

# Appendix 15A: TIMSS 2015 Context Questionnaire Scales, Fourth Grade

## Challenges Facing Teachers Scale, Fourth Grade

The Challenges Facing Teachers (CFT) scale was created based on teachers' degree of agreement with the eight statements described below.

### Items in the TIMSS 2015 Challenges Facing Teachers Scale, Fourth Grade

Indicate the extent to which you agree or disagree with each of the following statements.

	Disagree a lot	Disagree a little	Agree a little	Agree a lot
ATBG11A 1) There are too many students in the classes -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ATBG11B 2) I have too much material to cover in class -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ATBG11C 3) I have too many teaching hours -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ATBG11D 4) I need more time to prepare for class -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ATBG11E 5) I need more time to assist individual students -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ATBG11F 6) I feel too much pressure from parents -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ATBG11G 7) I have difficulty keeping up with all the changes to the curriculum-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ATBG11H 8) I have too many administrative tasks -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Item Parameters for the TIMSS 2015 Challenges Facing Teachers Scale, Fourth Grade**

Item	delta	tau_1	tau_2	tau_3	Infit
ATBG11A	0.07889	-0.76467	0.14939	0.61528	1.15
ATBG11B	0.47864	-1.35276	0.09232	1.26044	0.93
ATBG11C	-0.52363	-0.93560	-0.19692	1.13252	0.97
ATBG11D	0.33075	-1.28469	0.21303	1.07166	0.92
ATBG11E	1.28961	-1.28077	0.54728	0.73349	0.89
ATBG11F	-0.86698	-1.40866	-0.06337	1.47203	1.04
ATBG11G	-0.76404	-1.47618	0.14792	1.32826	1.00
ATBG11H	-0.02324	-0.71014	0.16389	0.54625	1.09

**Scale Transformation Constants for the TIMSS 2015 Challenges Facing Teachers Scale, Fourth Grade**

**Scale Transformation Constants**

A = 10.434525

B = 2.004701

Transformed Scale Score = 10.434525 + 2.004701 • Logit Scale Score

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 Challenges Facing Teachers Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	1.92363	
1	4.32702	
2	5.54237	
3	6.39547	
4	7.07364	7.1
5	7.64510	
6	8.14648	
7	8.59908	
8	9.01602	
9	9.40854	
10	9.78201	
11	10.14266	
12	10.49619	10.4
13	10.84813	
14	11.20423	
15	11.57049	
16	11.95345	
17	12.36030	
18	12.79709	
19	13.27735	
20	13.81571	
21	14.43884	
22	15.19930	
23	16.26129	
24	18.41488	

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 2015 Challenges Facing Teachers Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			ATBGT1A	ATBGT1B	ATBGT1C	ATBGT1D	ATBGT1E	ATBGT1F	ATBGT1G	ATBGT1H
Australia	0.74	38	0.61	0.70	0.53	0.75	0.68	0.49	0.49	0.61
Bahrain	0.81	43	0.63	0.66	0.73	0.72	0.68	0.60	0.64	0.60
Belgium (Flemish)	0.73	35	0.54	0.68	0.59	0.67	0.63	0.48	0.45	0.67
Bulgaria	0.71	34	0.61	0.62	0.74	0.65	0.55	0.37	0.44	0.58
Canada	0.77	39	0.62	0.65	0.56	0.66	0.60	0.61	0.59	0.68
Chile	0.72	38	0.58	0.68	0.67	0.74	0.76	0.47	0.31	0.60
Chinese Taipei	0.80	43	0.70	0.73	0.72	0.72	0.67	0.64	0.48	0.52
Croatia	0.78	40	0.56	0.65	0.62	0.69	0.70	0.67	0.52	0.64
Cyprus	0.66	30	0.49	0.55	0.63	0.72	0.50	0.49	0.51	0.42
Czech Republic	0.78	40	0.51	0.68	0.72	0.75	0.71	0.55	0.56	0.54
Denmark	0.78	41	0.57	0.58	0.78	0.76	0.67	0.55	0.52	0.62
England	0.86	51	0.65	0.79	0.69	0.72	0.78	0.62	0.71	0.77
Finland	0.67	31	0.49	0.59	0.61	0.70	0.60	0.46	0.55	0.41
France	0.61	28	0.42	0.62	0.56	0.62	0.46	0.41	0.57	0.50
Georgia	0.66	31	0.54	0.70	0.52	0.65	0.59	0.48	0.55	0.34
Germany	0.74	36	0.49	0.55	0.69	0.70	0.58	0.55	0.59	0.63
Hong Kong SAR	0.76	39	0.69	0.65	0.41	0.71	0.63	0.56	0.68	0.60
Hungary	0.78	41	0.48	0.67	0.69	0.78	0.75	0.58	0.54	0.56
Indonesia	0.70	33	0.49	0.71	0.63	0.55	0.44	0.57	0.52	0.61
Iran, Islamic Rep. of	0.73	35	0.53	0.52	0.55	0.67	0.68	0.56	0.61	0.61
Ireland	0.81	44	0.54	0.74	0.52	0.75	0.64	0.62	0.73	0.74
Italy	0.76	39	0.45	0.74	0.48	0.78	0.64	0.54	0.72	0.52
Japan	0.73	38	0.35	0.76	0.77	0.76	0.66	0.36	0.35	0.69
Jordan	0.76	39	0.65	0.58	0.73	0.82	0.60	0.61	0.42	0.52
Kazakhstan	0.66	32	0.26	0.35	0.68	0.57	0.46	0.70	0.65	0.69
Korea, Rep. of	0.84	48	0.55	0.75	0.79	0.72	0.75	0.67	0.67	0.62
Kuwait	0.76	38	0.52	0.66	0.75	0.66	0.60	0.59	0.62	0.50
Lithuania	0.67	31	0.43	0.59	0.48	0.65	0.57	0.58	0.66	0.47
Morocco	0.70	34	0.62	0.72	0.72	0.58	0.50	0.41	0.51	0.49
Netherlands	0.73	36	0.53	0.54	0.54	0.72	0.73	0.52	0.53	0.66
New Zealand	0.82	46	0.53	0.72	0.61	0.78	0.73	0.59	0.70	0.72
Northern Ireland	0.80	45	0.65	0.64	0.67	0.73	0.70	0.46	0.67	0.78
Norway (5)	0.79	42	0.53	0.68	0.72	0.74	0.61	0.66	0.60	0.65
Oman	0.75	38	0.58	0.70	0.67	0.73	0.63	0.60	0.51	0.43
Poland	0.74	36	0.46	0.48	0.58	0.74	0.71	0.59	0.60	0.59
Portugal	0.74	40	0.58	0.76	0.64	0.71	0.73	0.56	0.49	0.52
Qatar	0.79	41	0.52	0.66	0.64	0.71	0.58	0.72	0.67	0.58
Russian Federation	0.68	33	0.37	0.59	0.53	0.74	0.63	0.63	0.61	0.38
Saudi Arabia	0.75	38	0.73	0.73	0.69	0.66	0.65	0.45	0.46	0.46
Serbia	0.76	38	0.64	0.61	0.71	0.69	0.63	0.55	0.58	0.50
Singapore	-	-	-	-	-	-	-	-	-	-
Slovak Republic	0.79	42	0.60	0.77	0.73	0.69	0.66	0.59	0.54	0.53
Slovenia	0.68	31	0.65	0.62	0.64	0.55	0.53	0.50	0.50	0.45
South Africa (5)	0.66	31	0.51	0.50	0.70	0.70	0.56	0.25	0.56	0.53
Spain	0.72	34	0.56	0.50	0.60	0.71	0.54	0.54	0.61	0.57
Sweden	0.73	37	0.36	0.65	0.69	0.81	0.66	0.51	0.41	0.64
Turkey	0.76	38	0.57	0.77	0.75	0.72	0.65	0.42	0.39	0.48
United Arab Emirates	0.84	47	0.62	0.79	0.74	0.77	0.72	0.61	0.63	0.60
United States	0.79	41	0.49	0.76	0.55	0.73	0.65	0.57	0.70	0.65
<b>Benchmarking Participants</b>										
Buenos Aires, Argentina	0.78	40	0.63	0.61	0.77	0.66	0.72	0.52	0.54	0.59
Ontario, Canada	0.77	39	0.63	0.72	0.52	0.65	0.56	0.61	0.64	0.63
Quebec, Canada	0.79	41	0.65	0.59	0.59	0.61	0.62	0.67	0.66	0.71
Norway (4)	0.74	37	0.58	0.63	0.64	0.65	0.58	0.64	0.53	0.59
Abu Dhabi, UAE	0.79	41	0.59	0.74	0.68	0.75	0.71	0.35	0.64	0.59
Dubai, UAE	0.84	49	0.56	0.82	0.74	0.73	0.73	0.72	0.63	0.64
Florida, US	0.73	37	0.49	0.67	0.29	0.73	0.81	0.49	0.60	0.65

A dash (-) indicates comparable data not available.

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

**Relationship Between the TIMSS 2015 Challenges Facing Teachers Scale, Fourth Grade, and TIMSS 2015 Achievement**

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )	
	(r)		(r <sup>2</sup> )		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	-0.01	0.02	0.00	0.00	0.00	0.00
Bahrain	0.01	-0.02	0.00	0.00	0.00	0.00
Belgium (Flemish)	-0.11	-0.11	0.01	0.01	0.01	0.01
Bulgaria	0.06	0.04	0.00	0.00	0.00	0.00
Canada	-0.07	-0.06	0.01	0.00	0.00	0.00
Chile	0.04	0.05	0.00	0.00	0.01	0.01
Chinese Taipei	0.06	-0.04	0.00	0.00	0.01	0.00
Croatia	-0.06	-0.05	0.00	0.00	0.00	0.00
Cyprus	0.01	0.03	0.00	0.00	0.00	0.00
Czech Republic	0.00	-0.01	0.00	0.00	0.00	0.00
Denmark	-0.03	0.02	0.00	0.00	0.00	0.00
England	0.04	0.02	0.00	0.00	0.00	0.00
Finland	-0.01	-0.01	0.00	0.00	0.00	0.00
France	0.05	0.05	0.00	0.00	0.01	0.00
Georgia	0.07	0.11	0.00	0.01	0.01	0.01
Germany	0.02	-0.01	0.00	0.00	0.00	0.00
Hong Kong SAR	-0.04	0.10	0.00	0.01	0.01	0.01
Hungary	-0.10	-0.11	0.01	0.01	0.01	0.01
Indonesia	0.07	0.06	0.00	0.00	0.01	0.01
Iran, Islamic Rep. of	0.02	0.02	0.00	0.00	0.00	0.00
Ireland	-0.05	-0.02	0.00	0.00	0.00	0.00
Italy	-0.02	-0.06	0.00	0.00	0.00	0.00
Japan	-0.03	-0.05	0.00	0.00	0.00	0.00
Jordan	0.09	-	0.01	-	0.00	-
Kazakhstan	0.15	0.16	0.02	0.03	0.00	0.00
Korea, Rep. of	0.01	0.01	0.00	0.00	0.00	0.00
Kuwait	0.12	0.09	0.01	0.01	0.01	0.00
Lithuania	-0.08	-0.08	0.01	0.01	0.01	0.01
Morocco	0.14	0.16	0.02	0.03	0.01	0.01
Netherlands	-0.05	-0.07	0.00	0.00	0.01	0.01
New Zealand	-0.01	-0.03	0.00	0.00	0.00	0.00
Northern Ireland	0.02	0.01	0.00	0.00	0.00	0.00
Norway (5)	0.02	0.04	0.00	0.00	0.00	0.00
Oman	-0.01	0.00	0.00	0.00	0.01	0.00
Poland	-0.02	-0.05	0.00	0.00	0.00	0.00
Portugal	0.08	0.06	0.01	0.00	0.02	0.01
Qatar	0.08	0.08	0.01	0.01	0.02	0.01
Russian Federation	0.06	0.06	0.00	0.00	0.01	0.01
Saudi Arabia	0.08	0.15	0.01	0.02	0.01	0.01
Serbia	-0.04	-0.03	0.00	0.00	0.01	0.01
Singapore	-	-	-	-	-	-
Slovak Republic	0.02	0.03	0.00	0.00	0.00	0.00
Slovenia	-0.01	0.01	0.00	0.00	0.00	0.00
South Africa (5)	0.10	-	0.01	-	0.03	-
Spain	-0.01	-0.01	0.00	0.00	0.00	0.00
Sweden	-0.01	0.05	0.00	0.00	0.00	0.00
Turkey	0.02	0.03	0.00	0.00	0.00	0.00
United Arab Emirates	0.13	0.16	0.02	0.03	0.01	0.02
United States	-0.06	-0.06	0.00	0.00	0.00	0.00
<b>International Median</b>	<b>0.01</b>	<b>0.02</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	0.13	0.14	0.02	0.02	0.01	0.01
Ontario, Canada	-0.06	-0.08	0.00	0.01	0.00	0.01
Quebec, Canada	-0.01	0.01	0.00	0.00	0.01	0.00
Norway (4)	-0.04	-0.01	0.00	0.00	0.00	0.00
Abu Dhabi, UAE	0.18	0.15	0.03	0.02	0.03	0.02
Dubai, UAE	0.05	0.08	0.00	0.01	0.00	0.00
Florida, US	0.02	-0.02	0.00	0.00	0.00	0.00

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

A dash (-) indicates comparable data not available.

# Could Do Literacy and Numeracy Tasks When Began Primary School Scale, Fourth Grade

The Could Do Literacy and Numeracy Tasks When Began Primary School (LNT) scale was created based on parents' responses to how well their children could do the tasks described below when they began primary school.

## Items in the TIMSS 2015 Could Do Literacy and Numeracy Tasks When Began Primary School, Fourth Grade

		How well could your child do the following when he/she began the first grade of primary/elementary school?			
		Very well	Moderately well	Not very well	Not at all
ASBH07A	1) Recognize most of the letters of the alphabet -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBH07B	2) Read some words -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBH07C	3) Read sentences -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBH07D	4) Read a story -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBH07E	5) Write letters of the alphabet -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBH07F	6) Write some words -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		<b>Could your child do the following when he/she began the first grade of primary/elementary school?</b>			
		Up to 100 or higher	Up to 20	Up to 10	Not at all
ASBH08A	1) Count by himself/herself -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBH08B	2) Recognize written numbers -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBH08C	3) Write numbers -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		<b>Could your child do the following when he/she began the first grade of primary/elementary school?</b>			
		Yes	No		
ASBH08D	1) Do simple addition -----	<input type="radio"/>	<input type="radio"/>		
ASBH08E	2) Do simple subtraction -----	<input type="radio"/>	<input type="radio"/>		

Very Well    Moderately Well    Not Well

11.5                      8.7

**Item Parameters for the TIMSS 2015 Could Do Literacy and Numeracy Tasks When Began Primary School Scale, Fourth Grade**

Item	delta	tau_1	tau_2	tau_3	Infit
ASBH07A	-1.03450	-1.59845	-0.12765	1.72610	0.95
ASBH07B	0.00558	-1.49311	-0.20363	1.69674	0.80
ASBH07C	0.95109	-1.27650	-0.19632	1.47282	0.84
ASBH07D	1.46628	-1.16350	-0.27247	1.43597	1.06
ASBH07E	-0.54696	-1.61915	-0.16181	1.78096	0.91
ASBH07F	0.16992	-1.52300	-0.23087	1.75387	0.87
ASBH08A	-0.41760	-2.17966	0.18999	1.98967	1.43
ASBH08B	0.05264	-2.24322	0.38476	1.85846	1.14
ASBH08C	0.30953	-2.07283	0.40542	1.66741	1.10
ASBH08D	-0.97181				1.01
ASBH08E	0.01583				1.06

**Scale Transformation Constants for the TIMSS 2015 Could Do Literacy and Numeracy Tasks When Began Primary School Scale, Fourth Grade**

Scale Transformation Constants	
A = 8.878367	Transformed Scale Score = 8.878367 + 1.114077 • Logit Scale Score
B = 1.114077	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS 2015 Could Do Literacy and Numeracy Tasks When Began Primary School Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.40776	
1	4.74405	
2	5.42885	
3	5.92038	
4	6.31822	
5	6.66220	
6	6.96984	
7	7.25206	
8	7.51564	
9	7.76514	
10	8.00345	
11	8.23377	
12	8.45736	
13	8.67576	8.7
14	8.89052	
15	9.10234	
16	9.31314	
17	9.52414	
18	9.73701	
19	9.95373	
20	10.17669	
21	10.40891	
22	10.65416	
23	10.91566	
24	11.20323	
25	11.52771	11.5
26	11.90919	
27	12.38473	
28	13.05784	
29	14.38775	

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 2015 Could Do Literacy and Numeracy Tasks When Began Primary School Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item										
			ASBH07A	ASBH07B	ASBH07C	ASBH07D	ASBH07E	ASBH07F	ASBH08A	ASBH08B	ASBH08C	ASBH08D	ASBH08E
Australia	0.91	53	0.72	0.82	0.82	0.79	0.78	0.81	0.64	0.72	0.76	0.58	0.56
Bahrain	0.87	45	0.65	0.80	0.81	0.73	0.72	0.80	0.57	0.62	0.63	0.46	0.48
Belgium (Flemish)	0.89	48	0.73	0.82	0.80	0.75	0.78	0.80	0.44	0.63	0.68	0.50	0.53
Bulgaria	0.93	61	0.83	0.86	0.82	0.76	0.83	0.85	0.73	0.77	0.78	0.65	0.67
Canada	0.90	50	0.69	0.80	0.80	0.76	0.75	0.80	0.62	0.67	0.71	0.59	0.57
Chile	0.90	50	0.73	0.80	0.83	0.77	0.77	0.81	0.57	0.63	0.64	0.58	0.58
Chinese Taipei	0.83	40	0.78	0.85	0.85	0.79	0.80	0.76	0.21	0.26	0.26	0.39	0.42
Croatia	0.90	52	0.76	0.84	0.83	0.77	0.78	0.82	0.59	0.68	0.70	0.55	0.56
Cyprus	0.90	49	0.73	0.84	0.81	0.74	0.78	0.82	0.55	0.63	0.65	0.54	0.57
Czech Republic	0.89	49	0.78	0.85	0.83	0.77	0.79	0.82	0.50	0.60	0.62	0.45	0.50
Denmark	0.87	44	0.73	0.79	0.73	0.61	0.72	0.78	0.54	0.66	0.70	0.49	0.48
England	-	-	-	-	-	-	-	-	-	-	-	-	-
Finland	0.91	53	0.75	0.83	0.82	0.78	0.78	0.83	0.66	0.72	0.72	0.49	0.52
France	0.88	46	0.65	0.77	0.76	0.68	0.71	0.76	0.60	0.69	0.69	0.56	0.52
Georgia	0.88	46	0.74	0.83	0.82	0.71	0.78	0.80	0.42	0.57	0.62	0.46	0.50
Germany	0.88	46	0.75	0.79	0.76	0.67	0.75	0.75	0.52	0.65	0.71	0.50	0.51
Hong Kong SAR	0.82	38	0.74	0.82	0.83	0.71	0.79	0.78	0.31	0.32	0.33	0.32	0.35
Hungary	0.90	50	0.80	0.86	0.82	0.72	0.81	0.80	0.49	0.67	0.72	0.43	0.44
Indonesia	0.91	53	0.76	0.83	0.82	0.76	0.76	0.80	0.66	0.71	0.71	0.58	0.57
Iran, Islamic Rep. of	0.90	51	0.77	0.82	0.81	0.74	0.81	0.82	0.43	0.62	0.64	0.63	0.62
Ireland	0.89	51	0.75	0.83	0.85	0.80	0.80	0.83	0.56	0.60	0.63	0.55	0.54
Italy	0.90	49	0.73	0.80	0.79	0.70	0.75	0.79	0.58	0.71	0.73	0.55	0.54
Japan	0.86	46	0.82	0.84	0.86	0.82	0.84	0.85	0.27	0.36	0.40	0.52	0.48
Jordan	0.89	50	0.78	0.85	0.81	0.69	0.81	0.84	0.54	0.59	0.61	0.58	0.60
Kazakhstan	0.88	46	0.69	0.79	0.80	0.76	0.73	0.78	0.57	0.64	0.67	0.46	0.48
Korea, Rep. of	0.84	47	0.85	0.89	0.92	0.90	0.90	0.89	0.21	0.19	0.22	0.38	0.41
Kuwait	0.89	48	0.74	0.82	0.82	0.74	0.77	0.82	0.56	0.63	0.63	0.48	0.48
Lithuania	0.89	48	0.75	0.81	0.80	0.75	0.73	0.75	0.60	0.65	0.65	0.53	0.54
Morocco	0.93	59	0.78	0.88	0.86	0.74	0.83	0.86	0.66	0.76	0.78	0.70	0.57
Netherlands	0.91	52	0.79	0.84	0.82	0.78	0.77	0.79	0.58	0.70	0.72	0.49	0.54
New Zealand	0.90	51	0.73	0.81	0.80	0.74	0.78	0.80	0.57	0.70	0.74	0.58	0.57
Northern Ireland	-	-	-	-	-	-	-	-	-	-	-	-	-
Norway (5)	0.90	50	0.78	0.83	0.81	0.69	0.80	0.82	0.52	0.70	0.72	0.53	0.50
Oman	0.88	47	0.69	0.79	0.79	0.71	0.73	0.80	0.61	0.65	0.65	0.52	0.54
Poland	0.90	51	0.75	0.83	0.83	0.76	0.80	0.83	0.59	0.70	0.71	0.47	0.51
Portugal	0.89	48	0.73	0.80	0.77	0.71	0.77	0.79	0.54	0.65	0.67	0.55	0.56
Qatar	0.89	48	0.68	0.81	0.80	0.73	0.76	0.82	0.59	0.65	0.66	0.50	0.52
Russian Federation	0.90	51	0.75	0.83	0.83	0.77	0.74	0.77	0.65	0.71	0.72	0.50	0.52
Saudi Arabia	0.89	49	0.70	0.83	0.82	0.73	0.78	0.83	0.53	0.61	0.62	0.55	0.57
Serbia	0.89	49	0.77	0.81	0.77	0.51	0.78	0.82	0.61	0.67	0.70	0.59	0.61
Singapore	0.88	47	0.73	0.82	0.83	0.78	0.76	0.80	0.59	0.60	0.60	0.44	0.47
Slovak Republic	0.89	48	0.75	0.82	0.76	0.67	0.78	0.79	0.52	0.66	0.72	0.54	0.55
Slovenia	0.92	54	0.80	0.84	0.82	0.74	0.81	0.84	0.60	0.72	0.76	0.55	0.56
South Africa (5)	0.86	42	0.65	0.74	0.77	0.72	0.72	0.74	0.52	0.58	0.61	0.47	0.49
Spain	0.91	53	0.76	0.80	0.83	0.78	0.78	0.82	0.64	0.67	0.70	0.59	0.55
Sweden	0.90	52	0.76	0.84	0.83	0.76	0.78	0.81	0.61	0.68	0.70	0.52	0.57
Turkey	0.92	58	0.81	0.84	0.83	0.80	0.85	0.86	0.57	0.69	0.73	0.66	0.67
United Arab Emirates	0.88	47	0.68	0.80	0.80	0.74	0.73	0.80	0.61	0.65	0.66	0.47	0.48
United States	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Benchmarking Participants</b>													
Buenos Aires, Argentina	0.91	52	0.76	0.81	0.80	0.73	0.77	0.77	0.65	0.73	0.73	0.54	0.54
Ontario, Canada	0.90	50	0.68	0.79	0.82	0.77	0.75	0.80	0.62	0.67	0.71	0.56	0.56
Quebec, Canada	0.89	48	0.68	0.79	0.76	0.69	0.73	0.77	0.65	0.68	0.72	0.59	0.55
Norway (4)	0.91	52	0.77	0.84	0.80	0.69	0.78	0.82	0.58	0.73	0.76	0.54	0.55
Abu Dhabi, UAE	0.89	47	0.70	0.82	0.81	0.75	0.74	0.81	0.61	0.64	0.65	0.45	0.45
Dubai, UAE	0.88	47	0.67	0.78	0.80	0.73	0.72	0.79	0.61	0.64	0.67	0.52	0.51
Florida, US	-	-	-	-	-	-	-	-	-	-	-	-	-

A dash (-) indicates comparable data not available.

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

**Relationship Between the TIMSS 2015 Could Do Literacy and Numeracy Tasks When Began Primary School Scale, Fourth Grade, and TIMSS 2015 Achievement**

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )	
	(r)		(r <sup>2</sup> )		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.27	0.22	0.07	0.05	0.06	0.04
Bahrain	0.27	0.27	0.08	0.07	0.06	0.06
Belgium (Flemish)	0.03	-0.05	0.00	0.00	0.00	0.00
Bulgaria	0.30	0.35	0.09	0.12	0.07	0.09
Canada	0.32	0.31	0.10	0.09	0.08	0.07
Chile	0.35	0.28	0.12	0.08	0.10	0.07
Chinese Taipei	0.30	0.26	0.09	0.07	0.07	0.05
Croatia	0.35	0.31	0.12	0.09	0.10	0.08
Cyprus	0.25	0.21	0.06	0.05	0.05	0.04
Czech Republic	0.24	0.15	0.06	0.02	0.05	0.03
Denmark	0.21	0.14	0.05	0.02	0.03	0.01
England	-	-	-	-	-	-
Finland	0.45	0.35	0.20	0.12	0.18	0.11
France	0.22	0.14	0.05	0.02	0.04	0.02
Georgia	0.20	0.19	0.04	0.04	0.03	0.03
Germany	0.15	0.07	0.02	0.00	0.01	0.00
Hong Kong SAR	0.32	0.33	0.10	0.11	0.07	0.08
Hungary	0.19	0.14	0.04	0.02	0.03	0.02
Indonesia	0.35	0.33	0.12	0.11	0.11	0.11
Iran, Islamic Rep. of	0.26	0.23	0.07	0.05	0.04	0.03
Ireland	0.41	0.36	0.16	0.13	0.14	0.11
Italy	0.18	0.09	0.03	0.01	0.02	0.01
Japan	0.35	0.29	0.13	0.08	0.11	0.08
Jordan	0.43	-	0.19	-	0.15	-
Kazakhstan	0.16	0.16	0.03	0.02	0.03	0.02
Korea, Rep. of	0.34	0.32	0.12	0.10	0.10	0.09
Kuwait	0.30	0.27	0.09	0.07	0.07	0.05
Lithuania	0.44	0.35	0.19	0.12	0.15	0.10
Morocco	0.22	0.27	0.05	0.07	0.06	0.07
Netherlands	0.25	0.23	0.06	0.05	0.04	0.04
New Zealand	0.26	0.19	0.07	0.03	0.06	0.03
Northern Ireland	-	-	-	-	-	-
Norway (5)	0.30	0.23	0.09	0.05	0.06	0.03
Oman	0.26	0.29	0.07	0.08	0.05	0.06
Poland	0.31	0.26	0.10	0.07	0.08	0.06
Portugal	0.21	0.17	0.04	0.03	0.03	0.02
Qatar	0.28	0.31	0.08	0.10	0.06	0.08
Russian Federation	0.32	0.32	0.10	0.10	0.09	0.09
Saudi Arabia	0.15	0.19	0.02	0.04	0.02	0.03
Serbia	0.39	0.33	0.15	0.11	0.13	0.10
Singapore	0.46	0.45	0.21	0.20	0.17	0.17
Slovak Republic	0.22	0.18	0.05	0.03	0.03	0.02
Slovenia	0.29	0.23	0.08	0.05	0.07	0.04
South Africa (5)	0.27	-	0.07	-	0.06	-
Spain	0.35	0.29	0.12	0.08	0.09	0.06
Sweden	0.34	0.25	0.11	0.06	0.10	0.05
Turkey	0.25	0.24	0.06	0.06	0.03	0.03
United Arab Emirates	0.29	0.32	0.09	0.10	0.07	0.09
United States	-	-	-	-	-	-
<b>International Median</b>	<b>0.28</b>	<b>0.26</b>	<b>0.08</b>	<b>0.07</b>	<b>0.06</b>	<b>0.05</b>
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	0.35	0.22	0.12	0.05	0.10	0.05
Ontario, Canada	0.41	0.34	0.17	0.12	0.13	0.09
Quebec, Canada	0.27	0.21	0.07	0.04	0.06	0.04
Norway (4)	0.31	0.21	0.09	0.04	0.08	0.03
Abu Dhabi, UAE	0.35	0.37	0.12	0.14	0.10	0.11
Dubai, UAE	0.25	0.27	0.06	0.07	0.05	0.06
Florida, US	-	-	-	-	-	-

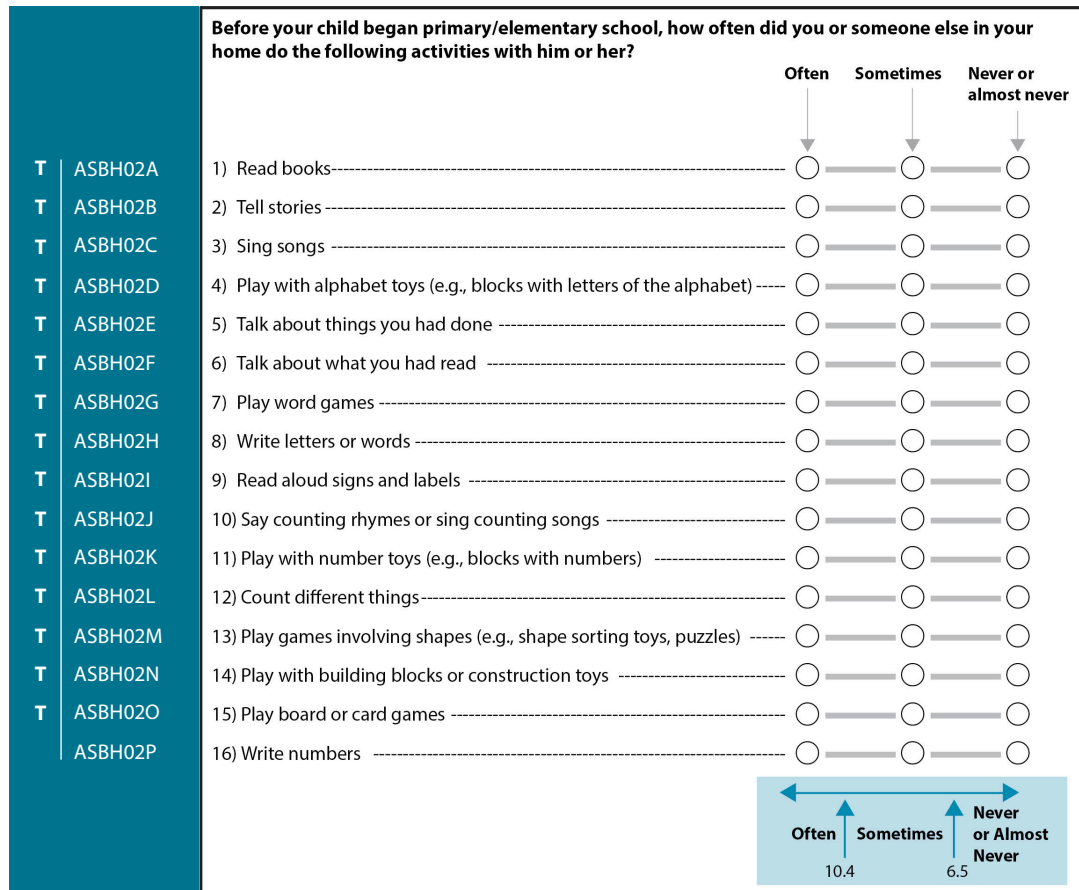
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

A dash (-) indicates comparable data not available.

# Early Literacy and Numeracy Activities Before Beginning Primary School Scale, Fourth Grade

The Early Literacy and Numeracy Activities Before Beginning Primary School (ELN) scale was created based on parents' frequency of doing the sixteen activities described below.

## Items in the TIMSS 2015 Early Literacy and Numeracy Activities Before Beginning Primary School Scale, Fourth Grade



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.

**Item Parameters for the TIMSS 2015 Early Literacy and Numeracy Activities Before Beginning Primary School Scale, Fourth Grade**

Item	delta	tau_1	tau_2	Infit
ASBH02A	-0.32169	-1.40660	1.40660	1.01
ASBH02B	-0.20513	-1.37557	1.37557	1.00
ASBH02C	0.10661	-1.03171	1.03171	1.17
ASBH02D	0.25379	-1.05591	1.05591	0.94
ASBH02E	-0.76183	-1.25727	1.25727	1.09
ASBH02F	0.35496	-1.37009	1.37009	1.03
ASBH02G	0.47225	-1.25920	1.25920	0.93
ASBH02H	0.01255	-1.16783	1.16783	0.99
ASBH02I	0.19765	-1.01939	1.01939	1.00
ASBH02J	0.48348	-1.02734	1.02734	1.01
ASBH02K	0.39214	-1.07179	1.07179	0.89
ASBH02L	-0.60000	-1.25574	1.25574	0.90
ASBH02M	-0.28391	-1.03163	1.03163	0.95
ASBH02N	-0.32170	-0.85306	0.85306	1.02
ASBH02O	0.30628	-1.16501	1.16501	1.08
ASBH02P	-0.08545	-1.21120	1.21120	1.02

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

**Scale Transformation Constants for the TIMSS 2015 Early Literacy and Numeracy Activities Before Beginning Primary School Scale, Fourth Grade**

Scale Transformation Constants	
A = 8.435922	Transformed Scale Score = 8.435922 + 1.454568 • Logit Scale Score
B = 1.454568	

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS 2015 for the TIMSS 2015 Early Literacy and Numeracy Activities Before Beginning Primary School Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	1.52118	
1	3.21261	
2	4.05217	
3	4.63893	
4	5.10326	
5	5.49791	
6	5.84602	
7	6.16205	
8	6.45508	6.5
9	6.73118	
10	6.99414	
11	7.24849	
12	7.49560	
13	7.73744	
14	7.97558	
15	8.21137	
16	8.44607	
17	8.68032	
18	8.91562	
19	9.15294	
20	9.39354	
21	9.63897	
22	9.89110	
23	10.15236	
24	10.42416	10.4
25	10.71309	
26	11.02427	
27	11.36672	
28	11.75490	
29	12.21205	
30	12.79071	
31	13.62125	
32	15.30297	

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 2015 Early Literacy and Numeracy Activities Before Beginning Primary School Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item															
			ASBH02A	ASBH02B	ASBH02C	ASBH02D	ASBH02E	ASBH02F	ASBH02G	ASBH02H	ASBH02J	ASBH02I	ASBH02K	ASBH02L	ASBH02M	ASBH02N	ASBH02O	ASBH02P
Australia	0.90	40	0.59	0.60	0.54	0.70	0.48	0.61	0.70	0.66	0.65	0.68	0.73	0.68	0.66	0.55	0.57	0.64
Bahrain	0.84	30	0.47	0.48	0.36	0.62	0.43	0.44	0.61	0.60	0.56	0.56	0.69	0.60	0.59	0.57	0.56	0.57
Belgium (Flemish)	0.84	29	0.45	0.44	0.45	0.60	0.35	0.43	0.65	0.59	0.59	0.62	0.66	0.64	0.53	0.46	0.51	0.57
Bulgaria	0.93	47	0.69	0.67	0.45	0.75	0.61	0.71	0.70	0.76	0.68	0.63	0.75	0.74	0.75	0.69	0.63	0.73
Canada	0.89	38	0.57	0.57	0.47	0.69	0.46	0.59	0.68	0.66	0.62	0.65	0.72	0.68	0.66	0.55	0.51	0.63
Chile	0.88	35	0.51	0.55	0.45	0.66	0.44	0.56	0.67	0.65	0.56	0.67	0.72	0.58	0.63	0.60	0.49	0.61
Chinese Taipei	0.90	40	0.61	0.61	0.52	0.65	0.52	0.54	0.64	0.56	0.65	0.73	0.74	0.74	0.72	0.70	0.48	0.64
Croatia	0.84	30	0.51	0.53	0.38	0.63	0.42	0.59	0.58	0.59	0.59	0.55	0.68	0.59	0.58	0.47	0.43	0.59
Cyprus	0.89	37	0.56	0.54	0.48	0.70	0.46	0.59	0.68	0.64	0.57	0.61	0.74	0.65	0.65	0.58	0.66	0.61
Czech Republic	0.82	27	0.38	0.45	0.40	0.61	0.43	0.54	0.54	0.58	0.52	0.53	0.67	0.61	0.51	0.45	0.44	0.60
Denmark	0.84	30	0.49	0.52	0.44	0.61	0.44	0.61	0.65	0.61	0.55	0.61	0.61	0.60	0.49	0.41	0.44	0.58
England	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Finland	0.84	29	0.45	0.50	0.39	0.59	0.41	0.57	0.59	0.62	0.59	0.52	0.62	0.62	0.54	0.43	0.50	0.63
France	0.83	29	0.50	0.49	0.43	0.63	0.38	0.50	0.61	0.61	0.52	0.58	0.65	0.62	0.54	0.45	0.41	0.58
Georgia	0.81	27	0.55	0.44	0.33	0.61	0.34	0.46	0.57	0.56	0.55	0.55	0.69	0.53	0.56	0.59	0.36	0.53
Germany	0.83	28	0.41	0.50	0.42	0.59	0.34	0.48	0.62	0.57	0.59	0.61	0.67	0.59	0.53	0.42	0.45	0.56
Hong Kong SAR	0.88	37	0.58	0.59	0.51	0.68	0.42	0.49	0.67	0.54	0.60	0.69	0.73	0.69	0.70	0.65	0.48	0.59
Hungary	0.82	28	0.44	0.46	0.38	0.64	0.37	0.47	0.63	0.57	0.57	0.60	0.68	0.57	0.52	0.41	0.44	0.57
Indonesia	0.88	36	0.51	0.49	0.51	0.63	0.56	0.61	0.65	0.63	0.59	0.64	0.64	0.63	0.65	0.63	0.59	0.59
Iran, Islamic Rep. of	0.88	35	0.58	0.52	0.50	0.64	0.47	0.55	0.66	0.63	0.62	0.58	0.67	0.60	0.63	0.58	0.62	0.59
Ireland	0.88	36	0.53	0.55	0.47	0.67	0.43	0.55	0.66	0.64	0.63	0.65	0.72	0.67	0.68	0.58	0.51	0.64
Italy	0.83	29	0.39	0.46	0.36	0.68	0.34	0.47	0.57	0.64	0.56	0.59	0.67	0.60	0.56	0.50	0.40	0.60
Japan	0.87	33	0.49	0.52	0.50	0.58	0.49	0.55	0.65	0.65	0.61	0.61	0.64	0.67	0.58	0.50	0.50	0.66
Jordan	0.86	33	0.44	0.52	0.45	0.64	0.50	0.46	0.62	0.63	0.56	0.61	0.69	0.59	0.59	0.58	0.59	0.61
Kazakhstan	0.85	31	0.53	0.45	0.43	0.62	0.47	0.53	0.57	0.55	0.53	0.56	0.68	0.56	0.62	0.59	0.62	0.56
Korea, Rep. of	0.90	40	0.55	0.48	0.48	0.65	0.50	0.59	0.72	0.69	0.70	0.72	0.75	0.75	0.66	0.59	0.48	0.68
Kuwait	0.85	31	0.46	0.45	0.34	0.63	0.40	0.44	0.60	0.61	0.56	0.57	0.69	0.59	0.63	0.56	0.56	0.62
Lithuania	0.84	30	0.54	0.48	0.39	0.66	0.48	0.60	0.63	0.59	0.42	0.56	0.70	0.59	0.55	0.53	0.41	0.56
Morocco	0.92	45	0.67	0.63	0.57	0.71	0.62	0.67	0.70	0.74	0.70	0.65	0.74	0.60	0.69	0.66	0.67	0.72
Netherlands	0.86	32	0.44	0.51	0.45	0.70	0.39	0.48	0.71	0.65	0.52	0.65	0.69	0.65	0.55	0.40	0.49	0.61
New Zealand	0.90	39	0.54	0.59	0.53	0.68	0.49	0.61	0.69	0.65	0.65	0.69	0.71	0.69	0.66	0.57	0.58	0.63
Northern Ireland	0.89	38	0.54	0.56	0.51	0.67	0.48	0.63	0.70	0.65	0.64	0.63	0.70	0.62	0.66	0.60	0.59	0.61
Norway (5)	0.87	34	0.52	0.54	0.44	0.67	0.45	0.61	0.70	0.63	0.59	0.64	0.69	0.63	0.55	0.42	0.51	0.60
Oman	0.83	29	0.49	0.47	0.21	0.61	0.38	0.51	0.59	0.58	0.59	0.50	0.65	0.52	0.57	0.58	0.60	0.57
Poland	0.85	32	0.48	0.49	0.46	0.65	0.50	0.59	0.62	0.58	0.58	0.59	0.71	0.61	0.51	0.47	0.48	0.62
Portugal	0.86	32	0.57	0.57	0.45	0.64	0.41	0.54	0.65	0.59	0.49	0.57	0.71	0.65	0.62	0.56	0.47	0.55
Qatar	0.87	33	0.50	0.52	0.38	0.63	0.47	0.49	0.61	0.60	0.58	0.60	0.70	0.65	0.65	0.59	0.55	0.62
Russian Federation	0.88	36	0.60	0.50	0.46	0.66	0.57	0.60	0.63	0.63	0.52	0.59	0.70	0.61	0.61	0.60	0.58	0.64
Saudi Arabia	0.85	31	0.43	0.47	0.22	0.62	0.49	0.45	0.65	0.62	0.57	0.55	0.71	0.53	0.60	0.59	0.62	0.61
Serbia	0.87	33	0.53	0.55	0.51	0.63	0.48	0.55	0.62	0.60	0.58	0.59	0.67	0.62	0.59	0.56	0.55	0.58
Singapore	0.91	43	0.62	0.62	0.55	0.69	0.53	0.58	0.66	0.68	0.69	0.69	0.74	0.74	0.66	0.56	0.66	0.66
Slovak Republic	0.86	33	0.51	0.52	0.36	0.65	0.52	0.61	0.60	0.59	0.60	0.61	0.69	0.62	0.62	0.55	0.46	0.61
Slovenia	0.86	32	0.47	0.55	0.51	0.65	0.46	0.60	0.64	0.61	0.58	0.63	0.65	0.60	0.54	0.37	0.44	0.64
South Africa (5)	0.89	36	0.61	0.50	0.44	0.63	0.52	0.61	0.63	0.64	0.65	0.60	0.68	0.61	0.67	0.60	0.56	0.60
Spain	0.84	30	0.50	0.53	0.46	0.65	0.35	0.44	0.61	0.61	0.55	0.57	0.69	0.54	0.63	0.57	0.42	0.58
Sweden	0.85	32	0.46	0.49	0.43	0.65	0.43	0.57	0.67	0.63	0.61	0.63	0.70	0.60	0.56	0.44	0.45	0.60
Turkey	0.90	40	0.64	0.64	0.47	0.61	0.60	0.67	0.67	0.65	0.69	0.65	0.68	0.65	0.70	0.56	0.54	0.65
United Arab Emirates	0.86	33	0.46	0.48	0.38	0.64	0.46	0.48	0.60	0.60	0.56	0.62	0.70	0.65	0.66	0.62	0.54	0.61
United States	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Benchmarking Participants</b>																		
Buenos Aires, Argentina	0.85	31	0.48	0.48	0.44	0.69	0.41	0.51	0.69	0.63	0.46	0.53	0.67	0.49	0.63	0.57	0.52	0.54
Ontario, Canada	0.89	38	0.57	0.59	0.47	0.69	0.48	0.60	0.69	0.65	0.64	0.65	0.73	0.68	0.68	0.59	0.55	0.61
Quebec, Canada	0.87	34	0.54	0.55	0.43	0.67	0.43	0.53	0.66	0.64	0.58	0.64	0.69	0.66	0.63	0.48	0.48	0.62
Norway (4)	0.86	33	0.50	0.47	0.46	0.68	0.41	0.62	0.68	0.65	0.56	0.64	0.72	0.62	0.52	0.42	0.47	0.62
Abu Dhabi, UAE	0.86	33	0.46	0.48	0.35	0.63	0.47	0.48	0.62	0.60	0.55	0.62	0.70	0.66	0.66	0.64	0.57	0.64
Dubai, UAE	0.87	34	0.52	0.51	0.42	0.65	0.46	0.49	0.61	0.59	0.60	0.63	0.71	0.66	0.67	0.60	0.49	0.58
Florida, US	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

A dash (-) indicates comparable data not available.

