

Trends in International Mathematics and Science Study International Data Explorer Help Guide

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TIMSS International Data Explorer Help Guide

I. Background on the Trends in International Mathematics and Science Study (TIMSS) and the TIMSS International Data Explorer

The TIMSS International Data Explorer (IDE) is a web-based application for accessing Trends in International Mathematics and Science Study (TIMSS) data supported by the U.S. National Center for Education Statistics (NCES). Developed and implemented at the international level by the International Association for the Evaluation of Educational Achievement (IEA), TIMSS is an international comparative study of the mathematics and science achievement of students.

TIMSS, which was first administered in 1995, is used to measure the mathematics and science knowledge and skills of fourth- and eighth-graders over time. Since 1995, TIMSS has been administered in 1999, 2003, 2007 and, most recently, in 2011. TIMSS is designed to align broadly with mathematics and science curricula in the participating countries and education systems. The results, therefore, suggest the degree to which students have learned mathematics and science concepts and skills likely to have been taught in school. TIMSS also collects background information on students, teachers, and schools in order to allow cross-national comparisons of educational contexts that may be related to student achievement. The 2011 assessment was administered in a total of 77 education systems, which includes 14 benchmarking education systems and 3 countries that only administered the fourth-grade assessment to sixth-graders and the eighth-grade assessment to ninth-graders. TIMSS 2011, 2007, 2003, 1999, and 1995 results are now available through the IDE. The next TIMSS administration is scheduled for 2015.

In TIMSS, an overall mathematics scale and an overall science scale are used to report achievement for each grade in each year. The overall scales can be used for trend analyses across years. Subscales in both math and science are used to report student performance in various topic areas. The subscales, since they are a smaller subset of items, cannot be used for trend analyses across years. In the IDE, the subscales are shown separately for each year.

What aspects of mathematics achievement can I explore in TIMSS?

Overall mathematics scale, grade 4—The TIMSS mathematics achievement scale for grade 4 summarizes student performance on test items designed to measure understanding of content in number, geometric shapes and measures, and data display, as well as a range of processes within the knowing, applying, and reasoning cognitive domains.

Mathematics content domains, grade 4—In grade 4, there are subscales for three content domains in 2011 and 2007, five content domains in 2003, and four content domains in 1995:

- **Number (2011, 2007), fractions and number (2003)**—The *number* content domain includes understanding of place value, ways of representing numbers, and the relationships between numbers.
- **Geometry (2011, 2007, 2003, 1995)**—The *geometry* content domain includes understanding geometric figures, and recognizing lines of symmetry, angles, and geometric relationships.
- **Data display (2011, 2007)**—The *data display* content domain includes reading and interpreting displays of data, as well as understanding how to organize data with graphs and charts.
- **Patterns and relationships (2003)**—The *patterns and relationships* content domain includes understanding patterns, simple equations, and the idea of functions as they apply to pairs of numbers.
- **Data and probability (2003, 1995)**—The *data* content domain includes understanding simple data-gathering, data representation and interpretation.
- **Measurement (2003)**—The *measurement* content domain includes the understanding of attributes and units and the use of basic instruments and formulas for measurement of area, length, volume, weight, and time.
- **Fractions and proportions (1995)**—The *fractions and proportions* content domain includes recognizing the pictorial representation of common fractions and decimal fractions as well as the relationships between common and decimal fractions.
- **Whole numbers (1995)**—The *whole numbers* content domain includes understanding place value, ordering and comparing numbers, and solving single- as well as multistep problems involving the operations of addition, subtraction, and multiplication.

Overall mathematics scale, grade 8—The TIMSS mathematics achievement scale for grade 8 summarizes student performance on test items designed to measure understanding of content in number, algebra, geometry, and data and chance, as well as a range of processes within the knowing, applying, and reasoning cognitive domains.

Mathematics content domains, grade 8—In grade 8 there are subscales for four content domains in 2011 and 2007 and five content domains in 2003, 1999, and 1995:

- **Number (2011, 2007), fractions and number (2003, 1999, 1995)**—The *number* content domain includes understanding of numbers, ways of representing numbers, relationships among numbers, and number systems.
- **Algebra (2011, 2007, 2003, 1999, 1995)**—The *algebra* content domain includes recognizing and extending patterns, using algebraic symbols to represent mathematical situations, and developing fluency in producing equivalent expressions and solving linear equations.

- **Geometry (2011, 2007, 2003, 1999, 1995)**—The *geometry* content domain includes analyzing the properties and characteristics of a variety of two- and three-dimensional geometric figures, including lengths of sides and sizes of angles, and providing explanations based on geometric relationships. In addition, this content area includes using spatial visualization skills to move between two- and three-dimensional shapes and their representations.
- **Data and chance (2011, 2007), data and probability (2003, 1999, 1995)**—The *data* content domain includes understanding characteristics of data, trends, making predictions, evaluating interpretations, and understanding uncertainty and probability.
- **Measurement (2003, 1999, 1995)**—The *measurement* content domain includes the use of instruments and tools to measure physical attributes, conversions, and application of formulas for measuring rate, surface area, etc.

Mathematics cognitive domains—There are subscales for three cognitive domains in both grades, but the balance of testing time differs, reflecting the difference in age and experience of students in the two grades. These subscales are shown in the IDE for 2011, 2007, and 2003 for grade 4 and grade 8.

- **Knowing**—The *knowing* cognitive domain covers the facts, procedures, and concepts that students need to know.
- **Applying**—The *applying* cognitive domain focuses on students' ability to apply knowledge and conceptual understanding to solve problems or answer questions.
- **Reasoning**—The *reasoning* cognitive domain goes beyond the solution of routine problems to encompass unfamiliar situations, complex contexts, and multistep problems.

Which aspects of science achievement can I explore in TIMSS?

Overall science scale, grade 4—The TIMSS science achievement scale for grade 4 summarizes student performance on test items designed to measure understanding of content in the life, physical, and Earth sciences, as well as a range of processes within the knowing, applying, and reasoning cognitive domains.

Science content domains, grade 4—In grade 4 there are subscales for three content domains in 2011, 2007, 2003, and 1995:

- **Life science (2011, 2007, 2003, 1995)**—The *life science* content domain includes understanding of the characteristics and life processes of living things, the relationships between them, and their interaction with the environment.
- **Physics (2011, 2007, 2003, 1995)**—The *physical science* content domain includes concepts related to matter and energy, and covers topics in the areas of both chemistry and physics. Since students in grade 4 have only a beginning knowledge of chemistry, the framework places more emphasis on physics concepts.

- **Earth science (2011, 2007, 2003, 1995)**—The *Earth science* content domain is concerned with the study of Earth and its place in the solar system.

Overall science scale, grade 8—The TIMSS overall science achievement scale for grade 8 summarizes student performance on test items designed to measure understanding of content in the biological, chemical, physical, and Earth sciences, as well as a range of processes within the knowing, applying, and reasoning cognitive domains.

Science content domains, grade 8—In grade 8 there are subscales for four content domains in 2011, 2007, and 1995; five content domains in 2003; and six content domains in 1999:

- **Biology (2011, 2007)**—The *biology* content domain emphasizes students' understanding of the structure, life processes, diversity, and interdependence of living organisms.
- **Chemistry (2011, 2007, 2003, 1999, 1995)**—The *chemistry* content domain assesses students' understanding of concepts related to the following topic areas: classification and composition of matter, properties of matter, and chemical change.
- **Physics (2011, 2007, 2003, 1999, 1995)**—The *physics* content domain assesses students' understandings of concepts related to energy and physical processes in the following topic areas: physical states and changes in matter; energy transformations, heat, and temperature; light; sound; electricity and magnetism; and forces and motion.
- **Earth science (2011, 2007, 2003, 1999, 1995)**—The *Earth science* content domain is concerned with the study of Earth and its place in the solar system and the universe. Topics covered draw on the fields of geology, astronomy, meteorology, hydrology, and oceanography, and are related to concepts in biology, physics, and chemistry.
- **Life science (2003, 1999, 1995)**—The *life science* content domain assesses understandings of the nature and function of living organisms, the relationships between them, and their interaction with the environment.
- **Environmental science (2003, 1999)**—The *environmental science* content domain emphasizes students' understanding of limiting resources and the impact of science and technology on the use and conservation of these resources.
- **Nature science (1999)**—The *nature science* content domain includes the nature of scientific knowledge, the scientific enterprise, interactions of science, technology, mathematics, and society, and the tools and process used in conducting investigations.

Science cognitive domains—There are subscales for three cognitive domains in both grades, but the balance of testing time differs, reflecting the difference in age and experience of students in the 4th and 8th grades. These subscales are shown in the IDE for 2011, 2007, and 2003 for grade 4 and grade 8.

- **Knowing**—The *knowing* cognitive domain covers the facts, procedures, and concepts that students need to know.

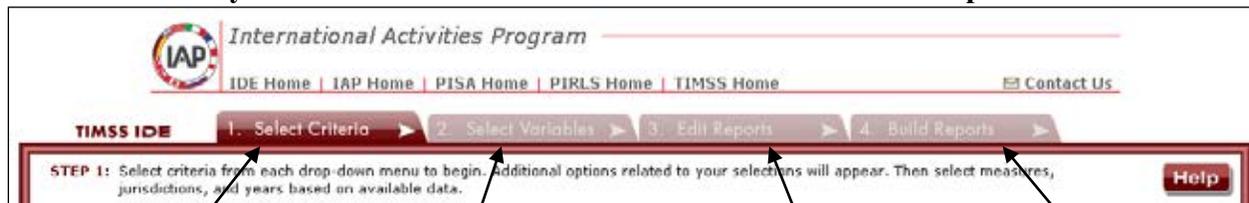
- **Applying** – The *applying* cognitive domain focuses on the ability of students to apply knowledge and conceptual understanding to solve problems or answer questions.
- **Reasoning** – The *reasoning* cognitive domain goes beyond the solution of routine problems to encompass unfamiliar situations, complex contexts, and multistep problems.

For more information on the TIMSS mathematics and science domains from the 2011 TIMSS assessment, see Mullis, I.V.S., Martin, M.O., Ruddock, G.J., O’Sullivan, C.Y., and Preuschoff, C. (2009). [*TIMSS 2011 Assessment Frameworks*](#). Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College. For further information on the TIMSS mathematics and science domains from previous years, visit timssandpirls.bc.edu.

II. General Overview

There are four general steps for exploring the Trends in International Mathematics and Science Study (TIMSS) data using the TIMSS International Data Explorer (IDE) (see exhibit 1). Each step is described in more detail starting on page 10.

Exhibit 1. What you will see in the IDE environment and what each step entails



1. Select Criteria:

Choose your subject, grade, years, measure(s), and jurisdiction(s).

2. Select Variables:

Select at least one variable from the selection of categories and subcategories.

3. Edit Reports:

Preview how your data will look and edit your report format options and statistics options as desired.

4. Build Reports:

Retrieve the data, make charts and graphs, and save and print reports.

III. Computer Requirements for the International Data Explorer (IDE)

- Screen resolution should be 1024 × 768.
- Browsers: Internet Explorer (IE) version 6 or higher (IE7 is recommended). For rendering and scrolling pages with large tables, Firefox 2.0 is faster than IE7 (Firefox 3.0 or higher is recommended).
- Enable JavaScript and pop-ups in your browser.
- The TIMSS IDE requires Flash version 9.0.115 or higher (download Adobe Flash Player at <http://get.adobe.com/flashplayer/>).
- Exports of files to Microsoft Office require Office 2003 or later.
- Exports of files to PDF can be read with Adobe Acrobat Reader.
- Screen reader software should be Jaws 8.0 or higher.

If you encounter an error, please send us the details through **Contact Us** (located in the upper-right portion of the screen on each page of the IDE website). When writing, include your browser version and operating system version, and as many other details as possible. Be sure to provide an e-mail address so that we can contact you.

IV. Steps to Explore Data

To create your own custom tables, charts, graphs, and maps, follow these steps when using the TIMSS International Data Explorer (IDE).

1. Select criteria
2. Select variables
3. Edit reports
4. Build reports

Each of these steps is discussed in detail throughout the remainder of this guide, beginning with the selection of criteria.

1. Select Criteria

1.A. Overview

Your data query in the IDE begins at the **Select Criteria** screen (see exhibit 2).

Choose one **Subject**, one **Grade**, and one or more **Measures**, **Years**, and **Jurisdictions** for the data you wish to view or compare.

Use the **Reset** button, located in the upper-right portion of the screen (just below the **Help** button), to erase your choices and begin again.

Click on a red sideways-facing arrow (▶) to open up a category and click on a red downward-facing arrow (▼) to close a category.

Exhibit 2. Selecting criteria

TIMSS IDE 1. Select Criteria 2. Select Variables 3. Edit Reports 4. Build Reports

STEP 1: Select criteria from each drop-down menu to begin. Additional options related to your selections will appear. Then select measures, jurisdictions, and years based on available data. [Help](#)

Subject: Grade: [Reset](#)

[View All \(229\)](#) [View Selected \(1\)](#) Search [Go](#)

Category	Sub Category	Measure	All Years	2011	2007	2003	1995
▼ Scale Scores	▼ Scale Score	<input checked="" type="checkbox"/> TIMSS Mathematics Scale: Overall Mathematics details	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	▶ Subscale Scores						
	▶ Student and Family Characteristics						
	▶ Student Perception/Valuing of Mathematics/Science						
	▶ Teacher						

Group	Jurisdiction	All Years	2011	2007	2003	1995
<input type="checkbox"/> International	<input type="checkbox"/> International Average	<input type="checkbox"/>				
	<input type="checkbox"/> Average for Selected Countries	<input type="checkbox"/>				
<input type="checkbox"/> Country	<input type="checkbox"/> Algeria	<input type="checkbox"/>				
	<input type="checkbox"/> Armenia	<input type="checkbox"/>				
	<input type="checkbox"/> Australia	<input type="checkbox"/>				
	<input type="checkbox"/> Austria	<input type="checkbox"/>				
	<input type="checkbox"/> Azerbaijan	<input type="checkbox"/>				
	<input type="checkbox"/> Bahrain	<input type="checkbox"/>				
	<input type="checkbox"/> Belgium (Flemish)	<input type="checkbox"/>				

[2. Select Variables](#)

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1.B. Choose Subject

Under **Subject**, you have the choice of **Mathematics** or **Science**.

1.C. Choose Grade

Under **Grade**, choose **Grade 4** or **Grade 8**. Once a grade is chosen, the screen resets and you can select **Year(s)**, **Measure(s)**, and **Jurisdiction(s)**.

1.D. Choose Year

At the top of the **Measure** and **Jurisdiction** sections, you have the choice of selecting 2011, 2007, 2003, 1999, and/or 1995 by checking the appropriate box. To include data from all years, check the “All Years” box to the left of the individual years. Mathematics and science data are available for 2011, 2007, 2003, 1999, and 1995. In 1999, no data for grade 4 were collected in mathematics or science.

1.E. Choose Measure

After choosing a subject, you can choose between the overall scale and/or any of the subject's subscales. Note that the overall scale is the default. The overall scale can be used for trend analyses across years. The subscales are shown separately for each year and cannot be used for trend analyses across years.

In addition, there are a number of continuous variables other than scale scores that you may choose as a measure of analysis. These variables fall under different categories, such as Student and Family Characteristics and Teacher Background Characteristics, and include variables such as age, teaching experience, and class size.

1.F. Choose Jurisdiction

With your **Measure(s)** and **Year(s)** selected, next choose at least one **Jurisdiction**.

Jurisdictions are found under the following groups: **Country**, **Benchmarking jurisdictions**, and **Sixth-Grade** or **Ninth-Grade Participants**. There is also a group category called **International**, with options to display the **International Average** and the **Average for Selected Countries**. Please note that selecting **International Average** or **Average for Selected Countries** increases the frequency of receiving an error message in the **Build Reports** step due to the high volume of information contained in these groups.

The general procedures for selecting one or more jurisdictions are as follows:

1. To open or close jurisdictions, click on the arrow. Jurisdictions in the group are open and can be selected when the red arrow points down (see exhibit 3).
2. Click the checkboxes next to the specific jurisdictions that you are interested in, or uncheck those jurisdictions that you wish to deselect. If you click the checkbox next to the group name (e.g., "Country"), you will select all the jurisdictions within that group. If desired, uncheck the group name to deselect all.
3. If you want to close a group (for example, close the list of countries in order to readily see the benchmarking jurisdictions), click the red arrow next to the group name. The closed group's arrow points to the right. Be advised that closing the group will not deselect your choices.

Exhibit 3. Choosing jurisdictions

The screenshot shows the TIMSS IDE interface. At the top, there are four steps: 1. Select Criteria, 2. Select Variables, 3. Edit Reports, and 4. Build Reports. The current step is 2. Below the steps, there is a 'Subject' dropdown menu set to 'Mathematics' and a 'Grade' dropdown menu set to 'Grade 4'. A 'Reset' button is located to the right of the grade dropdown. Below the dropdowns, there are two tabs: 'View All (222)' and 'View Selected (1)'. A search bar is also present. The main content area is a table with columns for 'Category', 'Sub Category', 'Measure', and years 'All Years', '2011', '2007', '2003', and '1993'. The 'Measure' column is expanded to show 'TIMSS Mathematics Scale: Overall Mathematics details'. Below this, there are subcategories for 'Subscale Scores' for the years 2011, 2007, and 2003. A 'Jurisdiction' table is also visible, listing countries with checkboxes: International (checked), International Average (checked), Average for Selected Countries (unchecked), Algeria (checked), Armenia (checked), Australia (checked), Austria (checked), Azerbaijan (checked), Bahrain (checked), and Belgium (Flemish) (checked). A '2. Select Variables' button is highlighted at the bottom right of the interface.

To continue in the IDE, click the **Select Variables** button at the bottom right of the page or the tab at the top of the page to go to the next screen (see exhibit 3 above).

2. Select Variables

2.A. Overview

Step 2, **Select Variables**, can only be accessed after choosing criteria at step 1, **Select Criteria**.

To continue your data query and edit a report, you may choose at least one variable on the Select Variables screen. To do this, you can use either the **Category** and **Sub Category** lists or the **Search** function (see exhibit 4). These methods are explained in sections 2.B and 2.C, respectively, below. You may also skip from Select Criteria, step 1, to Build Reports, step 4, in which case the IDE will automatically build a table of average scores using the variable All Students.

You can return to the **Select Variables** screen to change your variable selections at any time.

Exhibit 4. Selecting variables overview

2.B. Select Variables Using Category and Subcategory Lists

One way to select variables on the **Select Variables** screen is to use the **Category** and **Sub Category** lists. If you don't wish to choose from any of the specified categories and subcategories, select **All students** in the **Total** category.

The variables shown are tied to the criteria you selected at step 1 (**Subject, Grade, Measure, Year, and Jurisdiction**), which are indicated at the top of the screen. To change any of these criteria, return to step 1, **Select Criteria**.

To browse for variables, get details about them, select them, and view them:

1. Click the red arrows to open and close categories and subcategories of variables (see exhibit 5).
2. Click **details** or **hide details** to show or hide the full title of a given variable, the TIMSS ID, and the values (i.e., variable labels). Note that some variables have the same or similar short titles, but comparing details will show you how they differ. See the example in exhibit 5 below, which shows **Speak language of test at home (2011)** and **Gen speak language of test at home (2007, 2003)**. “Gen” refers to variables that are general cross-subject variables. The differences between these two index variables are described in the details.

3. Click the checkbox next to a variable to select it for your analysis/report. You will see the count increase next to **View Selected**.
4. Click the **View Selected** tab to see the variables you have chosen. To return to the full list of variables by category, click the **View All** tab.
5. Remember to select the year for which you wish to build a report and make sure that data are available for your chosen year and variables.
6. Searching variables is an option from the **Search** box. See Section 2.C Search Function (below) for more details about this function.

Exhibit 5. Select variables using category and sub category lists

TIMSS IDE 1. Select Criteria ▶ 2. Select Variables ▶ 3. Edit Reports ▶ 4. Build Reports ▶

STEP 2: Select at least one variable from the category list below. View the list of all available variables, view by selected variables only, or search variables by keywords. Years selected will override previous selections. [Help](#)

Subject, Grade: Mathematics, Grade 4
Jurisdictions: International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States
Measure: TIMSS Mathematics Scale: Overall Mathematics
Year: 2011 [Reset](#)

[View All \(1004\)](#) [View Selected \(0\)](#) Search: [Go](#)

Category	Sub Category	Variable	All Years	2011	2007	2003	1993
	Language and Family Characteristics	<input type="checkbox"/> Speak language of test at home (2011) hide details Full Title: How often do you speak [language of test] at home? ID: AS5BG004 Values: Always; Sometimes; Never	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Language speak at home (U.S. only) details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Language of testing details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Language of testing (2007) Grade 4 details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Gen speak language of test at home (2007, 2003) hide details Full Title: How often do you speak [language of test] [U.S. version: English] at home? For additional details, see Glossary in Help Guide. ID: AS4GOLAN Values: Always; Almost always; Sometimes; Never	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[3. Edit Reports](#) ▶

When you have selected the variable(s) you want to include, continue by clicking the **Edit Reports** button at the bottom of the page or the tab at the top of the page to go to the next screen.

2.C. Search Function

The second way to select variables is to use the **Search** function on the **Select Variables** screen.

