

TIMSS 2011

The TIMSS 2011 Students Like Learning Biology Scale, Eighth Grade

The Students Like Learning Biology (SLB) scale was created based on students' degree of agreement to the five statements described below. This scale was administered in countries where the sciences are taught as separate subjects. 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 Like Learning Biology Scale, Eighth Grade

		How much do you agree with these statements about learning biology?			
		Agree a lot	Agree a little	Disagree a little	Disagree a lot
BSBB18A	1) I enjoy learning biology -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBB18B*	2) I wish I did not have to study biology* -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBB18D*	3) Biology is boring* -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBB18E	4) I learn many interesting things in biology -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
BSBB18F	5) I like biology -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* Reverse coded

Like Somewhat Like Do Not Like

10.7 8.1

Exhibit 2: Item Parameters for the TIMSS 2011 Students Like Learning Biology Scale, Eighth Grade

Item	delta	tau_1	tau_2	tau_3
BSBB18A	-1.63604	-1.39320	-0.42272	1.81592
BSBB18B*	-1.06929	-1.04000	-0.22428	1.26428
BSBB18D*	-1.06529	-1.11005	-0.25664	1.36669
BSBB18E	-2.06572	-1.05057	-0.51683	1.56740
BSBB18F	-1.39365	-1.22478	-0.35901	1.58379

*Reverse coded

Exhibit 3: Scale Transformation Constants

Scale Transformation Constants

$$A = 10.08904$$

$$B = 1.18143$$

$$\text{Transformed Scale Score} = 10.08904 + 1.18143 \cdot \text{Logit Scale Score}$$

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	4.15352		8	8.45031	
1	5.46924		9	8.82147	
2	6.13197		10	9.22026	
3	6.61468		11	9.66026	
4	7.02673		12	10.15946	
5	7.39775		13	10.75363	10.7
6	7.75003		14	11.54285	
7	8.09757	8.1	15	13.01279	

Exhibit 5: Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2011 Students Like Learning Biology Scale, Eighth Grade

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Factor Loadings for Each Item				
			BSBB18A	BSBB18B*	BSBB18D*	BSBB18E	BSBB18F
Armenia	0.81	58	0.81	0.71	0.71	0.75	0.84
Finland	0.90	72	0.87	0.81	0.84	0.82	0.90
Georgia	0.82	59	0.84	0.71	0.71	0.70	0.86
Hungary	0.88	69	0.87	0.75	0.82	0.79	0.90
Indonesia	0.80	55	0.79	0.63	0.73	0.74	0.82
Kazakhstan	0.78	54	0.79	0.65	0.66	0.75	0.83
Lebanon	0.75	51	0.78	0.60	0.58	0.75	0.84
Lithuania	0.88	68	0.86	0.78	0.81	0.78	0.89
Macedonia, Rep. of	0.66	48	0.84	0.48	0.21	0.81	0.88
Morocco	0.67	46	0.75	0.51	0.65	0.64	0.79
Romania	0.82	60	0.82	0.63	0.75	0.77	0.88

Exhibit 5: Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS 2011 Students Like Learning Biology Scale, Eighth Grade (Continued)

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Factor Loadings for Each Item				
			BSBB18A	BSBB18B*	BSBB18D*	BSBB18E	BSBB18F
Russian Federation	0.84	62	0.83	0.64	0.79	0.77	0.89
Slovenia	0.90	72	0.87	0.78	0.85	0.83	0.90
Sweden	0.89	70	0.86	0.76	0.83	0.82	0.90
Syrian Arab Republic	0.63	44	0.71	0.39	0.65	0.70	0.80
Ukraine	0.86	65	0.83	0.74	0.80	0.76	0.88

*Reverse coded

Exhibit 6: Relationship Between the TIMSS 2011 Students Like Learning Biology Scale, Eighth 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	0.12	0.02	0.02
Finland	0.20	0.04	0.03
Georgia	0.19	0.04	0.04
Hungary	0.07	0.00	0.01
Indonesia	0.09	0.01	0.01
Kazakhstan	0.16	0.03	0.03
Lebanon	0.28	0.08	0.08
Lithuania	0.10	0.01	0.01
Macedonia, Rep. of	0.20	0.04	0.08
Morocco	0.27	0.07	0.06
Romania	0.15	0.02	0.02
Russian Federation	0.04	0.00	0.00
Slovenia	-0.01	0.00	0.00
Sweden	0.21	0.04	0.03
Syrian Arab Republic	0.23	0.05	0.05
Ukraine	0.08	0.01	0.00
International Median	0.16	0.02	0.02