Navigation Reminder Sheet

☺ Following a Route

- Break your route down into easy, manageable "legs"
- In poor visibility, keep the legs short - a few hundred metres or even less
- Choose easy recognisable features to navigate between

☺ Measuring Distance

- Use **double-paces**. How many do you walk in 100 metres?
- Use **Naismith's Rule**
- Use both!

☺ Planning a Leg

Always have the following:

- What **direction** are we walking in?
- What **distance** are we walking?
- What **duration time** will it take?
- What **tick-off features** will we see - **description**?
- What **arrival feature(s)** are we looking for?
- What is the **catching feature**?

☺ Timing (Naismith's Rule)

- We usually walk at about 3 - 4 km per hour
- Slower depending on terrain/fitness/load carried
- Use a "crib sheet" to work out timings
- Add 1 minute extra for every contour you cross when going up hill

☺ Timing Chart

speed km/h	Distance (metres) 1000	500	250	100	50
5	12	6	3	1	30s
4	15	7.5	3m45	1m30	45s
3	20	10	5	2	1
2	30	15	7m30	3	1m30
1	60	30	15	6	3

☺ Magnetic Deviation

- Remember to **check you map** for what it is!
- **Mag-to-grid-GET RID = SUBTRACT**
- **Grid-to-mag-ADD = ADD**

Get the deviation off your map – it is almost nothing at present

☺ Taking Bearings from a map

- **Guess** what direction it is, e.g. "looks roughly south-east, so around about 110 degrees"
- Now **measure** using your compass - check against your guess
- Now **ADD** the deviation
- Off you go!

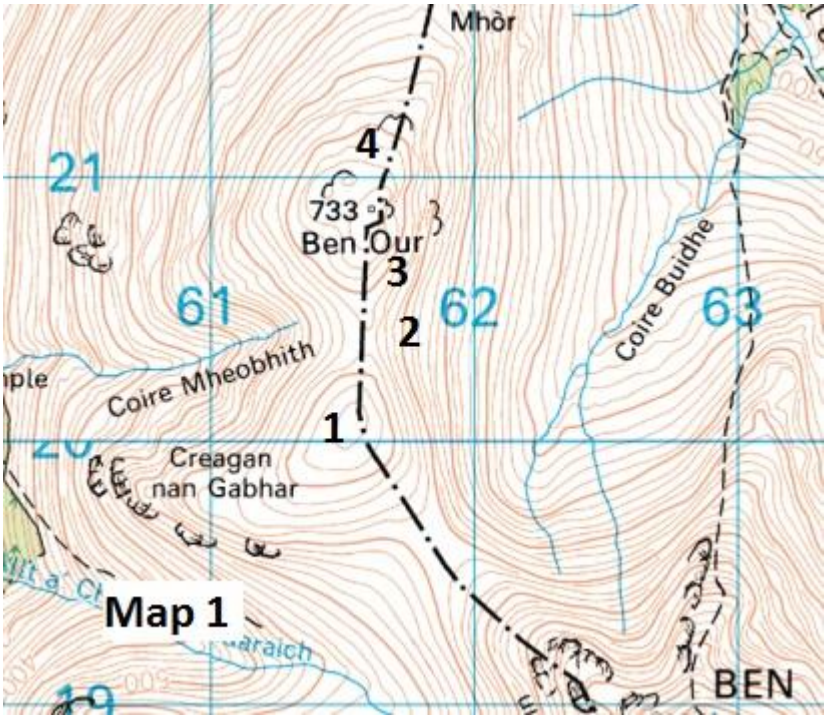
☺ Following Bearings

It's hard to follow a bearing accurately so:

- Keep legs **short**
- In poor visibility, look for small features in your path (rocks, tufts of heather etc), and go to them, rather than keeping your head down.
- It can be a good idea to use other people as "markers"
- Check you're on route using "tick off features" and back-bearings

Planning a Leg

In **map 1** below, we're following the ridge northwards to **Ben Our** from the point marked **1.**



