Ordnance Survey®

Map reading made easy

What is a map?

A map is simply a plan of the ground on paper. The plan is usually drawn as the land would be seen from directly above.

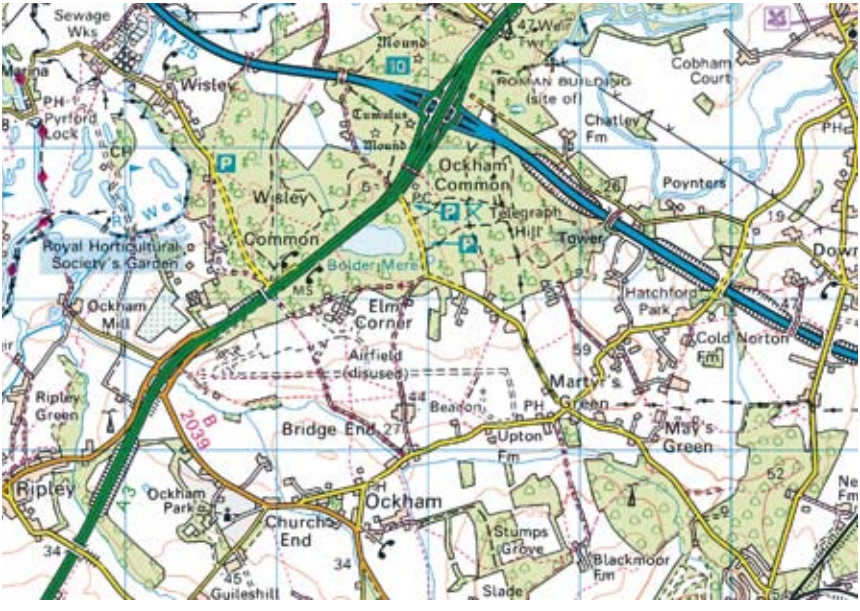
A map will normally have the following features:

- The names of important places and locations.
- Standard symbols to show the location of key landmarks and features.
- A key, or a legend, to explain what the symbols on the map mean.
- A scale and scale bar to allow you to measure distance on the map and convert it to the actual distance on the land.
- A grid system of lines to allow you to pinpoint your location, orientate your map to the land and quickly estimate distances.
- Contour lines to show relief (the height of the ground above sea level) and the steepness of the land.

Understanding your map 1. The basics

There are some basic features that most maps will include:

- **Roads** tend to be marked in different colours depending on the type of road depicted. Roads on a map range from thick blue lines, showing motorways, to dashed lines, indicating an unfenced minor road.
- **Footpaths** are marked on Ordnance Survey maps in various colours. On a 1:25 000 scale OS Explorer Map the public rights of way are marked in green and on a 1:50 000 scale OS Landranger Map they are marked in magenta. There are various types of public rights of way and public access, so please check the map key for full information. It is important to be aware that footpaths that are shown in black are not necessarily public rights of way.
- **Woods** are shown in green with a coniferous or non-coniferous tree shape printed over the top.
- **Buildings** are marked by small black squares. However, some particular buildings have their own special symbols, such as churches and windmills. Any of these buildings can be useful landmarks, helping you to check your position on the map.
- **Rivers and streams** are shown as blue lines. The width of the line is representative of the watercourse width (if the width of a river is more than 8 metres it is shown as two blue lines with a light blue area between). Rivers and streams can be extremely useful in determining your position on a map.
- **Scale** tells you how much the land has been scaled down to fit on the paper. If the scale of a map is 1:50 000 then everything on the map will be 50 000 times smaller than it is in reality.
- **Your Ordnance Survey map** will also contain other features and information that will be explained, along with the features above, in the key of the map.

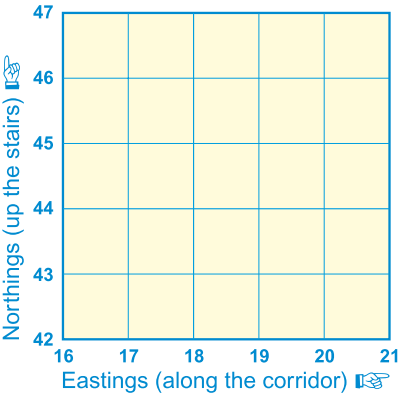


Understanding your map 2. Grid lines explained

Ordnance Survey maps are covered in a series of faint blue lines that make up a grid. The lines have numbers accompanying them that allow you to accurately pinpoint your location on a map. Once you have located where you are, the grid system makes it simple to give others (such as mountain rescue) an accurate description of your location. This description, which will be a series of numbers, is known as a grid reference.

