

Navigation Contents

Introduction	3
Starting Mapping.....	4
How Do You Fold A Map?	4
Scale	5
Understanding Scale	6
What is scale?	6
1:25 000	6
Large scale maps	6
Small scale maps.....	7
Scale summary	7
Grid Reference	10
Quick Reference Guide	13
Four-figure grid references	13
Six-figure grid references.....	13
Grid Reference Exercise	14
Setting The Map.....	15
Contours.....	16
Contours.....	16
The Norths	17
True North	17
Grid North.....	17
Magnetic North	17
How Is Each Used?.....	18
Grid North.....	18

Magnetic Bearing	18
Compasses.....	19
16-point compass.....	19
Bearings	24
How To Use Your Compass.....	24
Taking A Bearing.....	24
Following A Bearing	25
Back Bearing.....	26
Finding Your Position On A Map	26
Compass Bearings	27
How To Take A Bearing.....	27
Bearings Exercise	29
How long is a piece of string?	29
On The Paper's Edge	29
Naismith's Rule.....	29
Route Cards/Planners.....	29
Filling Out A Route Card	29
Nature's Compasses	29
Finding Your Way At Night	29
The Wind	29
Trees As Indicators.....	29
Trees As Indicators.....	29
Shadow method	29

Introduction



Travelling through wild countryside is achieved by the use of a map and a compass. The map conveys a detailed picture of the landscape and terrain we are travelling across and the compass provides us with a tool that will steer us

in the correct direction. The secret of good navigation is a good knowledge of map reading and interpretation. The compass although important is secondary to good map reading skills.

Understanding your map

The map is a representation of the landscape. It is produced from satellite pictures and on the ground surveying. The map however is only two dimensional therefore it must employ a method known as contouring in order to show the rises and dents of the landscape. A number of symbols are also

used to establish such features such as forests, churches, boggy ground, fences, train tracks etc. Roads and tracks are marked on the map using a number of different coloured lines and such methods as broken lines and chequered lines. Rivers and lakes are marked in blue.

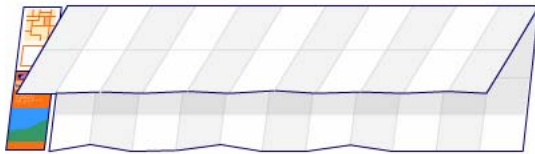
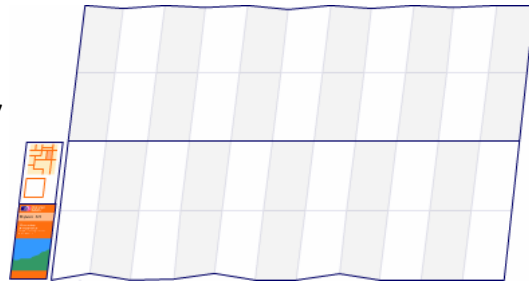
Starting Mapping

How Do You Fold A Map?

All large maps fold in the same way and you will find that the creases in them will help you. You will also find folding easier to do on a flat surface.

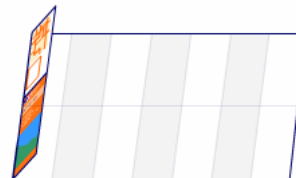
Step 1

Start with your map completely unfolded with the shiny cover face up in the bottom left hand corner.



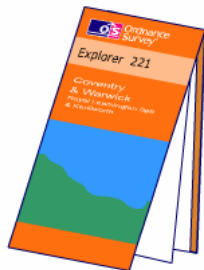
Step 2

Now fold the map in half by bringing the top edge to meet the bottom edge.



Step 3

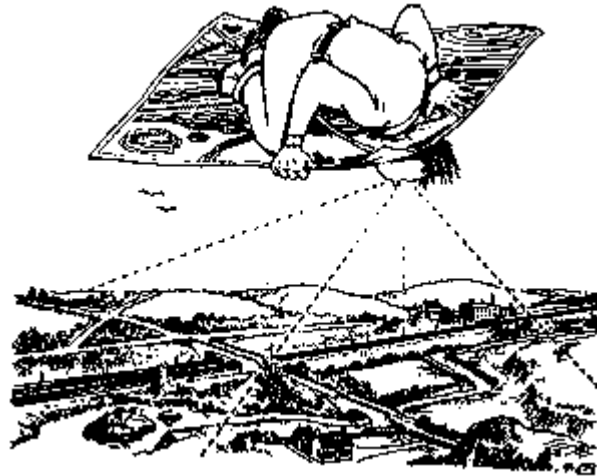
Next start folding from the cover along the crease lines, making sure the shiny cover can be seen all the time.



Step 4

Finally, fold in half so that the shiny covers are on the outside. It's as simple as that!

Scale



In order to draw a map of manageable size we use a process of scaling to ensure the correct miniaturisation of the landscape on the map. Typical scales used are half inch to the mile, one inch to the mile.

In such a scaling system one inch on the map represents one mile on the ground.

Therefore the bigger the scale the more information it is possible to draw onto the map.

For walking purposes you will be using the OS Explorer Series of maps which have a scale of 1:25 000 or 4 centimetres to a kilometre ($2\frac{1}{2}$ inches to a mile).

Understanding Scale

What is scale?

Scale is what makes map drawing possible. It takes real life things and reduces them in size many times so they can be shown on a map.

Every map has a scale printed on the front and you should always check this figure before you start reading it. It will tell you how much smaller the area shown on the map is compared to the same area in real life.



1:25 000

This means that every one unit of measurement on the map (like a centimetre) is the same as 25 000 of those units (in this case 25 000 cm or 250 metres) in real life.

Ordnance Survey produces maps drawn to many different scales, depending on what people want to use them for.

Large scale maps

Large scale maps are better for showing individual buildings in detail because they only cover a small area of land.





Small scale maps

Small scale maps are ideal for travelling either by car or walking because they cover large areas of land.

Other maps are drawn to a smaller scale and show smaller amounts of detail, but cover a wider area. These maps are often used for planning long walks and drives.

It might help you to remember that the larger the number in the scale, the smaller the scale of the map will be.

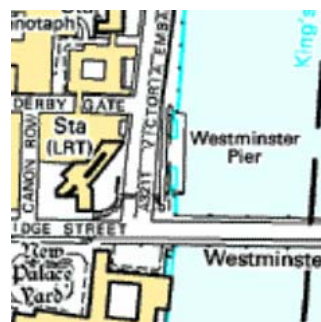
Scale summary

Ordnance Survey produces different maps for different uses. Each of these uses normally requires a different scale.

1:1250

OS MasterMap™

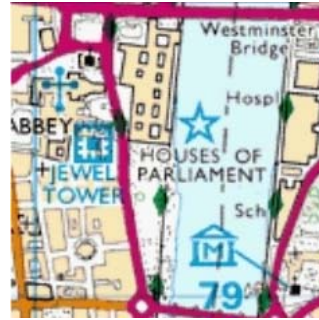
Ideal for architects



1:10 000

Landplan®

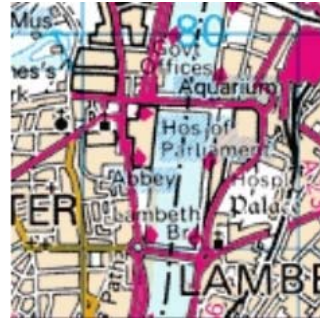
Ideal for town developers



1:25 000

Explorer™

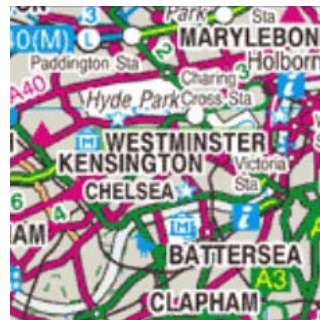
Ideal for outdoor activities



1:50 000

Landranger®

Ideal for planning a day out



1:250 000

OS Travel Map - Road

Ideal for motorists, and long journeys

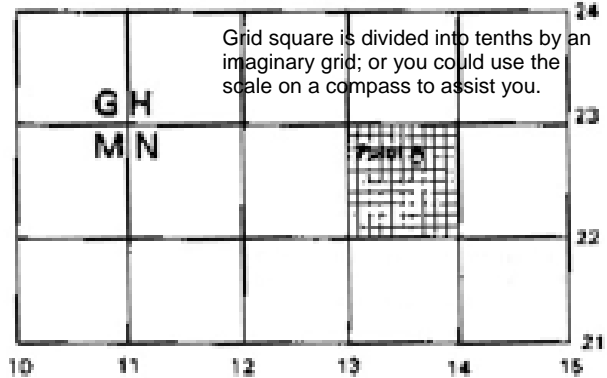
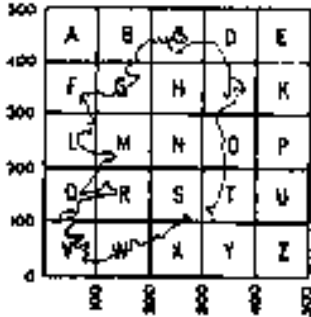


1:1 000 000

MiniScale®

Ideal for seeing the whole country at a glance

Grid Lines



Grid reference for point A is N 137 227

Overlaying all maps there is drawn a grid of light lines running from top to bottom and side to side on the map. The purpose of this grid is to allow us to identify every part of the map with a unique number system (grid reference).

