6 Statistics

This chapter is going to show you:

- how to calculate the mode, the median and the range for a set of data
- how to interpret statistical diagrams and charts
- how to collect and organise data
- how to create data-collection forms
- how to create questionnaires
- how to use frequency tables
- how to draw simple conclusions from data.

What you should already know:

- how to interpret data from tables, graphs and charts
- how to draw frequency tables and bar charts
- how to create a tally chart
- how to draw bar charts and pictograms.

About this chapter

How many people are there in the world? Or even in our country? How do they live? What do they eat and drink? How big are their families?

We find out statistics like these by carrying out censuses and surveys. Censuses are huge surveys that find out information about every single man, woman and child in a country.

In the UK a census is carried out every 10 years. When the data is analysed and interpreted it helps the government decide what it needs to do. Charts and graphs give us tools for analysing and representing statistical data – crucial for drawing the right conclusions from it.

6.1 Mode, median and range

Learning objective

- To understand the meaning of mode, median and range

Key words	
average	data
median	mode
outlier	range

Statistics is all about collecting and organising information, or **data**, then using diagrams to represent and interpret it.

When you are trying to understand or interpret data, you often need to find an **average**, for example: the average rainfall in Britain, the average weekly wage, the average mark in an examination.

But what is an average?

An average is a useful statistic because you can use it to represent a whole set of data by just a single value.

This section explains how to find two types of average: the **mode** and the **median**.

The mode is the value that occurs most often in a set of data. It is the only average that can be used for non-numerical data, such as colours or makes of car. Sometimes there may be no mode because either all the values are different, or no single value occurs more often than other values.

The median is the middle value for a set of values, when they are put in numerical order.

You also need to be able to find the **range** of a set of values. This is the difference between the largest and smallest values.

Range = largest value – smallest value

A small range means that the values in the set of data are similar in size, whereas a large range means that the values differ a lot and therefore are more spread out.

Sometimes, one value in a set of numerical data is much larger or much smaller than the rest. This value is called an **outlier**.

Example 1

These are the ages of 11 players in a football squad.

23, 19, 24, 26, 27, 27, 24, 23, 20, 23, 26

Work out: **a** the mode **b** the median **c** the range.

First, put the ages in order.

19, 20, 23, 23, 23, 24, 24, 26, 26, 27, 27

a The mode is the number that occurs most often.

So, the mode is 23.

b The median is the number in the middle of the set.

So, the median is 24.

c The range is the largest number minus the smallest number.

27 – 19 = 8

The range is 8.

Example 2

These are the marks of ten pupils in a mental arithmetic test.

19, 18, 16, 15, 13, 14, 20, 19, 18, 12

Work out: **a** the mode **b** the median **c** the range.

First, put the marks in order.

12, 13, 14, 15, 16, 18, 18, 19, 19, 20

a Most of the numbers appear only once, but 18 and 19 each occur twice.

The mode is the number that appears most often.

In this case, there are two modes, 18 and 19.

b There are two numbers in the middle of the set: 16 and 18.

The median is the number that would be in the middle of these two numbers.

So, the median is 17.

c The range is the largest number minus the smallest number.

$20 - 12 = 8$

The range is 8.

Exercise 6A

1 Find the mode of each set of data.

a yellow, white, blue, yellow, white, blue, yellow, blue, white, yellow

b cloud, sun, cloud, fog, sun, sun, snow, cloud, snow, sun, rain, sun

c I, A, E, U, I, O, E, I, A, I, A, O, E, U, I, E, I

d ♥, ♦, ♥, ♦, ♣, ♠, ♥, ♣, ♥, ♥, ♦, ♥, ♦, ♥

2 Find the mode of each set of data.

a 8, 7, 3, 4, 2, 10, 6, 5, 9, 5, 6, 6

b 26, 23, 34, 17, 26, 29, 13, 16, 22, 20, 30, 23, 29, 23

c 25, 23, 29, 17, 21, 31, 27, 19, 24, 25, 24

d 100, 102, 108, 104, 110, 103, 106, 111, 101, 99, 102, 96, 105

3 Find the range of each set of data.

a 12, 26, 7, 12, 17, 8, 10, 14, 25

b 4, 2, 3, 4, 2, 1, 5, 3, 5, 1, 7, 6, 5, 6

c 31, 34, 7, 8, 18, 25, 19, 30

d 101, 107, 101, 98, 112, 106, 103, 107, 105

4 Find the mode and range of each set of data.

a £1.50, £0.80, £2.65, £1.80, £3.20, £1.25, £0.80

b 25 kg, 20 kg, 24 kg, 33 kg, 31 kg, 24 kg

c 33 cm, 46 cm, 52 cm, 33 cm, 41 cm, 43 cm

d 21°, 25°, 21°, 19°, 20°, 20°, 23°, 22°, 21°, 24°

5 A group of nine Year 7 pupils had their lunch in the school cafeteria. These are the amounts that they spent.

£2.40, £2.30, £2.00, £2.60, £2.30, £3.00, £3.70, £2.30, £2.90

a Find the mode for the data.

b Find the range for the data.

