How can we use maps?

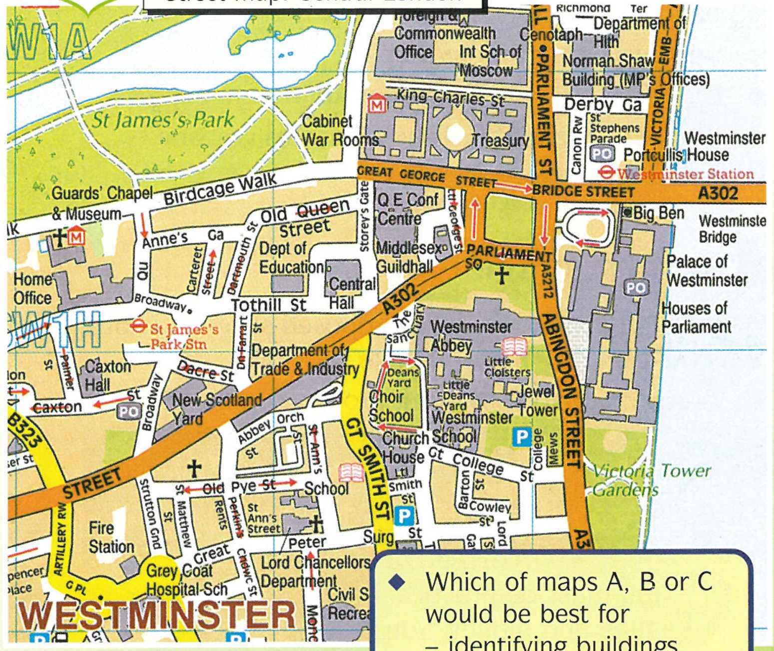
What is this unit about?

The aim of this unit is to help you use, understand and enjoy maps. It will show you how to interpret maps and use them as a source of information. It will also show you how to locate places and find your way about.

In this unit you will learn:

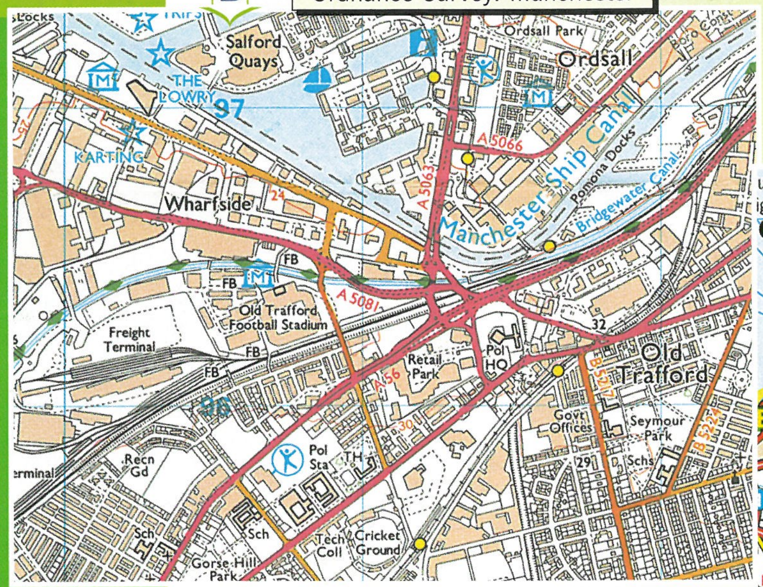
- **how to work out distance and direction**
- **how to use map symbols**
- **how to use four figure and six figure map references**
- **how height and shape of the land are shown on a map**
- **how to plan and follow routes on a map.**

A Street map: Central London



- Which of maps A, B or C would be best for
  - identifying buildings
  - finding your way round a city
  - finding a friend's house
  - getting to a football stadium
  - finding a large park?

B Ordnance Survey: Manchester



C Road atlas: Liverpool

Why is learning map skills useful to us?

Maps are useful to everybody.

- They give information, tell us where places are and help us find our way about.
- They show features and amenities of an area.
- They tell us how steep or flat the land is.
- They can help us find a friend's house or the best way to school, to shops and to a holiday destination.

Learning about maps can also help us to use, and get the best out of satellite and computer mapping systems such as:

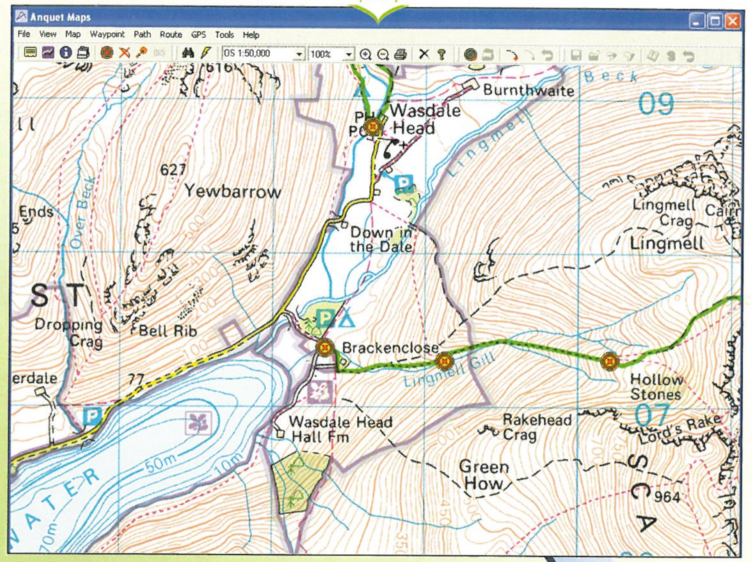
- **Global Positioning Systems (GPS)**
- **satellite navigation (sat-nav)** and
- **Geographic Information Systems (GIS)**.

An example of a computer mapping system that can be linked to a GPS unit is shown in **D**, **E** and **F** below.

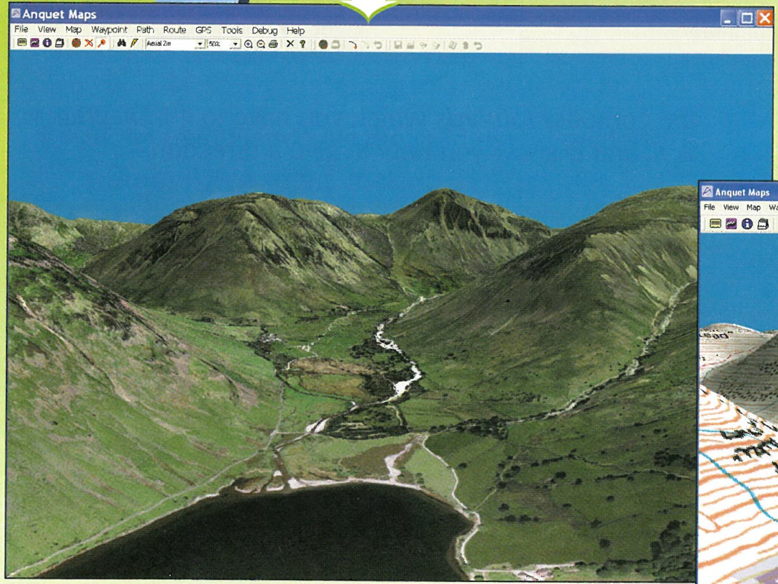
- D, E and F all show the same place. You are going on a walk with friends. Which would be the best
  - for choosing the walk
  - planning the walk
  - finding out how steep or flat it is
  - finding out where you are when on the walk?

  Give reasons for your answers.

D

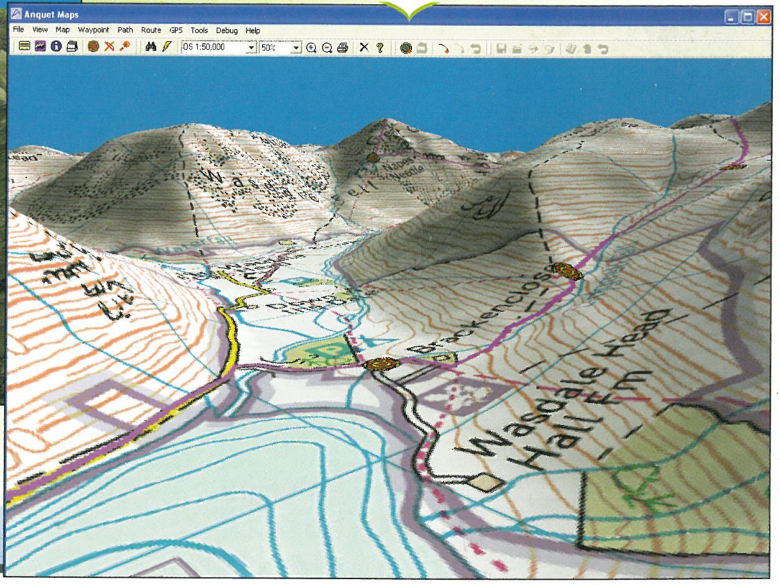


F



The Lake District

E



How can we show direction?

