

TIMSS 2011

The TIMSS 2011 Instruction Affected by Science Resource Shortages Scale, Fourth Grade

The Instruction Affected by Science Resource Shortages (SRS) scale was created based on principals' responses concerning twelve school and classroom resources described below. See [Creating and Interpreting TIMSS and PIRLS 2011 Context Questionnaire Scales](#) for more information on how the scales were formed.

Exhibit 1: Items in the TIMSS 2011 Instruction Affected by Science Resource Shortages Scale, Fourth Grade

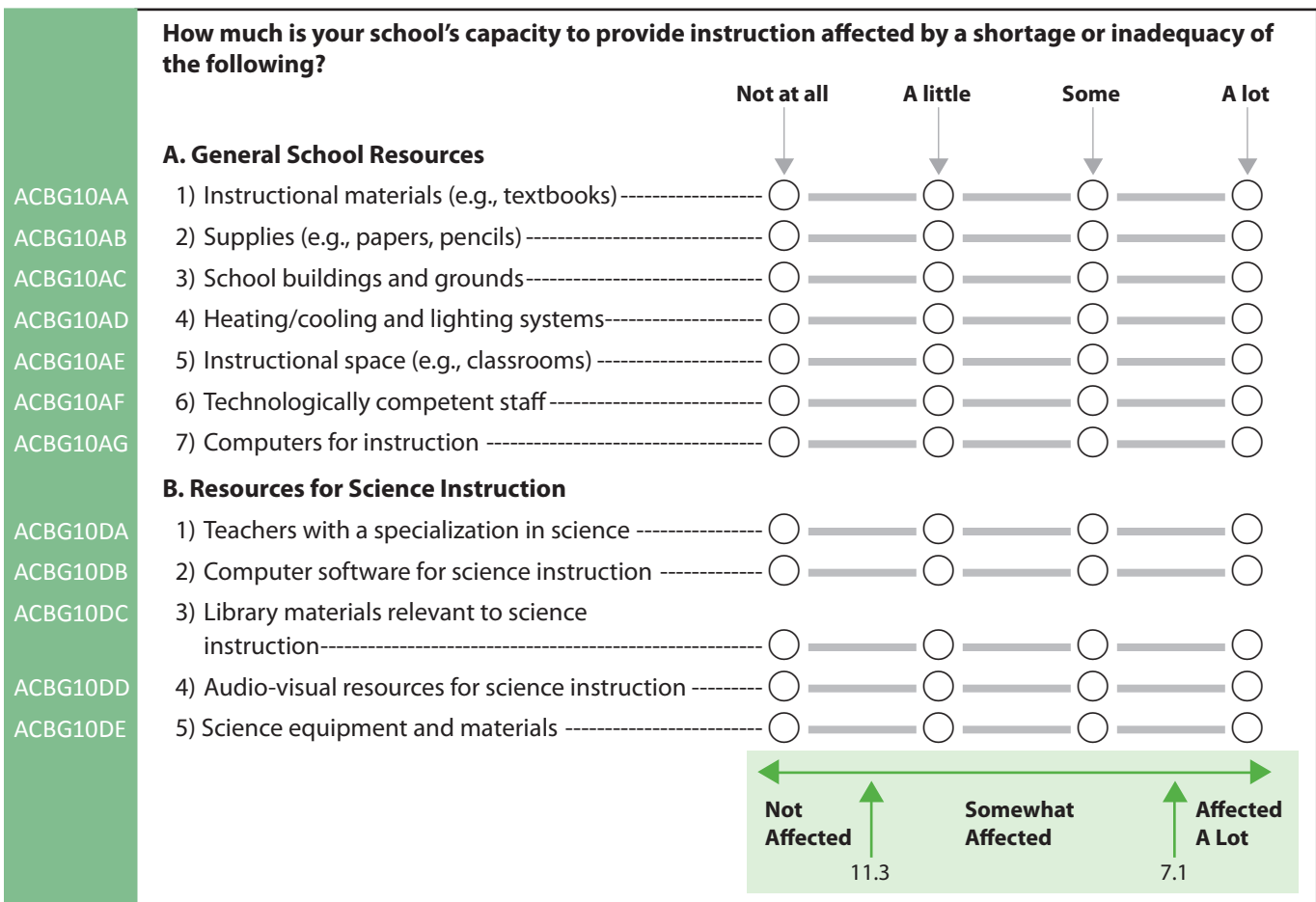


Exhibit 2: Item Parameters for the TIMSS 2011 Instruction Affected by Science Resource Shortages Scale, Fourth Grade

