

# Program for International Student Assessment International Data Explorer Help Guide

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# PISA International Data Explorer Help Guide

## I. Background on the Program for International Student Assessment (PISA) and the PISA International Data Explorer (IDE)

The Program for International Student Assessment (PISA) International Data Explorer (IDE) is a web-based application for accessing data from PISA, supported by the U.S. National Center for Education Statistics (NCES). PISA is a system of international assessments that measures 15-year-olds' capabilities in reading literacy, mathematics literacy, and science literacy. PISA also includes measures of general or cross-curricular competencies, such as problem solving. PISA focuses on the application of knowledge and skills as students near the end of mandatory schooling. PISA is organized by the Organization for Economic Cooperation and Development (OECD), an intergovernmental organization of industrialized countries.

Begun in 2000, PISA is administered every 3 years. Each administration includes assessments of all three subjects, but assesses one of the subjects in depth (the *major* subject area or domain). The other two subjects in that year are considered *minor* domains. The major subject area assessed in 2000 was reading literacy; in 2003, mathematics literacy; and in 2006, science literacy. (The cycle repeated again in 2009, with reading literacy as the major subject area.) Exhibit 1 summarizes the PISA administration cycle from 2000 through 2015.

When a subject area is the major domain, the design is such that it is possible to report subscales as well as a combined scale. For example, in 2009 and 2000, results are reported for a combined reading literacy scale and five reading subscales. In the years when a subject area is a minor domain, only an overall scale is available, and it is based on a set of items of varying difficulty that represent the range of topics covered by the full assessment. For example, in 2006, results are reported for an overall reading literacy scale, but not for subscales. Table 1 (on the next page) shows the PISA reporting scales currently available in the IDE, by year.

### Exhibit 1. PISA administration cycle

Assessment year	2000	2003	2006	2009	2012	2015
Subjects assessed	READING	Reading	Reading	READING	Reading	Reading
	Mathematics	MATHEMATICS	Mathematics	Mathematics	MATHEMATICS	Mathematics
	Science	Science	SCIENCE	Science	Science	SCIENCE
		Problem solving			Problem solving	

NOTE: Reading, mathematics, and science literacy are assessed in each assessment cycle of the Program for International Student Assessment (PISA). A separate problem-solving assessment was administered in 2003 and is planned for 2012. The subject in all capital letters is the major subject area for that cycle.

SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2009.

**Table 1. PISA reporting scales currently available in the IDE, by year**

Reporting scale	Year			
	2000	2003	2006	2009
<b>Reading</b>				
Overall scale	x	x	x	x
Subscale: Access and retrieve	x			x
Subscale: Integrate and interpret	x			x
Subscale: Reflect and evaluate	x			x
Subscale: Continuous text				x
Subscale: Noncontinuous text				x
<b>Mathematics</b>				
Overall scale	x	x	x	x
Subscale: Space and shape	x	x		
Subscale: Change and relationships	x	x		
Subscale: Quantity		x		
Subscale: Uncertainty		x		
<b>Science</b>				
Overall scale	x	x	x	x
Subscale: Identifying scientific issues			x	
Subscale: Explaining phenomena scientifically			x	
Subscale: Using scientific evidence			x	
Attitude subscale: Interest in science			x	
Attitude subscale: Support for scientific inquiry			x	

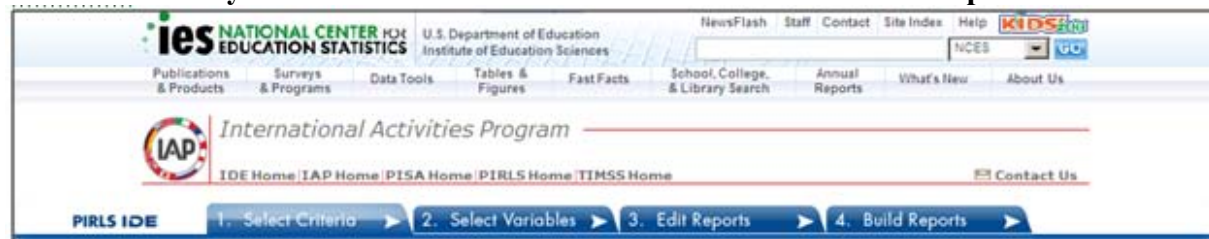
NOTE: The science attitude subscales are not included in the overall science scale. Data for two of the reading subscales—continuous text and noncontinuous text—are not available for PISA 2000.

For more information about the definitions of the various literacy scales and subscales, see the *PISA 2009 Assessment Framework: Key Competencies in Reading, Mathematics and Science* (Paris: OECD), available at <http://www.oecd.org/dataoecd/11/40/44455820.pdf>.

## II. General Overview

There are four general steps for exploring PISA data using the PISA IDE (see exhibit 2). Each step is described in more detail starting on page 8.

### Exhibit 2. What you will see in the IDE environment and what each step entails



#### 1. Select criteria:

Choose your measure(s), year(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 IDE

- Screen resolution should be 1024 x 768 pixels.
- 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 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, and graphs, follow these steps when using the PISA 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 PISA IDE begins on the **Select Criteria** screen (see exhibit 3).

Select a **Subject** from the drop-down menu. Once the screen resets, you can choose one or more **Years, Measures, 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 cancel your selections and begin again.

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



### Exhibit 3. Selecting criteria

**PISA 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:** Mathematics **Age:** Age 15 [Reset](#)

Category	Sub Category	Measure	All Years	2009	2006	2003	2000
Scales	Overall score	<input checked="" type="checkbox"/> PISA Mathematics Scale: Overall Mathematics details	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> PISA Mathematics Scale: Overall Mathematics (2000) details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Subscale scores	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Student and Family Characteristics							
Students' Attitudes and Learning							
Group	Jurisdiction	All Years	2009	2006	2003	2000	
International	<input checked="" type="checkbox"/> International Average (OECD)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Average for Selected Countries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OECD	<input type="checkbox"/> Australia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Austria	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Belgium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Canada	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Chile	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Czech Republic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Denmark	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

#### 1.B. Choose Subject

Under **Subject**, you have the choice of **Mathematics**, **Reading**, or **Science**. Once a subject is chosen, the screen resets and you can select **Year(s)**, **Measure(s)**, and **Jurisdiction(s)**.

#### 1.C. Choose Year

At the top of the **Measure** and **Jurisdiction** sections, you have the choice of selecting 2009, 2006, 2003, and/or 2000 by checking the appropriate box. To include data from all years, check the “All Years” box to the left of the individual years. Reading, mathematics, and science data are available for 2009, 2006, 2003, and 2000.

#### 1.D. Choose Measure

After choosing a subject, you can choose between the overall scale and/or any of the subject’s subscales. However, subscales are only available for the subject area that was the major domain in a particular year. Note that the overall scale is the default.

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.

#### 1.E. Choose Jurisdiction

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

Jurisdictions are found under the following groups: **OECD** and **Non-OECD**. There is also a group category called **International**, with options to display the **International Average (OECD)** and the **Average for Selected Countries**. Please note that selecting **International Average (OECD)** 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 blue arrow points down (see exhibit 4).
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., “OECD”), 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 OECD countries in order to readily see the non-OECD jurisdictions), click the blue 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 4. Choosing jurisdictions

The screenshot displays the PISA IDE interface during the '2. Select Variables' step. The navigation bar at the top shows four steps: '1. Select Criteria', '2. Select Variables', '3. Edit Reports', and '4. Build Reports'. Below the navigation bar, there are dropdown menus for 'Subject: Mathematics' and 'Age: Age 15', along with a 'Reset' button. The main content area is a table with columns for 'Category', 'Sub Category', 'Measure', and years (All Years, 2009, 2006, 2003, 2000). A table with 'Group' and 'Jurisdiction' columns is highlighted with a black box, showing options like 'International', 'OECD', and various countries. A '2. Select Variables' button is also highlighted with a black box.

Group	Jurisdiction	All Years	2009	2006	2003	2000
<input type="checkbox"/> International	<input type="checkbox"/> International Average (OECD)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Average for Selected Countries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> OECD	<input type="checkbox"/> Australia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Austria	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Belgium	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Canada	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Chile	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Czech Republic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Denmark	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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 4 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 must choose at least one variable on this screen*. You can browse for variables using the **Category** and **Sub Category** lists or by using the **Search** function (see exhibit 5). You can return to this screen to change variable selections at any time.

#### Exhibit 5. Select variables overview

The screenshot displays the 'PISA IDE' interface at the '2. Select Variables' step. The navigation bar at the top includes tabs for '1. Select Criteria', '2. Select Variables', '3. Edit Reports', and '4. Build Reports'. Below the navigation bar, the 'STEP 2' instruction reads: '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.' A 'Help' button is located in the top right corner.

The main content area shows the following details:

- Subject, Grade:** Mathematics, Age 15
- Jurisdictions:** International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Republic of, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States
- Measure:** PISA Mathematics Scale: Overall Mathematics
- Year:** 2009

A 'Reset' button is located on the right side of the details section. Below this, there are two tabs: 'View All (1252)' and 'View Selected (0)'. A search box is highlighted with a black box, containing the text 'Search:'. To the right of the search box is a 'Go' button. Below the search box, there are four columns for years: 'All Years', '2009', '2006', and '2003'. The '2009' column has a checked checkbox, while the others are unchecked. Below the year columns is a table with columns for 'Category', 'Sub Category', and 'Variable'. The table lists various variables under the 'Student and Family Characteristics' category, such as 'All students', 'Sex', 'Race/ethnicity (U.S. only)', and 'Your Race: White'. Each variable has a 'details' link and a grid of checkboxes for the years. A '3. Edit Reports' button is located at the bottom right of the table.

### 2.B. Search Using Category and Sub Category Lists

On the **Select Variables** screen, choose at least one variable for your report. One way to do this is to search for variables using the **Category** and **Sub Category** lists. If you don't wish to choose

from any of the specified categories and subcategories, then select **All students** in the **Student Demographics** sub category.

The variables shown are tied to the criteria you selected at step 1 (**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 blue arrows to open and close categories and subcategories of variables (see exhibit 6).
2. Click **details** or **hide details** to show or hide the full title of a given variable, the PISA 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 6 below, which shows **Language at home** and **Language at home (2006, 2003, 2000)**. 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 6. Select variables using category and sub category lists

**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.

**Subject, Grade:** Mathematics, Age 15  
**Jurisdictions:** International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Republic of, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States  
**Measure:** PISA Mathematics Scale: Overall Mathematics  
**Year:** 2009

Category	Sub Category	Variable	All Years	2009	2006	2003	2000
Student and Family Characteristics	Student Demographics						
	Language and Immigration	<input type="checkbox"/> Index immigration (2009, 2006, 2003) <a href="#">details</a>					
		<input type="checkbox"/> Country of birth: Self <a href="#">details</a>					
		<input type="checkbox"/> Country of birth: Mother <a href="#">details</a>					
		<input type="checkbox"/> Country of birth: Father <a href="#">details</a>					
		<input type="checkbox"/> Country arrival age <a href="#">details</a>					
		<input type="checkbox"/> Language at home <a href="#">hide details</a>					
		<b>Full Title:</b> What language do you speak at home most of the time? <b>ID:</b> ST013401 <b>Values:</b> Language of test; Another language					
		<input type="checkbox"/> Language at home (2006, 2003, 2000) <a href="#">hide details</a>					
		<b>Full Title:</b> What language do you speak at home most of the time? <b>ID:</b> ST009001 <b>Values:</b> Language of test; Other national language; Other language					

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 search for 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 7). 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 7. Select variables using the search function

**PISA 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, Age 15  
**Jurisdictions:** International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Republic of, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States  
**Measure:** PISA Mathematics Scale: Overall Mathematics  
**Year:** 2009 [Reset](#)

View All (1252) View Selected (0) Search: (24) interest or enjoyment [Go](#)

Category	Sub Category	Variable	All Years	2009	2006	2003	2000
Students' Attitudes and Learning Strategies	Engagement in Reading Activities	<input type="checkbox"/> Read each day <a href="#">details</a>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Enjoyment of and Interest in Science	<input type="checkbox"/> Science enjoyment: Have fun <a href="#">details</a>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Science enjoyment: Like reading <a href="#">details</a>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Science enjoyment: Science problems <a href="#">details</a>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Science enjoyment: New knowledge <a href="#">details</a>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Science enjoyment: Learning science <a href="#">details</a>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Science interest: Physics <a href="#">details</a>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Science interest: Chemistry <a href="#">details</a>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Science interest: Plant biology <a href="#">details</a>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Science interest: Human biology <a href="#">details</a>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Science interest: Astronomy <a href="#">details</a>	<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.

### 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 format options can overwrite previous edits);

- change statistics options, such as average scale scores and proficiency levels, 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 you won't get the cross-tabulation. If your selected criteria include more than one measure (e.g., overall mathematics scale and one or more subscale or continuous variable), a separate set of data reports will be generated for each measure (see exhibit 8).

### Exhibit 8. Edit reports overview

Report	All	Action	Measure	Variable	Year	Jurisdiction	Statistic
Report 1	<input checked="" type="checkbox"/>	Preview   Edit   Delete   Copy	PISA Mathematics Scale: Overall Mathematics	All students	2009, 2006, 2003, 2000	International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Averages Greec...	
Report 2	<input checked="" type="checkbox"/>	Preview   Edit   Delete   Copy	PISA Mathematics Scale: Overall Mathematics	Language at home	2009, 2006, 2003, 2000	International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Averages Greec...	
Report 3	<input checked="" type="checkbox"/>	Preview   Edit   Delete   Copy	PISA Mathematics Scale: Overall Mathematics	Read each day	2009, 2006, 2003, 2000	International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Averages Greec...	
Cross-Tabulated Report 1	<input checked="" type="checkbox"/>	Preview   Edit   Delete   Copy	PISA Mathematics Scale: Overall Mathematics	Language at home, Read each day	2009, 2006, 2003, 2000	International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Averages Greec...	
Report 4	<input checked="" type="checkbox"/>	Preview   Edit   Delete   Copy	Student age in months	All students	2009, 2006, 2003, 2000	International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Averages Greec...	
Report 5	<input checked="" type="checkbox"/>	Preview   Edit   Delete   Copy	Student age in months	Language at home	2009, 2006, 2003, 2000	International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Averages Greec...	
Report 6	<input checked="" type="checkbox"/>	Preview   Edit   Delete   Copy	Student age in months	Read each day	2009, 2006, 2003, 2000	International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Averages Greec...	
Cross-Tabulated Report 2	<input checked="" type="checkbox"/>	Preview   Edit   Delete   Copy	Student age in months	Language at home, Read each day	2009, 2006, 2003, 2000	International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Averages Greec...	

The **Edit Reports** step shows 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 and subnational education systems 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 8), 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 9). You can select **Preview** at any time to see how your changes will affect the report's final layout.

#### Exhibit 9. Using preview report

Years	Jurisdictions	Language at home			
		Averages	Standard Errors	Averages	Standard Errors
2009	International Average (OECD)				
	Australia				
	Austria				
	Belgium				
	Canada				
	Chile				
	Czech Republic				
	Denmark				
	Estonia				
	Finland				
	France				
	Germany				
	Greece				
	Hungary				
	Iceland				
	Ireland				

### 3.C. Edit Report

To edit the report, select the **Edit** command, in the **Action** column, next to the report number (see exhibit 8). (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 10):

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 if more than one was selected 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 options from the following: average scale scores, percentages, proficiency levels –



discrete, proficiency levels – cumulative, standard deviations, and percentiles. (For further information, see Section 3.G. Statistics Options, page 21.)

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.
5. 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 10. Editing reports

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

- Name:** Report2
- Measure:** PISA Mathematics Scale: Overall Mathematics
- Jurisdiction:**
  - Select All
  - International Average (OECD)
  - Australia
  - Austria
  - Belgium
  - Canada
  - Chile
- Variable:**
  - All students
  - Language at home
  - Read each day
- Year:**
  - Select All
  - 2009
  - 2006
  - 2003
  - 2000
- Statistic:**
  - Averages
  - Percentages
  - Proficiency levels - discrete
  - Proficiency levels - cumulative
  - Standard deviations
  - Percentiles

**TABLE LAYOUT**

Row	Column
Years	Language at home
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 10). The new variable is created by combining values for an existing variable. The steps are as follows:

1. Click **Create new...** under the **Variable** heading.
2. Select the variable for which you wish to combine values.
3. Select the values you want to combine by checking the boxes to the left of the values (see exhibit 11).

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 11. Creating new variables

**Create Variables**

1. Select a Variable group: Help

Read each day

2. Select values to create new Variable:

I don't read for enjoyment

30 minutes or less a day

Between 30 and 60 minutes

1 to 2 hours a day

More than 2 hours a day

3. Create a name for the new Value:

Name:  Create

Reset Cancel 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, then 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, below.)

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 12). 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 12. Edit reports with collapsed variables

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

- Name:** Report2
- Measure:** PISA Mathematics Scale: Overall Mathematics
- Jurisdiction:**
  - Select All
  - International Average (OECD)
  - Australia
  - Austria
  - Belgium
  - Canada
  - Chile
- Variable:**
  - All students
  - Language at home
  - Read each day
  - Read each day (collapsed)
- Year:**
  - Select All
  - 2009
  - 2006
  - 2003
  - 2000
- Statistic:**
  - Averages
  - Percentages
  - Proficiency levels - discrete
  - Proficiency levels - cumulative
  - Standard deviations
  - Percentiles

**TABLE LAYOUT**

Row	Column
Years	Read each day (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 13). 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 13. 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	Year	Statistic
<input type="checkbox"/> Select All	<input type="checkbox"/> All students	<input type="checkbox"/> Select All	<input type="checkbox"/> Averages
<input type="checkbox"/> International Average (OECD)	<input type="checkbox"/> Language at home	<input type="checkbox"/> 2009	<input type="checkbox"/> Percentages
<input type="checkbox"/> Australia	<input type="checkbox"/> Read each day	<input type="checkbox"/> 2006	<input type="checkbox"/> Proficiency levels - discrete
<input type="checkbox"/> Austria		<input type="checkbox"/> 2003	<input type="checkbox"/> Proficiency levels - cumulative
<input type="checkbox"/> Belgium		<input type="checkbox"/> 2000	<input type="checkbox"/> Standard deviations
<input type="checkbox"/> Canada			<input type="checkbox"/> Percentiles
<input type="checkbox"/> Chile			

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 14):

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. **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 proficiency 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.

4. **Include** gives you the option of showing standard errors. By default, standard errors are shown inside parentheses, but you have the option of choosing to show 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 14).

#### Exhibit 14. Format options

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 16.)

The following statistics options are available (see exhibits 15a and 15b):

1. **Average scale scores.** For the PISA assessment, student performance is reported on scales that range from 0 to 1,000. PISA reports the average scale score for a variety of demographic samples of the student population (e.g., the average scale score in science 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, page 20.
3. **Proficiency levels – discrete and cumulative.** Discrete proficiency levels are reported as the percentage of students performing at each PISA proficiency level. Cumulative proficiency levels are reported as the percentage of students performing *at or above* each PISA proficiency level. Proficiency levels are available by subject, as shown:
  - For reading, the proficiency levels available are level 1 and below, at level 2, at level 3, at level 4, and level 5 and above (see exhibit 15a).
  - For science and mathematics, the proficiency levels available are below level 1, at level 1, at level 2, at level 3, at level 4, at level 5, and at level 6 (see exhibit 15b).
4. **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.
5. **Percentiles.** This statistic shows the threshold (or cutpoint) score for the following:
  - 10<sup>th</sup> percentile – the bottom 10 percent of students
  - 25<sup>th</sup> percentile – the bottom quarter of students
  - 50<sup>th</sup> percentile – the median (half the students scored below the cutpoint and half scored above it)
  - 75<sup>th</sup> percentile – the top quarter of students
  - 90<sup>th</sup> percentile – the top 10 percent of students

**Exhibit 15a. Statistics options (reading)**

**Statistics Options**

Selections will automatically be applied to all reports. Choose up to two statistics to be included in every report. [Help](#)

**Select Options:**  
(maximum of two)

- Average scale scores
- Percentages
- Proficiency levels - discrete
  - Level 1 and below
  - Level 2
  - Level 3
  - Level 4
  - Level 5 and above
- Standard deviations
- Percentiles
  - 10th Percentile
  - 25th Percentile
  - 50th Percentile
  - 75th Percentile
  - 90th Percentile

[Cancel](#) [Done](#)

**Exhibit 15b. Statistics options (mathematics and science)**

**Statistics Options**

Selections will automatically be applied to all reports. Choose up to two statistics to be included in every report. [Help](#)

**Select Options:**  
(maximum of two)

- Average scale scores
- Percentages
- Proficiency levels - discrete
  - Below level 1
  - At level 1
  - At level 2
  - At level 3
  - At level 4
  - At level 5
  - At level 6
- Standard deviations
- Percentiles

[Cancel](#) [Done](#)

As noted on page 23, 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 19.) 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.
- Proficiency-level results cannot be displayed in both columns and rows.
- If proficiency levels are selected as a variable, only percentages will be displayed.