6 Find the median of each set of data.

a 7, 6, 2, 3, 1, 9, 5, 4, 8

b 20, 18, 29, 12, 21, 24, 8, 11, 17, 15, 25

c 15, 13, 19, 7, 11, 21, 17, 9

d 101, 102, 109, 105, 111, 104, 107, 112, 102, 100

7 Find the mode, range and median of each set of data.

a £2.50, £1.80, £3.65, £3.80, £4.20, £3.25, £1.80

b 11 kg, 6 kg, 10 kg, 19 kg, 19 kg, 14 kg, 20 kg

c 111 cm, 124 cm, 130 cm, 111 cm, 119 cm, 121 cm, 111 cm

d 33°, 37°, 33°, 31°, 32°, 33°, 35°, 34°, 34°, 36°, 35°

8 **a** Write down a set of three numbers that has a median of 5 and a mode of 5.

b Write down a set of five numbers that has a median of 5 and a mode of 6.

c Write down a list of seven numbers that has a median of 5, a mode of 4 and a range of 6.

9 These are the names of the nine people who work for a company.

Lee	Helen	Suki
Wynn	Helen	Tom
Helen	John	Tom

a Which name is the mode?

b One person leaves the company. A new person joins the company.

Now the name that is the mode is Tom.

i What is the name of the person who leaves?

ii What is the name of the person who joins?

MR **10** **a** There are two children in a family.

The range of their ages is exactly 4 years.

What could the ages of the two children be?

Give an example and explain why.

b There are two children in another family.

They are twins of the same age.

What is the range of their ages and explain why?

Activity: Simple statistics

Work out: **a** the mode **b** the median **c** the range of each set of data.

A The temperature yesterday of some UK cities

B The temperature yesterday of European cities around the world

C The number of pets each member of your class has

D The number of hours members of your class spend playing computer games in a day

6.2 Reading data from tables and charts

Learning objective

- To read data from tables and charts

Key words

chart	frequency

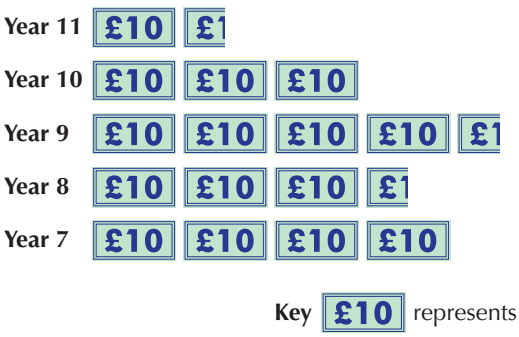
You can display data in various forms. Two simple ways are tables and **charts**. In Exercise 6B you will learn some of the different ways to do this.

You will see that some charts have a column called **frequency**. This is the number of times this value occurs in the set of data.

The mode is always the value with the highest frequency.

Exercise 6B

1 The pictogram shows the amount of money collected for charity by different year groups in a school.



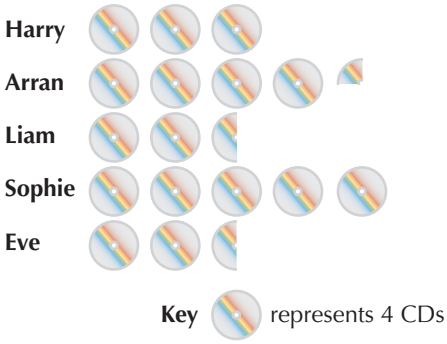
a How much money did Year 7 collect?

b How much money did Year 8 collect?

c Which year group collected the most money?

d How much money did the groups collect altogether?

2 The pictogram shows how many CDs five friends have in their collections.



a Who has the most CDs?

b How many CDs does Harry have?

c How many CDs does Liam have?

d How many more CDs does Sophie have than Arran?

e How many CDs do the five friends have altogether?

3 The calendar shows the dates of the days of the month of October one year.

OCTOBER

M	Tu	W	Th	F	Sa	Su
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

a What day of the week is 26 October?

b What is the date of the second Sunday in the month?

c A school's half-term holiday begins after 18 October and ends on 27 October.

How many days will Syed be in school in October?

d On what day will 5 November fall in this year?

PS **4** The chart shows the distances, by road, between six cities in England. All of the distances are in miles.

Birmingham					
121	Leeds				
120	198	London			
89	44	204	Manchester		
68	171	57	161	Oxford	
134	24	212	71	185	York

a How many miles is it from Leeds to London?

b How many miles is it from Birmingham to Oxford?

c Which two cities are the furthest apart?

d Freya drives from Manchester to Leeds. She then drives from Leeds to York. Then she returns home from York to Manchester.

How many miles has she driven altogether?

PS **5** This two-way table shows the results of five football teams after 28 games.

	Games won	Games lost	Games drawn
Arsenal	16	5	7
Leicester City	3	17	8
Manchester United	18	7	3
Newcastle United	17	7	4
Southampton	10	14	4

a How many games did Newcastle United win?

b Which teams drew the same number of games?