These grid lines which correspond with the lines of longitude and latitude also enable us to identify the north of the map and aid with compass alignment. You will notice that each line is given a number, this will enable us to create the grid reference number.

Grid Reference

A grid reference is a series of numbers (co-ordinates) which gives us the exact location on a map. It is created by using the grid lines which appear on all ordnance survey maps using the following steps.

1. Find your location on the map. If possible choose a recognisable feature rather than a point in the middle of nowhere.
2. Find the grid letter on the national grid by looking at your map. These are printed in blue and are large in size. Quote the letter of the sector your position is in.
3. Start at the bottom left hand side of the map and move across the grid lines till you arrive at the grid line nearest your location. The number of the line is the first two numbers of your reference.

4. You should then divide up the grids square into tenths. Half way is 0.5, three quarters of the way is 0.8 etc. State the location of your position as a decimal. This number is the third number of the reference.

5. Repeat the same steps for the grid lines that cross the map and this will give you the 3 figure reference for you location.

6. You now have your six figure reference for your position.

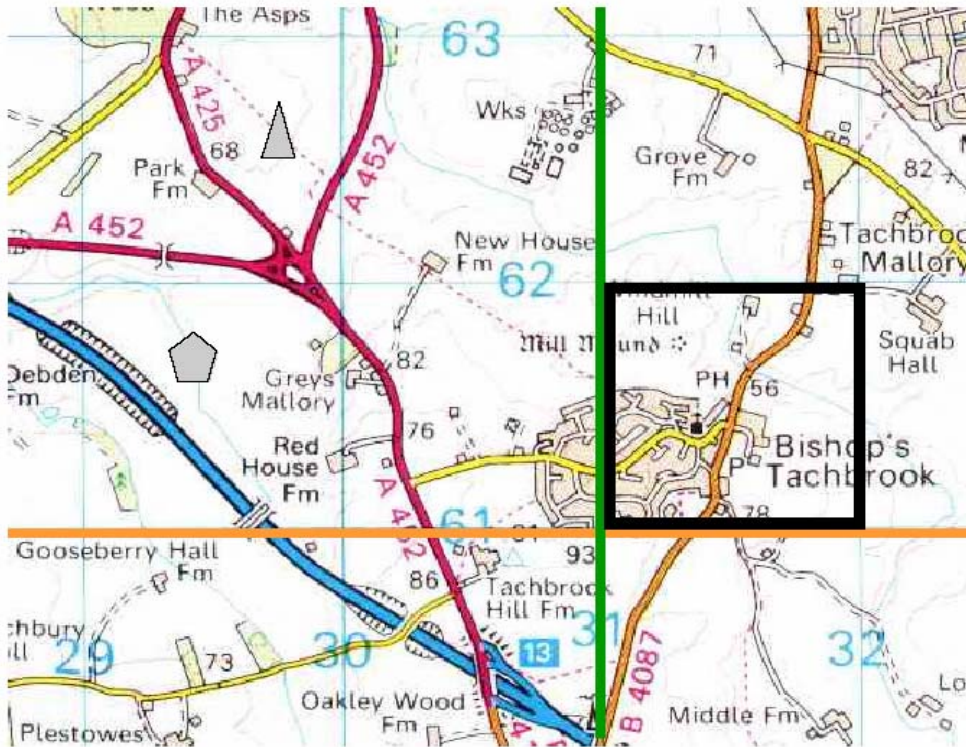
A simple rule of thumb is the phrase that states - 'go in the door and up the stairs'

Which means that if you visualise a door at the left hand side of the map - then you go in the door (give the bottom line first) then go up the stairs (give the side numbers next).

Map Co-ordinates

To find the co-ordinate of a square (a four figure co-ordinate) we read

Across then Up



Bishops Tachbrook

31 61

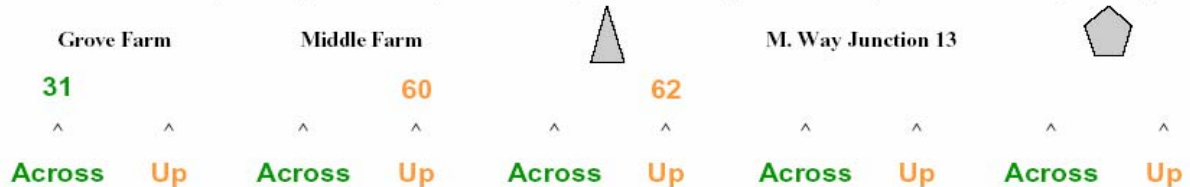
^ ^
Across Up

You would come across from the left until you hit the square you want. Then look at the number (blue number) of that line.

Then you come up from the bottom of the map until you hit the square what you want. Take a note of the number of this line.

So you come across first (counting the vertical lines) then go up (counting the horizontal lines)

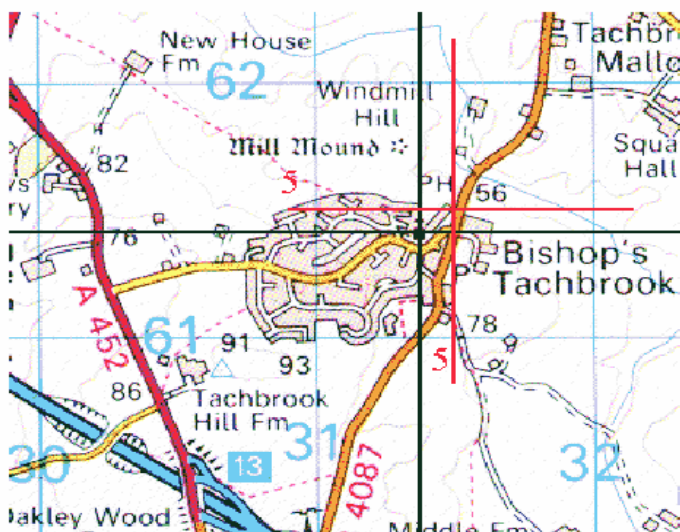
The number you get (31 61) is called a four figure grid reference. It lets you find any square on the map. Each square has its own number (its own grid reference). On the map above each square is 1 km by 1 km, which is quite a big area.



	12	13	14	15	16	17	18
45							
44		H					L
43				D		C	
42				M			
41	F	B				I	G
40				J			
39	N					A	
38		K	E				

Write down the four figure grid reference for each letter

- A 16 39
- B 13 41
- C I
- D J
- E K
- F L
- G M
- H N



Map Co-ordinates

The Church with a Tower in Bishop's Tachbrook is

314614

Eastings First (Vertical Lines) - 31 - How many large blue grid squares it is along. The first 4 represents how many tenths of a square it is along. Think of it as

31.4 across

Northings Second (Horizontal Lines) - 61 - How many large blue grid squares it is up. The last 4 represents how many tenths of a square it is up. Think of it as

61.4 up

Now try completing the tables below using your Ordnance Survey Leaflet. Just fill in all the missing parts.

