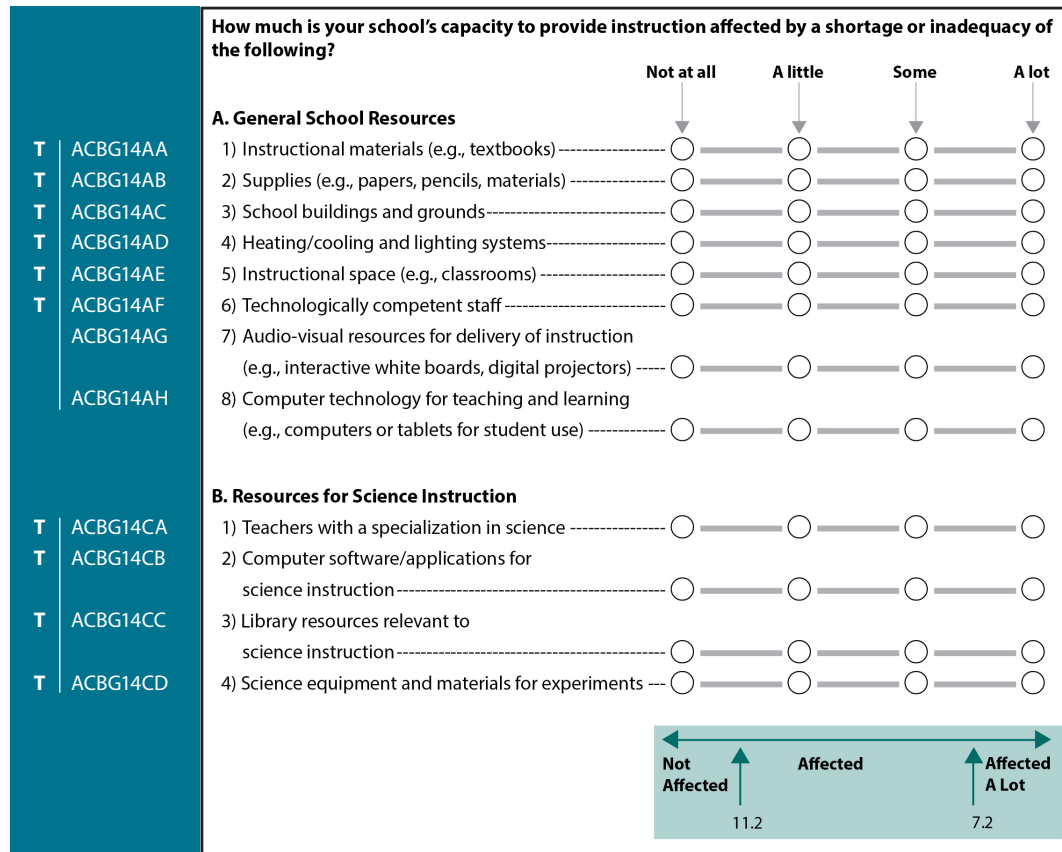# Instruction Affected by Science Resource Shortages–Principals' Reports Scale, Fourth Grade

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

Items in the TIMSS 2015 Instruction Affected by Science Resource Shortages–Principals' Reports Scale, Fourth Grade

How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following?

			Not at all	A little	Some	A lot
		A. General School Resources				
T	ACBG14AA	1) Instructional materials (e.g., textbooks)	○	○	○	○
T	ACBG14AB	2) Supplies (e.g., papers, pencils, materials)	○	○	○	○
T	ACBG14AC	3) School buildings and grounds	○	○	○	○
T	ACBG14AD	4) Heating/cooling and lighting systems	○	○	○	○
T	ACBG14AE	5) Instructional space (e.g., classrooms)	○	○	○	○
T	ACBG14AF	6) Technologically competent staff	○	○	○	○
	ACBG14AG	7) Audio-visual resources for delivery of instruction (e.g., interactive white boards, digital projectors)	○	○	○	○
	ACBG14AH	8) Computer technology for teaching and learning (e.g., computers or tablets for student use)	○	○	○	○
		B. Resources for Science Instruction				
T	ACBG14CA	1) Teachers with a specialization in science	○	○	○	○
T	ACBG14CB	2) Computer software/applications for science instruction	○	○	○	○
T	ACBG14CC	3) Library resources relevant to science instruction	○	○	○	○
T	ACBG14CD	4) Science equipment and materials for experiments	○	○	○	○

Not Affected	Affected	Affected A Lot
	11.2	7.2

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.