Please note that the statistics produced by the IDE may not match the statistics in reports published by the OECD, due to differences in certain statistical standards. In particular, NCES and the OECD may differ in the minimum sample sizes required for publishing student scores.

### 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, page 16.) 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 16), data will be retrieved for all reports.



## Exhibit 16. Selecting reports to build

**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, Age 15  
**Jurisdictions:** International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Republic of, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States  
**Measures:** PISA Mathematics Scale: Overall Mathematics, Student age in months  
**Variables:** All students, Language at home, Read each day  
**Years:** 2009, 2006, 2003, 2000

Report	All	Action	Measure	Variable	Year	Jurisdiction	Statistic
Report 1	<input checked="" type="checkbox"/>	<a href="#">Preview</a>   <a href="#">Delete</a>   <a href="#">Edit</a>   <a href="#">Copy</a>	PISA Mathematics Scale: Overall Mathematics	All students	2009, 2006, 2003, 2000	International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Grec...	Averages
Report 2	<input checked="" type="checkbox"/>	<a href="#">Preview</a>   <a href="#">Delete</a>   <a href="#">Edit</a>   <a href="#">Copy</a>	PISA Mathematics Scale: Read each day	Read each day (collapsed)	2009, 2000	International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Grec...	Percentages
Report 3	<input checked="" type="checkbox"/>	<a href="#">Preview</a>   <a href="#">Delete</a>   <a href="#">Edit</a>   <a href="#">Copy</a>	PISA Mathematics Scale: Overall Mathematics	Read each day	2009, 2006, 2003, 2000	International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Grec...	Averages
Cross-Tabulated Report 1	<input checked="" type="checkbox"/>	<a href="#">Preview</a>   <a href="#">Delete</a>   <a href="#">Edit</a>   <a href="#">Copy</a>	PISA Mathematics Scale: Overall Mathematics	Language at home, Read each day	2009, 2006, 2003, 2000	International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Grec...	Averages
Report 4	<input checked="" type="checkbox"/>	<a href="#">Preview</a>   <a href="#">Delete</a>   <a href="#">Edit</a>   <a href="#">Copy</a>	Student age in months	All students	2009, 2006, 2003, 2000	International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Grec...	Averages
Report 5	<input checked="" type="checkbox"/>	<a href="#">Preview</a>   <a href="#">Delete</a>   <a href="#">Edit</a>   <a href="#">Copy</a>	Student age in months	Language at home	2009, 2006, 2003, 2000	International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Grec...	Averages
Report 6	<input checked="" type="checkbox"/>	<a href="#">Preview</a>   <a href="#">Delete</a>   <a href="#">Edit</a>   <a href="#">Copy</a>	Student age in months	Read each day	2009, 2006, 2003, 2000	International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Grec...	Averages
Cross-Tabulated Report 2	<input checked="" type="checkbox"/>	<a href="#">Preview</a>   <a href="#">Delete</a>   <a href="#">Edit</a>   <a href="#">Copy</a>	Student age in months	Language at home, Read each day	2009, 2006, 2003, 2000	International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Grec...	Averages

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 Reports** drop-down feature (see 1 in exhibit 17). 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 24.)
2. Export and save data tables into various formats using the **Export Reports** button (see 2 in exhibit 17). The output formats include HTML (print-friendly), Microsoft Word, Microsoft Excel, and Adobe PDF.
3. Select the **Chart** tab (see 3 in exhibit 17) to create and customize charts for each report and save them for export in the above formats.
4. Select the **Significance Test** tab (see 4 in exhibit 17) to run a significance test on your results, customize it, and export it.

### Exhibit 17. 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, Age 15  
**Jurisdictions:** International Average (OECD), Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Republic of, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States  
**Features:** PISA Mathematics Scale: Overall Mathematics, Student age in months  
**Variables:** All students, Language at home, Read each day  
**Years:** 2009, 2006, 2003, 2000

**Select Report:** Report 1

**Export Reports**

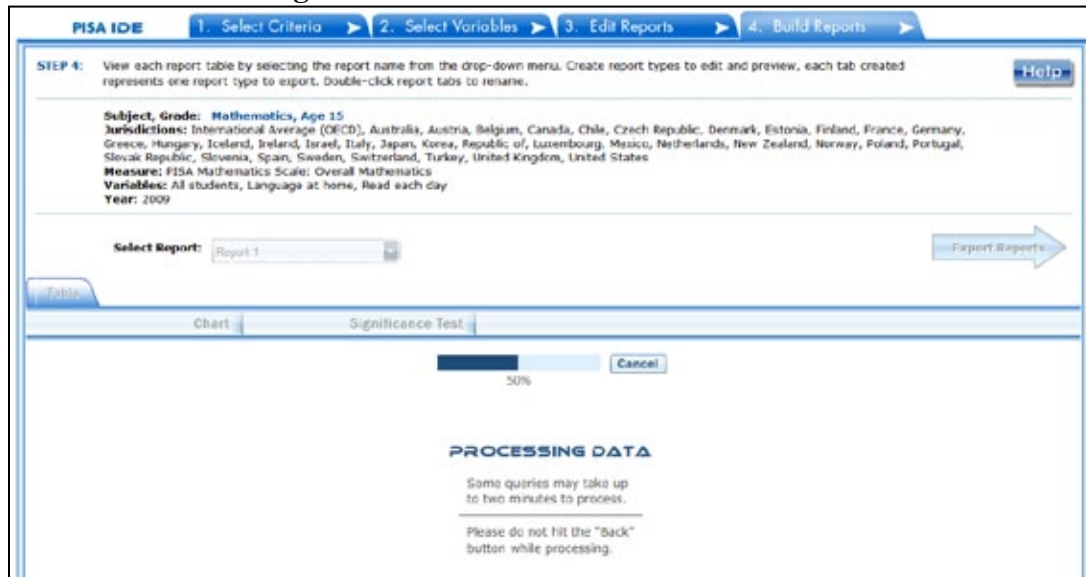
**Averages for mathematics, age 15 by year, jurisdiction and All students [TOTAL]: 2009, 2006, 2003, and 2000**

Year	Jurisdiction	Average	Standard Error
2009	International Average (OECD)	496	(0.5)
	Australia	514	(2.5)
	Austria	496	(2.7)
	Belgium	515	(2.3)
	Canada	527	(1.6)
	Chile	421	(3.1)
	Czech Republic	493	(2.8)
	Denmark	503	(2.6)
	Estonia	512	(2.6)
	Finland	541	(2.2)
	France	497	(3.1)
	Germany	513	(2.9)

#### 4.B. View Reports as Data Tables

Once you click on **Build Reports**, the words “Processing Data” will appear on your screen (see exhibit 18). 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 17) 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 18. Processing data

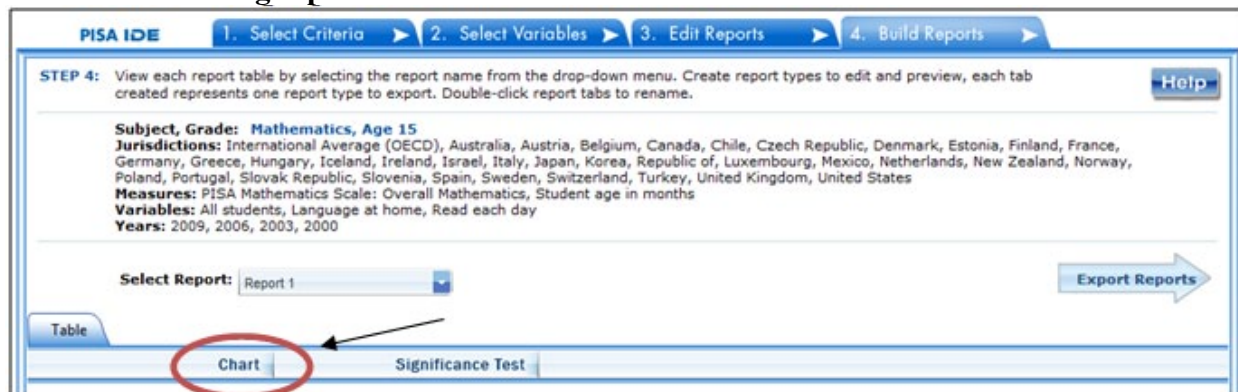


### 4.C. Charts

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 19).

You will be able to create many types of charts and customize them. Section 4.E. Create Charts – Chart Options (page 28) provides a summary of the available features and how they can be customized.

## Exhibit 19. Viewing reports as charts



### 4.D. Create Charts – Data Options

When you click **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

20). 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 the **Chart Options** button in the lower-right corner of the screen.

### Exhibit 20. Data options for charts

#### 4.E. Create Charts – Chart Options

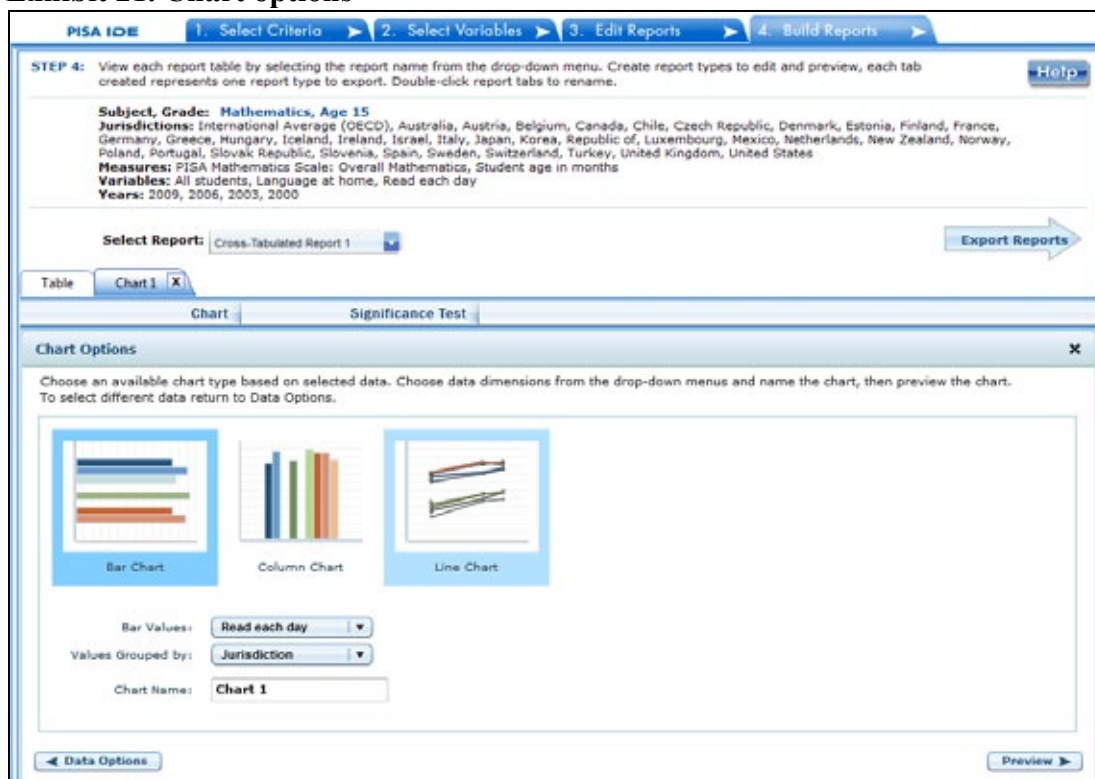
On the **Chart Options** screen, select **Bar Chart**, **Column Chart**, or **Line Chart** (see exhibit 21). For data on proficiency levels, you also have the option of selecting a **Discrete Chart** or **Cumulative Chart**, while for percentiles you also have the option of selecting a **Percentile Chart**.

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.

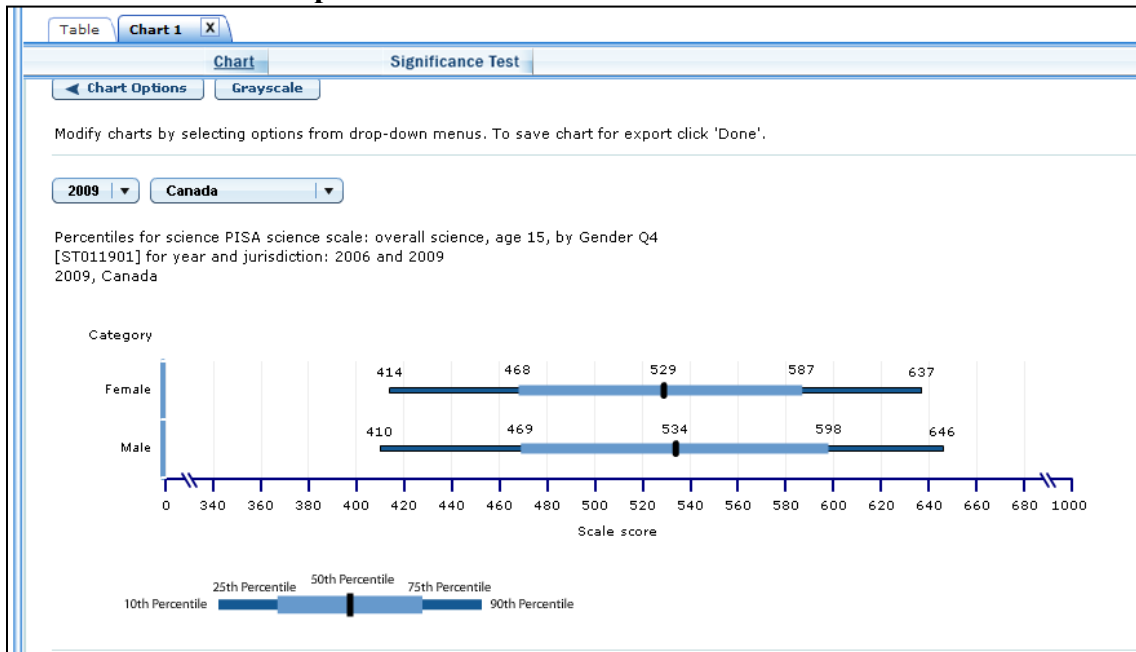
### Exhibit 21. Chart options



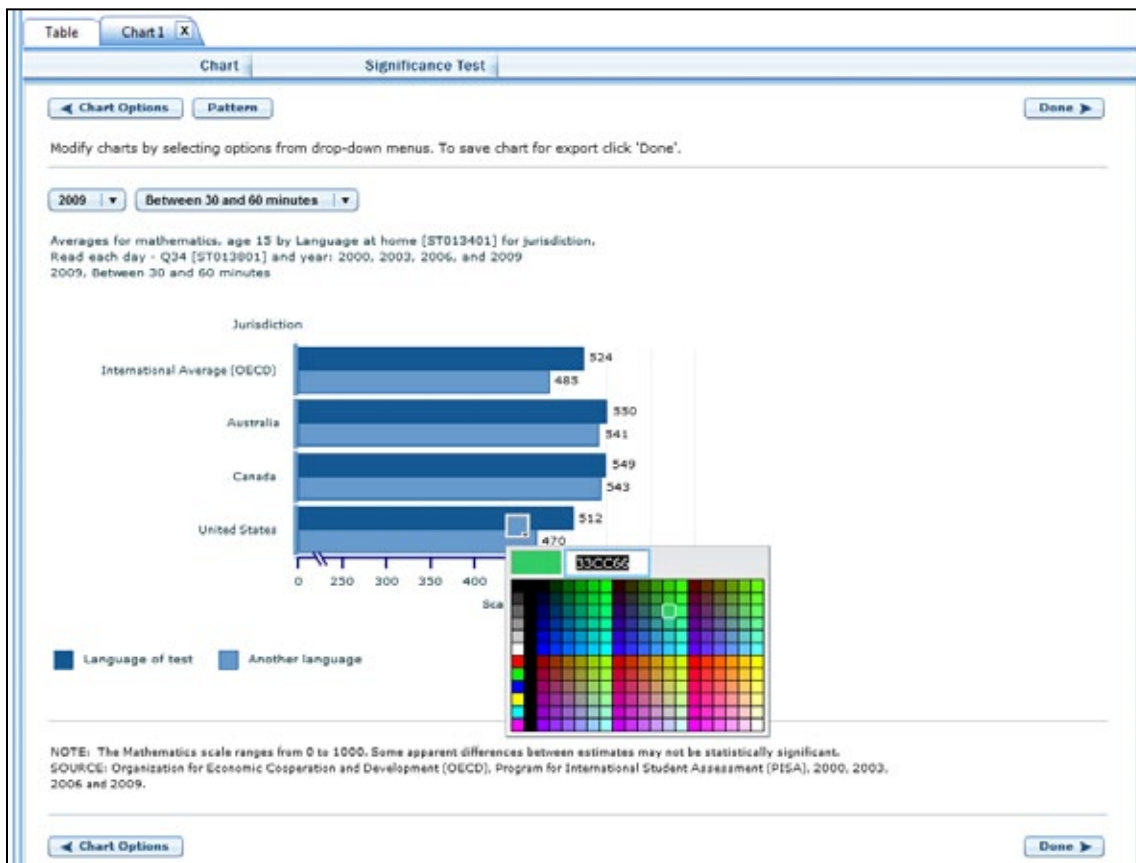
While previewing your chart, you can do the following (see exhibit 22 as an example of a **Percentile Chart** and exhibit 23 as an example of a **Bar Chart**):

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. For the **Bar Chart**, 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 22. Preview of percentile chart



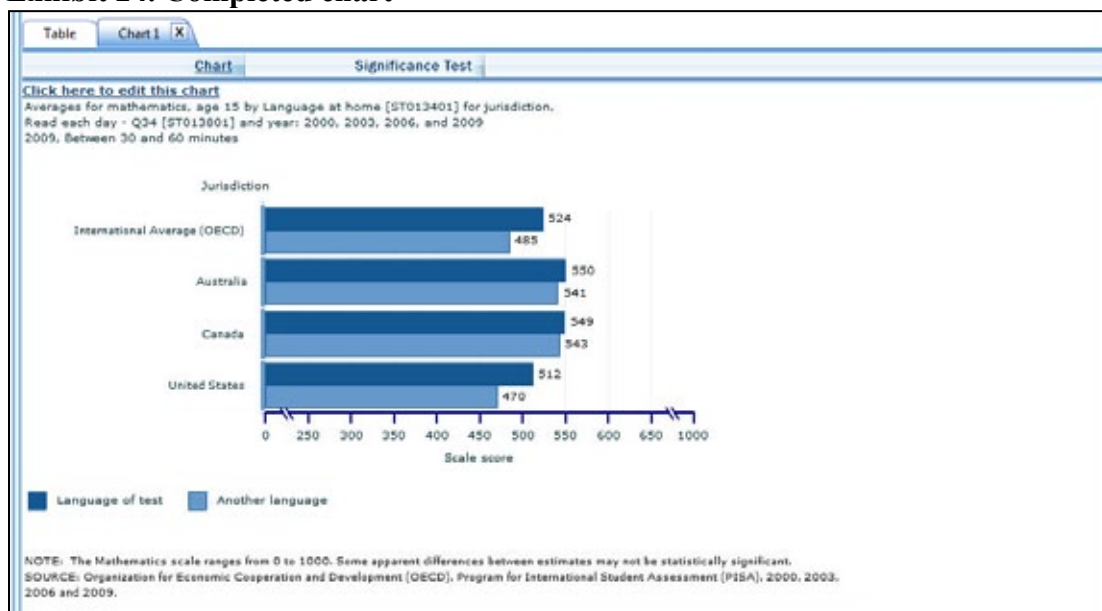
### Exhibit 23. Preview of bar chart



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 23). 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 24). 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 24. 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. 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 35.)

#### 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 24, above). 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. For example, with the variables shown in exhibit 25, you could choose to compare scores of students speaking the language of the test between countries, or you could choose to compare scores of students speaking the language of the test and students speaking another language within a country. 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 25):

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 25. 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"/> Language at home	<input checked="" type="checkbox"/> All Years	<input checked="" type="checkbox"/> Averages
<input checked="" type="checkbox"/> International Average (C)	<input checked="" type="checkbox"/> Language of test	<input type="checkbox"/> 2009	
<input checked="" type="checkbox"/> Australia	<input checked="" type="checkbox"/> Another language	<input checked="" type="checkbox"/> 2006	
<input checked="" type="checkbox"/> Austria		<input checked="" type="checkbox"/> 2003	
<input checked="" type="checkbox"/> Belgium		<input type="checkbox"/> 2000	

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 26). Most comparisons are independent with an alpha level of .05, except for (1) within-variable tests for gender, where a dependent methodology is used; and (2) significance testing across years, where a linking error is used.

PISA 2009, 2006, 2003, and 2000 are linked assessments. That is, the sets of items used to assess mathematics, reading, and science in these years include a subset of common items, referred to as link items. To establish common reporting metrics for PISA, the difficulty of the link items, measured on different occasions, is compared. The comparison of the item difficulties on the different occasions is used to determine a score transformation that allows the reporting of the data on a common scale.

