Program for International Student Assessment (PISA) International Data Explorer Help Guide

Contents

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 financial literacy and 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 fully repeated itself in 2009 and began again in 2018. Additionally, problem solving was assessed in 2003 and 2012, collaborative problem solving in 2015, and financial literacy in 2012, 2015, and 2018. Currently, the IDE includes problem solving, collaborative problem solving, and financial literacy data for 2012, 2015, and 2018. Exhibit 1 summarizes the PISA administration cycle from 2000 through 2018.

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 2003 and 2012, results are reported for a combined mathematics literacy scale and four mathematic 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 2009, results are reported for an overall mathematics literacy scale, but not for subscales. Table 1 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	2018
Subjects assessed	READING	Reading	Reading	READING	Reading	Reading	READING
	Mathematics	MATHEMATICS	Mathematics	Mathematics	MATHEMATICS	Mathematics	Mathematics
	Science	Science	SCIENCE	Science	Science	SCIENCE	Science
		Problem solving			Problem solving	Collaborative problem solving	
					Financial literacy	Financial literacy	Financial literacy

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 2012, and a separate collaborative problem-solving assessment was administered in 2015; a separate financial literacy assessment was administered in 2012, 2015, and 2018. 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), 2018.

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

Reporting scale	Year						
	2000	2003	2006	2009	2012	2015	2018
Reading							
Overall scale	x	x	x	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			
Subscale: Locate information							x
Subscale: Understand							x
Subscale: Evaluate and reflect							x
Mathematics							
Overall scale (2000)	x						
Overall scale		x	x	x	x	x	x
Subscale: Space and shape	x	x			x		
Subscale: Change and relationships	x	x			x		
Subscale: Quantity		x			x		
Subscale: Uncertainty		x			x		
Subscale: Employ					x		
Subscale: Formulate					x		
Subscale: Interpret					x		
Science							
Overall scale (2000)	x						
Overall scale (2003)		x					
Overall scale				x	x	x	x	x
Subscale: Identifying scientific issues				x			
Subscale: Explaining phenomena scientifically				x		x	
Subscale: Using scientific evidence				x			

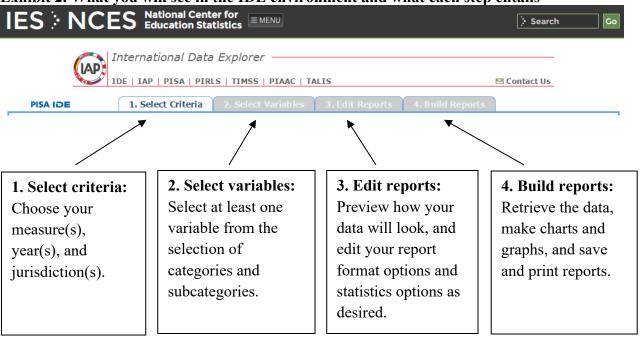|								
Subscale: Evaluate and design scientific enquiry							x	
Subscale: Interpret data and evidence scientifically							x	
Subscale: Physical systems							x	
Subscale: Living systems							x	
Subscale: Earth and space							x	
Subscale: Content Knowledge							x	
Subscale: Procedural and Epistemic Knowledge							x	
Attitude subscale: Interest in science			x					
Attitude subscale: Support for scientific inquiry			x					
Financial Literacy								
Overall scale						x	x	x
Problem Solving								
Overall scale						x		
Collaborative Problem Solving								
Overall scale							x	

NOTE: The science attitude subscales are not included in the overall science scale. For more information about the definitions of the various literacy scales and subscales, see the *PISA 2018 Assessment and Analytical Framework* (Paris: OECD), available at https://www.oecd-ilibrary.org/education/pisa-2018-assessment-and-analytical-framework_b25efab8-en.

SOURCE: U.S. Department of Education, National Center for Education Statistics. (2020). PISA International Data Explorer, available at https://nces.ed.gov/surveys/international/ide/.

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 section VI.

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

1. Select criteria:	2. Select variables:	3. Edit reports:	4. Build reports:
Choose your measure(s), year(s), and jurisdiction(s).	Select at least one variable from the selection of categories and subcategories.	Preview how your data will look, and edit your report format options and statistics options as desired.	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 10 or higher), Firefox, Google Chrome, or Safari.

- Enable JavaScript and pop-ups in your browser.

- 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.

Screenshots throughout this Help Guide were made using the Google Chrome browser. Other browsers may vary the way the IDE is displayed.

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.
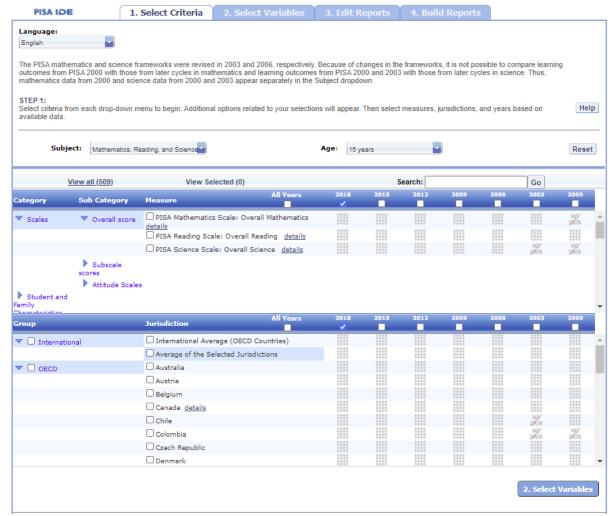
1. Select Criteria

1.A. Overview

Your data query in the PISA IDE begins on the **Select Criteria** screen (see exhibit 3).

Select a **Language** from the drop-down menu and then 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

1.B. Choose Subject

Under **Subject**, you have the choice of **Mathematics, Reading, and Science**; **Financial Literacy**; **Collaborative Problem Solving; Problem Solving**; **Science (2003)**; **Science (2000)**; or **Mathematics (2000)**. Once a subject is chosen, the screen resets and you can select **Year**(s), **Measure**(s), and **Jurisdiction**(s).

The PISA mathematics and science frameworks were revised in 2003 and 2006, respectively. Because of changes in the frameworks, it is not possible to compare learning outcomes from PISA 2000 with those from later cycles in mathematics and learning outcomes from PISA 2000 and 2003 with those from later cycles in science. Thus, mathematics data from 2000 and science data from 2000 and 2003 appear separately in the Subject dropdown.

1.C. Choose Year

At the top of the **Measure** and **Jurisdiction** sections, you have the choice of selecting 2018, 2015, 2012, 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 all years. Currently, problem-solving data are available for 2012, collaborative problem-solving data are available for 2015, and financial literacy data are available for 2012, 2015, and 2018.

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 and Classroom Climate, and include variables such as student age in years, size of class, and an index of computer availability.
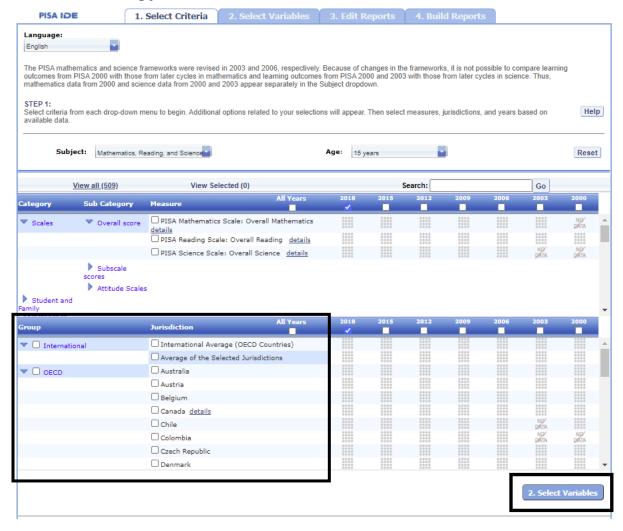
1.E. Choose Jurisdiction

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

Jurisdictions are found under the following groups: **OECD**, **Non-OECD**, and **US States and Territories.** There is also a group category called **International,** with options to display the **International Average (OECD Countries)** and the **Average of the Selected Jurisdictions.**

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.
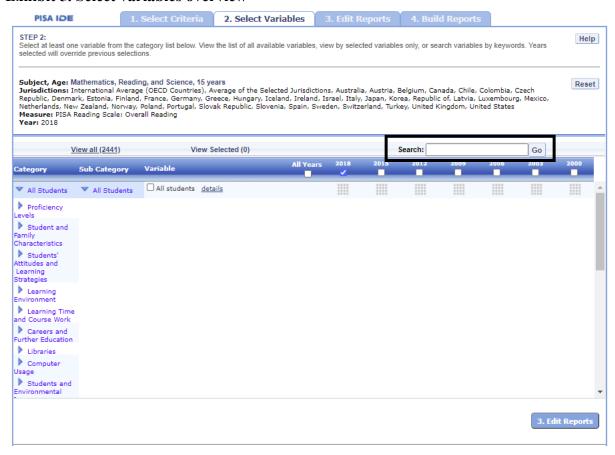
Exhibit 4. Choosing jurisdictions

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).