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



**Relationship Between the TIMSS 2015 Early Literacy and Numeracy Activities Before Beginning Primary School Scale, Fourth Grade, and TIMSS 2015 Achievement**

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )	
	(r)		(r)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.15	0.19	0.02	0.04	0.02	0.03
Bahrain	0.19	0.19	0.04	0.04	0.03	0.03
Belgium (Flemish)	0.10	0.11	0.01	0.01	0.01	0.01
Bulgaria	0.25	0.33	0.06	0.11	0.05	0.10
Canada	0.13	0.19	0.02	0.04	0.01	0.03
Chile	0.21	0.22	0.05	0.05	0.03	0.03
Chinese Taipei	0.21	0.22	0.04	0.05	0.04	0.04
Croatia	0.19	0.21	0.04	0.04	0.03	0.03
Cyprus	0.18	0.24	0.03	0.06	0.03	0.04
Czech Republic	0.08	0.07	0.01	0.00	0.01	0.00
Denmark	0.14	0.12	0.02	0.01	0.01	0.01
England	-	-	-	-	-	-
Finland	0.12	0.16	0.01	0.03	0.01	0.02
France	0.16	0.15	0.03	0.02	0.02	0.02
Georgia	0.07	0.10	0.00	0.01	0.01	0.01
Germany	0.08	0.08	0.01	0.01	0.01	0.01
Hong Kong SAR	0.20	0.20	0.04	0.04	0.04	0.04
Hungary	0.14	0.13	0.02	0.02	0.03	0.03
Indonesia	0.17	0.15	0.03	0.02	0.02	0.02
Iran, Islamic Rep. of	0.25	0.25	0.06	0.06	0.05	0.04
Ireland	0.20	0.21	0.04	0.04	0.03	0.03
Italy	0.13	0.15	0.02	0.02	0.01	0.01
Japan	0.18	0.15	0.03	0.02	0.02	0.02
Jordan	0.25	-	0.06	-	0.05	-
Kazakhstan	0.12	0.14	0.01	0.02	0.01	0.01
Korea, Rep. of	0.27	0.24	0.07	0.06	0.06	0.05
Kuwait	0.15	0.17	0.02	0.03	0.02	0.02
Lithuania	0.11	0.09	0.01	0.01	0.01	0.01
Morocco	0.12	0.17	0.01	0.03	0.02	0.03
Netherlands	0.01	0.06	0.00	0.00	0.00	0.01
New Zealand	0.21	0.23	0.04	0.05	0.04	0.04
Northern Ireland	0.17	0.20	0.03	0.04	0.01	0.02
Norway (5)	0.18	0.18	0.03	0.03	0.02	0.02
Oman	0.17	0.20	0.03	0.04	0.02	0.03
Poland	0.13	0.13	0.02	0.02	0.01	0.01
Portugal	0.17	0.19	0.03	0.04	0.02	0.03
Qatar	0.23	0.23	0.05	0.05	0.04	0.04
Russian Federation	0.12	0.16	0.01	0.03	0.01	0.01
Saudi Arabia	0.05	0.09	0.00	0.01	0.00	0.01
Serbia	0.20	0.20	0.04	0.04	0.05	0.06
Singapore	0.19	0.22	0.04	0.05	0.03	0.04
Slovak Republic	0.14	0.12	0.02	0.02	0.02	0.02
Slovenia	0.10	0.11	0.01	0.01	0.01	0.01
South Africa (5)	0.23	-	0.05	-	0.05	-
Spain	0.18	0.20	0.03	0.04	0.03	0.03
Sweden	0.15	0.14	0.02	0.02	0.01	0.01
Turkey	0.38	0.38	0.15	0.15	0.13	0.13
United Arab Emirates	0.21	0.23	0.05	0.05	0.04	0.04
United States	-	-	-	-	-	-
<b>International Median</b>	<b>0.17</b>	<b>0.18</b>	<b>0.03</b>	<b>0.03</b>	<b>0.02</b>	<b>0.03</b>
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	0.25	0.24	0.06	0.06	0.06	0.03
Ontario, Canada	0.15	0.19	0.02	0.04	0.02	0.03
Quebec, Canada	0.16	0.18	0.02	0.03	0.02	0.02
Norway (4)	0.17	0.15	0.03	0.02	0.03	0.03
Abu Dhabi, UAE	0.20	0.21	0.04	0.04	0.03	0.03
Dubai, UAE	0.22	0.23	0.05	0.05	0.04	0.04
Florida, US	-	-	-	-	-	-

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

A dash (-) indicates comparable data not available.

# Home Resources for Learning Scale, Fourth Grade

The Home Resources for Learning (HRL) scale was created based on students' and parents' responses concerning the availability of five resources described below.

## Items in the TIMSS 2015 Home Resources for Learning Scale, Fourth Grade

T	ASBG04	<p><b>Number of books in the home (students):</b></p> <p>1) 0-10 2) 11-25 3) 26-100 4) 101-200 5) More than 200</p>	<p><b>Number of children's books in the home (parents):</b></p> <p>1) 0-10 2) 11-25 3) 26-50 4) 51-100 5) More than 100</p>	T	ASBH14
T	ASDG05S <sup>1</sup>	<p><b>Number of home study supports (students):</b></p> <p>1) None 2) Internet connection or own room 3) Both</p>	<p><b>Highest level of education of either parent (parents):</b></p> <p>1) Finished some primary or lower secondary or did not go to school 2) Finished lower secondary 3) Finished upper secondary 4) Finished post-secondary education 5) Finished university or higher</p>	T	ASDHEDUP <sup>1</sup>
T	ASDHOCCP <sup>1</sup>	<p><b>Highest level of occupation of either parent (parents):</b></p> <p>1) Has never worked outside home for pay, general laborer, or semi-professional (skilled agricultural or fishery worker, craft or trade worker, plant or machine operator) 2) Clerical (clerk or service or sales worker) 3) Small business owner 4) Professional (corporate manager or senior official, professional, or technician or associate professional)</p>			

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.

1 Derived variable. For more details, see Supplement 3 of the User Guide for the [TIMSS 2015 International Database](#).



**Item Parameters for the TIMSS 2015 Home Resources for Learning Scale, Fourth Grade**

Item	delta	tau_1	tau_2	tau_3	tau_4	Infit
ASBG04	0.50877	-1.25665	-0.44740	0.93994	0.76411	1.01
ASBH14	0.58514	-0.74466	-0.46122	0.43512	0.77076	0.96
ASDG05S	-0.78604	-0.78596	0.78596			1.08
ASDHEDUP	-0.40313	-0.37335	-0.98713	0.84623	0.51425	0.94
ASDHOCCP	0.09526	-0.32617	0.95244	-0.62627		1.02

**Scale Transformation Constants for the TIMSS 2015 Home Resources for Learning Scale, Fourth Grade**

Scale Transformation Constants	
A = 9.487504	Transformed Scale Score = 9.487504 + 1.844284 • Logit Scale Score
B = 1.844284	

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 Home Resources for Learning Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.68952	
1	5.69990	
2	6.65832	
3	7.34373	7.4
4	7.90391	
5	8.38881	
6	8.82316	
7	9.21608	
8	9.57946	
9	9.92615	
10	10.27747	
11	10.63489	
12	11.01616	
13	11.43841	
14	11.92828	11.9
15	12.52570	
16	13.35902	
17	15.03850	

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 2015 Home Resources for Learning  
Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item				
			ASB604	ASBH14	ASD025S	ASDHEDUP	ASDH0CCP
Australia	0.62	41	0.66	0.66	0.33	0.74	0.73
Bahrain	0.55	36	0.50	0.64	0.26	0.75	0.71
Belgium (Flemish)	0.70	47	0.67	0.72	0.34	0.79	0.79
Bulgaria	0.83	60	0.78	0.82	0.48	0.89	0.82
Canada	0.56	37	0.70	0.70	0.33	0.61	0.62
Chile	0.66	43	0.52	0.68	0.41	0.82	0.76
Chinese Taipei	0.71	48	0.78	0.80	0.21	0.77	0.72
Croatia	0.68	46	0.68	0.75	0.22	0.79	0.76
Cyprus	0.62	41	0.65	0.73	0.25	0.76	0.67
Czech Republic	0.67	44	0.71	0.74	0.20	0.76	0.73
Denmark	0.64	42	0.71	0.72	0.29	0.68	0.72
England	-	-	-	-	-	-	-
Finland	0.60	39	0.65	0.69	0.10	0.75	0.72
France	0.72	48	0.72	0.76	0.32	0.81	0.74
Georgia	0.66	44	0.68	0.75	0.36	0.74	0.70
Germany	0.65	43	0.73	0.74	0.09	0.76	0.69
Hong Kong SAR	0.76	52	0.75	0.82	0.29	0.82	0.78
Hungary	0.80	57	0.78	0.84	0.27	0.87	0.83
Indonesia	0.58	37	0.46	0.55	0.37	0.79	0.76
Iran, Islamic Rep. of	0.74	49	0.69	0.72	0.57	0.79	0.70
Ireland	0.68	45	0.72	0.75	0.17	0.77	0.75
Italy	0.67	44	0.66	0.74	0.11	0.80	0.77
Japan	0.61	40	0.68	0.74	0.30	0.71	0.62
Jordan	0.55	36	0.50	0.49	0.50	0.74	0.71
Kazakhstan	0.61	40	0.63	0.63	0.54	0.68	0.65
Korea, Rep. of	0.63	41	0.72	0.72	0.38	0.73	0.59
Kuwait	0.42	31	0.45	0.56	0.12	0.71	0.70
Lithuania	0.72	48	0.70	0.76	0.39	0.78	0.75
Morocco	0.71	45	0.68	0.63	0.62	0.77	0.65
Netherlands	0.62	41	0.63	0.68	0.01	0.81	0.72
New Zealand	0.65	42	0.68	0.72	0.34	0.73	0.71
Northern Ireland	0.70	46	0.72	0.75	0.17	0.80	0.76
Norway (5)	0.65	43	0.66	0.73	0.25	0.78	0.73
Oman	0.59	38	0.42	0.59	0.36	0.82	0.76
Poland	0.73	49	0.68	0.74	0.32	0.84	0.80
Portugal	0.75	50	0.72	0.78	0.24	0.82	0.80
Qatar	0.53	35	0.46	0.66	0.26	0.73	0.71
Russian Federation	0.65	42	0.65	0.72	0.31	0.75	0.72
Saudi Arabia	0.50	33	0.36	0.51	0.33	0.79	0.74
Serbia	0.71	47	0.67	0.77	0.26	0.80	0.77
Singapore	0.68	45	0.69	0.71	0.33	0.78	0.72
Slovak Republic	0.77	53	0.78	0.82	0.28	0.82	0.79
Slovenia	0.65	43	0.62	0.72	0.06	0.80	0.77
South Africa (5)	0.62	39	0.57	0.55	0.58	0.69	0.70
Spain	0.69	46	0.67	0.74	0.15	0.83	0.78
Sweden	0.67	46	0.71	0.76	0.42	0.74	0.70
Turkey	0.74	49	0.67	0.74	0.59	0.80	0.69
United Arab Emirates	0.58	37	0.58	0.71	0.33	0.68	0.66
United States	-	-	-	-	-	-	-
<b>Benchmarking Participants</b>							
Buenos Aires, Argentina	0.70	46	0.60	0.75	0.31	0.80	0.81
Ontario, Canada	0.55	36	0.65	0.66	0.35	0.62	0.65
Quebec, Canada	0.62	40	0.74	0.75	0.34	0.66	0.60
Norway (4)	0.64	43	0.65	0.69	0.27	0.80	0.75
Abu Dhabi, UAE	0.59	38	0.56	0.70	0.30	0.72	0.69
Dubai, UAE	0.59	38	0.69	0.78	0.36	0.61	0.56
Florida, US	-	-	-	-	-	-	-

A dash (-) indicates comparable data not available.

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

**Relationship Between the TIMSS 2015 Home Resources for Learning Scale, Fourth Grade, and TIMSS 2015 Achievement**

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )	
	(r)		(r)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.38	0.40	0.15	0.16	0.11	0.12
Bahrain	0.30	0.28	0.09	0.08	0.05	0.04
Belgium (Flemish)	0.43	0.50	0.18	0.25	0.11	0.16
Bulgaria	0.35	0.46	0.13	0.22	0.10	0.16
Canada	0.33	0.39	0.11	0.15	0.07	0.09
Chile	0.34	0.37	0.11	0.13	0.06	0.07
Chinese Taipei	0.39	0.42	0.15	0.18	0.10	0.12
Croatia	0.40	0.41	0.16	0.16	0.08	0.09
Cyprus	0.34	0.39	0.12	0.15	0.07	0.08
Czech Republic	0.47	0.46	0.22	0.21	0.14	0.13
Denmark	0.35	0.37	0.12	0.13	0.09	0.10
England	-	-	-	-	-	-
Finland	0.33	0.36	0.11	0.13	0.08	0.08
France	0.46	0.46	0.21	0.21	0.15	0.15
Georgia	0.35	0.38	0.12	0.15	0.06	0.07
Germany	0.43	0.47	0.18	0.22	0.11	0.14
Hong Kong SAR	0.40	0.39	0.16	0.15	0.12	0.12
Hungary	0.57	0.56	0.33	0.32	0.25	0.24
Indonesia	0.29	0.30	0.08	0.09	0.05	0.06
Iran, Islamic Rep. of	0.46	0.45	0.21	0.20	0.14	0.14
Ireland	0.45	0.45	0.20	0.21	0.13	0.14
Italy	0.34	0.39	0.11	0.15	0.06	0.07
Japan	0.41	0.38	0.17	0.14	0.08	0.07
Jordan	0.38	-	0.14	-	0.06	-
Kazakhstan	0.19	0.21	0.04	0.04	0.02	0.02
Korea, Rep. of	0.47	0.46	0.23	0.22	0.16	0.15
Kuwait	0.24	0.24	0.06	0.06	0.02	0.02
Lithuania	0.45	0.46	0.21	0.21	0.11	0.11
Morocco	0.15	0.15	0.02	0.02	0.02	0.03
Netherlands	0.25	0.35	0.06	0.12	0.04	0.08
New Zealand	0.43	0.49	0.18	0.24	0.12	0.16
Northern Ireland	0.49	0.51	0.24	0.26	0.17	0.19
Norway (5)	0.35	0.37	0.12	0.14	0.09	0.10
Oman	0.24	0.24	0.06	0.06	0.03	0.03
Poland	0.44	0.44	0.19	0.19	0.13	0.13
Portugal	0.40	0.38	0.16	0.14	0.11	0.09
Qatar	0.39	0.37	0.15	0.14	0.08	0.07
Russian Federation	0.32	0.39	0.11	0.15	0.05	0.07
Saudi Arabia	0.12	0.17	0.01	0.03	0.01	0.02
Serbia	0.44	0.43	0.19	0.19	0.11	0.11
Singapore	0.48	0.52	0.23	0.28	0.15	0.18
Slovak Republic	0.53	0.55	0.28	0.31	0.19	0.21
Slovenia	0.41	0.39	0.17	0.15	0.10	0.09
South Africa (5)	0.41	-	0.17	-	0.12	-
Spain	0.40	0.40	0.16	0.16	0.10	0.11
Sweden	0.44	0.48	0.19	0.23	0.13	0.16
Turkey	0.51	0.48	0.26	0.23	0.19	0.17
United Arab Emirates	0.42	0.42	0.18	0.17	0.09	0.08
United States	-	-	-	-	-	-
<b>International Median</b>	<b>0.40</b>	<b>0.39</b>	<b>0.16</b>	<b>0.16</b>	<b>0.10</b>	<b>0.10</b>
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	0.45	0.32	0.20	0.10	0.10	0.07
Ontario, Canada	0.35	0.38	0.12	0.14	0.08	0.10
Quebec, Canada	0.34	0.38	0.12	0.14	0.07	0.08
Norway (4)	0.40	0.45	0.16	0.20	0.10	0.13
Abu Dhabi, UAE	0.45	0.43	0.20	0.18	0.09	0.08
Dubai, UAE	0.41	0.39	0.17	0.15	0.10	0.08
Florida, US	-	-	-	-	-	-

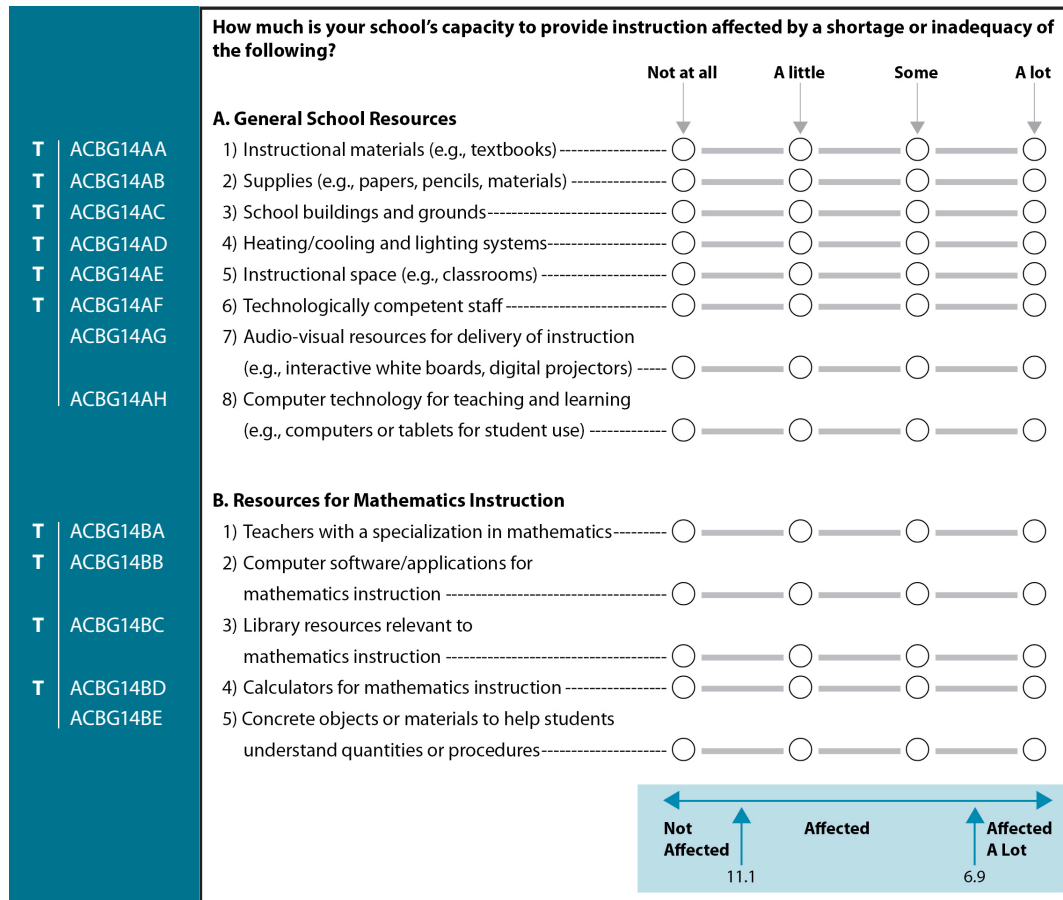
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

A dash (-) indicates comparable data not available.

# Instruction Affected by Mathematics Resource Shortages–Principals’ Reports Scale, Fourth Grade

The Instruction Affected by Mathematics Resource Shortages–Principals’ Reports (MRS) scale was created based on principals’ responses concerning thirteen school and classroom resources described below.

## Items in the TIMSS 2015 Instruction Affected by Mathematics Resource Shortages–Principals’ Reports Scale, Fourth Grade



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.

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

Item	delta	tau_1	tau_2	tau_3	Infit
ACBG14AA	-0.11368	-0.14996	-0.16025	0.31021	0.88
ACBG14AB	-0.41885	-0.32199	0.24004	0.08195	0.86
ACBG14AC	0.07784	-0.85921	0.21812	0.64109	1.07
ACBG14AD	-0.21398	-0.48151	0.11638	0.36513	0.89
ACBG14AE	0.19673	-0.49556	-0.02468	0.52024	1.03
ACBG14AF	0.14704	-1.22945	-0.05377	1.28322	0.98
ACBG14AG	0.13794	-1.04602	0.15706	0.88896	0.97
ACBG14AH	0.36809	-1.19595	0.07061	1.12534	1.07
ACBG14BA	-0.05349	-0.40689	-0.11097	0.51786	1.04
ACBG14BB	0.18965	-1.45960	0.04141	1.41819	1.01
ACBG14BC	0.10994	-1.52282	0.10727	1.41555	1.08
ACBG14BD	-0.54492	-0.79258	0.20495	0.58763	1.28
ACBG14BE	0.11769	-1.09911	-0.18316	1.28227	0.87

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

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

Scale Transformation Constants	
A = 8.983616	Transformed Scale Score = 8.983616 + 1.470593 • Logit Scale Score
B = 1.470593	

**Equivalence Table of Raw and Transformed Scale Scores for the  
TIMSS 2015 Instruction Affected by Mathematics Resources Shortages -  
Principals' Reports Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	2.83270	
1	4.48826	
2	5.27602	
3	5.80449	
4	6.20549	
5	6.53026	
6	6.80414	6.9
7	7.04261	
8	7.25461	
9	7.44645	
10	7.62264	
11	7.78577	
12	7.94054	
13	8.08763	
14	8.22857	
15	8.36472	
16	8.49731	
17	8.62738	
18	8.75594	
19	8.88387	
20	9.01304	
21	9.14126	
22	9.27241	
23	9.40635	
24	9.54404	
25	9.68650	
26	9.83482	
27	9.99025	
28	10.15341	
29	10.32815	
30	10.51618	
31	10.72077	
32	10.94627	
33	11.19873	11.1
34	11.48704	
35	11.82627	
36	12.24151	
37	12.78364	
38	13.58356	
39	15.25009	

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 2015 Instruction Affected by Mathematics 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	ACBG14BA	ACBG14BB	ACBG14BC	ACBG14BD	ACBG14BE
Australia	0.89	43	0.68	0.61	0.53	0.45	0.54	0.75	0.69	0.72	0.56	0.75	0.69	0.71	0.77
Bahrain	0.95	62	0.90	0.87	0.83	0.90	0.90	0.79	0.90	0.78	0.81	0.68	0.55	0.44	0.74
Belgium (Flemish)	0.86	40	0.57	0.57	0.68	0.62	0.59	0.65	0.78	0.79	0.52	0.67	0.55	0.49	0.66
Bulgaria	0.82	35	0.67	0.75	0.71	0.66	0.44	0.54	0.69	0.63	0.59	0.41	0.56	0.37	0.57
Canada	0.87	39	0.67	0.62	0.59	0.47	0.62	0.66	0.69	0.67	0.46	0.63	0.75	0.60	0.66
Chile	0.91	49	0.69	0.72	0.70	0.57	0.74	0.70	0.79	0.71	0.67	0.63	0.74	0.68	0.76
Chinese Taipei	0.90	47	0.69	0.68	0.67	0.81	0.70	0.71	0.71	0.71	0.68	0.66	0.64	0.50	0.68
Croatia	0.88	41	0.64	0.67	0.59	0.66	0.65	0.63	0.70	0.61	0.52	0.67	0.66	0.61	0.73
Cyprus	0.91	50	0.84	0.72	0.71	0.72	0.77	0.79	0.74	0.54	0.57	0.72	0.59	0.64	0.75
Czech Republic	0.76	28	0.57	0.57	0.46	0.48	0.52	0.57	0.64	0.61	0.46	0.49	0.27	0.45	0.62
Denmark	0.85	36	0.76	0.61	0.66	0.56	0.61	0.54	0.64	0.73	0.43	0.64	0.49	0.50	0.55
England	0.87	41	0.75	0.63	0.40	0.50	0.44	0.65	0.72	0.70	0.59	0.72	0.70	0.64	0.73
Finland	0.80	30	0.51	0.57	0.66	0.66	0.69	0.56	0.58	0.66	0.48	0.46	0.30	0.31	0.53
France	0.85	35	0.73	0.63	0.49	0.53	0.48	0.53	0.66	0.62	0.65	0.63	0.60	0.58	0.56
Georgia	0.88	43	0.54	0.76	0.63	0.58	0.66	0.69	0.68	0.73	0.70	0.71	0.69	0.43	0.62
Germany	0.83	34	0.65	0.65	0.63	0.45	0.66	0.52	0.71	0.65	0.29	0.60	0.52	0.44	0.63
Hong Kong SAR	0.91	50	0.77	0.80	0.64	0.78	0.74	0.74	0.77	0.64	0.63	0.75	0.65	0.48	0.75
Hungary	0.90	45	0.65	0.73	0.76	0.70	0.65	0.60	0.68	0.71	0.61	0.65	0.58	0.58	0.79
Indonesia	0.86	37	0.63	0.60	0.49	0.70	0.45	0.67	0.67	0.69	0.42	0.67	0.66	0.56	0.63
Iran, Islamic Rep. of	0.84	36	0.75	0.77	0.71	0.81	0.79	0.68	0.52	0.13	0.65	0.42	0.35	0.31	0.46
Ireland	0.86	39	0.67	0.60	0.55	0.59	0.56	0.52	0.64	0.54	0.61	0.72	0.69	0.72	0.67
Italy	0.79	29	0.60	0.60	0.58	0.54	0.64	0.48	0.51	0.54	0.34	0.43	0.46	0.55	0.61
Japan	0.92	52	0.76	0.76	0.76	0.74	0.83	0.66	0.66	0.72	0.59	0.59	0.69	0.75	0.84
Jordan	0.88	42	0.64	0.72	0.73	0.71	0.73	0.69	0.56	0.67	0.65	0.62	0.51	0.50	0.64
Kazakhstan	0.94	58	0.80	0.71	0.69	0.79	0.79	0.79	0.75	0.67	0.83	0.73	0.86	0.63	0.79
Korea, Rep. of	0.90	48	0.76	0.75	0.77	0.73	0.78	0.83	0.66	0.79	0.53	0.56	0.60	0.49	0.66
Kuwait	0.91	50	0.82	0.75	0.75	0.84	0.86	0.72	0.37	0.56	0.83	0.61	0.55	0.48	0.83
Lithuania	0.90	46	0.73	0.74	0.64	0.64	0.57	0.71	0.73	0.63	0.52	0.67	0.69	0.63	0.83
Morocco	0.84	39	-0.05	0.29	0.46	0.57	-0.11	0.75	0.66	0.75	0.78	0.75	0.79	0.82	0.56
Netherlands	0.82	33	0.50	0.50	0.55	0.66	0.52	0.56	0.62	0.63	0.42	0.71	0.60	0.55	0.55
New Zealand	0.87	39	0.70	0.65	0.58	0.52	0.50	0.57	0.62	0.66	0.59	0.72	0.65	0.67	0.66
Northern Ireland	0.85	38	0.74	0.72	0.59	0.59	0.62	0.68	0.51	0.60	0.61	0.65	0.54	0.43	0.62
Norway (5)	0.84	36	0.73	0.71	0.75	0.74	0.70	0.54	0.60	0.62	0.33	0.58	0.57	0.32	0.37
Oman	0.92	50	0.73	0.72	0.67	0.76	0.74	0.78	0.62	0.67	0.83	0.72	0.65	0.52	0.75
Poland	0.91	47	0.74	0.71	0.54	0.71	0.67	0.63	0.72	0.73	0.57	0.74	0.73	0.58	0.81
Portugal	0.89	43	0.53	0.54	0.58	0.54	0.50	0.60	0.76	0.71	0.70	0.75	0.75	0.68	0.78
Qatar	0.98	77	0.93	0.92	0.86	0.94	0.92	0.93	0.89	0.89	0.91	0.80	0.83	0.71	0.87
Russian Federation	0.91	50	0.83	0.77	0.61	0.73	0.67	0.66	0.75	0.68	0.70	0.73	0.78	0.47	0.78
Saudi Arabia	0.88	43	0.71	0.70	0.69	0.78	0.77	0.67	0.70	0.47	0.73	0.65	0.49	0.46	0.55
Serbia	0.91	47	0.79	0.69	0.63	0.68	0.69	0.70	0.75	0.77	0.63	0.62	0.64	0.57	0.72
Singapore	0.97	73	0.90	0.89	0.84	0.90	0.86	0.81	0.91	0.91	0.76	0.76	0.73	0.91	0.89
Slovak Republic	0.91	49	0.80	0.79	0.61	0.72	0.67	0.72	0.81	0.78	0.79	0.66	0.28	0.62	0.70
Slovenia	0.84	36	0.56	0.52	0.57	0.47	0.57	0.52	0.70	0.73	0.33	0.71	0.75	0.57	0.62
South Africa (5)	0.82	37	-0.19	-0.11	0.33	0.63	0.16	0.71	0.84	0.81	0.45	0.83	0.83	0.59	0.67
Spain	0.88	41	0.63	0.66	0.60	0.69	0.55	0.67	0.70	0.71	0.61	0.65	0.67	0.48	0.68
Sweden	0.83	34	0.65	0.63	0.48	0.52	0.52	0.65	0.61	0.69	0.45	0.69	0.44	0.57	0.64
Turkey	0.87	40	0.75	0.71	0.60	0.70	0.69	0.53	0.71	0.51	0.65	0.66	0.62	0.34	0.67
United Arab Emirates	0.96	65	0.87	0.85	0.83	0.87	0.86	0.87	0.83	0.81	0.80	0.70	0.68	0.65	0.82
United States	0.90	46	0.69	0.70	0.69	0.66	0.59	0.70	0.69	0.62	0.61	0.74	0.70	0.67	0.74
<b>Benchmarking Participants</b>															
Buenos Aires, Argentina	0.93	54	0.74	0.78	0.69	0.67	0.83	0.78	0.74	0.69	0.59	0.74	0.77	0.75	0.75
Ontario, Canada	0.87	40	0.59	0.58	0.53	0.42	0.64	0.72	0.68	0.73	0.50	0.66	0.76	0.64	0.65
Quebec, Canada	0.89	44	0.79	0.77	0.67	0.50	0.76	0.59	0.71	0.64	0.36	0.54	0.75	0.56	0.79
Norway (4)	0.84	36	0.73	0.71	0.75	0.74	0.68	0.51	0.64	0.62	0.34	0.59	0.53	0.31	0.40
Abu Dhabi, UAE	0.95	63	0.84	0.84	0.84	0.83	0.85	0.84	0.81	0.77	0.79	0.61	0.69	0.75	0.85
Dubai, UAE	0.97	76	0.90	0.91	0.84	0.93	0.86	0.93	0.89	0.89	0.89	0.86	0.80	0.66	0.91
Florida, US	0.93	55	0.83	0.56	0.79	0.79	0.84	0.74	0.77	0.69	0.76	0.78	0.70	0.46	0.85

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



**Relationship Between the TIMSS 2015 Instruction Affected by Mathematics Resource Shortages - Principals' Reports Scale, Fourth Grade, and TIMSS 2015 Mathematics Achievement**

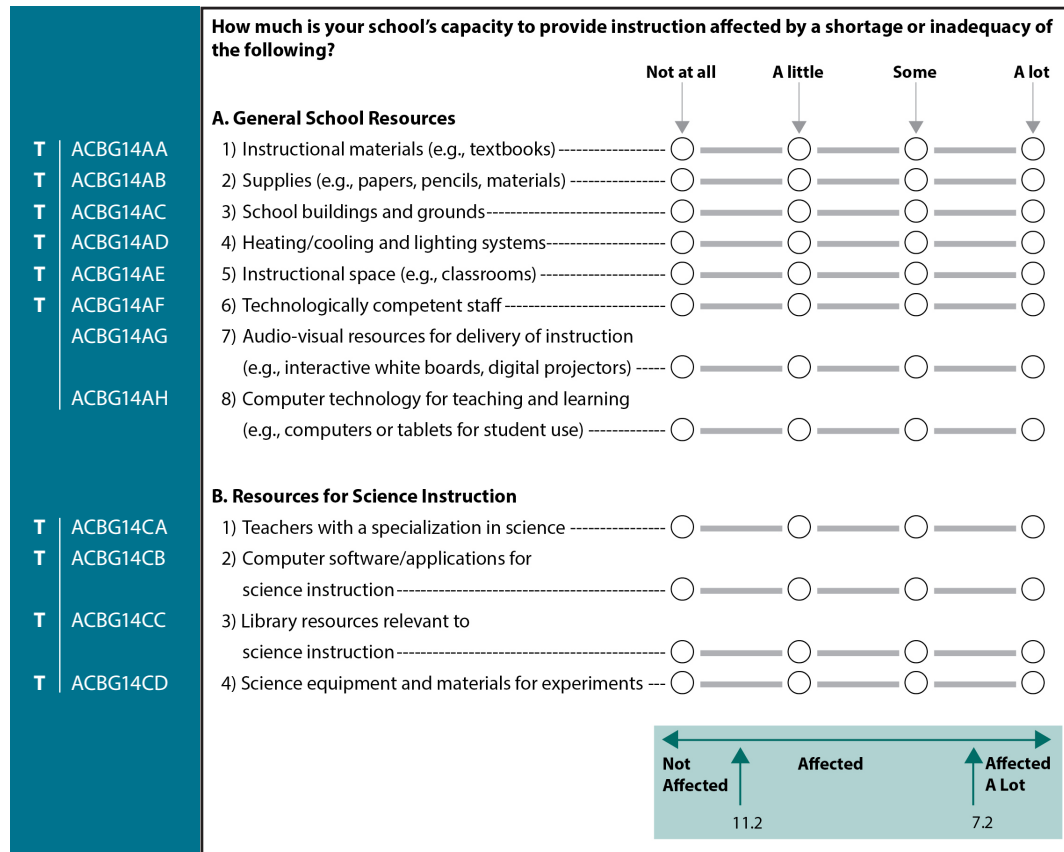
Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )
	(r)	( $r^2$ )	
Australia	0.12	0.01	0.01
Bahrain	0.08	0.01	0.01
Belgium (Flemish)	0.03	0.00	0.00
Bulgaria	0.10	0.01	0.01
Canada	0.08	0.01	0.01
Chile	0.14	0.02	0.02
Chinese Taipei	0.11	0.01	0.01
Croatia	0.03	0.00	0.00
Cyprus	0.08	0.01	0.01
Czech Republic	0.01	0.00	0.00
Denmark	-0.06	0.00	0.00
England	0.08	0.01	0.00
Finland	0.01	0.00	0.00
France	0.07	0.00	0.01
Georgia	0.09	0.01	0.01
Germany	0.04	0.00	0.00
Hong Kong SAR	0.19	0.04	0.04
Hungary	0.00	0.00	0.00
Indonesia	-0.25	0.06	0.02
Iran, Islamic Rep. of	-0.02	0.00	0.01
Ireland	0.04	0.00	0.00
Italy	0.05	0.00	0.01
Japan	0.00	0.00	0.00
Jordan	-0.07	0.01	0.04
Kazakhstan	-0.06	0.00	0.00
Korea, Rep. of	-0.05	0.00	0.00
Kuwait	0.06	0.00	0.02
Lithuania	-0.10	0.01	0.00
Morocco	-0.12	0.01	0.00
Netherlands	-0.01	0.00	0.00
New Zealand	0.07	0.01	0.01
Northern Ireland	0.02	0.00	0.00
Norway (5)	0.06	0.00	0.00
Oman	-0.02	0.00	0.01
Poland	0.02	0.00	0.01
Portugal	0.05	0.00	0.01
Qatar	0.20	0.04	0.04
Russian Federation	0.07	0.01	0.01
Saudi Arabia	0.04	0.00	0.01
Serbia	0.04	0.00	0.01
Singapore	-0.07	0.01	0.01
Slovak Republic	-0.03	0.00	0.00
Slovenia	-0.08	0.01	0.00
South Africa (5)	0.17	0.03	0.04
Spain	0.11	0.01	0.00
Sweden	0.01	0.00	0.00
Turkey	-0.08	0.01	0.02
United Arab Emirates	0.26	0.07	0.10
United States	0.11	0.01	0.01
<b>International Median</b>	<b>0.04</b>	<b>0.00</b>	<b>0.01</b>
<b>Benchmarking Participants</b>			
Buenos Aires, Argentina	0.10	0.01	0.01
Ontario, Canada	0.06	0.00	0.00
Quebec, Canada	0.15	0.02	0.01
Norway (4)	0.04	0.00	0.00
Abu Dhabi, UAE	0.20	0.04	0.10
Dubai, UAE	0.28	0.08	0.08
Florida, US	-0.07	0.00	0.02

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

# 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



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.

**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

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

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

Scale Transformation Constants	
A = 9.169706	Transformed Scale Score = 9.169706 + 1.448865 • Logit Scale Score
B = 1.448865	

**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	

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 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
<b>Benchmarking Participants</b>														
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

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

**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 ( $\eta^2$ )
	(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
<b>International Median</b>	<b>0.03</b>	<b>0.00</b>	<b>0.01</b>
<b>Benchmarking Participants</b>			
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

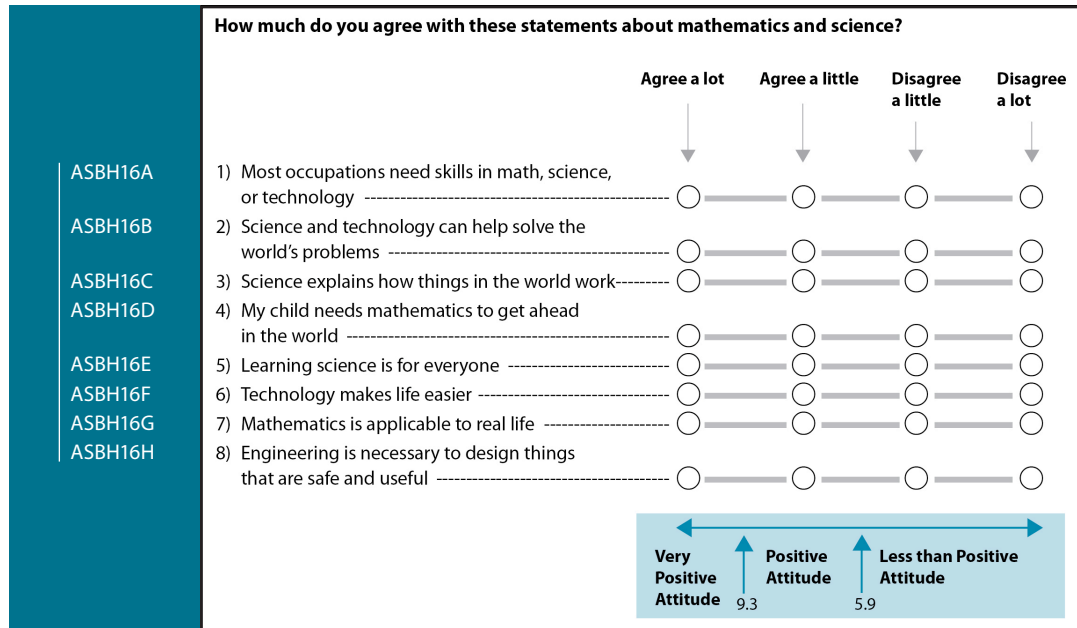
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

A dash (-) indicates comparable data not available.

# Parental Attitude Toward Mathematics and Science Scale, Fourth Grade

The Parental Attitude Toward Mathematics and Science (AMS) scale was created based on parents' responses to the eight statements described below.

## Items in the TIMSS 2015 Parental Attitude Toward Mathematics and Science Scale, Fourth Grade<sup>1</sup>



<sup>1</sup> For the purpose of scaling, categories in which there were very few respondents were combined. The categories "Disagree a little" and "Disagree a lot" were combined for all variables. The scale statistics that are reported herein reflect analysis of the items following collapsing.