As each item provides slightly different information about the link transformation, it follows that the chosen sample of link items will influence the estimated transformation. The consequence is an uncertainty in the transformation due to the sampling of link items, just as there is an uncertainty in country means due to the sampling of students.

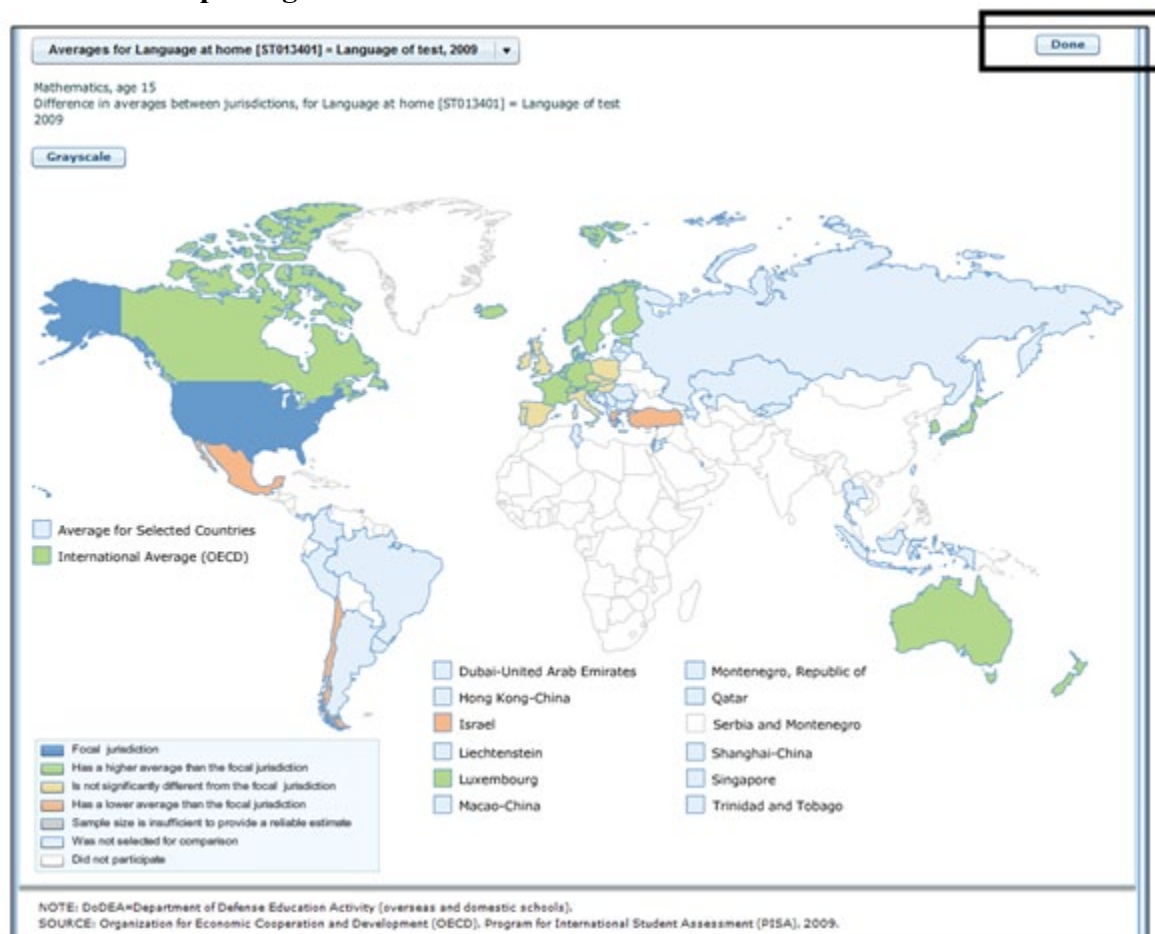
The uncertainty that results from the link-item sampling is referred to as linking error, and this error must be taken into account when making certain comparisons using the 2009, 2006, 2003, and 2000 data. As with sampling errors, the likely range of magnitude for the errors is represented as a standard error. Significance tests for scores across years within the IDE take into account the linking errors applicable to each subject.

## Exhibit 26. Significance test table output

Table		Sig Test 1 X	Sig Test 2 X	
Chart		Significance Test		
<p>To read the results of these significant tests, read across the rows for each variable. Each cell in the row will compare the variable in that row with the variable in the respective column. The symbol displayed in each cell indicates whether that row variable is significantly higher, significantly lower, or not significantly different from the variable in the respective column. Empty cells indicate that a variable cannot be compared to itself.</p>				
<p>Mathematics, age 15 Difference in averages between jurisdictions, for Language at home [ST013401] = Language of test 2006</p>				
	Australia	Canada	France	United States
Australia		< Diff = -10 P-value = 0.0002	> Diff = 19 P-value = 0.0000	> Diff = 41 P-value = 0.0000
Canada	> Diff = 10 P-value = 0.0002		> Diff = 29 P-value = 0.0000	> Diff = 51 P-value = 0.0000
France	< Diff = -19 P-value = 0.0000	< Diff = -29 P-value = 0.0000		> Diff = 22 P-value = 0.0000
United States	< Diff = -41 P-value = 0.0000	< Diff = -51 P-value = 0.0000	< Diff = -22 P-value = 0.0000	
<b>LEGEND:</b>				
<	Significantly lower.			
>	Significantly higher.			
X	No significant difference.			
<p>NOTE: Comparisons are independent with an alpha level of 0.05, except for comparisons of achievement scores across years where a linking error is taken into account and 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: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2006.</p>				

When the map option is selected, a global map is shown with the countries selected shaded (see exhibit 27). 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. (Note that a lighter shade of blue is the default color for countries categorized as “not selected for comparison.”) 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 27. Map of significance tests



Please note that the IDE does not apply adjustments for multiple comparisons. This is consistent with current NCES statistical standards and practice. However, the U.S. PISA 2000 national report published by NCES, and the PISA 2000 international report published by the OECD, did adjust for multiple comparisons in significance testing (using the Bonferroni method). Therefore, results from significance testing obtained from the IDE may not match those in the NCES and OECD PISA 2000 reports.

### 4.G. Export Reports

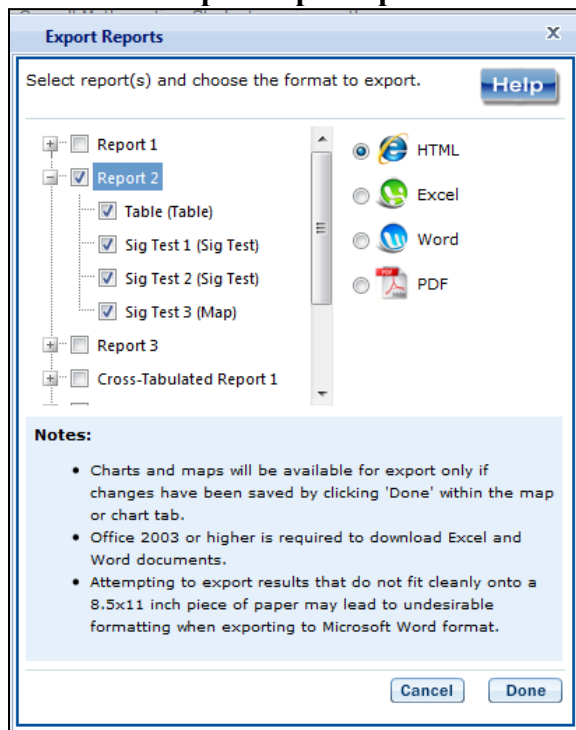
Click on the **Export Reports** button/arrow located on the right side of the **Build Reports** screen to save or print your tables, charts, and significance tests. The report names that appear in the **Export Reports** window are those that were checked off at step 3, **Edit Reports**.

Check the files you want to export, and select one of the file formats: **HTML** (print-friendly), **Excel**, **Word**, or **PDF** (see exhibit 28). 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.

Charts or maps for each report will only be available on the **Export Reports** menu if you saved them by clicking **Done** when you finished each one (see exhibit 27). 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 28. Export report options



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

## V. PISA International Data Explorer Definitions

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

These topics include the following:

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

### 1. Criteria

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

1. Subject:
  - Science literacy
  - Reading literacy
  - Mathematics literacy
2. Year:
  - 2009 (data available for reading, reading subscales, mathematics, and science)
  - 2006 (data available for reading, mathematics, science, and science subscales)
  - 2003 (data available for reading, mathematics, mathematics subscales, and science)
  - 2000 (data available for reading, reading subscales, mathematics, and science)

### 3. Measure:

- Reading scale: Overall reading
- Reading subscale: Access and retrieve
- Reading subscale: Integrate and interpret
- Reading subscale: Reflect and evaluate
- Reading subscale: Continuous text
- Reading subscale: Noncontinuous text
- Mathematics scale: Overall mathematics
- Mathematics subscale: Space and shape
- Mathematics subscale: Change and relationships
- Mathematics subscale: Quantity
- Mathematics subscale: Uncertainty
- Science scale: Overall science
- Science subscale: Identifying scientific issues
- Science subscale: Explaining phenomena scientifically
- Science subscale: Using scientific evidence
- Attitude subscale: Interest in science
- Attitude subscale: Support for scientific inquiry

### 4. Jurisdiction:

- International average (OECD)
- Average for selected countries
- OECD
- Non-OECD

### *Subject*

PISA assesses reading literacy, mathematics literacy, and science literacy at each administration; thus, any can be selected as the subject.

### *Measures*

Although each administration of PISA assesses reading, mathematics, and science, one of these subjects is assessed in depth in each administration. You can choose between the overall scale and/or any of the subject's subscales. However, subscales are only available for a subject area in the years in which it was the major domain. The major subject area assessed in 2000 was reading literacy; in 2003, mathematics literacy; and in 2006, science literacy. (The cycle repeated again in 2009, with reading literacy as the major subject area.) Subscales are constituent parts of the major overall subject scale for an assessment and are specified by the PISA assessment frameworks. In the years when a subject area is a minor domain, only an overall scale is available, and it is based on a set of items of varying difficulty that represent the range of topics covered by the full assessment. Please see Section I. Background, on page 4, for more information.

In 2009 and 2000, reading was the major domain, and mathematics and science were minor domains. Therefore, for these years, subscales are only available for reading data; only single composite scales are available for PISA mathematics and science data.

In 2003, mathematics was the major domain, and reading and science were minor domains. Therefore, for this year, subscales are only available for mathematics data; only single composite scales are available for PISA reading and science data.

In 2006, science was the major domain, and mathematics and reading were minor domains. Therefore, for this year, subscales are only available for science data; only single scales are available for PISA mathematics and reading data. The science attitude subscales are not included in the overall science scale.


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.

### *Years*

Currently, data availability in the IDE is dependent on the measure selected. If the measure chosen is an overall literacy scale, you can choose one or multiple years between 2009, 2006, 2003, and 2000. If the measure chosen is one of the reading subscales, you can choose 2009 and/or 2000. If you choose any of the mathematics subscales, data are only available for 2003. If you choose any of the science subscales, data are only available for 2006.

### *Jurisdictions*

All listed jurisdictions can be selected for any analyses, provided data are available for the selected year. In 2009, a total of 65 jurisdictions participated: 34 Organization for Economic Cooperation and Development (OECD) countries and 31 non-OECD jurisdictions. The non-OECD jurisdictions include some subnational education systems, such as Hong Kong-China. Data are not available for some of these 65 jurisdictions for 2006, 2003, and 2000, either because they did not participate in that PISA cycle or because their data were suppressed due to reporting standards not being met (for example, PISA 2000 data for the Netherlands and the United Kingdom were suppressed due to international reporting standards not being met).


Data are available for 57 jurisdictions (34 OECD and 23 non-OECD) in 2006, 41 jurisdictions (30 OECD and 11 non-OECD) in 2003, and 38 jurisdictions (28 OECD and 10 non-OECD) in 2000. Jurisdictions for which data are not available for a selected year are identified by the icon representing “no data”—. Note that the IDE contains a few U.S.-specific background variables (e.g., race/ethnicity) that, when selected, will not yield information for any other jurisdictions.

Jurisdictions listed in the IDE as OECD countries are those that are currently members of the OECD. In some cases, countries which are current members of the OECD were not members during a particular administration of PISA.

## 2. Variables

In the PISA IDE, questions from two types of questionnaires (student 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.

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.

Note that some variables might be similar in content, but not comparable over the years, either due to differences in the question asked or differences in their response categories. For example, an index variable for students' family structure is available in both 2009 and 2000. Each index variable is based on students' responses to the same question asking who usually lived at home with them. However, these two variables (FAMSTR09 in 2009 and FAMSTR00 in 2000) are not comparable over the two administrations due to differences in response categories (single-parent family, two-parent family, and other in 2009; single-parent family, two-parent family, mixed, and other in 2000). The icon representing "no data" —  — will help in identifying the year for which the variable has data available for analysis.

## 3. Statistics Options

The IDE reports PISA data with several statistics options:

- Average scale scores
- Percentages
- Proficiency levels – discrete
- Proficiency levels – cumulative
- Standard deviations
- Percentiles

### *Average scale scores*

For the PISA assessment, student performance is reported on scales that range from 0 to 1,000.

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

PISA scales are produced using item response theory (IRT) to estimate average scores for science, mathematics, and reading literacy 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 the 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 each of the score categories for constructed-response questions.

### *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, although there is an option to include them.

### *Proficiency levels (discrete and cumulative)*

In addition to average scale scores, achievement results for PISA are reported using proficiency levels for reading, mathematics, and science. Discrete proficiency levels are reported as the percentage of students performing at each PISA proficiency level. Cumulative proficiency levels are reported as the percentage of students performing *at or above* each PISA proficiency level. Increasing levels represent the knowledge, skills, and capabilities needed to perform tasks of increasing complexity. As a result, the findings are reported in terms of percentages of the student population at each of the predefined levels.

Reading literacy results in 2009 were reported using seven proficiency levels: level 1b, level 1a, level 2, level 3, level 4, level 5, and level 6. (An eighth level, below level 1b, was established to include students whose abilities could not be accurately described based on their responses.) The number of proficiency levels in 2009 differs from the number in 2006, 2003, and 2000, when five proficiency levels were used: level 1, level 2, level 3, level 4, and level 5. The cutpoint for level 1a in 2009 is the same as level 1 in 2000, while the cutpoint score for level 1b is set significantly lower; levels 2 to 5 have the same cutpoints for all 3 years.

In order to ensure comparability across years, results for reading literacy are available in the IDE for five proficiency levels: level 1 and below, level 2, level 3, level 4, and level 5 and above. Please note that in 2009 the percentage of students performing at level 1 and below includes students scoring below level 1b, at level 1b, and at level 1a, while the percentage of students scoring at level 5 and above includes students performing at both levels 5 and 6.

For mathematics and science literacy, there are six PISA proficiency levels: level 1, level 2, level 3, level 4, level 5, and level 6. A seventh level, below level 1, was established to include students whose abilities could not be accurately described based on their responses.

Descriptions that characterize typical student performance in reading, mathematics, and science literacy at each proficiency level available in the IDE are shown in the following tables.

### Description of PISA reading literacy proficiency levels

Proficiency level and lower cutpoint score <sup>1</sup>	Task descriptions
<b>Level 1</b>  <b>335</b>	At level 1, tasks require the reader to locate one or more independent pieces of explicitly stated information; to recognize the main theme or author's purpose in a text about a familiar topic; or to make a simple connection between information in the text and common, everyday knowledge. Typically, the required information in the text is prominent and there is little, if any, competing information. The reader is explicitly directed to consider relevant factors in the task and in the text.
<b>Level 2</b>  <b>407</b>	At level 2, some tasks require the reader to locate one or more pieces of information, which may need to be inferred and may need to meet several conditions. Others require recognizing the main idea in a text, understanding relationships, or construing meaning within a limited part of the text when the information is not prominent and the reader must make low-level inferences. Tasks at this level may involve comparisons or contrasts based on a single feature in the text. Typical reflective tasks at this level require the reader to make a comparison or several connections between the text and outside knowledge, by drawing on personal experience and attitudes.
<b>Level 3</b>  <b>480</b>	At level 3, tasks require the reader to locate, and in some cases recognize the relationship between, several pieces of information that must meet multiple conditions. Interpretative tasks at this level require the reader to integrate several parts of a text in order to identify a main idea, understand a relationship, or construe the meaning of a word or phrase. The reader needs to take into account many features in comparing, contrasting, or categorizing. Often the required information is not prominent or there is much competing information; other text obstacles could exist as well, such as ideas that are contrary to expectation or negatively worded. Reflective tasks at this level may require connections, comparisons, and explanations, or they may require the reader to evaluate a feature of the text. Some reflective tasks require the reader to demonstrate a fine understanding of the text in relation to familiar, everyday knowledge. Other tasks do not require detailed text comprehension, but require the reader to draw on less common knowledge.

<b>Level 4</b>  <b>553</b>	At level 4, tasks involve retrieving information that requires the reader to locate and organize several pieces of embedded information. Some tasks at this level require interpreting the meaning of nuances of language in a section of text by taking into account the text as a whole. Other interpretative tasks require understanding and applying categories in an unfamiliar context. Reflective tasks at this level require readers to use formal or public knowledge to hypothesize about or critically evaluate a text. Readers must demonstrate an accurate understanding of long or complex texts whose content or form may be unfamiliar.
<b>Level 5</b>  <b>626</b>	At level 5, tasks involve retrieving information that requires the reader to locate and organize several pieces of deeply embedded information, inferring which information in the text is relevant. Reflective tasks require critical evaluation or hypothesizing, drawing on specialized knowledge. Both interpretative and reflective tasks require a full and detailed understanding of a text whose content or form is unfamiliar. For all aspects of reading, tasks at this level typically involve dealing with concepts that are contrary to expectations.

In PISA 2009, newly constructed items furnished the description of proficiency levels above and below those established in PISA 2000. Level 6 was developed to better describe the skills and understandings of students at the upper end of the reading scale. The cutpoint score for level 6 is a score greater than 698.32, although students at or above this level are included in “level 5 and above” in the IDE. Levels 1a and 1b were developed to better describe the skills and understandings of students at the bottom end of the reading scale. The cutpoint score for level 1a in PISA 2009 is the same as that for level 1 in PISA 2000, while the cutpoint score for level 1b is set significantly lower (at a score less than or equal to 262.04). Students performing at or below level 1a or 1b are included in “level 1 and below” in the IDE.

NOTE: Information about the procedures used to set the proficiency levels is available in the OECD *PISA 2009 Technical Report*.

SOURCE: Fleischman, H.L., Hopstock, P.J., Pelczar, M.P., and Shelley, B.E. (2010). *Highlights From PISA 2009: Performance of U.S. 15-Year-Old Students in Reading, Mathematics, and Science Literacy in an International Context* (NCES 2011-004). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S Government Printing Office.

### Description of PISA mathematics literacy proficiency levels

Proficiency level and lower cutpoint score	Task descriptions
<b>Level 1</b>  <b>358</b>	At level 1, students can answer questions involving familiar contexts where all relevant information is present and the questions are clearly defined. They are able to identify information and to carry out routine procedures according to direct instructions in explicit situations. They can perform actions that are obvious and follow immediately from the given stimuli.
<b>Level 2</b>  <b>420</b>	At level 2, students can interpret and recognize situations in contexts that require no more than direct inference. They can extract relevant information from a single source and make use of a single representational mode. Students at this level can employ basic algorithms, formulas, procedures, or conventions. They are capable of direct reasoning and making literal interpretations of the results.
<b>Level 3</b>  <b>482</b>	At level 3, students can execute clearly described procedures, including those that require sequential decisions. They can select and apply simple problem-solving strategies. Students at this level can interpret and use representations based on different information sources and reason directly from them. They can develop short communications reporting their interpretations, results, and reasoning.
<b>Level 4</b>  <b>545</b>	At level 4, students can work effectively with explicit models for complex concrete situations that may involve constraints or call for making assumptions. They can select and integrate different representations, including symbolic ones, linking them directly to aspects of real-world situations. Students at this level can utilize well-developed skills and reason flexibly, with some insight, in these contexts. They can construct and communicate explanations and arguments based on their interpretations, arguments, and actions.
<b>Level 5</b>  <b>607</b>	At level 5, students can develop and work with models for complex situations, identifying constraints and specifying assumptions. They can select, compare, and evaluate appropriate problem-solving strategies for dealing with complex problems related to these models. Students at this level can work strategically using broad, well-developed thinking and reasoning skills, appropriate linked representations, symbolic and formal characterizations, and insight pertaining to these situations. They can reflect on their actions and formulate and communicate their interpretations and reasoning.

<b>Level 6</b>  <b>669</b>	At level 6, students can conceptualize, generalize, and utilize information based on their investigations and modeling of complex problem situations. They can link different information sources and representations and flexibly translate among them. Students at this level are capable of advanced mathematical thinking and reasoning. These students can apply this insight and these understandings, along with a mastery of symbolic and formal mathematical operations and relationships, to develop new approaches and strategies for attacking novel situations. Students at this level can formulate and precisely communicate their actions and reflections regarding their findings, interpretations, arguments, and the appropriateness of these to the original situations.
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NOTE: Information about the procedures used to set the proficiency levels is available in the OECD *PISA 2009 Technical Report*.

