

# 6. Should There be a Lake Here?



## Introduction

It's embarrassing when rescuers need rescuing! Being lost is something searchers work hard not to become by regularly taking part in navigation exercises.

## Activities

### Ages 10 ½ - 14 ½ years (e.g. Scouts and Guides)

- Recognise common colours and symbols on an OS map.
- We've all heard of the north and south poles, but how many are there?
- Show how to orientate a map using both terrain and a compass.
- "Add to mag, rid to grid". Is this true everywhere? Check what maps you have and calculate the magnetic variation that should be used for them.
- Show knowledge of Safety on the Mountains, the Countryside Code or the Cave Conservation Code, whichever is most relevant to your area or interests.
- Following safety guidelines from your organisation complete one of the following:
  - Complete an orienteering course of at least level yellow.
  - Find at least 2 geocaches.
  - Using only a map navigate a pre-planned route.



From Hill to High Water™



### Ages 14 ½ years + (e.g. Senior Section, Explorers and Network)

- Recognise common colours and symbols on an OS map.
- Show how to orientate a map using both terrain and a compass.
- Show knowledge of Safety on the Mountains, the Countryside Code or the Cave Conservation Code, whichever is most relevant to your area or interests.
- Naismith's rule estimates walking times saying one hour for every three miles walked plus half an hour for every 1000ft of height gained. We've gone metric since then so what rule do you think

works for you?

- In pairs or threes prepare a route card for a 10 mile/16 kilometre route. Swap cards with another group then draw their route on a map to see how clear it is to follow.
- Following safety guidelines from your organisation complete one of the following:
  - Complete an orienteering course of at least level light green.
  - Find at least 5 geocaches.
  - Using only a compass and pacing navigate a pre-planned route.

## Equipment

Relevant ordnance survey maps, compasses, route card template, background resources (below) and access to the internet, a library or experienced map reader.

## Setup

Activity advisors are a source of information and should be able to give advice and instruction on map and compass if required. **These notes are designed only as a refresher**, if you are not familiar with map work, rope in someone who is!

Preparing route cards is best done in twos or threes. Outdoor activities are best done in patrols or teams of at least the 'safe' number stipulated by your organisation.

Participants need outdoor clothing to stay warm and dry as necessary and should carry equipment and items recommended by your organisation. Remember to carry water!.

## Further information

### Map Reading

There are many ways to learn to recognise map symbols. One fun way is through map symbol bingo! In the second resource for this challenge you will find bingo cards and symbol flash cards. Simply print and cut where needed.

Other resources are:

Map reading: <https://www.ordnancesurvey.co.uk/documents/resources/map-reading-made-easy.pdf>

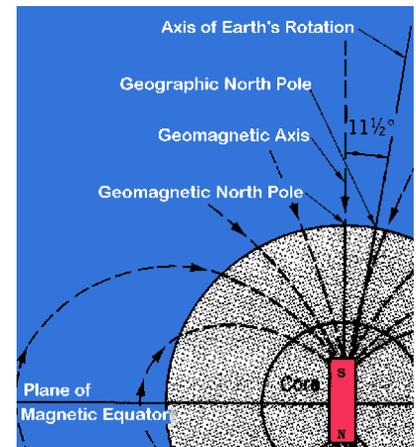
Map reading: <http://scouts.org.uk/supportresources/3660/scout-skills>

Using a compass: <http://scouts.org.uk/supportresources/3653/scout-skills>

## North and South Poles

There are twelve poles: two geographic poles, two instantaneous poles, two magnetic poles, two geomagnetic poles, two celestial poles and two other “poles”:

- A geographic north pole, ‘true north’, is the northernmost point on the earth's surface. It's located at 90° North latitude and is the point where all imaginary lines of longitude converge.
- An instantaneous north pole, the point on the earth's surface where the earth's rotational axis meets the earth's crust, although because the Earth wobbles slightly this point isn't fixed!
- A magnetic north pole where compasses point to. If you're standing here with a compass, the needle would dip and try to point straight down. Over the magnetic south pole, your compass needle would try to point straight up.
- A geomagnetic pole, a secondary magnetic pole which is currently around 11 degrees different from magnetic north. It's a remnant of the variable magnetic fields of our planet and is much weaker than magnetic north.
- And a celestial north pole which is an imaginary point in the sky where if you carried on the line of the earth's axis into the sky it would meet the stars. This is approximately around Polaris or the Pole Star.



There is also a town in Alaska called North Pole and an "additional" south pole; the Ceremonial South Pole, an area set aside for photo opportunities at the South Pole Station! It is located a short distance from the Geographic South Pole and consists of a metallic sphere on a plinth, surrounded by the flags of the Antarctic Treaty signatory states.



## Magnetic Variation – UK National Grid Reference System

The terminology here is a whole subject in its own right. However, we're only looking at the difference between the bearing measured on a UK map using the national grid reference system (such as Ordnance Survey or Harvey's) and the compass bearing you then use for walking.