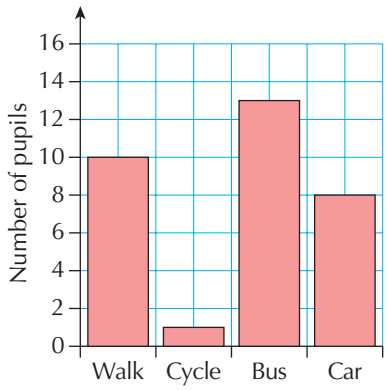
c Three points are awarded for a win, one point is awarded for a draw and no points are awarded for a lost game.

i How many points did Southampton have after the 28 games?

ii Which team had the most points after 28 games?

iii Which team had the least points after 28 games?

6 The bar chart shows how the pupils in class 7BT travel to school.



a How many pupils cycle to school?

b What is the mode for the way the pupils travel to school?

c How many pupils are there in class 7BT?

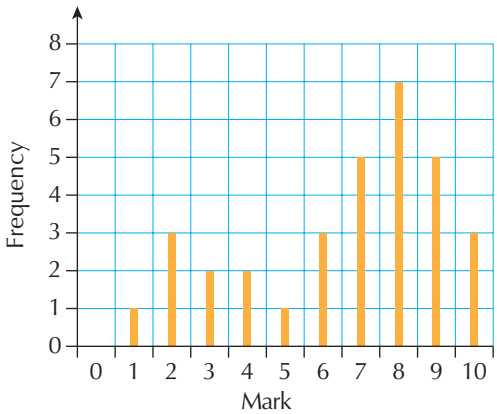
7 The graph illustrates how many pupils gained different marks, from a possible total of 10, in a spelling test.

a How many pupils had a mark of 6 in the test?

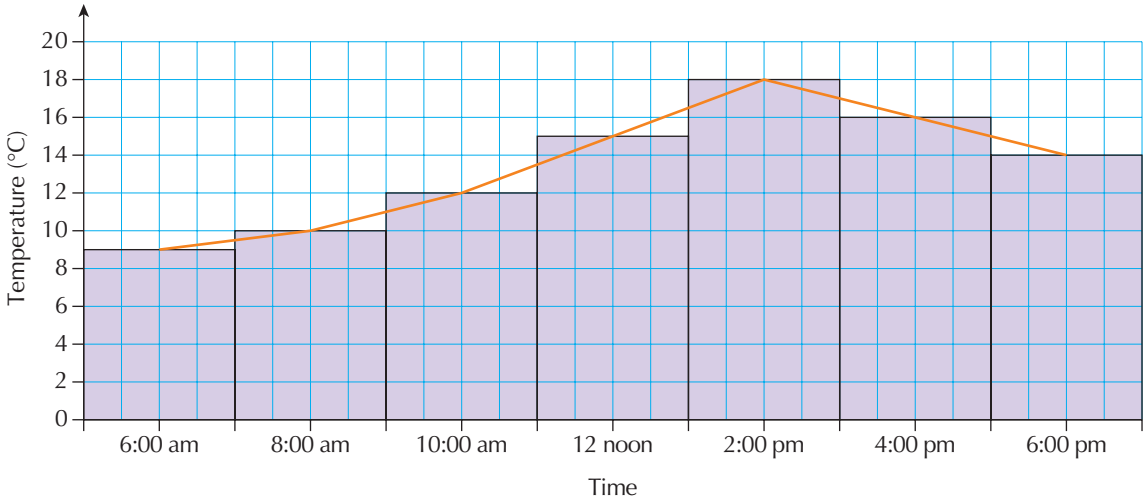
b How many pupils had a mark of 8 or more in the test?

c How many pupils are there in the class altogether?

d Which mark is the mode?



MR **8** The line graph shows the average temperature, in Celsius degrees (°C), in Bristol over a 14-hour period.



a What is the average temperature at around 8:00 am?

b What is the average temperature at midday?

c Write down the range for the temperature over the 14-hour period.

Problem solving: Places in the UK

The chart shows the names of six places in England.

Sheffield					
	London				
		Nottingham			
			Mablethorpe		
85				Solihul	
					Lincoln

A Do some research to find out the distances between the places.
Copy the chart and use what you find out to complete it.

B Which two places are the furthest apart?

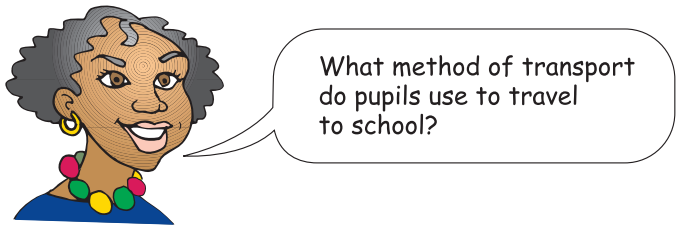
C Trevor drives from Sheffield to Nottingham.
He then drives from Nottingham to Lincoln.
Then he returns home from Lincoln to Sheffield.
How many miles has he driven altogether?

6.3 Using a tally chart

Learning objective

- To create and use a tally chart

Key words	
modal	tally chart



If you ask pupils this question, they will name all sorts of different methods of travelling, such as by bus, car, bike, walking, train and maybe some others.