Grid references

Before you begin to look at grid references it is important to be aware that all the numbers going across the face of the map, for example, left to right, are called eastings (this is because they are heading eastward), and similarly, all the numbers going up the face of the map from bottom to top are called northings (again because they are heading in a northward direction).



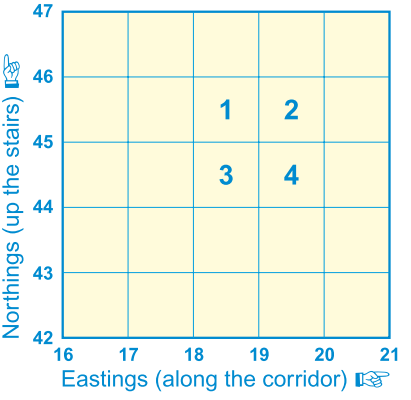
There are two main types of grid reference:

- **4-figure** – for example, **1945**, this indicates a single kilometre square on an Ordnance Survey map.
- **6-figure** – for example, **192454**, shows a point within a square.

4-figure map references

When giving a 4-figure grid reference you should always give the eastings number first and the northings number second, very much like when giving the reading of a graph in school – you must go along the corridor/hallway (horizontal) and then up the stairs (vertical).

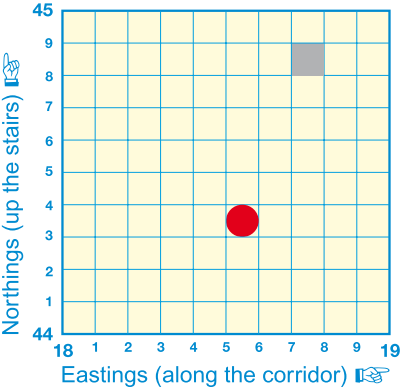
For example, the number **2** in the diagram opposite is **19** across and **45** up and therefore the 4-figure grid reference is **1945**.



The numbered squares on the diagram above would have the following 4-figure grid references:

1 = **18 45** 2 = **19 45**
3 = **18 44** 4 = **19 44**

6-figure map references

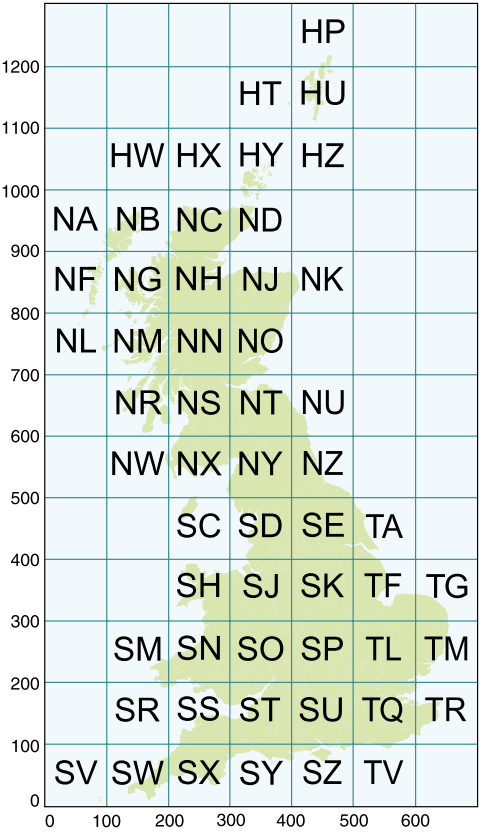


Having worked out the basic 4-figure grid reference, for example, square 3 below, imagine this square is further divided up into tenths. Using the example opposite, the grey box is in the square **1844**. More accurately it is 7 tenths across and 8 tenths up within the grid square **1844** and therefore has the 6-figure map reference **187448**.

