

Mathletics

Series



Student



Statistics



My name _____



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Series F – Statistics

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Pictograms – reading pictograms

Pictograms are used to display large amounts of data. A symbol is chosen to represent a specific amount. Pictograms have a title that tells us what data has been collected, category labels and a key to show the value of the symbol.

How many chocolate cupcakes were sold?













































$$4 + 4 + 4 + 4 + 2 = 18$$

Cupcakes Sold in a Day Key:  = 4 cupcakes

Strawberry	  
Chocolate	    
Cherry	 
Choc-chip	   

1

At the bus terminal buses arrive and depart at regular intervals. This pictogram shows the number of buses that departed the bus terminal in one week. Use the graph and the key to answer the following:

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						
						
						
						
						
						
						
						
						

Key:  = 10 buses

a On which day did 55 buses depart?

b Which is the terminal's busiest day?





















c How many buses depart on this day?


d How many buses leave on Tuesday?

e How many more buses depart on Friday than Saturday?

2

This graph shows the number of tickets bought at the local cinema.

Movie Classification	Tickets Bought
Comedy	     
Children	     
Horror	   
Action/Drama	   

Key:  = 100 tickets

a How many tickets were bought for Comedy and Childrens' movies?

b What was the total amount of tickets bought?


Pictograms – reading pictograms

3 5F put on their own version of “So You Think You Can Dance”. Use the graph and key to answer the following:

Ticket Sales

Key:  = 20 tickets



- a How many tickets does each  represent?
- b How many tickets were sold in Week 1?
- c How many tickets were sold in Week 5?
- d In which week were the most tickets sold?
- e How many tickets were sold that week?
- f During which two weeks were the same number of tickets sold?
- g How many more tickets were sold in Week 3 than Week 1?
- h How many tickets were sold during the entire sales period?

4 In a scandal that rocked the school, it was found that ticket sales data was exaggerated. The maximum attendees for any one week was actually 60.









- a How many tickets does each symbol now represent?
- b How many tickets were really sold during the entire sales period?

Pictograms – reading pictograms

5 Pupils sold chocolates to raise money for charity. This pictogram shows their collection for the first week. Use this graph to answer the following:

Week 1 Chocolate Sale

Key:  = 4 bars










Ethan	
Claire	
Pablo	
Heba	
Reece	
Mia	
Rania	
Hassan	

- a Who sold 56 chocolate bars?
- b Who sold $\frac{1}{2}$ dozen bars?
- c Mia sold chocolate bars.
- d How many bars did Ethan sell?
- e How many bars were sold altogether?
- f If each bar sold for £2, how much money did the group raise for charity?

6 Bars sold in Week 2 of the charity drive appear in the tally column of this table. Represent this information using symbols. The first pupil has been done for you:

Week 2 Chocolate Sale

Key:  = 4 bars

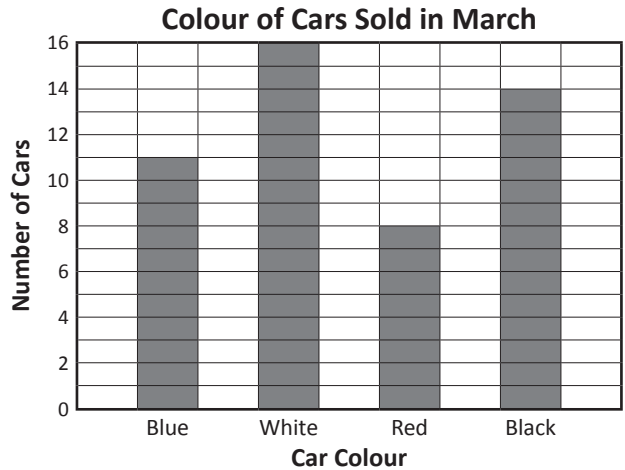
Pupil	Tally	Pictogram
Ethan		
Claire		
Pablo		
Heba		
Reece		
Mia		
Rania		
Hassan		

- a During Week 2, how much money was raised altogether? Each chocolate bar is £2.
- b A prize was given at the end of the 2 weeks to the pupil who raised the most money. Who won?

Bar charts – reading bar charts

We often use bar charts when we want to compare data. All bar charts have a title and each axis is labelled.

From this we can quickly see that 16 white cars were sold in March and that this was the most popular colour choice.



1 Answer the questions about this bar chart:

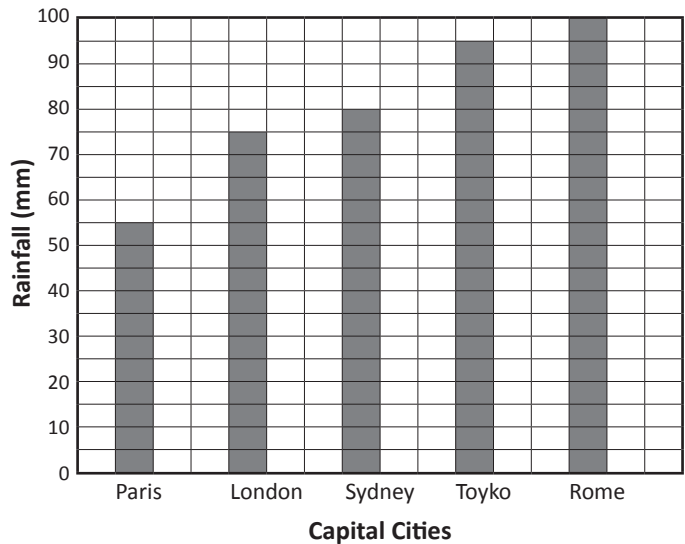
a Which city had the highest rainfall in October?

b What was this city's rainfall?

c Which cities had a rainfall between 70 mm and 90 mm?

d How many more millimetres of rain did Rome have than Paris?

Total Rainfall in October



2 Below are the November figures for the same cities. Add them to the graph (above). Think first how best to do this:

Paris 65 mm

London 40 mm

Sydney 95 mm

Tokyo 60 mm

Rome 30 mm

a Will you use the same colour columns?

b Will you need to change anything else on the graph?

