

TIMSS 2011

The TIMSS 2011 Students Engaged in Biology Lessons Scale, Eighth Grade

The Students Engaged in Biology Lessons (ESB) scale was created based on students' degree of agreement to the five statements described below. This scale was administered in countries where the sciences are taught as separate subjects. See [Creating and Interpreting TIMSS and PIRLS 2011 Context Questionnaire Scales](#) for more information on how the scales were formed.

Exhibit 1: Items in the TIMSS 2011 Students Engaged in Biology Lessons Scale, Eighth Grade

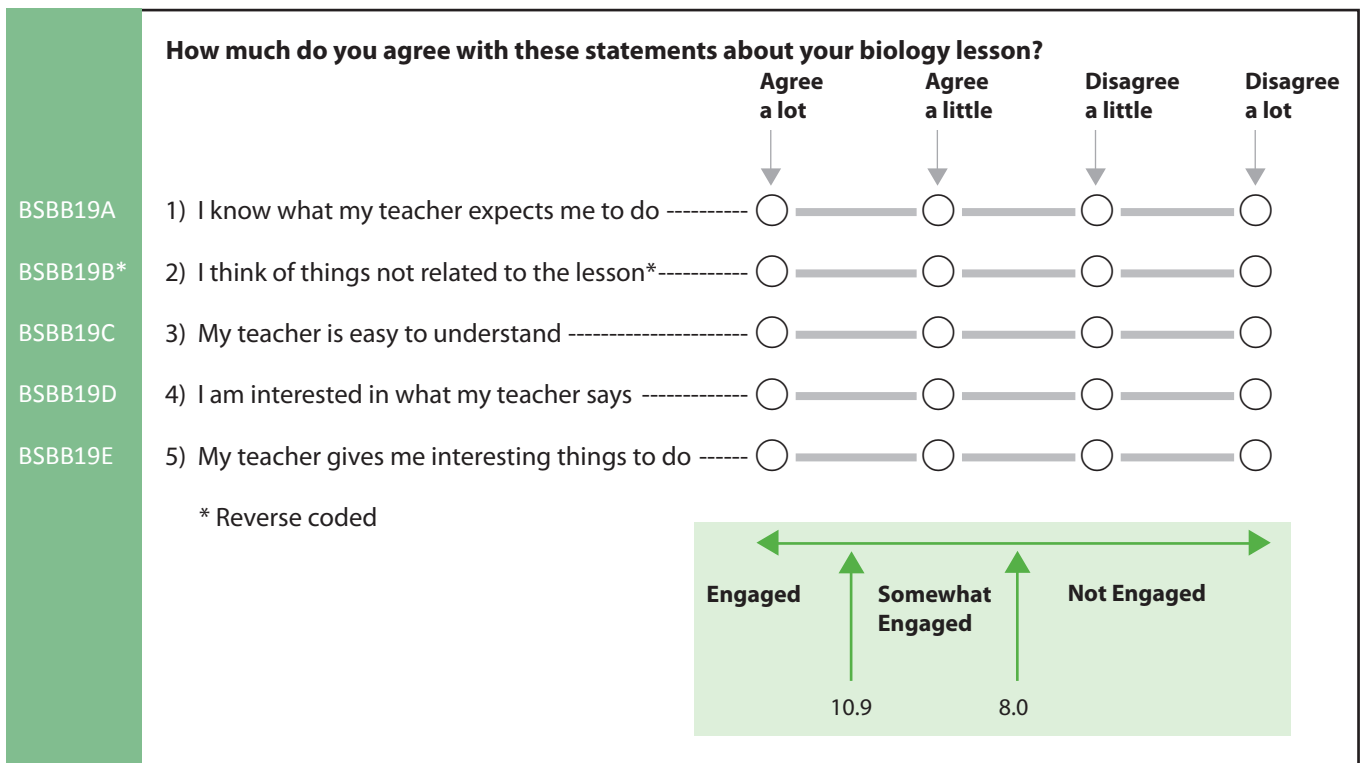


Exhibit 2: Item Parameters for the TIMSS 2011 Students Engaged in Biology Lessons Scale, Eighth Grade

| Item | delta | tau_1 | tau_2 | tau_3 |
|----------|----------|----------|----------|---------|
| BSBB19A | -1.29906 | -0.89116 | -0.49732 | 1.38848 |
| BSBB19B* | -0.50921 | -1.17236 | 0.14181 | 1.03055 |
| BSBB19C | -1.43175 | -0.70363 | -0.39170 | 1.09533 |
| BSBB19D | -1.49158 | -0.77313 | -0.32496 | 1.09809 |
| BSBB19E | -1.05671 | -0.85360 | -0.19968 | 1.05328 |