CHAPTER 15: CREATING AND INTERPRETING THE TIMSS 2015 CONTEXT QUESTIONNAIRE SCALES METHODS AND PROCEDURES IN TIMSS 2015   15.43

IEA

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

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

Item	delta	tau_1	tau_2	tau_3	Infit
ACBG14AA	-0.24271	-0.15468	-0.15689	0.31157	0.88
ACBG14AB	-0.54779	-0.32899	0.24385	0.08514	0.89
ACBG14AC	-0.04867	-0.86218	0.22062	0.64156	1.04
ACBG14AD	-0.34143	-0.48719	0.12016	0.36703	0.88
ACBG14AE	0.06971	-0.49816	-0.02197	0.52013	1.02
ACBG14AF	0.01673	-1.23646	-0.04988	1.28634	0.96
ACBG14AG	0.00728	-1.05224	0.16138	0.89086	1.01
ACBG14AH	0.23712	-1.20141	0.07412	1.12729	1.06
ACBG14CA	0.01564	-0.59589	0.05252	0.54337	1.14
ACBG14CB	0.27596	-1.48062	0.01306	1.46756	1.02
ACBG14CC	-0.00723	-1.52053	0.04353	1.47700	0.99
ACBG14CD	0.56539	-1.15196	-0.06683	1.21879	0.99

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

Scale Transformation Constants
A = 9.169706
B = 1.448865

Transformed Scale Score = 9.169706 + 1.448865 • Logit Scale Score

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

Raw Score	Transformed Scale Score	Cutpoint
0	3.19089	
1	4.82763	
2	5.60806	
3	6.13220	
4	6.52977	
5	6.85141	
6	7.12344	7.2
7	7.36033	
8	7.57143	
9	7.76318	
10	7.93955	
11	8.10599	
12	8.26361	
13	8.41441	
14	8.56013	
15	8.70226	
16	8.84212	
17	8.98089	
18	9.11966	
19	9.25946	
20	9.40134	
21	9.54635	
22	9.69564	
23	9.85047	
24	10.01218	
25	10.18145	
26	10.36189	
27	10.55547	
28	10.76551	
29	10.99648	
30	11.25452	11.2
31	11.54832	
32	11.89305	
33	12.31351	
34	12.86021	
35	13.66164	
36	15.31821	

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

CHAPTER 15: CREATING AND INTERPRETING THE
TIMSS 2015 CONTEXT QUESTIONNAIRE SCALES
METHODS AND PROCEDURES IN TIMSS 2015   15.45

