics Scale – Grade 8

Scale Transformation Constants

A = 9.428686

B = 1.324891

Transformed Scale Score = 9.428686 + 1.324891 • Logit Scale Score

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 Students Confident in Physics Scale – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	3.90479	
1	5.44008	
2	6.20005	
3	6.73122	
4	7.15482	
5	7.51483	
6	7.83462	
7	8.12702	
8	8.40231	
9	8.66453	
10	8.91821	
11	9.16694	
12	9.41328	9.5
13	9.66135	
14	9.91242	
15	10.16987	
16	10.43713	
17	10.71844	
18	11.01730	
19	11.34485	
20	11.71341	11.7
21	12.14624	
22	12.68694	
23	13.45737	
24	15.00359	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 Students Confident in Physics Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BSBP40A	BSBP40B ^R	BSBP40C ^R	BSBP40D	BSBP40E	BSBP40F	BSBP40G ^R	BSBP40H ^R
Cyprus	0.91	61	0.81	0.74	0.75	0.83	0.82	0.76	0.75	0.75
Finland	0.89	58	0.85	0.76	0.81	0.84	0.81	0.75	0.70	0.53
France	0.89	57	0.83	0.68	0.80	0.84	0.79	0.63	0.67	0.78
Georgia	0.85	49	0.77	0.64	0.70	0.78	0.75	0.73	0.60	0.58
Hungary	0.89	57	0.83	0.68	0.79	0.83	0.76	0.76	0.72	0.66
Kazakhstan	0.87	52	0.79	0.65	0.79	0.79	0.79	0.74	0.61	0.60
Lebanon	0.78	41	0.73	0.54	0.49	0.77	0.77	0.74	0.50	0.46
Lithuania	0.90	58	0.85	0.73	0.76	0.84	0.82	0.72	0.76	0.63
Morocco	0.72	34	0.68	0.49	0.36	0.76	0.69	0.72	0.40	0.42
Portugal	0.89	57	0.79	0.66	0.77	0.84	0.81	0.71	0.71	0.72
Romania	0.81	44	0.78	0.50	0.56	0.77	0.73	0.74	0.54	0.59
Russian Federation	0.88	55	0.78	0.71	0.80	0.83	0.78	0.73	0.68	0.61
Sweden	0.88	54	0.80	0.70	0.78	0.82	0.77	0.68	0.67	0.68
Benchmarking Participants										
Moscow City, Russian Fed.	0.90	59	0.81	0.76	0.83	0.85	0.80	0.73	0.74	0.63

^R Reverse coded

Relationship Between the TIMSS 2019 Students Confident in Physics Scale and TIMSS 2019 Achievement – Grade 8

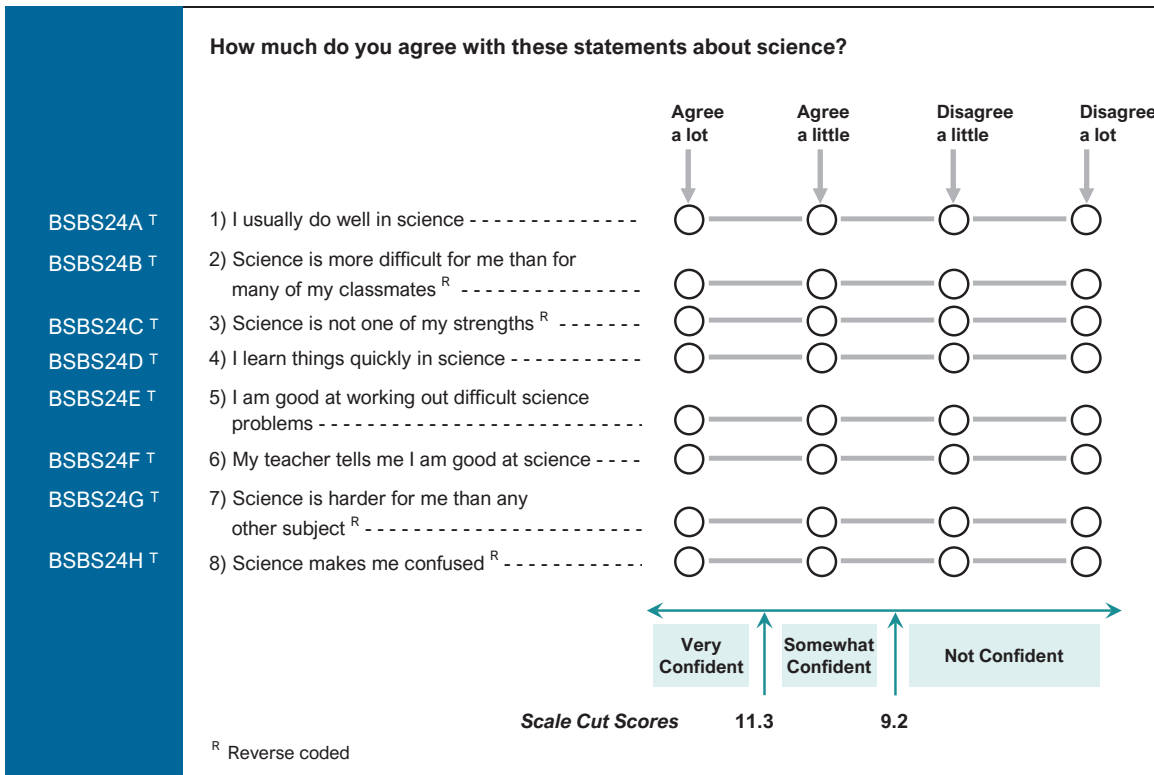
Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2	
Cyprus	0.34	0.12	0.13
Finland	0.35	0.12	0.15
France	0.34	0.11	0.13
Georgia	0.29	0.08	0.10
Hungary	0.31	0.10	0.11
Kazakhstan	0.18	0.03	0.04
Lebanon	0.29	0.08	0.10
Lithuania	0.25	0.06	0.08
Morocco	0.32	0.11	0.10
Portugal	0.37	0.14	0.14
Romania	0.17	0.03	0.06
Russian Federation	0.22	0.05	0.05
Sweden	0.37	0.13	0.15
International Median	0.31	0.10	0.10
Benchmarking Participants			
Moscow City, Russian Fed.	0.28	0.08	0.08

Scale was created for TIMSS 2019 countries where science is taught as separate subjects.

Students Confident in Science – Grade 8

About the Scale

The *Students Confident in Science* scale was created based on students’ responses to eight items listed below.



^T Trend item—item was included in the same scale in TIMSS 2015 and was used for linking the TIMSS 2015 and TIMSS 2019 scales.

Item Parameters for the TIMSS 2019 *Students Confident in Science* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBS24A	-0.46541	-1.14798	-0.28032	1.42830	0.92
BSBS24B ^R	0.03957	-1.24140	0.10527	1.13613	1.04
BSBS24C ^R	0.31928	-1.10283	0.16654	0.93629	1.02
BSBS24D	-0.30224	-1.38866	0.03271	1.35595	0.89
BSBS24E	0.16257	-1.43808	0.06778	1.37030	0.99
BSBS24F	0.14256	-1.20554	0.05071	1.15483	1.10
BSBS24G ^R	0.01606	-0.96248	-0.04795	1.01043	1.02
BSBS24H ^R	0.08761	-1.03184	0.12933	0.90251	1.05

^R Reverse coded

Scale Transformation Constants for the TIMSS 2019 *Students Confident in Science* Scale – Grade 8

Scale Transformation Constants

A = 9.091884

B = 1.446981

Transformed Scale Score = 9.091884 + 1.446981 • Logit Scale Score

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 *Students Confident in Science* Scale – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	3.24992	
1	4.91876	
2	5.74112	
3	6.31300	
4	6.76777	
5	7.15260	
6	7.49248	
7	7.80038	
8	8.08863	
9	8.36075	
10	8.62122	
11	8.87381	
12	9.12286	9.2
13	9.36803	
14	9.61581	
15	9.86849	
16	10.13014	
17	10.40580	
18	10.70197	
19	11.02414	
20	11.39185	11.3
21	11.82899	
22	12.38397	
23	13.18921	
24	14.84182	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Students Confident in Science* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BSBS24A	BSBS24B _R	BSBS24C _R	BSBS24D	BSBS24E	BSBS24F	BSBS24G _R	BSBS24H _R
Australia	0.89	56	0.77	0.72	0.79	0.80	0.79	0.62	0.74	0.75
Bahrain	0.82	44	0.54	0.67	0.67	0.71	0.65	0.64	0.71	0.68
Chile	0.82	44	0.75	0.55	0.64	0.77	0.73	0.62	0.58	0.66
Chinese Taipei	0.92	63	0.82	0.78	0.82	0.83	0.80	0.78	0.77	0.75
Cyprus	-	-	-	-	-	-	-	-	-	-
Egypt	0.73	35	0.31	0.74	0.61	0.53	0.46	0.52	0.72	0.70
England	0.89	57	0.79	0.73	0.80	0.81	0.79	0.61	0.75	0.76
Finland	-	-	-	-	-	-	-	-	-	-
France	-	-	-	-	-	-	-	-	-	-
Georgia	-	-	-	-	-	-	-	-	-	-
Hong Kong SAR	0.85	49	0.74	0.69	0.75	0.73	0.71	0.56	0.71	0.68
Hungary	-	-	-	-	-	-	-	-	-	-
Iran, Islamic Rep. of	0.84	48	0.73	0.61	0.63	0.75	0.73	0.71	0.66	0.68
Ireland	0.90	60	0.81	0.77	0.79	0.83	0.79	0.65	0.78	0.78
Israel	0.85	50	0.76	0.70	0.65	0.78	0.76	0.67	0.66	0.65
Italy	0.86	52	0.78	0.69	0.74	0.79	0.67	0.67	0.68	0.71
Japan	0.89	57	0.78	0.74	0.82	0.76	0.77	0.67	0.76	0.73
Jordan	0.75	36	0.32	0.73	0.67	0.54	0.50	0.52	0.72	0.70
Kazakhstan	-	-	-	-	-	-	-	-	-	-
Korea, Rep. of	0.92	64	0.86	0.76	0.84	0.82	0.84	0.80	0.78	0.72
Kuwait	0.76	38	0.40	0.67	0.59	0.69	0.61	0.59	0.66	0.65
Lebanon	-	-	-	-	-	-	-	-	-	-
Lithuania	-	-	-	-	-	-	-	-	-	-
Malaysia	0.77	38	0.60	0.52	0.64	0.66	0.67	0.57	0.64	0.63
Morocco	-	-	-	-	-	-	-	-	-	-
New Zealand	0.86	50	0.75	0.68	0.74	0.77	0.75	0.61	0.69	0.67
Norway (9)	0.88	55	0.77	0.72	0.80	0.80	0.76	0.62	0.73	0.70
Oman	0.74	36	0.38	0.74	0.65	0.56	0.43	0.47	0.74	0.69
Portugal	-	-	-	-	-	-	-	-	-	-
Qatar	0.79	41	0.62	0.64	0.61	0.70	0.66	0.62	0.64	0.61
Romania	-	-	-	-	-	-	-	-	-	-
Russian Federation	-	-	-	-	-	-	-	-	-	-
Saudi Arabia	0.76	38	0.46	0.72	0.60	0.64	0.52	0.56	0.69	0.68
Singapore	0.91	60	0.82	0.78	0.84	0.79	0.79	0.66	0.78	0.74
South Africa (9)	0.76	37	0.68	0.52	0.59	0.70	0.68	0.57	0.55	0.58
Sweden	-	-	-	-	-	-	-	-	-	-
Turkey	0.85	49	0.75	0.68	0.74	0.70	0.69	0.65	0.69	0.70
United Arab Emirates	0.81	43	0.63	0.67	0.66	0.70	0.66	0.60	0.67	0.64
United States	0.87	52	0.73	0.72	0.74	0.79	0.74	0.58	0.74	0.73

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Students Confident in Science* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BSBS24A	BSBS24B ^R	BSBS24C ^R	BSBS24D	BSBS24E	BSBS24F	BSBS24G ^R	BSBS24H ^R
Benchmarking Participants										
Ontario, Canada	0.89	57	0.79	0.76	0.81	0.79	0.78	0.59	0.77	0.75
Quebec, Canada	0.89	58	0.80	0.73	0.82	0.83	0.76	0.59	0.74	0.77
Moscow City, Russian Fed.	-	-	-	-	-	-	-	-	-	-
Gauteng, RSA (9)	0.82	45	0.72	0.60	0.68	0.73	0.71	0.59	0.63	0.67
Western Cape, RSA (9)	0.82	44	0.73	0.59	0.64	0.73	0.70	0.63	0.62	0.66
Abu Dhabi, UAE	0.77	38	0.58	0.63	0.58	0.67	0.64	0.58	0.63	0.60
Dubai, UAE	0.85	50	0.73	0.69	0.76	0.73	0.72	0.61	0.71	0.69

^R Reverse coded

A dash (-) indicates comparable data not available.

Relationship Between the TIMSS 2019 Students Confident in Science Scale and TIMSS 2019 Achievement – Grade 8

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	0.13
Bahrain	0.36	0.13	0.14
Chile	0.22	0.05	0.07
Chinese Taipei	0.35	0.13	0.19
Cyprus	-	-	-
Egypt	0.37	0.14	0.14
England	0.36	0.13	0.15
Finland	-	-	-
France	-	-	-
Georgia	-	-	-
Hong Kong SAR	0.29	0.09	0.13
Hungary	-	-	-
Iran, Islamic Rep. of	0.37	0.14	0.14
Ireland	0.43	0.19	0.18
Israel	0.39	0.15	0.17
Italy	0.32	0.10	0.10
Japan	0.37	0.14	0.15
Jordan	0.43	0.18	0.18
Kazakhstan	-	-	-
Korea, Rep. of	0.42	0.18	0.22
Kuwait	0.32	0.10	0.10
Lebanon	-	-	-
Lithuania	-	-	-
Malaysia	0.21	0.04	0.06
Morocco	-	-	-
New Zealand	0.33	0.11	0.13
Norway (9)	0.38	0.15	0.16
Oman	0.39	0.15	0.15
Portugal	-	-	-
Qatar	0.35	0.12	0.15
Romania	-	-	-
Russian Federation	-	-	-
Saudi Arabia	0.34	0.12	0.11
Singapore	0.28	0.08	0.09
South Africa (9)	0.23	0.05	0.07
Sweden	-	-	-
Turkey	0.46	0.21	0.22
United Arab Emirates	0.37	0.13	0.16
United States	0.32	0.10	0.11
International Median	0.36	0.13	0.14

Relationship Between the TIMSS 2019 *Students Confident in Science* Scale and TIMSS 2019 Achievement – Grade 8

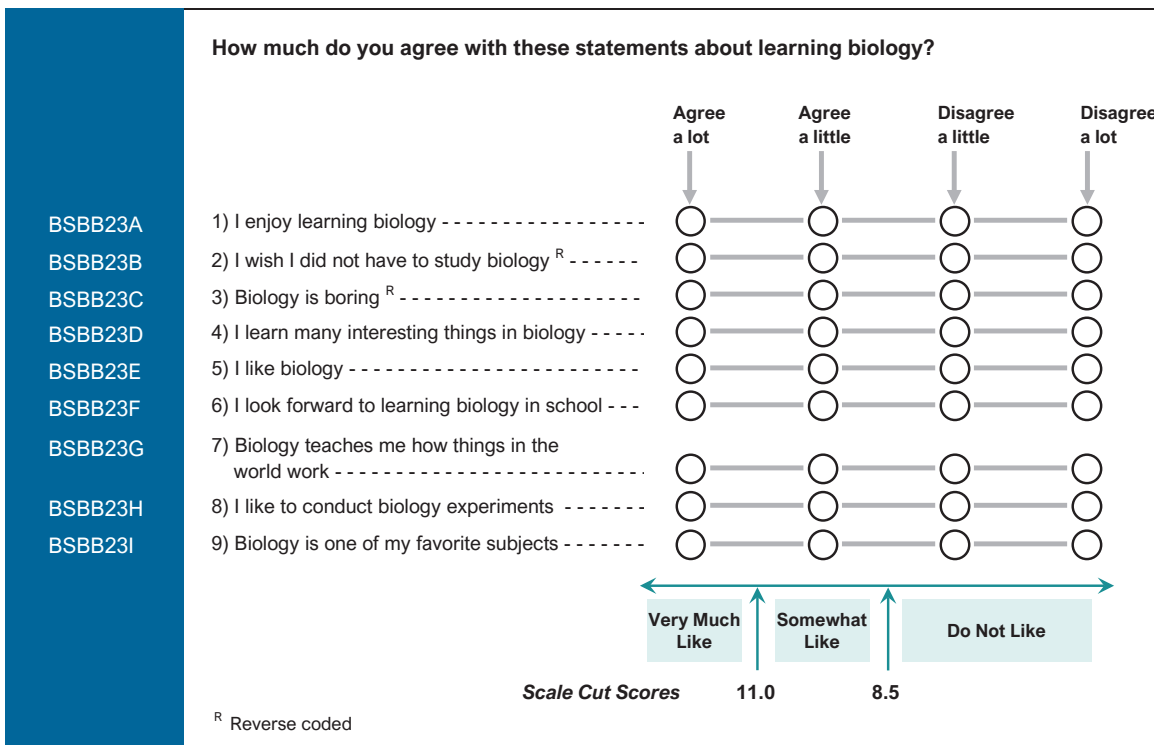
Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2	
Benchmarking Participants			
Ontario, Canada	0.34	0.11	0.10
Quebec, Canada	0.37	0.14	0.13
Moscow City, Russian Fed.	-	-	-
Gauteng, RSA (9)	0.20	0.04	0.05
Western Cape, RSA (9)	0.18	0.03	0.05
Abu Dhabi, UAE	0.42	0.17	0.20
Dubai, UAE	0.31	0.10	0.11

A dash (–) indicates comparable data not available.

Students Like Learning Biology – Grade 8

About the Scale

The *Students Like Learning Biology* scale was created based on students’ responses to nine items listed below.



Item Parameters for the TIMSS 2019 *Students Like Learning Biology* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBB23A	-0.16212	-1.47892	-0.46297	1.94189	0.75
BSBB23B ^R	0.20512	-1.24042	-0.29613	1.53655	1.45
BSBB23C ^R	0.20601	-1.47581	-0.19591	1.67172	1.21
BSBB23D	-0.77117	-1.31189	-0.49265	1.80454	0.88
BSBB23E	-0.08618	-1.39978	-0.31230	1.71208	0.64
BSBB23F	0.71997	-1.80718	0.05532	1.75186	0.90
BSBB23G	-0.76337	-1.31194	-0.65352	1.96546	1.21
BSBB23H	-0.19527	-0.99360	-0.40491	1.39851	1.48
BSBB23I	0.84701	-1.40607	0.05039	1.35568	0.85

^R Reverse coded

Scale Transformation Constants for the TIMSS 2019 *Students Like Learning Biology* Scale – Grade 8

Scale Transformation Constants

A = 8.641623

B = 1.107618

Transformed Scale Score = 8.641623 + 1.107618 • Logit Scale Score

**Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019
Students Like Learning Biology Scale – Grade 8**

Raw Score	Transformed Scale Score	Cutpoint
0	3.77033	
1	5.00936	
2	5.61016	
3	6.03106	
4	6.36568	
5	6.65211	
6	6.90865	
7	7.14591	
8	7.37038	
9	7.58667	
10	7.79825	
11	8.00863	
12	8.21825	
13	8.43038	8.5
14	8.64675	
15	8.86844	
16	9.09669	
17	9.33234	
18	9.57605	
19	9.82964	
20	10.09524	
21	10.37666	
22	10.68028	
23	11.01688	11.0
24	11.40423	
25	11.88207	
26	12.54999	
27	13.86476	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Students Like Learning Biology* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BSBB23A	BSBB23B ^R	BSBB23C ^R	BSBB23D	BSBB23E	BSBB23F	BSBB23G	BSBB23H	BSBB23I	
Cyprus	0.92	62	0.87	0.68	0.73	0.81	0.91	0.85	0.67	0.63	0.86	
Finland	0.93	63	0.86	0.70	0.75	0.82	0.91	0.87	0.70	0.69	0.83	
France	0.91	59	0.87	0.70	0.76	0.79	0.90	0.83	0.64	0.54	0.84	
Georgia	0.89	54	0.83	0.62	0.64	0.72	0.89	0.83	0.56	0.62	0.84	
Hungary	0.91	60	0.88	0.67	0.76	0.79	0.91	0.86	0.63	0.57	0.85	
Kazakhstan	0.90	56	0.83	0.49	0.72	0.79	0.88	0.83	0.64	0.68	0.82	
Lebanon	0.86	50	0.81	0.41	0.44	0.77	0.88	0.61	0.73	0.75	0.83	
Lithuania	0.92	61	0.87	0.78	0.80	0.77	0.90	0.79	0.64	0.56	0.84	
Morocco	0.88	53	0.77	0.43	0.54	0.79	0.86	0.84	0.68	0.69	0.83	
Portugal	0.91	59	0.86	0.73	0.73	0.80	0.90	0.84	0.70	0.50	0.81	
Romania	0.88	54	0.86	0.38	0.59	0.78	0.89	0.85	0.68	0.60	0.83	
Russian Federation	0.90	58	0.86	0.61	0.71	0.77	0.89	0.82	0.67	0.60	0.84	
Sweden	0.92	61	0.87	0.68	0.77	0.83	0.91	0.88	0.65	0.57	0.81	
Benchmarking Participants												
Moscow City, Russian Fed.	0.92	61	0.87	0.72	0.77	0.80	0.90	0.83	0.65	0.54	0.87	

^R Reverse coded

Relationship Between the TIMSS 2019 *Students Like Learning Biology* Scale and TIMSS 2019 Achievement – Grade 8

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale
	<i>r</i>	<i>r</i> ²	
Cyprus	0.22	0.05	0.04
Finland	0.22	0.05	0.03
France	0.18	0.03	0.03
Georgia	0.13	0.02	0.02
Hungary	0.09	0.01	0.01
Kazakhstan	0.09	0.01	0.00
Lebanon	0.28	0.08	0.07
Lithuania	0.12	0.01	0.01
Morocco	0.23	0.05	0.04
Portugal	0.16	0.03	0.02
Romania	0.08	0.01	0.01
Russian Federation	0.06	0.00	0.00
Sweden	0.17	0.03	0.02
International Median	0.16	0.03	0.02
Benchmarking Participants			
Moscow City, Russian Fed.	0.03	0.00	0.00

Scale was created for TIMSS 2019 countries where science is taught as separate subjects.

Students Like Learning Chemistry – Grade 8

About the Scale

The *Students Like Learning Chemistry* scale was created based on students' responses to nine items listed below.