Remember: **Across then Up**

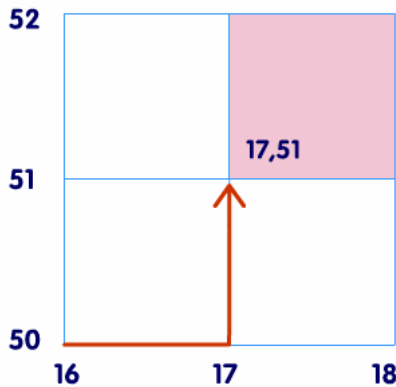
Feature	Co-ordinate	Other Symbols In Same 'Square'
Cart Common	17 78	Telephone, Church with Spire, Spot Height, Secondary Road, Mixed Wood
Little Afton		
Penn's Place		
Paynes Wood		
	13 75	
	13 81	
	17 81	
		Wildlife Centre, Telephone, Footpath, Secondary Road, River

Feature	6 Figure Co-ordinate
Church in Brackenbridge	136797 (in square 1379...estimate 6 across square and 7 up)
Woody End	155788
Church in little Polt (top left)	
Radio Mast (nr Abbots Wood, top centre)	
Church (top right near railway)	
	16 1 75 5
	189799
	175813

Grid References

Quick Reference Guide

This sheet is a quick guide to grid references. It should help you when you are asked to find something on a map, such as a town, or even an individual building. The grid lines on an Ordnance Survey map are called eastings (along the corridor/ground) and northings (up the stairs/tree).

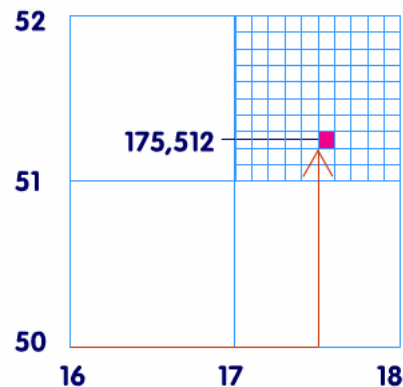


Four-figure grid references

Each square has a grid reference which you get by putting together the numbers of the easting and northing that cross in its bottom left hand corner.

Six-figure grid references

In your head, you should be able to divide all sides of the square into ten equal sections. By doing this, you can pinpoint locations within the square - these are called six-figure grid references.



Grid Reference Exercise

01 57	02	03	04	05	06	07	08
56							
55							
54							
53							
52							
51							
50							

Start at: Reference 025515 (line 02 and 0.5 across, line 51 and 0.5 up)

Plot the following references, join them up in sequence with drawn lines, and see what you get.

The question is 'How many sides does the object have?'

Create 3 objects as follows, to give you a 3 dimensional object?

Join 025515 to 025545, join that to 055545, join that to 055515, and join that back to 025515.

Join 025515 to 025545, join that to 055545, join that to 055515, and join that back to 025515

Then join 025545 to 045555, join that to 065555, and join that to 055545

Then join 065555 to 065525, and join that to 055515

Setting The Map

In order to read a map correctly you must first set, or align, the map. This is done by moving the map around until the map and the landscape correspond. One way of doing this is to select a landmark or feature, finding that landmark or feature on the map, then aligning the map so that when you look at the map and then at the landmark there is an imaginary line drawn between the two points.

When your map is correctly set, you will be able to identify other features from map to ground; the mountain peak on

your left or the stream junction on your right.

If this exercise is done correctly by aligning your map with two or three features rather than just one you can now travel by using the map alone - provided you establish correctly where you are standing in relation to these features.

As each feature or new feature appears on the trail identify it on the map and re-establish your position.



Incorrect



Correct

Contours

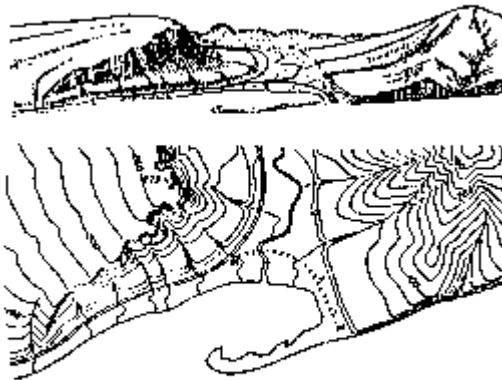
Contours are lines drawn on a map connecting together points of the same height above sea level. Together they are used to convey the shape of the terrain you are crossing.

The lines are drawn at 10 metre intervals and allow us to see a representation of the shape of a hill or mountain.

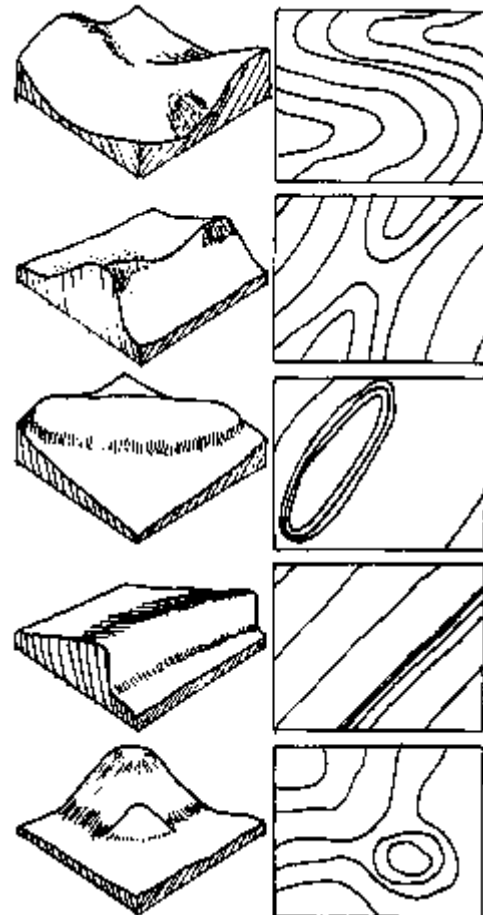
By looking at your map you can determine whether the mountain has a steep slope (contour lines close together) or a gentle slope (contour lines spread apart).

Contour lines are never, or rarely, circular in shape since they are plotting a particular height. This means that they allow us to see the gentle curves of a mountain as well as deep gullies.

Practice on the ground with your map will provide you with hands on experience. Over a period of time you will get to know what variations of contour lines mean and what they translate to in reality on the ground.

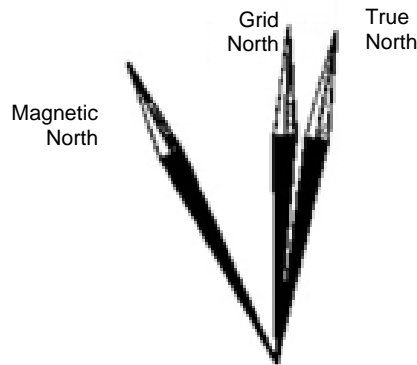


A landscape in perspective, and the same landscape in contour lines. Note especially that lines are far apart for level ground, almost touch for cliffs.



The Norths

A compass points to one north, your map is drawn with grid north, and the stars point to true north. What is the difference and how can you come to grips with them?



True North

True North is determined by sun readings and from the stars and is the point we would call the North Pole or

very top of the earth where all the lines of longitude converge.

Grid North

Map makers create a grid system around every country called the National Grid. Each box on this grid has a letter. It is this letter which we use to identify by means of a grid reference our position on the grid. These grid lines are shown on our map and are numbered thus allowing a grid reference to be created.

As the position of these grid lines are only slightly out of line with true north we use them as our method of setting our compasses. So for our purposes in Ireland and the British Isles, Grid North and True North can be considered as the same.

Magnetic North

This is the north that is indicated on our compass. Magnetic north is the location of a part of the earth which is magnetic and attracts the needle of the

compass. This north is located to the north of Canada, approximately 4 degrees west of Grid North.

How Is Each Used?

If you get lost or do not have a compass, then you will rely on the sun, stars, and nature signs to show you the direction to follow.

The direction you will seek is true or celestial north. It is only a general indicator and no fine navigation will be done by this method. Eg, if you are lost and you know that from the last time

you looked at a map that a road was to the east of you. What you would do is determine where north was by using the stars or sun and create a compass in effect. If you are facing north then east is to your right west is your left and south is to your back.

Grid North

Grid north as we have said is the map makers north. Therefore every map is created with the top of the map being north, bottom south. If you have your map folded up and you can read the

writing on the map (it is not upside down) it is turned in the right direction. This is an important point to remember when it comes to taking a compass bearing from your map (explained later).

Magnetic Bearing

The Magnetic North is the north that your compass needle will always point to.