**Item Parameters for the TIMSS 2015 Parental Attitude Towards Mathematics and Science Scale, Fourth Grade**

Item	delta	tau_1	tau_2	Infit
ASBH16A	-0.13348	-1.30430	1.30430	1.06
ASBH16B	0.46466	-1.45183	1.45183	1.02
ASBH16C	-0.14365	-1.51755	1.51755	0.98
ASBH16D	0.26093	-1.15860	1.15860	0.98
ASBH16E	0.49246	-1.14023	1.14023	1.07
ASBH16F	-0.23279	-1.41401	1.41401	1.07
ASBH16G	-0.42471	-1.32106	1.32106	0.97
ASBH16H	-0.28342	-1.41733	1.41733	1.02

**Scale Transformation Constants for the TIMSS 2015 Parental Attitude Towards Mathematics and Science Scale, Fourth Grade**

Scale Transformation Constants	
A = 7.585537	Transformed Scale Score = 7.585537 + 1.203307 • Logit Scale Score
B = 1.203307	

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



**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS 2015 Parental Attitude Towards Mathematics and Science Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	2.47515	
1	3.94784	
2	4.73109	
3	5.31751	
4	5.81902	5.9
5	6.28412	
6	6.72991	
7	7.16815	
8	7.60318	
9	8.03458	
10	8.46408	
11	8.89768	
12	9.34946	9.3
13	9.84146	
14	10.41768	
15	11.19234	
16	12.66016	

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 2015 Parental Attitude Towards Mathematics and Science Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			ASBH16A	ASBH16B	ASBH16C	ASBH16D	ASBH16E	ASBH16F	ASBH16G	ASBH16H
Australia	0.81	44	0.58	0.70	0.67	0.71	0.71	0.57	0.68	0.67
Bahrain	0.80	41	0.58	0.69	0.66	0.69	0.65	0.53	0.68	0.64
Belgium (Flemish)	0.84	47	0.61	0.69	0.68	0.75	0.67	0.67	0.71	0.69
Bulgaria	0.85	49	0.71	0.72	0.72	0.73	0.66	0.62	0.73	0.71
Canada	0.83	47	0.63	0.71	0.72	0.72	0.66	0.61	0.72	0.69
Chile	0.80	42	0.42	0.68	0.71	0.70	0.67	0.62	0.65	0.66
Chinese Taipei	0.87	53	0.72	0.77	0.77	0.67	0.73	0.73	0.73	0.70
Croatia	0.80	42	0.59	0.65	0.66	0.74	0.55	0.58	0.70	0.66
Cyprus	0.75	38	0.60	0.68	0.69	0.63	0.50	0.55	0.64	0.61
Czech Republic	0.82	45	0.66	0.68	0.67	0.70	0.70	0.63	0.64	0.68
Denmark	0.77	40	0.62	0.66	0.66	0.71	0.50	0.60	0.64	0.63
England	-	-	-	-	-	-	-	-	-	-
Finland	0.83	46	0.66	0.70	0.67	0.73	0.72	0.58	0.70	0.67
France	0.84	48	0.69	0.73	0.68	0.70	0.72	0.62	0.70	0.69
Georgia	0.80	42	0.54	0.58	0.65	0.70	0.67	0.69	0.70	0.63
Germany	0.80	42	0.60	0.60	0.63	0.70	0.63	0.67	0.69	0.65
Hong Kong SAR	0.83	47	0.67	0.72	0.72	0.68	0.69	0.66	0.65	0.69
Hungary	0.79	42	0.63	0.69	0.68	0.69	0.68	0.62	0.67	0.50
Indonesia	0.83	46	0.59	0.72	0.73	0.68	0.65	0.70	0.67	0.71
Iran, Islamic Rep. of	0.79	41	0.60	0.65	0.65	0.68	0.64	0.59	0.70	0.59
Ireland	0.79	42	0.57	0.68	0.65	0.71	0.64	0.58	0.70	0.63
Italy	0.80	42	0.58	0.69	0.67	0.69	0.54	0.62	0.67	0.69
Japan	0.85	49	0.66	0.73	0.71	0.73	0.76	0.66	0.65	0.70
Jordan	0.81	44	0.60	0.68	0.70	0.71	0.60	0.62	0.68	0.69
Kazakhstan	0.78	40	0.62	0.69	0.64	0.63	0.57	0.62	0.61	0.64
Korea, Rep. of	0.87	53	0.65	0.76	0.74	0.73	0.78	0.69	0.70	0.77
Kuwait	0.81	43	0.59	0.68	0.70	0.72	0.65	0.59	0.68	0.64
Lithuania	0.76	38	0.62	0.65	0.62	0.64	0.50	0.62	0.64	0.64
Morocco	0.84	47	0.63	0.71	0.70	0.70	0.65	0.70	0.68	0.71
Netherlands	0.80	43	0.65	0.67	0.70	0.69	0.51	0.61	0.71	0.71
New Zealand	0.83	46	0.64	0.73	0.67	0.74	0.70	0.56	0.72	0.67
Northern Ireland	0.81	43	0.59	0.71	0.65	0.65	0.68	0.62	0.69	0.67
Norway (5)	0.81	44	0.62	0.69	0.69	0.70	0.65	0.65	0.63	0.64
Oman	0.77	39	0.56	0.66	0.63	0.65	0.62	0.57	0.65	0.62
Poland	0.83	47	0.67	0.72	0.64	0.69	0.67	0.70	0.69	0.68
Portugal	0.76	38	0.48	0.64	0.66	0.62	0.57	0.58	0.65	0.68
Qatar	0.84	47	0.60	0.70	0.73	0.72	0.69	0.65	0.70	0.67
Russian Federation	0.82	44	0.64	0.70	0.67	0.71	0.69	0.59	0.66	0.67
Saudi Arabia	0.84	47	0.59	0.72	0.70	0.73	0.67	0.65	0.71	0.71
Serbia	0.84	48	0.65	0.72	0.73	0.75	0.63	0.62	0.70	0.71
Singapore	0.86	50	0.68	0.73	0.72	0.72	0.72	0.66	0.72	0.71
Slovak Republic	0.82	44	0.65	0.67	0.67	0.72	0.66	0.61	0.68	0.64
Slovenia	0.85	50	0.70	0.73	0.72	0.73	0.63	0.66	0.70	0.76
South Africa (5)	0.83	46	0.64	0.72	0.70	0.70	0.60	0.69	0.71	0.69
Spain	0.80	42	0.59	0.70	0.71	0.69	0.55	0.62	0.66	0.67
Sweden	0.82	45	0.60	0.70	0.70	0.72	0.61	0.69	0.64	0.70
Turkey	0.81	44	0.64	0.68	0.67	0.70	0.67	0.61	0.68	0.64
United Arab Emirates	0.85	49	0.65	0.71	0.73	0.71	0.71	0.65	0.73	0.67
United States	-	-	-	-	-	-	-	-	-	-
<b>Benchmarking Participants</b>										
Buenos Aires, Argentina	0.80	42	0.70	0.59	0.63	0.71	0.59	0.58	0.73	0.65
Ontario, Canada	0.82	45	0.57	0.70	0.68	0.72	0.67	0.62	0.71	0.64
Quebec, Canada	0.84	48	0.62	0.73	0.73	0.73	0.60	0.64	0.72	0.74
Norway (4)	0.81	44	0.66	0.72	0.69	0.72	0.65	0.60	0.61	0.65
Abu Dhabi, UAE	0.87	52	0.67	0.72	0.76	0.72	0.74	0.68	0.75	0.71
Dubai, UAE	0.83	45	0.62	0.68	0.72	0.72	0.69	0.60	0.70	0.65
Florida, US	-	-	-	-	-	-	-	-	-	-

A dash (-) indicates comparable data not available.

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

**Relationship Between the TIMSS 2015 Parental Attitude Towards Mathematics and Science Scale, Fourth Grade, and TIMSS 2015 Achievement**

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )	
	(r)		(r)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.15	0.13	0.02	0.02	0.02	0.02
Bahrain	0.13	0.17	0.02	0.03	0.01	0.02
Belgium (Flemish)	0.08	0.08	0.01	0.01	0.01	0.01
Bulgaria	0.08	0.10	0.01	0.01	0.01	0.02
Canada	0.10	0.13	0.01	0.02	0.01	0.01
Chile	0.09	0.06	0.01	0.00	0.00	0.00
Chinese Taipei	0.09	0.10	0.01	0.01	0.01	0.01
Croatia	0.06	0.05	0.00	0.00	0.01	0.00
Cyprus	0.03	0.04	0.00	0.00	0.00	0.00
Czech Republic	0.05	0.06	0.00	0.00	0.00	0.00
Denmark	0.09	0.08	0.01	0.01	0.01	0.01
England	-	-	-	-	-	-
Finland	0.17	0.16	0.03	0.03	0.02	0.02
France	0.16	0.15	0.03	0.02	0.02	0.02
Georgia	0.02	0.05	0.00	0.00	0.00	0.00
Germany	0.07	0.06	0.00	0.00	0.00	0.00
Hong Kong SAR	0.15	0.18	0.02	0.03	0.02	0.02
Hungary	0.08	0.07	0.01	0.00	0.01	0.01
Indonesia	0.02	0.05	0.00	0.00	0.00	0.00
Iran, Islamic Rep. of	0.10	0.12	0.01	0.01	0.01	0.01
Ireland	0.13	0.12	0.02	0.01	0.01	0.01
Italy	0.04	0.03	0.00	0.00	0.00	0.00
Japan	0.17	0.18	0.03	0.03	0.03	0.03
Jordan	0.18	-	0.03	-	0.03	-
Kazakhstan	0.01	-0.02	0.00	0.00	0.00	0.00
Korea, Rep. of	0.20	0.18	0.04	0.03	0.03	0.03
Kuwait	0.13	0.14	0.02	0.02	0.02	0.02
Lithuania	0.06	0.02	0.00	0.00	0.01	0.00
Morocco	0.10	0.12	0.01	0.02	0.01	0.02
Netherlands	0.17	0.20	0.03	0.04	0.02	0.04
New Zealand	0.16	0.15	0.03	0.02	0.02	0.02
Northern Ireland	0.08	0.10	0.01	0.01	0.00	0.01
Norway (5)	0.14	0.15	0.02	0.02	0.01	0.01
Oman	0.11	0.13	0.01	0.02	0.01	0.01
Poland	0.13	0.14	0.02	0.02	0.02	0.02
Portugal	0.08	0.11	0.01	0.01	0.00	0.01
Qatar	0.19	0.18	0.03	0.03	0.03	0.02
Russian Federation	-0.01	-0.02	0.00	0.00	0.00	0.00
Saudi Arabia	0.07	0.07	0.01	0.01	0.01	0.01
Serbia	0.04	0.05	0.00	0.00	0.01	0.01
Singapore	0.13	0.13	0.02	0.02	0.01	0.02
Slovak Republic	-0.05	-0.06	0.00	0.00	0.00	0.00
Slovenia	0.10	0.10	0.01	0.01	0.01	0.01
South Africa (5)	0.04	-	0.00	-	0.00	-
Spain	0.10	0.10	0.01	0.01	0.01	0.01
Sweden	0.14	0.14	0.02	0.02	0.02	0.02
Turkey	0.07	0.07	0.00	0.00	0.01	0.01
United Arab Emirates	0.20	0.23	0.04	0.05	0.04	0.05
United States	-	-	-	-	-	-
<b>International Median</b>	<b>0.10</b>	<b>0.10</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	0.16	0.08	0.02	0.01	0.01	0.01
Ontario, Canada	0.14	0.12	0.02	0.01	0.01	0.01
Quebec, Canada	0.16	0.14	0.02	0.02	0.02	0.01
Norway (4)	0.06	0.15	0.00	0.02	0.00	0.02
Abu Dhabi, UAE	0.22	0.25	0.05	0.06	0.05	0.06
Dubai, UAE	0.15	0.18	0.02	0.03	0.02	0.03
Florida, US	-	-	-	-	-	-

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

A dash (-) indicates comparable data not available.

# Parents' Perceptions of School Performance Scale, Fourth Grade

The Parents' Perceptions of School Performance (PSP) scale was created based on parents' responses to the eight statements described below.

## Items in the TIMSS 2015 Parents' Perceptions of School Performance Scale, Fourth Grade<sup>1</sup>

		What do you think of your child's school?			
		Agree a lot	Agree a little	Disagree a little	Disagree a lot
		↓	↓	↓	↓
ASBH11A	1) My child's school does a good job including me in my child's education -----	○	○	○	○
ASBH11B	2) My child's school provides a safe environment -----	○	○	○	○
ASBH11C	3) My child's school cares about my child's progress in school -----	○	○	○	○
ASBH11D	4) My child's school does a good job informing me of his/her progress -----	○	○	○	○
ASBH11E	5) My child's school promotes high academic standards -----	○	○	○	○
ASBH11F	6) My child's school does a good job in helping him/her become better in reading -----	○	○	○	○
ASBH11G	7) My child's school does a good job in helping him/her become better in mathematics -----	○	○	○	○
ASBH11H	8) My child's school does a good job in helping him/her become better in science -----	○	○	○	○

Very Satisfied      Satisfied      Less than Satisfied

9.7                      6.7

<sup>1</sup> For the purpose of scaling, categories in which there were very few respondents were combined. The categories "Disagree a little" and "Disagree a lot" were combined for all variables. The scale statistics that are reported herein reflect analysis of the items following collapsing.

**Item Parameters for the TIMSS 2015 Parents' Perceptions of School Performance Scale, Fourth Grade**

Item	delta	tau_1	tau_2	Infit
ASBH11A	0.11460	-1.73494	1.73494	1.12
ASBH11B	-0.67540	-1.75855	1.75855	1.32
ASBH11C	-0.56176	-1.77592	1.77592	0.86
ASBH11D	0.01006	-1.43467	1.43467	1.02
ASBH11E	0.89136	-1.72307	1.72307	1.18
ASBH11F	-0.12622	-1.56127	1.56127	0.87
ASBH11G	0.02192	-1.62039	1.62039	0.86
ASBH11H	0.32544	-1.66119	1.66119	0.95

**Scale Transformation Constants for the TIMSS 2015 Parents' Perceptions of School Performance Scale, Fourth Grade**

Scale Transformation Constants

A = 8.205877

B = 0.922019

Transformed Scale Score = 8.205877 + 0.922019 • Logit Scale Score

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



**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 Parents' Perceptions of School Performance Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.94852	
1	5.10034	
2	5.72134	
3	6.19579	
4	6.61062	6.7
5	7.00360	
6	7.39360	
7	7.79675	
8	8.21220	
9	8.62605	
10	9.02464	
11	9.41083	
12	9.79839	9.7
13	10.20989	
14	10.68380	
15	11.30495	
16	12.45977	

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 2015 Parents' Perceptions of School Performance Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			ASBHT1A	ASBHT1B	ASBHT1C	ASBHT1D	ASBHT1E	ASBHT1F	ASBHT1G	ASBHT1H
Australia	0.90	60	0.78	0.51	0.81	0.81	0.74	0.83	0.84	0.81
Bahrain	0.90	60	0.74	0.67	0.82	0.76	0.79	0.81	0.81	0.79
Belgium (Flemish)	0.88	55	0.76	0.62	0.80	0.79	0.59	0.77	0.81	0.78
Bulgaria	0.91	63	0.71	0.71	0.84	0.78	0.78	0.84	0.83	0.84
Canada	0.91	61	0.77	0.59	0.83	0.80	0.78	0.80	0.84	0.82
Chile	0.91	61	0.78	0.64	0.82	0.80	0.75	0.80	0.82	0.79
Chinese Taipei	0.91	62	0.77	0.67	0.84	0.84	0.72	0.77	0.86	0.83
Croatia	0.91	62	0.73	0.69	0.82	0.74	0.76	0.85	0.85	0.85
Cyprus	0.89	57	0.68	0.60	0.82	0.73	0.76	0.82	0.83	0.77
Czech Republic	0.90	60	0.70	0.57	0.81	0.78	0.76	0.84	0.87	0.86
Denmark	0.90	60	0.78	0.64	0.82	0.80	0.80	0.77	0.81	0.76
England	-	-	-	-	-	-	-	-	-	-
Finland	0.89	57	0.70	0.58	0.80	0.72	0.68	0.82	0.86	0.84
France	0.89	58	0.74	0.63	0.80	0.78	0.71	0.80	0.83	0.78
Georgia	0.87	54	0.61	0.63	0.77	0.74	0.64	0.80	0.82	0.81
Germany	0.89	57	0.79	0.60	0.79	0.79	0.59	0.80	0.83	0.82
Hong Kong SAR	0.89	57	0.76	0.55	0.79	0.80	0.75	0.80	0.80	0.76
Hungary	0.90	58	0.73	0.61	0.78	0.77	0.73	0.82	0.83	0.82
Indonesia	0.83	48	0.64	0.54	0.72	0.72	0.58	0.72	0.80	0.78
Iran, Islamic Rep. of	0.86	51	0.67	0.62	0.74	0.70	0.65	0.78	0.78	0.77
Ireland	0.88	56	0.78	0.58	0.80	0.79	0.78	0.76	0.79	0.70
Italy	0.90	59	0.77	0.55	0.79	0.78	0.74	0.81	0.82	0.83
Japan	0.86	51	0.61	0.58	0.70	0.70	0.74	0.80	0.78	0.77
Jordan	0.93	66	0.78	0.71	0.85	0.82	0.82	0.85	0.84	0.83
Kazakhstan	0.88	54	0.68	0.60	0.76	0.69	0.77	0.80	0.78	0.78
Korea, Rep. of	0.91	62	0.64	0.67	0.79	0.78	0.85	0.82	0.86	0.85
Kuwait	0.92	65	0.77	0.72	0.83	0.81	0.83	0.83	0.82	0.81
Lithuania	0.89	57	0.64	0.63	0.78	0.72	0.69	0.84	0.85	0.83
Morocco	0.88	55	0.68	0.66	0.80	0.72	0.69	0.80	0.81	0.77
Netherlands	0.89	56	0.76	0.56	0.80	0.78	0.70	0.83	0.85	0.70
New Zealand	0.91	61	0.81	0.56	0.82	0.82	0.78	0.81	0.83	0.77
Northern Ireland	0.89	58	0.79	0.55	0.83	0.81	0.75	0.80	0.81	0.69
Norway (5)	0.91	63	0.79	0.65	0.83	0.79	0.79	0.82	0.84	0.83
Oman	0.88	55	0.72	0.64	0.77	0.71	0.73	0.76	0.80	0.80
Poland	0.90	58	0.69	0.68	0.83	0.73	0.75	0.80	0.80	0.80
Portugal	0.90	59	0.78	0.59	0.81	0.76	0.71	0.83	0.85	0.81
Qatar	0.92	63	0.77	0.68	0.82	0.79	0.80	0.82	0.82	0.83
Russian Federation	0.89	58	0.62	0.66	0.79	0.70	0.70	0.85	0.87	0.86
Saudi Arabia	0.92	65	0.75	0.73	0.82	0.80	0.81	0.84	0.84	0.83
Serbia	0.92	66	0.81	0.70	0.86	0.82	0.77	0.84	0.84	0.85
Singapore	0.89	58	0.77	0.58	0.82	0.78	0.72	0.77	0.81	0.79
Slovak Republic	0.90	59	0.69	0.62	0.80	0.72	0.77	0.82	0.85	0.84
Slovenia	0.91	61	0.65	0.70	0.82	0.76	0.72	0.85	0.86	0.87
South Africa (5)	0.85	50	0.67	0.58	0.74	0.70	0.70	0.75	0.76	0.73
Spain	0.90	60	0.77	0.64	0.80	0.79	0.71	0.79	0.84	0.83
Sweden	0.91	63	0.77	0.65	0.82	0.80	0.81	0.81	0.83	0.84
Turkey	0.90	60	0.71	0.67	0.78	0.75	0.81	0.81	0.82	0.81
United Arab Emirates	0.91	62	0.78	0.67	0.83	0.79	0.80	0.80	0.81	0.81
United States	-	-	-	-	-	-	-	-	-	-
<b>Benchmarking Participants</b>										
Buenos Aires, Argentina	0.91	61	0.71	0.65	0.83	0.76	0.77	0.81	0.85	0.81
Ontario, Canada	0.91	61	0.79	0.56	0.84	0.80	0.79	0.79	0.84	0.83
Quebec, Canada	0.90	59	0.70	0.65	0.82	0.81	0.75	0.81	0.84	0.77
Norway (4)	0.91	62	0.79	0.62	0.84	0.80	0.76	0.80	0.84	0.81
Abu Dhabi, UAE	0.92	63	0.78	0.69	0.83	0.80	0.82	0.82	0.80	0.82
Dubai, UAE	0.90	59	0.76	0.61	0.83	0.78	0.79	0.77	0.80	0.80
Florida, US	-	-	-	-	-	-	-	-	-	-

A dash (-) indicates comparable data not available.

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

**Relationship Between the TIMSS 2015 Parents' Perceptions of School Performance Scale, Fourth Grade, and TIMSS 2015 Achievement**

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )	
	(r)		(r)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.10	0.05	0.01	0.00	0.01	0.01
Bahrain	0.13	0.17	0.02	0.03	0.02	0.03
Belgium (Flemish)	-0.03	-0.05	0.00	0.00	0.00	0.00
Bulgaria	-0.01	-0.04	0.00	0.00	0.00	0.00
Canada	0.00	0.02	0.00	0.00	0.00	0.00
Chile	0.04	0.04	0.00	0.00	0.00	0.00
Chinese Taipei	-0.02	-0.05	0.00	0.00	0.00	0.00
Croatia	-0.02	-0.03	0.00	0.00	0.00	0.00
Cyprus	-0.02	-0.04	0.00	0.00	0.00	0.00
Czech Republic	-0.09	-0.10	0.01	0.01	0.01	0.01
Denmark	0.05	0.04	0.00	0.00	0.01	0.00
England	-	-	-	-	-	-
Finland	0.01	0.01	0.00	0.00	0.00	0.00
France	0.01	-0.01	0.00	0.00	0.00	0.00
Georgia	0.04	0.04	0.00	0.00	0.00	0.00
Germany	0.06	0.02	0.00	0.00	0.01	0.01
Hong Kong SAR	0.11	0.09	0.01	0.01	0.01	0.01
Hungary	0.04	0.04	0.00	0.00	0.00	0.00
Indonesia	0.03	0.06	0.00	0.00	0.00	0.00
Iran, Islamic Rep. of	-0.01	-0.01	0.00	0.00	0.00	0.00
Ireland	-0.03	-0.02	0.00	0.00	0.00	0.00
Italy	0.01	-0.02	0.00	0.00	0.00	0.00
Japan	0.02	0.04	0.00	0.00	0.00	0.00
Jordan	0.16	-	0.03	-	0.03	-
Kazakhstan	0.05	0.02	0.00	0.00	0.00	0.00
Korea, Rep. of	0.05	0.02	0.00	0.00	0.00	0.00
Kuwait	0.06	0.07	0.00	0.00	0.00	0.01
Lithuania	0.04	-0.02	0.00	0.00	0.00	0.00
Morocco	0.15	0.22	0.02	0.05	0.02	0.04
Netherlands	0.06	0.05	0.00	0.00	0.01	0.01
New Zealand	0.04	-0.01	0.00	0.00	0.01	0.00
Northern Ireland	-0.03	-0.07	0.00	0.01	0.00	0.01
Norway (5)	0.12	0.03	0.02	0.00	0.01	0.00
Oman	0.14	0.14	0.02	0.02	0.02	0.02
Poland	-0.04	-0.06	0.00	0.00	0.00	0.00
Portugal	0.09	0.06	0.01	0.00	0.01	0.00
Qatar	0.13	0.14	0.02	0.02	0.02	0.02
Russian Federation	-0.02	-0.05	0.00	0.00	0.00	0.00
Saudi Arabia	0.05	0.03	0.00	0.00	0.01	0.00
Serbia	-0.07	-0.10	0.00	0.01	0.01	0.01
Singapore	0.08	0.06	0.01	0.00	0.01	0.01
Slovak Republic	-0.08	-0.11	0.01	0.01	0.01	0.01
Slovenia	0.01	-0.01	0.00	0.00	0.00	0.00
South Africa (5)	0.13	-	0.02	-	0.01	-
Spain	0.03	0.01	0.00	0.00	0.00	0.00
Sweden	0.03	-0.02	0.00	0.00	0.00	0.00
Turkey	-0.01	0.01	0.00	0.00	0.00	0.00
United Arab Emirates	0.16	0.17	0.03	0.03	0.03	0.03
United States	-	-	-	-	-	-
<b>International Median</b>	<b>0.04</b>	<b>0.02</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	0.07	0.09	0.00	0.01	0.00	0.01
Ontario, Canada	0.08	0.05	0.01	0.00	0.01	0.01
Quebec, Canada	-0.04	-0.06	0.00	0.00	0.00	0.00
Norway (4)	0.03	-0.02	0.00	0.00	0.00	0.00
Abu Dhabi, UAE	0.17	0.19	0.03	0.03	0.03	0.03
Dubai, UAE	0.15	0.15	0.02	0.02	0.02	0.02
Florida, US	-	-	-	-	-	-

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

A dash (-) indicates comparable data not available.





**Item Parameters for the TIMSS 2015 Problems with School Conditions and Resources – Teachers' Reports Scale, Fourth Grade**

Item	delta	tau_1	tau_2	tau_3	Infit
ATBG08A	0.25146	-1.10267	-0.04789	1.15056	1.15
ATBG08B	0.10778	-0.98715	0.06755	0.91960	1.14
ATBG08C	-0.00295	-1.33876	0.01594	1.32282	0.95
ATBG08D	-0.67894	-0.79406	0.02136	0.77270	1.14
ATBG08E	-0.05211	-1.13587	-0.15567	1.29154	0.97
ATBG08F	0.24992	-1.09700	-0.04657	1.14357	0.90
ATBG08G	0.12484	-1.05906	-0.07924	1.13830	1.02

**Scale Transformation Constants for the TIMSS 2015 Problems with School Conditions and Resources – Teachers' Reports Scale, Fourth Grade**

Scale Transformation Constants	
A = 8.325487	Transformed Scale Score = 8.325487 + 1.363794 • Logit Scale Score
B = 1.363794	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 Problems with School Conditions and Resources – Teachers’  
Reports Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.19241	
1	4.74715	
2	5.50395	
3	6.02702	
4	6.44003	
5	6.78968	
6	7.10030	
7	7.38690	
8	7.65644	
9	7.91569	
10	8.17000	8.2
11	8.42379	
12	8.68129	
13	8.94698	
14	9.22610	
15	9.52520	
16	9.85013	
17	10.21875	
18	10.65400	10.6
19	11.20171	
20	11.98622	
21	13.57043	

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 2015 Problems with School Conditions and Resources – Teachers' Reports Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item						
			ATB608A	ATB608B	ATB608C	ATB608D	ATB608E	ATB608F	ATB608G
Australia	0.83	51	0.76	0.68	0.77	0.50	0.75	0.73	0.75
Bahrain	0.85	54	0.61	0.74	0.79	0.70	0.68	0.84	0.76
Belgium (Flemish)	0.80	46	0.73	0.67	0.70	0.49	0.71	0.73	0.70
Bulgaria	0.87	57	0.71	0.65	0.82	0.66	0.79	0.81	0.80
Canada	0.80	47	0.73	0.56	0.69	0.64	0.75	0.67	0.72
Chile	0.85	53	0.75	0.77	0.75	0.56	0.72	0.76	0.77
Chinese Taipei	0.84	52	0.54	0.67	0.75	0.69	0.77	0.80	0.79
Croatia	0.88	59	0.72	0.75	0.83	0.52	0.84	0.86	0.78
Cyprus	0.86	54	0.76	0.70	0.77	0.56	0.83	0.75	0.73
Czech Republic	0.81	49	0.50	0.69	0.75	0.53	0.73	0.82	0.82
Denmark	0.82	49	0.76	0.53	0.69	0.58	0.81	0.77	0.70
England	0.86	55	0.71	0.68	0.79	0.64	0.80	0.81	0.72
Finland	0.83	51	0.75	0.75	0.78	0.56	0.79	0.71	0.62
France	0.78	44	0.76	0.68	0.68	0.46	0.73	0.70	0.60
Georgia	0.84	52	0.75	0.66	0.74	0.65	0.76	0.80	0.66
Germany	0.83	51	0.67	0.74	0.73	0.67	0.71	0.77	0.70
Hong Kong SAR	0.89	60	0.72	0.76	0.82	0.72	0.81	0.80	0.77
Hungary	0.84	51	0.60	0.66	0.79	0.61	0.75	0.86	0.71
Indonesia	0.88	59	0.79	0.72	0.75	0.66	0.80	0.81	0.81
Iran, Islamic Rep. of	0.83	49	0.78	0.81	0.71	0.50	0.80	0.68	0.57
Ireland	0.84	51	0.80	0.68	0.71	0.64	0.84	0.69	0.62
Italy	0.86	53	0.75	0.67	0.79	0.63	0.82	0.77	0.67
Japan	0.78	44	0.65	0.60	0.70	0.47	0.65	0.77	0.76
Jordan	0.90	62	0.78	0.79	0.82	0.69	0.80	0.82	0.80
Kazakhstan	0.86	56	0.63	0.83	0.78	0.67	0.78	0.80	0.69
Korea, Rep. of	0.87	57	0.69	0.67	0.80	0.61	0.78	0.86	0.86
Kuwait	0.87	56	0.67	0.69	0.82	0.68	0.78	0.79	0.79
Lithuania	0.84	51	0.65	0.75	0.80	0.33	0.75	0.81	0.79
Morocco	0.88	58	0.70	0.82	0.76	0.72	0.81	0.79	0.74
Netherlands	0.75	41	0.47	0.66	0.68	0.56	0.55	0.79	0.72
New Zealand	0.83	50	0.74	0.74	0.64	0.59	0.75	0.75	0.68
Northern Ireland	0.86	55	0.79	0.71	0.74	0.66	0.84	0.74	0.70
Norway (5)	0.81	48	0.72	0.69	0.75	0.50	0.72	0.73	0.69
Oman	0.85	53	0.67	0.65	0.74	0.72	0.75	0.81	0.73
Poland	0.84	51	0.70	0.72	0.78	0.57	0.74	0.79	0.70
Portugal	0.86	55	0.76	0.77	0.79	0.51	0.82	0.78	0.71
Qatar	0.87	56	0.62	0.62	0.68	0.76	0.83	0.86	0.84
Russian Federation	0.82	49	0.64	0.65	0.84	0.42	0.67	0.83	0.77
Saudi Arabia	0.88	58	0.69	0.76	0.82	0.67	0.77	0.83	0.79
Serbia	0.88	59	0.76	0.67	0.85	0.66	0.78	0.85	0.80
Singapore	0.87	56	0.70	0.75	0.78	0.67	0.79	0.77	0.77
Slovak Republic	0.85	54	0.61	0.70	0.85	0.59	0.76	0.84	0.76
Slovenia	0.85	54	0.71	0.69	0.85	0.59	0.76	0.80	0.72
South Africa (5)	0.90	62	0.79	0.75	0.82	0.70	0.83	0.84	0.77
Spain	0.85	54	0.72	0.72	0.82	0.58	0.75	0.80	0.72
Sweden	0.81	47	0.74	0.58	0.66	0.68	0.81	0.69	0.61
Turkey	0.89	60	0.69	0.76	0.80	0.64	0.79	0.85	0.85
United Arab Emirates	0.87	57	0.75	0.65	0.77	0.71	0.80	0.80	0.78
United States	0.83	50	0.72	0.66	0.69	0.65	0.78	0.74	0.71
<b>Benchmarking Participants</b>									
Buenos Aires, Argentina	0.88	58	0.80	0.77	0.77	0.72	0.85	0.71	0.71
Ontario, Canada	0.81	47	0.72	0.60	0.71	0.66	0.77	0.67	0.65
Quebec, Canada	0.82	50	0.73	0.39	0.71	0.64	0.76	0.74	0.86
Norway (4)	0.83	51	0.79	0.69	0.79	0.48	0.79	0.72	0.69
Abu Dhabi, UAE	0.87	57	0.77	0.65	0.76	0.71	0.78	0.81	0.77
Dubai, UAE	0.80	47	0.78	0.52	0.66	0.56	0.78	0.73	0.73
Florida, US	0.87	57	0.81	0.72	0.62	0.75	0.83	0.79	0.73

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

**Relationship Between the TIMSS 2015 Problems with School Conditions and Resources – Teachers' Reports Scale, Fourth Grade, and TIMSS 2015 Achievement**

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )	
	(r)		(r <sup>2</sup> )		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.01	0.03	0.00	0.00	0.00	0.00
Bahrain	0.03	0.02	0.00	0.00	0.00	0.00
Belgium (Flemish)	0.02	0.03	0.00	0.00	0.00	0.00
Bulgaria	0.01	0.01	0.00	0.00	0.00	0.00
Canada	-0.05	-0.03	0.00	0.00	0.00	0.00
Chile	0.17	0.17	0.03	0.03	0.04	0.04
Chinese Taipei	0.06	0.01	0.00	0.00	0.00	0.00
Croatia	-0.07	-0.07	0.00	0.00	0.00	0.00
Cyprus	0.06	0.04	0.00	0.00	0.00	0.00
Czech Republic	0.02	0.02	0.00	0.00	0.00	0.00
Denmark	-0.02	0.04	0.00	0.00	0.00	0.00
England	-0.02	-0.02	0.00	0.00	0.00	0.01
Finland	0.01	0.01	0.00	0.00	0.00	0.00
France	0.08	0.07	0.01	0.01	0.01	0.00
Georgia	0.08	0.09	0.01	0.01	0.00	0.01
Germany	0.07	0.09	0.00	0.01	0.01	0.01
Hong Kong SAR	0.16	0.18	0.03	0.03	0.01	0.01
Hungary	-0.10	-0.08	0.01	0.01	0.01	0.00
Indonesia	0.13	0.13	0.02	0.02	0.02	0.04
Iran, Islamic Rep. of	0.22	0.20	0.05	0.04	0.03	0.03
Ireland	0.00	0.03	0.00	0.00	0.00	0.00
Italy	0.04	0.03	0.00	0.00	0.01	0.00
Japan	-0.04	-0.01	0.00	0.00	0.00	0.00
Jordan	0.20	-	0.04	-	0.03	-
Kazakhstan	0.09	0.09	0.01	0.01	0.00	0.00
Korea, Rep. of	0.09	0.04	0.01	0.00	0.01	0.00
Kuwait	0.06	0.10	0.00	0.01	0.00	0.00
Lithuania	-0.02	-0.02	0.00	0.00	0.00	0.00
Morocco	0.19	0.25	0.04	0.06	0.05	0.07
Netherlands	-0.05	-0.06	0.00	0.00	0.01	0.01
New Zealand	0.05	0.05	0.00	0.00	0.00	0.00
Northern Ireland	0.01	0.03	0.00	0.00	0.00	0.00
Norway (5)	0.09	0.09	0.01	0.01	0.02	0.01
Oman	0.01	-0.02	0.00	0.00	0.01	0.00
Poland	0.02	0.01	0.00	0.00	0.00	0.00
Portugal	0.04	0.05	0.00	0.00	0.01	0.01
Qatar	-0.05	-0.02	0.00	0.00	0.01	0.00
Russian Federation	0.06	0.08	0.00	0.01	0.00	0.00
Saudi Arabia	0.17	0.03	0.03	0.00	0.02	0.00
Serbia	0.00	-0.02	0.00	0.00	0.00	0.00
Singapore	-0.04	-0.04	0.00	0.00	0.00	0.00
Slovak Republic	-0.04	-0.02	0.00	0.00	0.01	0.00
Slovenia	-0.04	-0.05	0.00	0.00	0.00	0.00
South Africa (5)	0.39	-	0.15	-	0.14	-
Spain	0.05	0.05	0.00	0.00	0.00	0.00
Sweden	0.11	0.11	0.01	0.01	0.00	0.00
Turkey	0.24	0.23	0.06	0.05	0.05	0.04
United Arab Emirates	0.15	0.18	0.02	0.03	0.03	0.04
United States	0.09	0.10	0.01	0.01	0.01	0.01
<b>International Median</b>	<b>0.04</b>	<b>0.03</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	0.23	0.20	0.05	0.04	0.04	0.04
Ontario, Canada	0.03	0.01	0.00	0.00	0.00	0.00
Quebec, Canada	0.01	0.02	0.00	0.00	0.01	0.01
Norway (4)	0.04	0.04	0.00	0.00	0.00	0.00
Abu Dhabi, UAE	-0.01	0.04	0.00	0.00	0.02	0.02
Dubai, UAE	0.15	0.23	0.02	0.05	0.02	0.04
Florida, US	0.07	0.04	0.00	0.00	0.01	0.01

A dash (-) indicates comparable data not available.

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

# Safe and Orderly School–Teachers’ Reports Scale, Fourth Grade

The Safe and Orderly School – Teachers’ Reports (SOS) scale was created based on teachers’ degree of agreement with the eight statements described below.

## Items in the TIMSS 2015 Safe and Orderly School–Teachers’ Reports Scale, Fourth Grade<sup>1</sup>

		Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements.			
		Agree a lot	Agree a little	Disagree a little	Disagree a lot
T	ATBG07A	1) This school is located in a safe neighborhood ----- ○ ○ ○ ○			
T	ATBG07B	2) I feel safe at this school ----- ○ ○ ○ ○			
T	ATBG07C	3) This school's security policies and practices are sufficient ----- ○ ○ ○ ○			
T	ATBG07D	4) The students behave in an orderly manner ----- ○ ○ ○ ○			
T	ATBG07E	5) The students are respectful of the teachers ----- ○ ○ ○ ○			
	ATBG07F	6) The students respect school property ----- ○ ○ ○ ○			
	ATBG07G	7) This school has clear rules about student conduct ----- ○ ○ ○ ○			
	ATBG07H	8) This school's rules are enforced in a fair and consistent manner ----- ○ ○ ○ ○			

Very Safe and Orderly      Safe and Orderly      Less than Safe and Orderly

10.0      6.7

<sup>1</sup> For the purpose of scaling, categories in which there were very few respondents were combined. The categories “Disagree a little” and “Disagree a lot” were combined for all variables. The scale statistics that are reported herein reflect analysis of the items following collapsing.

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.

**Item Parameters for the TIMSS 2015 Safe and Orderly School – Teachers' Reports Scale, Fourth Grade**

Item	delta	tau_1	tau_2	Infit
ATBG07A	-0.40272	-1.05787	1.05787	1.40
ATBG07B	-1.33285	-1.23553	1.23553	1.00
ATBG07C	-0.54308	-1.43816	1.43816	1.08
ATBG07D	0.97878	-1.91297	1.91297	0.84
ATBG07E	0.55100	-1.90039	1.90039	0.87
ATBG07F	1.18574	-1.83791	1.83791	0.89
ATBG07G	-0.48880	-1.35559	1.35559	1.08
ATBG07H	0.05193	-1.51487	1.51487	1.00

**Scale Transformation Constants for the TIMSS 2015 Safe and Orderly School – Teachers' Reports Scale, Fourth Grade**

Scale Transformation Constants	
A = 8.379152	Transformed Scale Score = 8.379152 + 1.021142 • Logit Scale Score
B = 1.021142	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 Safe and Orderly School – Teachers' Reports Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.75218	
1	5.02760	
2	5.71019	
3	6.22383	
4	6.66369	6.7
5	7.06780	
6	7.45682	
7	7.84491	
8	8.23956	
9	8.65006	
10	9.08289	
11	9.54538	
12	10.04965	10.0
13	10.61012	
14	11.25092	
15	12.04413	
16	13.41271	

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 2015 Safe and Orderly School – Teachers' Reports Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			ATB607A	ATB607B	ATB607C	ATB607D	ATB607E	ATB607F	ATB607G	ATB607H
Australia	0.86	52	0.64	0.66	0.66	0.83	0.81	0.81	0.62	0.71
Bahrain	0.89	57	0.51	0.65	0.73	0.86	0.78	0.82	0.81	0.82
Belgium (Flemish)	0.83	46	0.49	0.59	0.66	0.78	0.77	0.73	0.65	0.72
Bulgaria	0.83	46	0.55	0.68	0.64	0.78	0.76	0.75	0.58	0.66
Canada	0.86	51	0.52	0.60	0.64	0.81	0.79	0.80	0.73	0.76
Chile	0.88	54	0.59	0.70	0.72	0.79	0.83	0.81	0.66	0.77
Chinese Taipei	0.89	56	0.70	0.75	0.73	0.76	0.77	0.76	0.78	0.76
Croatia	0.88	55	0.63	0.72	0.73	0.77	0.78	0.74	0.74	0.81
Cyprus	0.87	53	0.70	0.67	0.70	0.77	0.77	0.79	0.72	0.69
Czech Republic	0.83	47	0.56	0.73	0.68	0.70	0.74	0.63	0.72	0.72
Denmark	0.83	47	0.54	0.51	0.63	0.78	0.77	0.76	0.68	0.74
England	0.86	52	0.48	0.64	0.61	0.83	0.80	0.77	0.71	0.85
Finland	0.82	45	0.43	0.63	0.55	0.79	0.78	0.69	0.70	0.74
France	0.84	48	0.73	0.78	0.72	0.74	0.70	0.71	0.50	0.58
Georgia	0.83	47	0.58	0.69	0.73	0.72	0.71	0.49	0.79	0.73
Germany	0.85	49	0.70	0.76	0.68	0.79	0.79	0.76	0.53	0.56
Hong Kong SAR	0.88	55	0.55	0.68	0.67	0.78	0.76	0.82	0.82	0.83
Hungary	0.86	51	0.50	0.67	0.74	0.77	0.80	0.77	0.71	0.69
Indonesia	0.85	50	0.62	0.70	0.67	0.81	0.74	0.81	0.59	0.70
Iran, Islamic Rep. of	0.84	47	0.62	0.70	0.69	0.80	0.74	0.77	0.65	0.47
Ireland	0.86	53	0.62	0.67	0.55	0.83	0.84	0.83	0.66	0.73
Italy	0.82	45	0.50	0.61	0.57	0.76	0.73	0.79	0.62	0.71
Japan	0.74	36	0.63	0.64	0.52	0.72	0.54	0.70	0.44	0.57
Jordan	0.87	53	0.55	0.62	0.76	0.79	0.75	0.78	0.75	0.77
Kazakhstan	0.88	54	0.67	0.76	0.62	0.73	0.74	0.79	0.80	0.79
Korea, Rep. of	0.89	57	0.60	0.70	0.75	0.82	0.80	0.80	0.77	0.79
Kuwait	0.86	51	0.49	0.57	0.72	0.80	0.81	0.79	0.72	0.75
Lithuania	0.83	46	0.46	0.70	0.72	0.71	0.75	0.72	0.53	0.73
Morocco	0.88	56	0.67	0.76	0.71	0.80	0.70	0.79	0.79	0.74
Netherlands	0.84	47	0.66	0.62	0.64	0.84	0.82	0.75	0.43	0.64
New Zealand	0.86	53	0.66	0.69	0.67	0.79	0.80	0.77	0.71	0.72
Northern Ireland	0.81	47	0.50	0.60	0.63	0.83	0.85	0.81	0.57	0.56
Norway (5)	0.87	53	0.60	0.61	0.67	0.83	0.82	0.78	0.72	0.76
Oman	0.84	47	0.46	0.52	0.63	0.77	0.76	0.74	0.78	0.75
Poland	0.83	46	0.54	0.64	0.68	0.72	0.77	0.72	0.65	0.67
Portugal	0.86	51	0.66	0.69	0.80	0.75	0.71	0.78	0.64	0.67
Qatar	0.85	49	0.39	0.55	0.62	0.75	0.82	0.81	0.77	0.79
Russian Federation	0.80	44	0.53	0.62	0.56	0.77	0.77	0.75	0.42	0.76
Saudi Arabia	0.85	51	0.33	0.42	0.63	0.83	0.82	0.84	0.82	0.83
Serbia	0.89	57	0.62	0.74	0.79	0.80	0.80	0.78	0.68	0.81
Singapore	0.89	56	0.58	0.63	0.74	0.81	0.81	0.82	0.78	0.80
Slovak Republic	0.85	49	0.37	0.68	0.65	0.76	0.80	0.79	0.72	0.75
Slovenia	0.84	47	0.61	0.62	0.74	0.72	0.71	0.66	0.65	0.76
South Africa (5)	0.88	55	0.66	0.74	0.70	0.80	0.74	0.79	0.72	0.75
Spain	0.85	49	0.57	0.66	0.71	0.78	0.78	0.79	0.59	0.70
Sweden	0.84	49	0.61	0.74	0.72	0.75	0.78	0.77	0.46	0.72
Turkey	0.89	57	0.76	0.76	0.74	0.75	0.76	0.75	0.75	0.76
United Arab Emirates	0.89	56	0.48	0.63	0.71	0.82	0.81	0.84	0.80	0.82
United States	0.88	55	0.62	0.67	0.70	0.85	0.81	0.82	0.70	0.75
<b>Benchmarking Participants</b>										
Buenos Aires, Argentina	0.87	52	0.49	0.65	0.59	0.78	0.82	0.74	0.80	0.82
Ontario, Canada	0.86	51	0.53	0.59	0.63	0.79	0.80	0.78	0.75	0.80
Quebec, Canada	0.83	47	0.58	0.65	0.60	0.76	0.67	0.74	0.73	0.73
Norway (4)	0.87	54	0.74	0.71	0.70	0.81	0.79	0.79	0.70	0.65
Abu Dhabi, UAE	0.87	53	0.34	0.59	0.67	0.82	0.79	0.84	0.79	0.82
Dubai, UAE	0.88	54	0.39	0.56	0.66	0.79	0.82	0.85	0.84	0.85
Florida, US	0.90	60	0.64	0.71	0.70	0.88	0.85	0.92	0.77	0.67

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

**Relationship Between the TIMSS 2015 Safe and Orderly School – Teachers' Reports Scale, Fourth Grade, and TIMSS 2015 Achievement**

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )	
	(r)		(r)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.24	0.22	0.06	0.05	0.05	0.04
Bahrain	0.18	0.13	0.03	0.02	0.02	0.01
Belgium (Flemish)	0.16	0.17	0.03	0.03	0.01	0.01
Bulgaria	0.20	0.22	0.04	0.05	0.03	0.03
Canada	0.06	0.10	0.00	0.01	0.00	0.01
Chile	0.24	0.28	0.06	0.08	0.04	0.06
Chinese Taipei	0.01	-0.02	0.00	0.00	0.00	0.00
Croatia	-0.03	-0.03	0.00	0.00	0.00	0.00
Cyprus	0.08	0.07	0.01	0.00	0.01	0.00
Czech Republic	0.06	0.07	0.00	0.01	0.00	0.00
Denmark	0.12	0.13	0.01	0.02	0.02	0.03
England	0.13	0.12	0.02	0.02	0.01	0.01
Finland	0.06	0.07	0.00	0.00	0.01	0.01
France	0.18	0.17	0.03	0.03	0.04	0.04
Georgia	0.04	0.05	0.00	0.00	0.00	0.00
Germany	0.16	0.18	0.03	0.03	0.02	0.02
Hong Kong SAR	0.06	0.14	0.00	0.02	0.00	0.01
Hungary	0.18	0.17	0.03	0.03	0.02	0.02
Indonesia	0.01	0.01	0.00	0.00	0.00	0.00
Iran, Islamic Rep. of	0.09	0.09	0.01	0.01	0.01	0.01
Ireland	0.14	0.19	0.02	0.03	0.02	0.03
Italy	0.06	0.05	0.00	0.00	0.01	0.01
Japan	0.04	0.05	0.00	0.00	0.01	0.01
Jordan	0.13	-	0.02	-	0.01	-
Kazakhstan	0.07	0.08	0.01	0.01	0.00	0.00
Korea, Rep. of	0.10	0.08	0.01	0.01	0.01	0.01
Kuwait	0.04	0.11	0.00	0.01	0.00	0.00
Lithuania	0.02	0.01	0.00	0.00	0.00	0.00
Morocco	0.13	0.13	0.02	0.02	0.02	0.02
Netherlands	0.10	0.14	0.01	0.02	0.01	0.02
New Zealand	0.25	0.23	0.06	0.05	0.05	0.04
Northern Ireland	0.11	0.10	0.01	0.01	0.01	0.01
Norway (5)	0.09	0.12	0.01	0.01	0.01	0.01
Oman	0.03	0.02	0.00	0.00	0.00	0.00
Poland	0.02	0.04	0.00	0.00	0.00	0.00
Portugal	0.16	0.14	0.02	0.02	0.01	0.01
Qatar	0.08	0.14	0.01	0.02	0.01	0.03
Russian Federation	0.05	0.02	0.00	0.00	0.00	0.00
Saudi Arabia	0.18	0.14	0.03	0.02	0.03	0.02
Serbia	0.03	0.03	0.00	0.00	0.00	0.00
Singapore	0.10	0.12	0.01	0.02	0.00	0.02
Slovak Republic	0.13	0.13	0.02	0.02	0.02	0.03
Slovenia	0.04	0.05	0.00	0.00	0.00	0.00
South Africa (5)	0.08	-	0.01	-	0.01	-
Spain	0.22	0.23	0.05	0.05	0.04	0.04
Sweden	0.22	0.24	0.05	0.06	0.05	0.06
Turkey	0.16	0.16	0.03	0.02	0.02	0.02
United Arab Emirates	0.33	0.34	0.11	0.11	0.08	0.07
United States	0.21	0.22	0.05	0.05	0.04	0.04
<b>International Median</b>	<b>0.10</b>	<b>0.12</b>	<b>0.01</b>	<b>0.02</b>	<b>0.01</b>	<b>0.01</b>
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	0.20	0.19	0.04	0.04	0.03	0.03
Ontario, Canada	0.07	0.07	0.00	0.00	0.00	0.01
Quebec, Canada	0.09	0.08	0.01	0.01	0.00	0.00
Norway (4)	0.07	0.09	0.00	0.01	0.01	0.03
Abu Dhabi, UAE	0.24	0.22	0.06	0.05	0.06	0.02
Dubai, UAE	0.31	0.33	0.10	0.11	0.08	0.09
Florida, US	0.22	0.20	0.05	0.04	0.06	0.05

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

A dash (-) indicates comparable data not available.