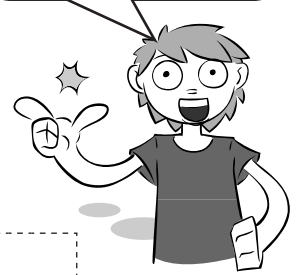
3 Write a problem using the new data for a partner to solve:

Bar charts – reading bar charts

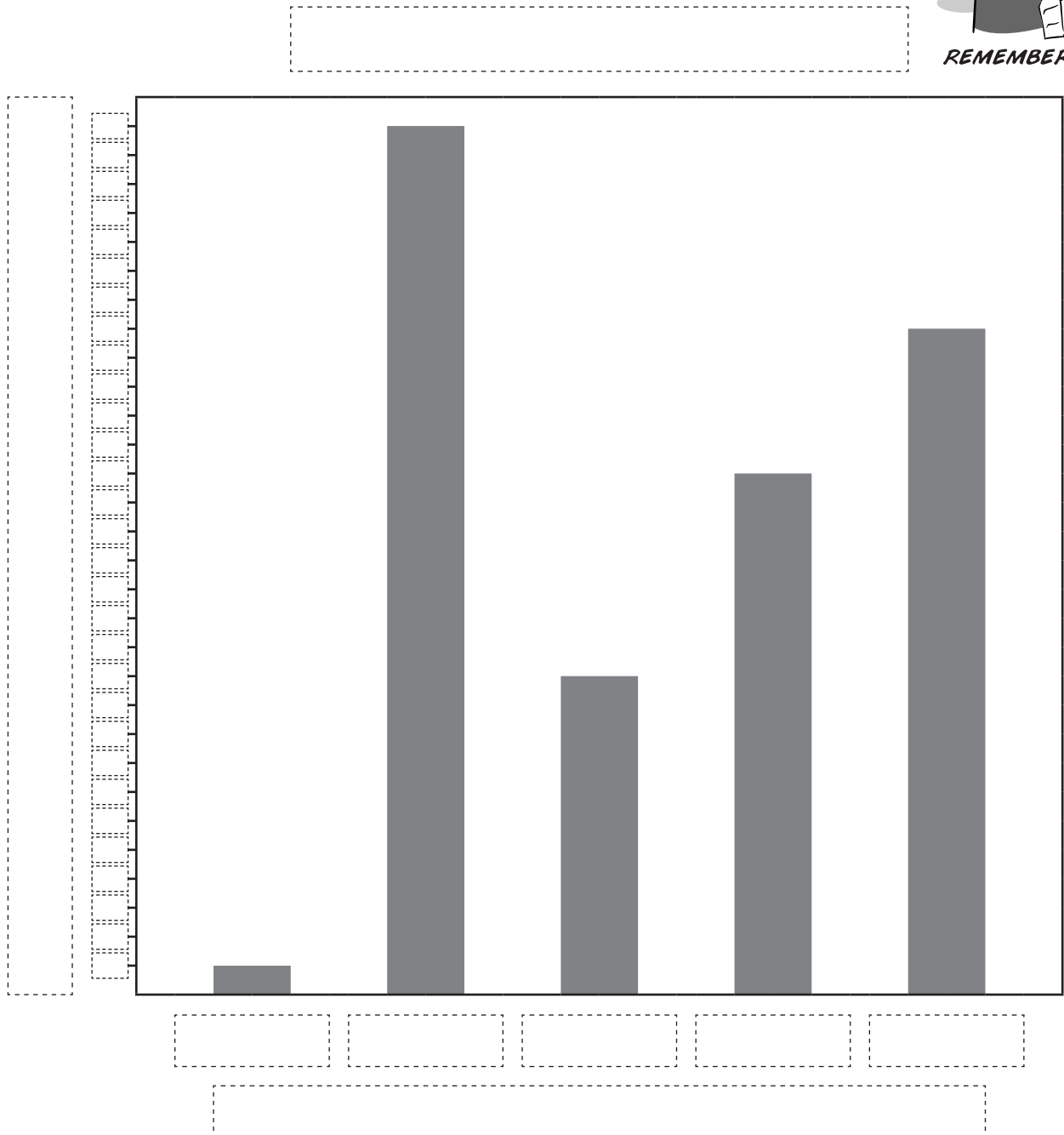
4 The after school club kids are staging a mutiny. They are over watching the same DVDs and making popcorn every day and want to do something new and exciting on Wednesdays. This table shows the activities they'd prefer.

Activity	Number of Pupils
No change	1
Swimming	30
Art	11
Football	18
Dancing	23

- Name your graph and both axes
- Label each column
- Select and label an appropriate scale



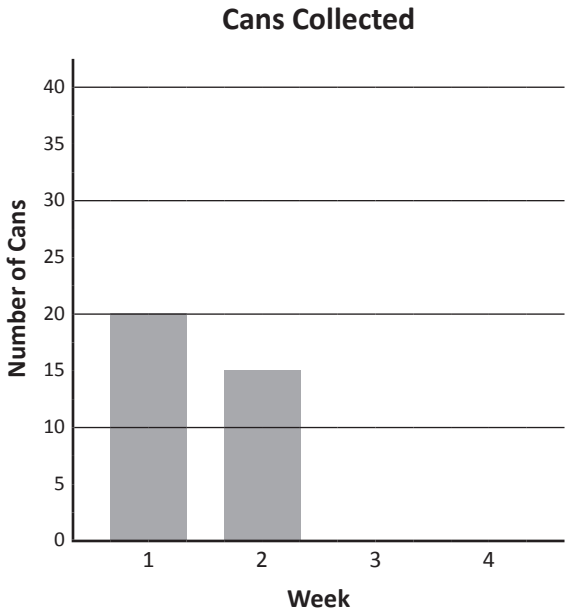
REMEMBER



b What are some key issues on the graph you'd point out? Work in a small team to come up with a solution. Pretend your teacher or another group is the head teacher and present your case.

Bar charts – reading bar charts

5 5D decide to run a recycling campaign and collect cans in and around the school. They recorded how many cans were collected each week and started constructing this bar chart. In Week 3 they collected 40 cans and in Week 4 they collected 10 cans.



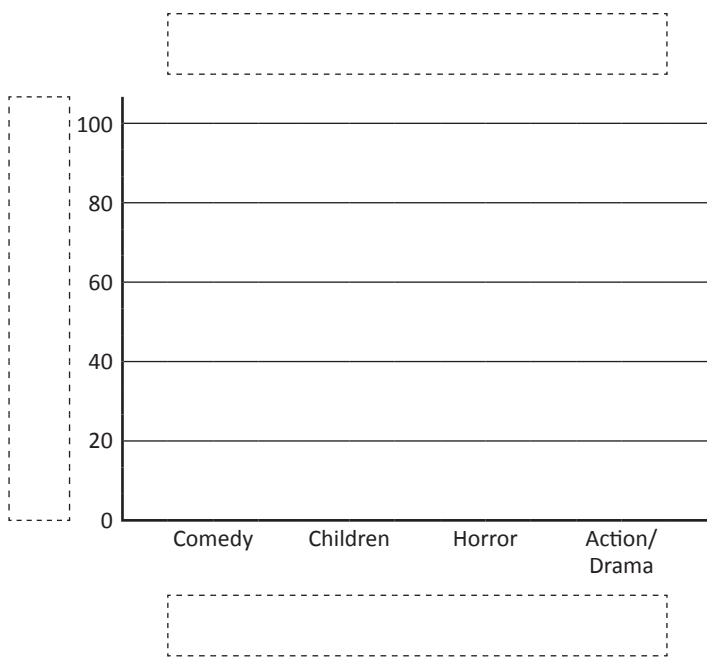
- a Add Week 3 and 4 data to the graph.
- b There was a soft drink special at the local store during one of the weeks. Which week do you think it was and why?

c How many cans were collected in all?

d If each can is worth 5p, how much money did 5D make from the campaign?