Maps show what things look like from above. They are very useful because they give information and show where places are. There are many different types of map. These include street maps, road maps, **atlas** maps and **Ordnance Survey** (OS) maps.

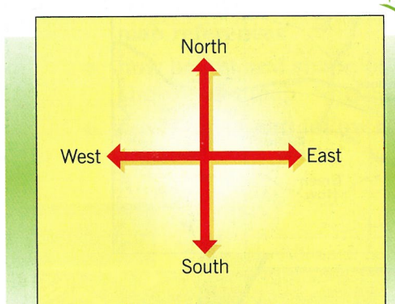
A **plan** is a type of map. Plans give detailed information about small areas. Places like schools, shopping centres, parks and leisure centres are shown on plans.

This section is about **direction**. The best way to show direction is to use the **points of the compass**. There are four main points. These are north, east, south and west. You can remember their order by saying '**N**ever **E**at **S**hredded **W**heat'.

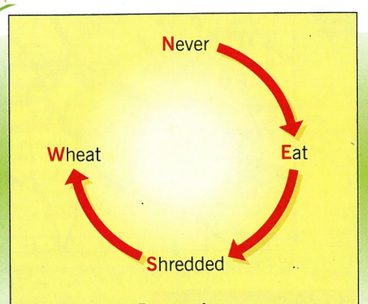
Between these four main points there are four other points. These are north-east, south-east, south-west and north-west.

Most maps have a sign to show the **north** direction. If there is no sign the top edge of the map should be **north**.

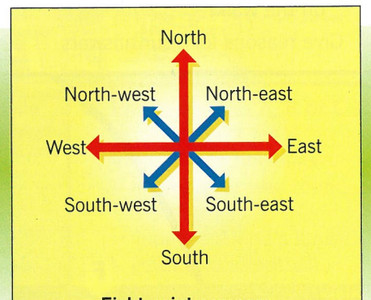
A



Four point compass



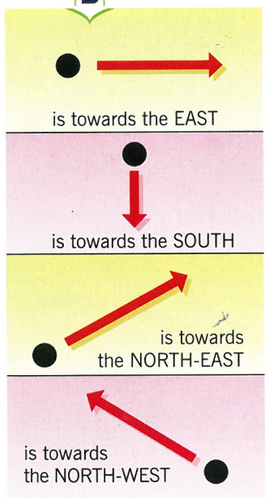
Remember...



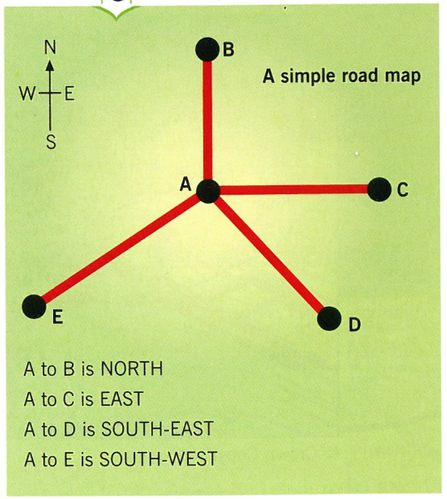
Eight point compass

To give direction for a place you have to say which way you need to go to get there. The direction is the point of the compass *towards* which you have to go. Diagrams **B**, **C** and **D** show you how to give a direction.

B

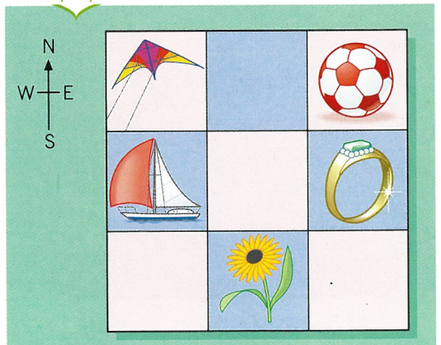


C



A to B is NORTH
A to C is EAST
A to D is SOUTH-EAST
A to E is SOUTH-WEST

D

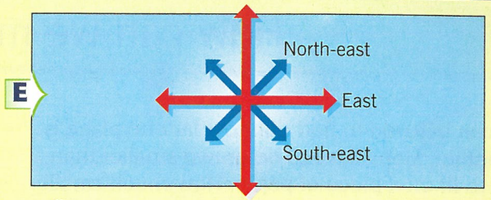


The kite is NORTH of the boat.
The ring is SOUTH of the ball.
The boat is WEST of the ring.
The flower is SOUTH-EAST of the boat.
The ring is NORTH-EAST of the flower.

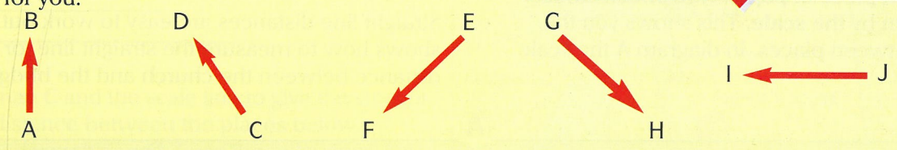
Activities

1 Draw the compass in diagram **E** and label the unmarked points.

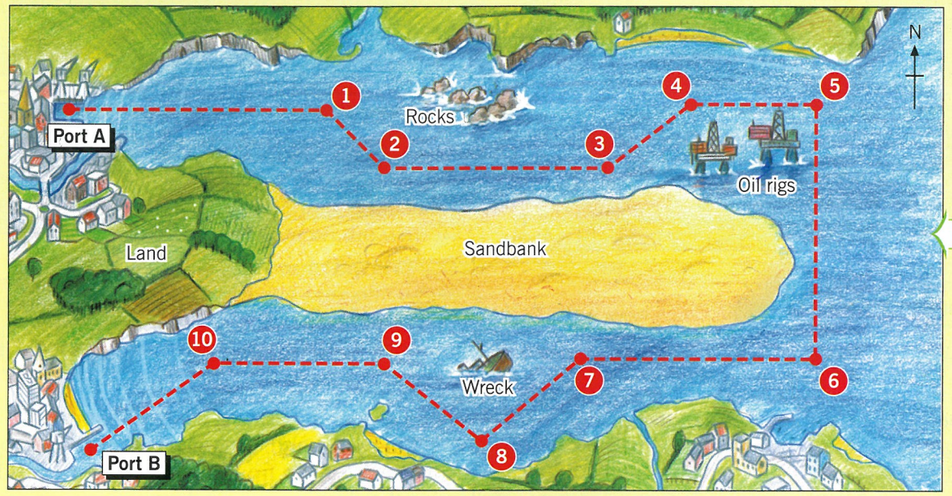
E



2 Copy these drawings and complete the sentences below them. The first one has been done for you.



B is north of **A**
D is . . . of **C**
F is . . . of **E**
H is . . . of **G**
I is . . . of **J**



F

3 Study map **F** and give the following directions:

- **a** from Port A to the rocks
- **b** from the wreck to the oil rigs
- **c** from the oil rigs to the rocks
- **d** from the wreck to Port A
- **e** from the rocks to the wreck.

4 **a** A ship has landed its cargo at Port A. It must go to Port B to reload. The course the ship must follow is shown by the dotted line on the map. Give the Captain compass directions to follow between each numbered point. Start like this: *Leave Port A. Go east to point 1. Go south-east ...*

b Imagine that the sandbank has been cleared to make ship movement easier. Work out the best course from Port B to Port A. Give compass directions to follow that course.

EXTRA

You will need to use the Ordnance Survey map of the Cambridge area for this question. It is on the inside back cover.

Look at the villages near the bottom of the map. Give the following directions:

- **a** from Foxton to Whittlesford
- **b** from Foxton to Newton
- **c** from Great Shelford to Whittlesford
- **d** from Great Shelford to Haslingfield
- **e** from Haslingfield to Harston.