# School Discipline Problems–Principals’ Reports Scale, Fourth Grade

The School Discipline Problems–Principals’ Reports (DAS) scale was created based on principals’ responses concerning the ten potential school problems described below.

## Items in the TIMSS 2015 School Discipline Problems–Principals’ Reports Scale, Fourth Grade

		To what degree is each of the following a problem among fourth grade students in your school?				
		Not a problem	Minor problem	Moderate problem	Serious problem	
T	ACBG16A	1) Arriving late at school -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	ACBG16B	2) Absenteeism (i.e., unjustified absences) -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	ACBG16C	3) Classroom disturbance -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	ACBG16D	4) Cheating -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	ACBG16E	5) Profanity -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	ACBG16F	6) Vandalism -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	ACBG16G	7) Theft -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	ACBG16H	8) Intimidation or verbal abuse among students (including texting, emailing, etc.) -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	ACBG16I	9) Physical fights among students -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	ACBG16J	10) Intimidation or verbal abuse of teachers or staff (including texting, emailing, etc.) -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Hardly Any Problems      Minor Problems (9.7)      Moderate to Severe Problems (7.6)

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.

**Item Parameters for the TIMSS 2015 School Discipline Problems - Principals' Reports Scale, Fourth Grade**

Item	delta	tau_1	tau_2	tau_3	Infit
ACBG16A	-0.04434	-2.20733	-0.33916	2.54649	1.32
ACBG16B	0.26055	-1.25742	-0.52690	1.78432	1.23
ACBG16C	0.73852	-2.23001	-0.29453	2.52454	0.99
ACBG16D	-0.48580	-0.99657	-0.85069	1.84726	0.96
ACBG16E	0.48637	-1.57910	-0.46416	2.04326	0.90
ACBG16F	-0.25161	-0.42885	-0.69852	1.12737	0.80
ACBG16G	-0.46856	0.19761	-1.13779	0.94018	0.75
ACBG16H	0.20843	-1.29153	-0.75176	2.04329	0.93
ACBG16I	0.26742	-1.29267	-0.85001	2.14268	0.87
ACBG16J	-0.71098	0.19104	-0.78670	0.59566	0.85

**Scale Transformation Constants for the TIMSS 2015 School Discipline Problems - Principals' Reports Scale, Fourth Grade**

Scale Transformation Constants

A = 7.80934

B = 0.969053

Transformed Scale Score = 7.80934 + 0.969053 • Logit Scale Score

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



**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 School Discipline Problems - Principals' Reports Scale, Fourth  
Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.69215	
1	4.77953	
2	5.28846	
3	5.62589	
4	5.88225	
5	6.09144	
6	6.27112	
7	6.43124	
8	6.57814	
9	6.71457	
10	6.84760	
11	6.97770	
12	7.10707	
13	7.23779	
14	7.37193	
15	7.51249	7.6
16	7.65937	
17	7.81721	
18	7.98823	
19	8.17529	
20	8.38218	
21	8.61094	
22	8.86392	
23	9.14220	
24	9.44664	
25	9.77698	9.7
26	10.13829	
27	10.54381	
28	11.02588	
29	11.67067	
30	12.88232	

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 2015 School Discipline Problems - Principals' Reports Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			ACBG16A	ACBG16B	ACBG16C	ACBG16D	ACBG16E	ACBG16F	ACBG16G	ACBG16H	ACBG16I	ACBG16J
Australia	0.92	62	0.71	0.79	0.78	0.74	0.84	0.82	0.76	0.77	0.85	0.77
Bahrain	0.97	78	0.80	0.84	0.82	0.92	0.90	0.93	0.91	0.92	0.87	0.93
Belgium (Flemish)	0.87	46	0.56	0.62	0.67	0.57	0.64	0.72	0.71	0.78	0.75	0.73
Bulgaria	0.93	61	0.79	0.71	0.82	0.74	0.84	0.83	0.69	0.78	0.83	0.75
Canada	0.86	49	0.63	0.55	0.69	0.69	0.78	0.80	0.76	0.68	0.76	0.58
Chile	0.86	46	0.52	0.65	0.72	0.67	0.82	0.68	0.72	0.66	0.75	0.52
Chinese Taipei	0.91	57	0.73	0.66	0.78	0.70	0.83	0.83	0.78	0.79	0.82	0.57
Croatia	0.81	38	0.44	0.39	0.62	0.56	0.70	0.71	0.61	0.78	0.72	0.47
Cyprus	0.93	62	0.71	0.74	0.84	0.77	0.78	0.80	0.81	0.80	0.85	0.78
Czech Republic	0.88	49	0.58	0.61	0.65	0.73	0.73	0.76	0.75	0.76	0.76	0.65
Denmark	0.83	40	0.63	0.69	0.63	0.36	0.68	0.70	0.61	0.69	0.63	0.63
England	0.82	41	0.58	0.57	0.69	0.42	0.71	0.70	0.52	0.69	0.75	0.72
Finland	0.83	43	0.62	0.62	0.61	0.69	0.74	0.67	0.74	0.61	0.67	0.58
France	0.90	53	0.61	0.65	0.71	0.67	0.80	0.79	0.76	0.77	0.76	0.75
Georgia	0.95	71	0.66	0.76	0.88	0.84	0.91	0.85	0.89	0.85	0.87	0.87
Germany	0.90	54	0.71	0.71	0.77	0.66	0.73	0.78	0.73	0.75	0.77	0.69
Hong Kong SAR	0.83	39	0.59	0.67	0.72	0.57	0.75	0.70	0.59	0.56	0.71	0.27
Hungary	0.92	60	0.71	0.80	0.79	0.77	0.69	0.80	0.78	0.84	0.80	0.73
Indonesia	0.97	80	0.78	0.89	0.83	0.89	0.94	0.89	0.93	0.93	0.92	0.92
Iran, Islamic Rep. of	0.92	58	0.57	0.67	0.65	0.75	0.85	0.82	0.85	0.82	0.79	0.77
Ireland	0.87	51	0.53	0.55	0.64	0.65	0.81	0.80	0.79	0.72	0.83	0.77
Italy	0.95	69	0.56	0.88	0.70	0.78	0.69	0.92	0.93	0.90	0.92	0.93
Japan	0.92	61	0.54	0.63	0.78	0.85	0.85	0.84	0.90	0.84	0.58	0.87
Jordan	0.94	67	0.62	0.71	0.68	0.86	0.87	0.84	0.90	0.87	0.90	0.86
Kazakhstan	0.98	81	0.85	0.89	0.89	0.74	0.95	0.95	0.94	0.94	0.92	0.94
Korea, Rep. of	0.96	76	0.75	0.88	0.76	0.92	0.84	0.93	0.93	0.88	0.92	0.91
Kuwait	0.94	67	0.68	0.78	0.85	0.80	0.86	0.89	0.82	0.83	0.85	0.79
Lithuania	0.82	39	0.47	0.52	0.65	0.72	0.73	0.58	0.73	0.67	0.66	0.43
Morocco	0.95	68	0.47	0.64	0.86	0.85	0.87	0.89	0.89	0.89	0.92	0.86
Netherlands	0.76	35	0.43	0.50	0.54	0.54	0.62	0.58	0.25	0.78	0.83	0.61
New Zealand	0.87	48	0.63	0.60	0.63	0.65	0.76	0.79	0.72	0.66	0.79	0.65
Northern Ireland	0.83	45	0.50	0.43	0.67	0.67	0.81	0.73	0.60	0.76	0.77	0.64
Norway (5)	0.84	43	0.73	0.69	0.60	0.60	0.77	0.77	0.54	0.64	0.65	0.52
Oman	0.95	69	0.75	0.80	0.78	0.87	0.88	0.90	0.90	0.85	0.75	0.79
Poland	0.84	41	0.61	0.40	0.66	0.64	0.70	0.72	0.71	0.68	0.67	0.58
Portugal	0.93	63	0.63	0.82	0.68	0.75	0.68	0.90	0.90	0.83	0.81	0.88
Qatar	0.96	75	0.67	0.76	0.78	0.92	0.90	0.90	0.89	0.93	0.93	0.91
Russian Federation	0.76	33	0.43	0.39	0.63	0.50	0.67	0.65	0.68	0.71	0.64	0.33
Saudi Arabia	0.96	73	0.59	0.63	0.82	0.91	0.90	0.93	0.93	0.92	0.92	0.92
Serbia	0.93	63	0.64	0.72	0.79	0.82	0.77	0.86	0.84	0.85	0.83	0.79
Singapore	0.88	49	0.64	0.67	0.71	0.74	0.72	0.72	0.73	0.80	0.70	0.52
Slovak Republic	0.88	48	0.57	0.66	0.59	0.75	0.77	0.76	0.74	0.71	0.72	0.64
Slovenia	0.88	49	0.71	0.72	0.68	0.68	0.69	0.75	0.63	0.70	0.70	0.71
South Africa (5)	0.87	47	0.54	0.60	0.69	0.71	0.68	0.74	0.76	0.72	0.79	0.56
Spain	0.94	68	0.66	0.80	0.77	0.78	0.79	0.90	0.89	0.86	0.86	0.92
Sweden	0.90	52	0.63	0.68	0.75	0.58	0.75	0.78	0.70	0.80	0.79	0.74
Turkey	0.96	73	0.71	0.82	0.82	0.89	0.83	0.89	0.92	0.91	0.85	0.87
United Arab Emirates	0.93	62	0.64	0.74	0.77	0.81	0.81	0.85	0.85	0.79	0.78	0.82
United States	0.88	49	0.62	0.68	0.72	0.67	0.78	0.67	0.74	0.71	0.73	0.67
<b>Benchmarking Participants</b>												
Buenos Aires, Argentina	0.90	54	0.38	0.60	0.65	0.71	0.81	0.81	0.85	0.81	0.78	0.81
Ontario, Canada	0.88	52	0.57	0.46	0.73	0.74	0.84	0.84	0.78	0.74	0.80	0.62
Quebec, Canada	0.80	39	0.62	0.63	0.56	0.65	0.72	0.58	0.63	0.65	0.61	0.58
Norway (4)	0.86	45	0.57	0.62	0.73	0.48	0.81	0.64	0.62	0.79	0.73	0.66
Abu Dhabi, UAE	0.86	48	0.60	0.69	0.76	0.60	0.72	0.74	0.70	0.64	0.74	0.73
Dubai, UAE	0.94	67	0.66	0.75	0.83	0.85	0.86	0.83	0.89	0.83	0.77	0.87
Florida, US	0.87	54	0.29	0.33	0.74	0.86	0.83	0.85	0.80	0.82	0.78	0.80

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

**Relationship Between the TIMSS 2015 School Discipline Problems - Principals' Reports Scale, Fourth Grade, and TIMSS 2015 Achievement**

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )	
	(r)		(r)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.28	0.25	0.08	0.06	0.07	0.06
Bahrain	0.11	0.15	0.01	0.02	0.01	0.02
Belgium (Flemish)	0.14	0.18	0.02	0.03	0.02	0.02
Bulgaria	0.20	0.25	0.04	0.06	0.04	0.05
Canada	0.16	0.13	0.03	0.02	0.02	0.02
Chile	0.15	0.15	0.02	0.02	0.02	0.02
Chinese Taipei	0.13	0.15	0.02	0.02	0.01	0.01
Croatia	-0.04	-0.04	0.00	0.00	0.00	0.00
Cyprus	0.07	0.09	0.01	0.01	0.01	0.01
Czech Republic	0.08	0.08	0.01	0.01	0.01	0.01
Denmark	0.13	0.14	0.02	0.02	0.02	0.02
England	0.18	0.19	0.03	0.03	0.02	0.02
Finland	0.04	0.03	0.00	0.00	0.00	0.00
France	0.15	0.14	0.02	0.02	0.03	0.02
Georgia	-0.01	-0.03	0.00	0.00	0.02	0.02
Germany	0.17	0.18	0.03	0.03	0.02	0.02
Hong Kong SAR	0.17	0.14	0.03	0.02	0.00	0.00
Hungary	0.21	0.22	0.04	0.05	0.05	0.06
Indonesia	0.05	0.05	0.00	0.00	0.01	0.01
Iran, Islamic Rep. of	0.20	0.21	0.04	0.05	0.03	0.04
Ireland	0.17	0.17	0.03	0.03	0.02	0.02
Italy	0.04	0.03	0.00	0.00	0.00	0.00
Japan	0.03	0.03	0.00	0.00	0.00	0.00
Jordan	0.12	-	0.01	-	0.03	-
Kazakhstan	0.02	0.07	0.00	0.00	0.01	0.01
Korea, Rep. of	0.02	0.01	0.00	0.00	0.00	0.00
Kuwait	0.12	0.13	0.01	0.02	0.02	0.02
Lithuania	0.07	0.07	0.01	0.00	0.01	0.01
Morocco	0.06	0.10	0.00	0.01	0.01	0.01
Netherlands	0.11	0.15	0.01	0.02	0.00	0.01
New Zealand	0.26	0.26	0.07	0.07	0.06	0.06
Northern Ireland	0.15	0.13	0.02	0.02	0.01	0.01
Norway (5)	0.12	0.10	0.01	0.01	0.01	0.01
Oman	-0.06	-0.06	0.00	0.00	0.01	0.00
Poland	-0.03	-0.03	0.00	0.00	0.00	0.00
Portugal	0.07	0.06	0.00	0.00	0.01	0.00
Qatar	0.05	0.05	0.00	0.00	0.00	0.01
Russian Federation	0.09	0.10	0.01	0.01	0.00	0.00
Saudi Arabia	0.04	0.05	0.00	0.00	0.00	0.00
Serbia	-0.05	-0.08	0.00	0.01	0.00	0.00
Singapore	0.07	0.08	0.01	0.01	0.00	0.00
Slovak Republic	0.20	0.22	0.04	0.05	0.04	0.05
Slovenia	0.02	0.03	0.00	0.00	0.00	0.00
South Africa (5)	0.15	-	0.02	-	0.02	-
Spain	0.20	0.18	0.04	0.03	0.03	0.02
Sweden	0.21	0.24	0.04	0.06	0.05	0.07
Turkey	0.16	0.15	0.03	0.02	0.05	0.05
United Arab Emirates	0.28	0.28	0.08	0.08	0.06	0.06
United States	0.24	0.23	0.06	0.05	0.05	0.05
<b>International Median</b>	<b>0.12</b>	<b>0.13</b>	<b>0.01</b>	<b>0.02</b>	<b>0.01</b>	<b>0.01</b>
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	0.16	0.22	0.03	0.05	0.02	0.05
Ontario, Canada	0.12	0.11	0.01	0.01	0.02	0.01
Quebec, Canada	0.22	0.20	0.05	0.04	0.02	0.02
Norway (4)	0.06	0.05	0.00	0.00	0.02	0.02
Abu Dhabi, UAE	0.12	0.12	0.01	0.01	0.02	0.02
Dubai, UAE	0.36	0.37	0.13	0.14	0.10	0.11
Florida, US	0.20	0.18	0.04	0.03	0.05	0.04

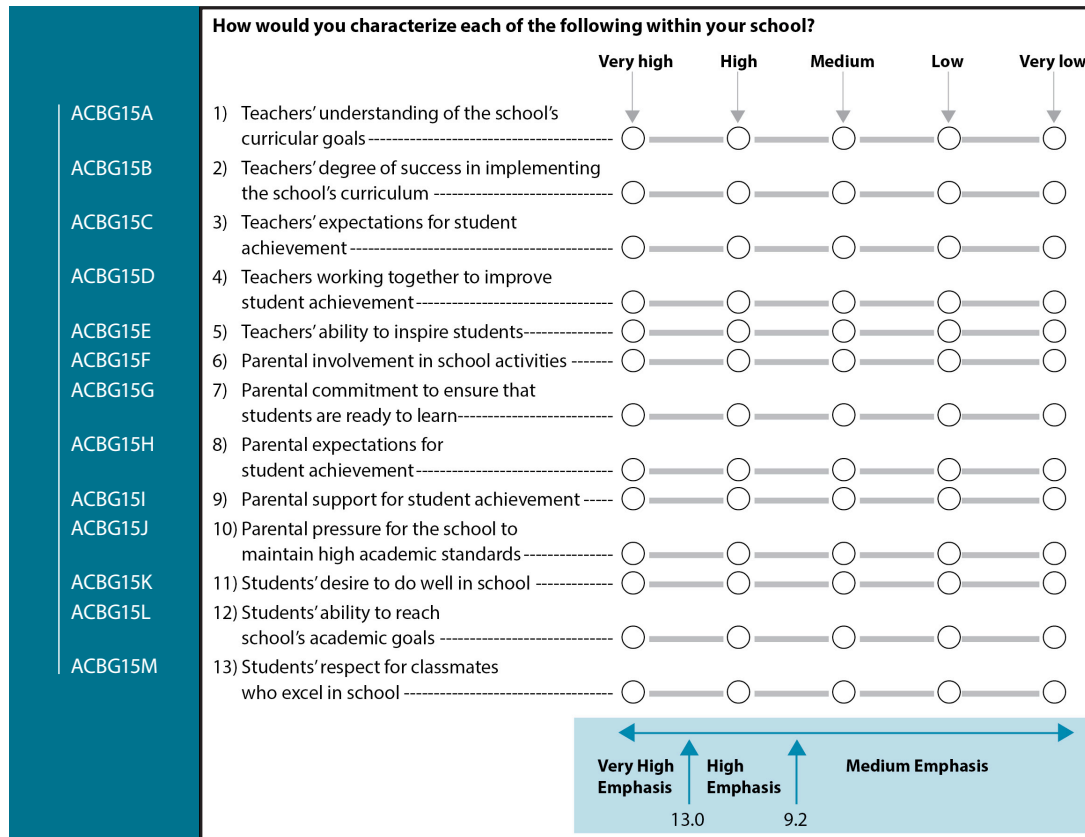
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

A dash (-) indicates comparable data not available.

# School Emphasis on Academic Success–Principals’ Reports Scale, Fourth Grade

The School Emphasis on Academic Success–Principals’ Reports (EAS) scale was created based on principals’ responses characterizing the thirteen aspects described below.

## Items in the TIMSS 2015 School Emphasis on Academic Success–Principals’ Reports Scale, Fourth Grade<sup>1</sup>



<sup>1</sup> For the purpose of scaling, categories in which there were very few respondents were combined. The categories “Low” and “Very low” were combined for all variables. The scale statistics that are reported herein reflect analysis of the items following collapsing.



**Item Parameters for the TIMSS 2015 School Emphasis on Academic Success - Principals' Reports Scale, Fourth Grade**

Item	delta	tau_1	tau_2	tau_3	Infit
ACBG15A	-1.49153	-3.26339	0.01543	3.24796	1.11
ACBG15B	-1.14521	-3.76020	0.21124	3.54896	0.95
ACBG15C	-0.95253	-3.19800	-0.09325	3.29125	0.94
ACBG15D	-0.84577	-2.65178	-0.07563	2.72741	1.11
ACBG15E	-0.77543	-3.34641	0.10015	3.24626	0.95
ACBG15F	1.23139	-2.36291	0.07932	2.28359	1.08
ACBG15G	1.35745	-2.55669	0.11018	2.44651	0.82
ACBG15H	-0.12575	-2.38828	-0.21068	2.59896	1.05
ACBG15I	1.17337	-2.68711	0.13967	2.54744	0.86
ACBG15J	0.95539	-2.12628	-0.10531	2.23159	1.30
ACBG15K	0.25637	-3.18819	0.01950	3.16869	0.87
ACBG15L	0.45531	-3.64831	0.12426	3.52405	0.87
ACBG15M	-0.09306	-2.86040	-0.25037	3.11077	1.11

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

**Scale Transformation Constants for the TIMSS 2015 School Emphasis on Academic Success - Principals' Reports Scale, Fourth Grade**

Scale Transformation Constants	
A = 9.225455	Transformed Scale Score = 9.225455 + 1.162825 • Logit Scale Score
B = 1.162825	

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 School Emphasis on Academic Success - Principals' Reports Scale,  
Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	1.11861	
2	3.38565	
3	3.98611	
4	4.49199	
5	4.94072	
6	5.35139	
7	5.73260	
8	6.08989	
9	6.42657	
10	6.74506	
11	7.04762	
12	7.33657	
13	7.61508	
14	7.88540	
15	8.15003	
16	8.41127	
17	8.67110	
18	8.93106	
19	9.19207	9.2
20	9.45487	
21	9.71913	
22	9.98452	
23	10.25046	
24	10.51641	
25	10.78212	
26	11.04771	
27	11.31374	
28	11.58121	
29	11.85159	
30	12.12605	
31	12.40830	
32	12.70126	
33	13.00978	13.0
34	13.34166	
35	13.70576	
36	14.12459	
37	14.63845	
38	15.34805	
39	16.73753	

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 2015 School Emphasis on Academic Success - Principals' Reports Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item													
			ACBG15A	ACBG15B	ACBG15C	ACBG15D	ACBG15E	ACBG15F	ACBG15G	ACBG15H	ACBG15I	ACBG15J	ACBG15K	ACBG15L	ACBG15M	
Australia	0.93	57	0.68	0.75	0.74	0.66	0.72	0.66	0.83	0.79	0.80	0.76	0.84	0.81	0.72	
Bahrain	0.91	48	0.63	0.78	0.75	0.75	0.79	0.56	0.72	0.63	0.70	0.53	0.80	0.70	0.60	
Belgium (Flemish)	0.80	32	0.07	0.34	0.58	0.29	0.39	0.66	0.79	0.64	0.72	0.59	0.65	0.72	0.48	
Bulgaria	0.92	53	0.54	0.72	0.75	0.66	0.71	0.83	0.85	0.72	0.80	0.66	0.74	0.79	0.65	
Canada	0.94	58	0.71	0.77	0.82	0.71	0.75	0.76	0.84	0.78	0.82	0.70	0.77	0.76	0.65	
Chile	0.91	48	0.67	0.75	0.63	0.63	0.68	0.68	0.79	0.71	0.74	0.68	0.70	0.72	0.65	
Chinese Taipei	0.92	53	0.73	0.82	0.74	0.64	0.76	0.75	0.67	0.67	0.80	0.67	0.76	0.81	0.63	
Croatia	0.90	47	0.69	0.73	0.67	0.77	0.73	0.67	0.71	0.55	0.74	0.72	0.68	0.57	0.62	
Cyprus	0.91	50	0.40	0.64	0.72	0.53	0.65	0.78	0.86	0.79	0.82	0.73	0.76	0.76	0.61	
Czech Republic	0.84	35	0.41	0.48	0.51	0.52	0.67	0.63	0.67	0.64	0.61	0.69	0.66	0.64	0.52	
Denmark	0.89	44	0.74	0.70	0.77	0.67	0.63	0.59	0.76	0.72	0.68	0.37	0.72	0.62	0.60	
England	0.91	49	0.63	0.72	0.74	0.67	0.72	0.65	0.76	0.69	0.74	0.66	0.68	0.78	0.69	
Finland	0.85	36	0.54	0.63	0.66	0.57	0.67	0.59	0.70	0.65	0.60	0.45	0.63	0.52	0.57	
France	0.80	32	0.29	0.40	0.40	0.29	0.49	0.45	0.83	0.64	0.75	0.46	0.71	0.71	0.61	
Georgia	0.90	47	0.60	0.66	0.72	0.68	0.72	0.75	0.73	0.58	0.75	0.67	0.72	0.67	0.64	
Germany	0.80	32	0.23	0.39	0.61	0.30	0.41	0.64	0.80	0.63	0.78	0.51	0.54	0.71	0.40	
Hong Kong SAR	0.92	53	0.66	0.77	0.65	0.60	0.75	0.66	0.81	0.79	0.83	0.69	0.76	0.82	0.60	
Hungary	0.90	45	0.54	0.65	0.53	0.49	0.69	0.61	0.74	0.77	0.76	0.67	0.74	0.71	0.71	
Indonesia	0.92	51	0.63	0.70	0.55	0.69	0.67	0.77	0.79	0.76	0.79	0.71	0.77	0.72	0.69	
Iran, Islamic Rep. of	0.90	47	0.73	0.73	0.53	0.61	0.71	0.70	0.71	0.63	0.72	0.64	0.78	0.74	0.62	
Ireland	0.90	48	0.50	0.69	0.67	0.51	0.67	0.67	0.81	0.82	0.80	0.64	0.75	0.73	0.63	
Italy	0.85	37	0.56	0.65	0.65	0.57	0.73	0.71	0.66	0.51	0.60	0.57	0.69	0.62	0.27	
Japan	0.89	43	0.57	0.57	0.60	0.49	0.62	0.70	0.81	0.82	0.75	0.60	0.68	0.70	0.50	
Jordan	0.91	49	0.67	0.68	0.60	0.74	0.67	0.70	0.82	0.75	0.73	0.58	0.74	0.78	0.63	
Kazakhstan	0.92	51	0.59	0.65	0.63	0.68	0.78	0.71	0.82	0.68	0.83	0.73	0.76	0.73	0.66	
Korea, Rep. of	0.92	51	0.57	0.57	0.66	0.61	0.61	0.83	0.85	0.76	0.78	0.64	0.81	0.82	0.72	
Kuwait	0.93	56	0.75	0.79	0.85	0.81	0.78	0.61	0.79	0.77	0.63	0.52	0.75	0.84	0.75	
Lithuania	0.88	41	0.43	0.59	0.60	0.62	0.69	0.74	0.77	0.72	0.68	0.36	0.71	0.62	0.70	
Morocco	0.90	45	0.62	0.67	0.62	0.72	0.62	0.67	0.75	0.72	0.73	0.66	0.67	0.71	0.51	
Netherlands	0.81	32	0.45	0.59	0.58	0.20	0.56	0.49	0.61	0.64	0.71	0.63	0.64	0.52	0.58	
New Zealand	0.92	52	0.59	0.68	0.68	0.53	0.67	0.75	0.80	0.83	0.80	0.75	0.76	0.73	0.72	
Northern Ireland	0.87	39	0.27	0.42	0.51	0.48	0.48	0.68	0.74	0.77	0.76	0.68	0.68	0.75	0.66	
Norway (5)	0.88	43	0.54	0.64	0.64	0.58	0.59	0.74	0.75	0.67	0.79	0.68	0.65	0.64	0.52	
Oman	0.89	44	0.52	0.59	0.69	0.68	0.64	0.74	0.77	0.69	0.76	0.40	0.69	0.71	0.62	
Poland	0.87	40	0.52	0.56	0.57	0.48	0.70	0.65	0.79	0.64	0.77	0.62	0.71	0.61	0.58	
Portugal	0.89	45	0.55	0.70	0.73	0.57	0.68	0.68	0.81	0.77	0.80	0.55	0.68	0.62	0.52	
Qatar	0.92	55	0.66	0.76	0.80	0.71	0.82	0.68	0.78	0.69	0.82	0.58	0.80	0.78	0.71	
Russian Federation	0.82	36	0.57	0.63	0.60	0.53	0.62	0.75	0.67	0.38	0.77	0.00	0.71	0.65	0.51	
Saudi Arabia	0.91	48	0.68	0.70	0.64	0.72	0.67	0.72	0.74	0.74	0.72	0.60	0.74	0.70	0.61	
Serbia	0.87	41	0.64	0.65	0.54	0.68	0.76	0.69	0.77	0.28	0.73	0.47	0.69	0.67	0.53	
Singapore	0.93	55	0.66	0.78	0.79	0.67	0.71	0.73	0.81	0.74	0.83	0.66	0.80	0.79	0.62	
Slovak Republic	0.85	37	0.60	0.66	0.56	0.64	0.61	0.57	0.65	0.49	0.59	0.53	0.64	0.69	0.61	
Slovenia	0.83	35	0.75	0.79	0.63	0.76	0.74	0.48	0.53	0.46	0.57	0.46	0.46	0.35	0.43	
South Africa (5)	0.89	43	0.64	0.63	0.58	0.66	0.69	0.66	0.75	0.55	0.69	0.56	0.74	0.75	0.56	
Spain	0.91	49	0.54	0.74	0.77	0.65	0.59	0.74	0.82	0.80	0.78	0.61	0.68	0.70	0.61	
Sweden	0.90	46	0.60	0.65	0.76	0.57	0.68	0.64	0.74	0.74	0.72	0.66	0.74	0.71	0.51	
Turkey	0.90	46	0.56	0.69	0.61	0.48	0.62	0.71	0.79	0.73	0.79	0.73	0.72	0.77	0.50	
United Arab Emirates	0.93	54	0.73	0.75	0.77	0.75	0.74	0.71	0.79	0.68	0.77	0.62	0.75	0.79	0.71	
United States	0.94	59	0.64	0.74	0.74	0.67	0.75	0.85	0.86	0.81	0.85	0.80	0.80	0.75	0.67	
<b>Benchmarking Participants</b>																
Buenos Aires, Argentina	0.92	53	0.71	0.80	0.74	0.63	0.65	0.72	0.82	0.73	0.84	0.74	0.68	0.71	0.62	
Ontario, Canada	0.92	52	0.60	0.68	0.80	0.60	0.66	0.76	0.82	0.78	0.85	0.70	0.75	0.77	0.54	
Quebec, Canada	0.90	47	0.63	0.78	0.75	0.75	0.71	0.63	0.80	0.64	0.66	0.64	0.63	0.59	0.62	
Norway (4)	0.88	43	0.60	0.66	0.69	0.57	0.61	0.72	0.74	0.66	0.76	0.69	0.65	0.64	0.46	
Abu Dhabi, UAE	0.92	51	0.73	0.82	0.78	0.73	0.70	0.65	0.74	0.56	0.70	0.59	0.75	0.79	0.69	
Dubai, UAE	0.94	60	0.75	0.73	0.82	0.76	0.78	0.79	0.80	0.77	0.82	0.65	0.84	0.83	0.76	
Florida, US	0.90	47	0.47	0.64	0.46	0.36	0.51	0.81	0.87	0.82	0.83	0.72	0.79	0.78	0.59	

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

**Relationship Between the TIMSS 2015 School Emphasis on Academic Success - Principals' Reports Scale, Fourth Grade, and TIMSS 2015 Achievement**

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )	
	(r)		(r <sup>2</sup> )		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.30	0.28	0.09	0.08	0.06	0.06
Bahrain	0.15	0.16	0.02	0.03	0.02	0.02
Belgium (Flemish)	0.21	0.23	0.04	0.05	0.02	0.03
Bulgaria	0.26	0.32	0.07	0.10	0.06	0.10
Canada	0.22	0.12	0.05	0.02	0.04	0.01
Chile	0.25	0.23	0.06	0.06	0.03	0.02
Chinese Taipei	0.16	0.15	0.03	0.02	0.03	0.02
Croatia	0.05	0.04	0.00	0.00	0.00	0.00
Cyprus	0.13	0.13	0.02	0.02	0.02	0.02
Czech Republic	0.11	0.10	0.01	0.01	0.01	0.00
Denmark	0.09	0.10	0.01	0.01	0.00	0.00
England	0.20	0.23	0.04	0.05	0.03	0.04
Finland	0.06	0.04	0.00	0.00	0.00	0.00
France	0.19	0.19	0.04	0.04	0.01	0.01
Georgia	0.15	0.13	0.02	0.02	0.01	0.00
Germany	0.18	0.19	0.03	0.04	0.02	0.03
Hong Kong SAR	0.27	0.26	0.07	0.07	0.06	0.05
Hungary	0.32	0.33	0.10	0.11	0.06	0.06
Indonesia	0.09	0.11	0.01	0.01	0.02	0.02
Iran, Islamic Rep. of	0.11	0.11	0.01	0.01	0.01	0.01
Ireland	0.15	0.15	0.02	0.02	0.02	0.02
Italy	0.09	0.08	0.01	0.01	0.00	0.00
Japan	0.10	0.10	0.01	0.01	0.01	0.01
Jordan	0.23	-	0.05	-	0.02	-
Kazakhstan	0.14	0.12	0.02	0.01	0.00	0.00
Korea, Rep. of	0.14	0.13	0.02	0.02	0.02	0.01
Kuwait	0.19	0.20	0.04	0.04	0.04	0.04
Lithuania	0.20	0.17	0.04	0.03	0.02	0.01
Morocco	0.18	0.20	0.03	0.04	0.02	0.03
Netherlands	0.06	0.08	0.00	0.01	0.00	0.00
New Zealand	0.26	0.26	0.07	0.07	0.05	0.05
Northern Ireland	0.12	0.09	0.01	0.01	0.01	0.01
Norway (5)	0.15	0.14	0.02	0.02	0.01	0.01
Oman	-0.01	-0.01	0.00	0.00	0.00	0.00
Poland	0.12	0.11	0.01	0.01	0.01	0.01
Portugal	0.22	0.18	0.05	0.03	0.05	0.03
Qatar	0.20	0.21	0.04	0.05	0.03	0.04
Russian Federation	0.13	0.14	0.02	0.02	0.00	0.01
Saudi Arabia	0.12	0.14	0.02	0.02	0.01	0.01
Serbia	0.19	0.19	0.04	0.03	0.04	0.03
Singapore	0.22	0.23	0.05	0.05	0.04	0.05
Slovak Republic	0.23	0.23	0.05	0.05	0.04	0.04
Slovenia	0.02	0.02	0.00	0.00	0.00	0.00
South Africa (5)	0.17	-	0.03	-	0.00	-
Spain	0.27	0.27	0.07	0.07	0.06	0.06
Sweden	0.22	0.22	0.05	0.05	0.03	0.03
Turkey	0.35	0.33	0.13	0.11	0.07	0.07
United Arab Emirates	0.35	0.35	0.12	0.12	0.11	0.11
United States	0.28	0.29	0.08	0.08	0.08	0.08
<b>International Median</b>	<b>0.18</b>	<b>0.16</b>	<b>0.03</b>	<b>0.03</b>	<b>0.02</b>	<b>0.02</b>
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	0.28	0.30	0.08	0.09	0.06	0.08
Ontario, Canada	0.19	0.13	0.03	0.02	0.03	0.01
Quebec, Canada	0.12	0.07	0.01	0.01	0.01	0.00
Norway (4)	0.10	0.10	0.01	0.01	0.01	0.01
Abu Dhabi, UAE	0.34	0.34	0.11	0.12	0.09	0.09
Dubai, UAE	0.38	0.37	0.15	0.14	0.12	0.12
Florida, US	0.21	0.16	0.04	0.03	0.02	0.01

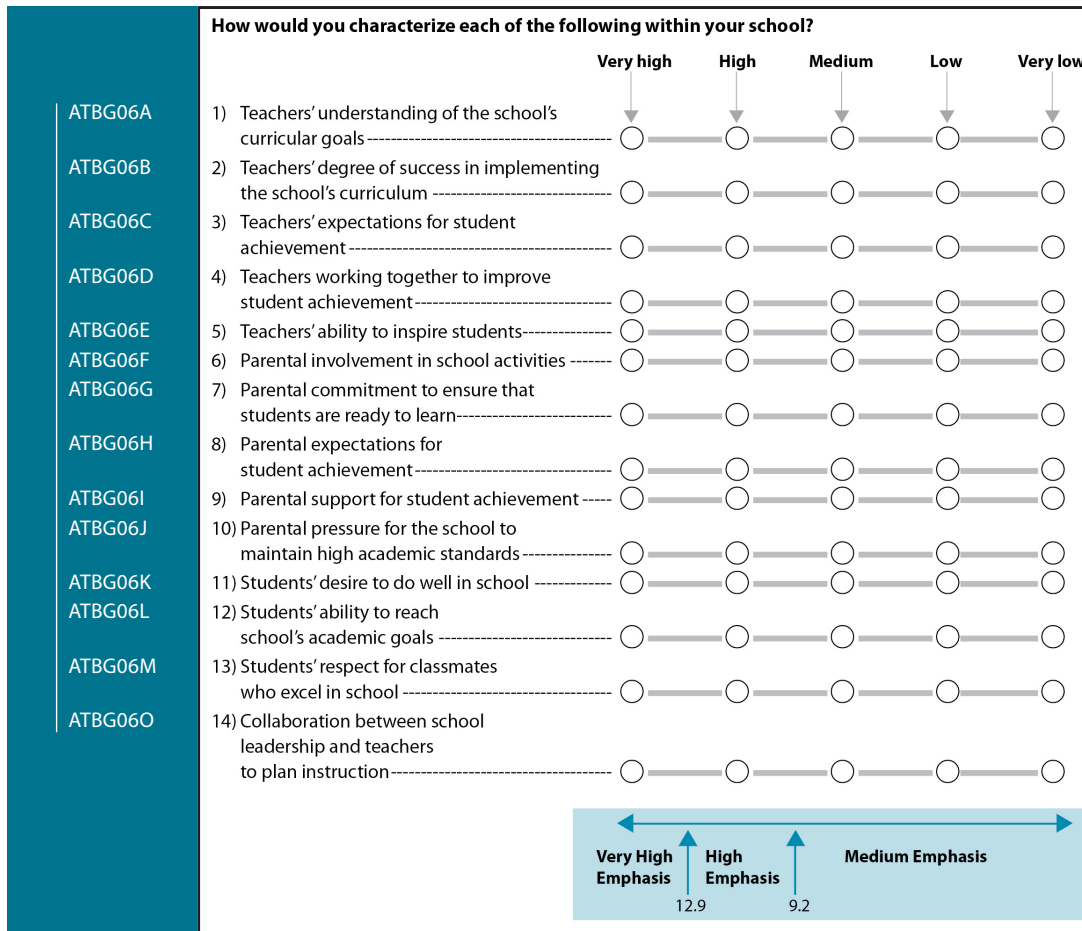
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

A dash (-) indicates comparable data not available.

# School Emphasis on Academic Success–Teachers’ Reports Scale, Fourth Grade

The School Emphasis on Academic Success–Teachers’ Reports (EAS) scale was created based on teachers’ responses characterizing the fourteen aspects described below.

## Items in the TIMSS 2015 School Emphasis on Academic Success–Teachers’ Reports Scale, Fourth Grade<sup>1</sup>



<sup>1</sup> For the purpose of scaling, categories in which there were very few respondents were combined. The categories “Low” and “Very low” were combined for all variables. The scale statistics that are reported herein reflect analysis of the items following collapsing.