6 The same information can be represented in different graphs.

a Design a bar chart to represent the data shown in this pictogram.



Type of Movie	Ticket Sales
Comedy	
Children	
Horror	
Action/Drama	

Key: = 20 tickets

- Name your graph
- Label both axes
- Select and label an appropriate scale
- Label each column



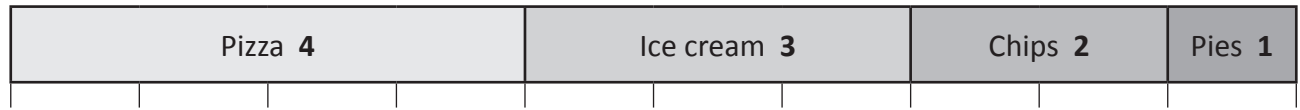
b If you ran a cinema and wanted to plan your weekly movie schedule, which graph would you prefer? Which type of graph makes it easier to analyse and compare data?

Bar charts – divided bar charts

A divided bar chart is used to show how a total is divided.

It's similar to a pie chart except it's a rectangle divided into parts that represent the information.

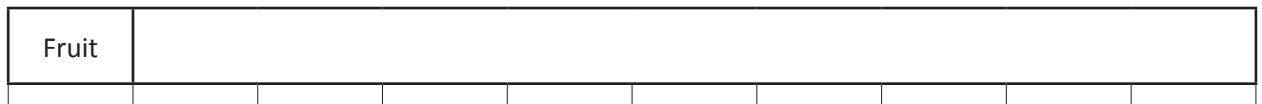
This divided bar chart shows the favourite food of 10 children.



- 1 The Nicholls' family grocery budget is £200 per week. This table shows how the money is spent:

Fruit	Vegetables	Meat	Snacks	Drinks
£20	£40	£60	£40	£40

- a Show the information in this table as a divided bar chart. Each space represents £20.



- b What was $\frac{3}{10}$ of the budget spent on?

- 2 This divided bar chart shows how Paula spent £360 on her party. Answer the questions below about how much she spent on each category. You may use a calculator.



- a What is each segment worth?

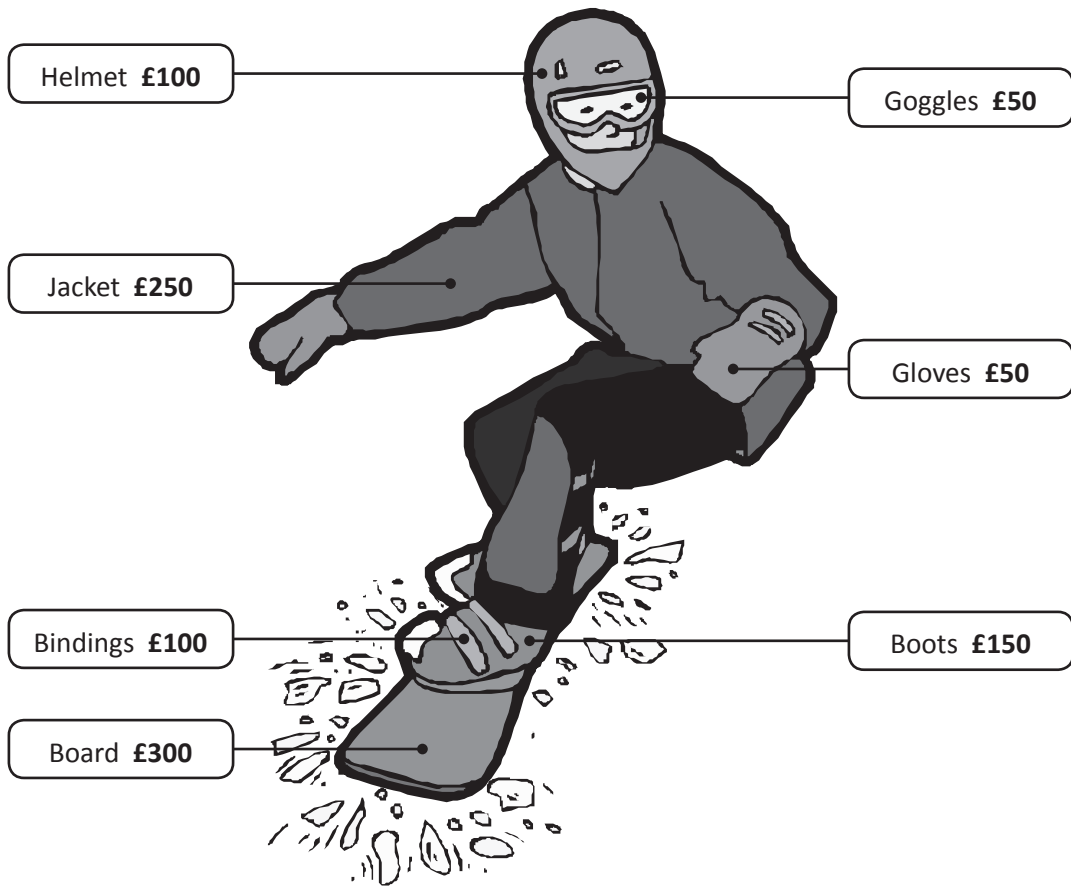
- b $\frac{1}{3}$ was spent on decorations. How much is this?

- c $\frac{2}{9}$ was spent on food and drink. How much is this?

- d How much was spent on entertainment? Show your workings below:

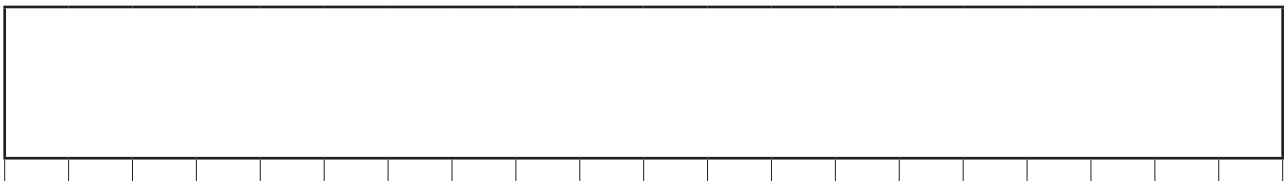
Bar charts – divided bar charts

- 3 You want to try snowboarding and you need to ask your parents for £1,000 to buy all the gear. Understandably, they want to know how their hard earned cash will be spent.



Complete a divided bar chart to show them. Colour in each category a different colour, label it clearly and include a title.

