

TIMSS 2011

The TIMSS 2011 Teachers Emphasize Science Investigation Scale, Fourth Grade

The Teachers Emphasize Science Investigation (ESI) scale was created based on teachers' responses to the six statements 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 Teachers Emphasize Science Investigation Scale, Fourth Grade

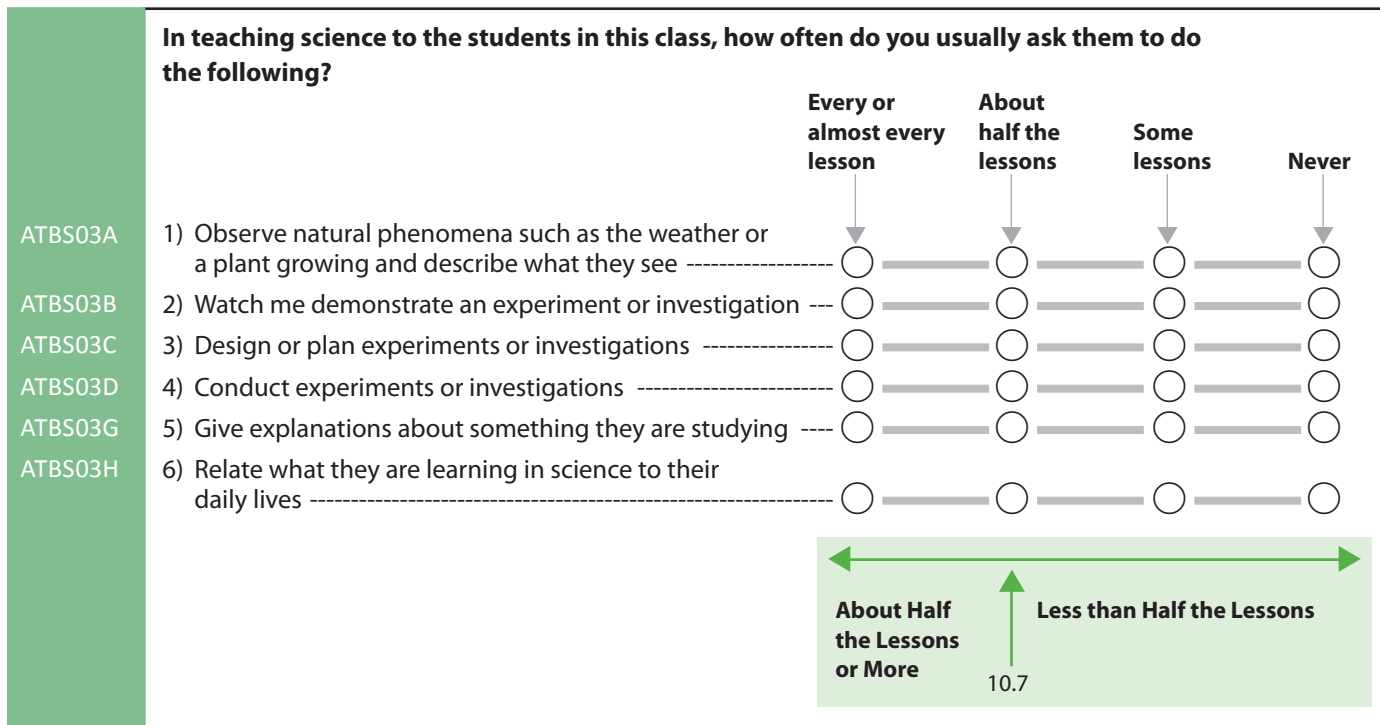


Exhibit 2: Item Parameters for the TIMSS 2011 Teachers Emphasize Science Investigation Scale, Fourth Grade¹

Item	delta	tau_1	tau_2
ATBS03A	0.87707	-0.22078	0.22078
ATBS03B	1.03992	-0.06192	0.06192
ATBS03C	1.44959	-0.30179	0.30179
ATBS03D	1.18748	-0.27222	0.27222
ATBS03G	-0.98099	-0.17900	0.17900
ATBS03H	-1.19675	-0.21703	0.21703

¹ For the purpose of scaling, the categories "Some lessons" and "Never" were combined because there were very few respondents in each of these categories.