**Item Parameters for the TIMSS 2015 School Emphasis on Academic Success – Teachers' Reports Scale, Fourth Grade**

Item	delta	tau_1	tau_2	tau_3	Infit
ATBG06A	-1.44621	-2.99618	-0.10920	3.10538	1.03
ATBG06B	-1.02745	-3.33623	-0.02415	3.36038	0.92
ATBG06C	-0.80942	-3.00204	-0.03625	3.03829	0.97
ATBG06D	-0.82375	-2.16113	-0.18841	2.34954	1.12
ATBG06E	-1.03209	-3.02365	-0.12507	3.14872	0.94
ATBG06F	1.06140	-2.19239	0.10160	2.09079	0.99
ATBG06G	1.33471	-2.43171	0.10214	2.32957	0.84
ATBG06H	0.09125	-2.39276	-0.14839	2.54115	1.00
ATBG06I	1.18060	-2.53725	0.11920	2.41805	0.81
ATBG06J	0.99194	-2.19510	0.01274	2.18236	1.18
ATBG06K	0.18650	-2.93168	0.00378	2.92790	0.91
ATBG06L	0.72569	-3.47712	0.18892	3.28820	0.85
ATBG06M	-0.16081	-2.70547	-0.18329	2.88876	1.11
ATBG06O	-0.27236	-1.68993	-0.37720	2.06713	1.22

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

**Scale Transformation Constants for the TIMSS 2015 School Emphasis on Academic Success – Teachers' Reports Scale, Fourth Grade**

Scale Transformation Constants	
A = 9.063358	Transformed Scale Score = 9.063358 + 1.313036 • Logit Scale Score
B = 1.313036	

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 School Emphasis on Academic Success – Teachers' Reports Scale,  
Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	0.32674	
1	1.95328	
2	2.81824	
3	3.45663	
4	3.98402	
5	4.44252	
6	4.85355	
7	5.22828	
8	5.57462	
9	5.89827	
10	6.20320	
11	6.49407	
12	6.77317	
13	7.04306	
14	7.30603	
15	7.56425	
16	7.81962	
17	8.07381	
18	8.32820	
19	8.58380	
20	8.84122	
21	9.10064	9.2
22	9.36202	
23	9.62473	
24	9.88825	
25	10.15200	
26	10.41565	
27	10.67922	
28	10.94307	
29	11.20798	
30	11.47508	
31	11.74519	
32	12.02119	
33	12.30494	
34	12.59942	
35	12.90857	12.9
36	13.23796	
37	13.59643	
38	13.99453	
39	14.45744	
40	15.03090	
41	15.82855	
42	17.39737	

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 2015 School Emphasis on Academic Success – Teachers' Reports Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item													
			ATB606A	ATB606B	ATB606C	ATB606D	ATB606E	ATB606F	ATB606G	ATB606H	ATB606I	ATB606J	ATB606K	ATB606L	ATB606M	ATB606O
Australia	0.90	45	0.57	0.63	0.68	0.59	0.71	0.71	0.77	0.68	0.80	0.63	0.73	0.71	0.64	0.49
Bahrain	0.90	46	0.54	0.64	0.75	0.57	0.65	0.67	0.78	0.70	0.76	0.62	0.74	0.74	0.67	0.55
Belgium (Flemish)	0.85	35	0.37	0.52	0.60	0.49	0.58	0.67	0.75	0.69	0.75	0.62	0.66	0.55	0.48	0.44
Bulgaria	0.89	43	0.63	0.73	0.68	0.58	0.60	0.77	0.73	0.65	0.69	0.59	0.71	0.69	0.54	0.54
Canada	0.91	47	0.59	0.62	0.65	0.56	0.64	0.74	0.83	0.75	0.82	0.65	0.72	0.73	0.61	0.58
Chile	0.90	44	0.52	0.59	0.58	0.53	0.53	0.72	0.82	0.76	0.78	0.69	0.72	0.70	0.71	0.58
Chinese Taipei	0.90	43	0.64	0.57	0.63	0.65	0.72	0.65	0.72	0.66	0.71	0.47	0.71	0.73	0.61	0.66
Croatia	0.90	44	0.56	0.60	0.57	0.70	0.68	0.75	0.71	0.57	0.80	0.80	0.59	0.62	0.61	0.61
Cyprus	0.87	39	0.44	0.57	0.68	0.40	0.53	0.68	0.79	0.70	0.77	0.64	0.73	0.69	0.60	0.37
Czech Republic	0.88	40	0.60	0.64	0.68	0.71	0.64	0.65	0.72	0.62	0.67	0.54	0.71	0.65	0.51	0.50
Denmark	0.86	37	0.45	0.52	0.55	0.40	0.63	0.68	0.76	0.69	0.75	0.56	0.68	0.65	0.62	0.34
England	0.92	49	0.63	0.66	0.66	0.66	0.62	0.75	0.81	0.76	0.81	0.64	0.75	0.73	0.66	0.67
Finland	0.85	36	0.53	0.64	0.59	0.57	0.58	0.61	0.71	0.64	0.67	0.42	0.66	0.61	0.53	0.51
France	0.78	29	0.21	0.27	0.35	0.21	0.32	0.61	0.80	0.72	0.79	0.45	0.68	0.80	0.49	0.19
Georgia	0.90	45	0.63	0.62	0.64	0.66	0.63	0.72	0.75	0.75	0.73	0.68	0.60	0.61	0.69	0.68
Germany	0.85	36	0.59	0.63	0.64	0.45	0.56	0.75	0.79	0.57	0.75	0.47	0.47	0.66	0.39	0.50
Hong Kong SAR	0.90	44	0.61	0.69	0.70	0.58	0.67	0.66	0.75	0.74	0.72	0.56	0.68	0.77	0.47	0.57
Hungary	0.89	42	0.42	0.67	0.57	0.49	0.60	0.71	0.80	0.67	0.77	0.70	0.78	0.73	0.61	0.41
Indonesia	0.91	47	0.60	0.65	0.57	0.65	0.62	0.76	0.78	0.74	0.81	0.59	0.69	0.73	0.72	0.64
Iran, Islamic Rep. of	0.89	43	0.67	0.62	0.45	0.54	0.64	0.76	0.78	0.63	0.76	0.69	0.70	0.72	0.60	0.57
Ireland	0.91	47	0.58	0.70	0.76	0.57	0.70	0.66	0.80	0.71	0.80	0.60	0.78	0.69	0.59	0.62
Italy	0.88	41	0.63	0.69	0.61	0.53	0.72	0.66	0.73	0.59	0.73	0.57	0.63	0.71	0.48	0.64
Japan	0.87	39	0.45	0.54	0.69	0.49	0.59	0.64	0.79	0.74	0.81	0.53	0.59	0.72	0.45	0.54
Jordan	0.89	42	0.55	0.59	0.55	0.65	0.64	0.65	0.78	0.61	0.73	0.71	0.63	0.73	0.60	0.63
Kazakhstan	0.93	52	0.70	0.72	0.67	0.73	0.74	0.74	0.82	0.71	0.82	0.66	0.72	0.76	0.55	0.69
Korea, Rep. of	0.91	48	0.63	0.64	0.70	0.66	0.66	0.75	0.78	0.75	0.76	0.67	0.71	0.69	0.62	0.62
Kuwait	0.88	39	0.57	0.53	0.65	0.55	0.60	0.67	0.76	0.64	0.67	0.54	0.67	0.70	0.62	0.51
Lithuania	0.89	42	0.49	0.62	0.64	0.58	0.67	0.69	0.75	0.78	0.76	0.61	0.64	0.65	0.52	0.58
Morocco	0.91	47	0.61	0.63	0.60	0.68	0.60	0.76	0.80	0.69	0.78	0.71	0.71	0.73	0.55	0.66
Netherlands	0.77	28	0.08	0.25	0.19	0.25	0.49	0.65	0.75	0.66	0.78	0.60	0.59	0.66	0.48	0.38
New Zealand	0.89	42	0.57	0.63	0.60	0.55	0.61	0.60	0.75	0.72	0.74	0.66	0.73	0.72	0.57	0.53
Northern Ireland	0.90	45	0.58	0.60	0.65	0.61	0.60	0.75	0.83	0.76	0.83	0.65	0.69	0.72	0.39	0.57
Norway (5)	0.87	39	0.49	0.53	0.67	0.55	0.53	0.80	0.72	0.74	0.75	0.55	0.60	0.60	0.52	0.58
Oman	0.89	42	0.50	0.62	0.61	0.60	0.59	0.71	0.81	0.71	0.74	0.49	0.62	0.71	0.62	0.62
Poland	0.87	39	0.53	0.68	0.61	0.55	0.62	0.71	0.76	0.58	0.77	0.54	0.61	0.67	0.57	0.47
Portugal	0.87	41	0.62	0.72	0.62	0.44	0.53	0.74	0.81	0.72	0.79	0.55	0.65	0.59	0.49	0.49
Qatar	0.88	40	0.57	0.59	0.66	0.48	0.64	0.69	0.77	0.64	0.73	0.42	0.69	0.75	0.57	0.53
Russian Federation	0.82	34	0.58	0.59	0.63	0.66	0.71	0.65	0.67	0.52	0.57	-0.07	0.60	0.65	0.49	0.53
Saudi Arabia	0.92	50	0.65	0.67	0.70	0.70	0.71	0.71	0.76	0.74	0.80	0.65	0.77	0.77	0.59	0.61
Serbia	0.87	40	0.59	0.60	0.68	0.66	0.70	0.73	0.73	0.43	0.78	0.46	0.62	0.61	0.41	0.67
Singapore	0.90	45	0.56	0.56	0.60	0.58	0.62	0.68	0.80	0.73	0.80	0.68	0.76	0.77	0.56	0.58
Slovak Republic	0.88	40	0.54	0.64	0.62	0.58	0.61	0.72	0.76	0.47	0.73	0.57	0.74	0.66	0.62	0.51
Slovenia	0.81	31	0.57	0.66	0.63	0.64	0.69	0.62	0.64	0.29	0.62	0.15	0.54	0.54	0.33	0.60
South Africa (5)	0.89	42	0.49	0.41	0.51	0.60	0.58	0.69	0.78	0.68	0.76	0.73	0.74	0.73	0.71	0.57
Spain	0.90	43	0.47	0.71	0.71	0.56	0.55	0.73	0.81	0.71	0.80	0.70	0.69	0.68	0.43	0.50
Sweden	0.88	41	0.62	0.60	0.68	0.52	0.69	0.66	0.76	0.65	0.72	0.66	0.60	0.69	0.53	0.46
Turkey	0.90	45	0.60	0.70	0.62	0.51	0.57	0.77	0.79	0.71	0.78	0.66	0.71	0.79	0.49	0.58
United Arab Emirates	0.91	47	0.59	0.68	0.68	0.68	0.72	0.69	0.77	0.63	0.76	0.56	0.75	0.77	0.61	0.61
United States	0.91	48	0.54	0.65	0.65	0.55	0.66	0.77	0.82	0.81	0.82	0.72	0.75	0.71	0.63	0.55
<b>Benchmarking Participants</b>																
Buenos Aires, Argentina	0.90	43	0.60	0.62	0.64	0.72	0.55	0.63	0.73	0.73	0.69	0.64	0.64	0.72	0.53	0.67
Ontario, Canada	0.90	46	0.55	0.51	0.64	0.43	0.51	0.76	0.83	0.78	0.84	0.74	0.75	0.73	0.62	0.59
Quebec, Canada	0.88	42	0.74	0.71	0.62	0.69	0.73	0.66	0.80	0.65	0.72	0.43	0.60	0.65	0.42	0.54
Norway (4)	0.87	38	0.55	0.64	0.69	0.54	0.60	0.71	0.72	0.67	0.62	0.44	0.64	0.64	0.63	0.52
Abu Dhabi, UAE	0.90	45	0.53	0.69	0.63	0.68	0.78	0.74	0.79	0.57	0.76	0.49	0.74	0.77	0.49	0.60
Dubai, UAE	0.89	42	0.61	0.64	0.72	0.62	0.62	0.61	0.74	0.62	0.75	0.45	0.75	0.71	0.62	0.61
Florida, US	0.93	54	0.69	0.80	0.64	0.71	0.74	0.81	0.81	0.81	0.83	0.79	0.68	0.67	0.63	0.63

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



**Relationship Between the TIMSS 2015 School Emphasis on Academic Success – Teachers' Reports Scale, Fourth Grade, and TIMSS 2015 Achievement**

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )	
	(r)		(r <sup>2</sup> )		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.24	0.22	0.06	0.05	0.05	0.04
Bahrain	0.11	0.02	0.01	0.00	0.02	0.03
Belgium (Flemish)	0.20	0.22	0.04	0.05	0.03	0.03
Bulgaria	0.23	0.28	0.05	0.08	0.04	0.06
Canada	0.14	0.06	0.02	0.00	0.03	0.01
Chile	0.24	0.25	0.06	0.06	0.03	0.03
Chinese Taipei	0.07	0.02	0.01	0.00	0.01	0.00
Croatia	0.02	0.02	0.00	0.00	0.00	0.00
Cyprus	0.15	0.16	0.02	0.03	0.02	0.02
Czech Republic	0.08	0.10	0.01	0.01	0.00	0.01
Denmark	0.15	0.16	0.02	0.02	0.01	0.01
England	0.20	0.21	0.04	0.04	0.05	0.04
Finland	0.05	0.06	0.00	0.00	0.00	0.01
France	0.20	0.18	0.04	0.03	0.04	0.03
Georgia	0.14	0.17	0.02	0.03	0.02	0.02
Germany	0.18	0.21	0.03	0.04	0.02	0.03
Hong Kong SAR	0.25	0.18	0.06	0.03	0.05	0.03
Hungary	0.25	0.26	0.06	0.07	0.05	0.05
Indonesia	0.14	0.14	0.02	0.02	0.02	0.02
Iran, Islamic Rep. of	0.15	0.14	0.02	0.02	0.03	0.03
Ireland	0.17	0.19	0.03	0.04	0.03	0.04
Italy	0.07	0.05	0.00	0.00	0.00	0.00
Japan	0.11	0.14	0.01	0.02	0.00	0.01
Jordan	0.21	-	0.04	-	0.02	-
Kazakhstan	0.09	0.08	0.01	0.01	0.01	0.00
Korea, Rep. of	0.22	0.17	0.05	0.03	0.03	0.02
Kuwait	0.17	0.12	0.03	0.01	0.03	0.01
Lithuania	0.12	0.12	0.02	0.01	0.03	0.02
Morocco	0.24	0.23	0.06	0.05	0.07	0.05
Netherlands	0.12	0.17	0.01	0.03	0.00	0.01
New Zealand	0.23	0.22	0.05	0.05	0.04	0.04
Northern Ireland	0.15	0.13	0.02	0.02	0.02	0.01
Norway (5)	0.15	0.13	0.02	0.02	0.03	0.02
Oman	0.08	0.06	0.01	0.00	0.01	0.00
Poland	0.13	0.12	0.02	0.01	0.02	0.01
Portugal	0.23	0.19	0.05	0.04	0.03	0.02
Qatar	0.12	0.18	0.01	0.03	0.02	0.02
Russian Federation	0.07	0.11	0.01	0.01	0.01	0.01
Saudi Arabia	0.21	0.16	0.04	0.03	0.03	0.01
Serbia	0.10	0.11	0.01	0.01	0.01	0.02
Singapore	0.26	0.28	0.07	0.08	0.06	0.07
Slovak Republic	0.20	0.22	0.04	0.05	0.03	0.03
Slovenia	0.01	0.02	0.00	0.00	0.00	0.00
South Africa (5)	0.05	-	0.00	-	0.00	-
Spain	0.25	0.25	0.06	0.06	0.06	0.06
Sweden	0.17	0.15	0.03	0.02	0.02	0.01
Turkey	0.28	0.26	0.08	0.07	0.06	0.05
United Arab Emirates	0.34	0.35	0.11	0.13	0.09	0.10
United States	0.23	0.24	0.05	0.06	0.04	0.05
<b>International Median</b>	<b>0.15</b>	<b>0.16</b>	<b>0.02</b>	<b>0.03</b>	<b>0.03</b>	<b>0.02</b>
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	0.18	0.20	0.03	0.04	0.03	0.04
Ontario, Canada	0.11	0.07	0.01	0.01	0.02	0.02
Quebec, Canada	0.03	0.02	0.00	0.00	0.00	0.00
Norway (4)	0.10	0.13	0.01	0.02	0.01	0.01
Abu Dhabi, UAE	0.37	0.37	0.13	0.14	0.09	0.08
Dubai, UAE	0.28	0.29	0.08	0.08	0.05	0.07
Florida, US	0.34	0.28	0.11	0.08	0.08	0.06

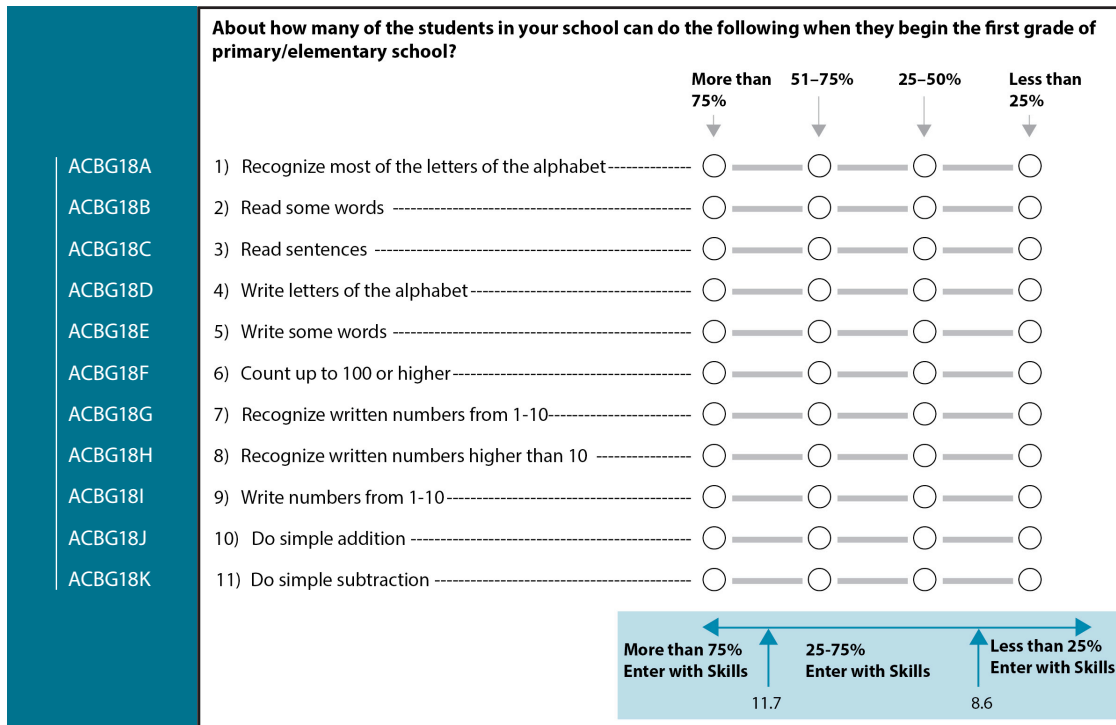
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

A dash (-) indicates comparable data not available.

# Schools Where Students Enter the Primary Grades with Literacy and Numeracy Skills Scale, Fourth Grade

The Schools Where Students Enter the Primary Grades with Literacy and Numeracy Skills (LNS) scale was created based on principals' responses about the percentage of children in the school who began first grade with the eleven key skills described below.

## Items in the TIMSS 2015 Schools Where Students Enter the Primary Grades with Literacy and Numeracy Skills Scale, Fourth Grade



**Item Parameters for the TIMSS 2015 Schools Where Students Enter the Primary Grades with Literacy and Numeracy Skills Scale, Fourth Grade**

Item	delta	tau_1	tau_2	tau_3	Infit
ACBG18A	-0.95602	-1.74763	0.14297	1.60466	1.24
ACBG18B	0.12688	-1.85096	0.04000	1.81096	0.98
ACBG18C	1.51017	-1.41087	-0.14993	1.56080	0.99
ACBG18D	-0.71076	-2.06675	0.21261	1.85414	1.22
ACBG18E	0.44307	-1.83523	0.12227	1.71296	0.94
ACBG18F	0.94633	-2.15667	0.04262	2.11405	1.39
ACBG18G	-2.31455	-2.27679	0.44943	1.82736	1.18
ACBG18H	-0.10805	-2.00446	-0.00426	2.00872	1.13
ACBG18I	-1.08180	-1.80290	0.25691	1.54599	1.12
ACBG18J	0.76680	-1.99761	0.02009	1.97752	1.07
ACBG18K	1.37793	-1.79326	-0.02855	1.82181	1.14

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

**Scale Transformation Constants for the TIMSS 2015 Schools Where Students Enter the Primary Grades with Literacy and Numeracy Skills Scale, Fourth Grade**

Scale Transformation Constants	
A = 10.111117	Transformed Scale Score = 10.111117 + 0.64701 • Logit Scale Score
B = 0.64701	

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS 2015 Schools Where Students Enter the Primary Grades with Literacy and Numeracy Skills Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	6.26128	
1	7.18133	
2	7.67242	
3	8.01378	
4	8.28032	
5	8.50311	8.6
6	8.69803	
7	8.87309	
8	9.03362	
9	9.18319	
10	9.32436	
11	9.45882	
12	9.58860	
13	9.71450	
14	9.83751	
15	9.95849	
16	10.07824	
17	10.19745	
18	10.31684	
19	10.43711	
20	10.55900	
21	10.68334	
22	10.81104	
23	10.94315	
24	11.08052	
25	11.22538	
26	11.37954	
27	11.54578	
28	11.72807	11.7
29	11.93264	
30	12.16926	
31	12.46093	
32	12.86502	
33	13.64705	

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 2015 Schools Where Students Enter the Primary Grades with Literacy and Numeracy Skills Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item										
			ACBG18A	ACBG18B	ACBG18C	ACBG18D	ACBG18E	ACBG18F	ACBG18G	ACBG18H	ACBG18I	ACBG18J	ACBG18K
Australia	0.97	78	0.85	0.91	0.87	0.91	0.91	0.88	0.86	0.89	0.91	0.88	0.85
Bahrain	0.97	76	0.84	0.92	0.86	0.89	0.90	0.86	0.80	0.88	0.85	0.89	0.86
Belgium (Flemish)	0.88	47	0.72	0.71	0.54	0.66	0.71	0.52	0.71	0.71	0.74	0.76	0.73
Bulgaria	0.95	66	0.82	0.86	0.77	0.84	0.85	0.64	0.77	0.83	0.81	0.85	0.84
Canada	0.96	69	0.79	0.88	0.83	0.83	0.88	0.83	0.79	0.84	0.82	0.84	0.81
Chile	0.95	66	0.73	0.86	0.82	0.85	0.88	0.84	0.76	0.83	0.78	0.77	0.77
Chinese Taipei	0.95	67	0.80	0.87	0.84	0.89	0.84	0.80	0.66	0.77	0.73	0.89	0.92
Croatia	0.92	55	0.71	0.82	0.71	0.78	0.81	0.67	0.72	0.71	0.76	0.77	0.72
Cyprus	0.92	57	0.77	0.84	0.60	0.79	0.77	0.64	0.74	0.79	0.75	0.81	0.78
Czech Republic	0.86	42	0.66	0.66	0.34	0.71	0.68	0.59	0.70	0.76	0.67	0.65	0.61
Denmark	0.92	55	0.72	0.78	0.75	0.52	0.75	0.74	0.78	0.82	0.75	0.76	0.78
England	0.97	78	0.90	0.93	0.88	0.91	0.93	0.73	0.88	0.87	0.90	0.87	0.86
Finland	0.92	55	0.68	0.74	0.61	0.72	0.74	0.68	0.73	0.81	0.78	0.85	0.82
France	0.88	46	0.59	0.70	0.57	0.67	0.71	0.62	0.66	0.72	0.67	0.77	0.74
Georgia	0.96	72	0.82	0.86	0.86	0.90	0.91	0.81	0.77	0.88	0.86	0.84	0.85
Germany	0.91	55	0.70	0.75	0.71	0.69	0.81	0.65	0.72	0.75	0.76	0.81	0.80
Hong Kong SAR	0.91	54	0.59	0.76	0.78	0.80	0.80	0.66	0.61	0.70	0.68	0.82	0.82
Hungary	0.84	40	0.55	0.47	0.32	0.60	0.62	0.66	0.72	0.76	0.70	0.71	0.67
Indonesia	0.96	71	0.79	0.88	0.87	0.86	0.91	0.76	0.78	0.84	0.84	0.87	0.87
Iran, Islamic Rep. of	0.95	69	0.75	0.85	0.84	0.89	0.85	0.79	0.77	0.88	0.82	0.86	0.84
Ireland	0.84	59	0.86	0.92	0.81	0.91	0.90	0.37	0.91	0.47	0.87	0.76	0.39
Italy	0.95	66	0.78	0.88	0.81	0.76	0.86	0.71	0.76	0.86	0.83	0.86	0.83
Japan	0.94	65	0.70	0.76	0.85	0.88	0.87	0.76	0.73	0.81	0.83	0.83	0.79
Jordan	0.97	77	0.86	0.91	0.85	0.88	0.90	0.84	0.84	0.88	0.87	0.90	0.90
Kazakhstan	0.94	64	0.74	0.83	0.79	0.84	0.83	0.73	0.72	0.76	0.81	0.87	0.88
Korea, Rep. of	0.95	69	0.86	0.69	0.87	0.90	0.83	0.80	0.82	0.86	0.88	0.81	0.82
Kuwait	0.97	79	0.90	0.94	0.90	0.91	0.92	0.86	0.81	0.90	0.84	0.90	0.89
Lithuania	0.94	62	0.75	0.81	0.77	0.76	0.80	0.71	0.71	0.78	0.78	0.87	0.86
Morocco	0.97	74	0.87	0.91	0.90	0.92	0.90	0.80	0.87	0.87	0.87	0.83	0.74
Netherlands	0.88	45	0.59	0.63	0.67	0.61	0.73	0.72	0.55	0.65	0.74	0.71	0.74
New Zealand	0.96	73	0.82	0.89	0.89	0.85	0.93	0.87	0.80	0.86	0.86	0.82	0.83
Northern Ireland	-	-	-	-	-	-	-	-	-	-	-	-	-
Norway (5)	0.95	65	0.84	0.82	0.77	0.78	0.83	0.77	0.78	0.85	0.84	0.81	0.79
Oman	0.96	74	0.82	0.92	0.85	0.85	0.89	0.86	0.78	0.90	0.82	0.88	0.87
Poland	0.95	66	0.79	0.84	0.81	0.89	0.88	0.66	0.79	0.78	0.83	0.85	0.82
Portugal	0.95	65	0.82	0.83	0.76	0.78	0.86	0.71	0.76	0.84	0.80	0.87	0.85
Qatar	0.98	82	0.85	0.92	0.87	0.92	0.94	0.91	0.86	0.93	0.91	0.92	0.90
Russian Federation	0.94	63	0.79	0.87	0.81	0.79	0.78	0.71	0.78	0.82	0.75	0.83	0.81
Saudi Arabia	0.96	70	0.77	0.85	0.82	0.88	0.89	0.83	0.74	0.85	0.80	0.88	0.87
Serbia	0.93	58	0.69	0.81	0.76	0.82	0.81	0.67	0.77	0.82	0.84	0.73	0.63
Singapore	0.95	69	0.82	0.84	0.83	0.83	0.80	0.74	0.84	0.84	0.85	0.85	0.86
Slovak Republic	0.91	54	0.78	0.78	0.66	0.77	0.69	0.68	0.73	0.77	0.74	0.78	0.73
Slovenia	0.92	55	0.81	0.83	0.50	0.81	0.78	0.60	0.76	0.80	0.77	0.75	0.72
South Africa (5)	0.96	73	0.80	0.88	0.81	0.85	0.90	0.83	0.83	0.86	0.87	0.89	0.89
Spain	0.94	65	0.84	0.87	0.85	0.86	0.87	0.59	0.80	0.72	0.84	0.85	0.77
Sweden	0.94	64	0.82	0.85	0.76	0.76	0.83	0.73	0.82	0.83	0.81	0.83	0.76
Turkey	0.93	60	0.81	0.85	0.78	0.80	0.85	0.65	0.72	0.79	0.71	0.75	0.75
United Arab Emirates	0.97	79	0.87	0.91	0.86	0.92	0.92	0.87	0.86	0.89	0.89	0.90	0.87
United States	0.98	81	0.89	0.92	0.89	0.91	0.93	0.90	0.89	0.90	0.90	0.88	0.86
<b>Benchmarking Participants</b>													
Buenos Aires, Argentina	0.97	75	0.87	0.89	0.82	0.84	0.88	0.88	0.81	0.91	0.85	0.87	0.88
Ontario, Canada	0.96	73	0.87	0.90	0.87	0.90	0.86	0.83	0.82	0.84	0.83	0.84	0.84
Quebec, Canada	0.93	58	0.62	0.77	0.73	0.69	0.86	0.79	0.70	0.84	0.76	0.81	0.77
Norway (4)	0.94	63	0.79	0.80	0.75	0.76	0.81	0.75	0.79	0.83	0.84	0.80	0.78
Abu Dhabi, UAE	0.97	77	0.86	0.90	0.85	0.89	0.89	0.87	0.86	0.90	0.88	0.88	0.85
Dubai, UAE	0.98	85	0.92	0.94	0.87	0.96	0.95	0.87	0.93	0.92	0.94	0.93	0.89
Florida, US	0.97	77	0.89	0.93	0.92	0.90	0.87	0.84	0.87	0.89	0.84	0.86	0.82

A dash (-) indicates comparable data not available.

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

**Relationship Between the TIMSS 2015 Schools Where Students Enter the Primary Grades with Literacy and Numeracy Skills Scale, Fourth Grade, and TIMSS 2015 Achievement**

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )	
	(r)		(r)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.20	0.18	0.04	0.03	0.05	0.05
Bahrain	0.08	0.04	0.01	0.00	0.00	0.00
Belgium (Flemish)	0.05	0.07	0.00	0.01	0.00	0.00
Bulgaria	0.19	0.27	0.04	0.07	0.03	0.06
Canada	0.11	0.12	0.01	0.02	0.02	0.02
Chile	0.23	0.21	0.05	0.04	0.03	0.02
Chinese Taipei	0.08	0.05	0.01	0.00	0.02	0.01
Croatia	0.11	0.13	0.01	0.02	0.01	0.01
Cyprus	0.10	0.11	0.01	0.01	0.00	0.00
Czech Republic	0.08	0.07	0.01	0.00	0.00	0.00
Denmark	0.05	0.05	0.00	0.00	0.00	0.01
England	0.16	0.20	0.03	0.04	0.03	0.04
Finland	0.12	0.12	0.01	0.01	0.01	0.02
France	0.13	0.13	0.02	0.02	0.00	0.00
Georgia	0.02	0.01	0.00	0.00	0.00	0.00
Germany	0.10	0.12	0.01	0.01	0.01	0.01
Hong Kong SAR	0.14	0.11	0.02	0.01	0.02	0.02
Hungary	0.22	0.23	0.05	0.05	0.03	0.03
Indonesia	0.25	0.27	0.06	0.08	0.05	0.05
Iran, Islamic Rep. of	0.09	0.06	0.01	0.00	0.01	0.01
Ireland	0.07	0.06	0.01	0.00	0.00	0.00
Italy	0.07	0.05	0.01	0.00	0.00	0.00
Japan	0.06	0.04	0.00	0.00	0.01	0.01
Jordan	0.17	-	0.03	-	0.02	-
Kazakhstan	0.01	0.01	0.00	0.00	0.00	0.00
Korea, Rep. of	0.21	0.19	0.05	0.04	0.03	0.02
Kuwait	0.23	0.21	0.06	0.04	0.06	0.05
Lithuania	0.11	0.10	0.01	0.01	0.01	0.01
Morocco	0.19	0.19	0.03	0.04	0.03	0.03
Netherlands	0.05	0.08	0.00	0.01	0.00	0.01
New Zealand	0.23	0.24	0.05	0.06	0.04	0.04
Northern Ireland	-	-	-	-	-	-
Norway (5)	0.08	0.08	0.01	0.01	0.01	0.01
Oman	0.01	0.01	0.00	0.00	0.00	0.00
Poland	0.04	0.03	0.00	0.00	0.00	0.00
Portugal	0.16	0.14	0.03	0.02	0.01	0.01
Qatar	0.13	0.12	0.02	0.01	0.02	0.02
Russian Federation	0.20	0.24	0.04	0.06	0.02	0.03
Saudi Arabia	0.15	0.19	0.02	0.04	0.03	0.05
Serbia	0.16	0.18	0.03	0.03	0.03	0.04
Singapore	0.14	0.15	0.02	0.02	0.02	0.03
Slovak Republic	0.21	0.23	0.05	0.05	0.03	0.04
Slovenia	-0.01	-0.01	0.00	0.00	0.00	0.00
South Africa (5)	0.07	-	0.00	-	0.03	-
Spain	0.18	0.18	0.03	0.03	0.04	0.04
Sweden	0.15	0.15	0.02	0.02	0.01	0.01
Turkey	0.01	0.02	0.00	0.00	0.02	0.01
United Arab Emirates	0.19	0.22	0.04	0.05	0.04	0.05
United States	0.20	0.22	0.04	0.05	0.03	0.04
<b>International Median</b>	<b>0.12</b>	<b>0.12</b>	<b>0.02</b>	<b>0.02</b>	<b>0.02</b>	<b>0.01</b>
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	0.25	0.25	0.06	0.06	0.07	0.08
Ontario, Canada	0.13	0.13	0.02	0.02	0.02	0.02
Quebec, Canada	0.10	0.08	0.01	0.01	0.01	0.01
Norway (4)	-0.02	0.01	0.00	0.00	0.00	0.00
Abu Dhabi, UAE	0.28	0.27	0.08	0.07	0.07	0.06
Dubai, UAE	0.12	0.18	0.01	0.03	0.02	0.04
Florida, US	0.20	0.18	0.04	0.03	0.03	0.02

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

A dash (-) indicates comparable data not available.

# Student Bullying Scale, Fourth Grade

The Student Bullying (SB) scale was created based on students' responses to how often they experienced the eight bullying behaviors described below.

## Items in the TIMSS 2015 Student Bullying Scale, Fourth Grade

		During this school year, how often have other students from your school done any of the following things to you (including through texting or the Internet)?			
		Never	A few times a year	Once or twice a month	At least once a week
ASBG12A	1) Made fun of me or called me names-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBG12B	2) Left me out of their games or activities-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBG12C	3) Spread lies about me-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBG12D	4) Stole something from me-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBG12E	5) Hit or hurt me (e.g., <i>shoving, hitting, kicking</i> )-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBG12F	6) Made me do things I didn't want to do-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBG12G	7) Shared embarrassing information about me-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBG12H	8) Threatened me-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

←-----→

Almost Never      About Monthly      About Weekly

9.6                      8.0

**Item Parameters for the TIMSS 2015 Student Bullying Scale, Fourth Grade**

Item	delta	tau_1	tau_2	tau_3	Infit
ASBG12A	0.46618	0.24420	-0.31625	0.07205	1.09
ASBG12B	0.28450	0.07329	-0.01726	-0.05603	1.19
ASBG12C	0.16218	0.09498	-0.07059	-0.02439	0.96
ASBG12D	-0.27878	0.38164	-0.13690	-0.24474	1.12
ASBG12E	0.15176	0.07103	-0.16425	0.09322	1.01
ASBG12F	-0.31617	0.31731	0.10905	-0.42636	0.97
ASBG12G	-0.16420	0.27826	-0.07753	-0.20073	0.94
ASBG12H	-0.30547	0.43020	0.06771	-0.49791	0.94

**Scale Transformation Constants for the TIMSS 2015 Student Bullying Scale, Fourth Grade**

Scale Transformation Constants

A = 7.986312

B = 1.843301

Transformed Scale Score = 7.986312 + 1.843301 • Logit Scale Score

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





**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 Student Bullying Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.45583	
1	4.98767	
2	5.62711	
3	6.04410	
4	6.36087	
5	6.61949	
6	6.85019	
7	7.05738	
8	7.24822	
9	7.42814	
10	7.60130	
11	7.77094	
12	7.93577	8.0
13	8.10996	
14	8.28412	
15	8.46483	
16	8.65532	
17	8.85956	
18	9.08276	
19	9.32730	
20	9.61409	9.6
21	9.96469	
22	10.42778	
23	11.14791	
24	12.87429	

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 2015 Student Bullying Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			ASBG12A	ASBG12B	ASBG12C	ASBG12D	ASBG12E	ASBG12F	ASBG12G	ASBG12H
Australia	0.87	52	0.74	0.68	0.78	0.63	0.73	0.71	0.76	0.73
Bahrain	0.85	48	0.63	0.61	0.71	0.66	0.74	0.72	0.72	0.74
Belgium (Flemish)	0.86	50	0.76	0.71	0.74	0.50	0.73	0.63	0.80	0.74
Bulgaria	0.83	47	0.70	0.50	0.73	0.59	0.75	0.70	0.76	0.72
Canada	0.87	52	0.73	0.68	0.77	0.65	0.73	0.71	0.74	0.74
Chile	0.86	52	0.70	0.67	0.77	0.64	0.76	0.71	0.76	0.75
Chinese Taipei	0.84	47	0.71	0.66	0.74	0.53	0.67	0.68	0.75	0.71
Croatia	0.84	49	0.64	0.68	0.75	0.56	0.71	0.70	0.78	0.72
Cyprus	0.85	48	0.71	0.63	0.74	0.62	0.73	0.71	0.68	0.71
Czech Republic	0.84	47	0.75	0.60	0.76	0.55	0.67	0.69	0.75	0.70
Denmark	0.84	48	0.73	0.65	0.76	0.50	0.72	0.69	0.73	0.74
England	0.86	50	0.72	0.67	0.77	0.60	0.74	0.70	0.74	0.70
Finland	0.87	52	0.74	0.69	0.79	0.61	0.70	0.68	0.78	0.76
France	0.81	43	0.65	0.63	0.73	0.52	0.68	0.61	0.71	0.68
Georgia	0.81	48	0.57	0.53	0.74	0.70	0.67	0.76	0.77	0.76
Germany	0.84	48	0.69	0.66	0.75	0.59	0.71	0.72	0.72	0.70
Hong Kong SAR	0.83	47	0.58	0.65	0.74	0.59	0.67	0.74	0.73	0.75
Hungary	0.81	44	0.67	0.61	0.73	0.51	0.72	0.66	0.66	0.69
Indonesia	0.83	47	0.61	0.49	0.72	0.69	0.71	0.72	0.77	0.75
Iran, Islamic Rep. of	0.79	42	0.60	0.50	0.70	0.57	0.68	0.70	0.69	0.71
Ireland	0.85	49	0.72	0.69	0.77	0.59	0.70	0.69	0.73	0.71
Italy	0.80	42	0.68	0.60	0.69	0.55	0.65	0.63	0.68	0.68
Japan	0.84	49	0.73	0.72	0.71	0.62	0.71	0.74	0.68	0.65
Jordan	0.86	52	0.66	0.63	0.71	0.69	0.74	0.76	0.78	0.77
Kazakhstan	0.82	47	0.66	0.59	0.73	0.66	0.71	0.72	0.72	0.68
Korea, Rep. of	0.81	44	0.68	0.65	0.71	0.51	0.71	0.70	0.69	0.66
Kuwait	0.82	44	0.61	0.58	0.68	0.61	0.71	0.70	0.70	0.72
Lithuania	0.83	46	0.69	0.62	0.74	0.60	0.71	0.68	0.70	0.66
Morocco	0.80	43	0.59	0.60	0.65	0.61	0.68	0.69	0.70	0.70
Netherlands	0.83	46	0.73	0.64	0.73	0.57	0.74	0.69	0.69	0.64
New Zealand	0.87	51	0.72	0.66	0.77	0.65	0.74	0.73	0.74	0.73
Northern Ireland	0.85	49	0.71	0.66	0.77	0.61	0.71	0.69	0.72	0.71
Norway (5)	0.86	50	0.71	0.66	0.77	0.58	0.71	0.72	0.79	0.71
Oman	0.81	44	0.63	0.55	0.70	0.66	0.67	0.68	0.70	0.67
Poland	0.86	51	0.70	0.66	0.77	0.62	0.74	0.70	0.81	0.72
Portugal	0.83	47	0.71	0.65	0.75	0.55	0.74	0.64	0.69	0.71
Qatar	0.87	52	0.64	0.66	0.75	0.69	0.74	0.74	0.77	0.75
Russian Federation	0.82	45	0.72	0.48	0.73	0.53	0.75	0.63	0.78	0.68
Saudi Arabia	0.87	53	0.68	0.61	0.75	0.69	0.76	0.76	0.78	0.77
Serbia	0.84	48	0.68	0.67	0.78	0.56	0.70	0.63	0.79	0.68
Singapore	0.85	48	0.64	0.66	0.77	0.61	0.69	0.71	0.75	0.73
Slovak Republic	0.85	49	0.70	0.63	0.74	0.60	0.73	0.69	0.76	0.72
Slovenia	0.85	49	0.71	0.67	0.76	0.59	0.69	0.70	0.78	0.72
South Africa (5)	0.80	42	0.59	0.62	0.68	0.58	0.66	0.69	0.71	0.66
Spain	0.83	46	0.65	0.64	0.71	0.58	0.71	0.70	0.67	0.74
Sweden	0.82	45	0.72	0.62	0.74	0.55	0.71	0.67	0.67	0.68
Turkey	0.80	43	0.59	0.65	0.69	0.57	0.66	0.64	0.71	0.70
United Arab Emirates	0.84	48	0.65	0.63	0.72	0.66	0.72	0.71	0.71	0.72
United States	0.86	50	0.74	0.69	0.77	0.64	0.70	0.66	0.73	0.72
<b>Benchmarking Participants</b>										
Buenos Aires, Argentina	0.86	50	0.68	0.69	0.74	0.63	0.74	0.70	0.74	0.72
Ontario, Canada	0.86	51	0.72	0.70	0.78	0.63	0.73	0.70	0.73	0.73
Quebec, Canada	0.86	50	0.75	0.65	0.74	0.62	0.71	0.69	0.74	0.75
Norway (4)	0.85	50	0.71	0.65	0.76	0.61	0.70	0.75	0.76	0.70
Abu Dhabi, UAE	0.85	48	0.65	0.63	0.70	0.68	0.72	0.72	0.71	0.73
Dubai, UAE	0.85	48	0.68	0.65	0.73	0.65	0.72	0.70	0.71	0.70
Florida, US	0.86	51	0.72	0.68	0.77	0.66	0.71	0.67	0.76	0.72

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

**Relationship Between the TIMSS 2015 Student Bullying Scale, Fourth Grade, and TIMSS 2015 Achievement**

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )	
	(r)		(r <sup>2</sup> )		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.16	0.13	0.03	0.02	0.03	0.02
Bahrain	0.16	0.17	0.03	0.03	0.03	0.03
Belgium (Flemish)	0.04	0.05	0.00	0.00	0.01	0.01
Bulgaria	0.19	0.20	0.03	0.04	0.04	0.04
Canada	0.12	0.13	0.01	0.02	0.03	0.03
Chile	0.16	0.16	0.02	0.02	0.04	0.04
Chinese Taipei	0.07	0.06	0.00	0.00	0.01	0.01
Croatia	0.09	0.07	0.01	0.00	0.01	0.01
Cyprus	0.13	0.15	0.02	0.02	0.03	0.03
Czech Republic	0.11	0.09	0.01	0.01	0.02	0.01
Denmark	0.09	0.06	0.01	0.00	0.02	0.01
England	0.08	0.09	0.01	0.01	0.02	0.02
Finland	0.08	0.07	0.01	0.01	0.02	0.01
France	0.06	0.08	0.00	0.01	0.01	0.01
Georgia	0.19	0.16	0.04	0.03	0.05	0.03
Germany	0.09	0.13	0.01	0.02	0.02	0.03
Hong Kong SAR	0.08	0.06	0.01	0.00	0.01	0.00
Hungary	0.15	0.18	0.02	0.03	0.03	0.04
Indonesia	0.03	0.02	0.00	0.00	0.01	0.00
Iran, Islamic Rep. of	0.04	0.06	0.00	0.00	0.00	0.01
Ireland	0.15	0.12	0.02	0.01	0.04	0.03
Italy	0.07	0.05	0.00	0.00	0.01	0.01
Japan	0.09	0.06	0.01	0.00	0.02	0.01
Jordan	0.23	-	0.06	-	0.07	-
Kazakhstan	0.10	0.08	0.01	0.01	0.01	0.01
Korea, Rep. of	-0.02	-0.06	0.00	0.00	0.00	0.00
Kuwait	0.05	0.07	0.00	0.01	0.01	0.01
Lithuania	0.17	0.20	0.03	0.04	0.05	0.06
Morocco	0.16	0.14	0.03	0.02	0.03	0.03
Netherlands	0.05	0.10	0.00	0.01	0.01	0.02
New Zealand	0.13	0.12	0.02	0.01	0.03	0.02
Northern Ireland	0.12	0.06	0.01	0.00	0.03	0.01
Norway (5)	0.08	0.06	0.01	0.00	0.02	0.01
Oman	0.11	0.12	0.01	0.01	0.01	0.02
Poland	0.11	0.10	0.01	0.01	0.02	0.02
Portugal	0.07	0.05	0.00	0.00	0.01	0.01
Qatar	0.17	0.19	0.03	0.04	0.05	0.06
Russian Federation	0.12	0.09	0.01	0.01	0.02	0.01
Saudi Arabia	0.23	0.25	0.05	0.06	0.05	0.06
Serbia	0.05	0.06	0.00	0.00	0.01	0.02
Singapore	0.17	0.16	0.03	0.03	0.04	0.04
Slovak Republic	0.12	0.13	0.02	0.02	0.02	0.02
Slovenia	0.08	0.09	0.01	0.01	0.02	0.02
South Africa (5)	0.26	-	0.07	-	0.08	-
Spain	0.10	0.10	0.01	0.01	0.01	0.01
Sweden	0.11	0.12	0.01	0.01	0.03	0.03
Turkey	0.22	0.22	0.05	0.05	0.07	0.06
United Arab Emirates	0.16	0.19	0.02	0.04	0.04	0.05
United States	0.12	0.12	0.01	0.01	0.03	0.03
International Median	0.11	0.10	0.01	0.01	0.02	0.02
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	0.10	0.06	0.01	0.00	0.03	0.01
Ontario, Canada	0.12	0.13	0.01	0.02	0.02	0.02
Quebec, Canada	0.07	0.10	0.01	0.01	0.02	0.03
Norway (4)	0.10	0.11	0.01	0.01	0.02	0.02
Abu Dhabi, UAE	0.15	0.19	0.02	0.04	0.04	0.06
Dubai, UAE	0.12	0.15	0.01	0.02	0.03	0.04
Florida, US	0.14	0.17	0.02	0.03	0.04	0.04

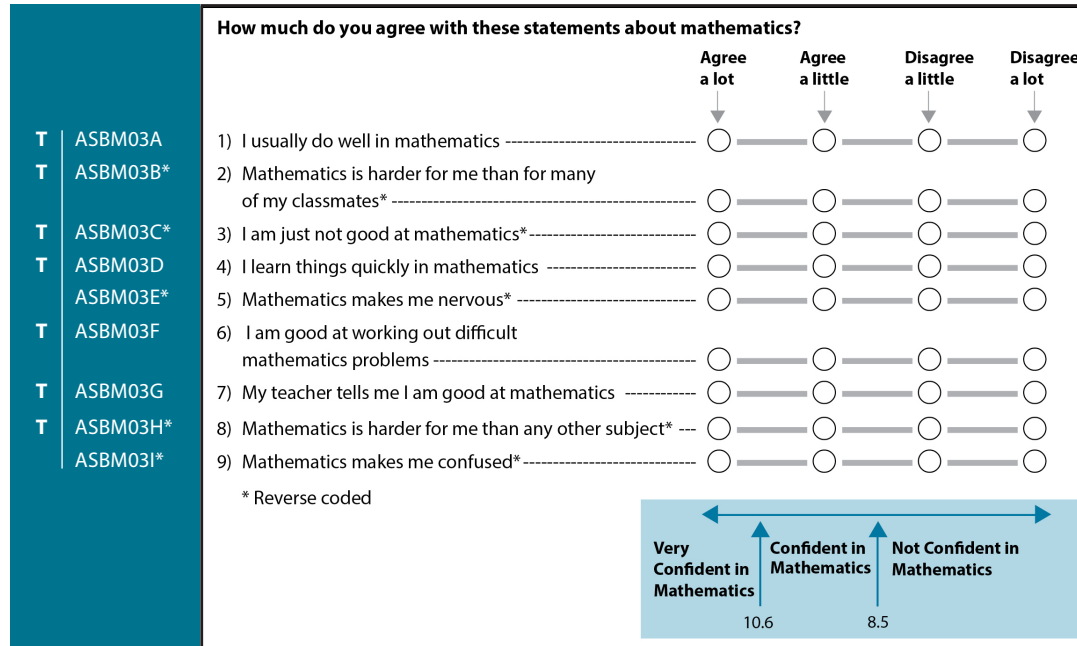
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

A dash (-) indicates comparable data not available.