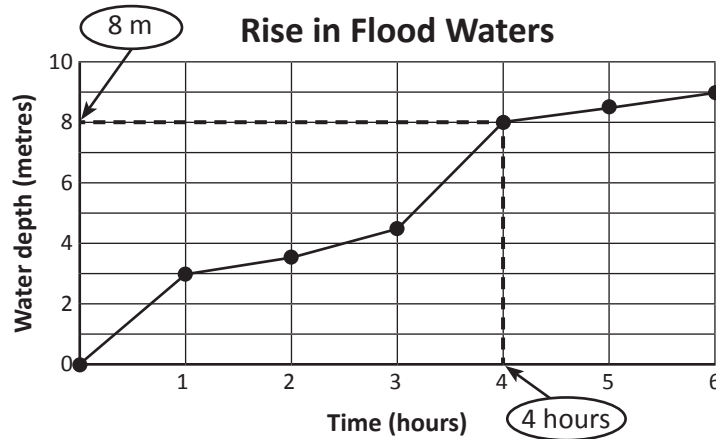
Title



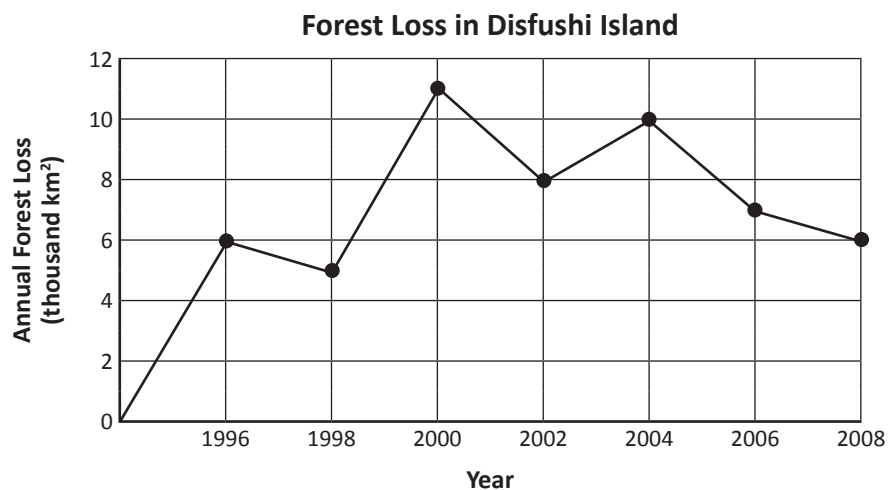
Line graphs – reading line graphs

Line graphs show how something changes over time in relation to something else. In this topic, we'll look at different examples of line graphs. Look at the line graph below. See how the more time passed, the higher the water got?

In which hour was the water 8 metres deep? Look below for how we read this information:



1 Look carefully at this line graph and answer the questions:



- a How many square kilometres of forest was lost in 1996?
- b How many square kilometres of forest was lost in 2000?
- c In which year were 7,000 square kilometres of forest lost?
- d How much more forest was lost in 2000 than in 2008?
- e Use the graph to estimate the forest loss in 1999.
- f Use the graph to estimate the forest loss in 2003.

Line graphs – reading line graphs

2 Polly and her friend Molly were practising reading a thermometer for homework. They boiled water in a kettle and then took turns measuring the temperature every minute as it cooled down. To make this more interesting, they made it a guessing game.

Look at the graph and answer the questions to see how they went:

a Polly guessed that after 1 minute the temperature would be 46°C. Was she right?

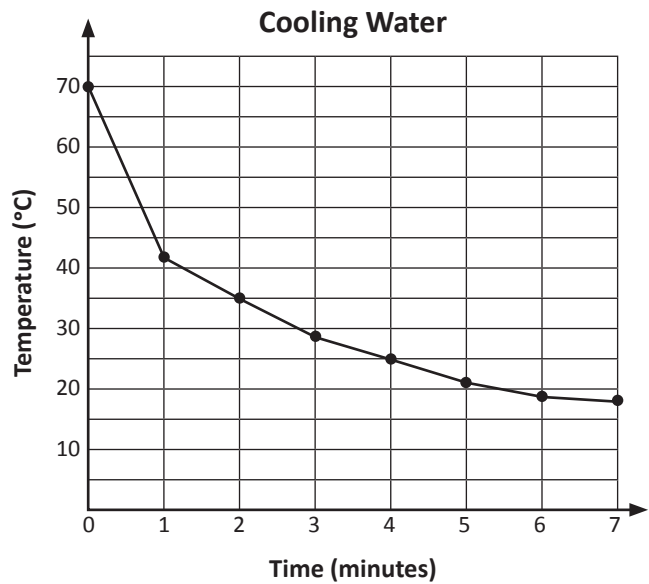
b Molly guessed that after 2 minutes the temperature would be 34°C. Was she right?

Look closely at the graph they made showing the temperature of the water in the kettle.

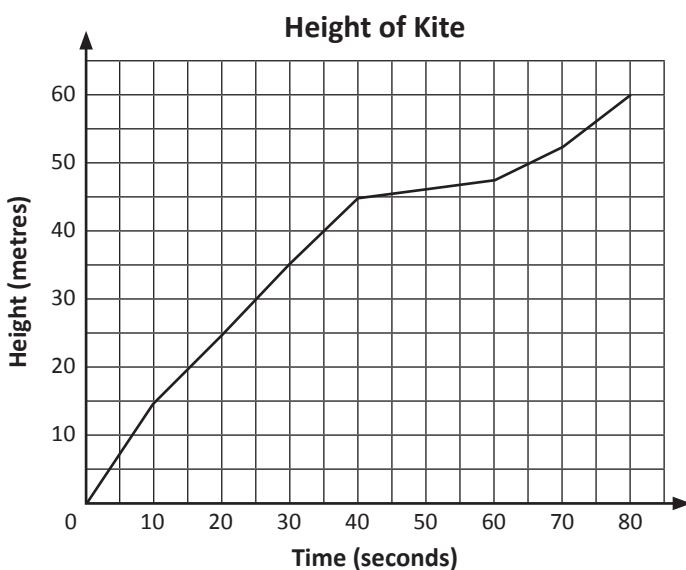
c What is the value of each small division on the temperature axis?

d By how much did the water cool down between 2 minutes and 4 minutes?

e How long did the water take to cool to 19°C?



3 This graph shows a kite's height at different times. Answer the questions below:

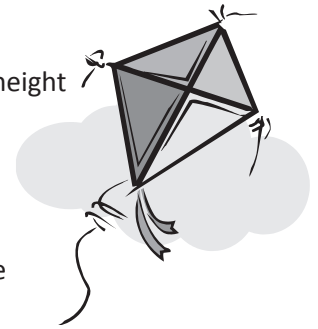


a What was the kite's height at 65 seconds?

b How long did the kite take to rise from 25 metres to 40 metres?

c Estimate the height of the kite at 1 minute.

d If the kite continued to rise, how high do you think it would be after 90 seconds?



Line graphs – constructing line graphs

Let's see how to build a line graph from a data table.
This data shows the rate of filling a fish tank with water.

