



THIRD SPACE  
LEARNING

# Diagnostic Questions

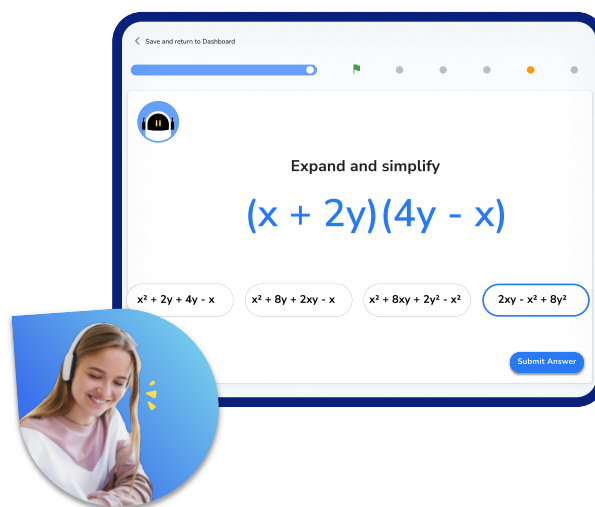
Data handling cycle | Statistics

## This resource in a nutshell

Diagnostic questions are a quick and easy way of assessing your students' knowledge and understanding of a particular topic.

Students may be struggling with a given topic for a number of different reasons. Diagnostic questions can help to identify the particular misconception that the student has and help to determine the specific support they will need in order to improve.

They are low stakes and support students developing metacognition around how their learning is progressing and what they need to do to improve further.



At Third Space Learning, we use diagnostic questions before and after online tutoring sessions to identify gaps and track progress, an example of this is shown above.

## How to use the questions in this resource

There are 10 multiple choice questions, each designed to assess each of the key skills required to master the **data handling cycle**. Each question has **one correct answer** and **three carefully chosen incorrect answers** that are designed to identify and highlight fundamental misconceptions, including: **Confusing independent and dependent data**, **Confusing primary and secondary data**, **Sample size**, and **Key definitions e.g., bias, leading and census**.

When answering these questions, students should be **encouraged to explain why they have chosen a particular answer**, and why the other three answers are incorrect. This can be done verbally in small groups, or written down on the worksheet or in their books.

This resource has been designed to be as **flexible** as possible with questions that can be easily chopped up and reordered, and come with a separate answer sheet that details all of the misconceptions highlighted in the answers.

## Diagnostic Questions: Data handling cycle

1. Sav walks around the school car park and records the colour of every car.  
The data that Sav has collected is:

A) Primary & ordinal	B) Secondary & categorical
C) Primary & categorical	D) Primary & quantitative

2. The heights, in centimetres, of 100 plants in a field are recorded.  
What type of data has been recorded?

A) Ordinal	B) Continuous
C) Categorical	D) Discrete

## Diagnostic Questions: Data handling cycle

3. Students in Year 9 have their feet measured, and are then given a rank from longest to shortest. The data is then stored in a list. This type of data is:

A) Continuous	B) Discrete
C) Categorical	D) Ordinal

4. Tami is conducting a survey to find out how students spend their money on snacks. One of the survey questions is

How much do you spend on chocolate?

How much do you spend on chocolate?

☐ £0 - £2.99  
 ☐ £3 - £5.99  
 ☐ £6 - £8.99  
 ☐ £9 or more

A) No time frame given	B) Student may not buy chocolate
C) Student may not have used £s	D) Student may not like chocolate



## Diagnostic Questions: Data handling cycle

5. In a survey about movie viewing habits at a school, students are asked,

*“Why are science-fiction movies so brilliant?”*

This question would be \_\_\_\_\_ .

A) Unbiased	B) Fair
C) Leading	D) Insightful

6. What proportion of a population is used when conducting a census?

A) 100%	B) At least 50%
C) It depends on the sampling method	D) 25% - 75%, depending on costs

## Diagnostic Questions: Data handling cycle

7. Gill is investigating the popularity of musical genres over time. Out of the sources of data that Gill uses, which one is the primary data?

A) A detailed history from	B) Sales records from
C) Streaming records from	D) Interviews conducted by Gill

8. Stevie is investigating opinions about the food served in the school canteen. Which would be the best option for the number of participants that Stevie should ask?

A) 3000	B) 30
C) 3	D) 300

## Diagnostic Questions: Data handling cycle

9. Finn is investigating usage of the local leisure centre. He is going to conduct a survey. Which of these options provides the best plan for when to conduct the survey?

A) On Saturday morning as soon as the centre opens	B) At lunch time, Monday to Friday
C) At different times of day throughout the week	D) As people are leaving the session

10. Sal is investigating the change in daily maximum temperature in 50 cities around the world over the past century. Sal's hypothesis is,

*"Daily maximum temperature has increased over the past century."*

What is the dependent variable in this investigation?

