



THIRD SPACE
LEARNING

Diagnostic Questions

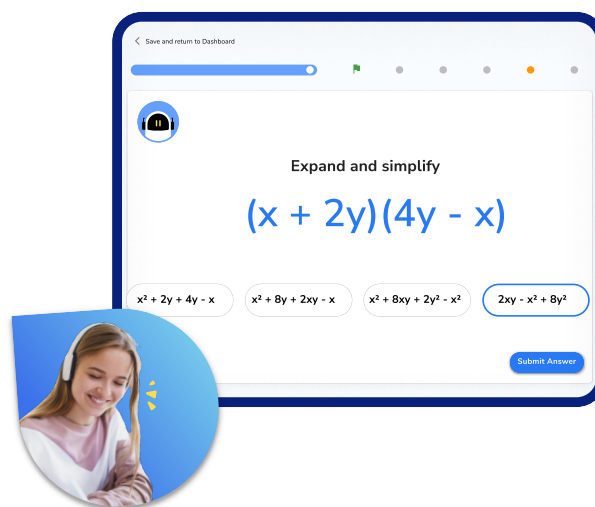
Frequency Tables | Statistics

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 **frequency trees** 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 12 multiple choice questions, each designed to assess each of the key skills required to master the given topic. Each question has **one correct answer** and **three carefully chosen incorrect answers** that are designed to identify and highlight fundamental misconceptions, including: **Incorrect average, Totalling the raw data column unnecessarily, Incorrect midpoints, and Missing frequencies.**

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: Frequency tables

1. Each pupil in class 8J was asked how many siblings they have, with the results recorded in this frequency table. How many pupils had at least one sibling?

Siblings	Tally	Frequency
0		
1		
2		

A) 12	B) 16
C) 19	D) 9

2. Each pupil in class 7K was asked how many pets they have, with the results recorded in this frequency table. How many pupils are there in class 7K?

Number of pets	Tally	Frequency
0		5
1		7
2		
3		

A) 44	B) 64
C) 12	D) 32

Diagnostic Questions: Frequency tables

3. Tami records the colours of cars in the school car park in a frequency table. Which statistic could be determined using the table?

Colour of car	Tally	Frequency
Red		19
Blue		16
Green		10

A) Mode	B) Mean
C) Range	D) Median

4. The scores in a spelling test for class 6B are recorded in a frequency table. What was the median score?

Score	Frequency
6	3
7	6
8	4
9	8
10	5

A) 9	B) 8
C) 5	D) 8.5

Diagnostic Questions: Frequency tables

5. The scores in an arithmetic test for class 5C are recorded in a frequency table. Calculate the mean score:

Score	Frequency
10	1
11	3
12	5
13	9
14	2

A) 13	B) 12.4
C) 12	D) 24.5

6. A student divided some sweets into 10 bags to sell at a stall. The masses of the individual bags are recorded in this frequency table. Estimate the total mass of sweets:

Mass (g)	Frequency
$80 < m \leq 100$	2
$100 < m \leq 120$	5
$120 < m \leq 140$	3

A) 1220g	B) 1100g
C) 1020g	D) 1120g

Diagnostic Questions: Frequency tables

7. The weights of the members of a youth group are recorded in this frequency table. Determine an estimate for the mean weight of a youth group member:

Weight (w) kg	Frequency
$30 < w \leq 40$	7
$40 < w \leq 50$	14
$50 < w \leq 60$	5
$60 < w \leq 70$	2

A) 50 kg	B) 40.7 kg
C) 45.7 kg	D) 50.7 kg

8. The price of a football shirt at 40 different stores is recorded in this frequency table. Work out an estimate for the mean price for a football shirt:

Price, p (€)	Frequency
$25 < p \leq 30$	7
$30 < p \leq 40$	17
$40 < p \leq 50$	10
$50 < p \leq 65$	6

A) €44.50	B) €39.56
C) €34.63	D) €41.25

Diagnostic Questions: Frequency tables

9. In an end of year assessment, students are required to score at least 40 marks on their Physics test to pass. Using this frequency table, which records the marks awarded to each student, determine the percentage of students that passed the test:

Number of marks	Frequency
0 – 19	6
20 – 39	8
40 – 59	17
60 – 79	22
80 – 99	3

A) 25%	B) 75%
C) 30.4%	D) 44.6%

10. The number of daisies in each $1m^2$ area of a $20m$ by $30m$ meadow are recorded in this frequency table. Estimate the total number of daisies in the meadow:

Number of daisies in $1m^2$	Frequency
1 – 25	90
26 – 50	240
51 – 75	215
76 – 100	55

A) 28675	B) 35875
C) 30300	D) 28700

Diagnostic Questions: Frequency tables

11. A cohort of students are awarded a score for their Art coursework.
Determine an estimate for the mean score:

Score	Frequency
21 – 30	2
31 – 40	6
41 – 50	15
51 – 60	9

A) 45.7	B) 44.7
C) 45.2	D) 40.5

12. The colours of all 25 cars in a car park were recorded. Some of the data was not written down. Given that there were three times as many white cars as blue cars, determine the number of white cars in the car park:

Colour	Black	Red	White	Blue	Yellow
Frequency	4	7			2

A) 3	B) 9
C) 12	D) 4

Diagnostic Questions: Frequency tables Answers

1. Each pupil in class 8J was asked how many siblings they have, with the results recorded in this frequency table. How many pupils had at least one sibling?

Siblings	Tally	Frequency
0		
1		
2		

- A) 12 Student stated how many pupils had exactly one sibling
 B) 16 Student does not understand tallies (counted each five as four)
 C) 19 Correct answer
 D) 9 Student stated the number of pupils that were an only child

2. Each pupil in class 7K was asked how many pets they have, with the results recorded in this frequency table. How many pupils are there in class 7K?