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

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item											
			ACBG14AA	ACBG14AB	ACBG14AC	ACBG14AD	ACBG14AE	ACBG14AF	ACBG14AG	ACBG14AH	ACBG14CA	ACBG14CB	ACBG14CC	ACBG14CD
Australia	0.87	42	0.64	0.54	0.58	0.46	0.58	0.75	0.70	0.72	0.59	0.69	0.74	0.68
Bahrain	0.96	68	0.90	0.87	0.83	0.91	0.90	0.78	0.89	0.78	0.83	0.71	0.64	0.77
Belgium (Flemish)	0.86	42	0.56	0.53	0.64	0.60	0.58	0.73	0.79	0.79	0.56	0.71	0.63	0.62
Bulgaria	0.83	36	0.67	0.75	0.72	0.65	0.49	0.54	0.71	0.63	0.60	0.36	0.55	0.42
Canada	0.85	38	0.65	0.55	0.60	0.48	0.62	0.68	0.69	0.69	0.51	0.62	0.71	0.58
Chile	0.91	50	0.67	0.68	0.71	0.62	0.76	0.69	0.77	0.72	0.64	0.70	0.78	0.69
Chinese Taipei	0.91	50	0.74	0.71	0.68	0.83	0.71	0.70	0.73	0.72	0.71	0.64	0.63	0.69
Croatia	0.87	41	0.64	0.68	0.63	0.68	0.66	0.65	0.68	0.58	0.59	0.62	0.62	0.69
Cyprus	0.91	52	0.86	0.71	0.72	0.70	0.79	0.80	0.75	0.57	0.64	0.73	0.64	0.74
Czech Republic	0.78	30	0.51	0.53	0.46	0.47	0.53	0.60	0.63	0.62	0.39	0.71	0.45	0.63
Denmark	0.86	40	0.80	0.60	0.65	0.54	0.60	0.54	0.63	0.73	0.44	0.71	0.63	0.69
England	0.87	43	0.71	0.52	0.39	0.46	0.46	0.75	0.70	0.70	0.69	0.76	0.76	0.77
Finland	0.81	33	0.51	0.56	0.67	0.66	0.71	0.57	0.53	0.64	0.46	0.46	0.46	0.54
France	0.85	37	0.69	0.57	0.55	0.50	0.48	0.62	0.64	0.64	0.65	0.67	0.67	0.57
Georgia	0.88	44	0.54	0.74	0.59	0.60	0.66	0.70	0.69	0.73	0.66	0.66	0.72	0.63
Germany	0.83	36	0.68	0.67	0.66	0.43	0.66	0.53	0.67	0.59	0.34	0.51	0.62	0.72
Hong Kong SAR	0.91	52	0.76	0.77	0.63	0.77	0.73	0.80	0.82	0.70	0.57	0.65	0.65	0.74
Hungary	0.89	46	0.65	0.73	0.78	0.70	0.68	0.59	0.70	0.72	0.66	0.64	0.61	0.68
Indonesia	0.85	38	0.66	0.59	0.49	0.73	0.44	0.69	0.66	0.70	0.41	0.61	0.64	0.65
Iran, Islamic Rep. of	0.85	39	0.77	0.79	0.69	0.83	0.79	0.67	0.49	0.12	0.59	0.43	0.41	0.50
Ireland	0.85	38	0.61	0.57	0.51	0.57	0.51	0.58	0.60	0.57	0.65	0.76	0.74	0.65
Italy	0.76	28	0.56	0.52	0.53	0.48	0.67	0.52	0.56	0.59	0.41	0.49	0.45	0.49
Japan	0.92	55	0.73	0.73	0.77	0.74	0.83	0.68	0.68	0.75	0.68	0.70	0.73	0.83
Jordan	0.89	47	0.69	0.75	0.76	0.71	0.76	0.68	0.51	0.64	0.71	0.61	0.53	0.79
Kazakhstan	0.93	58	0.80	0.69	0.69	0.81	0.80	0.81	0.74	0.64	0.82	0.75	0.80	0.75
Korea, Rep. of	0.91	53	0.79	0.77	0.79	0.74	0.80	0.84	0.66	0.80	0.60	0.54	0.60	0.72
Kuwait	0.93	58	0.85	0.77	0.76	0.85	0.89	0.72	0.31	0.53	0.87	0.78	0.78	0.87
Lithuania	0.89	47	0.74	0.72	0.67	0.62	0.59	0.74	0.75	0.66	0.49	0.74	0.76	0.69
Morocco	0.81	38	-0.10	0.25	0.46	0.56	-0.15	0.74	0.71	0.77	0.80	0.77	0.80	0.68
Netherlands	0.81	32	0.47	0.38	0.63	0.58	0.60	0.53	0.61	0.70	0.44	0.66	0.58	0.53
New Zealand	0.86	40	0.68	0.61	0.59	0.55	0.53	0.64	0.66	0.64	0.58	0.63	0.68	0.74
Northern Ireland	0.84	37	0.67	0.67	0.64	0.64	0.59	0.65	0.53	0.63	0.64	0.55	0.50	0.54
Norway (5)	0.85	39	0.73	0.73	0.75	0.75	0.70	0.54	0.61	0.62	0.28	0.52	0.51	0.59
Oman	0.92	53	0.74	0.73	0.66	0.77	0.75	0.78	0.62	0.68	0.83	0.75	0.66	0.78
Poland	0.90	48	0.76	0.74	0.59	0.69	0.68	0.62	0.70	0.70	0.60	0.75	0.78	0.67
Portugal	0.88	43	0.51	0.52	0.62	0.57	0.54	0.59	0.76	0.71	0.68	0.76	0.75	0.78
Qatar	0.98	80	0.93	0.92	0.87	0.95	0.93	0.93	0.89	0.89	0.90	0.80	0.85	0.88
Russian Federation	0.91	52	0.80	0.75	0.58	0.73	0.66	0.68	0.75	0.70	0.69	0.73	0.79	0.74
Saudi Arabia	0.88	45	0.69	0.69	0.70	0.78	0.75	0.68	0.71	0.49	0.67	0.62	0.52	0.66
Serbia	0.90	49	0.78	0.68	0.65	0.69	0.71	0.72	0.76	0.78	0.63	0.67	0.64	0.62
Singapore	0.96	71	0.88	0.87	0.84	0.89	0.86	0.83	0.92	0.92	0.60	0.78	0.80	0.90
Slovak Republic	0.90	49	0.79	0.80	0.63	0.73	0.66	0.70	0.82	0.81	0.81	0.65	0.44	0.40
Slovenia	0.84	37	0.51	0.53	0.56	0.49	0.57	0.52	0.75	0.75	0.19	0.74	0.74	0.73
South Africa (5)	0.70	36	-0.22	-0.17	0.42	0.68	0.22	0.80	0.87	0.84	0.00	0.00	0.00	0.00
Spain	0.88	43	0.62	0.66	0.59	0.68	0.55	0.69	0.73	0.73	0.65	0.64	0.68	0.65
Sweden	0.83	36	0.66	0.62	0.50	0.56	0.58	0.66	0.59	0.69	0.38	0.64	0.52	0.74
Turkey	0.88	43	0.76	0.69	0.60	0.71	0.70	0.51	0.71	0.52	0.67	0.66	0.63	0.64
United Arab Emirates	0.96	69	0.86	0.85	0.84	0.88	0.87	0.87	0.82	0.82	0.82	0.74	0.76	0.83
United States	0.89	46	0.67	0.68	0.68	0.63	0.62	0.70	0.70	0.62	0.67	0.69	0.76	0.68
Benchmarking Participants														
Buenos Aires, Argentina	0.91	51	0.74	0.79	0.69	0.65	0.82	0.78	0.75	0.72	0.58	0.71	0.71	0.62
Ontario, Canada	0.86	40	0.59	0.46	0.56	0.45	0.66	0.72	0.64	0.71	0.61	0.74	0.71	0.61
Quebec, Canada	0.85	40	0.80	0.74	0.67	0.52	0.74	0.58	0.72	0.67	0.31	0.33	0.72	0.53
Norway (4)	0.84	38	0.73	0.73	0.78	0.76	0.71	0.50	0.63	0.60	0.28	0.47	0.48	0.55
Abu Dhabi, UAE	0.95	65	0.84	0.83	0.84	0.84	0.86	0.83	0.79	0.78	0.80	0.66	0.77	0.82
Dubai, UAE	0.98	80	0.90	0.91	0.85	0.93	0.87	0.93	0.89	0.89	0.89	0.88	0.87	0.91
Florida, US	0.94	59	0.81	0.50	0.80	0.80	0.82	0.75	0.78	0.72	0.74	0.81	0.80	0.86

