



Peak Mountain Adventures Ltd

Duke of Edinburgh Award

An information booklet to accompany PMA's DofE expedition courses.

PMA is an Approved Activity Provider for the Duke of Edinburgh Award throughout the country.

In this booklet I wish to make available to you, as you take the steps towards experiencing your DofE expedition, all the theoretical aspects you will need.

I will cover issues surrounding navigation, camp craft, food budgeting and cooking, equipment and rucksacks along with risk assessments and route planning. This is by no means a complete guide in itself, but a tool to help you have a better understanding of what skills and tools you will need to make your expedition a success, safe and more importantly FUN.

I cannot cover all the various equipment parts that are available today in most good outdoor retailers but I will try to cover the basics so that the fundamental aspects can be adhered to and applied to almost any situation. Nor shall I try to influence your purchase of anyone type of equipment or any specific brand name. Instead I shall just try to mention key aspects of equipment that I feel is very important and let you shop or judge for yourself.

Taking your first or continued journey through the expedition side of the DofE can be daunting. This booklet will hopefully help you prepare yourself for your exciting journey and give to a base to reflect on as you gain more knowledge through your training and your practice. Again this booklet is not an alternative for your training or practice.

I wish you well on your journey.

David Nolan

Managing Director

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Navigation:

What is a map?

A map is a simple 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, 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

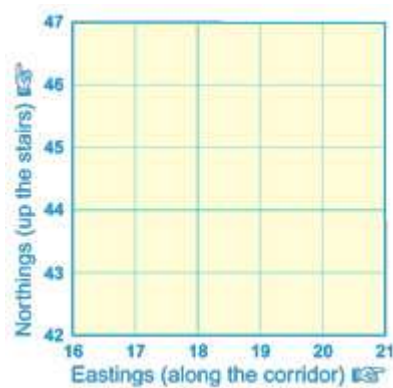
There are some basic features that most maps will include

- 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 white lines, indicating an unfenced minor road.
- Footpaths are marked on Ordnance Survey maps in various colours. On a 1:25,000 scale 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 right of way and public access so please check the map key for full information. It is important to be aware that footpaths which are shown in black are not necessarily public rights of way.
- Woods are shown in green with a coniferous or non-coniferous tree shape 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 meters it is shown as 2 blue lines with a light blue area between). Rivers and streams can be extremely useful in determining your position on the map.
- Scale tells you how much the land has been scaled down to fit on to 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.

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 easting's (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).

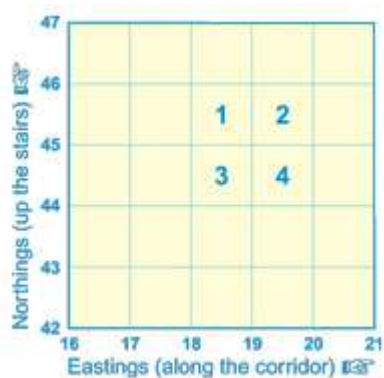
There are two main types of grid reference:

4-figure – for example, **1945**, this indicates a single kilometer 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 easting's 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).

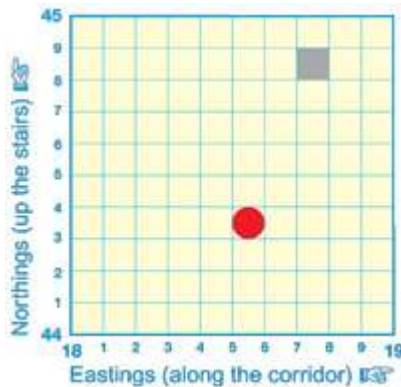
For example, the number 2 in the diagram opposite is 19 across and 45 up and therefore the 4-figure grid reference is 1945

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 diagram opposite would have the following 6-figure grid references:

■ = 187448 ● = 185443

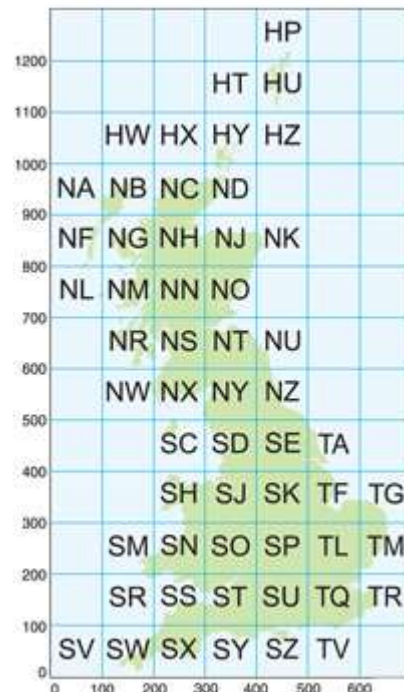
National Grid Lines

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).