Summary

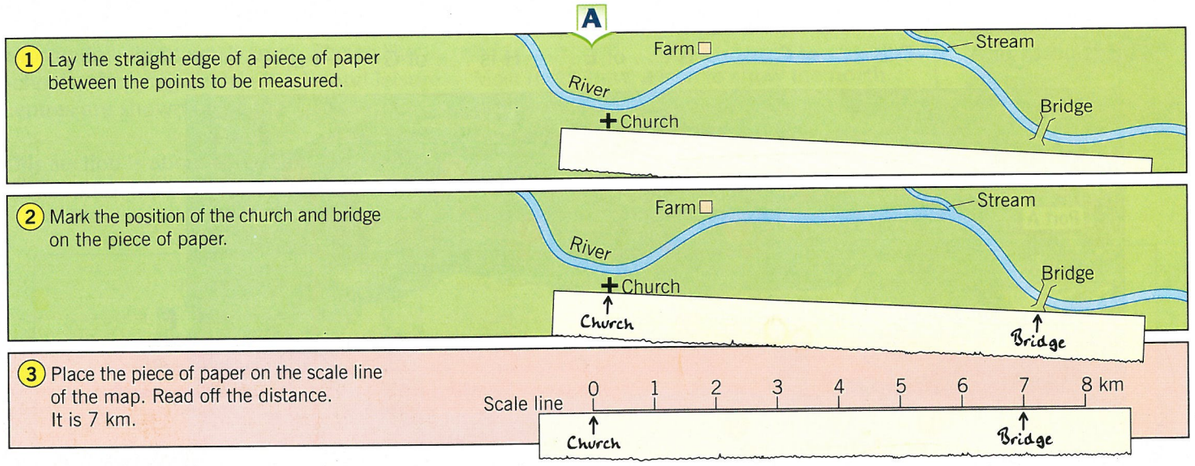
Maps are a good way of giving information and showing where places are. Direction can be described by using the points of the compass.

How can we measure distance?

A map can be used to find out how far one place is from another. Maps have to be drawn smaller than real life to fit on a piece of paper. How much smaller they are is shown by the **scale**. This shows you the **real** distance between places. In diagram **A** the scale line shows that 1 cm on the map is the same as 1 km on the ground. Every map should have a **scale line**.

Straight line distances are easy to work out. Diagram **A** shows how to measure the straight line, or shortest, distance between the church and the bridge.

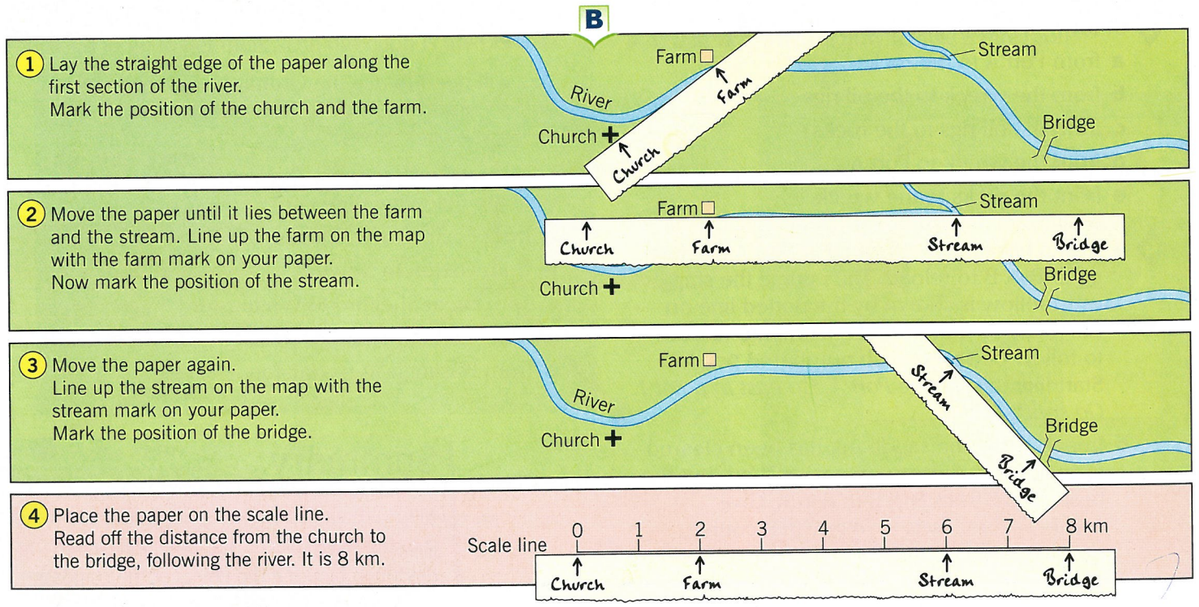
A



The same method can be used to work out distances that are not straight lines. To measure these, divide the route into a number of sections and measure each one.

This can be done by using a piece of paper and turning it at each bend. Diagram **B** shows how to measure the distance from the church to the bridge, following the river.

B



Activities

1 Use the scale line from map **C** to give the lengths of these lines. Answer like this:

Line **a** is ... metres (m) in length.

a _____

b _____

c _____

d _____

2 Use map **C** and the scale line to give the straight line distance between the places below. Choose your answers from the following:

40 m | 80 m | 100 m | 120 m

a Kate's house and the school

b Joanne's house and the post office

c Tim's house and the post office

d John's house and the garage

3 **a** Give the distance Joanne has to travel to school if she calls on Kate on the way.

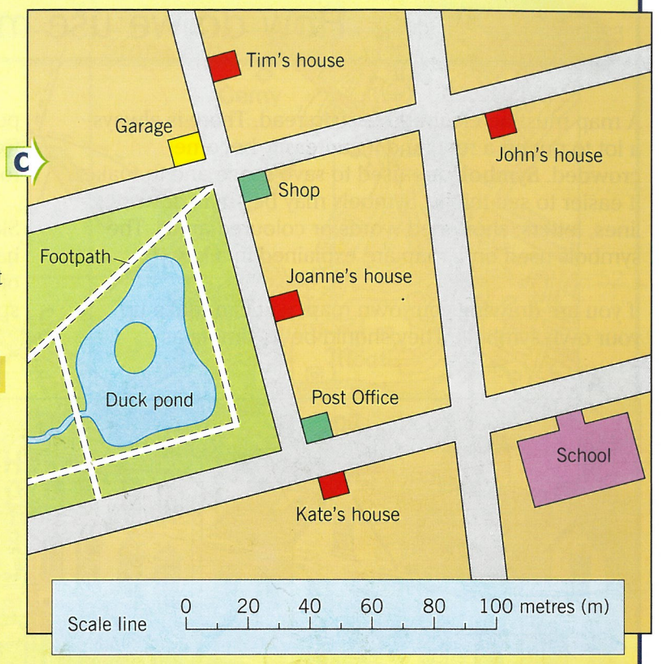
b Give the distance John has to travel to school if he calls at the shop and post office first.

4 What is the distance around the duck pond if you walk on the footpath? Give your answer in metres (m).

5 You have been given a map and some instructions to help you find some hidden treasure. Follow the instructions to find out where it is.

Check the exact spot by sorting out the jumbled words in the treasure chest and choosing the correct answer.