Number of pets	Tally	Frequency
0		5
1		7
2		
3		

- A) 44 Student found the sum of the given tallies and frequencies
 B) 64 Student added total frequencies to total tallies
 C) 12 Student forgot to enumerate the missing frequencies
 D) 32 Correct answer

Diagnostic Questions: Frequency tables Answers

3. Tami records the colours of cars in the school car park in a frequency table. Which statistic could be determined using the table?

Colour of car	Tally	Frequency
Red		19
Blue		16
Green		10

A) Mode Correct answer

- B) Mean Student does not understand the mean cannot be used on qualitative data
- C) Range Student is not using range in the statistical context
- D) Median Student does not understand the median cannot be used on qualitative data

4. The scores in a spelling test for class 6B are recorded in a frequency table. What was the median score?

Score	Frequency
6	3
7	6
8	4
9	8
10	5

- A) 9 Student confused mode and median
- B) 8 Student used the score column only
- C) 5 Student ordered the frequency column and picked middle number
- D) 8.5 Correct answer

Diagnostic Questions: Frequency tables Answers

5. The scores in an arithmetic test for class 5C are recorded in a frequency table. Calculate the mean score:

Score	Frequency
10	1
11	3
12	5
13	9
14	2

- A) 13 Student stated the modal score
 B) 12.4 Correct answer
 C) 12 Student found total of score column and divided by five
 D) 24.5 Student found sum of score divided by respective frequency

6. A student divided some sweets into 10 bags to sell at a stall. The masses of the individual bags are recorded in this frequency table. Estimate the total mass of sweets:

Mass (g)	Frequency
$80 < m \leq 100$	2
$100 < m \leq 120$	5
$120 < m \leq 140$	3

- A) 1220g Student used the upper bounds instead of midpoints
 B) 1100g Student used the overall midpoint and multiplied by ten
 C) 1020g Student used the lower bounds instead of midpoints
 D) 1120g Correct answer

Diagnostic Questions: Frequency tables Answers

7. The weights of the members of a youth group are recorded in this frequency table. Determine an estimate for the mean weight of a youth group member:

Weight (w) kg	Frequency
$30 < w \leq 40$	7
$40 < w \leq 50$	14
$50 < w \leq 60$	5
$60 < w \leq 70$	2

- A) 50 kg Student used the weight column only
 B) 40.7 kg Student used the lower bounds instead of midpoints
 C) 45.7 kg Correct answer
 D) 50.7 kg Student used the upper bounds instead of midpoints

8. The price of a football shirt at 40 different stores is recorded in this frequency table. Work out an estimate for the mean price for a football shirt:

Price, p (€)	Frequency
$25 < p \leq 30$	7
$30 < p \leq 40$	17
$40 < p \leq 50$	10
$50 < p \leq 65$	6

- A) €44.50 Student used the upper bounds instead of midpoints
 B) €39.56 Correct answer
 C) €34.63 Student used the lower bounds instead of midpoints
 D) €41.25 Student used the cost column only

Diagnostic Questions: Frequency tables Answers

9. In an end of year assessment, students are required to score at least 40 marks on their Physics test to pass. Using this frequency table, which records the marks awarded to each student, determine the percentage of students that passed the test:

Number of marks	Frequency
0 – 19	6
20 – 39	8
40 – 59	17
60 – 79	22
80 – 99	3

- A) 25% Student stated the percentage of students who did not pass
 B) 75% Correct answer
 C) 30.4% Student used only the frequency of students that scored 40-59
 D) 44.6% Student forgot to include the frequency of students that scored 40-59

10. The number of daisies in each 1m^2 area of a 20m by 30m meadow are recorded in this frequency table. Estimate the total number of daisies in the meadow:

Number of daisies in 1m^2	Frequency
1 – 25	90
26 – 50	240
51 – 75	215
76 – 100	55

- A) 28675 Correct answer
 B) 35875 Student used upper bounds of class intervals, not midpoints
 C) 30300 Student multiplied midpoint of 1st column (50.5) by 600
 D) 28700 Student used multiples of 20 as interval midpoints

Diagnostic Questions: Frequency tables Answers

11. A cohort of students are awarded a score for their Art coursework.
Determine an estimate for the mean score:

Score	Frequency
21 – 30	2
31 – 40	6
41 – 50	15
51 – 60	9

- A) 45.7 Student rounded each midpoint to nearest integer prior to multiplying by frequency
 B) 44.7 Student calculated midpoints as multiples of five
 C) 45.2 Correct answer
 D) 40.5 Student found the mean of the four midpoints

12. The colours of all 25 cars in a car park were recorded. Some of the data was not written down. Given that there were three times as many white cars as blue cars, determine the number of white cars in the car park:

Colour	Black	Red	White	Blue	Yellow
Frequency	4	7			2

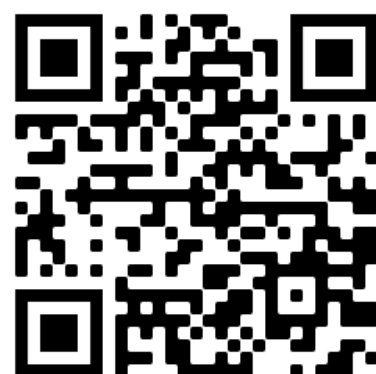
- A) 3 Student found the number of blue cars
 B) 9 Correct answer
 C) 12 Student found the total number of blue or white cars
 D) 4 Student divided the number of blue or white cars by three

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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