

TIMSS 2011

The TIMSS 2011 Students Engaged in Science Lessons Scale, Fourth Grade

The Students Engaged in Science Lessons (ESL) scale was created based on students' degree of agreement with the five 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 Students Engaged in Science Lessons Scale, Fourth Grade

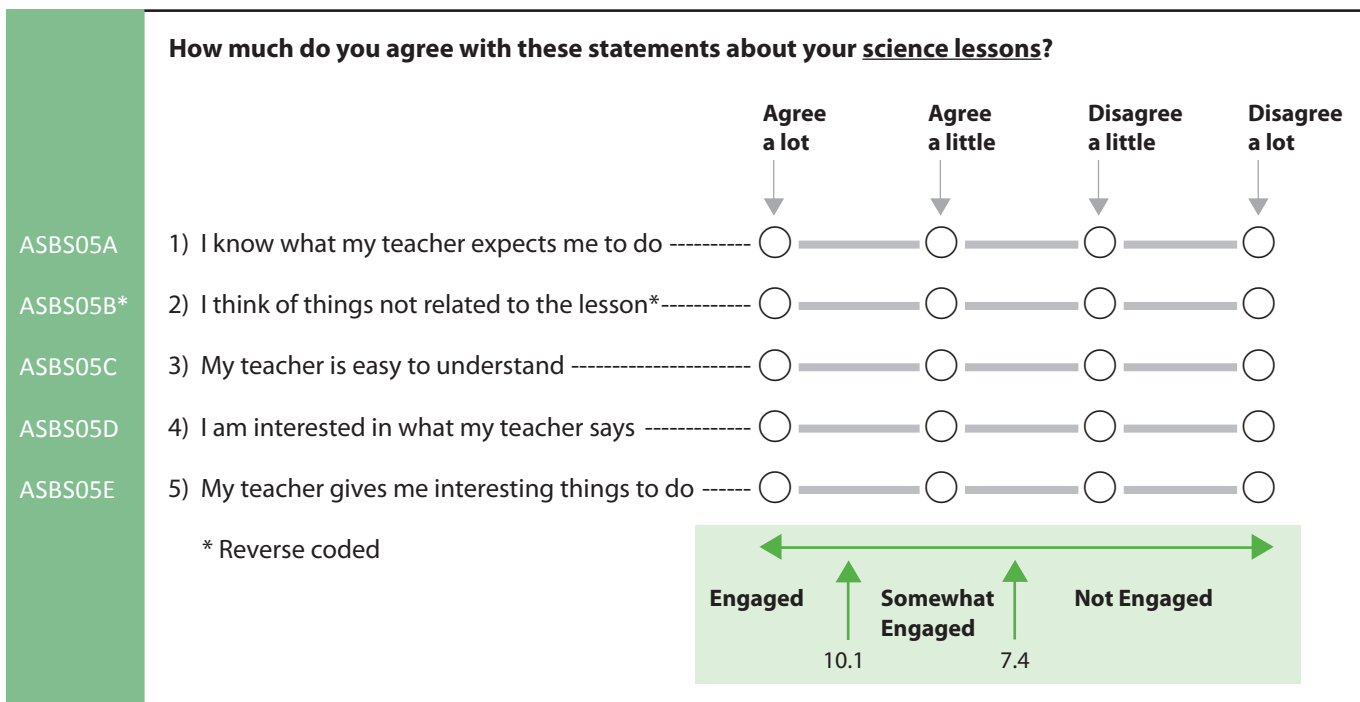


Exhibit 2: Item Parameters for the TIMSS 2011 Students Engaged in Science Lessons Scale, Fourth Grade

Item	delta	tau_1	tau_2	tau_3
ASBS05A	-1.21885	0.02395	-0.46687	0.44292
ASBS05B*	-0.54515	-0.34931	0.33456	0.01475
ASBS05C	-1.46142	-0.06779	-0.36569	0.43348
ASBS05D	-1.46652	0.01094	-0.31419	0.30325
ASBS05E	-1.23817	-0.03374	-0.21880	0.25254

*Reverse coded

Exhibit 3: Scale Transformation Constants

Scale Transformation Constants

$$A = 10.12775$$

$$B = 2.07921$$

$$\text{Transformed Scale Score} = 10.12775 + 2.07921 \cdot \text{Logit Scale Score}$$