A good way to collect this data is to fill in a **tally chart** as you ask each pupil the question. Your chart might look like this.

Type of transport	Tally	Frequency
Bus	𝍸 ||||	9
Car	𝍸	5
Bike	||	2
Walking	𝍸 𝍸 ||||	14
Other		0
	Total:	30

Notice that you use one mark to represent each pupil. When you make the fifth mark you draw it so that it slopes across the previous four. This is sometimes called a gate because it looks like a gate. Sometimes it is called a bar, because it 'bars the gate'.

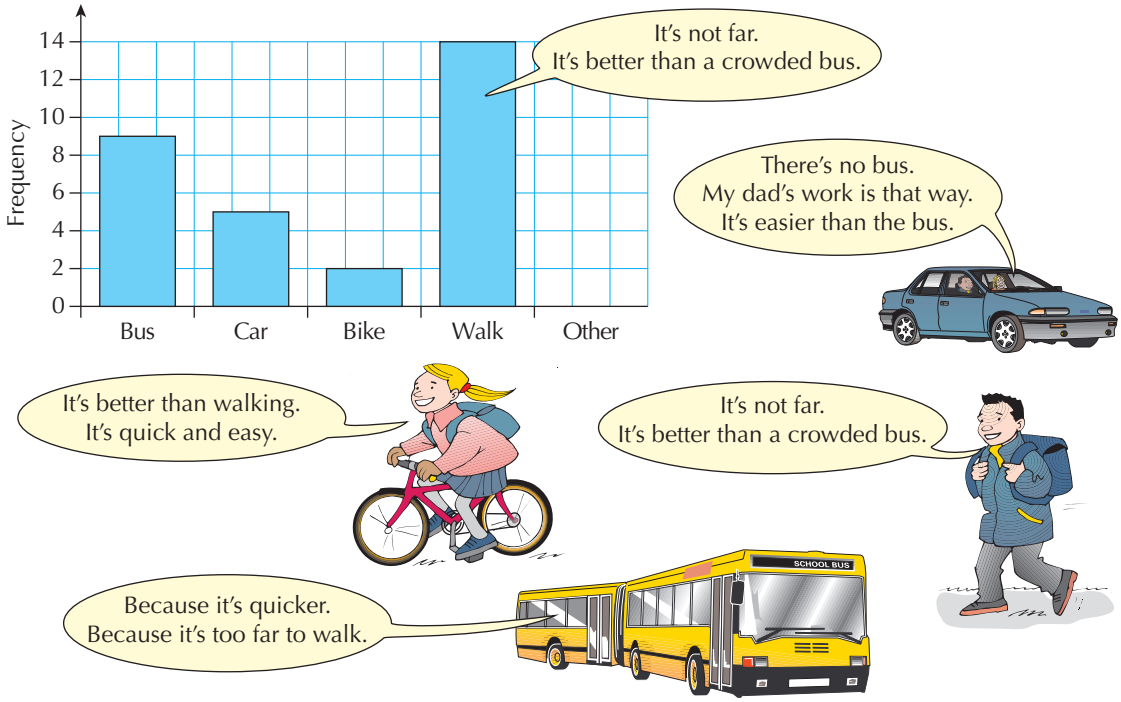
It is important to use this method because, when you have collected the data, you can count it easily, in fives.

In the tally chart above, the most common type of transport is 'walking'. So 'walking' is the mode. You can also say that the **modal** form of transport is 'walking'.

When they are asked why they have chosen that particular form of transport, pupils may give answers such as those listed below.

Bus	Because it's quicker.
	Because it's too far to walk.
Car	My mum goes that way to work.
	There's no bus and it's too far.
	It's easier than the bus.
Bike	It's better than walking.
Walking	It's not too far. It's better than a crowded bus.

Look at all the reasons given by pupils. Pick out those that are common to many pupils. These reasons can be left as a table, or illustrated in different ways.



Exercise 6C

1 The pupils in a class were asked: 'Where would you like to go for your form trip?' This is how they voted.

a Draw a bar chart to show the results of the vote.

b Write down some suitable reasons why the pupils might have voted for each place.

c What was the modal place chosen?

Place	Tally
Seaside	𝍸 𝍸
Countryside	𝍸 |
Amusement park	𝍸 |||
A zoo	|||
A castle	||||

2 The pupils in a class were asked: 'What is your favourite pet?' This is how they voted.

a Draw a chart illustrating the results.

b Write down some suitable reasons why the students might have voted for each pet.

c What was the modal pet chosen?

Pet	Tally
Dog	𝍸 |
Cat	𝍸 |||
Mice	𝍸
Guinea pig	|||
Other	||

3 The pupils in a class were asked: 'What is your favourite sport?' This is how they voted.

a Draw a chart illustrating the results.

b What was the modal sport chosen?

Sport	Tally
Hockey	𝍸 ||
Netball	𝍸 |
Football	𝍸 ||||
Badminton	|||
Other	||

4 The pupils in a class were asked: 'What is your favourite school subject?' This is how they voted.

a Draw a chart illustrating the results.

b What was the modal subject chosen?

