# Statistics

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## This chapter is going to show you:

- how to calculate the mode, the median, the mean and the range for a set of data
- how to use tally charts and frequency tables to collate 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 draw simple conclusions from data.

### You should already know:

- how to interpret data from tables, graphs and charts
- how to draw line graphs 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.

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6.1 Mode, median and range

### Learning objective

 To understand and calculate the mode, median and range of data

Key words	
average	median
mode	range

Statistics is all about collecting and organising data, then using diagrams to represent and interpret it. You often need to find an average to help you to interpret data. An average is a single or typical value that represents a whole set of values.

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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 you can use for non-numerical data, such as favourite colours or football teams. Sometimes there may be no mode because either all the values are different, or no single value occurs more often than any other values.
- The median is the middle value for a set of values when they are put in numerical order.

The **range** of a set of values is the difference between the largest and smallest values.

This is equal to the largest value minus the smallest.

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.

Example 1		
These are the ages of 11 players in a football squad. 23, 19, 24, 26, 27, 27, 24, 23, 20, 23, 26		
Find: <b>a</b> the mode <b>b</b> the median <b>c</b> the range.		
First, put the ages in order.		
19, 20, 23, 23, 23, 24, 24, 26, 26, 27, 27		
<b>a</b> The mode is the number that occurs most often.		
So, the mode is 23.		
<b>b</b> The median is the number in the middle of the set.		
This will be the sixth of 11 values.		
So, the median is 24.		
<b>c</b> The largest value is 27, the smallest is 19.		
As $27 - 19 = 8$ , the range is 8.		
Example 2		
These are the marks of 10 pupils in a mental arithmetic test.		
18, 16, 25, 15, 13, 14, 20, 19, 22, 12		
Find: a the modeb the medianc the range.		
First, put the marks in order.		
12, 13, 14, 15, 16, 18, 19, 20, 22, 25		
<b>a</b> There is no mode because no number occurs more often than any others.		
(Continued)		
6.1 Mode, median and range		

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12, 13, 14, 15, 16, 18, 19, 20, 22, 25

b In this case there are two numbers in the middle of the set: 16 and 18. The median is the number that would be between these two numbers. So, the median is 17.

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

25 - 12 = 13

The range is 13.

### **Exercise 6A**

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6 Find the median of each set of data.				
<b>6</b> Find the median of each set of data.				
<b>a</b> 8, 7, 3, 4, 2, 10, 6, 5, 9				
<b>b</b> 30, 28, 39, 22, 31, 34, 18, 21, 27, 25, 35				
<b>c</b> 16, 14, 20, 8, 12, 22, 18, 10				
<b>d</b> 100, 101, 108, 105, 110, 103, 106, 111, 101, 99				
<b>7</b> Find the mode, range and median of each set of data.	he mode, range and median of each set of data.			
<b>a</b> £3.60, £2.90, £4.75, £4.90, £5.30, £4.35, £2.90				
<b>b</b> 20 kg, 15 kg, 19 kg, 28 kg, 28 kg, 23 kg, 29 kg				
<b>c</b> 121 cm, 134 cm, 140 cm, 121 cm, 129 cm, 131 cm, 121 cm				
<b>d</b> 44°, 48°, 44°, 42°, 43°, 44°, 46°, 45°, 45°, 47°, 46°				
<b>e</b> €2.40, €1.70, €3.55, €4.10, €3.15, €1.70, €3.75				
(PS) 8 a Write down a list of seven numbers with a median of 10 and a r	mode of 12.			
<ul> <li>b Write down a list of eight numbers with a median of 10 and a mode of c Write down a list of seven numbers with a median of 10, a mode of 12 range of 8.</li> <li>9 These are the names of the 12 people who work for a company.</li> </ul>				
			Abbas Kathy Yiiki Suki	
			Brian Kathy Lucy Tim	
Kathy James Ryan Tim				
<b>a</b> Which name is the mode?				
(PS) b One person leaves the company. A different person joins the company.	mpany.			
Now the name that is the mode is Tim.				
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 the Bishop family.				
The range of their ages is exactly 5 years.				
What could the ages of the two children be?				
Give an example.				
<b>b</b> In the Patel family, two of the children are twins.				
What is the range of their ages?				