The shapes on the map opposite would have the following 6-figure grid references:

= **187448** = **185443**

National Grid lines



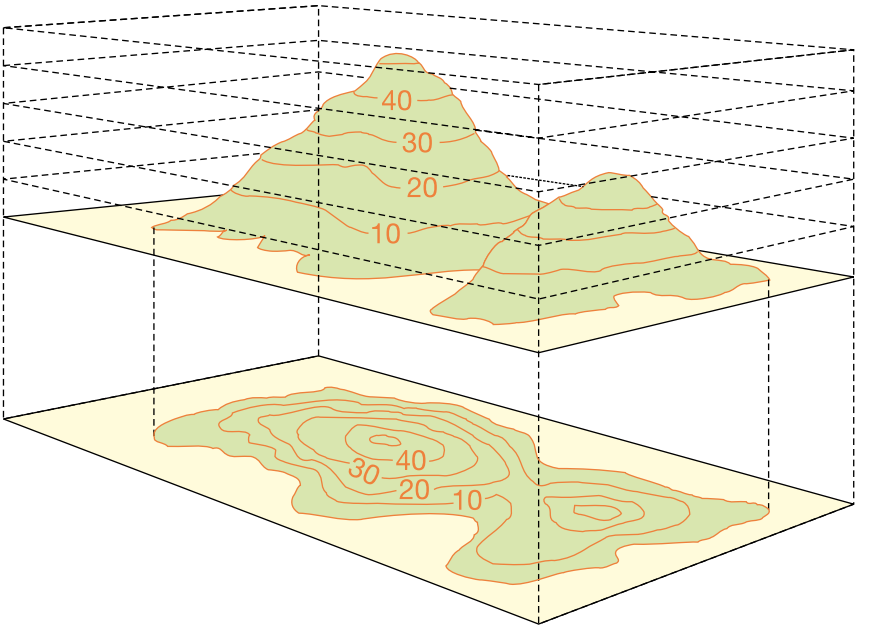
As well as numbered grid lines, Ordnance Survey maps have codes made of two letters. These two letter codes can be found printed in faint blue capitals on Ordnance Survey maps. The whole of Great Britain is divided into squares of 100 km and each square is given two letters. There will be a diagram within your map's key showing you which areas of your map fall into different squares of the National Grid.

When you quote your six-digit grid reference you should put the two letters of the area you are in before the numbers. This means that there is no doubt or confusion about your location. For example, you may be at grid reference **509 582** in south-west Scotland. The complete grid reference you should quote would be **NX 509 582** (without the letters the numeric reference would be repeated in every 100 km square).

Understanding your map 3. Reading contours and relief

Understanding the shape of the land by looking at a map is a very useful skill and can be essential if you're going to be walking in mountainous terrain. The height and shape of the land is shown on a map using 'contour lines'. These lines appear as thin orange or brown lines with numbers on them. The number tells you the height above sea level of that line.

A contour line is drawn between points of the same height, so any single contour line will be at the same height all the way along its length. The height difference between separate contour lines is normally 5 metres, but it will be 10 metres in very hilly or mountainous areas. The map key will tell you the contour interval used.