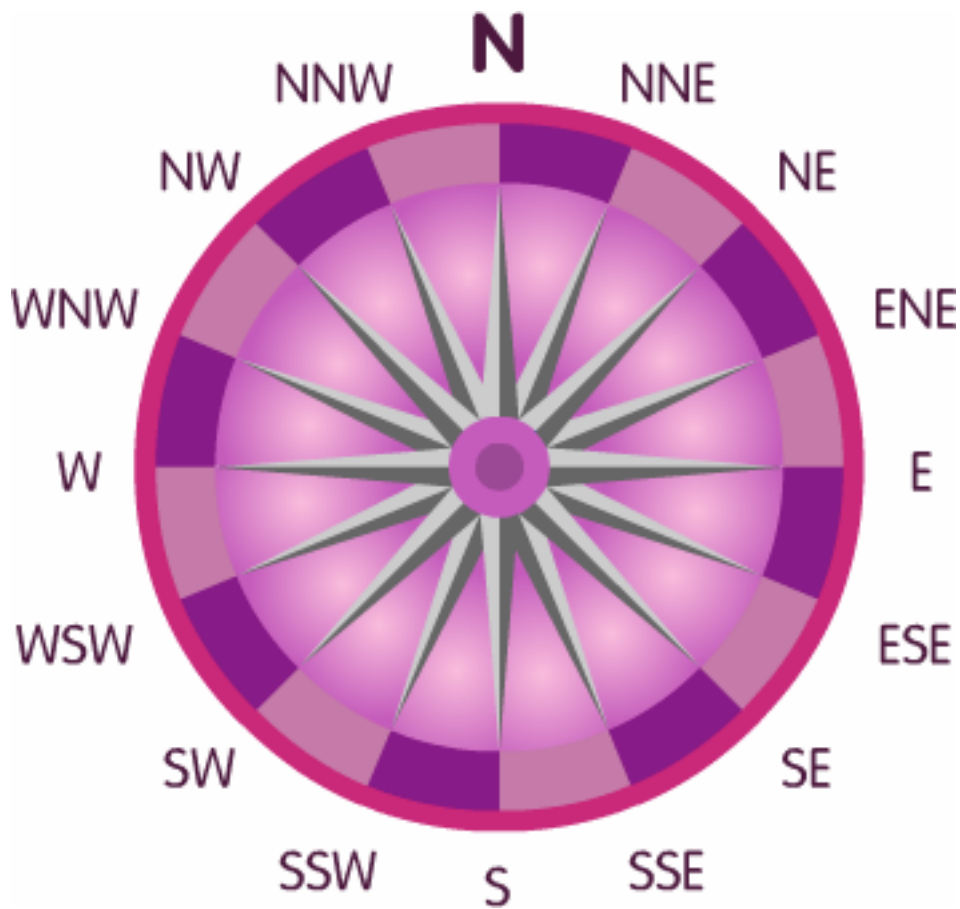
This magnetic field is constantly moving so in the UK it moves by a number of degrees every couple of years. In the UK the current variation is 4 degrees west (2002). See the side panel of your map to see what the current variation is.

This means that your map and your compass are out of line with each other. So in order to take a directional bearing from the map and translate that to the compass for you to follow, you have to add on the variation of 4 degrees. This variation is different in every country so always check the side panel of your map for variation particular to that location.

Compasses

16-point compass

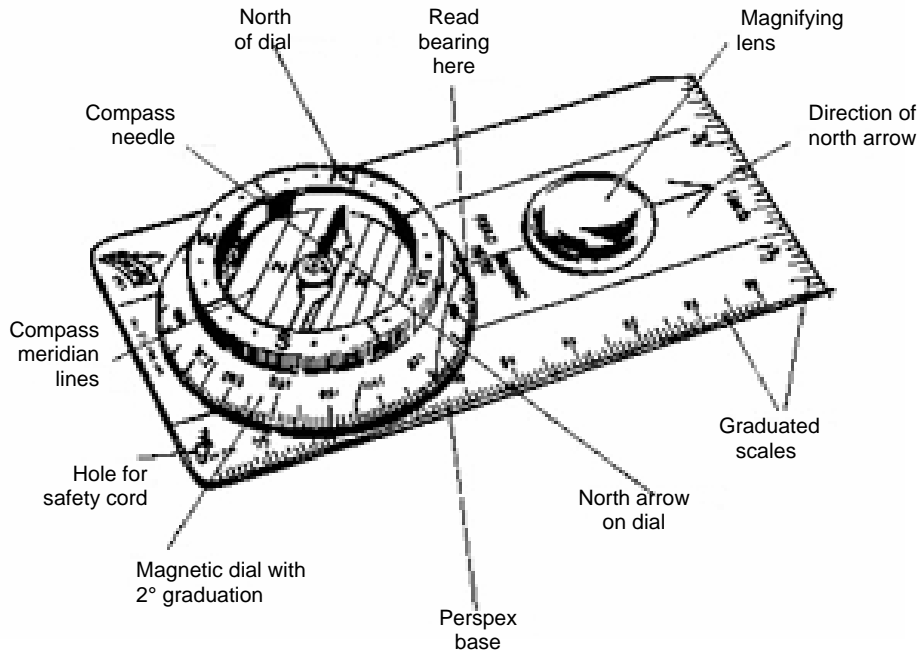
Use this compass as a 'print out and keep' version to help you with your directions when you're map reading. When you've printed out your copy, use scissors and glue to stick it onto some card and keep it in a safe place with your maps.



The Compass

The compass is an instrument that tells us where north is. This is done by way of a magnetised needle that is allowed to float freely within the instrument housing.

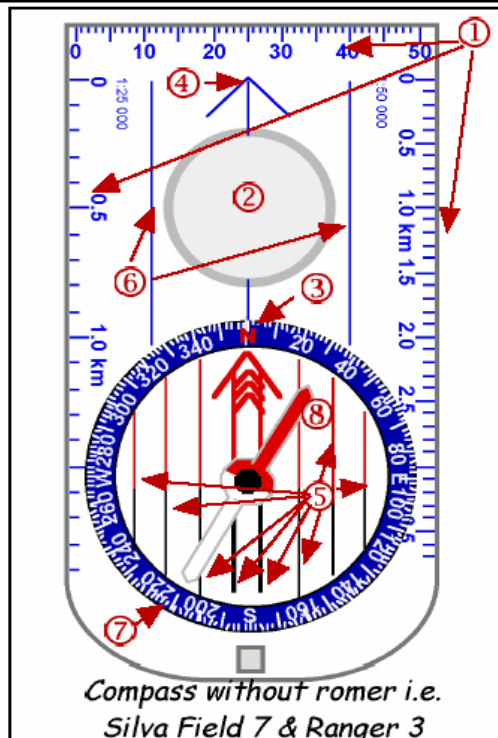
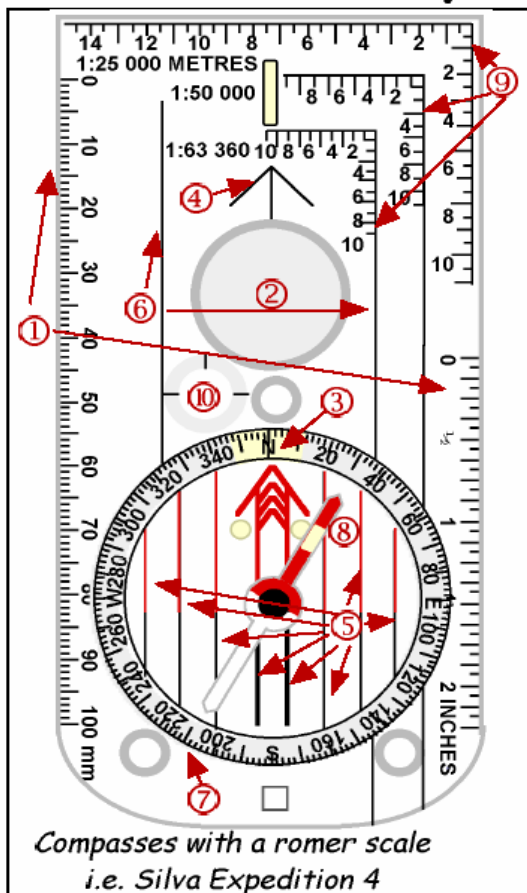
Around the edge of the compass is plotted a circle on which marking similar to that on a ruler are inscribed. Each marking determines the number of degrees it is from north to this point.



There are many compasses on sale from the simple floating needle type to the more expensive plotting compasses. We will only be concerning ourselves with one compass and that is the Silva Compass. This is the best compass and only compass you should use for navigational purposes on land.

