

Basic map and compass navigation

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First published in BNT Tracks February 2013

There is tremendous satisfaction to be gained from learning a basic survival skill such as map and compass navigation. What is more when the chips are down, the batteries have gone flat in the GPS and there is a howling storm not far away that skill may make the difference between reaching a safe point of shelter and being stranded in the bush somewhere in a raging thunderstorm.

1) First catch your hare errr ... grab your map and compass. Basic ingredients are a reasonable quality orienteering compass (usually under \$50) and topographical maps of the area you wish to cover. Paper maps are becoming harder to buy over the counter particularly from government suppliers but there are still plenty of online stores selling maps - Geoscience Australia would be a good starting point - [.ga.gov.au](http://ga.gov.au).

You need proper topographical maps with the UTM grid and easting and northing co-ordinates along the edges of the map. Generally tourism maps are unsuitable but I have seen some 1:25K Council maps in Queensland in the past which did have UTM gridlines and co-ordinates (don't confuse street directory grids with letters and numbers for a navigational UTM grid). 1:100K (1:100,000) scale maps are best for National Trail trekking because one day's trek fits into a manageable area on the map.

2) Become personally aware of the points of the compass. Take your compass with you in your daily life. Stop regularly for a few seconds to hold your compass horizontally in front of you with both thumbs and pointer fingers (or cradled in one hand held close to your chest) and slowly turn your body around until the red end of the needle is pointing directly away from you. Make sure that in this and later exercises north on the dial (the rotating ring) lines up with the "direction-of-travel" arrow (in other words - points north!). You are now facing north. South is behind you, east is to your right and west is to your left. Your compass points going clockwise are remembered by "Never Eat Soggy Weetbix"!

Each time you do this take into account the position of the sun and the time of day. Remember in winter the arc of the sun moving east to west shifts northwards across the sky.

Keep doing this orientation process until you develop a strong sense of your position in your environs in terms of the compass points using the sun as your guide.

Be careful any time you are using the compass to give you directions that you are not near metal, particularly iron or steel, or powerlines. Check there isn't any metal or wire in items of clothing which are close to the compass as this can cause errors. Similarly don't lie a compass on the boot of your car when finding direction with the compass needle (when you are using your compass as a protractor or ruler this isn't a problem).

3) Be able to relate your environment around you to your map. Find a map of your local area. Even a copy of a street directory would be OK initially so long as the top of the map is north. Pick a place on the map, work out the directions needed to reach it (using your compass points of north, east, south, west) then travel there using your compass points. Identify a number of landmarks around you and find them on the map.

Once you are comfortable with that go bush to an identifiable location with a 1:100K topographical map and compass in your hand. If you live near the Trail then use that. At your chosen location lay the compass on the map so that the "direction" arrow faces the top of the map and the meridian lines are parallel to the map grid. Turn yourself around with map and compass so the red end of the needle is facing north.

Find your present location on the map. Pick a destination which is easily reached by following tracks or roads marked on the map and travel to that destination using compass points. Once you can achieve that then it is time to hone the skills further.

4) Doin' a 360. We're all familiar with the term "doing a 360" to mean turning a full circle. Compass scales are divided into 360 degrees so by easy division north is 0 degrees, east is 90 degrees, south is 180 degrees, west is 270 degrees and of course 360 degrees is back to north again.

5) When north ain't north. In your exercise of #3, north on the compass is actually magnetic north which, on the east coast of Australia, is currently about 11 degrees east of true north. What you need to find is north on your map, which is known as grid north (because of the irregular shape of the earth, grid north is slightly different to true north - but so close we can disregard the difference). So in #3 above, you need to turn slightly west - in fact reading 11 degrees east on your compass so that you are facing grid north.

If you needed to travel in a grid north direction you would in reality turn your dial clockwise so that is reading 349 degrees (360 - 11=349). When you put "red in the shed" ie with the compass ring set to 349 degrees make sure the red needle aligns with the red N on the dial and the "direction-of-travel" arrow will indicate grid north. This process is known as "declination".

All of this now means that when you are facing north with your map you need to re-adjust your map so that it faces grid north (the "north of the map"). Now that you know how to set the compass to show grid north, lay the compass on your map and turn yourself and your map so that the meridian lines inside the compass dial are parallel with the grid lines on the map. The map is now oriented to grid north.

Now that you understand the theory of map compass navigation we can turn to practicalities.

6) Measuring distance on map and on ground. Compasses usually have rulers along their edges calibrated in the most common map scales. By choosing the correct ruler you can measure distances directly off the map. Alternatively you can use a standard metric ruler applying it to the scale first to work out what distance one millimetre equals. Grid squares are often 1 km by 1 km on maps so you can measure distance directly from the grid.

Distance on the ground is usually measured by pacing. Mark out 100 metres on the ground and pace it with your regular walk, counting the number of paces. Repeat a few times for consistency. Remember the number of paces you walk to cover 100 metres. This is a useful tool when following a bearing. For example a Guidebook instruction might tell you to “travel 300 degrees for 350 metres”. Your compass will give you the bearing and you use your pace count to estimate distance. If there are several people in a party one can pace, one can keep record of the paces and one can follow the compass bearing.

7) Leaving the beaten track (briefly). Now we see the fruits of our hard work. First check your map for the scale and the orientation of the map (which way faces north). In older editions of the Guidebooks orientation AND scale often vary for each map. Then take your map and look for a starting point and destination at least several hundred metres apart. Choose some lightly timbered country which is easy hiking but where you can't see your destination from your starting point.

Lay your map on a flat hard surface (car boots are often used for this in the field - but NEVER put a compass on a metal surface when direction finding with the compass needle!!). Pencil a line from start to finish using your compass base plate edge as a straight edge. Using the correct compass ruler, measure the distance from start to finish.

Now lay your compass long edge along the line you have drawn, with the “direction-of-travel” arrow pointing towards your destination. Ignore the needle. Turn your dial so the meridian lines inside the dial are parallel with the grid lines on the map. Read your bearing off the dial at the “direction-of-travel” arrow.

NOW we turn this “grid bearing” or “map bearing” into a magnetic or trekking bearing as we factor in the magnetic north variation. “Grand Ma’s Socks” tells us that to turn a Grid bearing into a Magnetic bearing we have to Subtract. So if we had a grid bearing of 298 degrees we would subtract 11 degrees to give us a magnetic bearing, on the ground, of 287 degrees¹.

Take your compass in the trekking position (held with thumbs and forefinger) and set up for the bearing as in the last paragraph. Put “red in the shed” (rotate yourself and the compass until the red needle lines up with the red N on

the dial). Use the “direction-of-travel” arrow to identify a recognizable feature distance on your bearing. Walk towards it, counting your paces. When you reach that landmark identify another distant landmark on your bearing and walk towards it continuing to count your paces. When you reach your desired distance you should have arrived at your destination!

It may be necessary to read and re-read this information a few times and it will be best understood when put into practice with a map and compass in hand. There are many refinements to navigating with map and compass, and once you have mastered these basic navigation skills you can progress to more advanced techniques.

Congratulations on your journey to date!

¹ Note: this is true in the east of Australia, not in other parts of the country.