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

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 **All Students** 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., value 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, which shows two **Grandparents** variables (SU002004 and SU012305). The differences between these two 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 for more details about this function.
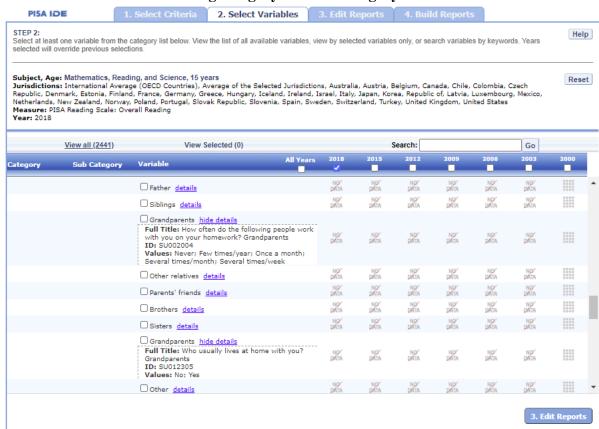
Exhibit 6. Select variables using category and sub category lists

When selecting **Financial Literacy** as the subject, additional student questionnaire items will appear under the category **Students' Financial Awareness and Experiences.** These items address key areas related to students' experience and exposure to financial literacy including access to information and education, access to money and financial products, and spending and saving behaviors.

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

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 averages, 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

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 shows 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

		Read each day								
		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
Years	**Jurisdictions**	Averages	Standard Errors	Averages	Standard Errors	Averages	Standard Errors	Averages	Standard Errors	Averages	Standard Errors
2018	International Average (OECD Countries)										
	Average of the Selected Jurisdictions										
	Australia										
	Austria										
	Belgium										
	Canada										
	Chile										
	Colombia										
	Czech Republic										
	Denmark										
	Estonia										
	Finland										
	France										
	Germany										
	Greece										
	Hungary										
	Iceland										
	Ireland										
	Israel										
	Italy										
	Japan										
	Korea, Republic of										
	Latvia										
	Luxembourg										
	Mexico										

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: averages, percentages, standard deviations, and percentiles. (For further information, see Section 3.G. Statistics Options.)
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

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

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

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

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 the level of precision for a particular statistic. Depending on the value range of the dependent variable (for example, the dependent variable "PISA Mathematics Scale: Overall Mathematics [PVMATH]" ranges from 0 to 1,000; the dependent variable "Index economic, social and cultural status [ESCS15]" ranges from -5 to 5), the default decimal places for a report could be from zero to three. Also, standard errors will be shown to one more decimal place than is shown for their respective statistic. For example, if you request that average scores be displayed to one decimal place (by default, the average scores are rounded to the nearest whole number), the corresponding standard errors will display two decimal places. If you export to Excel, you will be able to increase the number of decimal places in most cases. Note that only integer-level precision is allowed for percentages; that is, the number of decimal places is fixed at "none" for percentages and the corresponding standard errors are shown to one decimal place.

4. **Include** gives you the option of showing standard errors. By default, standard errors are shown inside parentheses, but you can choose 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 below).

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.)

The following statistics options are available (see exhibit 15):

1. **Averages.** This statistic provides the average value for a selected continuous variable or score (i.e., overall score or subscale score). For the PISA assessment, student performance is reported on scales that range from 0 to 1,000. By default, the standard errors of the 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.

3. **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.

4. **Percentiles.** This statistic shows the threshold (or cutpoint) score for the following:
   - 10th percentile – the bottom 10 percent of students
   - 25th percentile – the bottom quarter of students
   - 50th percentile – the median (half the students scored below the cutpoint and half scored above it)
   - 75th percentile – the top quarter of students
   - 90th percentile – the top 10 percent of students

Exhibit 15. Statistics options

As previously noted, 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.) 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 averages 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.
- If proficiency levels are selected in the variable section, only average scores and 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 estimates. In the IDE, statistics for a group are suppressed if they are based on less than 62 cases. In the OECD reports, statistics are suppressed if there are fewer than 30 students or fewer than 5 schools with valid data.

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.) 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

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 averages 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 as shown in the **Select Report** drop-down feature (see 1 in exhibit 17). By default, all reports are checked at step 3, 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.)
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 Excel, Microsoft Word, 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

4.B. View Reports as Data Tables

Some reports will take longer than others to process, so please do not hit the "Back" button on your browser once you click on **Build Reports** (see exhibit 18). 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 provides a summary of the available features and how they can be customized.

Exhibit 19. Viewing reports as charts

4.D. Create Charts

When you click **Chart,** you will first make selections pertaining to **Jurisdiction, Year/Study, and Statistic** (see exhibit 20). All **Jurisdictions** and **Studies** are selected by default, while you can only choose one **Statistic**. Uncheck any of the criteria that you do not wish to chart, as long as you have one selected in each category.

Only the statistics option(s) used to report data in the previous step will be presented, and only one statistics option can be selected at a time. For example, **Percentiles** will appear as the only data option to build the chart if the table created in the previous step is reporting data with only percentiles selected as the statistics option.

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

Exhibit 20. Data options for charts

4.E. Create Charts – Chart Options

Next, you can make selections regarding the chart options located below on the same page.

1. Select **Bar Chart**, **Column Chart**, or **Line Chart** (see 1 in exhibit 21). If the Percentiles Statistic is selected, you can also select from a **Percentiles Chart** option.

2. After selecting a chart type, change any data dimensions from the drop-down menus for **Bar**, **Column**, or **Line Values** and **Values Grouped by** (see 2 in exhibit 21). 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.

3. Create your chart by clicking the **Create Chart** button in the lower-right corner (see 3 in exhibit 21).

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.

2. Place your cursor over the bars of the chart to see the data points and value label(s).

Exhibit 22. Percentile chart

NOTE: Some apparent differences between estimates may not be statistically significant.
SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2018 Mathematics, Reading, and Science Assessment.

Exhibit 23. Bar chart

You can choose **"Back to Chart Options"** (located in the upper-left corner, below the **Chart** link) to make more changes.

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 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 another 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.I. Export Reports**.)

4.F. Significance Tests

Tests for statistical significance indicate whether observed differences between estimates 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 exhibits 17 and 24). 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 variable shown in exhibit 24, you could choose to compare scores of female students between countries and subnational education systems, or you could choose to compare scores of female students and male students.

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

1. In the **Significance Test** window, select either **Between Jurisdictions**, **Within Variables**, or **Across Years**. Then, select the appropriate jurisdiction(s), variable(s), year(s), and statistic(s). For **Between Jurisdictions**, select at least two jurisdictions. For **Within Variables**, select one or more jurisdictions. For **Across Years**, more than one year needs to be selected.
2. You can enter a **Test Title** 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 and subnational education systems that have been selected. The map output is only available when **Between Jurisdictions** is selected in the first step.
4. Additional options allow you to select **Show Score Details** to display the estimates and standard errors for the table cells. If you selected a map, this option is not applicable, as the map will automatically show score details.
5. Click the **Preview** tab located in the upper-left corner, or the **Preview** button located in the bottom-left corner.
6. Click the **Edit** tab in the upper-left corner of the screen if you wish to go back and make changes to the selections you made for running the significance tests.
7. Click the **Done** button in the upper- or lower-right corner of the screen to run the significance tests.

Exhibit 24. Significance test options

When the table option is selected, you will get a significance test matrix in which you will see the differences and *p* values. Using the symbols shown in the legend of the matrix, an indication is also provided of whether one estimate is significantly lower or higher than another estimate or whether there is no significant difference (see exhibit 25).

The alpha level for all *t*-tests is .05. All comparisons within a jurisdiction, within the same year, are made using dependent *t*-tests. Comparisons between jurisdictions are treated as independent, and comparisons of achievement across years are made using independent *t*-tests with a linking error taken into account.

PISA assessments are linked across years. That is, the sets of items used to assess mathematics, reading, and science across 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 PISA assessment 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 25. Significance test table output

| Table | Sig Test 2 X |

| Chart | Significance Test | Gap Analysis | Regression Analysis |

To see how one value compares with the others, read across the row for that value. The displayed symbols indicate whether that value is significantly higher, significantly l... or not significantly different than the value associated with that column. In some cases the significance test may have not been possible for statistical reasons.