		How much do you agree with these statements about learning chemistry?			
		Agree a lot	Agree a little	Disagree a little	Disagree a lot
BSBC33A	1) I enjoy learning chemistry -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBC33B	2) I wish I did not have to study chemistry ^R -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBC33C	3) Chemistry is boring ^R -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBC33D	4) I learn many interesting things in chemistry ---	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBC33E	5) I like chemistry -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBC33F	6) I look forward to learning chemistry in school -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBC33G	7) Chemistry teaches me how things in the world work -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBC33H	8) I like to conduct chemistry experiments -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBC33I	9) Chemistry is one of my favorite subjects -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Very Much Like	Somewhat Like	Do Not Like
Scale Cut Scores		11.1
		8.8

^R Reverse coded

Item Parameters for the TIMSS 2019 *Students Like Learning Chemistry* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBC33A	-0.14307	-1.46743	-0.25973	1.72716	0.73
BSBC33B ^R	0.23803	-1.27441	-0.19417	1.46858	1.66
BSBC33C ^R	0.14201	-1.45492	-0.16456	1.61948	1.36
BSBC33D	-0.61457	-1.44666	-0.41712	1.86378	0.86
BSBC33E	0.01742	-1.41770	-0.19178	1.60948	0.63
BSBC33F	0.68268	-1.77504	0.14928	1.62576	0.91
BSBC33G	-0.28919	-1.51200	-0.36951	1.88151	1.20
BSBC33H	-0.74644	-0.84521	-0.55612	1.40133	1.37
BSBC33I	0.71313	-1.44581	0.09000	1.35581	0.82

^R Reverse coded

Scale Transformation Constants for the TIMSS 2019 *Students Like Learning Chemistry* Scale – Grade 8

Scale Transformation Constants

A = 8.951511

B = 1.041262

Transformed Scale Score = 8.951511 + 1.041262 • Logit Scale Score

**Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019
Students Like Learning Chemistry Scale – Grade 8**

Raw Score	Transformed Scale Score	Cutpoint
0	4.38181	
1	5.56044	
2	6.13177	
3	6.52970	
4	6.84408	
5	7.11089	
6	7.35187	
7	7.57186	
8	7.78125	
9	7.98339	
10	8.18235	
11	8.37833	
12	8.57458	
13	8.77259	8.8
14	8.97386	
15	9.17852	
16	9.38835	
17	9.60400	
18	9.82660	
19	10.05696	
20	10.29850	
21	10.55457	
22	10.83124	
23	11.13865	11.1
24	11.49497	
25	11.93332	
26	12.55122	
27	13.77684	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Students Like Learning Chemistry* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BSBC33A	BSBC33B ^R	BSBC33C ^R	BSBC33D	BSBC33E	BSBC33F	BSBC33G	BSBC33H	BSBC33I	
Cyprus	0.92	63	0.87	0.61	0.67	0.84	0.91	0.85	0.74	0.72	0.86	
Finland	0.94	67	0.90	0.74	0.76	0.85	0.92	0.88	0.74	0.70	0.86	
France	0.92	60	0.87	0.63	0.73	0.81	0.91	0.82	0.69	0.59	0.85	
Georgia	0.91	59	0.86	0.57	0.62	0.80	0.90	0.84	0.68	0.67	0.86	
Hungary	0.92	61	0.88	0.66	0.70	0.81	0.91	0.87	0.70	0.59	0.86	
Kazakhstan	0.92	61	0.85	0.50	0.76	0.82	0.90	0.85	0.68	0.75	0.86	
Lebanon	0.86	51	0.81	0.34	0.42	0.81	0.88	0.61	0.75	0.75	0.84	
Lithuania	0.92	62	0.88	0.76	0.78	0.80	0.91	0.80	0.67	0.60	0.86	
Morocco	0.88	55	0.77	0.38	0.45	0.81	0.88	0.86	0.76	0.78	0.83	
Portugal	0.93	64	0.89	0.74	0.74	0.83	0.91	0.86	0.76	0.57	0.84	
Romania	0.90	58	0.89	0.31	0.53	0.82	0.91	0.86	0.77	0.67	0.85	
Russian Federation	0.91	60	0.88	0.61	0.67	0.81	0.90	0.85	0.69	0.65	0.86	
Sweden	0.93	64	0.87	0.64	0.77	0.85	0.92	0.89	0.69	0.67	0.82	
Benchmarking Participants												
Moscow City, Russian Fed.	0.93	64	0.89	0.68	0.73	0.83	0.91	0.86	0.72	0.62	0.88	

^R Reverse coded

Relationship Between the TIMSS 2019 *Students Like Learning Chemistry* Scale and TIMSS 2019 Achievement – Grade 8

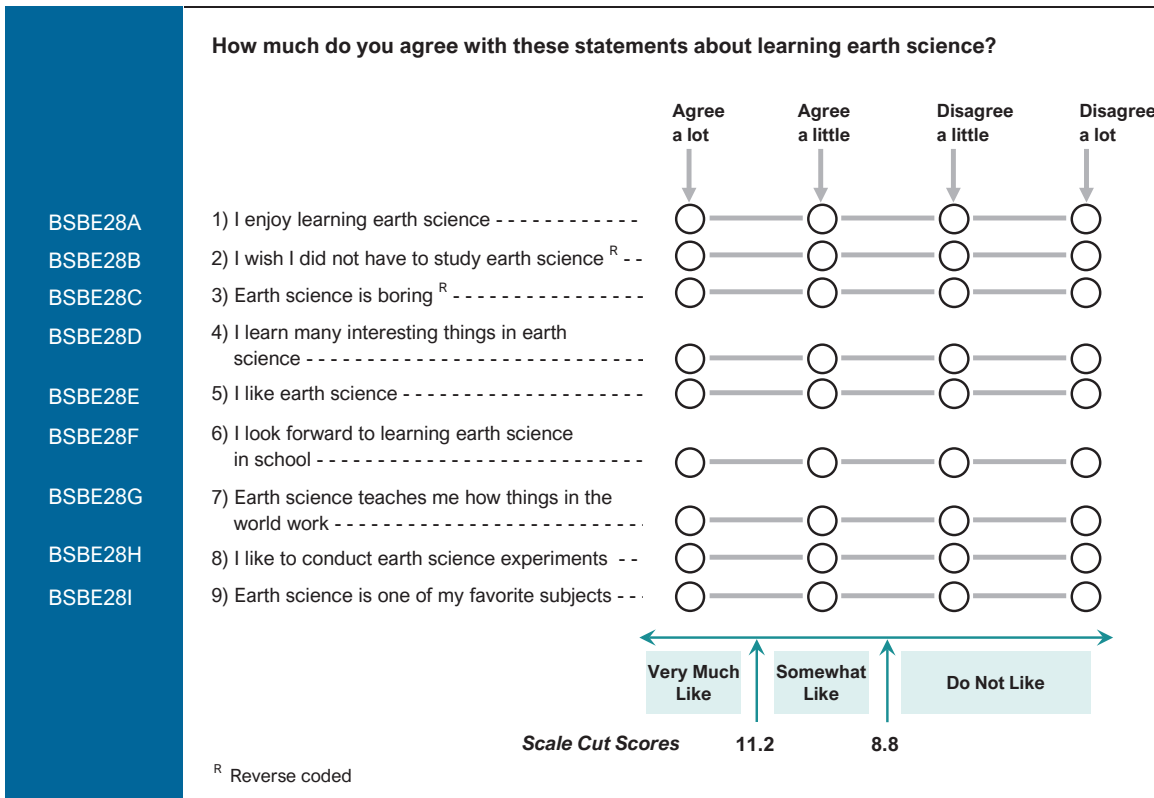
Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale
	r	r^2	
Cyprus	0.22	0.05	0.04
Finland	0.36	0.13	0.10
France	0.21	0.04	0.04
Georgia	0.20	0.04	0.04
Hungary	0.11	0.01	0.02
Kazakhstan	0.16	0.03	0.02
Lebanon	0.25	0.06	0.07
Lithuania	0.23	0.05	0.04
Morocco	0.25	0.06	0.05
Portugal	0.24	0.06	0.06
Romania	0.18	0.03	0.03
Russian Federation	0.17	0.03	0.03
Sweden	0.20	0.04	0.03
International Median	0.21	0.04	0.04
Benchmarking Participants			
Moscow City, Russian Fed.	0.18	0.03	0.03

Scale was created for TIMSS 2019 countries where science is taught as separate subjects.

Students Like Learning Earth Science – Grade 8

About the Scale

The *Students Like Learning Earth Science* scale was created based on students’ responses to nine items listed below.



Item Parameters for the TIMSS 2019 *Students Like Learning Earth Science* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBE28A	-0.22224	-1.55381	-0.36522	1.91903	0.75
BSBE28B ^R	0.08027	-1.31109	-0.29421	1.60530	1.56
BSBE28C ^R	0.08661	-1.54312	-0.20119	1.74431	1.29
BSBE28D	-0.72581	-1.46248	-0.48855	1.95103	0.87
BSBE28E	-0.12416	-1.50925	-0.28124	1.79049	0.64
BSBE28F	0.66218	-1.87680	0.10256	1.77424	0.84
BSBE28G	-0.84329	-1.28030	-0.70858	1.98888	1.11
BSBE28H	0.27811	-0.98803	-0.30562	1.29365	1.52
BSBE28I	0.80833	-1.46329	0.03245	1.43084	0.85

^R Reverse coded

Scale Transformation Constants for the TIMSS 2019 *Students Like Learning Earth Science* Scale – Grade 8

Scale Transformation Constants

A = 8.903182

B = 1.089155

Transformed Scale Score = 8.903182 + 1.089155 • Logit Scale Score

**Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019
Students Like Learning Earth Science Scale – Grade 8**

Raw Score	Transformed Scale Score	Cutpoint
0	4.02015	
1	5.24902	
2	5.84858	
3	6.27182	
4	6.61042	
5	6.90196	
6	7.16441	
7	7.40916	
8	7.64056	
9	7.86305	
10	8.07990	
11	8.29368	
12	8.50651	
13	8.72026	8.8
14	8.93707	
15	9.15692	
16	9.38258	
17	9.61474	
18	9.85461	
19	10.10305	
20	10.36341	
21	10.63911	
22	10.93638	
23	11.26581	11.2
24	11.64644	
25	12.11289	
26	12.76721	
27	14.05738	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 Students Like Learning Earth Science Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item								
			BSBE28A	BSBE28B ^R	BSBE28C ^R	BSBE28D	BSBE28E	BSBE28F	BSBE28G	BSBE28H	BSBE28I
Cyprus	0.92	61	0.87	0.61	0.66	0.82	0.91	0.86	0.70	0.70	0.85
Finland	0.93	64	0.87	0.69	0.74	0.83	0.91	0.86	0.73	0.71	0.82
France	0.91	59	0.87	0.70	0.75	0.79	0.90	0.83	0.64	0.54	0.84
Georgia	0.87	52	0.80	0.42	0.49	0.75	0.87	0.81	0.70	0.69	0.81
Hungary	0.92	61	0.89	0.61	0.71	0.81	0.92	0.87	0.68	0.64	0.86
Kazakhstan	0.90	57	0.81	0.43	0.73	0.78	0.88	0.83	0.68	0.70	0.84
Lebanon	-	-	-	-	-	-	-	-	-	-	-
Lithuania	0.91	61	0.88	0.75	0.79	0.79	0.90	0.79	0.66	0.55	0.85
Morocco	0.88	55	0.79	0.40	0.49	0.81	0.87	0.85	0.72	0.75	0.83
Portugal	0.91	59	0.86	0.73	0.73	0.80	0.90	0.84	0.70	0.50	0.81
Romania	0.85	51	0.84	0.16	0.36	0.80	0.89	0.85	0.76	0.61	0.81
Russian Federation	0.90	57	0.84	0.57	0.67	0.79	0.89	0.83	0.72	0.62	0.83
Sweden	-	-	-	-	-	-	-	-	-	-	-
Benchmarking Participants											
Moscow City, Russian Fed.	0.91	60	0.86	0.66	0.73	0.81	0.89	0.84	0.69	0.62	0.85

^R Reverse coded

Relationship Between the TIMSS 2019 Students Like Learning Earth Science Scale and TIMSS 2019 Achievement – Grade 8

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale
	<i>r</i>	<i>r</i> ²	
Cyprus	0.10	0.01	0.01
Finland	0.19	0.04	0.03
France	0.18	0.03	0.03
Georgia	0.08	0.01	0.01
Hungary	0.03	0.00	0.01
Kazakhstan	0.07	0.00	0.00
Lebanon	-	-	-
Lithuania	0.06	0.00	0.00
Morocco	0.19	0.04	0.03
Portugal	0.16	0.03	0.02
Romania	0.09	0.01	0.02
Russian Federation	0.01	0.00	0.00
Sweden	-	-	-
International Median	0.09	0.01	0.01
Benchmarking Participants			
Moscow City, Russian Fed.	0.02	0.00	0.00

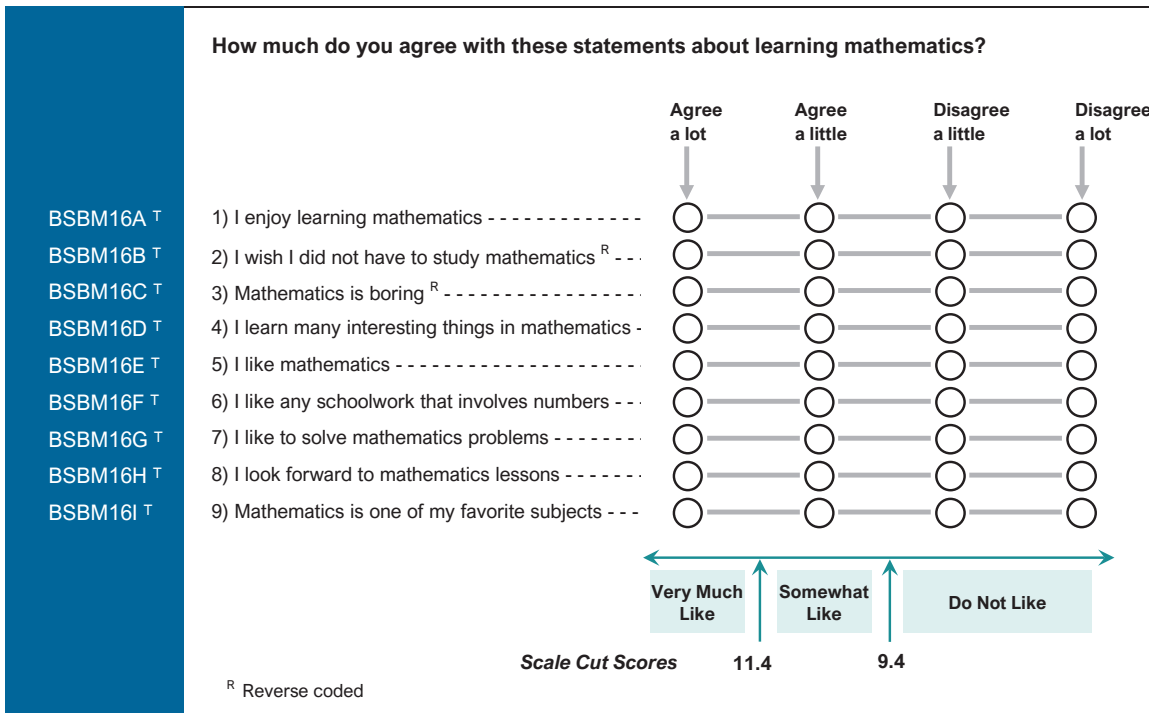
Scale was created for TIMSS 2019 countries where science is taught as separate subjects.

A dash (-) indicates comparable data not available.

Students Like Learning Mathematics – Grade 8

About the Scale

The *Students Like Learning Mathematics* scale was created based on students’ responses to nine items listed below.



^T Trend item—item was included in the same scale in TIMSS 2015 and was used for linking the TIMSS 2015 and TIMSS 2019 scales.

Item Parameters for the TIMSS 2019 *Students Like Learning Mathematics* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBM16A	-0.52075	-1.52420	-0.44716	1.97136	0.80
BSBM16B ^R	-0.16493	-1.27666	0.02387	1.25279	1.68
BSBM16C ^R	0.08233	-1.70726	0.11045	1.59681	1.34
BSBM16D	-0.67768	-1.75407	-0.23907	1.99314	1.13
BSBM16E	-0.20808	-1.32239	-0.32723	1.64962	0.66
BSBM16F	0.24118	-1.93026	0.06299	1.86727	1.03
BSBM16G	0.07107	-1.61719	-0.15594	1.77313	0.85
BSBM16H	0.65566	-1.77947	-0.05548	1.83495	0.93
BSBM16I	0.52120	-1.07237	-0.04864	1.12101	0.81

^R Reverse coded

Scale Transformation Constants for the TIMSS 2019 *Students Like Learning Mathematics* Scale – Grade 8

Scale Transformation Constants

$$A = 9.42706$$

$$B = 0.94246$$

$$\text{Transformed Scale Score} = 9.42706 + 0.94246 \cdot \text{Logit Scale Score}$$

**Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019
Students Like Learning Mathematics Scale – Grade 8**

Raw Score	Transformed Scale Score	Cutpoint
0	5.09484	
1	6.19800	
2	6.74882	
3	7.13627	
4	7.44727	
5	7.71308	
6	7.95043	
7	8.16805	
8	8.37412	
9	8.57095	
10	8.76139	
11	8.94763	
12	9.13133	
13	9.31385	9.4
14	9.49640	
15	9.68014	
16	9.86638	
17	10.05658	
18	10.25252	
19	10.45644	
20	10.67004	
21	10.89898	
22	11.14859	
23	11.42832	11.4
24	11.75478	
25	12.15847	
26	12.72711	
27	13.84849	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Students Like Learning Mathematics* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item								
			BSBM16A	BSBM16B R	BSBM16C R	BSBM16D	BSBM16E	BSBM16F	BSBM16G	BSBM16H	BSBM16I
Australia	0.94	67	0.89	0.72	0.75	0.73	0.91	0.81	0.86	0.83	0.86
Bahrain	0.94	66	0.85	0.66	0.74	0.79	0.91	0.79	0.85	0.84	0.87
Chile	0.93	64	0.85	0.64	0.74	0.71	0.90	0.80	0.87	0.84	0.85
Chinese Taipei	0.94	70	0.90	0.69	0.76	0.83	0.92	0.85	0.89	0.79	0.87
Cyprus	0.94	67	0.88	0.73	0.73	0.77	0.91	0.79	0.83	0.84	0.88
Egypt	0.88	53	0.74	0.41	0.49	0.74	0.86	0.71	0.86	0.82	0.82
England	0.93	65	0.86	0.72	0.75	0.72	0.90	0.79	0.84	0.82	0.84
Finland	0.94	67	0.87	0.72	0.77	0.80	0.92	0.79	0.81	0.83	0.85
France	0.93	63	0.86	0.71	0.78	0.71	0.90	0.73	0.74	0.82	0.85
Georgia	0.92	60	0.85	0.59	0.59	0.68	0.89	0.77	0.84	0.84	0.86
Hong Kong SAR	0.93	67	0.88	0.58	0.64	0.83	0.92	0.85	0.90	0.81	0.88
Hungary	0.93	65	0.88	0.64	0.71	0.74	0.91	0.83	0.83	0.83	0.85
Iran, Islamic Rep. of	0.93	64	0.84	0.71	0.69	0.74	0.89	0.77	0.84	0.82	0.88
Ireland	0.94	66	0.88	0.73	0.76	0.74	0.91	0.78	0.82	0.82	0.86
Israel	0.93	65	0.85	0.65	0.74	0.78	0.91	0.78	0.86	0.80	0.88
Italy	0.95	71	0.91	0.78	0.82	0.71	0.92	0.85	0.84	0.86	0.89
Japan	0.94	69	0.89	0.62	0.73	0.82	0.92	0.85	0.88	0.84	0.88
Jordan	0.91	60	0.82	0.43	0.54	0.78	0.89	0.80	0.85	0.85	0.87
Kazakhstan	0.92	62	0.81	0.58	0.73	0.74	0.88	0.77	0.87	0.84	0.85
Korea, Rep. of	0.94	69	0.89	0.59	0.74	0.82	0.92	0.88	0.91	0.76	0.89
Kuwait	0.92	62	0.83	0.45	0.63	0.79	0.90	0.80	0.84	0.85	0.87
Lebanon	0.89	53	0.83	0.51	0.52	0.71	0.88	0.69	0.82	0.64	0.86
Lithuania	0.93	64	0.86	0.70	0.74	0.70	0.90	0.80	0.87	0.80	0.83
Malaysia	0.90	57	0.82	0.65	0.71	0.69	0.87	0.73	0.78	0.71	0.81
Morocco	0.91	59	0.82	0.52	0.63	0.77	0.89	0.75	0.75	0.86	0.85
New Zealand	0.93	66	0.88	0.74	0.73	0.70	0.90	0.81	0.85	0.83	0.85
Norway (9)	0.94	69	0.88	0.69	0.77	0.79	0.91	0.83	0.89	0.86	0.86
Oman	0.88	53	0.80	0.35	0.55	0.77	0.87	0.69	0.82	0.71	0.85
Portugal	0.95	71	0.89	0.75	0.79	0.79	0.91	0.81	0.88	0.88	0.85
Qatar	0.92	63	0.84	0.54	0.58	0.78	0.91	0.82	0.87	0.84	0.88
Romania	0.92	61	0.85	0.52	0.63	0.75	0.89	0.72	0.88	0.84	0.86
Russian Federation	0.92	63	0.85	0.60	0.72	0.72	0.89	0.79	0.84	0.82	0.85
Saudi Arabia	0.93	64	0.82	0.55	0.75	0.78	0.89	0.80	0.85	0.86	0.87
Singapore	0.94	67	0.88	0.75	0.74	0.72	0.90	0.77	0.86	0.81	0.88
South Africa (9)	0.89	55	0.80	0.56	0.62	0.64	0.87	0.72	0.81	0.75	0.81
Sweden	0.94	70	0.88	0.69	0.81	0.78	0.92	0.87	0.86	0.84	0.86
Turkey	0.92	62	0.81	0.65	0.76	0.61	0.89	0.76	0.84	0.83	0.88
United Arab Emirates	0.92	62	0.83	0.60	0.63	0.76	0.89	0.78	0.84	0.83	0.87
United States	0.94	67	0.88	0.67	0.71	0.73	0.91	0.81	0.89	0.85	0.86

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Students Like Learning Mathematics* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BSBM16A	BSBM16B ^R	BSBM16C ^R	BSBM16D	BSBM16E	BSBM16F	BSBM16G	BSBM16H	BSBM16I	
Benchmarking Participants												
Ontario, Canada	0.94	68	0.89	0.71	0.76	0.71	0.91	0.81	0.87	0.87	0.87	
Quebec, Canada	0.93	65	0.88	0.60	0.79	0.75	0.91	0.82	0.83	0.81	0.86	
Moscow City, Russian Fed.	0.93	65	0.88	0.68	0.76	0.75	0.90	0.76	0.83	0.82	0.86	
Gauteng, RSA (9)	0.91	59	0.83	0.64	0.68	0.67	0.88	0.73	0.82	0.78	0.83	
Western Cape, RSA (9)	0.91	60	0.83	0.61	0.66	0.69	0.88	0.77	0.84	0.81	0.85	
Abu Dhabi, UAE	0.90	57	0.82	0.51	0.53	0.72	0.88	0.78	0.83	0.80	0.85	
Dubai, UAE	0.93	65	0.83	0.69	0.71	0.77	0.89	0.78	0.85	0.83	0.87	

^R Reverse coded

Relationship Between the TIMSS 2019 *Students Like Learning Mathematics* Scale and TIMSS 2019 Achievement – Grade 8

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	0.39	0.15	0.12
Bahrain	0.20	0.04	0.04
Chile	0.21	0.05	0.04
Chinese Taipei	0.42	0.17	0.16
Cyprus	0.37	0.13	0.13
Egypt	0.17	0.03	0.04
England	0.24	0.06	0.05
Finland	0.44	0.19	0.16
France	0.35	0.12	0.11
Georgia	0.26	0.07	0.06
Hong Kong SAR	0.30	0.09	0.08
Hungary	0.38	0.14	0.14
Iran, Islamic Rep. of	0.25	0.06	0.07
Ireland	0.32	0.11	0.10
Israel	0.17	0.03	0.02
Italy	0.35	0.12	0.12
Japan	0.40	0.16	0.13
Jordan	0.16	0.02	0.03
Kazakhstan	0.16	0.03	0.03
Korea, Rep. of	0.39	0.15	0.13
Kuwait	0.17	0.03	0.03
Lebanon	0.22	0.05	0.05
Lithuania	0.26	0.07	0.07
Malaysia	0.21	0.04	0.05
Morocco	0.25	0.06	0.05
New Zealand	0.29	0.08	0.07
Norway (9)	0.42	0.18	0.13
Oman	0.27	0.07	0.08
Portugal	0.37	0.14	0.13
Qatar	0.25	0.06	0.05
Romania	0.30	0.09	0.09
Russian Federation	0.28	0.08	0.08
Saudi Arabia	0.14	0.02	0.02
Singapore	0.33	0.11	0.09
South Africa (9)	0.11	0.01	0.02
Sweden	0.34	0.12	0.10
Turkey	0.25	0.06	0.07
United Arab Emirates	0.23	0.05	0.05
United States	0.27	0.07	0.07
International Median	0.27	0.07	0.07

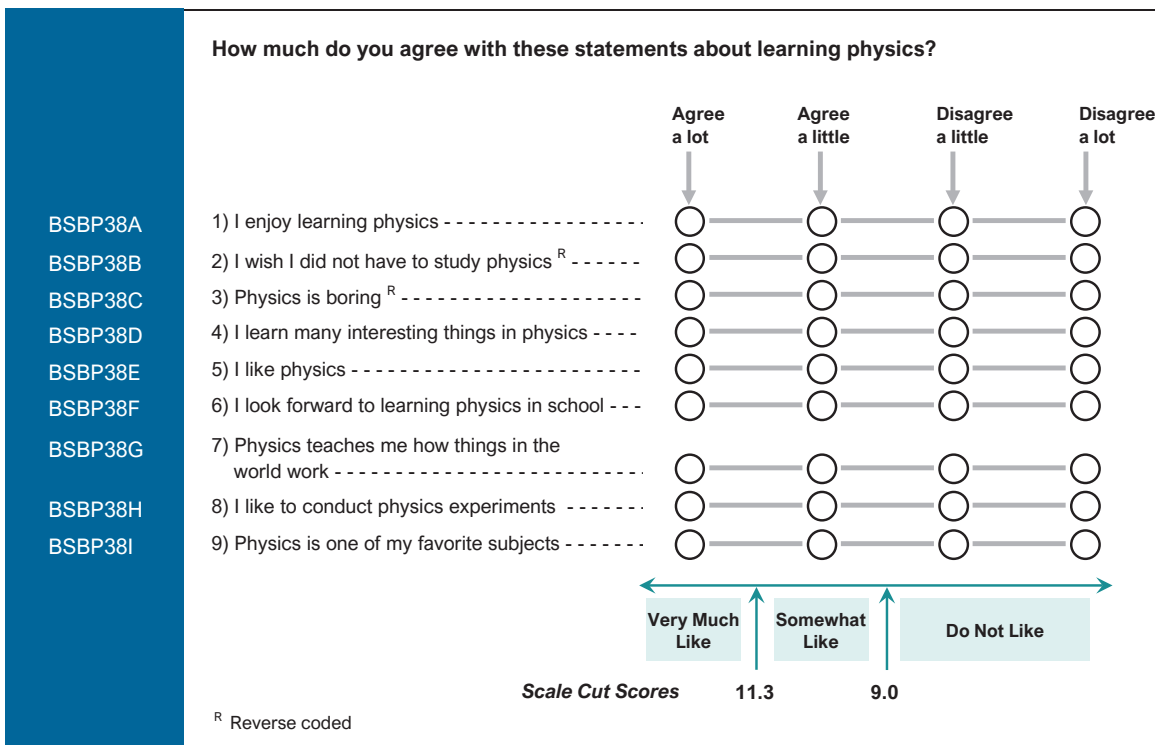
Relationship Between the TIMSS 2019 *Students Like Learning Mathematics* Scale and TIMSS 2019 Achievement – Grade 8

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	
Benchmarking Participants			
Ontario, Canada	0.40	0.16	0.14
Quebec, Canada	0.36	0.13	0.11
Moscow City, Russian Fed.	0.39	0.15	0.15
Gauteng, RSA (9)	0.09	0.01	0.01
Western Cape, RSA (9)	0.06	0.00	0.01
Abu Dhabi, UAE	0.21	0.05	0.07
Dubai, UAE	0.27	0.07	0.07

Students Like Learning Physics – Grade 8

About the Scale

The *Students Like Learning Physics* scale was created based on students’ responses to nine items listed below.



