

spreadsheet tool to assist with answering the questions. After the introduction screen, students come to a practice screen where they must perform several actions to familiarise themselves with the functionality of the spreadsheet. After the practice screen, students come to an instruction screen, which lets them know that instructions for using the spreadsheet are available in each item. The data used for all items in this unit comprise the amount of forested area as a percentage of the total land area for 15 countries in the years 2005, 2010, and 2015. The spreadsheet also has columns that are always empty when students first navigate to each item, and the default ordering of the countries is alphabetical.

Question 1 in the FORESTED AREAS unit is a task at proficiency Level 5. It asks students to identify the countries that had the greatest gain, the greatest loss or no overall change in its percentage of forested area between 2005 and 2015. To answer this question, students need to determine what calculation(s) to perform, how to use the spreadsheet to perform them, and, lastly, interpret the results with respect to the context. This question measures the *formulating situations mathematically* process, and *uncertainty and data* in the content category.

Question 3 in FORESTED AREAS is a task at proficiency Level 6 (Figure I.3.3). Students are told to consider the data in terms of two time periods: 2005 to 2010 and 2010 to 2015. They must identify the two countries that had biggest change in their percentage of forested area from one time period to the other. To answer this question, students need to calculate the change in the percent of forested area for each time period and then compute the change between the two time periods; they might also find it helpful to sort the results. Students have to devise a strategy for using the spreadsheet, which requires performing multiple operations before being able to evaluate the results. Possibly contributing to the difficulty of this item is recognising that “biggest change” in this context does not just mean an increase but it can also mean a decrease in the percentage of forested area between time periods. This question was allocated to the *interpreting, applying and evaluating mathematical outcomes* process category, and to the *uncertainty and data* content category.

Figure I.3.3. Forested Area unit, released item #3

The screenshot shows the PISA 2022 interface for the 'Forested Area' unit. On the left, there is a question card titled 'Forested Area' with 'Question 3 / 4'. Below the title is a section 'How to Use the Spreadsheet' with instructions: 'Refer to "Forested Area" on the right. Use the spreadsheet to help you answer the question below. Select from the drop-down menus to answer the question.' The question text reads: 'Consider the two time periods: 2005 to 2010 and 2010 to 2015. In terms of percentage points, which two countries had the biggest change in the percent of forested area from one time period to the other time period?' Below the question are two 'Select' dropdown menus separated by 'and'. On the right, the 'FORESTED AREA' spreadsheet tool is displayed. It includes a title, a description: 'The spreadsheet below shows the amount of forested area as a percentage of the total land area in each of the 15 countries in this data set. Data are shown for the years 2005, 2010, and 2015.' Below this is a table with columns for Country, 2005, 2010, 2015, and three empty columns (E, F, G). The table contains data for 15 countries. At the bottom of the spreadsheet tool are 'Calculate' and 'Mean' sections with dropdown menus for Column, Operation, and Run buttons.

Country	2005	2010	2015	Column E	Column F	Column G
Algeria	0.64	0.81	0.82			
Armenia	11.77	11.74	11.77			
Colombia	54.26	52.85	52.73			
Germany	32.66	32.73	32.76			
Greece	29.11	30.28	31.45			
India	22.77	23.47	23.77			
Kazakhstan	1.24	1.23	1.23			
Lebanon	13.34	13.38	13.42			
Panama	64.33	63.21	62.11			
Peru	59.01	58.45	57.79			
Portugal	36.52	35.89	35.25			
Senegal	45.05	44.01	42.97			
South Korea	64.42	64.08	63.69			
Thailand	31.51	31.81	32.1			
United States	33.26	33.7	33.85			

Note: For the full set of publicly released mathematics items, see Annex C.