PISA reading scale: overall reading scale, age 15 years
Difference in averages between variables - dependent test, for Read each day [ST013801]
United States, 2018

	I don't read for enjoyment (479)	30 minutes or less a day (522)	Between 30 and 60 minutes (536)	1 to 2 hours a day (536)	More than 2 hours a day (535)
I don't read for enjoyment (479)		< Diff = -42 (3.9) P-value = 0.0000	< Diff = -56 (4.8) P-value = 0.0000	< Diff = -56 (6.4) P-value = 0.0000	< Diff = -55 (9.0) P-value = 0.0000
30 minutes or less a day (522)	> Diff = 42 (3.9) P-value = 0.0000		< Diff = -14 (5.4) P-value = 0.0096	< Diff = -14 (6.6) P-value = 0.0355	x Diff = -13 (9.4) P-value = 0.1668
Between 30 and 60 minutes (536)	> Diff = 56 (4.8) P-value = 0.0000	> Diff = 14 (5.4) P-value = 0.0096		x Diff = 0 (7.1) P-value = 0.9992	x Diff = 1 (8.8) P-value = 0.9085
1 to 2 hours a day (536)	> Diff = 56 (6.4) P-value = 0.0000	> Diff = 14 (6.6) P-value = 0.0355	x Diff = 0 (7.1) P-value = 0.9992		x Diff = 1 (9.6) P-value = 0.9167
More than 2 hours a day (535)	> Diff = 55 (9.0) P-value = 0.0000	x Diff = 13 (9.4) P-value = 0.1668	x Diff = -1 (8.8) P-value = 0.9085	x Diff = -1 (9.6) P-value = 0.9167	

LEGEND:	
<	Significantly lower.
>	Significantly higher.
x	No significant difference.

NOTE: Standard errors are in parentheses in the table body. As of December 2016, all comparisons within a jurisdiction, within the same year, are made using dependent t-tests. Prior to this, only male-female comparisons within a jurisdiction were treated as dependent. Comparisons of achievement across years are made using independent t-tests with a linking error taken into account. Comparisons between jurisdictions are also treated as independent. The alpha level for all t-tests is .05. For more information see the Statistical Notations and Other Notes section in the Help Guide.

Averages for age 15 years PISA reading scale: overall reading, by Read each day [ST013801] and jurisdiction: 2018

When the **map option** is selected, a global map is shown with the countries and subnational education systems selected shaded (see exhibit 26). The focal jurisdiction is shaded in teal green, with all other countries compared to it. 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 light shade of gray is the default color for jurisdictions not selected for comparison.) When you hover over a jurisdiction, a text bubble displays the numerical difference in estimates between that jurisdiction and the focal jurisdiction. At any point, you may choose a different focal jurisdiction by clicking on another country. You may also choose a different variable category for comparison by using the drop-down menu above the map.

Exhibit 26. Map of significance tests

Averages for Read each day = Between 30 and 60 minutes, 2018 ▼

Hover over any of the labels below to see how any selected jurisdiction performed in comparison to the focal jurisdiction. Click on a jurisdiction to make it the focal jurisdiction. Names appear below if they are difficult to display or click on in map format (i.e., they are subnational entities, small national entities, or international averages).

| 2018 International Average (OECD Countries) average (0–1000) 520 | 20 jurisdictions performed significantly higher | 6 jurisdictions not significantly different | 10 jurisdictions performed significantly lower | 1 jurisdictions no assessment/data not available | Was not selected for comparison |

PISA reading scale: overall reading scale, age 15 years
Difference in averages between jurisdictions - independent test, for Read each day = Between 30 and 60 minutes 2018

■ International Average (OECD Countries)	■ Average of the Selected Jurisdictions	☐ Belgium - Flemish Community
☐ Israel	■ Luxembourg	☐ Baku (Azerbaijan)
☐ Bosnia and Herzegovina	☐ Brunei Darussalam	☐ B-S-J-G (China)
☐ B-S-J-Z (China)	☐ Buenos Aires - Argentina	☐ Cyprus
☐ Dubai - United Arab Emirates	☐ Hong Kong - China	☐ Kosovo
☐ Lebanon	☐ Liechtenstein	☐ Macao - China
☐ Malta	☐ Moldova, Republic of	☐ Montenegro, Republic of
☐ North Macedonia	☐ Qatar	☐ Serbia and Montenegro
☐ Shanghai - China	☐ Singapore	☐ Trinidad and Tobago
☐ USA: Connecticut	☐ USA: Florida	☐ USA: Massachusetts
☐ USA: North Carolina	☐ USA: Puerto Rico	

NOTE: Although Spain's PISA 2018 data meet international technical standards, its reading literacy data show unusual student response behavior that prevent them from being reported in the IDE. Some apparent differences between estimates may not be statistically significant.
SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2018 Mathematics, Reading, and Science Assessment.

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. Gap Analysis

Gap Analysis is included in the IDE to compare differences in gaps shown in a map, table, or chart. These gap differences can be compared between jurisdictions and/or across years.
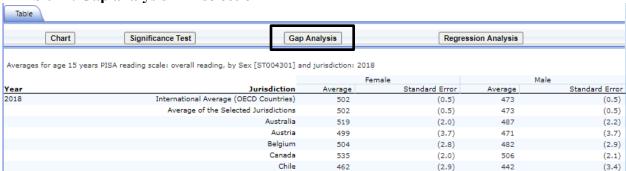
Exhibit 27. Gap analysis link selection

Table							

Chart	Significance Test	**Gap Analysis**	Regression Analysis

Averages for age 15 years PISA reading scale: overall reading, by Sex [ST004301] and jurisdiction: 2018

		Female		Male	
Year	**Jurisdiction**	Average	Standard Error	Average	Standard Error
2018	International Average (OECD Countries)	502	(0.5)	473	(0.5)
	Average of the Selected Jurisdictions	502	(0.5)	473	(0.5)
	Australia	519	(2.0)	487	(2.2)
	Austria	499	(3.7)	471	(3.7)
	Belgium	504	(2.8)	482	(2.9)
	Canada	535	(2.0)	506	(2.1)
	Chile	462	(2.9)	442	(3.4)

With your report of interest selected, click on the **Gap Analysis** link, which is located to the right of the **Significance Test** link (see exhibit 27). You will need to decide which variable you would like to test (e.g., gender) and the criterion by which you want to test it (i.e., between jurisdictions or across years). The difference measure, or gap, can be viewed between groups, between years, between groups and years, or between percentiles within the selected variable. For example, if you compute average mathematics literacy scores for two countries at two time points for males and females, you can:

- at one time point, compare the male-female gap in one country to the male-female gap in another country;
- compare the male-female gap at two time points within a country;
- compare the difference between the male-female gap at two time points in one country to the difference between the male-female gap at two time points in another country; or
- compare the gap for females at two time points in one country to the gap for females at two time points in another country.
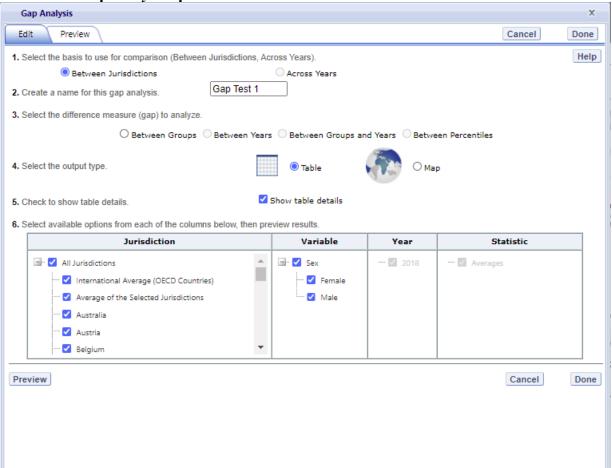
Exhibit 28. Gap analysis options

The steps for running a gap analysis are similar to those for conducting a statistical significance test (see exhibit 28). Thus, to run a gap analysis, follow the instructions under section **4.F. Significance Tests**, noting the following differences:

1. The **Gap Analysis** link should be selected, not the **Significance Test** link.
2. The gap analysis does not have a **Within Variables** option for analysis; the options are **Between Jurisdictions** and **Across Years.**
3. The difference measure (gap) of analysis must be selected from the following: **Between Groups, Between Years, Between Groups and Years,** and **Between Percentiles** (if variables are selected for which a difference measure is not feasible, the difference measure option will not appear as available in the Gap Analysis menu).

The gap analysis output is presented in a format similar to that of the significance test output, with one difference: the difference estimate shown in the output is the difference between the gaps selected for analysis. Note that you will still see the significance of these differences, just like in a significance test. For example, exhibit 29 shows cross-national differences between male-female score gaps.

The gap analysis function computes and statistically tests differences between score, percentage, or percentile gaps. For gap analysis tables, all comparisons are independent tests with an alpha level of 0.05. Note that the reference group for the gaps is kept constant during the analysis, as opposed to taking the absolute value of the gaps. Therefore, the gap analysis tests whether the magnitude of the gaps differ from each other only when the gaps go in the same direction (e.g., comparing a 5-point gender gap favoring females in one country with a 15-point gender gap favoring females in another country).

