BUSHBEAT

LEARNING OUTCOMES

Having completed this badge the members will be able to:

- use a compass;
- identify tracking and trail signs;
- read and interpret a topographic map;
- plan and participate in a hike,
- understand the use and limitations of modern GPS navigation technology.

BADGE REQUIREMENTS

1. Demonstrate how to read the 16 principal points of a compass and relate these to their equivalent in degrees.
2. Read the meaning of a series of simple tracks.
3. Learn trail signs and be able to set a trail for others to follow.
4. Learn how to read a map accurately and identify the components of a map.
5. Demonstrate how to orientate a map and plot compass bearings.
6. Plan, prepare and participate in a five kilometre hike.

The bushbeat badge is one of several badges on camping and outdoor survival.

GUARDS RANGERS

CATEGORY

Skills

TIME FRAME

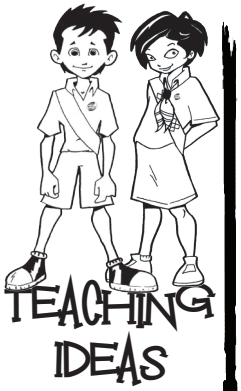
Five - six weeks

AIM

To provide members with knowledge and skills in navigation and hiking.

THE SALVATION ARMY SAGALA GUARDING AND LEGION ACTIVITIES

THE SALVATION ARMY YOUTH & CHILDREN'S MINISTRIES AUSTRALIA EASTERN TERRITORY



Teaching ideas

1. Demonstrate how to read the 16 principal points of a compass and relate these to their equivalent in degrees.

Points of a compass

Display **Leader's Resource 1** of the four cardinal points – north, south, east, west. Be sure members know these points. Point out that the four points are 90° (degrees) from each other.

Play a quick game of 'Compass Face'. Assign each cardinal point to a wall in the correct order. Members stand facing the 'north' wall. Call out various cardinal points and members either turn to point, face or run to the correct direction.

Cut out **Leader's Resource 2** and place it over Leader's Resource 1. This shows an additional four compass points. The angle between each of the eight points is 45°. Explain the meaning of the initials, i.e. NE (north-east), SE (south-east), SW (south-west), NW (north-west). Play the game again, adding these points into the game.

Cut out **Leader's Resource 3** and place it over the previous compass display. Explain the meaning of the points, i.e. NNE (north-north-east), ENE (east-north-east), ESE (east-south-east), SSE (south-south-east), SSW (south-south-west), WSW (west-south-west), WNW (west-north-west), NNW (north-north-west). The 16 points are 22.5° apart. Spend more time on the names of the points to ensure the members know them. Use **Handout 1** to reinforce this teaching.

Play the game again using all the compass points that have been learnt. Award points or a treat for the winner/s if you wish.

Game – Compass change

Aim: to teach member the 16 points.

Draw a circle on the floor and mark the 16 points of the compass (or place suitable cardboard compass points in a large circle). Only indicate north by writing an N. Place one or two members – depending on group size – on each mark, one behind the other. Place one member in the centre of the circle.

The leader calls two directions, e.g. SE and NW. The members at the front of the compass points called change places. As they race to change places the player in the middle also races to either of the compass points called. The first players to reach the compass points stand at the back of the line. The remaining player stands in the middle of the circle for the next round and races against two new players.

360° Compass

A compass can also be read using degrees. North is both 0° and 360°; east is 90°; south is 180° and west is 270°. Other compass points also have a degree equivalent, e.g. north-east is 45°, south-west is 225°. The red end of the magnetic needle always points north. An optional activity for the members to complete can be found on **Handout 2.**

Distribute compasses and/or use **Handout 3**.

Teaching ideas

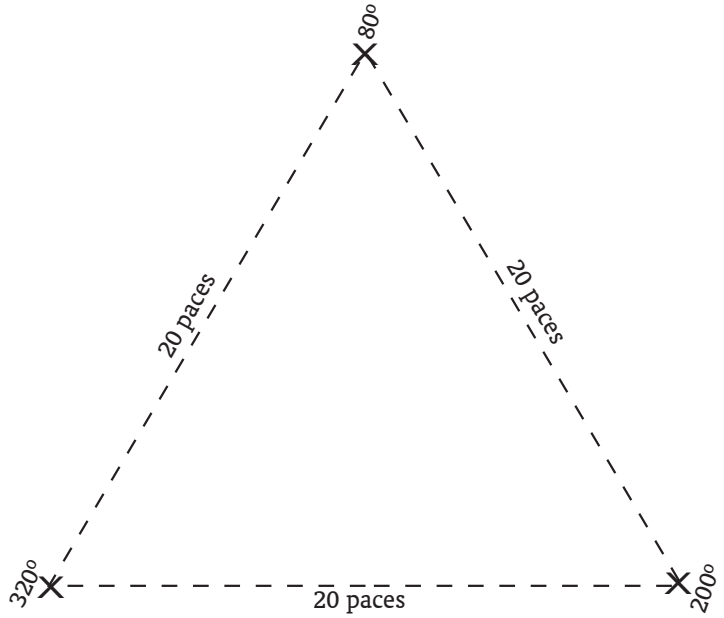
To use a compass hold it flat on the palm of your hand and turn your body to face north according to the red end of the magnetic needle. Adjust the dial so that 360º (North) is at the tip of the red needle. Point out that the red magnetic needle lines up with the orienting arrows. To walk a bearing, locate your bearing (e.g. 90º) on the compass housing and that is the direction of travel.

Choose a landmark or a chosen point (not too far away) which is on your direction of travel and walk toward it. Choose another landmark and adjust your compass to that bearing and walk toward it. Repeat this process several times to help the members to become familiar with the compass.

Use **Handout 4** to reinforce the teaching of the various aspects of the compass.

Game – Three-legged compass walk

Mark a spot on the ground and choose a bearing between 0 and 120 (e.g. 80). Walk on that bearing for a set number of paces (e.g. 20). Add 120 to your original bearing (80+120=200) and walk on your new bearing for another 20 paces. Again add 120 (80+120+120=320) and walk another 20 paces on this bearing. If you're accurate, you will arrive back at your beginning spot!

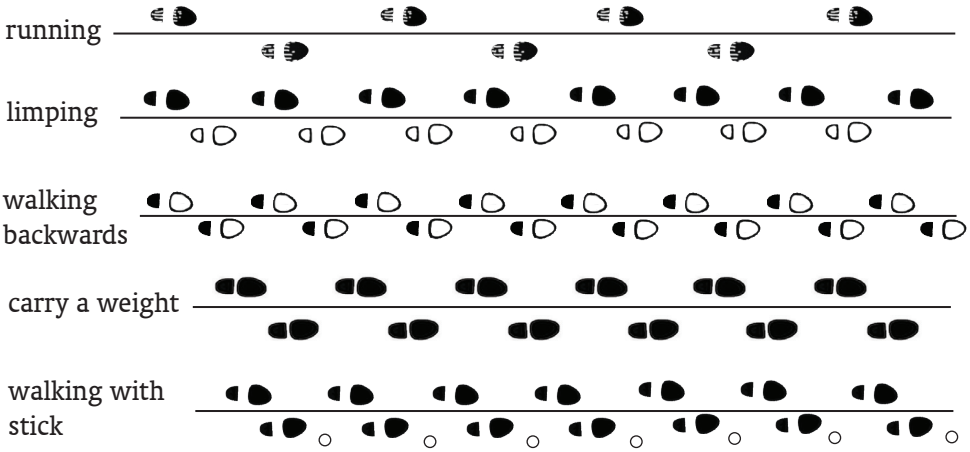


2. Read the meaning of a series of simple tracks.

Indigenous people developed an amazing ability to read the signs left on the ground by humans and animals. The story of a situation can be easily unravelled by observing tracks.

Read the meaning of a series of simple tracks made in sandy or other suitable ground. These should include running, limping, walking backwards, carrying a load and walking with a stick.