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	2.73756		8	7.74862	
1	4.45419		9	8.12296	
2	5.25563		10	8.52955	
3	5.81227		11	8.98589	
4	6.26556		12	9.51210	
5	6.66102		13	10.16210	10.1
6	7.02850		14	11.07233	
7	7.37908	7.4	15	13.03107	

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

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Factor Loadings for Each Item				
			ASBS05A	ASBS05B*	ASBS05C	ASBS05D	ASBS05E
Armenia	0.62	49	0.41	0.19	0.84	0.89	0.88
Australia	0.71	51	0.64	0.33	0.78	0.85	0.84
Austria	0.68	48	0.64	0.36	0.73	0.83	0.81
Azerbaijan	0.27	37	0.50	-0.15	0.70	0.71	0.76
Bahrain	0.59	43	0.56	0.32	0.75	0.77	0.76
Belgium (Flemish)	0.70	49	0.70	0.46	0.75	0.79	0.74
Chile	0.55	41	0.63	0.22	0.67	0.75	0.75
Chinese Taipei	0.72	53	0.79	0.26	0.80	0.84	0.77
Croatia	0.62	45	0.57	0.34	0.72	0.80	0.79
Czech Republic	0.74	52	0.66	0.58	0.74	0.83	0.76
Denmark	0.73	50	0.57	0.52	0.73	0.83	0.81
England	0.73	51	0.65	0.44	0.76	0.84	0.82
Finland	0.75	53	0.65	0.44	0.76	0.86	0.83
Georgia	0.27	34	0.44	0.05	0.75	0.60	0.75
Germany	0.71	51	0.61	0.42	0.79	0.84	0.82
Hong Kong SAR	0.76	59	0.85	0.14	0.88	0.87	0.82
Hungary	0.73	53	0.67	0.40	0.82	0.84	0.82
Iran, Islamic Rep. of	0.56	41	0.56	0.32	0.76	0.75	0.70
Ireland	0.70	50	0.64	0.37	0.75	0.85	0.82
Italy	0.65	46	0.58	0.39	0.70	0.82	0.80
Japan	0.74	51	0.69	0.37	0.77	0.83	0.79

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

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Factor Loadings for Each Item				
			ASBS05A	ASBS05B*	ASBS05C	ASBS05D	ASBS05E
Kazakhstan	0.50	40	0.54	0.22	0.69	0.76	0.78
Korea, Rep. of	0.78	54	0.61	0.56	0.79	0.86	0.81
Kuwait	0.55	41	0.43	0.38	0.73	0.77	0.76
Lithuania	0.64	45	0.66	0.39	0.71	0.76	0.76
Malta	0.72	51	0.67	0.41	0.74	0.83	0.82
Morocco	0.53	37	0.51	0.42	0.70	0.65	0.71
Netherlands	0.69	47	0.67	0.48	0.74	0.76	0.73
New Zealand	0.67	50	0.67	0.18	0.78	0.85	0.83
Northern Ireland	0.67	49	0.66	0.26	0.76	0.83	0.83
Norway	0.68	48	0.60	0.41	0.69	0.84	0.83
Oman	0.49	38	0.44	0.30	0.76	0.76	0.69
Poland	0.72	52	0.70	0.39	0.79	0.84	0.81
Portugal	0.62	46	0.62	0.38	0.71	0.80	0.79
Qatar	0.56	43	0.50	0.18	0.79	0.80	0.78
Romania	0.62	46	0.61	0.38	0.77	0.79	0.77
Russian Federation	0.66	47	0.63	0.41	0.77	0.77	0.76
Saudi Arabia	0.54	39	0.40	0.42	0.72	0.76	0.74
Serbia	0.71	49	0.62	0.49	0.74	0.81	0.78
Singapore	0.73	54	0.76	0.20	0.82	0.86	0.83
Slovak Republic	0.68	48	0.70	0.39	0.75	0.80	0.77
Slovenia	0.69	47	0.66	0.47	0.71	0.78	0.75
Spain	0.64	46	0.56	0.33	0.74	0.83	0.79
Sweden	0.69	49	0.53	0.40	0.74	0.86	0.85
Thailand	0.56	40	0.45	0.40	0.76	0.75	0.72
Tunisia	0.48	34	0.47	0.53	0.61	0.66	0.62
Turkey	0.42	32	0.59	0.43	0.64	0.64	0.51
United Arab Emirates	0.57	44	0.57	0.21	0.76	0.78	0.79
United States	0.68	48	0.62	0.37	0.75	0.83	0.79
Yemen	0.49	37	0.52	0.26	0.77	0.77	0.57
Sixth Grade Participants							
Botswana	0.53	37	0.64	0.28	0.66	0.68	0.69
Honduras	0.36	37	0.49	-0.03	0.68	0.75	0.77
Yemen	0.46	36	0.53	0.31	0.77	0.76	0.49
Benchmarking Participants							
Alberta, Canada	0.67	48	0.60	0.38	0.74	0.83	0.81
Ontario, Canada	0.71	50	0.64	0.38	0.76	0.84	0.81
Quebec, Canada	0.73	52	0.63	0.45	0.76	0.86	0.83