Exhibit 29. Gap analysis output

PISA reading scale: overall reading scale, age 15 years
Differences between jurisdictions for gaps in averages between Sex [ST004301]=Female and Sex [ST004301]=Male 2018

	International Average (OECD Countries) (29)	Greece (42)	Mexico (11)	Netherlands (29)	Norway (47)	United Kingdom (20)	United States (24)
International Average (OECD Countries) (29)		< Diff = -13 (5.6) P-value = 0.0235	> Diff = 18 (4.3) P-value = 0.0000	x Diff = 1 (4.4) P-value = 0.8957	< Diff = -18 (3.7) P-value = 0.0000	> Diff = 9 (4.5) P-value = 0.0392	x Diff = 6 (5.6) P-value = 0.2923
Greece (42)	> Diff = 13 (5.6) P-value = 0.0235		> Diff = 31 (7.0) P-value = 0.0000	x Diff = 13 (7.1) P-value = 0.0602	x Diff = -5 (6.7) P-value = 0.4677	> Diff = 22 (7.1) P-value = 0.0020	> Diff = 19 (7.9) P-value = 0.0179
Mexico (11)	< Diff = -18 (4.3) P-value = 0.0000	< Diff = -31 (7.0) P-value = 0.0000		< Diff = -18 (6.1) P-value = 0.0037	< Diff = -36 (5.6) P-value = 0.0000	x Diff = -9 (6.2) P-value = 0.1448	x Diff = -12 (7.0) P-value = 0.0757
Netherlands (29)	x Diff = -1 (4.4) P-value = 0.8957	x Diff = -13 (7.1) P-value = 0.0602	> Diff = 18 (6.1) P-value = 0.0037		< Diff = -18 (5.7) P-value = 0.0015	x Diff = 9 (6.2) P-value = 0.1619	x Diff = 5 (7.1) P-value = 0.4523
Norway (47)	> Diff = 18 (3.7) P-value = 0.0000	x Diff = 5 (6.7) P-value = 0.4677	> Diff = 36 (5.6) P-value = 0.0000	> Diff = 18 (5.7) P-value = 0.0015		> Diff = 27 (5.8) P-value = 0.0000	> Diff = 23 (6.6) P-value = 0.0004
United Kingdom (20)	< Diff = -9 (4.5) P-value = 0.0392	< Diff = -22 (7.1) P-value = 0.0020	x Diff = 9 (6.2) P-value = 0.1448	x Diff = -9 (6.2) P-value = 0.1619	< Diff = -27 (5.8) P-value = 0.0000		x Diff = -3 (7.1) P-value = 0.6299
United States (24)	x Diff = -6 (5.6) P-value = 0.2923	< Diff = -19 (7.9) P-value = 0.0179	x Diff = 12 (7.0) P-value = 0.0757	x Diff = -5 (7.1) P-value = 0.4523	< Diff = -23 (6.6) P-value = 0.0004	x Diff = 3 (7.1) P-value = 0.6299	

LEGEND:	
<	Has a significant negative difference.
>	Has a significant positive difference.
x	No significant difference.

NOTE: Standard errors are in parentheses in the table body. For gap analysis tables, all comparisons are independent tests with an alpha level of 0.05.

Note that a gap analysis across years cannot be combined with the Between Years or Between Groups and Years difference measures, so you will select the difference measure Between Groups, or, if you have selected percentiles as one of your statistics, you may choose Between Percentiles.

4.H. Regression Analysis

Regression Analysis is included in the IDE to test for the relationship between one or more independent variables with a dependent variable, with the independent variables controlling for each other. The type of analysis performed in this feature of the IDE is referred to as linear
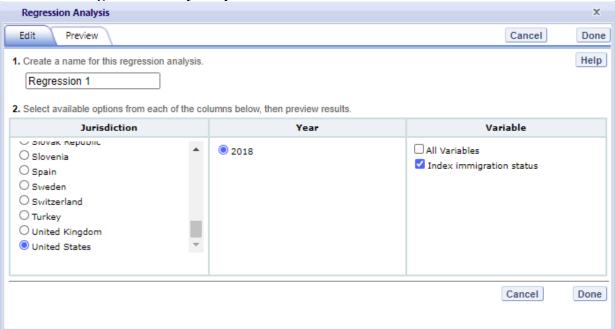
regression, with the dependent variable being a continuous variable selected at step 1. To run a regression, first go to **Build Reports** and choose the report of interest from the drop-down **Select Report** menu. Then click on the **Regression Analysis** link, which is to the right of the **Gap Analysis** link (see exhibit 30).

Exhibit 30. Regression analysis link selection

The general steps for running a regression analysis are as follows (see exhibit 31):

1. In the **Regression Analysis** pop-up window, you can enter a **Name** limited to 25 characters, using only letters, numbers, spaces, underscores, and hyphens (otherwise, by default, the test will be named "Regression 1").
2. Select the appropriate jurisdiction, year, and variable(s) for analysis. Please note that you may only choose one jurisdiction and year at a time, but you may choose up to three independent variables to be in your report. In order to use up to three independent variables, you must have already created and selected a cross-tabulated report (by selecting three variables in Step 2, **Select Variables**).
3. Click the **Preview** tab located in the upper-left corner to view the table format into which your output will be populated. In the Preview tab, an "X" denotes where the output will display.
4. 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 analysis.
5. Click the **Done** button in the upper- or lower-right corner of the screen to run the regression analysis.

Exhibit 31. Regression analysis options

After you have clicked **Done**, your regression analysis output will load onto the screen (see exhibit 32). A 0-1 contrast coding is used to code the independent variable, where the first subgroup of the independent variable is the reference group. Using dummy-coded variables in a linear regression is useful for comparing each subgroup against a reference group. For example, in exhibit 32, if the subgroup "Native" is the reference group for the independent variable **Index immigration status (IMMIG)**, the IDE creates a "Second Generation" dummy variable (1 for respondents who answered "Second Generation," 0 otherwise), a "First Generation" dummy variable (1 for respondents who answered "First Generation," 0 otherwise). Reference group "Native" is excluded from the regression analysis.

Exhibit 32. Regression analysis output

Mathematics, Reading, and Science, 15 years 2018
Dependent Variable: PISA Reading Scale: Overall Reading
Independent Variable(s): Index immigration status [IMMIG]
Contrast Coding Reference Group: Native
United States

Multiple Correlation	0.07	
R Squared	0	

	Degrees of Freedom	Mean square	F Ratio	P Value
Model	2	97237758.54	2.86	0.06
Error	1140.98	33948258.94		

	Standardized Regression Coefficients	S.E. of Standardized Coefficients	Regression Coefficients	S.E. of Regression Coefficients	T Statistic	Probability	Significance
Intercept	0	0	510.009	3.5831	142.3385	0	>
Index immigration status							
Second generation	0.0067	0.022	1.8959	6.2089	0.3054	0.7609	x
First generation	-0.0694	0.0179	-31.2536	7.8185	-3.9974	0.0001	<

NOTE: A 0-1 contrast coding has been used where the first subgroup of the (independent) variable is the reference group. Except for the reference group, each subgroup is contrasted (code 1) in a separate dummy variable against all the other subgroups of the variable (code 0). For more details about contrast coding with multiple variables see the help documentation.
SOURCE: Organization for Economic Cooperation and Development (OECD), Program for International Student Assessment (PISA), 2018 Mathematics, Reading, and Science Assessment.

Using the output from exhibit 32, you can compare the average mathematics literacy scores of first- and second-generation students to scores of native-born students. When a single dummy-coded variable is used in a regression, the *intercept* is the mean of the reference group (e.g., 510.009), and the *regression coefficient* is the difference between the mean of the reference group and the group identified (coded 1) with the dummy-coded variable (e.g., 1.8959 for second generation and -31.2536 for first generation.) Since the regression coefficients are presented with a standard error and a *t* value, they can be used to test whether a difference between means is statistically significant. Under the Significance column in the output you will see three possible signs: (1) < signifies a significant negative difference, (2) > signifies a significant positive difference, and (3) x signifies the difference is not statistically significant.

4.I. 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 33). 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 visible decimal places visible wherever more precision is available. 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.

Exhibit 33. Export report options

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

    o Language
    o Subject
    o Years
    o Measures
    o Jurisdictions

- Variables

- Statistics options

    o Averages
    o Percentages
    o Standard deviations
    o Percentiles

- Cross-tabulations

- Statistical notations and other notes

1. Criteria

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

1. Language:

    o English
    o Spanish

2. Subject:

    o Science literacy
    o Reading literacy
    o Mathematics literacy
    o Financial literacy
    o Problem solving
    o Collaborative problem solving

3. Year:

- o 2018 (data available for reading, reading subscales, mathematics, science, and financial literacy)
- o 2015 (data available for science, science subscales, reading, mathematics, financial literacy, and collaborative problem solving)
- o 2012 (data available for mathematics, mathematics subscales, reading, science, financial literacy, and problem solving)
- o 2009 (data available for reading, reading subscales, mathematics, and science)
- o 2006 (data available for reading, mathematics, science, and science subscales)
- o 2003 (data available for reading, mathematics, mathematics subscales, and science)
- o 2000 (data available for reading, reading subscales, mathematics, and science)

