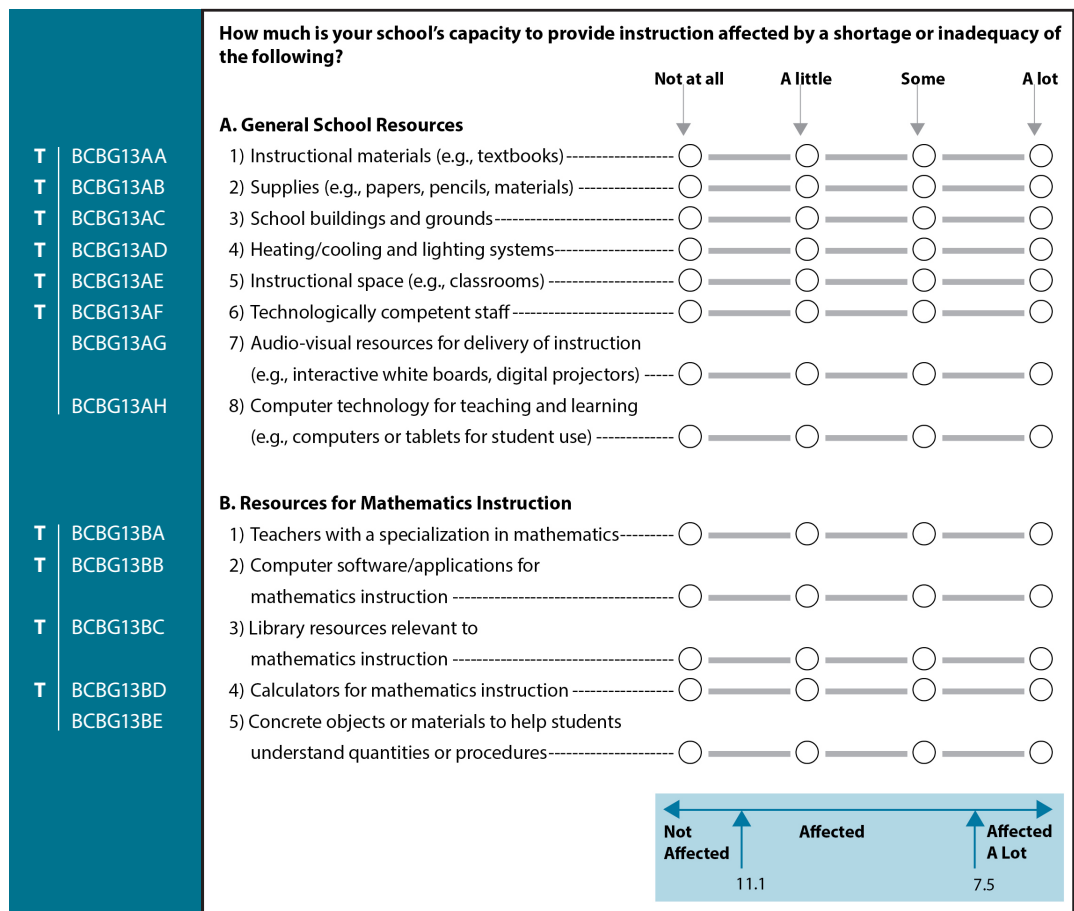


Instruction Affected by Mathematics Resource Shortages—Principals’ Reports Scale, Eighth Grade

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

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



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

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

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

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

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

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

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

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

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



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

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

A dash (-) indicates comparable data not available.

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

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

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

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