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Learning Ltd

Compass Points – Levels 1 and 2

I can describe, follow and record routes and journeys using signs, words and angles associated with direction and turning.
Knows and uses the compass points North, South, East and West. MTH 1-17 benchmark

Through practical activities which include the use of technology, I have developed my understanding of the link between compass points and angles and can describe, follow and record directions, routes and journeys using appropriate vocabulary.
Uses knowledge of the link between the eight compass points and angles to describe, follow and record directions. MTH2-17 benchmark

The compass points enable children to make connections between the landscape and directions. They enable children to develop a better sense of themselves in relation to their immediate environment and are useful for providing more specific instructions about moving through a landscape whether this be on foot or other means of transport.

The use of compass points links strongly to reading and using maps.

- Always encourage children to draw maps where the top of the map faces North.
- When using a map, teach children to orientate the map to face North wherever they are standing.
- If children use a compass and read maps for a clear purpose, such as orienteering or going on an expedition, their skill level tends to increase. It's worth planning a short series of lessons prior to these outdoor activities to make the maths connection.
- Children like and enjoy games which involve giving and following directions to find objects or key features in a landscape.

Initially children should be introduced to North, South, East and West. In my experience, most are keen to progress to the intermediate points North-east, South-east, South-west and North-west rapidly because these are terms often used. Yet the link with angles runs a risk of being forgotten. Try not to move onto the intermediate points until children are able to consistently and accurately give and follow directions that use the cardinal points. Many of the activities in this section can easily be extended so differentiation is relatively straightforward.

Introducing the compass points

When introducing the compass points, start by going outside and wondering which direction North is and how can we find out. Ask children what "North" means. Show them a globe so that the children understand that if we travel continuously north, eventually we end up at the North Pole. Move to different places in your school grounds and challenge children to face north in each place you stop. If you have a compass on a digital device, then look at the co-ordinates and show how these link to our location – the latitude and longitude bearings. Show how these, in turn, link to the grid references on maps.

Using a compass

The use of a compass is an essential instrument for map work, route finding, navigation and other outdoor life experiences. Many tablets and phones now have a built-in compass. Most are used when placed on a flat surface or held horizontally. Having the compass points displayed on a vertical surface, such as an interactive whiteboard, doesn't always aid conceptual understanding as it means that north appears to point skywards.

When is a compass useful to have and to use?

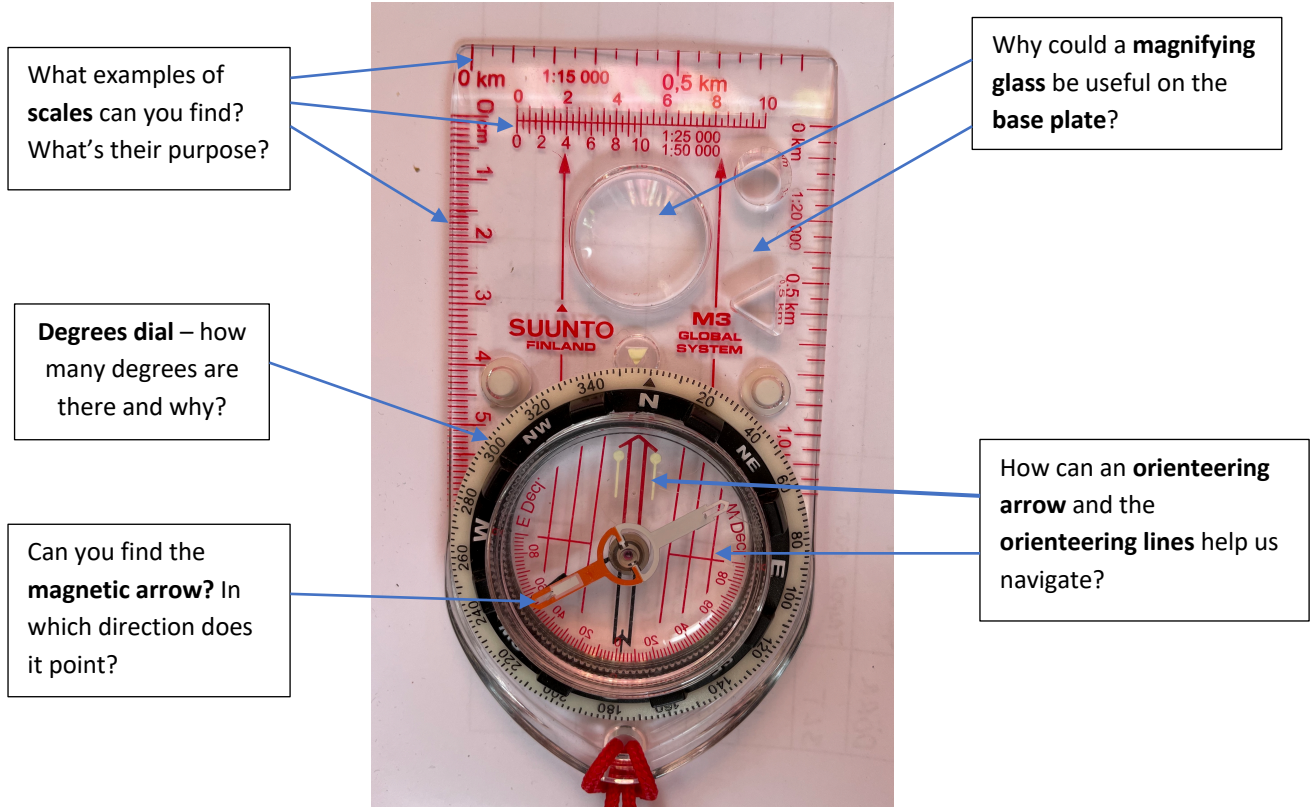
If you have sufficient for small groups, then provide one compass for each group to look at. Discuss the need to handle and store a compass carefully – ideally flat. Magnets affect the functionality of a compass. You can demonstrate this with an old compass by slowly moving a magnet towards the magnetic needle and observing what happens.