# Students Confident in Mathematics Scale, Fourth Grade

The Students Confident in Mathematics (SCM) scale was created based on students' degree of agreement with the nine statements described below.

## Items in the TIMSS 2015 Students Confident in Mathematics Scale, Fourth Grade



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.

**Item Parameters for the TIMSS 2015 Students Confident in Mathematics Scale, Fourth Grade**

Item	delta	tau_1	tau_2	tau_3	Infit
ASBM03A	-0.54541	-0.55281	-0.58064	1.13345	0.92
ASBM03B*	0.28031	-0.54709	0.20931	0.33778	1.03
ASBM03C*	0.03294	-0.35764	0.16685	0.19079	0.94
ASBM03D	-0.29218	-0.62562	-0.32950	0.95512	0.98
ASBM03E*	0.11800	-0.33518	0.20115	0.13403	1.14
ASBM03F	0.23717	-0.75825	-0.29418	1.05243	1.08
ASBM03G	-0.08982	-0.68948	-0.31756	1.00704	1.18
ASBM03H*	0.17797	-0.19045	0.15607	0.03438	0.92
ASBM03I*	0.08102	-0.31116	0.17313	0.13803	0.96

\*Reverse coded

**Scale Transformation Constants for the TIMSS 2015 Students Confident in Mathematics Scale, Fourth Grade**

Scale Transformation Constants

A = 8.5562

B = 1.599041

Transformed Scale Score = 8.5562 + 1.599041 • Logit Scale Score

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



**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 Students Confident in Mathematics Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.07742	
1	4.72829	
2	5.49394	
3	6.01123	
4	6.41043	
5	6.74273	
6	7.03006	
7	7.28571	
8	7.51692	
9	7.73253	
10	7.93452	
11	8.12606	
12	8.30992	
13	8.48862	8.5
14	8.66452	
15	8.83997	
16	9.01741	
17	9.19961	
18	9.38976	
19	9.59180	
20	9.81049	
21	10.04927	
22	10.32220	
23	10.64456	10.6
24	11.04413	
25	11.57999	
26	12.39959	
27	14.17323	

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 2015 Students Confident in Mathematics Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item								
			ASBM03A	ASBM03B*	ASBM03C*	ASBM03D	ASBM03E*	ASBM03F	ASBM03G	ASBM03H*	ASBM03I*
Australia	0.87	50	0.74	0.71	0.78	0.71	0.65	0.74	0.42	0.78	0.74
Bahrain	0.76	35	0.18	0.72	0.74	0.38	0.73	0.34	0.33	0.79	0.74
Belgium (Flemish)	0.88	52	0.81	0.76	0.82	0.70	0.50	0.71	0.60	0.80	0.72
Bulgaria	0.87	49	0.73	0.70	0.73	0.71	0.62	0.70	0.66	0.74	0.73
Canada	0.86	48	0.73	0.75	0.77	0.70	0.63	0.69	0.38	0.78	0.74
Chile	0.82	41	0.65	0.60	0.70	0.64	0.64	0.61	0.44	0.72	0.75
Chinese Taipei	0.86	48	0.74	0.68	0.65	0.74	0.57	0.70	0.62	0.75	0.76
Croatia	0.89	53	0.75	0.73	0.71	0.76	0.69	0.70	0.67	0.77	0.78
Cyprus	0.86	47	0.71	0.68	0.71	0.68	0.61	0.70	0.59	0.73	0.74
Czech Republic	0.88	51	0.74	0.74	0.80	0.75	0.64	0.59	0.61	0.78	0.73
Denmark	0.87	50	0.78	0.75	0.80	0.74	0.58	0.63	0.54	0.75	0.74
England	0.87	49	0.73	0.70	0.78	0.71	0.64	0.72	0.36	0.79	0.76
Finland	0.86	49	0.78	0.73	0.81	0.74	0.64	0.70	0.52	0.77	0.53
France	0.87	50	0.75	0.72	0.77	0.74	0.64	0.61	0.54	0.76	0.77
Georgia	0.76	35	0.38	0.71	0.73	0.44	0.65	0.32	0.39	0.75	0.70
Germany	0.89	53	0.76	0.76	0.80	0.74	0.66	0.70	0.63	0.77	0.73
Hong Kong SAR	0.86	48	0.72	0.68	0.81	0.71	0.56	0.71	0.60	0.77	0.63
Hungary	0.88	52	0.78	0.72	0.78	0.76	0.56	0.74	0.72	0.74	0.68
Indonesia	0.75	34	0.37	0.70	0.73	0.41	0.70	0.16	0.32	0.75	0.76
Iran, Islamic Rep. of	0.76	34	0.50	0.56	0.50	0.52	0.68	0.52	0.49	0.72	0.72
Ireland	0.85	48	0.73	0.75	0.77	0.70	0.63	0.69	0.29	0.78	0.74
Italy	0.85	45	0.69	0.70	0.64	0.71	0.66	0.59	0.60	0.75	0.71
Japan	0.88	50	0.71	0.67	0.83	0.72	0.66	0.77	0.46	0.75	0.75
Jordan	0.75	35	0.09	0.73	0.76	0.26	0.78	0.17	0.25	0.80	0.77
Kazakhstan	0.85	45	0.68	0.69	0.72	0.66	0.62	0.66	0.65	0.72	0.64
Korea, Rep. of	0.88	53	0.82	0.78	0.78	0.73	0.43	0.79	0.56	0.80	0.76
Kuwait	0.75	33	0.22	0.68	0.70	0.40	0.71	0.36	0.39	0.75	0.70
Lithuania	0.84	45	0.75	0.70	0.75	0.66	0.48	0.69	0.62	0.72	0.59
Morocco	0.74	32	0.39	0.66	0.71	0.35	0.71	0.27	0.32	0.72	0.70
Netherlands	0.89	54	0.80	0.77	0.82	0.74	0.46	0.77	0.53	0.80	0.82
New Zealand	0.83	42	0.70	0.66	0.74	0.66	0.54	0.67	0.42	0.72	0.67
Northern Ireland	0.87	49	0.77	0.74	0.79	0.70	0.66	0.71	0.31	0.76	0.76
Norway (5)	0.87	49	0.76	0.72	0.75	0.75	0.57	0.75	0.50	0.76	0.70
Oman	0.69	30	0.07	0.73	0.62	0.21	0.74	0.08	0.15	0.78	0.76
Poland	0.88	52	0.75	0.74	0.73	0.76	0.60	0.74	0.65	0.79	0.74
Portugal	0.86	49	0.72	0.64	0.77	0.67	0.65	0.72	0.66	0.69	0.75
Qatar	0.80	38	0.34	0.75	0.76	0.43	0.72	0.40	0.39	0.79	0.73
Russian Federation	0.89	54	0.75	0.75	0.78	0.77	0.69	0.71	0.62	0.76	0.76
Saudi Arabia	0.75	35	0.04	0.74	0.74	0.24	0.79	0.18	0.24	0.81	0.77
Serbia	0.88	51	0.71	0.72	0.75	0.68	0.68	0.68	0.66	0.76	0.75
Singapore	0.87	49	0.77	0.73	0.76	0.69	0.61	0.69	0.52	0.78	0.75
Slovak Republic	0.87	48	0.72	0.68	0.75	0.70	0.67	0.67	0.58	0.74	0.74
Slovenia	0.88	52	0.76	0.70	0.72	0.69	0.66	0.74	0.66	0.78	0.75
South Africa (5)	0.69	29	0.12	0.72	0.73	0.11	0.68	0.05	0.06	0.76	0.71
Spain	0.85	45	0.68	0.71	0.74	0.61	0.65	0.61	0.58	0.73	0.73
Sweden	0.87	49	0.75	0.73	0.74	0.74	0.60	0.71	0.47	0.79	0.72
Turkey	0.82	42	0.63	0.70	0.74	0.55	0.61	0.58	0.59	0.70	0.70
United Arab Emirates	0.79	37	0.46	0.67	0.71	0.51	0.65	0.48	0.44	0.73	0.70
United States	0.86	48	0.70	0.75	0.77	0.68	0.64	0.68	0.39	0.79	0.75
<b>Benchmarking Participants</b>											
Buenos Aires, Argentina	0.81	40	0.64	0.62	0.69	0.55	0.66	0.55	0.41	0.74	0.75
Ontario, Canada	0.86	49	0.73	0.76	0.78	0.69	0.61	0.70	0.39	0.78	0.74
Quebec, Canada	0.87	50	0.77	0.75	0.76	0.77	0.66	0.69	0.39	0.75	0.72
Norway (4)	0.84	45	0.71	0.67	0.72	0.73	0.49	0.74	0.47	0.72	0.68
Abu Dhabi, UAE	0.77	35	0.37	0.67	0.71	0.45	0.69	0.40	0.37	0.72	0.73
Dubai, UAE	0.83	42	0.62	0.69	0.70	0.60	0.63	0.60	0.54	0.73	0.69
Florida, US	0.87	50	0.71	0.78	0.76	0.68	0.68	0.67	0.47	0.81	0.75

\*Reverse coded

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

**Relationship Between the TIMSS 2015 Students Confident in Mathematics Scale, Fourth Grade, and TIMSS 2015 Mathematics Achievement**

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )
	(r)	( $r^2$ )	
Australia	0.44	0.19	0.18
Bahrain	0.37	0.14	0.13
Belgium (Flemish)	0.39	0.15	0.14
Bulgaria	0.40	0.16	0.16
Canada	0.44	0.19	0.19
Chile	0.41	0.17	0.17
Chinese Taipei	0.44	0.19	0.20
Croatia	0.45	0.20	0.19
Cyprus	0.44	0.19	0.18
Czech Republic	0.42	0.18	0.18
Denmark	0.42	0.17	0.17
England	0.32	0.10	0.12
Finland	0.43	0.19	0.17
France	0.40	0.16	0.16
Georgia	0.36	0.13	0.15
Germany	0.42	0.18	0.18
Hong Kong SAR	0.41	0.17	0.18
Hungary	0.49	0.24	0.25
Indonesia	0.29	0.09	0.09
Iran, Islamic Rep. of	0.30	0.09	0.10
Ireland	0.43	0.18	0.18
Italy	0.32	0.10	0.10
Japan	0.44	0.19	0.19
Jordan	0.38	0.14	0.15
Kazakhstan	0.22	0.05	0.05
Korea, Rep. of	0.54	0.29	0.27
Kuwait	0.26	0.07	0.07
Lithuania	0.46	0.21	0.21
Morocco	0.32	0.10	0.10
Netherlands	0.52	0.27	0.28
New Zealand	0.37	0.14	0.13
Northern Ireland	0.40	0.16	0.17
Norway (5)	0.42	0.18	0.16
Oman	0.31	0.10	0.10
Poland	0.47	0.22	0.22
Portugal	0.49	0.24	0.25
Qatar	0.28	0.08	0.10
Russian Federation	0.39	0.15	0.16
Saudi Arabia	0.28	0.08	0.09
Serbia	0.44	0.19	0.19
Singapore	0.47	0.22	0.22
Slovak Republic	0.40	0.16	0.15
Slovenia	0.46	0.21	0.21
South Africa (5)	0.38	0.15	0.15
Spain	0.44	0.19	0.21
Sweden	0.38	0.14	0.13
Turkey	0.47	0.22	0.20
United Arab Emirates	0.32	0.11	0.11
United States	0.43	0.18	0.19
<b>International Median</b>	<b>0.41</b>	<b>0.17</b>	<b>0.17</b>
<b>Benchmarking Participants</b>			
Buenos Aires, Argentina	0.33	0.11	0.12
Ontario, Canada	0.45	0.20	0.20
Quebec, Canada	0.43	0.19	0.17
Norway (4)	0.39	0.15	0.14
Abu Dhabi, UAE	0.37	0.14	0.14
Dubai, UAE	0.30	0.09	0.10
Florida, US	0.43	0.18	0.20

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



# Students Confident in Science Scale, Fourth Grade

The Students Confident in Science (SCS) scale was created based on students’ degree of agreement with the seven statements described below.

## Items in the TIMSS 2015 Students Confident in Science Scale, Fourth Grade

		How much do you agree with these statements about science?				
		Agree a lot	Agree a little	Disagree a little	Disagree a lot	
T	ASBS06A	1) I usually do well in science -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	ASBS06B*	2) Science is harder for me than for many of my classmates* -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	ASBS06C*	3) I am just not good at science* -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	ASBS06D	4) I learn things quickly in science -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	ASBS06E	5) My teacher tells me I am good at science -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
T	ASBS06F*	6) Science is harder for me than any other subject* -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	ASBS06G*	7) Science makes me confused* -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\* Reverse coded

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.

**Item Parameters for the TIMSS 2015 Students Confident in Science Scale, Fourth Grade**

Item	delta	tau_1	tau_2	tau_3	Infit
ASBS06A	-0.39055	-0.49625	-0.66696	1.16321	1.02
ASBS06B*	0.20690	-0.51673	0.11786	0.39887	0.99
ASBS06C*	0.09646	-0.33652	0.05023	0.28629	0.95
ASBS06D	-0.24028	-0.68647	-0.30807	0.99454	1.03
ASBS06E	0.14669	-0.81490	-0.26498	1.07988	1.27
ASBS06F*	0.12712	-0.23193	0.04516	0.18677	0.93
ASBS06G*	0.05366	-0.19671	0.12470	0.07201	0.99

\*Reverse coded

**Scale Transformation Constants for the TIMSS 2015 Students Confident in Science Scale, Fourth Grade**

Scale Transformation Constants	
A = 8.285794	Transformed Scale Score = 8.285794 + 1.489538 • Logit Scale Score
B = 1.489538	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 Students Confident in Science Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.59707	
1	5.10277	
2	5.80866	
3	6.29097	
4	6.67014	
5	6.98812	
6	7.26571	
7	7.51852	
8	7.75142	
9	7.97047	
10	8.18083	8.2
11	8.38716	
12	8.59408	
13	8.80664	
14	9.03080	
15	9.27412	
16	9.54624	
17	9.85727	
18	10.24189	10.2
19	10.75225	
20	11.53013	
21	13.20458	

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 2015 Students Confident in Science Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item						
			ASB506A	ASB506B*	ASB506C*	ASB506D	ASB506E	ASB506F*	ASB506G*
Australia	0.84	51	0.72	0.77	0.79	0.71	0.50	0.75	0.73
Bahrain	0.72	39	0.08	0.81	0.79	0.35	0.26	0.85	0.76
Belgium (Flemish)	0.85	52	0.77	0.75	0.80	0.67	0.54	0.78	0.73
Bulgaria	0.82	48	0.60	0.76	0.77	0.64	0.53	0.77	0.75
Canada	0.83	51	0.70	0.78	0.77	0.71	0.45	0.79	0.74
Chile	0.76	42	0.51	0.74	0.72	0.53	0.31	0.79	0.77
Chinese Taipei	0.83	50	0.68	0.75	0.68	0.71	0.55	0.78	0.78
Croatia	0.87	57	0.75	0.79	0.75	0.74	0.66	0.81	0.77
Cyprus	0.85	52	0.73	0.72	0.75	0.72	0.65	0.72	0.75
Czech Republic	0.87	57	0.75	0.76	0.81	0.75	0.62	0.81	0.74
Denmark	0.86	55	0.78	0.73	0.79	0.79	0.61	0.75	0.73
England	0.85	54	0.75	0.77	0.82	0.73	0.46	0.79	0.76
Finland	0.82	49	0.76	0.76	0.81	0.75	0.53	0.76	0.47
France	0.85	54	0.75	0.72	0.76	0.74	0.58	0.78	0.78
Georgia	0.74	40	0.29	0.80	0.80	0.31	0.21	0.82	0.78
Germany	0.84	52	0.69	0.77	0.78	0.71	0.56	0.79	0.72
Hong Kong SAR	0.81	47	0.65	0.72	0.81	0.65	0.49	0.79	0.65
Hungary	0.86	55	0.77	0.77	0.80	0.72	0.68	0.78	0.66
Indonesia	0.73	39	0.29	0.77	0.78	0.38	0.21	0.79	0.78
Iran, Islamic Rep. of	0.76	41	0.32	0.69	0.80	0.44	0.36	0.83	0.80
Ireland	0.82	49	0.71	0.77	0.77	0.69	0.38	0.77	0.73
Italy	0.78	44	0.67	0.68	0.57	0.70	0.57	0.75	0.68
Japan	0.83	51	0.70	0.73	0.83	0.70	0.46	0.77	0.74
Jordan	0.72	40	-0.02	0.82	0.82	0.21	0.22	0.85	0.80
Kazakhstan	0.82	48	0.60	0.76	0.76	0.63	0.58	0.77	0.71
Korea, Rep. of	0.86	55	0.80	0.77	0.80	0.69	0.57	0.78	0.76
Kuwait	0.72	39	0.17	0.78	0.76	0.40	0.34	0.81	0.75
Lithuania	0.81	48	0.69	0.75	0.79	0.60	0.51	0.78	0.66
Morocco	0.72	37	0.31	0.75	0.75	0.40	0.30	0.77	0.74
Netherlands	0.84	52	0.70	0.75	0.80	0.67	0.44	0.79	0.81
New Zealand	0.77	43	0.63	0.69	0.75	0.61	0.41	0.75	0.69
Northern Ireland	0.84	52	0.71	0.73	0.80	0.72	0.47	0.79	0.75
Norway (5)	0.82	48	0.72	0.75	0.75	0.71	0.49	0.74	0.67
Oman	0.70	37	0.11	0.78	0.72	0.33	0.25	0.82	0.77
Poland	0.83	50	0.72	0.77	0.66	0.73	0.58	0.76	0.72
Portugal	0.76	42	0.64	0.65	0.73	0.67	0.54	0.59	0.72
Qatar	0.77	43	0.30	0.82	0.77	0.42	0.37	0.84	0.78
Russian Federation	0.87	57	0.73	0.79	0.82	0.76	0.63	0.79	0.76
Saudi Arabia	0.72	40	0.00	0.81	0.81	0.24	0.20	0.85	0.80
Serbia	0.82	49	0.63	0.74	0.75	0.65	0.59	0.76	0.74
Singapore	0.86	55	0.74	0.80	0.79	0.70	0.55	0.80	0.75
Slovak Republic	0.85	53	0.73	0.73	0.79	0.71	0.57	0.79	0.74
Slovenia	0.86	54	0.74	0.75	0.73	0.73	0.64	0.79	0.74
South Africa (5)	-	-	-	-	-	-	-	-	-
Spain	0.82	49	0.67	0.75	0.75	0.64	0.58	0.76	0.72
Sweden	0.81	48	0.69	0.71	0.76	0.71	0.47	0.77	0.70
Turkey	0.77	43	0.50	0.75	0.79	0.49	0.41	0.79	0.73
United Arab Emirates	0.77	42	0.39	0.77	0.75	0.50	0.40	0.81	0.74
United States	0.82	49	0.67	0.78	0.77	0.64	0.43	0.80	0.74
<b>Benchmarking Participants</b>									
Buenos Aires, Argentina	0.74	40	0.54	0.70	0.74	0.50	0.38	0.72	0.73
Ontario, Canada	0.84	52	0.70	0.79	0.80	0.69	0.44	0.80	0.75
Quebec, Canada	0.83	50	0.74	0.75	0.70	0.75	0.47	0.78	0.73
Norway (4)	0.81	48	0.70	0.74	0.75	0.71	0.51	0.74	0.65
Abu Dhabi, UAE	0.74	40	0.27	0.78	0.76	0.41	0.33	0.82	0.75
Dubai, UAE	0.81	47	0.58	0.78	0.75	0.60	0.50	0.79	0.73
Florida, US	0.84	52	0.67	0.77	0.79	0.68	0.49	0.80	0.77

\*Reverse coded

A dash (-) indicates comparable data not available.

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

**Relationship Between the TIMSS 2015 Students Confident in Science 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 ( $\eta^2$ )
	(r)	( $r^2$ )	
Australia	0.20	0.04	0.05
Bahrain	0.38	0.15	0.15
Belgium (Flemish)	0.25	0.06	0.08
Bulgaria	0.42	0.18	0.20
Canada	0.24	0.06	0.07
Chile	0.29	0.08	0.09
Chinese Taipei	0.31	0.10	0.10
Croatia	0.25	0.06	0.07
Cyprus	0.21	0.04	0.05
Czech Republic	0.20	0.04	0.06
Denmark	0.18	0.03	0.04
England	0.22	0.05	0.06
Finland	0.25	0.06	0.07
France	0.23	0.05	0.07
Georgia	0.29	0.09	0.10
Germany	0.24	0.06	0.06
Hong Kong SAR	0.30	0.09	0.11
Hungary	0.33	0.11	0.11
Indonesia	0.29	0.08	0.10
Iran, Islamic Rep. of	0.35	0.12	0.13
Ireland	0.23	0.05	0.07
Italy	0.20	0.04	0.05
Japan	0.22	0.05	0.05
Jordan	-	-	-
Kazakhstan	0.21	0.05	0.05
Korea, Rep. of	0.36	0.13	0.12
Kuwait	0.27	0.07	0.09
Lithuania	0.33	0.11	0.12
Morocco	0.35	0.12	0.13
Netherlands	0.28	0.08	0.09
New Zealand	0.26	0.07	0.08
Northern Ireland	0.18	0.03	0.05
Norway (5)	0.22	0.05	0.06
Oman	0.33	0.11	0.12
Poland	0.24	0.06	0.07
Portugal	0.26	0.07	0.08
Qatar	0.34	0.11	0.14
Russian Federation	0.20	0.04	0.04
Saudi Arabia	0.32	0.11	0.12
Serbia	0.27	0.07	0.08
Singapore	0.26	0.07	0.08
Slovak Republic	0.28	0.08	0.09
Slovenia	0.31	0.10	0.12
South Africa (5)	-	-	-
Spain	0.34	0.12	0.13
Sweden	0.22	0.05	0.06
Turkey	0.43	0.19	0.19
United Arab Emirates	0.37	0.14	0.15
United States	0.26	0.07	0.08
<b>International Median</b>	<b>0.26</b>	<b>0.07</b>	<b>0.08</b>
<b>Benchmarking Participants</b>			
Buenos Aires, Argentina	0.24	0.06	0.05
Ontario, Canada	0.23	0.05	0.06
Quebec, Canada	0.22	0.05	0.06
Norway (4)	0.24	0.06	0.07
Abu Dhabi, UAE	0.42	0.18	0.17
Dubai, UAE	0.28	0.08	0.10
Florida, US	0.27	0.07	0.08

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

A dash (-) indicates comparable data not available.

# Students Like Learning Mathematics Scale, Fourth Grade

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

## Items in the TIMSS 2015 Students Like Learning Mathematics Scale, Fourth Grade

		How much do you agree with these statements about learning mathematics?			
		Agree a lot	Agree a little	Disagree a little	Disagree a lot
T	ASBM01A	1) I enjoy learning mathematics -----○	○	○	○
T	ASBM01B*	2) I wish I did not have to study mathematics* -----○	○	○	○
T	ASBM01C*	3) Mathematics is boring* -----○	○	○	○
T	ASBM01D	4) I learn many interesting things in mathematics ---○	○	○	○
T	ASBM01E	5) I like mathematics -----○	○	○	○
	ASBM01F	6) I like any schoolwork that involves numbers -----○	○	○	○
	ASBM01G	7) I like to solve mathematics problems-----○	○	○	○
	ASBM01H	8) I look forward to mathematics lessons -----○	○	○	○
	ASBM01I	9) Mathematics is one of my favorite subjects -----○	○	○	○

\* Reverse coded

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.

**Item Parameters for the TIMSS 2015 Students Like Learning Mathematics Scale, Fourth Grade**

Item	delta	tau_1	tau_2	tau_3	Infit
ASBM01A	-0.36154	-0.78229	-0.58169	1.36398	0.78
ASBM01B*	0.16159	-0.46676	-0.01626	0.48302	1.72
ASBM01C*	0.12982	-0.82103	0.11530	0.70573	1.39
ASBM01D	-0.81796	-0.82855	-0.37351	1.20206	1.18
ASBM01E	-0.19078	-0.58243	-0.43159	1.01402	0.65
ASBM01F	0.03849	-1.25798	-0.21189	1.46987	1.05
ASBM01G	0.15055	-0.96095	-0.26596	1.22691	1.06
ASBM01H	0.41364	-1.10049	-0.23780	1.33829	0.84
ASBM01I	0.47619	-0.62831	-0.10305	0.73136	0.91

\*Reverse coded

**Scale Transformation Constants for the TIMSS 2015 Students Like Learning Mathematics Scale, Fourth Grade**

Scale Transformation Constants

A = 8.402636

B = 1.047479

Transformed Scale Score = 8.402636 + 1.047479 • Logit Scale Score

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



**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 Students Like Learning Mathematics Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	4.40782	
1	5.53183	
2	6.06393	
3	6.42611	
4	6.71073	
5	6.94947	
6	7.15899	
7	7.34756	
8	7.52392	
9	7.68976	
10	7.84785	
11	8.00037	
12	8.14916	
13	8.29582	8.3
14	8.44192	
15	8.58902	
16	8.73889	
17	8.89348	
18	9.05518	
19	9.22676	
20	9.41034	
21	9.61310	
22	9.84154	
23	10.10678	10.1
24	10.42683	
25	10.83982	
26	11.43903	
27	12.65794	

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 2015 Students Like Learning Mathematics Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item								
			ASBM01A	ASBM01B*	ASBM01C*	ASBM01D	ASBM01E	ASBM01F	ASBM01G	ASBM01H	ASBM01I
Australia	0.93	66	0.88	0.67	0.77	0.70	0.91	0.76	0.82	0.89	0.86
Bahrain	0.89	55	0.79	0.47	0.52	0.76	0.87	0.69	0.80	0.82	0.83
Belgium (Flemish)	0.93	65	0.89	0.78	0.82	0.64	0.92	0.78	0.70	0.82	0.86
Bulgaria	0.92	63	0.86	0.52	0.68	0.74	0.89	0.83	0.88	0.84	0.85
Canada	0.93	64	0.87	0.63	0.74	0.70	0.91	0.77	0.81	0.87	0.85
Chile	0.91	59	0.84	0.58	0.68	0.69	0.88	0.71	0.83	0.84	0.83
Chinese Taipei	0.95	70	0.88	0.75	0.74	0.79	0.92	0.84	0.85	0.88	0.87
Croatia	0.93	66	0.89	0.71	0.82	0.68	0.92	0.82	0.61	0.92	0.86
Cyprus	0.93	64	0.86	0.70	0.70	0.73	0.89	0.77	0.79	0.87	0.85
Czech Republic	0.93	66	0.90	0.65	0.79	0.63	0.92	0.81	0.73	0.91	0.89
Denmark	0.94	67	0.86	0.70	0.81	0.77	0.90	0.76	0.85	0.87	0.82
England	0.93	66	0.87	0.72	0.80	0.68	0.91	0.77	0.77	0.90	0.85
Finland	0.93	65	0.86	0.68	0.82	0.78	0.91	0.81	0.67	0.86	0.85
France	0.91	59	0.87	0.65	0.76	0.68	0.89	0.70	0.67	0.83	0.84
Georgia	0.84	47	0.78	0.36	0.37	0.69	0.85	0.70	0.75	0.71	0.74
Germany	0.93	66	0.88	0.73	0.73	0.71	0.92	0.81	0.76	0.90	0.87
Hong Kong SAR	0.94	67	0.86	0.65	0.74	0.79	0.91	0.83	0.84	0.86	0.86
Hungary	0.93	63	0.87	0.65	0.72	0.69	0.90	0.81	0.74	0.88	0.84
Indonesia	0.75	40	0.72	0.31	0.39	0.66	0.81	0.69	0.43	0.70	0.74
Iran, Islamic Rep. of	0.83	46	0.77	0.47	0.44	0.63	0.83	0.53	0.79	0.72	0.80
Ireland	0.92	63	0.87	0.66	0.75	0.67	0.91	0.78	0.76	0.88	0.83
Italy	0.93	63	0.88	0.73	0.79	0.63	0.90	0.77	0.68	0.88	0.86
Japan	0.94	67	0.89	0.60	0.73	0.76	0.91	0.82	0.85	0.89	0.85
Jordan	0.83	50	0.71	0.30	0.36	0.75	0.86	0.74	0.80	0.82	0.77
Kazakhstan	0.83	47	0.62	0.36	0.56	0.63	0.80	0.71	0.77	0.80	0.78
Korea, Rep. of	0.94	67	0.86	0.63	0.80	0.77	0.91	0.85	0.86	0.83	0.85
Kuwait	0.87	54	0.80	0.30	0.46	0.76	0.87	0.74	0.82	0.84	0.80
Lithuania	0.92	61	0.85	0.66	0.67	0.59	0.89	0.81	0.86	0.85	0.80
Morocco	0.75	41	0.66	0.27	0.31	0.68	0.79	0.70	0.70	0.76	0.66
Netherlands	0.93	63	0.85	0.71	0.78	0.65	0.90	0.76	0.82	0.85	0.81
New Zealand	0.93	66	0.88	0.70	0.75	0.71	0.90	0.79	0.84	0.87	0.85
Northern Ireland	0.92	62	0.87	0.65	0.75	0.66	0.90	0.79	0.74	0.88	0.83
Norway (5)	0.94	68	0.86	0.66	0.82	0.75	0.91	0.81	0.86	0.87	0.85
Oman	0.77	41	0.69	0.33	0.39	0.62	0.79	0.64	0.76	0.65	0.75
Poland	0.93	65	0.88	0.71	0.78	0.73	0.91	0.78	0.87	0.72	0.85
Portugal	0.92	63	0.87	0.72	0.75	0.66	0.90	0.76	0.79	0.85	0.83
Qatar	0.89	55	0.80	0.44	0.52	0.77	0.87	0.74	0.79	0.80	0.82
Russian Federation	0.89	56	0.84	0.45	0.70	0.67	0.87	0.75	0.73	0.84	0.82
Saudi Arabia	0.87	54	0.78	0.34	0.40	0.79	0.87	0.75	0.83	0.85	0.80
Serbia	0.93	65	0.86	0.65	0.75	0.71	0.91	0.79	0.79	0.90	0.83
Singapore	0.93	64	0.86	0.75	0.75	0.72	0.89	0.73	0.81	0.84	0.85
Slovak Republic	0.92	62	0.87	0.65	0.73	0.58	0.89	0.75	0.82	0.90	0.85
Slovenia	0.93	66	0.86	0.65	0.78	0.76	0.91	0.77	0.81	0.91	0.84
South Africa (5)	0.77	39	0.70	0.26	0.33	0.60	0.79	0.67	0.67	0.67	0.72
Spain	0.91	59	0.83	0.59	0.74	0.64	0.88	0.70	0.77	0.85	0.84
Sweden	0.93	67	0.85	0.68	0.85	0.72	0.91	0.83	0.77	0.87	0.83
Turkey	0.84	48	0.78	0.54	0.65	0.40	0.83	0.62	0.74	0.77	0.79
United Arab Emirates	0.89	56	0.80	0.52	0.65	0.74	0.86	0.69	0.79	0.79	0.81
United States	0.93	65	0.88	0.66	0.75	0.71	0.91	0.76	0.86	0.87	0.85
<b>Benchmarking Participants</b>											
Buenos Aires, Argentina	0.91	60	0.84	0.54	0.64	0.68	0.89	0.78	0.81	0.85	0.85
Ontario, Canada	0.93	65	0.88	0.66	0.74	0.70	0.91	0.76	0.83	0.88	0.85
Quebec, Canada	0.91	60	0.84	0.56	0.76	0.69	0.89	0.74	0.73	0.87	0.82
Norway (4)	0.93	66	0.87	0.60	0.79	0.74	0.91	0.79	0.86	0.89	0.83
Abu Dhabi, UAE	0.89	55	0.79	0.48	0.60	0.75	0.85	0.71	0.80	0.80	0.80
Dubai, UAE	0.91	58	0.84	0.60	0.71	0.71	0.87	0.68	0.78	0.79	0.84
Florida, US	0.93	65	0.87	0.65	0.74	0.70	0.90	0.77	0.88	0.86	0.83

\*Reverse coded

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

**Relationship Between the TIMSS 2015 Students Like Learning Mathematics Scale, Fourth Grade, and TIMSS 2015 Mathematics Achievement**

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )
	(r)	( $r^2$ )	
Australia	0.19	0.04	0.03
Bahrain	0.21	0.04	0.05
Belgium (Flemish)	0.10	0.01	0.01
Bulgaria	0.22	0.05	0.04
Canada	0.21	0.04	0.04
Chile	0.19	0.04	0.04
Chinese Taipei	0.21	0.05	0.04
Croatia	0.14	0.02	0.02
Cyprus	0.18	0.03	0.04
Czech Republic	0.17	0.03	0.02
Denmark	0.17	0.03	0.03
England	0.12	0.02	0.02
Finland	0.20	0.04	0.03
France	0.19	0.04	0.03
Georgia	0.22	0.05	0.04
Germany	0.16	0.03	0.03
Hong Kong SAR	0.22	0.05	0.04
Hungary	0.20	0.04	0.03
Indonesia	0.24	0.06	0.06
Iran, Islamic Rep. of	0.23	0.05	0.05
Ireland	0.17	0.03	0.03
Italy	0.13	0.02	0.01
Japan	0.30	0.09	0.09
Jordan	0.25	0.06	0.06
Kazakhstan	0.15	0.02	0.02
Korea, Rep. of	0.33	0.11	0.10
Kuwait	0.18	0.03	0.04
Lithuania	0.16	0.02	0.02
Morocco	0.29	0.09	0.08
Netherlands	0.18	0.03	0.03
New Zealand	0.05	0.00	0.00
Northern Ireland	0.18	0.03	0.03
Norway (5)	0.10	0.01	0.02
Oman	0.26	0.07	0.06
Poland	0.13	0.02	0.02
Portugal	0.28	0.08	0.07
Qatar	0.21	0.04	0.05
Russian Federation	0.22	0.05	0.04
Saudi Arabia	0.21	0.04	0.05
Serbia	0.10	0.01	0.01
Singapore	0.23	0.05	0.05
Slovak Republic	0.07	0.01	0.00
Slovenia	0.19	0.03	0.03
South Africa (5)	0.32	0.10	0.12
Spain	0.13	0.02	0.02
Sweden	0.07	0.00	0.00
Turkey	0.26	0.07	0.06
United Arab Emirates	0.19	0.03	0.04
United States	0.16	0.02	0.02
<b>International Median</b>	<b>0.19</b>	<b>0.04</b>	<b>0.03</b>
<b>Benchmarking Participants</b>			
Buenos Aires, Argentina	0.06	0.00	0.01
Ontario, Canada	0.21	0.04	0.04
Quebec, Canada	0.18	0.03	0.03
Norway (4)	0.17	0.03	0.03
Abu Dhabi, UAE	0.21	0.04	0.05
Dubai, UAE	0.16	0.02	0.02
Florida, US	0.19	0.04	0.04

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

# Students Like Learning Science Scale, Fourth Grade

The Students Like Learning Science (SLS) scale was created based on students' degree of agreement with the nine statements described below.

## Items in the TIMSS 2015 Students Like Learning Science Scale, Fourth Grade

		How much do you agree with these statements about learning science?			
		Agree a lot	Agree a little	Disagree a little	Disagree a lot
T	ASBS04A	1) I enjoy learning science -----○-----	○-----	○-----	○-----
T	ASBS04B*	2) I wish I did not have to study science* -----○-----	○-----	○-----	○-----
T	ASBS04C*	3) Science is boring*-----○-----	○-----	○-----	○-----
T	ASBS04D	4) I learn many interesting things in science -----○-----	○-----	○-----	○-----
T	ASBS04E	5) I like science -----○-----	○-----	○-----	○-----
	ASBS04F	6) I look forward to learning science in school -----○-----	○-----	○-----	○-----
	ASBS04G	7) Science teaches me how things in the world work -----○-----	○-----	○-----	○-----
	ASBS04H	8) I like to do science experiments -----○-----	○-----	○-----	○-----
	ASBS04I	9) Science is one of my favorite subjects -----○-----	○-----	○-----	○-----

\* Reverse coded

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.