Item	delta	tau_1	tau_2	tau_3
ACBG10AA	-0.62693	-0.28147	0.01091	0.27056
ACBG10AB	-1.05531	-0.49530	0.25746	0.23784
ACBG10AC	-0.48989	-0.73372	0.14805	0.58567
ACBG10AD	-0.79665	-0.43599	0.14579	0.29020
ACBG10AE	-0.42022	-0.52276	0.07420	0.44856
ACBG10AF	-0.56565	-1.13070	0.01857	1.11213
ACBG10AG	-0.33908	-1.05564	0.08791	0.96773
ACBG10DA	-0.48144	-0.59130	0.04397	0.54733
ACBG10DB	-0.29862	-1.37229	-0.02419	1.39648
ACBG10DC	-0.58727	-1.45857	0.04044	1.41813
ACBG10DD	-0.30825	-1.39875	-0.01287	1.41162
ACBG10DE	-0.01549	-1.18536	-0.09503	1.28039

Exhibit 3: Scale Transformation Constants

Scale Transformation Constants

$$A = 9.94974$$

$$B = 1.52778$$

$$\text{Transformed Scale Score} = 9.94974 + 1.52778 \cdot \text{Logit Scale Score}$$

Exhibit 4: Equivalence Table of the Raw Score and the Transformed Scale Score

Raw Score	Transformed Scale Score	Cutpoint	Raw Score	Transformed Scale Score	Cutpoint
0	2.86638		19	9.29909	
1	4.59328		20	9.44858	
2	5.41824		21	9.59857	
3	5.97366		22	9.75275	
4	6.39598		23	9.91112	
5	6.73929		24	10.07942	
6	7.03002	7.1	25	10.25536	
7	7.28307		26	10.44245	
8	7.50895		27	10.64251	
9	7.71419		28	10.86037	
10	7.90358		29	11.10038	
11	8.08066		30	11.36920	11.3
12	8.24821		31	11.67648	
13	8.40838		32	12.03714	
14	8.56298		33	12.47844	
15	8.71346		34	13.05346	
16	8.86117		35	13.89794	
17	9.00727		36	15.64463	
18	9.15288				