Subject	Tally
French	𝍸
Geography	𝍸
Maths	𝍸 𝍸 ||
PE	||||
Technology	𝍸 |
Other	|

5 The pupils in a class were asked: 'Find out your parents' favourite detectives on TV.' This is how they voted.

a Draw a chart illustrating the results.

b Which was the modal detective chosen?

Detective	Tally
Frost	𝍸 ||
Morse	||||
Scott and Bailey	𝍸 𝍸
Poirot	𝍸
Barnaby	|||
Other	||

PS **6**

a Use your own class tally chart to draw a chart illustrating the methods of transport used by pupils to get to school.

b Remember to ask for their reasons. Make a table of the results.

Extension Work

A Choose five different places to visit as a form trip near you.
Create your own tally sheet, so that you can collect opinions from other pupils.

B Collect some data for this sheet, then create a bar chart with some reasons on it.

C You could try using a spreadsheet and creating graphs from your data.

6.4 Using data

Learning objective

- To understand how to use data

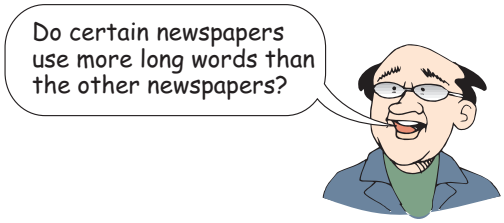
Key words

data-collection form	sample

Can you list six different national newspapers? There are lots of different newspapers to choose from.

Now think how you could answer Ted's question.

The way to find an exact answer would be to count all the words – and all their letters –in all of the newspapers, but this would take a very long time.



A better way is to take a **sample**. You could take, say, 100 words from each newspaper and find the length of each word.

Exercise 6D

Do the whole of this exercise as a class activity, so that between the whole class you will get a lot of data from different sorts of newspapers

1 **a** Select one or two pages from the newspaper given to you.

b Create a tally chart like the one below. This is your **data-collection form.**

Number of letters	Tally	Frequency
1		
2		
3		
4		
5		

Hint

A data-collection form is a table that you can use to collect the results of your research. It may also be called a data-collection sheet.

c **i** Select at least two different articles.

ii Count the letters in each word and complete the tally.

Note: numbers such as 3, 4, 5 count as 1 letter

numbers such as 15, 58 count as 2 letters

numbers such as 156, 897 count as 3 letters, and so on

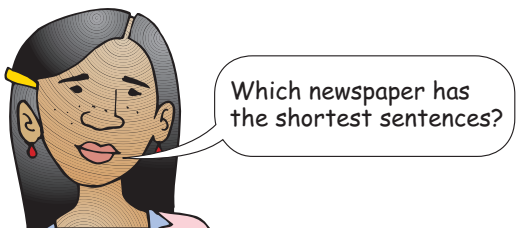
ignore the hyphen in hyphenated words such as 'vice-versa'.

d Fill in the frequency column.

e Create a bar chart for your results.

f What is the modal number of letters?

2 **a** Select one or two pages from the newspaper you have been given.



b Create a data-collection form, like the one below.

Number of words	Tally	Frequency
2		
3		
4		
12		
13		

c **i** Select at least two different articles.

ii Count the words in each sentence and complete the tally.

d Check you have used between 50 and 100 sentences. If not choose more articles to get this number of sentences.

e Once you have used over 50 sentences, fill in the frequency column.

f Create a bar chart for your results.

g What is the modal number of words?

h Compare the different sorts of newspapers. Which has the shortest sentences?

Activity: Easy reading

Choose a book or magazine that you find easy to read and create a bar chart of the number of letters in each word for selected parts of them (either two paragraphs or two articles).

6.5 Grouped frequency

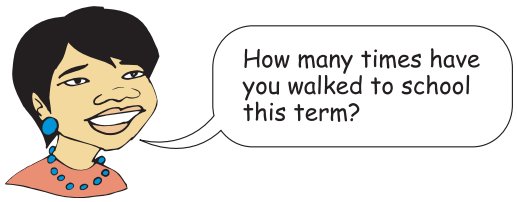
Learning objective

- To understand and use grouped frequency

Key words

- class
- grouped frequency
- grouped frequency table
- modal class

A teacher asked her class this question.



These are the replies.

6	3	5	20	15	11	13	28	30	5	2	6
8	18	23	22	17	13	4	2	30	17	19	25
8	3	9	12	15	8						

There are too many different values to make a sensible bar chart.

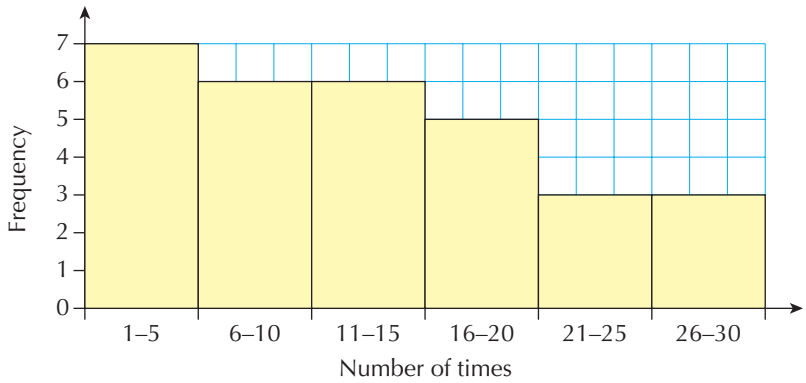
You need to put the values into groups, to produce a **grouped frequency table**, like this.