Exhibit 3: Scale Transformation Constants

Scale Transformation Constants

$$A = 9.96908$$

$$B = 1.42538$$

$$\text{Transformed Scale Score} = 9.96908 + 1.42538 \cdot \text{Logit Scale Score}$$

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	5.78666		7	11.21849	
1	7.29089		8	11.68771	
2	8.12877		9	12.17831	
3	8.83893		10	12.74382	
4	9.52932		11	13.50584	
5	10.16979		12	15.01664	
6	10.72399	10.7			

Exhibit 5: Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2011 Teachers Emphasize Science Investigation Scale, Fourth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Factor Loadings for Each Item					
			ATBS03A	ATBS03B	ATBS03C	ATBS03D	ATBS03G	ATBS03H
Armenia	0.59	39	0.56	0.79	0.84	0.83	0.11	0.05
Australia	0.82	52	0.58	0.66	0.76	0.80	0.75	0.78
Austria	0.66	41	0.73	0.79	0.55	0.71	0.55	0.44
Azerbaijan	0.56	33	0.46	0.68	0.72	0.70	0.41	0.37
Bahrain	0.68	39	0.61	0.67	0.78	0.75	0.40	0.44
Belgium (Flemish)	0.65	45	0.56	0.77	0.86	0.82	0.40	0.49
Chile	0.80	52	0.69	0.83	0.88	0.83	0.51	0.47
Chinese Taipei	0.80	51	0.48	0.72	0.80	0.83	0.68	0.74
Croatia	0.66	44	0.55	0.85	0.87	0.86	0.29	0.25
Czech Republic	0.68	43	0.62	0.76	0.77	0.76	0.48	0.46
Denmark	0.70	41	0.52	0.56	0.68	0.75	0.60	0.70
England	0.62	36	0.49	0.48	0.81	0.81	0.41	0.44
Finland	0.64	40	0.65	0.71	0.74	0.67	0.42	0.54
Georgia	0.51	33	0.43	0.51	0.83	0.82	0.20	0.37
Germany	0.72	47	0.62	0.75	0.84	0.86	0.45	0.45
Hong Kong SAR	0.70	48	0.64	0.87	0.84	0.85	0.34	0.39
Hungary	0.67	43	0.65	0.79	0.80	0.75	0.42	0.39
Iran, Islamic Rep. of	0.74	44	0.67	0.65	0.75	0.78	0.53	0.53
Ireland	0.71	42	0.41	0.73	0.78	0.75	0.60	0.55
Italy	0.72	45	0.66	0.78	0.88	0.87	0.16	0.33
Japan	0.76	46	0.56	0.63	0.76	0.70	0.61	0.76

Exhibit 5: Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2011 Teachers Emphasize Science Investigation Scale, Fourth Grade (Continued)

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Factor Loadings for Each Item					
			ATBS03A	ATBS03B	ATBS03C	ATBS03D	ATBS03G	ATBS03H
Kazakhstan	0.61	36	0.61	0.71	0.74	0.74	0.28	0.29
Korea, Rep. of	0.70	40	0.57	0.72	0.71	0.75	0.48	0.52
Kuwait	0.67	38	0.53	0.72	0.71	0.71	0.56	0.42
Lithuania	0.72	45	0.57	0.80	0.85	0.85	0.38	0.43
Malta	0.70	44	0.56	0.85	0.83	0.78	0.29	0.46
Morocco	0.72	42	0.61	0.73	0.82	0.81	0.43	0.37
Netherlands	0.62	43	0.65	0.83	0.81	0.75	0.30	0.41
New Zealand	0.81	53	0.66	0.70	0.79	0.82	0.70	0.69
Northern Ireland	0.73	45	0.49	0.60	0.73	0.77	0.73	0.68
Norway	0.66	46	0.24	0.75	0.84	0.81	0.73	0.50
Oman	0.61	35	0.50	0.59	0.76	0.77	0.39	0.42
Poland	0.61	40	0.67	0.64	0.78	0.75	0.48	0.42
Portugal	0.76	49	0.69	0.78	0.85	0.84	0.43	0.50
Qatar	0.75	44	0.67	0.64	0.76	0.76	0.55	0.59
Romania	0.71	43	0.61	0.69	0.85	0.83	0.45	0.30
Russian Federation	0.68	43	0.57	0.79	0.86	0.82	0.27	0.37
Saudi Arabia	0.71	41	0.57	0.70	0.75	0.76	0.47	0.57
Serbia	0.77	49	0.75	0.83	0.89	0.80	0.38	0.31
Singapore	0.76	45	0.68	0.64	0.70	0.69	0.62	0.70
Slovak Republic	0.68	42	0.67	0.73	0.83	0.77	0.29	0.44
Slovenia	0.70	41	0.65	0.54	0.69	0.77	0.56	0.60
Spain	0.63	42	0.60	0.74	0.89	0.83	0.19	0.33
Sweden	0.75	44	0.52	0.58	0.68	0.76	0.73	0.69
Thailand	0.83	55	0.70	0.83	0.79	0.83	0.61	0.65
Tunisia	0.69	40	0.41	0.74	0.79	0.71	0.49	0.58
Turkey	0.77	47	0.59	0.65	0.84	0.77	0.60	0.63
United Arab Emirates	0.75	45	0.56	0.73	0.76	0.79	0.54	0.61
United States	0.78	49	0.69	0.66	0.78	0.79	0.59	0.67
Yemen	0.66	39	0.56	0.71	0.72	0.76	0.39	0.50
Sixth Grade Participants								
Botswana	0.78	49	0.70	0.83	0.85	0.83	0.30	0.52
Honduras	0.74	46	0.58	0.80	0.89	0.89	0.32	0.38
Yemen	0.65	37	0.67	0.72	0.61	0.66	0.49	0.47

