

# Training others

This sheet provides practical ideas to help teach other volunteers and young people how to use maps and compasses. Training might take place informally on camp, as part of a series of regular Scout meetings or more formally as part of a skills workshop or training course. The sheet is split into two parts; map skills are covered first, followed by compass skills.

## Map skills objectives

By the end of this session, participants will be able to:

1. Identify different map types and their uses.
2. Identify map symbols and describe their meanings.

3. Demonstrate how to find and use a six-figure grid reference.
4. Understand map scales and measure distances.
5. Understand how to interpret contours on the ground.

## Equipment

- A selection of maps including Ordnance Survey (OS) maps from the Explorer (1:25,000) and Landranger (1:50,000) series.
- Resources for running training activities as required.

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## Lesson 1: What is a map? (20 minutes)

### Introduce...

**What?** Maps and their uses.

**How?** Provide participants with a list of different occupations, such as pilot, weatherman, courier, tourist, hiker, and ask the group why each of these people might need to use a map.

piece should show a specific feature, such as the key, scale bar, grid numbers and so on. Give participants a piece each and ask them what they think their piece is used for. Put the pieces back together, and correct participants' explanations where necessary.

### Demonstrate...

**What?** That there are various different types of map and each has a different use.

**How?** Show participants a variety of different maps, such as a road atlas, a town map, a city A–Z, a tourist map and an OS map. Working in pairs, ask participants to categorise the maps in some way. This could be done by looking at scale, colour or size. Once they have completed this task, demonstrate that maps are designed differently depending on their intended use. Display an Ordnance Survey (OS) map and explain that these are the maps you will be focusing on during the session.

### Apply...

**What?** This activity reinforces the parts of a map and what they do.

**How?** Ask pairs of participants to create a map of their immediate area. They should include all of the key features found on an OS map.

### Explain...

**What?** The key parts of an OS map.

**How?** Cut an Ordnance Survey map into pieces. Each

### Summarise...

**What?** Use this section to check understanding of the topics covered.

**How?** Play a card-sorting game in which the object is to match two sets of cards together as quickly as possible. One set should be marked with the name of a type of map or feature ('road atlas', 'town map', 'key' and so on), and the second set with corresponding explanations and uses ('making a road journey', 'finding your way around a town', 'explains the symbols found on a map').

## Lesson 2: Map symbols (20 minutes)

### Introduce...

**What?** Map symbols and their use.

**How?** Using photographs of common features, ask participants to draw what they think the feature would look like from above. Some will be easy – buildings and roads, for example, while others may be more difficult – caravan sites or windmills. Explain that map symbols make it easy to understand what a feature is, even if it is difficult to tell from a real life sketch.

### Demonstrate...

**What?** That a standard set of symbols are used on OS maps.

**How?** Using a printed set of map symbol cards, show participants that common features are represented by a symbol. Ask them to draw the symbols beside their 'views from above'.

### Explain...

**What?** That the map symbols are contained in a key, which can be used to interpret the information on a map.

**How?** Show participants where the key can be found on an OS map. Working in teams, ask them to complete their own mini-version of the OS

map key. Stick an OS map up at one end of the room, and place sheets of paper, a set of symbols and a set of words at the other end. Teams must run between the map and their blank sheets to work out which symbols belong with which words to complete the key.

### Apply...

**What?** This section reinforces learning about map symbols and what they mean.

**How?** Print out a number of map symbols on cards and stick them up around the room. Tell a story of a hike, in which you visit various different features. Each time you mention a different feature participants should run to the correct symbol. The last one there is 'out'.

### Summarise...

**What?** Use this section to check understanding of the topics covered.

**How?** Give out pieces of paper and pencils. Name a map feature and ask participants to draw the correct symbol, holding it up for you to see. You can give scores for correct responses, but note any participants who are struggling and give them extra help if needed.