The Silva Compass is made up of three parts - the needle, the compass housing, and the base plate. The needle is coloured red and white. The red end points to north and the white to the south. The compass housing revolves and determines any desired bearing or direction of travel. The base plate is used to indicate line of travel.

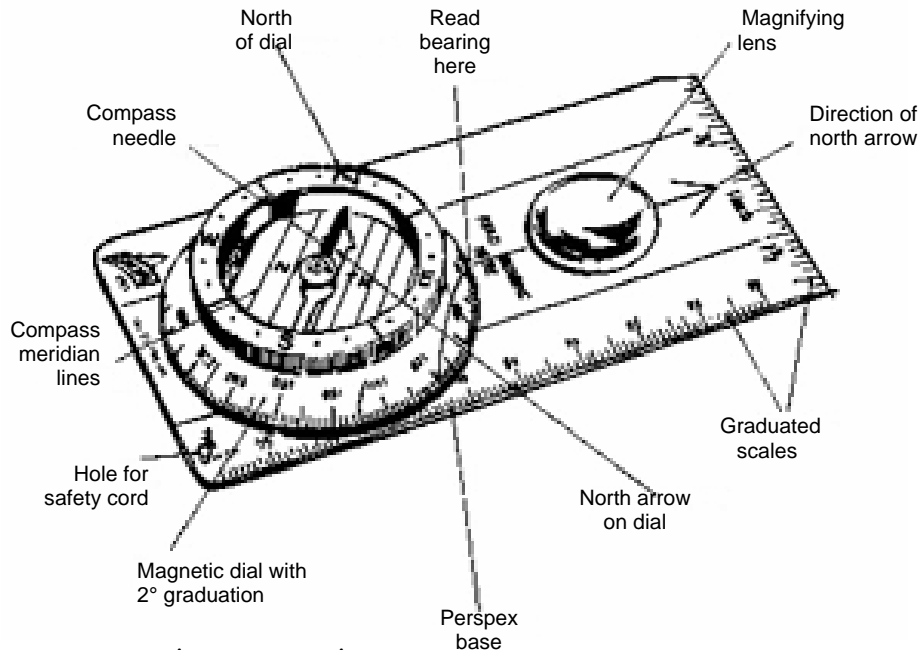
Know your compass



- ① **Scale Ruler** : Used to measure distances on the map
- ② **Magnifier** : For helping to read details or in cluttered areas
- ③ **Index Line** : This is the point where you read off the bearing. Some models this is luminous.
- ④ **Direction of Travel Arrow** : To point the compass in the direction that you are travelling.
- ⑤ **North/South Orienting Lines** : To help you taking bearings from a map.
- ⑥ **Parallel Lines** : These lines run parallel with the direction of arrow line. They can be used when taking map bearings.
- ⑦ **Compass Housing** : A rotating dial normally marked in degrees.
- ⑧ **Magnetic needle** : The red half points to magnetic north.
- ⑨ **Romer Scale** : To help take grid references. Be careful to use the correct scale.
- ⑩ **Stencil hole** : Used in marking exact positions on the map.

All these part are on the **Baseplate** which allows you to line up features on the map. The rounded corners allow it to be held comfortable in the hand. Some models have silicon feet to stop it moving on the map.

Compass



When using a compass there are three main points to remember about the arrows on the compass, whatever you are using it for.

You only walk in the direction of the arrow at the top of the compass. This is known as the direction-of-travel arrow.

The arrow that spins in the middle of the compass (usually coloured red and white) always turns to point north (the red end is the end that points north). NEVER follow this arrow (because you will always be walking north, no matter where you actually wanted to go!). When using a compass try not to hold it near any metal or magnets. The arrow will be attracted to them and you will end up going in the wrong direction.

The third arrow is the one that will be marked upon the dial. This is the one that will match up with the red and white pointer that spins. When you want to read a number on the dial, look at the point where it touches the line at the top (the one marked by 'read bearing here'), this is the number you want.

NOTE: There are 360 degrees in a circle. Be careful about how many degrees each line on the compass represents. Normally on compasses of this type, each line represents 2 degrees. This is important as a difference of 5 degrees over a walk of 6 miles will mean you will be about half a mile from where you should be!

To follow a certain bearing you will have to do the following:

Turn the dial until the correct bearing (number) is lined up with the direction-of-travel arrow (there is usually a black line under the dial to help you line this up).

Now turn the whole compass so that the red & white needle lines up with the red arrow on the bottom of the dial (red end of the needle in line with the red arrow on the dial).

The compass is now facing in the correct direction. Simply walk in the

same direction as the direction-of-travel arrow.

All you have to remember are the four main points of the compass. All the other points are made by combining these four. (For instance, halfway between north and east is north-east).

To remember the order of points, recall the following phrases. The points start at the top and go around clockwise.

Never Eat Shredded Wheat

Naughty Elephants Squirt Water

Bearings

How To Use Your Compass

Your compass is a tool that is used in conjunction with your map. By using the compass it is possible to navigate very precisely between points on a map. Your

compass can also be used to check your position on the map and check the correctness of your line of travel.

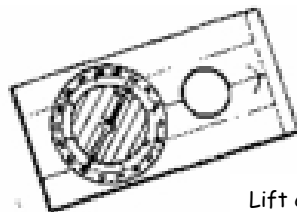
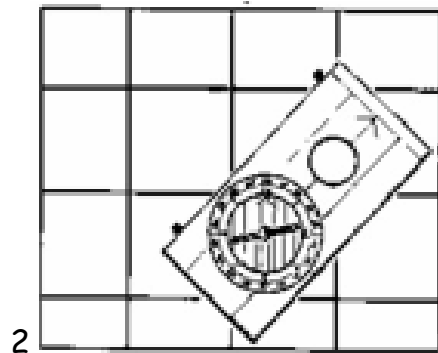
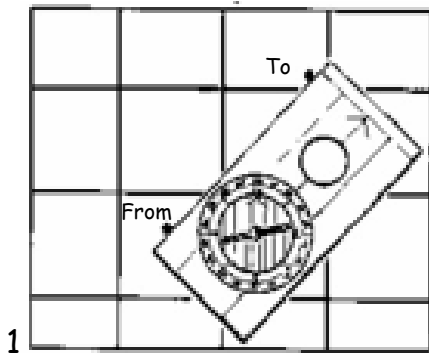
Taking A Bearing

Place the compass on the map with the edge of the base plate along the desired line of travel. The direction arrow on the compass should point to the place you wish to go.

north arrow on the compass housing should be pointing north.

Move the compass housing until the north/south lines on the transparent base of the compass housing are parallel with the grid lines on the map. The

You should be as accurate as possible when lining up these lines as a movement each way will add or subtract degrees from your final bearing and result in bad navigation and missing your destination by hundreds of yards.



Lift compass & add on magnetic variation

3

Lift the compass from the map and read the bearing indicated on the compass dial. Now add on the magnetic variation (eg if the bearing is 92 degrees, add on 4 degrees, resulting in 96 degrees). Next move the compass housing to this setting.

It is a good practice to do bearings this way rather than adding on by moving the compass housing immediately so that you do not make a mistake. It is better

to confirm in your mind what the bearing is before you move the compass.

Your compass is now set. Hold the compass in your hand and move your body around until the needle of the compass is correctly aligned with the north/south markings on the housing. The direction of travel arrow on the compass now points in the direction you need to travel to your next destination.

This exercise is repeated from point to point as you travel on your journey.

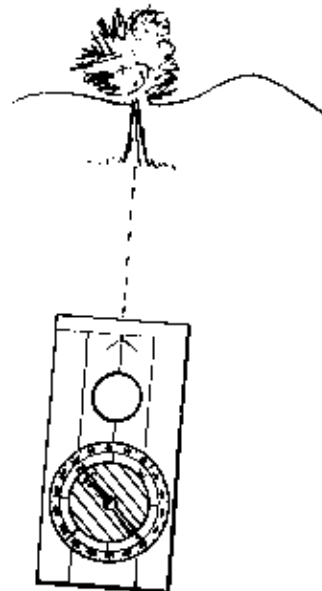
Following A Bearing

You travel on a bearing by sighting a recognisable landmark along its path and then travelling to that point. Repeat this procedure until you reach your destination.