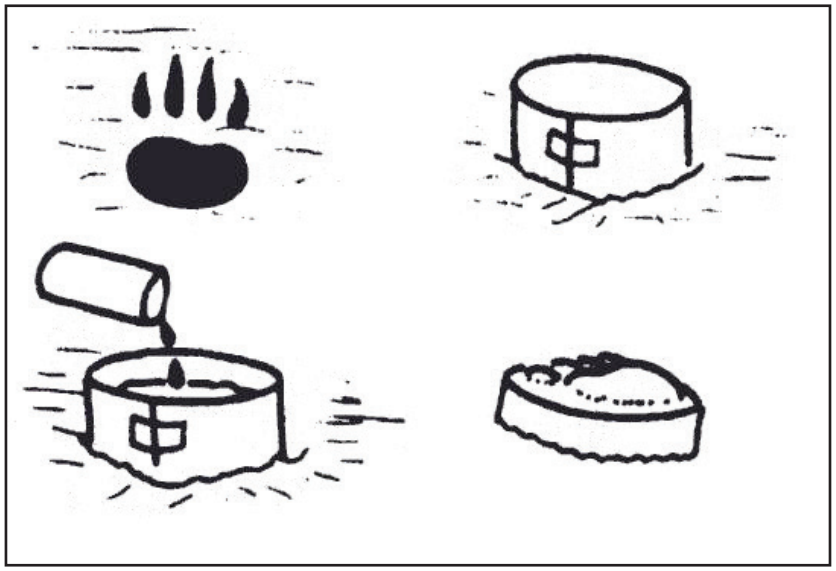
Teaching ideas



Reading tracks

Make similar tracks by doing all of these things in sand or soft earth. Challenge members to determine how other people are moving by reading their tracks.

When reading tracks, remember to always look at them with the sunlight in front of you. In this way the shadows will accentuate the outline of any prints. With the sun behind you, a lot of important details are missed because the fainter prints do not show.



Reading tracks

Make a plaster cast

Make a cast of animal tracks, bird tracks, or human footprints.

1. Find a good clear print in the ground.
2. Make up a cardboard circle.
3. Place cardboard circle around print.
4. Mix up plaster of Paris (very wet mix) and pour into circle over print. Leave to dry.
5. Remove cardboard, clean off dirt and you should have a raised cast of the print.
6. Paint track imprint on cast – this makes it easier to see.

Teaching ideas

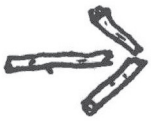
3. Learn trail signs and be able to set a trail for others to follow.

Trail signs are normally made by using natural objects found in the bush, e.g. rocks, sticks, branches or clumps of grass, or scratched in the ground.

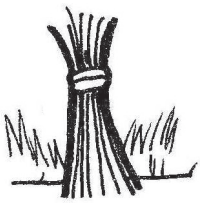
When following a trail it is important to be observant and move slowly so as not to knock stones or twigs, because they could be a trail sign.

Making trail signs

- Make signs clear and easy to see.
- When making a trail space the signs evenly on the left side of the track, where possible.
- If following a trail and you lose your way, return to the last sign.



This way



This way

This way

This way

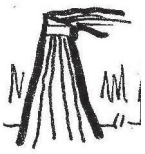
This way to water

Don't go this way

Message 3 paces to the right

Danger

Turn right



Turn right

Turn left

Turn left

gone home

Activity

Follow a trail marked by trail signs made by your leader, or a more experienced Guard/Ranger, for a distance of one kilometre (preferably in the bush).

Teaching ideas

4 Learn how to read a map accurately and identify the essential components of a map.

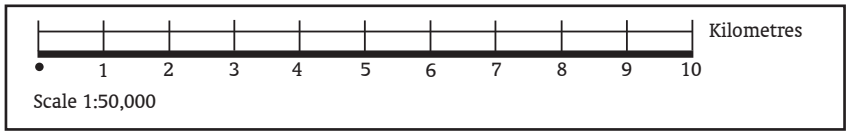
(Adapted from the *Australian Scout Magazine*, June 1996. Used with permission.)

Title

The title of a map defines the location of an area.

Scale

The scale is the proportion between a distance on a map and the actual distance on the ground. The scale will be written or expressed in the form of a ratio, e.g. 1:50,000. This means 1 centimetre on the map equals 50,000 cm (or 500 metres) on the ground.

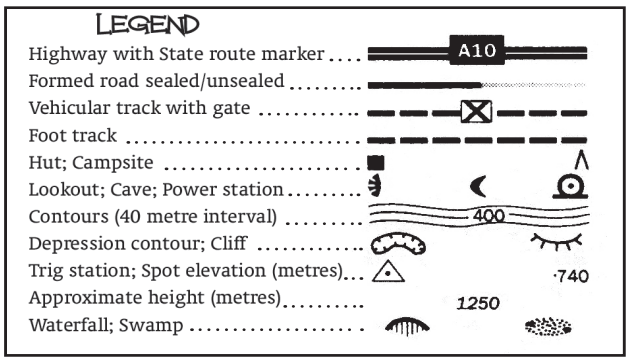


North point or North reference

Indicates which direction North is for the map.

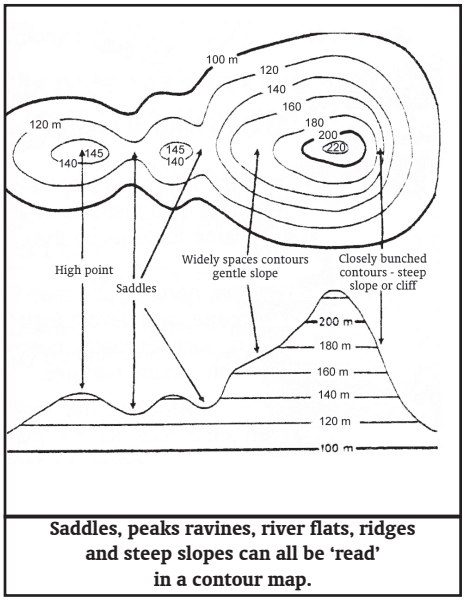
Legend or Key

This is situated on the edge of a map usually near the contour interval and scale. The legend is made up of a group of symbols to show details on a landscape. In many cases these features are easily recognised e.g. buildings, rivers, roads, while others like contour lines are not seen on the ground.



Contour lines

Contour lines are brown lines on a map representing vertical height or altitude above sea level. The contour interval (the height between each line – usually 20 metres) is written near the scale. Follow a brown line on a map and you will find a number, e.g. 100. Everything on that line lies 100 metres above sea level.



Saddles, peaks ravines, river flats, ridges and steep slopes can all be 'read' in a contour map.

Teaching ideas

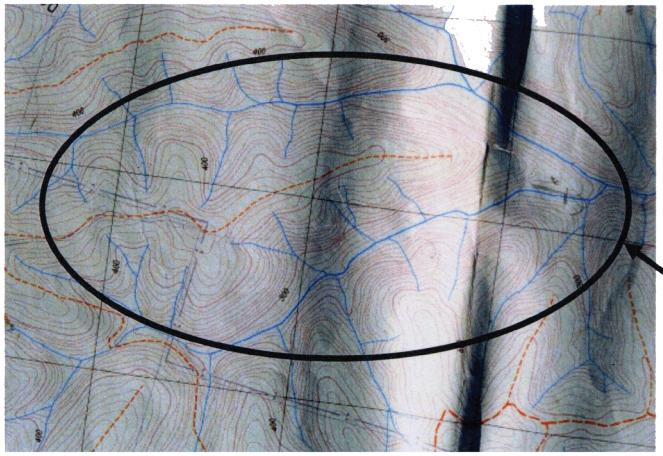
Patterns formed by contour lines on the map represent certain physical features. An understanding of contour lines is essential when using a map to anticipate the terrain that lies ahead. Where lines are far apart, the ground slopes gently. Where they are close together, the hill is steep. Where lines are crowded, they show a cliff. The top of a prominent hill may be indicated by a number called a spot location which shows the altitude of the crest.