SOURCE: Fleischman, H.L., Hopstock, P.J., Pelczar, M.P., and Shelley, B.E. (2010). *Highlights From PISA 2009: Performance of U.S. 15-Year-Old Students in Reading, Mathematics, and Science Literacy in an International Context* (NCES 2011-004). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S Government Printing Office.

### Description of PISA science literacy proficiency levels

Proficiency level and lower cutpoint score	Task descriptions
<b>Level 1</b>  <b>335</b>	At level 1, students have such a limited scientific knowledge that it can only be applied to a few, familiar situations. They can present scientific explanations that are obvious and follow explicitly from given evidence.
<b>Level 2</b>  <b>410</b>	At level 2, students have adequate scientific knowledge to provide possible explanations in familiar contexts or draw conclusions based on simple investigations. They are capable of direct reasoning and making literal interpretations of the results of scientific inquiry or technological problem solving.
<b>Level 3</b>  <b>484</b>	At level 3, students can identify clearly described scientific issues in a range of contexts. They can select facts and knowledge to explain phenomena and apply simple models or inquiry strategies. Students at this level can interpret and use scientific concepts from different disciplines and can apply them directly. They can develop short statements using facts and make decisions based on scientific knowledge.
<b>Level 4</b>  <b>559</b>	At level 4, students can work effectively with situations and issues that may involve explicit phenomena requiring them to make inferences about the role of science or technology. They can select and integrate explanations from different disciplines of science or technology and link those explanations directly to aspects of life situations. Students at this level can reflect on their actions and they can communicate decisions using scientific knowledge and evidence.

<b>Level 5</b>  <b>633</b>	At level 5, students can identify the scientific components of many complex life situations, apply both scientific concepts and knowledge about science to these situations, and can compare, select and evaluate appropriate scientific evidence for responding to life situations. Students at this level can use well-developed inquiry abilities, link knowledge appropriately, and bring critical insights to situations. They can construct explanations based on evidence and arguments based on their critical analysis.
<b>Level 6</b>  <b>708</b>	At level 6, students can consistently identify, explain, and apply scientific knowledge and knowledge about science in a variety of complex life situations. They can link different information sources and explanations and use evidence from those sources to justify decisions. They clearly and consistently demonstrate advanced scientific thinking and reasoning, and they demonstrate willingness to use their scientific understanding in support of solutions to unfamiliar scientific and technological situations. Students at this level can use scientific knowledge and develop arguments in support of recommendations and decisions that center on personal, social, or global situations.

NOTE: Information about the procedures used to set the proficiency levels is available in the OECD *PISA 2009 Technical Report*.

SOURCE: Fleischman, H.L., Hopstock, P.J., Pelczar, M.P., and Shelley, B.E. (2010). *Highlights From PISA 2009: Performance of U.S. 15-Year-Old Students in Reading, Mathematics, and Science Literacy in an International Context* (NCES 2011-004). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S Government Printing Office.

Exact cut scores for the reading proficiency levels in the IDE are as follows:

- level 1 and below, less than or equal to 407.47;
- level 2, greater than 407.47 and less than or equal to 480.18;
- level 3, greater than 480.18 and less than or equal to 552.89;
- level 4, greater than 552.89 and less than or equal to 625.61;
- level 5 and above, greater than 625.61.

Exact cut scores for the mathematics proficiency levels are as follows:

- below level 1, less than or equal to 357.77;
- level 1, greater than 357.77 and less than or equal to 420.07;
- level 2, greater than 420.07 and less than or equal to 482.38;
- level 3, greater than 482.38 and less than or equal to 544.68;
- level 4, greater than 544.68 and less than or equal to 606.99;
- level 5, greater than 606.99 and less than or equal to 669.30; and
- level 6, greater than 669.30.

Exact cut scores for the science proficiency levels are as follows:

- below level 1, less than or equal to 334.94;
- level 1, greater than 334.94 and less than or equal to 409.54;
- level 2, greater than 409.54 and less than or equal to 484.14;
- level 3, greater than 484.14 and less than or equal to 558.73;
- level 4, greater than 558.73 and less than or equal to 633.33;
- level 5, greater than 633.33 and less than or equal to 707.93; and
- level 6, greater than 707.93.

### *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.

### *Percentiles*

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

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

## **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 a list with 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. (Data were not collected or not reported.)

# The statistic rounds to zero.

‡ Reporting standards not met. (Did not meet reporting standard.)

NOTE: A general note pertains to any special characteristics of the data in the table.

SOURCE: Source information is listed for all PISA data and should be cited when data are used in a publication or presentation.

### *Calculation of OECD averages*

The IDE generates the OECD average for the selected measures and variables if “International Average” is clicked under “Jurisdiction.”

The OECD average generated by the IDE is based on 34 OECD countries in 2009 and 2006, 30 OECD countries in 2003, and 28 OECD countries in 2000. Four current OECD countries (Estonia, the Slovak Republic, Slovenia, and Turkey) did not participate in 2000 and 2003. Also, in 2000 the data for the Netherlands and the United Kingdom were suppressed due to international reporting standards not being met.<sup>1</sup>

Please note that there might be differences between the OECD averages generated by the IDE and the OECD averages for reading literacy and mathematics literacy published in the PISA 2009 OECD and NCES reports. These differences are discussed below.

*Differences in the OECD averages for reading literacy.* In the PISA 2009 OECD and NCES reports, the OECD averages used for trend analyses in reading literacy, referred to as *OECD trend scores*, are based on the averages of the 27 countries that participated in both the 2009 and 2000 assessments and that met all technical standards. As a result, the seven current OECD members not included in the OECD averages used to report on trends in reading literacy are the Slovak Republic and Turkey, which joined PISA in 2003; Estonia and Slovenia, which joined PISA in 2006; Luxembourg, which experienced substantial changes in its assessment conditions between 2000 and 2003; and the Netherlands and the United Kingdom, which did not meet the PISA reporting standards in 2000.

The 2009 OECD average generated in the IDE includes all of the 34 OECD countries, while the 2000 OECD average generated in the IDE includes 28 countries, rather than 27 countries. That is, the OECD score for 2000 generated by the IDE excludes Estonia, Slovenia, the Slovak Republic, Turkey, the Netherlands, and the United Kingdom; however, it does not exclude Luxembourg.

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<sup>1</sup> While the Netherlands data for 2000 were suppressed for the OECD release of the PISA 2000 results, the United Kingdom data for 2000 were suppressed retroactively by the OECD after the release of the PISA 2000 results.



In addition, the OECD average generated by the IDE might differ from previously published results in OECD and NCES reports using 2006, 2003, and 2000 data. The differences might be due to either of two reasons: (1) the composition of the OECD has changed since 2000, with new members joining at various points in time; or (2) reporting standards necessitated revisions of PISA 2000 data for Austria and suppression of PISA 2000 data for the United Kingdom.

You can choose to generate an OECD trend average for reading literacy with the same country composition as the PISA 2009 OECD and NCES reports by selecting “Average for Selected Countries” under “Jurisdiction” and manually clicking on the 27 OECD countries.

*Differences in the OECD averages for mathematics literacy.* The OECD trend averages for mathematics literacy in the PISA 2009 OECD and NCES reports are based on 29 OECD countries that participated in the PISA 2009, 2006, and 2003 assessments and that met all technical standards. As a result, the OECD trend average excludes Chile, Estonia, Israel, and Slovenia, which did not participate in 2003, and the United Kingdom, which did not meet PISA reporting standards for the 2003 assessment.

The OECD averages in mathematics that are generated by the IDE include 34 countries in 2009 and 2006, 30 countries in 2003, and 28 countries in 2000.

You can choose to generate an OECD trend average for mathematics literacy with the same country composition as the PISA 2009 OECD and NCES reports by selecting “Average for Selected Countries” under “Jurisdiction” and manually clicking on the 29 OECD countries (i.e., all of the OECD countries except Chile, Estonia, Israel, Slovenia, and the United Kingdom).

## 6. Glossary

### 6.A. Student and Family Characteristics

#### i. Student Demographics

**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 at 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.

**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 university, further schooling, or the labor force. Senior high school (grades 10 through 12) is considered level 3 in the United States.

**Level 4** – consists of primarily 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.

**Level 5** – divided into levels 5A and 5B, this level focuses on tertiary education. 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 higher 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 as level 5B.

**Level 6** – refers to the doctoral level of academic higher education. Level 6 programs usually require the completion of a research thesis or dissertation.

**Study Programs (ISCEDD, ISCEDL, ISCEDO)** – PISA 2009, 2006, and 2003 collected data on study programs available to 15-year-old students in each country. At the individual level, the study program was identified both through the student tracking form and the student questionnaire. All study programs were classified using the International Standard Classification of Education (ISCED).

**ISCED designation (ISCEDD)** – indicates the designation of the study program: “A” (general programs designed to give access to the next program level); “B” (programs designed to give access to vocational studies at the next program level); “C” (programs designed to give direct access to the labor market); or “M” (modular programs that combine any or all of these characteristics).

**ISCED level (ISCEDL)** – indicates whether students are (1) primary education level (ISCED 1); (2) lower secondary education level (ISCED 2); or (3) upper secondary education level (ISCED 3).

**ISCED orientation (ISCEDO)** – indicates whether the program's curricular content is (1) general; (2) prevocational; (3) vocational; or (4) modular programs that combine any or all of these characteristics.

**What grade are you in? (DGRADE)** – Data on the student's grade are obtained both from the student questionnaire and from the student tracking form. In order to adjust for between-country variations, the relative grade index indicates whether students are at the modal grade in a country

(value of “0”) or whether they are below or above the modal grade level (+ x grades, - x grades). Students’ responses in PISA 2009, 2006, 2003, and 2000 were recoded as follows: 7th grade – 1; 8th grade – 2; 9th grade – 3; 10th grade – 4; 11th grade – 5; 12th grade – 6.

**Family Structure (FAMSTR09 and FAMSTR00)** – This index is based on students’ reports on people living at home with them. **FAMSTR09** in PISA 2009 includes two items: mother (including stepmother or foster mother) and father (including stepfather or foster father) [ST012301–2]. **FAMSTR00** in PISA 2000 and 2003 includes four items: mother; other female guardian (e.g., step or foster mother); father; and other male guardian (e.g., step or foster father) [ST000401–4]. The variable names are listed as they appear in the IDE.

Student response options for all 3 years were then grouped into the following categories:

**Single-parent family** – students living with one of the following: mother, father, male guardian, or female guardian.

**Two-parent family** or nuclear family (PISA 2003 and 2000) – students living with a mother and a father.

**Two-parent family** (PISA 2009) – students living with a father or step/foster father and a mother or step/foster mother.

**Mixed family** (PISA 2003 and 2000) – students living with a mother and a male guardian, a father and a female guardian, or two guardians

**Other** – other response combinations.

**Number of Siblings (NSIB)** – In PISA 2000, students were asked to indicate the number of siblings older and younger than themselves, or the same age [ST000501–3]. The variable names are listed as they appear in the IDE.

## ii. Language and Immigration

**Immigration status (IMMIG and IMMIG03)** – The index on immigrant background was calculated for PISA 2009, 2006, and 2003 from students’ responses to the following three questions: In what country were you born? In what country was your mother born? In what country was your father born? [ST005501–3]. The variable names are listed as they appear in the IDE.

Students were characterized into one of the following groups:

**Native students** – those students born in the country of assessment or who had at least one parent born in the country.

**First-generation students** – those students born outside the country of assessment and whose parents were also born in another country.

**Second-generation students** – those students born in the country of assessment but whose parents were born in another country.

**Foreign Language Spoken at Home (LANG)** – The PISA 2003 index of foreign language spoken at home is based on students’ responses to one item asking if the language spoken at home most of the time was the language of assessment, another official national language,

another national dialect or language, or another language [ST013401]. The variable name is listed as it appears in the IDE.

Student responses are then grouped into two categories:

**Test language or other national language** – The language spoken at home most of the time is the language of assessment, another official national language, or other national dialect or language.

**Foreign language** – The language spoken at home most of the time is different from the language of assessment, from other official national languages, and from other national dialects or languages.

### iii. Parents' Employment and Education

**Occupational Status of Parents (MSECATEG, FSECATEG, HSECATEG)** – In PISA 2003, 2006, and 2009 occupational data for both the student's father and student's mother were obtained by asking open-ended questions. The responses were coded to the four-digit International Standard Classification of Occupations (ISCO) codes: (1) white collar, high skilled (legislators, senior officials and managers, professionals, technicians and associate professionals); (2) white collar, low skilled (service workers, shop and market sales workers and clerks); (3) blue collar, high skilled (skilled agricultural and fishery workers and craft and related trades workers); and (4) blue collar, low skilled (plant and machine operators and assemblers and elementary occupations). Three variables were created:

**Mother's employment category (MSECATEG)** – the ISCO code for the mother.

**Father's employment category (FSECATEG)** – the ISCO code for the father.

**Highest employment category of either parent (HSECATEG)** – the higher ISCO code of either parent or the only available parent.

**International Socio-Economic Index of Occupational Status (ISEI)** – In PISA 2000, the ISEI index was created and is equal to the father's occupation or to the mother's occupation if the father's ISEI is missing. Students are assigned numbers ranging from 16 to 90 on the index based on their parents' occupations, so that they are arrayed on a continuum from low to high socioeconomic status, rather than placed into discrete categories. Three additional indices were obtained from these scores in PISA 2000 and later years, with higher ISEI scores indicating higher levels of occupational status:

**Mother's occupational status (BMMJ)** – In PISA 2006, 2003, and 2000 this variable was derived to show the ISEI score for the mother.

**Father's occupational status (BFMJ)** – In PISA 2006, 2003, and 2000 this variable was derived to show the ISEI score for the father.

**Highest occupational status of parents (HISEI)** – In PISA 2009, 2006, 2003, and 2000 this variable was derived to show the higher ISEI score of either parent or the only available parent.

In PISA 2000, ISEI was computed from BMMJ or BFMJ. If BFMJ is available, ISEI is equal to BFMJ. If BFMJ is not available, but BMMJ is, then ISEI is equal to BMMJ.

**Educational level of parents (MISCED, FISCED, HISCED, PARED)** – The educational level of parents is classified using the International Standard Classification of Education (ISCED) and is constructed by recoding the highest level of educational qualifications for each parent into the following categories: (0) none; (1) ISCED 1 (primary education); (2) ISCED 2 (lower secondary); (3) ISCED 3B or 3C (vocational/prevocational upper secondary); (4) ISCED 3A (upper secondary) and/or ISCED 4 (nontertiary postsecondary); (5) ISCED 5B (vocational tertiary); or (6) ISCED 5A, 6 (theoretically oriented tertiary and postgraduate) [ST001201, ST001301, ST001401, ST001501, ST005201, ST005401, ST008501, ST008801, ST012501, ST012601–4, ST012901, ST013001–4]. The variable names are listed as they appear in the IDE.

Four indices were created based upon the items for parents' educational level:

**Mother's educational level (MISCED09 and MISCED00)** – the highest ISCED level obtained by the mother. MISCED09 includes PISA 2009, 2006, and 2003, and MISCED00 includes PISA 2000.

**Father's educational level (FISCED09 and FISCED00)** – the highest ISCED level obtained by the father. FISCED09 includes PISA 2009, 2006, and 2003, and FISCED00 includes PISA 2000.

**Highest educational level of parents (HISCED09)** – the higher ISCED level of either parent calculated for PISA 2009, 2006, and 2003.

**Highest parental education in years of schooling (PARED)** – calculated for PISA 2009, 2006, and 2003 by recoding HISCED into estimated years of schooling. The conversion of years of schooling varies by PISA administration and country. The conversion tables by year can be found in the respective PISA technical reports.

#### iv. Home Possessions and Socioeconomic Status

**Family Wealth (WEALTH)** – The index of family wealth was derived from student responses to (i) whether they had household items at home; and (ii) the number of household items.

**WEALTH09** in PISA 2009 included 12 items: (i) a dishwasher; a room of their own; a link to the Internet; a DVD player; country-specific option 1 (“a guest room” in the U.S.); country-specific option 2 (“a high-speed internet connection” in the U.S.); and country-specific option 3 (“a musical instrument” in the U.S.); (ii) cellular phone; television; computer; car; and bathrooms [ST013502, ST013506, ST013513–7, ST005811–5]. **WEALTH06** in PISA 2006 included 11 items: (i) a dishwasher; a room of their own; a link to the Internet; a DVD or VCR player; country-specific option 1 (“a guest room” in the U.S.); country-specific option 2 (“a high-speed internet connection” in the U.S.); and country-specific option 3 (“an iPod or MP3” in the U.S.); (ii) cellular phone; television; computer; and car [ST013502, ST013506, ST013513, ST009114–7, ST005811–4]. **WEALTH00** in PISA 2000 included 9 items: (i) a dishwasher; a room of their own; a link to the Internet; and educational software; (ii) cellular phone; television; computer; car; and bathrooms [ST013502, ST013505–6, ST013513, ST005811–5]. Positive values indicate more wealth-related possessions, and negative values indicate fewer. The variable names are listed as they appear in the IDE.

**Economic, Social, and Cultural Status (ESCS)** –The index of economic, social, and cultural status is derived from student responses for PISA 2003, 2006, and 2009. The index was calculated using the following indices: highest occupational status of parents (HISEI); highest educational level of parents, in years of education according to the ISCED (PARED); and home possessions (HOMEPOS). Additionally, the variable reporting how many books at home [ST005901] was recoded into different categorical variables for each PISA administration: **ESCS09** in PISA 2009 is a four-level categorical variable (0–10 books, 11–25 or 26–100 books, 101–200 or 201–500 books, more than 500 books); **ESCS06** in PISA 2006 is a three-level categorical variable (0–25 books, 25–100 books, more than 100 books); and **ESCS03** in PISA 2003 is a two-level categorical variable (less than 100 books, 100 books or more). Positive values indicate a higher ESCS, and negative values indicate a lower ESCS. The variable names are listed as they appear in the IDE.

**Home Educational Resources (HEDRES)** – The PISA index of home educational resources was derived from students’ reports on the availability and number of educational resource items in the home. **HEDRES09** in PISA 2009 included seven items: a dictionary; a quiet place to study; a desk for study; textbooks; a computer that can be used for schoolwork; educational software; and technical reference books [ST013501, ST013503–5, ST013510–12]. **HEDRES06** in PISA 2006 included seven items: a dictionary; a quiet place to study; a desk for study; textbooks; a calculator; a computer that can be used for schoolwork; and educational software [ST013501, ST013503–5, ST013510, ST013512, ST009107]. **HEDRES03** in PISA 2003 included five items: a dictionary, a quiet place to study, a desk for study, textbooks, and a calculator [ST013501, ST013503, ST013510, ST013512, ST009107]. **HEDRES00** in PISA 2000 included five items: a dictionary; a quiet place to study; a desk for study; textbooks; and number of calculators [ST013501, ST013503, ST013510, ST013512, ST002203]. Positive values indicate more educational resources in the home, and negative values indicate fewer educational resources. The variable names are listed as they appear in the IDE.

**Home Possessions (HOMEPOS)** – The household possession index is a summary index based upon students’ responses to (i) whether they had household items at home; and (ii) the number of household items. **HOMPOS09** in PISA 2009 included the following items: (i) a desk to study; a room of your own; a quiet place to study; a computer you can use for schoolwork; educational software; a link to the Internet; classic literature (e.g., Shakespeare); books of poetry; works of art (e.g., paintings); textbooks; technical reference books; a dictionary; a dishwasher; a DVD player; country-specific option 1 (“a guest room” in the U.S.); country-specific option 2 (“a high-speed internet connection” in the U.S.); and country-specific option 3 (“a musical instrument” in the U.S.); (ii) cell phones; televisions; computers; cars; bathrooms; and books (recoded into a four-level categorical variable: 0–10 books, 11–25 or 26–100 books, 101–200 or 201–500 books, more than 500 books) [ST013501–17, ST005811–5, ST005901]. **HOMPOS06** in PISA 2006 included the following items: (i) a desk to study; a room of your own; a quiet place to study; educational software; a link to the Internet; a calculator; classic literature (e.g., Shakespeare); books of poetry; works of art (e.g., paintings); textbooks; a dictionary; a dishwasher; a DVD or VCR player; country-specific option 1 (“a guest room” in the U.S.); country-specific option 2 (“a high-speed internet connection” in the U.S.); and country-specific option 3 (“an iPod or MP3” in the U.S.); (ii) cell phones; televisions; computers; cars; and books (recoded into a three-level categorical variable: 0–25 books, 25–100 books, more than 100 books) [ST013501–3,

ST013505–10, ST013512–17, ST005811–4, ST005901, ST009107]. **HOMPOS03** in PISA 2003 included the following items: (i) a desk to study; a room of your own; a quiet place to study; a computer you can use for schoolwork; educational software; a link to the Internet; a calculator; classic literature (e.g., Shakespeare); books of poetry; works of art (e.g., paintings); textbooks; a dictionary; and a dishwasher; (ii) books (recoded into a two-level categorical variable: less than 100 books, 100 books or more) [ST013501–10, ST013512–3, ST005901, ST009107]. Positive values indicate more household possessions, and negative values indicate fewer household possessions. The variable names are listed as they appear in the IDE.