It is not advisable to follow your bearing by looking at the compass and watching the movement of the needle. As you walk you will have to move from side to side to avoid obstacles so this method of following the bearing is discouraged in favour of line of sight identification method.

However, if you find yourself in heavy fog or at night, you must use members of your party to line up on the bearing under your direction, and then travel to these members. This is far more

accurate method than looking at the compass.



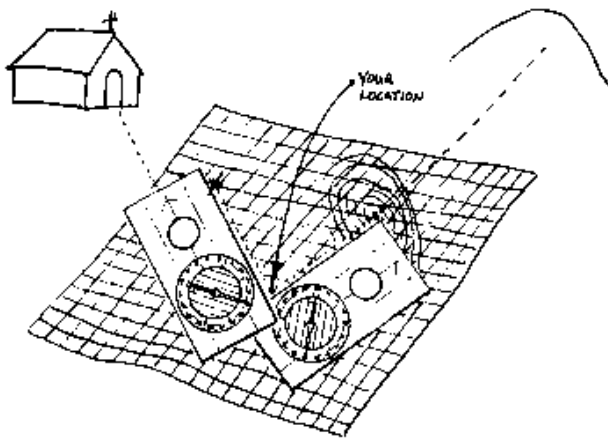
Back Bearing

If you think you have erred from your line of travel, you can check your bearing by using a back bearing. To do this you turn around and point the compass back to your last location. The

white part of the needle should now point north. If it is slightly out, you should walk left or right until the needle lines up, thereby correcting your line of travel.

Finding Your Position On A Map

To find your position on a map we use a process called resection. This is performed by plotting at least two points on the map to determine your position.



First select a landmark that you can identify on the map and from the position you are standing.

Point the compass at the landmark and move the housing until the needle and north/south marking align. Read off the bearing on the dial.

Now subtract 4 degrees from that bearing. (e.g. bearing of 88 degrees less 4 degrees total 84 degrees). You then place the compass on the map with the edge of the base plate on the symbol for identifiable feature.

Without adjusting the compass move the whole compass round this point until north - south lines are parallel with grid lines. If you have a pencil, draw a light line along the side of the base plate. Your position is somewhere along this line.

You now select another feature which can be seen and identified from your position and repeat the process. If possible choose a feature which is nearly 90 degrees from your position.

By doing this, your new line will precisely cross the line drawn from the other feature. If the two points selected are too close to each other then the lines will tend to merge, resulting in a less accurate determination of your position.

The intersection of the two lines is your position.

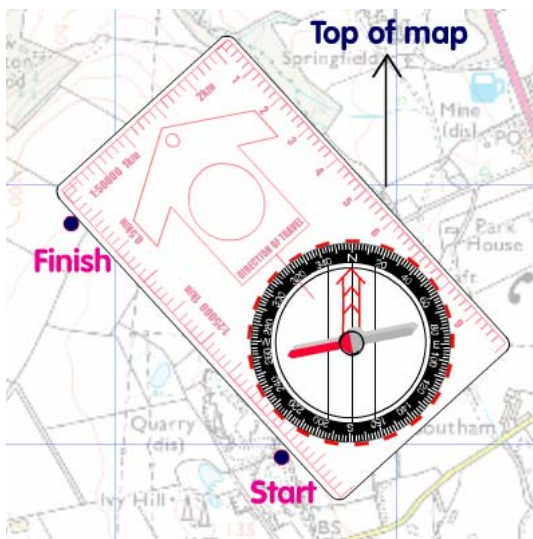
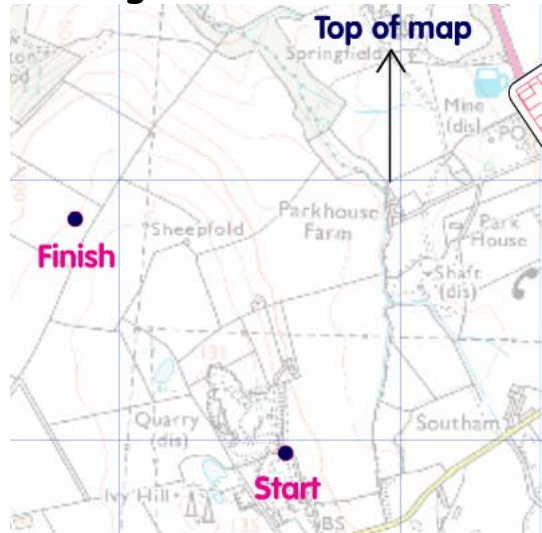
Two bearings should be all that are required. However, it is recommended that a third be taken for greater accuracy.

Compass Bearings

How To Take A Bearing

Step 1

Find the two points on the map that you want to travel from and to. Line up your compass edge between the two points, so that your direction-of-travel arrow is pointing to your destination.



Step 4

Now read the bearing at the bottom of the direction-of-travel arrow, at the index line. In our example, the bearing is 320°.

You will need to take into account the difference between grid north (on your map) and magnetic north (on your compass). This is called magnetic variation and your map will tell you how many degrees to add to your bearing. This can vary depending on where you are in the country.

Step 2

Rotate the compass housing until the orienting lines in the centre are pointing to the top of your map.

You can do this by lining them up parallel to the grid lines.

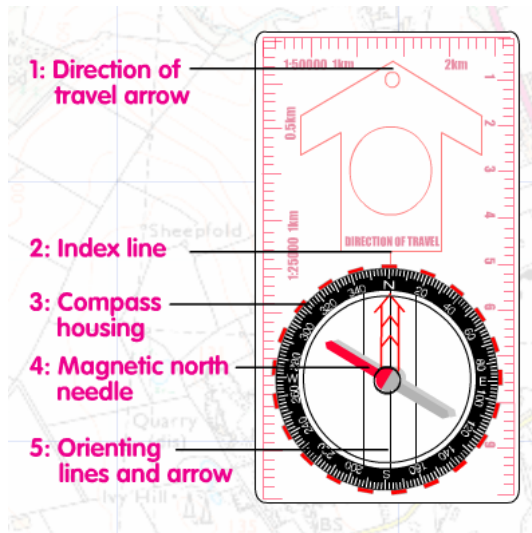
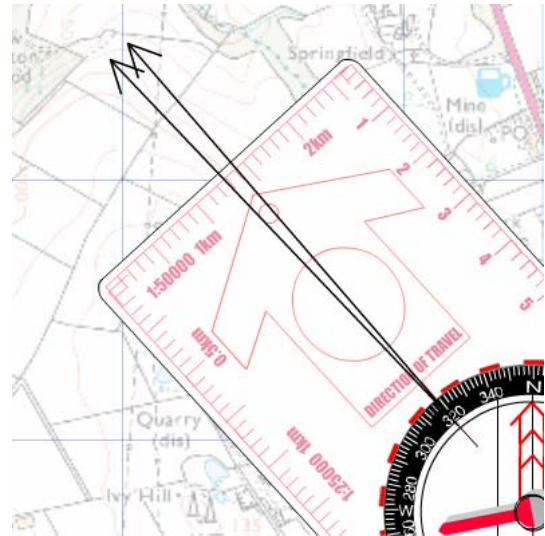
Step 3

Now rotate the dial until the north pointer lines up with the mark on the dial that joins the direction of travel arrow (this is called the index line).

Step 5

To head in the right direction, you must now re-orientate your compass. This means turning the whole compass around until the magnetic north needle points in the same direction as the orienting arrow.

The way the direction-of-travel arrow is now pointing is the direction you must walk in to get to your destination.



To help you stay on track, it's important to take regular bearings during your journey. Being one degree out at the start of your journey is not too serious, but if you continue in the wrong direction for too long, you will end up far from where you want to be.

Wherever possible, try and divide your journey up into short sections, taking new bearings from the landmarks that you pass on the way.

Bearings Exercise

The Exercise

You are somewhere in the circular area, but you do not know where!

You could be anywhere within 6 square kilometres!

Good News.....

You can see a church with a tower and one with a spire, and you know where they are on your map.

