



## DT Applied: Data Analytics Unplugged activities for students



Teachers

This activity is for: Years 7-8

# Roll a fake data story

## This activity teaches:

Students to develop an understanding of how data can have a bias and be used as evidence in an argument. It addresses sample size and representing data as graphs.

This activity is targeted towards students in Years 7 and 8. This activity is expected to be run in pairs and take one 40-minute lesson.

## Learning Intention:

We are learning to...

- Be able to identify different methods of data collection.
- Be able to question the reliability of a data source.
- Be able to be aware of data bias to skew an argument or opinion.
- Be able to recognise sample size as a true data representation.
- Be able to determine the best graph to visualise the data for the intended audience.

## You will need:

- pen/pencil
- dice (1 per pair)
- *Roll a Fake Data story* worksheet (1 per pair)

## Getting started:

- Divide the class in pairs
- Provide handouts (1 per pair) of *Roll a Fake Data story* worksheet.
- Follow the step-by-step instructions below to:
  - Discuss with the class data visualisation and data bias
  - Conduct a class brainstorm of potential data questions
  - Complete the Roll a Fake Data story activity
  - Present your argument and corresponding data to the class.



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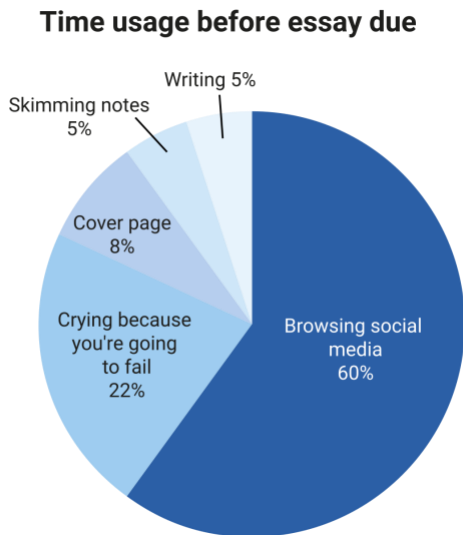
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# Step by Step:

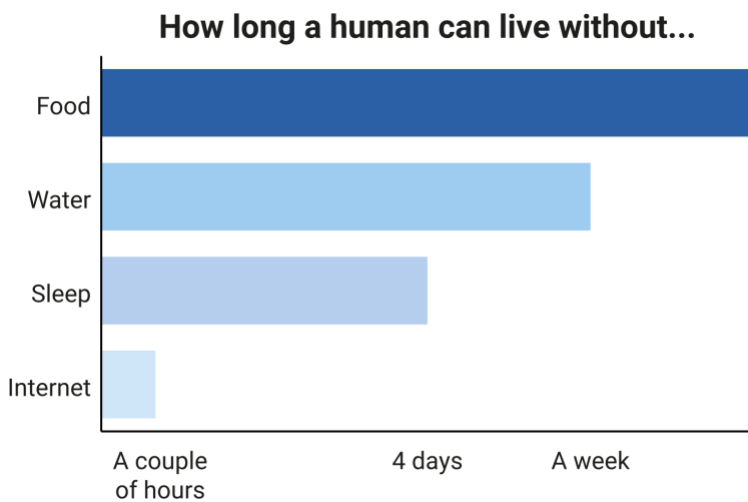
## Step 1 - Data visualisation

Students view examples of data being used as evidence in an argument.

*Example 1: Time wasting*



*Example 2: Human Necessities*



Conduct your own thumbs up/down to vote how long you would last without...