A) Passage of time	B) City
C) 50	D) Temperature

## Diagnostic Questions: Data handling cycle Answers

1. Sav walks around the school car park and records the colour of every car.

The data that Sav has collected is:

- A) Primary & ordinal - Student confused categorical and ordinal
- B) Secondary & categorical - Student confused primary and secondary data
- C) Primary & categorical - Correct answer
- D) Primary & quantitative - Student lacks knowledge that categorical data is qualitative

2. The heights, in centimetres, of 100 plants in a field are recorded.

What type of data has been recorded?

- A) Ordinal - The plants are not ranked in height order, so the data are not ordinal
- B) Continuous - Correct answer
- C) Categorical - The height has been recorded, not a qualitative descriptor
- D) Discrete - Height is not discrete as it can take a range of values to a given degree of accuracy

## Diagnostic Questions: Data handling cycle Answers

3. Students in Year 9 have their feet measured, and are then given a rank from longest to shortest. The data is then stored in a list. This type of data is:

- A) Continuous - The initial measurement is continuous, but the type of data stored is not
- B) Discrete - Student considered shoe size (discrete data) rather than the ranked data
- C) Categorical - Student thinks that data given as a list is categorical
- D) Ordinal - Correct answer

4. Tami is conducting a survey to find out how students spend their money on snacks. One of the survey questions is

How much do you spend on chocolate?

How much do you spend on chocolate?

☐ £0 - £2.99    ☐ £3 - £5.99    ☐ £6 - £8.99    ☐ £9 or more

A) No time frame given - Correct answer

- B) Student may not buy chocolate - This is accounted for in the first option
- C) Student may not have used £s - The assumption of £ usage is valid in the UK
- D) Student may not like chocolate - The question is asking for an amount, not an opinion

## Diagnostic Questions: Data handling cycle Answers

5. In a survey about movie viewing habits at a school, students are asked,

*“Why are science-fiction movies so brilliant?”*

This question would be \_\_\_\_\_ .

- A) Unbiased - Student thinks this question is impartial
- B) Fair - Student lacks understanding of bias in questioning
- C) Leading - Correct answer
- D) Insightful - Student lacks understanding why the data from this question would not be representative

6. What proportion of a population is used when conducting a census?

- A) 100% - Correct answer
- B) At least 50% - Student thinks that a census has a lower bound
- C) It depends on the sampling method - Student does not understand the difference between a census and a sample
- D) 25% - 75%, depending on costs - Student does not know the definition of a census

## Diagnostic Questions: Data handling cycle Answers

7. Gill is investigating the popularity of musical genres over time. Out of the sources of data that Gill uses, which one is the primary data?

- A) A detailed history from Wikipedia - Student does not understand the definition of primary data. This is secondary data as the data is collected from another source (Wikipedia).
- B) Sales records from Itunes - Student does not understand the definition of primary data. This is secondary data as the data is collected from another source (Itunes).
- C) Streaming records from Spotify - Student does not understand the definition of primary data. This is secondary data as the data is collected from another source (Spotify).
- D) Interviews conducted by Gill - Correct answer

8. Stevie is investigating opinions about the food served in the school canteen. Which would be the best option for the number of participants that Stevie should ask?

- A) 3000 - Student did not consider how feasible this sample size would be, and it may exceed the relevant population size
- B) 30 - Correct answer
- C) 3 - Student does not understand that a sample size should be representative of the population as this could be too small.
- D) 300 - Student did not consider how practical or manageable this would be to carry out.

## Diagnostic Questions: Data handling cycle Answers

9. Finn is investigating usage of the local leisure centre. He is going to conduct a survey. Which of these options provides the best plan for when to conduct the survey?

- A) On Saturday morning as soon as the centre opens - Student does not understand that a sample size should be representative of the population. This sample could be too specific
- B) At lunch time, Monday to Friday - Student does not understand that a sample size should be representative of the population as this option may only include people likely to be visiting due to lifestyle constraints
- C) At different times of day throughout the week - Correct answer
- D) As people are leaving the session - Student does not understand that a sample size should be representative of the population as this option includes only those with a particular activity preference

10. Sal is investigating the change in daily maximum temperature in 50 cities around the world over the past century. Sal's hypothesis is,

"Daily maximum temperature has increased over the past century."

What is the dependent variable in this investigation?

- A) Passage of time - Student confused dependent and independent variables
- B) City - Student confused dependent and independent variables; the city is chosen so it is an independent variable
- C) 50 - Student assumed the answer should be a numerical value
- D) Temperature - Correct answer

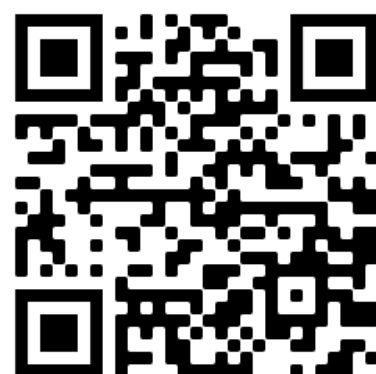


# Where to go next?

For more diagnostic questions, and GCSE maths revision resources and worksheets to support students in fixing any misconceptions take a look at the free Third Space Learning [GCSE maths revision](#) pages.

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## Do you have KS4 students who need additional support in maths?



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