You know how to take magnetic bearings from objects

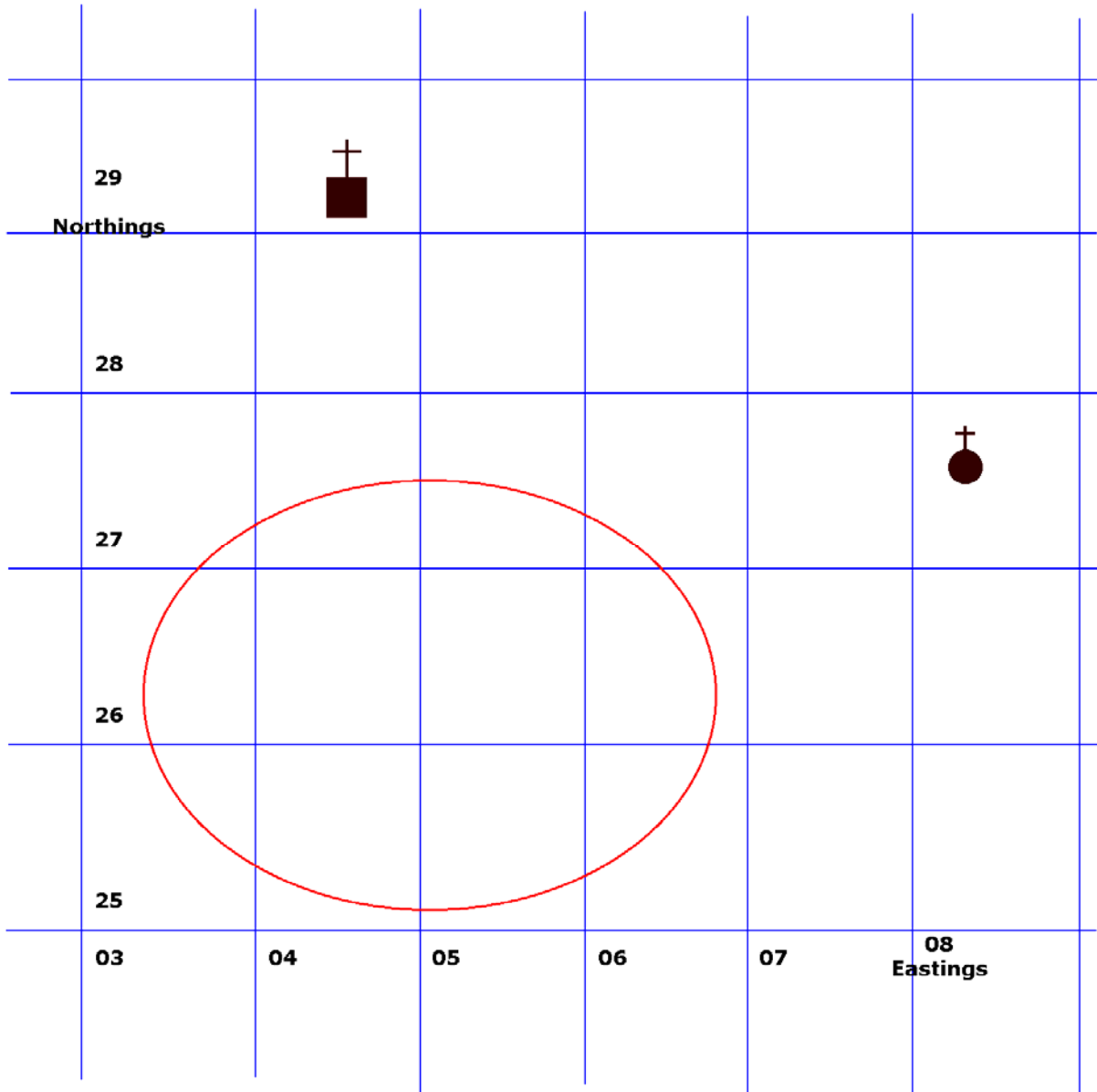
The Church with the spire is on a magnetic bearing of 48 degrees

The Church with the tower is on a magnetic bearing of 336 degrees

So.....

Assuming that the squares on the map are Grid Lines, and that the bearings are from the tops of the crosses on the churches

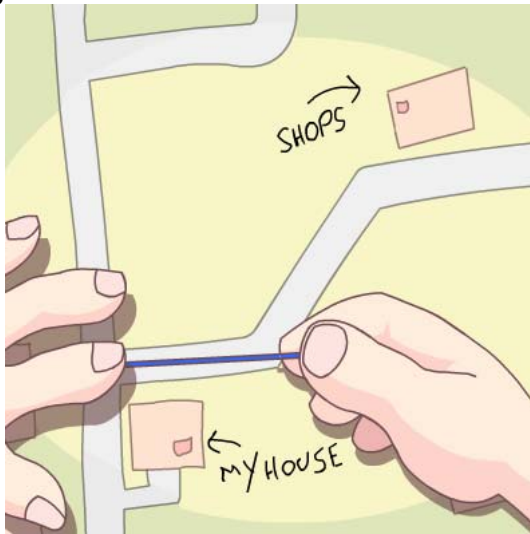
What is the 6 figure Grid Reference of the place where you are?



Measuring Distance

How long is a piece of string?

It's usually not possible to travel in a straight line between two points on a map. If you're following a road or footpath, it can change direction many times to avoid things like woods and rivers. However, there are still simple ways of measuring the actual distance you will need to travel between two points. One of them is to use a piece of string.

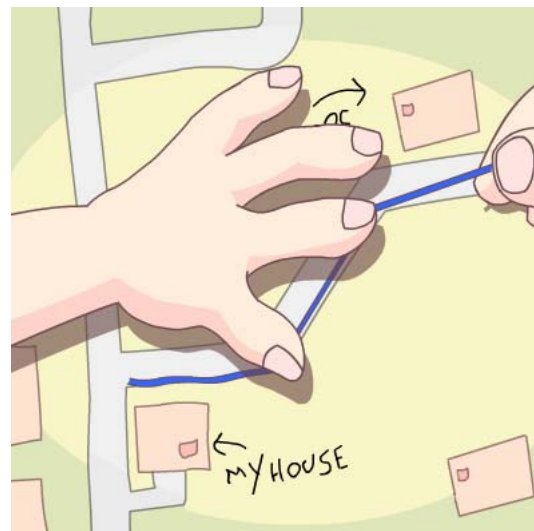


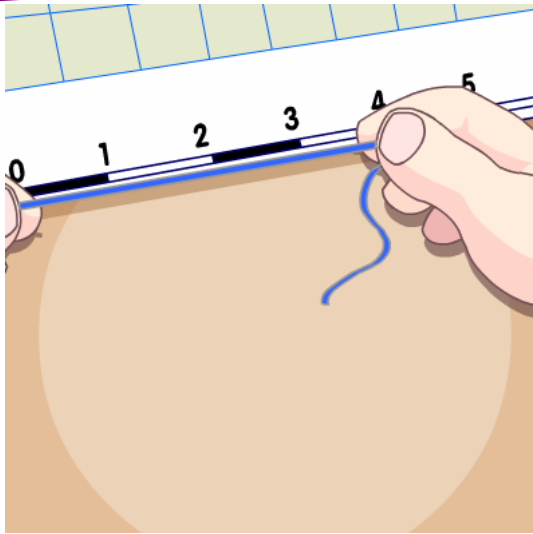
Step 1

Take a length of string - it's best to take one longer than you think you'll need - and place one end on your starting point.

Step 2

Now carefully lay the string along the road or path you know you're going to use, following the curves as closely as you can. When you reach your finishing point, mark it on your string with a pen.





Step 3

Now that you have your distance from the map, you can straighten out your string and place it against the scale bar to find out how far you will actually be travelling.

On The Paper's Edge

Another method of measuring distance is to take a sheet of paper and place the corner of a straight edge on your starting point. Now pivot the paper until the edge follows the route that you want to take.

Step 1

Every time the route disappears or moves away from the straight edge of your paper, make a small mark on the edge and pivot the paper so the edge is back on course.





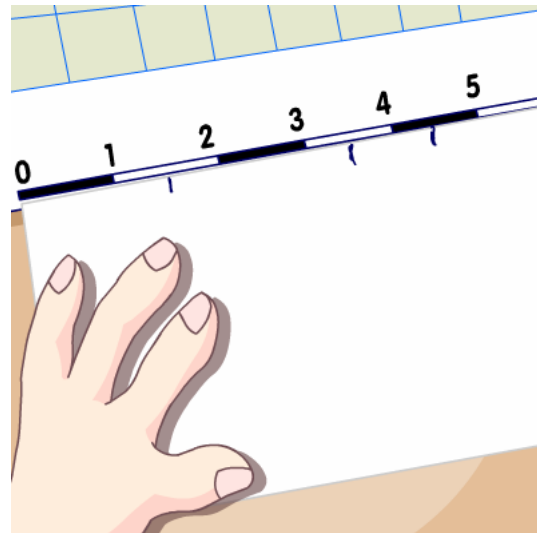
Step 2

Repeat this process until you reach your destination.