C



D

Summary

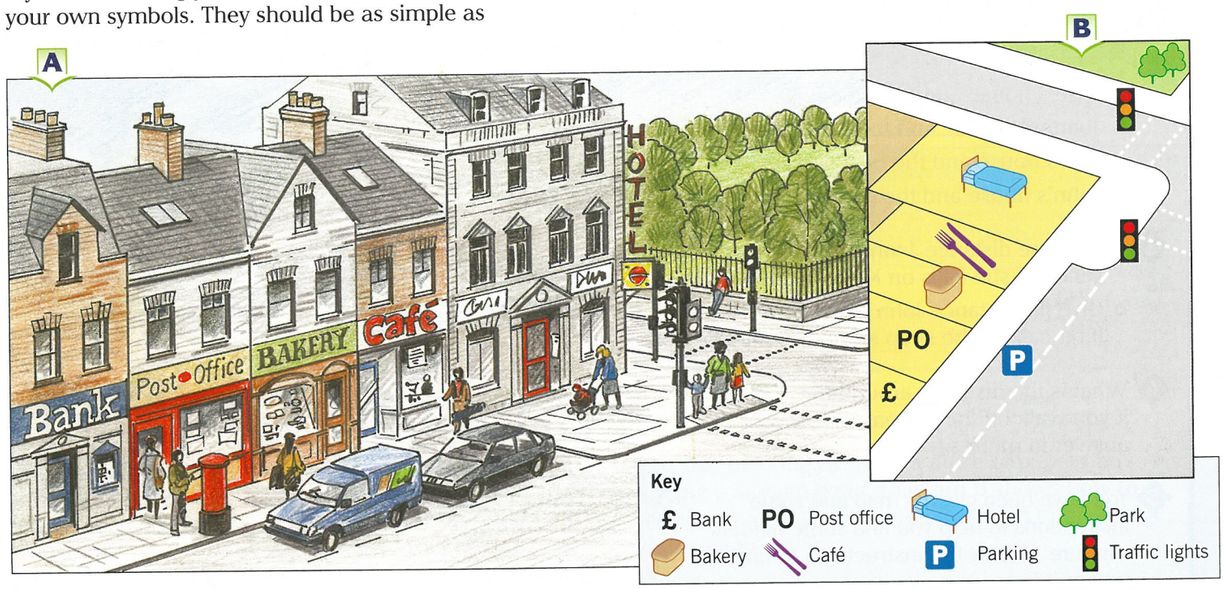
Distances on a map can be measured using the scale line. The scale line gives the real distance between places on the map.

How do we use map symbols?

A map must be clear and easy to read. There is always a lot to put on a map and it can easily become crowded. **Symbols** are used to save space and to make it easier to see things. Symbols may be small drawings, lines, letters, shortened words or coloured areas. The symbols used on a map are explained in a **key**.

If you are drawing your own map, you can make up your own symbols. They should be as simple as possible and look something like the feature they stand for. How would you show a postbox, a library or a football ground?

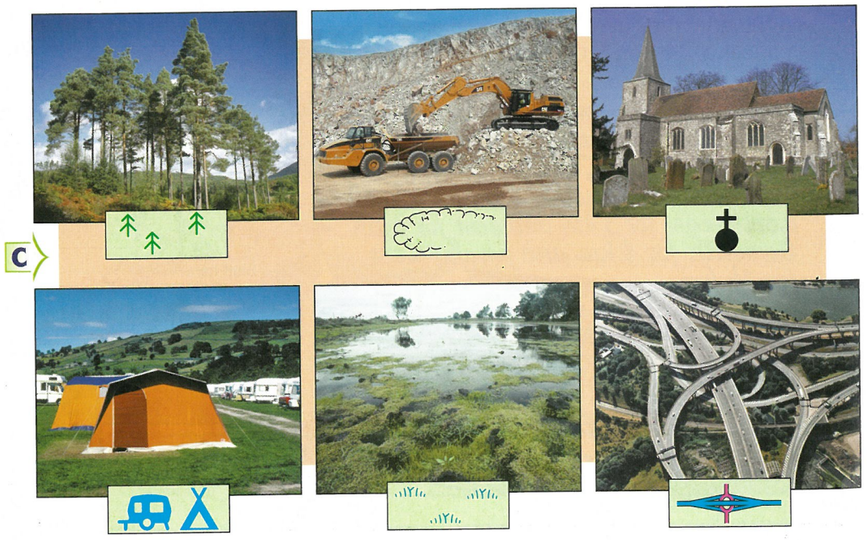
Sketch **A** and map **B** show the same street. The map has simplified the street scene. Only the main features of the street are shown and symbols are used to save space. The symbols are explained in the key.



The **Ordnance Survey** (OS) is responsible for mapping Britain. The OS produces very accurate maps that have a lot of information on them.

There is an Ordnance Survey map of the Cambridge area on the inside back cover of this book. The symbols used on that map are also shown on the inside back cover.

Look at the photos in **C**. They show some of the symbols used on Ordnance Survey maps. Which symbols could you work out without the answers being given?



Activities

1 Look at map **D**. It is part of the Ordnance Survey map of the Cambridge area on the inside back cover. It has been enlarged to make it easier to read. The scale has changed so the 4 cm on the map equals 1 km on the ground.

a Make a copy of table **E** below.

b Draw the symbols from map **D** in the correct columns of your table.

c Say what each symbol shows. You will need to use the key on the inside back cover. Some have been done for you.

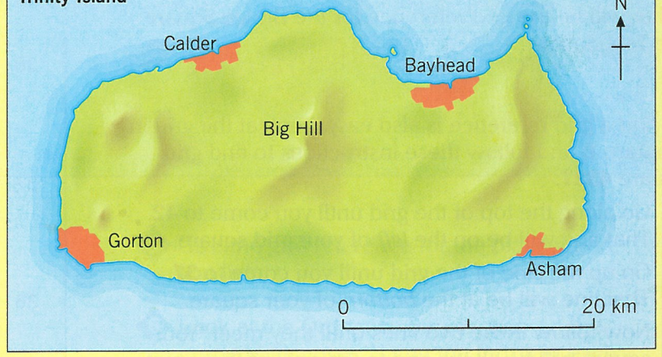
E

Drawings	Lines	Abbreviations (letters/shortened words)	Coloured areas
= Embankment	= Contour	Cemy = Cemetery	= Buildings

2 Make a larger copy of map **F**. It should be at least half a page in size. Using the Ordnance Survey symbols from the inside back cover, draw on the map the following information.

- There is a main road between Gorton and Bayhead, and a second class road between Bayhead and Asham. A minor road joins Asham and Gorton and goes on to Calder.
- A railway line runs from Asham to Gorton, to Calder and on to Bayhead. The station at Calder is closed but the others are open.
- Gorton has a church with a spire and a chapel. Bayhead has a church with a tower and a post office. Asham has a telephone box and a youth hostel.
- The spot height at Big Hill is 312 metres high. The land south of Big Hill is marshy.
- The River Bee rises to the north of Big Hill and flows into the sea at Calder. (Remember to use bridges.)
- There is a wood on the east coast.

F



3 Draw a map of an island of your own. Use at least **15** different symbols. Name your towns, villages and other main features. Give your map a title.

Summary

Symbols are simple drawings that show things on maps. All maps have a key to explain the symbols.

What are grid references?

Maps can be quite complicated and it may be difficult to find things on them. To make places easier to find, a grid of squares may be drawn on the map. If the lines making up the grid are numbered, the exact position of a square can be given.

On Ordnance Survey maps these lines are shown in blue and each has its own special number. The blue lines form **grid squares**. **Grid references** are the numbers which give the position of a grid square. On these two pages you will learn about **four figure grid references**.

To *give* a grid reference is simple. Look at the grid in diagram **A** and follow these instructions to give the reference for the yellow square.

- Give the number of the line on the *left* of the yellow square – it is **04**.
- Give the number of the line at the *bottom* of the yellow square – it is **12**.
- Put the numbers together and you have a four figure grid reference. It is **0412**.

In the same way, the Picnic Square has a reference of 0313 and the Church Square is 0512.

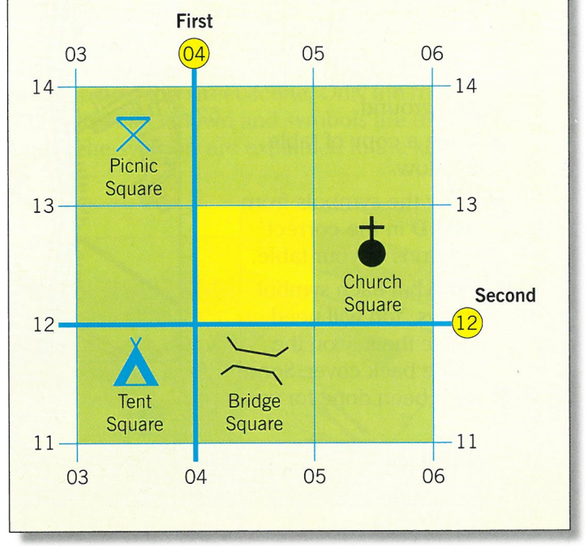
What will be the grid reference for the Bridge Square the Tent Square?

To *find* a grid reference is also easy. Look at the grid in diagram **B** and follow these instructions to find grid square **4327**.