4. Measure:

- o Mathematics scale: Overall mathematics
- o Reading scale: Overall reading
- o Science scale: Overall science
- o Mathematics subscale: Employ
- o Mathematics subscale: Formulate
- o Mathematics subscale: Interpret
- o Mathematics subscale: Space and shape
- o Mathematics subscale: Change and relationships
- o Mathematics subscale: Quantity
- o Mathematics subscale: Uncertainty
- o Reading subscale: Locate information
- o Reading subscale: Understand
- o Reading subscale: Evaluate and reflect
- o Reading subscale: Access and retrieve
- o Reading subscale: Integrate and interpret
- o Reading subscale: Reflect and evaluate
- o Reading subscale: Continuous text
- o Reading subscale: Noncontinuous text
- o Science subscale: Identifying scientific issues
- o Science subscale: Explaining phenomena scientifically
- o Science subscale: Using scientific evidence
- o Science competency subscale: Evaluate and design scientific enquiry
- o Science competency subscale: Explain phenomena scientifically
- o Science competency subscale: Interpret data and evidence scientifically
- o Science knowledge subscale: Content Knowledge
- o Science knowledge subscale: Procedural and Epistemic Knowledge
- o Science system subscale: Earth and space
- o Science system subscale: Living systems
- o Science system subscale: Physical systems
- o Attitude scale: Interest in science
- o Attitude scale: Support for scientific inquiry

- o Financial literacy scale
- o Problem-solving scale
- o Collaborative problem-solving scale

5. Jurisdiction:

- o International average (OECD countries)
- o Average of the selected jurisdictions
- o OECD
- o Non-OECD
- o U.S. states

Language

The PISA IDE currently provides the option to view all steps of the IDE and build reports in English or Spanish. The Help Guide currently is only offered in English.

Subject

PISA assesses reading literacy, mathematics literacy, and science literacy at each administration. In addition, the IDE contains data from the administration of the 2012, 2015, and 2018 PISA financial literacy assessments, the 2012 PISA problem-solving assessments, and the 2015 PISA collaborative problem-solving assessment.

Measures

The PISA IDE includes measures for each subject when selected, such as an overall scale, subscales (if applicable), and continuous variables.

Although each administration of PISA assesses mathematics, reading, 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 as your measure. 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 fully repeated itself in 2009 and began again in 2018. 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. Only overall scale scores are reported in the IDE for financial literacy, problem solving, and collaborative problem solving. Please see Section I. Background, for more information.

In 2015 and 2006, science was the major domain, and reading and mathematics were minor domains. Therefore, for these years, subscales are only available for science data; only single composite scales are available for PISA reading and mathematics data.

In 2012 and 2003, mathematics was the major domain, and reading and science were minor domains. Therefore, for these years, subscales are only available for mathematics data; only single composite scales are available for PISA reading and science data.

In 2018, 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 reading data.

In addition, there are 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 and Classroom Climate*, and include variables such as student age in years, size of class, and an index of computer availability.

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: 2018, 2015, 2012, 2009, 2006, 2003, and 2000. If the measure chosen is one of the science subscales, you can choose 2015 and/or 2006. If you choose between any of the mathematics subscales, you can choose 2012 and/or 2003. If you choose any of the reading subscales, you can choose 2018, 2009, and/or 2000. Subscales are not available for financial literacy, problem solving, or collaborative problem solving.

Jurisdictions

All listed jurisdictions can be selected for any analyses, provided data are available for the selected year. In 2018, a total of 79 jurisdictions participated in the mathematics, reading, and science literacy PISA assessments: 37 Organization for Economic Cooperation and Development (OECD) countries and 42 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 79 jurisdictions for 2015, 2012, 2009, 2006, 2003, and/or 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 2018 data for Vietnam were suppressed due to international reporting standards not being met, and PISA 2015 data for Argentina, Malaysia, and Kazakhstan were suppressed due to international reporting standards not being met).

Data are available for 73 jurisdictions (35 OECD and 38 non-OECD) in 2015, 65 jurisdictions (35 OECD and 30 non-OECD) in 2012, 65 jurisdictions (35 OECD and 30 non-OECD) in 2009, 57 jurisdictions (35 OECD and 22 non-OECD) in 2006, 41 jurisdictions (31 OECD and 10 non-OECD) in 2003, and 38 jurisdictions (29 OECD and 9 non-OECD) in 2000.

Also included in the IDE are the 5 U.S. states or territories that participated in PISA 2012 and PISA 2015. Data from the 43 jurisdictions that participated in the administration of the problem-solving assessment in 2012 are included in the IDE, as well as the 51 jurisdictions that participated in the 2015 collaborative problem-solving assessment. All jurisdictions that

participated in the financial literacy assessment in at least one year (2012, 2015, 2018) are included in the IDE.

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 prior administration or release of PISA. For example, Latvia was an OECD country at the time of the 2015 PISA release, but not during earlier PISA cycles. The IDE recalculates OECD averages for previous PISA cycles based on the current count of 37 OECD countries as of the 2018 release. Please note that the recalculation of the OECD average based on the current count explains why OECD averages calculated by the IDE for earlier years (e.g., 2015 or 2012) do not match the OECD averages from OECD and NCES reports published in earlier years.

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 for 2012, 2009, 2003, and 2000. Each index variable is based on students' responses to the same question asking who usually lived at home with them. However, these three variables (STP5437 in 2012, FAMSTR09 in 2009 and FAMSTR00 in 2003 and 2000) are not comparable due to differences in response categories. In 2012, the response categories were "single-parent (natural or otherwise)," "two parents (natural or otherwise)," and "other"; in 2009, the categories were "single-parent family," "two-parent family," and "other"; and in 2003 and 2000, the categories were "single-parent family," "two-parent family," "mixed," and "other." The icon representing "no data"——will help in identifying the year for which the variable has data available for analysis.

Proficiency levels

Achievement results for PISA are reported using discrete proficiency levels for reading, mathematics, science, financial literacy, problem solving, and collaborative problem solving. Increasing levels represent the knowledge, skills, and capabilities needed to perform tasks of increasing complexity. Based on the statistics option chosen, IDE can report the average scores of students at each proficiency level or the percentage of students performing at each of the predefined levels for the chosen jurisdictions. Two statistics options, standard deviations and

percentiles, will not generate reports as proficiency levels are not reportable using these statistical analyses. Proficiency levels for any subject should be analyzed with the scale of that same subject; for example, the reading literacy proficiency levels should be analyzed with the reading literacy scale.

Mathematics literacy: Administered in all cycles (2000, 2003, 2006, 2009, 2012, 2015, 2018). In 2000, an interim scale was used, and cut-off points between mathematics literacy proficiency levels were not established. Thus, proficiency levels cannot be analyzed in the IDE for 2000 mathematics literacy. From 2003 to 2018, mathematics literacy results were reported using 6 proficiency levels (level 1–level 6); the IDE shows 7 categories (below level 1, level 1, level 2, level 3, level 4, level 5, level 6).

Science literacy: Administered in all cycles (2000, 2003, 2006, 2009, 2012, 2015, 2018). Proficiency levels did not have strict definitions until 2006, when science literacy was the major domain and had a non-interim scale for the first time. Thus, proficiency levels cannot be analyzed in the IDE for 2000 and 2003 science literacy. In 2006, 2009, and 2012, science literacy results were reported using 6 proficiency levels. In 2015 and 2018, science literacy results were reported using 7 proficiency levels, as level 1 was broken into level 1b and level 1a. The cutpoint score for level 1a in 2015 and 2018 is the same as level 1 in 2006, 2009, and 2012; the cutpoint score for level 1b is set significantly lower. IDE programmers have retroactively calculated level 1b for 2006, 2009, and 2012 to allow for trend comparisons, so the IDE shows 8 categories for all years (below level 1b, level 1b, level 1a, level 2, level 3, level 4, level 5, level 6).

Reading literacy: Administered in all cycles (2000, 2003, 2006, 2009, 2012, 2015, 2018). In 2000, 2003, and 2006, 5 proficiency levels were used (level 1–level 5). Starting in 2009 and continuing in 2012 and 2015, reading literacy results were reported using 7 proficiency levels, with level 1 broken into level 1b and level 1a, followed by level 2 through 5 and a new top level (level 6). In 2018, a new lowest proficiency level (level 1c) was added, and the full list of 8 reading literacy proficiency levels became level 1c, level 1b, level 1a, level 2, level 3, level 4, level 5, and level 6. The cut point for level 1a from 2009 to 2018 is the same as for level 1 from 2000 to 2006. IDE programmers have retroactively calculated level 1c for pre-2018 years and level 1b and level 6 for pre-2009 years to allow for trend comparisons, so the IDE shows 9 categories for all years (below level 1c, level 1c, level 1b, level 1a, level 2, level 3, level 4, level 5, level 6).

Financial literacy: Administered in 2012, 2015, and 2018. In all 3 years, financial literacy results were reported using 5 proficiency levels (level 1–level 5); the IDE shows 6 categories (below level 1, level 1, level 2, level 3, level 4, level 5).

Problem solving: Administered in 2012. Problem-solving results were reported using 6 proficiency levels (level 1–level 6); the IDE shows 7 categories (below level 1, level 1, level 2, level 3, level 4, level 5, level 6).