## **Activity: Research**

Carry out some research, and find the mode, the median and the range of:

A yesterday's UK temperatures

 ${\bf B}$  yesterday's worldwide temperatures

- ${\bf C}$  the numbers of brothers of the pupils in your class
- **D** the number of sisters of the pupils in your class.

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# 6.2 The mean

### Learning objective

• To understand and calculate the mean average of data

Key words	
average	mean
mean average	outlier

The **mean** is the most commonly used average. You may see it called the **mean average** or simply the **average** but, for clarity, it is better to call it the mean. The mean can be used only with numerical data.

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The mean of a set of values is the sum of all the values divided by the number of values in the set.

 $Mean = \frac{sum of all values}{number of values}$ 

The mean is a useful statistic because it takes all of the values into account, but it can be distorted by an **outlier**. This is a value, in the set of data, that is much larger or much smaller than the rest.

When there is an outlier, the median is often used instead of the mean.

#### **Example 3**

Find the mean of 2, 7, 9, 10.

The mean is  $\frac{2+7+9+10}{4} = \frac{28}{4} = 7$ 

For more complex data, you can use a calculator. When the answer is not exact, the mean is usually given to one decimal place (1 dp).

#### Example 4

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The ages of seven people are 40, 37, 34, 42, 45, 39, 35. Calculate their mean age.

The mean age is 
$$\frac{40 + 37 + 34 + 42 + 45 + 39 + 35}{7} = \frac{272}{7} = 38.9 \text{ (1 dp)}$$

#### **Exercise 6B**

Complete each calculation.

- **a** The mean of 3, 5, 10 is  $\frac{3+5+10}{3} = \frac{1}{3} = \frac{1}{3}$
- **b** The mean of 2, 5, 6, 7 is  $\frac{2+5+6+7}{4} = \frac{1}{4} = \frac{1}{4}$
- **c** The mean of 1, 4, 8, 11 is  $\frac{1+4+8+11}{4} = \frac{1}{4} = \frac{1}{4}$
- **d** The mean of 1, 1, 2, 3, 8 is  $\frac{1+1+2+3+8}{5} = \frac{1}{5} = \frac{1}{5}$

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These are the numbers of children in the families of Marie's class at school.

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- 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 3, 3, 3, 3, 4
- a What is the mode? b What is the median? c What is the mean?

These are the shoe sizes of all the girls in class 7JS.

3, 3, 3, 3, 3, 4, 4, 4, 5, 6, 6

**a** What is the mode? **b** What is the median? **c** What is the mean?

These are the prices of chocolate bars on sale at a school fete.

50p, 70p, 45p, 60p, 90p, 65p, 55p, 60p, 55p, 60p The mean price of the chocolate bars last year was 60p. Is the mean price this year higher or lower? Explain your answer.

## Investigation: Find the mean

A Vital statistics

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Work in a group. Calculate the mean and the median for your group's ages and heights.

**B** Average score

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- a Throw a dice 10 times. Record your results. What is the mean score?
- **b** Repeat the experiment but throw the dice 20 times. What is the mean score now?
- c Repeat the experiment but throw the dice 50 times. What is the mean score now?
- **d** Write down anything you notice as you throw the dice more times.

# 6.3 Statistical diagrams

# Learning objective

• To be able to read and interpret different statistical diagrams

Key words	
bar chart	grouped data
icon	line graph
pictogram	pie chart

When you have collected data from a survey, you can display it in various ways, to make it easier to understand and interpret.

The most common ways to display data are pictograms, bar charts, pie charts and line graphs.

- In pictograms, you use small diagrams or icons to represent the data.
- Bar charts may be drawn in several different ways. The questions in Exercise 5C will show you the different types of bar chart that can be used. Notice that you can show data that has separate or distinct categories in a bar chart with gaps between the bars. For **grouped data**, for example, where data values fall into ranges such as 1–5, 6–7, you will use a bar chart with no gaps between the bars.
- You would generally use line graphs to show trends and patterns in the data. They often show what happens over time.
- A pie chart is a circular diagram divided into sectors to show proportions. A pie chart shows what fraction of the whole sample each category represents.

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When you compare pie charts of data from different sources, you must take care. They may not be based on similar numbers. For example, two different classes did a survey of how the pupils travelled to school. These pie charts show their results.

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The pie chart shows that a larger proportion of Jim's class than Noriko's class travelled by bus.