Exhibit 5: Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2011 Instruction Affected by Science Resource Shortages Scale, Fourth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Factor Loadings for Each Item											
			ACBG10AA	ACBG10AB	ACBG10AC	ACBG10AD	ACBG10AE	ACBG10AF	ACBG10AG	ACBG10DA	ACBG10DB	ACBG10DC	ACBG10DD	ACBG10DE
Armenia	0.83	36	0.59	0.54	0.62	0.62	0.69	0.55	0.53	0.59	0.59	0.64	0.61	0.60
Australia	0.88	44	0.68	0.59	0.70	0.65	0.67	0.66	0.64	0.62	0.62	0.74	0.70	0.70
Austria	0.83	35	0.46	0.61	0.70	0.54	0.65	0.63	0.67	0.58	0.63	0.50	0.66	0.46
Azerbaijan	0.85	38	0.65	0.60	0.61	0.64	0.66	0.75	0.57	0.68	0.51	0.56	0.46	0.62
Bahrain	0.93	57	0.86	0.85	0.78	0.87	0.87	0.75	0.77	0.82	0.52	0.62	0.47	0.75
Belgium (Flemish)	0.84	38	0.57	0.49	0.49	0.50	0.45	0.70	0.67	0.58	0.77	0.68	0.78	0.59
Chile	0.89	47	0.57	0.68	0.63	0.60	0.56	0.76	0.76	0.69	0.65	0.78	0.75	0.74
Chinese Taipei	0.95	63	0.75	0.76	0.77	0.80	0.83	0.74	0.83	0.83	0.77	0.82	0.81	0.84
Croatia	0.90	51	0.86	0.82	0.67	0.81	0.82	0.77	0.62	0.67	0.19	0.70	0.67	0.74
Czech Republic	0.86	40	0.61	0.65	0.66	0.65	0.65	0.66	0.55	0.64	0.68	0.56	0.69	0.58
Denmark	0.82	35	0.62	0.55	0.60	0.59	0.36	0.57	0.50	0.55	0.70	0.69	0.68	0.64
England	0.86	40	0.60	0.45	0.60	0.47	0.55	0.49	0.50	0.65	0.80	0.76	0.78	0.77
Finland	0.89	46	0.64	0.67	0.75	0.65	0.78	0.77	0.69	0.73	0.51	0.52	0.62	0.71
Georgia	0.85	38	0.52	0.56	0.51	0.60	0.61	0.61	0.64	0.65	0.61	0.70	0.65	0.70
Germany	0.84	37	0.59	0.53	0.61	0.57	0.62	0.61	0.56	0.47	0.65	0.65	0.73	0.68
Hong Kong SAR	0.82	34	0.52	0.50	0.62	0.59	0.70	0.66	0.61	0.43	0.61	0.59	0.58	0.52
Hungary	0.91	52	0.78	0.77	0.77	0.73	0.81	0.57	0.71	0.73	0.51	0.73	0.71	0.76
Iran, Islamic Rep. of	0.88	45	0.75	0.78	0.74	0.79	0.76	0.59	0.13	0.75	0.46	0.62	0.59	0.77
Ireland	0.84	37	0.40	0.31	0.57	0.47	0.49	0.64	0.59	0.69	0.77	0.76	0.77	0.59
Italy	0.84	38	0.48	0.57	0.60	0.51	0.54	0.56	0.60	0.48	0.75	0.76	0.77	0.66
Japan	0.92	53	0.74	0.70	0.75	0.69	0.78	0.74	0.71	0.73	0.53	0.76	0.78	0.83
Kazakhstan	0.95	64	0.84	0.69	0.73	0.80	0.89	0.84	0.81	0.78	0.76	0.86	0.73	0.83
Korea, Rep. of	0.93	57	0.77	0.80	0.68	0.77	0.76	0.68	0.74	0.72	0.77	0.76	0.81	0.81
Kuwait	0.94	62	0.84	0.86	0.79	0.88	0.89	0.79	0.85	0.89	0.56	0.58	0.63	0.81
Lithuania	0.80	32	0.63	0.59	0.40	0.45	0.45	0.55	0.63	0.18	0.70	0.70	0.71	0.58
Malta	0.85	39	0.75	0.75	0.69	0.71	0.71	0.66	0.73	0.38	0.39	0.59	0.44	0.53
Morocco	0.83	43	-0.16	0.18	0.32	0.54	-0.12	0.80	0.68	0.77	0.87	0.90	0.87	0.83
Netherlands	0.82	35	0.43	0.39	0.49	0.48	0.37	0.56	0.57	0.66	0.73	0.82	0.81	0.58
New Zealand	0.84	36	0.48	0.48	0.60	0.57	0.62	0.62	0.53	0.60	0.67	0.57	0.71	0.73
Northern Ireland	0.87	42	0.54	0.46	0.53	0.53	0.48	0.67	0.64	0.73	0.77	0.71	0.79	0.78
Norway	0.83	35	0.63	0.32	0.60	0.53	0.59	0.50	0.70	0.37	0.66	0.66	0.72	0.70
Oman	0.91	50	0.73	0.68	0.64	0.74	0.78	0.78	0.58	0.74	0.57	0.70	0.67	0.78
Poland	0.85	39	0.70	0.69	0.67	0.67	0.55	0.60	0.56	0.55	0.60	0.67	0.67	0.55
Portugal	0.86	39	0.66	0.59	0.63	0.55	0.54	0.67	0.68	0.47	0.64	0.70	0.70	0.63
Qatar	0.97	73	0.88	0.89	0.80	0.91	0.91	0.88	0.89	0.89	0.74	0.83	0.81	0.84