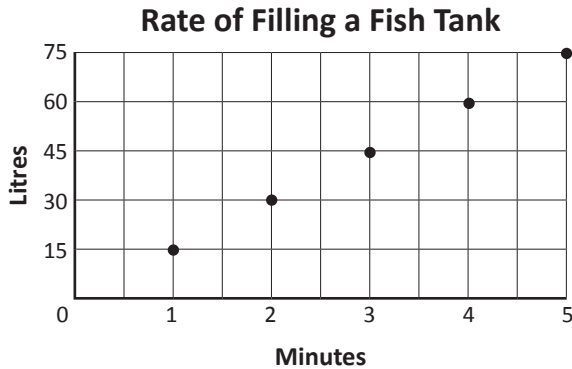
Minutes	1	2	3	4	5
Litres	15	30	45	60	75



Usually, we join the dots, but sometimes we don't.

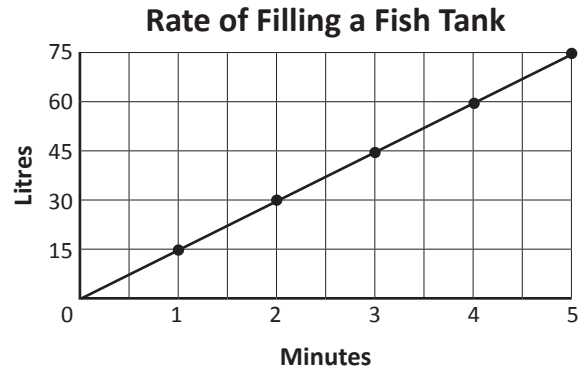
Step 1

Carefully plot the data from the table.



Step 2

Join the points with straight lines.



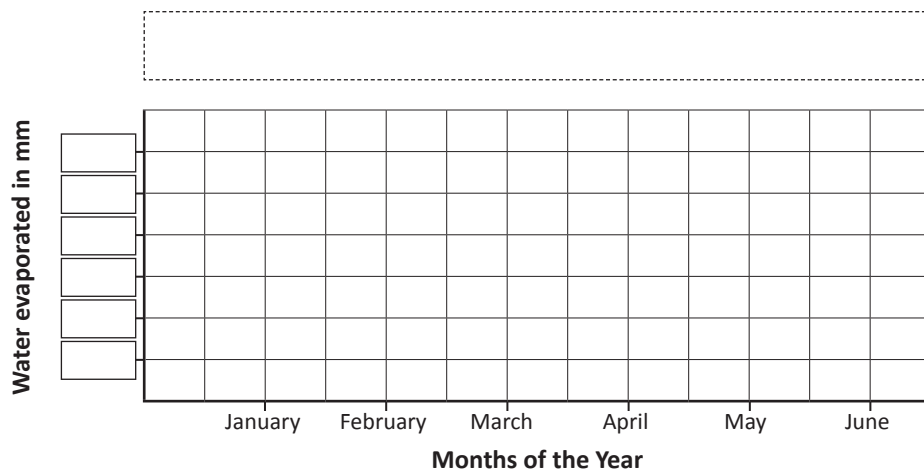
1

The average rate that water evaporates from an indoor swimming pool is 6 mm a month.

a Complete this table to show how much water will evaporate over 6 months:

Millimetres	6					
Month	January	February	March	April	May	June

b Label the vertical axis with an appropriate scale, then plot the points and join the points with a ruler. What else do you need to add to make this graph complete?



c Write 2 questions about this graph and write the answers.

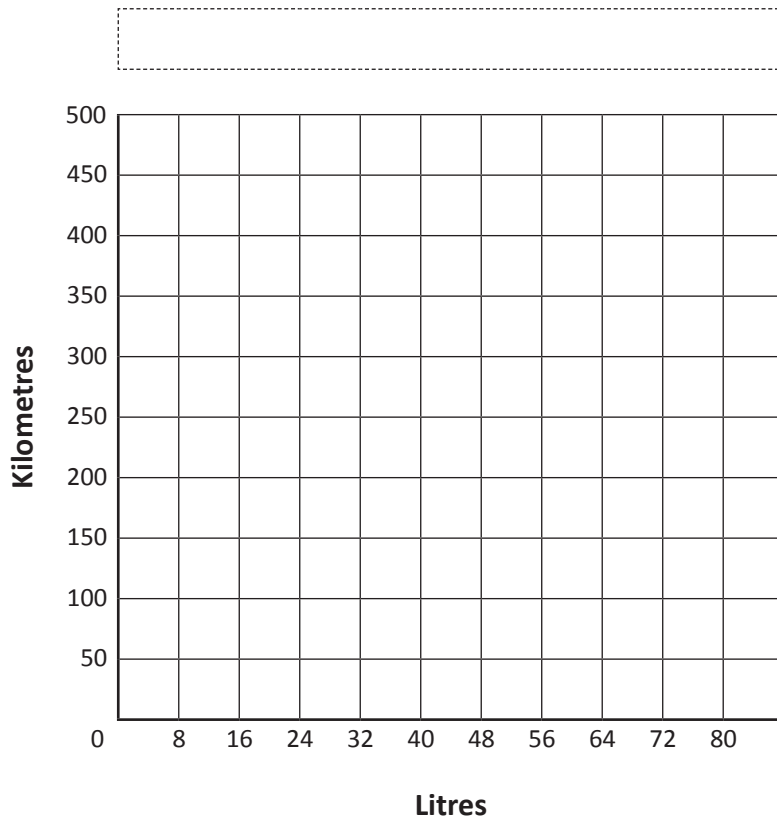
Line graphs – constructing line graphs

2 A car uses 8 litres of petrol for every 50 km travelled.

a Complete this table to show how much petrol is needed for a journey:

Litres	8	16	24	32	40	48	56	64	72	80
Kilometres	50									

b Complete this line graph:



c How far can the car go on 32 litres of petrol?

d How many litres of petrol are needed to travel 450 km?

e How far would a car travel on 12 litres of petrol?

f How far would you have travelled if you used 96 litres of petrol?

g If this car's fuel tank had a capacity of 40 litres, how many times would you need to fill it if you wanted to travel 500 km?

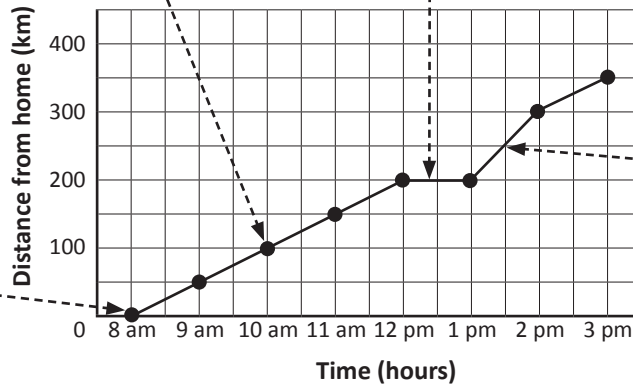
Line graphs – travel graphs

A travel graph is a type of line graph that shows the distance travelled and the time taken to travel that distance. We can tell a lot about a journey just by the shape of a line.

Between 8 am and 12 pm, it travels 200 km. This is 50 km per hour.

Here we see the car stops for one hour. We know this because it stays at 200 km from home between 12 pm and 1 pm. This tells us it's not moving.