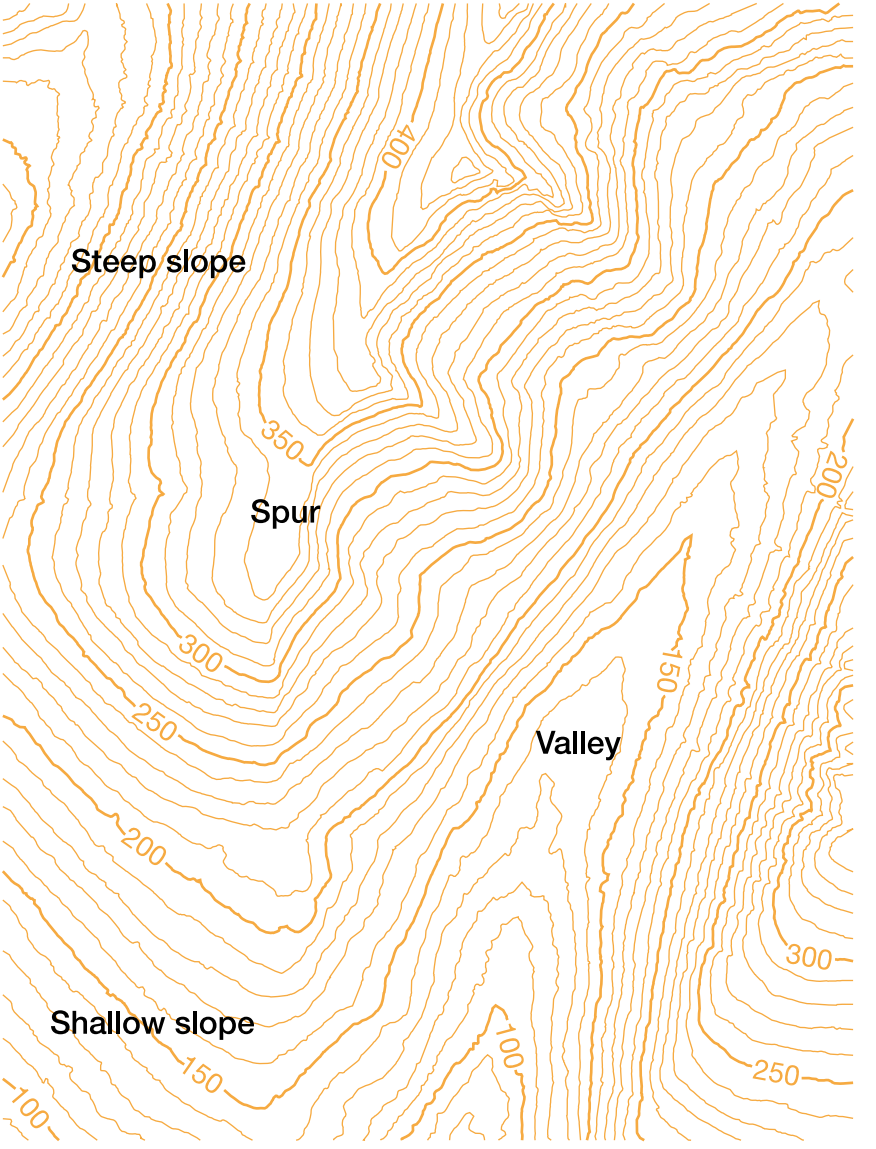
The picture shown illustrates how a landscape can be converted into contour lines on a map. An easy way to understand and visualise contour lines is to think of them as high tide lines that would be left by the sea. As the water level drops it would leave a line every 10 metres on the landscape. These marks would be contour lines.

Being able to visualise the shape of the landscape by looking at the contour lines of a map is a very useful skill that can be developed with practice. It will allow you to choose the best route for your journey. When reading contour lines on a map it's helpful to remember the numbering on them reads uphill. It might be useful to imagine that to read contour line numbers you have to be stood at the bottom of the hill looking up it, otherwise the numbers would be upside down.

Other useful things to look out for when reading contour lines are rivers, which usually flow into valleys, or areas with very few contour lines, which will be flat.

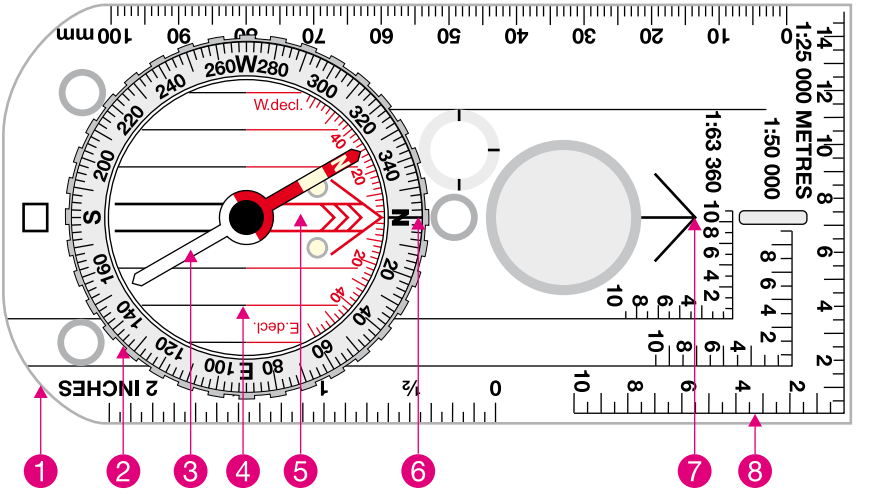
The picture below shows how contour lines can be used on maps to describe different landscapes. Even though all the lines look similar at first, they are describing very different landscape features. The closer together the contour lines, the steeper the slope of the hill. If a hill is very steep the contour lines might even merge into each other.