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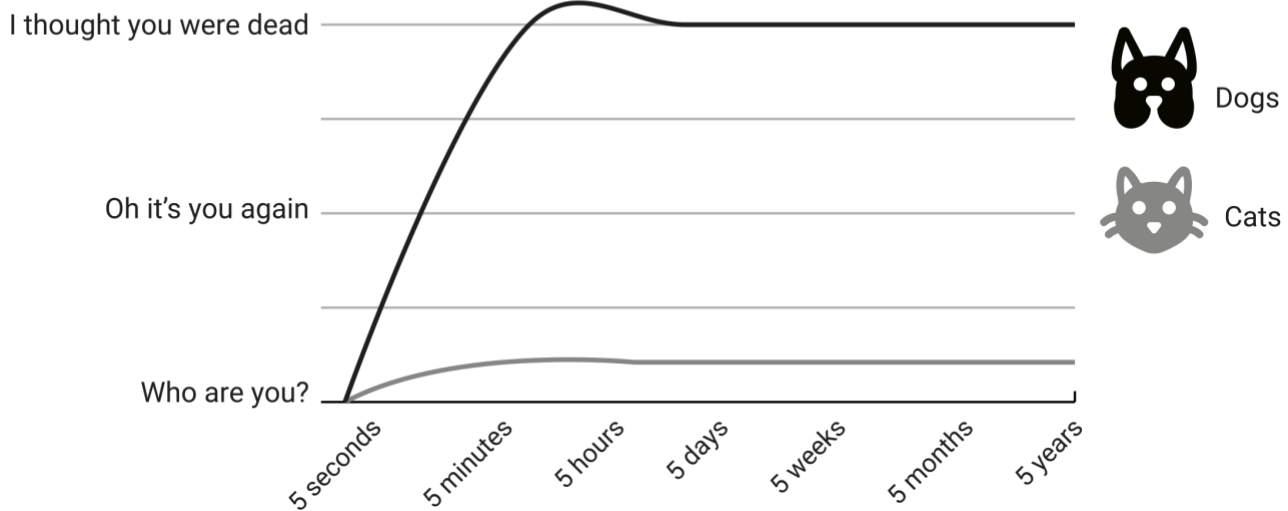


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Example 3: Pet Perils

**Dogs vs cats**

How much they miss you relative to the time you are gone.



Conduct your own blind vote about your classes dog's vs cat's preferences.

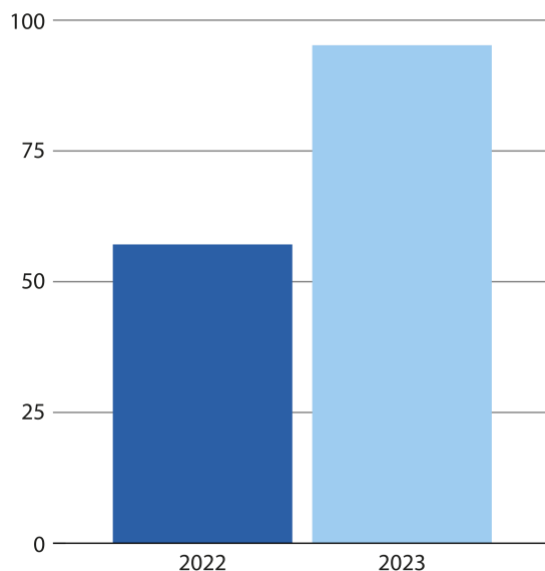
- Count your sample size.
- Question the class, is this enough to make a call on Australia's pet preferences?
- What would be a good sample size?
- These data collection methods are surveys or polls. There are many other ways groups can collect data. Can you think of any others?

**Step 2 - Data bias**

Start a class discussion and ask students leading questions:

- What is bias?
- Do you think you have your own bias when it comes to certain topics?
- Do you think data can add more value to an argument?
- Do you think data can be misused?

Reading scores before and after school implemented reading program



In this example, the source of the data for the "school implementing the reading program" has a bias towards over-representing the data from reading tests to prove its worth

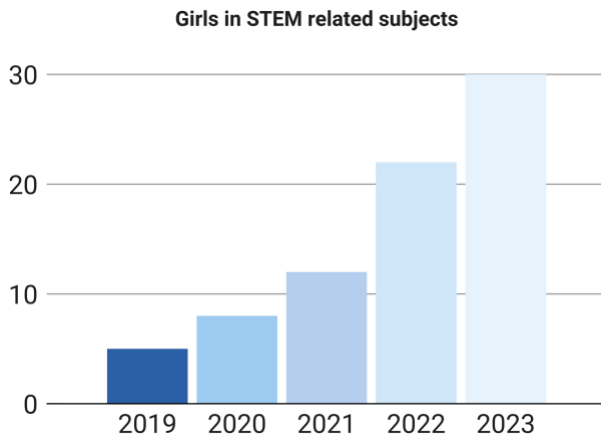


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Example 5: Girls in STEM subjects



In this example, understanding the context helps, as the source of the data is the school implementing the STEM subjects, and they have a vested interest in ensuring they see female participation in STEM subjects offered at their location. They have, therefore, used only the data that supports their argument -known as cherry picking- and have left out the data about which subjects are offered yearly and the number of STEM subjects available. Leading questions:

- Why would a group use data to support their argument?
- Do you think people question the source of their data?