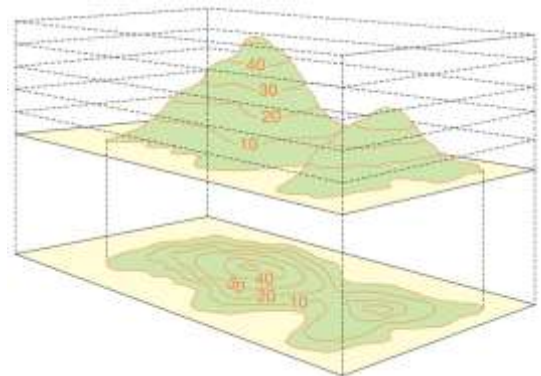


Reading Contours and Relief

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 meters, but it will be 10 meters in very hilly or mountainous areas. The map key will tell you the contour interval used.

The picture above illustrates how a landscape can be converted into contour lines on a map. An easy way to understand and visualize 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 meters on the landscape. These marks would be contour lines.



Being able to visualize 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 to the right 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.

Orienting Your Map - Compass Skills

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.

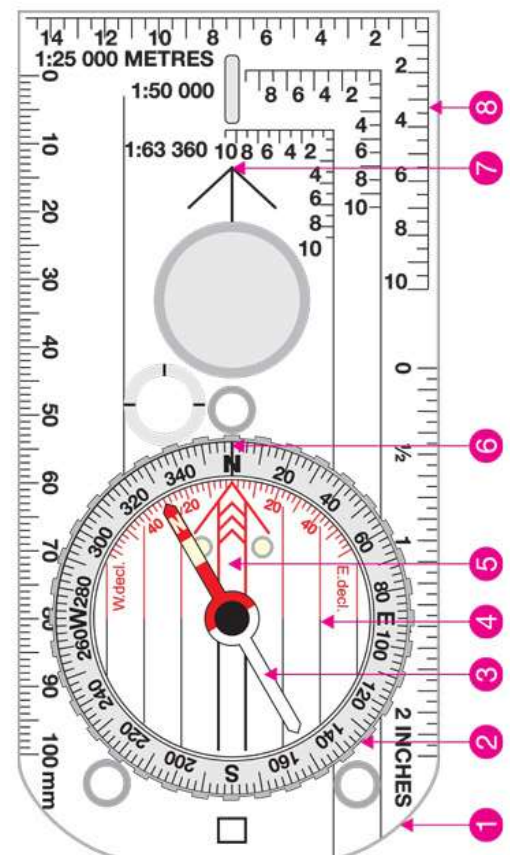
4 - Orienting lines - Fixed within the compass housing and designed to be aligned with the eastings on a map. On some compasses half the lines are coloured red to indicate north.

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.



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 orientating lines match up with the easting's (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.

Measuring the distance travelled on the ground

You now know the direction you need to be heading in, but it would be expecting too much from both your equipment and yourself to be able to reach your target spot on. So you must be able to tell when you have missed your target location and have gone too far. As much as possible you need to track your position on the ground whilst your walking. This can be done using features both on the map and on the ground.

The first step is to use your map to measure the distance to your next check point. If you haven't got a ruler, use the millimeter scale on your compass. On a map with a scale of 1:25,000 each millimeter is worth 25 meters or on a 1:50,000 map each is worth 50 meters and so on. You then need to measure your distance on the ground. There are 2 ways of doing this:

2. Pacing – To pace successfully you need to know in advance how many double paces you can take for every 100 meters. Double pacing is better than single as it reduces the level of counting. It is estimated that a person of average height will take 65 double paces every 100 meters, but it is vital you work it out on your own pace count. Please do this by walking normally. Remember slopes or poor conditions under foot will require an adjustment and steep slopes will shorten your stride dramatically.
3. Timing – If you know, or at least guess, how fast you're walking you can work out how long it is going to take you to walk from your starting point to your next target location. At 4km/hr, which is an 'average' speed, it will take you 1.5 minutes to cover each 100 meters, so a leg of 700 meters should take you 10.5 minutes to walk. Again, as with pacing, this will be affected by slopes, poor underfoot conditions and other factors, so you will have to adjust your time accordingly.