Exhibit 5: Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2011 Teachers Emphasize Science Investigation Scale, Fourth Grade (Continued)

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Factor Loadings for Each Item					
			ATBS03A	ATBS03B	ATBS03C	ATBS03D	ATBS03G	ATBS03H
Benchmarking Participants								
Alberta, Canada	0.61	35	0.62	0.24	0.55	0.73	0.59	0.69
Ontario, Canada	0.71	42	0.54	0.62	0.70	0.75	0.58	0.66
Quebec, Canada	0.75	45	0.62	0.65	0.73	0.72	0.55	0.72
Abu Dhabi, UAE	0.70	41	0.50	0.71	0.74	0.78	0.42	0.60
Dubai, UAE	0.82	53	0.66	0.76	0.78	0.78	0.68	0.69
Florida, US	0.78	48	0.69	0.59	0.85	0.86	0.55	0.56
North Carolina, US	0.76	46	0.62	0.67	0.74	0.78	0.66	0.57

Exhibit 6: Relationship Between the TIMSS 2011 Teachers Emphasize Science Investigation 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	-0.08	0.01	0.00
Australia	0.17	0.03	0.02
Austria	-0.01	0.00	0.00
Azerbaijan	0.02	0.00	0.00
Bahrain	0.03	0.00	0.01
Belgium (Flemish)	0.02	0.00	0.00
Chile	-0.03	0.00	0.00
Chinese Taipei	0.06	0.00	0.01
Croatia	-0.03	0.00	0.00
Czech Republic	0.05	0.00	0.00
Denmark	0.01	0.00	0.00
England	0.06	0.00	0.01
Finland	0.07	0.01	0.00
Georgia	0.07	0.00	0.00
Germany	-0.05	0.00	0.00
Hong Kong SAR	-0.04	0.00	0.00
Hungary	-0.04	0.00	0.00
Iran, Islamic Rep. of	0.01	0.00	0.00
Ireland	0.02	0.00	0.00
Italy	-0.03	0.00	0.00
Japan	-0.01	0.00	0.00
Kazakhstan	-0.04	0.00	0.00
Korea, Rep. of	0.03	0.00	0.00
Kuwait	0.06	0.00	0.00
Lithuania	0.01	0.00	0.00

Exhibit 6: Relationship Between the TIMSS 2011 Teachers Emphasize Science Investigation 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)	
Malta	0.03	0.00	0.00
Morocco	0.06	0.00	0.00
Netherlands	0.09	0.01	0.00
New Zealand	0.04	0.00	0.00
Northern Ireland	-0.08	0.01	0.00
Norway	0.01	0.00	0.00
Oman	0.07	0.00	0.01
Poland	-0.04	0.00	0.00
Portugal	0.04	0.00	0.00
Qatar	-0.02	0.00	0.00
Romania	0.01	0.00	0.00
Russian Federation	0.02	0.00	0.00
Saudi Arabia	0.10	0.01	0.00
Serbia	0.04	0.00	0.00
Singapore	-0.04	0.00	0.00
Slovak Republic	-0.04	0.00	0.00
Slovenia	-0.02	0.00	0.00
Spain	-0.01	0.00	0.00
Sweden	0.02	0.00	0.00
Thailand	0.15	0.02	0.04
Tunisia	0.06	0.00	0.01
Turkey	0.14	0.02	0.01
United Arab Emirates	-0.07	0.01	0.01
United States	0.06	0.00	0.00
Yemen	0.01	0.00	0.00
International Median	0.02	0.00	0.00
Sixth Grade Participants			
Botswana	0.05	0.00	0.00
Honduras	0.12	0.01	0.02
Yemen	0.01	0.00	0.00
Benchmarking Participants			
Alberta, Canada	0.06	0.00	0.00
Ontario, Canada	-0.01	0.00	0.00
Quebec, Canada	0.09	0.01	0.01
Abu Dhabi, UAE	-0.03	0.00	0.00
Dubai, UAE	-0.18	0.03	0.03
Florida, US	0.04	0.00	0.00
North Carolina, US	-0.02	0.00	0.00