Item Parameters for the TIMSS 2019 *Students Like Learning Physics* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBP38A	-0.09991	-1.44455	-0.24740	1.69195	0.76
BSBP38B ^R	0.21221	-1.24941	-0.18976	1.43917	1.65
BSBP38C ^R	0.16331	-1.45914	-0.11608	1.57522	1.41
BSBP38D	-0.60437	-1.42950	-0.41629	1.84579	0.88
BSBP38E	0.06539	-1.42600	-0.16967	1.59567	0.63
BSBP38F	0.66918	-1.74385	0.15965	1.58420	0.90
BSBP38G	-0.58101	-1.34701	-0.48738	1.83439	1.17
BSBP38H	-0.57636	-0.98606	-0.45642	1.44248	1.27
BSBP38I	0.75156	-1.40132	0.07443	1.32689	0.83

^R Reverse coded

Scale Transformation Constants for the TIMSS 2019 *Students Like Learning Physics* Scale – Grade 8

Scale Transformation Constants

A = 9.112372

B = 1.052564

Transformed Scale Score = 9.112372 + 1.052564 • Logit Scale Score

**Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019
Students Like Learning Physics Scale – Grade 8**

Raw Score	Transformed Scale Score	Cutpoint
0	4.50052	
1	5.69131	
2	6.27071	
3	6.67290	
4	6.99227	
5	7.26430	
6	7.50753	
7	7.73282	
8	7.94527	
9	8.14964	
10	8.34943	
11	8.54716	
12	8.74474	
13	8.94365	9.0
14	9.14548	
15	9.34993	
16	9.55919	
17	9.77382	
18	9.99507	
19	10.22382	
20	10.46372	
21	10.71828	
22	10.99372	
23	11.30039	11.3
24	11.65666	
25	12.09616	
26	12.71724	
27	13.95282	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Students Like Learning Physics* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BSBP38A	BSBP38B ^R	BSBP38C ^R	BSBP38D	BSBP38E	BSBP38F	BSBP38G	BSBP38H	BSBP38I	
Cyprus	0.93	65	0.89	0.64	0.68	0.85	0.92	0.87	0.74	0.76	0.88	
Finland	0.94	67	0.89	0.72	0.74	0.84	0.92	0.88	0.74	0.75	0.85	
France	0.92	60	0.87	0.63	0.73	0.81	0.91	0.82	0.69	0.59	0.85	
Georgia	0.89	55	0.84	0.53	0.54	0.78	0.89	0.83	0.67	0.68	0.85	
Hungary	0.92	62	0.88	0.64	0.70	0.80	0.91	0.86	0.68	0.72	0.85	
Kazakhstan	0.91	59	0.83	0.44	0.74	0.79	0.89	0.83	0.70	0.77	0.84	
Lebanon	0.86	52	0.83	0.21	0.31	0.82	0.90	0.67	0.78	0.79	0.84	
Lithuania	0.93	63	0.88	0.78	0.76	0.80	0.91	0.78	0.68	0.67	0.86	
Morocco	0.88	56	0.79	0.35	0.41	0.82	0.88	0.87	0.77	0.80	0.83	
Portugal	0.93	64	0.89	0.74	0.74	0.83	0.91	0.86	0.76	0.57	0.84	
Romania	0.89	55	0.86	0.28	0.45	0.81	0.90	0.85	0.76	0.70	0.83	
Russian Federation	0.91	59	0.84	0.57	0.66	0.80	0.89	0.82	0.70	0.71	0.84	
Sweden	0.93	65	0.88	0.65	0.75	0.86	0.92	0.90	0.72	0.70	0.82	
Benchmarking Participants												
Moscow City, Russian Fed.	0.92	63	0.87	0.66	0.71	0.81	0.91	0.83	0.71	0.71	0.86	

^R Reverse coded

Relationship Between the TIMSS 2019 *Students Like Learning Physics* Scale and TIMSS 2019 Achievement – Grade 8

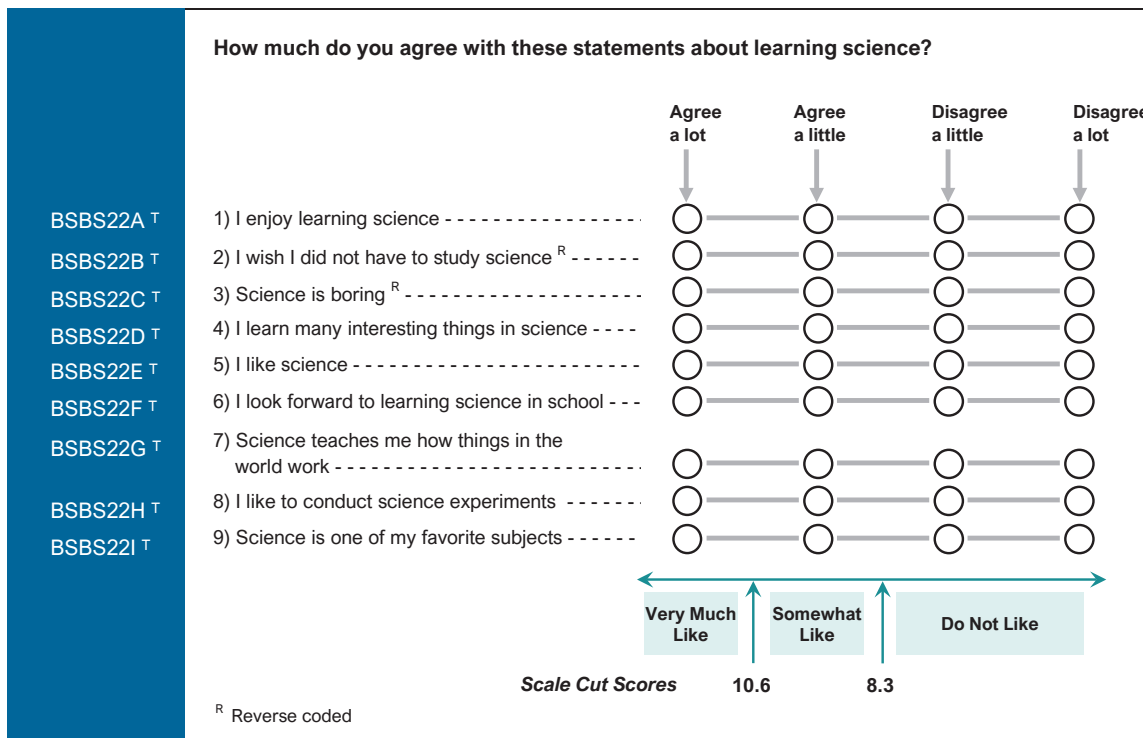
Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale
	r	r^2	
Cyprus	0.27	0.07	0.06
Finland	0.31	0.10	0.08
France	0.21	0.04	0.04
Georgia	0.17	0.03	0.04
Hungary	0.19	0.04	0.03
Kazakhstan	0.15	0.02	0.02
Lebanon	0.20	0.04	0.05
Lithuania	0.17	0.03	0.03
Morocco	0.25	0.06	0.06
Portugal	0.24	0.06	0.06
Romania	0.15	0.02	0.03
Russian Federation	0.17	0.03	0.02
Sweden	0.25	0.06	0.05
International Median	0.20	0.04	0.04
Benchmarking Participants			
Moscow City, Russian Fed.	0.20	0.04	0.03

Scale was created for TIMSS 2019 countries where science is taught as separate subjects.

Students Like Learning Science – Grade 8

About the Scale

The *Students Like Learning Science* scale was created based on students' responses to nine items listed below.



^T Trend item—item was included in the same scale in TIMSS 2015 and was used for linking the TIMSS 2015 and TIMSS 2019 scales.

Item Parameters for the TIMSS 2019 *Students Like Learning Science* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBS22A	-0.18816	-1.12110	-0.51287	1.63397	0.77
BSBS22B ^R	0.51905	-1.21205	-0.09407	1.30612	1.56
BSBS22C ^R	0.45459	-1.38086	-0.07300	1.45386	1.35
BSBS22D	-0.51760	-1.05343	-0.51799	1.57142	0.88
BSBS22E	-0.00730	-1.17719	-0.29690	1.47409	0.64
BSBS22F	0.40936	-1.50803	-0.05340	1.56143	0.81
BSBS22G	-0.58381	-1.04270	-0.57925	1.62195	1.08
BSBS22H	-0.60801	-0.85093	-0.44646	1.29739	1.35
BSBS22I	0.52188	-1.21442	0.00714	1.20728	0.80

^R Reverse coded

Scale Transformation Constants for the TIMSS 2019 *Students Like Learning Science* Scale – Grade 8

Scale Transformation Constants

A = 8.489044

B = 1.125793

Transformed Scale Score = 8.489044 + 1.125793 • Logit Scale Score

**Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019
Students Like Learning Science Scale – Grade 8**

Raw Score	Transformed Scale Score	Cutpoint
0	3.84650	
1	5.07484	
2	5.65807	
3	6.06022	
4	6.37614	
5	6.64332	
6	6.88421	
7	7.10319	
8	7.31154	
9	7.51243	
10	7.71018	
11	7.90450	
12	8.09896	
13	8.29500	8.3
14	8.49394	
15	8.69661	
16	8.90441	
17	9.11856	
18	9.34076	
19	9.57219	
20	9.81723	
21	10.07979	
22	10.36663	
23	10.68878	10.6
24	11.06414	
25	11.53300	
26	12.19630	
27	13.51778	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Students Like Learning Science* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BSBS22A	BSBS22B ^R	BSBS22C ^R	BSBS22D	BSBS22E	BSBS22F	BSBS22G	BSBS22H	BSBS22I	
Australia	0.93	64	0.88	0.70	0.76	0.80	0.92	0.90	0.74	0.57	0.87	
Bahrain	0.90	58	0.81	0.54	0.62	0.82	0.89	0.85	0.74	0.62	0.86	
Chile	0.90	57	0.85	0.50	0.66	0.80	0.90	0.85	0.71	0.62	0.84	
Chinese Taipei	0.92	62	0.87	0.63	0.66	0.82	0.90	0.86	0.74	0.69	0.87	
Cyprus	-	-	-	-	-	-	-	-	-	-	-	
Egypt	0.83	47	0.66	0.33	0.41	0.75	0.83	0.82	0.73	0.70	0.79	
England	0.93	63	0.88	0.75	0.75	0.81	0.91	0.89	0.70	0.53	0.86	
Finland	-	-	-	-	-	-	-	-	-	-	-	
France	-	-	-	-	-	-	-	-	-	-	-	
Georgia	-	-	-	-	-	-	-	-	-	-	-	
Hong Kong SAR	0.92	61	0.87	0.54	0.58	0.83	0.90	0.88	0.75	0.76	0.87	
Hungary	-	-	-	-	-	-	-	-	-	-	-	
Iran, Islamic Rep. of	0.89	56	0.82	0.63	0.62	0.73	0.87	0.81	0.67	0.63	0.86	
Ireland	0.93	64	0.90	0.73	0.75	0.80	0.92	0.89	0.71	0.57	0.87	
Israel	0.91	59	0.86	0.59	0.64	0.82	0.90	0.82	0.72	0.63	0.88	
Italy	0.91	59	0.86	0.77	0.77	0.77	0.89	0.83	0.62	0.43	0.84	
Japan	0.92	63	0.87	0.67	0.73	0.82	0.90	0.86	0.69	0.65	0.87	
Jordan	0.86	55	0.78	0.28	0.38	0.82	0.88	0.86	0.79	0.76	0.84	
Kazakhstan	-	-	-	-	-	-	-	-	-	-	-	
Korea, Rep. of	0.93	64	0.89	0.67	0.75	0.81	0.91	0.84	0.72	0.69	0.90	
Kuwait	0.89	56	0.79	0.39	0.53	0.82	0.89	0.87	0.73	0.66	0.86	
Lebanon	-	-	-	-	-	-	-	-	-	-	-	
Lithuania	-	-	-	-	-	-	-	-	-	-	-	
Malaysia	0.88	52	0.80	0.58	0.63	0.76	0.85	0.73	0.68	0.63	0.78	
Morocco	-	-	-	-	-	-	-	-	-	-	-	
New Zealand	0.92	61	0.88	0.71	0.66	0.78	0.91	0.89	0.70	0.56	0.85	
Norway (9)	0.92	60	0.88	0.70	0.75	0.81	0.91	0.87	0.66	0.50	0.83	
Oman	0.84	49	0.73	0.28	0.48	0.77	0.85	0.78	0.74	0.68	0.81	
Portugal	-	-	-	-	-	-	-	-	-	-	-	
Qatar	0.89	57	0.83	0.39	0.45	0.82	0.90	0.86	0.78	0.70	0.87	
Romania	-	-	-	-	-	-	-	-	-	-	-	
Russian Federation	-	-	-	-	-	-	-	-	-	-	-	
Saudi Arabia	0.89	55	0.80	0.44	0.58	0.82	0.87	0.85	0.69	0.68	0.84	
Singapore	0.91	60	0.86	0.73	0.73	0.76	0.90	0.87	0.68	0.52	0.86	
South Africa (9)	0.86	50	0.79	0.45	0.52	0.69	0.85	0.81	0.64	0.68	0.80	
Sweden	-	-	-	-	-	-	-	-	-	-	-	
Turkey	0.87	52	0.80	0.57	0.67	0.60	0.86	0.78	0.68	0.62	0.84	
United Arab Emirates	0.90	56	0.81	0.49	0.55	0.80	0.89	0.85	0.75	0.68	0.85	
United States	0.91	60	0.87	0.58	0.66	0.78	0.90	0.88	0.72	0.65	0.86	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Students Like Learning Science* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BSBS22A	BSBS22B ^R	BSBS22C ^R	BSBS22D	BSBS22E	BSBS22F	BSBS22G	BSBS22H	BSBS22I	
Benchmarking Participants												
Ontario, Canada	0.92	61	0.88	0.68	0.76	0.76	0.91	0.88	0.67	0.57	0.87	
Quebec, Canada	0.91	60	0.88	0.58	0.76	0.80	0.91	0.87	0.63	0.57	0.86	
Moscow City, Russian Fed.	-	-	-	-	-	-	-	-	-	-	-	
Gauteng, RSA (9)	0.89	54	0.82	0.56	0.64	0.70	0.88	0.84	0.66	0.63	0.83	
Western Cape, RSA (9)	0.89	54	0.84	0.52	0.59	0.71	0.88	0.85	0.64	0.65	0.84	
Abu Dhabi, UAE	0.88	54	0.80	0.39	0.41	0.80	0.88	0.84	0.76	0.71	0.84	
Dubai, UAE	0.91	58	0.82	0.63	0.71	0.76	0.89	0.84	0.72	0.60	0.84	

^R Reverse coded

A dash (-) indicates comparable data not available.

Relationship Between the TIMSS 2019 *Students Like Learning Science* Scale and TIMSS 2019 Achievement – Grade 8

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	0.33	0.11	0.09
Bahrain	0.26	0.07	0.06
Chile	0.16	0.02	0.02
Chinese Taipei	0.32	0.10	0.09
Cyprus	-	-	-
Egypt	0.34	0.12	0.11
England	0.31	0.09	0.08
Finland	-	-	-
France	-	-	-
Georgia	-	-	-
Hong Kong SAR	0.26	0.07	0.06
Hungary	-	-	-
Iran, Islamic Rep. of	0.22	0.05	0.05
Ireland	0.34	0.11	0.09
Israel	0.22	0.05	0.04
Italy	0.20	0.04	0.03
Japan	0.31	0.10	0.09
Jordan	0.26	0.07	0.08
Kazakhstan	-	-	-
Korea, Rep. of	0.39	0.15	0.15
Kuwait	0.24	0.06	0.04
Lebanon	-	-	-
Lithuania	-	-	-
Malaysia	0.28	0.08	0.08
Morocco	-	-	-
New Zealand	0.26	0.07	0.06
Norway (9)	0.27	0.07	0.06
Oman	0.34	0.12	0.10
Portugal	-	-	-
Qatar	0.28	0.08	0.07
Romania	-	-	-
Russian Federation	-	-	-
Saudi Arabia	0.22	0.05	0.04
Singapore	0.30	0.09	0.08
South Africa (9)	0.22	0.05	0.05
Sweden	-	-	-
Turkey	0.24	0.06	0.05
United Arab Emirates	0.36	0.13	0.13
United States	0.21	0.05	0.04
International Median	0.27	0.07	0.07

Relationship Between the TIMSS 2019 *Students Like Learning Science* Scale and TIMSS 2019 Achievement – Grade 8

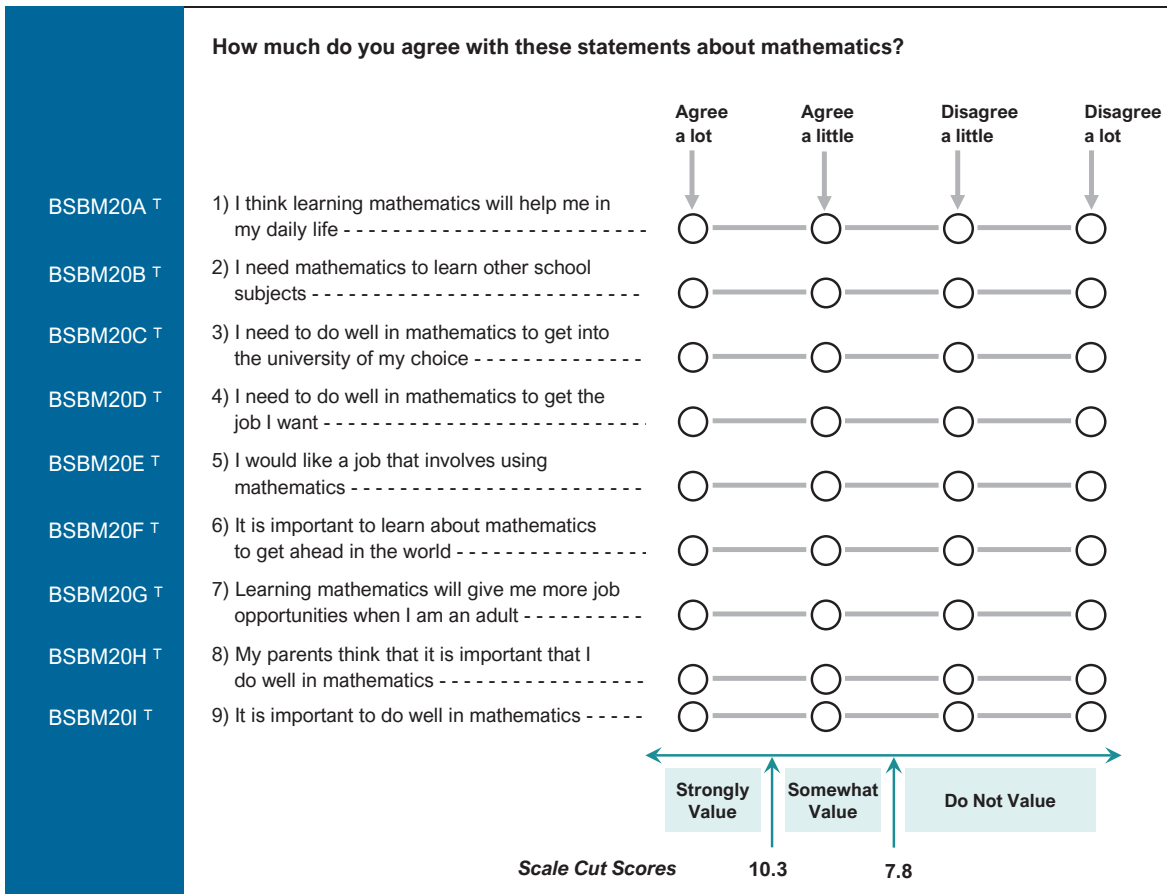
Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2	
Benchmarking Participants			
Ontario, Canada	0.24	0.06	0.04
Quebec, Canada	0.26	0.07	0.06
Moscow City, Russian Fed.	-	-	-
Gauteng, RSA (9)	0.13	0.02	0.02
Western Cape, RSA (9)	0.14	0.02	0.02
Abu Dhabi, UAE	0.42	0.17	0.17
Dubai, UAE	0.27	0.07	0.08

A dash (–) indicates comparable data not available.

Students Value Mathematics – Grade 8

About the Scale

The *Students Value Mathematics* scale was created based on students’ responses to nine items listed below.



^T Trend item—item was included in the same scale in TIMSS 2015 and was used for linking the TIMSS 2015 and TIMSS 2019 scales.

Item Parameters for the TIMSS 2019 *Students Value Mathematics* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBM20A	-0.07683	-0.97955	-0.48401	1.46356	1.08
BSBM20B	0.21444	-1.41743	-0.41427	1.83170	1.14
BSBM20C	-0.21179	-1.03293	-0.24434	1.27727	0.96
BSBM20D	0.00026	-1.16359	-0.12444	1.28803	0.89
BSBM20E	1.46285	-1.34979	-0.01893	1.36872	1.28
BSBM20F	0.08173	-1.23148	-0.32418	1.55566	0.88
BSBM20G	-0.27682	-1.09839	-0.44615	1.54454	0.86
BSBM20H	-0.61122	-1.07802	-0.36012	1.43814	1.19
BSBM20I	-0.58262	-0.91732	-0.52093	1.43825	0.89

Scale Transformation Constants for the TIMSS 2019 *Students Value Mathematics* Scale – Grade 8

Scale Transformation Constants

A = 7.964227

B = 1.193777

Transformed Scale Score = 7.964227 + 1.193777 • Logit Scale Score

**Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019
Students Value Mathematics Scale – Grade 8**

Raw Score	Transformed Scale Score	Cutpoint
0	3.03682	
1	4.34723	
2	4.96949	
3	5.39638	
4	5.72855	
5	6.01079	
6	6.25944	
7	6.48714	
8	6.70110	
9	6.90631	
10	7.10653	
11	7.30474	
12	7.50425	
13	7.70526	7.8
14	7.91135	
15	8.12441	
16	8.34615	
17	8.57829	
18	8.82228	
19	9.08085	
20	9.35676	
21	9.65438	
22	9.98068	
23	10.34734	10.3
24	10.77308	
25	11.30190	
26	12.04145	
27	13.48294	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 Students Value Mathematics Scale – Grade 8

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	0.76	0.74	0.78	0.80	0.66	0.83	0.82	0.63	0.81	
Bahrain	0.90	56	0.74	0.73	0.78	0.77	0.64	0.80	0.81	0.63	0.77	
Chile	0.89	54	0.71	0.69	0.78	0.79	0.58	0.81	0.81	0.67	0.75	
Chinese Taipei	0.91	57	0.68	0.68	0.79	0.82	0.72	0.81	0.84	0.65	0.79	
Cyprus	0.88	52	0.70	0.64	0.79	0.81	0.67	0.77	0.73	0.59	0.77	
Egypt	0.87	49	0.65	0.69	0.74	0.75	0.61	0.73	0.73	0.66	0.71	
England	0.88	53	0.69	0.70	0.72	0.77	0.63	0.80	0.79	0.63	0.76	
Finland	0.91	58	0.72	0.70	0.80	0.82	0.68	0.83	0.81	0.69	0.81	
France	0.88	53	0.71	0.68	0.74	0.78	0.60	0.79	0.77	0.64	0.80	
Georgia	0.89	54	0.72	0.63	0.76	0.78	0.65	0.81	0.80	0.67	0.79	
Hong Kong SAR	0.92	61	0.70	0.75	0.81	0.84	0.70	0.84	0.87	0.67	0.81	
Hungary	0.88	52	0.72	0.68	0.69	0.78	0.68	0.77	0.76	0.67	0.76	
Iran, Islamic Rep. of	0.89	53	0.68	0.65	0.77	0.80	0.73	0.80	0.78	0.56	0.76	
Ireland	0.88	52	0.70	0.70	0.74	0.78	0.63	0.80	0.76	0.59	0.77	
Israel	0.88	52	0.70	0.68	0.73	0.79	0.63	0.82	0.78	0.54	0.75	
Italy	0.88	52	0.75	0.67	0.69	0.76	0.66	0.80	0.80	0.55	0.74	
Japan	0.87	49	0.66	0.68	0.70	0.76	0.60	0.81	0.79	0.59	0.66	
Jordan	0.89	54	0.67	0.72	0.79	0.78	0.57	0.80	0.79	0.71	0.77	
Kazakhstan	0.90	56	0.72	0.65	0.79	0.82	0.73	0.77	0.83	0.66	0.77	
Korea, Rep. of	0.90	55	0.65	0.70	0.79	0.82	0.60	0.80	0.83	0.65	0.82	
Kuwait	0.89	53	0.70	0.69	0.79	0.78	0.62	0.80	0.79	0.60	0.76	
Lebanon	0.88	51	0.70	0.69	0.75	0.75	0.62	0.79	0.77	0.62	0.73	
Lithuania	0.88	51	0.74	0.65	0.73	0.79	0.67	0.72	0.77	0.56	0.78	
Malaysia	0.87	50	0.64	0.60	0.75	0.76	0.57	0.75	0.76	0.70	0.77	
Morocco	0.89	53	0.69	0.71	0.78	0.79	0.65	0.77	0.77	0.62	0.78	
New Zealand	0.90	57	0.75	0.72	0.77	0.79	0.65	0.82	0.80	0.67	0.80	
Norway (9)	0.90	57	0.73	0.73	0.79	0.80	0.68	0.82	0.81	0.63	0.76	
Oman	0.87	49	0.66	0.69	0.73	0.73	0.58	0.76	0.76	0.66	0.74	
Portugal	0.89	55	0.70	0.66	0.79	0.81	0.66	0.82	0.78	0.63	0.79	
Qatar	0.91	59	0.74	0.74	0.81	0.81	0.67	0.83	0.84	0.67	0.80	
Romania	0.90	56	0.74	0.71	0.74	0.79	0.69	0.78	0.80	0.69	0.79	
Russian Federation	0.90	56	0.72	0.70	0.78	0.82	0.70	0.79	0.81	0.61	0.77	
Saudi Arabia	0.87	50	0.70	0.66	0.68	0.75	0.60	0.81	0.79	0.61	0.75	
Singapore	0.86	49	0.67	0.64	0.73	0.76	0.60	0.79	0.78	0.58	0.73	
South Africa (9)	0.84	46	0.67	0.57	0.75	0.76	0.55	0.73	0.72	0.58	0.70	
Sweden	0.87	50	0.64	0.65	0.79	0.80	0.68	0.75	0.76	0.59	0.68	
Turkey	0.88	51	0.62	0.64	0.76	0.79	0.67	0.81	0.79	0.58	0.74	
United Arab Emirates	0.90	55	0.70	0.71	0.78	0.78	0.65	0.82	0.80	0.66	0.76	
United States	0.89	54	0.74	0.70	0.75	0.78	0.63	0.82	0.81	0.63	0.76	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Students Value Mathematics* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BSBM20A	BSBM20B	BSBM20C	BSBM20D	BSBM20E	BSBM20F	BSBM20G	BSBM20H	BSBM20I	
Benchmarking Participants												
Ontario, Canada	0.87	50	0.72	0.67	0.74	0.75	0.64	0.80	0.77	0.55	0.73	
Quebec, Canada	0.87	51	0.73	0.66	0.75	0.77	0.64	0.73	0.77	0.62	0.76	
Moscow City, Russian Fed.	0.90	55	0.73	0.64	0.80	0.83	0.74	0.78	0.81	0.55	0.75	
Gauteng, RSA (9)	0.83	46	0.66	0.60	0.74	0.78	0.58	0.75	0.74	0.52	0.68	
Western Cape, RSA (9)	0.85	48	0.67	0.63	0.74	0.77	0.60	0.77	0.74	0.53	0.73	
Abu Dhabi, UAE	0.89	54	0.68	0.71	0.77	0.78	0.63	0.80	0.79	0.66	0.76	
Dubai, UAE	0.88	53	0.69	0.65	0.77	0.75	0.66	0.81	0.79	0.64	0.73	

Relationship Between the TIMSS 2019 Students Value Mathematics Scale and TIMSS 2019 Achievement – Grade 8

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	0.05
Bahrain	0.12	0.02	0.01
Chile	0.07	0.01	0.01
Chinese Taipei	0.36	0.13	0.12
Cyprus	0.25	0.06	0.06
Egypt	0.12	0.02	0.02
England	0.07	0.01	0.01
Finland	0.33	0.11	0.09
France	0.16	0.02	0.03
Georgia	0.14	0.02	0.02
Hong Kong SAR	0.23	0.05	0.05
Hungary	0.24	0.06	0.04
Iran, Islamic Rep. of	0.12	0.02	0.01
Ireland	0.20	0.04	0.04
Israel	0.09	0.01	0.01
Italy	0.16	0.02	0.02
Japan	0.25	0.06	0.05
Jordan	0.15	0.02	0.03
Kazakhstan	0.05	0.00	0.00
Korea, Rep. of	0.41	0.17	0.16
Kuwait	0.13	0.02	0.02
Lebanon	0.21	0.04	0.04
Lithuania	0.13	0.02	0.01
Malaysia	0.24	0.06	0.05
Morocco	0.21	0.04	0.03
New Zealand	0.13	0.02	0.01
Norway (9)	0.23	0.05	0.05
Oman	0.20	0.04	0.04
Portugal	0.30	0.09	0.07
Qatar	0.16	0.03	0.03
Romania	0.17	0.03	0.03
Russian Federation	0.15	0.02	0.02
Saudi Arabia	0.09	0.01	0.01
Singapore	0.14	0.02	0.02
South Africa (9)	0.17	0.03	0.03
Sweden	0.13	0.02	0.02
Turkey	0.23	0.05	0.05
United Arab Emirates	0.18	0.03	0.04
United States	0.13	0.02	0.02
International Median	0.16	0.03	0.03

Relationship Between the TIMSS 2019 *Students Value Mathematics* Scale and TIMSS 2019 Achievement – Grade 8

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	
Benchmarking Participants			
Ontario, Canada	0.22	0.05	0.05
Quebec, Canada	0.20	0.04	0.04
Moscow City, Russian Fed.	0.27	0.07	0.06
Gauteng, RSA (9)	0.06	0.00	0.00
Western Cape, RSA (9)	0.04	0.00	0.00
Abu Dhabi, UAE	0.21	0.05	0.05
Dubai, UAE	0.17	0.03	0.03

Students Value Science – Grade 8

About the Scale

The *Students Value Science* scale was created based on students' responses to nine items listed below.