*Reverse coded

Exhibit 3: Scale Transformation Constants

Scale Transformation Constants

A = 10.02843

B = 1.53529

Transformed Scale Score = 10.02843 + 1.53529 • Logit Scale Score

Exhibit 4: Equivalence Table of the Raw Score and the Transformed Scale Score

| Raw Score | Transformed Scale Score | Cutpoint | Raw Score | Transformed Scale Score | Cutpoint |
|-----------|-------------------------|----------|-----------|-------------------------|----------|
| 0 | 3.32430 | | 8 | 8.31635 | |
| 1 | 4.94187 | | 9 | 8.73279 | |
| 2 | 5.72452 | | 10 | 9.18106 | |
| 3 | 6.27889 | | 11 | 9.67739 | |
| 4 | 6.74069 | | 12 | 10.24013 | |
| 5 | 7.15078 | | 13 | 10.92298 | 10.9 |
| 6 | 7.53878 | | 14 | 11.85877 | |
| 7 | 7.92332 | 8.0 | 15 | 13.68012 | |

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

| Country | Cronbach's Alpha Reliability Coefficient | Percent of Variance Explained | Factor Loadings for Each Item | | | | |
|--------------------|--|-------------------------------|-------------------------------|----------|---------|---------|---------|
| | | | BSBB19A | BSBB19B* | BSBB19C | BSBB19D | BSBB19E |
| Armenia | 0.68 | 50 | 0.54 | 0.37 | 0.79 | 0.85 | 0.83 |
| Finland | 0.79 | 56 | 0.68 | 0.53 | 0.79 | 0.86 | 0.82 |
| Georgia | 0.64 | 45 | 0.65 | 0.34 | 0.77 | 0.71 | 0.79 |
| Hungary | 0.80 | 57 | 0.72 | 0.51 | 0.83 | 0.86 | 0.81 |
| Indonesia | 0.68 | 48 | 0.61 | 0.26 | 0.78 | 0.83 | 0.80 |
| Kazakhstan | 0.70 | 48 | 0.67 | 0.40 | 0.71 | 0.81 | 0.80 |
| Lebanon | 0.69 | 49 | 0.69 | 0.20 | 0.80 | 0.82 | 0.80 |
| Lithuania | 0.79 | 56 | 0.76 | 0.51 | 0.80 | 0.84 | 0.78 |
| Macedonia, Rep. of | 0.68 | 48 | 0.64 | 0.36 | 0.80 | 0.82 | 0.74 |
| Morocco | 0.52 | 37 | 0.58 | 0.33 | 0.67 | 0.69 | 0.68 |

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

| Country | Cronbach's Alpha Reliability Coefficient | Percent of Variance Explained | Factor Loadings for Each Item | | | | |
|----------------------|--|-------------------------------|-------------------------------|----------|---------|---------|---------|
| | | | BSBB19A | BSBB19B* | BSBB19C | BSBB19D | BSBB19E |
| Romania | 0.76 | 54 | 0.70 | 0.45 | 0.79 | 0.86 | 0.80 |
| Russian Federation | 0.78 | 55 | 0.68 | 0.51 | 0.81 | 0.85 | 0.80 |
| Slovenia | 0.82 | 59 | 0.76 | 0.54 | 0.82 | 0.85 | 0.83 |
| Sweden | 0.77 | 54 | 0.65 | 0.42 | 0.81 | 0.86 | 0.86 |
| Syrian Arab Republic | 0.57 | 40 | 0.55 | 0.36 | 0.70 | 0.74 | 0.74 |
| Ukraine | 0.74 | 52 | 0.65 | 0.49 | 0.77 | 0.83 | 0.79 |

*Reverse coded

Exhibit 6: Relationship Between the TIMSS 2011 Students Engaged in Biology Lessons Scale, Eighth Grade, and TIMSS 2011 Science Achievement

| Country | Pearson's Correlation with Science Achievement | | Variance in Science Achievement Accounted for by Difference Between Regions of the Scale (η^2) |
|-----------------------------|--|-------------------|---|
| | (r) | (r ²) | |
| Armenia | 0.12 | 0.01 | 0.03 |
| Finland | 0.20 | 0.04 | 0.03 |
| Georgia | 0.26 | 0.07 | 0.07 |
| Hungary | 0.01 | 0.00 | 0.01 |
| Indonesia | -0.05 | 0.00 | 0.00 |
| Kazakhstan | 0.16 | 0.03 | 0.03 |
| Lebanon | 0.17 | 0.03 | 0.03 |
| Lithuania | 0.00 | 0.00 | 0.00 |
| Macedonia, Rep. of | 0.11 | 0.01 | 0.02 |
| Morocco | 0.18 | 0.03 | 0.03 |
| Romania | 0.11 | 0.01 | 0.02 |
| Russian Federation | 0.04 | 0.00 | 0.00 |
| Slovenia | -0.01 | 0.00 | 0.00 |
| Sweden | 0.14 | 0.02 | 0.02 |
| Syrian Arab Republic | 0.19 | 0.04 | 0.04 |
| Ukraine | 0.10 | 0.01 | 0.01 |
| International Median | 0.11 | 0.01 | 0.02 |