Type a term in the **Search** box and click **Go** (or hit “Enter” on your keyboard) to find variables by keywords in the question and/or details for the variable (see exhibit 6). If you use multiple keywords, “and” is assumed. You can narrow your search by using “or,” “not,” or “and not.” The search function operates on an exact phrase if it is contained in quotes. The variable(s) that include the search term(s) in the question or its details will be listed.

Exhibit 6. Select variables using the search function

TIMSS IDE 1. Select Criteria ▶ 2. Select Variables ▶ 3. Edit Reports ▶ 4. Build Reports ▶

STEP 2: Select at least one variable from the category list below. View the list of all available variables, view by selected variables only, or search variables by keywords. Years selected will override previous selections. [Help](#)

Subject: Grade: **Mathematics, Grade 4**
Jurisdictions: International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States
Measure: TIMSS Mathematics Scale: Overall Mathematics
Year: 2011 [Reset](#)

View All (995) View Selected (0) Search: (9) interest or enjoyment [Go](#)

Category	Sub Category	Variable	All Years	2011	2007	2003	1995
Student Activities Outside of School	Activities Outside of School	<input type="checkbox"/> Gen\spend time/read book for enjoyment details	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Gen\outside sch\l reading a book details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Student Perception/Valuing of Mathematics/Science	Attitudes towards Mathematics	<input type="checkbox"/> Mat\agree\learn interesting things details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Mat\agree\interested in what tchr says details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/> Mat\agree\interesting things to do details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Teacher Perception of Mathematics/Science Teaching/Learning	Teacher Perception of Teaching/Learning	<input type="checkbox"/> Math\confident\engage students interest details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Classroom Characteristics	Teacher Perception of Factors that May Limit Teaching	<input type="checkbox"/> gen\cls parents interested in progress details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Organization of Mathematics Instruction by Differing Ability Levels	<input type="checkbox"/> Math\group\interest groups (U.S. only) details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

[3. Edit Reports](#) ▶

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When you have selected the variable(s) you want to include, continue by clicking the **Edit Reports** button at the bottom of the page or the tab at the top of the page to go to the next screen.

3. Edit Reports

3.A. Overview

You can access step 3, **Edit Reports**, after choosing criteria at step 1, **Select Criteria**, and choosing variables at step 2, **Select Variables**. The IDE will automatically build reports based on your selections from steps 1 and 2. However, at step 3, the **Edit Reports** phase, you may modify your selections for each report.

At this step, you can

- preview and edit the layout of your reports;
- copy reports or create new reports based on the variables selected;

- change formatting options, such as number of decimal places to display, for all reports (these may also be changed in individual reports, but formatting options can overwrite previous edits);
- change statistics options, such as average scale scores and benchmarks, for all reports (these may also be changed in individual reports, but statistics options can overwrite previous edits);
- select reports to be built into tables and charts at step 4, **Build Reports**; and
- delete reports.

Using your chosen criteria, the IDE will return a separate data report for each variable you have chosen. If you have selected two or three variables (not counting **All students**), you will also see a cross-tabulated report for these variables. If you have chosen four or more variables, you will get tables for each variable, but not the cross-tabulation. If your selected criteria include more than one measure (e.g., the overall science scale and one or more science subscales or continuous variables), a separate set of data reports will be generated for each measure (see exhibit 7).

Exhibit 7. Edit reports overview

TIMSS IDE 1. Select Criteria ▶ 2. Select Variables ▶ 3. Edit Reports ▶ 4. Build Reports ▶

STEP 3: Preview and edit existing reports using the action links next to each report name. Create new reports, set format and statistic options. (New and copied reports will appear at the bottom of the report list.) Help

Subject, Grade: Mathematics, Grade 4
Jurisdictions: International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States
Measures: TIMSS Mathematics Scale: Overall Mathematics, TIMSS Mathematics Scale: Number (2011, 2007)
Variables: Speak language of test at home (2011), Gen speak language of test at home (2007, 2003), Sex of student, Parents born in country
Years: 2011, 2007, 2003, 1995 Reset

Create New Report | Format Options | Statistics Options

Report	All	Action	Measure	Variable	Year	Jurisdiction	Statistic
Report 1	<input checked="" type="checkbox"/>	Preview Delete Copy Edit	TIMSS Mathematics Scale: Overall Mathematics	Speak language of test at home (2011)	2011	International Average, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States	Averages
Report 2	<input checked="" type="checkbox"/>	Preview Delete Copy Edit	TIMSS Mathematics Scale: Overall Mathematics	Gen speak language of test at home (2007, 2003)	2011, 2007, 2003, 1995	International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States	Averages
Report 3	<input checked="" type="checkbox"/>	Preview Delete Copy Edit	TIMSS Mathematics Scale: Overall Mathematics	Sex of student	2011, 2007, 2003, 1995	International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States	Averages
Report 4	<input checked="" type="checkbox"/>	Preview Delete Copy Edit	TIMSS Mathematics Scale: Overall Mathematics	Parents born in country	2011, 2007, 2003, 1995	International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States	Averages
Report 5	<input checked="" type="checkbox"/>	Preview Delete Copy Edit	TIMSS Mathematics Scale: Number (2011, 2007)	Speak language of test at home (2011)	2011, 2007, 2003, 1995	International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States	Averages
Report 6	<input checked="" type="checkbox"/>	Preview Delete Copy Edit	TIMSS Mathematics Scale: Number (2011, 2007)	Gen speak language of test at home (2007, 2003)	2011, 2007, 2003, 1995	International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States	Averages
Report 7	<input checked="" type="checkbox"/>	Preview Delete Copy Edit	TIMSS Mathematics Scale: Number (2011, 2007)	Sex of student	2011, 2007, 2003, 1995	International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States	Averages
Report 8	<input checked="" type="checkbox"/>	Preview Delete Copy Edit	TIMSS Mathematics Scale: Number (2011, 2007)	Parents born in country	2011, 2007, 2003, 1995	International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States	Averages

4. Build Reports ▶

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At the **Edit Reports** step, you will see detailed information on the layout of your reports. The **Report** column indicates the report, or cross-tabulation report, number based on the variable(s) chosen during the criteria selection. Under the **All** tab, reports may be chosen for the report-building phase, either by selecting **All** or selecting individual reports. The **Action** column gives you the option to **Preview**, **Edit**, **Delete**, or **Copy** the report. The **Measure** column shows which measure the report will portray. The **Variable** column indicates the variable(s) included in the

report. The **Year** column shows which years you have selected for comparison. The **Jurisdiction** column labels the countries selected for comparison, and the **Statistic** column provides the type of statistic output that will be generated in the report-building phase.

3.B. Preview Report

Select **Preview**, in the **Action** column (see exhibit 7), to see how your report will be laid out. The preview will not provide actual data, but will show how the data will be arranged in rows and columns (see exhibit 8). You can select **Preview** at any time to see how your changes will affect the report's final layout.

Exhibit 8. Using preview report

Speak language of test at home (2011)							
Years	Jurisdictions	Always		Sometimes		Never	
		Averages	Standard Errors	Averages	Standard Errors	Averages	Standard Errors
2011	International Average						
	Australia						
	Chile						
	Chinese Taipei						
	Hong Kong SAR						
	United States						

3.C. Edit Report

To edit the report, select the **Edit** command, in the **Action** column, next to the report number. (Another way to edit a report is to select the **Edit** tab when you are previewing a report.) The following can be done using the edit function (see exhibit 9):

1. Name your report. You have the option of giving each report a distinctive name, up to a limit of 50 characters, using only letters, numbers, spaces, underscores, and hyphens. (Otherwise, by default, the report is named Report 1, Report 2, etc., or Cross-Tabulated Report 1, Cross-Tabulated Report 2, etc.)
2. Select a measure. You can choose a measure from the drop-down box at the top right, which will list the measures you chose at step 1.
3. Select which jurisdictions, variables, years (if applicable), and statistics to include (out of the selections previously made at steps 1 and 2). You can select up to two statistics from the following: average scale scores; percentages; benchmarks—discrete; benchmarks—cumulative; percentiles; and standard deviations. (For further information, see Section 3.G. Statistics Options, below.)
4. To create a new variable while editing a report, click on **Create New...** under the **Variable** heading. Section 3.D below explains the process for creating a new variable.

- Change the table layout by dragging elements to determine which items will appear in rows and which will appear in columns. Some of the arrangements will not be permissible, but a pop-up alert will explain this.

Exhibit 9. Editing reports

The screenshot shows the 'Edit Report' window with the following configuration:

- Name:** Report 1
- Measure:** TIMSS Mathematics Scale: Overall Mathematics
- Jurisdiction:** International Average, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States
- Variable:** Speak language of test at home (2011)
- Year:** 2011
- Statistic:** Averages

The 'TABLE LAYOUT' section shows the following arrangement:

Row	Column
Years	Speak language of test at home (2011)
Jurisdictions	

To save changes, make sure to select **Done** in the upper-right portion of the screen before closing the **Edit Report** window.

3.D. Create New Variables

To create a new variable, select **Edit**, in the **Action** column, and select **Create new...** under **Variable** (see exhibit 9 above). The new variable is created by combining values for an existing variable. The steps are as follows:

- Click **Create new...** under the **Variable** heading.
- Select the variable for which you wish to combine values.
- Select the values you want to combine by checking the boxes to the left of the values (see exhibit 10).

4. Create a name for the new value, and press **Create**. The collapsed values will appear in gray to indicate that they have already been used.
5. Wait for the screen to refresh, and press **Done**.
6. The new variable will appear in the **Variable** list in the **Edit Report** window or **Create New Report** window, designated as “collapsed.”
7. Check the box next to the new variable to view it in the report. You can click **Preview** to see how the table will be laid out before retrieving data.

Exhibit 10. Creating new variables

The screenshot shows a dialog box titled "Create Variables" with a close button (X) in the top right corner. The dialog is divided into three numbered sections:

1. **Select a Variable group:** A dropdown menu is set to "Speak language of test at home (2011)". A red "Help" button is located to the right of the dropdown.
2. **Select values to create new Variable:** Three checkboxes are listed: "Always" (unchecked), "Sometimes" (checked), and "Never" (checked).
3. **Create a name for the new Value:** A text input field contains "Sometimes or Never". A blue "Create" button is to the right of the input field.

At the bottom of the dialog, there are three buttons: "Reset", "Cancel", and "Done".

A new variable that you create is applicable only to a specific report; it does not apply to the other reports listed on the **Edit Reports** screen. For example, if you selected multiple measures of science literacy for analysis, you would need to create the new variable for each measure, or create a copy of the report and edit it accordingly. To do the latter, click on **Copy** report on the **Edit Reports** screen (copied reports appear at the end of the list of reports) and then, for the new copy, click on **Edit** (using the above example, you can change the measure and give the report a new name).

You can repeat the process and combine different values of a variable to create additional new variables. Using the **Create New Report** function, you can create a new report for each new variable that you create. (For further information, see section 3.E. Create New Report, page 21.)

If you selected two or three variables from which to create new variables, you can repeat the process for each of them. Using the **Create New Report** or **Edit Report** function, these

collapsed variables will be listed and available for cross-tabulation (see exhibit 11). If you have chosen four or more variables (not counting **All Students**), you won't get the cross-tabulation. You can click **Preview** to see how the table will be laid out before retrieving data.

Exhibit 11. Edit reports with collapsed variables

The screenshot shows the 'Edit Report' dialog box with the following configuration:

- Name:** Report 1
- Measure:** TIMSS Mathematics Scale: Overall Mathematics
- Step 1:** Create a name and select a measure for the new report.
- Step 2:** Select available options from each of the columns below, then preview results.

Jurisdiction	Variable	Year	Statistic
<input type="checkbox"/> Select All	<input type="checkbox"/> Speak language of test at home (2011)	<input type="checkbox"/> Select All	<input checked="" type="checkbox"/> Averages
<input checked="" type="checkbox"/> International Average	<input type="checkbox"/> Gen speak language of test at home (2007, 2003)	<input checked="" type="checkbox"/> 2011	<input type="checkbox"/> Percentages
<input type="checkbox"/> Algeria	<input type="checkbox"/> Sex of student	<input type="checkbox"/> 2007	<input type="checkbox"/> Benchmarks - discrete
<input checked="" type="checkbox"/> Australia	<input type="checkbox"/> Parents born in country	<input type="checkbox"/> 2003	<input type="checkbox"/> Benchmarks - cumulative
<input checked="" type="checkbox"/> Chile	<input checked="" type="checkbox"/> Speak language of test at home (2011) (collapsed)	<input type="checkbox"/> 1995	<input type="checkbox"/> Percentiles
<input checked="" type="checkbox"/> Chinese Taipei			<input type="checkbox"/> Standard deviations
<input checked="" type="checkbox"/> Hong Kong SAR			
<input checked="" type="checkbox"/> United States			
- Step 3:** Drag and drop header elements between Row and Column to custom design the report.

TABLE LAYOUT	
Row	Column
Years	Speak language of test at home (2011) (collapsed)
Jurisdictions	

3.E. Create New Report

From the main **Edit Reports** screen, clicking on **Create New Report** brings up the same options as **Edit Report**, but with no checkboxes marked and without any new variables you may have created. Thus, **Create New Report** provides a clean slate for your selections from the first two steps, **Select Criteria** and **Select Variables** (see exhibit 12). Each new report you create will appear at the end of the list of reports. If you do not give the report a specific name, it will be called "New Report."

Exhibit 12. Creating new reports

New Report

1. Create a name and select a measure for the new report.

Name: Measure:

2. Select available options from each of the columns below, then preview results.

Jurisdiction	Variable Create new...	Year	Statistic
<input type="checkbox"/> Select All	<input type="checkbox"/> Speak language of test at home (2011)	<input type="checkbox"/> Select All	<input type="checkbox"/> Averages
<input type="checkbox"/> International Average	<input type="checkbox"/> Gen speak language of test at home (2007, 2003)	<input type="checkbox"/> 2011	<input type="checkbox"/> Percentages
<input type="checkbox"/> Algeria	<input type="checkbox"/> Sex of student	<input type="checkbox"/> 2007	<input type="checkbox"/> Benchmarks - discrete
<input type="checkbox"/> Australia	<input type="checkbox"/> Parents born in country	<input type="checkbox"/> 2003	<input type="checkbox"/> Benchmarks - cumulative
<input type="checkbox"/> Chile		<input type="checkbox"/> 1995	<input type="checkbox"/> Percentiles
<input type="checkbox"/> Chinese Taipei			<input type="checkbox"/> Standard deviations
<input type="checkbox"/> Hong Kong SAR			
<input type="checkbox"/> United States			

3. Drag and drop header elements between Row and Column to custom design the report.

TABLE LAYOUT	
Row	Column
<input type="text" value="Jurisdictions"/>	
<input type="text" value="Years"/>	

3.F. Format Options

From the main **Edit Reports** screen, clicking on **Format Options** will allow you to make formatting changes applicable to all the reports listed. The following formatting options are available using this function (see exhibit 13):

1. **Variable Labels (Long)** displays a more detailed description of the variables selected in a query than the default short label. For variables from questionnaires, the full text of the question is displayed. Be advised that the length of the extra detail may sometimes interfere with table formatting.
2. **Show data for values categorized as “missing”** will include the percentage of students in the total sample or in a reporting group for whom membership in a particular response category is unknown because no response was given by the students, their teacher, or their school. The percentage of “missing” will be shown in the right-most table column. Missing data are available only for queries that involve percentages as the statistic type. Unless you check this option, the default is for missing responses not to be included in the percentage distribution shown.
3. **Show variable names in titles** is an option to include or not include the variable name in the title of your report.

4. **Decimal Places** allows you to specify a greater level of precision for a particular statistic (one or two decimal places) than does the default, which is whole numbers. Note that only integer-level precision is allowed for percentages; that is, the number of decimal places is fixed at “none” for percentages. Also, standard errors will be shown to one more decimal place than is shown for a particular statistic. For example, if you request that achievement scores be displayed to one decimal place, the corresponding standard errors will be displayed to two decimal places. If you export to Excel, you will be able to increase the number of decimal places in most cases.
5. **Include** gives you the option of showing standard errors. By default, standard errors are shown inside parentheses, but you have the option of showing them without parentheses. You can preview the effects of your selection in the **Sample Display** area (see the blue-shaded box at the bottom of exhibit 13).

Exhibit 13. Format options

Format Options

Choose options that will apply to all reports. View selected format in Sample Display. **Help**

Variable Labels:

Short (e.g. Gender)

Long (e.g. Gender of student as taken from school records)

Show data for values categorized as Missing (this applies only when percentages are displayed).

Show variable name in titles (e.g. [GENDER])

Decimal Places: None 1 2

(For row percents, the number of decimal places is fixed at "None")

Include:

Standard Errors None

Use parentheses/brackets

Sample Display: ### (#.#)

Cancel **Done**

Be advised that the choices you make in the **Format Options** window will apply to all reports and cannot be changed for individual reports. Use the **Reset** button, located in the upper-right portion of the main **Edit Reports** screen (just below the **Help** button), to restore the **Format Options** to the default settings (although caution is advised, as this will also delete any new reports that you have created).

3.G. Statistics Options

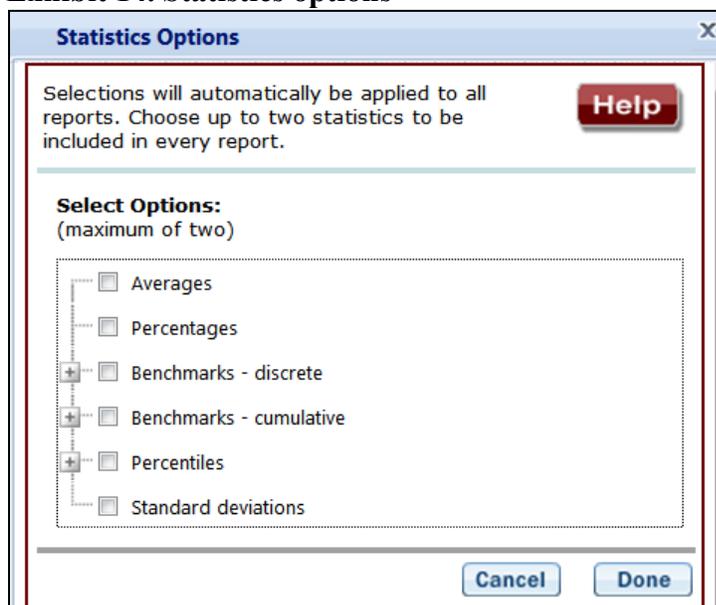
Available only from the main **Edit Reports** screen, clicking on **Statistics Options** allows you to designate up to two statistics. The selections you make are applicable to all the reports listed, although you can also change the statistics for an individual report when you edit it. (For further information, see section 3.C. Edit Report, page 18.)

The following **Statistics Options** are available (see exhibit 14):

1. **Average scale scores.** For the TIMSS assessment, student performance is reported on scales that range from 0 to 1,000. TIMSS reports the average scale score for a variety of demographic samples of the student population (e.g., the average scale score in mathematics for female students). By default, the standard errors of the scale scores are shown in parentheses.
2. **Percentages.** This statistic shows the percentage of students as a row percentage. For example, if the first column lists countries, then each country will display its own percentage distribution across its row. By default, percentage distributions do not include missing data. For information on how to show data for values categorized as missing, see section 3.F. Format Options, above.
3. **Benchmarks—discrete.** Discrete levels are reported as the percentage of students performing at four benchmarks: *low*, *intermediate*, *high*, and *advanced*, with an additional category created for those students scoring below the *low* benchmark (*below low*). There is simply too little information to know what students scoring below the *low* benchmark can actually do. This statistic shows the percentage of students performing in the following categories:
 - *Below low*—below 400
 - *At low*—400 to 474
 - *At intermediate*—475 to 549
 - *At high*—550 to 624
 - *At advanced*—at or above 625
4. **Benchmarks—cumulative.** Cumulative levels are reported as the percentage of students performing *at or above* each international benchmark:
 - *At or above low*—at or above 400
 - *At or above intermediate*—at or above 475
 - *At or above high*—at or above 550
 - *At advanced*—at or above 625
5. **Percentiles.** This statistic shows the threshold (or cutpoint) score for the following:
 - 10th percentile—the bottom 10 percent of students
 - 25th percentile—the bottom quarter of students

- 50th percentile—the median (half the students scored below the cutpoint and half scored above it)
 - 75th percentile—the top quarter of students
 - 90th percentile—the top 10 percent of students
6. **Standard deviations.** The standard deviation is a measure of how widely or narrowly dispersed scores are for a particular dataset. Under general normality assumptions, 95 percent of the scores are within two standard deviations of the mean. For example, if the average score of a dataset is 500 and the standard deviation is 100, it means that 95 percent of the scores in this dataset fall between 300 and 700. The standard deviation is the square root of the variance.

Exhibit 14. Statistics options



As noted above, the selections you make in **Statistics Options** will be applied automatically to all reports, although you can change the statistics for an individual report when you edit it. Be advised that if you use **Statistics Options** after editing the statistics in one or more of your individual reports, the statistics options selected will overwrite your previously edited selections. If you wish to use the same criteria and variables in a report with a different selection of statistics, consider using the **Create New Report** function to generate a new report with different statistics. (For further information, see section 3.E. Create New Report, page 21.) You can also make a copy of an individual report.

You can use the **Reset** button, located in the upper-right portion of the main **Edit Reports** screen (just below the **Help** button), to restore the **Statistics Options** to the default setting, which is average scale scores for all reports (this will also delete any new reports that you created).

Not all statistics are available for all reports. Their availability depends on other selections you have made to define the content and format of your report:

- Percentages will not display if jurisdictions or years appear in columns.
- Benchmark results are available only for the composite, or overall, scale.
- If benchmarks are selected as a variable, only percentages will be displayed.