Times	1–5	6–10	11–15	16–20	21–25	26–30
Frequency	7	6	6	5	3	3

The data has been put into groups, called **classes**.

Where possible, you should always make the classes the same size as each other. This means that the difference between the first and second numbers should always be the same: $5 - 1 = 4$, $10 - 6 = 4, \ldots 30 - 26 = 4$.

Now you can draw a bar chart from this data and put information on each bar, about some of the reasons.



You cannot find a mode for grouped data. You have to use the **modal class**. This is the class with the most data items in it – the highest frequency – so it will be the tallest bar in a bar chart.

Exercise 6E

1 A class did a survey on how many text messages each pupil had received the day before. These are the results of the survey.

3	6	1	17	0	15	18	14	12	0	8	16
3	5	9	11	14	7	2	13	1	13	14	17
4	15	2	5	4	17	11	4	8	18	4	16
16	15	4	9	18	6	9	16	15	9	6	18
2	15	15	18	5	4	7	8	2			

a Draw a grouped frequency table with a class size of 5, like this.

Number of texts	Tally	Frequency
0–4		
5–9		
10–14		
15–19		
	Total:	

b Use the above data to complete your table.

c Draw a bar chart of the data.

d What is the modal class?

2 A teacher asked her class: 'How many times this week have you played electronic games?'

These were their replies.

4	7	10	3	24	19	7	9	30	28	3	2
1	6	20	24	14	22	8	5	24	9	8	2
1	26	25	9	14	19	16	17	4	8	12	6
28	24	7	10	30	30	7	7	1	7	23	27
26	13	5	25	12	11	6	26				

a Draw a grouped frequency table with a class size of 5, like this.

Number of times	Tally	Frequency
1–5		
6–10		
11–15		
16–20		
21–25		
26–30		
	Total:	

b Use the above data to complete your table.

c Draw a bar chart of the data.

d What is the modal class?

3 At a club, the members were asked: 'How many times have you played table football this week?'

These were their replies.

4	7	0	14	6	1	0	3	7	9	5	15
2	1	0	0	4	0	5	8	1	2	3	2
1	15	14	0	3	1	10	14	5	6	2	0
1	12	5	4	2	0	1	1	4	5	7	11
0	2	0	0	0	0	14	3	2	4	1	0
11	7	0									

a Create a grouped frequency table:

i with a class size of 3, i.e. 0–2, 3–5, 6–8, 9–11, 12–14, 15–17

ii with a class size of 5, i.e. 0–4, 5–9, 10–14, 15–19.

b Draw a bar chart for each frequency table.

c What is the modal class?

d Which class size seems more appropriate to use?

Challenge: Boat trips down the Ganges

In India, tourists take boat trips down the River Ganges. One week in March a boat owner recorded how many people were in his boat on the main days these trips were made.

These are the results.

Saturday:	20	24	14	18	10	30	15	11	19	23	31
	19	16	24	13	16	25	20	19	17	12	10
	11	13	24	30	22	24	15	10	26	29	27
	13	13	16	11	17	26	17	14	11	28	30
	24	18	15	19	23	28	15	11			
Sunday:	15	20	8	11	7	26	10	7	12	15	19
	25	14	9	16	10	11	14	13	11	8	7
	5	6	7	8	18	22	14	20	10	7	18
	22	23	9	7	10	8	13	8	7	5	19
	27	19	13	7	15	18	21	9	8		
Wednesday:	25	30	19	23	15	33	19	26	33	25	21
	32	18	22	32	26	24	24	23	19	15	16
	19	29	33	28	29	22	16	21	32	31	19
	19	22	16	25	31	23	20	17	33	34	29
	21	22	25	28	33	20					

A Complete a grouped frequency tally chart for each day's recorded results. (Decide on your own class size.)

B Draw a bar chart from each frequency chart.

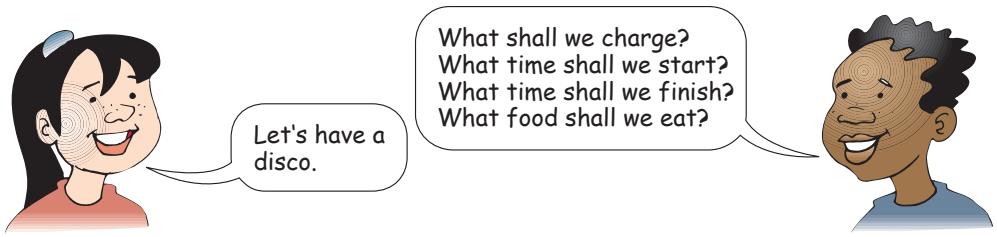
C Comment on your results.