**Computer Facilities at Home (COMPHOME)** – The index of computer facilities at home was calculated for PISA 2003 based upon students’ reports on the presence of the following items in their home: a computer you can use for schoolwork; educational software; and a link to the Internet [ST005704–6]. Positive values indicate more computer facilities at home and negative values indicate fewer computer facilities. The variable names are listed as they appear in the IDE.

**Cultural Possessions of the Family (CULTPOSS)** – The index of possessions related to classical culture in the family home was calculated for PISA 2009, 2006, 2003, and 2000 based upon students’ reports on the availability of the following items in their home: classic literature (e.g., Shakespeare); books of poetry; and works of art (e.g., paintings) [ST013507–9]. Positive values indicate more possessions related to classical culture in the home, and negative values indicate fewer such possessions. The variable names are listed as they appear in the IDE.

**Cultural Activities of Students (CULTACTV)** – The index of activities related to classical culture was calculated for 2000 PISA based upon students’ reports on how often they had participated in the following activities during the past year: visited a museum or art gallery; attended an opera, ballet, or classical symphony concert; and watched live theatre [ST001802, ST001804–5]. Students responded to each statement on a four-point scale: *never or hardly ever*, *once or twice a year*, *about three or four times a year*, and *more than four times a year*. Positive values indicate a higher frequency of activities related to classical culture, and negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

## 6.B. Students’ Attitudes and Learning Strategies

### i. Engagement in Reading Activities

**Enjoyment of Reading (ENJOY/JOYREAD)** – The index of enjoyment of reading was derived from students’ level of agreement with statements about reading. **ENJOY** in PISA 2009 included the following statements: I read only if I have to; reading is one of my favorite hobbies; I like talking about books with other people; I find it hard to finish books; I feel happy if I receive a book as a present; for me, reading is a waste of time; I enjoy going to a bookstore or a library; I read only to get information that I need; I cannot sit still and read for more than a few minutes; I like to express my opinions about books I have read; and I like to exchange books with my friends [ST013901–11]. **JOYREAD** in PISA 2000 included the following statements: I read only if I have to; reading is one of my favorite hobbies; I like talking about books with other people; I find it hard to finish books; I feel happy if I receive a book as a present; for me, reading

is a waste of time; I enjoy going to a bookstore or a library; I read only to get information that I need; and I cannot sit still and read for more than a few minutes [ST013901–9]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree* and *strongly agree*. All items that are negatively phrased are inverted for scaling. Positive values indicate more positive attitudes towards reading, and negative values indicate less positive attitudes. The variable names are listed as they appear in the IDE.

**Reading Diversity (DIVRED)** – The index of diversity of reading materials was derived from students’ responses to the frequency with which they read different materials. **DIVRED09** in PISA 2009 included the following items: magazines; comic books; fiction; nonfiction books; and newspapers [ST014001–5]. **DIVRED00** in PISA 2000 included the following items: magazines; comic books; fiction; nonfiction books; e-mail and web pages; and newspapers [ST014001–5, ST003605]. Students responded to each statement on a five-point scale: *never*, *a few times a year*, *about once a month*, *several times a month*, and *more often*. Positive values indicate higher diversity of reading materials, and negative values indicate lower diversity. The variable names are listed as they appear in the IDE.

**Online Reading Activities (ONLNREAD)** – The index of online reading activities from PISA 2009 was derived from the frequency with which students were involved in the following reading activities: reading e-mails; chatting online; reading online news; using an online dictionary or encyclopedia; searching online information to learn about a particular topic; taking part in online group discussions or forums; and searching for practical information online [ST014101–7]. Students responded to each statement on a five-point scale: *don’t know what it is*, *never or almost never*, *several times a month*, *several times a week*, and *several times a day*. The higher values on this index indicate more frequent online reading activities. The variable names are listed as they appear in the IDE.

**Interest in Reading (INTREA)** – The index of interest in reading from PISA 2000 was derived from student agreement with the following three statements: because reading is fun, I wouldn’t want to give it up; I read in my spare time; and when I read, I sometimes get totally absorbed [CC000206, CC000213, CC000217]. Students responded to each statement on a four-point scale: *disagree*, *disagree somewhat*, *agree somewhat*, and *agree*. Positive values indicate higher levels of interest in reading, and negative values indicate lower levels. The variable names are listed as they appear in the IDE.

## ii. Reading Types and Tasks

**Interpretation of Literary Texts (RFSINTRP)** – The index of interpretation of literary texts from PISA 2009 was derived from the frequency with which students reported that in the past month they did the following: read fiction; explain the cause of events in a text; explain the way characters behave in a text; and explain the purpose of a text [RFS00104, RFS00202–3, RFS00205]. Students responded to each statement on a four-point scale: *many times*, *two or three times*, *once*, or *not at all*. All items are inverted for scaling, so that higher values on this index indicate more frequent interpretation of literary texts. The variable names are listed as they appear in the IDE.



**Use of Texts Containing Noncontinuous Materials (RFSNCONT)** – The index of use of texts containing noncontinuous materials from PISA 2009 was derived from the frequency with which students reported that in the past month they did the following: use texts that include diagrams or maps; use texts that include tables or graphs; find information from a graph, diagram, or table; and describe the way the information in a table or graph is organized [RFS00103, RFS00107, RFS00201, RFS00208]. Students responded to each statement on a four-point scale: *many times*, *two or three times*, *once*, or *not at all*. All items are inverted for scaling, so that higher values on this index indicate more frequent use of text containing noncontinuous materials. The variable names are listed as they appear in the IDE.

**Reading Activities for Traditional Literature Courses (RFSTRLIT)** – The index of reading activities for traditional literature courses from PISA 2009 was derived from the frequency with which students reported that in the past month they did the following: read informational texts about writers or books; read poetry; memorize a text by heart; learn about the place of a text in the history of literature; and learn about the life of the writer [RFS00101–2, RFS00204, RFS00206–7]. Students responded to each statement on a four-point scale: *many times*, *two or three times*, *once*, or *not at all*. All items are inverted for scaling, so that higher values on this index indicate more frequent reading activities for traditional literature courses. The variable names are listed as they appear in the IDE.

**Use of Functional Texts (RFSFUMAT)** – The index of use of functional texts from PISA 2009 was derived from the frequency with which students reported that in the past month they did the following: read newspaper reports and magazine articles; read instructions or manuals telling how to make or do something (e.g., how a machine works); read advertising material (e.g., advertisements); and explain the connection between different parts of a text [RFS00105–6, RFS00108, RFS00209]. Students responded to each statement on a four-point scale: *many times*, *two or three times*, *once*, or *not at all*. All items are inverted for scaling, so that higher values on this index indicate more frequent use of functional texts. The variable names are listed as they appear in the IDE.

### iii. Interest in Mathematics

**Interest in and Enjoyment of Mathematics (INTMAT)** – The index of interest in and enjoyment of mathematics from PISA 2003 was derived from students' responses concerning the extent to which they agreed with the following four statements: I enjoy reading about mathematics; I look forward to my mathematics lessons; I do mathematics because I enjoy it; and I am interested in the things I learn in mathematics [ST007001, ST007003–4, ST007006]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. Positive scores indicate higher levels of interest in and enjoyment of mathematics. The variable names are listed as they appear in the IDE.

**Interest in Mathematics (INSMAT)** – The index of interest in mathematics from PISA 2000 was derived from students' responses concerning the extent to which they agreed with the following three items: when I do mathematics, I sometimes get totally absorbed; because doing mathematics is fun, I wouldn't want to give it up; and mathematics is important to me personally [CC000201, CC000210, CC000221]. Students responded to each statement on a four-point scale:

*disagree, disagree somewhat, agree somewhat, and agree*. Positive values indicate a greater interest in mathematics, and negative values a lower interest. The variable names are listed as they appear in the IDE.

#### iv. Enjoyment of and Interest in Science

**Enjoyment of Science Learning (JOYSCIE)** – The index of enjoyment of science learning from PISA 2006 was derived from students’ responses concerning the extent to which they agreed with the following statements: I generally have fun when I am learning broad science topics; I like reading about broad science; I am happy doing broad science problems; I enjoy acquiring new knowledge in broad science; and I am interested in learning about broad science [ST009401–5]. Students responded to each statement on a four-point scale: *strongly disagree, disagree, agree, and strongly agree*. All items were inverted for scaling so that positive scores indicate higher levels of enjoyment of science learning. The variable names are listed as they appear in the IDE.

**Interest in and Enjoyment of Science (INTSCIE)** – The index of interest in and enjoyment of science learning from PISA 2006 was derived from students’ responses concerning their interest in learning about the following broad science topics: topics in physics; topics in chemistry; the biology of plants; human biology; topics in astronomy; topics in geology; how scientists design experiments; and what is required for scientific explanations [ST009901–8]. Students responded to each statement on a four-point scale: *strongly disagree, disagree, agree, and strongly agree*. All items were inverted for scaling so that positive scores indicate higher levels of interest in science learning. The variable names are listed as they appear in the IDE.

#### v. Value of Science

**General Value of Science (GENSCIE)** – The index of the general value of science from PISA 2006 was derived from students’ responses concerning their level of agreement with the following statements: advances in broad science and technology usually improve people’s living conditions; broad science is important for helping us to understand the natural world; advances in broad science and technology usually help improve the economy; broad science is valuable to society; and advances in broad science and technology usually bring social benefits [ST009601–2, ST009604, ST009606, ST009609]. Students responded to each statement on a four-point scale: *strongly disagree, disagree, agree, and strongly agree*. All items were inverted for scaling so that positive scores indicate positive perceptions of the general value of science. The variable names are listed as they appear in the IDE.

**Personal Value of Science (PERSCIE)** – The index of the personal value of science from PISA 2006 was derived from students’ responses concerning their level of agreement with the following statements: some concepts in broad science help me see how I relate to other people; I will use broad science in many ways when I am an adult; broad science is very relevant to me; I find that broad science helps me to understand the things around me; and when I leave school there will be many opportunities for me to use broad science [ST009603, ST009605, ST009607–8, ST009610]. Students responded to each statement on a four-point scale: *strongly disagree, disagree, agree, and strongly agree*. All items were inverted for scaling so that positive scores

indicate positive perceptions of the personal value of science. The variable names are listed as they appear in the IDE.

#### vi. Self-Related Cognition Related to Learning

**Perceived Self-Efficacy (SELFEF)** – The index of perceived self-efficacy from PISA 2000 was derived from students’ responses concerning how often the following statements apply to them: I’m certain I can understand the most difficult material presented in texts; I’m confident I can do an excellent job on assignments and tests; and I’m certain I can master the skills being taught [CC000102, CC000118, CC000126]. Students responded to each statement on a four-point scale: *almost never*, *sometimes*, *often*, and *almost always*. Positive values indicate a higher sense of perceived self-efficacy, and negative values indicate a lower sense of perceived self-efficacy. The variable names are listed as they appear in the IDE.

**Effort and Perseverance (EFFPER)** – The index of effort and perseverance from PISA 2000 was derived from students’ responses concerning how often the following statements apply to them when they study: I work as hard as possible; I keep working even if the material is difficult; I try to do my best to acquire the knowledge and skills taught; and I put forth my best effort [CC000107, CC000112, CC000120, CC000128]. Students responded to each statement on a four-point scale: *almost never*, *sometimes*, *often*, and *almost always*. Positive values indicate a higher frequency of effort and perseverance as a learning strategy, and negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

**Instrumental Motivation (INSMOT)** – The index of instrumental motivation from PISA 2000 was derived from students’ responses concerning how often they study to increase their job opportunities; ensure that their future will be financially secure; and enable them to get a good job [CC000106, CC000114, CC000122]. Students responded to each statement on a four-point scale: *almost never*, *sometimes*, *often*, and *almost always*. Positive values indicate higher levels of instrumental motivation for learning, and negative values indicate lower levels. The variable names are listed as they appear in the IDE.

**Student Academic Self-Concept (SCACAD)** – The index of student academic self-concept from PISA 2000 was derived from students’ responses concerning their level of agreement with the following statements: I learn things quickly in most school subjects; I’m good at most school subjects; and I do well in tests in most school subjects [CC000203, CC000207, CC000220]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. Positive scores indicate higher levels of academic self-concept, and negative values indicate lower levels. The variable names are listed as they appear in the IDE.

**Self-Concept in Reading (SCVERB)** – The index of self-concept in reading from PISA 2000 was derived from students’ responses concerning their level of agreement with the following statements: I’m hopeless in test language classes; I learn things quickly in test language class; and I get good marks in test language [CC000205, CC000209, CC000223]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. Positive values indicate a higher level of self-concept in reading, and negative values indicate a lower level. The variable names are listed as they appear in the IDE.

## vii. Self-Related Cognition in Mathematics

**Instrumental Motivation in Mathematics (INSTMOT)** – The index of instrumental motivation in mathematics from PISA 2003 was derived from students' responses concerning their level of agreement with the following statements: making an effort in mathematics is worth it because it will help me in the work that I want to do later on; learning mathematics is worthwhile for me because it will improve my career prospects; mathematics is an important subject for me because I need it for what I want to study later on; and I will learn many things in mathematics that will help me get a job [ST007002, ST007005, ST007007, ST007008]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive scores indicate higher levels of instrumental motivation to learn mathematics. The variable names are listed as they appear in the IDE.

**Mathematics Self-Efficacy (MATHEFF)** – The index of students' self-efficacy regarding mathematics from PISA 2003 was derived from students' responses concerning their level of confidence doing the following calculations: using a train timetable, calculating how long it would take to get from Zedville to Zedtown; calculating how much cheaper a TV would be after a 30 percent discount; calculating how many square meters of tiles you need to cover a floor; understanding graphs presented in newspapers; solving an equation like  $3x + 5 = 17$ ; finding the actual distance between two places on a map with a 1:10,000 scale; solving an equation like  $2(x+3) = (x+3)(x-3)$ ; and calculating the gas consumption rate of a car [ST007101–8]. Students responded to each statement on a four-point scale: *very confident*, *confident*, *not very confident*, and *not at all confident*. All items were inverted for scaling so that positive scores indicate higher levels of confidence in self-efficacy regarding mathematics, and negative scores indicate lower levels of confidence. The variable names are listed as they appear in the IDE.

**Mathematics Anxiety (ANXMAT)** – The index of mathematics anxiety from PISA 2003 was derived from students' responses concerning their level of agreement with the following statements: I often worry that it will be difficult for me in mathematics classes; I get very tense when I have to do mathematics homework; I get very nervous doing mathematics problems; I feel helpless when doing a mathematics problem; and I worry that I will get poor grades in mathematics [ST007201, ST007203, ST007205, ST007208, ST007210]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive scores indicate higher levels of mathematics anxiety, and negative scores indicate lower levels. The variable names are listed as they appear in the IDE.

**Mathematics Self-Concept (SCMAT/MATCON)** – The index of mathematics self-concept was derived from students' responses concerning their level of agreement on their performance in mathematics. **SCMAT** in PISA 2003 included the following items: I am just not good at mathematics; I get good marks in mathematics; I learn mathematics quickly; I have always believed that mathematics is one of my best subjects; and in my mathematics class, I understand even the most difficult work [ST007202, ST007204, ST007206–7, ST007209]. **MATCON** in PISA 2000 included the following items: I get good marks in mathematics; mathematics is one of my best subjects; and I have always done well in mathematics [CC000212, CC000215,

CC000218]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling, except one item in PISA 2003 that was negatively phrased and therefore not inverted. Positive values indicate a greater self-concept in mathematics, and negative values indicate a lower self-concept. The variable names are listed as they appear in the IDE.

#### viii. Self-Related Cognition in Science

**Science Self-Efficacy (SCIEEFF)** – The index of science self-efficacy from PISA 2006 was derived from students’ responses concerning their level of confidence doing the following science-related tasks: recognize the science question that underlies a newspaper report on a health issue; explain why earthquakes occur more frequently in some areas than in others; describe the role of antibiotics in the treatment of disease; identify the science question associated with the disposal of garbage; predict how changes to an environment will affect the survival of certain species; interpret the scientific information provided on the labeling of food items; discuss how new evidence can lead you to change your understanding about the possibility of life on Mars; and identify the better of two explanations for the formation of acid rain [ST009501–8]. Students responded to each statement on a four-point scale: *I could do this easily*, *I could do this with a bit of effort*, *I would struggle to do this on my own*, and *I couldn’t do this*. These items cover important themes identified in the science literacy framework: identifying scientific questions, explaining phenomena scientifically, and using scientific evidence. All items were inverted for scaling so that positive scores indicate higher levels of self-efficacy in science-related tasks. The variable names are listed as they appear in the IDE.

**Instrumental Motivation in Science (INSTSCIE)** – The index of instrumental motivation to learn science from PISA 2006 was derived from students’ responses concerning their level of agreement with the following statements: making an effort in my school science subject(s) is worth it because this will help me in the work I want to do later on; what I learn in my school science subject(s) is important for me because I need this for what I want to study later on; I study school science because I know it is useful for me; studying my school science subject(s) is worthwhile for me because what I learn will improve my career prospects; and I will learn many things in my school science subject(s) that will help me get a job [ST011301–5]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive scores indicate higher levels of instrumental motivation to learn science. The variable names are listed as they appear in the IDE.

**Future-Oriented Science Motivation (SCIEFUT)** – The index of future-oriented science motivation from PISA 2006 was derived from students’ responses concerning their level of agreement with the following statements: I would like to work in a career involving broad science; I would like to study broad science after secondary school; I would like to spend my life doing advanced broad science; and I would like to work on broad science projects as an adult [ST010701–4]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive scores indicate higher levels of motivation to take up a science-related career. The variable names are listed as they appear in the IDE.

**Science Self-Concept (SCSCIE)** – The index of science self-concept from PISA 2006 was derived from students’ responses concerning their level of agreement with the following statements: learning advanced school science topics would be easy for me; I can usually give good answers to test questions on school science topics; I learn school science topics quickly; school science topics are easy for me; when I am being taught school science, I can understand the concepts very well; and I can easily understand new ideas in school science [ST011501–6]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive scores indicate higher levels of self-concept in science. The variable names are listed as they appear in the IDE.

### ix. Learning Strategies – Reported by Student

**Memorization Strategies (MEMOR)** – The index of memorization was derived from students’ responses concerning the frequency with which they used memorization as a learning strategy when studying. **MEMOR09** in PISA 2009 included the following items: I try to memorize everything that is covered in the text; I try to memorize as many details as possible; I read the text so many times that I can recite it; and I read the text over and over again [ST014201, ST014203, ST014205, ST014207]. **MEMOR03** in PISA 2003 included the following items: I go over some problems in mathematics so often that I feel as if I could solve them in my sleep; when I study for mathematics, I try to learn as much as I can by heart; in order to remember the method for solving a mathematics problem, I go through examples again and again; to learn mathematics, I try to remember every step in a procedure [ST007406–7, ST007409, ST007413]. **MEMOR00** in PISA 2000 included the following items: I try to memorize everything that might be covered; I memorize as much as possible; I memorize all new material so that I can recite it; and I practice by saying the material to myself over and over [ST014201, ST014203, ST014205, ST014207]. Students responded to each statement on a four-point scale: *almost never*, *sometimes*, *often*, and *almost always* (MEMOR09 and MEMOR00); and *strongly disagree*, *disagree*, *agree*, and *strongly agree* (MEMOR03). Items for MEMOR03 were inverted for scaling. Positive values indicate a higher frequency of self-reported use of memorization as a learning strategy, and negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

**Control Expectation (CEXP)** – The index of control expectation from PISA 2000 was derived from students’ responses concerning the frequency with which the following statements applied to them: when I sit myself down to learn something really difficult, I can learn it; if I decide not to get any bad grades, I can really do it; if I decide not to get any problems wrong, I can really do it; and if I want to learn something well, I can [CC000104, CC000111, CC000116, CC000124]. Students responded to each statement on a four-point scale: *almost never*, *sometimes*, *often*, and *almost always*. Positive values indicate higher control expectation, and negative values indicate lower control expectation. The variable names are listed as they appear in the IDE.

**Use of Elaboration Strategies (ELAB)** – The index of elaboration was derived from students’ responses concerning the frequency with which they used elaboration (e.g., making connections to related areas) as a learning strategy when studying. **ELAB09** in PISA 2009 included the following items: I try to relate new information to prior knowledge acquired in other subjects; I figure out how the information might be useful outside school; I try to understand the material

better by relating it to my own experiences; and I figure out how the text information fits in with what happens in real life [ST014204, ST014208, ST014210, ST014212]. **ELAB03** in PISA 2003 included the following items: when I am solving mathematics problems, I often think of new ways to get the answer; I think how the mathematics I have learned can be used in everyday life; I try to understand new concepts in mathematics by relating them to things I already know; when I am solving a mathematics problem, I often think about how the solution might be applied to other interesting questions; and when learning mathematics, I try to relate the work to things I have learned in other subjects [ST007402, ST007405, ST007408, ST007411, ST007414].