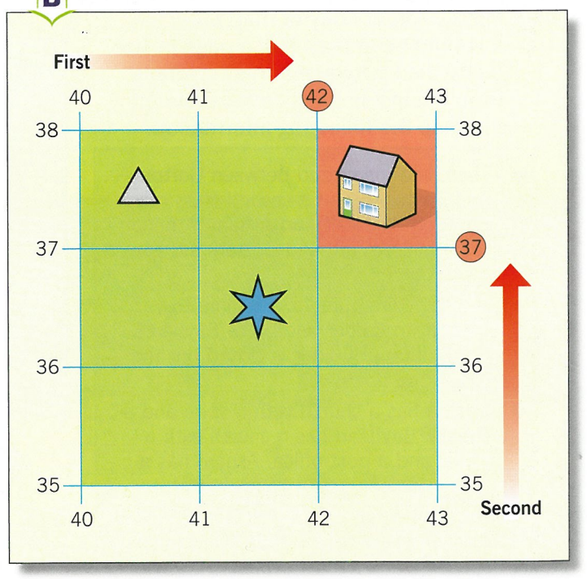
- Go along the top of the grid until you come to **42**. That line will be on the *left* of your grid square.
- Go up the side of the grid until you come to **37**. That line will be at the *bottom* of your square.
- Now follow those two lines until they meet. Your square will be above and to the right of that point. There is a house in it.

What is in squares 4136 and 4037?

A



B



Activities

Look at map **C** of the British Isles. It shows some of the main towns, mountain areas and the three longest rivers. Use the map to answer the questions below.

✔ Remember

✔ The line on the left comes first.

✔ The line at the bottom comes second.

It may help you to remember if you say '**Along** the corridor and **up** the stairs'.

C

1 Name the towns in each of the grid squares given below. Choose your answers from this list:

Belfast Manchester Glasgow Bristol

a 0202 **b** 0104
c 0200 **d** 0003.

2 Name the mountain areas in each of the following grid squares:

a 0104 **b** 0103 **c** 0202.

3 **a** Which rivers flow through grid square 0201?
b Which river reaches the sea in grid square 0201?

4 Give the grid references for these places:

a Dublin
b Newcastle upon Tyne
c London
d The Irish Sea.

5 Give the grid reference for the place where you live.

6 Look at the Ordnance Survey map on the inside back cover. Name the farms in each of the following grid squares (the symbol for farm is Fm).

a 4149 **b** 4156 **c** 4456
d 4650 **e** 4257.

Summary

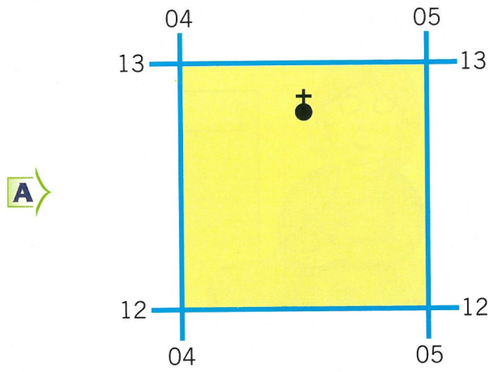
Grid references can be used to help describe the location of a place on a map.

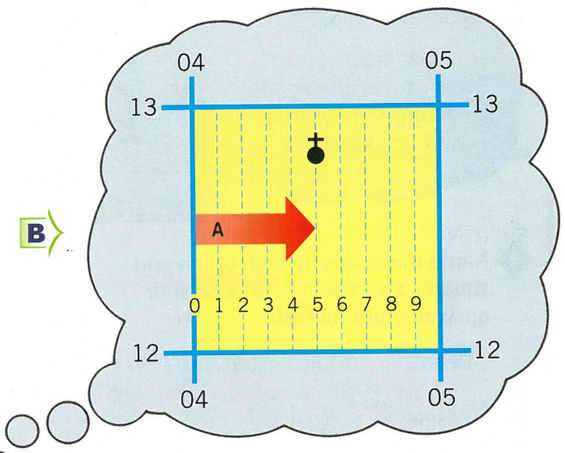
How do we use six figure grid references?

Grid references are very useful in helping us to find places on maps. A four figure reference on an Ordnance Survey map equals an area on the ground of one square kilometre. This is quite a large area. To be more accurate we need to use a **six figure grid reference**. This pinpoints a place exactly to within 100 metres.

Look at the grid in diagram **A**. The six figure grid reference for the church is 045128. Follow these instructions and look at diagrams **B** and **C** to see how that reference is worked out.

- Give the number of the line on the *left* of the yellow square – it is **04**.
- In your head divide the square into tenths as shown in the grid in diagram **B**. Follow arrow **A** across the square. The church is about halfway across from the left. That puts it on the five-tenths line. Write down **5** after your number 04.
- You now have the first half of your six figure reference – **045**.

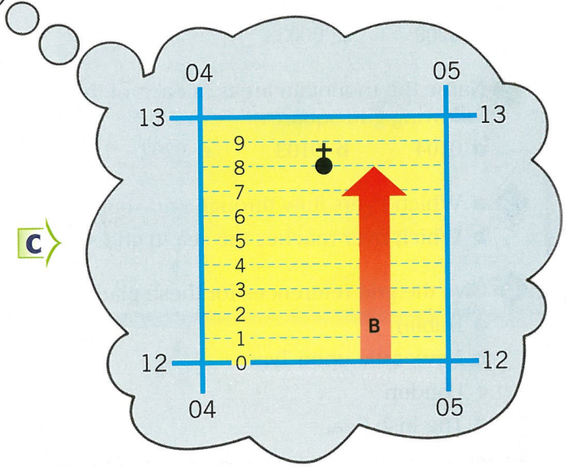




✔ Remember

- ✔ The numbers along the **bottom** come first.
- ✔ The numbers on the **left** come second.
- ✔ There must always be six figures.

- Now give the number of the line at the *bottom* of the yellow square – it is **12**.
- In your head divide the square into tenths as shown in the grid in diagram **C**. Follow arrow **B**. The church is over halfway up from the bottom. That puts it on the eight-tenths line. Write down **8** after your number 12.
- You now have the second half of your six figure reference – it is **128**.
- Put the two halves together and you have **045128**.



Activities

Look at map **D**. The 'tenths' lines have been added to help you with activities **1**, **2** and **3**. Check your references ...

- The village of Eldon is in grid square 1623.
- The Mill is at reference 166256.
- Dingle Farm is at reference 170238.

1 Copy and complete the sentences below. Use the correct answer from the brackets.

a At 168245 there is a (church, post office, farm).

b At 165257 there is a (telephone, school, bridge).

c At 175233 there is a (farm, lake, level crossing).

d At 177244 there is a (station, wood, roundabout).

2 Give the six figure grid reference for each of the following:

a Eldon post office

b Causey railway station

c Padley school

d Burr Wood picnic site.

3 **a** Follow these directions for a pleasant walk:

> Start at 170238. Walk down to 173237. Turn left and go to 177244. Go along the road to 171248. Follow the path to 178257. Turn left and finish your walk when the path reaches the road.

b Name the place where you finished your walk. Give its six figure grid reference.

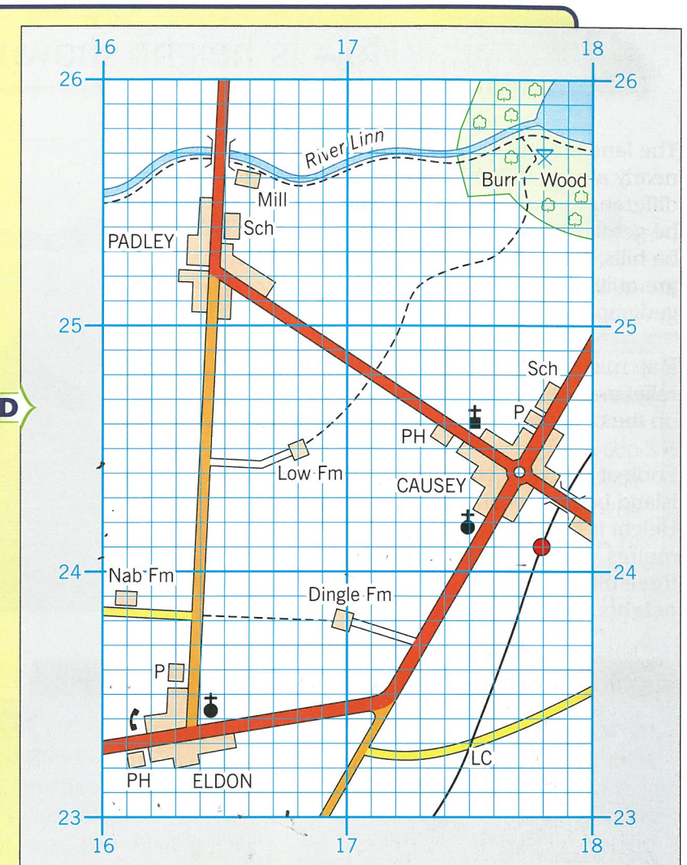
c Where would you have stopped for lunch?

d How many churches did you pass on the way? Give their six figure grid references.