6.6 Data collection

Learning objective

- To gain a greater understanding of data collection

Suppose you ask a sample of the pupils in your school these questions. In other words, you will not ask not everyone, but a few from each year group.



How will you record their answers, though?

You will need a suitable data-collection form. An example is shown below.

Year group	Boy or girl	How much to charge?	Time to start?	Time to finish?	What would you like to eat?
Y7	B	£1	7 pm	11 pm	Snacks, burgers, chips
Y7	G	50p	7 pm	9 pm	Chips, Snacks, lollies
Y8	G	£2	7:30 pm	10 pm	Snacks, hot dogs
Y11	B	£3	8:30 pm	11:30 pm	Chocolate, pizza
↑	↑	↑			
Keep track of the age.	Try to ask equal numbers.	Once the data is collected, it can be sorted into frequency tables.			

Now, as you ask each question, you can immediately complete your data-collection form.

Collecting data

There are five stages in running this type of data collection. They are:

- deciding what questions to ask and who to ask
- creating a simple, suitable data-collection form for all the questions
- asking the questions and completing the data-collection form
- after collecting all the data, collating it in frequency tables
- analysing the data to draw conclusions from the data collected.

The size of your sample will depend on many things. It may be simply the first 50 people you come across. Or you may want a particular fraction of the available people.

In the above example, a good sample would probably be about four from each class, two boys and two girls.

Exercise 6F

A class completed the data-collection activity described above on a sample of 10 pupils from each of years 7, 8 and 9.

This is their data-collection form.

Year group	Boy or girl	How much to charge	Time to start	Time to finish	What would you like to eat?
Y7	B	50p	6:30 pm	10:00 pm	Snacks, burgers, chips
Y7	G	0	7:00 pm	9:00 pm	Chips, Snacks, ice pops
Y8	G	£1.50	7:00 pm	10:00 pm	Snacks, hot dogs
Y9	B	£2.50	8:00 pm	11:00 pm	Chocolate, pizza
Y9	G	£1.50	8:00 pm	10:00 pm	Pizza
Y9	B	£2	7:30 pm	9:00 pm	Hot dogs, Chocolate
Y8	G	£1	7:30 pm	10:30 pm	Snacks
Y7	B	50p	7:00 pm	9:00 pm	Snacks, burgers
Y7	B	£1	7:30 pm	10:30 pm	Snacks, ice pops
Y8	B	50p	6:30 pm	9:00 pm	Snacks, chips, hot dogs
Y9	G	£1.50	8:00 pm	11:00 pm	Pizza, chocolate
Y9	G	£1	8:00 pm	10:30 pm	Chips, pizza
Y9	G	£2	8:00 pm	11:00 pm	Snacks, pizza
Y7	G	£1	7:00 pm	9:00 pm	Snacks, ice pops, chocolate
Y8	B	£1.50	7:30 pm	9:30 pm	Snacks, ice pops, chocolate
Y8	B	50p	8:00 pm	10:00 pm	Chips, hot dogs
Y9	B	£1	8:00 pm	11:00 pm	Pizza
Y7	B	0	7:00 pm	9:30 pm	Snacks, hot dogs
Y8	G	50p	8:00 pm	10:00 pm	Snacks, chips
Y9	B	£1.50	7:00 pm	10:30 pm	Pizza
Y8	G	£1	7:30 pm	10:00 pm	Chips, hot dogs, chocolate
Y8	B	£1.50	7:00 pm	9:00 pm	Chips, hot dogs, ice pops
Y9	G	£2.50	6:30 pm	9:30 pm	Snacks, pizza
Y9	B	£2	8:00 pm	10:30 pm	Snacks, hot dogs
Y7	G	0	7:30 pm	10:00 pm	Snacks, burgers, ice pops
Y7	G	0	6:30 pm	9:00 pm	Snacks, pizza
Y7	G	50p	7:00 pm	9:30 pm	Snacks, pizza
Y8	B	£1.50	7:30 pm	10:00 pm	Snacks, chips, chocolate
Y8	G	£1	7:30 pm	9:30 pm	Chips, burgers
Y7	B	50p	7:30 pm	10:00 pm	Snacks, ice pops

1 **a** Copy this chart and complete the tallies for the suggested charges from each year group.

Charges	Tallies					
	Y7	Total	Y8	Total	Y9	Total
0						
25p						
50p						
75p						
£1						
£1.25						
£1.50						
£2						
£2.50						

b Comment on the differences between the year groups.

2 **a** Copy this chart and complete the tallies for the suggested starting times from each year group.

Times	Tallies					
	Y7	Total	Y8	Total	Y9	Total
6:30 pm						
7:00 pm						
7:30 pm						
8:00 pm						

b Comment on the differences between the year groups.

3 **a** Copy this chart and complete the tallies for the suggested finishing times from each year group.

Times	Tallies					
	Y7	Total	Y8	Total	Y9	Total
9:00 pm						
9:30 pm						
10:00 pm						
10:30 pm						
11:00 pm						

b Comment on the differences between the year groups.