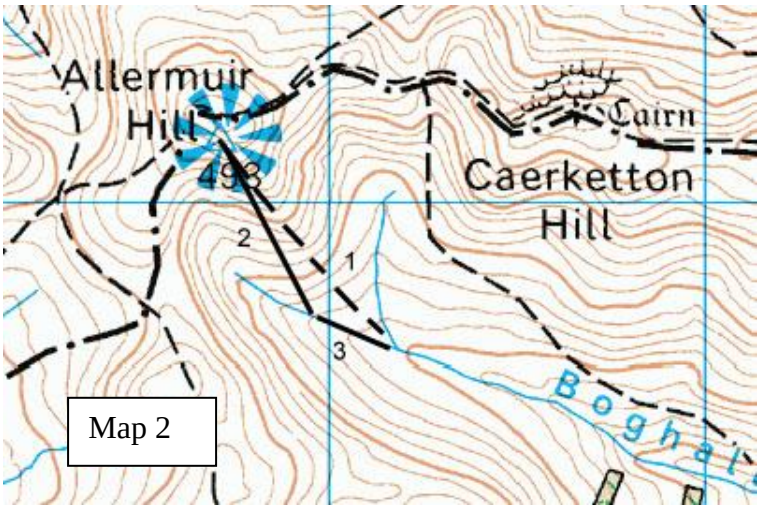
- **Direction:** Roughly north, 9 degrees GRID
- **Distance:** 800m
- **Time:** Allow 4km/h, so about 12 minutes. We descend to point **2,** and re-ascend cross 5 contours, so we should add an extra 5 minutes. **12 +5 = 17 minutes**
- **Tick-off and Arrival Features:**
  1. We leave the hill, head north-ish and loose height until we reach a flat area to the west of **2**
  2. We leave the flat area, and we start ascending, at first gradually then more steeply.
  3. The ground flattens out with some rocky outcrops, We arrive at the top of **Ben Our –** if we are at the top, the ground will be falling away all around us – this is the **arrival feature.**
  4. **Catching Feature** – if we start going downhill after 800m we have missed the top of Ben Our!

Aiming off

We want to travel from the Top of Allermuir hill to the stream junction in map 2.

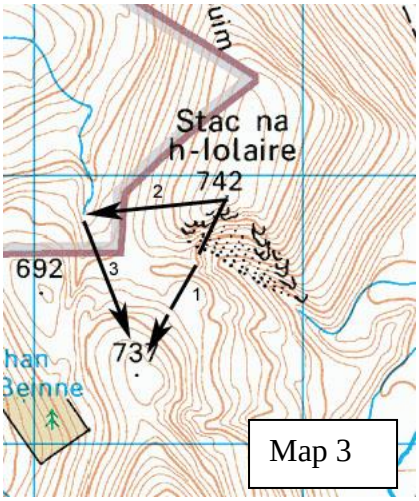
If we take a bearing and walk straight to it (dashed bearing **1)** we may miss our arrival point and be upstream, downstream or even on the wrong stream!

So, we deliberately **aim off**, and take a bearing **upstream** of the junction (bearing **2**), and then travel **downstream** to get to the junction