		Agree a lot	Agree a little	Disagree a little	Disagree a lot
BSBS25A ^T BSBS25B ^T BSBS25C ^T BSBS25D ^T BSBS25E ^T BSBS25F ^T BSBS25G ^T BSBS25H ^T BSBS25I ^T	1) I think learning science will help me in my daily life -----	○	○	○	○
	2) I need science to learn other school subjects -----	○	○	○	○
	3) I need to do well in science to get into the university of my choice -----	○	○	○	○
	4) I need to do well in science to get the job I want -----	○	○	○	○
	5) I would like a job that involves using science -----	○	○	○	○
	6) It is important to learn about science to get ahead in the world -----	○	○	○	○
	7) Learning science will give me more job opportunities when I am an adult -----	○	○	○	○
	8) My parents think that it is important that I do well in science -----	○	○	○	○
	9) It is important to do well in science -----	○	○	○	○

Scale Cut Scores: 10.6, 8.5

^T Trend item—item was included in the same scale in TIMSS 2015 and was used for linking the TIMSS 2015 and TIMSS 2019 scales.

Item Parameters for the TIMSS 2019 *Students Value Science* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BSBS25A	-0.54895	-1.70374	-0.44149	2.14523	1.15
BSBS25B	0.21327	-2.19431	-0.06708	2.26139	1.21
BSBS25C	-0.00218	-1.78502	-0.01869	1.80371	0.91
BSBS25D	0.28699	-1.77451	0.08479	1.68972	0.87
BSBS25E	1.01281	-1.78405	0.20415	1.57990	1.16
BSBS25F	0.03247	-1.87630	-0.18356	2.05986	0.95
BSBS25G	-0.09115	-1.79872	-0.19220	1.99092	0.92
BSBS25H	-0.29541	-1.89534	-0.18736	2.08270	1.29
BSBS25I	-0.60785	-1.66485	-0.36766	2.03251	1.02

Scale Transformation Constants for the TIMSS 2019 *Students Value Science* Scale – Grade 8

Scale Transformation Constants

A = 8.556049

B = 0.883354

Transformed Scale Score = 8.556049 + 0.883354 • Logit Scale Score

**Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019
Students Value Science Scale – Grade 8**

Raw Score	Transformed Scale Score	Cutpoint
0	4.28340	
1	5.31763	
2	5.83503	
3	6.20452	
4	6.50215	
5	6.75863	
6	6.99286	
7	7.21075	
8	7.41821	
9	7.61946	
10	7.81751	
11	8.01452	
12	8.21205	
13	8.41123	8.5
14	8.61280	
15	8.81725	
16	9.02481	
17	9.23574	
18	9.45051	
19	9.66950	
20	9.89532	
21	10.13091	
22	10.38161	
23	10.65629	10.6
24	10.97071	
25	11.35416	
26	11.88785	
27	12.93670	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 Students Value Science Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BSBS25A	BSBS25B	BSBS25C	BSBS25D	BSBS25E	BSBS25F	BSBS25G	BSBS25H	BSBS25I	
Australia	0.94	67	0.82	0.79	0.87	0.86	0.81	0.84	0.84	0.70	0.81	
Bahrain	0.92	60	0.74	0.73	0.83	0.83	0.76	0.80	0.82	0.70	0.76	
Chile	0.92	62	0.76	0.75	0.85	0.85	0.79	0.82	0.85	0.69	0.72	
Chinese Taipei	0.93	65	0.72	0.76	0.85	0.87	0.81	0.83	0.87	0.72	0.81	
Cyprus	0.92	63	0.76	0.75	0.85	0.85	0.75	0.82	0.81	0.72	0.81	
Egypt	0.90	54	0.64	0.72	0.80	0.79	0.73	0.76	0.75	0.70	0.74	
England	0.93	63	0.79	0.77	0.83	0.82	0.76	0.83	0.84	0.71	0.80	
Finland	0.94	66	0.77	0.78	0.86	0.86	0.77	0.86	0.83	0.76	0.84	
France	0.92	62	0.76	0.75	0.81	0.84	0.74	0.80	0.82	0.73	0.82	
Georgia	0.91	58	0.68	0.69	0.78	0.81	0.73	0.81	0.82	0.75	0.79	
Hong Kong SAR	0.94	69	0.71	0.80	0.88	0.89	0.83	0.87	0.89	0.74	0.83	
Hungary	0.92	61	0.70	0.73	0.81	0.84	0.76	0.80	0.80	0.73	0.81	
Iran, Islamic Rep. of	0.92	60	0.72	0.71	0.84	0.84	0.81	0.83	0.83	0.64	0.75	
Ireland	0.93	63	0.78	0.75	0.84	0.84	0.78	0.82	0.83	0.69	0.81	
Israel	0.94	66	0.81	0.83	0.85	0.86	0.80	0.88	0.84	0.64	0.78	
Italy	0.91	58	0.76	0.69	0.79	0.81	0.78	0.82	0.82	0.62	0.74	
Japan	0.90	56	0.70	0.74	0.79	0.82	0.66	0.84	0.82	0.65	0.65	
Jordan	0.92	61	0.71	0.78	0.82	0.82	0.73	0.83	0.81	0.73	0.77	
Kazakhstan	0.92	62	0.67	0.71	0.84	0.86	0.80	0.81	0.86	0.77	0.77	
Korea, Rep. of	0.92	62	0.74	0.77	0.85	0.85	0.70	0.79	0.86	0.68	0.84	
Kuwait	0.91	59	0.72	0.72	0.84	0.83	0.76	0.81	0.82	0.66	0.73	
Lebanon	0.92	60	0.73	0.72	0.82	0.82	0.75	0.81	0.82	0.71	0.80	
Lithuania	0.90	57	0.72	0.71	0.81	0.84	0.74	0.73	0.78	0.68	0.80	
Malaysia	0.91	57	0.70	0.68	0.81	0.82	0.72	0.73	0.80	0.75	0.77	
Morocco	0.92	60	0.70	0.76	0.81	0.82	0.76	0.81	0.80	0.72	0.76	
New Zealand	0.93	65	0.81	0.80	0.83	0.84	0.77	0.83	0.83	0.73	0.82	
Norway (9)	0.93	64	0.79	0.79	0.85	0.85	0.79	0.82	0.84	0.68	0.79	
Oman	0.89	54	0.69	0.72	0.80	0.78	0.68	0.77	0.78	0.69	0.71	
Portugal	0.92	62	0.72	0.69	0.83	0.85	0.79	0.85	0.84	0.71	0.80	
Qatar	0.94	67	0.77	0.77	0.87	0.86	0.79	0.86	0.86	0.75	0.82	
Romania	0.93	65	0.73	0.76	0.83	0.84	0.79	0.82	0.84	0.79	0.84	
Russian Federation	0.92	60	0.71	0.70	0.83	0.84	0.78	0.80	0.82	0.68	0.78	
Saudi Arabia	0.92	61	0.75	0.76	0.83	0.83	0.76	0.83	0.83	0.69	0.75	
Singapore	0.91	60	0.74	0.63	0.83	0.83	0.76	0.82	0.84	0.68	0.79	
South Africa (9)	0.91	58	0.73	0.71	0.83	0.83	0.77	0.76	0.80	0.68	0.76	
Sweden	0.92	59	0.70	0.72	0.85	0.85	0.81	0.79	0.79	0.68	0.72	
Turkey	0.90	56	0.64	0.68	0.81	0.83	0.77	0.81	0.81	0.65	0.71	
United Arab Emirates	0.92	61	0.74	0.73	0.83	0.83	0.77	0.82	0.82	0.72	0.77	
United States	0.92	62	0.77	0.74	0.83	0.83	0.76	0.84	0.84	0.69	0.76	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Students Value Science* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			BSBS25A	BSBS25B	BSBS25C	BSBS25D	BSBS25E	BSBS25F	BSBS25G	BSBS25H	BSBS25I	
Benchmarking Participants												
Ontario, Canada	0.92	61	0.78	0.72	0.84	0.83	0.78	0.82	0.81	0.69	0.76	
Quebec, Canada	0.92	61	0.79	0.74	0.85	0.83	0.74	0.76	0.83	0.70	0.79	
Moscow City, Russian Fed.	0.92	60	0.71	0.70	0.84	0.85	0.81	0.81	0.81	0.66	0.78	
Gauteng, RSA (9)	0.93	63	0.76	0.74	0.86	0.86	0.81	0.77	0.83	0.72	0.78	
Western Cape, RSA (9)	0.92	62	0.73	0.73	0.85	0.85	0.80	0.79	0.81	0.71	0.78	
Abu Dhabi, UAE	0.92	61	0.73	0.74	0.83	0.82	0.76	0.82	0.81	0.73	0.78	
Dubai, UAE	0.91	60	0.74	0.72	0.84	0.84	0.80	0.81	0.82	0.67	0.73	

Relationship Between the TIMSS 2019 Students Value Science Scale and TIMSS 2019 Achievement – Grade 8

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	0.28	0.08	0.07
Bahrain	0.22	0.05	0.04
Chile	0.05	0.00	0.00
Chinese Taipei	0.30	0.09	0.07
Cyprus	0.28	0.08	0.06
Egypt	0.23	0.05	0.06
England	0.20	0.04	0.04
Finland	0.33	0.11	0.09
France	0.24	0.06	0.06
Georgia	0.11	0.01	0.01
Hong Kong SAR	0.18	0.03	0.03
Hungary	0.15	0.02	0.02
Iran, Islamic Rep. of	0.15	0.02	0.02
Ireland	0.30	0.09	0.07
Israel	0.15	0.02	0.02
Italy	0.15	0.02	0.02
Japan	0.28	0.08	0.06
Jordan	0.17	0.03	0.03
Kazakhstan	0.07	0.00	0.00
Korea, Rep. of	0.40	0.16	0.15
Kuwait	0.15	0.02	0.02
Lebanon	0.25	0.06	0.05
Lithuania	0.12	0.02	0.01
Malaysia	0.36	0.13	0.12
Morocco	0.15	0.02	0.02
New Zealand	0.18	0.03	0.03
Norway (9)	0.16	0.03	0.02
Oman	0.26	0.07	0.06
Portugal	0.23	0.05	0.04
Qatar	0.20	0.04	0.04
Romania	0.12	0.01	0.01
Russian Federation	0.02	0.00	0.00
Saudi Arabia	0.11	0.01	0.01
Singapore	0.27	0.07	0.07
South Africa (9)	0.05	0.00	0.02
Sweden	0.14	0.02	0.02
Turkey	0.13	0.02	0.02
United Arab Emirates	0.25	0.06	0.06
United States	0.13	0.02	0.02
International Median	0.18	0.03	0.03

Relationship Between the TIMSS 2019 Students Value Science Scale and TIMSS 2019 Achievement – Grade 8

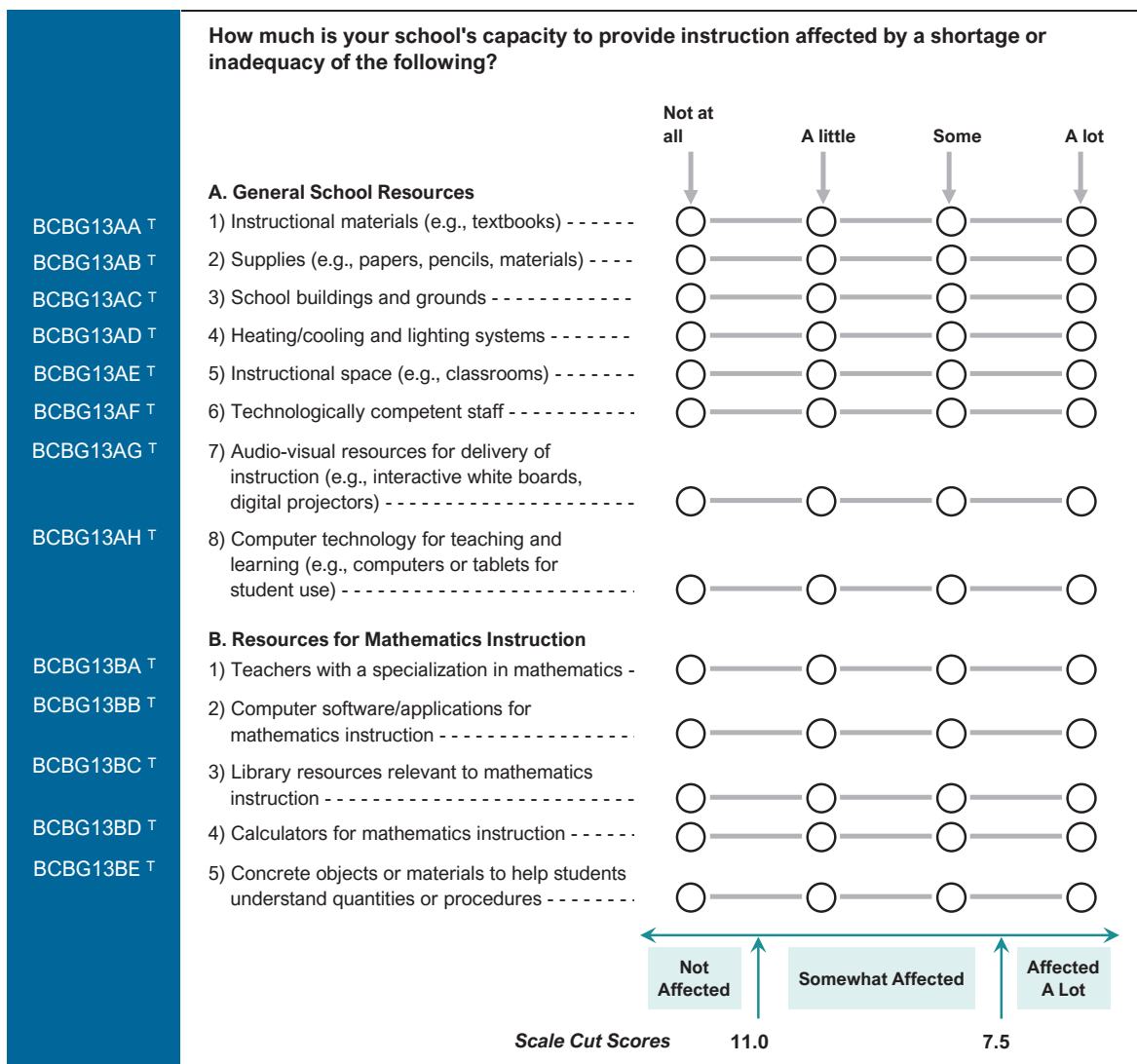
Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2	
Benchmarking Participants			
Ontario, Canada	0.21	0.04	0.04
Quebec, Canada	0.28	0.08	0.07
Moscow City, Russian Fed.	0.02	0.00	0.00
Gauteng, RSA (9)	-0.06	0.00	0.02
Western Cape, RSA (9)	-0.01	0.00	0.01
Abu Dhabi, UAE	0.29	0.09	0.08
Dubai, UAE	0.19	0.04	0.04

Scales Based on Principals' Reports

Instruction Affected by Mathematics Resource Shortages – Grade 8

About the Scale

The *Instruction Affected by Mathematics Resource Shortages* scale was created based on principals' responses to thirteen items listed below.



^T Trend item—item was included in the same scale in TIMSS 2015 and was used for linking the TIMSS 2015 and TIMSS 2019 scales.

**Item Parameters for the TIMSS 2019 *Instruction Affected by Mathematics*
Resource Shortages Scale – Grade 8**

Item	delta	tau_1	tau_2	tau_3	Infit
BCBG13AA	-0.08523	-0.29202	0.01436	0.27766	0.91
BCBG13AB	-0.31466	-0.30062	0.24458	0.05604	0.91
BCBG13AC	0.24178	-0.75472	0.05376	0.70096	1.06
BCBG13AD	-0.07941	-0.62905	0.03772	0.59133	1.08
BCBG13AE	0.29495	-0.47671	-0.14092	0.61763	0.99
BCBG13AF	0.08339	-1.41713	-0.02038	1.43751	0.98
BCBG13AG	0.05752	-1.15114	0.03387	1.11727	0.92
BCBG13AH	0.22037	-1.21651	0.06667	1.14984	1.06
BCBG13BA	0.12749	0.03139	-0.10299	0.07160	1.10
BCBG13BB	0.00156	-1.56949	0.12923	1.44026	1.01
BCBG13BC	-0.14676	-1.50055	0.10438	1.39617	1.17
BCBG13BD	-0.38067	-0.76280	0.07944	0.68336	1.15
BCBG13BE	-0.02033	-1.41394	-0.03525	1.44919	0.90

**Scale Transformation Constants for the TIMSS 2019 *Instruction Affected by Mathematics*
Resource Shortages Scale – Grade 8**

Scale Transformation Constants

A = 9.262831

B = 1.171716

Transformed Scale Score = 9.262831 + 1.171716 • Logit Scale Score

**Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS
2019 Instruction Affected by Mathematics Resource Shortages Scale – Grade 8**

Raw Score	Transformed Scale Score	Cutpoint
0	4.23486	
1	5.57102	
2	6.21558	
3	6.65270	
4	6.98745	
5	7.26025	
6	7.49129	7.5
7	7.69254	
8	7.87145	
9	8.03304	
10	8.18097	
11	8.31802	
12	8.44578	
13	8.56742	
14	8.68343	
15	8.79492	
16	8.90286	
17	9.00816	
18	9.11164	
19	9.21409	
20	9.31621	
21	9.41874	
22	9.52239	
23	9.62794	
24	9.73618	
25	9.84801	
26	9.96435	
27	10.08629	
28	10.21426	
29	10.35137	
30	10.49907	
31	10.66003	
32	10.83775	
33	11.03708	11.0
34	11.26511	
35	11.53380	
36	11.86315	
37	12.29366	
38	12.92960	
39	14.25596	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Instruction Affected by Mathematics Resource Shortages* Scale – Grade 8

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	0.94	58	0.84	0.85	0.70	0.71	0.71	0.75	0.77	0.81	0.69	0.74	0.74	0.81	0.75
Bahrain	0.97	73	0.92	0.89	0.89	0.87	0.91	0.80	0.93	0.76	0.87	0.80	0.74	0.78	0.90
Chile	0.92	53	0.69	0.72	0.71	0.55	0.76	0.79	0.79	0.81	0.66	0.73	0.73	0.72	0.76
Chinese Taipei	0.90	46	0.55	0.62	0.71	0.70	0.71	0.76	0.79	0.79	0.50	0.67	0.67	0.55	0.68
Cyprus	0.92	53	0.84	0.77	0.70	0.79	0.71	0.79	0.72	0.64	0.76	0.69	0.75	0.63	0.68
Egypt	0.89	43	0.66	0.69	0.70	0.55	0.69	0.74	0.55	0.69	0.63	0.66	0.61	0.68	0.70
England	0.91	48	0.72	0.62	0.72	0.63	0.70	0.66	0.78	0.69	0.66	0.69	0.70	0.66	0.74
Finland	0.90	46	0.75	0.64	0.61	0.63	0.72	0.69	0.71	0.69	0.62	0.74	0.46	0.68	0.78
France	0.86	40	0.68	0.56	0.61	0.56	0.68	0.58	0.77	0.68	0.49	0.74	0.74	0.45	0.62
Georgia	0.89	45	0.67	0.62	0.58	0.62	0.67	0.67	0.80	0.78	0.69	0.77	0.74	0.18	0.71
Hong Kong SAR	0.96	70	0.86	0.88	0.78	0.91	0.76	0.78	0.82	0.83	0.84	0.83	0.84	0.86	0.85
Hungary	0.89	44	0.68	0.57	0.65	0.68	0.73	0.55	0.72	0.73	0.56	0.66	0.67	0.59	0.75
Iran, Islamic Rep. of	0.89	44	0.68	0.75	0.67	0.79	0.77	0.74	0.72	0.50	0.69	0.65	0.46	0.53	0.58
Ireland	0.85	40	0.48	0.47	0.73	0.61	0.65	0.72	0.76	0.68	0.54	0.64	0.42	0.66	0.77
Israel	0.90	46	0.71	0.72	0.58	0.71	0.66	0.68	0.70	0.60	0.71	0.69	0.61	0.74	0.73
Italy	0.85	37	0.46	0.48	0.59	0.47	0.59	0.61	0.66	0.73	0.60	0.66	0.57	0.63	0.72
Japan	0.90	48	0.69	0.73	0.69	0.59	0.81	0.71	0.73	0.73	0.71	0.62	0.71	0.39	0.78
Jordan	0.88	43	0.76	0.80	0.77	0.54	0.79	0.68	0.51	0.71	0.76	0.59	0.41	0.46	0.60
Kazakhstan	0.93	55	0.78	0.68	0.67	0.76	0.75	0.80	0.81	0.80	0.78	0.77	0.76	0.55	0.73
Korea, Rep. of	0.95	64	0.81	0.83	0.79	0.87	0.85	0.74	0.81	0.81	0.84	0.77	0.77	0.72	0.75
Kuwait	0.95	61	0.86	0.83	0.71	0.80	0.83	0.74	0.82	0.78	0.80	0.73	0.61	0.75	0.86
Lebanon	0.94	59	0.84	0.85	0.85	0.70	0.87	0.82	0.81	0.39	0.78	0.72	0.65	0.84	0.73
Lithuania	0.88	43	0.74	0.62	0.49	0.54	0.53	0.58	0.73	0.73	0.52	0.68	0.75	0.71	0.77
Malaysia	0.91	47	0.74	0.77	0.72	0.63	0.71	0.72	0.59	0.49	0.74	0.67	0.66	0.76	0.67
Morocco	0.79	32	0.20	0.24	-0.06	0.42	-0.12	0.74	0.73	0.76	-0.11	0.80	0.79	0.67	0.70
New Zealand	0.95	64	0.85	0.84	0.76	0.80	0.70	0.76	0.86	0.75	0.74	0.88	0.83	0.80	0.84
Norway (9)	0.82	33	0.59	0.41	0.65	0.66	0.76	0.73	0.71	0.51	0.31	0.62	0.55	0.36	0.38
Oman	0.95	61	0.79	0.79	0.83	0.81	0.80	0.84	0.79	0.81	0.83	0.78	0.72	0.58	0.74
Portugal	0.90	47	0.58	0.63	0.72	0.63	0.77	0.71	0.79	0.67	0.60	0.69	0.70	0.70	0.66
Qatar	0.98	85	0.95	0.92	0.91	0.95	0.95	0.95	0.94	0.95	0.93	0.85	0.91	0.89	0.91
Romania	0.89	45	0.79	0.79	0.73	0.74	0.70	0.70	0.57	0.60	0.66	0.50	0.67	0.50	0.69
Russian Federation	0.91	49	0.76	0.66	0.59	0.72	0.61	0.73	0.77	0.71	0.66	0.74	0.75	0.63	0.77
Saudi Arabia	0.92	51	0.72	0.80	0.59	0.80	0.78	0.77	0.78	0.74	0.69	0.66	0.45	0.72	0.69
Singapore	0.98	82	0.95	0.94	0.91	0.87	0.91	0.86	0.93	0.94	0.93	0.89	0.82	0.91	0.90
South Africa (9)	0.84	35	0.58	0.41	0.67	0.64	0.52	0.69	0.69	0.57	0.32	0.63	0.53	0.65	0.65
Sweden	0.86	40	0.78	0.74	0.61	0.60	0.61	0.66	0.71	0.74	0.56	0.63	0.27	0.52	0.63
Turkey	0.93	53	0.84	0.82	0.73	0.80	0.80	0.57	0.77	0.67	0.73	0.73	0.64	0.55	0.76
United Arab Emirates	0.97	76	0.88	0.87	0.89	0.92	0.90	0.91	0.91	0.89	0.87	0.82	0.78	0.81	0.85
United States	0.94	58	0.79	0.82	0.68	0.71	0.67	0.76	0.82	0.78	0.74	0.82	0.72	0.76	0.83