Exhibit 5: Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2011 Instruction Affected by Science Resource Shortages Scale, Fourth Grade (Continued)

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Factor Loadings for Each Item											
			ACBG10AA	ACBG10AB	ACBG10AC	ACBG10AD	ACBG10AE	ACBG10AF	ACBG10AG	ACBG10DA	ACBG10DB	ACBG10DC	ACBG10DD	ACBG10DE
Romania	0.87	41	0.75	0.64	0.64	0.73	0.65	0.63	0.62	0.66	0.57	0.63	0.55	0.60
Russian Federation	0.92	52	0.77	0.68	0.71	0.73	0.73	0.74	0.71	0.73	0.72	0.78	0.67	0.72
Saudi Arabia	0.80	32	0.42	0.47	0.66	0.60	0.48	0.63	0.56	0.52	0.61	0.53	0.56	0.68
Serbia	0.90	48	0.74	0.77	0.71	0.75	0.78	0.78	0.73	0.61	0.44	0.61	0.67	0.61
Singapore	0.95	65	0.86	0.83	0.81	0.83	0.80	0.78	0.86	0.62	0.79	0.80	0.81	0.84
Slovak Republic	0.83	35	0.67	0.50	0.54	0.58	0.57	0.57	0.59	0.51	0.66	0.55	0.72	0.62
Slovenia	0.82	35	0.50	0.60	0.43	0.54	0.49	0.56	0.64	0.46	0.65	0.67	0.71	0.74
Spain	0.89	46	0.70	0.72	0.62	0.63	0.67	0.59	0.75	0.73	0.65	0.73	0.75	0.59
Sweden	0.88	45	0.65	0.60	0.66	0.54	0.65	0.67	0.60	0.67	0.76	0.72	0.70	0.77
Thailand	0.92	55	0.78	0.75	0.67	0.62	0.63	0.78	0.81	0.74	0.73	0.77	0.79	0.83
Tunisia	0.86	40	0.60	0.64	0.43	0.61	0.29	0.71	0.66	0.63	0.66	0.72	0.74	0.72
Turkey	0.85	39	0.71	0.66	0.64	0.71	0.72	0.47	0.64	0.63	0.49	0.43	0.66	0.64
United Arab Emirates	0.94	61	0.83	0.85	0.78	0.90	0.86	0.79	0.82	0.82	0.53	0.68	0.60	0.81
United States	0.91	51	0.74	0.66	0.68	0.62	0.64	0.72	0.74	0.68	0.68	0.80	0.81	0.76
Yemen	0.81	40	-0.24	0.30	0.22	0.60	-0.03	0.66	0.85	0.49	0.85	0.87	0.84	0.79
Sixth Grade Participants														
Botswana	0.81	38	0.18	0.39	0.11	0.40	-0.19	0.60	0.71	0.68	0.88	0.82	0.88	0.79
Honduras	0.92	54	0.67	0.68	0.41	0.70	0.54	0.78	0.78	0.77	0.83	0.82	0.86	0.82
Yemen	0.85	44	-0.13	0.23	0.44	0.70	0.08	0.71	0.85	0.60	0.83	0.87	0.86	0.86
Benchmarking Participants														
Alberta, Canada	0.87	42	0.63	0.59	0.56	0.41	0.41	0.71	0.57	0.62	0.76	0.80	0.80	0.77
Ontario, Canada	0.86	40	0.70	0.60	0.68	0.61	0.64	0.69	0.70	0.50	0.50	0.66	0.65	0.64
Quebec, Canada	0.87	42	0.63	0.53	0.61	0.62	0.55	0.72	0.73	0.64	0.62	0.70	0.68	0.68
Abu Dhabi, UAE	0.93	59	0.79	0.84	0.73	0.87	0.84	0.81	0.82	0.81	0.50	0.66	0.58	0.84
Dubai, UAE	0.96	69	0.86	0.88	0.85	0.91	0.86	0.80	0.84	0.85	0.66	0.81	0.80	0.85
Florida, US	0.92	54	0.79	0.74	0.71	0.65	0.64	0.78	0.66	0.66	0.78	0.78	0.89	0.71
North Carolina, US	0.93	56	0.80	0.78	0.73	0.77	0.79	0.72	0.78	0.65	0.82	0.74	0.71	0.66