3D Contour activities

Three dimensional models of an area can be made using contour information. Different media can be used to make the model such as thick cardboard, plywood or play dough.

How to make a 'Contour Mountain'

1. Select a section of a map that has contours indicating a mountainous region.
2. Enlarge the selected map area to a suitable size using a photocopier.
3. From the enlarged copy, make additional copies *one copy for every contour line in the mountain.*
4. Glue each copy to a piece of thick cardboard.
5. With each copy cut out one of the contour lines. Do this until you have one cardboard slice for each contour line. This will give you all the 'slices' of the mountain.
6. Stack and glue each contour line slice together making your final mountain profile. (You can then Paper-Mache over the top if you wish to create the final effect)



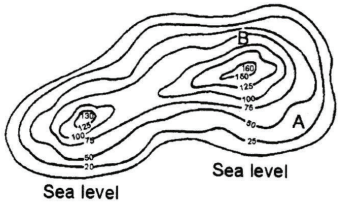
From this

To this

Teaching ideas

Model from plywood

Copy the contour lines of a map through carbon paper. Cut a piece of plywood the size of each contour. Slant the edges and stack the pieces on top of each other. Paint. Where would you camp – A or B?



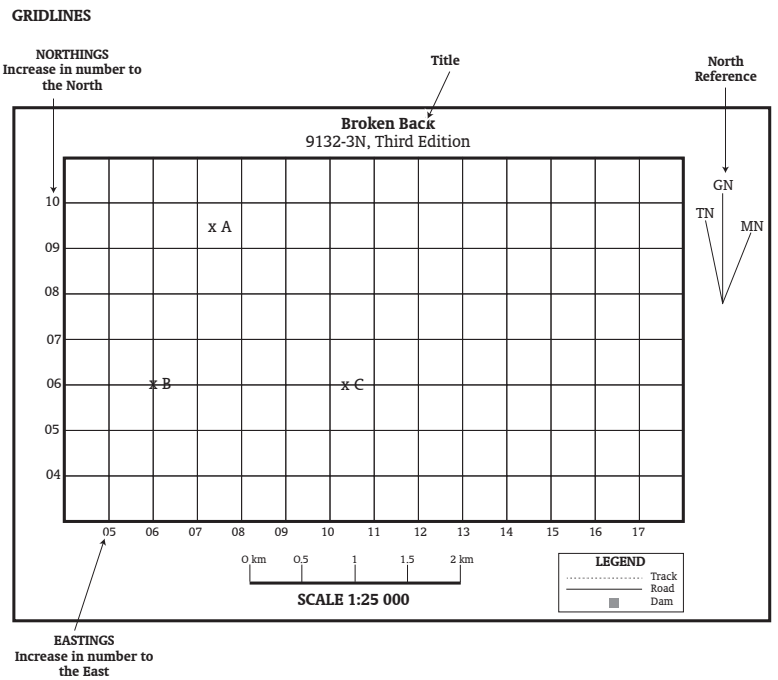
Model made from play dough

Roll layers of play dough to approximately one centimetre thickness. Lay a map over the dough and make shapes representing each contour level of the chosen area. The outer contour line should be the largest layer and act as a base. Place each layer on top in the correct position to create a 3-D model of the terrain, e.g. showing hills, plains, cliffs, slopes. The edges can be smoothed to give a more natural effect.

Grid references

Grid references are read from grid lines. These are the straight lines that form boxes over a map. The grid lines are always numbered. A grid reference is given in six figures.

The first three numbers are read from left to right (eastings), and the second set of three numbers are read from south to north (northings). When reading or giving a grid reference, eastings always come before northings. A handy reminder is that E comes before N on the alphabet.



Teaching ideas

The grid reference for A would be written as 073094.
The grid reference B would be wrtten as 060060.
The grid reference C would be written as 104060.
In giving a grid reference to someone else, be sure to also tell them the map title, sheet number and scale you are using.

Game – grid referencing

Distribute street directories to members or Patrols/Teams and instruct members to open the directory to a page of your choice. Identify places of interest on the map, e.g. Salvation Army hall, library, school, shops, and have the members find the map references.

If possible use another map of the same area, e.g. local council district or topographical map, for members to identify the same places of interest, and again give the map references.

5. Demonstrate how to orientate a map and plot compass bearings.

Magnetic variation

There are three 'norths' on a map (see diagram in 'Grid references' section): 'true north' is the geographic north pole; the needle of your compass is attracted to 'magnetic north' and 'grid north' is the direction of the vertical grid lines on a map. The small variation between grid north and magnetic north is because maps are printed on a grid of squares, whilst the earth is round. For all practical purposes, true north can be ignored and grid north and magnetic north used. The difference between these two is called magnetic declination.

An area where the compass needle points east of true north is *easterly variation*, and if it points west it is *westerly variation.* Where grid and magnetic north appear to be the same, it is *zero*.

To apply variation when working from a map to a compass, do the following:

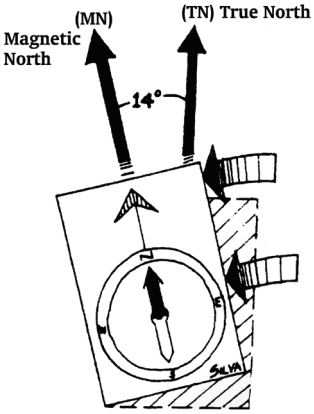
1. Determine the variation from the map being used.
2. If it is easterly variation, deduct it from the bearing you require on your compass.
3. If it is westerly variation, add it to the bearing required on your compass.

A simple way to remember this is 'east is least', 'west is best'.

Orienting a map by compass

- When orienting a map by compass turn the dial on the compass so that the needle lines up with north (N).
- By placing the edge of the compass on the magnetic north (MN) arrow on the side of the map, you can put the map into perspective with features from the real surroundings.
- Do this by turning the compass around until the rotating metal needle is pointing to N also.

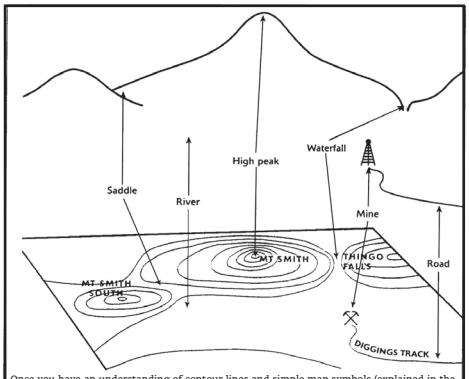
You have now orientated your map.



Teaching ideas

Orientating a map by natural features

- A map is 'orientated' when it is placed so that the directions on it correspond to the directions of the same features on the ground.
- Turn the map so that north on the map equates with north on the landscape, and terrain features shown on the map, such as roads and rivers, are lined up with natural features.



Once you have an understanding of contour lines and simple map symbols (explained in the map's marginal information) it is possible to work out roughly where you are by orienting your map with thelandscape around you. Distinctive peaks make the best landmarks.

6. Plan, prepare and participate in a five kilometre hike.

At least one month before your activity send an 'Activity Approval Form' to your DHQ and obtain permission from parents. Current medical records need to be taken on the hike.

Before setting out on a hike of any distance a plan should be made considering suitability of the route, season and weather conditions, type of backpack, clothing, footwear, food, water and an emergency first aid kit.

Remind the members that they have to carry everything they will need!

The route

Choose a destination such as a park, nature reserve, historic landmark, picnic spot or National Park. Contact the National Parks and Wildlife Service for information and maps that show walking tracks. Your local council may have scenic walks that could be interesting. The 'Country Code' should be observed at all times.