4 You will need to use the Ordnance Survey map of the Cambridge area for this question. It is on the inside back cover.

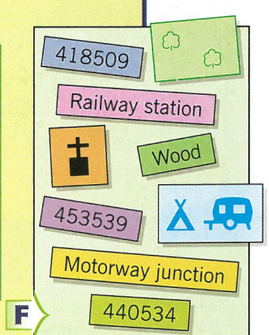
a Make a copy of table **E**.

b Use the map to complete table **E**. The missing symbols, meanings and references are given in diagram **F**.



E

Symbol	Meaning	Six figure grid reference
		465523
		488505
	Church with tower	
	Camp/ caravan site	



Summary

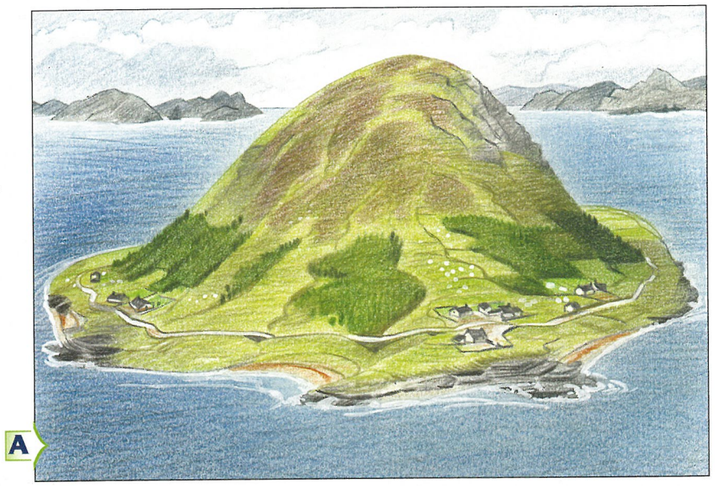
Six figure grid references can be used to give the exact position of a place on a map.

How is height shown on a map?

The land around us is seldom flat. There are nearly always differences in height and differences in slope. Sometimes slopes may be gentle and at other times steep. There may be hills, mountains and valleys or areas that are quite level. The word **relief** is used by geographers to describe the shape of the land.

Map makers have to find ways of showing relief and height. How they do this is shown on the next four pages.

Look at sketch **A**. How can height on the island be shown on a flat piece of paper? Height is usually measured from sea level in metres. This can then be shown on a map in three different ways. These are by using **spot heights, layer colouring** and **contours**.

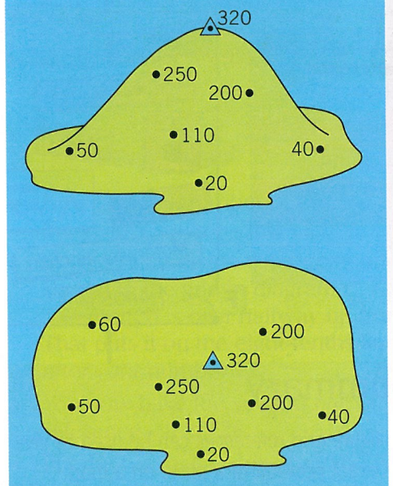


A

Spot heights

B

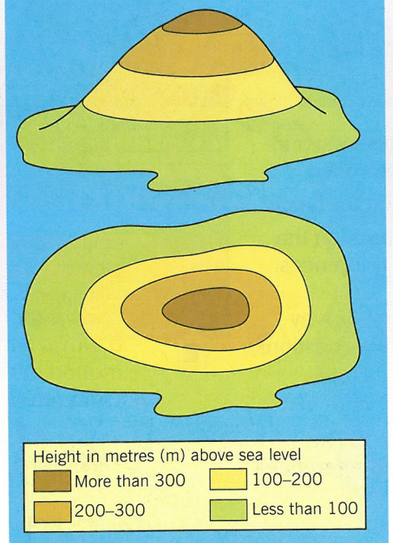
These give the exact height of a point on the map. They are shown as a black dot and each one has a number next to it. The number gives the height in metres. A **triangulation pillar** is also used to show height. These are drawn as a dot inside a blue triangle on the map.



Layer colouring

C

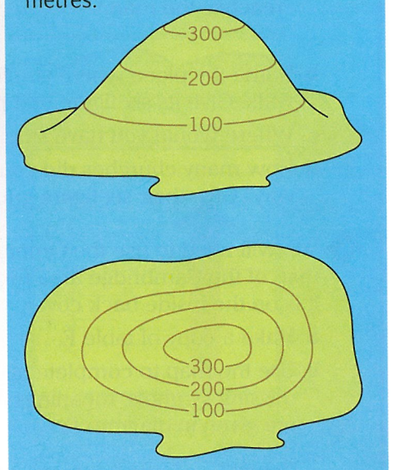
This can also be called **layer shading**. Areas of different heights are shown by bands of different colours. Brown is usually used for high ground, and green for low ground. There always needs to be a key. Layer colouring is used in atlases to show height.



Contours

D

Contours are lines drawn on a map. They join places which have the same height. They are usually coloured brown. Most contours have their height marked on them but you may have to trace your finger along the line to find it. Sometimes you will have to go to the contour above or below to get the height. Heights are given in metres.



Activities

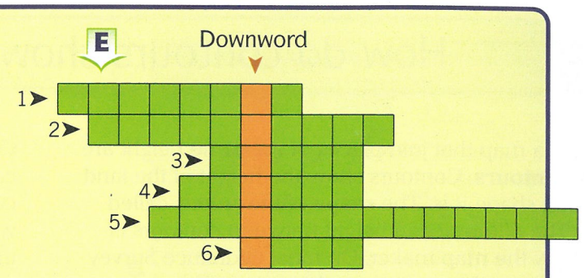
1 **a** Copy out and complete crossword **E** using the clues below.

b When you have finished, give the meaning of the downword in the orange squares.

Clues

1 Lines that join places of the same height.
2 Height at one place.
3 This can be gentle or steep.
4 Measured from sea level.
5 Colouring to show height.
6 A level area with no slope.

E



2 Look at map **F** of England and Wales. The map uses layer colouring to show height. The letters mark land at different heights.

a Which letters mark lowland areas under 100 metres?

b Which letters mark land between 100 and 500 metres?

c Which letters mark land above 500 metres?

3 Use map **F** to answer these questions.

a The highest mountain in England is Scafell Pike and the highest mountain in Wales is Snowdon. What colour are they shaded?

b The Pennines are an area of high land in the centre of northern England. How high are they?

c The Cotswolds and Chilterns are hills in the south of England. What height are they?

d What height is the area where you live?

F

EXTRA

Look at the Ordnance Survey map on the inside back cover.

1 Give the heights above sea level of the following:

a the contours in grid squares 4852 and 4450

b the spot heights in grid squares 4151 and 4754

c the triangulation pillar in grid square 4051.

2 Look at Rowley's Hill in grid square 4249. Draw the pattern of contours and the triangulation pillar. Write in any heights that are given.

Summary

There are three main methods of showing height on maps. These are spot heights, layer colouring and contours.

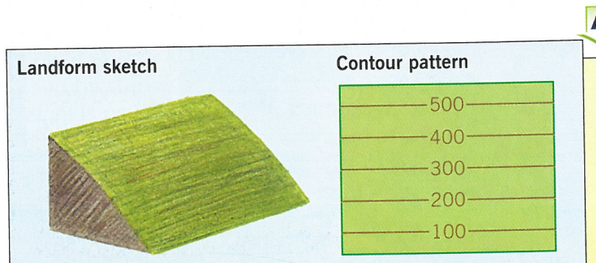
How do contours show height and relief?