**Item Parameters for the TIMSS 2015 Students Like Learning Science Scale, Fourth Grade**

Item	delta	tau_1	tau_2	tau_3	Infit
ASBS04A	-0.03177	-0.48837	-0.55624	1.04461	0.81
ASBS04B*	0.54508	-0.31578	-0.16722	0.48300	1.53
ASBS04C*	0.36011	-0.48672	-0.06029	0.54701	1.28
ASBS04D	-0.49710	-0.28238	-0.48794	0.77032	0.95
ASBS04E	-0.00762	-0.45509	-0.40061	0.85570	0.65
ASBS04F	0.32089	-0.78932	-0.22311	1.01243	0.85
ASBS04G	-0.63912	-0.42807	-0.58269	1.01076	1.21
ASBS04H	-0.63548	-0.16495	-0.39717	0.56212	1.38
ASBS04I	0.58501	-0.73823	-0.18404	0.92227	0.93

\*Reverse coded

**Scale Transformation Constants for the TIMSS 2015 Students Like Learning Science Scale, Fourth Grade**

Scale Transformation Constants	
A = 7.692952	Transformed Scale Score = 7.692952 + 1.31277 • Logit Scale Score
B = 1.31277	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 Students Like Learning Science Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.23946	
1	4.51118	
2	5.09266	
3	5.48363	
4	5.78856	
5	6.04394	
6	6.26730	
7	6.47373	
8	6.66589	
9	6.84816	
10	7.02381	
11	7.19528	
12	7.36446	
13	7.53286	7.6
14	7.70219	
15	7.87285	
16	8.04737	
17	8.22734	
18	8.41513	
19	8.61378	
20	8.82516	
21	9.05834	
22	9.32098	
23	9.62700	9.6
24	9.99920	
25	10.48630	
26	11.20666	
27	12.70534	

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 2015 Students Like Learning Science Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			ASBS04A	ASBS04B*	ASBS04C*	ASBS04D	ASBS04E	ASBS04F	ASBS04G	ASBS04H	ASBS04I	
Australia	0.92	62	0.86	0.69	0.74	0.79	0.90	0.90	0.66	0.62	0.84	
Bahrain	0.86	52	0.76	0.43	0.47	0.79	0.87	0.81	0.74	0.70	0.81	
Belgium (Flemish)	0.91	59	0.88	0.78	0.83	0.70	0.91	0.83	0.58	0.46	0.84	
Bulgaria	0.86	52	0.81	0.43	0.56	0.78	0.88	0.77	0.73	0.59	0.80	
Canada	0.91	59	0.87	0.64	0.74	0.77	0.91	0.88	0.60	0.57	0.84	
Chile	0.86	51	0.81	0.40	0.56	0.76	0.89	0.83	0.63	0.58	0.82	
Chinese Taipei	0.92	62	0.87	0.66	0.60	0.81	0.91	0.87	0.75	0.72	0.85	
Croatia	0.90	58	0.86	0.67	0.78	0.78	0.90	0.89	0.56	0.42	0.84	
Cyprus	0.91	59	0.86	0.70	0.71	0.78	0.91	0.87	0.64	0.48	0.86	
Czech Republic	0.92	61	0.88	0.63	0.77	0.71	0.92	0.90	0.63	0.58	0.88	
Denmark	0.93	65	0.87	0.74	0.81	0.84	0.91	0.90	0.67	0.59	0.84	
England	0.93	64	0.88	0.74	0.79	0.75	0.92	0.90	0.65	0.64	0.85	
Finland	0.93	63	0.86	0.73	0.82	0.80	0.91	0.85	0.67	0.66	0.82	
France	0.92	61	0.88	0.70	0.78	0.78	0.91	0.86	0.62	0.60	0.82	
Georgia	0.82	45	0.77	0.36	0.37	0.75	0.85	0.65	0.71	0.72	0.66	
Germany	0.91	60	0.82	0.77	0.76	0.77	0.90	0.90	0.65	0.46	0.84	
Hong Kong SAR	0.92	61	0.84	0.58	0.65	0.79	0.91	0.88	0.75	0.71	0.85	
Hungary	0.89	54	0.87	0.59	0.71	0.72	0.90	0.88	0.53	0.42	0.83	
Indonesia	0.74	37	0.66	0.29	0.36	0.68	0.78	0.65	0.58	0.61	0.71	
Iran, Islamic Rep. of	0.79	43	0.74	0.39	0.41	0.68	0.82	0.66	0.62	0.67	0.78	
Ireland	0.91	59	0.86	0.65	0.74	0.73	0.90	0.89	0.64	0.63	0.82	
Italy	0.85	47	0.84	0.67	0.70	0.74	0.86	0.56	0.41	0.46	0.81	
Japan	0.92	63	0.87	0.65	0.69	0.79	0.91	0.90	0.70	0.72	0.84	
Jordan	0.82	48	0.70	0.34	0.37	0.78	0.85	0.79	0.75	0.74	0.75	
Kazakhstan	0.83	46	0.68	0.34	0.62	0.68	0.80	0.77	0.69	0.64	0.76	
Korea, Rep. of	0.93	63	0.86	0.71	0.79	0.81	0.90	0.86	0.69	0.65	0.83	
Kuwait	0.82	46	0.69	0.38	0.46	0.72	0.84	0.77	0.67	0.69	0.72	
Lithuania	0.89	55	0.82	0.65	0.65	0.76	0.87	0.83	0.65	0.62	0.77	
Morocco	0.77	41	0.61	0.38	0.42	0.69	0.78	0.73	0.66	0.69	0.65	
Netherlands	0.90	57	0.84	0.65	0.78	0.74	0.90	0.86	0.58	0.54	0.81	
New Zealand	0.91	59	0.84	0.63	0.66	0.77	0.90	0.87	0.69	0.70	0.82	
Northern Ireland	0.90	57	0.85	0.65	0.72	0.72	0.89	0.87	0.62	0.59	0.80	
Norway (5)	0.91	59	0.87	0.67	0.79	0.77	0.91	0.88	0.61	0.48	0.82	
Oman	0.75	41	0.67	0.35	0.41	0.62	0.78	0.65	0.69	0.70	0.73	
Poland	0.90	57	0.85	0.63	0.66	0.81	0.89	0.71	0.72	0.65	0.82	
Portugal	0.87	52	0.82	0.62	0.64	0.72	0.88	0.81	0.59	0.59	0.77	
Qatar	0.86	52	0.74	0.44	0.48	0.80	0.87	0.81	0.75	0.70	0.79	
Russian Federation	0.88	53	0.83	0.57	0.72	0.71	0.86	0.83	0.62	0.49	0.80	
Saudi Arabia	0.85	51	0.73	0.33	0.39	0.79	0.87	0.84	0.73	0.74	0.80	
Serbia	0.88	54	0.85	0.47	0.64	0.75	0.89	0.88	0.58	0.57	0.83	
Singapore	0.92	60	0.86	0.72	0.73	0.78	0.90	0.87	0.66	0.58	0.85	
Slovak Republic	0.90	57	0.86	0.65	0.73	0.64	0.90	0.88	0.62	0.58	0.84	
Slovenia	0.91	59	0.85	0.66	0.76	0.80	0.91	0.90	0.57	0.48	0.82	
South Africa (5)	-	-	-	-	-	-	-	-	-	-	-	
Spain	0.88	53	0.83	0.58	0.72	0.73	0.89	0.86	0.52	0.37	0.84	
Sweden	0.92	62	0.86	0.70	0.81	0.80	0.91	0.88	0.66	0.61	0.82	
Turkey	0.76	38	0.70	0.53	0.58	0.45	0.78	0.68	0.49	0.53	0.73	
United Arab Emirates	0.88	53	0.77	0.51	0.63	0.78	0.86	0.80	0.70	0.65	0.80	
United States	0.91	60	0.87	0.63	0.71	0.78	0.91	0.88	0.67	0.61	0.84	
<b>Benchmarking Participants</b>												
Buenos Aires, Argentina	0.87	52	0.84	0.48	0.56	0.75	0.90	0.86	0.60	0.51	0.84	
Ontario, Canada	0.91	59	0.87	0.66	0.75	0.76	0.91	0.88	0.63	0.53	0.85	
Quebec, Canada	0.90	58	0.88	0.60	0.76	0.78	0.92	0.90	0.50	0.57	0.83	
Norway (4)	0.91	59	0.87	0.64	0.77	0.77	0.91	0.90	0.57	0.57	0.82	
Abu Dhabi, UAE	0.88	52	0.74	0.50	0.60	0.79	0.86	0.81	0.71	0.64	0.78	
Dubai, UAE	0.88	54	0.82	0.58	0.70	0.74	0.86	0.79	0.66	0.57	0.82	
Florida, US	0.92	60	0.88	0.65	0.72	0.79	0.92	0.88	0.66	0.59	0.84	

\*Reverse coded

A dash (-) indicates comparable data not available.

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

**Relationship Between the TIMSS 2015 Students Like Learning Science 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 ( $\eta^2$ )
	(r)	( $r^2$ )	
Australia	0.10	0.01	0.01
Bahrain	0.38	0.14	0.13
Belgium (Flemish)	0.12	0.02	0.02
Bulgaria	0.28	0.08	0.08
Canada	0.11	0.01	0.01
Chile	0.14	0.02	0.02
Chinese Taipei	0.16	0.03	0.02
Croatia	0.10	0.01	0.01
Cyprus	0.10	0.01	0.01
Czech Republic	0.06	0.00	0.00
Denmark	0.07	0.00	0.01
England	0.10	0.01	0.01
Finland	0.08	0.01	0.01
France	0.11	0.01	0.01
Georgia	0.20	0.04	0.04
Germany	0.09	0.01	0.01
Hong Kong SAR	0.22	0.05	0.04
Hungary	0.15	0.02	0.02
Indonesia	0.29	0.09	0.10
Iran, Islamic Rep. of	0.28	0.08	0.07
Ireland	0.19	0.04	0.03
Italy	0.10	0.01	0.01
Japan	0.17	0.03	0.02
Jordan	-	-	-
Kazakhstan	0.16	0.03	0.02
Korea, Rep. of	0.26	0.07	0.05
Kuwait	0.27	0.03	0.06
Lithuania	0.18	0.11	0.03
Morocco	0.34	0.02	0.10
Netherlands	0.15	0.01	0.02
New Zealand	0.12	0.02	0.02
Northern Ireland	0.14	0.01	0.01
Norway (5)	0.10	0.12	0.01
Oman	0.34	0.00	0.10
Poland	0.07	0.02	0.01
Portugal	0.14	0.12	0.02
Qatar	0.34	0.00	0.11
Russian Federation	0.06	0.08	0.00
Saudi Arabia	0.28	0.00	0.09
Serbia	0.02	0.02	0.00
Singapore	0.14	0.00	0.02
Slovak Republic	0.06	0.02	0.00
Slovenia	0.13	0.02	0.01
South Africa (5)	-	-	-
Spain	0.13	0.02	0.02
Sweden	-0.02	0.00	0.00
Turkey	0.34	0.12	0.11
United Arab Emirates	0.35	0.12	0.11
United States	0.13	0.02	0.02
<b>International Median</b>	<b>0.14</b>	<b>0.02</b>	<b>0.02</b>
<b>Benchmarking Participants</b>			
Buenos Aires, Argentina	0.08	0.01	0.01
Ontario, Canada	0.11	0.01	0.01
Quebec, Canada	0.12	0.01	0.01
Norway (4)	0.11	0.01	0.01
Abu Dhabi, UAE	0.35	0.13	0.13
Dubai, UAE	0.27	0.07	0.06
Florida, US	0.16	0.02	0.02

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

A dash (-) indicates comparable data not available.

# Students' Sense of School Belonging Scale, Fourth Grade

The Students' Sense of School Belonging (SSB) scale was created based on students' degree of agreement with the seven statements described below.

## Items in the TIMSS 2015 Students' Sense of School Belonging, Fourth Grade

What do you think about your school? Tell how much you agree with these statements.

	Agree a lot	Agree a little	Disagree a little	Disagree a lot
ASBG11A 1) I like being in school -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBG11B 2) I feel safe when I am at school -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBG11C 3) I feel like I belong at this school -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBG11D 4) I like to see my classmates at school -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBG11E 5) Teachers at my school are fair to me -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBG11F 6) I am proud to go to this school -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBG11G 7) I learn a lot in school -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

High Sense of School Belonging 9.1    Sense of School Belonging 6.8    Little Sense of School Belonging



**Item Parameters for the TIMSS 2015 Students' Sense of School Belonging Scale, Fourth Grade**

Item	delta	tau_1	tau_2	tau_3	Infit
ASBG11A	0.56254	-0.33789	-0.81923	1.15712	1.06
ASBG11B	0.18287	-0.43736	-0.56824	1.00560	1.01
ASBG11C	0.30843	-0.24942	-0.47527	0.72469	1.02
ASBG11D	-0.64754	0.09352	-0.52319	0.42967	1.13
ASBG11E	0.05958	-0.20049	-0.59003	0.79052	1.10
ASBG11F	0.13972	-0.12324	-0.60389	0.72713	0.94
ASBG11G	-0.60560	-0.08268	-0.71676	0.79944	1.00

**Scale Transformation Constants for the TIMSS 2015 Students' Sense of School Belonging Scale, Fourth Grade**

Scale Transformation Constants

A = 7.050578	Transformed Scale Score = 7.050578 + 1.530558 • Logit Scale Score
B = 1.530558	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 Students' Sense of School Belonging Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	2.69267	
1	3.96448	
2	4.56327	
3	4.97987	
4	5.31312	
5	5.59808	
6	5.85633	
7	6.09696	
8	6.32653	
9	6.55299	
10	6.77277	6.8
11	6.99462	
12	7.22296	
13	7.46316	
14	7.72193	
15	8.00589	
16	8.33009	
17	8.71486	
18	9.19396	9.1
19	9.83052	
20	10.76714	
21	12.63595	

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 2015 Students' Sense of School Belonging Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item						
			ASBG11A	ASBG11B	ASBG11C	ASBG11D	ASBG11E	ASBG11F	ASBG11G
Australia	0.82	49	0.70	0.73	0.74	0.51	0.69	0.82	0.66
Bahrain	0.80	46	0.69	0.70	0.73	0.59	0.59	0.76	0.65
Belgium (Flemish)	0.77	43	0.71	0.67	0.74	0.53	0.64	0.75	0.51
Bulgaria	0.79	45	0.65	0.69	0.72	0.54	0.63	0.78	0.68
Canada	0.82	48	0.70	0.71	0.73	0.60	0.68	0.80	0.63
Chile	0.81	48	0.69	0.71	0.73	0.61	0.65	0.80	0.64
Chinese Taipei	0.78	44	0.72	0.69	0.69	0.57	0.65	0.65	0.68
Croatia	0.78	45	0.67	0.72	0.67	0.48	0.65	0.77	0.68
Cyprus	0.81	48	0.71	0.67	0.73	0.48	0.70	0.81	0.69
Czech Republic	0.77	43	0.64	0.66	0.61	0.53	0.69	0.78	0.66
Denmark	0.83	49	0.73	0.76	0.77	0.60	0.63	0.78	0.63
England	0.82	48	0.72	0.71	0.75	0.45	0.69	0.81	0.69
Finland	0.82	49	0.76	0.74	0.69	0.57	0.65	0.77	0.69
France	0.68	36	0.63	0.61	0.66	0.48	0.44	0.78	0.57
Georgia	0.77	45	0.57	0.58	0.46	0.79	0.65	0.80	0.79
Germany	0.80	46	0.70	0.72	0.73	0.59	0.63	0.78	0.60
Hong Kong SAR	0.85	52	0.76	0.79	0.81	0.59	0.67	0.75	0.69
Hungary	0.76	42	0.64	0.67	0.73	0.50	0.66	0.77	0.53
Indonesia	0.79	45	0.62	0.60	0.70	0.72	0.66	0.69	0.70
Iran, Islamic Rep. of	0.66	38	0.66	0.67	0.68	0.64	0.66	0.35	0.61
Ireland	0.79	46	0.66	0.74	0.74	0.50	0.67	0.79	0.62
Italy	0.77	43	0.68	0.66	0.69	0.49	0.67	0.78	0.59
Japan	0.83	50	0.76	0.74	0.69	0.64	0.67	0.79	0.67
Jordan	0.80	46	0.68	0.65	0.72	0.64	0.61	0.74	0.68
Kazakhstan	0.75	42	0.62	0.56	0.67	0.59	0.65	0.73	0.67
Korea, Rep. of	0.83	50	0.75	0.72	0.64	0.66	0.65	0.79	0.70
Kuwait	0.77	42	0.67	0.66	0.69	0.56	0.57	0.74	0.63
Lithuania	0.77	43	0.68	0.65	0.68	0.57	0.66	0.76	0.55
Morocco	0.75	42	0.62	0.62	0.63	0.61	0.63	0.72	0.69
Netherlands	0.80	47	0.74	0.69	0.73	0.61	0.66	0.77	0.58
New Zealand	0.82	48	0.71	0.71	0.76	0.52	0.65	0.81	0.67
Northern Ireland	0.79	47	0.66	0.73	0.73	0.50	0.71	0.77	0.64
Norway (5)	0.81	48	0.65	0.73	0.78	0.57	0.63	0.79	0.64
Oman	0.80	46	0.64	0.64	0.68	0.65	0.65	0.75	0.71
Poland	0.79	45	0.74	0.68	0.71	0.42	0.64	0.80	0.63
Portugal	0.75	42	0.72	0.65	0.70	0.47	0.50	0.81	0.62
Qatar	0.84	50	0.75	0.72	0.76	0.58	0.67	0.80	0.65
Russian Federation	0.75	41	0.72	0.61	0.69	0.47	0.62	0.75	0.59
Saudi Arabia	0.80	46	0.67	0.68	0.71	0.60	0.68	0.75	0.65
Serbia	0.76	42	0.70	0.66	0.72	0.51	0.62	0.79	0.48
Singapore	0.81	47	0.75	0.70	0.76	0.51	0.65	0.80	0.61
Slovak Republic	0.79	44	0.67	0.68	0.74	0.41	0.68	0.78	0.60
Slovenia	0.81	48	0.70	0.69	0.74	0.45	0.69	0.81	0.69
South Africa (5)	0.75	41	0.63	0.66	0.67	0.65	0.48	0.70	0.69
Spain	0.77	43	0.66	0.67	0.66	0.52	0.65	0.76	0.66
Sweden	0.81	47	0.68	0.69	0.76	0.60	0.58	0.80	0.66
Turkey	0.60	34	0.59	0.64	0.64	0.60	0.34	0.62	0.58
United Arab Emirates	0.81	47	0.67	0.69	0.72	0.59	0.66	0.77	0.67
United States	0.82	49	0.69	0.72	0.76	0.57	0.69	0.82	0.63
<b>Benchmarking Participants</b>									
Buenos Aires, Argentina	0.76	43	0.69	0.67	0.64	0.49	0.66	0.77	0.62
Ontario, Canada	0.81	48	0.70	0.70	0.74	0.57	0.68	0.81	0.63
Quebec, Canada	0.80	46	0.70	0.70	0.72	0.58	0.66	0.78	0.58
Norway (4)	0.78	45	0.66	0.67	0.76	0.52	0.60	0.80	0.65
Abu Dhabi, UAE	0.80	46	0.64	0.69	0.72	0.62	0.65	0.75	0.67
Dubai, UAE	0.81	47	0.70	0.69	0.71	0.55	0.67	0.80	0.64
Florida, US	0.82	49	0.70	0.72	0.76	0.59	0.66	0.83	0.59

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

**Relationship Between the TIMSS 2015 Students' Sense of School Belonging Scale, Fourth Grade, and TIMSS 2015 Achievement**

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )	
	(r)		(r <sup>2</sup> )		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.11	0.10	0.01	0.01	0.01	0.01
Bahrain	0.10	0.12	0.01	0.01	0.01	0.02
Belgium (Flemish)	0.08	0.10	0.01	0.01	0.01	0.02
Bulgaria	0.02	-0.01	0.00	0.00	-0.01	0.01
Canada	0.07	0.08	0.01	0.01	0.01	0.01
Chile	0.16	0.12	0.02	0.02	0.02	0.01
Chinese Taipei	0.11	0.08	0.01	0.01	0.01	0.01
Croatia	0.05	0.03	0.00	0.00	0.00	0.00
Cyprus	0.02	0.03	0.00	0.00	0.00	0.00
Czech Republic	-0.03	-0.05	0.00	0.00	0.01	0.00
Denmark	0.14	0.12	0.02	0.01	0.02	0.01
England	0.12	0.12	0.01	0.01	0.01	0.01
Finland	0.08	0.07	0.01	0.01	0.01	0.01
France	0.04	0.07	0.00	0.01	0.01	0.01
Georgia	0.09	0.04	0.01	0.00	0.02	0.01
Germany	0.07	0.06	0.00	0.00	0.01	0.00
Hong Kong SAR	0.16	0.13	0.03	0.02	0.02	0.01
Hungary	0.09	0.05	0.01	0.00	0.01	0.00
Indonesia	0.09	0.08	0.01	0.01	0.02	0.02
Iran, Islamic Rep. of	-0.12	-0.12	0.01	0.02	0.01	0.02
Ireland	0.10	0.06	0.01	0.00	0.01	0.01
Italy	0.06	0.03	0.00	0.00	0.01	0.01
Japan	0.16	0.13	0.03	0.02	0.03	0.02
Jordan	0.06	-	0.00	-	0.01	-
Kazakhstan	0.11	0.16	0.01	0.02	0.01	0.02
Korea, Rep. of	0.13	0.06	0.02	0.00	0.01	0.00
Kuwait	-0.01	0.07	0.00	0.00	0.00	0.01
Lithuania	0.07	0.06	0.00	0.00	0.01	0.01
Morocco	0.14	0.19	0.02	0.04	0.02	0.05
Netherlands	0.09	0.13	0.01	0.02	0.01	0.02
New Zealand	0.03	0.02	0.00	0.00	0.01	0.00
Northern Ireland	0.10	0.06	0.01	0.00	0.02	0.01
Norway (5)	0.09	0.05	0.01	0.00	0.01	0.01
Oman	0.11	0.13	0.01	0.02	0.02	0.02
Poland	-0.05	-0.06	0.00	0.00	0.00	0.00
Portugal	0.11	0.05	0.01	0.00	0.01	0.00
Qatar	0.13	0.16	0.02	0.02	0.02	0.03
Russian Federation	0.08	0.01	0.01	0.00	0.01	0.00
Saudi Arabia	0.16	0.17	0.03	0.03	0.03	0.03
Serbia	-0.04	-0.08	0.00	0.01	0.00	0.00
Singapore	0.08	0.05	0.01	0.00	0.01	0.00
Slovak Republic	-0.08	-0.08	0.01	0.01	0.01	0.01
Slovenia	-0.03	-0.02	0.00	0.00	0.00	0.00
South Africa (5)	0.16	-	0.03	-	0.04	-
Spain	0.03	0.04	0.00	0.00	0.00	0.01
Sweden	0.07	0.08	0.00	0.01	0.01	0.01
Turkey	0.22	0.20	0.05	0.04	0.04	0.04
United Arab Emirates	0.13	0.16	0.02	0.03	0.02	0.03
United States	0.14	0.13	0.02	0.02	0.02	0.02
<b>International Median</b>	<b>0.09</b>	<b>0.07</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>	<b>0.01</b>
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	-0.01	-0.01	0.00	0.00	0.00	0.00
Ontario, Canada	0.10	0.09	0.01	0.01	0.01	0.01
Quebec, Canada	0.04	0.04	0.00	0.00	0.00	0.00
Norway (4)	0.12	0.13	0.02	0.02	0.01	0.01
Abu Dhabi, UAE	0.11	0.13	0.01	0.02	0.02	0.02
Dubai, UAE	0.15	0.18	0.02	0.03	0.03	0.04
Florida, US	0.18	0.17	0.03	0.03	0.03	0.03

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

A dash (-) indicates comparable data not available.

# Students' Views on Engaging Teaching in Mathematics Lessons Scale, Fourth Grade

The Students' Views on Engaging Teaching in Mathematics Lessons (EML) scale was created based on students' degree of agreement with the ten statements described below.

## Items in the TIMSS 2015 Students' Views on Engaging Teaching in Mathematics Lessons Scale, Fourth Grade

**How much do you agree with these statements about your mathematics lessons?**

	Agree a lot	Agree a little	Disagree a little	Disagree a lot
ASBM02A 1) I know what my teacher expects me to do -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBM02B 2) My teacher is easy to understand -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBM02C 3) I am interested in what my teacher says -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBM02D 4) My teacher gives me interesting things to do -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBM02E 5) My teacher has clear answers to my questions ----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBM02F 6) My teacher is good at explaining mathematics ----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBM02G 7) My teacher lets me show what I have learned-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBM02H 8) My teacher does a variety of things to help us learn -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBM02I 9) My teacher tells me how to do better when I make a mistake -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ASBM02J 10) My teacher listens to what I have to say -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Very Engaging Teaching 9.0    Engaging Teaching 7.0    Less than Engaging Teaching

**Item Parameters for the TIMSS 2015 Students' Views on Engaging Teaching in Mathematics Lessons Scale, Fourth Grade**

Item	delta	tau_1	tau_2	tau_3	Infit
ASBM02A	0.38419	-0.45928	-0.74716	1.20644	1.45
ASBM02B	0.03877	-0.72151	-0.67326	1.39477	1.09
ASBM02C	0.12130	-0.75604	-0.46634	1.22238	0.99
ASBM02D	0.40625	-0.83775	-0.35861	1.19636	0.99
ASBM02E	-0.14411	-0.72485	-0.45891	1.18376	0.90
ASBM02F	-0.48092	-0.43600	-0.50640	0.94240	0.86
ASBM02G	0.35273	-0.79575	-0.43071	1.22646	1.10
ASBM02H	-0.39195	-0.38697	-0.55457	0.94154	0.95
ASBM02I	-0.20522	-0.43958	-0.49368	0.93326	1.01
ASBM02J	-0.08104	-0.40846	-0.52440	0.93286	1.01

**Scale Transformation Constants for the TIMSS 2015 Students' Views on Engaging Teaching in Mathematics Lessons Scale, Fourth Grade**

Scale Transformation Constants	
A = 7.092835	Transformed Scale Score = 7.092835 + 1.336512 • Logit Scale Score
B = 1.336512	

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS 2015 Students' Views on Engaging Teaching in Mathematics Lessons Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	2.28692	
1	3.63188	
2	4.24280	
3	4.64797	
4	4.95849	
5	5.21283	
6	5.43698	
7	5.63375	
8	5.81602	
9	5.98702	
10	6.15013	
11	6.30793	
12	6.46248	
13	6.61730	
14	6.76989	
15	6.92442	7.0
16	7.08212	
17	7.24591	
18	7.41643	
19	7.59618	
20	7.78743	
21	7.99236	
22	8.21605	
23	8.46252	
24	8.73772	
25	9.04989	9.0
26	9.41158	
27	9.84507	
28	10.39553	
29	11.17927	
30	12.74909	

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 2015 Students' Views on Engaging Teaching in Mathematics Lessons Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			ASBM02A	ASBM02B	ASBM02C	ASBM02D	ASBM02E	ASBM02F	ASBM02G	ASBM02H	ASBM02I	ASBM02J
Australia	0.88	49	0.52	0.73	0.75	0.75	0.74	0.76	0.65	0.71	0.68	0.68
Bahrain	0.88	49	0.45	0.63	0.71	0.76	0.76	0.74	0.73	0.75	0.70	0.68
Belgium (Flemish)	0.83	41	0.52	0.65	0.66	0.63	0.70	0.72	0.57	0.65	0.61	0.65
Bulgaria	0.86	47	0.50	0.65	0.70	0.69	0.76	0.71	0.73	0.66	0.70	0.71
Canada	0.88	48	0.54	0.70	0.73	0.73	0.75	0.75	0.64	0.69	0.67	0.68
Chile	0.87	48	0.49	0.63	0.71	0.69	0.74	0.76	0.65	0.72	0.72	0.75
Chinese Taipei	0.90	54	0.70	0.71	0.77	0.71	0.76	0.75	0.75	0.77	0.74	0.66
Croatia	0.87	48	0.54	0.68	0.61	0.67	0.79	0.77	0.70	0.71	0.73	0.72
Cyprus	0.89	51	0.54	0.62	0.76	0.75	0.76	0.77	0.72	0.77	0.68	0.73
Czech Republic	0.88	50	0.54	0.76	0.69	0.66	0.77	0.77	0.57	0.77	0.72	0.74
Denmark	0.88	50	0.49	0.75	0.73	0.73	0.73	0.79	0.67	0.72	0.67	0.73
England	0.87	48	0.51	0.72	0.73	0.73	0.74	0.76	0.60	0.70	0.67	0.71
Finland	0.86	46	0.41	0.72	0.68	0.68	0.66	0.78	0.67	0.74	0.70	0.72
France	0.84	42	0.45	0.66	0.71	0.69	0.68	0.72	0.64	0.63	0.64	0.65
Georgia	0.87	53	0.38	0.74	0.48	0.79	0.80	0.87	0.76	0.83	0.66	0.79
Germany	0.85	44	0.46	0.74	0.69	0.71	0.74	0.73	0.65	0.63	0.63	0.63
Hong Kong SAR	0.91	56	0.67	0.76	0.78	0.78	0.79	0.75	0.74	0.75	0.72	0.73
Hungary	0.87	47	0.51	0.63	0.73	0.71	0.73	0.75	0.62	0.70	0.70	0.72
Indonesia	0.79	36	0.43	0.55	0.63	0.64	0.57	0.62	0.64	0.67	0.64	0.56
Iran, Islamic Rep. of	0.85	45	0.36	0.62	0.71	0.66	0.75	0.76	0.70	0.68	0.64	0.73
Ireland	0.87	47	0.48	0.71	0.73	0.73	0.75	0.75	0.62	0.69	0.68	0.71
Italy	0.82	41	0.36	0.54	0.70	0.69	0.72	0.71	0.67	0.60	0.60	0.69
Japan	0.90	53	0.57	0.79	0.77	0.73	0.77	0.79	0.55	0.76	0.76	0.75
Jordan	0.84	46	0.35	0.60	0.75	0.73	0.76	0.76	0.65	0.71	0.71	0.66
Kazakhstan	0.83	43	0.41	0.52	0.72	0.75	0.72	0.73	0.75	0.60	0.66	0.63
Korea, Rep. of	0.90	54	0.53	0.70	0.78	0.76	0.78	0.78	0.59	0.81	0.78	0.78
Kuwait	0.85	45	0.44	0.66	0.67	0.72	0.75	0.75	0.65	0.69	0.66	0.65
Lithuania	0.83	42	0.47	0.60	0.60	0.70	0.70	0.71	0.63	0.64	0.66	0.70
Morocco	0.78	37	0.37	0.53	0.67	0.64	0.66	0.69	0.55	0.69	0.65	0.62
Netherlands	0.82	40	0.54	0.66	0.64	0.63	0.72	0.70	0.56	0.60	0.60	0.67
New Zealand	0.87	48	0.53	0.69	0.73	0.72	0.75	0.75	0.63	0.70	0.65	0.69
Northern Ireland	0.86	45	0.49	0.70	0.73	0.70	0.75	0.72	0.57	0.66	0.63	0.71
Norway (5)	0.87	48	0.51	0.72	0.69	0.70	0.74	0.74	0.67	0.70	0.70	0.71
Oman	0.81	41	0.35	0.59	0.69	0.64	0.69	0.71	0.68	0.68	0.68	0.65
Poland	0.91	55	0.61	0.70	0.73	0.77	0.81	0.81	0.72	0.78	0.72	0.76
Portugal	0.79	38	0.37	0.51	0.64	0.71	0.67	0.67	0.63	0.57	0.63	0.67
Qatar	0.90	53	0.53	0.73	0.76	0.78	0.78	0.78	0.69	0.78	0.71	0.70
Russian Federation	0.82	42	0.43	0.64	0.68	0.69	0.69	0.69	0.62	0.67	0.64	0.68
Saudi Arabia	0.87	48	0.40	0.68	0.74	0.72	0.77	0.77	0.63	0.77	0.69	0.69
Serbia	0.85	44	0.46	0.67	0.70	0.68	0.73	0.72	0.72	0.61	0.64	0.65
Singapore	0.88	49	0.56	0.72	0.75	0.74	0.74	0.73	0.64	0.72	0.71	0.68
Slovak Republic	0.88	49	0.56	0.70	0.69	0.69	0.73	0.76	0.69	0.73	0.74	0.72
Slovenia	0.88	49	0.55	0.59	0.68	0.76	0.74	0.79	0.71	0.74	0.71	0.68
South Africa (5)	0.85	42	0.52	0.63	0.67	0.69	0.63	0.68	0.64	0.66	0.67	0.64
Spain	0.84	44	0.39	0.58	0.69	0.72	0.72	0.67	0.65	0.70	0.71	0.72
Sweden	0.86	46	0.44	0.70	0.68	0.68	0.73	0.73	0.68	0.73	0.67	0.70
Turkey	0.73	34	0.39	0.53	0.61	0.40	0.65	0.63	0.60	0.58	0.64	0.68
United Arab Emirates	0.88	48	0.48	0.70	0.72	0.74	0.76	0.75	0.67	0.71	0.69	0.68
United States	0.88	49	0.54	0.73	0.74	0.72	0.75	0.75	0.63	0.71	0.71	0.72
<b>Benchmarking Participants</b>												
Buenos Aires, Argentina	0.84	43	0.41	0.56	0.72	0.70	0.72	0.72	0.61	0.67	0.67	0.71
Ontario, Canada	0.88	48	0.53	0.71	0.73	0.74	0.74	0.75	0.62	0.70	0.67	0.68
Quebec, Canada	0.87	46	0.49	0.68	0.73	0.72	0.74	0.74	0.67	0.67	0.67	0.65
Norway (4)	0.85	44	0.52	0.64	0.69	0.70	0.70	0.73	0.63	0.69	0.66	0.67
Abu Dhabi, UAE	0.87	46	0.47	0.69	0.72	0.74	0.74	0.74	0.65	0.70	0.67	0.65
Dubai, UAE	0.88	49	0.53	0.70	0.71	0.74	0.75	0.75	0.67	0.71	0.70	0.69
Florida, US	0.87	47	0.57	0.72	0.74	0.72	0.72	0.73	0.65	0.65	0.66	0.71

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



**Relationship Between the TIMSS 2015 Students' Views on Engaging Teaching in Mathematics Lessons Scale, Fourth Grade, and TIMSS 2015 Mathematics Achievement**

Country	Pearson's Correlation with Mathematics Achievement		Variance in Mathematics Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )
	(r)	( $r^2$ )	
Australia	0.03	0.00	0.01
Bahrain	0.13	0.02	0.02
Belgium (Flemish)	-0.06	0.00	0.00
Bulgaria	0.09	0.01	0.02
Canada	0.02	0.00	0.00
Chile	0.12	0.01	0.02
Chinese Taipei	0.10	0.01	0.01
Croatia	0.08	0.01	0.00
Cyprus	0.05	0.00	0.00
Czech Republic	-0.05	0.00	0.00
Denmark	0.11	0.01	0.01
England	0.01	0.00	0.00
Finland	0.08	0.01	0.01
France	0.01	0.00	0.00
Georgia	0.13	0.02	0.03
Germany	-0.01	0.00	0.00
Hong Kong SAR	0.12	0.02	0.02
Hungary	0.05	0.00	0.00
Indonesia	0.07	0.00	0.02
Iran, Islamic Rep. of	0.04	0.00	0.01
Ireland	-0.01	0.00	0.00
Italy	0.07	0.00	0.01
Japan	0.05	0.00	0.01
Jordan	0.14	0.02	0.03
Kazakhstan	0.10	0.01	0.02
Korea, Rep. of	0.11	0.01	0.01
Kuwait	0.06	0.00	0.01
Lithuania	0.03	0.00	0.00
Morocco	0.13	0.02	0.03
Netherlands	0.04	0.00	0.01
New Zealand	-0.06	0.00	0.00
Northern Ireland	-0.03	0.00	0.00
Norway (5)	0.05	0.00	0.00
Oman	0.15	0.02	0.04
Poland	0.02	0.00	0.00
Portugal	0.08	0.01	0.00
Qatar	0.13	0.02	0.04
Russian Federation	0.04	0.00	0.00
Saudi Arabia	0.11	0.01	0.03
Serbia	-0.01	0.00	0.00
Singapore	0.10	0.01	0.01
Slovak Republic	-0.08	0.01	0.00
Slovenia	0.05	0.00	0.00
South Africa (5)	0.23	0.05	0.07
Spain	-0.01	0.00	0.00
Sweden	-0.02	0.00	0.00
Turkey	0.24	0.06	0.06
United Arab Emirates	0.17	0.03	0.03
United States	0.07	0.01	0.01
<b>International Median</b>	<b>0.06</b>	<b>0.00</b>	<b>0.01</b>
<b>Benchmarking Participants</b>			
Buenos Aires, Argentina	-0.01	0.00	0.00
Ontario, Canada	0.03	0.00	0.01
Quebec, Canada	-0.01	0.00	0.00
Norway (4)	0.05	0.00	0.00
Abu Dhabi, UAE	0.17	0.03	0.04
Dubai, UAE	0.12	0.01	0.02
Florida, US	0.10	0.01	0.02

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

# Students' Views on Engaging Teaching in Science Lessons Scale, Fourth Grade

The Students' Views on Engaging Teaching in Science Lessons (ESL) scale was created based on students' degree of agreement with the ten statements described below.

## Items in the TIMSS 2015 Students' Views on Engaging Teaching in Science Lessons Scale, Fourth Grade

**How much do you agree with these statements about your science lessons?**

	Agree a lot	Agree a little	Disagree a little	Disagree a lot
ASBS05A	1) I know what my teacher expects me to do ----- ○	○	○	○
ASBS05B	2) My teacher is easy to understand ----- ○	○	○	○
ASBS05C	3) I am interested in what my teacher says ----- ○	○	○	○
ASBS05D	4) My teacher gives me interesting things to do ----- ○	○	○	○
ASBS05E	5) My teacher has clear answers to my questions ----- ○	○	○	○
ASBS05F	6) My teacher is good at explaining science ----- ○	○	○	○
ASBS05G	7) My teacher lets me show what I have learned ----- ○	○	○	○
ASBS05H	8) My teacher does a variety of things to help us learn ----- ○	○	○	○
ASBS05I	9) My teacher tells me how to do better when I make a mistake ----- ○	○	○	○
ASBS05J	10) My teacher listens to what I have to say ----- ○	○	○	○

Very Engaging Teaching 9.0      Engaging Teaching      Less than Engaging Teaching 7.0

**Item Parameters for the TIMSS 2015 Students' Views on Engaging Teaching in Science Lessons Scale, Fourth Grade**

Item	delta	tau_1	tau_2	tau_3	Infit
ASBS05A	0.50888	-0.81715	-0.58879	1.40594	1.50
ASBS05B	-0.03751	-0.82603	-0.63735	1.46338	1.09
ASBS05C	-0.04871	-0.88128	-0.35960	1.24088	1.02
ASBS05D	0.22876	-0.99483	-0.27841	1.27324	1.02
ASBS05E	-0.21612	-0.95060	-0.40396	1.35456	0.90
ASBS05F	-0.47098	-0.74576	-0.49669	1.24245	0.91
ASBS05G	0.45511	-1.06157	-0.35018	1.41175	1.15
ASBS05H	-0.31307	-0.72648	-0.49092	1.21740	1.02
ASBS05I	-0.05738	-0.77774	-0.42703	1.20477	1.04
ASBS05J	-0.04898	-0.67414	-0.50076	1.17490	1.05

**Scale Transformation Constants for the TIMSS 2015 Students' Views on Engaging Teaching in Science Lessons Scale, Fourth Grade**

Scale Transformation Constants

A = 7.078772

B = 1.209047

Transformed Scale Score = 7.078772 + 1.209047 • Logit Scale Score

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

**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 Students' Views on Engaging Teaching in Science Lessons Scale,  
Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	2.40628	
1	3.68357	
2	4.27493	
3	4.67030	
4	4.97489	
5	5.22528	
6	5.44624	
7	5.64160	
8	5.82255	
9	5.99269	
10	6.15531	
11	6.31297	
12	6.46770	
13	6.62249	
14	6.77592	
15	6.93146	7.0
16	7.09103	
17	7.25510	
18	7.42646	
19	7.60651	
20	7.79674	
21	8.00038	
22	8.22000	
23	8.45923	
24	8.72285	
25	9.01785	9.0
26	9.35467	
27	9.75424	
28	10.25748	
29	10.97053	
30	12.39384	

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 2015 Students' Views on Engaging Teaching in Science Lessons Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item									
			ASBS05A	ASBS05B	ASBS05C	ASBS05D	ASBS05E	ASBS05F	ASBS05G	ASBS05H	ASBS05I	ASBS05J
Australia	0.91	56	0.63	0.78	0.79	0.78	0.80	0.76	0.69	0.77	0.72	0.72
Bahrain	0.90	54	0.49	0.71	0.77	0.79	0.81	0.76	0.75	0.78	0.74	0.71
Belgium (Flemish)	0.87	48	0.62	0.74	0.71	0.69	0.75	0.72	0.58	0.70	0.69	0.69
Bulgaria	0.88	50	0.54	0.66	0.71	0.71	0.78	0.74	0.75	0.71	0.74	0.74
Canada	0.90	53	0.60	0.76	0.76	0.76	0.78	0.76	0.68	0.74	0.71	0.71
Chile	0.90	53	0.56	0.68	0.75	0.75	0.78	0.78	0.68	0.76	0.75	0.75
Chinese Taipei	0.92	59	0.76	0.79	0.81	0.77	0.79	0.77	0.75	0.80	0.74	0.69
Croatia	0.90	55	0.59	0.77	0.66	0.72	0.82	0.82	0.76	0.73	0.76	0.78
Cyprus	0.93	60	0.63	0.70	0.81	0.80	0.83	0.82	0.78	0.82	0.77	0.79
Czech Republic	0.90	55	0.65	0.80	0.74	0.68	0.79	0.80	0.62	0.79	0.75	0.75
Denmark	0.92	60	0.62	0.80	0.80	0.78	0.79	0.81	0.74	0.80	0.77	0.77
England	0.91	55	0.62	0.78	0.77	0.77	0.80	0.79	0.65	0.74	0.73	0.73
Finland	0.89	52	0.52	0.79	0.73	0.72	0.72	0.80	0.72	0.74	0.72	0.73
France	0.89	52	0.55	0.74	0.74	0.75	0.76	0.77	0.73	0.73	0.69	0.72
Georgia	0.89	57	0.39	0.78	0.54	0.82	0.84	0.86	0.82	0.83	0.70	0.82
Germany	0.89	51	0.52	0.78	0.74	0.76	0.79	0.78	0.67	0.66	0.71	0.71
Hong Kong SAR	0.94	65	0.77	0.81	0.83	0.84	0.85	0.81	0.78	0.82	0.78	0.78
Hungary	0.90	54	0.63	0.71	0.76	0.74	0.78	0.79	0.68	0.74	0.74	0.76
Indonesia	0.81	38	0.47	0.56	0.61	0.69	0.59	0.62	0.68	0.65	0.66	0.60
Iran, Islamic Rep. of	0.85	46	0.37	0.66	0.75	0.65	0.74	0.77	0.72	0.71	0.65	0.70
Ireland	0.90	53	0.56	0.76	0.76	0.75	0.79	0.76	0.67	0.74	0.72	0.74
Italy	0.85	45	0.45	0.57	0.72	0.73	0.75	0.71	0.69	0.63	0.67	0.71
Japan	0.92	58	0.62	0.80	0.82	0.76	0.81	0.79	0.59	0.79	0.80	0.78
Jordan	0.87	49	0.37	0.66	0.77	0.76	0.77	0.78	0.64	0.79	0.73	0.66
Kazakhstan	0.84	45	0.44	0.60	0.71	0.76	0.70	0.74	0.73	0.64	0.68	0.66
Korea, Rep. of	0.92	59	0.63	0.77	0.81	0.81	0.81	0.80	0.63	0.82	0.80	0.79
Kuwait	0.84	44	0.39	0.65	0.71	0.73	0.75	0.74	0.63	0.71	0.64	0.64
Lithuania	0.87	48	0.54	0.65	0.65	0.73	0.77	0.75	0.64	0.68	0.70	0.77
Morocco	0.79	38	0.34	0.47	0.67	0.69	0.69	0.71	0.52	0.71	0.63	0.66
Netherlands	0.86	45	0.60	0.71	0.67	0.64	0.75	0.70	0.62	0.65	0.64	0.73
New Zealand	0.92	57	0.65	0.76	0.78	0.80	0.81	0.78	0.72	0.78	0.75	0.75
Northern Ireland	0.90	53	0.59	0.75	0.74	0.77	0.77	0.71	0.67	0.74	0.73	0.74
Norway (5)	0.90	53	0.60	0.75	0.71	0.74	0.76	0.77	0.70	0.73	0.75	0.72
Oman	0.82	42	0.34	0.65	0.73	0.69	0.69	0.70	0.67	0.67	0.64	0.65
Poland	0.93	62	0.71	0.77	0.79	0.80	0.84	0.83	0.79	0.79	0.76	0.79
Portugal	0.84	44	0.53	0.55	0.67	0.74	0.69	0.69	0.66	0.67	0.68	0.72
Qatar	0.91	56	0.55	0.76	0.79	0.80	0.80	0.80	0.71	0.79	0.74	0.72
Russian Federation	0.86	48	0.51	0.67	0.73	0.74	0.75	0.73	0.69	0.69	0.67	0.70
Saudi Arabia	0.89	51	0.47	0.72	0.77	0.74	0.78	0.78	0.68	0.75	0.69	0.73
Serbia	0.87	48	0.52	0.74	0.72	0.68	0.78	0.73	0.74	0.58	0.70	0.68
Singapore	0.91	56	0.66	0.78	0.79	0.79	0.79	0.78	0.68	0.76	0.76	0.69
Slovak Republic	0.90	55	0.65	0.75	0.73	0.71	0.78	0.77	0.70	0.77	0.76	0.75
Slovenia	0.91	56	0.64	0.70	0.71	0.78	0.79	0.83	0.74	0.78	0.77	0.74
South Africa (5)	-	-	-	-	-	-	-	-	-	-	-	-
Spain	0.88	51	0.47	0.68	0.74	0.74	0.78	0.69	0.71	0.76	0.77	0.77
Sweden	0.89	52	0.53	0.75	0.71	0.73	0.78	0.78	0.69	0.74	0.70	0.73
Turkey	0.77	37	0.39	0.55	0.61	0.45	0.70	0.66	0.66	0.57	0.68	0.70
United Arab Emirates	0.90	54	0.54	0.75	0.77	0.77	0.79	0.79	0.71	0.74	0.73	0.71
United States	0.91	56	0.64	0.78	0.78	0.76	0.79	0.78	0.69	0.76	0.73	0.76
<b>Benchmarking Participants</b>												
Buenos Aires, Argentina	0.87	49	0.49	0.63	0.75	0.73	0.78	0.75	0.65	0.74	0.73	0.71
Ontario, Canada	0.90	53	0.62	0.76	0.77	0.76	0.77	0.76	0.67	0.74	0.72	0.71
Quebec, Canada	0.89	52	0.52	0.76	0.75	0.76	0.78	0.73	0.72	0.74	0.69	0.70
Norway (4)	0.89	52	0.61	0.71	0.72	0.75	0.77	0.76	0.72	0.74	0.74	0.70
Abu Dhabi, UAE	0.89	52	0.51	0.74	0.75	0.77	0.79	0.77	0.70	0.73	0.71	0.70
Dubai, UAE	0.90	53	0.59	0.74	0.75	0.76	0.78	0.77	0.70	0.74	0.72	0.71
Florida, US	0.91	57	0.66	0.77	0.77	0.76	0.79	0.78	0.73	0.73	0.75	0.77

A dash (-) indicates comparable data not available.

