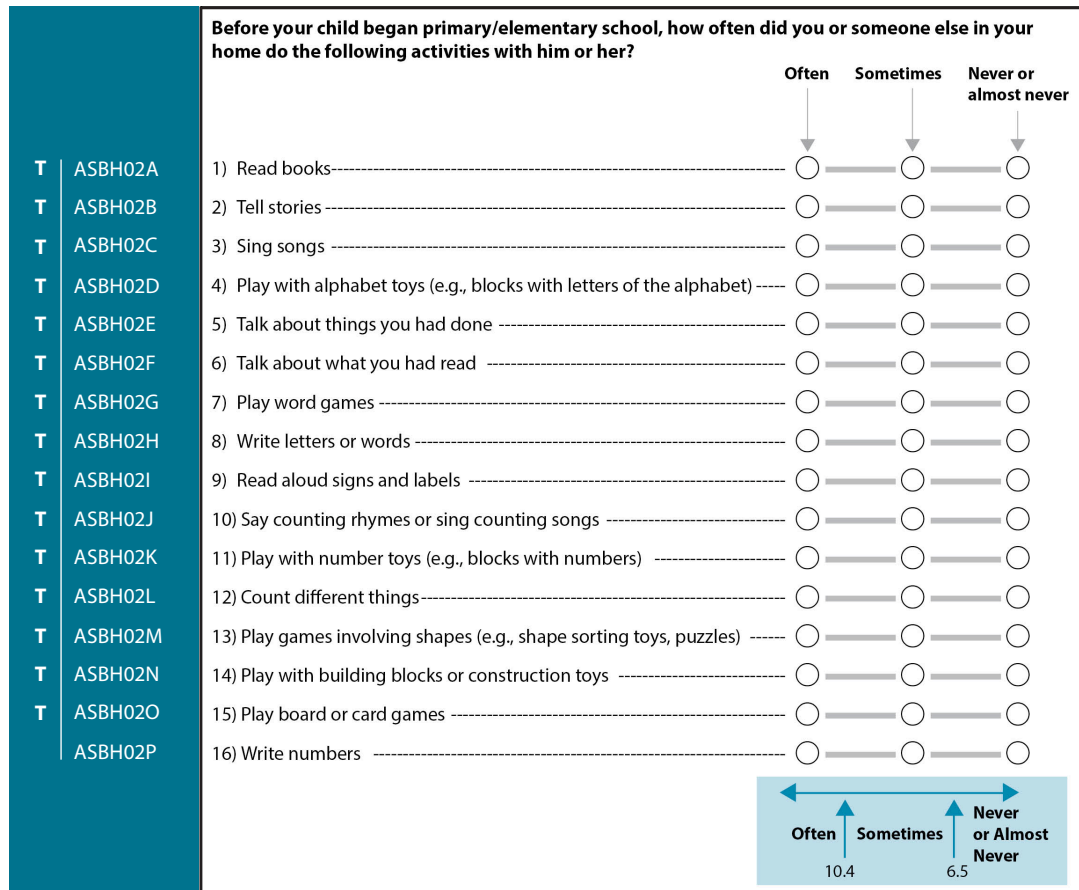


Early Literacy and Numeracy Activities Before Beginning Primary School Scale, Fourth Grade

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	ASBH02I	ASBH02J	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	0.61
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benchmarking Participants																		
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 (η^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	-	-	-	-	-	-
International Median	0.17	0.18	0.03	0.03	0.02	0.03
Benchmarking Participants						
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.