Collaborative problem solving: Administered in 2015. Collaborative problem solving results were reported using 4 proficiency levels (level 1–level 4); the IDE shows 5 categories (below level 1, level 1, level 2, level 3, level 4).

As noted above, the IDE also provides available data for students performing below proficiency level 1 for mathematics literacy, financial literacy, problem solving, and collaborative problem solving; below level 1b for science; and below level 1c for reading literacy. Patterns of responses for students in the proficiency levels below each subject's lowest level (e.g., below level 1 for mathematics literacy, below level 1c for reading literacy, etc.) suggest that these students are unable to answer at least half of the items from those levels correctly; for this reason, the cognitive capabilities of students scoring below these levels are unclear and not defined by OECD. Proficiency at and below these low levels is sometimes combined in reports and referred to as below level 2 (e.g., for reading literacy, below level 2 refers to levels 1a, 1b, lc, and below level 1c.) Descriptions that characterize typical student performance at each proficiency level are shown in the following tables for reading, mathematics, and science literacy, as well as financial literacy, problem solving, and collaborative problem solving.

The following tables show the proficiency-level task descriptions for the most recent administration of each subject shown (e.g., 2018 for mathematics literacy and 2015 for collaborative problem solving).

Description of PISA mathematics literacy proficiency levels

Proficiency level and lower cutpoint score	Task descriptions
Level 1 358	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.
Level 2 420	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.
Level 3 482	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.

Level 4 **545**	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.
Level 5 **607**	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.
Level 6 **669**	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.

NOTE: PISA technical reports contain information about the procedures used to set the proficiency levels for each cycle and are available on the OECD PISA publications page.

SOURCE: *Highlights of U.S. PISA 2018 Results Web Report* (NCES 2020-166) and *Highlights of the 2018 Program for International Student Assessment (PISA) Financial Literacy Assessment* (NCES 2020-072). U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics. Available at https://nces.ed.gov/surveys/pisa/pisa2018/index.asp.

Description of PISA reading literacy proficiency levels

Proficiency level and lower cutpoint score[1]	Task descriptions
Level 1c 189	Readers at Level 1c can understand and affirm the meaning of short, syntactically simple sentences on a literal level and read for a clear and simple purpose within a limited amount of time.
Level 1b 262	Readers at Level 1b can evaluate the literal meaning of simple sentences. They can also interpret the literal meaning of texts by making simple connections between adjacent pieces of information in the question and/or the text. Readers at this level can scan for and locate a single piece of prominently placed, explicitly stated information in a single sentence, a short text, or a simple list. They can access a relevant page from a small set based on simple prompts when explicit cues are present.
Level 1a 335	Readers at Level 1a can understand the literal meaning of sentences or short passages. Readers at this level can also recognize the main theme or the author's purpose in a piece of text about a familiar topic and make a simple connection between several adjacent pieces of information, or between the given information and their own prior knowledge. They can select a relevant page from a small set based on simple prompts and locate one or more independent pieces of information within short texts. Level 1a readers can reflect on the overall purpose and on the relative importance of information (e.g., the main idea vs. non-essential detail) in simple texts containing explicit cues. Most tasks at this level contain explicit cues regarding what needs to be done, how to do it, and where in the text(s) readers should focus their attention.
Level 2 407	Readers at Level 2 can identify the main idea in a piece of text of moderate length. They can understand relationships or construe meaning within a limited part of the text when the information is not prominent by producing basic inferences, and/or when the text(s) include some distracting information. They can select and access a page in a set based on explicit although sometimes complex prompts, and locate one or more pieces of information based on multiple, partly implicit criteria. Readers at Level 2 can, when explicitly cued, reflect on the overall purpose, or on the purpose of specific details, in texts of moderate length. They can reflect on simple visual or typographical features. They can compare claims and evaluate the reasons supporting them based on short, explicit statements.

Level 3 480	Readers at Level 3 can represent the literal meaning of single or multiple texts in the absence of explicit content or organizational clues. Readers can integrate content and generate both basic and more advanced inferences. They can also integrate several parts of a piece of text in order to identify the main idea, understand a relationship, or construe the meaning of a word or phrase when the required information is featured on a single page. Readers can search for information based on indirect prompts and locate target information that is not in a prominent position and/or is in the presence of distractors. In some cases, readers at this level recognize the relationship between several pieces of information based on multiple criteria. Level 3 readers can reflect on a piece of text or a small set of texts and compare and contrast several authors' viewpoints based on explicit information. Reflective tasks at this level may require the reader to perform comparisons, generate explanations, or evaluate a feature of the text. Some reflective tasks require readers to demonstrate a detailed understanding of a piece of text dealing with a familiar topic, whereas others require a basic understanding of less familiar content.
Level 4 553	Readers at Level 4 can comprehend extended passages in single- or multiple-text settings. They interpret the meaning of nuances of language in a section of text by taking into account the text as a whole. In other interpretative tasks, students demonstrate understanding and application of ad hoc categories. They can compare perspectives and draw inferences based on multiple sources. Readers can search, locate, and integrate several pieces of embedded information in the presence of plausible distractors. They can generate inferences based on the task statement in order to assess the relevance of target information. They can handle tasks that require them to memorize prior task context. Readers at this level can evaluate the relationship between specific statements and a person's overall stance or conclusion about a topic. They can reflect on the strategies that authors use to convey their points, based on salient features of texts (e.g., titles and illustrations). They can compare and contrast claims explicitly made in several texts and assess the reliability of a source based on salient criteria.

Level 5 626	Readers at Level 5 can comprehend lengthy texts, inferring which information in the text is relevant even though the information of interest may be easily overlooked. They can perform causal or other forms of reasoning based on a deep understanding of extended pieces of text. They can also answer indirect questions by inferring the relationship between the question and one or several pieces of information distributed within or across multiple texts and sources. Readers can establish distinctions between content and purpose, and between fact and opinion as applied to complex or abstract statements. They can assess neutrality and bias based on explicit or implicit cues pertaining to both the content and/or source of the information. They can also draw conclusions regarding the reliability of the claims or conclusions offered in a piece of text.
Level 6 698	Readers at Level 6 can comprehend lengthy and abstract texts in which the information of interest is deeply embedded and only indirectly related to the task. They can compare, contrast, and integrate information representing multiple and potentially conflicting perspectives, using multiple criteria and generating inferences across distant pieces of information to determine how the information may be used. Readers at Level 6 can reflect deeply on a text's source in relation to its content, using criteria external to the text. They can compare and contrast information across texts, identifying and resolving intertextual discrepancies and conflicts through inferences about the sources of information, their explicit or vested interests, and other cues as to the validity of the information.

NOTE: PISA technical reports contain information about the procedures used to set the proficiency levels for each cycle and are available on the OECD PISA publications page.
SOURCE: *Highlights of U.S. PISA 2018 Results Web Report* (NCES 2020-166) and *Highlights of the 2018 Program for International Student Assessment (PISA) Financial Literacy Assessment* (NCES 2020-072). U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics. Available at https://nces.ed.gov/surveys/pisa/pisa2018/index.asp.

Description of PISA science literacy proficiency levels

Proficiency level and lower cutpoint score[1]	Task descriptions
Level 1b **261**	At Level 1b, students can use basic or everyday scientific knowledge to recognize aspects of familiar or simple phenomenon. They are able to identify simple patterns in data, recognize basic scientific terms and follow explicit instructions to carry out a scientific procedure.
Level 1a **335**	At Level 1a, students are able to use basic or everyday content and procedural knowledge to recognize or identify explanations of simple scientific phenomenon. With support, they can undertake structured scientific enquiries with no more than two variables. They are able to identify simple causal or correlational relationships and interpret graphical and visual data that require a low level of cognitive demand. Level 1a students can select the best scientific explanation for given data in familiar personal, local and global contexts.
Level 2 **410**	At Level 2, students are able to draw on everyday content knowledge and basic procedural knowledge to identify an appropriate scientific explanation, interpret data, and identify the question being addressed in a simple experimental design. They can use basic or everyday scientific knowledge to identify a valid conclusion from a simple dataset. Level 2 students demonstrate basic epistemic knowledge by being able to identify questions that can be investigated scientifically.
Level 3 **484**	At Level 3, students can draw upon moderately complex content knowledge to identify or construct explanations of familiar phenomena. In less familiar or more complex situations, they can construct explanations with relevant cueing or support. They can draw on elements of procedural or epistemic knowledge to carry out a simple experiment in a constrained context. Level 3 students are able to distinguish between scientific and non-scientific issues and identify the evidence supporting a scientific claim.
Level 4 **559**	At Level 4, students can use more complex or more abstract content knowledge, which is either provided or recalled, to construct explanations of more complex or less familiar events and processes. They can conduct experiments involving two or more independent variables in a constrained context. They are able to justify an experimental design, drawing on elements of procedural and epistemic knowledge. Level 4 students can interpret data drawn from a moderately complex data set or less familiar context, draw appropriate conclusions that go beyond the data and provide justifications for their choices.