Ask the children in their groups to discuss:

- What is the purpose of a compass?
- In what ways is a compass mathematical?
- Can they work out how to use their compass?
- The terminology around a compass. As there are lots of varieties, ask your children to find your compass online and to learn the names for all the different parts as a follow up activity or finishing off task inside. This can help children understand the range of functions a compass may have.

Parts of a compass

In the UK, finding compasses that have romer scales are particularly useful for working out six-figure grid references for their standard 1:25 000 and 1:50 000 scale maps.



Compass Skills

The compass is useful when developing navigation skills. Relying on digital devices alone is not recommended. Compasses are the combination of a fixed direction (North) and a protractor giving an angle from that fixed direction. The result is a bearing from North and is written as a three-figure bearing, e.g. 045°

Encourage your class to discover why compasses and maps work well for navigating. For example, it could be:

- To help align the map so that it matches with the features you can see for real.
- To check the direction that a stream or path or road is going.
- To use when visibility is poor.
- To find distant features such as a church building or the top of a hill.
- To check the aspect of a slope – and the map to give an indication of how steep or gentle the gradient is.
- To measure distances on the map. This is why the measurement markings on the side of many compasses are useful.

Magnetic North

Compasses do not point true north but to magnetic north pole which is a few degrees adrift of the North Pole and varies slightly in accordance with the movements of the earth's magnetic core. The compass relies on a strip of magnetised metal to indicate North.

How to magnetise a needle

This is useful to demonstrate so that your class can see that the needle will point North-South when this happens. It involves drawing a strong magnet along a steel needle in the same direction lots of times. The needle can be held on a thread or inserted into a cork to float on water. Check the needle's alignment by comparing with a compass. This activity, as with all needle and thread activities needs appropriate supervision and risk assessment. There are lots of instructions available online as to how to do this successfully.

Find true North without a compass

It is perfectly possible to find North without having a compass, providing it is a bright sunny day.

- 1) Put a stick upright in sand or on the ground. Place a mark (A) exactly at the end of the shadow.
- 2) Wait half an hour or even longer as this increases the accuracy of your experiment. Go and do some other activities.
- 3) Come back to the shadow stick and mark the new position of the end of the shadow (B).
- 4) Draw a straight line between marks A and B. A is West and B is East.
- 5) Draw a bisecting line (this is the halfway point between A and B) perpendicular to the line AB. This is the North-South line.
- 6) If you want to double check, compare your result with a compass.

Another option is to use an analogue wristwatch to find North. Have a look online to find out how to do this accurately.

On a clear night, it is possible to find true north using the Plough (the Big Dipper) constellation. There are seven stars in the Plough and the two at the end of the spoon shape align directly with Polaris, the Pole Star. Follow the Pole Star. As you move northwards, Polaris becomes more overhead. Astronomy apps can be helpful here.

Linking compass directions to wind

Often we talk about wind direction in relation to the compass directions, such as a westerly wind. When you do this, take care to emphasise that it is blowing *from* the West. Its name is taken from where it originates not where it is blowing *to*.

Captain's coming

Many children know the traditional game "Captain's Coming" where they have to move in different ways according to instructions. There are lots of variations on this theme. You can adapt it so that when you call out a compass direction, the children move to the fence or another obvious feature in that direction. The children need to know these directions and key landmarks in each direction in advance of playing the game.

