

GCSE Maths – Statistics

Tables, Charts and Diagrams

Notes

WORKSHEET



This work by [PMT Education](https://www.pmt.education) is licensed under [CC BY-NC-ND 4.0](https://creativecommons.org/licenses/by-nc-nd/4.0/)



Tables, Charts and Diagrams

Data can be collected in a list or as a tally, however displaying this information in a **table, chart or diagram** is easier to read and shows its important features in a simple and effective way.

Diagrams should be:

- Properly laid out.
- Easy to interpret.
- Labelled and titled.
- Unambiguous (not open to more than one interpretation).

Tables

Frequency Tables

Frequency tables are a visual method of showing the **outcomes** of an **experiment** or **trial**. They usually display the number of items being counted in the left-hand column, and the frequency in the right-hand column.

Example: Display the following data in a frequency table:

The teacher asks her class of 15 students to count the number of trees in their garden. The students came back with the results: 0, 0, 0, 0, 1, 1, 1, 2, 2, 3, 4, 4, 5, 5, 6.

*The left-hand column will be the number of trees in the garden.
The right-hand column will be the number of students who recorded that many trees.*

Number of Trees (x)	Frequency (f)
0	4 (count the number of children who had 0 trees in their garden)
1	3 (meaning 3 children had 1 tree in their garden)
2	2
3	1
4	2
5	2
6	1

Note

Add up all numbers in the frequency column to get **total frequency = 15**.
*This is the number of people the teacher asked in the class.
The frequency in a table must always add up to the number of trials.*



Two-Way Tables

Two-way tables can be used to display information from a survey or experiment with **two variables**. An experiment has two variables if the participants can make **two choices** during the experiment.

For example, 100 men and 100 women are asked whether they prefer running or cycling. The results were as follows:

	Men	Women
Running	60	55
Cycling	40	35

One variable is the gender of the person who took part in the survey. This can be either male or female. The **second variable** is their preferred sport, which can be either running or cycling.

Example: 50 male and 50 female pet owners were asked whether they owned at least one dog. What percentage of pet owners in the survey owned a dog?

	Male	Female	Total
Dog	30	32	62
No dogs	20	18	38
Total	50	50	100

There were 100 participants in total.

Reading from the table, $30 + 32 = 62$ owned a dog.

Percentage pet owners who own a dog:

$$\frac{62}{100} \times 100 = 62\%$$

62% of the participants own a dog.

Example: People in the queue at a bakery were asked if they preferred brown or white bread, and whether they bought their bread ready sliced. Fill in the missing cells in the table below:

	Sliced	Not sliced	Total
White	7	7	
Brown	8		11
Total		10	25

Add the values in each column to calculate the totals.

	Sliced	Not sliced	Total
White	7	7	$7 + 7 = 14$
Brown	8	$10 - 7 = 3$	11
Total	$7 + 8 = 15$	10	25



Charts

Bar Charts

Bar charts are for displaying **discrete qualitative data**.

Discrete data is data that must take certain numerical values. For example, someone's shoe size cannot be 5.25; it can only take whole number or half number values like 5 or 5.5.

Qualitative data is non-numerical. For example, colours: 5 children have red wellies, 4 have blue wellies, and 1 has a green pair of wellies. The colour of wellies is non-numerical.

On a bar chart:

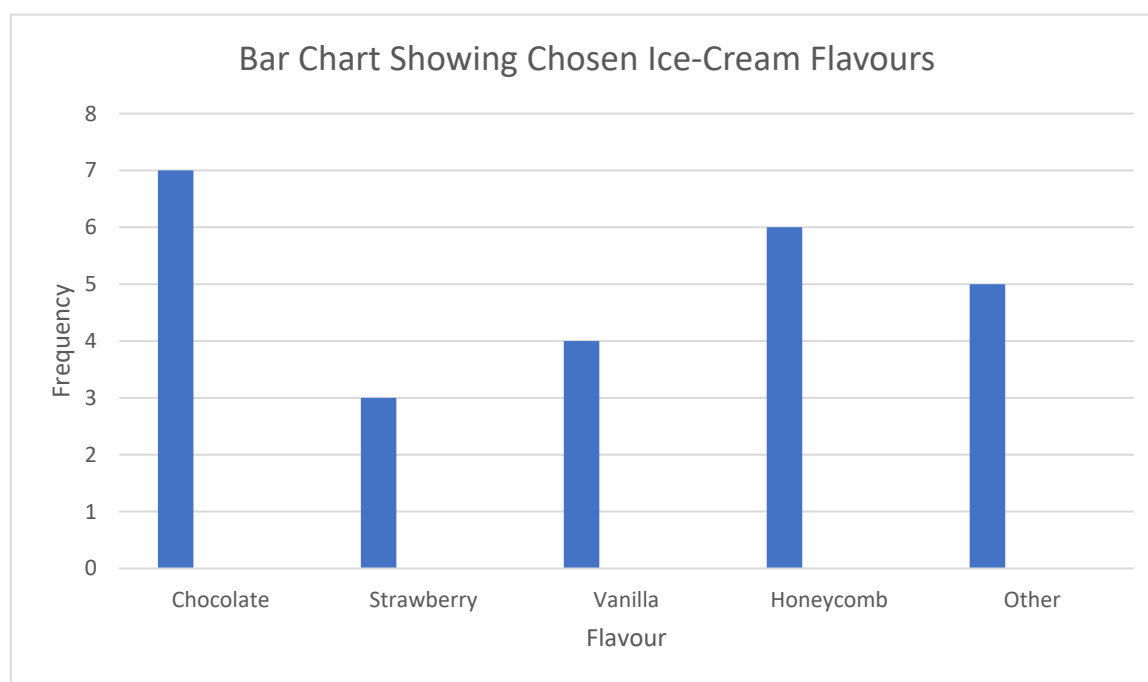
- Bars must all be the **same width** with equal sized gaps between them.
- **Length of the bar = frequency**, but remember to check the scale of the graph first.
- The bars may be horizontal or vertical. Sometimes, different colour bars will be stacked on top of each other.
- A dual bar chart has two (or more) bars drawn next to each other. They should be clearly labelled with a key to help make comparison easy.

Example: People at an ice-cream parlour were asked what flavour ice cream they were going to buy. Their responses are shown in the table.

Create a bar chart from the data given.

Flavour (x)	Frequency (f)
Chocolate	7
Strawberry	3
Vanilla	4
Honeycomb	6
Other	5

Draw a bar for each category. The bar's height should be equal to the frequency of that category. For example, 7 people chose chocolate so the bar should be 7 units tall. Label each bar with the category. Give the bar chart a suitable title.



Pie Charts

Pie charts are another way of representing **discrete data**. The proportion of the data in a certain category is represented by a slice of the pie chart.

If a question asks you to draw a pie chart, use a **sharp pencil, compass** and **protractor**, Calculate the fraction of the total for each sector using the fact that there are 360° in a circle.

$$\text{Angle} = \frac{\text{Section Frequency}}{\text{Total Frequency}} \times 360^\circ$$

Example: Create a pie chart from the data about animals on George's farm.

Animal (x)	Frequency (f)
Cows	25
Sheep	100
Pigs	15
Horses	10

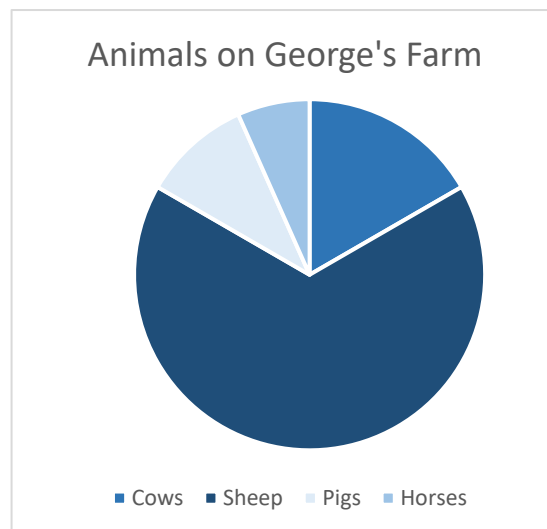
1. Find the total frequency

$$\text{Sum of Frequency Column} = \text{Total Animals} = 25 + 100 + 15 + 10 = 150$$

2. Use ' $\text{Angle} = \frac{\text{Section Frequency}}{\text{Total Frequency}} \times 360^\circ$ ' to calculate the angle that represents each animal.