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Instruction Affected by Mathematics Resource Shortages* Scale – Grade 8

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
Benchmarking Participants															
Ontario, Canada	0.90	46	0.75	0.72	0.64	0.63	0.63	0.65	0.79	0.76	0.51	0.69	0.69	0.63	0.71
Quebec, Canada	0.93	54	0.80	0.81	0.74	0.62	0.78	0.71	0.79	0.61	0.77	0.69	0.75	0.74	0.74
Moscow City, Russian Fed.	0.95	66	0.82	0.78	0.77	0.81	0.82	0.84	0.84	0.83	0.82	0.85	0.90	0.59	0.85
Gauteng, RSA (9)	0.87	39	0.73	0.71	0.77	0.50	0.75	0.73	0.58	0.27	0.62	0.44	0.33	0.74	0.66
Western Cape, RSA (9)	0.90	45	0.74	0.66	0.70	0.69	0.60	0.73	0.78	0.67	0.67	0.68	0.46	0.67	0.61
Abu Dhabi, UAE	0.98	78	0.89	0.86	0.92	0.92	0.92	0.93	0.93	0.87	0.92	0.85	0.74	0.87	0.84
Dubai, UAE	0.98	80	0.90	0.93	0.85	0.94	0.88	0.90	0.92	0.92	0.91	0.85	0.86	0.84	0.90

Relationship Between the TIMSS 2019 *Instruction Affected by Mathematics Resource Shortages* Scale and TIMSS 2019 Achievement – Grade 8

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	0.28	0.08	0.05
Bahrain	0.05	0.00	0.01
Chile	0.24	0.06	0.06
Chinese Taipei	0.06	0.00	0.00
Cyprus	0.00	0.00	0.01
Egypt	0.08	0.01	0.02
England	0.11	0.01	0.01
Finland	0.04	0.00	0.00
France	0.10	0.01	0.02
Georgia	0.14	0.02	0.01
Hong Kong SAR	0.09	0.01	0.04
Hungary	-0.02	0.00	0.00
Iran, Islamic Rep. of	0.09	0.01	0.03
Ireland	0.14	0.02	0.01
Israel	0.14	0.02	0.01
Italy	0.07	0.01	0.00
Japan	0.08	0.01	0.01
Jordan	-0.12	0.01	0.02
Kazakhstan	0.05	0.00	0.00
Korea, Rep. of	0.03	0.00	0.00
Kuwait	0.03	0.00	0.02
Lebanon	0.20	0.04	0.08
Lithuania	-0.02	0.00	0.00
Malaysia	-0.09	0.01	0.03
Morocco	-0.06	0.00	0.04
New Zealand	0.20	0.04	0.02
Norway (9)	0.02	0.00	0.00
Oman	0.10	0.01	0.02
Portugal	0.11	0.01	0.01
Qatar	0.28	0.08	0.10
Romania	0.18	0.03	0.03
Russian Federation	0.12	0.01	0.01
Saudi Arabia	-0.04	0.00	0.01
Singapore	0.05	0.00	0.00
South Africa (9)	0.21	0.04	0.09
Sweden	0.03	0.00	0.01
Turkey	0.17	0.03	0.03
United Arab Emirates	0.21	0.04	0.05
United States	0.11	0.01	0.02
International Median	0.09	0.01	0.01

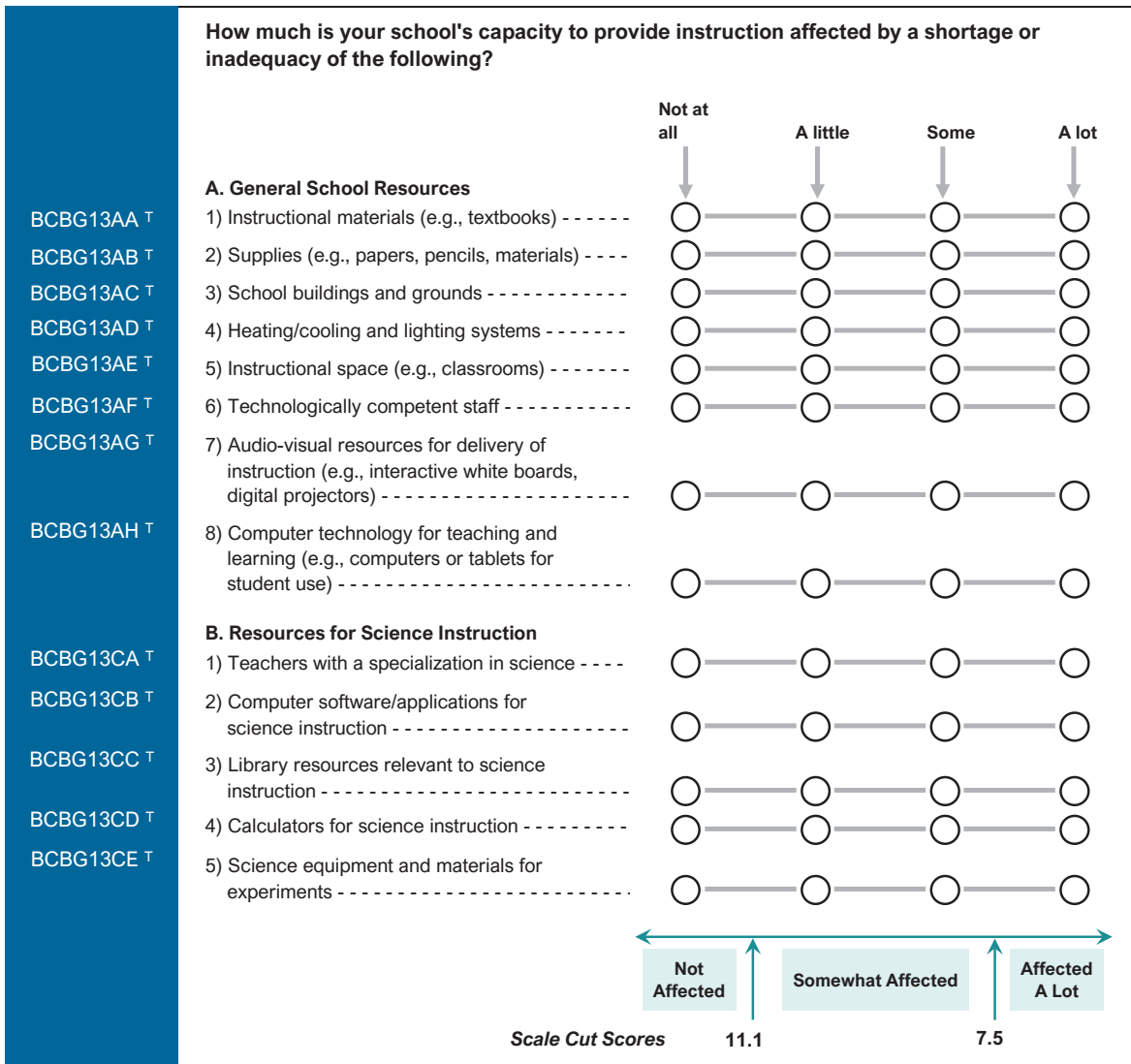
Relationship Between the TIMSS 2019 *Instruction Affected by Mathematics Resource Shortages* Scale and TIMSS 2019 Achievement – Grade 8

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	
Benchmarking Participants			
Ontario, Canada	0.12	0.01	0.02
Quebec, Canada	0.01	0.00	0.00
Moscow City, Russian Fed.	-0.02	0.00	0.00
Gauteng, RSA (9)	0.30	0.09	0.13
Western Cape, RSA (9)	0.47	0.22	0.21
Abu Dhabi, UAE	0.19	0.04	0.04
Dubai, UAE	0.19	0.04	0.05

Instruction Affected by Science Resource Shortages – Grade 8

About the Scale

The *Instruction Affected by Science Resource Shortages* scale was created based on students' responses to thirteen items listed below.



^T Trend item—item was included in the same scale in TIMSS 2015 and was used for linking the TIMSS 2015 and TIMSS 2019 scales.

Item Parameters for the TIMSS 2019 *Instruction Affected by Science Resource Shortages* Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BCBG13AA	-0.11528	-0.33350	0.01422	0.31928	0.92
BCBG13AB	-0.35173	-0.34117	0.24349	0.09768	0.92
BCBG13AC	0.22227	-0.79974	0.05530	0.74444	1.07
BCBG13AD	-0.10888	-0.67368	0.03847	0.63521	1.12
BCBG13AE	0.27674	-0.51943	-0.13970	0.65913	1.00
BCBG13AF	0.05952	-1.47321	-0.01797	1.49118	1.01
BCBG13AG	0.03294	-1.20191	0.03559	1.16632	0.95
BCBG13AH	0.20110	-1.26755	0.06834	1.19921	1.09
BCBG13CA	0.07561	0.07128	-0.07062	-0.00066	1.08
BCBG13CB	0.04668	-1.47047	0.01664	1.45383	0.97
BCBG13CC	-0.14890	-1.46091	0.00973	1.45118	1.05
BCBG13CD	-0.50898	-0.84828	0.02025	0.82803	1.27
BCBG13CE	0.31891	-0.97265	-0.04312	1.01577	0.90

Scale Transformation Constants for the TIMSS 2019 *Instruction Affected by Science Resource Shortages* Scale – Grade 8

Scale Transformation Constants

A = 9.315269

B = 1.229797

Transformed Scale Score = 9.315269 + 1.229797 • Logit Scale Score

**Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS
2019 Instruction Affected by Science Resource Shortages Scale – Grade 8**

Raw Score	Transformed Scale Score	Cutpoint
0	4.07624	
1	5.47004	
2	6.13851	
3	6.59064	
4	6.93605	
5	7.21741	
6	7.45575	7.5
7	7.66379	
8	7.84903	
9	8.01669	
10	8.17049	
11	8.31328	
12	8.44672	
13	8.57396	
14	8.69549	
15	8.81243	
16	8.92582	
17	9.03657	
18	9.14554	
19	9.25352	
20	9.36128	
21	9.46956	
22	9.57915	
23	9.69082	
24	9.80545	
25	9.92393	
26	10.04727	
27	10.17656	
28	10.31231	
29	10.45776	
30	10.61443	
31	10.78505	
32	10.97329	
33	11.18424	11.1
34	11.42529	
35	11.70901	
36	12.05633	
37	12.50978	
38	13.17876	
39	14.57239	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Instruction Affected by Science Resource Shortages* Scale – Grade 8

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	0.94	59	0.85	0.83	0.70	0.71	0.73	0.74	0.76	0.79	0.74	0.78	0.76	0.76	0.79
Bahrain	0.97	73	0.92	0.89	0.89	0.88	0.92	0.79	0.93	0.75	0.88	0.88	0.80	0.65	0.88
Chile	0.93	54	0.69	0.71	0.73	0.58	0.79	0.78	0.78	0.79	0.70	0.75	0.78	0.73	0.73
Chinese Taipei	0.90	48	0.57	0.65	0.71	0.71	0.70	0.76	0.78	0.78	0.57	0.72	0.72	0.52	0.76
Cyprus	0.93	54	0.83	0.76	0.74	0.80	0.74	0.78	0.71	0.61	0.75	0.72	0.70	0.63	0.76
Egypt	0.89	44	0.65	0.67	0.72	0.56	0.70	0.72	0.54	0.71	0.68	0.70	0.63	0.59	0.76
England	0.91	50	0.72	0.61	0.74	0.62	0.70	0.63	0.80	0.72	0.63	0.76	0.79	0.69	0.78
Finland	0.90	45	0.73	0.62	0.64	0.66	0.73	0.69	0.73	0.69	0.54	0.73	0.54	0.67	0.76
France	0.87	40	0.67	0.56	0.63	0.60	0.69	0.58	0.76	0.68	0.48	0.70	0.69	0.48	0.69
Georgia	0.91	48	0.64	0.57	0.57	0.59	0.67	0.70	0.78	0.80	0.71	0.82	0.77	0.47	0.76
Hong Kong SAR	0.97	71	0.86	0.88	0.79	0.90	0.77	0.79	0.82	0.84	0.88	0.85	0.81	0.88	0.87
Hungary	0.89	43	0.69	0.62	0.68	0.66	0.75	0.52	0.70	0.72	0.54	0.70	0.63	0.58	0.71
Iran, Islamic Rep. of	0.89	44	0.70	0.76	0.67	0.78	0.79	0.73	0.69	0.48	0.69	0.67	0.57	0.31	0.65
Ireland	0.88	42	0.49	0.50	0.73	0.62	0.66	0.70	0.74	0.65	0.55	0.69	0.58	0.67	0.79
Israel	0.89	43	0.71	0.74	0.61	0.70	0.70	0.66	0.67	0.56	0.59	0.66	0.58	0.66	0.71
Italy	0.84	35	0.42	0.49	0.62	0.46	0.61	0.60	0.65	0.72	0.57	0.70	0.64	0.51	0.62
Japan	0.91	49	0.71	0.73	0.68	0.61	0.79	0.70	0.70	0.73	0.72	0.71	0.73	0.50	0.70
Jordan	0.90	46	0.74	0.77	0.79	0.52	0.78	0.65	0.53	0.74	0.73	0.65	0.55	0.48	0.79
Kazakhstan	0.94	58	0.76	0.67	0.69	0.76	0.74	0.80	0.82	0.79	0.83	0.80	0.80	0.60	0.80
Korea, Rep. of	0.96	66	0.82	0.84	0.79	0.87	0.86	0.74	0.81	0.80	0.83	0.79	0.80	0.68	0.86
Kuwait	0.95	62	0.86	0.84	0.72	0.81	0.84	0.73	0.81	0.78	0.87	0.72	0.74	0.60	0.87
Lebanon	0.94	61	0.85	0.85	0.84	0.67	0.86	0.82	0.82	0.36	0.84	0.79	0.75	0.77	0.76
Lithuania	0.88	42	0.70	0.59	0.52	0.55	0.54	0.64	0.76	0.75	0.62	0.69	0.78	0.58	0.63
Malaysia	0.91	48	0.76	0.77	0.73	0.61	0.72	0.71	0.56	0.50	0.78	0.71	0.72	0.64	0.74
Morocco	0.82	33	0.38	0.35	0.13	0.51	0.08	0.73	0.72	0.70	0.06	0.77	0.81	0.70	0.67
New Zealand	0.96	66	0.85	0.83	0.75	0.81	0.70	0.77	0.86	0.75	0.80	0.87	0.85	0.84	0.87
Norway (9)	0.84	36	0.63	0.43	0.63	0.62	0.74	0.73	0.71	0.52	0.28	0.66	0.58	0.40	0.63
Oman	0.95	63	0.79	0.80	0.81	0.81	0.82	0.82	0.80	0.82	0.85	0.81	0.79	0.55	0.84
Portugal	0.91	47	0.58	0.63	0.74	0.67	0.80	0.71	0.78	0.67	0.62	0.65	0.69	0.66	0.71
Qatar	0.99	86	0.95	0.93	0.91	0.94	0.95	0.95	0.94	0.95	0.93	0.86	0.91	0.89	0.91
Romania	0.90	45	0.77	0.75	0.73	0.72	0.69	0.69	0.61	0.63	0.62	0.62	0.65	0.62	0.59
Russian Federation	0.91	50	0.77	0.66	0.60	0.71	0.61	0.73	0.77	0.72	0.68	0.77	0.80	0.60	0.75
Saudi Arabia	0.92	53	0.74	0.80	0.57	0.80	0.78	0.77	0.77	0.75	0.75	0.70	0.54	0.64	0.75
Singapore	0.99	85	0.95	0.95	0.91	0.87	0.91	0.86	0.94	0.94	0.94	0.94	0.87	0.95	0.96
South Africa (9)	0.85	36	0.55	0.38	0.65	0.62	0.49	0.69	0.70	0.59	0.41	0.66	0.60	0.67	0.69
Sweden	0.87	40	0.77	0.74	0.60	0.57	0.59	0.63	0.72	0.72	0.58	0.64	0.40	0.51	0.67
Turkey	0.93	54	0.84	0.81	0.73	0.81	0.81	0.57	0.78	0.66	0.77	0.72	0.63	0.54	0.79
United Arab Emirates	0.97	76	0.88	0.87	0.89	0.92	0.90	0.91	0.91	0.90	0.87	0.85	0.81	0.76	0.88
United States	0.94	57	0.78	0.82	0.68	0.70	0.68	0.76	0.81	0.77	0.72	0.78	0.74	0.73	0.79

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Instruction Affected by Science Resource Shortages* Scale – Grade 8

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
Benchmarking Participants															
Ontario, Canada	0.88	43	0.73	0.70	0.61	0.59	0.61	0.69	0.74	0.77	0.48	0.68	0.73	0.53	0.57
Quebec, Canada	0.93	56	0.80	0.83	0.76	0.61	0.81	0.70	0.80	0.61	0.84	0.62	0.72	0.71	0.85
Moscow City, Russian Fed.	0.95	66	0.82	0.78	0.77	0.80	0.82	0.84	0.85	0.84	0.83	0.84	0.87	0.67	0.84
Gauteng, RSA (9)	0.87	39	0.69	0.67	0.74	0.53	0.74	0.74	0.59	0.31	0.66	0.50	0.45	0.65	0.72
Western Cape, RSA (9)	0.89	43	0.76	0.68	0.71	0.68	0.62	0.71	0.77	0.65	0.68	0.56	0.42	0.59	0.64
Abu Dhabi, UAE	0.98	80	0.89	0.85	0.92	0.93	0.92	0.93	0.93	0.87	0.92	0.86	0.81	0.83	0.94
Dubai, UAE	0.98	79	0.89	0.92	0.85	0.94	0.88	0.90	0.92	0.93	0.92	0.87	0.87	0.80	0.86

Relationship Between the TIMSS 2019 *Instruction Affected by Science Resource Shortages* Scale and TIMSS 2019 Achievement – Grade 8

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	<i>r</i>	<i>r</i> ²	
Australia	0.25	0.06	0.03
Bahrain	-0.01	0.00	0.03
Chile	0.21	0.04	0.06
Chinese Taipei	0.06	0.00	0.00
Cyprus	0.01	0.00	0.01
Egypt	0.09	0.01	0.01
England	0.13	0.02	0.01
Finland	0.05	0.00	0.00
France	0.09	0.01	0.02
Georgia	0.06	0.00	0.00
Hong Kong SAR	0.09	0.01	0.03
Hungary	-0.02	0.00	0.00
Iran, Islamic Rep. of	0.11	0.01	0.04
Ireland	0.12	0.01	0.01
Israel	0.12	0.02	0.01
Italy	0.03	0.00	0.00
Japan	0.08	0.01	0.01
Jordan	-0.12	0.01	0.01
Kazakhstan	0.07	0.00	0.01
Korea, Rep. of	0.02	0.00	0.00
Kuwait	-0.01	0.00	0.02
Lebanon	0.17	0.03	0.10
Lithuania	-0.02	0.00	0.00
Malaysia	-0.08	0.01	0.01
Morocco	-0.03	0.00	0.03
New Zealand	0.21	0.04	0.03
Norway (9)	0.01	0.00	0.00
Oman	0.05	0.00	0.01
Portugal	0.10	0.01	0.01
Qatar	0.20	0.04	0.05
Romania	0.16	0.03	0.02
Russian Federation	0.08	0.01	0.02
Saudi Arabia	-0.05	0.00	0.01
Singapore	0.04	0.00	0.00
South Africa (9)	0.21	0.05	0.09
Sweden	0.04	0.00	0.00
Turkey	0.18	0.03	0.02
United Arab Emirates	0.20	0.04	0.05
United States	0.12	0.01	0.02
International Median	0.08	0.01	0.01

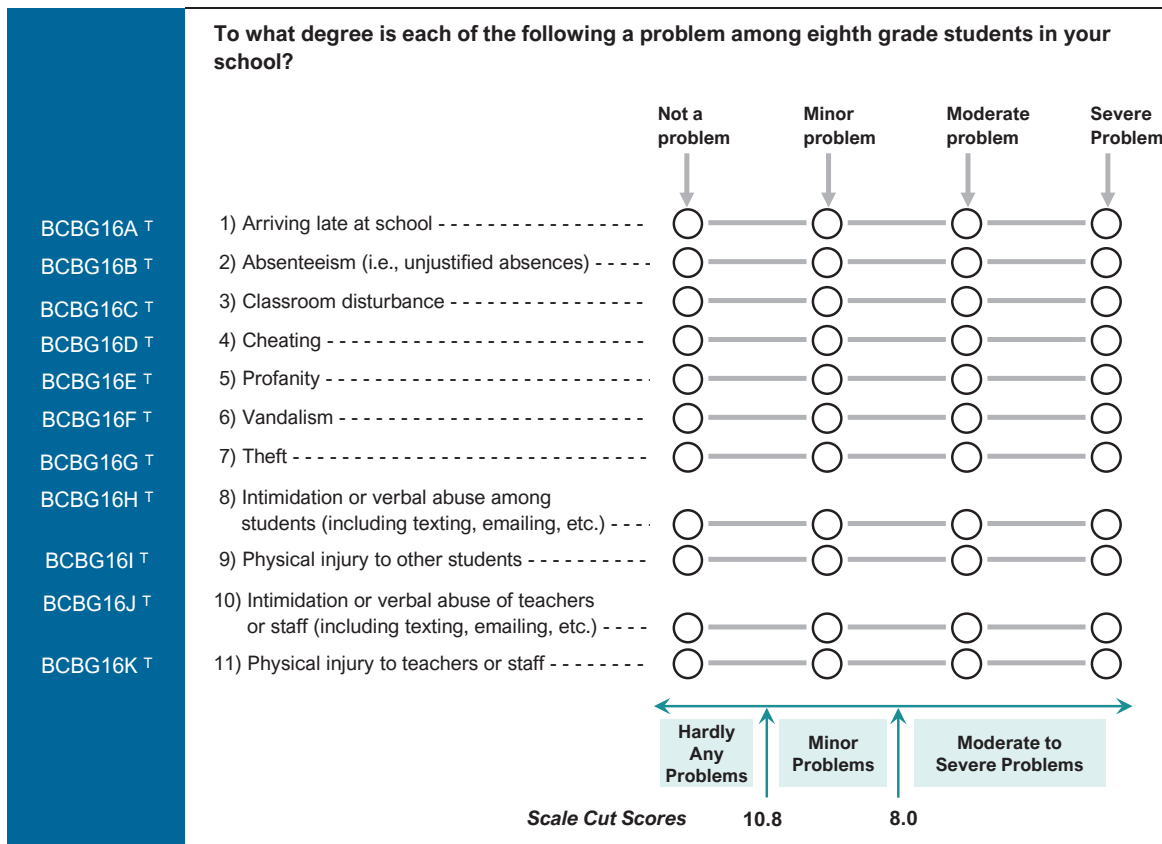
Relationship Between the TIMSS 2019 *Instruction Affected by Science Resource Shortages* Scale and TIMSS 2019 Achievement – Grade 8

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	
Benchmarking Participants			
Ontario, Canada	0.08	0.01	0.02
Quebec, Canada	-0.02	0.00	0.01
Moscow City, Russian Fed.	0.00	0.00	0.00
Gauteng, RSA (9)	0.32	0.10	0.15
Western Cape, RSA (9)	0.47	0.22	0.24
Abu Dhabi, UAE	0.16	0.03	0.04
Dubai, UAE	0.19	0.04	0.05

School Discipline – Grade 8

About the Scale

The *School Discipline* scale was created based on principals’ responses to eleven items listed below.



^T Trend item—item was included in the same scale in TIMSS 2015 and was used for linking the TIMSS 2015 and TIMSS 2019 scales.