Please note that the statistics produced by the IDE may not match the statistics shown in reports published by the International Association for the Evaluation of Educational Achievement (IEA) due to differences in certain statistical standards. In particular, organizations such as NCES and the IEA differ in the minimum sample sizes required for publishing student scores. Furthermore, in IEA reports, if a student has more than one teacher, estimates for teacher variables are calculated as an average of data reported by all of the teachers. In comparison, in the IDE, a student is randomly assigned one teacher, and the teacher estimate represents the data reported by the teacher assigned to the student.

3.H. Select Reports to Build

As you edit your reports, you can give them distinct names (up to 50 characters) to differentiate them, as well as make changes to the jurisdictions and variables previously selected, the statistics, and the layout of the rows and columns. (For further information, see section 3.C. Edit Report, above.) You may make copies of reports with these changes. In order to proceed to step 4, **Build Reports**, each report for which you want to retrieve data should be previewed using the **Preview** function. To decrease processing time as you move to step 4, you can uncheck any reports for which you do not wish to retrieve data. By default, all reports are checked. To uncheck one or more reports, you can either uncheck the reports individually or click on the **All** box. (Doing the latter will uncheck all of the reports and allow you to check only those for which you wish to retrieve data.) In the example that follows (see exhibit 15), data will be retrieved for all reports.

Exhibit 15. Selecting reports to build

TIMSS IDE 1. Select Criteria 2. Select Variables 3. Edit Reports 4. Build Reports

STEP 3: Preview and edit existing reports using the action links next to each report name. Create new reports, set format and statistic options. (New and copied reports will appear at the bottom of the report list.) **Help**

Subject, Grade: Mathematics, Grade 4
Jurisdictions: International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States
Measures: TIMSS Mathematics Scale: Overall Mathematics, TIMSS Mathematics Scale: Number (2011, 2007)
Variables: Speak language of test at home (2011), Gen speak language of test at home (2007, 2003), Sex of student in country
Years: 2011, 2007, 2003, 1995 **Reset**

Report	All <input checked="" type="checkbox"/>	Action	Measure	Variable	Year	Jurisdiction	Statistic
Report 1	<input checked="" type="checkbox"/>	Preview Delete Copy Edit	TIMSS Mathematics Scale: Overall Mathematics	Speak language of test at home (2011)	2011	International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States	Averages
Report 2	<input checked="" type="checkbox"/>	Preview Delete Copy Edit	TIMSS Mathematics Scale: Overall Mathematics	Gen speak language of test at home (2007, 2003)	2011, 2007, 2003, 1995	International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States	Averages
Report 3	<input checked="" type="checkbox"/>	Preview Delete Copy Edit	TIMSS Mathematics Scale: Overall Mathematics	Sex of student	2011, 2007, 2003, 1995	International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States	Averages
Report 4	<input checked="" type="checkbox"/>	Preview Delete Copy Edit	TIMSS Mathematics Scale: Overall Mathematics	Parents born in country	2011, 2007, 2003, 1995	International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States	Averages
Report 5	<input checked="" type="checkbox"/>	Preview Delete Copy Edit	TIMSS Mathematics Scale: Number (2011, 2007)	Speak language of test at home (2011)	2011, 2007, 2003, 1995	International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States	Averages
Report 6	<input checked="" type="checkbox"/>	Preview Delete Copy Edit	TIMSS Mathematics Scale: Number (2011, 2007)	Gen speak language of test at home (2007, 2003)	2011, 2007, 2003, 1995	International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States	Averages
Report 7	<input checked="" type="checkbox"/>	Preview Delete Copy Edit	TIMSS Mathematics Scale: Number (2011, 2007)	Sex of student	2011, 2007, 2003, 1995	International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States	Averages
Report 8	<input checked="" type="checkbox"/>	Preview Delete Copy Edit	TIMSS Mathematics Scale: Number (2011, 2007)	Parents born in country	2011, 2007, 2003, 1995	International Average, Algeria, Australia, Chile, Chinese Taipei, Hong Kong SAR, United States	Averages

4. Build Reports

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If you wish to delete a report from the list of reports, click **Delete** (see 1 above) in the **Action** column. Use the **Reset** button (see 2 above), located in the upper-right portion of the screen (just below the **Help** button), to restore the deleted reports (although caution is advised, as this will also delete any new reports that you created and restore the **Format Options** and **Statistics Options** to the default settings).

To continue to the last step in the IDE, click the **Build Reports** button at the bottom of the page (see 3 above) or the tab at the top of the page to go to the next screen.

4. Build Reports

4.A. Overview

You can access step 4, **Build Reports**, after choosing criteria at step 1, **Select Criteria**, in which case the default report built will provide data for just average scale scores and for the **All Students** variable. After step 1, you may also go on to steps 2 and 3, where you can select additional variables and edit reports, before moving on to **Build Reports**. In **Build Reports**, you can do the following:

1. Generate a data table for each report selected in step 3, as shown by the **Select Report** drop-down feature (see 1 in exhibit 16). By default, all reports are checked, although you

can uncheck any reports for which you do not wish to retrieve data. (For further information, see section 3.H. Select Reports to Build, page 26.)

- Export and save data tables into various formats using the **Export Reports** button (see 2 in exhibit 16). The output formats include HTML (print-friendly), Microsoft Word, Microsoft Excel, and Adobe PDF.
- Select the **Chart** tab (see 3 in exhibit 16) to create and customize charts for each report and save them for export in the above formats.
- Select the **Significance Test** tab (see 4 in exhibit 16) to run a significance test on your results, customize it, and export it.

4.B. View Reports as Data Tables

Once you click on **Build Reports**, the words “Processing Data” will appear on your screen (see exhibit 17). Some reports will take longer than others to process, so please do not hit the “Back” button on your browser during this stage. Your table will appear once the processing is complete. To select a different table to view, go to the **Select Report** drop-down menu (see 1 in exhibit 16) and choose the table of interest. To change the formatting or statistics options of a table or to generate a table from a report not included in your selection, return to step 3, **Edit Reports**.

Exhibit 16. Building reports overview

STEP 4: View each report table by selecting the report name from the drop-down menu. Create report types to edit and preview, each tab created represents one report type to export. Double-click report tabs to rename.

Subject, Grade: Mathematics, Grade 4
Jurisdictions: International Average, Algeria, Australia, Austria, Chinese Taipei, England, Germany, Hong Kong SAR, Italy, Japan, Russian Federation, Scotland, Sweden, United States, Yemen
Measure: TIMSS Mathematics Scale: Overall Mathematics
Variables: All students, Sex of student, Gen speak language of test at home (2003, 2007), Parents born in country
Year: 2007

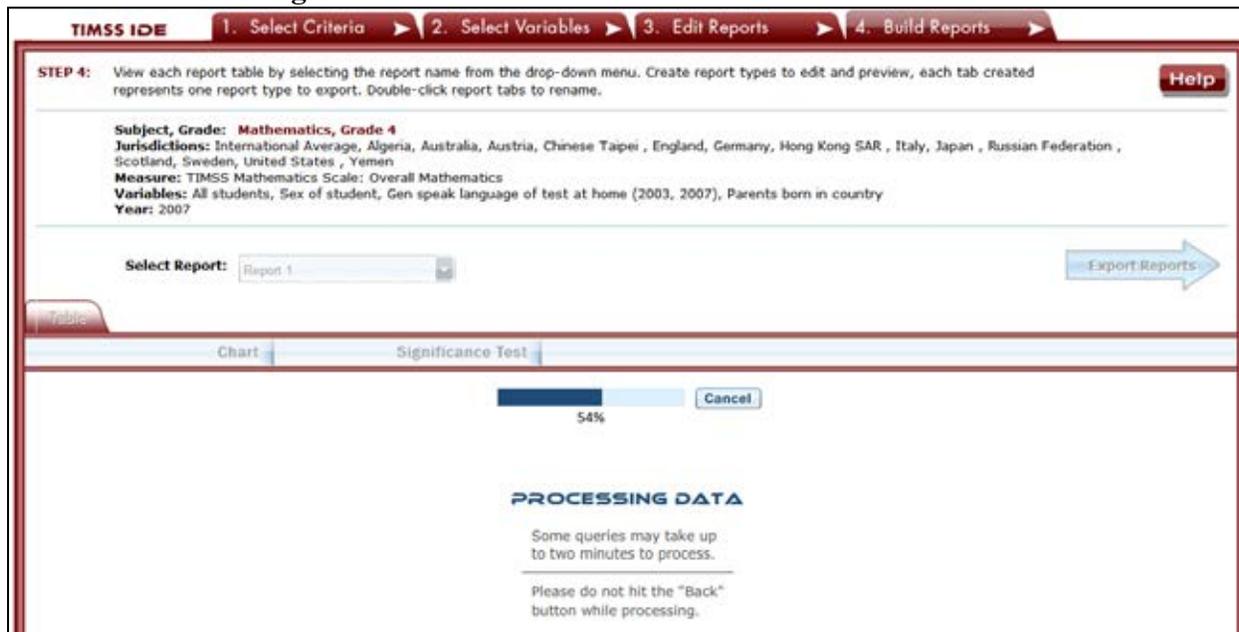
Select Report: Report 1

Export Reports

Averages for mathematics, grade 4 by All students [TOTAL], year and jurisdiction: 2007

Year	Jurisdiction	Average	Standard Error
2007	International Average	500	(0.0)
	Algeria	378	(5.2)
	Australia	516	(3.5)
	Austria	505	(2.0)
	Chinese Taipei	576	(1.7)
	England	541	(2.9)
	Germany	525	(2.3)
	Hong Kong SAR	607	(3.6)
	Italy	507	(3.1)
	Japan	568	(2.1)
	Russian Federation	544	(4.9)
	Scotland	494	(2.2)
	Sweden	503	(2.5)
	United States	529	(2.4)
Yemen	224	(6.0)	

Exhibit 17. Processing data

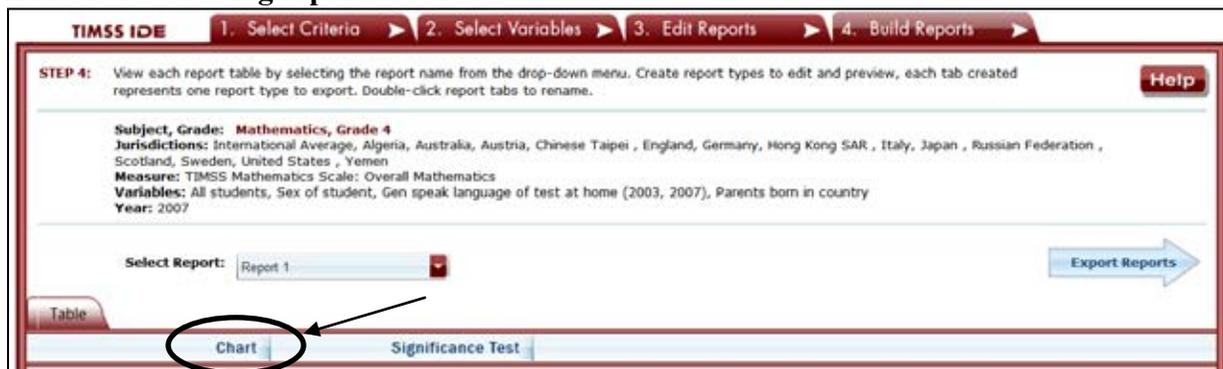


4.C. Charts

To create a chart, go to **Select Report** on the **Build Reports** screen to choose the report of interest from the drop-down menu, and then click the **Chart** link (see exhibit 18).

You will be able to create many types of charts and customize them. Section 4.E. Create Charts—Chart Options (page 30) provides a summary of the available features and how they can be customized.

Exhibit 18. Viewing reports as charts



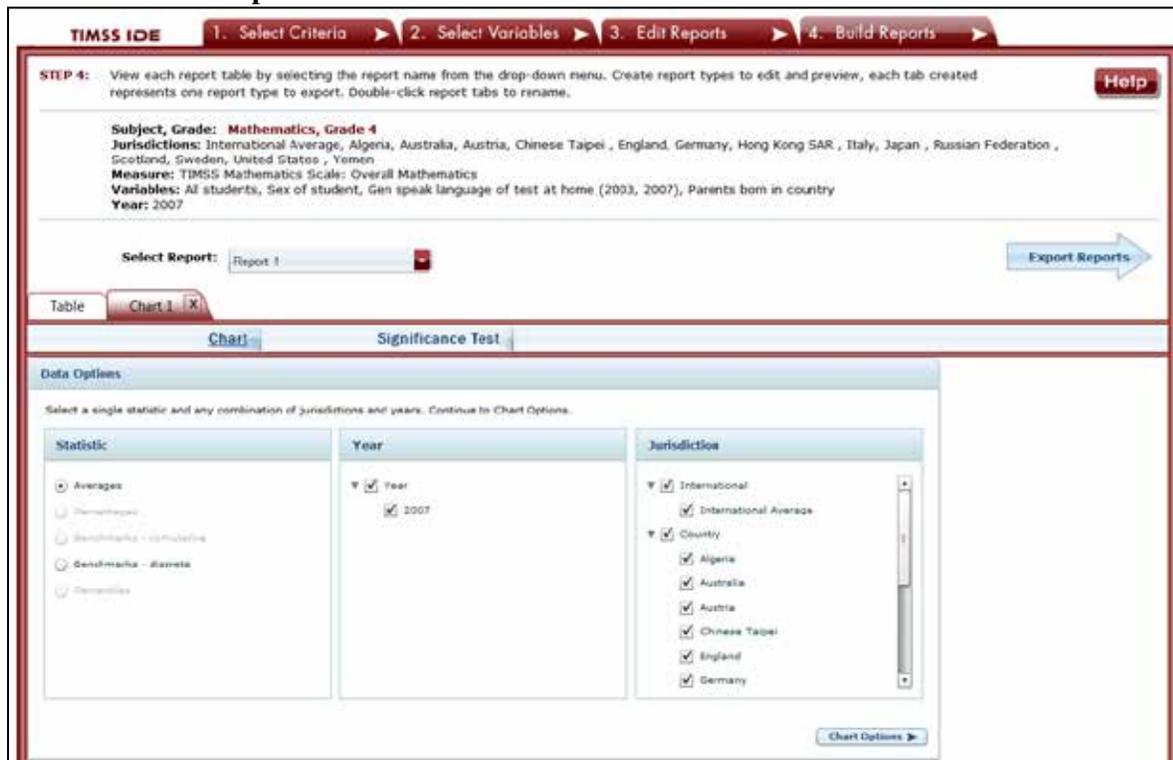
4.D. Create Charts—Data Options

When you click on **Chart**, your screen will present **Data Options** pertaining to **Statistic**, **Year**, and **Jurisdiction**. All are selected by default, except that you can have only one statistic

(see exhibit 19). Uncheck any of the criteria that you do not wish to chart, as long as you have one selected in each category.

Once you are finished with the Data Options, click on the **Chart Options** button in the lower-right corner of the screen.

Exhibit 19. Data options for charts



4.E. Create Charts—Chart Options

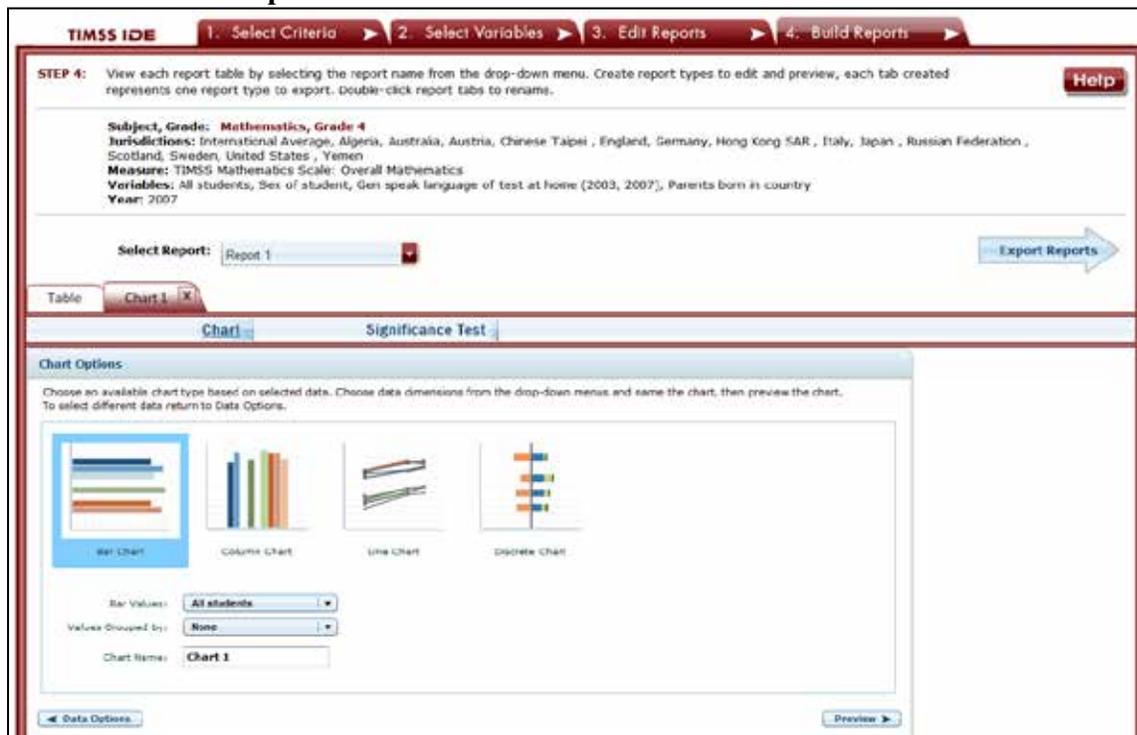
On the **Chart Options** screen, select **Bar Chart**, **Column Chart**, or **Line Chart** (see exhibit 20). For data on benchmarks, you also have the option of selecting a **Discrete Chart** or **Cumulative Chart**, while for percentiles you also have the option of selecting a **Percentile Chart**.

After selecting a chart type, change any data dimensions from the drop-down menus for **Bar**, **Column**, or **Line Values** and **Values Grouped by**. Any new variables that you created at step 3, **Edit Reports**, will be available for selection, but only if you selected the variables (by clicking the checkbox next to them) and pressed **Done** after you edited the report.

Enter a **Chart Name** limited to 25 characters, using only letters, numbers, spaces, underscores, and hyphens (otherwise, by default, the chart is named “Chart 1”).

Preview your chart by clicking the **Preview** button in the lower-right corner, or go back to the data options and make different selections by clicking the **Data Options** button in the lower-left corner.

Exhibit 20. Chart options



While previewing your chart, you can do the following (see exhibit 21 as an example of a **Discrete Chart** and exhibit 22 as an example of a **Bar Chart**):

1. Use the drop-down menus to change the jurisdiction and other variables as applicable. Notice that when you change your selection, the change occurs slowly enough that you get a sense of the size and direction of the change—especially if you didn't previously specify in the data dimensions how you want your values grouped.
2. Place your cursor over the bars of the chart to see the data points and value label(s).
3. Choose between using colors or patterns for the bars by clicking the alternating **Pattern** or **Color** button located just below the **Chart** tab in the upper-left portion of the screen. For the **Percentile Chart**, choose between **Color** or **Grayscale**.
4. Change the color of the bars with a single click on each level in the bars, which brings up a thumbnail of a color chart. Click on the thumbnail to reveal a color grid, and then select the color you desire.
5. Change the pattern of the bars with a single click on each level in the bars. Continuous clicking brings up many patterns to choose from.