**ELAB00** in PISA 2000 included the following items: I try to relate new material to things I have learned in other subjects; I figure out how the information might be useful in the real world; I try to understand the material better by relating it to things I already know; and I figure out how the material fits in with what I have already learned [ST014204, ST014212, CC000121, CC000125]. Students responded to each statement on a four-point scale: *almost never*, *sometimes*, *often*, and *almost always* (ELAB09 and ELAB00); and *strongly disagree*, *disagree*, *agree*, and *strongly agree* (ELAB03). Items for ELAB03 were inverted for scaling. Positive values indicate a higher frequency of the self-reported use of elaboration as a learning strategy, and negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

**Control Strategies (CSTRAT)** – The index of control strategies was derived from students’ responses concerning the frequency with which they used strategies that involve planning, monitoring, and regulation when studying. **CSTRAT** in PISA 2009 and 2000 included the following items: I start by figuring out what exactly I need to learn; I check if I understand what I have read; I try to figure out which concepts I still haven’t really understood; I make sure that I remember the most important points in the text; and if I don’t understand something, I look for additional information to clarify this [ST014202, ST014206, ST014209, ST014211, ST014213]. **CSTRAT03** in PISA 2003 included the following items: when I study for a mathematics test, I try to work out what are the most important parts to learn; when I study mathematics, I make myself check to see if I remember the work I have already done; when I study mathematics, I try to figure out which concepts I still have not understood properly; when I cannot understand something in mathematics, I always search for more information to clarify the problem; when I study mathematics, I start by figuring out exactly what I need to learn [ST007401, ST007403, ST007404, ST007410, ST007412]. Students responded to each statement on a four-point scale: *almost never*, *sometimes*, *often*, and *almost always* (CSTRAT); and *strongly disagree*, *disagree*, *agree*, and *strongly agree* (CSTRAT03). Items for CSTRAT03 were inverted for scaling. Positive values indicate a higher frequency of the self-reported use of control strategies, and negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

**Understanding and Remembering (UNDREM)** – The index of understanding and remembering from PISA 2009 was derived from students’ responses concerning the usefulness of the following strategies for understanding and memorizing text: I concentrate on the parts of the text that are easy to understand; I quickly read through the text twice; after reading the text, I discuss its content with other people; I underline important parts of the text; I summarize the text in my own words; and I read the text aloud to another person [ST015601–6]. Students responded to each statement on a six-point scale where *not useful at all* was scored as 1, and *very useful* was

scored as 6. Higher values on this index indicate a greater perception of the usefulness of this strategy. The variable names are listed as they appear in the IDE.

**Preference for Competitive Learning Situations (COMPLRN)** – The index of preference for competitive learning situations from PISA 2003 was derived from students’ responses concerning the extent to which they agreed with the following statements: I would like to be the best in my class in mathematics; I try very hard in mathematics because I want to do better in the exams than the others; I make a real effort in mathematics because I want to be one of the best; in mathematics I always try to do better than the other students in my class; I do my best work in mathematics when I try to do better than others [ST007701, ST007703, ST007705, ST007707, ST007710]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive scores indicate a preference for competitive learning situations. The variable names are listed as they appear in the IDE.

**Preference for Cooperative Learning Situations (COOPLRN)** – The index of preference for cooperative learning situations from PISA 2003 was derived from students’ responses concerning the extent to which they agreed with the following statements: in mathematics I enjoy working with other students in groups; when we work on a project in mathematics, I think that it is a good idea to combine the ideas of all the students in a group; I do my best work in mathematics when I work with other students; in mathematics, I enjoy helping others to work well in a group; and in mathematics I learn most when I work with other students in my class [ST007702, ST007704, ST007706, ST007708–9]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive scores indicate a preference for cooperative learning situations. The variable names are listed as they appear in the IDE.

**Cooperative Learning (COPLRN)** – The index of cooperative learning from PISA 2000 was derived from students’ responses concerning their level of agreement with the following statements: I like to work with other students; I learn most when I work with other students; I like to help other people do well in a group; it is helpful to put together everyone’s ideas when working on a project [CC000202, CC000208, CC000219, CC000222]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. Positive scores indicate higher levels of preference for cooperative learning, and negative values indicate lower levels. The variable names are listed as they appear in the IDE.

**Summarizing (METASUM)** – The index of summarizing from PISA 2009 was derived from students’ responses concerning the usefulness of the following strategies for writing a summary of a long and rather difficult two-page text about fluctuations in the water levels of a lake in Africa: (a) I write a summary. Then I check that each paragraph is covered in the summary, because the content of each paragraph should be included; (b) I try to copy out accurately as many sentences as possible; (c) before writing the summary, I read the text as many times as possible; (d) I carefully check whether the most important facts in the text are represented in the summary; and (e) I read through the text, underlining the most important sentences, then I write them in my own words as a summary [ST015701–5]. Students responded to each statement on a six-point scale where *not useful at all* was scored as 1 and *very useful* was scored as 6. Higher



values on this index indicate a greater perception of the usefulness of this strategy. The variable names are listed as they appear in the IDE.

**Competitive Learning (CPMLRN/)** – The index of competitive learning from PISA 2000 was derived from students’ responses concerning their level of agreement with the following statements: I like to try to be better than other students; trying to be better than others makes me work well; I would like to be the best at something; I learn faster if I’m trying to do better than the others [CC000204, CC000211, CC000216, CC000224]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. Positive scores indicate higher reported levels of preference for competitive learning, and negative values indicate lower levels. The variable names are listed as they appear in the IDE.

#### x. Classroom Instruction in Reading-Teacher Strategies

**Teachers’ Stimulation of Students’ Reading Engagement (STIMREAD)** – The index of teachers’ stimulation of students’ reading engagement from PISA 2009 was derived from students’ responses concerning how often the following occurred in their lessons of the language of instruction: the teacher asks students to explain the meaning of a text; the teacher asks questions that challenge students to get a better understanding of a text; the teacher gives students enough time to think about their answers; the teacher recommends a book or author to read; the teacher encourages students to express their opinion about a text; the teacher helps students relate the stories they read to their lives; and the teacher shows students how the information in texts builds on what they already know [ST015201–7]. Students responded to each statement on a four-point scale: *never or hardly ever*, *some lessons*, *most lessons*, and *all lessons*. Higher values on this index indicate higher teachers’ stimulation of students’ reading engagement. The variable names are listed as they appear in the IDE.

**Use of Structuring and Scaffolding Strategies (STRSTRAT)** – The index of the use of structuring and scaffolding strategies from PISA 2009 was derived from students’ responses concerning how often the following occurred in their lessons of the language of instruction (e.g., English in the U.S.): the teacher explains beforehand what is expected of the students; the teacher checks that students are concentrating while working on the reading assignment; the teacher discusses students’ work, after they have finished the reading assignment; the teacher tells students in advance how their work is going to be judged; the teacher asks whether every student has understood how to complete the reading assignment; the teacher marks students’ work; the teacher gives students the chance to ask questions about the reading assignment; the teacher poses questions that motivate students to participate actively; and the teacher tells students how well they did on the reading assignment immediately after [ST015301–9]. Students responded to each statement on a four-point scale: *never or hardly ever*, *some lessons*, *most lessons*, and *all lessons*. Higher values on this index indicate a greater use of structured teaching. The variable names are listed as they appear in the IDE.

#### xi. Instructional Experiences in Science

**Science Teaching: Interaction (SCINTACT)** – The index of science teaching: interaction from PISA 2006 was derived from students’ responses concerning the frequency of the following

interactive teaching in science lessons: students are given opportunities to explain their ideas; the lessons involve students' opinions about the topics; there is a class debate or discussion; and the students have discussions about the topics [ST011201, ST011205, ST011209, ST011213]. Students responded to each statement on a four-point scale: *in all lessons, in most lessons, in some lessons, and never or hardly ever*. All items were inverted for scaling so that positive scores indicate higher frequencies of interactive science teaching. The variable names are listed as they appear in the IDE.

**Science Teaching: Hands-on Activities (SCHANDS)** – The index of science teaching: hands-on activities from PISA 2006 was derived from students' responses concerning the frequency of the following hands-on activities in science lessons: students spend time in the laboratory doing practical experiments; students are required to design how a school science question could be investigated in the laboratory; students are asked to draw conclusions from an experiment they have conducted; students do experiments by following the instructions of the teacher [ST011202, ST011203, ST011206, ST011214]. Students responded to each statement on a four-point scale: *in all lessons, in most lessons, in some lessons, and never or hardly ever*. All items were inverted for scaling so that positive scores indicate higher frequencies of this type of science teaching. The variable names are listed as they appear in the IDE.

**Science Teaching: Student Investigations (SCINVEST)** – The index of science teaching: student investigations from PISA 2006 was derived from students' responses concerning the frequency of the following activities that occur at school: students are allowed to design their own experiments; students are given the chance to choose their own investigations; and students are asked to do an investigation to test out their own ideas [ST011208, ST011211, ST011216]. Students responded to each statement on a four-point scale: *in all lessons, in most lessons, in some lessons, and never or hardly ever*. All items were inverted for scaling so that positive scores indicate higher frequencies of this type of science teaching. The variable names are listed as they appear in the IDE.

**Science Teaching: Focus on Applications or Models (SCAPPLY)** – The index of science teaching: focus on applications or models from PISA 2006 was derived from students' responses concerning the frequency with which the following activities occur at school: the teacher explains how a school science idea can be applied to a number of different phenomena (e.g., the movement of objects, substances with similar properties); the teacher uses science to help students understand the world outside school; the teacher clearly explains the relevance of broad science concepts to our lives; and the teacher uses examples of technological application to show how school science is relevant to society [ST011207, ST011212, ST011214, ST011217]. Students responded to each statement on a four-point scale: *in all lessons, in most lessons, in some lessons, and never or hardly ever*. All items were inverted for scaling so that positive scores indicate higher frequencies of this type of science teaching. The variable names are listed as they appear in the IDE.

## 6.C. Learning Environment

### i. Learning Environment – Home

**Parental Cultural Communication (CULTCOM)** – The index of cultural communication from PISA 2000 was derived from students’ responses concerning the frequency with which their parents (or guardians) engaged with them in discussing political or social issues; discussing books, films, or television programs; and listening to classical music [ST001901–3]. Students responded to each statement on a five-point scale: *never or hardly ever, a few times a year, about once a month, several times a month, and several times a week*. Positive values indicate a higher frequency of cultural communication, and negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

**Parental Social Communication (SOCCOM)** – The index of social communication from PISA 2000 was derived from students’ responses concerning the frequency with which their parents (or guardians) engaged with them in the following activities: discussing how well they are doing at school; eating the main meal with them around a table; and spending time simply talking with them [ST001904–6]. Students responded to each statement on a five-point scale: *never or hardly ever, a few times a year, about once a month, several times a month, and several times a week*. Positive values indicate a higher frequency of social communication, and negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

**Family Educational Support (FAMEDSUP)** – The index of family educational support from PISA 2000 was derived from students’ reports on how frequently the following people worked with the student on schoolwork: mother; father; and brothers and sisters [ST002001–3]. Students responded to each statement on a five-point scale: *never or hardly ever, a few times a year, about once a month, several times a month, and several times a week*. Positive values indicate a higher frequency of family (parents and siblings) support for the student’s schoolwork, while negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

### ii. Learning Environment – Classroom for Test Language

**Achievement Press (ACHPRESS)** – The index of achievement press from PISA 2000 was derived from students’ reports on the frequency with which, in their test language lesson, the teacher wants students to work hard; tells students that they can do better; does not like it when students deliver careless work; and students have to learn a lot [ST002602, ST002603, ST002604, ST002615]. Students responded to each statement on a four-point scale: *never, some lessons, most lessons, and every lesson*. Positive values indicate higher levels, and negative values indicate lower levels, of achievement press. The variable names are listed as they appear in the IDE.

**Teacher Support in Test Language (TCHSUP00)** – The index of teacher support from PISA 2000 was derived from students’ reports on the frequency with which the teacher supports learning in their test language class by doing the following: shows an interest in every student’s learning; gives students an opportunity to express opinions; helps students with their work; continues teaching until the students understand; does a lot to help students; and helps students

with their learning [ST002605–10]. Students responded to each statement on a four-point scale: *never*, *some lessons*, *most lessons*, and *every lesson*. Positive values indicate higher levels, and negative values indicate lower levels, of teacher support. The variable names are listed as they appear in the IDE.

### iii. Teacher Support for Learning Mathematics

**Teacher Support in Mathematics (TCHSUP03)** – The index of teacher support (in mathematics) from PISA 2003 was derived from students’ reports on the frequency with which the teacher supports learning in their mathematics class by doing the following: shows an interest in every student’s learning; gives extra help when students need it; helps students with their learning; continues teaching until the students understand; and gives students an opportunity to express opinions [ST007801, ST007803, ST007805, ST007807, ST007810]. Students responded to each statement on a four-point scale: *never or hardly ever*, *some lessons*, *most lessons*, and *every lesson*. All items were inverted for scaling so that positive values on this index indicate students’ perceptions of higher levels of teacher support. The variable names are listed as they appear in the IDE.

### 6.D. Learning Time (in and out of school)

**Hours of Schooling (TOTHR)** – The index of hours of schooling from PISA 2000 was based on information provided by principals on the number of instructional weeks in the school year; the number of class periods in the school week; and the number of teaching minutes in the average single class period [SC000601–3]. The index was derived from the product of these three factors, divided by 60. The variable names are listed as they appear in the IDE.

**Instructional Time** – PISA 2009, 2003, and 2000 collected data on the number of minutes spent each week at school. The variable names are listed as they appear in the IDE.

**Reading Courses (LMINS and RMINS)** – The index from 2009 and 2000 was derived from the product of the number of class periods in the test language per week [ST014401] and the number of minutes per single class period [ST014301 in 2009; SC000603 in 2000].

**Mathematics Courses (MMINS)** – The index from 2009, 2003, and 2000 was derived from the product of the number of class periods in mathematics per week [ST014402 in 2009 and 2000; ST007502 in 2003] and the number of minutes per single class period [ST014302 in 2009; SC000603 in 2000].

**Science Courses (SMINS)** – The index from 2009 and 2000 was derived from the product of the number of class periods in science per week [ST014403] and the number of minutes per single class period [ST014303 in 2009; SC000603 in 2000].

**Total Minutes of Instructional Time per Week (TMINS)** – The index from 2003 was calculated by multiplying the median length of a class period by the number of class periods with instruction in all subjects (including mathematics) [ST007503].

**Relative Instructional Time on Mathematics (PCMATH)** – The index from 2003 was calculated by dividing the instructional time in minutes on mathematics (MMINS) by the overall instructional time in minutes (TMINS).

**Time Spent on Homework (HMWKTIME)** – The index of time spent on homework from PISA 2000 was derived from students’ reports on the amount of time they devoted to homework in the test language; mathematics; and science [ST003301–3]. Students responded to each statement on a four-point scale: *no time, less than 1 hour a week, between 1 and 3 hours a week, and 3 hours or more a week*. Positive values indicate more time spent on homework, and negative values indicate less time. The variable names are listed as they appear in the IDE.

**Relative Time Spent on Mathematics Homework (RMHMWK)** – The index of relative time spent on mathematics homework from PISA 2003 was derived from the ratio of students’ responses to the following items: how much time do you spend per week doing mathematics homework; and how much time do you spend per week doing homework [ST007301, ST006901]. The variable names are listed as they appear in the IDE.

## 6.E. Careers and Further Education

### i. Educational Expectations

**Expected Educational Level (SISCED)** – The index of the expected educational level from PISA 2003 was derived from students’ responses about their educational aspirations [ST006301–6]. Educational levels were classified according to the International Standard Classification of Education (ISCED) in the following categories: (1) ISCED 2 (lower secondary); (2) ISCED 3B or 3C (vocational/prevocational upper secondary); (3) ISCED 3A (upper secondary); (4) ISCED 4 (nontertiary postsecondary); (5) ISCED 5B (vocational tertiary); (6) ISCED 5A, 6 (theoretically oriented tertiary and postgraduate). The variable names are listed as they appear in the IDE.

### ii. Career Expectations

**Students’ Self-Expected Socio-Economic Index of Occupational Status (BTHR)** – The student self-expected socioeconomic index of occupational status from PISA 2000 was based upon students’ responses concerning their expected occupation at age 30. The responses were transformed into socioeconomic indices (SEI) that capture the attributes of occupations that convert education into income and were derived by the optimal scaling of occupation groups to maximize the indirect effect of education on income by occupation and to minimize the direct effect of education on income net of occupation. Higher scores of BTHR indicate higher levels of expected socioeconomic status. The variable names are listed as they appear in the IDE.

**Students’ Expected Occupational Status (BSMJ)** – The index of the expected occupational status from PISA 2006 and 2003 was based on students’ responses concerning their expected occupation at age 30 and a description of this job. The index is derived from recoding the responses into four-digit International Standard Classification of Occupations (ISCO) codes, which are then mapped to the International Socio-Economic Index of Occupational Status (ISEI) index. Higher scores of BSMJ indicate higher levels of expected occupational status. The variable names are listed as they appear in the IDE.

### iii. Preparedness for Science-Related Career

**School Preparation for Science-Related Careers (CARPREP)** – The index of school preparation for science careers from PISA 2006 was derived from students’ responses to the following statements regarding the usefulness of schooling as preparation for a science-related career: the subjects available at my school provide students with the basic skills and knowledge for a science-related career; the school science subjects at my school provide students with the basic skills and knowledge for many different careers; the subjects I study provide me with the basic skills and knowledge for a science-related career; and my teachers equip me with the basic skills and knowledge I need for a science-related career [ST010501–4]. Students responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling so that positive values on this index indicate higher levels of agreement with the usefulness of schooling for this purpose. The variable names are listed as they appear in the IDE.

**Student Information on Science-Related Careers (CARINFO)** – The index of student information on science careers for PISA 2006 was derived from students’ responses regarding how informed they were about the following topics concerning science-related careers: science-related careers that are available in the job market; where to find information about science-related careers; the steps students need to take if they want a science-related career; and employers or companies that hire people to work in science-related careers [ST010601–4]. Students responded to each statement on a four-point scale: *very well informed*, *fairly informed*, *not well informed*, and *not informed at all*. All items were reverse coded so that positive scores indicate higher levels of information about science-related careers. The variable names are listed as they appear in the IDE.

## 6.F. Library Use

**Use of Libraries (LIBUSE)** – The index of the use of libraries from PISA 2009 was derived from students’ responses on the frequency with which they visited a library for the following activities: borrow books to read for pleasure; borrow books for schoolwork; work on homework, course assignments, or research papers; read magazines or newspapers; read books for fun; learn about things that are not course-related, such as sports, hobbies, people, or music; and use the Internet [ST015401–7]. Students responded to each statement on a five-point scale: *never*, *a few times a year*, *about once a month*, *several times a month*, and *several times a week*. Positive values on this index indicate a greater use of libraries. The variable names are listed as they appear in the IDE.

## 6.G. Computer Usage

### i. Comfort With Computers

**Comfort and Ability with Computers (COMAB)** – The index of comfort with and perceived ability to use computers from PISA 2000 was derived from students’ responses to the following questions: how comfortable are you using a computer; how comfortable are you using a

computer to write a paper; how comfortable are you taking a test on a computer; and if you compare yourself with other 15-year-olds, how would you rate your ability to use a computer [IT000201–3, IT000301]. For the first three questions, students responded to each statement on a four-point scale: *very comfortable*, *comfortable*, *somewhat comfortable*, and *not at all comfortable*. For the last question, students responded to each statement on a four-point scale: *excellent*, *good*, *fair*, and *poor*. Positive values indicate a higher self-perception of computer abilities, and negative values indicate a lower self-perception of computer abilities. The variable names are listed as they appear in the IDE.

## ii. Confidence with Computer-related Tasks

### **Confidence in Information, Communication and Technology (ICT) High-Level Tasks**

**(HIGHCONF)** – The index of confidence in ICT high-level tasks was derived from students’ responses to how well they could perform certain computer tasks. **HIGHCONF** in PISA 2006 asked students about their confidence doing the following: use software to find and get rid of computer viruses; edit digital photographs or other graphic images; create a database (e.g., using Microsoft Access); use a word processor (e.g., to write an essay for school); use a spreadsheet to plot a graph; create a presentation (e.g., using Microsoft PowerPoint); create a multimedia presentation (with sound, pictures, video); and construct a web page [IC000602, IC001403-4, IC001410-12, IC001414, IC000623]. **HIGHCONF** in PISA 2003 asked about the following tasks: use software to find and get rid of computer viruses; use a database to produce a list of addresses; create a computer program (e.g., in Logo, Pascal, Basic); use a spreadsheet to plot a graph; create a presentation (e.g., using Microsoft PowerPoint); create a multimedia presentation (with sound, pictures, video); and construct a web page [IC000602, IC000606, IC000615, IC000616-17, IC000620, IC000623]. Students responded to each statement on a four-point scale: *I can do this very well by myself*, *I can do this with help from someone*, *I know what this means but I cannot do it*, and *I don’t know what this means*. All items were inverted for scaling so that positive values on this index indicate high self-confidence in ICT high-level tasks. The variable names are listed as they appear in the IDE.