Journey of a Car



This car leaves home at 8 am for a holiday.

Between 1 pm and 2 pm, the car travels at 100 km per hour.

1 This travel graph shows the journey of the Henderson family on a driving holiday.

a What time did they leave home?

b How long was their first rest stop?

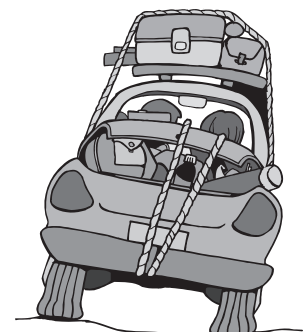
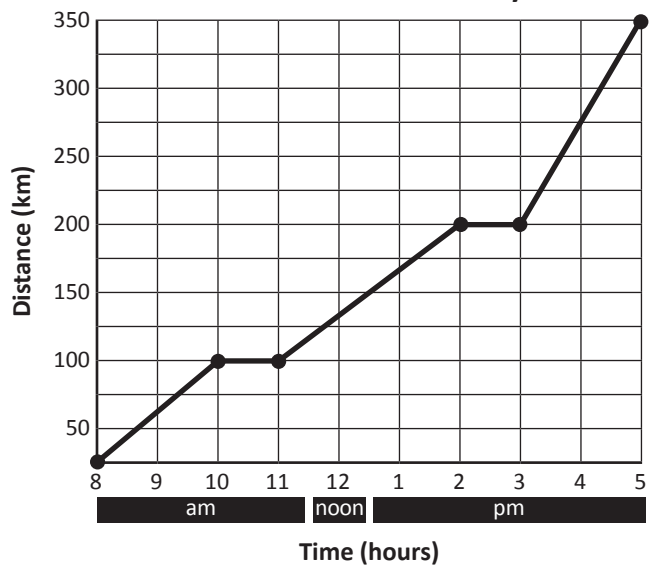
c How far had they travelled by 10 am?

d At what speed were they travelling between 3 pm and 5 pm?

e What could they have been doing at 2.30 pm?

f How long was the journey, excluding rest stops?

The Henderson Holiday

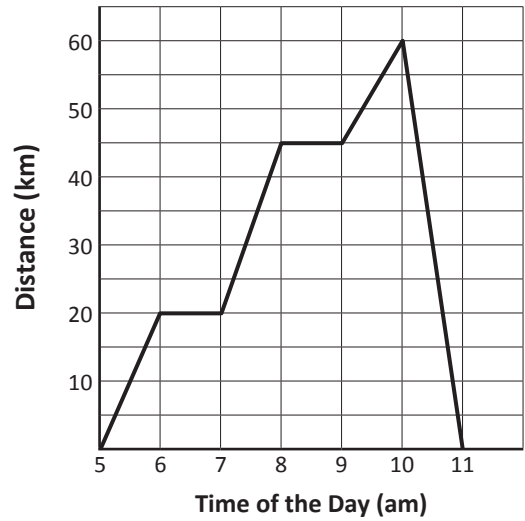


Line graphs – travel graphs

2 Look carefully at this journey of a cyclist and fill in the blanks.

- a I started training at .
- b I met a friend for breakfast at .
- I continued again at .
- c By 8 am I had cycled km.
- d Due to a flat tyre, I had to stop again at .
- e I turned around to cycle all the way home at .
- f I got home at and had a nice long bubble bath.

Julie's Cycling Training

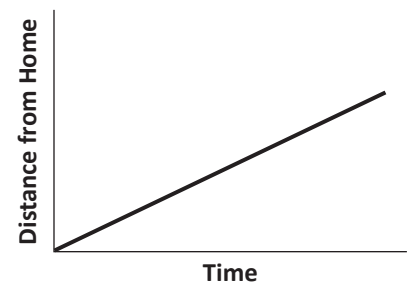
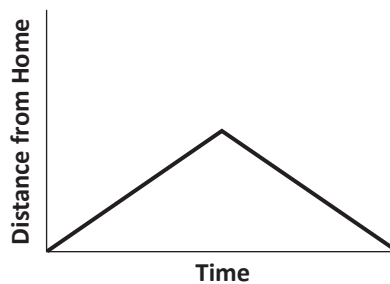
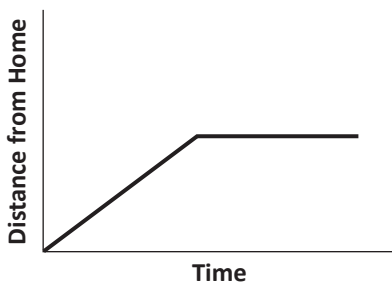


3 Connect each travel graph to the matching statement with a line.

I was on my way to school when I felt sick, so I turned around and went home again.

On the way to the shops we stopped to get petrol.

We travelled at the same speed, not stopping until we got there.



Collecting and analysing data – frequency tables

Raw data is often collected in a frequency table. Tally marks are a quick way to record numbers. When we're finished, we add the marks to find totals:

Car Types in Car Park	Tally	Frequency
4WD		20
Sedan		17
Station wagon		20
Hatchback		14

1 Charlie sold drinks at the beach for an hour each day. He wrote down the drinks he sold each day:

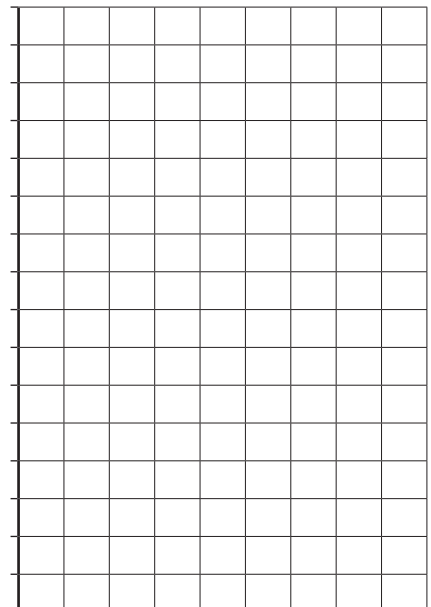
Monday	Coke	Lemonade	Water	Juice			
Tuesday	Juice	Juice	Coke	Coke			
Wednesday	Water	Juice	Juice	Juice	Coke	Lemonade	
Thursday	Water	Water	Water	Coke	Coke	Juice	Lemonade
Friday	Lemonade	Water	Juice	Coke	Coke	Juice	
Saturday	Coke	Coke	Coke	Juice	Juice	Water	Water
Sunday	Lemonade	Lemonade	Coke	Juice	Water	Coke	

- a This is a time-consuming way to record data. Show Charlie how to set up a frequency table to record the same data faster. The first one has been done for you.
- b Represent your data in a bar chart:

Type of Drink	Tally	Frequency
Coke		13
Juice		
Water		
Lemonade		



- Name your graph and both axes
- Label each column
- Select and label an appropriate scale