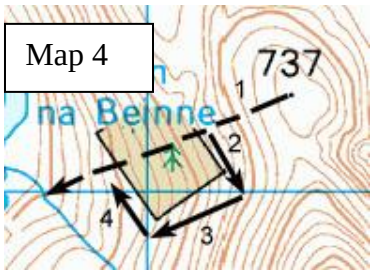


Dog-Legs and Boxing

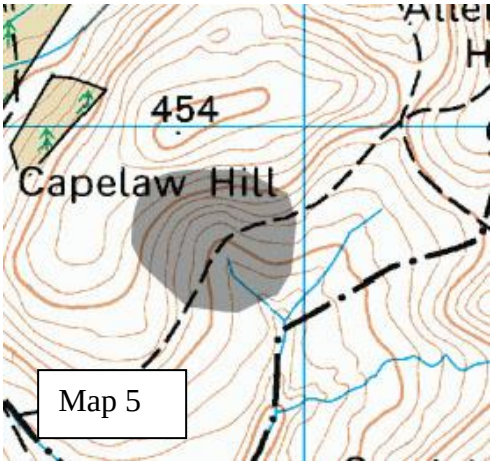
Travelling from Point 742 to 737 (map 3) via dashed bearing **1** is a bad idea, as we go over a cliff! To avoid this, we perform a **dog-leg** by splitting the leg in two. First, we aim for the head of the stream, and follow bearing **2.** We then follow bearing **3** to get to point 737.



Map 4 shows how we **box** around a feature. Bearing **1** takes is straight through the plantation, so we make a 90 degree turn **anti-clockwise** onto bearing **2,** then walk for a set distance. We then turn 90 degrees **clockwise.** Bearing **3** is parallel with bearing 1. We walk until we are past the feature, then turn 90 degrees **clockwise** onto bearing **4,** and walk the same distance as we did when following bearing 2. We are then back on bearing 1, and continue onto the end of the original leg.

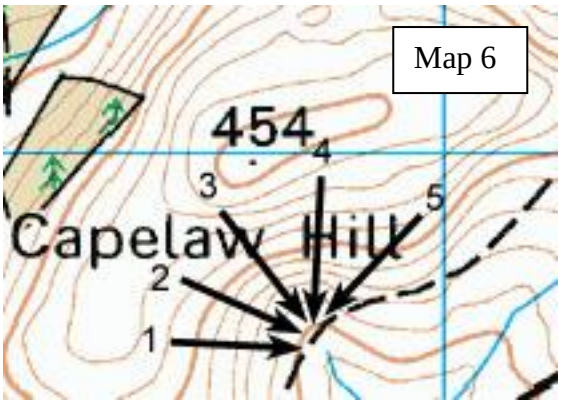


Slope Aspect and Contour Interpretation



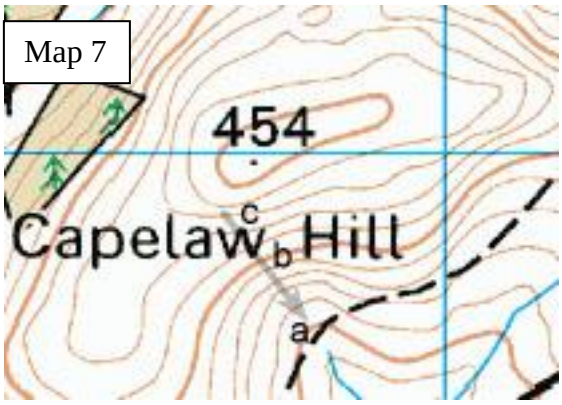
Map 5

Imagine it's dark and misty, we're somewhere on the side of Capelaw Hill (the grey area in map 5). How can we find out **exactly** where we are?



Map 6

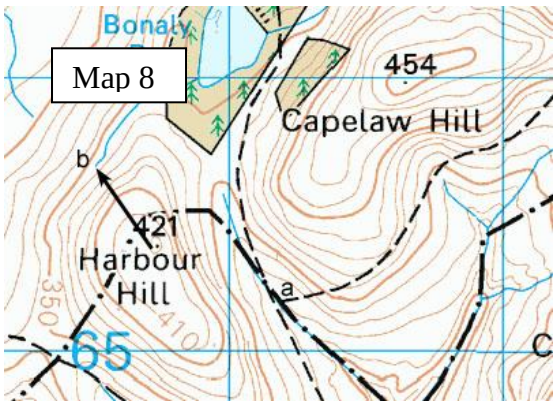
The first thing we should do, is take a compass bearing facing directly **downhill,** as in map 6. Depending on which part of the hill side we are on, the bearing down hill will be different. This is called the **aspect of the slope.** In our example, the slope aspect is changing, all the way around the hill-side. By taking a magnetic bearing, and transferring it to the map, we discover given the slope aspect we are measuring, we have to be somewhere on bearing **3**.