Item Parameters for the TIMSS 2019 School Discipline Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BCBG16A	0.32951	-2.48171	-0.42419	2.90590	1.27
BCBG16B	0.89186	-1.91504	-0.57924	2.49428	1.28
BCBG16C	0.79991	-2.31615	-0.33558	2.65173	0.97
BCBG16D	-0.17728	-1.38113	-0.75069	2.13182	1.09
BCBG16E	0.54617	-1.88683	-0.34275	2.22958	0.92
BCBG16F	-0.05891	-0.80027	-0.74541	1.54568	0.83
BCBG16G	-0.59715	-0.18031	-1.07997	1.26028	0.82
BCBG16H	0.45456	-1.89207	-0.59214	2.48421	1.02
BCBG16I	-0.30789	-0.85864	-0.95601	1.81465	0.80
BCBG16J	-0.64994	-0.36374	-0.79318	1.15692	0.82
BCBG16K	-1.23084	1.01064	-0.65683	-0.35381	0.88

Scale Transformation Constants for the TIMSS 2019 School Discipline Scale – Grade 8

Scale Transformation Constants

$$A = 8.418512$$

$$B = 0.982377$$

$$\text{Transformed Scale Score} = 8.418512 + 0.982377 \cdot \text{Logit Scale Score}$$

**Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS
2019 School Discipline Scale – Grade 8**

Raw Score	Transformed Scale Score	Cutpoint
0	4.10007	
1	5.19151	
2	5.69640	
3	6.02711	
4	6.27380	
5	6.47245	
6	6.64117	
7	6.79025	
8	6.92622	
9	7.05373	
10	7.17625	
11	7.29658	
12	7.41582	
13	7.53896	
14	7.66553	
15	7.79736	
16	7.93621	8.0
17	8.08398	
18	8.24184	
19	8.41207	
20	8.59633	
21	8.79625	
22	9.01493	
23	9.25300	
24	9.51280	
25	9.79607	
26	10.10482	
27	10.43939	
28	10.80136	10.8
29	11.19421	
30	11.62884	
31	12.13532	
32	12.80218	
33	14.02858	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 School Discipline Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item										
			BCBG16A	BCBG16B	BCBG16C	BCBG16D	BCBG16E	BCBG16F	BCBG16G	BCBG16H	BCBG16I	BCBG16J	BCBG16K
Australia	0.92	57	0.71	0.74	0.82	0.65	0.85	0.78	0.61	0.76	0.86	0.83	0.66
Bahrain	0.96	73	0.76	0.76	0.79	0.86	0.87	0.88	0.90	0.87	0.90	0.90	0.88
Chile	0.90	52	0.56	0.64	0.77	0.76	0.80	0.73	0.76	0.72	0.80	0.72	0.60
Chinese Taipei	0.88	48	0.68	0.73	0.60	0.75	0.69	0.72	0.80	0.68	0.75	0.67	0.46
Cyprus	0.94	61	0.58	0.68	0.77	0.82	0.83	0.85	0.80	0.83	0.88	0.83	0.69
Egypt	0.96	70	0.64	0.71	0.82	0.81	0.84	0.91	0.88	0.89	0.92	0.88	0.86
England	0.82	36	0.67	0.65	0.68	0.46	0.71	0.68	0.44	0.50	0.65	0.62	0.47
Finland	0.85	41	0.59	0.65	0.67	0.61	0.70	0.66	0.50	0.71	0.70	0.67	0.54
France	0.88	46	0.64	0.75	0.78	0.52	0.81	0.58	0.60	0.72	0.72	0.75	0.49
Georgia	0.95	69	0.68	0.80	0.78	0.62	0.85	0.88	0.90	0.90	0.91	0.90	0.88
Hong Kong SAR	0.81	37	0.65	0.53	0.60	0.72	0.74	0.66	0.68	0.58	0.63	0.41	0.37
Hungary	0.89	47	0.69	0.70	0.81	0.69	0.82	0.78	0.49	0.70	0.71	0.71	0.14
Iran, Islamic Rep. of	0.90	52	0.64	0.61	0.75	0.73	0.82	0.78	0.75	0.78	0.71	0.73	0.60
Ireland	0.88	45	0.71	0.73	0.76	0.63	0.79	0.72	0.59	0.74	0.60	0.74	0.11
Israel	0.92	56	0.63	0.65	0.70	0.71	0.79	0.78	0.79	0.74	0.77	0.84	0.80
Italy	0.91	52	0.57	0.74	0.64	0.64	0.68	0.80	0.74	0.75	0.84	0.79	0.71
Japan	0.92	63	0.62	0.15	0.86	0.80	0.86	0.92	0.79	0.67	0.88	0.88	0.93
Jordan	0.95	68	0.55	0.70	0.81	0.84	0.88	0.89	0.86	0.87	0.89	0.88	0.79
Kazakhstan	0.98	82	0.74	0.91	0.89	0.72	0.89	0.95	0.96	0.96	0.96	0.96	0.96
Korea, Rep. of	0.95	67	0.77	0.86	0.75	0.76	0.83	0.85	0.81	0.83	0.87	0.85	0.78
Kuwait	0.95	67	0.60	0.72	0.79	0.87	0.84	0.89	0.86	0.85	0.83	0.85	0.83
Lebanon	0.97	77	0.83	0.86	0.81	0.91	0.87	0.92	0.93	0.80	0.88	0.90	0.92
Lithuania	0.83	38	0.62	0.61	0.65	0.62	0.73	0.66	0.49	0.60	0.74	0.63	0.22
Malaysia	0.92	58	0.59	0.64	0.76	0.85	0.82	0.82	0.84	0.81	0.84	0.75	0.59
Morocco	0.96	72	0.59	0.72	0.87	0.87	0.89	0.89	0.92	0.85	0.91	0.89	0.86
New Zealand	0.90	52	0.71	0.74	0.79	0.59	0.78	0.79	0.75	0.71	0.78	0.75	0.42
Norway (9)	0.88	46	0.72	0.76	0.67	0.68	0.69	0.64	0.69	0.75	0.65	0.70	0.49
Oman	0.97	80	0.80	0.82	0.83	0.91	0.90	0.93	0.94	0.91	0.92	0.92	0.91
Portugal	0.92	56	0.61	0.68	0.76	0.70	0.70	0.84	0.79	0.76	0.82	0.84	0.67
Qatar	0.97	75	0.77	0.86	0.86	0.92	0.87	0.88	0.83	0.89	0.87	0.89	0.87
Romania	0.94	65	0.76	0.67	0.80	0.81	0.76	0.87	0.90	0.75	0.80	0.88	0.83
Russian Federation	0.81	36	0.52	0.48	0.61	0.56	0.67	0.60	0.68	0.68	0.68	0.63	0.39
Saudi Arabia	0.96	72	0.53	0.68	0.80	0.89	0.90	0.92	0.93	0.87	0.92	0.91	0.87
Singapore	0.86	43	0.64	0.68	0.70	0.64	0.75	0.71	0.74	0.56	0.73	0.68	0.30
South Africa (9)	0.91	53	0.67	0.70	0.77	0.71	0.77	0.77	0.75	0.80	0.80	0.69	0.56
Sweden	0.85	40	0.63	0.69	0.63	0.52	0.73	0.64	0.55	0.67	0.69	0.63	0.49
Turkey	0.96	72	0.69	0.75	0.86	0.86	0.81	0.87	0.89	0.88	0.92	0.91	0.88
United Arab Emirates	0.92	57	0.62	0.66	0.73	0.80	0.77	0.82	0.75	0.80	0.77	0.78	0.76
United States	0.89	49	0.70	0.67	0.76	0.45	0.78	0.69	0.71	0.71	0.80	0.79	0.57

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *School Discipline* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item										
			BCBG16A	BCBG16B	BCBG16C	BCBG16D	BCBG16E	BCBG16F	BCBG16G	BCBG16H	BCBG16I	BCBG16J	BCBG16K
Benchmarking Participants													
Ontario, Canada	0.88	48	0.67	0.57	0.73	0.59	0.81	0.75	0.75	0.75	0.71	0.78	0.44
Quebec, Canada	0.87	45	0.63	0.72	0.75	0.51	0.83	0.67	0.57	0.74	0.67	0.77	0.34
Moscow City, Russian Fed.	0.79	35	0.59	0.54	0.67	0.61	0.73	0.56	0.52	0.65	0.56	0.44	-
Gauteng, RSA (9)	0.92	54	0.74	0.74	0.75	0.69	0.74	0.80	0.79	0.81	0.77	0.60	0.62
Western Cape, RSA (9)	0.93	58	0.77	0.80	0.78	0.76	0.83	0.80	0.81	0.78	0.80	0.71	0.50
Abu Dhabi, UAE	0.92	58	0.70	0.69	0.80	0.83	0.76	0.84	0.63	0.83	0.76	0.79	0.71
Dubai, UAE	0.85	45	0.45	0.59	0.59	0.77	0.71	0.83	0.78	0.63	0.64	0.55	0.74

Relationship Between the TIMSS 2019 School Discipline Scale and TIMSS 2019 Achievement – Grade 8

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2		r	r^2	
Australia	0.35	0.12	0.12	0.32	0.10	0.10
Bahrain	0.08	0.01	0.01	0.07	0.01	0.02
Chile	0.26	0.07	0.06	0.25	0.06	0.06
Chinese Taipei	0.12	0.01	0.01	0.10	0.01	0.01
Cyprus	0.24	0.06	0.08	0.21	0.04	0.07
Egypt	0.06	0.00	0.01	0.06	0.00	0.01
England	0.22	0.05	0.02	0.22	0.05	0.02
Finland	0.11	0.01	0.01	0.12	0.01	0.02
France	0.28	0.08	0.08	0.28	0.08	0.08
Georgia	0.13	0.02	0.02	0.12	0.01	0.02
Hong Kong SAR	0.24	0.06	0.02	0.17	0.03	0.00
Hungary	0.28	0.08	0.06	0.27	0.07	0.06
Iran, Islamic Rep. of	0.23	0.05	0.04	0.22	0.05	0.03
Ireland	0.24	0.06	0.04	0.24	0.06	0.03
Israel	0.22	0.05	0.05	0.20	0.04	0.04
Italy	0.08	0.01	0.01	0.08	0.01	0.01
Japan	0.08	0.01	0.00	0.07	0.01	0.00
Jordan	0.09	0.01	0.01	0.10	0.01	0.02
Kazakhstan	0.10	0.01	0.01	0.07	0.00	0.00
Korea, Rep. of	0.01	0.00	0.00	0.02	0.00	0.00
Kuwait	0.15	0.02	0.03	0.15	0.02	0.03
Lebanon	0.04	0.00	0.01	0.06	0.00	0.01
Lithuania	0.09	0.01	0.00	0.08	0.01	0.00
Malaysia	0.20	0.04	0.03	0.17	0.03	0.03
Morocco	0.01	0.00	0.01	-0.02	0.00	0.01
New Zealand	0.28	0.08	0.05	0.25	0.06	0.04
Norway (9)	0.11	0.01	0.00	0.12	0.02	0.01
Oman	0.12	0.01	0.02	0.10	0.01	0.01
Portugal	0.11	0.01	0.01	0.09	0.01	0.01
Qatar	0.09	0.01	0.01	0.04	0.00	0.00
Romania	0.18	0.03	0.03	0.18	0.03	0.03
Russian Federation	0.03	0.00	0.00	0.02	0.00	0.00
Saudi Arabia	0.10	0.01	0.01	0.12	0.01	0.01
Singapore	0.15	0.02	0.02	0.14	0.02	0.02
South Africa (9)	0.17	0.03	0.04	0.15	0.02	0.03
Sweden	0.16	0.03	0.02	0.16	0.03	0.02
Turkey	0.14	0.02	0.03	0.13	0.02	0.02
United Arab Emirates	0.26	0.07	0.06	0.28	0.08	0.07
United States	0.28	0.08	0.07	0.28	0.08	0.07
International Median	0.14	0.02	0.02	0.13	0.02	0.02

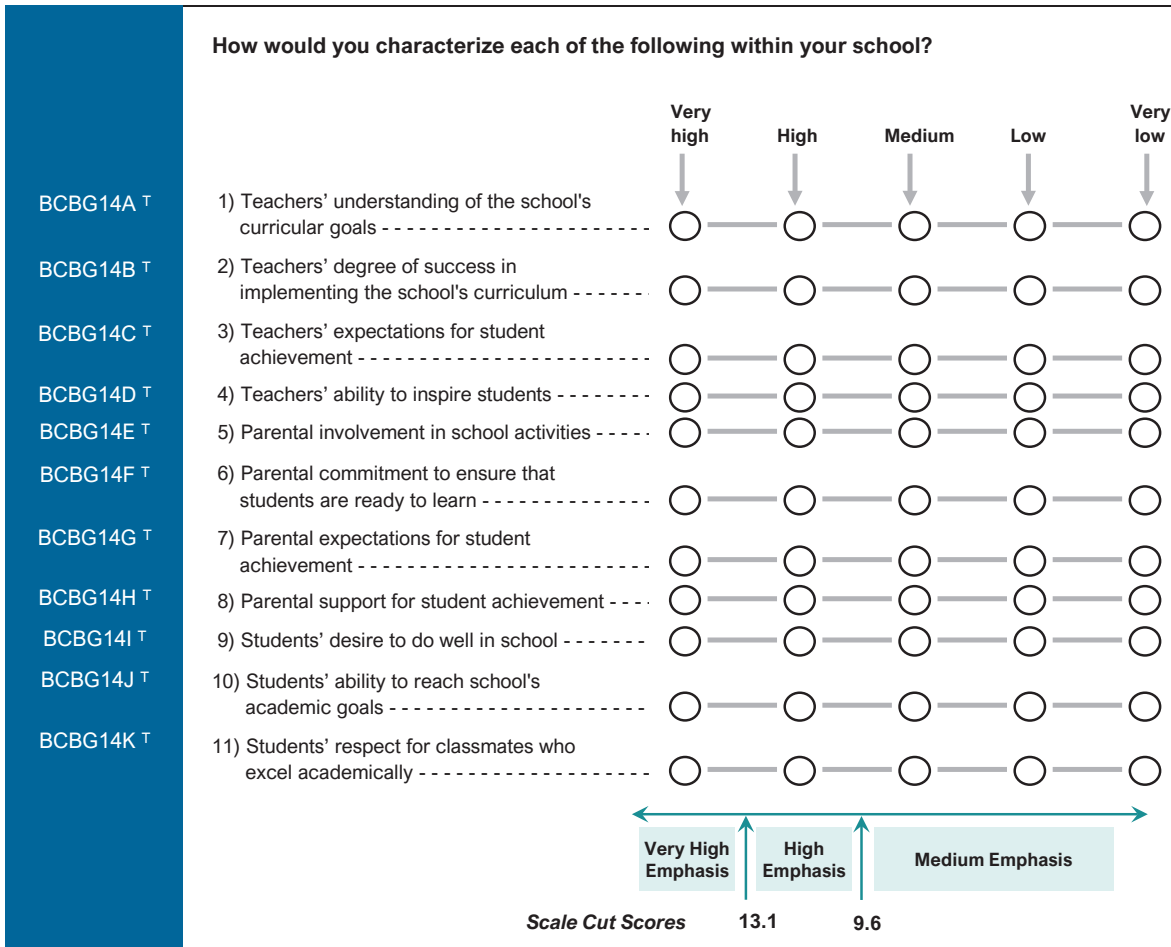
Relationship Between the TIMSS 2019 *School Discipline* Scale and TIMSS 2019 Achievement – Grade 8

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2		r	r^2	
Benchmarking Participants						
Ontario, Canada	0.20	0.04	0.02	0.15	0.02	0.02
Quebec, Canada	0.15	0.02	0.01	0.12	0.01	0.01
Moscow City, Russian Fed.	0.02	0.00	0.00	0.00	0.00	0.00
Gauteng, RSA (9)	0.39	0.15	0.17	0.39	0.16	0.17
Western Cape, RSA (9)	0.58	0.34	0.31	0.58	0.33	0.31
Abu Dhabi, UAE	0.23	0.05	0.04	0.26	0.07	0.06
Dubai, UAE	0.23	0.05	0.04	0.23	0.05	0.03

School Emphasis on Academic Success— Principals’ Reports – Grade 8

About the Scale

The *School Emphasis on Academic Success* scale was created based on principals’ responses to eleven items listed below.¹



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.

^T Trend item—item was included in the same scale in TIMSS 2015 and was used for linking the TIMSS 2015 and TIMSS 2019 scales.

Item Parameters for the TIMSS 2019 School Emphasis on Academic Success—Principals' Reports Scale – Grade 8

Item	delta	tau_1	tau_2	tau_3	Infit
BCBG14A	-1.68808	-3.41252	0.01816	3.39436	1.19
BCBG14B	-1.24407	-3.72289	0.13877	3.58412	1.00
BCBG14C	-0.83743	-3.38294	-0.01936	3.40230	0.98
BCBG14D	-0.60365	-3.45458	0.05816	3.39642	1.03
BCBG14E	1.62892	-2.42516	0.09836	2.32680	1.17
BCBG14F	1.44778	-2.60585	0.04277	2.56308	0.82
BCBG14G	-0.09004	-2.61114	-0.18026	2.79140	1.02
BCBG14H	1.20810	-2.67184	0.05169	2.62015	0.85
BCBG14I	0.05948	-3.47526	0.16895	3.30631	0.86
BCBG14J	0.43096	-3.76989	0.24784	3.52205	0.85
BCBG14K	-0.31197	-2.97209	-0.24200	3.21409	1.20

Scale Transformation Constants for the TIMSS 2019 School Emphasis on Academic Success—Principals' Reports Scale – Grade 8

Scale Transformation Constants

A = 9.585866

B = 1.044298

Transformed Scale Score = 9.585866 + 1.044298 • Logit Scale Score

**Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019
School Emphasis on Academic Success—Principals' Reports Scale – Grade 8**

Raw Score	Transformed Scale Score	Cutpoint
1	3.55446	
2	4.30371	
3	4.88060	
4	5.37607	
5	5.82698	
6	6.24903	
7	6.65002	
8	7.03177	
9	7.39368	
10	7.73586	
11	8.06046	
12	8.37165	
13	8.67341	
14	8.96990	
15	9.26475	
16	9.56054	9.6
17	9.85898	
18	10.15969	
19	10.46161	
20	10.76309	
21	11.06274	
22	11.35999	
23	11.65536	
24	11.95038	
25	12.24755	
26	12.55044	
27	12.86324	
28	13.19357	13.1
29	13.55081	
30	13.95351	
31	14.43815	
32	15.09677	
33	16.36222	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 School Emphasis on Academic Success—Principals' Reports Scale – Grade 8

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
Australia	0.94	65	0.68	0.76	0.81	0.73	0.79	0.85	0.83	0.87	0.87	0.81	0.83
Bahrain	0.94	63	0.72	0.76	0.77	0.85	0.69	0.87	0.84	0.88	0.81	0.85	0.69
Chile	0.95	66	0.75	0.79	0.81	0.81	0.77	0.83	0.83	0.86	0.86	0.84	0.77
Chinese Taipei	0.93	61	0.64	0.77	0.77	0.78	0.77	0.81	0.85	0.82	0.84	0.76	0.73
Cyprus	0.89	50	0.39	0.73	0.70	0.53	0.59	0.78	0.83	0.82	0.77	0.82	0.66
Egypt	0.89	49	0.46	0.64	0.63	0.67	0.71	0.82	0.78	0.81	0.74	0.74	0.59
England	0.93	58	0.64	0.70	0.75	0.71	0.70	0.85	0.80	0.82	0.85	0.83	0.71
Finland	0.87	44	0.67	0.62	0.63	0.64	0.65	0.75	0.71	0.72	0.66	0.68	0.57
France	0.86	42	0.39	0.54	0.56	0.54	0.69	0.82	0.65	0.80	0.71	0.74	0.56
Georgia	0.91	51	0.76	0.76	0.74	0.77	0.73	0.78	0.62	0.72	0.74	0.65	0.56
Hong Kong SAR	0.92	55	0.62	0.71	0.78	0.78	0.67	0.83	0.78	0.82	0.77	0.79	0.54
Hungary	0.91	54	0.47	0.72	0.63	0.77	0.73	0.87	0.69	0.86	0.81	0.76	0.67
Iran, Islamic Rep. of	0.89	49	0.71	0.69	0.69	0.69	0.69	0.77	0.59	0.76	0.75	0.76	0.55
Ireland	0.92	59	0.65	0.70	0.82	0.67	0.76	0.83	0.80	0.80	0.85	0.84	0.68
Israel	0.88	46	0.54	0.62	0.69	0.60	0.60	0.72	0.77	0.79	0.71	0.72	0.66
Italy	0.84	40	0.53	0.64	0.61	0.56	0.65	0.74	0.56	0.72	0.71	0.65	0.51
Japan	0.91	52	0.55	0.57	0.73	0.71	0.67	0.85	0.72	0.83	0.78	0.81	0.65
Jordan	0.91	53	0.66	0.74	0.63	0.72	0.70	0.80	0.77	0.78	0.78	0.76	0.64
Kazakhstan	0.89	50	0.63	0.68	0.68	0.79	0.67	0.79	0.68	0.78	0.73	0.62	0.69
Korea, Rep. of	0.91	54	0.62	0.64	0.69	0.53	0.78	0.83	0.78	0.81	0.77	0.81	0.72
Kuwait	0.91	53	0.61	0.69	0.71	0.72	0.68	0.80	0.79	0.75	0.80	0.75	0.68
Lebanon	0.87	44	0.58	0.54	0.66	0.59	0.67	0.73	0.68	0.76	0.65	0.78	0.56
Lithuania	0.85	41	0.54	0.62	0.61	0.68	0.70	0.77	0.58	0.77	0.62	0.57	0.48
Malaysia	0.91	51	0.54	0.61	0.60	0.65	0.77	0.80	0.73	0.80	0.83	0.81	0.69
Morocco	0.88	47	0.66	0.63	0.68	0.70	0.63	0.80	0.73	0.73	0.67	0.72	0.55
New Zealand	0.92	56	0.68	0.80	0.77	0.73	0.65	0.77	0.79	0.81	0.81	0.76	0.63
Norway (9)	0.89	48	0.49	0.60	0.74	0.59	0.77	0.72	0.76	0.71	0.78	0.77	0.61
Oman	0.89	49	0.66	0.68	0.61	0.64	0.67	0.83	0.74	0.77	0.68	0.77	0.61
Portugal	0.91	52	0.59	0.74	0.75	0.57	0.68	0.81	0.74	0.81	0.77	0.79	0.63
Qatar	0.92	56	0.67	0.76	0.78	0.85	0.79	0.77	0.72	0.70	0.74	0.81	0.62
Romania	0.88	46	0.51	0.64	0.63	0.71	0.73	0.76	0.58	0.73	0.75	0.81	0.56
Russian Federation	0.84	39	0.56	0.67	0.61	0.60	0.75	0.68	0.49	0.73	0.67	0.59	0.42
Saudi Arabia	0.92	53	0.64	0.67	0.76	0.73	0.72	0.75	0.75	0.78	0.77	0.79	0.66
Singapore	0.94	61	0.70	0.73	0.81	0.75	0.70	0.84	0.82	0.84	0.82	0.84	0.73
South Africa (9)	0.88	47	0.52	0.68	0.63	0.63	0.77	0.81	0.62	0.81	0.69	0.69	0.67
Sweden	0.89	49	0.61	0.60	0.74	0.68	0.74	0.82	0.74	0.79	0.74	0.75	0.46
Turkey	0.90	51	0.66	0.60	0.74	0.63	0.80	0.81	0.62	0.83	0.75	0.80	0.56
United Arab Emirates	0.94	65	0.75	0.78	0.85	0.83	0.76	0.85	0.75	0.83	0.85	0.84	0.74
United States	0.93	60	0.68	0.77	0.77	0.80	0.80	0.84	0.82	0.82	0.80	0.72	0.69

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 School Emphasis on Academic Success—Principals' Reports Scale – Grade 8

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
Benchmarking Participants													
Ontario, Canada	0.90	53	0.54	0.68	0.76	0.61	0.63	0.77	0.77	0.83	0.82	0.76	0.74
Quebec, Canada	0.91	53	0.68	0.69	0.65	0.75	0.62	0.79	0.75	0.80	0.83	0.77	0.68
Moscow City, Russian Fed.	0.86	42	0.63	0.68	0.60	0.67	0.70	0.78	0.48	0.69	0.68	0.60	0.57
Gauteng, RSA (9)	0.90	50	0.64	0.74	0.63	0.63	0.72	0.77	0.63	0.78	0.73	0.76	0.71
Western Cape, RSA (9)	0.91	54	0.58	0.68	0.63	0.68	0.79	0.84	0.63	0.83	0.83	0.82	0.74
Abu Dhabi, UAE	0.95	65	0.72	0.74	0.83	0.82	0.80	0.85	0.74	0.86	0.87	0.85	0.78
Dubai, UAE	0.94	62	0.73	0.76	0.85	0.80	0.70	0.82	0.75	0.83	0.84	0.82	0.71

Relationship Between the TIMSS 2019 School Emphasis on Academic Success—Principals' Reports Scale and TIMSS 2019 Achievement – Grade 8

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2		r	r^2	
Australia	0.45	0.20	0.17	0.39	0.15	0.11
Bahrain	0.14	0.02	0.02	0.32	0.10	0.10
Chile	0.35	0.12	0.13	0.34	0.11	0.12
Chinese Taipei	0.26	0.07	0.05	0.22	0.05	0.04
Cyprus	0.21	0.05	0.04	0.18	0.03	0.03
Egypt	0.19	0.03	0.03	0.20	0.04	0.03
England	0.29	0.08	0.18	0.26	0.07	0.15
Finland	0.14	0.02	0.01	0.13	0.02	0.01
France	0.26	0.07	0.05	0.25	0.06	0.04
Georgia	0.12	0.01	0.02	0.05	0.00	0.00
Hong Kong SAR	0.41	0.17	0.15	0.35	0.12	0.12
Hungary	0.44	0.20	0.12	0.42	0.17	0.10
Iran, Islamic Rep. of	0.34	0.12	0.10	0.34	0.12	0.10
Ireland	0.29	0.08	0.08	0.26	0.07	0.07
Israel	0.20	0.04	0.04	0.22	0.05	0.04
Italy	0.13	0.02	0.00	0.13	0.02	0.00
Japan	0.23	0.05	0.06	0.20	0.04	0.04
Jordan	0.24	0.06	0.05	0.25	0.06	0.05
Kazakhstan	0.05	0.00	0.00	0.02	0.00	0.00
Korea, Rep. of	0.15	0.02	0.02	0.11	0.01	0.02
Kuwait	0.28	0.08	0.06	0.29	0.09	0.08
Lebanon	0.33	0.11	0.09	0.36	0.13	0.11
Lithuania	0.15	0.02	0.02	0.14	0.02	0.01
Malaysia	0.30	0.09	0.07	0.30	0.09	0.07
Morocco	0.17	0.03	0.03	0.13	0.02	0.02
New Zealand	0.31	0.10	0.07	0.29	0.08	0.06
Norway (9)	0.14	0.02	0.01	0.11	0.01	0.01
Oman	0.18	0.03	0.03	0.16	0.03	0.03
Portugal	0.32	0.10	0.05	0.28	0.08	0.04
Qatar	0.24	0.06	0.08	0.19	0.04	0.05
Romania	0.26	0.07	0.05	0.24	0.06	0.04
Russian Federation	0.19	0.04	0.03	0.17	0.03	0.02
Saudi Arabia	0.16	0.02	0.02	0.19	0.03	0.03
Singapore	0.37	0.14	0.14	0.36	0.13	0.13
South Africa (9)	0.27	0.07	0.04	0.27	0.07	0.04
Sweden	0.25	0.06	0.05	0.24	0.06	0.05
Turkey	0.28	0.08	0.07	0.26	0.07	0.06
United Arab Emirates	0.36	0.13	0.11	0.37	0.14	0.12
United States	0.31	0.10	0.09	0.29	0.08	0.08
International Median	0.26	0.07	0.05	0.25	0.06	0.04