Exhibit 21. Preview of discrete chart

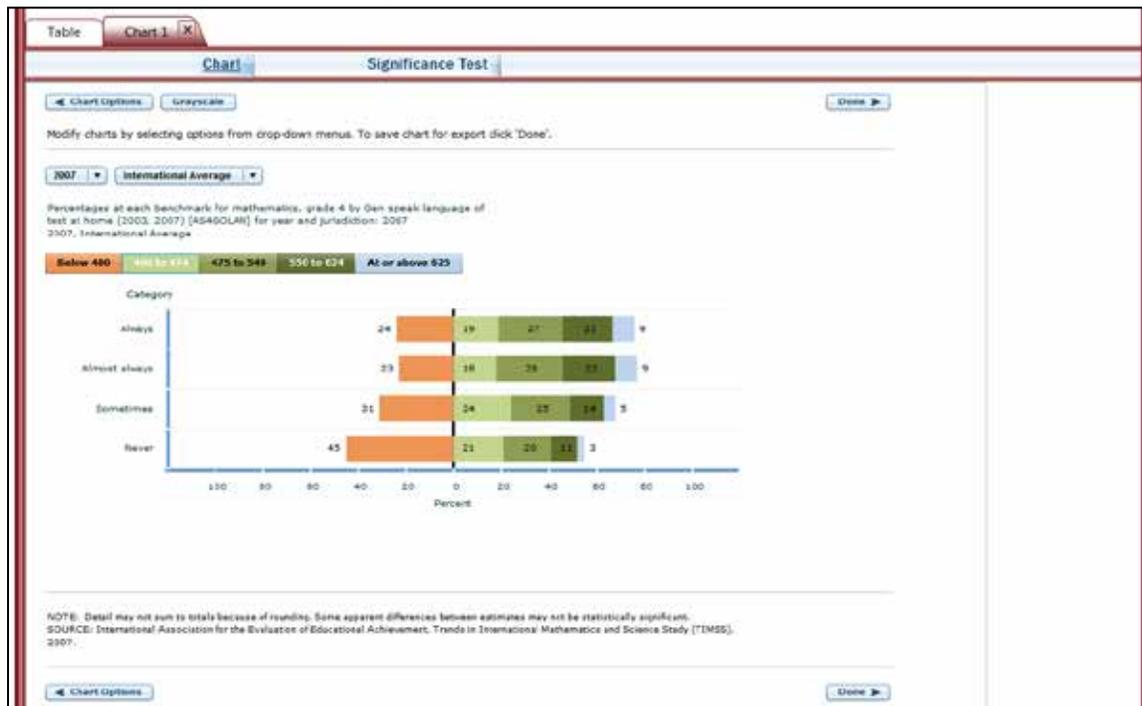
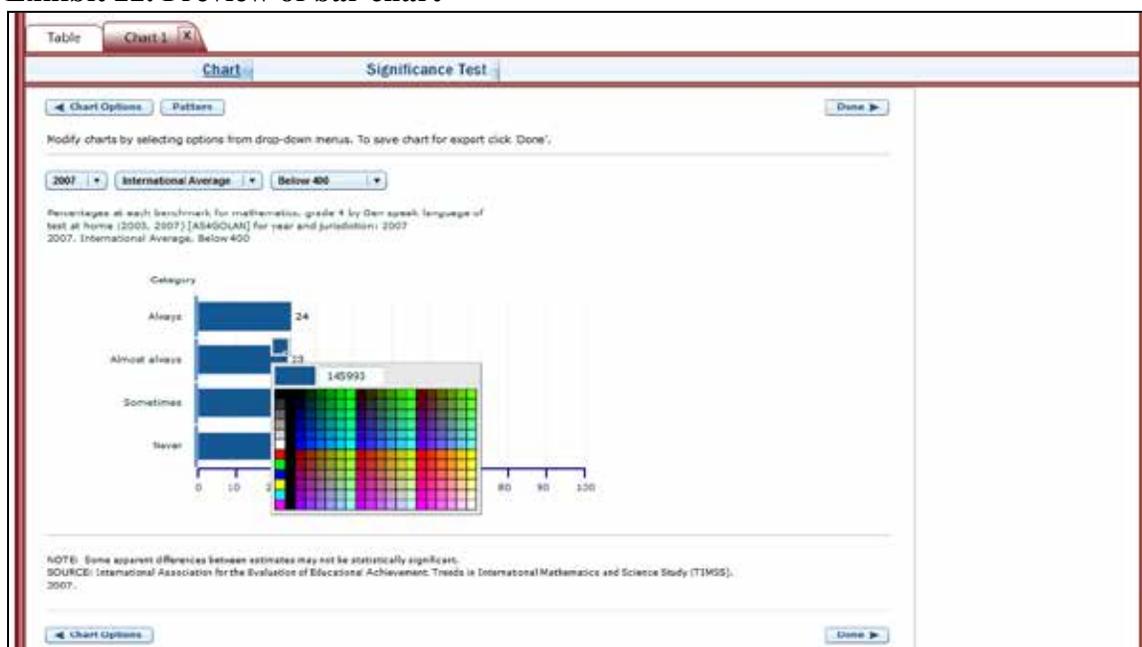


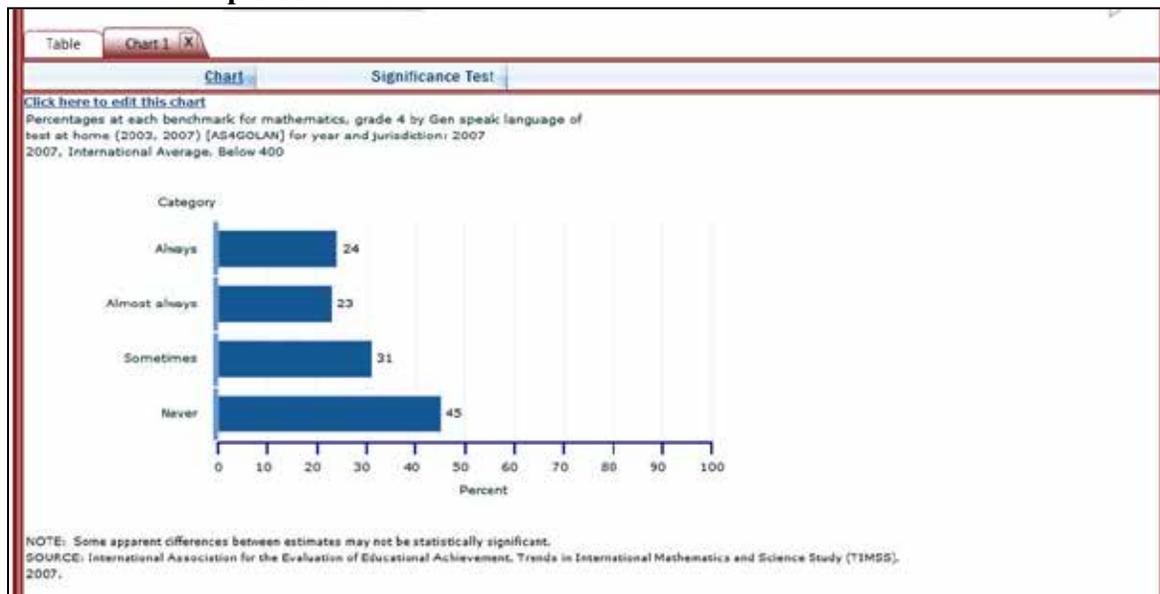
Exhibit 22. Preview of bar chart



Click the **Done** button located on the right side of the screen, or click back to **Chart Options** to change your selection criteria (see exhibit 22). You must click **Done** if you wish to later save and/or print your chart via the **Export Reports** function.

Clicking **Done** takes you to the exportable version of the chart (see exhibit 23). You can subsequently “**Click here to edit this chart**” (located in the upper-left corner, below the **Chart** link) to make more changes. Alternatively, clicking anywhere in the chart area will take you to the edit screen.

Exhibit 23. Completed chart



To make an additional chart from the same report or table, click the **Chart** link on the **Build Reports** screen. It is recommended that you provide a new chart name (the default is Chart 1, Chart 2, etc.). If you don't start the chart process again by clicking the **Chart** link, the new chart will overwrite the previous one.

If you wish to make charts from other reports, select “other report” in the **Select Report** drop-down list on the **Build Reports** screen. (If other reports were not checked in step 3, **Edit Reports**, go back to step 3 and check the ones you want. Then, when you advance to step 4, **Build Reports**, the reports will appear in the **Select Report** drop-down list.) If you need to create new reports, go back to step 1, **Select Criteria**, and/or step 2, **Select Variables**. Remember to export any completed charts you want to save by clicking **Done** and using the **Export Reports** function before leaving the **Build Reports** screen. (For further information, see section 4.G. Export Reports, page 37.)

4.F. Significance Tests

Tests for statistical significance indicate whether observed differences between assessment results are likely to have occurred because of sampling error or chance. “Significance” here does not imply any judgment about absolute magnitude or educational relevance. It refers only to the statistical nature of the difference and whether that difference likely reflects a true difference in the population.

With your report of interest selected, click the **Significance Test** link, which is located to the right of the **Chart** link (see exhibit 23, page 33). You first need to decide which variable you want to test and the criterion by which you want to test it (i.e., between jurisdictions, within variables, or across years). You will compare or “look across” the variable’s range of values, so it must have more than one value. You can look across jurisdictions for a variable (that is, compare between two or more jurisdictions) or you can look across the values within a variable for a single jurisdiction. Once the primary criterion is chosen, all other criteria must be restricted to a single value.

The general steps for running significance tests are as follows (see exhibit 24):

1. In the **Significance Test** window, select either **Between Jurisdictions**, **Within Variables**, or **Across Years**. Then, select the appropriate jurisdiction(s), variable(s), year(s), and statistic(s). For **Between Jurisdictions**, select at least two jurisdictions. For **Within Variables**, select one or more jurisdictions. For **Across Years**, more than one year needs to be selected.
2. Enter a **Name** limited to 25 characters, using only letters, numbers, spaces, underscores, and hyphens (otherwise, by default, the test is named “Sig Test 1”).
3. Select the output type as either **Table** or **Map**. The table option will show the significance test results as a matrix. The map option will show the significance test results on a world map, highlighting countries that have been selected. The map output is only available when **Between Jurisdictions** is selected in the first step.
4. Additional options allow you to select **Show Score Details** to display the estimates and standard errors for the table cells. If you selected a map, this option is not applicable, as the map will automatically show score details.
5. Click the **Preview** tab located in the upper-left corner, or the **Preview** button located in the bottom-left corner.
6. Click the **Edit** tab in the upper-left corner of the screen if you wish to go back and make changes to the selections you made for running the significance tests.
7. Click the **Done** button in the upper- or lower-right corner of the screen to run the significance tests.

Exhibit 24. Significance test options

Significance Test

Edit Preview Cancel Done

1. Select one category to compare significance from the choices available below. Help

Between Jurisdictions Within Variables Across Years

2. Create a name for this significance test. Name: Sig Test 1

3. Select the output type. Table Map

4. Select additional options. Show score details

5. Select available options from each of the columns below, then preview results.

Jurisdiction	Variable	Year	Statistic
<input checked="" type="checkbox"/> All Jurisdictions	<input checked="" type="checkbox"/> Gen speak language of test at home	<input checked="" type="checkbox"/> 2007	<input type="checkbox"/> Averages
<input checked="" type="checkbox"/> International Average	<input checked="" type="checkbox"/> Always		<input type="checkbox"/> Percentages at each bench
<input checked="" type="checkbox"/> Algeria	<input checked="" type="checkbox"/> Almost always		
<input checked="" type="checkbox"/> Australia	<input checked="" type="checkbox"/> Sometimes		
<input checked="" type="checkbox"/> Austria	<input checked="" type="checkbox"/> Never		
<input checked="" type="checkbox"/> Chinese Taipei			

Preview Cancel Done

When the table option is selected, you will get a significance test matrix in which you will see the differences and p values. Using the symbols shown in the legend of the matrix, an indication is also provided of whether one estimate is significantly lower or higher than another estimate or whether there is no significant difference (see exhibit 25). In the TIMSS IDE, most comparisons are independent with an alpha level of .05, and dependent t tests are performed only for basic male-female comparisons by country (with no additional variables included in the analysis). In contrast, reports published by the IEA employ a dependent testing methodology for all male-female comparisons by country (i.e., even when additional variables besides gender and country are included in the analysis). Because of this difference, the statistical significance of male-female differences by country may vary slightly between published reports and the IDE. Please note that multiple comparisons are not available in the IDE.

Note that the TIMSS IDE follows the IEA policy of using independent t tests, even between a country and a subnational entity that is participating as a benchmarking entity (for instance, in order to compare scores between the United States and Massachusetts or Minnesota, since they each have an independent sample).

Exhibit 25. Significance test table output

Significance Test					
	International Average	Algeria	Australia	Austria	Chinese Taipei
International Average		> Diff = 96 P-value = 0.0000	< Diff = -38 P-value = 0.0000	< Diff = -36 P-value = 0.0000	< Diff = -114 P-value = 0.0000
Algeria	< Diff = -96 P-value = 0.0000		< Diff = -135 P-value = 0.0000	< Diff = -132 P-value = 0.0000	< Diff = -211 P-value = 0.0000
Australia	> Diff = 38 P-value = 0.0000	> Diff = 135 P-value = 0.0000		x Diff = 2 P-value = 0.5409	< Diff = -76 P-value = 0.0000
Austria	> Diff = 36 P-value = 0.0000	> Diff = 132 P-value = 0.0000	x Diff = -2 P-value = 0.5409		< Diff = -78 P-value = 0.0000
Chinese Taipei	> Diff = 114 P-value = 0.0000	> Diff = 211 P-value = 0.0000	> Diff = 76 P-value = 0.0000	> Diff = 78 P-value = 0.0000	

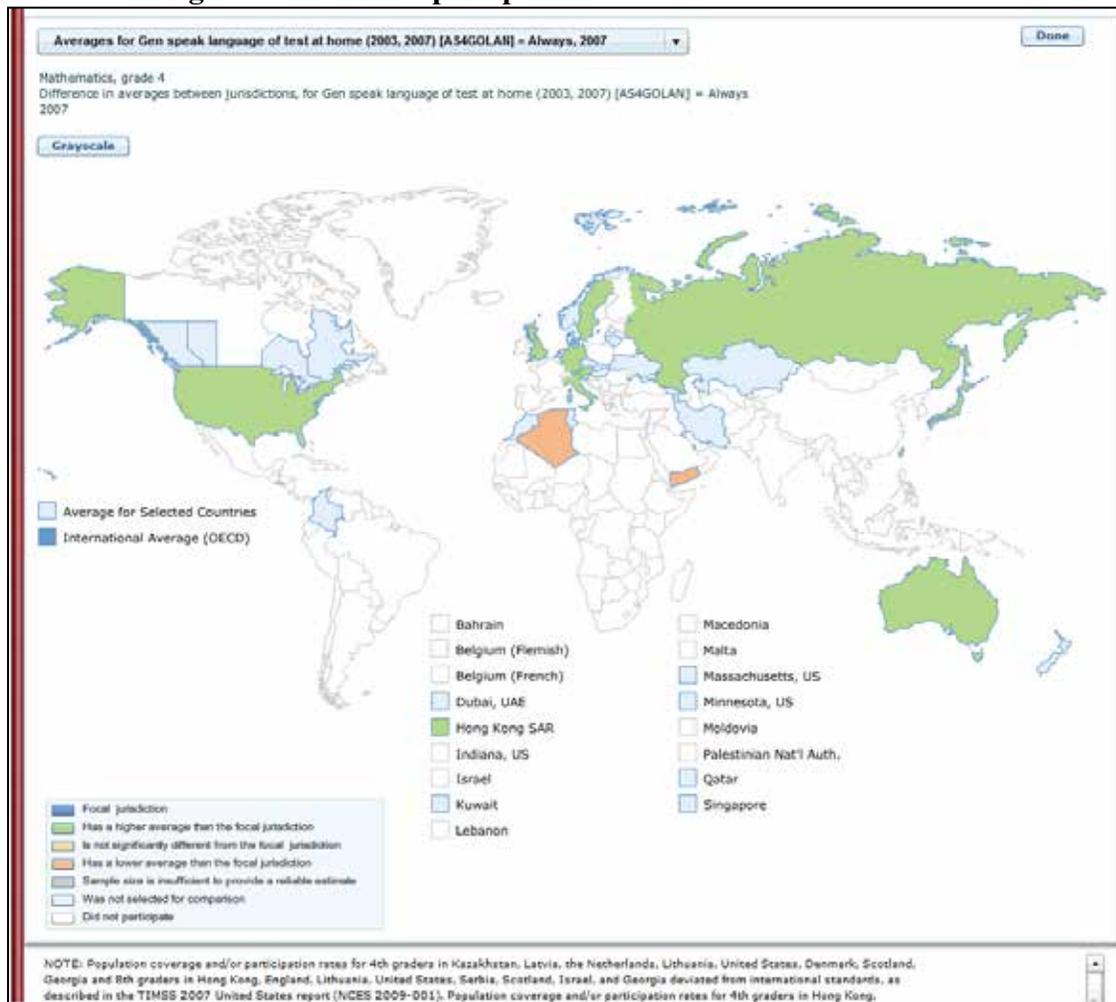
LEGEND:

- < Significantly lower.
- > Significantly higher.
- x No significant difference.

NOTE: Comparisons are independent with an alpha level of 0.05, except for basic male-female comparisons by country (with no additional variables included in the analysis) where a dependent methodology is used. For more information see the Statistical Notations and Other Notes section in the Help Guide.
SOURCE: International Association for the Evaluation of Educational Achievement, Trends in International Mathematics and Science Study (TIMSS), 2007.

When the map option is selected, a global map is shown with the countries selected shaded (see exhibit 26). The focal jurisdiction is shaded in blue and represents a comparison for all the other countries. The other countries are shaded in colors that indicate whether they are higher, lower, or not significantly different from the focal jurisdiction on whatever measure has been selected. When you scroll over a country, a text bubble pops up describing the strength of the difference between that country and the focal jurisdiction. At any point, you may choose a different focal jurisdiction by clicking on another country.

Exhibit 26. Significance test map output



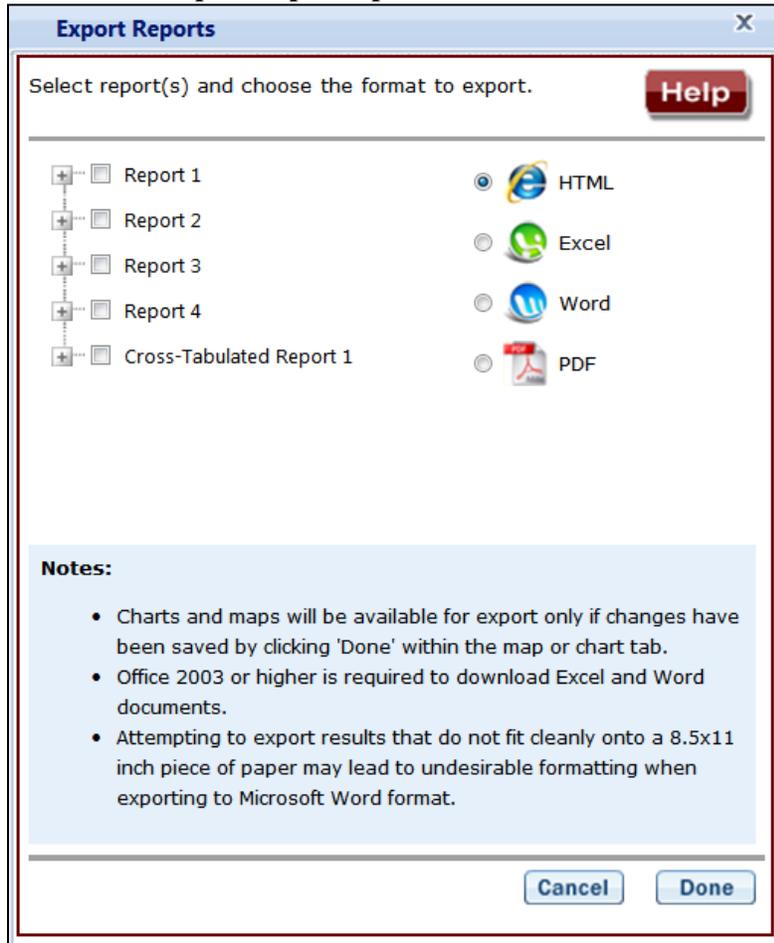
4.G. Export Reports

Click on the **Export Reports** button/arrow located on the right side of any **Build Reports** screen to save or print your tables, charts, and significance tests. The report names that appear in the **Export Reports** window are those that were checked off at step 3, **Edit Reports**.

Check the files you want to export, and select one of the file formats: **HTML** (print-friendly), **Excel**, **Word**, or **PDF** (see exhibit 27). All reports that you select at the same time will be exported in one file. In the Excel format, you will be able to increase the decimal places visible (wherever more precision is available in the database). Because there are many different operating systems in use, you may get an error message with Excel or one of the other formats. Usually, this will not affect your ability to export, so please wait for the software “errors” to resolve themselves.

Charts or maps for each report will only be available on this menu if you saved them by clicking **Done** on the last screen after you created them. If a chart or map that you wish to save or print is grayed out (not available for selection), cancel the **Export Reports** tool, go back to your chart or map, and be sure to click **Done** on the last screen. After that, it will be available for export.

Exhibit 27. Export report options



If you wish to edit tables or charts before saving or printing them, remember to do this before leaving the **Build Reports** screen. Returning to prior screens to edit the table formats or change variables or criteria will overwrite the tables and charts.

V. TIMSS International Data Explorer (IDE) Definitions

This section describes the kinds of criteria and variables that are used to form data queries, as well as the kinds of data that are available and the statistical methods used to assess them.

These topics include the following:

- Criteria
 - Subject
 - Grade
 - Measures
 - Jurisdictions
- Variables
- Statistics options
 - Average scale scores
 - Percentages
 - Benchmarks (discrete and cumulative)
 - Percentiles
 - Standard deviations
- Cross-tabulations
- Statistical notations and other notes

1. Criteria

Each data query must include at least one selection from four criteria choices: subject, grade, measure(s), and jurisdiction(s). Shown below is an outline of these selection criteria followed by a brief description.

1. Subject: Mathematics or Science
2. Grade: Fourth or Eighth
3. Measure:
 - TIMSS scale scores
 - Mathematics: Grade 4
 - Overall scale
 - Subscales
 - Mathematics: Grade 8
 - Overall scale
 - Subscales
 - Science: Grade 4
 - Overall scale
 - Subscales
 - Science: Grade 8
 - Overall scale
 - Subscales

- Student and Family Characteristics
- Student Computer Use
- Student Activities Outside of School
- Student Perception/Valuing of Mathematics/Science
- Teacher Background Characteristics, Formal Education, and Training
- Teacher Perception of Mathematics/Science Teaching/Learning
- Teacher Preparation and Collaboration
- Teacher Activities Outside of School
- Classroom Characteristics
- Classroom Instruction
- Role of Homework (Teacher)
- School Characteristics
- School Resources
- Home Involvement (School)
- School Climate and Safety

4. Jurisdiction:

- International Average
- Average for Selected Countries
- Country
- Benchmarking Jurisdiction
- Sixth-Grade Participants (when grade 4 is selected)
- Ninth-Grade Participants (when grade 8 is selected)

Subject

TIMSS is a study of mathematics and science, and those are the subjects that can be selected.