Lines on a map that join places of the same height are called **contours**. Contours show the height of the land and what shape it is. The shape of the land is called **relief**. The difference in height between contours is chosen by the map maker. On most Ordnance Survey maps they are drawn at every 10 metres. This difference in height is called the **contour interval**. Several contours together make up a pattern. By looking carefully at these patterns you can work out how steep the slopes are and what shape the land is.

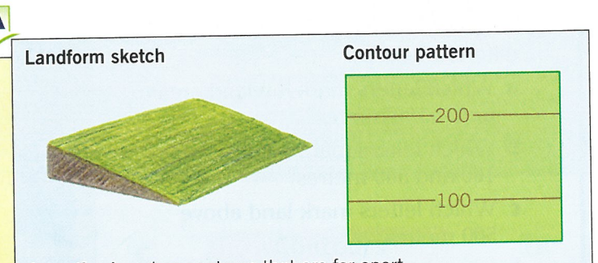
Contour lines are drawn on maps by map makers. You cannot see them on the ground. In diagram **A** the contours have been drawn on the main sketch. You will see that they make up different patterns. An important thing to remember is that:

- *the closer the contour lines are together, the steeper the slope will be.*

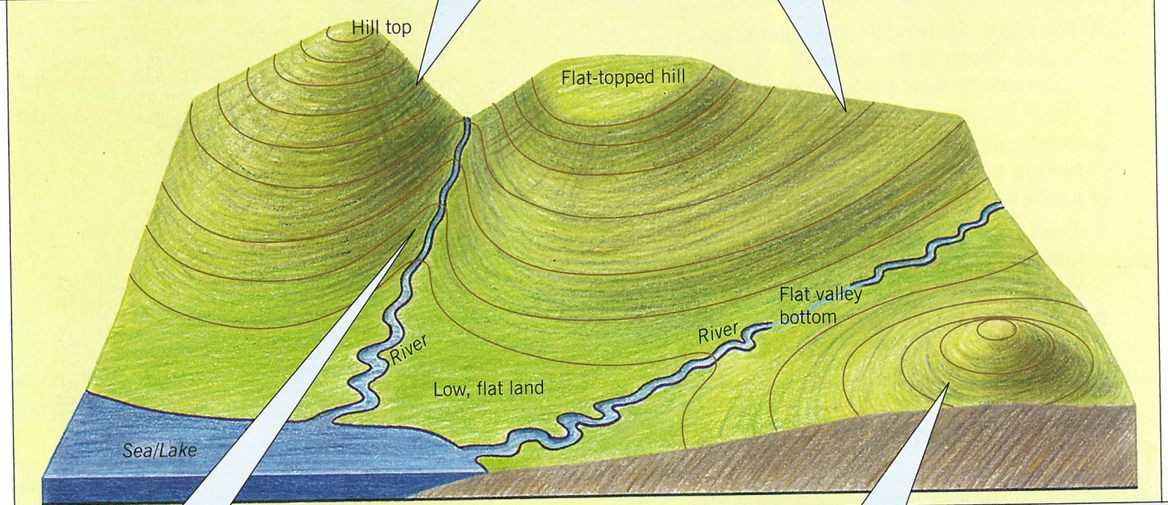
A

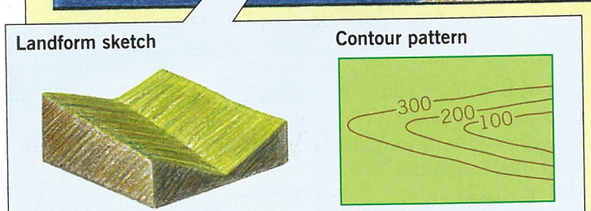


A **steep slope** has contours that are close together.

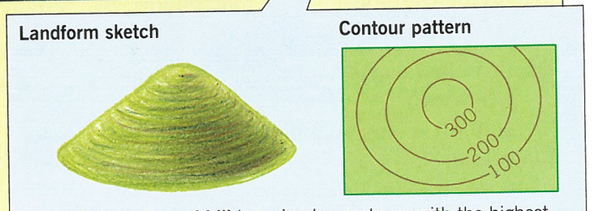


A **gentle slope** has contours that are far apart.





A **valley** has contours drawn in a V-shape. The arrow of the V points up the valley.



A **round cone-shaped hill** has circular contours with the highest one at the centre.

Activities

1 From map **B** give the heights of the following places. Choose your answers from those in the brackets.

- **a** The highest point is (22, 48, 52, 40, 60) metres.
- **b** Place **E** is (8, 42, 30, 20, 16) metres.
- **c** Place **B** is (30, 20, 26, 46, 34) metres.
- **d** Place **A** is (15, 10, 34, 6, 21) metres.
- **e** Place **D** is (28, 10, 12, 22, 8) metres.

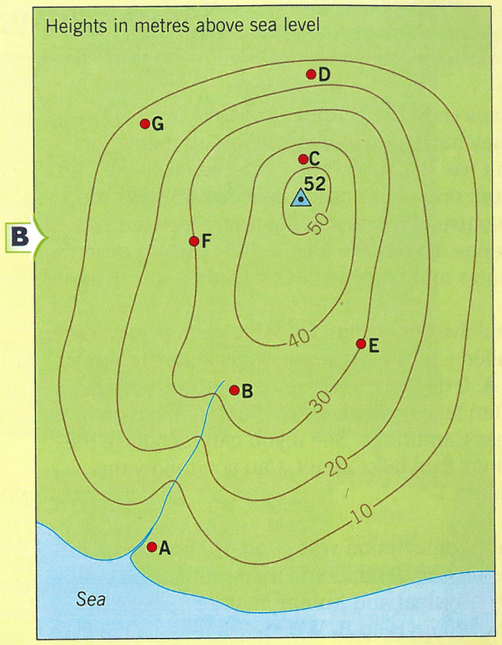
2 Look at map **B** and say if the following statements are TRUE or FALSE.

- **a** **E** and **F** are at the same height.
- **b** **D** is higher than **F**.
- **c** **B** is higher than **E** but lower than **C**.
- **d** **A** is the lowest place marked with a letter.
- **e** **D** to **C** is steeper than **A** to **B**.

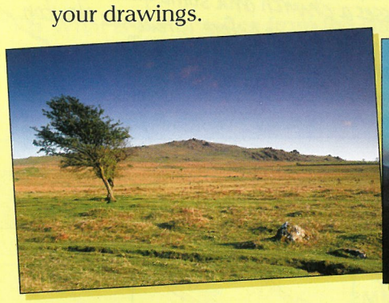
3 The photos in **C** show some landscape features.

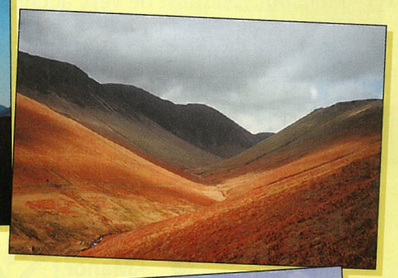
- **a** Draw a simple contour pattern for each of the photos.
- **b** Write a description of the feature next to each of your drawings.

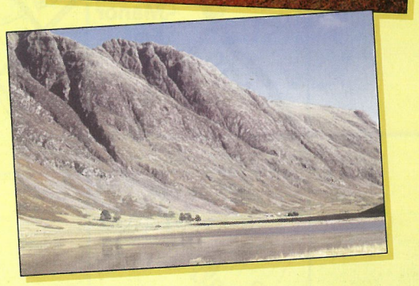
B



C



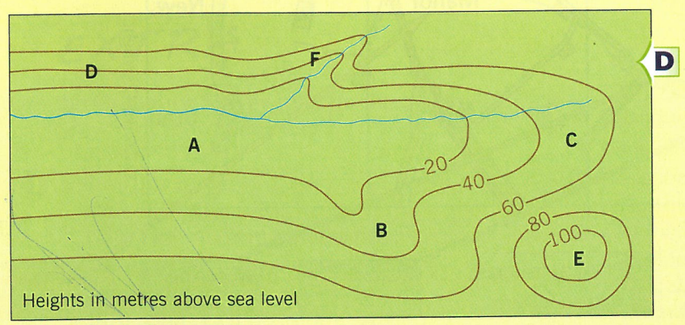




4 Look at the six letters on map **D**. Match the letters to each of the following:

1 A gentle slope
2 A steep slope
3 A hill top
4 A flat valley floor
5 A valley with a stream
6 A valley without a stream.