# Lesson 3: Grid reference (30 minutes)

## Introduce...

**What?** Grid references and their use.

**How?** Using a map, ask the group to identify features from map symbols and explain where they are. Start off with easy symbols (e.g. a bridge – where a road crosses a river), then move on to more difficult features, particularly symbols that appear frequently on the map. Explain that grid references enable us to identify a location without having to spend time describing what it's near or close to.

## Demonstrate...

**What?** The difference between co-ordinates and grid references.

**How?** Most young people will have learned basic co-ordinates from school. Use this starting point to explain the concept of a four-figure grid reference. Play a game of battleships to revisit the idea of coordinates. Then move the coordinates from numbered squares to the lines between the squares – this turns them from coordinates into grid lines. Play another round of battleships using grid lines, to get the group used to giving four-figure grid references. Also introduce the concept of going 'along the corridor before going up the stairs', ie always giving the easting before the northing.

## Explain...

**What?** How you can be even more accurate by using a six-figure grid reference.

**How?** Using the same idea as the first activity, ask the group how they would tell the difference between two identical features that appeared in the same grid square. Explain that they can

do this by splitting the grid square again – an easy way to do this is to use the concept of decimal places. Using a copy of the map and pencils, draw a 10 by 10 grid over a single grid square. Explain that each little line is 'point one' (0.1) of a square and that this can be used to pinpoint a more accurate location. Practise this by writing down the location of some map features including the decimal point. To perfect the skill, simply rub out the decimal point to turn the four-figure reference with decimals into a six-figure grid reference. Finally, locate another feature on the map, but this time, do not draw the pencil grid line – participants will need to estimate where the lines would be.

## Apply...

**What?** This section reinforces how to use six-figure grid references.

**How?** Create a map treasure trail. This should be a story that participants can follow on their maps using six-figure grid references. Ask them to write down what they find at each location to create a list of answers – if you're clever about it this could even spell out a word or create a sentence (e.g. 'the first letter of the symbol found at 123, 456').

## Summarise...

**What?** Use this section to check understanding of the topics covered.

**How?** Play a quick-fire quiz. Give the group a six-figure grid reference and ask them to shout back (or write down) the name of the symbol. Then reverse this, asking them to tell you the correct six-figure grid reference for any symbol that you name.

## Lesson 4: Scale and distance (30 minutes)

### Introduce...

**What?** The fact that maps are drawn to different scales and show different amounts of detail.

**How?** Ask participants why it might be difficult to draw a picture of a house in real size (you'd need a giant sheet of paper!). Explain that we can shrink the picture down until it fits on the paper – this is called scaling. A scale number shows how much something has been scaled by. Use simple examples to show this, demonstrating how many times smaller a picture of an object is compared to the real object. This can then be transferred to a map. So, for example, a scale of 1:25,000 means that 1cm on the map is 250,000 cm (or 250m) in real life.

### Demonstrate...

**What?** How distance is shown on a map using a scale bar.

**How?** Instead of having to work it out every time, the scale bar, which is found at the bottom edge of a map, does the work for us. Just as you would use a ruler to measure how long something is in cm, you can use the scale bar to tell how far a distance on the map is on the ground, either in kilometres (km) or in miles (m). Demonstrate this to participants using a map. Make a ruler from a strip of paper, changing the units to match the scale of the map.

### Explain...

**What?** How to measure distance using string and the scale bar.

**How?** A piece of string can be used to measure the distance between two distant points or a route that isn't straight. Simply lay the piece of

string along the route, marking the start and the end. Then move the string to the scale bar and measure it off against this to come up with the total distance. Get participants to practise this in pairs – first by following a drawn or straight line, then by coming up with their own route. Ask them to find the shortest distance between two symbols, such as a lighthouse and a public house.

### Apply...

**What?** This section reinforces how to measure distance on an OS map.

**How?** Using a similar story activity to the map treasure trail in the previous lesson, ask participants to work out the distance that would be covered if you were to walk each part of the treasure trail.