Level 5 633	At Level 5, students can use abstract scientific ideas or concepts to explain unfamiliar and more complex phenomena, events and processes involving multiple causal links. They are able to apply more sophisticated epistemic knowledge to evaluate alternative experimental designs and justify their choices and use theoretical knowledge to interpret information or make predictions. Level 5 students can evaluate ways of exploring a given question scientifically and identify limitations in interpretations of data sets including sources and the effects of uncertainty in scientific data.
Level 6 708	At Level 6, students can draw on a range of interrelated scientific ideas and concepts from the physical, life and earth and space sciences and use content, procedural and epistemic knowledge in order to offer explanatory hypotheses of novel scientific phenomena, events and processes or to make predictions. In interpreting data and evidence, they are able to discriminate between relevant and irrelevant information and can draw on knowledge external to the normal school curriculum. They can distinguish between arguments that are based on scientific evidence and theory and those based on other considerations. Level 6 students can evaluate competing designs of complex experiments, field studies or simulations and justify their choices.

NOTE: PISA technical reports contain information about the procedures used to set the proficiency levels for each cycle and are available on the OECD PISA publications page.
SOURCE: *Highlights of U.S. PISA 2018 Results Web Report* (NCES 2020-166) and *Highlights of the 2018 Program for International Student Assessment (PISA) Financial Literacy Assessment* (NCES 2020-072). U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics. Available at https://nces.ed.gov/surveys/pisa/pisa2018/index.asp.

Description of PISA financial literacy proficiency levels

Proficiency level and lower cutpoint score	Task descriptions
Level 1 **326**	At Level 1, students can identify common financial products and terms and interpret information relating to basic financial concepts. They can recognize the difference between needs and wants and can make simple decisions on everyday spending. They can recognize the purpose of everyday financial documents such as an invoice and apply single and basic numerical operations (addition, subtraction or multiplication) in financial contexts that they are likely to have experienced personally.
Level 2 **400**	At Level 2, students begin to apply their knowledge of common financial products and commonly used financial terms and concepts. They can use given information to make financial decisions in contexts that are immediately relevant to them. They can recognize the value of a simple budget and can interpret prominent features of everyday financial documents. They can apply single basic numerical operations, including division, to answer financial questions. They show an understanding of the relationships between different financial elements, such as the amount of use and the costs incurred.
Level 3 **475**	At Level 3, students can apply their understanding of commonly used financial concepts, terms and products to situations that are relevant to them. They begin to consider the consequences of financial decisions and they can make simple financial plans in familiar contexts. They can make straightforward interpretations of a range of financial documents and can apply a range of basic numerical operations, including calculating percentages. They can choose the numerical operations needed to solve routine problems in relatively common financial literacy contexts, such as budget calculations.
Level 4 **550**	At Level 4, students can apply their understanding of less common financial concepts and terms to contexts that will be relevant to them as they move towards adulthood, such as bank account management and compound interest in saving products. They can interpret and evaluate a range of detailed financial documents, such as bank statements, and explain the functions of less commonly used financial products. They can make financial decisions taking into account longer term consequences, such as the impact of loan repayment on cost, and they can solve routine problems in less common financial contexts.

Level 5 625	At Level 5, students can apply their understanding of a wide range of financial terms and concepts to contexts that may only become relevant to their lives in the long term. They can analyze complex financial products and can take into account features of financial documents that are significant but unstated or not immediately evident, such as transaction costs. They can work with a high level of accuracy and solve non-routine financial problems, and they can describe the potential outcomes of financial decisions, showing an understanding of the wider financial landscape, such as income tax.

NOTE: PISA technical reports contain information about the procedures used to set the proficiency levels for each cycle and are available on the OECD PISA publications page.
SOURCE: *Highlights of U.S. PISA 2018 Results Web Report* (NCES 2020-166) and *Highlights of the 2018 Program for International Student Assessment (PISA) Financial Literacy Assessment* (NCES 2020-072). U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics. Available at https://nces.ed.gov/surveys/pisa/pisa2018/index.asp.

Description of PISA problem-solving proficiency levels

Proficiency level and lower cutpoint score	Task descriptions
Level 1 **358**	At Level 1, students can explore a problem scenario only in a limited way but tend to do so only when they have encountered very similar situations before. Based on their observations of familiar scenarios, these students are able only to partially describe the behavior of a simple, everyday device. In general, students at Level 1 can solve straightforward problems provided there is a simple condition to be satisfied and there are only one or two steps to be performed to reach the goal. Level 1 students tend not to be able to plan ahead or set subgoals.
Level 2 **423**	At Level 2, students can explore an unfamiliar problem scenario and understand a small part of it. They try, but only partially succeed, to understand and control digital devices with unfamiliar controls, such as home appliances and vending machines. Level 2 problem solvers can test a simple hypothesis that is given to them and can solve a problem that has a single, specific constraint. They can plan and carry out one step at a time to achieve a subgoal and have some capacity to monitor overall progress towards a solution.
Level 3 **488**	At Level 3, students can handle information presented in several different formats. They can explore a problem scenario and infer simple relationships among its components. They can control simple digital devices but have trouble with more complex devices. Problem solvers at Level 3 can fully deal with one condition, for example, by generating several solutions and checking to see whether these satisfy the condition. When there are multiple conditions or inter-related features, they can hold one variable constant to see the effect of change on the other variables. They can devise and execute tests to confirm or refute a given hypothesis. They understand the need to plan ahead and monitor progress and are able to try a different option if necessary.
Level 4 **553**	At Level 4, students can explore a moderately complex problem scenario in a focused way. They grasp the links among the components of the scenario that are required to solve the problem. They can control moderately complex digital devices, such as unfamiliar vending machines or home appliances, but they don't always do so efficiently. These students can plan a few steps ahead and monitor the progress of their plans. They are usually able to adjust these plans or reformulate a goal in light of feedback. They can systematically try out different possibilities and check whether multiple conditions have been satisfied. They can form a hypothesis about why a system is malfunctioning and describe how to test it.

Level 5 618	At Level 5, students can systematically explore a complex problem scenario to gain an understanding of how relevant information is structured. When faced with unfamiliar, moderately complex devices, such as vending machines or home appliances, they respond quickly to feedback in order to control the device. In order to reach a solution, Level 5 problem solvers think ahead to find the best strategy that addresses all the given constraints. They can immediately adjust their plans or backtrack when they detect unexpected difficulties or when they make mistakes that take them off course.
Level 6 683	At Level 6, students can develop complete, coherent mental models of diverse problem scenarios, enabling them to solve complex problems efficiently. They can explore a scenario in a highly strategic manner to understand all information pertaining to the problem. The information may be presented in different formats, requiring interpretation and integration of related parts. When confronted with very complex devices, such as home appliances that work in an unusual or unexpected manner, they quickly learn how to control the devices to achieve a goal in an optimal way. Level 6 problem solvers can set up general hypotheses about a system and thoroughly test them. They can follow a premise through to a logical conclusion or recognize when there is not enough information available to reach one. In order to reach a solution, these highly proficient problem solvers can create complex, flexible, multi-step plans that they continually monitor during execution. Where necessary, they modify their strategies, taking all constraints into account, both explicit and implicit.

NOTE: PISA technical reports contain information about the procedures used to set the proficiency levels for each cycle and are available on the OECD PISA publications page.
SOURCE: *PISA 2012 Results: Creative Problem Solving: Students' Skills in Tackling Real-Life Problems (Volume V),* OECD Publishing. Available at http://www.oecd.org/pisa/keyfindings/pisa-2012-results-volume-v.htm.

Description of PISA collaborative problem-solving proficiency levels

Proficiency level and lower cutpoint score	Task descriptions
Level 1 **340**	At Level 1, students can complete tasks with low problem complexity and limited collaboration complexity. They can provide requested information and take actions to enact plans when prompted. Level 1 students can confirm actions or proposals made by others. They tend to focus on their individual role within the group. With support from team members, and when working on a simple problem, these students can help find a solution to the given problem.
Level 2 **440**	At Level 2, students can contribute to a collaborative effort to solve a problem of medium difficulty. They can help solve a problem by communicating with team members about the actions to be performed. They can volunteer information not specifically requested by another team member. Level 2 students understand that not all team members have the same information and can consider differing perspectives in their interactions. They can help the team establish a shared understanding of the steps required to solve a problem. These students can request additional information required to solve a problem and solicit agreement or confirmation from team members about the approach to be taken. Students near the top of Level 2 can take the initiative to suggest a logical next step, or propose a new approach, to solve a problem.
Level 3 **540**	At Level 3, students can complete tasks with either complex problem-solving requirements or complex collaboration demands. These students can perform multi-step tasks that require integrating multiple pieces of information, often in complex and dynamic problems. They orchestrate roles within the team and identify information needed by particular team members to solve the problem. Level 3 students can recognize the information needed to solve a problem, request it from the appropriate team member, and identify when the provided information is incorrect. When conflicts arise, they can help team members negotiate a solution.