- Captain's coming: Stand straight and salute
- Scrub the decks: kneel down and scrub the ground
- Hoist the rigging: pretend to climb the rigging
- Man overboard: everyone lies down.
- North/South/East/West: Run to the identified feature in that direction.

Creating a compass rose

Create a cross on the ground. The compass points can be added using chalk or moveable markers as can the right angles. Each child can stand on the cross to participate in movement challenges where children change directions according to the instructions:

- Face North, turn 90° clockwise, which direction are you facing?
- Face West, turn 180° anticlockwise, where are you facing?
- Face South, turn 90° right, which direction are you facing?
- Face East, turn 90° left, where are you facing now?

Once children are familiar with this, it makes for a good quick revision game. They can also work in pairs to give each other instructions.

Compass trails

Demonstrate how to create a simple trail using pebbles and sticks cut to specific sizes, e.g. 20cm. Lay a stick on the ground facing North. Then add a pebble. Put another stick facing East. Add another pebble. Lay down another stick. The addition of pebbles helps children with a visual reminder to turn clockwise or anticlockwise. Build up a trail which can then be walked through. Then ask the children to write down the instructions. The true test of accuracy is if another child can create the same trail by following the written instructions.

In the playground this can be extended to create stick paths between features, e.g. a picnic bench and a litter bin. The children should only use the four compass points to create directions until they can do this consistently and accurately.

Compass treasure hunts

Before undertaking this activity, place some “treasure” in a few hidden spots around the area where you are working. Then mark these with crosses on a simple map of the area. The children begin by all sitting in the same direction. Get the children to use a compass and mark the compass points on the ground. This can be done on a large scale for all the class to see.

Next, one child has to find some treasure. They will be guided by the others who are the navigators. They take turns to look at the treasure map – where the treasure is hidden and shout out directions such as “10 steps North” or “3 steps East.” After each instruction, another navigator has a go.

As the children become more proficient at this game, they can aim to reduce the number of instructions given (use a tally chart to monitor this). Once the class understands what to do, then the children can work in small groups to hide and find their own treasure.

Alphabet drawing directions (good for revision at Level 2)

Which letters of the alphabet can be created through providing sticks and compass directions or bearings? Have the class estimate these in advance and then test their theory. Begin by facing North each time. For example to create the letter ‘L’ the instructions may look like this:

- Face North. Place a long stick on the ground.
- Turn 90° clockwise to face East. Place a shorter stick on the ground.
- Make sure the ends of the stick are touching each other and create a right angle.

Drawing a compass rose

With older classes, discuss how to draw an eight-point compass rose outside. Ask children to consider the equipment needed and a way of ensuring it is a reasonably accurate model prior to going ahead and creating one. Request that children note down the angles between each direction, to reinforce the link between the two. Encourage this to be written as three-figure bearings, e.g. 090°

Follow up with quick calculations where children change directions according to the instructions:

- Face North, turn 135° clockwise, which direction are you facing?
- Face South-west, turn 180° anticlockwise, where are you facing?
- Face South-east, turn 090° right, which direction are you facing?
- Face West, turn 235° left, where are you facing now?
- Face North-east, turn 360° clockwise, where should you now face?

Ask children to do this with a partner as well as a whole class.

Frisbee golf

This is a fun way of putting angles into a game. Set up a course of cone markers on a playing field (or chalk crosses on asphalt) and create a very simple map. In small groups, children have to take turns to throw the Frisbee from cone to cone, aiming for a throw-in-one. At each cone, the children take turns to align their compass to north and work out the angle from north to the next cone (reflex angles can be used here too). The distance in metres can also be measured between each cone and this can give rise to some good discussions especially if different measuring markers are used, e.g. one group uses a metre stick, another a trundle wheel and another a tape measure. If there is a GPS system in school, this can be used to accurately measure all angles and distances quickly.

Environmental indicators of direction

It is possible to gain an approximate indication of direction using clues in our environment. For example prevailing wind direction may be shown by the branches of a tree being longer in the lee. Likewise, some plants that bend with the wind, bend away from the prevailing wind direction. Often different types of moss and lichen will grow on rock outcrops that reflect which direction provides the most shelter. An online search will give you pictorial examples of these effects.

Integrating the compass points into other work

- When in different parts of the playground, challenge children to face North and other directions. Do a quick recap.
- Refer to the compass points when discussing where seeds and plants should be positioned do they prefer to be planted in a North, South or other aspect?
- When undertaking sit spot activities, encourage children to face different directions. They can draw or write about what they see or make it into a poem, prayer or blessing that reflects the different directions and the cultural attributes associated with each direction.
- Link compass directions to grid and coordinates.

Further outdoor work

Orienteering is the natural next step to develop confidence at using compass points and reading maps in a real life context. For further information, visit <https://www.scottish-orienteeing.org>