Map 7

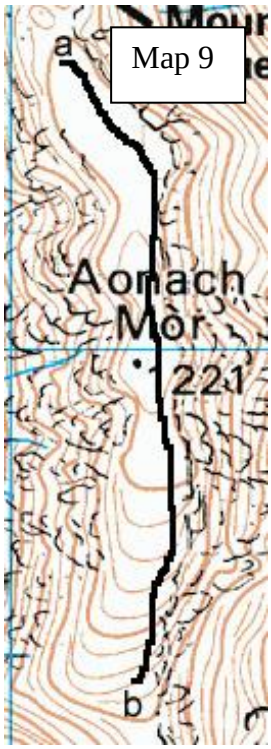
Now we have to find out where on line **3** we are. Looking closely at map 7, we can see that the contours change quite bit. At point **a,** the contours are quite **wide apart**. At point **b**, the contours are very **close together -** here it is **steep.** At point **c,** not only are the contours getting **further apart,** but the **slope aspect is changing.** Now we look closely at where we are standing- we may even want to walk up and down hill a bit. The ground tells us that we the hill side gets **less steep** above **and** below us: we can only be at point **b. Contour interpretation** is invaluable for poor visibility navigation, when you can not make out larger features, or there aren't any!

Attack Points



Map 8

On map 8, we are at the path junction at point **a**, and we want to go to the stream head at point **b.** Because point **b** is a fairly indistinct feature, the best way to find it is to use an **attack point** - a larger, easier to find feature. In this case, we climb to the top of Harbour Hill first, then take a bearing and pace the exact distance to point **b.**



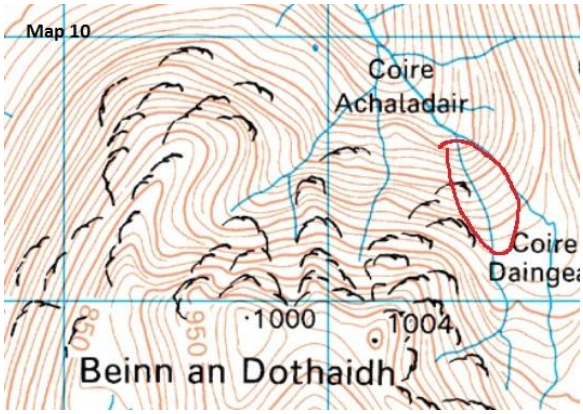
Map 9

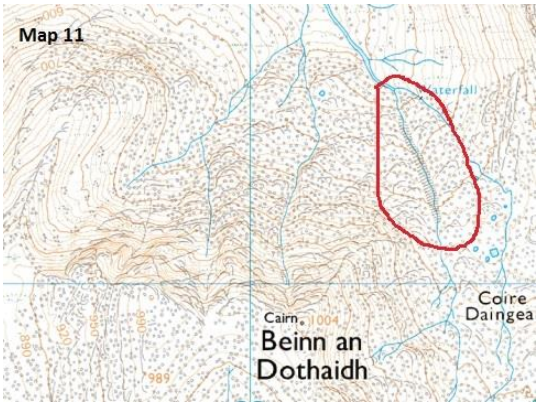
Hand-railing

We can follow linear, easy to spot features to lead us to a destination. Ridges, rivers, forest edges, walls and fences are all good features to use. In map 9, to get from point **a** to point **b**, we **hand-rail** the edge of the plateau. However, hand-railing a feature such as this requires caution - you do not want to fall over!