Relationship Between the TIMSS 2019 School Emphasis on Academic Success—Principals' Reports Scale and TIMSS 2019 Achievement – Grade 8

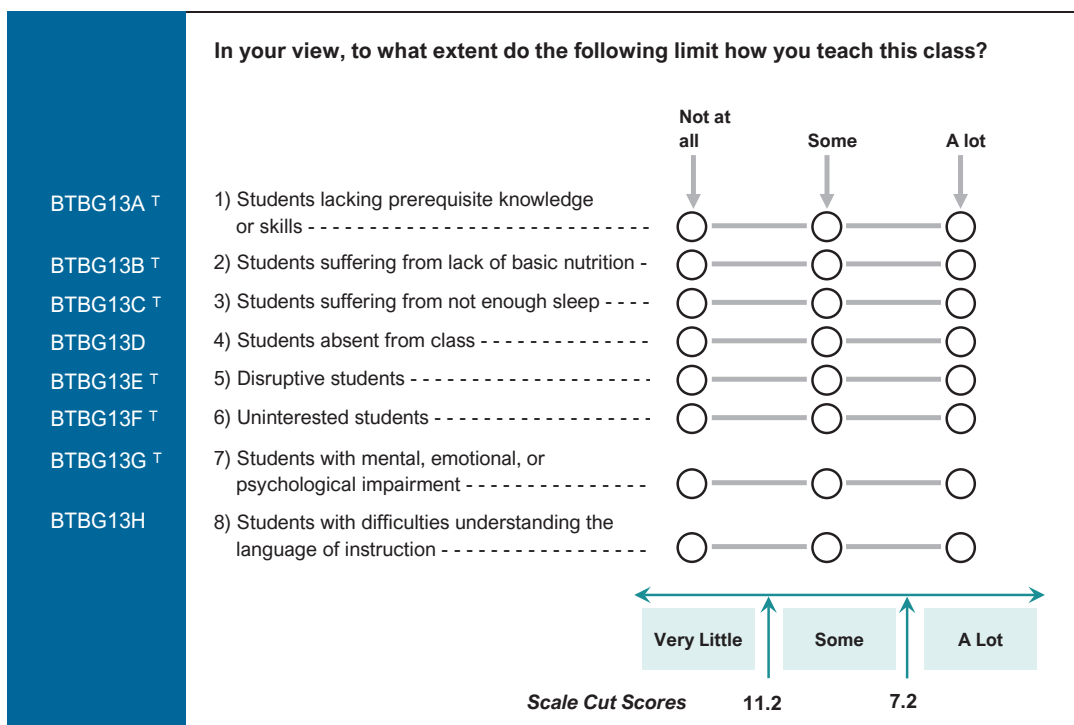
Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2		r	r^2	
Benchmarking Participants						
Ontario, Canada	0.24	0.06	0.05	0.17	0.03	0.03
Quebec, Canada	0.31	0.09	0.10	0.27	0.07	0.08
Moscow City, Russian Fed.	0.06	0.00	0.01	0.06	0.00	0.01
Gauteng, RSA (9)	0.29	0.08	0.04	0.29	0.09	0.04
Western Cape, RSA (9)	0.55	0.30	0.25	0.54	0.29	0.25
Abu Dhabi, UAE	0.37	0.13	0.13	0.40	0.16	0.16
Dubai, UAE	0.30	0.09	0.07	0.27	0.07	0.05

Scales Based on Teachers' Reports

Classroom Teaching Limited by Students Not Ready for Instruction – Grade 8

About the Scale

The *Classroom Teaching Limited by Students Not Ready for Instruction* scale was created based on teachers' responses to eight items listed below.



^T Trend item—item was included in the same scale in TIMSS 2015 and was used for linking the TIMSS 2015 and TIMSS 2019 scales.

Item Parameters for the TIMSS 2019 Classroom Teaching Limited by Students Not Ready for Instruction Scale – Grade 8

Item	delta	tau_1	tau_2	Infit
BTBG13A	1.09871	-1.88960	1.88960	1.02
BTBG13B	-1.09149	-1.20078	1.20078	1.11
BTBG13C	0.14688	-1.69582	1.69582	0.99
BTBG13D	0.14205	-1.54079	1.54079	0.98
BTBG13E	0.27077	-1.26887	1.26887	0.95
BTBG13F	0.84736	-1.78301	1.78301	0.91
BTBG13G	-0.61321	-1.43379	1.43379	0.99
BTBG13H	-0.80107	-1.14438	1.14438	1.08

Scale Transformation Constants for the TIMSS 2019 Classroom Teaching Limited by Students Not Ready for Instruction Scale – Grade 8

Scale Transformation Constants

$$A = 9.253899$$

$$B = 1.261053$$

$$\text{Transformed Scale Score} = 9.253899 + 1.261053 \cdot \text{Logit Scale Score}$$

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 Classroom Teaching Limited by Students Not Ready for Instruction Scale – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	3.62369	
1	5.18385	
2	6.01647	
3	6.64377	
4	7.18242	7.2
5	7.67828	
6	8.15603	
7	8.63238	
8	9.11668	
9	9.61910	
10	10.14509	
11	10.69865	
12	11.28828	11.2
13	11.93193	
14	12.67245	
15	13.61824	
16	15.29510	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 Classroom Teaching Limited by Students Not Ready for Instruction Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BTBG13A	BTBG13B	BTBG13C	BTBG13D	BTBG13E	BTBG13F	BTBG13G	BTBG13H
Australia	0.83	46	0.69	0.60	0.65	0.67	0.75	0.76	0.66	0.61
Bahrain	0.76	38	0.63	0.60	0.64	0.39	0.71	0.73	0.58	0.55
Chile	0.84	47	0.67	0.72	0.73	0.73	0.71	0.76	0.64	0.53
Chinese Taipei	0.80	43	0.59	0.56	0.63	0.70	0.69	0.62	0.71	0.71
Cyprus	0.80	43	0.57	0.58	0.69	0.68	0.65	0.69	0.70	0.69
Egypt	0.68	31	0.49	0.42	0.35	0.55	0.72	0.71	0.60	0.55
England	0.82	45	0.58	0.70	0.76	0.64	0.72	0.72	0.62	0.63
Finland	0.78	40	0.72	0.44	0.68	0.62	0.63	0.73	0.70	0.46
France	0.75	36	0.58	0.56	0.61	0.70	0.57	0.59	0.65	0.53
Georgia	0.71	33	0.56	0.43	0.43	0.56	0.66	0.69	0.66	0.57
Hong Kong SAR	0.71	34	0.65	0.33	0.51	0.62	0.65	0.69	0.69	0.40
Hungary	0.78	40	0.62	0.55	0.66	0.58	0.69	0.71	0.74	0.47
Iran, Islamic Rep. of	0.76	38	0.50	0.59	0.60	0.59	0.69	0.61	0.75	0.55
Ireland	0.81	43	0.54	0.63	0.69	0.65	0.69	0.74	0.66	0.61
Israel	0.86	51	0.63	0.64	0.72	0.78	0.72	0.74	0.71	0.72
Italy	0.80	42	0.70	0.65	0.66	0.66	0.70	0.64	0.54	0.65
Japan	0.78	40	0.68	0.21	0.63	0.66	0.61	0.71	0.65	0.72
Jordan	0.71	34	0.57	0.40	0.56	0.59	0.67	0.73	0.47	0.60
Kazakhstan	0.83	46	0.62	0.53	0.71	0.70	0.74	0.71	0.76	0.62
Korea, Rep. of	0.77	39	0.37	0.53	0.66	0.62	0.67	0.64	0.73	0.68
Kuwait	0.68	32	0.43	0.33	0.60	0.60	0.69	0.74	0.55	0.47
Lebanon	0.75	37	0.57	0.49	0.60	0.64	0.64	0.70	0.59	0.60
Lithuania	0.85	49	0.63	0.68	0.73	0.76	0.74	0.73	0.72	0.60
Malaysia	0.84	48	0.67	0.58	0.63	0.73	0.78	0.82	0.69	0.57
Morocco	0.69	31	0.45	0.52	0.51	0.56	0.66	0.65	0.55	0.55
New Zealand	0.79	41	0.57	0.63	0.64	0.66	0.69	0.73	0.71	0.47
Norway (9)	0.74	36	0.55	0.63	0.71	0.67	0.64	0.65	0.47	0.41
Oman	0.75	37	0.53	0.54	0.56	0.62	0.61	0.64	0.65	0.67
Portugal	0.77	39	0.56	0.60	0.65	0.68	0.62	0.76	0.55	0.56
Qatar	0.78	39	0.62	0.56	0.70	0.61	0.70	0.74	0.50	0.56
Romania	0.78	40	0.59	0.57	0.55	0.67	0.71	0.67	0.65	0.60
Russian Federation	0.84	48	0.61	0.63	0.69	0.78	0.75	0.71	0.75	0.58
Saudi Arabia	0.78	40	0.55	0.60	0.64	0.67	0.70	0.66	0.61	0.61
Singapore	0.80	42	0.60	0.53	0.55	0.72	0.69	0.70	0.70	0.64
South Africa (9)	0.75	37	0.47	0.54	0.58	0.62	0.71	0.74	0.63	0.54
Sweden	0.75	36	0.65	0.37	0.64	0.57	0.69	0.68	0.62	0.54
Turkey	0.83	46	0.62	0.69	0.66	0.68	0.68	0.71	0.74	0.63
United Arab Emirates	0.84	48	0.64	0.54	0.70	0.67	0.77	0.78	0.69	0.71
United States	0.80	42	0.61	0.66	0.65	0.64	0.73	0.72	0.70	0.48

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 Classroom Teaching Limited by Students Not Ready for Instruction Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BTBG13A	BTBG13B	BTBG13C	BTBG13D	BTBG13E	BTBG13F	BTBG13G	BTBG13H
Benchmarking Participants										
Ontario, Canada	0.81	45	0.61	0.67	0.74	0.73	0.70	0.76	0.69	0.36
Quebec, Canada	0.80	42	0.61	0.68	0.70	0.71	0.59	0.74	0.68	0.42
Moscow City, Russian Fed.	0.87	52	0.65	0.63	0.72	0.78	0.76	0.73	0.77	0.71
Gauteng, RSA (9)	0.79	41	0.46	0.66	0.58	0.63	0.69	0.74	0.63	0.66
Western Cape, RSA (9)	0.82	45	0.58	0.67	0.58	0.64	0.77	0.79	0.69	0.58
Abu Dhabi, UAE	0.84	47	0.70	0.40	0.67	0.68	0.77	0.77	0.69	0.75
Dubai, UAE	0.84	48	0.52	0.61	0.71	0.68	0.77	0.79	0.71	0.71

Relationship Between the TIMSS 2019 Classroom Teaching Limited by Students Not Ready for Instruction Scale and TIMSS 2019 Achievement – Grade 8

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2		r	r^2	
Australia	0.49	0.24	0.20	0.36	0.13	0.10
Bahrain	0.05	0.00	0.00	0.21	0.04	0.04
Chile	0.26	0.07	0.05	0.21	0.04	0.04
Chinese Taipei	0.13	0.02	0.02	0.08	0.01	0.01
Cyprus	0.16	0.02	0.02	0.10	0.01	0.02
Egypt	0.11	0.01	0.01	0.05	0.00	0.00
England	0.34	0.12	0.12	0.23	0.05	0.08
Finland	0.25	0.06	0.04	0.22	0.05	0.04
France	0.24	0.06	0.04	0.19	0.04	0.04
Georgia	0.01	0.00	0.00	0.11	0.01	0.01
Hong Kong SAR	0.45	0.20	0.14	0.26	0.07	0.06
Hungary	0.34	0.11	0.10	0.29	0.09	0.07
Iran, Islamic Rep. of	0.21	0.04	0.02	0.05	0.00	0.00
Ireland	0.36	0.13	0.09	0.24	0.06	0.04
Israel	0.34	0.11	0.11	0.33	0.11	0.11
Italy	0.05	0.00	0.00	0.03	0.00	0.01
Japan	0.09	0.01	0.00	0.10	0.01	0.01
Jordan	0.18	0.03	0.03	0.24	0.06	0.05
Kazakhstan	-0.01	0.00	0.01	0.01	0.00	0.01
Korea, Rep. of	0.00	0.00	0.00	0.06	0.00	0.01
Kuwait	0.22	0.05	0.04	0.03	0.00	0.00
Lebanon	0.08	0.01	0.01	0.15	0.02	0.01
Lithuania	0.21	0.04	0.03	0.13	0.02	0.02
Malaysia	0.39	0.15	0.12	0.39	0.15	0.11
Morocco	0.17	0.03	0.04	0.18	0.03	0.03
New Zealand	0.41	0.17	0.13	0.39	0.15	0.09
Norway (9)	0.17	0.03	0.02	0.15	0.02	0.02
Oman	0.15	0.02	0.02	0.08	0.01	0.01
Portugal	0.25	0.06	0.02	0.20	0.04	0.04
Qatar	0.27	0.07	0.04	0.17	0.03	0.02
Romania	0.29	0.08	0.08	0.23	0.05	0.03
Russian Federation	0.16	0.03	0.03	0.13	0.02	0.01
Saudi Arabia	0.10	0.01	0.01	0.15	0.02	0.02
Singapore	0.42	0.17	0.14	0.32	0.10	0.07
South Africa (9)	0.21	0.04	0.03	0.16	0.03	0.02
Sweden	0.21	0.05	0.03	0.18	0.03	0.02
Turkey	0.29	0.08	0.08	0.24	0.06	0.04
United Arab Emirates	0.37	0.14	0.13	0.40	0.16	0.13
United States	0.41	0.17	0.13	0.26	0.07	0.06
International Median	0.21	0.05	0.03	0.18	0.03	0.03

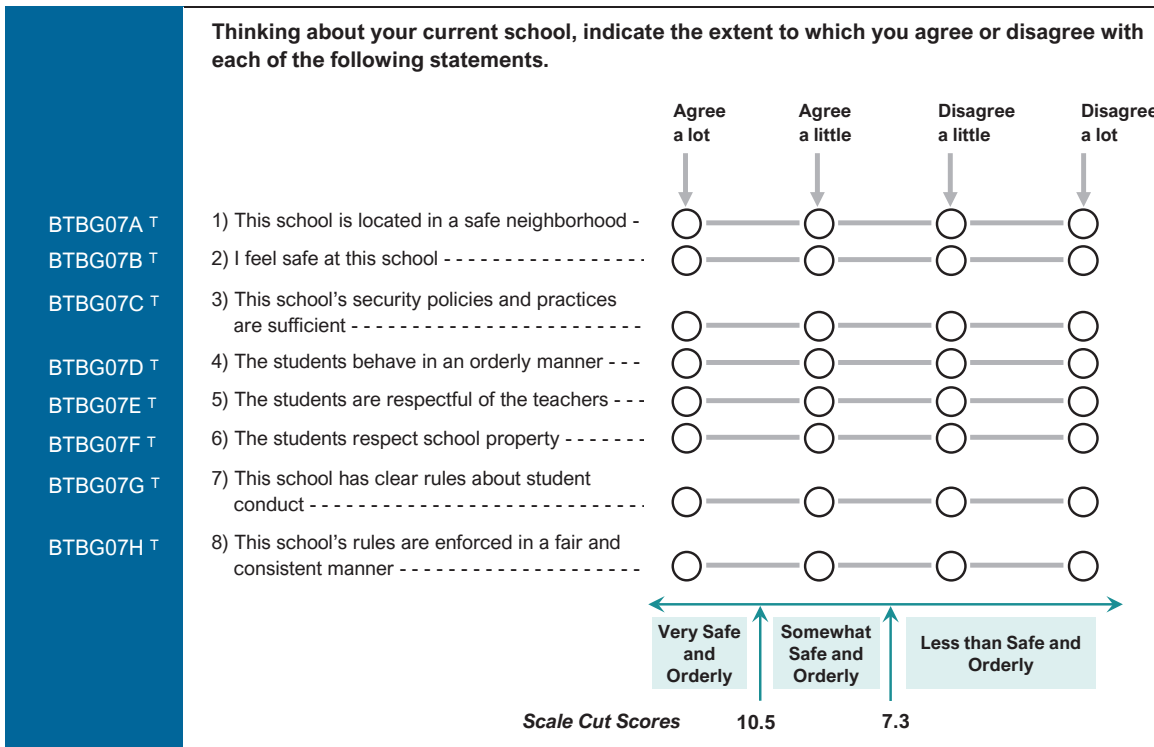
Relationship Between the TIMSS 2019 Classroom Teaching Limited by Students Not Ready for Instruction Scale and TIMSS 2019 Achievement – Grade 8

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2		r	r^2	
Benchmarking Participants						
Ontario, Canada	0.26	0.07	0.08	0.24	0.06	0.05
Quebec, Canada	0.33	0.11	0.09	0.35	0.13	0.12
Moscow City, Russian Fed.	0.17	0.03	0.04	0.16	0.03	0.02
Gauteng, RSA (9)	0.23	0.05	0.09	0.17	0.03	0.03
Western Cape, RSA (9)	0.49	0.24	0.16	0.42	0.18	0.10
Abu Dhabi, UAE	0.39	0.15	0.13	0.43	0.18	0.15
Dubai, UAE	0.34	0.11	0.11	0.35	0.12	0.10

Safe and Orderly School – Grade 8

About the Scale

The *Safe and Orderly School* scale was created based on teachers’ responses to eight items listed below.



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.

^T Trend item—item was included in the same scale in TIMSS 2015 and was used for linking the TIMSS 2015 and TIMSS 2019 scales.

Item Parameters for the TIMSS 2019 *Safe and Orderly School* Scale – Grade 8

Item	delta	tau_1	tau_2	Infit
BTBG07A	-0.93180	-1.21284	1.21284	1.26
BTBG07B	-1.50733	-1.31584	1.31584	0.98
BTBG07C	-0.70617	-1.53302	1.53302	1.04
BTBG07D	1.04692	-1.96681	1.96681	0.91
BTBG07E	0.77423	-1.93544	1.93544	0.91
BTBG07F	1.59701	-1.88167	1.88167	0.94
BTBG07G	-0.48472	-1.53624	1.53624	1.05
BTBG07H	0.21186	-1.57604	1.57604	1.03

Scale Transformation Constants for the TIMSS 2019 *Safe and Orderly School* Scale – Grade 8

Scale Transformation Constants

$$A = 8.929660$$

$$B = 0.950459$$

$$\text{Transformed Scale Score} = 8.929660 + 0.950459 \cdot \text{Logit Scale Score}$$

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 *Safe and Orderly School* Scale – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	4.42632	
1	5.63149	
2	6.28831	
3	6.79059	
4	7.22558	7.3
5	7.62717	
6	8.01327	
7	8.39631	
8	8.78337	
9	9.18523	
10	9.61153	
11	10.07263	
12	10.58171	10.5
13	11.14932	
14	11.78998	
15	12.56459	
16	13.87035	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Safe and Orderly School* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BTBG07A	BTBG07B	BTBG07C	BTBG07D	BTBG07E	BTBG07F	BTBG07G	BTBG07H
Australia	0.89	58	0.59	0.71	0.74	0.85	0.85	0.85	0.70	0.74
Bahrain	0.87	53	0.41	0.53	0.68	0.85	0.83	0.82	0.77	0.79
Chile	0.90	59	0.66	0.72	0.75	0.80	0.83	0.83	0.73	0.78
Chinese Taipei	0.88	54	0.69	0.73	0.72	0.76	0.78	0.75	0.70	0.72
Cyprus	0.91	61	0.63	0.81	0.79	0.83	0.84	0.81	0.73	0.78
Egypt	0.86	50	0.64	0.63	0.71	0.74	0.73	0.77	0.68	0.75
England	0.88	56	0.42	0.69	0.75	0.85	0.84	0.84	0.69	0.80
Finland	0.85	50	0.54	0.69	0.65	0.79	0.80	0.74	0.66	0.77
France	0.89	57	0.75	0.76	0.73	0.82	0.82	0.76	0.70	0.70
Georgia	0.78	40	0.35	0.58	0.54	0.73	0.74	0.71	0.65	0.68
Hong Kong SAR	0.85	49	0.51	0.62	0.71	0.76	0.77	0.74	0.73	0.73
Hungary	0.86	50	0.57	0.64	0.74	0.78	0.79	0.75	0.63	0.74
Iran, Islamic Rep. of	0.88	54	0.69	0.68	0.71	0.79	0.72	0.76	0.78	0.74
Ireland	0.88	56	0.56	0.70	0.68	0.85	0.85	0.79	0.75	0.78
Israel	0.87	52	0.48	0.62	0.62	0.82	0.82	0.80	0.77	0.78
Italy	0.83	46	0.69	0.73	0.65	0.69	0.63	0.69	0.64	0.72
Japan	0.83	46	0.66	0.76	0.61	0.72	0.67	0.68	0.62	0.72
Jordan	0.90	58	0.67	0.76	0.77	0.79	0.77	0.82	0.74	0.75
Kazakhstan	0.84	48	0.54	0.64	0.67	0.71	0.75	0.69	0.75	0.77
Korea, Rep. of	0.90	58	0.72	0.80	0.82	0.78	0.72	0.73	0.75	0.75
Kuwait	0.84	48	0.42	0.60	0.65	0.78	0.73	0.81	0.72	0.73
Lebanon	0.85	50	0.50	0.52	0.61	0.81	0.79	0.81	0.77	0.74
Lithuania	0.87	52	0.56	0.76	0.78	0.76	0.75	0.72	0.67	0.73
Malaysia	0.88	55	0.73	0.80	0.76	0.78	0.77	0.70	0.69	0.69
Morocco	0.89	58	0.68	0.77	0.80	0.79	0.77	0.77	0.73	0.75
New Zealand	0.88	54	0.56	0.67	0.66	0.84	0.82	0.82	0.71	0.73
Norway (9)	0.83	46	0.45	0.64	0.63	0.78	0.76	0.75	0.66	0.70
Oman	0.80	42	0.54	0.58	0.60	0.77	0.74	0.66	0.64	0.65
Portugal	0.87	53	0.61	0.71	0.74	0.77	0.79	0.76	0.72	0.71
Qatar	0.88	54	0.46	0.69	0.67	0.80	0.79	0.76	0.83	0.82
Romania	0.86	51	0.48	0.62	0.69	0.79	0.82	0.81	0.66	0.76
Russian Federation	0.87	52	0.60	0.68	0.69	0.80	0.81	0.81	0.59	0.76
Saudi Arabia	0.86	51	0.45	0.66	0.71	0.76	0.73	0.77	0.79	0.79
Singapore	0.88	56	0.59	0.65	0.70	0.82	0.83	0.82	0.72	0.79
South Africa (9)	0.87	53	0.67	0.76	0.77	0.78	0.79	0.78	0.59	0.65
Sweden	0.82	45	0.59	0.64	0.70	0.77	0.75	0.65	0.56	0.69
Turkey	0.90	58	0.73	0.75	0.78	0.80	0.74	0.78	0.76	0.74
United Arab Emirates	0.89	56	0.50	0.61	0.65	0.84	0.84	0.84	0.81	0.84
United States	0.87	54	0.50	0.64	0.65	0.86	0.84	0.83	0.70	0.78

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Safe and Orderly School* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BTBG07A	BTBG07B	BTBG07C	BTBG07D	BTBG07E	BTBG07F	BTBG07G	BTBG07H
Benchmarking Participants										
Ontario, Canada	0.89	58	0.61	0.69	0.69	0.87	0.84	0.86	0.75	0.74
Quebec, Canada	0.87	54	0.56	0.72	0.80	0.80	0.73	0.77	0.75	0.71
Moscow City, Russian Fed.	0.87	52	0.58	0.64	0.68	0.81	0.79	0.79	0.68	0.79
Gauteng, RSA (9)	0.88	55	0.64	0.77	0.81	0.81	0.78	0.83	0.55	0.71
Western Cape, RSA (9)	0.89	57	0.75	0.83	0.74	0.81	0.76	0.80	0.63	0.68
Abu Dhabi, UAE	0.90	59	0.52	0.59	0.67	0.86	0.87	0.88	0.80	0.85
Dubai, UAE	0.87	54	0.49	0.60	0.60	0.84	0.85	0.79	0.79	0.83

Relationship Between the TIMSS 2019 *Safe and Orderly School* Scale and TIMSS 2019 Achievement – Grade 8