- **The Country Code**

When possible, ask permission before going on to private land.
Use gates rather than climb through fences. If it is necessary to climb through a fence, climb near a fence post.
Leave gates exactly as you find them.
Leave no litter – take it home.
Avoid disturbing grazing sheep and cattle.
Walk around crops, not through them.
Obey the fire regulations.
If it is necessary to walk on the road, walk in a single file on the right hand side facing oncoming traffic.
Consider toilet facilities. Know about hygienic and minimal waste disposal.
Don't pick wildflowers or break branches to make walking sticks. Many plants are protected and incur a fine if picked.

Teaching ideas

Enjoy the surroundings – take time to stop and look at the plants, birds and scenery.

Remember – minimal impact hiking is IN! - 'Take only photos and leave only footprints!'

- Never hike alone. Organise the group taking into consideration each individual's stamina, capacity and skills. Remember that your timing will depend on the slowest member. Everyone wants to enjoy themselves and not be hassled all day.
- Predicting walking time – Naismith's 'rule' for an average walker with a medium backpack:
  Allow one hour for 5km easy going or 3km easy scrambling or 1.5km of extremely rough country, deep sand, soft snow or thick bush.
  Add one hour for every 500m up and every 1000m down.
  For every hour (after 5 hours) add an extra hour for fatigue. Very experienced and very fit walkers can reduce the total by one-third.
- Leave a map of your route and the time you expect to come back with a responsible person. Report in when you finish. Your safety could depend on such detail!

Season

When planning a hike, take into consideration the time of year, e.g. hot or wet. Plan how you will cope with the weather and reassess your destination if necessary.

Clothing and footwear

The time of year and type of terrain will determine the clothing and footwear required. For example a coastal walk in summer, would require shorts, t-shirt and swimmers underneath; a bush walk in winter, requires layered clothing that can be taken off as your body gets hot. The most important item is footwear – comfortable, sturdy shoes will protect feet from twigs and rocks and give the support needed when walking a distance. Remember to take a hat and sunscreen!

Backpack

A small backpack is the most comfortable way to carry equipment. Set out everything needed, then halve it! Practise packing to ensure everything fits and the pack is comfortable to carry.

Food and water

Energy foods and water are essential. Energy food will 'pick you up' when you feel tired – chocolate, dried fruit and nuts make a good mix to nibble on.

More water is required in hot weather and take extra if there is no safe drinking water along the way. The minimum amount of liquid required during exercise is one litre per person.

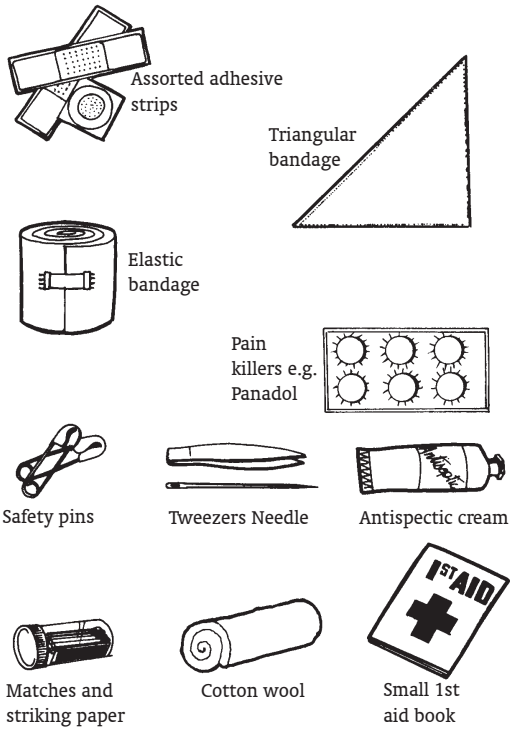
Teaching ideas

Emergency First Aid Kit

This is not about teaching first aid, it is about the contents of an emergency first aid kit. Before attempting a hike participants should have first aid knowledge. There are first aid badges in the Guard/Ranger program.

Each person or group should carry a first aid kit, insect repellent, notebook and pencil, compass and map, tissues, flashlight torch, a mobile phone, a phone card or money for a phone call. Place these essentials into a plastic bag to keep them dry and pack it where it can be easily accessed.

An emergency first aid kit should include the following:.



Lost in the bush

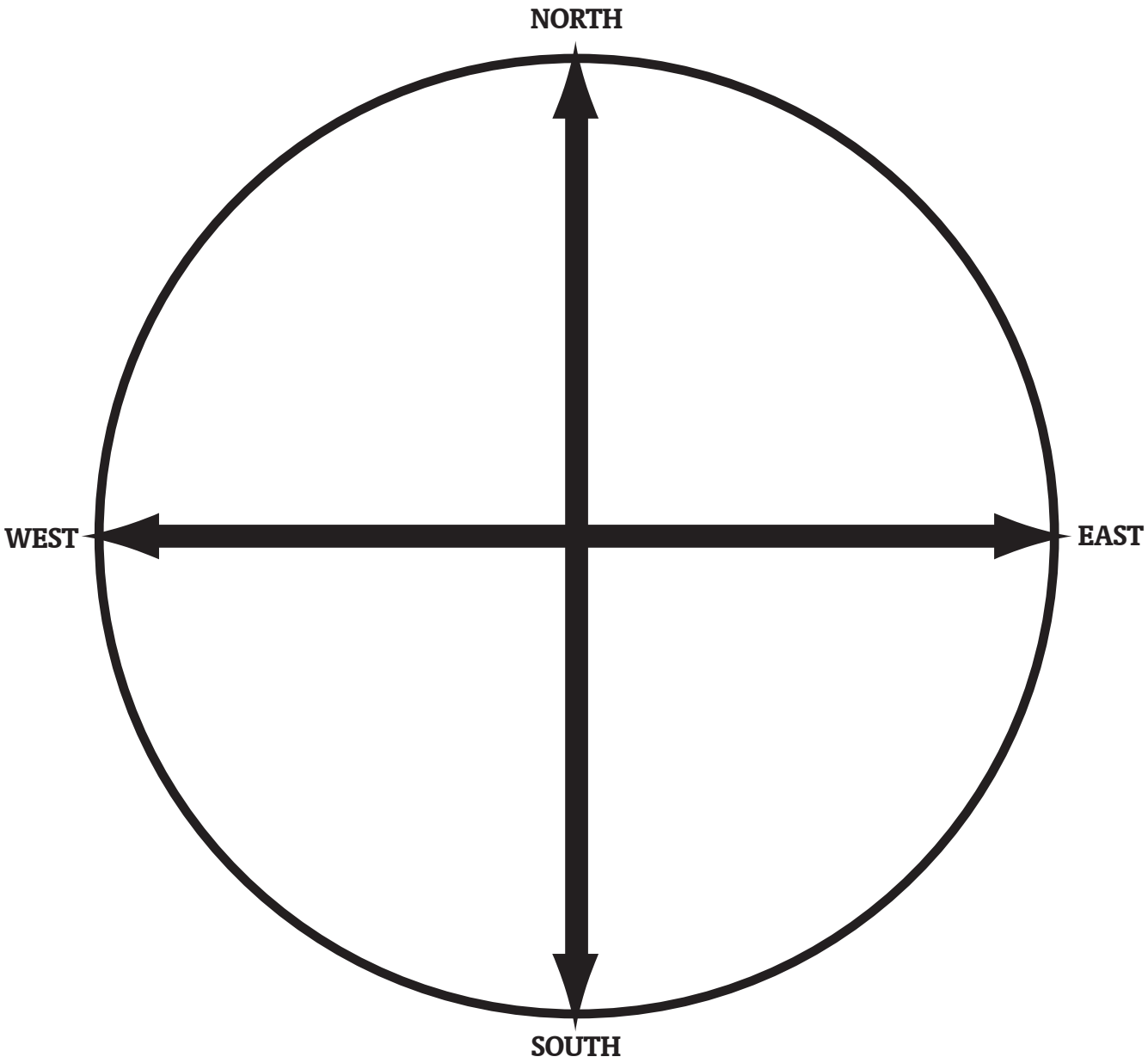
ALWAYS remember to leave details of the proposed route and estimated time of return to ensure that all plans are known so a rescue may be organised if required.