### Step 3 – Student brainstorm

Graphs are powerful visualisations of data as they communicate a whole data story with one image.

### Leading questions:

- Have you ever tried to convince someone to your point of view?
- What were you aiming to communicate?
- Who was your audience?
- Would data have helped support your argument?
- Would a graph that summed it all up have assisted?

### Step 4 – Roll a Fake Data story activity

- Students working in pairs using the Roll a Fake Data story double-sided worksheet to roll the dice 6 times and determine the 6 characteristics of their data story (audience, argument, data source, number of responses, response outcome, graph type).
- On the second page of the worksheet, students create a graph as a data visualisation ensuring the graph checklist is complete (Graph title, X and Y axes labels, scale, plot the data and a legend to help understand the graph).
- On this second page of the worksheet, students also critically analyze if this graph was the best choice to represent this data and consider if there are better alternatives.

### Step 5 – Students present their data to the class

- Working in pairs, students present their findings to the class to convince them of the argument. Use the data and graph as undeniable evidence of their viewpoint.
- Ask the class to vote at the end of the presentation if the students convinced them to their way of thinking using their fake data.



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# Roll a fake data story

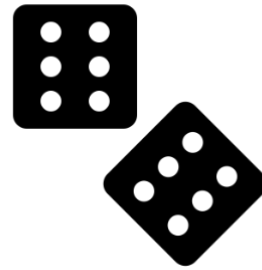
Instructions:

- 1 Roll the dice and match the number with the row on the chart.
- 2 Circle the corresponding image.
- 3 Repeat for 6 rolls, circling your fake data story decisions.
- 4 Create a graph visualisation of your data and argument (2nd page).
- 5 Present your case to the class using your fake data and ask them to vote if you convinced them.

Dice number	1st roll	2nd roll	3rd roll	4th roll	5th roll	6th roll
	Audience	Argument	Data source	Number of responses	Response outcome	Graph type
	 Parents/ Guardians	 Longer lunch breaks	 Student survey	 50	 3/4 1/4	 Bar Graph
	 Classmates	 Eat more ice cream	 Focus group	 100	 70% 30%	 Pie Graph
	 Teachers	 More tech time	 Interview	 800	 1/2 1/2	 Line Graph
	 Principal	 Stay up until midnight	 Observation	 250	 15% 85%	 Bar Graph
	 Local shop keeper	 Go to Disneyland	 Records	 1000	 1/3 2/3	 Pie Graph
	 Coach	 Host a party	 Social Media monitoring	 720	 80% 20%	 Line Graph



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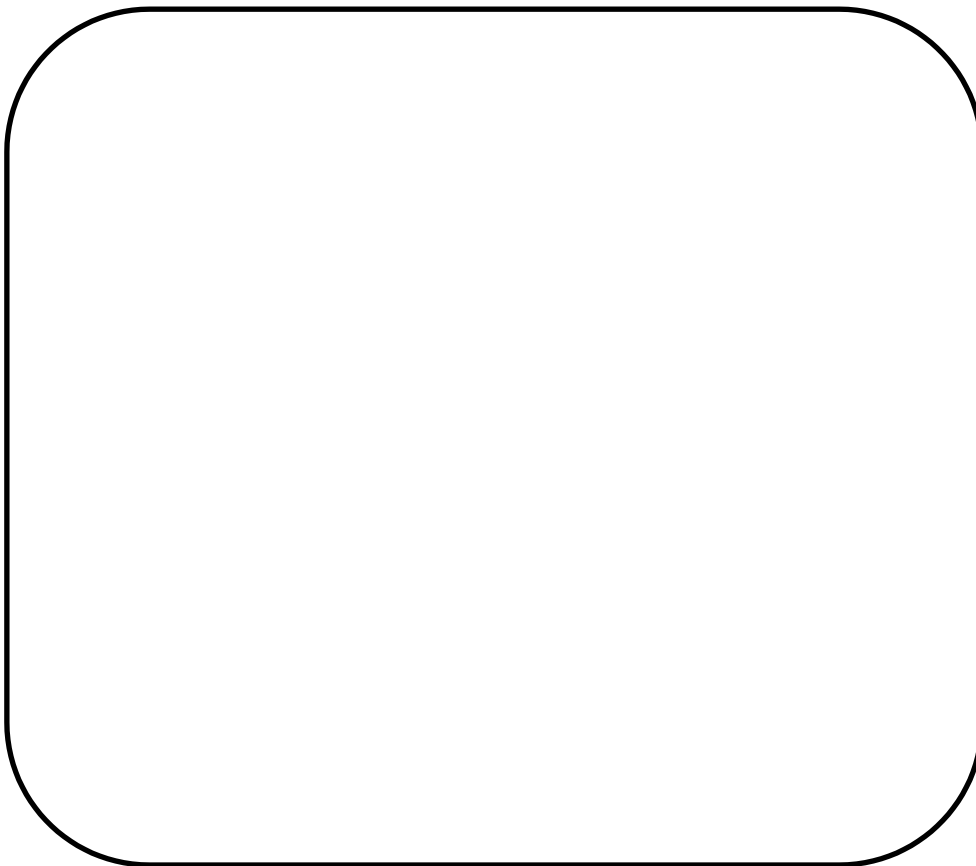
Students