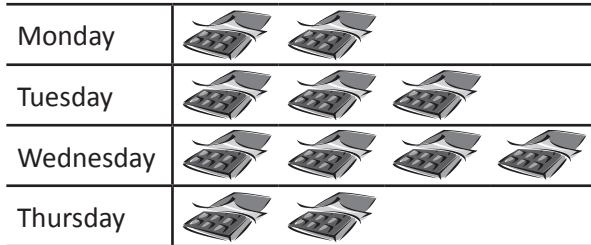


Collecting and analysing data – collecting data

1 Study all the different types of graphs showing sales of chocolate bars. Match each graph to its main feature by completing the table below:

Pictogram

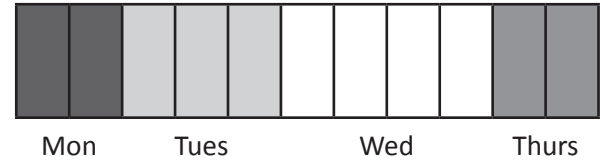
Sales of Chocolate Bars



Key:  = 10 chocolate bars

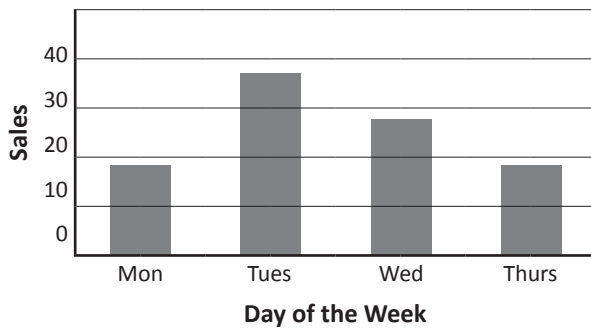
Divided Bar Chart

Sales of Chocolate Bars



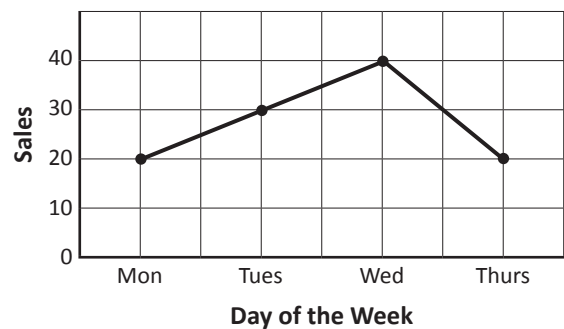
Bar Chart

Sales of Chocolate Bars



Line Graph

Sales of Chocolate Bars



Main Feature	Name of Graph
Shows an exact amount in each category and allows you to compare categories.	
Compares sizes of categories at a glance and takes up very little space.	
Shows numerical data using pictures. Has a key.	
Shows how data changes in relation to something – usually time.	

Collecting and analysing data – collecting data

2 Here are 3 different sets of data. Read over each table of data and decide which is the most appropriate graph to use.

Graph 1

Name	Number of Books
Blair	8
Charlie	4
Amity	5
Nicky	12

Graph 2

Week	Height of Plant
1	2.5 cm
2	3 cm
3	5 cm
4	7.5 cm
5	9 cm
6	9.5 cm

Graph 3

Item	Profit
Hot food	£40
Chips	£30
Drinks	£20
Fruit	£10

Construct the graphs using the templates below. You must work out the scale, label the axes and include a heading for each graph:

- Show how many books each person read over the holidays. It should be clear to see who read the most and who read the least.
- Show how much a plant has grown over 6 weeks. It should be clear to see where the biggest growth spurt was.
- Show what the £100 profit that the canteen made yesterday was made up of.



Getting ready

Many crimes are solved by analysing paperwork. Detectives spend countless hours sifting through data. It can be one tiny fact that breaks a case open.



What to do

Read this next part very carefully. A bank was robbed during the month of May. Since it was the bank with all your savings, you have a vested interest in tracking down the offender.

An informant has told you that the crime was committed on the thief's birthday. They treated themselves to a shopping spree with your money! Apparently they crept in during a busy weekday and quietly cracked a safe.

The next three pages contain data about criminals in your area. Use the information to identify the thief and get your money back. You'll need to flick between graphs and clues to crack the case.

CLUE 1

MAY						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24 31	25	26	27	28	29	30

CLUE 2

Birthdays of Local Criminals

	EG										
	FF		SK	HC					MH		
	NK		EW	PJ		BJ	LM		CW		
DC	MC	BT	FC	BB		EK	DK	LL	RB		SM
J	F	M	A	M	J	J	A	S	O	N	D

More clues on page 19.

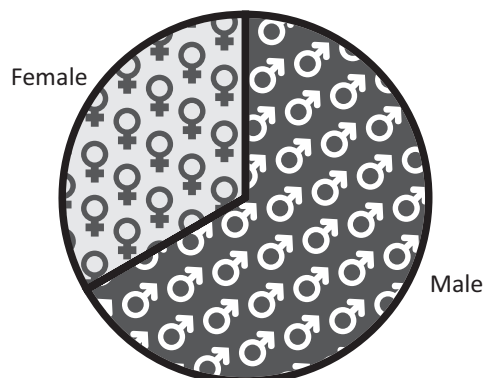
CLUE 3

Birthdates by Gender

Males	Females
04.01.75	11.02.85
23.02.86	14.02.78
17.02.66	03.03.80
02.04.73	13.05.84
04.04.75	07.07.77
24.04.67	17.10.78
10.05.81	31.10.87
23.05.82	
18.07.81	
09.08.67	
18.08.63	
26.09.66	
13.10.72	
24.12.65	

CLUE 4

Gender Breakdown of Local Criminals



CLUE 5

Known Crims

- | | |
|----------------------|-----------------|
| Sam McNab | Earl Wyatt |
| Master Criminal | Frannie Fingers |
| Bobette Trimbole | Emma Getaway |
| Ned Kelly | Shifty Keys |
| Dan Kelly | Betty Balaclava |
| Ellen Kelly | Ron Biggs |
| Pretty-boy Jones | Buster Jones |
| Harry Cracker | Luke Moran |
| Mata Hari | Dan Cuffme |
| Light-fingered Larry | Carla Williams |
| Fred Capone | |

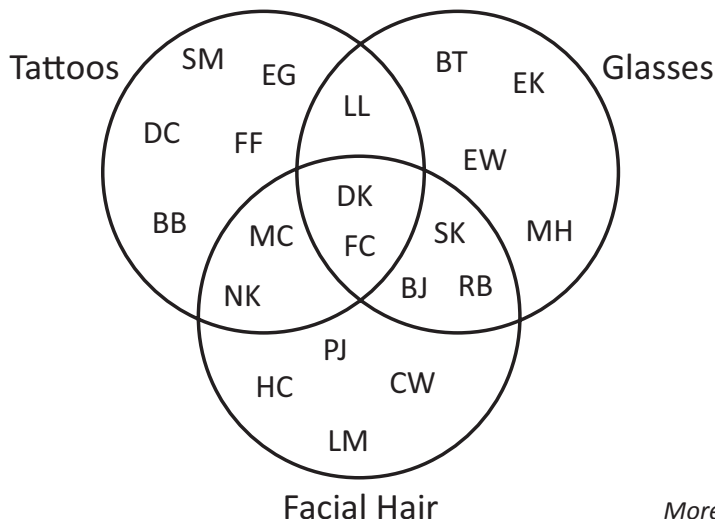
You should know who the criminal is by now!
Use the following data to find out more about them.



