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Learning Ltd

Compass Points – Levels 1 and 2

Knows and uses the compass points North, South, East and West. MTH 1-17a benchmark

Uses knowledge of the link between the eight compass points and angles to describe, follow and record directions. MTH2-17c 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.

Going into more explicit directions such as north-north-west is a useful extension for children who are more interested and able. However, the links between these directions and angles does start getting complicated.

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.

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. 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 to consider:

- 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.

Compass Skills

The compass adds another dimension to the skill of navigation. Modern 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.

The compass can be used to:

- align the map to correspond with the features on the ground
- check the direction of a linear feature such as a stream or path
- give a direction of travel to follow in poor visibility
- identify features in the distance such as hill tops or buildings
- pinpoint the navigators position on the map by using identifiable features in the distance
- check the aspect of a slope
- measure distances on the map

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.

If it is a cloudy day, then another alternative is to magnetise a needle. This 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. 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 half way 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 wrist watch 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.

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

With younger children, it is usually quicker when first introducing the concept creating the compass points to use one-metre sticks or ropes and to create a cross on the ground. It is easier to make adjustments to ensure accuracy. The compass points can be added using chalk as can the right angles.

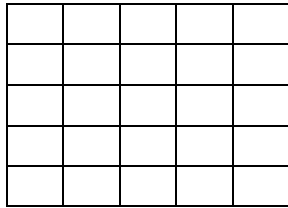
Follow up movement challenges where children change directions according to the instructions:

- 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?

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

Amazing

This is a popular whole class problem solving activity that helps children use the four compass points. It can be undertaken on a grid or using lots of hoops laid on the ground. Begin with a small grid and once the children succeed, the size of the grid can be increased to raise the difficulty.



The teacher needs a map of the grid with a path marked on that goes from the starting square (S) to the finishing square (F). Do not share this with the children, e.g.

S	X	X		
		X		
	X	X		
	X			
	X	X	X	F

The whole class works as a team. They should make a circle around the grid so that they can see what is happening. Explain that the children may step north, south, east or west but not diagonally. As a team they have to work out their way across the grid.

The first child steps on the starting square. She then steps onto another square. If this is not on your secret map, so tell her that she is "out" and the next child has a go. The activity continues until the class have worked their way through your "maze". If you wish, the class need to learn a secret code, e.g. "*Ships in harbour are safe, but that is not what ships are built for.*" A child who completes the maze must then state the secret code, without help, to be successful. If he or she cannot remember the code, then the next child must go through the maze until the code is stated.

It is always worthwhile reflecting on this activity. Often the children are keen to adapt the concept and create their own variations of the game.

Back inside the children can look at online maze creating programmes. The level depends upon the age and ability of the children. Younger pupils will find this advice helpful <http://www.wikihow.com/Make-a-Picture-Maze> This site has some great advice: <http://gwydir.demon.co.uk/jo/maze/>. This website also has some useful information <https://www.ncetm.org.uk/resources/10769>

Compass labyrinths

Demonstrate how to create a simple labyrinth 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 labyrinth 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 labyrinth 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. He 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 90° 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.

Environmental indicators of direction

It is possible to gain an approximate indication of direction using clues in our environment. Examples include:

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. See the relevant handout for further ideas.