### **Confidence in Information, Communication and Technology (ICT) Routine Tasks on a Computer (ROUTCONF)**

– The index of confidence in ICT routine tasks on a computer from PISA 2003 was derived from students’ responses to the following items: start a computer game; open a file; create/edit a document; scroll a document up and down a screen; copy a file from a floppy disk; save a computer document or file; print a computer document or file; delete a computer document or file; moves files from one place to another on a computer; play computer games; and draw pictures using a mouse [IC000601, IC000603-5, IC000607-11, IC000618, IC000621]. Students responded to each statement on a four-point scale: *I can do this very well by myself*, *I can do this with help from someone*, *I know what this means but I cannot do it*, and *I don’t know what this means*. All items were inverted for scaling so that positive values on this index indicate high self-confidence in ICT routine tasks. The variable names are listed as they appear in the IDE.

### **Confidence in Information, Communication and Technology (ICT) Internet tasks**

**(INTCONF)** – The index of confidence in ICT internet tasks was derived from students’ responses to how well they could perform certain computer tasks. **INTCONF** in PISA 2006

included the following items: chat online; search the Internet for information; download files or programs from the Internet; attach a file to an e-mail message; download music from the Internet; and write and send e-mails [IC001401, IC001407, IC000613–14, IC000619, IC000622]. **INTCNF03** in PISA 2003 included the following items: get on to the Internet; copy or download files from the Internet; attach a file to an e-mail message; download music from the Internet; and write and send e-mails [IC000612–4, IC000619, IC000622]. Students responded to each statement on a four-point scale: *I can do this very well by myself, I can do this with help from someone, I know what this means but I cannot do it, and I don't know what this means*. All items were inverted for scaling so that positive values on this index indicate high self-confidence in ICT internet tasks. The variable names are listed as they appear in the IDE.

### iii. Attitudes Towards Computers

**Attitudes Towards Computers (ATTCOMP)** – The index of attitudes towards computers from PISA 2003 was derived from students' responses to the following items: it is very important to me to work with a computer; to play or work with a computer is really fun; I use a computer because I am very interested; and I lose track of time when I am working with the computer [IC002401–4]. Students responded to each statement on a four-point scale: *strongly agree, agree, disagree, and strongly disagree*. All items were inverted for scaling so that positive values on this index indicate positive attitudes towards computers. The variable names are listed as they appear in the IDE.

**Interest in Computers (COMATT)** – The index of interest in computers from PISA 2000 was derived from students' responses to the following items: it is very important to me to work with a computer; to play or work with a computer is really fun; I use a computer because I am very interested in this; I forget the time, when I am working with the computer [IT000701, IT000801, IT000901, IT001001]. Students responded to each statement with a *yes* or *no*. Positive values indicate more interest in computers, and negative values indicate less interest. The variable names are listed as they appear in the IDE.

### iv. Usage and Availability of Computers

**Information, Communication and Technology (ICT) for School Related Tasks (HOMSCH)** – The index of computer use at home for schoolwork from PISA 2009 was derived from students' responses regarding how often they used a computer at home for the following activities: browse the Internet for schoolwork; use e-mail to communicate with other students about schoolwork; use e-mail to communicate with teachers and submit homework or other schoolwork; download, upload, or browse material from the school's website; and check the school's website for announcements [IC001901–5]. Students responded to each statement on a four-point scale: *almost every day, once or twice a week, once or twice a month, and never or hardly ever*. The variable names are listed as they appear in the IDE.

**Computer Usage and Experience (COMUSE)** – The index of computer usage from PISA 2000 was derived from students' responses regarding how often they used computers or computer software as follows: the computer to help you learn school material; the computer for programming; word processing (e.g., Word or WordPerfect); spreadsheets (e.g., Lotus or Excel);



drawing, painting, or graphics software; and educational software [IT000503–4, IT000602–5]. Students responded to each statement on a five-point scale: *almost every day, a few times each week, between once a week and once a month, less than once a month, and never*. Positive values indicate a higher frequency of computer use, and negative values indicate a lower frequency. The variable names are listed as they appear in the IDE.

**Information, Communication and Technology (ICT) Availability at Home (ICTHOME) –**

The index of ICT availability at home from PISA 2009 was derived from students’ reports on whether any of the following are available for them to use at home: a desktop computer; a portable laptop; an internet connection; a video games console; a cell phone; Mp3/Mp4 player; a printer; and a USB memory stick [IC001501–8]. Students responded to each statement on a three-point scale: *yes, I use it; yes, but I don’t use it; and no*. The variable names are listed as they appear in the IDE.

**Information, Communication and Technology (ICT) Internet/Entertainment Use (INTUSE) –**

The index of ICT internet/entertainment use from PISA 2006 and 2003 was based on students’ responses to the following items measuring the frequency of different types of ICT use: the Internet to look up information about people, things, or ideas; games on a computer; the Internet to collaborate with a group or team; the Internet to download software; the Internet to download music; and a computer for electronic communication (e.g., e-mail or “chat rooms”) [IC000501-2, IC000504, IC000506, IC000510, IC000512]. Students responded to each statement on a five-point scale: *almost every day, a few times each week, between once a week and once a month, less than once a month, and never*. All items were inverted for scaling so that positive values on this index indicate higher frequencies of ICT internet/ entertainment use. The variable names are listed as they appear in the IDE.

**Information, Communication and Technology (ICT) Internet/Entertainment Use (ENTUSE) –**

The index of computer use at home for leisure from PISA 2009 was derived from students’ reports on how often they used a computer for the following activities at home: play one-player games; play collaborative online games; use e-mail; chat on line; browse the Internet for fun; download music, films, games or software from the Internet; publish and maintain a personal website, weblog or blog; and participate in online forums, virtual communities or spaces [IC001801-2, IC001804-9]. Students responded to each statement on a four-point scale: *almost every day, once or twice a week, once or twice a month, and never or hardly ever*. All items were inverted for scaling so that positive values on this index indicate high levels of computer use at home for leisure. The variable names are listed as they appear in the IDE.

**Information, Communication and Technology (ICT) Program/Software Use (PRGUSE) –**

The index of ICT program/software use was derived from students’ responses to how often they used various programs and software. **PRGUSE** in PISA 2006 included the following items: word processing (e.g., Microsoft Word or Corel WordPerfect); spreadsheets (e.g., IBM Lotus 1-2-3 or Microsoft Excel); drawing, painting, or graphics programs on a computer; educational software, such as mathematics programs; and the computer for programming [IC000503, IC000505, IC000507-8, IC000511]. **PRGUS03** in PISA 2003 included the following items: word processing (e.g., Microsoft Word or Corel WordPerfect); spreadsheets (e.g., IBM Lotus 1-2-3 or Microsoft Excel); drawing, painting, or graphics programs on a computer; educational

software, such as mathematics programs; the computer to help you learn school material; and the computer for programming [IC000503, IC000505, IC000507-9, IC000511]. Students responded to each statement on a five-point scale: *almost every day, a few times each week, between once a week and once a month, less than once a month, and never*. All items were inverted for scaling so that positive values on this index indicate high frequencies of ICT program/software use. The variable names are listed as they appear in the IDE.

## 6.H. Students and Environmental Issues

### i. Environmental Awareness

**Awareness of Environmental Issues (ENVAWARE)** – The index of awareness of environmental issues from PISA 2006 was based on students’ responses regarding how informed they were about the following environmental issues: the increase of greenhouse gases in the atmosphere; the use of genetically modified organisms (GMOs); acid rain; nuclear waste; and the consequences of clearing forests for other land use [ST010001–5]. Students responded to each statement on a five-point scale: *I have never heard of this; I have heard about this but I would not be able to explain what it is; I know something about this and could explain the general issue; I am familiar with this; and I would be able to explain this well*. Positive scores on this index indicate higher levels of awareness of environmental issues. The variable names are listed as they appear in the IDE.

### ii. Environmental Issues and Responsibility

**Concern for Environmental Issues (ENVPERC)** – The index of concern for environmental issues from PISA 2006 was derived from student responses as to whether the following six items were a serious concern for themselves and others: air pollution; energy shortages; extinction of plants and animals; clearing of forests for other land use; water shortages; and nuclear waste [ST010201–6]. Students responded to each statement on a four-point scale: *this is a serious concern for me personally as well as others; this is a serious concern for other people in my country but not me personally; this is a serious concern only for people in other countries; and this is not a serious concern to anyone*. The items were reverse scored for scaling so that positive scores on this index indicate higher levels of concerns about environmental issues. The variable names are listed as they appear in the IDE.

**Environmental Optimism (ENVOPT)** – The index of environmental optimism from PISA 2006 was based on students’ responses regarding whether they felt the following environmental problems would improve or get worse in the next 20 years: air pollution; energy shortages; extinction of plants and animals; clearing of forests for other land use; water shortages; and nuclear waste [ST010301–6]. Students responded to each statement on a three-point scale: *improve, stay about the same, and get worse*. All items were inverted for scaling so that positive values on this index indicate higher levels of optimism about environmental issues. The variable names are listed as they appear in the IDE.

**Responsibility for Sustainable Development (RESPDEV)** – The index of responsibility for sustainable development from PISA 2006 was derived from students’ level of agreement with

the following statements: it is important to carry out regular checks on the emissions from cars as a condition of their use; it disturbs me when energy is wasted through the unnecessary use of electrical appliances; I am in favor of having laws that regulate factory emissions even if this would increase the price of products; to reduce waste, the use of plastic packaging should be kept to a minimum; industries should be required to prove that they safely dispose of dangerous waste materials; I am in favor of having laws that protect the habitats of endangered species; and electricity should be produced from renewable sources as much as possible, even if this increases the cost [ST010401–7]. Students responded to each statement on a four-point scale: *strongly agree*, *agree*, *disagree*, and *strongly disagree*. The items were reverse scored for scaling so that positive scores on this index indicate higher levels of responsibility for sustainable development. The variable names are listed as they appear in the IDE.

## 6.I. School Composition, SES, and Organization

### i. School Enrollment

**National modal grade for 15-year-olds (SC008801 – Total number of students)** – This PISA 2009 school variable asks for the total number of students in the school. Each of the participating countries in PISA selects a nationally representative sample of 15-year-olds, regardless of grade level. This generally corresponds to 10<sup>th</sup> grade in the United States, but grade levels vary across countries.

**Grade 13 (SC007913)** – This variable can be found in PISA 2009, 2006, 2003, and 2000. While schools in the United States generally end at grade 12, students in some countries begin school at an earlier age and consequently have 13 years of primary and secondary schooling.

**School Size (SCHLSIZE/SCHSIZE/DSCHSIZE)** – The index of school size from PISA 2009, 2006, 2003, and 2000 was derived from summing school principals' responses to the total number of girls and boys at a school. Values on this index indicate total enrollment at a school [SC008401 and SC008402]. Responses were recoded as follows: 0 to 500 – 1; 501 to 1,000 – 2; 1,001 to 1,500 – 3; more than 1,500 – 4. The variable names are listed as they appear in the IDE.

**Percentage of Girls in the School (PCGIRLS)** – The index of the percentage of girls enrolled at school from PISA 2009, 2006, 2003, and 2000 was based on the enrollment data provided by school principals regarding the number of girls at the school divided by the total number of girls and boys at the school [SC008401 and SC008402]. The variable names are listed as they appear in the IDE.

**Class Size (CLSIZE)** – The index of the average class size from PISA 2006 was derived from one of nine possible categories, ranging from “15 students or fewer” to “more than 50 students.” **CLSIZE** takes the midpoint of each response category, a value of 13 for the lowest category, and a value of 53 for the highest. The variable names are listed as they appear in the IDE.

## ii. School Type and Community

**School Type (SCHTYPE)** – Schools are classified as either public or private, according to whether a private entity or a public agency has the ultimate power to make decisions concerning their affairs. The index of school type from PISA 2009, 2006, 2003, and 2000 was derived from school principals’ responses to questions asking them to specify the percentage of the school’s total funding received in a typical school year from government sources; student fees or school charges paid by parents; benefactors, donations, bequests, sponsorships, or parental fund-raising; and other sources [SC002501, SC008101-4]. The PISA index on school type has three categories: (1) public schools controlled and managed by a public education authority or agency; (2) government-dependent private schools controlled by a nongovernmental organization (or with a governing board not selected by a government agency) that receive more than 50 percent of their core funding from government agencies; and (3) government-independent private schools controlled by a nongovernmental organization (or with a governing board not selected by a government agency) that receive less than 50 percent of their core funding from government agencies. The variable names are listed as they appear in the IDE.

## iii. Ability Tracking

**Ability Grouping (ABGROUP)** – The index of ability grouping between classes was derived from school principals’ reports on whether the school organizes instruction differently for students with different abilities. **ABGROUP** in PISA 2009 and 2006 reports organization into different classes [SC009001] or within classes [SC009002] “for all subjects,” “for some subjects,” or “not for any subjects” for students with different abilities. This index has the following three categories: (1) schools that do not group students by ability in any subjects, either between or within classes; (2) schools that group students by ability for some, but not all, subjects, and that do so either between or within classes; and (3) schools that group students by ability in all subjects either between or within classes. **ABGRP03** in PISA 2003 reports organization into mathematics classes studying similar content, but at different levels of difficulty [SC003801] and different classes studying different content or sets of mathematics topics that have different levels of difficulty [SC003802] for students with different abilities. This index has the following three categories: (1) schools with no ability grouping between any classes; (2) schools with one of these forms of ability grouping between classes for some classes; and (3) schools with one of these forms of ability grouping for all classes. The variable names are listed as they appear in the IDE.

## 6.J. School Staffing and Resources

### i. Staffing

**Student-Teacher Ratio (STRATIO)** – The index of student-teacher ratio from PISA 2009, 2006, 2003, and 2000 was obtained by dividing the school size [DSCHSIZE] by the total number of teachers (full-time teachers [SC008711] and part-time teachers [SC008712]). Values on this index indicate the number of students per teacher. To convert head counts into full-time equivalents, a full-time teacher employed for at least 90 percent of the statutory time as a classroom teacher received a weight of 1, and a part-time teacher employed for less than 90

percent of the time as a classroom teacher received a weight of 0.5. The variable names are listed as they appear in the IDE.

**Proportion of Teachers With ISCED 5A Qualification in Pedagogy**

**(PROPQUAL/PROPQPED)** – The index of the proportion of teachers who have an ISCED 5A qualification in pedagogy from PISA 2009, 2006, and 2000 (**PROPQUAL**) and PISA 2003 (**PROPQPED**) was derived from school principals' reports by dividing the number of teachers with an International Standard Classification of Education (ISCED) level 5A (bachelor's in the U.S.) qualification in pedagogy ( $[SC008731] + 0.5 * [SC008732]$ ) by the total number of teachers ( $[SC008711] + 0.5 * [SC008712]$ ). The variable names are listed as they appear in the IDE.

**Proportion of Mathematics Teachers With ISCED 5A Qualification in Math (PROPMA5A)** –

The index of the proportion of mathematics teachers with an ISCED 5A qualification in math from PISA 2003 and 2000 was derived from school principals' reports by dividing the number of mathematics teachers with an ISCED level 5A (bachelor's in the U.S.) qualification and a major in mathematics ( $[SC004112] + 0.5 * [SC004122]$ ) by the total number of mathematics teachers ( $[SC004111] + 0.5 * [SC004121]$ ). The variable names are listed as they appear in the IDE.

**Proportion of Teachers Fully Certified (PROPCERT)** – The index of the proportion of teachers fully certified by the appropriate authority from PISA 2009, 2006, 2003, and 2000 was derived from school principals' reports by dividing the number of fully certified teachers ( $[SC008721] + 0.5 * [SC008722]$ ) by the total number of teachers ( $[SC008711] + 0.5 * [SC008712]$ ). The variable names are listed as they appear in the IDE.

**Proportion of Language Teachers With ISCED 5A Qualification (PROPREAD)** – The index of the proportion of test language teachers with an ISCED 5A qualification from PISA 2000 was derived from school principals' reports by dividing the number of test language teachers who have an ISCED level 5A (bachelor's in the U.S.) qualification ( $[SC001409] + 0.5 * [SC001410]$ ) by the total number of test language teachers ( $[SC001407] + 0.5 * [SC001408]$ ). The variable names are listed as they appear in the IDE.

**Student-Mathematics Teacher Ratio (SMRATIO)** – The index of the student-mathematics teacher ratio from PISA 2003 was derived from questions asking school principals to report the school size [SCHLSIZE] divided by the total number of mathematics teachers ( $[SC004111] + 0.5 * [SC004121]$ ). The variable names are listed as they appear in the IDE.

**Proportion of Mathematics Teachers (PROPMATH)** – The index of the proportion of mathematics teachers from PISA 2003 was derived from school principals' reports by dividing the number of mathematics teachers ( $[SC004111] + 0.5 * [SC004121]$ ) by the total number of teachers ( $[SC008711] + 0.5 * [SC008712]$ ). The variable names are listed as they appear in the IDE.

**Proportion of Science Teachers With ISCED 5A Qualification (PROPSCIE)** – The index of the proportion of science teachers who have an ISCED 5A qualification from PISA 2000 was

derived from school principals' reports by dividing the number of science teachers with an ISCED level 5A (bachelor's in the U.S.) qualification ( $[SC001417] + 0.5 * [SC001418]$ ) by the total number of science teachers ( $[SC001415] + 0.5 * [SC001416]$ ). The variable names are listed as they appear in the IDE.

## ii. Shortage of School Staff Including Teachers

**Shortage of Teachers (TCSHORT)** – The index of teacher shortage from PISA 2009, 2006, 2003, and 2000 was derived from four items measuring the school principal's perceptions of potential factors hindering instruction at school: a lack of qualified science teachers; a lack of qualified mathematics teachers; a lack of qualified test language teachers; and a lack of qualified teachers of other subjects [ $SC008904, SC003001-3$ ]. Principals responded to each statement on a four-point scale: *not at all, very little, to some extent, and a lot*. All items were inverted for scaling so that positive values on this index indicate a perception of higher teacher shortage, and negative values indicate a perception of lower teacher shortage. The variable names are listed as they appear in the IDE.

## iii. Quality of School Educational Resources

**Quality of Schools' Educational Resources (SCMATEDU)** – The index of the quality of a school's educational resources was derived from school principals' reports on the extent to which learning by 15-year-olds in their school was hindered by a lack of resources.

**SCMATEDU** in PISA 2009 and 2006 included the following items: shortage or inadequacy of science laboratory equipment; shortage or inadequacy of instructional materials; shortage or inadequacy of computers for instruction; lack or inadequacy of internet connectivity; shortage or inadequacy of computer software for instruction; shortage or inadequacy of library materials; and shortage or inadequacy of audiovisual resources [ $SC003009, SC003015-16, SC003018-20, SC008910$ ]. **SCMATE03** in PISA 2003 included the following items: shortage of instructional materials (e.g., textbooks); shortage of computers for instruction; shortage of computer software for instruction; shortage of calculators for instruction; shortage of library materials; shortage of audiovisual resources; and shortage of science laboratory equipment and materials [ $SC003009, SC003015-20$ ]. **SCMATE00** in PISA 2000 included the following items: shortage of instructional materials (e.g., textbooks); shortage of computers for instruction; lack of instructional materials in the library; lack of multimedia resources for instruction; inadequate science laboratory equipment; and inadequate facilities for the fine arts [ $SC001109, SC003009, SC003015, SC003018-20$ ]. Principals responded to each statement on a four-point scale: *not at all, very little, to some extent, and a lot*. All items were inverted for scaling so that positive values on this index indicate that the unavailability of educational resources was not a hindrance to learning, and negative values indicate that the unavailability of educational resources was a hindrance to learning. The variable names are listed as they appear in the IDE.

**Quality of Schools' Physical Infrastructure (SCMATBUI)** – The index of the quality of a school's physical infrastructure from PISA 2003 and 2000 was derived from principals' reports on the extent to which learning by 15-year-olds in their school was hindered by the poor condition of buildings; poor heating, cooling and/or lighting systems; and a lack of instructional space (e.g., classrooms) [ $SC001101-3$ ]. Principals responded to each statement on a four-point

scale: *not at all, very little, to some extent, and a lot*. All items were inverted for scaling so that positive values on this index indicate that the quality of the school's physical infrastructure was not a hindrance to learning, and negative values indicate that the school's physical infrastructure was a hindrance to learning. The variable names are listed as they appear in the IDE.