A spur is a ‘V’-shaped hill that juts out. A simple way to tell a valley from a spur when looking at contour lines is to remember that if the ‘V’ points uphill it’s a valley, if it points downhill it’s a spur.



Understanding your map 4. Orienting your map

Now you have the skills and knowledge to read and understand a map, the next step is to learn how to orientate your map to the land so that you can use it to navigate. One of the best ways to orientate your map is with a compass. The picture below shows a compass, explaining its various features.



1 The base plate
The mounting of the compass, with a ruler for measuring scale.

2 The compass housing
Contains the magnetic *needle* and has the points of the compass printed on a circular, rotating bezel.

3 The compass needle
Floats on liquid so it can rotate freely, the red end should always point to magnetic north.

4 Orienting lines
Fixed within the compass housing and designed to be aligned with the eastings on a map. On some compasses half the lines are coloured red to indicate north.

5 Orienting arrow
Fixed within the compass housing, aligned to north on the housing.

6 The index line
Fixed within the outer edge of the compass housing as an extension of the direction of travel arrow. It marks the bearing you set by rotating the compass housing.

7 The direction of travel arrow
Shows the direction that you want to travel along or the bearing you are taking. It is fixed parallel to the sides of the base plate.

8 Compass scale
Displayed along the edge of the base plate so you can measure distances on maps.

Understanding your map 5. Using your compass

Decide on the route of your walk and identify your starting point on the map. Place your compass on the map. Make sure the 'direction of travel arrow' is pointing in the direction of your route across the map. The easiest way to line the arrow is to place the side of the base plate so it crosses your starting point and the next destination of your journey.

Carefully holding the compass base plate still, you will need to turn the compass housing so the index line and orientating lines match up with the eastings (the vertical, north–south lines) on your map. Holding the map flat and the compass still, you need to rotate your body so that the compass needle settles in line (opposite) with the index line. To fully orientate your map you will need to make some adjustments for magnetic variation.

Adjustments for magnetic variation

One thing to remember is that your compass does not point to the true north – except by coincidence in some areas. The compass needle is attracted by magnetic force, which varies in different parts of the world and is constantly changing.

The magnetic variation throughout Great Britain currently ranges from 2° to 6°. The amount of variation changes every year, so check your Ordnance Survey map to work out the most current value.

You can properly orientate the map by carefully turning the compass housing 4° clockwise (for example, depending on where you are in Great Britain) and then turning your body again to realign the magnetic needle with the index line. Your map is now oriented to the north.