Animal (x)	Frequency (f)	Angle ($^\circ$)
Cows	25	$\frac{25}{150} \times 360^\circ = 60^\circ$
Sheep	100	$\frac{100}{150} \times 360^\circ = 240^\circ$
Pigs	15	$\frac{15}{150} \times 360^\circ = 36^\circ$
Horses	10	$\frac{10}{150} \times 360^\circ = 24^\circ$





3. Draw a pie chart using a compass and protractor. Label each section using a key.




Pictograms

Pictograms make data **easy to visualise**, although they aren't always as accurate as other charts. They use **symbols** to represent a set frequency of an item, and include a key to show how much of each quantity each symbol represents.

Example: How many hours of sun were there on Thursday?

	Hours of sun
Mon	
Tues	
Wed	
Thur	
Fri	



Use the pictogram scale

On Thursday there are 2.5 sun symbols.

Each sun represents 2 hours of sunshine.

This equates to $2.5 \times 2 = 5$ hours of sunshine.

There were 5 hours of sun on Thursday.

Diagrams

Vertical Line Graphs

Vertical line graphs are for **discrete quantitative** data.

Quantitative data is numerical, as opposed to qualitative data which is non-numerical.

An example of discrete quantitative data is the number of people visiting a cinema each week. The data is discrete because the number of people must take a whole value (we cannot have 0.5 of a person), and it is quantitative because we can count the number of people using a numerical system.

Example: The number of times students visited the canteen each week was surveyed.

Display the data as a vertical line graph

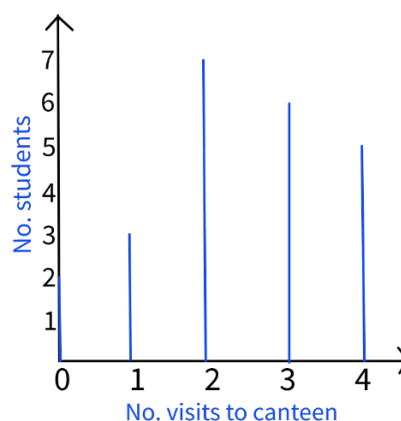
Visits to canteen	Students
0	2
1	3
2	7
3	6
4	5

Label the axis with headings from the table.

The frequency is shown on the vertical y-axis. The quantitate values are shown on the horizontal x-axis. Each data point along the axis must also be labelled.

Input the data.

Draw in the lines for the frequency of each category. Make sure they are straight and evenly-spaced on the diagram.



Tables, Charts and Diagrams - Practice Questions

1. Students in a school were asked if they have a garden, and whether they have a dog or not. Fill in the missing cells in the table below:

	Garden	No garden	Total
Dog	4	3	
No dog	9		18
Total		12	25

2. Create a pie chart from the data shown below about how many pupils do each of the following subjects at a school.

Subject (x)	Frequency (f)
Art	20
Drama	30
PE	10
Spanish	5
French	10
Food Technology	20
DT	10



3. George decided to record the temperature of his garden every month for a year. His results are shown below. Display the data by drawing a line graph.

Month	Temperature (°C)
January	7
February	12
March	13
April	16
May	17
June	19
July	22
August	26
September	18
October	9
November	5
December	2

4. The number of DVDs sold by a shop over the course of a week was recorded. Display the data shown in the table below as a line graph

Day of the Week	Number of DVDs Sold
Monday	12
Tuesday	15
Wednesday	10
Thursday	9
Friday	31
Saturday	34
Sunday	16

Worked solutions for the practice questions can be found amongst the worked solutions for the corresponding worksheet file.