#### iv. Computer Resources

**Proportion of Computers Connected to Internet/Web (COMPWEB)** – The index of the proportion of computers connected to the Internet/Web was computed by dividing the number of computers connected to the Web by the total number of computers in the school. **COMPWB09** in PISA 2009 [SC008802-3]. **COMPWB06** in PISA 2006 [SC006201, SC006203]. **COMPWEB** in PISA 2003 [SC003101, SC003105]. The variable names are listed as they appear in the IDE.

**Ratio of Computers for Instruction to School Size (IRATCO06)** – The index ratio of computers for instruction to school size from PISA 2006 was obtained by dividing the number of computers available for educational instruction at school [SC006202] by the number of students at school [SC008401 and SC008402]. The variable names are listed as they appear in the IDE.

**Total Number of Computers to School Size (RATCOMP)** – The index ratio of the total number of computers to school size from PISA 2009, 2006, 2003, and 2000 was computed by dividing the number of computers at school by the total number of students at school [see the subcategory Computer Resources in the category School Staffing and Resources]. The variable names are listed as they appear in the IDE.

**Proportion of Computers Connected to Local Area Network (COMPLAN)** – The index of the proportion of computers connected to the local area network from PISA 2003 was computed by dividing the number of computers connected to a local network [SC003106] by the total number of computers in the school [SC003101]. The variable names are listed as they appear in the IDE.

**Use of Information, Communication and Technology (ICT) Computers at School (USESCH)** – The index of computer use at school from PISA 2009 was derived from students' reports on how often they used a computer for the following activities at school: chat; e-mail; browse for school; download from website; post on website; simulations; practice and drilling; homework; and group work [IC002001–9]. Students responded to each statement on a four-point scale: *almost every day, once or twice a week, once or twice a month, and never or hardly ever*. All items were inverted for scaling so that positive values on this index indicate higher levels of computer use at school. The variable names are listed as they appear in the IDE.

**Information, Communication and Technology (ICT) Resources (ICTRES)** – The index of ICT resources at home from PISA 2009 was derived from students' reports on whether they had the following at home: educational software; a link to the Internet; and a computer you can use for schoolwork [ST013504–6]. Students responded to each statement with a *yes* or *no*. The variable names are listed as they appear in the IDE.

**Information, Communication and Technology (ICT) Availability at School (ICTSCH) –**

The index of ICT availability at school from PISA 2009 was derived from students' reports on whether any of the following were available for them to use at school: desktop computer; portable laptop; internet connection; printer; and USB (memory) stick [IC001601–5]. Students responded to each statement with a *yes* or *no*. The variable names are listed as they appear in the IDE.

**Percentage of Computers Available for 15-year-olds (PERCOMP1) –** The index of the percentage of computers available for 15-year-olds from PISA 2000 was derived from the number of computers available for 15-year-olds [SC001302] divided by the total number of computers in the school [SC001301]. The variable names are listed as they appear in the IDE.

**Percentage of Computers Available for Teachers Only (PERCOMP2) –** The index of the percentage of computers available for teachers only from PISA 2000 was derived from the number of computers available for teachers only [SC001303] divided by the total number of computers in the school [SC001301]. The variable names are listed as they appear in the IDE.

**Percentage of Computers Available to Administrative Staff (PERCOMP3) –** The index of the percentage of computers available to administrative staff from PISA 2000 was derived from the number of computers available only for administrative staff [SC001304] divided by the total number of computers in the school [SC001301]. The variable names are listed as they appear in the IDE.

**Percentage of Computers Connected to the Internet/Web (PERCOMP4) –** The index of the percentage of computers connected to the Internet/Web from PISA 2000 was derived from the number of computers connected to the Internet/World Wide Web [SC001305] divided by the total number of computers in the school [SC001301]. The variable names are listed as they appear in the IDE.

**Percentage of Computers Connected to a Local Area Network (PERCOMP5) –** The index of the percentage of computers connected to a local area network from PISA 2000 was derived from the number of computers connected to a local area network/intranet [SC001306] divided by the total number of computers in the school [SC001301]. The variable names are listed as they appear in the IDE.

## 6.K. Governance

### i. Teacher Participation and School Responsibility

**School Autonomy (RESPRES) –** The index of school autonomy or the relative level of responsibility of school staff in allocating resources from PISA 2009 and 2006 was derived from the following items measuring the school principal's report on who has considerable responsibility for tasks regarding school management of resource allocation: selecting teachers for hire; firing teachers; establishing teachers' starting salaries; determining teachers' salary increases; formulating the school budget; and deciding on budget allocations within the school [see the subcategories Teacher Participation and School Responsibility, Responsibilities



Assigned to Other Groups and Organizations, and School Responsibility: Curriculum in the category Governance]. The index was calculated on the basis of the ratio of “yes” responses for the principal or teachers to “yes” responses for central education authorities. Higher values on the scale indicate relatively higher levels of school responsibility in this area. The variable names are listed as they appear in the IDE.

**School Autonomy (SCHAUTON)** – The index of school autonomy from PISA 2003 and 2000 was based on school principals’ reports about whether teachers, department heads, the school principal, an appointed or elected board, or higher level education authorities were primarily responsible for the following 12 tasks: hiring teachers; firing teachers; establishing teachers’ starting salaries; determining teachers’ salary increases; formulating the school budget; allocating school budgets; establishing student disciplinary policies; establishing student assessment policies; approving students for admission; choosing textbooks; determining course content; and deciding which courses were offered [see the subcategories Teacher Participation and School Responsibility, Responsibilities Assigned to Other Groups and Organizations, and School Responsibility: Curriculum in the category Governance]. All items were inverted for scaling so that positive values indicate higher levels, and negative values indicate lower levels, of school autonomy. The PISA 2003 index used items whose wording had been modified slightly from PISA 2000. To adjust for differences, responses indicating that decision making was not a school responsibility were recoded to 0, and those with responses in all other categories but decision making was not a school responsibility were recoded to 1. The variable names are listed as they appear in the IDE.

**Index of Teacher Participation to Decision Making (TCHPARTI)** – The index of teacher participation from PISA 2009, 2003, and 2000 was derived from school principals’ reports about whether teachers had the main responsibility for appointing teachers; dismissing teachers; establishing teachers’ starting salaries; determining teachers’ salary increases; formulating school budgets; allocating budgets within the school; establishing student disciplinary policies; establishing student assessment policies; approving students for admittance to school; choosing which textbooks to use; determining course content; and deciding which courses were offered [see the subcategories Teacher Participation and School Responsibility, Responsibilities Assigned to Other Groups and Organizations, and School Responsibility: Curriculum in the category Governance]. Positive values indicate higher levels, and negative values indicate lower levels, of teacher participation in school decisions. The variable names are listed as they appear in the IDE.

## ii. School Responsibility: Curriculum

**School Responsibility for Curriculum and Assessment (RESPCURR)** – The index of school responsibility for curriculum and assessment from PISA 2009 and 2006 was computed from items measuring the school principal’s report concerning who had responsibility for curriculum and assessment: establishing student assessment policies, choosing which textbooks are used, determining course content, and deciding which courses are offered [see the subcategories Teacher Participation and School Responsibility, Responsibilities Assigned to Other Groups and Organizations, and School Responsibility: Curriculum in the category Governance]. The index was calculated on the basis of the ratio of “yes” responses for the principal or teachers to “yes”

responses for central education authorities. Higher values indicate relatively higher levels of school responsibility in this area. The variable names are listed as they appear in the IDE.

### iii. School Leadership

**School Leadership (LDRSHP)** – The index of school principal’s leadership from PISA 2009 was derived from school principals’ responses about the frequency with which they were involved in the following school affairs in the previous school year: make sure that the professional development activities of teachers are in accordance with the teaching goals of the school; ensure that teachers work according to the school’s educational goals; observe instruction in classrooms; give teachers suggestions as to how they can improve their teaching; use student performance results to develop the school’s educational goals; monitor students’ work; take the initiative to discuss matters, when a teacher has problems in his/her classroom; inform teachers about possibilities for updating their knowledge and skills; check to see whether classroom activities are in keeping with our educational goals; take exam results into account in decisions regarding curriculum development; ensure that there is clarity concerning the responsibility for coordinating the curriculum; solve the problem together, when a teacher brings up a classroom problem; pay attention to disruptive behavior in classrooms; and take over lessons from teachers who are unexpectedly absent [SC010401–14]. Principals responded to each statement on a four-point scale: *never*, *seldom*, *quite often*, and *very often*. Positive values on this index indicate greater involvement of school principals in school affairs. The variable names are listed as they appear in the IDE.

## 6.L. Curriculum and School Activities

### i. Science Activities at School

**School Activities to Promote the Learning of Science (SCIPROM)** – The index of school activities to promote the learning of science from PISA 2006 was derived from school principals’ reports concerning which activities to promote students’ learning of science occurred at their school: science clubs; science fairs; science competitions; extracurricular science projects (including research); and excursions and field trips [SC006901–5]. Students responded to each statement with a *yes* or *no*. Positive scores indicate higher levels of school activities in this area. The variable names are listed as they appear in the IDE.

**School Activities for Learning Environmental Topics (ENVLEARN)** – The index of school activities for learning environmental topics from PISA 2006 was derived from school principals’ reports concerning which activities to promote students’ learning of environmental topics occurred at their school: outdoor education; trips to museums; trips to science and/or technology centers; extracurricular environmental projects (including research); and lectures and/or seminars (e.g., guest speakers) [SC007101–5]. Students responded to each statement with a *yes* or *no*. Positive scores indicate higher levels of school activities for learning environmental topics. The variable names are listed as they appear in the IDE.

**Science Activities (SCIEACT)** – The index of science-related activities from PISA 2006 was derived from students’ engagement and learning in science concerning the frequency with which

they engaged in the following activities: watch TV programs about broad science; borrow or buy books on broad science topics; visit websites about broad science topics; listen to radio programs about advances in broad science; read broad science magazines or science articles in newspapers; and attend a science club [ST009701–6]. Students responded to each statement on a four-point scale: *very often, regularly, sometimes, never, or hardly ever*. All items were inverted for scaling so that positive values on this index indicate higher frequencies of students' science activities. The variable names are listed as they appear in the IDE.

## ii. Extension Courses

**School Offering Extension Courses (EXCOURSE)** – The index of the school offering extension courses from PISA 2003 was derived from the principals' responses to which extensions courses were offered at their school: enrichment mathematics; and remedial mathematics [SC003901-2]. Principals responded to each statement with a *yes* or *no*. Positive values on the index indicate more extension courses offered at school. The variable names are listed as they appear in the IDE.

## iii. Extracurricular Activities related to Mathematics

**Mathematics Activity at School (MACTIV)** – The index mathematics activity at school from PISA 2003 was derived from the principals' responses to which mathematics activities occurred at their school: enrichment mathematics; remedial mathematics; mathematics competitions; mathematics clubs; and computer clubs (specifically related to mathematics) [SC003901-5]. Principals responded to each statement with a *yes* or *no*. Positive values on the index indicate higher levels of mathematics activity at school. The variable names are listed as they appear in the IDE.

## 6.M. School and Classroom Climate

### i. School Climate (Reported by Students)

**Attitude Towards School (ATSCHL)** – The index of attitude towards school from PISA 2009 and 2003 was derived from students' level of agreement with the following statements: school has done little to prepare me for adult life when I leave school; school has been a waste of time; school has helped give me confidence to make decisions; and school has taught me things which could be useful in a job [ST014801–4]. Students responded to each statement on a four-point scale: *strongly agree, agree, disagree, and strongly disagree*. All items that are negatively phrased were inverted for scaling, and positive values on this index indicate the perception of a more positive school climate. The variable names are listed as they appear in the IDE.

**Sense of Belonging (BELONG)** – The index of sense of belonging from PISA 2003 and 2000 was derived from students' reports on whether their school was a place where they feel like an outsider; make friends easily; feel like they belong; feel awkward and out of place; other students seem to like them; and feel lonely [ST003101–6]. Students responded to each statement on a four-point scale: *strongly agree, agree, disagree, and strongly disagree*. Positive values indicate

more positive attitudes towards school, and negative values indicate less positive attitudes. The variable names are listed as they appear in the IDE.

## ii. Student-Teacher Relations (Reported by Students)

**Teacher-Student Relations (STUDREL)** – The index of teacher-student relations from PISA 2009, 2003, and 2000 was derived from students’ level of agreement with the following statements: I get along well with most of my teachers; most of my teachers are interested in my well-being; most of my teachers really listen to what I have to say; if I need extra help, I will receive it from my teachers; and most of my teachers treat me fairly [ST014901–5]. Students responded to each statement on a four-point scale: *strongly agree*, *agree*, *disagree*, and *strongly disagree*. Positive values indicate more positive perceptions of student-teacher relations, and negative values indicate less positive perceptions. The variable names are listed as they appear in the IDE.

**Poor Student-Teacher Relations (school average) (MSTREL)** – The index of poor student-teacher relations from PISA 2003 was derived from students’ responses to items measuring students’ perception of various aspects of student-teacher relationships: students get along well with most teachers; most teachers are interested in students’ well-being; most of my teachers really listen to what I have to say; if I need extra help, I will receive it from my teachers; and most of my teachers treat me fairly [ST014901–5]. Students responded to each statement on a four-point scale—*strongly agree*, *agree*, *disagree*, and *strongly disagree*—that was recoded into binary variables, with “*strongly disagree*” coded to 1 and other valid responses coded to 0. These responses were summarized by taking the average item response per student and computing the mean for each school. The variable names are listed as they appear in the IDE.

## iii. Classroom Climate (Reported by Students)

**Disciplinary Climate** – The index of classroom disciplinary climate summarizes students’ reports on the frequency with which teachers create a disciplinary climate in their classrooms. **Disciplinary Climate (DISCLI09)** in PISA 2009 included the following items: students don’t listen to what the teacher says; there is noise and disorder; the teacher has to wait a long time for students to quiet down; students cannot work well; and students don’t start working for a long time after lesson begins [ST015101–5]. **Disciplinary Climate in Mathematics Lessons (DISCLIM)** in PISA 2003 included the following items: students don’t listen to what the teacher says; there is noise and disorder; the teacher has to wait a long time for students to quiet down; students cannot work well; and students don’t start working for a long time after lesson begins [ST007802, ST007806, ST007808-9, ST007811]. **Classroom Disciplinary Climate (DISCLI00)** in PISA 2000 included the following items: the teacher has to wait a long time for students to quiet down; students cannot work well; students don’t listen to what the teacher says; students don’t start working for a long time after the lesson begins; there is noise and disorder; and at the start of class, more than five minutes are spent doing nothing [ST015101–5, ST002617]. Students responded to each statement on a four-point scale: *never*, *some lessons*, *most lessons*, and *every lesson*. All items were inverted for scaling. Positive values indicate a more positive perception of the disciplinary climate, and negative values indicate a less positive perception. The variable names are listed as they appear in the IDE.

#### iv. School Climate (Reported by Principal)

**Student Behavior (STUDBEHA)** – The index of student behavior from PISA 2009, 2003, and 2000 was derived from school principals’ reports on the extent to which student learning was hindered by the following student-related factors in their schools: student absenteeism; disruption of classes by students; students skipping classes; student lacking respect for teachers; student use of alcohol or illegal drugs; and students intimidating or bullying other students [SC004702, SC004704, SC004707-8, SC004710, SC004712]. Principals responded to each statement on a four-point scale: *not at all*, *very little*, *to some extent*, and *a lot*. All items were inverted for scaling. Positive values indicate the perception that student-related factors do not hinder learning, whereas negative values indicate the perception that student-related factors do hinder learning. The variable names are listed as they appear in the IDE.

#### v. Classroom Climate (Reported by Principal)

**Teacher Behavior (TEACBEHA)** – The index of teacher behavior from PISA 2009, 2003, and 2000 was derived from school principals’ reports on the extent to which student learning was hindered by the following teacher-related factors affecting school climate in their schools: teachers’ low expectations of students; poor student-teacher relations; teachers not meeting individual students’ needs; teacher absenteeism; staff resisting change; teachers being too strict with students; and students not being encouraged to achieve their full potential [SC004701, SC004703, SC004705-6, SC004709, SC004711, SC004713]. Principals responded to each statement on a four-point scale: *not at all*, *very little*, *to some extent*, and *a lot*. All items were inverted for scaling. Positive values indicate the perception that teacher-related factors do not hinder learning, whereas negative values indicate the perception that teacher-related factors do hinder learning. The variable names are listed as they appear in the IDE.

**Teacher Morale (TCMORALE)** – The index of teachers’ morale and commitment from PISA 2003 and 2000 was derived from the extent to which school principals agreed with the following statements: the morale of teachers in this school is high; teachers work with enthusiasm; teachers take pride in this school; and teachers value academic achievement [SC002001–4]. Principals responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. Positive values indicate a higher perception of teacher morale, and negative values indicate a lower perception. The variable names are listed as they appear in the IDE.

**Student Morale (STMORALE)** – The index of student morale and commitment from PISA 2003 was derived from principals’ responses concerning the extent to which they agreed with the following statements: students enjoy being in school; students work with enthusiasm; students take pride in this school; students value academic achievement; students are cooperative and respectful; students value the education they can receive in this school; and students do their best to learn as much as possible [SC003301–7]. Principals responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. All items were inverted for scaling, and the categories “*disagree*” and “*strongly disagree*” were collapsed into one category because of the small number of responses in these categories. Positive scores indicate principals’ reports of higher levels of student morale and commitment. The variable names are listed as they appear in the IDE.

**Mathematics Teacher Consensus (TCHCONS)** – The index of mathematics teacher consensus from PISA 2003 was based on the level of school principals’ agreement with the following items: there are frequent disagreements between “innovative” and “traditional” mathematics teachers; there are frequent disagreements between mathematics teachers who consider each other to be “too demanding” or “too lax”; and there are frequent disagreements between mathematics teachers who consider each other as “too focused on skill acquisition” or “too focused on the affective development” of the student [SC004303, SC004403, SC004503]. Principals responded to each statement on a four-point scale: *strongly disagree*, *disagree*, *agree*, and *strongly agree*. Positive values on this index indicate principals’ perception of higher levels of consensus among teachers. The variable names are listed as they appear in the IDE.

## 6.N. Student and Teacher Assessments

**Estimated Number of Assessments per Year (ASSESS)** – The index of the estimated number of assessments per year from PISA 2003 was derived from school principals’ responses regarding the frequency of the following assessments for 15-year-old students: standardized tests; teacher-developed tests; teachers’ judgmental ratings; student portfolios; and student assignments/projects/homework [SC003401–5]. All five items were recoded into numerical values, which approximately reflect the frequency of assessments per year: *never* = 0, *1–2 times a year* = 1.5, *3–5 times a year* = 4, *monthly* = 8, and *more than once a month* = 12. The index of the estimated number of assessments per year was calculated as the sum of these recoded items and then divided into three categories: *less than 20 times a year*, *20–39 times a year*, and *more than 40 times a year*. The variable names are listed as they appear in the IDE.

## 6.O. Admissions and Transfers

**School Academic Selectivity (SELSCH)** – The index of school selectivity was derived from school principals’ reports about admittance policies at their school. **SELSCH09** in PISA 2009, principals were asked how much consideration was given to two factors—students’ academic record (including placement tests) [SC009702] and the recommendation of feeder schools [SC009703]—when students are admitted to the school. Principals responded to each statement on a three-point scale: *never*, *sometimes*, and *always*. Based on these responses, an index of school selectivity was computed by assigning schools to three different categories: (1) schools where these two factors are “never” considered for student admittance; (2) schools considering at least one of these two factors “sometimes,” but neither factor “always”; and (3) schools where at least one of these two factors is “always” considered for student admittance. **SELSCH** in PISA 2006 and 2003 principals’ responded to two factors—students’ academic record (including placement tests) [SC003202] and the recommendation of feeder schools [SC003203]—when students are admitted to the school. Principals responded to each statement on a four-point scale: *not considered*, *considered*, *high priority*, and *prerequisite*. An index of school selectivity was computed by assigning schools to four different categories: (1) schools where neither of these factors is considered for student admittance; (2) schools considering at least one of these factors; (3) schools giving high priority to at least one of these factors; and (4) schools where at least one of these factors is a prerequisite for student admittance. The variable names are listed as they appear in the IDE.

## 6.P. Extracurricular Activities Offered by School

**Extracurricular Activities Offered by School (EXCURACT)** – The index of extracurricular activities from PISA 2009 was derived from school principals’ reports on whether their school offered the following activities to 15-year-old students: band, orchestra, or choir; school play or school musical; school yearbook, newspaper, or magazine; volunteering or service activities; book club; debating club or debating activities; school club or school competition for foreign language mathematics or science; academic club; art club or art activities; sporting team or sporting activities; lectures and/or seminars; collaboration with local libraries; collaboration with local newspapers; and a country-specific option (“school-wide scheduled reading periods” in the U.S.) [SC009101–14]. Principals responded to each statement with a *yes* or *no*. Positive values on the index indicate higher levels of extracurricular school activities. The variable names are listed as they appear in the IDE.