Step 3

You should be left with a series of marks along the edge of your paper. You can now place the sheet against the scale bar on your map.

The last mark you made will tell you the real distance you need to travel.



Naismith's Rule

Naismith's rule is a method of determining our speed of travel over the countryside. It states that:

we walk at 3 miles per hour;

to this calculation we must add half an hour for every 1000 ft climbed.

This calculation can be converted into a metric measurement by:

we walk at 5 kilometres per hour;

allow 30 minutes for every 300 meters climbed.

For the purposes of calculating time travelled with young people, it is better to use a figure of 4 miles per hour.

These calculations can be simplified:

15 minutes per 1 km or 7.5 minutes per half kilometre;

1 minute for every 10 metres of height.

These simplifications allow us to calculate with ease.

Measure the distance with the rule on your compass:

4 centimetres = 1 kilometre = 15 minutes travel time.

Count the number of contour lines you pass on your way up. Each contour line = 10 meters = 1 minute extra to your






travel time. You do not add on time if you are descending a mountain or high ground.

Be careful reading contour lines on the map. Your start of position maybe at the 150 metre line and you may travel through to the 250 metre line. You have therefore climbed 100 meters This means you have to add on 10 minutes in order to give your correct arrival time.

4 kilometres per hour is a suggested average for hiking across easy ground with a light pack. If you intend to carry heavy packs or if you are travelling through rough countryside then you will have to adjust this figure. The chart below will give a guide. If you are participating in a Mountain Pursuit Challenge then 2.5 km per hour is the suggested figure when planning your route.

In determining the correct speed of your Troop, it is a good exercise to measure out a set distance and time your Troop over this distance walking at an average pace, with packs, etc.

This simply rule enable us to navigate across rough ground with precision. We can also use this calculation to plan hikes and adventures into wild country without leaving our sitting rooms.

Number of minutes to cover 1 Km	 Road	 Open field	 Open forest	 Mountain
	15	18	22	25

Route Cards/Planners

Route cards are a device we use to plan our adventures across rough countryside. The route card/planner tells us essential information about our purposed route, number in the party, etc.

The card also serves as a safety device as we should leave a copy of the route card with a responsible person who is not taking part in the hike or trip. If an emergency arises then this person can advise the rescue services of your route and aid your rescue.

In preparing a route card we break up our journey into convenient sections or

'legs'. Each leg is then treated separately to calculate distances, bearings etc.



Filling Out A Route Card

Each point of reference on the route card is identified with a grid reference. So you will be travelling from grid reference to grid reference rather than from the edge of the forest to the river. Grid references give us precise position on the map whereas the edge of the forest is open to interpretation.

The direction of travel between two points is determined by a compass bearing. These bearing are obtained from your map (don't forget to add on magnetic variation).

The next steps are to determine what distances you will travel between points and the height gained and calculate the total time for each leg of your journey.

You will also need to add in such things as - stopping to admire the scenery, and rest time. A general rule is to allow 15 minutes per hour. This 15 minutes maybe spread over a number of legs.

In arriving at your total time you should also add in time for lunch or meals as required.

You should take note of the actual time that it takes to complete each section and put this figure down on your card. This information will be useful if you decide to do the route again at a later stage. It is also useful in determining your accuracy, which will improve with practice.

Nature's Compasses

Finding our way using map and compass can be exciting. But what if you had no map or compass and found yourself stranded in open countryside? Nature navigation relies on your skills of observation. Through it you can find your way to safety.

Nature provides us with a variety of ways of discovering direction, the sun, stars, trees, and the wind. The simplest and most obvious way to find north is by the sun. At dawn it rises in the east, at mid-day it is due south, and in the evening it sets in the west.

Finding Your Way At Night

Except for a few nights every month, the moon, like the sun, can help give you direction. Because the moon reflects the sun's light, the moon always points towards the sun, and thus even at night indicates the direction of the sun. Whether the moon is waxing or waning, an imaginary line through the horns of a crescent moon will always give you, approximately, a north/south line.

The location of north can also be determined from the stars using the pole star. The Plough constellation is visible all year round as it moves around the Pole Star. On a clear night the Pole Star can be found by plotting a line through the 'pointers'.

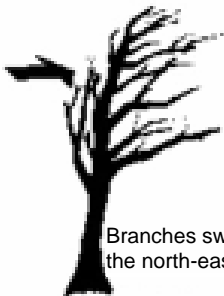


As with the sun and moon, the stars also appear from the east and sink in the west. So, if a star rises you are facing east, if it descends you are facing west.

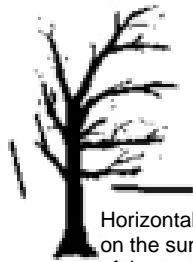
The Wind

Almost every area has what is called a prevailing wind - that is a wind which blows longest and strongest from a particular direction. In the UK this is from the south-west.

Prevailing winds have their impact on trees. You can very often observe how trees in a given area have been influenced by a prevailing wind. They tend to lean in a particular direction. By observing the direction of lean, you can tell from which direction the local prevailing wind blows.



Branches swept to the north-east



Horizontal growth on the sunny side of the tree

If, say, the trees are leaning north-east, you will find that the prevailing wind blows from the south-west. There are but a few exceptions to this general rule - such as with the trees on some of our coastlines.

Nature also provides other wind-influenced indicators. Spiders, for example, do not construct their webs against the wind. So observation of the general direction in which spider webs' are laid can be helpful.

Birds and insects almost always build their nests in positions that will protect them against the prevailing wind, so keep your eyes open.

Trees As Indicators

We have talked about the prevailing wind effect on trees which causes them to lean in a particular direction. Further studies of trees however can reveal many ways in which a tree can indicate direction.

Concentrate your observations primarily on indigenous trees, because nature designed trees in different shapes, with the main object of enabling them to receive as much light as possible. The observations which follow are only generalisations, but are good pointers.

Trees are affected by many factors. You should not jump to conclusions after studying a single tree only, but confirm your findings by observing several trees in the same vicinity.

Most trees tend to develop more foliage on the sunny side.

In many species, the branches exposed to the arc of the sun, and thus receiving more sunlight, will tend to be more developed. They will reach out southwards at an angle nearer the

horizontal. On the other hand, branches on the northern side, lacking sunlight, will tend to grow at a more upwards angle.

The tree trunk itself may lean sunwards, slightly. (While the prevailing wind usually cause a tree to lean with the wind, the sun can also affect its angle.)

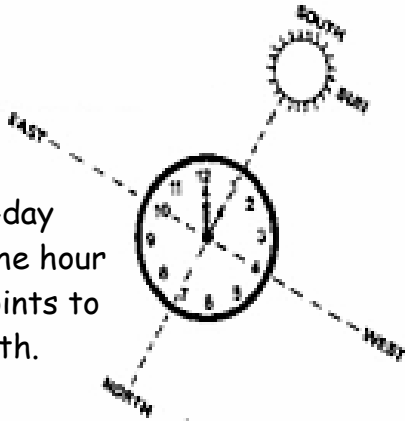
Mosses and lichens will almost always grow on the north side of a tree trunk, rather than on the southern, sun-facing side. Note however that mosses and lichens are also affected by humidity - they flourish best where moisture is retained longer. You can also observe a green strip on the north side of wooden telephone, and similar, poles.

The bark on the north side will often be darker and more tightly grained than on the southern sun facing side.

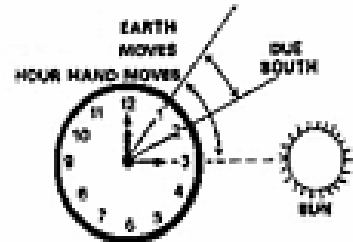
If the tree has been felled, the rings on the stump will be spread further apart on the southern side.

Watch Methods

At mid-day GMT, the hour hand points to the south.



At other times, point the hour hand to the sun. Divide the angle between the hour hand and the 12 o'clock. This line points south.



Shadow method

Place a stick in level ground and mark where the tip of the shadow is cast.

Wait at least 15 minutes and again mark the tip of the shadow.

Draw a line between these two points. This is the east/west line.

A line at right angles to this is the north/south line.