It does not show that a larger number of Jim's class than Noriko's class travel by bus.

In fact, there are 24 people In Jim's class and 12 travel by bus.

There are 36 people in Noriko's class and 14 travel by bus.

## **Exercise 6C**

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The pictogram shows how many DVDs five pupils have in their collections.

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- **a** Who has the most DVDs?
- **b** How many DVDs does Jessica have?
- c How many DVDs does Ceri have?
- d How many more DVDs does Dipesh have than Tania?
- e How many DVDs do the five pupils have altogether?

The dual bar chart shows the daily mean number of hours of sunshine in London and Edinburgh over a year.



- **a** Which city has the most sunshine?
- **b** Which month is the sunniest for:
  - i London
  - ii Edinburgh?
- **c** What is the range for the number of hours of sunshine over the year for:
  - i London
  - ii Edinburgh?

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6.3 Statistical diagrams





- **a** Which is the most popular channel?
- **b** Which is the least popular channel?

### Activity: Statistical diagrams

- **a** Look through newspapers and magazines and find as many statistical diagrams as you can Make a display to show the variety of diagrams used in the press.
- **b** What types of diagram are most common?
- **c** How effective are the diagrams in showing the information?
- d Are any of the diagrams misleading? If they are, explain why.

# 6.4 Collecting and using data

### Learning objectives

• To create and use a tally chart

Key words	
frequency	modal
sample	tally chart



If you ask pupils this question, they will name different methods of transport, such as bus, car, bike, walking, train and they will give various reasons for using them!

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A good way to collect this data is to fill in a **tally chart** as each pupil responds to the question. For example:

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Type of transport	Tally	Frequency
Bus	JHT 1111	9
Car	IHI	5
Bike		2
Walking		14
Other		
	Total:	30

Each 'stick' represents one pupil. When you get to the fifth, you draw it as a sloping stick across the other four. This can be called a gate – because that's what it looks like – or a bar, as it 'bars the gate'.

Using tallies allows you to collect the data and count it easily, in fives.

The **frequency** is the sum of all the sticks in the tally.

You can see from the tally chart that the most common type of transport is walking. This is the mode of the data and so you can say the **modal** form of transport is walking.

To answer the question 'Why?', the pupils might 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.

If you look at all the reasons they have given, you will be able to put some together because they are similar. These reasons can be left as a table.

Sometimes collecting every single piece of data would be very time-consuming. How would you find the answer to this question?



The most accurate way would be to count all of the words, in each newspaper, and compare the numbers of letters in the words. Because this would take far too long, instead you would take a **sample**. You would count, say, 100 words from each newspaper and find the length of each of these words.

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### **Exercise 6D**



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- **a** Draw a chart illustrating the places the pupils wanted to go to.
- **b** Suggest reasons why the pupils might have voted for each place.
- **c** What is the modal place chosen?

Place	Tally
Alton Towers	THL THL
Camelot	UHT I
Blackpool	JHT III
London	
Bath	

The students in a class were asked: 'What is your favourite pet?'

This is how they voted.

- **a** Draw a chart illustrating the favourite pets.
- **b** What is the modal pet chosen?

Pet	Tally
Cat	UHT II
Dog	
Hamster	Ш
Rabbit	
Other	

The pupils in a class were asked: 'What is your favourite sport?'

- This is how they voted.
- **a** Draw a chart illustrating the favourite sports.
- **b** What is the modal sport chosen?

Sport	Tally
Athletics	LHT I
Cricket	Ш.
Football	
Tennis	JHT 11
Other	

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

- **a** Draw a chart illustrating the favourite subjects.
- **b** Write suitable reasons why the pupils might have voted for each subject.
- **c** What is the modal subject chosen?

Subject	Tally
English	IHT
History	
Maths	
PE	IHT I
Science	
Other	

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The pupils in a class were asked: 'What is your favourite terrestrial TV channel?' This is how they voted.

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- **a** Draw a chart illustrating the favourite channels.
- **b** What is the modal channel chosen?

Channel	Tally
BBC 1	11HT III
BBC2	
ITV 1	JHT I
Channel 4	UHT II
Channel 5	IHT
Other	

- **a** Use your own class tally sheet to draw a chart illustrating the methods of transport used by pupils in your class to get to school.
  - **b** Make a table showing the reasons why.