Measures

TIMSS focuses on overall mathematics and science knowledge, but within these broad categories a variety of subscales are available each year. Subscales are constituent parts of the composite subject scale for an assessment, and are specified by the assessment framework for that year. The weighted average of these is the basis for the mathematics and science composite scales, as described in the TIMSS framework.

Subscales are based on fewer observations than the composite scales and, as a result, may have larger standard errors.

In addition, there are a number of continuous variables other than scale scores that you may choose as a measure of analysis. These variables fall under different categories, such as Student and Family Characteristics and School Characteristics, and include variables such as age, teaching experience, and class size.

Jurisdictions

Note that some country counts overlap because some countries participated at both the fourth- and eighth-grade levels. Also, benchmarking participants are currently available in the IDE for 2003, 2007 and 2011 and so are only listed below for those years.

In 1995, there were 29 countries and subnational education systems that participated in TIMSS at the fourth-grade level. At the eighth-grade level, 46 countries and subnational education systems participated.

In 1999, there were 38 countries and subnational education systems that participated in TIMSS at the eighth-grade level. Fourth-grade students were not assessed in TIMSS 1999.

In 2003, there were 25 countries and subnational education systems, as well as 3 benchmarking jurisdictions—the Canadian provinces of Ontario and Quebec and the U.S. state of Indiana—that participated in TIMSS at the fourth-grade level. At the eighth-grade level, 48 countries and subnational education systems, along with 4 benchmarking jurisdictions—the Canadian provinces of Ontario and Quebec; the Basque region of Spain; and the U.S. state of Indiana—participated.

In 2007, there were 37 countries and subnational education systems, as well as 7 benchmarking jurisdictions—the Canadian provinces of Alberta, British Columbia, Ontario, and Quebec; Dubai (United Arab Emirates); and the U.S. states of Massachusetts and Minnesota—that participated in TIMSS at the fourth-grade level. At the eighth-grade level, 50 countries and subnational education systems, along with 7 benchmarking jurisdictions—the Canadian provinces of British Columbia, Ontario, and Quebec; Dubai (United Arab Emirates); the Basque region of Spain; and the U.S. states of Massachusetts and Minnesota—participated.

In 2011, there were 52 countries and subnational education systems, as well as 7 benchmarking jurisdictions—Abu Dhabi and Dubai (United Arab Emirates); the Canadian provinces of Alberta, Ontario, and Quebec; and the U.S. states of Florida and North Carolina—that participated in TIMSS at the fourth-grade level. At the eighth-grade level, 45 countries and subnational education systems, along with 14 benchmarking jurisdictions—Abu Dhabi and Dubai (United Arab Emirates); the U.S. states of Alabama, California, Colorado, Connecticut, Florida, Indiana, Massachusetts, Minnesota, and North Carolina; and the Canadian provinces of Alberta, Ontario and Quebec—participated.

Also, for TIMSS 2011, countries where students were expected to find the TIMSS assessments too difficult for their fourth- or eighth-grade students were given the option to assess students at a higher grade. Accordingly, three countries administered the fourth grade assessment to their sixth grade students and the eighth grade assessment to their ninth grade students.

All listed jurisdictions can be selected for any analyses. However, the IDE contains a few U.S.-specific background variables (e.g., race/ethnicity) that, when selected, will not yield information for any non-U.S. jurisdictions.

2. Variables

In the TIMSS IDE, questions from three types of questionnaires (student, teacher, and school) as well as variables that are derived from background information are organized into categories that have shared characteristics and can be selected as a group when examining and generating tables.

The categories are listed in the Glossary along with variables that require further descriptions than can be provided in the IDE. Content category and subcategory titles may overlap, but specific variables appear only once in a subcategory. Use **Search** in the **Select Variables** step to locate variables.

3. Statistics Options

The IDE reports TIMSS data with several statistics options:

- Average scale scores
- Percentages
- Benchmarks—discrete
- Benchmarks—cumulative
- Percentiles
- Standard deviations

Average Scale Scores

For the TIMSS assessment, student performance is reported on scales that range from 0 to 1,000, with the TIMSS scale average fixed at 500 and a standard deviation of 100.

Scale scores can show the standard error and are often accompanied by data showing percentages and standard deviations.

TIMSS scales are produced using item response theory (IRT) to estimate average scores for mathematics and science for each jurisdiction. IRT identifies patterns of response and uses statistical models to predict the probability of answering an item correctly as a function of students' proficiency in answering other questions. That is, student responses to the assessment questions are analyzed to determine the percentage of students responding correctly to each multiple-choice question and the percentage of students achieving in each of the score categories for constructed-response questions.

Percentages

Percentages show the percentage of students as a row percentage. For example, if the table cell for Black female students in the United States is 9 percent, then Black females composed 9 percent of the U.S. sample. By default, percentage distributions do not include missing data, although there is an option to include them.

Benchmarks (Discrete and Cumulative)

In addition to average scale scores, achievement results for TIMSS are reported using benchmarks. The benchmarks are internationally set levels based on collective judgments about what students should know and be able to do relative to the body of content reflected in each subject-area assessment. Using score cutpoints, the overall fourth- and eighth-grade mathematics and science scales are divided into four international benchmarks: *low*, *intermediate*, *high*, and *advanced*.

Benchmark data are presented either in a discrete or cumulative format. The “discrete” format presents the percentage of students performing at each international benchmark: *at low*, *at intermediate*, *at high*, and *at advanced*, with an additional category created for those students scoring below the *low* benchmark (*below low*). (Note that there is simply too little information to know what students scoring below the *low* benchmark can actually do.) The “cumulative” format presents the percentage of students performing *at or above* each international benchmark (that is, *at or above low*, *at or above intermediate*, *at or above high*, and *at advanced*).

The following tables contain descriptions of the competencies displayed by students categorized at each benchmark in the 2011 TIMSS international assessment. Competencies are described separately for grade 4 mathematics, grade 8 mathematics, grade 4 science, and grade 8 science. The table also displays score cutpoints for each benchmark; note that the cutpoints are the same for both grade levels and subject areas.

Table 1. Description of TIMSS international benchmarks, fourth-grade mathematics: 2011

Benchmark	Cutpoint	Grade 4 mathematics skills and strategies
Low	400	<ul style="list-style-type: none"> • Basic mathematical knowledge of whole numbers, triangles, informal coordinate systems, and simple graphs
Intermediate	475	<ul style="list-style-type: none"> • Apply basic mathematical knowledge to whole numbers, and simple numeric and geometric patterns • Familiar with a range of two-dimensional shapes • Read and interpret different representations of the same data
High	550	<ul style="list-style-type: none"> • Apply knowledge and understanding to solve multistep word problems with whole numbers • Understand division, place values, and simple fractions • Extend patterns and identify the relationship between ordered pairs • Basic geometric knowledge
Advanced	625	<ul style="list-style-type: none"> • Understanding of a variety of relatively complex situations and ability to explain reasoning • Apply proportional reasoning in a variety of contexts • Developing understanding of fractions and decimals • Apply geometric knowledge of a range of two- and three-dimensional shapes in a variety of situations • Organize, interpret, and represent data to solve problems

NOTE: Information about the procedures used to set the international benchmarks is available in [Methods and Procedures in TIMSS and PIRLS 2011](#).

SOURCE: Mullis, I.V.S., Martin, M.O., Foy, P., and Arora, A. (2012). [TIMSS 2011 International Results in Mathematics](#). Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Table 2. Description of TIMSS international benchmarks, eighth-grade mathematics: 2011

Benchmark	Cutpoint	Grade 8 mathematics skills and strategies
Low	400	<ul style="list-style-type: none"> • Knowledge of whole numbers and decimals, operations, and basic graphs
Intermediate	475	<ul style="list-style-type: none"> • Apply basic mathematical knowledge in straightforward situations • Add and multiply to solve one-step word problems involving whole numbers, decimals, and simple algebraic relationships • Understand the properties of triangles and basic geometric concepts • Read and interpret graphs and tables
High	550	<ul style="list-style-type: none"> • Understanding and knowledge in a variety of relatively complex situations • Compute with fractions, decimals, percentages, negative integers, and proportions • Work with algebraic expressions and linear equations • Knowledge of geometric properties to solve problems, including area, volume, and angles • Interpret data in a variety of graphs and tables • Solve simple problems involving probability
Advanced	625	<ul style="list-style-type: none"> • Organize and draw conclusions from information, make generalizations, and solve nonroutine problems • Solve a variety of ratio, proportion, and percent problems • Express generalizations algebraically and model situations • Knowledge of geometry in complex problem situations • Derive and use data from several sources to solve multistep problems

NOTE: Information about the procedures used to set the international benchmarks is available in [Methods and Procedures in TIMSS and PIRLS 2011](#).

SOURCE: Mullis, I.V.S., Martin, M.O., Foy, P., and Arora, A. (2012). [TIMSS 2011 International Results in Mathematics](#). Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Table 3. Description of TIMSS international benchmarks, fourth-grade science: 2011

Benchmark	Cutpoint	Grade 4 science skills and strategies
Low	400	<ul style="list-style-type: none"> • Elementary knowledge of life science and physical science
Intermediate	475	<ul style="list-style-type: none"> • Basic knowledge and understanding of practical situations in the sciences • Recognize some basic information related to characteristics of living things and their interaction with the environment • Understanding of human biology and health • Know some basic facts about the solar system • Ability to interpret information in pictorial diagrams and apply factual knowledge to practical situations
High	550	<ul style="list-style-type: none"> • Demonstrate some understanding of plant and animal structure, life processes, and the environment and some knowledge of properties of matter and physical phenomena • Knowledge of the solar system, and of Earth's structure, processes, and resources • Demonstrate beginning scientific inquiry knowledge and skills • Provide brief descriptive responses combining knowledge of science concepts with information from everyday experience of physical and life processes
Advanced	625	<ul style="list-style-type: none"> • Communicate understanding of characteristics and life processes of organisms as well as of factors relating to human health • Demonstrate understanding of relationships among various physical properties of common materials and have some practical knowledge of electricity • Demonstrate some understanding of the solar system and Earth's physical features and processes • Ability to interpret the results of investigations and draw conclusions as well as ability to evaluate and support an argument

NOTE: Information about the procedures used to set the international benchmarks is available in [Methods and Procedures in TIMSS and PIRLS 2011](#).

SOURCE: Martin, M.O., Mullis, I.V.S., Foy, P., and Stanco, G.M. (2012). [TIMSS 2011 International Results in Science](#). Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Table 4. Description of TIMSS international benchmarks, eighth-grade science: 2011

Benchmark	Cutpoint	Grade 8 science skills and strategies
Low	400	<ul style="list-style-type: none"> • Recognize some basic facts from the life and physical sciences
Intermediate	475	<ul style="list-style-type: none"> • Recognize and communicate basic scientific knowledge across a range of topics • Understand the characteristics of animals, food webs, and the effect of population changes in ecosystems • Acquainted with some aspects of sound and force and have elementary knowledge of chemical change • Elementary knowledge of the solar system, Earth's processes, and resources and the environment
High	550	<ul style="list-style-type: none"> • Conceptual understanding of some science cycles, systems, and principles • Understand biological concepts including human biology and the interrelationship of plants and animals in ecosystems • Knowledge of situations related to light and sound, as well as heat and forces • Understand the structure of matter, and chemical and physical properties and changes • Understand the solar system, Earth's processes and resources, and some basic understanding of major environmental issues
Advanced	625	<ul style="list-style-type: none"> • Grasp of some complex and abstract concepts in biology, chemistry, physics, and Earth science • Understand the complexity of living organisms and how they relate to their environment • Understand the properties of magnets, sound, and light • Understand the structure of matter and physical and chemical properties and changes • Knowledge of the solar system and of Earth's features and processes, and apply understanding of major environmental issues • Understand some fundamentals of scientific investigation and apply basic physical principles to solve some quantitative problems

NOTE: Information about the procedures used to set the international benchmarks is available in [Methods and Procedures in TIMSS and PIRLS 2011](#)

SOURCE: Martin, M.O., Mullis, I.V.S., Foy, P., and Stanco, G.M. (2012). [TIMSS 2011 International Results in Science](#). Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Percentiles

This statistic shows the threshold (or cutpoint) score for the following:

- 10th percentile—the bottom 10 percent of students
- 25th percentile—the bottom quarter of students
- 50th percentile—the median (half the students scored below the cutpoint and half scored above it)
- 75th percentile—the top quarter of students
- 90th percentile—the top 10 percent of students

Standard Deviations

The standard deviation is a measure of how widely or narrowly dispersed scores are for a particular dataset. Under general normality assumptions, 95 percent of the scores are within two standard deviations of the mean. For example, if the average score of a dataset is 500 and the standard deviation is 100, it means that 95 percent of the scores in this dataset fall between 300 and 700.

In the IDE, you may select standard deviations as one of your two choices for “Statistics Options” in the Edit Reports step.

4. Cross-tabulations

Cross-tabulation is a method of combining separate variables into a single table. Normally, each variable has its own table. If you have selected two or three variables (not counting All Students), when you go to the Edit Reports step, you will automatically get one table for each variable (including one for All students); at the end of that list, you will get one cross-tabulation for the two or three variables selected.

If you have chosen four or more variables (not counting All Students), you will get tables for each variable, but you won't get the cross-tabulation.

Be advised that if you go back to add another variable without subtracting one to keep the total under four, you will lose any edits you might have made to the cross-tabulation.

5. Statistical Notations and Other Notes

Statistical notations and other notes are found at the end of a data table, as applicable to that table:

- — Not available.
- † Not applicable. (For instance, the standard error for the statistic cannot be reported because the statistic does not meet reporting standards.)
- # The statistic rounds to zero.
- ‡ Reporting standards not met. (For instance, the sample size is insufficient to permit a reliable estimate.)
- NOTE: A general note pertains to any special characteristics of the data in the table. Population coverage, participation rates, sampling procedures, and trend analysis issues are addressed here. See details below.
- SOURCE: Source information is listed for all TIMSS data and should be cited when data are used in a publication or presentation.

The general note (NOTE) warns users of jurisdiction-specific changes in population coverage, participation rates, or sampling procedures that deviate from international standards. For the 4th grade, please be aware of these concerns for the following jurisdictions (years in parentheses): Alberta-CAN (11, 07), Australia (03, 95), Austria (95), Azerbaijan (11), British Columbia-CAN (07), Croatia (11), Denmark (11, 07), Dubai-UAE (07), England (03, 95), Florida-US (11), Georgia (11, 07), Hong Kong (11, 03), Hungary (95), Israel (95), Kazakhstan (11, 07), Kuwait (11, 95), Latvia (07, 95), Lithuania (11, 07, 03), Massachusetts-US (07), Minnesota-US (07), Mongolia (07), the Netherlands (11, 07, 03, 95), North Carolina-US (11), Northern Ireland (11), Norway (11), Ontario-CAN (07), Qatar (11), Quebec-CAN (07), Scotland (07, 03, 95), Serbia (11), Singapore (11), Slovenia (95), Thailand (95), and the United States (11, 07, 03).

For the 8th grade, please be aware of these concerns for the following jurisdictions (years in parentheses): Alabama-US (11), Alberta-CAN (11), Australia (95), Austria (95), Belgium (Flemish) (99, 95), Belgium (French) (95), British Columbia-CAN (07), California-US (11), Colombia (95), Colorado-US (11), Connecticut-US (11), Denmark (95), Dubai-UAE (07), England (11, 07, 03, 99, 95), Florida-US (11), Greece (95), Georgia (11, 07), Germany (95), Honduras-Grade 9 (11), Hong Kong (07, 03, 99), Indiana-US (11), Indonesia (03), Israel (11, 07, 03, 99, 95), Kuwait (95), Latvia (99, 95), Lithuania (11, 07, 03, 99, 95), Macedonia (03), Massachusetts-US (11, 07), Minnesota-US (11, 07), Mongolia (07), Morocco (03, 07), the Netherlands (03, 99, 95), North Carolina-US (11), Ontario-CAN (11, 07), Quebec-CAN (07), Romania (95), the Russian Federation (11), Scotland (07, 03, 95), Serbia (07, 03), Singapore (11), Slovenia (95), Switzerland (95), Thailand (95), and the United States (11, 07, 03, 95).

Data from these jurisdictions have issues that interfere with proper trend analysis:

Armenia, Australia, Finland, Indonesia, Israel, Italy, Kazakhstan, Kuwait, Latvia, Morocco, New Zealand, Qatar, Saudi Arabia, Slovenia, South Africa, Syrian Arab Republic, Thailand, Turkey, and Yemen. For more details on trends with 2011 data, see appendix A in the IEA

[TIMSS 2011 International Reports](#), which lists all countries with previous years of data not comparable for measuring trends to 2011, primarily due to countries improving translations or increasing population coverage.

See the [IEA TIMSS 2007 International Reports](#) and the [IEA TIMSS 2003 International Reports](#) for further information on specific trend issues in previous years. Because of national-level changes in the starting age/date of school, 1999 data for Australia and Slovenia cannot be compared to 2003 data. Because of changes in the population tested, 1995 data for Israel, Italy, New Zealand, and South Africa and 1999 data for Morocco cannot be used for trend analyses. Because only Latvian-speaking schools were included in 1995 and 1999 data for Latvia, 1995 and 1999 data cannot be compared to 2003, 2007, and 2011 data. Data for Kuwait, Indonesia, Saudi Arabia, Morocco, and Turkey cannot be used for trend analyses because comparable data across years are not available.

The Syrian Arab Republic participated in TIMSS 2003 at the 8th grade and Yemen participated in TIMSS 2003 at the 4th grade, but because the characteristics of their sample are not completely known, they were shown in an appendix in the TIMSS 2003 International Report and their 2003 data are excluded from the IDE.

South Africa and Bulgaria participated in TIMSS 1995 at the 8th grade, but due to problems with their background data, their 1995 data are excluded from the IDE.

Linking Teacher Data

Results shown in the TIMSS IDE may differ slightly from those in the International Association for the Evaluation of Educational Achievement (IEA) TIMSS International Reports because of a slightly different procedure used in linking teacher data to the students. Some students (mostly for eighth grade) may be assigned more than one science or mathematics teacher. Each teacher is asked to complete the teacher questionnaire, and the IEA TIMSS reports present results that are based on averaged data for these teachers. For the IDE, if a student has more than one teacher for each subject, a student is linked to data from a single teacher for mathematics and science. The teacher is chosen randomly from the group of teachers (mathematics or science) who answered the questionnaire for each student.

Statistical Comparisons

In the TIMSS IDE, most comparisons are independent with an alpha level of .05, and dependent *t* tests are performed only for basic male-female comparisons by country (with no additional variables included in the analysis). In contrast, reports published by the IEA employ a dependent testing methodology for all male-female comparisons by country (i.e., even when additional variables besides gender and country are included in the analysis). Because of this difference, the statistical significance of male-female differences by country may vary slightly between published reports and the IDE.

Data Suppression

Finally, data suppression may be handled slightly differently in the TIMSS IDE and the IEA TIMSS International Reports. For the IDE, the Rule of 62 is applied to suppress data to avoid reporting results for groups about which little of interest could be said due to lack of power. The Rule of 62 is borrowed from the IDE's counterpart, the National Assessment of Educational Progress (NAEP) Data Explorer (NDE). This rule states that statistics for a group—means, standard errors, standard deviations, percentiles, and achievement-level percentages—are suppressed if they are based on less than 62 cases. The rule serves to assure a minimum power requirement to detect moderate differences at a nominal significance level (0.05). The minimum power is 0.80 and the moderate effect size is 0.5 standard deviation units. A design effect of 2 is assumed to derive an appropriate complex sample standard deviation.

6. Glossary

Below is a list of technical and TIMSS-specific assessment terms used in the IDE. The index variables listed are derived from a combination of variables, or questions, taken from the student, teacher, and/or school questionnaires. Sections 6.A. through 6.C. refer to variables taken from the TIMSS student questionnaire. Sections 6.D. through 6.F. and 6.I. refer to variables taken from the TIMSS teacher questionnaire, and section 6.J. and 6.L. refer to variables taken from the TIMSS school questionnaire. Sections 6.G., 6.H., 6.K. and 6.M. contain a variety of index variables that are derived from one of the three questionnaires. The items in brackets indicate the variable names listed in the IDE. The items in parentheses indicate an acronym for an index variable.

6.A. Student and Family Characteristics

Language of Testing

This question asks students how often they speak the language of the test at home. In 2011, students had three response options: *Always*, *Sometimes*, and *Never*. In 2003 and 2007, students had four response options: *Always*, *Almost always*, *Sometimes*, and *Never*. In 1999 and 1995, students also had three response options: *Always or almost always*, *Sometimes*, and *Never*. In 2007 and 2011, students who responded anything other than *Always* were asked what other language they spoke at home. Language options vary by country, but in the United States in 2007 and 2011, students could select Spanish in addition to English or write in any other language. For additional details about country-specific language options, see the forthcoming [TIMSS 2011 User Guide](#); the [TIMSS 2007 User Guide, Supplement 2](#); the [TIMSS 2003 User Guide, Supplement 2](#); the [TIMSS 1999 User Guide, Supplement 2](#); and the [TIMSS 1995 User Guide, Supplement 3](#).