### Summarise...

**What?** Use this section to check understanding of the topics covered.

**How?** Prepare a series of quick tasks on slips of paper, and give each participant a task to complete. Example tasks could be: 'the distance from A to B', 'which of these routes is shorter...' and so on. Run this as a relay activity, so that as participants complete each task they come and collect another one. See who can complete the most tasks in a set time.

## Lesson 5: Contours (30 minutes)

### Introduce...

**What?** The concept that maps are two-dimensional (2D) while the world is three-dimensional (3D).

**How?** Show participants a map of a mountainous area and ask them to measure a distance using the skills from the previous lesson. Then explain that it's a mountainous area – how would this affect the distance they would have to cover? A good way to demonstrate this is by using an egg box – from above it looks flat, but from the ground it is not.

### Demonstrate...

**What?** That markings on a map are used to show the shape of the land.

**How?** It is important that participants understand that when looking down, it is difficult to understand the topography or shape of a landscape. A good way to demonstrate this is to make a model. Prepare two sets of concentric circles cut from one-inch thick MDF or polystyrene. Paint one set green and the other set in different colours, using a different colour for each circle. Stack the green set so that the biggest circle is at the bottom and the smallest at the top. Ask participants to look straight down and tell you what shape the hill is – because they are all green this will be difficult to determine. Now try with the different coloured circles – it will be immediately obvious how high each section of the hill is. This technique is called relief shading.

### Explain...

**What?** How contour lines work.

**How?** Relief shading is effective, but makes it hard to see other details of the map. Instead, introduce

the concept of contour lines. To do this, use the green circles again, but this time, stick red wool around the edge of each circle. Now when you look down, you see contour lines instead of flat green. Add numbers to each line too, marking the number 10 on the lowest circle, 20 on the next, then 30, 40 and so on.

### Apply...

**What?** This section reinforces how to interpret contours on an OS map.

**How?** In pairs, ask participants to build their own model hill. They could use Plasticine, salt dough, papier mache or sticky tape and balls of newspaper. Then add contour lines with coloured wool. When they have done this, ask them to draw a map of their hill, including all the contour lines. Make sure participants understand that the closer together the contours are, the steeper the slope.

### Summarise...

**What?** Use this section to check understanding of the topics covered.

**How?** Use an OS map to check how well the group understand the concept of contours – pick a fairly simple grid square and ask pairs of participants to make a model of the shape of the land in that square. Plasticine or salt dough works well. Make models of a valley, a prominent summit, a ridge, and finally an area that combines high and low level terrain.

### Taking it further...

You could create lessons to cover some of the following topics:

- Run a simple navigation activity in which teams of participants follow a route using a map.
- Investigate GPS navigation, which can be used to give grid references to an even higher degree of accuracy than six figures.

- Follow up map-reading training and activities with a lesson on using a compass, and learn how to take bearings. This is the next stage in learning and practising good navigation and orienteering.
- Find out about route cards and how to create them. Route cards are a useful aid to route planning and navigation.

# Compass skills objectives

By the end of this session, participants will be able to:

1. Identify different map types and their uses.
2. Identify map symbols and describe their meanings.
3. Demonstrate how to find and use a six-figure grid reference.
4. Understand map scales and measure distances.
5. Understand how to interpret contours on the ground.

# Equipment

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## Lesson 6: What's in a name? Compasses (20 minutes)

### Introduce...

**What?** Compasses and their uses.

**How?** Show participants a selection of different compasses. Examine each type carefully. See if they can identify each type, their uses and the different parts.

### Demonstrate...

**What?** The main features of a Silva-type compass.

**How?** Point out the parts of a Silva-type compass and then ask participants to draw and label a picture of a giant compass. Alternatively, 'build' a human compass by forming its shape on the floor. Two people lying down could represent the needle, for example.

### Explain...

**What?** How a compass works.

**How?** Explain how a compass works and that the needle points towards a magnetic source. You can demonstrate this by using a magnet and an old compass. Also explain the differences between true, grid and magnetic north.

### Apply...

**What?** This activity reinforces how a compass works.

**How?** Make your own compass by magnetizing a needle and hanging it from a piece of cotton in a jar or by floating it in a bowl of water.