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

**Relationship Between the TIMSS 2015 Students' Views on Engaging Teaching in Science Lessons 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 ( $\eta^2$ )
	(r)	( $r^2$ )	
Australia	-0.02	0.00	0.00
Bahrain	0.22	0.05	0.04
Belgium (Flemish)	-0.08	0.01	0.01
Bulgaria	0.11	0.01	0.02
Canada	0.02	0.00	0.00
Chile	0.09	0.01	0.01
Chinese Taipei	0.07	0.01	0.01
Croatia	0.06	0.00	0.01
Cyprus	0.03	0.00	0.00
Czech Republic	-0.06	0.00	0.00
Denmark	0.02	0.00	0.00
England	-0.05	0.00	0.00
Finland	0.07	0.00	0.01
France	-0.02	0.00	0.00
Georgia	0.10	0.01	0.02
Germany	-0.02	0.00	0.00
Hong Kong SAR	0.07	0.00	0.01
Hungary	0.04	0.00	0.00
Indonesia	0.16	0.02	0.04
Iran, Islamic Rep. of	0.08	0.01	0.02
Ireland	-0.05	0.00	0.00
Italy	0.04	0.00	0.01
Japan	0.04	0.00	0.00
Jordan	-	-	-
Kazakhstan	0.12	0.01	0.02
Korea, Rep. of	0.09	0.01	0.01
Kuwait	0.13	0.02	0.03
Lithuania	0.07	0.00	0.01
Morocco	0.17	0.03	0.03
Netherlands	-0.01	0.00	0.00
New Zealand	-0.05	0.00	0.00
Northern Ireland	-0.06	0.00	0.00
Norway (5)	-0.01	0.00	0.00
Oman	0.17	0.03	0.04
Poland	-0.02	0.00	0.00
Portugal	0.07	0.01	0.00
Qatar	0.19	0.04	0.04
Russian Federation	-0.01	0.00	0.00
Saudi Arabia	0.12	0.01	0.02
Serbia	-0.02	0.00	0.00
Singapore	0.07	0.00	0.00
Slovak Republic	-0.07	0.00	0.00
Slovenia	0.06	0.00	0.01
South Africa (5)	-	-	-
Spain	0.03	0.00	0.00
Sweden	-0.06	0.00	0.01
Turkey	0.28	0.08	0.07
United Arab Emirates	0.20	0.04	0.04
United States	0.06	0.00	0.01
<b>International Median</b>	<b>0.06</b>	<b>0.00</b>	<b>0.01</b>
<b>Benchmarking Participants</b>			
Buenos Aires, Argentina	0.01	0.00	0.00
Ontario, Canada	0.02	0.00	0.00
Quebec, Canada	-0.01	0.00	0.00
Norway (4)	0.03	0.00	0.00
Abu Dhabi, UAE	0.18	0.03	0.03
Dubai, UAE	0.16	0.03	0.03
Florida, US	0.15	0.02	0.03

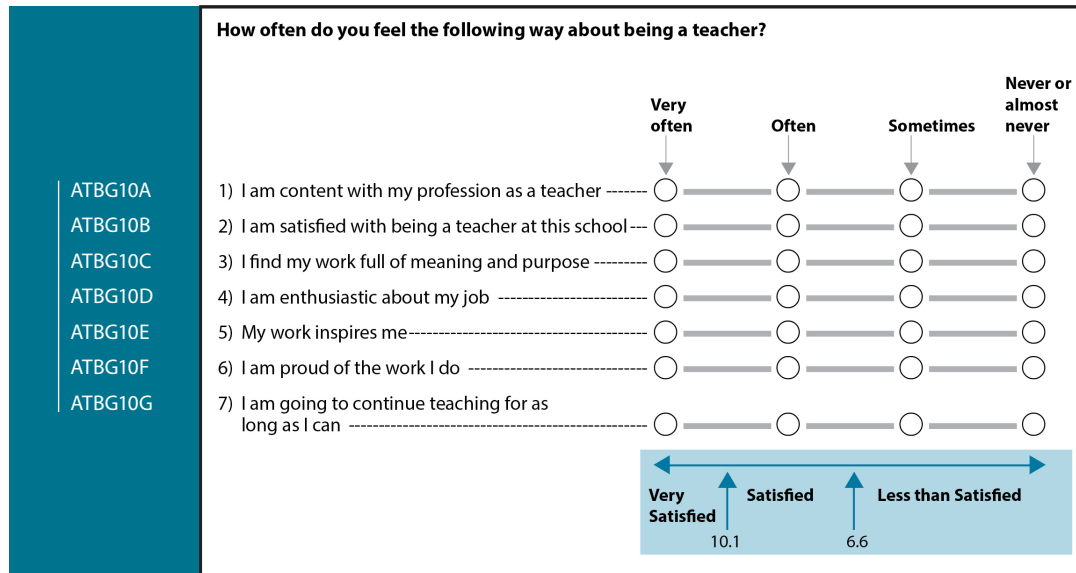
SOURCE: IEA's Trends in International Mathematics and Science Study – TIMSS 2015

A dash (-) indicates comparable data not available.

# Teacher Job Satisfaction Scale, Fourth Grade

The Teacher Job Satisfaction (TJS) scale was created based on how often teachers responded positively to the seven statements described below.

## Items in the TIMSS 2015 Teacher Job Satisfaction Scale, Fourth Grade<sup>1</sup>



<sup>1</sup> For the purpose of scaling, categories in which there were very few respondents were combined. The categories “Sometimes” and “Never or almost never” were combined for all variables. The scale statistics that are reported herein reflect analysis of the items following collapsing.

**Item Parameters for the TIMSS 2015 Teacher Job Satisfaction Scale, Fourth Grade**

Item	delta	tau_1	tau_2	Infit
ATBG10A	0.18167	-1.87034	1.87034	0.92
ATBG10B	0.10394	-1.66322	1.66322	1.28
ATBG10C	-0.65803	-1.81035	1.81035	0.97
ATBG10D	-0.08795	-1.84973	1.84973	0.79
ATBG10E	0.26732	-1.76637	1.76637	0.84
ATBG10F	-0.20476	-1.60751	1.60751	1.00
ATBG10G	0.39781	-1.29161	1.29161	1.19

**Scale Transformation Constants for the TIMSS 2015 Teacher Job Satisfaction Scale, Fourth Grade**

Scale Transformation Constants	
A = 8.377535	Transformed Scale Score = 8.377535 + 0.905788 • Logit Scale Score
B = 0.905788	

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



**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 Teacher Job Satisfaction Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	4.30095	
1	5.44546	
2	6.07197	
3	6.56411	6.6
4	7.00941	
5	7.44953	
6	7.91110	
7	8.39763	
8	8.88012	
9	9.32868	
10	9.75567	
11	10.18696	10.1
12	10.66453	
13	11.27347	
14	12.40375	

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 2015 Teacher Job Satisfaction Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item						
			ATBG10A	ATBG10B	ATBG10C	ATBG10D	ATBG10E	ATBG10F	ATBG10G
Australia	0.91	65	0.84	0.70	0.85	0.87	0.88	0.74	0.74
Bahrain	0.90	63	0.84	0.73	0.71	0.87	0.86	0.77	0.76
Belgium (Flemish)	0.90	63	0.80	0.65	0.75	0.89	0.85	0.84	0.74
Bulgaria	0.89	61	0.73	0.74	0.76	0.86	0.81	0.84	0.69
Canada	0.90	63	0.83	0.70	0.78	0.88	0.85	0.79	0.73
Chile	0.87	58	0.70	0.65	0.66	0.81	0.87	0.85	0.76
Chinese Taipei	0.94	75	0.89	0.79	0.89	0.91	0.88	0.92	0.80
Croatia	0.91	65	0.82	0.72	0.74	0.87	0.87	0.86	0.76
Cyprus	0.91	66	0.82	0.60	0.86	0.87	0.89	0.81	0.80
Czech Republic	0.91	66	0.80	0.65	0.86	0.89	0.89	0.80	0.77
Denmark	0.92	67	0.87	0.78	0.76	0.88	0.86	0.76	0.80
England	0.93	73	0.85	0.76	0.85	0.91	0.92	0.86	0.80
Finland	0.93	69	0.86	0.73	0.79	0.89	0.87	0.85	0.83
France	0.88	58	0.78	0.59	0.66	0.88	0.87	0.78	0.75
Georgia	0.85	54	0.69	0.67	0.58	0.79	0.77	0.82	0.79
Germany	0.87	58	0.77	0.61	0.77	0.86	0.83	0.74	0.71
Hong Kong SAR	0.93	70	0.86	0.81	0.86	0.86	0.85	0.83	0.77
Hungary	0.89	63	0.78	0.67	0.79	0.88	0.86	0.77	0.80
Indonesia	0.87	58	0.74	0.81	0.84	0.82	0.78	0.67	0.66
Iran, Islamic Rep. of	0.82	51	0.73	0.59	0.74	0.80	0.76	0.59	0.76
Ireland	0.91	67	0.83	0.63	0.87	0.86	0.87	0.80	0.84
Italy	0.90	62	0.80	0.73	0.74	0.87	0.83	0.83	0.69
Japan	0.92	67	0.84	0.76	0.84	0.83	0.89	0.84	0.73
Jordan	0.91	66	0.83	0.70	0.73	0.87	0.83	0.88	0.83
Kazakhstan	0.89	61	0.69	0.76	0.77	0.78	0.82	0.83	0.79
Korea, Rep. of	0.93	72	0.81	0.71	0.89	0.92	0.93	0.88	0.78
Kuwait	0.92	68	0.83	0.77	0.79	0.89	0.86	0.83	0.81
Lithuania	0.90	63	0.78	0.74	0.75	0.85	0.85	0.79	0.77
Morocco	0.89	62	0.81	0.71	0.76	0.85	0.87	0.79	0.69
Netherlands	0.87	57	0.75	0.65	0.71	0.83	0.87	0.72	0.73
New Zealand	0.92	67	0.83	0.76	0.84	0.88	0.86	0.75	0.81
Northern Ireland	0.92	68	0.88	0.72	0.88	0.87	0.87	0.75	0.78
Norway (5)	0.92	67	0.82	0.73	0.81	0.87	0.86	0.82	0.82
Oman	0.85	55	0.79	0.67	0.62	0.85	0.81	0.76	0.65
Poland	0.91	66	0.85	0.73	0.82	0.86	0.84	0.83	0.73
Portugal	0.86	54	0.77	0.63	0.71	0.85	0.78	0.69	0.70
Qatar	0.90	64	0.80	0.77	0.78	0.84	0.85	0.80	0.75
Russian Federation	0.89	61	0.86	0.78	0.63	0.84	0.85	0.79	0.68
Saudi Arabia	0.88	60	0.79	0.72	0.71	0.84	0.80	0.81	0.76
Serbia	0.88	59	0.81	0.66	0.70	0.83	0.82	0.78	0.76
Singapore	0.95	79	0.88	0.81	0.89	0.93	0.93	0.91	0.86
Slovak Republic	0.92	68	0.83	0.69	0.84	0.89	0.86	0.85	0.80
Slovenia	0.87	57	0.76	0.67	0.80	0.82	0.74	0.76	0.72
South Africa (5)	0.90	63	0.76	0.75	0.83	0.83	0.83	0.79	0.76
Spain	0.88	60	0.79	0.73	0.80	0.80	0.84	0.76	0.66
Sweden	0.85	55	0.80	0.56	0.69	0.85	0.85	0.69	0.69
Turkey	0.84	53	0.73	0.59	0.65	0.83	0.83	0.75	0.65
United Arab Emirates	0.90	63	0.79	0.74	0.74	0.86	0.84	0.81	0.75
United States	0.92	69	0.83	0.75	0.85	0.91	0.87	0.78	0.82
<b>Benchmarking Participants</b>									
Buenos Aires, Argentina	0.87	57	0.68	0.60	0.77	0.84	0.76	0.82	0.81
Ontario, Canada	0.91	65	0.84	0.70	0.85	0.87	0.86	0.79	0.73
Quebec, Canada	0.90	62	0.81	0.65	0.64	0.90	0.84	0.82	0.80
Norway (4)	0.92	68	0.86	0.66	0.78	0.90	0.88	0.88	0.78
Abu Dhabi, UAE	0.91	65	0.84	0.77	0.81	0.85	0.85	0.83	0.65
Dubai, UAE	0.89	62	0.75	0.78	0.75	0.87	0.82	0.77	0.77
Florida, US	0.91	67	0.78	0.77	0.88	0.85	0.86	0.72	0.84

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

**Relationship Between the TIMSS 2015 Teacher Job Satisfaction Scale, Fourth Grade, and TIMSS 2015 Achievement**

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )	
	(r)		(r)		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.04	0.03	0.00	0.00	0.00	0.00
Bahrain	0.10	0.02	0.01	0.00	0.01	0.00
Belgium (Flemish)	0.01	0.02	0.00	0.00	0.00	0.00
Bulgaria	0.05	0.05	0.00	0.00	0.00	0.01
Canada	-0.02	-0.02	0.00	0.00	0.00	0.00
Chile	0.13	0.09	0.02	0.01	0.02	0.01
Chinese Taipei	-0.02	0.03	0.00	0.00	0.00	0.00
Croatia	0.02	0.01	0.00	0.00	0.00	0.00
Cyprus	0.03	0.02	0.00	0.00	0.00	0.00
Czech Republic	0.04	0.05	0.00	0.00	0.00	0.00
Denmark	-0.04	-0.01	0.00	0.00	0.01	0.00
England	0.07	0.04	0.01	0.00	0.00	0.00
Finland	0.01	0.01	0.00	0.00	0.00	0.00
France	0.06	0.06	0.00	0.00	0.01	0.01
Georgia	0.01	0.03	0.00	0.00	0.00	0.00
Germany	0.03	0.02	0.00	0.00	0.00	0.00
Hong Kong SAR	0.06	0.15	0.00	0.02	0.01	0.02
Hungary	0.06	0.03	0.00	0.00	0.02	0.00
Indonesia	0.01	0.04	0.00	0.00	0.00	0.01
Iran, Islamic Rep. of	-0.01	-0.02	0.00	0.00	0.00	0.00
Ireland	0.02	0.05	0.00	0.00	0.00	0.00
Italy	0.00	0.01	0.00	0.00	0.00	0.00
Japan	0.02	0.02	0.00	0.00	0.00	0.00
Jordan	0.10	-	0.01	-	0.01	-
Kazakhstan	0.06	0.05	0.00	0.00	0.00	0.00
Korea, Rep. of	0.05	0.04	0.00	0.00	0.01	0.00
Kuwait	0.04	0.06	0.00	0.00	0.00	0.01
Lithuania	0.03	0.04	0.00	0.00	0.01	0.00
Morocco	0.12	0.07	0.02	0.00	0.01	0.01
Netherlands	-0.04	-0.04	0.00	0.00	0.00	0.00
New Zealand	0.07	0.07	0.00	0.00	0.00	0.00
Northern Ireland	0.04	0.03	0.00	0.00	0.00	0.00
Norway (5)	0.05	0.03	0.00	0.00	0.00	0.00
Oman	0.05	0.03	0.00	0.00	0.00	0.00
Poland	0.02	0.02	0.00	0.00	0.00	0.00
Portugal	0.12	0.10	0.01	0.01	0.01	0.01
Qatar	-0.07	-0.03	0.00	0.00	0.00	0.00
Russian Federation	-0.04	-0.04	0.00	0.00	0.00	0.00
Saudi Arabia	0.10	0.15	0.01	0.02	0.02	0.02
Serbia	0.01	0.01	0.00	0.00	0.00	0.00
Singapore	0.05	0.03	0.00	0.00	0.01	0.01
Slovak Republic	0.06	0.06	0.00	0.00	0.00	0.00
Slovenia	0.01	0.03	0.00	0.00	0.00	0.00
South Africa (5)	0.02	-	0.00	-	0.00	-
Spain	0.09	0.09	0.01	0.01	0.01	0.01
Sweden	0.08	0.10	0.01	0.01	0.01	0.01
Turkey	0.12	0.11	0.01	0.01	0.01	0.01
United Arab Emirates	0.14	0.14	0.02	0.02	0.02	0.01
United States	0.06	0.04	0.00	0.00	0.00	0.00
International Median	0.04	0.03	0.00	0.00	0.00	0.00
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	0.17	0.19	0.03	0.04	0.03	0.04
Ontario, Canada	-0.01	-0.03	0.00	0.00	0.00	0.00
Quebec, Canada	0.03	0.01	0.00	0.00	0.00	0.00
Norway (4)	0.04	0.07	0.00	0.01	0.00	0.01
Abu Dhabi, UAE	0.20	0.12	0.04	0.02	0.04	0.01
Dubai, UAE	0.07	0.07	0.00	0.01	0.01	0.01
Florida, US	0.17	0.15	0.03	0.02	0.03	0.03

A dash (-) indicates comparable data not available.

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

# Teachers Emphasize Science Investigation Scale, Fourth Grade

The Teachers Emphasize Science Investigation (ESI) scale was created based on teachers' responses to how often they used the eight instructional activities described below.

## Items in the TIMSS 2015 Teachers Emphasize Science Investigation Scale, Fourth Grade<sup>1</sup>

		In teaching science to the students in this class, how often do you ask them to do the following?			
		Every or almost every lesson	About half the lessons	Some lessons	Never
ATBS03B	1) Observe natural phenomena such as the weather or a plant growing and describe what they see -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ATBS03C	2) Watch me demonstrate an experiment or investigation ---	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ATBS03D	3) Design or plan experiments or investigations -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ATBS03E	4) Conduct experiments or investigations -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ATBS03F	5) Present data from experiments or investigations -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ATBS03G	6) Interpret data from experiments or investigations-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ATBS03H	7) Use evidence from experiments or investigations to support conclusions -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ATBS03K	8) Do field work outside the class -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11.3

<sup>1</sup> For the purpose of scaling, categories in which there were very few respondents were combined. The categories "Some Lessons" and "Never" were combined for all variables. The scale statistics that are reported herein reflect analysis of the items following collapsing.

**Item Parameters for the TIMSS 2015 Teachers Emphasize Science Investigation Scale, Fourth Grade**

Item	delta	tau_1	tau_2	Infit
ATBS03B	-0.97859	-1.00917	1.00917	1.54
ATBS03C	-0.43524	-0.63501	0.63501	1.34
ATBS03D	0.08764	-0.94529	0.94529	0.86
ATBS03E	-0.19774	-0.99274	0.99274	0.81
ATBS03F	0.14498	-0.92496	0.92496	0.72
ATBS03G	0.00719	-0.96463	0.96463	0.73
ATBS03H	-0.34379	-0.92870	0.92870	0.92
ATBS03K	1.71555	-0.79925	0.79925	1.40

**Scale Transformation Constants for the TIMSS 2015 Teachers Emphasize Science Investigation Scale, Fourth Grade**

Scale Transformation Constants

$$A = 11.370579$$

$$B = 1.031391$$

$$\text{Transformed Scale Score} = 11.370579 + 1.031391 \cdot \text{Logit Scale Score}$$

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



**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 Teachers Emphasize Science Investigation Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	7.29951	
1	8.55692	
2	9.20866	
3	9.68367	
4	10.07397	
5	10.42134	
6	10.74105	
7	11.04610	
8	11.34471	11.3
9	11.64792	
10	11.95987	
11	12.29081	
12	12.65106	
13	13.06204	
14	13.56297	
15	14.24746	
16	15.54731	

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 2015 Teachers Emphasize Science Investigation Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item							
			ATBS02B	ATBS02C	ATBS02D	ATBS02E	ATBS02F	ATBS02G	ATBS02H	ATBS02K
Australia	0.89	58	0.63	0.58	0.83	0.86	0.88	0.88	0.75	0.64
Bahrain	0.83	47	0.46	0.42	0.75	0.80	0.83	0.83	0.80	0.43
Belgium (Flemish)	0.90	64	0.58	0.70	0.90	0.93	0.93	0.91	0.88	0.41
Bulgaria	0.85	53	0.64	0.63	0.80	0.87	0.85	0.81	0.55	0.62
Canada	0.85	49	0.56	0.44	0.72	0.80	0.84	0.86	0.82	0.40
Chile	0.90	62	0.56	0.76	0.83	0.89	0.87	0.83	0.75	0.74
Chinese Taipei	0.89	57	0.59	0.60	0.78	0.84	0.89	0.90	0.88	0.40
Croatia	0.90	62	0.67	0.66	0.84	0.91	0.92	0.91	0.64	0.64
Cyprus	0.81	48	0.32	0.25	0.83	0.85	0.86	0.88	0.85	0.22
Czech Republic	0.87	57	0.54	0.65	0.84	0.88	0.90	0.87	0.79	0.40
Denmark	0.84	50	0.39	0.53	0.73	0.72	0.82	0.85	0.80	0.71
England	0.86	53	0.43	0.55	0.81	0.85	0.88	0.86	0.88	0.31
Finland	0.82	52	0.48	0.55	0.78	0.87	0.88	0.87	0.73	0.45
France	0.85	50	0.53	0.26	0.78	0.89	0.88	0.89	0.84	0.14
Georgia	0.86	56	0.50	0.68	0.87	0.89	0.90	0.86	0.61	0.53
Germany	0.88	55	0.65	0.51	0.78	0.88	0.87	0.88	0.84	0.37
Hong Kong SAR	0.89	58	0.66	0.77	0.87	0.79	0.87	0.85	0.81	0.30
Hungary	0.76	46	0.53	0.41	0.81	0.81	0.84	0.73	0.70	0.40
Indonesia	0.92	63	0.68	0.78	0.80	0.86	0.87	0.86	0.80	0.64
Iran, Islamic Rep. of	0.87	53	0.52	0.62	0.79	0.84	0.84	0.84	0.76	0.56
Ireland	0.81	45	0.37	0.41	0.69	0.75	0.81	0.84	0.85	0.41
Italy	0.91	63	0.67	0.67	0.84	0.87	0.90	0.86	0.86	0.59
Japan	0.84	49	0.64	0.59	0.65	0.76	0.80	0.83	0.82	0.45
Jordan	-	-	-	-	-	-	-	-	-	-
Kazakhstan	0.90	59	0.55	0.77	0.84	0.86	0.85	0.78	0.71	0.71
Korea, Rep. of	0.84	50	0.54	0.45	0.73	0.85	0.86	0.89	0.80	0.35
Kuwait	0.87	53	0.59	0.65	0.71	0.79	0.85	0.85	0.81	0.51
Lithuania	0.90	64	0.67	0.77	0.92	0.92	0.91	0.82	0.75	0.61
Morocco	0.85	49	0.49	0.48	0.74	0.83	0.85	0.85	0.76	0.38
Netherlands	0.82	51	0.66	0.56	0.86	0.87	0.67	0.85	0.82	-0.08
New Zealand	0.85	50	0.48	0.49	0.78	0.81	0.84	0.84	0.83	0.43
Northern Ireland	0.87	54	0.46	0.64	0.87	0.87	0.89	0.86	0.80	0.17
Norway (5)	0.85	50	0.70	0.48	0.74	0.81	0.83	0.83	0.70	0.48
Oman	0.84	48	0.44	0.59	0.77	0.80	0.80	0.81	0.79	0.37
Poland	0.92	67	0.61	0.75	0.89	0.88	0.88	0.91	0.91	0.66
Portugal	0.89	59	0.63	0.68	0.82	0.88	0.87	0.86	0.85	0.43
Qatar	0.89	58	0.49	0.58	0.82	0.86	0.89	0.87	0.87	0.61
Russian Federation	0.91	63	0.60	0.68	0.86	0.92	0.90	0.90	0.85	0.54
Saudi Arabia	0.84	47	0.45	0.40	0.71	0.76	0.88	0.85	0.76	0.54
Serbia	0.90	62	0.66	0.71	0.84	0.86	0.86	0.87	0.81	0.63
Singapore	0.86	51	0.63	0.60	0.75	0.78	0.83	0.84	0.64	0.61
Slovak Republic	0.90	61	0.57	0.70	0.86	0.90	0.91	0.90	0.77	0.52
Slovenia	0.89	59	0.57	0.61	0.80	0.91	0.93	0.90	0.79	0.49
South Africa (5)	-	-	-	-	-	-	-	-	-	-
Spain	0.87	55	0.54	0.65	0.85	0.84	0.84	0.82	0.77	0.55
Sweden	0.83	50	0.25	0.44	0.84	0.86	0.81	0.88	0.85	0.37
Turkey	0.88	57	0.64	0.59	0.82	0.82	0.90	0.88	0.83	0.41
United Arab Emirates	0.88	56	0.56	0.59	0.82	0.85	0.88	0.86	0.84	0.46
United States	0.90	60	0.73	0.66	0.79	0.88	0.90	0.89	0.78	0.52
<b>Benchmarking Participants</b>										
Buenos Aires, Argentina	0.91	61	0.70	0.72	0.85	0.87	0.87	0.87	0.83	0.42
Ontario, Canada	0.86	51	0.52	0.51	0.80	0.76	0.84	0.85	0.82	0.50
Quebec, Canada	0.81	45	0.47	0.51	0.61	0.81	0.84	0.87	0.78	0.16
Norway (4)	0.77	44	0.58	0.71	0.79	0.77	0.78	0.76	0.43	0.33
Abu Dhabi, UAE	0.90	60	0.65	0.65	0.85	0.86	0.89	0.83	0.84	0.57
Dubai, UAE	0.87	56	0.59	0.49	0.81	0.87	0.89	0.88	0.84	0.44
Florida, US	0.91	65	0.78	0.64	0.87	0.91	0.93	0.92	0.77	0.53

A dash (-) indicates comparable data not available.

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

**Relationship Between the TIMSS 2015 Teachers Emphasize Science Investigation 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 ( $\eta^2$ )
	(r)	( $r^2$ )	
Australia	0.05	0.00	0.00
Bahrain	0.05	0.00	0.01
Belgium (Flemish)	-0.07	0.00	0.01
Bulgaria	-0.05	0.00	0.00
Canada	-0.04	0.00	0.00
Chile	-0.08	0.01	0.01
Chinese Taipei	0.01	0.00	0.00
Croatia	-0.01	0.00	0.00
Cyprus	-0.01	0.00	0.00
Czech Republic	0.02	0.00	0.00
Denmark	-0.04	0.00	0.01
England	0.05	0.00	0.00
Finland	-0.04	0.00	0.00
France	0.05	0.00	0.00
Georgia	0.02	0.00	0.00
Germany	0.05	0.00	0.00
Hong Kong SAR	0.05	0.00	0.01
Hungary	-0.03	0.00	0.00
Indonesia	0.07	0.00	0.00
Iran, Islamic Rep. of	0.05	0.00	0.00
Ireland	0.08	0.01	0.01
Italy	-0.01	0.00	0.00
Japan	0.02	0.00	0.00
Jordan	-	-	-
Kazakhstan	0.04	0.00	0.01
Korea, Rep. of	-0.01	0.00	0.00
Kuwait	-0.06	0.00	0.00
Lithuania	-0.04	0.00	0.00
Morocco	0.05	0.00	0.01
Netherlands	0.02	0.00	0.00
New Zealand	0.06	0.00	0.00
Northern Ireland	-0.02	0.00	0.00
Norway (5)	-0.02	0.00	0.00
Oman	0.01	0.00	0.00
Poland	-0.02	0.00	0.00
Portugal	-0.03	0.00	0.00
Qatar	-0.13	0.02	0.02
Russian Federation	-0.03	0.00	0.00
Saudi Arabia	0.12	0.02	0.01
Serbia	0.04	0.00	0.00
Singapore	0.04	0.00	0.00
Slovak Republic	0.07	0.00	0.01
Slovenia	0.01	0.00	0.00
South Africa (5)	-	-	-
Spain	0.03	0.00	0.00
Sweden	0.02	0.00	0.00
Turkey	0.09	0.01	0.01
United Arab Emirates	0.10	0.01	0.01
United States	0.01	0.00	0.00
<b>International Median</b>	<b>0.02</b>	<b>0.00</b>	<b>0.00</b>
<b>Benchmarking Participants</b>			
Buenos Aires, Argentina	-0.07	0.01	0.01
Ontario, Canada	-0.03	0.00	0.00
Quebec, Canada	0.02	0.00	0.00
Norway (4)	0.03	0.00	0.00
Abu Dhabi, UAE	0.09	0.01	0.01
Dubai, UAE	-0.03	0.00	0.00
Florida, US	0.02	0.00	0.00

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

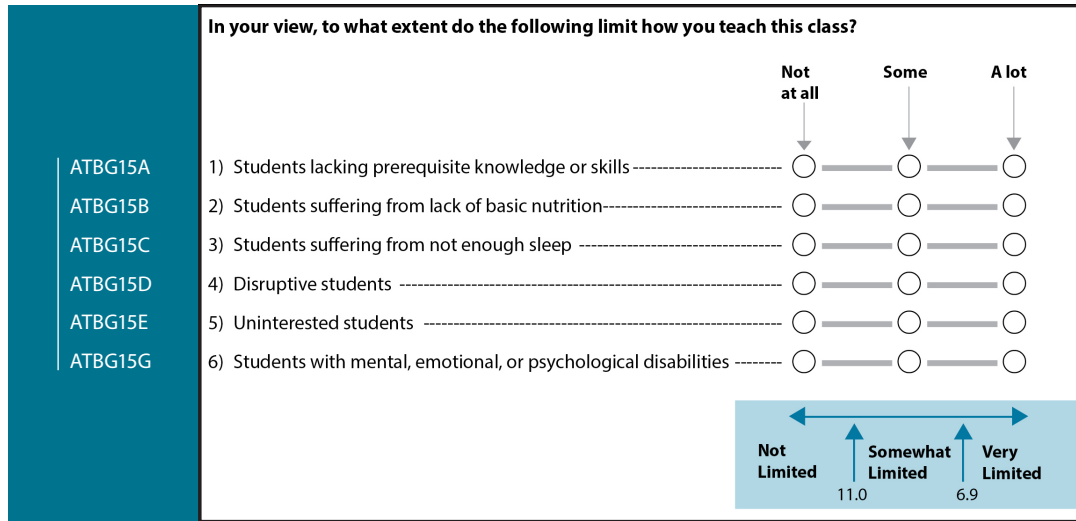
A dash (-) indicates comparable data not available.



# Teaching Limited by Student Needs Scale, Fourth Grade

The Teaching Limited by Student Needs (LSN) scale was created based on teachers' responses concerning six needs described below.

## Items in the TIMSS 2015 Teaching Limited by Student Needs Scale, Fourth Grade



**Item Parameters for the TIMSS 2015 Teaching Limited by Student Needs Scale, Fourth Grade**

Item	delta	tau_1	tau_2	Infit
ATBG15A	0.90362	-2.02080	2.02080	1.02
ATBG15B	-1.27753	-1.05996	1.05996	1.04
ATBG15C	-0.43516	-1.62325	1.62325	0.98
ATBG15D	0.58656	-1.51840	1.51840	0.97
ATBG15E	0.51242	-1.88467	1.88467	0.92
ATBG15G	-0.28991	-1.50177	1.50177	1.10

**Scale Transformation Constants for the TIMSS 2015 Teaching Limited by Student Needs Scale, Fourth Grade**

Scale Transformation Constants

$$A = 8.964842$$

$$B = 1.203519$$

$$\text{Transformed Scale Score} = 8.964842 + 1.203519 \cdot \text{Logit Scale Score}$$

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



**Equivalence Table of Raw and Transformed Scale Scores for the TIMSS  
2015 Teaching Limited by Student Needs Scale, Fourth Grade**

Raw Score	Transformed Scale Score	Cutpoint
0	3.80319	
1	5.34054	
2	6.20203	
3	6.88260	6.9
4	7.50773	
5	8.12884	
6	8.78577	
7	9.50093	
8	10.26124	
9	11.04392	11.0
10	11.87401	
11	12.86225	
12	14.51024	

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 2015 Teaching Limited by Student Needs Scale, Fourth Grade**

Country	Cronbach's Alpha Reliability Coefficient	Percent of Variance Explained	Component Loadings for Each Item					
			ATBG15A	ATBG15B	ATBG15C	ATBG15D	ATBG15E	ATBG15G
Australia	0.78	48	0.64	0.71	0.68	0.74	0.70	0.67
Bahrain	0.77	47	0.67	0.52	0.63	0.77	0.77	0.71
Belgium (Flemish)	0.67	38	0.66	0.45	0.68	0.63	0.68	0.57
Bulgaria	0.70	41	0.59	0.52	0.66	0.68	0.77	0.58
Canada	0.73	43	0.68	0.69	0.73	0.61	0.59	0.62
Chile	0.79	49	0.60	0.77	0.73	0.63	0.77	0.67
Chinese Taipei	0.78	48	0.59	0.70	0.71	0.75	0.74	0.64
Croatia	0.75	45	0.49	0.63	0.71	0.74	0.77	0.65
Cyprus	0.77	46	0.50	0.61	0.75	0.75	0.76	0.68
Czech Republic	0.63	35	0.70	0.28	0.44	0.65	0.72	0.64
Denmark	0.77	48	0.68	0.59	0.67	0.77	0.75	0.67
England	0.79	50	0.60	0.69	0.74	0.74	0.71	0.74
Finland	0.72	42	0.67	0.48	0.58	0.74	0.72	0.66
France	0.70	40	0.59	0.48	0.71	0.73	0.67	0.59
Georgia	0.69	39	0.59	0.57	0.67	0.71	0.58	0.63
Germany	0.74	44	0.69	0.60	0.70	0.68	0.58	0.71
Hong Kong SAR	0.71	41	0.67	0.49	0.60	0.66	0.70	0.69
Hungary	0.77	47	0.72	0.68	0.75	0.66	0.67	0.63
Indonesia	0.59	34	0.43	0.61	0.71	0.56	0.69	0.40
Iran, Islamic Rep. of	0.77	46	0.52	0.68	0.66	0.79	0.66	0.74
Ireland	0.75	44	0.61	0.74	0.66	0.67	0.71	0.58
Italy	0.81	52	0.69	0.73	0.75	0.79	0.72	0.63
Japan	0.75	44	0.71	0.27	0.69	0.76	0.75	0.69
Jordan	0.68	39	0.60	0.53	0.52	0.69	0.71	0.68
Kazakhstan	0.79	48	0.62	0.75	0.75	0.76	0.71	0.56
Korea, Rep. of	0.82	53	0.61	0.64	0.76	0.76	0.77	0.79
Kuwait	0.68	40	0.60	0.50	0.65	0.75	0.76	0.44
Lithuania	0.75	44	0.70	0.50	0.56	0.79	0.72	0.70
Morocco	0.70	40	0.64	0.59	0.59	0.73	0.69	0.56
Netherlands	0.73	42	0.57	0.61	0.62	0.72	0.73	0.63
New Zealand	0.79	48	0.59	0.75	0.80	0.72	0.58	0.71
Northern Ireland	0.75	46	0.65	0.65	0.79	0.54	0.75	0.65
Norway (5)	0.76	47	0.49	0.72	0.73	0.67	0.80	0.66
Oman	0.78	47	0.65	0.69	0.70	0.78	0.70	0.59
Poland	0.71	41	0.69	0.42	0.67	0.65	0.72	0.64
Portugal	0.76	46	0.61	0.73	0.72	0.69	0.71	0.61
Qatar	0.71	41	0.59	0.60	0.69	0.68	0.80	0.44
Russian Federation	0.81	51	0.60	0.73	0.82	0.75	0.67	0.70
Saudi Arabia	0.68	39	0.54	0.61	0.59	0.72	0.74	0.49
Serbia	0.72	42	0.63	0.57	0.65	0.74	0.75	0.56
Singapore	0.77	47	0.64	0.70	0.71	0.68	0.68	0.71
Slovak Republic	0.82	54	0.70	0.56	0.73	0.85	0.78	0.74
Slovenia	0.69	40	0.45	0.57	0.65	0.72	0.76	0.56
South Africa (5)	0.76	45	0.64	0.63	0.66	0.68	0.78	0.63
Spain	0.76	45	0.70	0.47	0.68	0.74	0.75	0.66
Sweden	0.75	45	0.66	0.53	0.67	0.76	0.71	0.65
Turkey	0.73	43	0.66	0.65	0.66	0.70	0.73	0.51
United Arab Emirates	0.76	45	0.66	0.62	0.67	0.75	0.75	0.56
United States	0.78	48	0.69	0.70	0.72	0.72	0.74	0.60
<b>Benchmarking Participants</b>								
Buenos Aires, Argentina	0.81	51	0.60	0.78	0.73	0.70	0.72	0.72
Ontario, Canada	0.74	43	0.67	0.65	0.69	0.62	0.69	0.64
Quebec, Canada	0.58	34	0.67	0.70	0.77	0.49	0.20	0.46
Norway (4)	0.75	45	0.66	0.69	0.71	0.74	0.69	0.51
Abu Dhabi, UAE	0.76	46	0.68	0.52	0.66	0.76	0.74	0.67
Dubai, UAE	0.71	41	0.63	0.68	0.60	0.74	0.68	0.47
Florida, US	0.80	50	0.73	0.67	0.70	0.75	0.82	0.54

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

**Relationship Between the TIMSS 2015 Teaching Limited by Student Needs Scale, Fourth Grade, and TIMSS 2015 Achievement**

Country	Pearson's Correlation with Achievement				Variance in Achievement Accounted for by Difference Between Regions of the Scale ( $\eta^2$ )	
	(r)		(r <sup>2</sup> )		Mathematics	Science
	Mathematics	Science	Mathematics	Science		
Australia	0.28	0.23	0.08	0.05	0.07	0.04
Bahrain	0.09	0.07	0.01	0.00	0.01	0.01
Belgium (Flemish)	0.16	0.18	0.02	0.03	0.02	0.02
Bulgaria	0.19	0.21	0.03	0.05	0.01	0.02
Canada	0.24	0.20	0.06	0.04	0.06	0.04
Chile	0.23	0.27	0.05	0.07	0.06	0.07
Chinese Taipei	0.08	0.02	0.01	0.00	0.01	0.00
Croatia	0.01	0.01	0.00	0.00	0.00	0.00
Cyprus	0.10	0.07	0.01	0.00	0.01	0.00
Czech Republic	0.09	0.09	0.01	0.01	0.01	0.01
Denmark	0.14	0.13	0.02	0.02	0.02	0.01
England	0.26	0.19	0.07	0.04	0.04	0.03
Finland	0.15	0.17	0.02	0.03	0.02	0.02
France	0.19	0.20	0.04	0.04	0.01	0.02
Georgia	0.14	0.14	0.02	0.02	0.02	0.02
Germany	0.18	0.20	0.03	0.04	0.03	0.04
Hong Kong SAR	0.22	0.17	0.05	0.03	0.04	0.02
Hungary	0.21	0.22	0.04	0.05	0.03	0.04
Indonesia	0.14	0.08	0.02	0.01	0.01	0.01
Iran, Islamic Rep. of	0.16	0.17	0.03	0.03	0.02	0.02
Ireland	0.19	0.21	0.04	0.04	0.03	0.03
Italy	0.08	0.05	0.01	0.00	0.01	0.00
Japan	0.09	0.06	0.01	0.00	0.00	0.00
Jordan	0.11	-	0.01	-	0.01	-
Kazakhstan	0.17	0.17	0.03	0.03	0.02	0.02
Korea, Rep. of	0.06	0.05	0.00	0.00	0.01	0.00
Kuwait	0.18	0.16	0.03	0.03	0.03	0.02
Lithuania	0.11	0.09	0.01	0.01	0.01	0.01
Morocco	0.14	0.18	0.02	0.03	0.01	0.03
Netherlands	0.14	0.16	0.02	0.03	0.02	0.03
New Zealand	0.27	0.26	0.07	0.07	0.07	0.06
Northern Ireland	0.22	0.20	0.05	0.04	0.04	0.03
Norway (5)	0.12	0.13	0.01	0.02	0.01	0.01
Oman	-0.04	-0.02	0.00	0.00	0.00	0.00
Poland	0.16	0.09	0.03	0.01	0.01	0.00
Portugal	0.14	0.11	0.02	0.01	0.02	0.01
Qatar	0.24	0.23	0.06	0.05	0.03	0.03
Russian Federation	0.12	0.13	0.01	0.02	0.02	0.02
Saudi Arabia	0.16	0.11	0.03	0.01	0.03	0.02
Serbia	0.05	0.04	0.00	0.00	0.00	0.00
Singapore	0.40	0.34	0.16	0.12	0.12	0.08
Slovak Republic	0.21	0.25	0.04	0.06	0.03	0.04
Slovenia	0.01	0.02	0.00	0.00	0.00	0.00
South Africa (5)	0.08	-	0.01	-	0.01	-
Spain	0.24	0.23	0.06	0.05	0.03	0.03
Sweden	0.18	0.20	0.03	0.04	0.04	0.04
Turkey	0.14	0.14	0.02	0.02	0.02	0.02
United Arab Emirates	0.33	0.34	0.11	0.11	0.09	0.09
United States	0.21	0.22	0.04	0.05	0.04	0.05
<b>International Median</b>	<b>0.16</b>	<b>0.17</b>	<b>0.02</b>	<b>0.03</b>	<b>0.02</b>	<b>0.02</b>
<b>Benchmarking Participants</b>						
Buenos Aires, Argentina	0.21	0.19	0.04	0.04	0.06	0.07
Ontario, Canada	0.16	0.14	0.03	0.02	0.02	0.02
Quebec, Canada	0.21	0.19	0.04	0.04	0.04	0.03
Norway (4)	0.09	0.10	0.01	0.01	0.01	0.01
Abu Dhabi, UAE	0.32	0.34	0.10	0.11	0.08	0.07
Dubai, UAE	0.28	0.26	0.08	0.07	0.08	0.05
Florida, US	0.31	0.28	0.09	0.08	0.04	0.03

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

A dash (-) indicates comparable data not available.