A qualified First Aider must be with the hiking group.

- Don't panic.
- Sit down to conserve energy.
- From your hike map you should have a rough idea of where you are so work out whether it is better to keep going or stay put.
- If you have food and water it is better to stay put, conserving your energy and lessening the chances of getting further lost.
- If you decide to go on, mark your trail with signs. You will be able to retrace your steps if necessary and the signs may guide your rescuers.
- When you think that rescuers have had time to organise a search, try to attract their attention with a fire that is smoky during the day and bright at night. Avoid making a bushfire.
- Make for high ground, stick to ridges or follow a fence.
- Don't move around at night. Make yourself comfortable in a sheltered spot till morning.

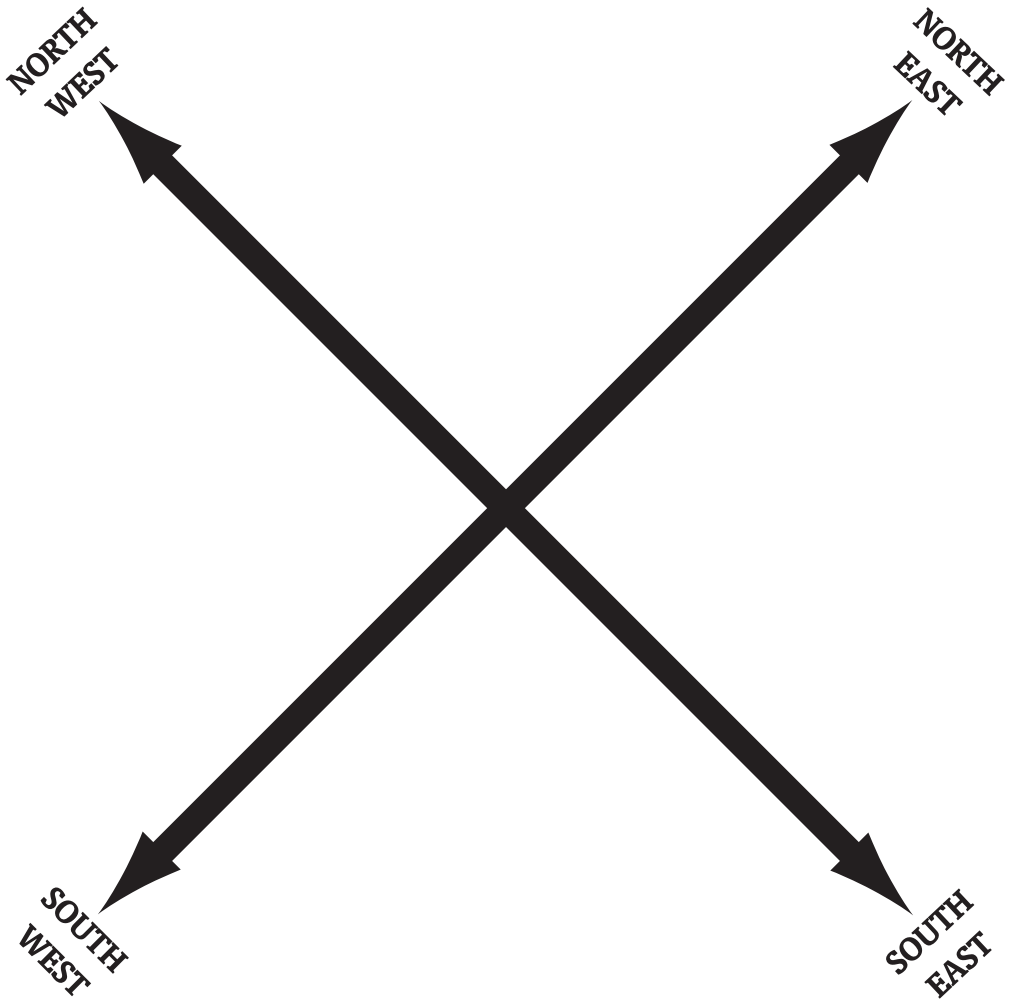
Leader's resource 1

Cardinal compass points



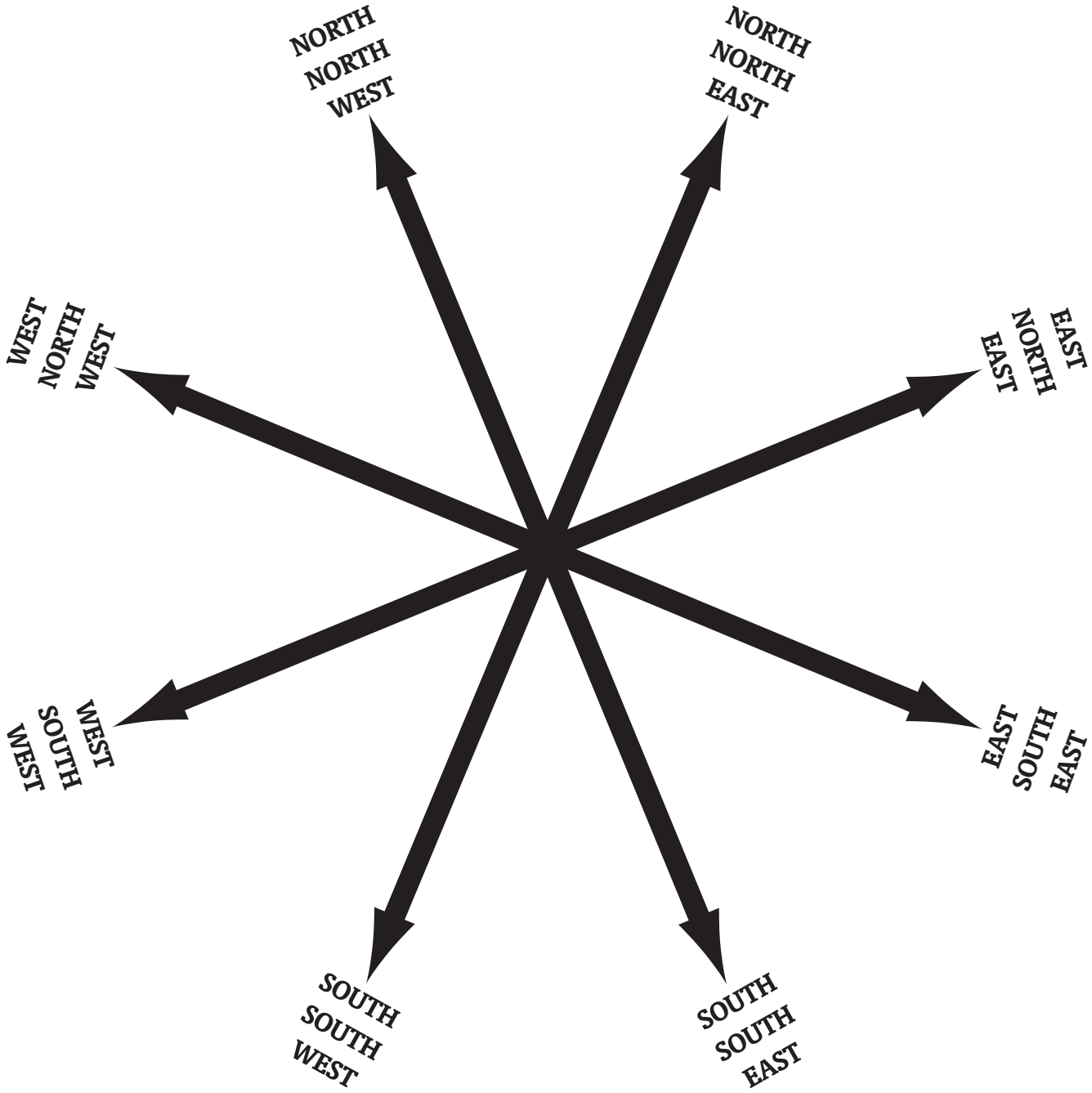
Leader's resource 2

Cut out these compass points to use as an overlay with Leader's resource 1.