### Summarise...

**What?** Use this section to check understanding of the topics covered.

**How?** Test the compass that you have made and compare it to a real compass. Use the findings to discuss why compasses are designed the way they are, e.g. as sealed units.

# Lesson 7: Walking on a compass bearing (20 minutes)

## Introduce...

**What?** Compasses are used to find precise directions in the field.

**How?** Build on basic knowledge of compass points with a game. Spread a number of objects around a field, shout out a direction and ask participants to run to the object that lies in that direction. Make the game harder by moving objects closer together, to introduce the idea that a more accurate method of determining direction is needed.

## Demonstrate...

**What?** How to take a compass bearing.

**How?** Make an oversized compass from a 360° protractor and a piece of clear plastic. Mark the degrees, direction of travel arrow and orienting lines with a marker pen. Make a needle from cardboard and a large split pin. Use the giant compass to set the bearing to the direction of travel arrow, emphasising your actions to make this obvious. Then turn the whole compass until the needle lines up. It may be difficult to keep your cardboard needle pointing north – try turning the needle from beneath the compass to keep it lined up as you move the rest of the compass. Remember that demonstrations should be visual, not auditory, so allow participants to concentrate on your actions and save the explanation until the next stage.

## Explain...

**What?** How you took the compass bearing.

**How?** Repeat your demonstration, but explain what you did at each stage.

## Apply...

**What?** This section puts compass bearings and their use into practice.

**How?** Organise a pirate treasure hunt. Create an ancient treasure map by staining a sheet of paper with a tea bag. Include directions to find the treasure, such as 'X marks the spot at 26 paces on a bearing of 125°'. Alternatively, why not play bearings golf? Pairs of participants must calculate the bearing and distance from the tee to the hole, then walk it. Where they stop is one shot. They must continue taking bearings and judging the distance until they reach the hole. The pair with the fewest corrections, or 'shots', wins.

## Summarise...

**What?** Use this section to check understanding of the topics covered.

**How?** Revisit the compass points games used to introduce the lesson, but this time give participants a bearing instead of a direction. Can they locate the intended objects?

## Lesson 8: Taking a bearing from a map (30 minutes)

### Introduce...

**What?** A compass can be used with a map to plot an accurate route.

**How?** Give participants a simple route to follow on a map. At a midway point, the route should split into two paths, but the directions should give only a vague indication of which way to go, such as 'north'. This demonstrates that it is important to be able to use bearings with a map as well as in the field.

### Demonstrate...

**What?** How to take a bearing on a map.

**How?** how how to work out a bearing between two prominent features on a map. Use a print-out or photocopy of an OS map so that you can draw arrows or lines on the map to clearly show what you are doing. Emphasise your actions throughout. As this skill involves small measurements and adjustments with the compass, it may be necessary to explain as you demonstrate, rather than afterwards.

### Explain...

**What?** How you took the bearing.

**How?** If necessary, repeat the demonstration, explaining what you did at each stage in more detail.

### Apply...

**What?** Reinforce the learning by asking participants to take bearings from a map themselves.

**How?** Ask participants to create their own route plans, linking various waypoints on an OS map. Set some rules; you could specify that the route cannot cross motorways, for example. However, you could allow the route to leave footpaths if you are confident in your participants' route-planning abilities. Ensure that participants work out the distance of their routes to link this activity to the mapping work covered previously.

### Summarise...

**What?** Use this section to check understanding of the topics covered.

**How?** If your OS maps cover a local area, then participants could swap route plans and try to follow them on the ground. Alternatively, participants could swap route plans and follow them on their maps – the winning teams are those that end up in the right place!

### Taking it further...

You could create lessons to cover some of the following topics:

- Taking back bearings to correct navigational errors.
- Learn about resectioning, which involves referencing two or more distant features in order to pinpoint a location.
- Learn how to 'aim off' to ensure you reach your destination.
- Learn how to use bearings to box around a hazard.