### Activity: How many letters?

Work as a class or a group.

- A Select one or two pages from a newspaper.
- **B** Create a data capture form (tally chart) like the one below, adding extra rows as necessary.

Number of letters	Tally	Frequency
1		
2		
3		
4		
5		
6		
7		

- C a Select at least two different articles.
  - **b** 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?
- **G** You may find it interesting to compare the differences between the different newspapers before looking at the next section, then again after reading the section.

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# **6.5 Grouped frequency**

## Learning objective

• To understand and use grouped frequencies

#### Key words

class

grouped frequency table modal class



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These are the pupils' replies, when the teacher asked the class this question.

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 here to make a sensible bar chart, so you need to organise them into a **grouped frequency table**, as shown below.

The data has been sorted into groups called **classes**. Where possible, you should always keep the classes the same size.

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

Now you can draw a bar chart, to show the results. Because there is no value between 5 and 6, 10 and 11, and so on, you can draw it like this.



You cannot find a mode for grouped data so, instead, you use the **modal class**. This is the class with the highest frequency.

The modal class of the data above is the class 1–5 times.

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### **Exercise 6E**

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Two classes carried out a survey to find out how many text messages each pupil had sent the day before.

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These are the results of this survey.

1	7	2	1.0	1	16	10	15	12	0	0	17
4	/	2	10	1	10	19	15	15	0	9	17
4	6	10	12	15	8	3	14	2	14	15	18
5	16	3	6	5	18	12	5	9	19	5	17
17	16	5	10	19	7	10	17	16	10	7	19
3	16	16	18	6	5	8	9	3			

**a** Create a grouped frequency table with a class size of 5, as below.

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

**b** Use the data above to complete your table.

**c** Draw a bar chart of the data.

**d** What is the modal class?

A leader of a youth club asked her members: 'How many times this week have you played electronic games?'

These were their responses.

3	6	9	2	23	18	6	8	29	27	2	1
0	5	19	23	13	21	7	4	23	8	7	1
0	25	24	8	13	18	15	16	3	7	11	5
27	23	6	9	18	17	6	6	0	6	21	26
25	12	4	24	11	11	5	25				

**a** Create a grouped frequency table with a class size of 5, as below.

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Number of times	Tally	Frequency
0–4		
5–9		
10–14		
15–19		
20–24		
25–29		
	Total:	

**b** Use the data above to complete your table.

c Draw a bar chart of the data.

**d** What is the modal class?

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

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These are their replies.

5	8	1	15	7	2	0	4	8	10	6	16
3	2	1	1	5	1	6	9	2	3	4	3
2	16	15	0	4	2	11	15	6	7	3	1
2	13	6	5	3	1	2	2	5	6	8	12
1	3	1	1	0	0	15	4	3	5	2	1
12	8	1									

- **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 from each chart?
- **d** Which class size seems most appropriate to use? Explain your reason.
- In a class sponsorship, the pupils raised these amounts of money.

£12.25	£6.50	£9.75	£23	£1.86	£5.34	£16.75	£11.32
£6.45	£2.50	£5	£18.65	£5.90	£4.34	£2.17	£8.89
£7.86	£19.70	£21.55	£13.87	£23.12	£14.67	£11.98	£13.60
£4.75	£19	£16.41	£1.90	£6.89	£8.33		

- **a** Create a grouped frequency table:
  - i with a class size of £4, i.e. £0–£4, £4.01–£8, £8.01–£12,...
  - ii with a class size of £6, i.e. £0–£6, £6.01–£12, £12.01–£18,....
- **b** What is the modal class for each table?
- **c** The teacher was asked to make a display illustrating how well the pupils had done. Select the better class size to illustrate the data.
- **d** Explain why you chose that class size.

#### Challenge: Boat trips down the Ganges

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

These are the results.
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Saturday:	18	23	12	17	8	29	13	9	18	21	29	18
	14	23	12	14	24	19	17	16	10	9	9	11
	23	28	21	22	13	9	24	28	25	12	11	15
	9	16	24	16	12	10	26	29	22	17	13	18
	21	26	14	9								

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

**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

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To develop greater understanding of data collection

Suppose you wanted to organise a party to celebrate the end of term at school. You need to know what pupils would like. Here are some questions you might ask.

