

Students Like Learning Advanced Mathematics Scale

The Students Like Learning Advanced Mathematics (SLM) scale was created based on students' degree of agreement with the twelve statements described below.

Items in the TIMSS Advanced 2015 Students Like Learning Advanced Mathematics Scale

How much do you agree with these statements about the mathematics you are studying?					
	Agree a lot	Agree a little	Disagree a little	Disagree a lot	
MSBM20A	1) When I do mathematics problems, I sometimes get completely absorbed -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MSBM20B	2) I get a sense of satisfaction when I solve mathematics problems -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MSBM20C*	3) I feel bored when I do my mathematics schoolwork* -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MSBM20D	4) I like studying for my mathematics class outside of school -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MSBM20E	5) It is interesting to learn mathematics theory -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MSBM20F*	6) I dread my mathematics class* -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MSBM20G	7) I am studying mathematics because I like to learn new things -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MSBM20H	8) I enjoy figuring out challenging mathematics -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MSBM20 I	9) Mathematics is one of my favorite subjects -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MSBM20J	10) Jobs that require advanced mathematics skills seem interesting to me -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MSBM20K*	11) I wish I did not have to study mathematics* -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
MSBM20L	12) I enjoy thinking about the world in terms of mathematical relationships -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* Reverse coded

Very Much Like Learning Advanced Mathematics 11.8 Like Learning Advanced Mathematics 9.1 Do Not Like Learning Advanced Mathematics

Item Parameters for the TIMSS Advanced 2015 Students Like Learning Advanced Mathematics Scale

Item	delta	tau_1	tau_2	tau_3	Infit
MSBM20A	-0.59588	-1.40851	-0.22921	1.63772	1.28
MSBM20B	-1.08963	-0.57708	-0.49790	1.07498	1.10
MSBM20C*	0.39039	-1.70328	-0.19453	1.89781	1.30
MSBM20D	0.79348	-1.59115	-0.11154	1.70269	1.13
MSBM20E	0.39789	-1.25999	-0.18804	1.44803	1.03
MSBM20F*	-0.55711	-1.10780	0.07358	1.03422	2.03
MSBM20G	0.00711	-1.53161	-0.11150	1.64311	0.89
MSBM20H	-0.16988	-1.21083	-0.10307	1.31390	0.85
MSBM20I	0.21802	-0.68925	-0.03127	0.72052	0.73
MSBM20J	0.15044	-0.99874	-0.14656	1.14530	0.95
MSBM20K*	-0.28490	-0.61660	-0.08438	0.70098	1.31
MSBM20L	0.74007	-1.30692	0.04757	1.25935	1.11

*Reverse coded

Scale Transformation Constants for the TIMSS Advanced 2015 Students Like Learning Advanced Mathematics Scale

Scale Transformation Constants

A = 9.128252

B = 1.556567

Transformed Scale Score = 9.128252 + 1.556567 • Logit Scale Score

**Equivalence Table of the Raw Score and the Transformed Scale Score
for the TIMSS Advanced 2015 Students Like Learning Advanced
Mathematics Scale**

Raw Score	Transformed Scale Score	Cutpoint
0	2.17529	
1	3.91526	
2	4.74499	
3	5.30942	
4	5.74558	
5	6.11032	
6	6.42755	
7	6.71198	
8	6.97262	
9	7.21536	
10	7.44367	
11	7.66218	
12	7.87192	
13	8.07472	
14	8.27223	
15	8.46589	
16	8.65702	
17	8.84686	
18	9.03665	9.1
19	9.22759	
20	9.42092	
21	9.61793	
22	9.82004	
23	10.02874	
24	10.24570	
25	10.47196	
26	10.71137	
27	10.96623	
28	11.24022	
29	11.53811	
30	11.86658	11.8
31	12.23465	
32	12.65864	
33	13.16494	
34	13.80785	
35	14.72417	
36	16.55930	

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



Cronbach's Alpha Reliability Coefficient and Principal Components Analysis of the Items in the TIMSS Advanced 2015 Students Like Learning Advanced Mathematics Scale

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item											
			MSBM20A	MSBM20B	MSBM20C*	MSBM20D	MSBM20E	MSBM20F*	MSBM20G	MSBM20H	MSBM20I	MSBM20J	MSBM20K*	MSBM20L
France	0.88	45	0.71	0.46	0.61	0.68	0.76	0.32	0.76	0.76	0.83	0.65	0.76	0.56
Italy	0.85	46	-0.47	0.41	0.64	0.78	0.66	0.39	0.81	0.80	0.85	0.79	0.76	0.63
Lebanon	0.74	30	0.47	0.59	0.33	0.45	0.63	0.08	0.68	0.66	0.72	0.67	0.30	0.62
Norway	0.89	45	0.66	0.42	0.66	0.68	0.75	0.41	0.76	0.79	0.84	0.67	0.69	0.59
Portugal	0.90	47	0.64	0.57	0.64	0.73	0.70	0.48	0.74	0.76	0.83	0.69	0.78	0.61
Russian Federation	0.91	51	0.65	0.75	0.59	0.67	0.74	0.42	0.80	0.84	0.84	0.82	0.62	0.68
Russian Federation 6hr+	0.91	51	0.69	0.76	0.57	0.67	0.73	0.43	0.78	0.85	0.85	0.81	0.60	0.68
Slovenia	0.90	47	0.71	0.44	0.51	0.67	0.52	0.65	0.78	0.82	0.84	0.78	0.76	0.65
Sweden	0.91	49	0.66	0.57	0.69	0.72	0.79	0.43	0.78	0.80	0.85	0.71	0.73	0.60
United States	0.91	50	0.68	0.58	0.58	0.63	0.74	0.66	0.76	0.79	0.82	0.76	0.70	0.71
International Avg.	0.87	46	0.52	0.53	0.58	0.67	0.70	0.43	0.76	0.78	0.82	0.73	0.68	0.63

*Reverse coded

Relationship Between the TIMSS Advanced 2015 Students Like Learning Advanced Mathematics Scale, and TIMSS Advanced 2015 Advanced Mathematics Achievement

Country	Pearson's Correlation with Advanced Mathematics Achievement		Variance in Advanced Mathematics Achievement Accounted for by Difference Between Regions of the Scale (η^2)
	(r)	(r ²)	
France	0.51	0.26	0.21
Italy	0.35	0.13	0.10
Lebanon	0.29	0.08	0.06
Norway	0.48	0.23	0.20
Portugal	0.50	0.25	0.21
Russian Federation	0.37	0.13	0.12
Russian Federation 6hr+	0.37	0.14	0.13
Slovenia	0.52	0.27	0.24
Sweden	0.54	0.29	0.24
United States	0.38	0.14	0.12
International Median	0.48	0.23	0.20

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