MR **4** **a** Create and complete a tally chart, as before, for the food suggestions of each year.

b Comment on the differences between the year groups.

Investigation: Time for the disco

Investigate the differences between boys and girls as to the suggested length of time for the disco.

Ready to progress?

I can find the mode and range for a set of data.
I can find the median for a set of data.

I can compare two simple distributions.
I can use a data-collection form to collect data.
I can group data, where appropriate, into equal class intervals.

Review questions

1 The pupils in a class were asked: 'What is your favourite food?' This is how they voted.

Subject	Tally
Beans	|||
Burger and chips	𝍸
Pizza	𝍸 𝍸 ||
Sausage and mash	||||
Pasta Bake	𝍸 |
Other	|

a Draw a chart illustrating the results.

b What was the modal food chosen?

2 Sophia did a survey on the types of vehicle that arrived at her school between 10:00 am and 2:00 pm.

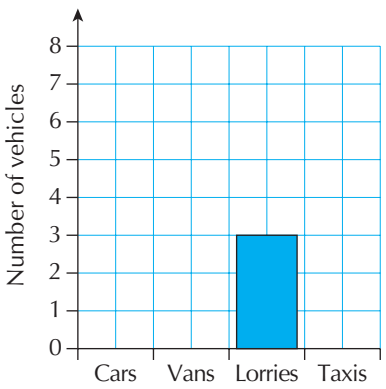
Vehicle	Tally
Cars	𝍸 |
Vans	𝍸 |||
Lorries	|||
Taxis	|

a How many vehicles arrived at Sophia's school during this survey?

b How many more vans arrived than cars?

c Sophia started drawing a bar chart to show the information.

Copy her chart and draw in the missing bars.



3 Twenty 11-year-old pupils were twittering about how much it cost them to travel to school on a bus. These are the amounts they paid.

40p	£1	70p	£1.20	£1	40p	70p
£1	£1	£1.20	50p	50p	£1.50	£1
50p	£1	£1.20	£1	70p	80p	

What was the modal amount spent on the bus fare?

4 These are the temperatures recorded on 12 February in 15 major towns of the UK.

0 °C	–5 °C	–1 °C	–2 °C	0 °C	–3 °C	–1 °C	–2 °C
–5 °C	1 °C	–4 °C	–2 °C	0 °C	–2 °C	–3 °C	

What was the median temperature recorded from these temperatures?

5 Kirstie was asked to make a rectangle with a piece of wire of length 12 cm.

She was told to make the length and width whole numbers of centimetres.

What is the range of areas she could make with that length of wire?

6 A sample of ten bags of flour were weighed. These are the results.

1.1 kg 1.2 kg 0.9 kg 1 kg 0.9 kg 1.1 kg 1 kg 0.9 kg 1.15 kg 1.2 kg

a What was the modal weight?

b What was the median weight?

c What was the range of the weights?

7 Kim was asked to draw a rectangle with an area of 30 cm^2. She was told to make sure that the length of each side was a whole number of centimetres.

a Show that there are only four different sized rectangles she can draw.

b Calculate the median of the four different perimeters.

c What is the range of the different perimeters.

8 Lewis asked his friends on Facebook to tell him their heights. His friends sent him the following results.

156 cm	158 cm	1.49 m	153 cm	1.62 m	143 cm
152 cm	158 cm	157 cm	1.42 m	148 cm	1.52 m
155 cm	162 cm	1.5 m	144 cm	1.47 m	144 cm
1.4 m	150 cm	142 cm	148 cm	1.55 m	1.37 m
157 cm	148 cm	141 cm	1.35 m	155 cm	1.36 m

Put the heights into a grouped frequency tally chart.

What is the modal class?

Challenge

Trains in Europe

We had a great holiday – wonderul views from the train and the freedom to go where we wanted in Europe. We were surprised how easy it was to get from one country to the next. We were able to go to some amazing places. It was unforgettable!

Train travel in Europe is getting easier each year. Look at the statistics for some of the European countries, gathered for a recent year.

Table A The total number of passenger kilometres for some European countries

This shows how many billion kilometres all the countries' passengers have made in total.

Passenger kilometres	
Country	**Billion**
UK	62.7
France	88.1
Germany	79.2
Italy	40.6
Switzerland	18

Table B The total number of rail journeys made in each country for this year

Railway journeys made	
Country	**Number of journeys (million)**
UK	1500
France	1100
Germany	1900
Italy	600
Switzerland	450

Table C The average number of kilometres each person in the country travelled on the railways in that year

Kilometres travelled on train	
Country	**Average distance (kilometres)**
UK	770
France	1370
Germany	910
Italy	780
Switzerland	2422

1 Which country has the highest number of passenger kilometres?

2 Round the data in Table A to the nearest ten billion. Then draw a pictogram to illustrate the data.

3 Which country has the highest number of rail journeys?

4 What is the median number of journeys made for these countries?

5 Put the data in Table B into order, largest first. Then draw a bar chart to illustrate the data.

6 Which country has the highest number of kilometres travelled per person?

7 Round the data in Table C to the nearest hundred. Then draw a bar chart to illustrate the data.