Naismith's Rule

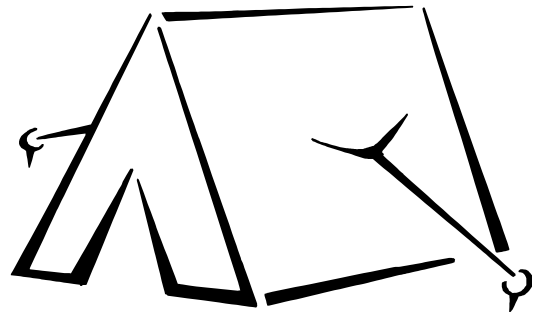
As previously mentioned, measuring the time you take to travel a certain distance is all well and good if you're travelling on flat landscape. However, in reality this won't be the case. With this in mind a Scottish climber, called Naismith, created a simple but effective formulae which took into account the changes in height whilst calculating speed over the ground – 5km/hr plus ½ hour for every 300 meters of ascent.

For convenience this formulae is often expressed in terms of extra time required to climb a given number of contour lines – for example, it takes an additional minute to one 10 meter contour line or an additional 5 minutes for each thick contour line. On a descending slope it is assumed that you will be walking faster on shallow slopes but possibly a lot slower on steep descents – it is therefore taken that this will even out over the course of a day's walk.

Camp craft:

What is camp craft?

- It is the setting of tents in a safe environment.
- Cooking a substantial meal in a safe manner.
- Keeping your tent and surrounding area tidy.
- Leaving the area as you found it.



In most circumstances camping will be done on registered camp sites with various levels of facilities to help refresh or clean yourself and your equipment. This is important as it raises morale but also ensures that your equipment is kept at peak performance so it won't let you down when you need it the most. Many a group have erected their tents and crawled inside to sleep, leaving maps and compasses or items of clothing and foot wear outside in the rain and then complain that it is unreadable or destroyed. So when their need to read a map to find their route they are at a loss.

- Rule: if you keep things clean and tidy you make yours and other's expeditions easier.

Cooking a hot meal at night is a must. It revitalise you and gets morale high. You go to bed feeling warm and ready for the next day.

- When cooking you must stay well away from the flammable tent which you wish to sleep in.
- Keep fuel away from cooking items with a naked flame. At least 5 meters away.
- Clean equipment straight after use as "critters" can come a calling at night.

Surrounding areas are generally covered by the "Critters" statement. Animals are attracted to the smell of food and will come into your tent to find some if things aren't tidied away and clean.

Making sure that things are tidy avoid instances where clothing and boots are left out in the rain till the following day. I always leave my boots upturned and in the porch area as moisture can leak out and can cause lots of condensation in the sleeping area. My rucksack is similarly keep locked and in the porch area. My clean clothes for the next day can sometimes act as a pillow and are generally kept dry in the sleeping section of the tent.

On some occasions a group may be forced to "wild Camp" due to circumstances. On this occasion it is extremely important to make sure you leave no sign of you been there when you set off the next day. No one wishes to come across piles of rubbish in the hills.

Make sure you package all rubbish up and deposit it in a bin at a later date. Remember the country code.

Route Planning:

Route cards are very important. Not only do they give a written account of when and where you will be on your day's journey. They also allow you to gauge your team's skills and abilities at navigation.