Number of Home Study Supports [AS5DG083, BS5DG265]

This index, used in 2011, was derived from two questions assessing the availability of an internet connection and/or student's own room, as reported by 4th- and 8th-grade students. The responses

are categorized as (1) neither own room nor internet connection are available; (2) either own room or internet connection are available; and (3) both own room and internet connection are available.

Home Resources for Learning (Index/Scale) [BS5BG213, BS5DG214]

Both the index and scale, used in 2011, were created using 8th-grade students' responses concerning the availability of three home educational resources: (1) the number of books in the home; (2) the number of home study supports (internet connection and own room); and (3) the highest level of education of either parent.

Students with *Many Resources* had a score of at least 12.5, which is the point on the scale corresponding to students reporting that they had more than 100 books in the home and two home study supports, and that at least one parent had finished university, on average. Students with *Few Resources* had a score no higher than 8.2, which is the scale point corresponding to students reporting that they had 25 or fewer books in the home, neither of the two home study supports, and that neither parent had gone beyond upper-secondary education, on average. All other students were assigned to the *Some Resources* category.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Home Resources

For 1995, 1999, 2003, 2007, and 2011 within the home resources category up to seven country-specific home possession items could be included, depending on the year of the assessment. Across countries and subnational education systems, students were asked whether they had items at home, varying by year, such as: books of your very own, own room, internet connection, calculator; computer (not including PlayStation, GameCube, Xbox, or other TV/video game computers); study desk/table for personal use; and dictionary. These variables are comparable across countries and applicable years. However, the nationally defined possessions are not comparable across countries or years. For example, in 2007, the United States used four country-specific variables: encyclopedia (book or CD-ROM); PlayStation, GameCube, Xbox, or other TV/video game system; VHS or DVD player; and three or more cars, small trucks, or sport utility vehicles. For additional details about country-specific adaptations, see the forthcoming [TIMSS 2011 User Guide](#); the [TIMSS 2007 User Guide, Supplement 2](#); the [TIMSS 2003 User Guide, Supplement 2](#); the [TIMSS 1999 User Guide, Supplement 2](#); and the [TIMSS 1995 User Guide, Supplement 3](#).

In 1995 and 1999, an **Index of Home Educational Resources [BSDGHERI]** was created. This index is based on 8th-grade students' responses to the following variables: number of books in the home; educational aids in the home (computer, study desk/table for own use, dictionary); and parents' education (mother's and father's). The index is reported on three levels: *high*, *medium*, and *low*. *High* indicates the student has more than 100 books in the home, has all three educational aids, and either parent's highest level of education is finished university. *Low* indicates the student has 25 or fewer books in the home, does not have all three educational aids,

and both parents' highest level of education is some secondary or less or the student did not know. *Medium* indicates all other combinations. For additional details about the index, please see the [TIMSS 1999 User Guide, Supplement 3](#).

In 1999 and 1995, another index was computed based on **the possession of a computer, desk, and dictionary [BSDGPSA]** at home. Students' responses to these three home resources questions were coded into two categories: yes, if all three responses are yes; and no, if any of the three responses are no.

Parents' Place of Birth [ASDGBORN, BSDGBORN]

This variable, used in 2007, is based on where 4th- and 8th-grade students' parents or guardians were born. Students were asked, "Was your mother (or stepmother or female guardian) born in <country>?" and "Was your father (or stepfather or male guardian) born in [country]?" The variable is given one of three values: *Both parents born in country* = 1; *Only one parent born in country* = 2; *Neither parent born in country* = 3.

ISCED

The International Standard Classification of Education (ISCED) is an internationally comparable method for describing levels of education across countries, created by the United Nations Educational, Scientific, and Cultural Organization (UNESCO). ISCED levels are defined as follows:

- **Level 0**—The initial stage of organized instruction, designed primarily to introduce very young children to a school-type environment. ISCED level 0 programs can either be center or school based. Preschool and kindergarten programs in the United States fall into the level 0 category.
- **Level 1**—Consists of primary education, which usually lasts 4 to 6 years. ISCED level 1 typically begins between ages 5 and 7, and is the stage where students begin to study basic subjects, such as reading, writing, and mathematics. In the United States, elementary school (grades 1 through 6) is classified as level 1.
- **Level 2**—Also known as lower secondary education, students continue to learn the basic subjects taught in level 1, but this level is typically more subject-specific than level 1 and may be taught by specialized teachers. ISCED level 2 usually lasts between 2 and 6 years, and begins around the age of 11. Middle school and junior high (grades 7 through 9) in the United States are classified as level 2. These programs are primarily designed to prepare students for ISCED level 3.
- **Level 3**—Also known as upper secondary education, student coursework is generally subject-specific and often taught by specialized teachers. Students often enter upper secondary education at the age of 15 or 16 and attend anywhere from 2 to 5 years. ISCED level 3 can prepare students for postsecondary education or the labor force. Senior high school (grades 10 through 12) is considered level 3 in the United States. These programs are primarily designed to prepare students for ISCED levels 5A and 5B.

- **Level 4**—Consists primarily of vocational education, and courses are taken after the completion of secondary school, though the content is not more advanced than the content of secondary school courses. ISCED level 4 programs in the United States are often in the form of 1-year certificate programs. These programs can prepare students for ISCED levels 5A and 5B.
- **Level 5**—Divided into levels 5A and 5B, this level refers to tertiary (postsecondary) education and usually lasts 3 to 6 years. ISCED level 5A refers to academic higher education below the doctoral level. Level 5A programs are intended to provide sufficient qualifications to gain entry into advanced research programs and professions with high skill requirements. In the United States, bachelor's, master's, and first-professional degree programs are classified as ISCED level 5A. ISCED level 5B refers to vocational postsecondary education. Level 5B programs provide a higher level of career and technical education and are designed to prepare students for the labor market. In the United States, associate's degree programs are classified at this level.
- **Level 6**—Refers to the doctoral level of academic higher education. Level 6 programs usually require the completion of a research thesis or dissertation.

Student Educational Aspirations Relative to Parents [BSDGASP]

This index variable, used in 2003 for grade 8, is based on three questions: (1) What is the highest level of education completed by your mother (or stepmother or female guardian)? (2) What is the highest level of education completed by your father (or stepfather or male guardian)? and (3) How far in school do you expect to go? Responses are reported in four categories: (1) Student expects to finish university, and either parent went to university or the equivalent, (2) Student expects to finish university, and neither parent went to university or the equivalent, (3) Student doesn't expect to finish university, regardless of parents' education, and (4) Student does not know, regardless of parents' education. The derived variable is coded as missing if the highest education level of either parent is missing.

6.B. Student Activities Outside of School

Out of School Study Time [BSDGOSTI]

This index, used in 1995 and 1999, is based on 8th-grade students' responses to three questions on (1) time spent after school studying mathematics or doing mathematics homework; (2) time spent after school studying science or doing science homework; and (3) time spent after school studying or doing homework in school subjects other than mathematics and science. The responses are summed and assigned to three levels: *High* = Student reports spending more than 3 hours studying all subjects combined; *Low* = Student reports spending 1 hour or less studying all subjects combined; and *Medium* = Student reports spending more than 1 hour to 3 hours studying all subjects combined. BSDGOSTI is coded as missing if any source variables are missing.

Time Spent on Math/Science Homework (Index) [BS5DM269, BS5DS270]

This variable, used in 2011, was derived from 8th-grade students' reports of weekly time spent on math homework. Answers were categorized into the following: (1) 3 hours or more; (2) more than 45 minutes but less than 3 hours; and (3) 45 minutes or less. For science, the subject-specific variables follow the same pattern [BS5DB271, BS5DC272, BS5DE274, and BS5DP273].

Index of Time Spent on Mathematics/Science Homework (TMH/TSH) [ASDMTMH, ASDSTSH, ASDMHW, ASDSHW, BSDMTMH, BSDSTSH, BSDMHW, BSDSHW]

This index, used in 2003 and modified slightly in 2007, is based on two questions given to 4th- and 8th-grade students about the frequency with which they are assigned homework and the amount of time they spend doing it. The first question remains the same across years: How often does your teacher give you homework in mathematics/science? The second question in 2003 was: When your teacher gives you mathematics homework, how many minutes are you usually given? In 2007 the second question was: When your teacher gives you mathematics homework, about how many minutes do you usually spend on your homework?

For both 2003 and 2007, responses to the frequency of homework assigned are coded on a 5-point scale for each item as follows: *Every day* = 1; *3 or 4 times a week* = 2; *1 or 2 times a week* = 3; *Less than once a week* = 4; and *Never* = 5. Responses to the 2003 variable, "how many minutes are you usually given," are coded as follows: *Fewer than 15 minutes* = 1; *15–30 minutes* = 2; *31–60 minutes* = 3; *61–90 minutes* = 4; and *More than 90 minutes* = 5. Responses to the amount of time spent on homework for the variable in 2007 are coded as follows: *0 minutes* = 1; *1–15 minutes* = 2; *16–30 minutes* = 3; *31–60 minutes* = 4; *61–90 minutes* = 5; and *More than 90 minutes* = 6.

For both 2003 and 2007, responses are categorized for the index variable such that *High* = students report that they receive homework at least 3 or 4 times a week and spend more than 30 minutes on each assignment; *Low* = students report that they receive homework no more than twice a week and spend 30 minutes or less on each assignment; and *Medium* = all other combinations of answers.

The eighth-grade science indexes follow a similar pattern for each science subject.

6.C. Student Perception/Valuing of Mathematics/Science

Students Like Learning Mathematics (Index/Scale) [AS5BG071, AS5DG072, BS5BG217, BS5DG218]

Both the index and scale, used in 2011, are based on 4th- and 8th-grade students' reports of the extent of their agreement with the following statements about learning math: (1) I enjoy learning mathematics; (2) I wish I did not have to study mathematics; (3) Mathematics is boring; (4) I learn many interesting things in mathematics; and (5) I like mathematics.

Students were scored according to their degree of agreement with the five statements on the scale. Students who *Like Learning Mathematics* had a score on the scale of at least 10.1 (for 4th-graders) or 11.3 (for 8th-graders), which corresponds to their “agreeing a lot” with three of the five statements and “agreeing a little” with the other two, on average. Students who *Do Not Like Learning Mathematics* had a score no higher than 8.1 (for 4th-graders) or 9.0 (for 8th-graders), which corresponds to their “disagreeing a little” with three of the five statements and “agreeing a little” with the other two, on average. All other students *Somewhat Like Learning Mathematics*.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Students Like Learning Science (Index/Scale) [AS5BG073, AS5DG074, BS5BG219, BS5DG220]

Both the index and scale, used in 2011, are based on 4th- and 8th-grade students’ reports of the extent of their agreement with the following statements about learning science: (1) I enjoy learning science; (2) I wish I did not have to study science; (3) Science is boring; (4) I learn many interesting things in science; and (5) I like science.

Students were scored according to their degree of agreement with the five statements on the scale. Students who *Like Learning Science* had a score on the scale of at least 9.7 (for 4th-graders) or 10.8 (for 8th-graders), which corresponds to their “agreeing a lot” with three of the five statements and “agreeing a little” with the other two, on average. Students who *Do Not Like Learning Science* had a score no higher than 7.6 (for 4th-graders) or 8.4 (for 8th-graders), which corresponds to their “disagreeing a little” with three of the five statements and “agreeing a little” with the other two, on average. All other students *Somewhat Like Learning Science*.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Students Like Learning Biology/Chemistry/Earth Science/Physics (Index/Scale) [BS5BG221, BS5DG222, BS5BG223, BS5DG224, BS5BG225, BS5DG226, BS5BG227, BS5DG228]

The science subject-specific indexes and scales used in 2011 follow the same guidelines and procedures as the general science index and scale, above. Note that not all countries report science subject-specific results. Where students are enrolled in science as a single subject, the general science index/scale is reported; where students are taught science as separate subjects, the subject-specific indexes/scales are reported.

Index of Students’ Positive Attitude Towards Mathematics/Science (PATM/PATS) [ASDMPATM, ASDSPATS, BSDMPATM, BSDSPATS]

This index, used in 2007 for 4th grade and 1995, 1999, and 2007 for 8th grade, is based on three statements directed at students’ feelings towards mathematics/science: (1) I enjoy learning mathematics/science; (2) Mathematics/science is boring; and (3) I like mathematics/science. The 1999 index also includes these statements: Mathematics/science is important to everyone’s life;

and I would like a job that involved using mathematics/science. Student responses were coded on a 4-point scale for each item, as follows: *Agree a lot* = 1; *Agree a little* = 2; *Disagree a little* = 3; and *Disagree a lot* = 4. After reverse-coding relevant items, the index was categorized by averaging the responses to the three source questions such that *High* = average ≤ 2 ; *Medium* = average $> 2 < 3$; and *Low* = average ≥ 3 .

The items used for the fourth-grade mathematics index are AS4MAENJ, AS4MABOR, and AS4MALIK. Please note that the same coding process was used for the items in the fourth-grade science index [AS4SAENJ, AS4SABOR, AS4SALIK] and the eighth-grade mathematics index [BS4MAENJ, BS4MABOR, BS4MALIK]. The eighth-grade science indexes follow a similar pattern for each science subject.

Mat Overall Attitude Toward Mathematics [ASDGMATT]

This index, used in 1995, is based on 4th-grade students' responses to three questions and statements directed at students' feelings toward mathematics: (1) How much do you like mathematics? (2) I enjoy learning mathematics; and (3) Mathematics is boring. Student responses were averaged on a 4-point scale as follows: *Strongly negative* ($1 < 1.5$) = 1; *Negative* ($1.5 < 2.5$) = 2; *Positive* ($2.5 < 3.5$) = 3; and *Strongly positive* ($3.5-4$) = 4. Students were coded as missing on the index variable only if all three of the source variables were missing.

Students' Confidence with Mathematics (Index/Scale) [AS5BG075, AS5DG076, BS5BG241, BS5DG242]

Both the index and scale, used in 2011, are based on 4th- and 8th-grade students' reports of the extent of their agreement with the following statements about math: (1) I usually do well in mathematics; (2) Mathematics is harder for me than for many of my classmates; (3) I am just not good at mathematics; (4) I learn things quickly in mathematics; (5) I am good at working out difficult mathematical problems; (6) My teacher tells me I am good at mathematics; and (7) Mathematics is harder for me than any other subject.

Students were scored according to their degree of agreement with the seven statements on the scale. Students *Confident* with mathematics had a score on the scale of at least 10.6 (for 4th-graders) or 12.0 (for 8th-graders), which corresponds to their "agreeing a lot" with four of the seven statements and "agreeing a little" with the other three, on average. Students who were *Not Confident* had a score no higher than 8.5 (for 4th-graders) or 9.4 (for 8th-graders), which corresponds to their "disagreeing a little" with four of the seven statements and "agreeing a little" with the other three, on average. All other students were *Somewhat Confident* with mathematics.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Students' Confidence with Science (Index/Scale) [AS5BG077, AS5DG078, BS5BG243, BS5DG244]

Both the index and scale, used in 2011, are based on 4th- and 8th-grade students' reports of the extent of their agreement with the following statements about science: (1) I usually do well in science; (2) Science is harder for me than for many of my classmates; (3) I am just not good at science; (4) I learn things quickly in science; (5) I am good at working out difficult science problems; (6) My teacher tells me I am good at science; and (7) Science is harder for me than any other subject.

Students were scored according to their degree of agreement with the seven statements on the scale. Students *Confident* with science had a score on the scale of at least 10.1 (for 4th-graders) or 11.5 (for 8th-graders), which corresponds to their "agreeing a lot" with four of the seven statements and "agreeing a little" with the other three, on average. Students who were *Not Confident* had a score no higher than 8.3 (for 4th-graders) or 9.0 (for 8th-graders), which corresponds to their "disagreeing a little" with four of the seven statements and "agreeing a little" with the other three, on average. All other students were *Somewhat Confident* with science.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Students' Confidence with Biology/Chemistry/Earth Science/Physics (Index/Scale) [BS5BG245, BS5DG246, BS5BG247, BS5DG248, BS5BG249, BS5DG250, BS5BG251, BS5DG252]

The science subject-specific indexes and scales used in 2011 follow the same guidelines and procedures as the general science index and scale, above. Note that not all countries report science subject-specific results. Where students are enrolled in science as a single subject, the general science index/scale is reported; where students are taught science as separate subjects, the subject-specific indexes/scales are reported.

Index of Self-Confidence in Learning Mathematics/Science (SCM/SCS) [ASDMSCM, ASDSSCS, BSDMSCM, BSDSSCS]

This index, used in 2003 and 2007 for 4th- and 8th-graders, is composed of four statements regarding students' self-confidence in learning mathematics/science: (1) I usually do well in mathematics/science; (2) Mathematics/science is harder for me than for many of my classmates; (3) I am just not good at mathematics/science; and (4) I learn things quickly in mathematics/science. Student responses were coded on a 4-point scale as follows: *Agree a lot* = 1; *Agree a little* = 2; *Disagree a little* = 3; and *Disagree a lot* = 4. After reverse-coding relevant items, the responses were averaged such that *High* = average ≤ 2 ; *Medium* = average $> 2 < 3$; and *Low* = average ≥ 3 .

The items used for the fourth-grade mathematics index are AS4MAWEL, AS4MACLM, AS4MANOT, and AS4MAQKY. Please note that the same coding process was used for the

items in the fourth-grade science index [AS4SAWEL, AS4SACLM, AS4SANOT, AS4SAQKY] and the eighth-grade mathematics index [BS4MAWEL, BS4MACLM, BS4MANOT, BS4MAQKY]. The eighth-grade science indexes follow a similar pattern for each subject: biology [BSDBSCS], chemistry [BSDCSCS], Earth science [BSDESCS] and physics [BSDPSCS].

Index of Confidence in Mathematics/Science Ability [BSDMCMAI, BSDSCSAI]

This index, used in 1999, is based on 8th-grade students' responses to statements regarding their self-confidence in their mathematics/science ability: (1) I would like mathematics/science if it were not so difficult; (2) Although I do my best, mathematics/science is more difficult for me than for many of my classmates; (3) Nobody can be good in every subject, and I am just not talented in mathematics/science; (4) Sometimes, when I do not understand a new topic in mathematics/science, I know that I will never really understand it; and (5) Mathematics/science is not one of my strengths. Student responses were coded on a 4-point scale for each item as follows: *Strongly agree* = 1; *Agree* = 2; *Disagree* = 3; and *Strongly disagree* = 4. Responses are categorized for the index variable such that *High* = student responds *Strongly disagree* or *Disagree* to all questions; *Low* = student responds *Strongly agree* or *Agree* to all questions; and *Medium* = all other combinations. The index is coded as missing if any source variable is missing.

Index of Self-Concept in Biology/Chemistry/Earth Science/Physics Ability [BSDBCSAI, BSDCCSAI, BSDECSAI, BSDPCSAI]

The eighth-grade science indexes follow a similar pattern as the 1999 Index of Confidence in Science Ability for each science subject.

Students Value Learning Mathematics (Index/Scale) [BS5BG229, BS5DG230]

Both the index and scale, used in 2011, are based on 8th-grade students' reports of the extent of their agreement with the following statements about math: (1) I think learning mathematics will help me in my daily life; (2) I need mathematics to learn other school subjects; (3) I need to do well in mathematics to get into the university of my choice; (4) I need to do well in mathematics to get the job I want; (5) I would like a job that involves using mathematics; and (6) It is important to do well in mathematics.

Students were scored according to their degree of agreement with the six statements on the scale. Students who *Value* mathematics had a score on the scale of at least 10.3, which corresponds to their "agreeing a lot" with three of the six statements and "agreeing a little" with the other three, on average. Students who *Do Not Value* mathematics had a score no higher than 7.9, which corresponds to their "disagreeing a little" with three of the six statements and "agreeing a little" with the other three, on average. All other students *Somewhat Value* mathematics.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [*Methods and Procedures in TIMSS and PIRLS 2011*](#).

Students Value Learning Science (Index/Scale) [BS5BG231, BS5DG232]

Both the index and scale, used in 2011, are based on 8th-grade students' reports of the extent of their agreement with the following statements about science: (1) I think learning science will help me in my daily life; (2) I need science to learn other school subjects; (3) I need to do well in science to get into the university of my choice; (4) I need to do well in science to get the job I want; (5) I would like a job that involves using science; and (6) It is important to do well in science.

Students were scored according to their degree of agreement with the six statements on the scale. Students who *Value* science had a score on the scale of at least 10.5, which corresponds to their "agreeing a lot" with three of the six statements and "agreeing a little" with the other three, on average. Students who *Do Not Value* science had a score no higher than 8.6, which corresponds to their "disagreeing a little" with three of the six statements and "agreeing a little" with the other three, on average. All other students *Somewhat Value* science.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Students Value Learning Biology/Chemistry/Earth Science/Physics (Index/Scale) [BS5BG233, BS5DG234, BS5BG235, BS5DG236, BS5BG237, BS5DG238, BS5BG239, BS5DG240]

The science subject-specific indexes and scales used in 2011 follow the same guidelines and procedures as the general science index and scale, above. Note that not all countries report science subject-specific results. Where students are enrolled in science as a single subject, the general science index/scale is reported; where students are taught science as separate subjects, the subject-specific indexes/scales are reported.