As you've seen above, compasses show magnetic north, aligning with the earth's own magnetic field. Maps' grid lines are oriented to Grid North.

The difference between the two ('magnetic variation') is usually shown on maps in a section cunningly given different names on different maps even by the same company!

You need to correct the difference between the map and compass before you can follow a compass bearing. The example below is taken from an OS 1:25,000 scale map and is found at the bottom of the map. The information is called “North



Points”.

*At the centre of this sheet true north is 1° 53' west of grid north. Magnetic North is estimated at 3° 49' west of grid north for Jul 2006. Annual change is approximately 09' east.*

- To decode this: “ = Degrees, ‘ = minutes.
- There are 60 minutes to a degree so to use this map in November 2011 a correction of 3° 49' – (9' \* 5) = 3° 49' - 45' = 3° 04'. In reality add 3 degrees to the grid bearing to convert to compass bearing.

If you pick up another map you'll likely need to make a **different correction!**

Is the rule “add to mag, rid to grid” true everywhere? NO! In the UK this used to be the case but no longer. Have a read of the link below:

<https://www.ordnancesurvey.co.uk/blog/2019/03/magnetic-north-continues-its-march-to-the-east/>

Also, remember magnetic variation changes as you move around the world, and in other countries maps will be drawn using a different projection and grid system than in the UK. ALWAYS check the number of degrees difference before using a compass.

## Route Cards

Route cards are a useful tool to plan your hike and to give you an insight into possible tricky navigation points and can be found on the internet. You should check to see if your organisation specifies a particular template route card to use. The template route card you use should, at the least, include map references, compass bearings, timings, breaks and evacuation routes in case of problems.

If you don't already have a route card template, contact your mountain/hiking advisor to get one so that you comply with your organisation's requirements

In order to be prepared for your navigation exercise and to fill in the route card the participants will need knowledge of:

- Information and symbols on the map.
- Orientating a map using either terrain or a compass.
- Six figure map references.
- Contour lines (to know whether a route is going up or down and how steeply).
- Taking compass bearings on a map.
- Magnetic variation (where to find it on the map and how to use it).

## **Naismith's Rule**

Naismith's Rule is a rule of thumb that helps in the planning of a walking or hiking expedition by calculating how long it will take to walk the route, taking into account hills. The rule was devised by William W. Naismith, a Scottish mountaineer, in 1892.

The basic rule is: *Allow 1 hour for every 3 miles (5km) forward, plus half an hour for every 1000 feet (300m) of ascent.*

Many mountaineers and hill walkers now use 4km per hour plus 1 minute for every 10m contour crossed of ascent when using metric OS maps but you should consider what is best for your group. Consider:

- When walking in groups, calculate for the speed of the slowest person.
- The basic rule assumes reasonable fitness, on typical terrain, under normal conditions.
- The timings produced by applying Naismith's Rule are usually considered the minimum time necessary to complete a route. This is because of the huge variety of factors that can influence the total route time such as:
  - The number and length of stops.
  - Weight carried.
  - Fitness.
  - Navigational obstacles.
  - Children or older people in the party.
  - Weather conditions.
- To plan expeditions or walks it is useful to use the rule together with a route card for greater accuracy.

## **Countryside Code**

A link to an example of a Countryside Code is given below. You should check to see if there is a specific one for the area you are visiting.

[www.herefordholidays.co.uk/docs/Countrysidecode.pdf](http://www.herefordholidays.co.uk/docs/Countrysidecode.pdf)

## **Safety on the Mountains**

Before venturing on to the mountains make sure you have the correct knowledge and qualifications required by your organisation or association especially if you are leading a group.

## **Orienteering**

Orienteering is a challenging outdoor sport that exercises the mind and body. The aim is to navigate in sequence between control points marked on a unique orienteering map and decide the best route to complete the course in the quickest time. It doesn't matter how young, old or fit you are, as you can run, walk or jog the course and progress at your own pace.

British Orienteering has loads of useful information for beginners on their website, including what you do and how to get involved! Also, there are orienteering clubs in every county who are always happy to help introduce new people.

[http://www.britishorienteering.org.uk/page/newcomers\\_guide](http://www.britishorienteering.org.uk/page/newcomers_guide)

## **Geocaching**

A worldwide, outdoor treasure hunting game. Participants navigate to a specific set of GPS coordinates, using GPS handsets or smart phones with a downloaded app, and then attempt to find the geocache (container) hidden there.

There are over 1 million hidden caches worldwide and over 2000 just in Kent!

<http://www.geocaching.com/>

## **Books on navigation**

- Mountaincraft and Leadership – Eric Langmuir
- Land Navigation (route finding with map & compass), The DofE Scheme -Wally Keay
- Ultimate Navigation Manual – Lyle Brotherton

Many others may be available in your local library, outdoor shops and book shops.