EXPEDITION ROUTE CARD (use one per day)

Aim of expedition: _____										Name of DofE Group: _____		
Day of the week: _____		Date: _____		Day number: _____		Names of team members: _____				Address: _____		
PLACE WITH GRID REF		General direction or bearing	Distance in km	Height climbed in m	Time allowed for journeying	Time allowed for exploring, rests, or meals	Total time for leg	Estimated Time of Arrival	Setting out time: _____		Tel No: _____	
START _____		Brief details of route to be followed or planned activity. (Enter full details of activity on reverse)										Escape/Notes
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)		(k)	
1	TO _____											
2	TO _____											
3	TO _____											
4	TO _____											
5	TO _____											
6	TO _____											
7	TO _____											
8	TO _____											
Totals:										Supervisor's name, location and Tel No: _____		

- Day of the week, date and day number: eg: Thursday day 1 of expedition
- Start: Name of location and grid ref
- 1-8 Name of check points and grid ref
- General direction or bearing eg: N, S, SE etc
- Distance in KM: length of journey from one check point to next
- Height climbed: Sum of contour lines in uphill walk. 5 line @ 10m is 50M
- Time allowed: travelling at approx. 3k/hr how long it takes to reach next point
- Exploration and rests: time taken to lunch and break and research etc...
- Total time: Time allowed for Journey + Time for exploration.
- From a setting out point Eg: 9am time it will be that each check point is arrived at.
- Brief route details. Here you wish to describe the route between 2 check points.
- Escape route: where an alternative safer route is used if conditions are too difficult.

EXPEDITION ROUTE CARD (use one per day)

Aim of expedition: Research the different types of Acquisita used in the expedition										Name of DofE Group: _____		
Day of the week: Saturday		Date: 20/7/2011		Day of venture: 2 nd July		Names of team members: _____				Address: _____		
PLACE WITH GRID REF		General direction or bearing	Distance in km	Height climbed in m	Time allowed for journeying (min)	Time allowed for exploring, rests, or meals (min)	Total time for leg (min)	Estimated Time of Arrival	Setting out time: 0:00		Tel No: _____	
START		Brief details of route to be followed or planned activity. (Enter full details of activity on reverse)										Escape/Notes
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)		(k)	
1	Corraline Road 110 850	N	0.51	20m	5	20	25	10:07	Head to Corraline Gough turn left and north towards stream.		Corraline Gough	
2	Chapel Gough 094 073	SW	1.75	20m	10	40m	1:10	11:00	Head westerly to the top of Chapel Gough		Chapel Gough	
3	Estate road 090 061	SW	2.43	45	25	55	1:15	11:15	Head past gate Chapel towards Estate road then south to Estate Circle		Jessie's track	
4	Small cross cairn 083 051	S	1.15	20	20	55	1:05	1:05	Head South to the cairn.		Jessie's track	
5	Chapel gate 086 054	SE	2.35	47m	20	57	2:15	2:15	Continue South east to the top of Chapel gate track		Chapel gate track	
6	Highfield 102 052	N	1.05	27	10	47	0:57	0:57	Down path of settlement rough to complete			
Totals:										Supervisor's name, location and Tel No: _____		

Stick to your plan. If your route card says you will arrive at point 5 at a certain time **never** leave that point until after that time. Being late is perfectly acceptable. If your assessor wishes to meet you there they will wait.

20 conditions and the country code:

1. Your expedition must be by your own physical effort, without any motorized or outside assistance.*
2. Your expedition must be unaccompanied and self-sufficient.
3. Your expeditions must be supervised by an adult who is able to accept responsibility for the safety of you and your team.
4. Your expedition must have an aim.
5. You must be properly equipped for your expedition.
6. You must have completed the required training and practice expeditions.
7. You must undertake at least one practice expedition at each level of the program. You should do this in the same mode of travel and in a similar environment to the qualifying expedition.
8. You and your team must plan and organize your expedition.
9. You must be assessed by an approved accredited Assessor to the DofE.
10. There must be between four and seven people in your team (eight people may be in a team for modes of travel which are tandem).*
11. You must be within the qualifying age of the DofE program level.
12. All the people in your team must be at the same level of assessment.*
13. Your team must not include anyone who has completed the same or higher level DofE expedition.*
14. Your overnight accommodation should be camping.
15. Your expedition must be the minimum number of days required for your DofE level.
16. Your expedition should normally take place between the end of March and the end of October.
17. Your expedition should be in the recommended environment for your DofE level.
18. You must do the minimum hours of planned daily activity for your DofE level.
19. You should cook and eat a substantial meal each day.
20. You must create and deliver a presentation after your expedition to complete the section.

Don't forget that all your team must meet these conditions!

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 dogs under close control
- Consider other people