



# Lying with Statistics versus Capturing the Truth

Key Stage 2 Programme

Pupil Name

Tutorial  
Group

PhD tutor



# Course Rationale

Maths and statistics are powerful tools. When applied to data about our daily life, they can help us better understand patterns of behaviour and at times predict what may happen next or explain past events. However, when used without training, or with the intention of skewing reality, it can misrepresent why things happen.

This course is aimed at exploring how data could be appropriately used to study the world around us.

In the first tutorials, students will consider the reliability, validity and bias of survey questions and learn how to measure averages. Then students will be introduced to different ways to represent their data, from pie charts to histograms. Finally, students will discuss what makes an effective survey question and write a final assignment in which they will evaluate a survey designed to gather opinions and inform a local council's spending decisions.



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A step-change in  
quantitative social  
science skills

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# Sample Tutorial Activity



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## What is the Purpose of Tutorial 4?

- Understand why question wording, format and response options matter in survey design
- Discuss different styles of survey questions
- Discuss common mistakes made when making survey questions

If we needed to find out where the nearest post box was, what questions should we ask?

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### Discuss

One question we could ask is: "Is there a post box nearby?"

- Would this be a useful question?
- How is the question not helpful for us without any other questions?
- What follow up question would we need to ask to find out the answer we are looking for?

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- What questions would be more helpful to ask? What questions would be less helpful to ask?

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## Question Format

Sometimes the things we are interested in studying involve people, and when people are our observations, we can talk to them to collect the data we need. But, collecting data from people is not an easy task. As researchers, we need to make sure we are asking the right questions and working out how to do that can take a bit of time.

There are two common types of questions we can ask people when we are collecting information:

- open-ended questions
- closed ended questions

### Open-ended questions

We ask people a question, but do not provide them with possible answers to select from. In this way, the question is "open" for the person to answer however they want. For example, if we asked someone what they think of school uniform as an open-ended question, we would let them give use their answer however they liked,

What are the strengths and weaknesses of asking a question in this way? (Hint: you might find it helpful to ask you one or two people in the tutorial and record their answer.)

Strengths	Weaknesses

### Closed-ended questions

We ask people a question, but this time we give them with a set of answers to choose from. In this way, the question is "closed" and the person answering is not free to make up their own answer. For example, if we asked someone what they think of school uniform as a closed-ended question, we would give them some options to choose, like:

- Really like it
- Like it
- Don't mind
- Don't like it
- Really don't like it

What are the strengths and weaknesses of asking a question in this way? (Hint: you might find it helpful to ask you one or two people in the tutorial and record their answer.)

Strengths	Weaknesses

## Asking the right question

When we want to study something, we need to make sure that how we choose to measure a concept is correct. If done correctly, survey questions can be used to measure and collect information about people. This can include factual information, such as age or height, but it can also include subjective information, such as about feelings and opinions. However, if we are not careful with the way we ask a question, we can end up with answers that are incorrect, meaning the things we find out are not helpful or misleading. Below are a few common mistakes that are made when trying to create survey questions.

### Leading Questions

Sometimes, when we write a question, we can accidentally include words that suggest that there are good and bad answers to give. For example, if we write a question that includes emotional language, this can lead people to give answers that they think we are looking for.

- Why would this be a bad thing for a survey?

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### Activity

Below is a survey question. What part of the question might affect someone's answer?

Do you think pollution is bad?

This could affect someone's answer because...

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A better way to word this question is...

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Here is another survey question, as a group see if you can figure it out how it might be leading. Circle the word that might affect someone's answer.

What problems do you have with dogs?

This could affect someone's answer because...

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A better way to word this question is...

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