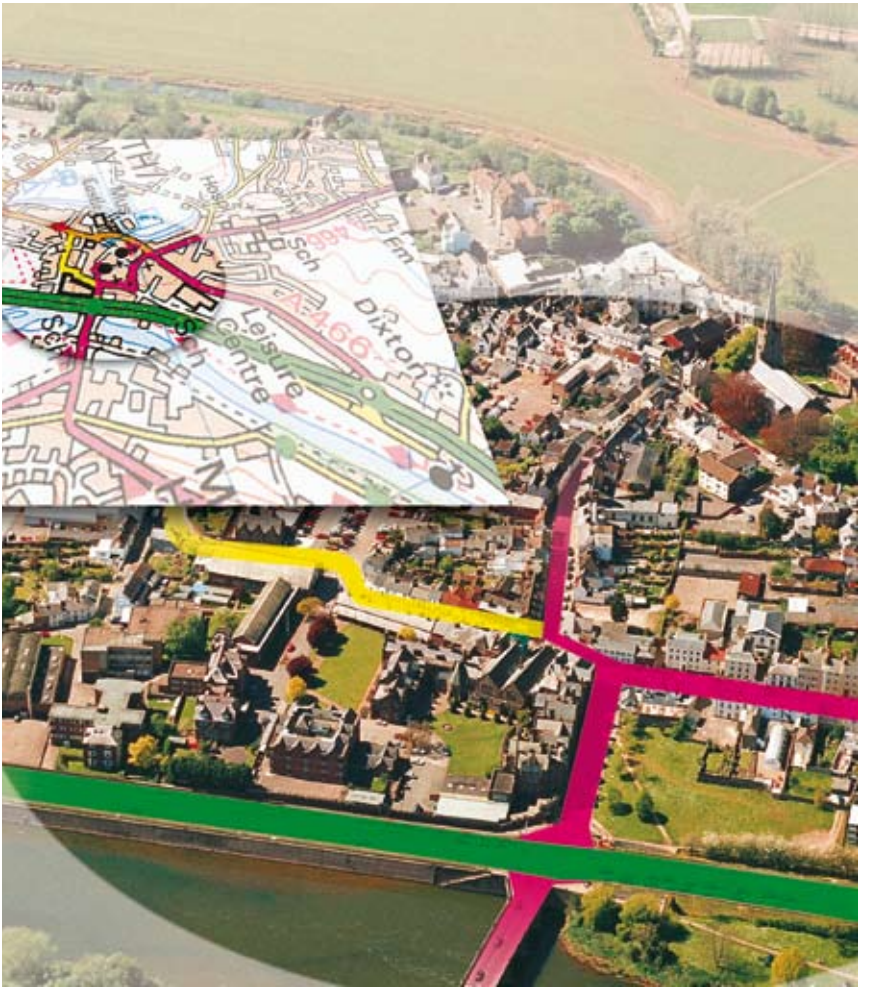
A word of caution

Compass readings are also affected by the presence of iron and steel objects, so be sure to look out for – and stay away from – pocket knives, belt buckles, railroad tracks and so forth when using your compass.

Using land features

As an alternative to using a compass to orientate your map, you can use your eyesight. This method will only work if you are in an area with visible prominent features or landmarks.

First, locate yourself next to a feature or landmark and place your finger on the map at the point where you are standing. Then begin to rotate the map so that other features and landmarks on the map begin to line up with the actual ones you can see. The map is now orientated with the land, although not as accurately as it would be using a compass.



And finally...

OK, so now you know how to understand and read a map, you're ready to get yourself out and about. But before you put on your boots and pack your rucksack, take the time to read through the following handy tips and safety points to ensure you get the most from your adventures.

1. Pre-plan your route

Before you set out, take the time to plot your route – mark your chosen route on your map. This will ensure your eyes are immediately drawn to the correct part of the map, otherwise you may find yourself having to spend a considerable amount of time continuously searching for your location. If it's your first expedition with a map and compass, start with a short route in an area you're familiar with. You could identify a new route within this to help you build your map-reading skills – remember, don't set yourself unrealistic challenges.

2. Make sure you have the right equipment

- A map of the area you are exploring, and map case will help to protect your map from bad weather.
- A compass with a base plate – the longer the better; shorter ones may frustrate you when orientating the map – and a circular, rotating housing.
- A pencil, in case you decide to plan and orientate a new route.
- A watch, to make sure that you can keep track of time, and finish your walk on time.
- And enough food and water to see you through your journey.
- Check the weather forecast in advance. This will allow you to plan for changes in weather patterns so you have appropriate clothing with you – it may be fair when you set out but could rapidly change to rain or fog.

3. Tell someone where you're going

Always remember to tell either a family member or a friend where you're going and when you expect to be back.

4. Abide by the Countryside Code

- Be safe – plan ahead and follow any signs.
- Leave gates and property as you find them.
- Protect plants and animals, and take your litter home.
- Keep your dog under close control.
- Consider other people.

5. Have fun

Getting out and about is all about having fun and enjoying yourself.

So go for it!

1 

2 

3 

1. Your passport to town and country
2. The essential map for outdoor activities
3. For people who love extremes

4 

5 

6 

4. For touring and local route planning
5. For regional route planning
6. For national route planning

Ordnance Survey®

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