DISCOVER

CLUE 6

Distinguishing Features



More clues on page 20.

CLUE 7

Hair Colour

SM	DC	BB	EK	EW	FF	MH	DK	FC	CW	BJ	PJ	HC
BT		LL			RB	MC	NK	LM	SK	EG		

black

blonde

brown

red

CLUE 8

Height of Known Criminals

	CW	PJ		
	BJ	EG	NK	LM
FF	FC	RB	MC	HC
EK	MH	DC	EW	DK
SM	BB	BT	SK	LL

150–59 cm

160–169 cm

170–179 cm

180–189 cm

190–199 cm

Height

Whodunnit? Give a name and a detailed description to the police superintendent:



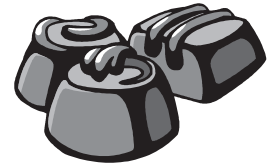
What to do next

Create a WANTED poster for the guilty party.



You work for the chocolate company Cocoa Delights. In less than an hour, you're presenting the annual report to the Board.

They're keen to know yearly sales figures, best selling lines, the breakdown of monthly expenses and how each product sells compared to the others.

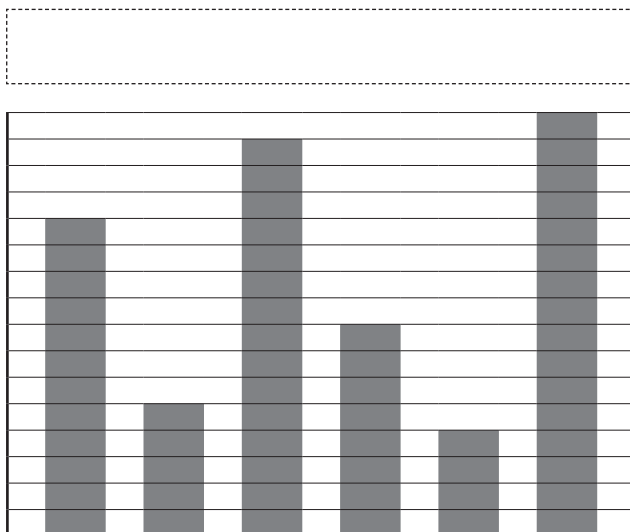
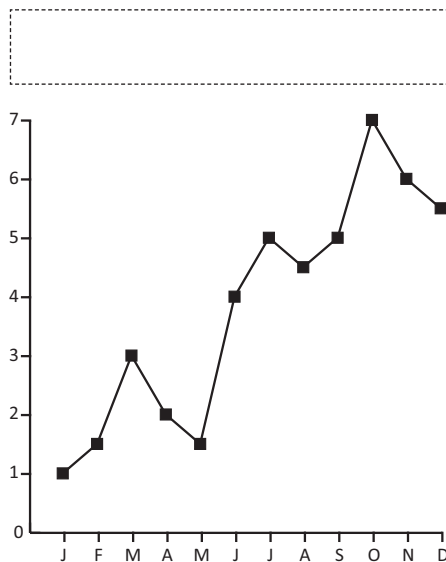


Your team has slaved to prepare the following data. However, someone didn't bother to add titles and labels to the graphs.

You don't have time to hunt for the culprit. You have to fix this yourself. Fast!



Look at the graphs below and come up with some believable information that would give each graph meaning and keep the Board happy. Think about which graph would best suit each set of data. They'll need titles, labels and numbers.



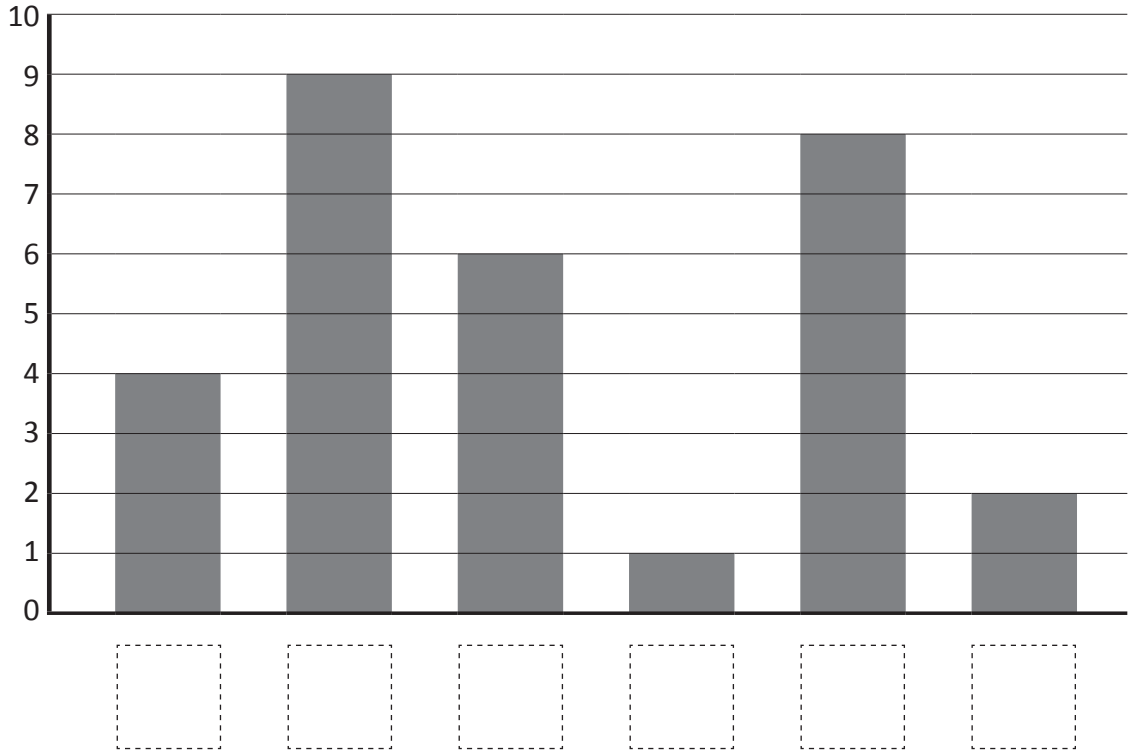
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What to do

Follow the clues to correctly label each column with the appropriate symbol:

5N's Preferred Holiday Activities



Four times as many kids would rather go to the beach than go to an art gallery.



A holiday at Wet 'n' Wild is the most preferred option.



There are 3 times as many shoppers than there are art gallery attenders.



Five fewer people like camping than Wet 'n' Wild.



Half the number of people who like camping prefer to visit art galleries.



Poor Mr N will be hill walking alone it seems. He'll probably get over it.