Index of Students' Valuing Mathematics/Science (SVM/SVS) [BSDMSVM, BSDMSV, BSDSSVS, BSDSSV]

This index, used in 2003 (BSDSSV and BSDMSV) and 2007 (BSDSSVS and BSDMSVM), is based on 8th-grade students' responses to statements regarding the value of mathematics/science in their lives: (1) I think learning mathematics/science will help me in my daily life; (2) I need mathematics/science to learn other school subjects; (3) I need to do well in mathematics/science to get into the university of my choice; and (4) I need to do well in mathematics/science to get the job I want. The 2003 index also includes these statements: (1) I would like to take more mathematics/science in school; (2) I enjoy learning mathematics/science; and (3) I would like a job that involved mathematics/science. Student responses were coded on a 4-point scale for each item as follows: *Agree a lot* = 1; *Agree a little* = 2; *Disagree a little* = 3; and *Disagree a lot* = 4. Responses are categorized for the index variable such that *High* = average ≤ 2 ; *Medium* = average $> 2 < 3$; and *Low* = average ≥ 3 .

There are no comparable fourth-grade indexes. The eighth-grade science indexes follow a similar pattern for each subject in each year: biology [BSDBSVS, BSDBSV], chemistry [BSDCSVS, BSDCSV], Earth science [BSESVS, BSESV] and physics [BSDPSVS, BSDPSV].

Students Engaged in Mathematics Lessons (Index/Scale) [AS5BG079, AS5DG080, BS5BG253, BS5DG254]

Both the index and scale, used in 2011, are based on 4th- and 8th-grade students' reports of the extent of their agreement with the following statements about mathematics lessons: (1) I know what my teacher expects me to do; (2) I think of things not related to the lesson; (3) My teacher is easy to understand; (4) I am interested in what my teacher says; and (5) My teacher gives me interesting things to do.

Students were scored according to their degree of agreement with the five statements on the scale. Students *Engaged* in mathematics lessons had a score on the scale of at least 10.2 (for 4th-graders) or 11.4 (for 8th-graders), which corresponds to their “agreeing a lot” with three of the five statements and “agreeing a little” with the other two, on average. Students who were *Not Engaged* had a score no higher than 7.4 (for 4th-graders) or 8.3 (for 8th-graders), which corresponds to their “disagreeing a little” with three of the five statements and “agreeing a little” with the other two, on average. All other students were *Somewhat Engaged* in mathematics lessons.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Students Engaged in Science Lessons (Index/Scale) [AS5BG081, AS5DG082, BS5BG255, BS5DG256]

Both the index and scale, used in 2011, are based on 4th- and 8th-grade students' reports of the extent of their agreement with the following statements about science lessons: (1) I know what my teacher expects me to do; (2) I think of things not related to the lesson; (3) My teacher is easy to understand; (4) I am interested in what my teacher says; and (5) My teacher gives me interesting things to do.

Students were scored according to their degree of agreement with the five statements on the scale. Students *Engaged* in science lessons had a score on the scale of at least 10.1 (for 4th-graders) or 11.2 (for 8th-graders), which corresponds to their “agreeing a lot” with three of the five statements and “agreeing a little” with the other two, on average. Students who were *Not Engaged* had a score no higher than 7.4 (for 4th-graders) or 8.4 (for 8th-graders), which corresponds to their “disagreeing a little” with three of the five statements and “agreeing a little” with the other two, on average. All other students were *Somewhat Engaged* in science lessons.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Students Engaged in Biology/Chemistry/Earth Science/Physics Lessons (Index/Scale) [BS5BG257, BS5DG258, BS5BG259, BS5DG260, BS5BG261, BS5DG262, BS5BG263, BS5DG264]

The science subject-specific indexes and scales used in 2011 follow the same guidelines and procedures as the general science index and scale, above. Note that not all countries report science subject-specific results. Where students are enrolled in science as a single subject, the general science index/scale is reported; where students are taught science as separate subjects, the subject-specific indexes/scales are reported.

6.D. Teacher Background Characteristics, Formal Education, and Training

Mat/Sci Qualifications to Teach Math/Science [BTDMQUA, BTDSPQUA, BTDSBQUA, BTDSCQUA, BTDSEQUA, BTDSSQUA]

This index, used in 1999, is based on 8th-grade teachers' responses concerning whether (1) they have a teacher training certificate and (2) they majored in mathematics or mathematics education (for BTDMQUA) or Physical Science, Chemistry, Biology, Earth Science, or General Science (for BTDSPQUA, BTDSBQUA, BTDSCQUA, BTDSEQUA, BTDSSQUA) when they obtained their B.A. or M.A. Responses were coded as 1 = *Yes* for both questions and 2 = *No* for either. The index is coded as missing if all responses are missing.

6.E. Teacher Perception of Mathematics/Science Teaching/Learning

Confidence in Teaching Mathematics—Teacher (Index/Scale) [AT5BM242, AT5DM243, BT5MB169, BT5MD170]

Both the index and scale, used in 2011, are based on 4th- and 8th-grade teachers' reports of how confident they feel in teaching math to the class to (1) answer students' questions about mathematics; (2) show students a variety of problem solving strategies; (3) provide challenging tasks for capable students; (4) adapt my teaching to engage students' interest; and (5) help students appreciate the value of learning mathematics.

Students were scored according to their teachers' responses on the scale. Students with *Very Confident* teachers had a score on the scale of at least 9.2 (for 4th- and 8th-graders), which corresponds to their teachers being "very confident" in using three of the five instructional strategies and "somewhat confident" in using the other two, on average. All other students had *Somewhat Confident* teachers.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Confidence in Teaching Science - Teacher (Index/Scale) [AT5BS244, AT5DS245, BT5SB168, BT5SD169]

Both the index and scale, used in 2011, are based on 4th- and 8th-grade teachers' reports of how confident they feel in teaching science to the class to (1) answer students' questions about science; (2) explain science concepts or principles by doing science experiments; (3) provide challenging tasks for capable students; (4) adapt my teaching to engage students' interest; and (5) help students appreciate the value of learning science.

Students were scored according to their teachers' responses on the scale. Students with *Very Confident* teachers had a score on the scale of at least 9.9 (for 4th-graders) or 9.3 (for 8th-graders), which corresponds to their teachers being "very confident" in using three of the five instructional strategies and "somewhat confident" in using the other two, on average. All other students had *Somewhat Confident* teachers.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Teacher Career Satisfaction (Index/Scale) [AT5BG246, AT5DG247, BT5MB171, BT5MD172, BT5SB170, BT5SD171]

Both the index and scale, used in 2011, are based on 4th- and 8th-grade teachers' reports of the extent of their agreement with the following statements about their satisfaction with their career: (1) I am content with my profession as a teacher; (2) I am satisfied with being a teacher at this school; (3) I had more enthusiasm when I began teaching than I have now; (4) I do important work as a teacher; (5) I plan to continue as a teacher for as long as I can; and (6) I am frustrated as a teacher.

Students were scored according to their teachers' degree of agreement with the six statements on the scale. Students with *Satisfied* teachers had a score on the scale of at least 10.1 (for 4th-graders) or 10.4 (for 8th-graders), which corresponds to their teachers "agreeing a lot" with three of the six statements and "agreeing a little" with the other three, on average. Students with *Less Than Satisfied* teachers had a score no higher than 6.6 (for 4th-graders) or 7.0 (for 8th-graders), which corresponds to their teachers "disagreeing a little" with three of the six statements and "agreeing a little" with the other three, on average. All other students had *Somewhat Satisfied* teachers.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

6.F. Teacher Preparation and Collaboration

Index of Confidence to Teach Math/Science [BTDMCPTM, BTDSCTPS]

This index, used in 1995 and 1999 for 8th-grade teachers, is based on teachers' responses to questions about their confidence in their preparation to teach different mathematics/science

topics. The average is computed across the items, including those items where the teacher did not respond. The average is computed based on recoded responses of 1 = *Not well prepared*, 2 = *Somewhat prepared*, and 3 = *Very well prepared*. The index is assigned three levels: *High* = average > 2.75; *Medium* = average > 2.25 ≤ 2.75; and *Low* = average ≤ 2.25. The index is coded as missing if all of the source variables are missing.

Collaborate to Improve Teaching (Index/Scale) [AT5BG248, AT5DG249, BT5MB173, BT5MD174, BT5SB172, BT5SD173]

Both the index and scale, used in 2011, were created using 4th- and 8th-grade teachers' responses concerning how often they interacted with other teachers in each of the following five teaching areas: (1) discuss how to teach a particular topic; (2) collaborate in planning and preparing instructional materials; (3) share what I have learned about my teaching experiences; (4) visit another classroom to learn more about teaching; and (5) work together to try out new ideas.

Students were scored according to their teachers' responses on the scale. Students with *Very Collaborative* teachers had a score on the scale of at least 11.0 (for 4th-graders) or 11.4 (for 8th-graders), which corresponds to their teachers having interactions with other teachers at least "one to three times per week" in each of three of the five areas and "two or three times per month" in each of the other two, on average. Students with *Somewhat Collaborative* teachers had a score no higher than 7.3 (for 4th-graders) or 7.5 (for 8th-graders), which corresponds to their teachers interacting with other teachers "never or almost never" in each of three of the five areas and "two or three times per month" in the other two, on average. All other students had *Collaborative* teachers.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Frequency of Collaboration Among Math/Science Teachers [ATDGCOLL, BTDMCOLL, BTDS COLL]

This index, used in 2007, is based on 4th- and 8th-grade teachers' responses to how often they have the following types of interactions with other teachers: (1) discussions about how to teach a particular concept; (2) working on preparing instructional materials; (3) visits to another teacher's classroom to observe his/her teaching; and (4) informal observations of their classroom by another teacher. Teacher responses were coded on a 4-point scale for each item as follows: *Never or almost never* = 1; *2 or 3 times per month* = 2; *1–3 times per week* = 3; and *Daily or almost daily* = 4. Responses are averaged for the index variable such that *Never or almost never* = average ≤ 1.4; *2 or 3 times per month* = average > 1.4 ≤ 2.4; and *at least weekly* = average > 2.4.

The items used for the fourth-grade mathematics and science indexes are AT4GOTDC, AT4GOTPM, AT4GOTVT, and AT4GOTAT. Please note that the same coding processes were used for the items in the eighth-grade mathematics and science indexes [BT4GOTDC, BT4GOTPM, BT4GOTVT, BT4GOTAT]. The items for the eighth-grade indexes share the

same variable names, but separate questionnaires were given to mathematics and science teachers.

6.G. Classroom Characteristics

Mathematics/Science Achievement Too Low for Estimation (Index) [AS5DM084, BS5DM267, AS5DS085, BS5DS268]

Students were considered to have achievement too low for estimation in 2011 if their performance on the assessment was no better than could be achieved by simply guessing on the multiple choice assessment items. However, such students were assigned scale scores (plausible values) by the achievement scaling procedure, despite concerns about their reliability.

Index of Teachers' Reports on Mathematics/Science Classes Without Limiting Factors (MCFL/SCFL) [ATDMCFL, ATDSCFL, BTDMCFL, BTDMMLT, BTDSCFL, BTDSLTL]

This index, used in 2007 in 4th grade and 2003 and 2007 in 8th grade, is based on teachers' responses about the instructional impact of five characteristics of their students: (1) differing academic abilities; (2) a wide range in backgrounds; (3) students with special needs; (4) uninterested students; and (5) disruptive students. In 2003, low morale among students was also included. Responses were coded on a 5-point scale for each item, where *Not applicable* = 1; *Not at all* = 2; *A little* = 3; *Some* = 4; and *A lot* = 5. Responses were averaged for the index variable such that *High* = average ≤ 2 ; *Medium* = average $> 2 < 3$; and *Low* = average ≥ 3 .

The items used for the fourth-grade mathematics index are AT4MVMSA, AT4MVMSW, AT4MVMSS, AT4MVMUS, and AT4MVMDS. Please note that the same coding process was used for the items in the fourth-grade science index [AT4SVSSA, AT4SVSSW, AT4SVSSS, AT4SVSUS, AT4SVSDS], the eighth-grade mathematics index [BT4MLI01–BT4MLI05], and the eighth-grade science index [BT4SLI01–BT4SLI05].

6.H. Classroom Instruction

Fourth Grade

References to fourth grade and 4th-graders are made throughout the IDE and the Help Guide. One target population for TIMSS 2011, 2007, 2003, and 1995 was students enrolled in the fourth year of formal schooling, counting from the first year of primary school as defined by UNESCO's International Standard Classification of Education (ISCED) system. Accordingly, the fourth year of formal schooling should be the fourth grade in most countries and subnational education systems. However, to avoid testing very young children, TIMSS has a policy that the average age of children in the grade tested should not be below 9.5 years old, so some countries and subnational education systems participate with students in the fifth grade. Fourth-grade students were not assessed in TIMSS 1999.

Eighth Grade

References to eighth grade and 8th-graders are made throughout the IDE and the Help Guide. One target population for TIMSS 2011, 2007, 2003, 1999, and 1995 was students enrolled in the eighth year of formal schooling, counting from the first year of primary school as defined by UNESCO's International Standard Classification of Education (ISCED) system, providing that the mean age at the time of testing is at least 13.5 years. Accordingly, the eighth year of formal schooling should be the eighth grade in most countries and subnational education systems.

Summ Students Taught [Topics]

Variables that describe the summary of students taught different mathematics and science topics can be found in the continuous variables section (Step 1) of the IDE. All of these derived variables are computed from teachers' responses to the following question: The following list includes the main topics addressed by the TIMSS mathematics/science test. Choose the response that best describes when students in the TIMSS class have been taught each topic. If a topic was taught half this year and half before this year, please choose "Mostly taught this year." The international version of the questionnaire has the following options for each topic: (1) mostly taught before this year; (2) mostly taught this year; (3) not yet taught or just introduced. The derived variables compute the percentage of students whose teachers checked option 1 or 2 for each individual topic. Then the average of all these percentages is included in the variable.

Mat Index: Emphasis on Problem Solving [BTDMERPS]

This index, used in 1995 and 1999, is based on 8th-grade teachers' responses to the following questions: In your mathematics lessons, how often do you usually ask students to do the following: (a) explain reasoning behind an idea; (b) represent and analyze relationships using tables, charts, graphs; (c) work on problems for which there is no immediately obvious method of solution; and (d) write equations to represent relationships? The average is computed across the four items based on *Never or almost never* = 1; *Some lessons* = 2; *Most lessons* = 3; and *Every lesson* = 4. Responses are categorized for the index variable such that *High* = average > 3; *Medium* = average > 2.25 ≤ 3; and *Low* = average < 2.25. The index is coded as missing if more than one source variable is missing.

Sci Index: Emphasis on Problem Solving [BTDSERPS]

This index, used in 1995 and 1999, is based on 8th-grade teachers' responses to the following questions: In your science lessons, how often do you usually ask students to do the following: (a) explain reasoning behind an idea; (b) represent and analyze relationships using tables, charts, graphs; (c) work on problems for which there is no immediately obvious method of solution; (d) write explanations about what was observed and why it happened; and (e) put events or objects in order and give a reason for the organization? The average is computed across the five items based on *Never or almost never* = 1; *Some lessons* = 2; *Most lessons* = 3; and *Every lesson* = 4. Responses are categorized for the index variable such that *High* = average > 3; *Medium* = average > 2.25 ≤ 3; and *Low* = average < 2.25. The index is coded as missing if more than one source variable is missing.

Instruction to Engage Students in Learning (Index/Scale) [AT5BG250, AT5DG251, BT5MB175, BT5MD176, BT5SB174, BT5SD175]

Both the index and scale, used in 2011, were created using 4th- and 8th-grade teachers' responses concerning how often they used each of the following six instructional practices to engage students in learning: (1) summarize what students should have learned from the lesson; (2) relate the lesson to students' daily lives; (3) use questioning to elicit reasons and explanations; (4) encourage all students to improve their performance; (5) praise students for good effort; and (6) bring interesting materials to class.

Students were scored according to their teachers' responses on the scale. Students with teachers who used engagement practices in *Most Lessons* had a score on the scale of at least 9.1 (for 4th-graders) or 8.7 (for 8th-graders), which corresponds to their teachers using three of the six practices "every or almost every lesson" and using the other three in "about half the lessons," on average. Students with teachers who used engagement practices in *Some Lessons* had a score no higher than 6.0 (for 4th-graders) or 5.7 (for 8th-graders), which corresponds to their teachers using three of the six practices in "some lessons" and using the other three in "about half the lessons," on average. All other students had teachers who used engagement practices in *About Half the Lessons*.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

6.I. Role of Homework

Index of Teachers' Emphasis on Mathematics/Science Homework (EMH/ESH) [ATDMEMH, ATDSESH, BTDMEMH, BTDSESH]

This index, used in 1995, 1999, 2003, and 2007 at grade 8, and in 2003 and 2007 at grade 4, is based on 4th- and 8th-grade teachers' responses to three questions about assigning homework: (1) whether they assign homework; (2) how often they assign it; and (3) how many minutes are usually assigned. Teachers can respond either "yes" or "no" to whether or not they assign homework. A 3-point scale is used to code how often homework is assigned: *Every or almost every lesson* = 1; *About half the lessons* = 2; and *Some lessons* = 3. Response options for the typical length of time usually assigned include the following: *Fewer than 15 minutes* = 1; *15–30 minutes* = 2; *31–60 minutes* = 3; *61–90 minutes* = 4; and *More than 90 minutes* = 5. Responses are categorized for the index variable such that *High* = responded *Yes* to assigning homework, responded *Every or almost every lesson* or *About half the lessons* to frequency of assigning homework, and responded *31–60 minutes* or *61–90 minutes* or *More than 90 minutes* to length of assignment; *Low* = responded *No* to assigning homework, or responded *Yes* to assigning homework, responded *About half the lessons* or *Some lessons* to frequency of assigning homework, and responded *Fewer than 15 minutes* or *15–30 minutes* to length of assignment; and *Medium* = all other response combinations.

The eighth-grade science indexes follow a similar pattern for each subject in each year: biology [BSDBSVS, BSDBSV], chemistry [BSDCSVS, BSDCSV], Earth science [BSDESVS, BSDES], and physics [BSDPSVS, BSDPSV].

Amount of Mathematics/Science Homework [BTDMHWK, BTDSHWK]

This index, used in 1999, is based on 8th-grade teachers' reports of the amount of mathematics/science homework given to students. The percentage of students in the following categories is based on teachers' responses concerning the amount and frequency of homework they assign. The options are (1) never assign homework; (2) assign homework less than once a week for more than 30 minutes; (3) assign homework less than once a week for 30 minutes or less; (4) assign homework once or twice a week for more than 30 minutes; (5) assign homework once or twice a week for 30 minutes or less; (6) assign homework three times a week or more for more than 30 minutes; and (7) assign homework three times a week or more for 30 minutes or less. The index is coded as missing if any source variable is missing.

Homework Based on Projects and Investigations [BTDMHWK2, BTDSHWK2]

This 1999 index is based on 8th-grade teachers' responses to questions about homework based on (1) small investigation(s) or gathering data; (2) working individually on long-term projects or experiments; and (3) working as a small group on long-term projects or experiments. Average responses are based on the response code values *Never* = 1; *Rarely* = 2; *Sometimes* = 3; and *Always* = 4. The averages values are recoded into two categories: *Sometimes or always* = Average ≥ 2.5 ; *Never or rarely* = Average < 2.5 . The index is coded as missing if more than one source variable is missing.

6.J. School Characteristics

School Composition by Student Background (Index) [AC5DG123, BC5DG103]

This index, used in 2011, was created using 4th- and 8th-grade principals' responses concerning the percentage of students who (1) come from economically disadvantaged homes; and/or (2) come from economically affluent homes. Students in schools where their principals reported a *More Affluent* school composition attended schools where more than 25 percent of students come from economically affluent homes and not more than 25 percent come from economically disadvantaged homes. Students in schools where their principals reported a *More Disadvantaged* school composition attended schools where more than 25 percent of students come from economically disadvantaged homes and not more than 25 percent come from economically affluent homes. All other students attended schools with a *Neither More Affluent nor More Disadvantaged* school composition.

Students Having Early Numeracy Skills (Index) [AC5DG124]

This index, used in 2011, was created using 4th-grade principals' responses concerning how many students could do the following when they began primary/elementary school: (1) count up

to 100 or higher; (2) recognize all 10 written numbers from 1–10; and (3) write all 10 numbers from 1–10.

Principals' responses across the three items were averaged and their students were assigned to one of four categories: (1) *Schools where more than 75 percent enter with skills* indicates an average greater than 3.25; (2) *Schools where 51–75 percent enter with skills* indicates an average greater than 2.5 through 3.25; (3) *Schools where 25–50 percent enter with skills* indicates an average of 1.75 through 2.5; and (4) *Schools where less than 25 percent enter with skills* indicates an average less than 1.75.

6.K. School Resources

Instruction Affected by Math Resource Shortages (Index/Scale) [AC5BG117, AC5DG118, BC5BG097, BC5DG098]

Both the index and scale, used in 2011, were created using 4th- and 8th-grade principals' responses concerning 12 school and classroom resources: (1) instructional materials (e.g., textbooks); (2) supplies (e.g., papers, pencils); (3) school buildings and grounds; (4) heating/cooling and lighting systems; (5) instructional space (e.g., classrooms); (6) technologically competent staff; (7) computers for instruction; (8) teachers with a specialization in mathematics; (9) computer software for mathematics instruction; (10) library materials relevant to mathematics instruction; (11) audio-visual resources for mathematics instruction; and (12) calculators for mathematics instruction.