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2		r	r^2	
Australia	0.26	0.07	0.05	0.23	0.05	0.03
Bahrain	0.05	0.00	0.01	0.16	0.03	0.02
Chile	0.27	0.07	0.10	0.24	0.06	0.05
Chinese Taipei	0.07	0.00	0.00	0.08	0.01	0.01
Cyprus	0.19	0.04	0.03	0.12	0.02	0.01
Egypt	0.15	0.02	0.02	0.08	0.01	0.01
England	0.14	0.02	0.02	0.09	0.01	0.01
Finland	0.11	0.01	0.01	0.11	0.01	0.01
France	0.18	0.03	0.04	0.21	0.04	0.04
Georgia	0.05	0.00	0.00	0.05	0.00	0.00
Hong Kong SAR	0.17	0.03	0.02	0.08	0.01	0.01
Hungary	0.22	0.05	0.04	0.20	0.04	0.03
Iran, Islamic Rep. of	0.13	0.02	0.01	0.13	0.02	0.02
Ireland	0.26	0.07	0.06	0.22	0.05	0.04
Israel	0.21	0.04	0.06	0.09	0.01	0.02
Italy	0.10	0.01	0.02	0.07	0.01	0.01
Japan	0.08	0.01	0.01	0.04	0.00	0.00
Jordan	0.18	0.03	0.03	0.22	0.05	0.02
Kazakhstan	-0.01	0.00	0.00	0.05	0.00	0.01
Korea, Rep. of	0.04	0.00	0.00	0.05	0.00	0.00
Kuwait	0.16	0.03	0.00	0.15	0.02	0.00
Lebanon	0.24	0.06	0.06	0.21	0.04	0.05
Lithuania	0.11	0.01	0.00	0.06	0.00	0.00
Malaysia	0.15	0.02	0.01	0.22	0.05	0.03
Morocco	0.12	0.01	0.01	0.06	0.00	0.00
New Zealand	0.27	0.07	0.06	0.20	0.04	0.03
Norway (9)	0.12	0.01	0.01	0.12	0.01	0.01
Oman	0.08	0.01	0.00	0.14	0.02	0.02
Portugal	0.16	0.02	0.02	0.12	0.01	0.01
Qatar	0.14	0.02	0.01	0.06	0.00	0.00
Romania	0.10	0.01	0.01	0.15	0.02	0.01
Russian Federation	0.01	0.00	0.00	0.08	0.01	0.01
Saudi Arabia	0.09	0.01	0.01	0.17	0.03	0.02
Singapore	0.12	0.01	0.00	0.14	0.02	0.01
South Africa (9)	0.21	0.05	0.04	0.13	0.02	0.02
Sweden	0.19	0.04	0.03	0.18	0.03	0.03
Turkey	0.11	0.01	0.01	0.18	0.03	0.04
United Arab Emirates	0.31	0.09	0.07	0.33	0.11	0.08
United States	0.20	0.04	0.05	0.25	0.06	0.06
International Median	0.14	0.02	0.01	0.13	0.02	0.01

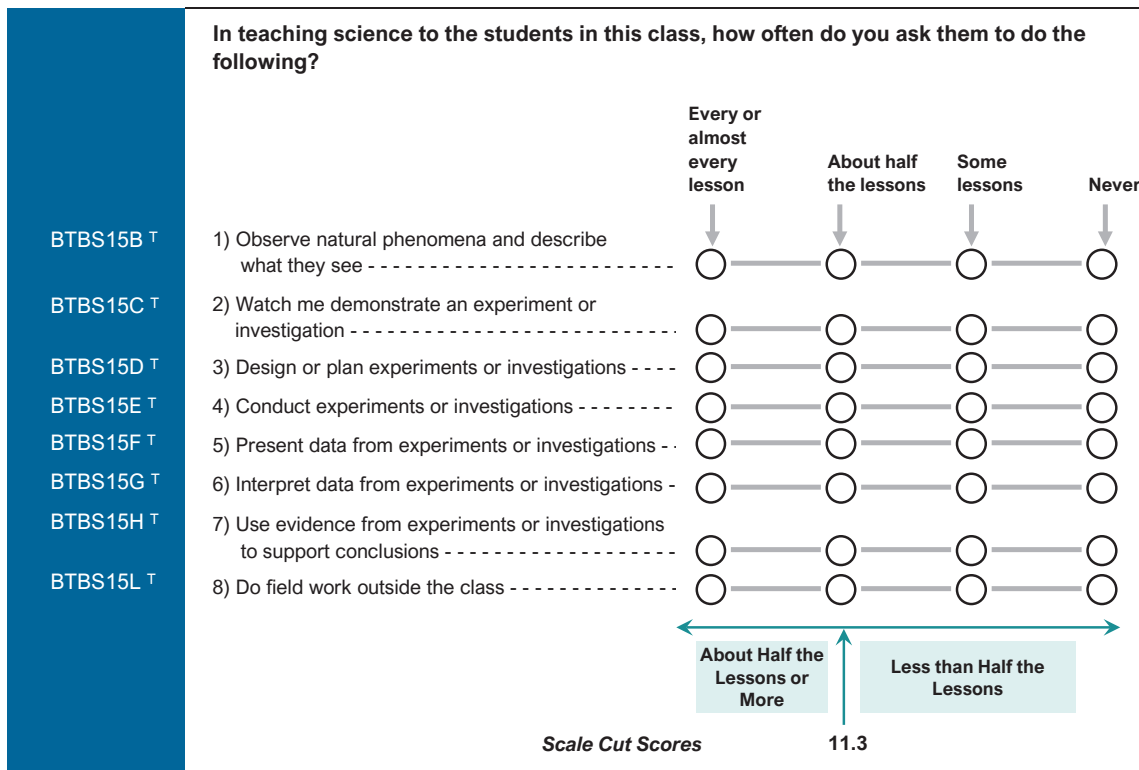
Relationship Between the TIMSS 2019 *Safe and Orderly School* Scale and TIMSS 2019 Achievement – Grade 8

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2		r	r^2	
Benchmarking Participants						
Ontario, Canada	0.20	0.04	0.04	0.19	0.03	0.04
Quebec, Canada	0.18	0.03	0.04	-0.06	0.00	0.02
Moscow City, Russian Fed.	0.13	0.02	0.02	0.09	0.01	0.01
Gauteng, RSA (9)	0.38	0.15	0.12	0.33	0.11	0.08
Western Cape, RSA (9)	0.51	0.26	0.21	0.57	0.33	0.32
Abu Dhabi, UAE	0.43	0.19	0.16	0.39	0.15	0.12
Dubai, UAE	0.19	0.04	0.03	0.20	0.04	0.01

Teachers' Emphasis on Science Investigation – Grade 8

About the Scale

The *Teachers' Emphasis on Science Investigation* scale was created based on teachers' responses to eight items listed below.



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.

^T Trend item—item was included in the same scale in TIMSS 2015 and was used for linking the TIMSS 2015 and TIMSS 2019 scales.

Item Parameters for the TIMSS 2019 *Teachers' Emphasis on Science Investigation* Scale – Grade 8

Item	delta	tau_1	tau_2	Infit
BTBS15B	-0.94861	-0.86697	0.86697	1.36
BTBS15C	-0.56557	-0.45648	0.45648	1.25
BTBS15D	0.34598	-0.71308	0.71308	0.89
BTBS15E	0.02202	-0.89215	0.89215	0.88
BTBS15F	0.14912	-0.77092	0.77092	0.75
BTBS15G	-0.20789	-0.79691	0.79691	0.76
BTBS15H	-0.49705	-0.80328	0.80328	0.92
BTBS15L	1.70200	-0.19205	0.19205	1.18

Scale Transformation Constants for the TIMSS 2019 *Teachers' Emphasis on Science Investigation* Scale – Grade 8

Scale Transformation Constants

$$A = 11.333349$$

$$B = 1.2708400$$

$$\text{Transformed Scale Score} = 11.333349 + 1.2708400 \cdot \text{Logit Scale Score}$$

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 *Teachers' Emphasis on Science Investigation* Scale – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	6.51309	
1	8.03870	
2	8.81776	
3	9.37904	
4	9.83696	
5	10.24200	
6	10.61377	
7	10.96886	
8	11.31862	11.3
9	11.67481	
10	12.04435	
11	12.43721	
12	12.86171	
13	13.33488	
14	13.88949	
15	14.62251	
16	16.03256	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Teachers' Emphasis on Science Investigation Scale* – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BTBS15B	BTBS15C	BTBS15D	BTBS15E	BTBS15F	BTBS15G	BTBS15H	BTBS15L
Australia	0.83	47	0.49	0.65	0.63	0.79	0.80	0.84	0.75	0.40
Bahrain	0.88	56	0.50	0.62	0.81	0.89	0.87	0.87	0.84	0.48
Chile	0.88	55	0.49	0.76	0.85	0.87	0.82	0.82	0.75	0.49
Chinese Taipei	0.83	47	0.51	0.58	0.71	0.79	0.82	0.84	0.76	0.26
Cyprus	0.86	56	0.54	0.59	0.81	0.88	0.87	0.90	0.86	0.27
Egypt	0.87	53	0.61	0.42	0.77	0.75	0.84	0.88	0.84	0.60
England	0.76	39	0.43	0.58	0.72	0.69	0.73	0.73	0.70	0.18
Finland	0.85	50	0.54	0.59	0.58	0.88	0.87	0.88	0.86	0.05
France	0.77	40	0.44	0.42	0.72	0.68	0.79	0.77	0.69	0.36
Georgia	0.85	54	0.43	0.60	0.80	0.88	0.90	0.88	0.75	0.47
Hong Kong SAR	0.86	52	0.54	0.69	0.68	0.73	0.84	0.85	0.81	0.52
Hungary	0.83	50	0.60	0.65	0.75	0.76	0.82	0.79	0.67	0.54
Iran, Islamic Rep. of	0.85	51	0.50	0.40	0.77	0.80	0.87	0.86	0.75	0.60
Ireland	0.81	46	0.33	0.29	0.77	0.81	0.88	0.87	0.84	0.14
Israel	0.88	57	0.68	0.58	0.87	0.83	0.88	0.83	0.75	0.54
Italy	0.83	51	0.44	0.55	0.85	0.83	0.86	0.85	0.76	0.33
Japan	0.81	44	0.74	0.66	0.30	0.82	0.84	0.80	0.63	0.07
Jordan	0.83	47	0.54	0.52	0.77	0.79	0.81	0.72	0.70	0.56
Kazakhstan	0.86	52	0.49	0.61	0.81	0.83	0.84	0.84	0.72	0.52
Korea, Rep. of	0.87	54	0.59	0.71	0.78	0.84	0.84	0.81	0.72	0.49
Kuwait	0.84	50	0.28	0.44	0.81	0.87	0.87	0.90	0.80	0.33
Lebanon	0.81	44	0.61	0.56	0.73	0.77	0.76	0.75	0.60	0.45
Lithuania	0.87	57	0.59	0.63	0.84	0.90	0.89	0.80	0.76	0.53
Malaysia	0.89	58	0.67	0.67	0.77	0.84	0.86	0.90	0.76	0.57
Morocco	0.78	40	0.47	0.40	0.71	0.73	0.79	0.77	0.69	0.37
New Zealand	0.80	44	0.47	0.61	0.68	0.68	0.79	0.82	0.80	0.22
Norway (9)	0.76	39	0.54	0.46	0.72	0.73	0.74	0.73	0.63	0.32
Oman	0.82	45	0.48	0.52	0.72	0.85	0.83	0.83	0.64	0.33
Portugal	0.84	51	0.58	0.66	0.81	0.78	0.82	0.79	0.73	0.50
Qatar	0.86	51	0.50	0.67	0.75	0.78	0.85	0.85	0.73	0.51
Romania	0.84	53	0.42	0.63	0.82	0.87	0.88	0.86	0.80	0.27
Russian Federation	0.90	61	0.61	0.66	0.85	0.89	0.90	0.87	0.76	0.63
Saudi Arabia	0.86	53	0.48	0.47	0.81	0.83	0.89	0.89	0.84	0.44
Singapore	0.78	43	0.47	0.57	0.58	0.72	0.83	0.79	0.70	0.45
South Africa (9)	0.90	59	0.61	0.71	0.80	0.85	0.87	0.85	0.83	0.53
Sweden	0.85	51	0.44	0.53	0.78	0.85	0.89	0.85	0.78	0.41
Turkey	0.91	61	0.62	0.64	0.82	0.89	0.88	0.87	0.80	0.67
United Arab Emirates	0.89	57	0.58	0.64	0.84	0.84	0.87	0.86	0.76	0.54
United States	0.84	48	0.57	0.46	0.71	0.82	0.86	0.85	0.76	0.33

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Teachers' Emphasis on Science Investigation* Scale – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			BTBS15B	BTBS15C	BTBS15D	BTBS15E	BTBS15F	BTBS15G	BTBS15H	BTBS15L
Benchmarking Participants										
Ontario, Canada	0.90	61	0.46	0.73	0.88	0.88	0.90	0.91	0.75	0.64
Quebec, Canada	0.62	-	-	-	-	-	-	-	-	-
Moscow City, Russian Fed.	0.87	56	0.56	0.58	0.83	0.88	0.88	0.88	0.77	0.48
Gauteng, RSA (9)	0.91	62	0.70	0.75	0.80	0.87	0.86	0.84	0.85	0.58
Western Cape, RSA (9)	0.90	60	0.63	0.67	0.81	0.87	0.88	0.88	0.87	0.49
Abu Dhabi, UAE	0.90	61	0.60	0.70	0.84	0.86	0.89	0.90	0.80	0.54
Dubai, UAE	0.87	54	0.56	0.59	0.85	0.76	0.86	0.85	0.79	0.52

A dash (-) indicates comparable data not available.

Relationship Between the TIMSS 2019 *Teachers' Emphasis on Science Investigation* Scale and TIMSS 2019 Achievement – Grade 8

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	0.06	0.00	0.00
Bahrain	-0.01	0.00	0.00
Chile	-0.06	0.00	0.00
Chinese Taipei	0.01	0.00	0.00
Cyprus	-0.10	0.01	0.00
Egypt	0.12	0.01	0.01
England	-0.06	0.00	0.01
Finland	0.04	0.00	0.00
France	0.07	0.00	0.00
Georgia	-0.01	0.00	0.00
Hong Kong SAR	0.12	0.01	0.01
Hungary	0.04	0.00	0.00
Iran, Islamic Rep. of	0.04	0.00	0.00
Ireland	0.02	0.00	0.00
Israel	0.00	0.00	0.00
Italy	-0.06	0.00	0.00
Japan	0.02	0.00	0.00
Jordan	0.04	0.00	0.00
Kazakhstan	0.00	0.00	0.00
Korea, Rep. of	0.03	0.00	0.00
Kuwait	-0.05	0.00	0.01
Lebanon	-0.03	0.00	0.00
Lithuania	-0.01	0.00	0.00
Malaysia	0.09	0.01	0.01
Morocco	0.02	0.00	0.00
New Zealand	0.05	0.00	0.00
Norway (9)	0.04	0.00	0.00
Oman	0.03	0.00	0.00
Portugal	0.01	0.00	0.00
Qatar	0.01	0.00	0.00
Romania	0.03	0.00	0.00
Russian Federation	0.05	0.00	0.00
Saudi Arabia	0.12	0.01	0.00
Singapore	0.08	0.01	0.00
South Africa (9)	-0.03	0.00	0.00
Sweden	-0.01	0.00	0.00
Turkey	0.05	0.00	0.00
United Arab Emirates	0.11	0.01	0.01
United States	0.13	0.02	0.00
International Median	0.03	0.00	0.00

Relationship Between the TIMSS 2019 *Teachers' Emphasis on Science Investigation* Scale and TIMSS 2019 Achievement – Grade 8

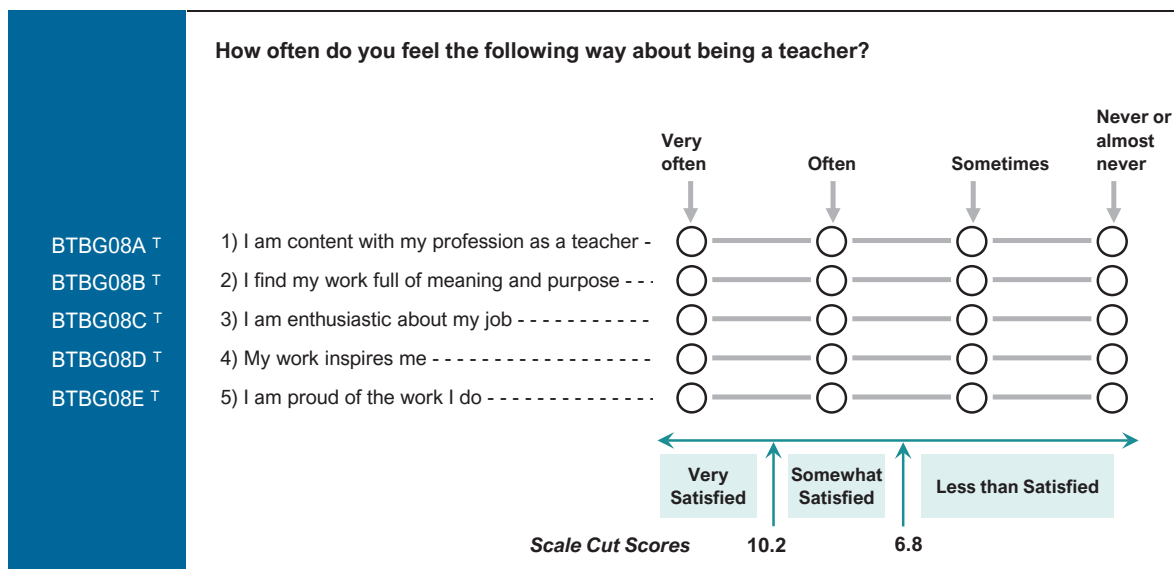
Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2	
Benchmarking Participants			
Ontario, Canada	0.01	0.00	0.00
Quebec, Canada	-	-	-
Moscow City, Russian Fed.	0.06	0.00	0.00
Gauteng, RSA (9)	-0.08	0.01	0.00
Western Cape, RSA (9)	-0.01	0.00	0.01
Abu Dhabi, UAE	0.24	0.06	0.04
Dubai, UAE	-0.08	0.01	0.00

A dash (–) indicates comparable data not available.

Teachers' Job Satisfaction – Grade 8

About the Scale

The *Teachers' Job Satisfaction* scale was created based on students' responses to five items listed below.¹



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.

^T Trend item—item was included in the same scale in TIMSS 2015 and was used for linking the TIMSS 2015 and TIMSS 2019 scales.

Item Parameters for the TIMSS 2019 *Teachers' Job Satisfaction Scale* – Grade 8

Item	delta	tau_1	tau_2	Infit
BTBG08A	0.21265	-2.26347	2.26347	1.09
BTBG08B	-0.61570	-2.17906	2.17906	1.04
BTBG08C	0.10008	-2.26113	2.26113	0.93
BTBG08D	0.65284	-2.20301	2.20301	0.95
BTBG08E	-0.34987	-1.96126	1.96126	1.13

Scale Transformation Constants for the TIMSS 2019 *Teachers' Job Satisfaction Scale* – Grade 8

Scale Transformation Constants

A = 8.497121

B = 0.691344

Transformed Scale Score = 8.497121 + 0.691344 • Logit Scale Score

Equivalence Table of the Raw Score and Transformed Scale Scores for the TIMSS 2019 *Teachers' Job Satisfaction Scale* – Grade 8

Raw Score	Transformed Scale Score	Cutpoint
0	5.28118	
1	6.19622	
2	6.74486	6.8
3	7.21969	
4	7.74231	
5	8.48286	
6	9.22836	
7	9.76930	
8	10.25874	10.2
9	10.82007	
10	11.74559	

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Teachers' Job Satisfaction Scale* – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item				
			BTBG08A	BTBG08B	BTBG08C	BTBG08D	BTBG08E
Australia	0.91	74	0.86	0.89	0.91	0.90	0.75
Bahrain	0.89	69	0.82	0.78	0.89	0.86	0.82
Chile	0.88	68	0.84	0.80	0.80	0.89	0.79
Chinese Taipei	0.93	78	0.89	0.91	0.90	0.84	0.87
Cyprus	0.93	78	0.87	0.92	0.89	0.89	0.83
Egypt	0.83	60	0.80	0.73	0.82	0.74	0.79
England	0.89	69	0.84	0.87	0.88	0.84	0.71
Finland	0.92	76	0.88	0.84	0.91	0.87	0.86
France	0.89	70	0.82	0.77	0.89	0.86	0.82
Georgia	0.78	54	0.71	0.71	0.69	0.75	0.80
Hong Kong SAR	0.91	75	0.87	0.87	0.87	0.85	0.87
Hungary	0.91	73	0.85	0.84	0.86	0.87	0.85
Iran, Islamic Rep. of	0.88	68	0.82	0.81	0.86	0.84	0.77
Ireland	0.91	74	0.84	0.88	0.90	0.86	0.81
Israel	0.90	72	0.83	0.84	0.87	0.87	0.83
Italy	0.88	68	0.81	0.78	0.87	0.84	0.83
Japan	0.90	72	0.85	0.86	0.83	0.88	0.82
Jordan	0.91	73	0.80	0.86	0.89	0.88	0.85
Kazakhstan	0.86	65	0.75	0.81	0.80	0.84	0.82
Korea, Rep. of	0.94	80	0.88	0.89	0.88	0.92	0.91
Kuwait	0.80	57	0.73	0.69	0.84	0.81	0.70
Lebanon	0.81	56	0.72	0.68	0.83	0.80	0.71
Lithuania	0.90	72	0.85	0.74	0.89	0.89	0.86
Malaysia	0.94	80	0.90	0.90	0.90	0.90	0.89
Morocco	0.89	69	0.83	0.80	0.88	0.85	0.80
New Zealand	0.91	73	0.83	0.87	0.88	0.88	0.81
Norway (9)	0.89	69	0.78	0.82	0.82	0.88	0.84
Oman	0.90	72	0.87	0.79	0.88	0.87	0.84
Portugal	0.90	72	0.86	0.85	0.88	0.89	0.74
Qatar	0.89	69	0.85	0.75	0.87	0.87	0.82
Romania	0.91	75	0.84	0.87	0.88	0.88	0.85
Russian Federation	0.89	69	0.83	0.74	0.86	0.88	0.85
Saudi Arabia	0.84	65	0.81	0.78	0.85	0.86	0.71
Singapore	0.95	83	0.89	0.90	0.93	0.92	0.91
South Africa (9)	0.89	69	0.78	0.85	0.85	0.86	0.82
Sweden	0.88	68	0.82	0.77	0.87	0.88	0.79
Turkey	0.92	77	0.85	0.85	0.92	0.91	0.86
United Arab Emirates	0.90	72	0.78	0.85	0.90	0.88	0.83
United States	0.93	78	0.85	0.92	0.92	0.92	0.83

Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2019 *Teachers' Job Satisfaction Scale* – Grade 8

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item				
			BTBG08A	BTBG08B	BTBG08C	BTBG08D	BTBG08E
Benchmarking Participants							
Ontario, Canada	0.92	75	0.83	0.86	0.90	0.88	0.87
Quebec, Canada	0.89	70	0.82	0.79	0.86	0.86	0.85
Moscow City, Russian Fed.	0.89	70	0.83	0.79	0.88	0.88	0.81
Gauteng, RSA (9)	0.90	72	0.79	0.87	0.87	0.87	0.83
Western Cape, RSA (9)	0.88	69	0.83	0.88	0.86	0.83	0.74
Abu Dhabi, UAE	0.91	74	0.80	0.90	0.90	0.87	0.84
Dubai, UAE	0.91	74	0.79	0.85	0.91	0.90	0.84

Relationship Between the TIMSS 2019 Teachers' Job Satisfaction Scale and TIMSS 2019 Achievement – Grade 8

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2		r	r^2	
Australia	0.12	0.01	0.02	0.07	0.00	0.00
Bahrain	0.03	0.00	0.00	0.10	0.01	0.01
Chile	0.01	0.00	0.01	0.04	0.00	0.01
Chinese Taipei	0.04	0.00	0.00	0.01	0.00	0.00
Cyprus	0.04	0.00	0.01	0.04	0.00	0.00
Egypt	0.17	0.03	0.03	0.05	0.00	0.01
England	0.19	0.04	0.05	0.11	0.01	0.01
Finland	0.03	0.00	0.00	0.03	0.00	0.00
France	0.01	0.00	0.00	0.06	0.00	0.00
Georgia	-0.06	0.00	0.00	0.03	0.00	0.00
Hong Kong SAR	0.08	0.01	0.00	0.05	0.00	0.01
Hungary	0.14	0.02	0.02	0.07	0.01	0.01
Iran, Islamic Rep. of	0.04	0.00	0.00	0.02	0.00	0.01
Ireland	0.13	0.02	0.01	0.10	0.01	0.01
Israel	0.04	0.00	0.01	0.05	0.00	0.00
Italy	0.01	0.00	0.00	-0.02	0.00	0.00
Japan	0.08	0.01	0.00	0.02	0.00	0.00
Jordan	0.04	0.00	0.00	0.22	0.05	0.04
Kazakhstan	-0.12	0.01	0.02	-0.07	0.00	0.00
Korea, Rep. of	-0.02	0.00	0.00	0.06	0.00	0.00
Kuwait	-0.04	0.00	0.00	0.08	0.01	0.01
Lebanon	0.11	0.01	0.01	0.09	0.01	0.01
Lithuania	0.06	0.00	0.00	0.07	0.00	0.01
Malaysia	-0.03	0.00	0.00	0.10	0.01	0.02
Morocco	0.07	0.00	0.01	-0.01	0.00	0.00
New Zealand	0.00	0.00	0.00	0.03	0.00	0.00
Norway (9)	0.04	0.00	0.00	0.00	0.00	0.00
Oman	0.08	0.01	0.00	0.11	0.01	0.01
Portugal	0.08	0.01	0.00	0.04	0.00	0.00
Qatar	0.08	0.01	0.01	-0.04	0.00	0.00
Romania	0.06	0.00	0.01	0.10	0.01	0.01
Russian Federation	0.05	0.00	0.00	0.06	0.00	0.00
Saudi Arabia	-0.03	0.00	0.00	0.10	0.01	0.02
Singapore	0.12	0.01	0.01	0.06	0.00	0.00
South Africa (9)	0.00	0.00	0.00	-0.02	0.00	0.00
Sweden	0.03	0.00	0.00	0.04	0.00	0.00
Turkey	0.03	0.00	0.01	0.11	0.01	0.01
United Arab Emirates	0.18	0.03	0.03	0.13	0.02	0.01
United States	0.05	0.00	0.00	0.11	0.01	0.01
International Median	0.04	0.00	0.00	0.06	0.00	0.00

Relationship Between the TIMSS 2019 Teachers' Job Satisfaction Scale and TIMSS 2019 Achievement – Grade 8

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	r	r^2		r	r^2	
Benchmarking Participants						
Ontario, Canada	0.01	0.00	0.00	0.04	0.00	0.00
Quebec, Canada	0.08	0.01	0.01	-0.05	0.00	0.02
Moscow City, Russian Fed.	0.14	0.02	0.02	0.02	0.00	0.00
Gauteng, RSA (9)	0.02	0.00	0.00	-0.08	0.01	0.01
Western Cape, RSA (9)	0.01	0.00	0.00	0.21	0.04	0.03
Abu Dhabi, UAE	0.25	0.06	0.04	0.21	0.05	0.03
Dubai, UAE	0.08	0.01	0.01	0.05	0.00	0.01