You could ask a sample of the pupils in your school these questions. This means you would not ask everyone, but a few from each group.

You ask each question, then immediately complete your **data-collection form**.

An example of a suitable data-collection form is shown below.

Key words

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	В	£1	7 pm	11 pm	Crisps, beefburgers, chips
Y7	G	50p	7 pm	9 pm	Chips, crisps, lollies
Y8	G	£2	7:30 pm	10 pm	Crisps, hot dogs
Y9	В	£3	8:30 pm	11:30 pm	Chocolate, pizza
Keep track of the age.	Try to ask equal numbers.	(	Once you have co	llected the data, yo frequency tables.	u can sort it into

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The five stages in running this type of data collection 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 meet. Or you may want to target 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.

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### **Exercise 6F**

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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	How much	Time to	Time to finish	What would you like
	girl	to charge	start		to eat?
Y7	В	£1	7 pm	11 pm	Crisps, beefburgers, chips
Y7	G	50p	7 pm	9 pm	Chips, crisps, ice pops
Y8	G	£2	7:30 pm	10 pm	Crisps, hot dogs
Y9	В	£3	8:30 pm	11:30 pm	Chocolate, pizza
Y9	G	£2	8 pm	10 pm	Pizza
Y9	В	£2.50	7:30 pm	9:30 pm	Hot dogs, chocolate
Y8	G	£1	8 pm	10:30 pm	Crisps
Y7	В	75p	7 pm	9 pm	Crisps, beefburgers
Y7	В	£1	7:30 pm	10:30 pm	Crisps, ice pops
Y8	В	£1.50	7 pm	9 pm	Crisps, chips, hot dogs
Y9	G	£2	8 pm	11 pm	Pizza, chocolate
Y9	G	£1.50	8 pm	10:30 pm	Chips, pizza
Y9	G	£2	8 pm	11 pm	Crisps, pizza
Y7	G	£1.50	7 pm	9 pm	Crisps, ice pops, chocolate
Y8	В	£2	7:30 pm	9:30 pm	Crisps, ice pops, chocolate
Y8	В	£1	8 pm	10 pm	Chips, hot dogs
Y9	В	£1.50	8 pm	11 pm	Pizza
Y7	В	50p	7 pm	9:30 pm	Crisps, hot dogs
Y8	G	75p	8 pm	10:30 pm	Crisps, chips
Y9	В	£2	7:30 pm	10:30 pm	Pizza
Y8	G	£1.50	7:30 pm	10 pm	Chips, hot dogs, chocolate
Y8	В	£1.25	7 pm	9:30 pm	Chips, hot dogs, ice pops
Y9	G	£3	7 pm	9:30 pm	Crisps, pizza
Y9	В	£2.50	8 pm	10:30 pm	Crisps, hot dogs
Y7	G	25p	7:30 pm	10 pm	Crisps, beefburgers, ice pops
Y7	G	50p	7 pm	9 pm	Crisps, pizza
Y7	G	£1	7 pm	9:30 pm	Crisps, pizza
Y8	В	£2	8 pm	10 pm	Crisps, chips, chocolate
Y8	G	£1.50	7:30 pm	9:30 pm	Chips, beefburgers
Y7	В	£1	7:30 pm	10 pm	Crisps, ice pops

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#### 1

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

Charges		Tallies						
	¥7	Total	¥8	Total	Y9	Total		
25p								
50p								
75p								
£1								
£1.25								
£1.50								
£2								
£2.50								
£3								

- **b** Comment on the differences between the year groups.
- **a** Copy this chart and complete the tallies for the suggested starting times from each year group.

Times	Tallies							
	¥7	Total	Y8	Total	Y9	Total		
7:00 pm								
7:30 pm								
8:00 pm								
8:30 pm								



b

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Comment on the differences between the year groups.

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

Times	Tallies							
	¥7	Total	Y8	Total	Y9	Total		
9:00 pm								
9:30 pm								
10:00 pm								
10:30 pm								
11:00 pm								
11:30 pm								

- **b** Comment on the differences between the year groups.
- **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: Length of the party

Investigate the differences between the views of boys and girls on the suggested length of time for the end-of-term party.

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# **Ready to progress?**

I can use a data-collection form to collect data. I can find the mode and range for a set of data.