Exhibit 6: Relationship Between the TIMSS 2011 Instruction Affected by Science Resource Shortages Scale, Fourth Grade, and TIMSS 2011 Science Achievement

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r ²)	
Armenia	0.07	0.01	0.01
Australia	0.11	0.01	0.01
Austria	0.03	0.00	0.00
Azerbaijan	0.01	0.00	0.03
Bahrain	0.08	0.01	0.01
Belgium (Flemish)	0.04	0.00	0.00
Chile	0.22	0.05	0.04
Chinese Taipei	0.07	0.01	0.01
Croatia	0.01	0.00	0.00
Czech Republic	-0.03	0.00	0.00
Denmark	-0.03	0.00	0.00
England	0.02	0.00	0.00
Finland	0.06	0.00	0.00
Georgia	-0.01	0.00	0.00
Germany	0.03	0.00	0.00
Hong Kong SAR	0.04	0.00	0.00
Hungary	0.07	0.00	0.00
Iran, Islamic Rep. of	0.03	0.00	0.01
Ireland	0.06	0.00	0.00
Italy	0.14	0.02	0.01
Japan	-0.01	0.00	0.00
Kazakhstan	-0.03	0.00	0.00
Korea, Rep. of	0.05	0.00	0.00
Kuwait	-0.04	0.00	0.01
Lithuania	-0.02	0.00	0.00
Malta	0.11	0.01	0.01
Morocco	-0.05	0.00	0.01
Netherlands	0.09	0.01	0.00
New Zealand	0.09	0.01	0.00
Northern Ireland	0.04	0.00	0.01
Norway	-0.06	0.00	0.01
Oman	0.01	0.00	0.00
Poland	0.05	0.00	0.00
Portugal	0.03	0.00	0.00
Qatar	0.17	0.03	0.02
Romania	0.09	0.01	0.01
Russian Federation	0.09	0.01	0.01
Saudi Arabia	0.02	0.00	0.00

Exhibit 6: Relationship Between the TIMSS 2011 Instruction Affected by Science Resource Shortages Scale, Fourth Grade, and TIMSS 2011 Science Achievement (Continued)

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)	
Serbia	0.08	0.01	0.01
Singapore	-0.03	0.00	0.00
Slovak Republic	0.02	0.00	0.00
Slovenia	0.01	0.00	0.00
Spain	0.03	0.00	0.01
Sweden	0.12	0.02	0.01
Thailand	0.15	0.02	0.03
Tunisia	0.06	0.00	0.00
Turkey	0.12	0.02	0.01
United Arab Emirates	0.14	0.02	0.02
United States	0.07	0.01	0.01
Yemen	-0.06	0.00	0.02
International Median	0.04	0.00	0.00
Sixth Grade Participants			
Botswana	0.01	0.00	0.03
Honduras	0.16	0.02	0.01
Yemen	-0.13	0.02	0.01
Benchmarking Participants			
Alberta, Canada	0.03	0.00	0.00
Ontario, Canada	-0.07	0.00	0.00
Quebec, Canada	0.08	0.01	0.01
Abu Dhabi, UAE	0.13	0.02	0.01
Dubai, UAE	0.20	0.04	0.03
Florida, US	0.01	0.00	0.01
North Carolina, US	-0.03	0.00	0.00