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

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Factor Loadings for Each Item				
			ASBS05A	ASBS05B*	ASBS05C	ASBS05D	ASBS05E
Abu Dhabi, UAE	0.56	42	0.52	0.24	0.77	0.77	0.78
Dubai, UAE	0.60	46	0.63	0.20	0.77	0.80	0.80
Florida, US	0.65	47	0.63	0.32	0.74	0.82	0.79
North Carolina, US	0.65	46	0.53	0.41	0.73	0.82	0.79

*Reverse coded.

Exhibit 6: Relationship Between the TIMSS 2011 Students Engaged in Science Lessons 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	0.22	0.05	0.05
Australia	0.15	0.02	0.03
Austria	0.06	0.00	0.01
Azerbaijan	0.23	0.05	0.04
Bahrain	0.27	0.07	0.08
Belgium (Flemish)	0.09	0.01	0.01
Chile	0.21	0.04	0.06
Chinese Taipei	0.14	0.02	0.03
Croatia	0.04	0.00	0.00
Czech Republic	0.03	0.00	0.00
Denmark	0.01	0.00	0.00
England	0.05	0.00	0.00
Finland	0.06	0.00	0.00
Georgia	0.23	0.05	0.06
Germany	0.09	0.01	0.01
Hong Kong SAR	0.14	0.02	0.02
Hungary	0.19	0.04	0.05
Iran, Islamic Rep. of	0.16	0.03	0.04
Ireland	0.13	0.02	0.02
Italy	0.11	0.01	0.01
Japan	0.11	0.01	0.01
Kazakhstan	0.16	0.03	0.03
Korea, Rep. of	0.20	0.04	0.04
Kuwait	0.20	0.04	0.06
Lithuania	0.12	0.02	0.02
Malta	0.24	0.06	0.06
Morocco	0.25	0.06	0.06

Exhibit 6: Relationship Between the TIMSS 2011 Students Engaged in Science Lessons 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)	
Netherlands	0.10	0.01	0.01
New Zealand	0.09	0.01	0.01
Northern Ireland	0.15	0.02	0.03
Norway	0.08	0.01	0.01
Oman	0.29	0.09	0.10
Poland	0.11	0.01	0.02
Portugal	0.23	0.05	0.04
Qatar	0.29	0.08	0.10
Romania	0.28	0.08	0.08
Russian Federation	0.08	0.01	0.01
Saudi Arabia	0.26	0.07	0.08
Serbia	0.11	0.01	0.01
Singapore	0.16	0.02	0.04
Slovak Republic	0.07	0.00	0.01
Slovenia	0.11	0.01	0.01
Spain	0.12	0.01	0.03
Sweden	0.02	0.00	0.00
Thailand	0.19	0.04	0.04
Tunisia	0.28	0.08	0.09
Turkey	0.36	0.13	0.14
United Arab Emirates	0.23	0.05	0.06
United States	0.19	0.04	0.04
Yemen	0.22	0.05	0.04
International Median	0.15	0.02	0.03
Sixth Grade Participants			
Botswana	0.43	0.19	0.18
Honduras	0.12	0.01	0.02
Yemen	0.19	0.04	0.03
Benchmarking Participants			
Alberta, Canada	0.15	0.02	0.02
Ontario, Canada	0.14	0.02	0.02
Quebec, Canada	0.13	0.02	0.02
Abu Dhabi, UAE	0.23	0.05	0.06
Dubai, UAE	0.21	0.04	0.06
Florida, US	0.18	0.03	0.03
North Carolina, US	0.21	0.04	0.06