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

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

Country	Pearson's Correlation with Science Achievement		Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r^2)	
Australia	0.11	0.01	0.01
Bahrain	0.06	0.00	0.01
Belgium (Flemish)	0.04	0.00	0.01
Bulgaria	0.10	0.01	0.01
Canada	0.05	0.00	0.00
Chile	0.14	0.02	0.02
Chinese Taipei	0.14	0.02	0.02
Croatia	0.03	0.00	0.00
Cyprus	0.06	0.00	0.01
Czech Republic	-0.02	0.00	0.00
Denmark	-0.03	0.00	0.00
England	0.11	0.01	0.01
Finland	0.01	0.00	0.00
France	0.05	0.00	0.00
Georgia	0.13	0.02	0.01
Germany	0.05	0.00	0.00
Hong Kong SAR	0.16	0.03	0.03
Hungary	0.01	0.00	0.00
Indonesia	-0.28	0.08	0.03
Iran, Islamic Rep. of	0.01	0.00	0.00
Ireland	0.01	0.00	0.00
Italy	0.04	0.00	0.00
Japan	0.01	0.00	0.00
Jordan	-	-	-
Kazakhstan	-0.06	0.00	0.00
Korea, Rep. of	-0.03	0.00	0.00
Kuwait	0.02	0.00	0.02
Lithuania	-0.09	0.01	0.01
Morocco	-0.11	0.01	0.00
Netherlands	-0.01	0.00	0.00
New Zealand	0.06	0.00	0.01
Northern Ireland	0.04	0.00	0.01
Norway (5)	0.03	0.00	0.00
Oman	-0.01	0.00	0.00
Poland	0.01	0.00	0.00
Portugal	0.05	0.00	0.01
Qatar	0.15	0.02	0.02
Russian Federation	0.09	0.01	0.01
Saudi Arabia	0.06	0.00	0.03
Serbia	0.02	0.00	0.01
Singapore	-0.07	0.01	0.01
Slovak Republic	-0.07	0.00	0.00
Slovenia	-0.09	0.01	0.01
South Africa (5)	-	-	-
Spain	0.13	0.02	0.01
Sweden	0.01	0.00	0.00
Turkey	-0.05	0.00	0.01
United Arab Emirates	0.22	0.05	0.07
United States	0.08	0.01	0.01
International Median	**0.03**	**0.00**	**0.01**
Benchmarking Participants			
Buenos Aires, Argentina	0.11	0.01	0.04
Ontario, Canada	0.04	0.00	0.00
Quebec, Canada	0.14	0.02	0.02
Norway (4)	0.03	0.00	0.00
Abu Dhabi, UAE	0.19	0.04	0.07
Dubai, UAE	0.22	0.05	0.05
Florida, US	-0.09	0.01	0.03

A dash (–) indicates comparable data not available.

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

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

CHAPTER 15: CREATING AND INTERPRETING THE TIMSS 2015 CONTEXT QUESTIONNAIRE SCALES
METHODS AND PROCEDURES IN TIMSS 2015   15.47