Leader's resource 3

Cut out these compass points to use as an overlay with Leader's resources 1 and 2.



Leader's resource 4

Devotions on trails

Isaiah 30:21 – And if you leave God's paths and go astray you will hear a voice behind you say, 'No, this is the way; walk here.'

Isaiah 55:7 – Let the wicked leave their way of life and change their way of thinking.

Jeremiah 6:16 – Ask where the best road is. Walk on it and you will live in peace.

Leader's resource 4 cont.d.

Devotions on trails

Isaiah 59:8 – You follow a crooked path and no one who walks that way will ever be safe.

John 14:2 – There are many rooms in my Father's house and I am going to prepare a place for you.

Joshua 1:9 – Don't be afraid or discouraged, for I, the Lord your God, am with you wherever you go.

Leader's resource 5

Cut along the lines and give one slip to various members of your group to read out to the others.

I run in the path of your commands, for you have set my heart free. Psalm 119:32

Direct me in the path of your commands, for there I find delight. Psalm 119:35

I have kept my feet from every evil path so that I might obey your word. Psalm 119:101

I gain understanding from your precepts (laws) therefore I hate every wrong path. Psalm 119:104

Your word is a lamp to my feet and a light for my path. Psalm 119:105

And because I consider all precepts (laws) right, I hate every wrong path. Psalm 119:128

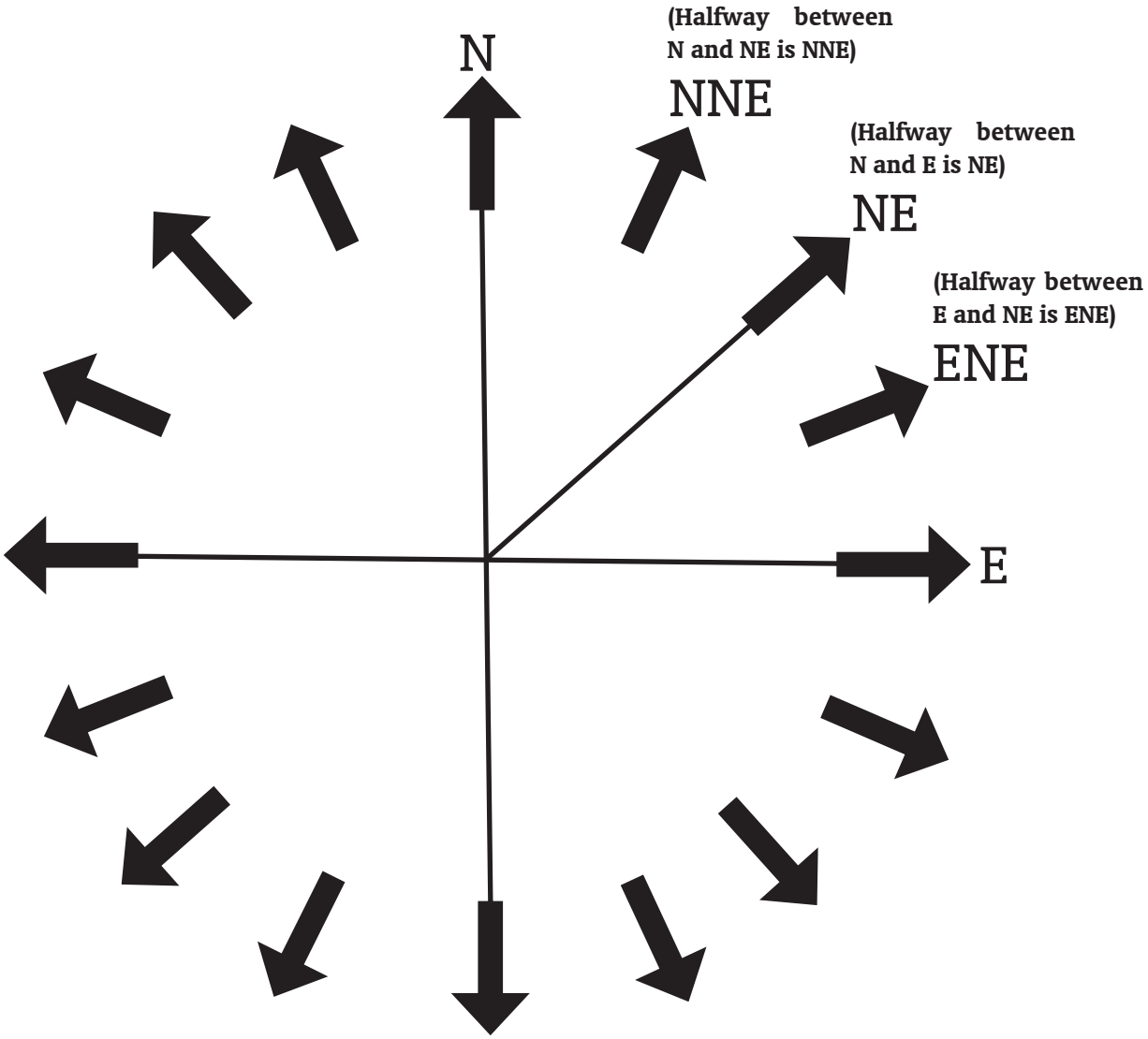
Handout 1 - Guards/Rangers

The Points of a Compass

The 16 main points of a compass

Between the cardinal points of the compass (north, east, south and west) there are a number of other points.

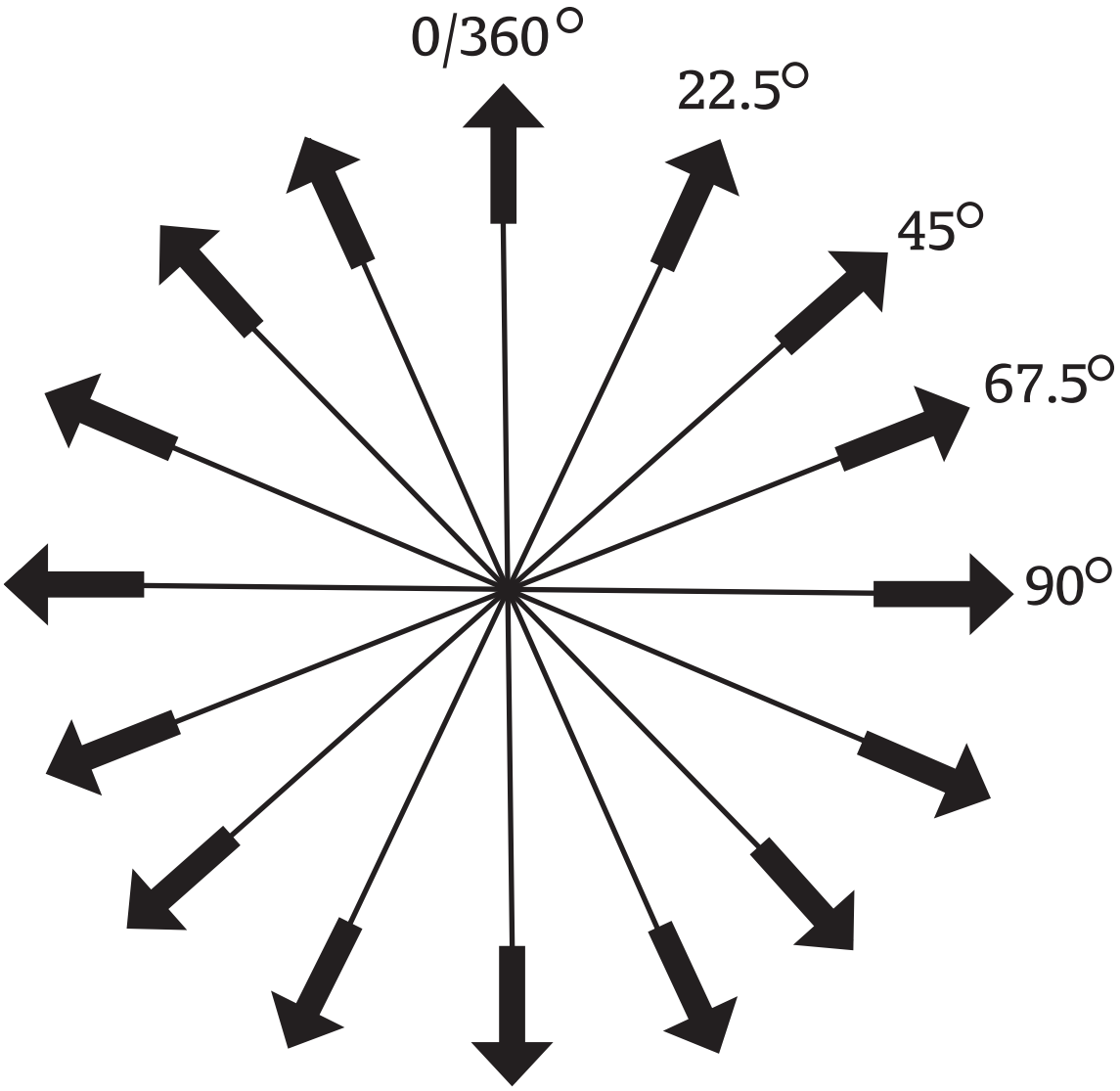
Indicate the remaining points on the diagram below.