D



Summary

Contour lines are a good way of showing height and relief on a map. Contours that are close together show steep slopes. Contours that are far apart show gentle slopes.

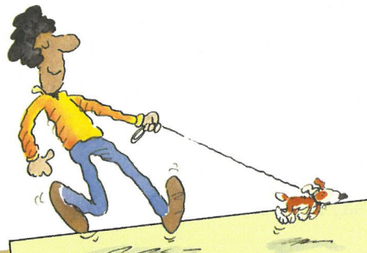
How can we describe routes?

Maps show what things look like from above. They have a lot of information on them. You can use this to describe where places are and work out what may be seen there. Maps are also useful for describing routes between places. These two pages show how to describe routes and places from Ordnance Survey maps.

Paul lives in Foxton. He writes letters to a friend called Chris. Part of one of his letters is shown in **A**. It describes where he lives and a walk he often takes. Map **B** shows the area, which is near Cambridge. See if you can recognise the things Paul talks about. Can you follow the route?

Paul's description was good. He first described the area in general and then mentioned both the **physical** and **human** features. These are labelled on map **B**. When describing a place or a route, there is no need to try to include everything, but you must be very accurate.

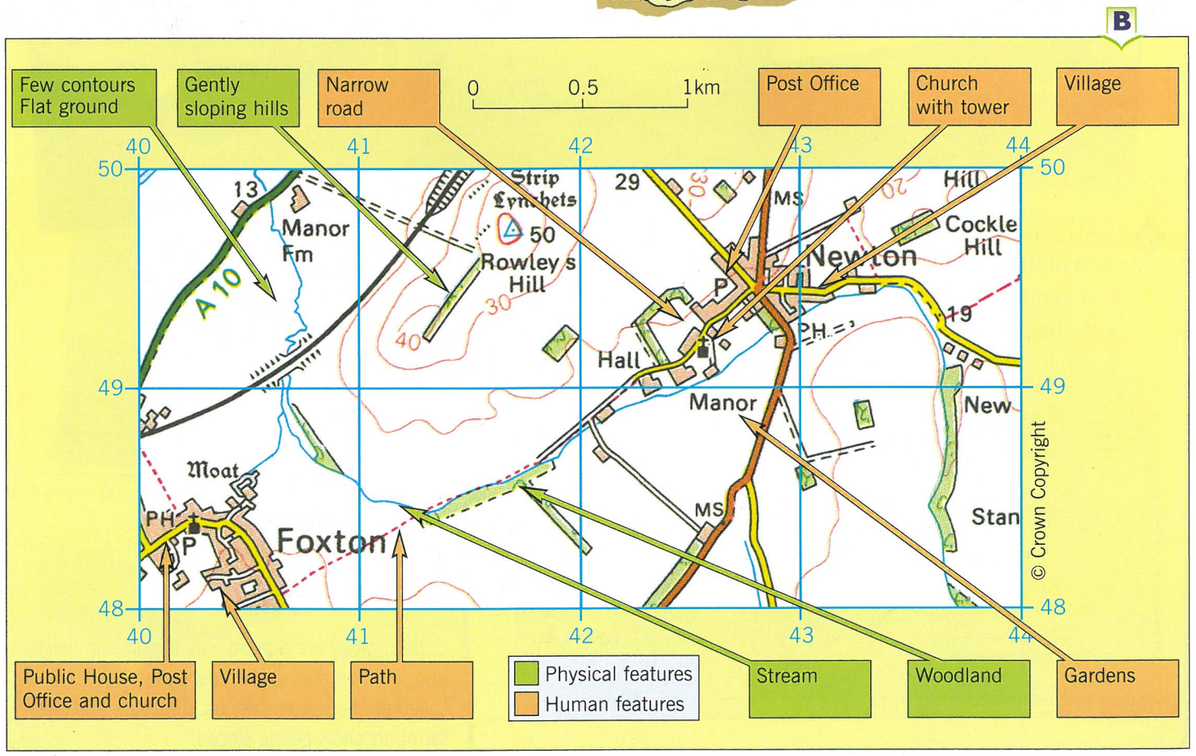
A



Rose Cottage
Foxton

Dear Chris,
I live in the small village of Foxton. It has a church, Post Office and Public House. The area around here is open countryside and mainly flat. I often take my dog for a walk across to Newton which is 2½ km away. We follow a path across fields until we reach a stream and some trees. Rowley's Hill is to the north. It is 50m high and gently sloping. We then follow the stream and trees until the path becomes a narrow road. The road passes a church and some gardens belonging to the Manor before it reaches Newton. My walk usually ends at the Post Office.

B



Activities

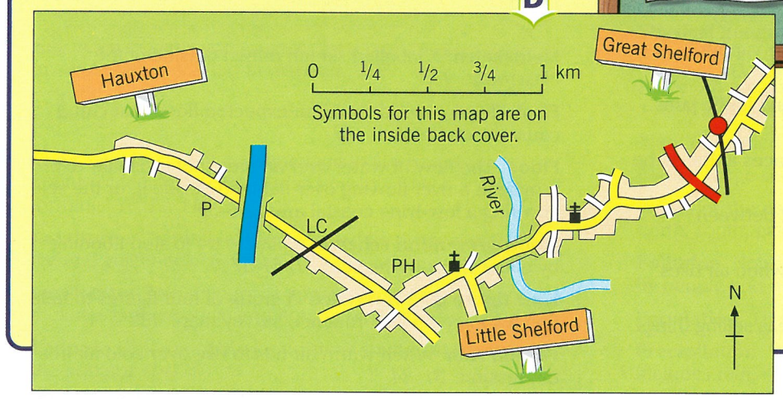
1 Look carefully at photo **C**.
- **a** List **three** physical features and **three** human features on it.
- **b** Write a brief description of the town.

2 Look at Newton on map **B**.
- **a** List the physical features and human features in and around the village.
- **b** Imagine that you own a cottage in the village that you want to rent out. Write a brief description of the village and surrounding area to advertise the cottage.

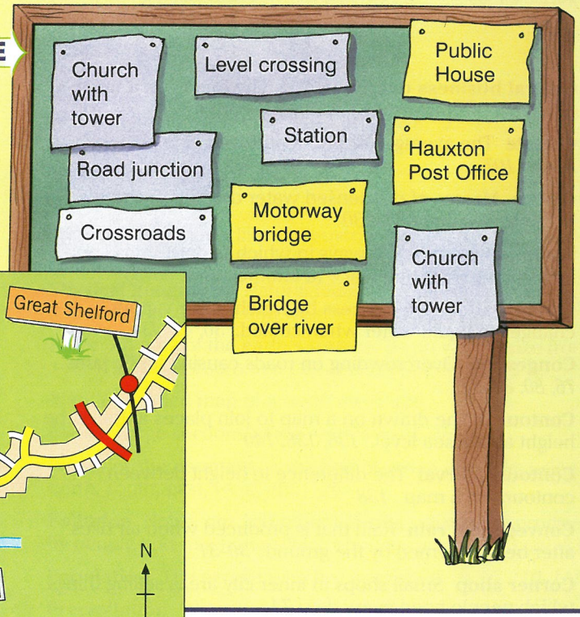
3 Map **D** shows part of the area covered by the OS map on the inside back cover.
- **a** Imagine that you have arrived by train at Great Shelford station and have to go to Hauxton post office. Some of the features that you will pass on your route are shown in diagram **E**. Write out the features in the order you would pass them. Begin with the station.
- **b** What is the distance from the station to the post office? Give your answer in kilometres.

C

D



E



EXTRA

Use the Ordnance Survey map on the inside back cover for these questions.

1 Follow this route:
Start at Barton (4055).
Go on the A603 to junction 12.
Travel by motorway to junction 11.
Follow the A10 (T) south-west for 2 km.
Turn south-east down the B1368.
Stop after 2.5 km. Where are you now?

2 **a** Describe the route you would follow by road from Haslingfield (4052) to Grantchester.

b Describe the village of Grantchester and the surrounding area. Mention both physical and human features.

Summary

Maps can be used to describe routes and places. Accuracy is very important when describing things.