Advanced Compass Training

Welcome to Cardinal Points Advanced Compass Training.

In the first two interactive lessons on the Cardinal Points website we covered two ways to use a map and compass. We looked at taking a magnetic bearing from a feature in the landscape and used this to find the same feature on the map. Then we reversed this process and took a grid bearing from a feature on the map and used this to point at the feature in the landscape.

Before we move on to the more advanced lessons we will look at perhaps the easiest way to use a map and compass together.

Setting a Map

This quick and easy technique is used to align a map with the landscape. This means that if a feature is to your right on the map it will also be on your right hand side in the landscape. Or to put it another way north on the map will point towards north, east on the map will point towards east and so on.

To do this, simply place your compass on the map and turn the map until the north-south grid lines align with the compass needle. Make sure the red end of the needle points towards the top of the map and that’s it!

The map is now aligned with the landscape. It does mean of course that unless you are facing north yourself the words on the map will not be the right way up, but you should have no trouble reading them. You should double check the alignment by matching up some obvious features.
I’ve held off long enough. It’s time to reveal the terrible truth. Grid North on the map is not the same as Magnetic North and to confuse things further, neither are the same as True North. In some parts of the world this could lead to huge errors in navigation unless we allowed for this variation. So what is the difference between the ‘three Norths’?

**True North** is the point around which the Earth revolves. The problem is the Earth wobbles slightly on its axis so True North varies, very slowly, over time.

**Magnetic North**, simply speaking, is what a magnetic needle points towards. Its position on the Earth’s surface is not at what we call the North Pole but currently lies somewhere in north east Canada. I say ‘currently lies’ because, yes you guessed it, it also varies, and remarkably quickly too (1/6 of a degree each year in the UK, approximately). So as you can see the difference between True North and Magnetic North varies not only over time but from place to place on the Earth’s surface. In the UK the difference is just a few degrees but in Maine on the east coast of the United States it is close to 20 degrees.

**Grid North**, or north on the map, doesn’t change but the difference between it and Magnetic North obviously does. The magnetic variation (also called Declination) for a particular area is normally printed on the relevant map. Remember that an old map will be out of date in this respect. When you take a bearing you have to add or subtract the magnetic variation from your reading (unless you purchase a compass that allows you to set the magnetic variation in advance by turning a small screw).

In the UK we have a little rhyme to help us with magnetic variation: *from grid to mag add, from mag to grid get rid.*

So, if you are taking a Grid bearing from the map and wish to convert it to a Magnetic bearing (as in Lesson Two on the website*), you add the magnetic variation.

If you are taking a Magnetic bearing from the landscape and wish to convert to a grid bearing (as in Lesson One on the website*), you subtract the magnetic variation.

This only works if you are in a part of the world where Magnetic North is west of Grid North as is the case in Europe. If Magnetic North for your location is to the East then you have to do the reverse of this and possibly come up with your own rhyme!

*Ignore magnetic variation in the lessons on the website.
Walking on a Bearing

In Lesson Two on the website you chose one of the stones in the stone circle on the map and were then able to turn towards it and identify it in the landscape.

Imagine the same process but on a larger scale. You are walking in a flat, almost featureless terrain in thick mist. You know where you are; you aren’t lost, but you need to know which direction to walk to find a bridge over a river, that leads to a road and ultimately to a place of warmth and safety. Night is falling, the mist is getting thicker and the temperature is dropping. You don’t panic and your training kicks in. You know your current location, you find the bridge over the river on the map and you take a bearing to it. Can you remember whether to add or subtract magnetic variation? You then turn on the spot until the magnetic needle and the orienting arrow are aligned. Now what?

You’re facing in the right direction but it would be a mistake to go marching off. Firstly, travelling as the crow flies, i.e. in a straight line, may not be the safest or quickest route. You may need to navigate to intermediate points along the way for example to avoid obstacles.

Secondly, you could easily wander off course, especially over long distances or when you are on sloping ground. This is where you need to know how to walk on a bearing.

You are facing in the right direction. Look along the direction the compass is pointing and select something, perhaps a rock or a tree. Walk to that location. In thick mist it may only be a relatively short distance.
Aiming Off

So, you have reached the river but there is no sign of the bridge. Over a long distance, even with the most careful navigation it is likely that errors will have crept in. You should hopefully not be too far from where you want to get to, but is it to the left or to the right? Do you walk upstream or downstream? This is where a technique called Aiming Off comes in handy. When you are heading to a point on a linear feature such as road or a river or even a fence or wall it is a good idea to aim off or deliberately take a bearing to one side of the place you want to be. In this example if you deliberately aimed to the left of the bridge, then when you reach the river you will know that the bridge is on your right.

Recession

I hinted at resection in lesson one on the website. If you were lost or unsure of your location but could identify two or preferably three features in the terrain then you could use resection to find your location. The more equally spaced the features are around you the more accurate the result will be. Take a magnetic bearing from one of the features and make an allowance for magnetic variation. The compass is placed on the map and you align the orienting lines on the compass with the grid lines on the map. Slide the compass over to the feature you recognise. When the feature rests against one edge of the compass you can draw a line on the map (preferably in pencil). Your position will lie somewhere along an extension of this line. To find out exactly where on the line you will need to repeat this process using other known features. Where the lines intersect they will form a ‘triangle of error’ and your location will be somewhere inside this triangle.