Handout 2 - Guards/Rangers

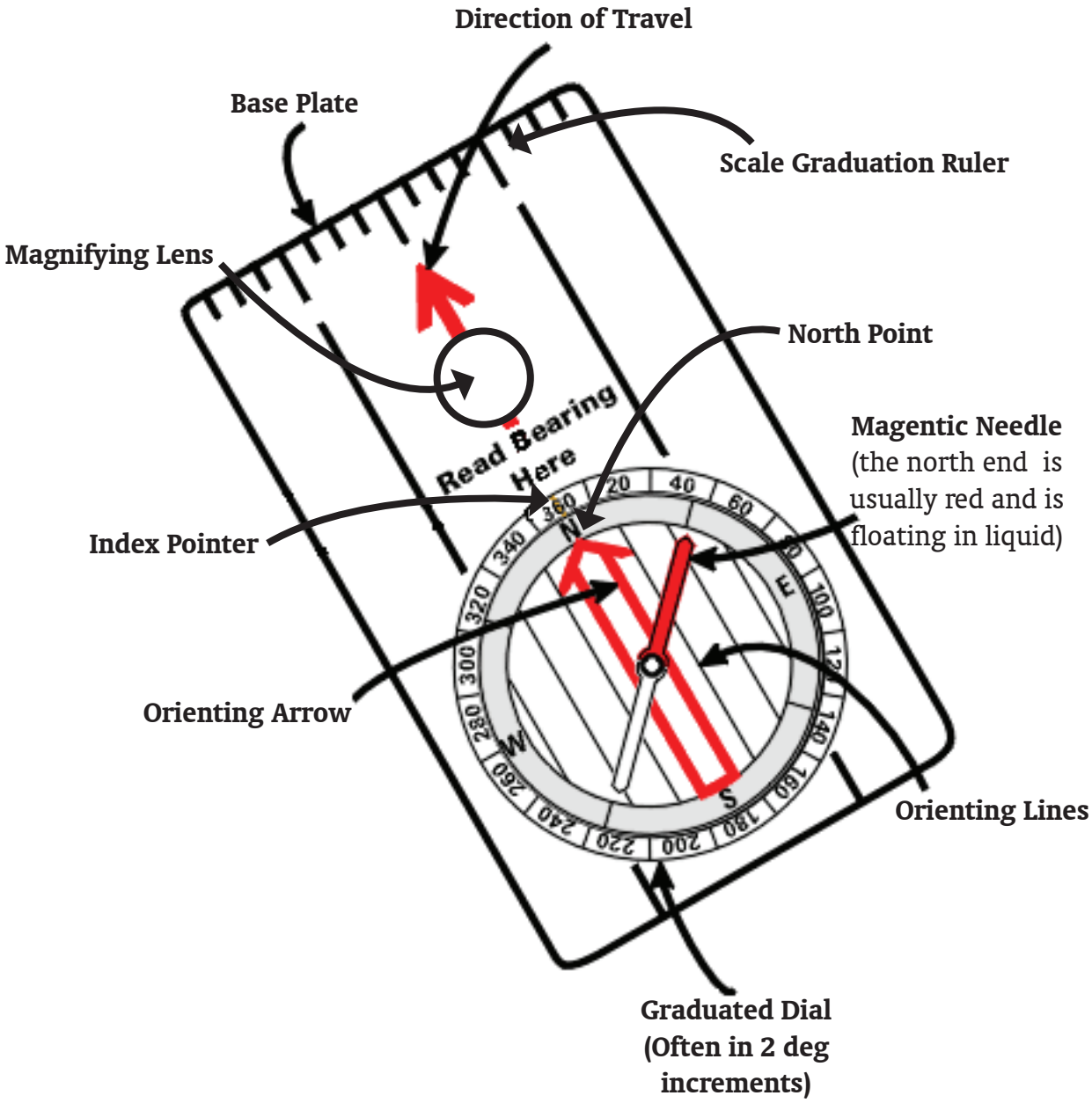
On a typical compass used for basic navigation degrees are used, instead of the cardinal points. As there are 360^{o} in a circle, North becomes 0^{o} as well as 360^{o}. One quarter of the way around (East), becomes 90^{o}, etc. Most (not all) compasses have 2^{o} increments displayed on their dial. It is important to know what increments the compass you are using has.

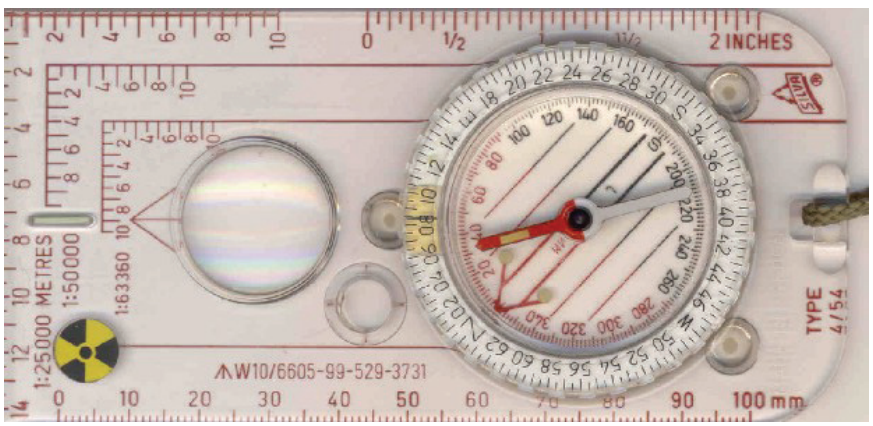
Indicate, in 'degrees', the directions shown on the diagram below. You may like to add the names of the 16 compass points as well.