# Roll a fake data story

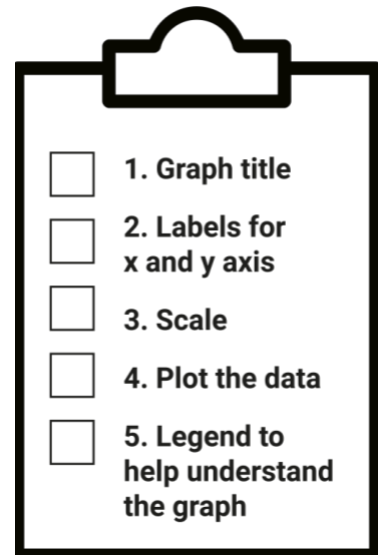
Your Names: \_\_\_\_\_

Graph Title: \_\_\_\_\_

Using your fake data story decisions draw the corresponding graph as evidence to support your argument and convince your audience. Ensure you have all the graph elements from the checklist.



## Graph checklist



Do you think this was the right graph choice for this type of data? If not, which graph type would have been a better choice?

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**Students**

# Glossary

**Data:** information (observations and/or measurements) collected during an investigation.

**Bias:** information that tends to favour one idea or group over another.

**Context:** extra information that helps you to understand what the data collected means.

**Bias in data:** data that shows a preference for one idea over another, because a group is not represented or over-represented.

**Cherry picking data:** using visuals to selectively highlight certain data points or time periods while ignoring others.

**Over representation in data:** the representation of a group in a category that exceeds our expectations for that group or differs substantially from the representation of others in that category.

**Graph axes:** the two types of lines (vertical x-axis and horizontal y-axis) used to measure data on graphs and grids.

**Graph scale:** the distance between the numbers on the X and Y axes that represent all the possible data that is to be graphed.

**Graph legend:** a graph legend (or key) generally appears as a box to the right or left of your graph and simplifies the data displayed in the graph.

**Data visualisation:** representing data as a story with graphs and charts to make it easier to see and understand.



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# Want more?

Here are some further activities, online resources, extension ideas and curriculum references.

### Adapting this activity

- Students can search for more examples of data bias online and collate them into a classroom anchor chart
- Students develop a board game with each argument and its data as well as real examples where players must decide if the data is true or false.

### Keep the conversation going

- Ask students to consider vested interests in their own school, community, state and country and how data could be manipulated in these examples
- Collate a list as a class of ways we could be critical of data presented in our newspapers and news broadcasts and published online.

### Keep learning

- Students can use their fake data story topic as a classroom debating topic and develop arguments for and against to present to the class
- Students can develop their fake data story into a persuasive writing piece or information report.

### Linking it back to the Australian Curriculum: Digital Technologies

This activity can be used to revise concepts in data, specifically visualising data to create information and evaluating data for authenticity and accuracy. Refer to [grok.ac/curriculum](http://grok.ac/curriculum) for more curriculum information.