Students were scored according to their principals' responses on the scale. Students in schools where instruction was *Not Affected* by resource shortages had a score on the scale of at least 11.1 (for both 4th- and 8th-graders), which corresponds to their principals reporting that shortages affected instruction “not at all” for 6 of the 12 resources and “a little” for the other 6, on average. Students in schools where instruction was *Affected a Lot* had a score no higher than 6.8 (for 4th-graders) or 7.3 (for 8th-graders), which corresponds to their principals reporting that shortages affected instruction “a lot” for 6 of the 12 resources and “some” for the other 6, on average. All other students attended schools where instruction was *Somewhat Affected* by resource shortages.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Instruction Affected by Science Resource Shortages (Index/Scale) [AC5BG115, AC5DG116, BC5BG095, BC5DG096]

Both the index and scale, used in 2011, were created using 4th- and 8th-grade principals' responses concerning 12 school and classroom resources: (1) instructional materials (e.g., textbooks); (2) supplies (e.g., papers, pencils); (3) school buildings and grounds; (4) heating/cooling and lighting systems; (5) instructional space (e.g., classrooms); (6) technologically competent staff; (7) computers for instruction; (8) teachers with a specialization in science; (9) computer software for science instruction; (10) library materials

relevant to science instruction; (11) audio-visual resources for science instruction; and (12) science equipment and materials.

Students were scored according to their principals' responses on the scale. Students in schools where instruction was *Not Affected* by resource shortages had a score on the scale of at least 11.3 (for 4th-graders) or 11.2 (for 8th-graders), which corresponds to their principals reporting that shortages affected instruction "not at all" for 6 of the 12 resources and "a little" for the other 6, on average. Students in schools where instruction was *Affected a Lot* had a score no higher than 7.1 (for 4th-graders) or 7.3 (for 8th-graders), which corresponds to their principals reporting that shortages affected instruction "a lot" for 6 of the 12 resources and "some" for the other 6, on average. All other students attended schools where instruction was *Somewhat Affected* by resource shortages.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Index of Availability of School Resources for Mathematics/Science Instruction (ASRMI/ASRSI) [ACDSRMI, ACDSRSI, BCDSRMI, BCDSRSI, BCDMST, BCDSST]

This index, used in 2003 and 2007 for 4th- and 8th-grade, is based on principals' responses about the availability of general school resources: instructional materials (e.g., textbook); budget for supplies (e.g., paper, pencils); school buildings and grounds, heating/cooling and lighting systems; and instructional space (e.g., classrooms). They also responded to five questions about shortages affecting instructional materials: computers for mathematics/science instruction; computer software for mathematics/science instruction; calculators for mathematics/science instruction; library materials relevant to mathematics/science instruction; and audiovisual resources for mathematics/science instruction. Responses were coded on a 4-point scale for each item as follows: *None* = 1; *A little* = 2; *Some* = 3; and *A lot* = 4. Responses were categorized for the index variable such that *High* = the average of general materials < 2 and the average of mathematics/science-specific materials < 2; *Low* = the average of general materials ≥ 3 and the average of mathematics/science-specific materials ≥ 3; and *Medium* = all other response combinations. Trends are not available in the IDE because the public-use data does not link the 2007 and 2003 variables.

The items used for the fourth-grade mathematics index are AC4GST01–AC4GST05 for general materials and AC4MST07–AC4MST11 for mathematics-specific materials. Please note that the same general material questions are used for the fourth-grade science index, and the same averaging process is used with the comparable science-specific questions [AC4SST12–AC4SST17]. Furthermore, the same pattern is followed for the eighth-grade indexes, with BC4GST01–BC4GST05 common to both indexes and BC4MST07–BC4MST11 and BC4SST12–BC4SST17 used for mathematics- and science-specific items, respectively.

Index Availability of School Resources for Science Instruction (1999, 1995) [BCDSASR]

This index, used in 1999 and 1995, is based on principals' average response to five questions about shortages that affect general capacity to provide instruction (instructional materials; budget

for supplies; school buildings and grounds; heating/cooling and lighting systems; instructional space), and the average response to six questions about shortages that affect science instruction (laboratory equipment and materials; computers; computer software; calculators; library materials; audio-visual resources) (see reference exhibits R4.1–R4.2). *High* level indicates that both shortages, on average, affect instructional capacity none or a little. *Medium* level indicates that one shortage affects instructional capacity none or a little and the other shortage affects instructional capacity some or a lot. *Low* level indicates that both shortages affect instructional capacity some or a lot.

School Library Size (Index) [AC5DG125]

This index, used in 2011, was derived from two questions assessing the availability of a school library and/or how many books with different titles the school library has (excluding magazines and periodicals), as reported by 4th- and 8th-grade principals. The responses are categorized as (1) more than 5,000 book titles; (2) 501–5,000 book titles; (3) 500 book titles or fewer; and (4) no school library.

Teaching Working Conditions (Index/Scale) [AT5BG236, AT5DG237, BT5MB163, BT5MD164, BT5SB162, BT5SD163]

Both the index and scale, used in 2011, were created using 4th- and 8th-grade teachers' responses to the following statements about working conditions in their school: (1) The school building needs significant repair; (2) Classrooms are overcrowded; (3) Teachers have too many teaching hours; (4) Teachers do not have adequate workspace (e.g., for preparation, collaboration, or meeting with students); and (5) Teachers do not have adequate instructional materials and supplies.

Students were scored according to their teachers' responses on the scale. Students whose teachers had *Hardly Any Problems* with their working conditions had a score on the scale of at least 11.3 (for 4th-graders) or 11.7 (for 8th-graders), which corresponds to their teachers reporting “not a problem” for three of five areas and a “minor problem” for the other two, on average. Students whose teachers had *Moderate Problems* had a score no higher than 8.7 (for 4th-graders) or 8.9 (for 8th-graders), which corresponds to their teachers reporting a “moderate problem” for three of five conditions and a “minor problem” for the other two, on average. All other students had teachers who reported *Minor Problems* with their working conditions.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Index of Adequate Working Conditions for Mathematics/Science Teachers (M-TAWC/S-TAWC) [ATDMTAWC, ATDSTAWC, BTDMTAWC, BTDSTAWC]

This index, used in 2007, is based on 4th- and 8th-grade teachers' responses about the severity of three school conditions: the school building needs significant repair; classrooms are overcrowded; and teachers do not have adequate workspace outside their classroom. Responses are coded on a 3-point scale for each item as follows: *Not a problem* = 1; *Minor problem* = 2;

and *Serious problem* = 3. Responses are averaged such that *High* = average value = 1; *Medium* = average value $> 1 \leq 2$; and *Low* = average value > 2 .

The items used for the fourth-grade mathematics index are AT4GSPBR, AT4GSPCO, and AT4GSPWO. Please note that the same items are used for the fourth-grade science index, with one extra item: materials are not available to conduct experiments or investigations [AT4GSPME]. A similar pattern is followed for the eighth-grade indexes, with three items common to both indexes [BT4GSPBR, BT4GSPCO, and BT4GSPWO] and one more included in the science index [BT4GSPME].

Computers Available for Instruction for Students (Index) [AC5DG126, BC5DG104]

This index, used in 2011, was derived from two questions assessing the availability of computers for instruction, as reported by 4th- and 8th-grade principals. The questions ask the principal to report (1) the total enrollment of 4th-grade students as of the first day of the month TIMSS 2011 testing begins; and (2) the total number of computers that can be used for instructional purposes by 4th-grade students. The responses are categorized as (1) 1 computer for 1–2 students; (2) 1 computer for 3–5 students; (3) 1 computer for 6 or more students; and (4) no computers available.

Schools' Access to the Internet [BCDGINT]

This index, used in 1999 for 8th grade, is based on principals' responses to the following questions: (1) Does your school have access to the Internet for instruction/educational purposes? (2) Is your school planning to get internet access? (3) What percentage of the computers have access to e-mail? and (4) What percentage have access to the World Wide Web? Responses are coded into four categories: *Have access to the Internet and the percentage of computers having access to the World Wide Web is 1–100%* = 1; *have access to the Internet and the percentage of computers having access to e-mail only is 1–100%* = 2; *do not have access to the Internet, but planning to obtain access by 2001* = 3; and *do not have access to the Internet and no immediate plans to obtain access* = 4. The index is coded as missing if any source variable is missing.

Availability of Computers/Ratio [BCDGCMRC]

This index, used in 1999 for 8th grade, is based on the ratio of grade 8 students to total computers for use by students and teachers. The index is derived from principals' responses to the following questions: (1) How many boys are in <grade 8>? (2) How many girls are in <grade 8>? and (3) What is the total number of computers that can be used for instructional purposes by either students or teachers? The variable is coded into the following categories: *<15 students per computer* = 1; *15–30 students per computer* = 2; *31–50 students per computer* = 3; *> 50 students per computer* = 4; and *No computers* = 5.

6.L. Home Involvement

School Expectations of Parents to Volunteer [BCDGVOL]

This index, used in 1999 for 8th grade, is derived from principals' responses to two "yes/no" questions about whether their school expects parents to serve as volunteers: *Volunteer for school projects and programs*; *Assist teachers on trips*. The index is based on the number of "yes" responses: *Expects parents to serve as volunteers* ("yes" to either) = 1; *Does not expect parents to serve as volunteers* ("no" to either) = 2. The index is coded as missing if both source variables are missing or if one is "no" and the other is missing.

6.M. School Climate and Safety

Students Bullied At School (Index/Scale) [AS5BG069, AS5DG070, BS5BG215, BS5DG216]

Both the index and scale, used in 2011, were created using 4th- and 8th-grade students' reports of how often they experienced the following six bullying behaviors at school: (1) I was made fun of or called names; (2) I was left out of games or activities by other students; (3) Someone spread lies about me; (4) Something was stolen from me; (5) I was hit or hurt by other student(s); and (6) I was made to do things I didn't want to do by other students.

Students were scored according to their responses on the scale. Students bullied *Almost Never* had a score on the scale of at least 10.1 (for 4th-graders) or 9.6 (for 8th-graders), which corresponds to "never" experiencing three of the six bullying behaviors and experiencing each of the other three behaviors "a few times a year," on average. Students bullied *About Weekly* had a score no higher than 8.3 (for 4th-graders) or 7.7 (for 8th-graders), which corresponds to their experiencing each of three of the six behaviors "once or twice a month" and each of the other three "a few times a year," on average. All other students were bullied *About Monthly*.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Index of Students' Perception of Being Safe in School (SPBSS) [ASDGPBSS, BSDGPBSS]

This index, used in 2003 and 2007, is based on 4th- and 8th-grade students' "yes" and "no" responses to statements about safety in school: (1) Something of mine was stolen; (2) I was hit or hurt by other student(s) (e.g., shoving, hitting, kicking); (3) I was made to do things I didn't want to do by other students; (4) I was made fun of or called names; and (5) I was left out of activities by other students. Responses were categorized for the index variable such that *High* = "no" responses to all five statements; *Low* = "yes" responses to three or more statements; and *Medium* = all other response combinations.

The items used for the fourth-grade index are AS4GSTOL, AS4GHURT, AS4GMADE, AS4GMFUN, and AS4GLEFT. Please note that the same process was used for the items in the eighth-grade index [BS4GSTOL, BS4GHURT, BS4GMADE, BS4GMFUN, BS4GLEFT].

Safe and Orderly School - Teacher Reports (Index/Scale) [AT5BG240, AT5DG241, BT5MB167, BT5MD168, BT5SB166, BT5SD167]

Both the index and scale, used in 2011, were created using 4th- and 8th-grade teachers' responses concerning the extent of their agreement with the following statements: (1) This school is located in a safe neighborhood; (2) I feel safe at this school; (3) This school's security policies and practices are sufficient; (4) The students behave in an orderly manner; and (5) The students are respectful of the teachers.

Students were scored according to their teachers' degree of agreement with the five statements on the scale. Students in *Safe and Orderly* schools had a score on the scale of at least 10.2 (for 4th-graders) or 10.7 (for 8th-graders), which corresponds to their teachers "agreeing a lot" with three of the five qualities of a safe and orderly school and "agreeing a little" with the other two, on average. Students in *Not Safe and Orderly* schools had a score no higher than 6.3 (for 4th-graders) or 6.8 (for 8th-graders), which corresponds to their teachers "disagreeing a little" with three of the five qualities and "agreeing a little" with the other two, on average. All other students attended *Somewhat Safe and Orderly* schools.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Index of Teachers' Perception of School Safety (TPSS, M-TPSS/S-TPSS) [ATDGTPSS, BTDMTPSS, BT DSTPSS]

This index, used in 2003 and 2007, is based on 4th- and 8th-grade teachers' responses to three statements regarding their sense of safety within the school where they work: (1) This school is located in a safe neighborhood; (2) I feel safe at this school; and (3) This school's security policies and practices are sufficient. Responses are coded on a 4-point scale for each item as follows: *Agree a lot* = 1; *Agree* = 2; *Disagree* = 3; and *Disagree a lot* = 4. Responses were categorized for the index variable such that *High* = responded *Agree a lot* or *Agree* to all three statements; *Low* = responded *Disagree* or *Disagree a lot* to all three statements; and *Medium* = all other combinations. For 2003, the index is coded as missing if one or more source variables are missing. For 2007, the index is coded as missing if two or more source variables have invalid data.

The items used for the fourth-grade index are AT4GCUSN, AT4GCUSA, and AT4GUAS. Please note that the same coding process was used for the items in the eighth-grade indexes for mathematics and science teachers (M-TPSS/S-TPSS) [BT4GCUSN, BT4GCUSA, BT4CUAS]. The items for the eighth-grade indexes share the same variable names, but separate questionnaires were given to mathematics and science teachers.

School Emphasis on Academic Success—Teacher (Index/Scale) [AT5BG238, AT5DG239, BT5MB165, BT5MD166, BT5SB164, BT5SD165]

Both the index and scale, used in 2011, were created using 4th- and 8th-grade teachers' responses characterizing the following five aspects of academic success within their school: (1) teachers' understanding of the school's curricular goals; (2) teachers' degree of success in implementing the school's curriculum; (3) teachers' expectations for student achievement; (4) parental support for student achievement; and (5) students' desire to do well in school.

Students were scored according to their teachers' responses on the scale. Students in schools where their teachers reported a *Very High Emphasis* on academic success had a score on the scale of at least 13.1 (for 4th-graders) or 13.6 (for 8th-graders), which corresponds to their teachers characterizing three of the five aspects as "very high" and the other two as "high," on average. Students in schools with a *Medium Emphasis* on academic success had a score no higher than 8.8 (for 4th-graders) or 9.5 (for 8th-graders), which corresponds to their teachers characterizing three of the five aspects as "medium" and the other two as "high," on average. All other students attended schools with a *High Emphasis* on academic success.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Index of Teachers' Perception of School Climate (TPSC, M-TPSC/S-TPSC) [ATDGTSPSC, BTDMTPSC, BTDSTPSC]

This index, used in 2003 and 2007, is based on 4th- and 8th-grade teachers' responses to questions about various aspects of their school environment: teachers' job satisfaction; teachers' understanding of the school's curricular goals; teachers' degree of success in implementing the school's curriculum; teachers' expectations for student achievement; parental support for student achievement; parental involvement in school activities; students' regard for school property; and students' desire to do well in school. Responses are coded on a 5-point scale for each item as follows: *Very high* = 1; *High* = 2; *Medium* = 3; *Low* = 4; and *Very low* = 5. Responses were categorized for the index variable such that *High* = average value ≤ 2 ; *Medium* = average value $> 2 < 3$ (for 2003) or $> 2 \leq 3$ (for 2007); and *Low* = average value ≥ 3 (for 2003) or > 3 (for 2007). The index is coded as missing if there are three or more source questions with invalid data.

The items used for the fourth-grade index are AT4GCHTS, AT4GCHTU, AT4GCHTC, AT4GCHES, AT4GCHPS, AT4GCHPI, AT4GCHSR, and AT4GCHSD. Please note that the same coding process was used for the items in the eighth-grade indexes for mathematics and science teachers (M-TPSC/S-TPSC) [BT4GCHTS, BT4GCHTU, BT4GCHTC, BT4GCHES, BT4GCHPS, BT4GCHPI, BT4GCHSR, BT4GCHSD]. The items for the eighth-grade indexes share the same variable names, but separate questionnaires were given to mathematics and science teachers.

School Emphasis on Academic Success—Principal (Index/Scale) [AC5BG119, AC5DG120, BC5BG099, BC5DG100]

Both the index and scale, used in 2011, were created using 4th- and 8th-grade principals' responses characterizing the following five aspects of academic success within their school: (1) teachers' understanding of the school's curricular goals; (2) teachers' degree of success in implementing the school's curriculum; (3) teachers' expectations for student achievement; (4) parental support for student achievement; and (5) students' desire to do well in school.

Students were scored according to their principals' responses on the scale. Students in schools where their principals reported a *Very High Emphasis* on academic success had a score on the scale of at least 13.1 (for 4th-graders) or 13.3 (for 8th-graders), which corresponds to their principals characterizing three of the five aspects as "very high" and the other two as "high," on average. Students in schools with a *Medium Emphasis* on academic success had a score no higher than 8.9 (for 4th-graders) or 9.2 (for 8th-graders), which corresponds to their principals characterizing three of the five aspects as "medium" and the other two as "high," on average. All other students attended schools with a *High Emphasis* on academic success.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).

Index of Principals' Perception of School Climate (PPSC) [ACDGPPSC, BCDGPPSC]

This index, used in 2003 and 2007 for 4th and 8th grade, is based on principals' responses to questions about various aspects of their school environment: teachers' job satisfaction; teachers' understanding of the school's curricular goals; teachers' degree of success in implementing the school's curriculum; teachers' expectations for student achievement; parental support for student achievement; parental involvement in school activities; students' regard for school property; and students' desire to do well in school. Responses are coded on a 5-point scale for each item as follows: *Very high* = 1; *High* = 2; *Medium* = 3; *Low* = 4; and *Very low* = 5. Responses were categorized for the index variable such that *High* = average value ≤ 2 ; *Medium* = average value $> 2 \leq 3$; and *Low* = average value > 3 . The index is coded as missing if there are three or more source questions with invalid data.

The items used for the fourth-grade index are AC4GCHTS, AC4GCHTU, AC4GCHTC, AC4GCHES, AC4GCHPS, AC4GCHPI, AC4GCHSR, and AC4GCHSD. Please note that the same coding process was used for the items in the eighth-grade index [BC4GCHTS, BC4GCHTU, BC4GCHTC, BC4GCHES, BC4GCHPS, BC4GCHPI, BC4GCHSR, BC4GCHSD].

Index of Good Attendance at School (GAS) [ACDGAS, BCDGAS]

This index, used in 2003 and 2007 for 4th and 8th grade, is based on principals' responses to questions about the frequency and severity of attendance issues in their school: arriving late at school, absenteeism (i.e., unjustified absences), and skipping class. Responses about the frequency of these events were coded as follows for each item: *Never* = 1; *Rarely* = 2;

Monthly = 3; *Weekly* = 4; and *Daily* = 5. Responses to questions about the severity of these issues were coded on a 3-point scale for each item: *Not a problem* = 1; *Minor problem* = 2; and *Serious problem* = 3. Responses were categorized for the index variable such that schools at the *High* level of the index reported that all three behaviors never occurred or were not a problem; schools at the *Low* level of the index indicated that two or more of the behaviors were a serious problem, one was a serious problem and the other two were minor problems, or one variable value was missing and the other two were coded as serious problems; and the *Medium* category includes all other combinations of responses.

The items used for the fourth-grade index are AC4GFP01–AC4GFP03 and AC4GSP01–AC4GSP03. Please note that the same coding process was used for the items in the eighth-grade index [BC4GFP01–BC4GFP03 and BC4GSP01–BC4GSP03].

Index of Good School Attendance (1999) [BCDGSA]

This index, used in 1999 for 8th grade, is based on principals' responses to three questions concerning the severity of attendance issues in their school: arriving late to school, absenteeism, and skipping class. Responses about the severity of each problem were coded as follows for each item: *Not a problem* = 1; *Minor problem* = 2; and *Serious problem* = 3. The index is assigned three levels: *Not a problem* for all three questions = *High*; *Serious problem* for two of three questions OR *Serious problem* for one question and *Minor problem* for two questions = *Low*; and All other combinations = *Medium*. The index is coded as missing if more than one source variable is missing.

School Discipline and Safety—Principal (Index/Scale) [AC5BG121, AC5DG122, BC5BG101, BC5DG102]

This index and scale, used in 2011, were created using 4th and 8th grade principals' responses concerning 10 potential school discipline and safety problems: (1) arriving late at school; (2) absenteeism (i.e., unjustified absences); (3) classroom disturbance; (4) cheating; (5) profanity; (6) vandalism; (7) theft; (8) intimidation or verbal abuse among students (including texting, e-mailing, etc.); (9) physical fights among students; and (10) intimidation or verbal abuse of teachers or staff (including texting, e-mailing, etc.).

Students were scored according to their principals' responses on the scale. Students in schools with *Hardly Any Problems* had a score on the scale of at least 9.7 (for 4th-graders) or 12.0 (for 8th-graders), which corresponds to their principals reporting "not a problem" for 5 of the 10 discipline and safety issues and a "minor problem" for the other 5, on average. Students in schools with *Moderate Problems* had a score no higher than 7.6 (for 4th-graders) or 8.4 (for 8th-graders), which corresponds to their principals reporting a "moderate problem" for 5 of the 10 issues and a "minor problem" for the other 5, on average. All other students attended schools with *Minor Problems*.

For information on creating and interpreting the TIMSS 2011 context questionnaire scales, see [Methods and Procedures in TIMSS and PIRLS 2011](#).