Handout 3 - Guards/Rangers

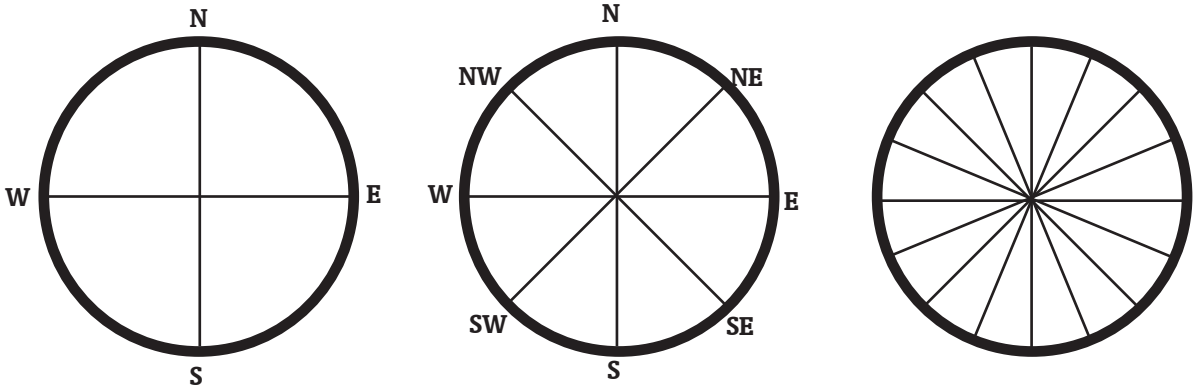
The essential parts of a compass - parts of a base plate style compass



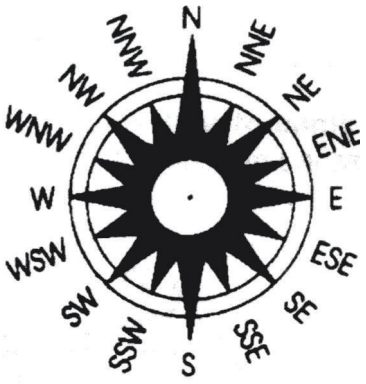


Handout 4 - Guards/Rangers

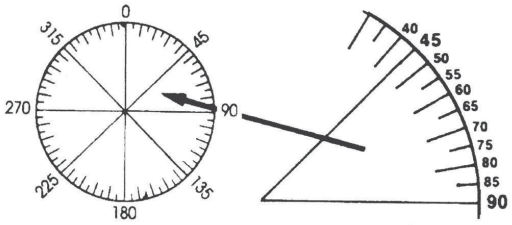
16 points of a compass



Points and degrees



16 principal compass points

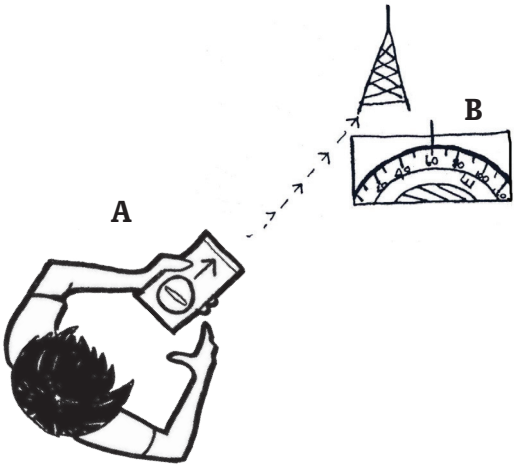


Degree (O) bearings are more exact and are more often used for map work.

Take a compass bearing

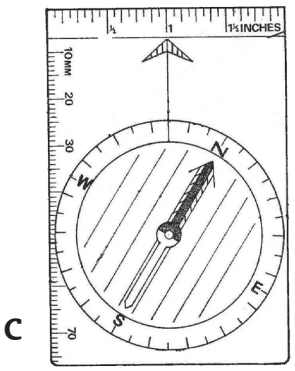
Point a compass at object (diagram A), then rotate housing of compass until magnetic needle is over the top of red arrow.

Read at front of compass, usually marked with 'read bearing here' (diagram B).



Following a compass bearing

To take a compass bearing, set bearing on compass, then rotate housing of compass until both magnetic needle and red arrow combine. Follow direction of travel arrow to object, e.g. 330° (diagram C). If object can't be seen, walk to an object not too far away on the same bearing, then repeat the process until the object comes into view.



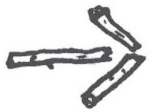
C

Handout 5 - Guards/Rangers

Track Cards for devotions on trails

Print out sufficient copies so that every member has a copy. (Light cardboard would be best.)

A Bible reference



Follow this trail _____

Don't follow this trail _____

Letter three
paces from here _____

I have gone home _____

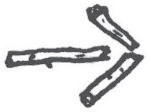
Turn to the right _____

My favourit verse: _____

_____

_____

A Bible reference



Follow this trail _____

Don't follow this trail _____

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paces from here _____

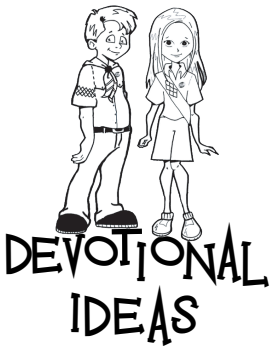
I have gone home _____

Turn to the right _____

My favourit verse: _____

_____

_____



Devotional ideas

1.

Title: Trails

Bible: Verses from Isaiah, Jeremiah, John and Joshua

Thought: God's word gives us clear directions

Supplies: Cards displaying the five tracking signs used in the devotion, placed on the floor in front of the group

Bible verses on Leader's Resource 4 cut into separate cards and displayed around the room.

Pens and a copy of the track card see **handout 5** – one for each member.

Sit with your group and talk to them about how living our life is just like walking along a bush trail.

Explain that there are times when we have to make up our minds which way we should go and if we want to make a wise choice we need to have God's help.

So God has left us instructions in His Word, the Bible, about the way we should go.

Ask a member to hold up the card that says, *Follow this trail.* Sometimes God tells us in the Bible the way we should go.

Sometimes God tells us not to follow a certain way. Who can find the tracking sign that tells us that? *(Do not follow this trail)*

God has given us some wonderful promises in the Bible and they are like a message for us to find. Someone hold up the tracking sign for that. *(Letter three paces from here.)*

And Jesus told us just before He went back to His home in heaven that He would be getting it ready for us. Can you think what sign we would put near it? *(I have gone home.)*

Sometimes we realise that we are on the wrong track and that we are going to be in big trouble if we don't make a change. What sign tells us that? *(Turn to the right.)*

Distribute the tracking cards on **Handout 5**. Explain that there are six Bible verses around the room and you want them to find one verse to match each of the signs on their card. Ask them to write the reference beside the tracking sign they think it best matches on their card. (Members may work in pairs if you choose so they can discuss each verse. Some verses match two signs – it doesn't matter which one they choose. It is more important that they are discussing what the verse means to them.)

Ask them to write the verse that they liked on their card.

Encourage several members to read out the verse they selected and suggest that they all take their card home and read one reference each night in the coming week.

Devotional ideas

2. Title: Trust God

Bible: Proverbs 3:5,6

Thought: You can trust God to keep you on the right way

Supplies: A very hard boiled egg that has cooled down; a glass bottle with an opening at the top a couple of millimetres smaller than the egg, newspaper and matches and a table to work on

Demonstration. Perform an experiment that 'defies understanding' (e.g. 'How to get an egg into a bottle'). Use this experiment or find another more suitable.

Ask your group whether it would be possible to get the egg into the jar without breaking the egg. If we don't know about the force of air pressure we would say that it is impossible.

Peel the shell off the egg and place the pointy end of the egg in the neck of the jar. Scrunch up a piece of paper and light it then lift the egg up and carefully but quickly put the burning paper into the jar and replace the egg. Thwump – the egg gets sucked into the jar. (Taken from the internet site www.csiro.au/resources/ps1tu.html.)

Make this point. There is much about life that we don't understand. For example why is there suffering in the world? How did the egg get into the bottle? How do birds fly? What's the difference between a freeway and a highway?

Life can be uncertain and complicated; we don't usually know what is ahead of us. Some people's lives include great hardship, sickness or sadness. Other people live lives that are happy, successful and content. We don't know the path our lives will take.

Read Proverbs 3:5, 6. *Trust in the Lord with all your heart. Never rely on what you think you know. Remember the Lord in everything you do, and He will show you the right way.*

Ask the group what they think these verses mean.

There are times when we may not understand why something is happening to us. These verses tell us to trust God and not what we think we know, because we could be wrong. We can do this because God knows everything and will do what is best for us. When we want to please God in everything we do we trust Him and He will show us the right way and remind us to stay on it.