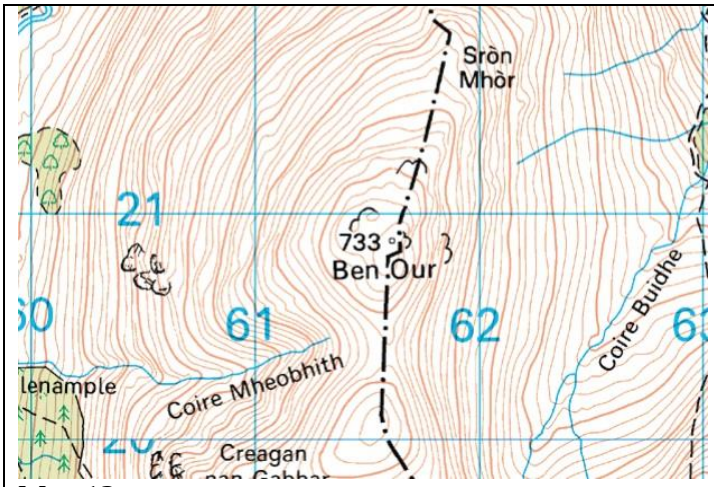
Map Scales

Common map scales are 1:50 000 (map 10) and 1:25 000 (map 11) made by Ordnance Survey. Compare maps 10 and 11 to see how they present detail – especially the summit area of Beinn an Dothaidh and the ravine marked in red. 1:50 000 tend to give a better "flavour" of what is going on while 1:25 000 give much more detail – sometimes too much. OS maps tend use a contour interval of every 10 metres – some 1:25 000 every 5 metres but they are rare. Harvey's maps produce 1:25 000 and 1:40 000 maps which are useful but the contour interval is every 15m and this can be confusing.

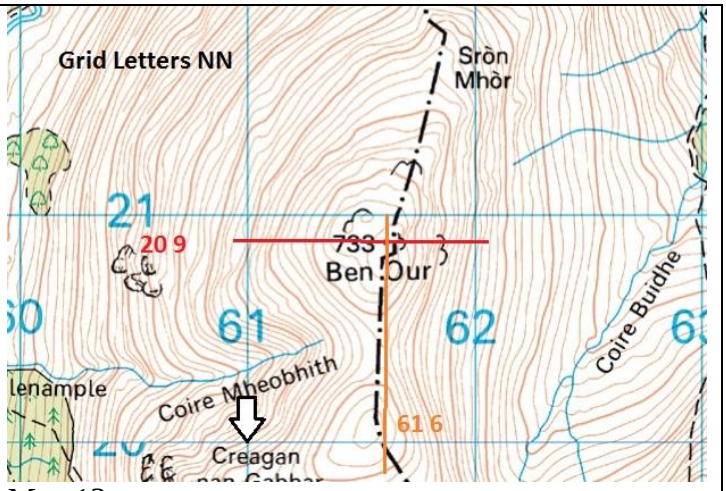




Grid References



Map 12



Map 13

Grid references are a unique way of finding any location on an OS map.

The UK is split into a unique 100km x 100 km squares each identified with two letters. Each 100km square is divided up again into one hundred 1 km x 1 km **grid squares and lines** shown in blue, labelled with numbers.

In the above example, we want to find the grid reference of Ben Our in Map 12. From our map legend, we can find the **grid letters.** In this example, it is **NN.** We now need to identify the 1 km square. Looking at Map 13, the square containing Ben Our is labelled from bottom left corner identified by the white arrow. We use **vertical** grid lines first, then the **horizontal.** The **1 km grid square** Ben Our is in is **NN 61 20.**
We can be more accurate by dividing the grid square up into 10 equal, 100m parts. So, Ben Our is about 6 out of 10 parts along from grid line 61 to 62; and 9 out of 10 parts up from grid line 20 to 21. We can give the location of Ben Our accurate to 100m by quoting the **6-figure grid reference NN 616 209**.

GPS devices and **mapping software** often give grid references to **10** figures, which is down to the nearest 1m. Using mapping software, a 10-figure reference for Ben Our is NN 61608 20879, which if we "round-up" to 6 figures becomes NN 616 209.