Level 4 640	At Level 4, students can successfully carry out complicated problem-solving tasks with high collaboration complexity. They can solve complex problems with multiple constraints, keeping relevant background information in mind. These students maintain an awareness of group dynamics and take actions to ensure that team members act in accordance with their agreed-upon roles. At the same time, they can monitor progress toward a solution and identify obstacles to overcome or gaps to be bridged. Level 4 students take initiative and perform actions or make requests to overcome obstacles and to resolve disagreements and conflicts. They can balance the collaboration and problem-solving aspects of a presented task, identify efficient pathways to a solution, and take actions to solve the given problem.

NOTE: PISA technical reports contain information about the procedures used to set the proficiency levels for each cycle and are available on the OECD PISA publications page.
SOURCE: *Performance of U.S. 15-Year-Old Students in Science, Reading, and Mathematics Literacy in an International Context: First Look at PISA 2015* (NCES 2017-048). U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics. Available at https://nces.ed.gov/pubs2017/2017048.pdf.

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

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

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

- below level 1c, less than or equal to 189.33;
- level 1c, greater than 189.33 and less than 262.04;
- level 1b, greater than 262.04 and less than 334.75;
- level 1a, equal to or greater than 334.75 and less than 407.47;
- level 2, equal to or greater than 407.47 and less than 480.18;
- level 3, equal to or greater than 480.18 and less than 552.89;
- level 4, equal to or greater than 552.89 and less than 625.61;
- level 5, equal to or greater than 625.61 and less than 698.32; and
- level 6, equal to or greater than 698.32.

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

- below level 1b, less than 260.54
- level 1b, equal to or greater than 260.54 and less than 334.94
- level 1a, equal to or greater than 334.94 and less than 409.54;
- level 2, equal to or greater than 409.54 and less than 484.14;
- level 3, equal to or greater than 484.14 and less than 558.73;
- level 4, equal to or greater than 558.73 and less than 633.33;
- level 5, equal to or greater than 633.33 and less than 707.93; and
- level 6, equal to or greater than 707.93.

Exact cut scores for the financial literacy proficiency levels are as follows:

- below level 1, less than or equal to 325.57;
- level 1, greater than 325.57 and less than or equal to 400.33;
- level 2, greater than 400.33 and less than or equal to 475.10;
- level 3, greater than 475.10 and less than or equal to 549.86;
- level 4, greater than 549.86 and less than or equal to 624.63; and
- level 5, greater than 624.63.

Exact cut scores for the problem-solving proficiency levels are as follows:

- below level 1, less than or equal to 358.49;
- level 1, greater than 358.49 and less than or equal to 423.42;
- level 2, greater than 423.42 and less than or equal to 488.35;
- level 3, greater than 488.35 and less than or equal to 553.28;
- level 4, greater than 553.28 and less than or equal to 618.21;
- level 5, greater than 618.21 and less than or equal to 683.14; and
- level 6, greater than 683.14.

Exact cut scores for the collaborative problem-solving proficiency levels are as follows:

- below level 1, less than 340.00;
- level 1, greater than or equal to 340.00 and less than 440.00;
- level 2, greater than or equal to 440.00 and less than 540.00;
- level 3, greater than or equal to 540.00 and less than 640.00; and
- level 4, greater than or equal to 640.00.

3. Statistics Options

The IDE reports PISA data with several statistics options:

- Averages
- Percentages
- Standard deviations
- Percentiles

Averages

This statistic provides the average value for a selected continuous variable or overall score for the combined literacy scale (for example, science literacy) or score for one of the subscales corresponding to the subject chosen (for example, the science competency subscale: interpret data and evidence scientifically).

For the PISA assessment, student performance is reported on scales that range from 0 to 1,000. PISA scales are produced using item response theory (IRT) to estimate average scores for mathematics, reading, science, financial literacy, and problem solving 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 a categorical variable is selected and the jurisdictions are listed in the table stub, the percentage data for the response categories will sum to 100 percent in each jurisdiction. By default, the percentage distributions do not include missing data, although there is an option to include them.

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 score (or cut point) for the following:

- 10th percentile – the bottom 10 percent of students
- 25th percentile – the bottom quarter of students
- 50th percentile – the median (half the students scored below the cut point and half scored above it)
- 75th percentile – the top quarter of students
- 90th 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**) and 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. (For instance, the standard error for the statistic cannot be reported because the statistic does not meet reporting standards.)
- # The statistic rounds to zero.
- ‡ Reporting standards not met. (For instance, the sample size is insufficient to permit a reliable estimate.)
- NOTE: A general note pertains to any special characteristics of the data in the table.
- 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 (OECD Countries)" is clicked under "Jurisdiction."

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 prior administration or release of PISA. For example, Latvia was an OECD country at the time of the 2015 PISA release, but not during earlier PISA cycles. The IDE recalculates OECD averages for previous PISA cycles based on the current count of 35 OECD countries as of the 2015 release. Please note that the recalculation of the OECD average based on the current count explains why OECD averages calculated by the IDE for earlier years (e.g., 2012 or 2009) do not match the OECD averages from OECD and NCES reports published in earlier years.

Furthermore, there are certain OECD countries that are excluded from the OECD averages both in the IDE and published OECD reports due to issues listed below:

- Four current OECD countries (Estonia, the Slovak Republic, Slovenia, and Turkey) did not participate in 2000 and 2003.

- Data for the Netherlands and the United Kingdom were suppressed in 2000 due to international reporting standards not being met.[1]

- The reading literacy scores are not reported in the 2006 cycle for the United States due to a printing error in the test booklets.

- The OECD average for the optional financial literacy assessment is calculated based on the average scores of the 14 participating countries in 2012.

- The OECD average for the optional problem-solving assessment is calculated based on the 28 participating countries in 2012.

- Data for Vietnam were suppressed in 2018 due to international reporting standards not being met.

- The reading literacy scores for Spain were not reported in 2018 due to sub-optimal response behaviors from students.

Please note that OECD averages are affected by data suppression rules (discussed on the next page). This means that in some cases the OECD average generated by the IDE when a variable is chosen may not match the PISA 2018 OECD and NCES reports for that variable. This occurs when an OECD country's data is suppressed in either the IDE or the OECD or NCES reports, but not both. If a country's data is suppressed in the IDE, it will not be included in the calculation of

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[1] While the Netherlands' 2000 data were suppressed for the OECD release of the PISA 2000 results, the United Kingdom's 2000 data were suppressed retroactively by the OECD after the release of the PISA 2000 results.

the average score. For example, the OECD excluded Spain's reading data from its first report presenting the results of the PISA 2018 survey (OECD, *PISA 2018 Results (Volume I): What Students Know and Can Do,* available at http://www.pisa.oecd.org) because of a concern over sub-optimal response behaviors from students. NCES also excluded these data from its 2018 report. After further investigation, the OECD decided to release all available PISA 2018 data for Spain, but this change was not reflected in the NCES report.

Statistical Comparisons

Comparisons of achievement across years are made using independent *t*-tests with a linking error taken into account. Comparisons between jurisdictions are also treated as independent. As of December 2016, all comparisons within a jurisdiction, within the same year, are made using dependent *t*-tests. Prior to this, only male-female comparisons within a jurisdiction were treated as dependent. Because of this change, the results of statistical significance testing may differ slightly from the results obtained using earlier versions of the PISA IDE. The alpha level for all *t*-tests is .05.

Data Suppression

Data suppression may be handled slightly differently in the PISA IDE and the OECD PISA International Reports. For the IDE, the Rule of 62 is applied to suppress data to avoid reporting results for groups about which little of interest could be said due to lack of power. The Rule of 62 is borrowed from the IDE's counterpart, the National Assessment of Educational Progress (NAEP) Data Explorer (NDE). This rule states that statistics for a group are suppressed if they are based on less than 62 cases. These statistics are means, standard errors, standard deviations, and a set of percentiles. The rule serves to assure a minimum power requirement to detect moderate differences at nominal significance level (.05). The minimum power is 0.80 and the moderate effect size is 0.5 standard deviation units. A design effect of 2 is assumed to derive an appropriate complex sample standard deviation.

6. Index Variables

In addition to scale scores representing performance in various subjects, PISA uses indices derived from the student, parent, teacher, and school questionnaires to contextualize PISA results or to estimate trends that account for demographic changes over time.

Information on indices for each year of administration can be found in the chapters referenced in the summary table below. The PISA technical reports can be found on the OECD PISA publications page (http://www.oecd.org/pisa/publications/).

Year of PISA administration	PISA technical report	Links
2018	Chapter 16	http://www.oecd.org/pisa/data/33688233.pdf
2015	Chapter 16	http://www.oecd.org/pisa/data/pisa2003technicalreport.htm
2012	Chapter 16	http://www.oecd.org/pisa/data/42025182.pdf
2009	Chapter 16	http://www.oecd.org/pisa/data/pisa2009technicalreport.htm
2006	Chapter 16	http://www.oecd.org/pisa/data/pisa2012technicalreport.htm
2003	Chapter 17	http://www.oecd.org/pisa/data/2015-technical-report/
2000	Chapter 17	http://www.oecd.org/pisa/data/pisa2018technicalreport/