

STUDENT PROFILING

Lesson 1: Assessing Data Collection

Australian Curriculum: Mathematics (Year 10)

ACMSP250: Compare shapes of box plots to corresponding histograms and dot plots

- investigating data in different ways to make comparisons and draw conclusions

Lesson abstract

Students answer and then critically analyse the Census@School 2014 Questionnaire. They are given a single participant's response sheet to the Questionnaire and use these responses to interpret and describe the participant's day-to-day life.

Mathematical purpose (for students)

To categorise and critically assess methods of data collection.

Mathematical purpose (for teachers)

To categorise and critically assess methods of data collection.

Suggested presentation Two lessons of approximately one hour each.

Vocabulary encountered

- outlier

Lesson materials

- Census@School 2014 Questionnaire* (see [Teacher Background Information](#) below)
- PDF *1b Census@School 2014 Selected Responses* (printed on card, one card per student)
- [Student Sheet 1 - Data Table](#) (one copy per student, also included as Word document *1c Data Table*)

We value your feedback after these lessons via <http://tiny.cc/resource-feedback>

Teacher Background Information

The Questionnaire used in this lesson (*Census@School 2014 Questionnaire*) is available at [this link](#). It is an unedited replica of the original Census@School 2014 Questionnaire (i.e. original text has been unchanged) released by the Australian Bureau of Statistics.

To use:

1. Open the link and click “Make a copy” (you will need to be signed in with a Google account first).
2. Select “SEND” from top menu.
3. Select the Hyperlink icon as shown on right.
4. Share the link with your class.



The answers submitted to the form will be visible to anyone who completes the survey. To disable this function, click the settings button and unselect “Respondents can: See summary charts and text responses”. This means that the results will be visible only to you.

If completing the survey online is not feasible the Questionnaire is also included as PDF *1a Questionnaire*. Each student will need one copy.

Completing the Questionnaire

Give students a link to your copy of *Census@School 2014 Questionnaire* prepared as described on previous page, or give each student a copy of *1a Census@School 2014 Questionnaire*. Have students complete the Questionnaire. You may choose to skip Questions 9-14 and 25.

Give each student a copy of [Student Sheet 1 - Data Table](#) and ask them to use the first three columns of the table to evaluate the Questionnaire. You may ask them to evaluate every question or a subset of questions.

Teacher Notes

- In the table as a selection of cells (including a completed row for Question 16) have been filled out as an example for students.
- The two columns “Useful ways to represent data” and “Useful ways to analyse data” will be used in Lesson 2; however, students may choose to start filling them in here as well.
- Note that for “Data type”, the examples given are ‘categorical’ and ‘numerical’. TinkerPlots can automatically recognise these data types and will mark categorical data in discrete colours and numerical data in a graduated colour.

Exploring questions

Ask students: *what do you think of Question 18? Question 26? Question 30? Would you make any adjustments or additions to these questions? Consider:*

- What are the possible responses? Do they cover all the options?
 - For example:
 - Question 18: Are any popular breakfast options excluded?
 - Question 26: Are there any other activities that should be added?
 - Question 30: Should any other issues be included?
- Are the categories given in the questions useful? Could you improve them?
 - For example:
 - Question 18: Note that according to these categories, a student who had pancakes for breakfast is indistinguishable from a student who had crackers.
 - Question 26: Would it be useful to distinguish between hours spent using the internet on a computer and on a phone? Why/why not?

- What is the method for inputting responses? Can you think of any other useful methods?
 - Would the responses to Questions 26 and 30 look different if they were ranked from **most** to **least** rather than given numerical values? What might be different?
- What would be other ways to present these questions? What would be the advantages/disadvantages?

Ask the class whether there are any other questions that they would like to change, and discuss as a group.

Building a person

Give each student one card from *1b Census@School 2014 Selected Responses*. This will be their subject for the rest of the sequence. Ask students to give their subject a name and record their Subject ID on their worksheet.

Students review their subject's answers and identify any responses for which they believe their subject may be an **outlier**. They take note of unusual/interesting responses and try to describe what the subject's life might look like. They are free to be as creative with their claims as they like, as long as they can support their claims with data.

For example:

- Subject #2 reports that she spends 29 hours a week using the computer/internet and 39 hours a week doing housework (see right). What might her week look like?
- Subject #31 rates the importance of owning a computer and having access to the internet as 1 out of 100 but spends 40 hours a week using the computer/internet. What might be some reasons for this?
- *Subject #15 earned \$600 last week. That's a lot - I think this might be an outlier.*

Q26.Hrs/wk hanging out with friends	0
Q26.Hrs/wk doing homework	5
Q26.Hrs/wk doing things with family	40
Q26.Hrs/wk playing sports/outdoor games/activities	
Q26.Hrs/wk playing computer/video games	
Q26.Hrs/wk using computer/internet	29
Q26.Hrs/wk watching TV	18
Q26.Hrs/wk doing paid work	
Q26.Hrs/wk volunteer community work	
Q26.Hrs/wk doing housework/jobs at home	39

Encourage students to compare their subject's responses to their own, but **not** to compare subjects more widely. Emphasise that different findings can be drawn from a dataset in isolation and in context. Lesson 2: Being Typical explores this further.

Reflection

Each student takes turns sharing the name of their subject and one interesting fact about their subject, along with the data to support the fact.

Possible Student Response

- Subject #28: *My subject is named Hanif. Hanif is failing school but he doesn't care because he just wants to be a professional tennis player. I know this because he spends one hour a week doing homework, but twenty hours a week playing sport. He works as a tennis coach for twelve hours a week too, but he earned only \$80 last week, so he gets paid only \$6 or \$7 an hour.*

Where to next?

In Lesson 2: Being Typical students use the responses of 550 students to contextualise their subject's responses, and debate whether their subject is "typical".

Question number	Question type (multiple choice, short answer etc.)	Data type (categorical, numerical etc.)	Useful ways to represent data	Useful ways to analyse data	Other notes
16	Multiple choice	Categorical	Pie chart	Percentage of students who speak each language	Should there be an "other" option?
28					
		Numerical			
		Categorical			
			Box and whisker plot		
				Two-way table	

Subject ID: _____