I can find the median and the mean for a set of data. I can compare two simple sets of data. I can group data, where appropriate, into classes of equal size.

# **Review questions**

1 Twenty 11-year-olds were tweeting about how much it cost them to travel to school on a bus. These are the amounts they paid.

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20р	£1	75p	£1.25	£1	20p	75p	£1	£1	£1.25
40p	50p	£1.50	£1	50p	£1	£1.25	£1	75p	80p

What was the modal amount spent on bus fares?

2 These are the temperatures recorded on 1 February in 15 major towns of the UK.

1 °C	_4 °C	0 °C	−1 °C	1 °C	−2 °C	0 °C	−1 °C
_4 °C	2 °C	−3 °C	−1 °C	1 °C	−1 °C	−2 °C	

What was the median temperature recorded from these temperatures?

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Tom was asked to make a rectangle with a piece of wire, of length 18 cm. He was told to make the length and width whole numbers of centimetres. What is the range of areas he could make with that length of wire?

- 4 Charlie compared the masses of a sample of ten bags of sugar. These are his results.1.08 kg 1.1 kg 0.95 kg 1.04 kg 0.98 kg 1.09 kg 1.02 kg 0.99 kg 0.97 kg 1.01 kgWhat was the mean mass of the ten bags of sugar?
- 5 Kim was asked to draw a rectangle with an area of 24 cm<sup>2</sup> and with sides that were whole numbers of centimetres.
  - a Show that there are only four different-sized rectangles she can draw.
  - **b** Calculate the mean of the four different perimeters.
  - c Hence state which rectangle has the closest perimeter to the mean found.

PS

6 Uzma asked children from two different schools: 'How do you travel to school?' Here are her results.

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- Uzma says: 'The number of children walking to Redwood school is greater than the number walking to Upperthorpe school.'
   Explain why Uzma is incorrect.
- b At Upperthorpe school, one-third of the children travel by car.The number of children who cycle is the same as the number who go on the bus.How many of the children cycle to Upperthorpe school?
- 7 Efrosyni asked her friends on Facebook to tell her their heights. Her friends sent her the following results.

151 cm	1.53 m	1.44 m	148 cm	1.57 m	138 cm
1473 mm	1535 mm	1.52 m	1.47 m	1432 mm	1.47 m
150 cm	157 cm	1.4 m	1398 mm	1.42 m	139 cm
1.35 m	1458 mm	146 cm	1433 mm	1.49 m	1.32 m
1529 mm	143 cm	136 cm	1.45 m	1503 mm	1.31 m

- a Put the heights into a grouped frequency tally chart.
- **b** What is the modal class?

Draw a triangle in which the sides have a modal length of 5 cm and a mean length of 6 cm.

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# Challenge School sports day

### Teams

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- 1 The ages of Ruskin team's seven members are shown in the table.
  - a Put their ages into order.
  - **b** What is the mode of the ages?
  - c What is the range of the ages?
  - **d** What is the median age?

Statistical	Age (years)
Joe	14
Kristen	15
Simon	13
Vikas	15
Helen	14
Sarah	13
Quinn	13

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## 100 m sprint

- 2 The table shows the times for the girls' 100 m race.
  - a Put these times into order.
  - **b** What is the mode of the times?
  - c What is the range of the times?
  - **d** What is the median time?

	Time (seconds)
Kate	22
Kerry	25
Maria	21
Oi Yin	25
Sara	23

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# Long jump

3 Alex had ten practice attempts at the long jump. The bar chart illustrates the range of lengths he jumps.

What is the length of his average jump?

	1
41–160 cm	
21–140 cm	
)1–120 cm <sup>–</sup>	
1–100 cm	

Range of jumps

## **Rounders competition**

- 4 In the rounders game between Huntsman and Chantry, these scorecards were produced as tallies. A tally was put next to a player each time they scored a rounder.
  - a Which team won the game?
  - **b** Which of all the players was the most likely to score a rounder?

	Par A	
신상	aline at	1.
D.C.		nm
rpi	due	IIC.

#### Chantry Frequency Ellen 111 Cynthia 11 Runuka ĦĦ Joanne 11 Michael Emily IĨ Julie HH I Kay HH Sue $\Pi$

Challenge

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Huntsman

Afzal

Claire

Gilbert

John

Izolda

Kate

Joy

Mari

Ali

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