**STUDENT ACTIVITY: Compass treasure hunt**

**Activity idea**

In this activity, students use their knowledge of the Sun and Moon to make compass directions and then use these directions to participate in a treasure hunt.

By the end of this activity, students should be able to:

* find E, W, N and S using the Sun and Moon
* devise a compass to use within the confines of school
* use their compass knowledge to complete and/or make a treasure hunt (that uses compass point clues).

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**Introduction/background**

This science story is about navigating without instruments across oceans. We are not on an ocean but can experience navigating our way across land without instruments – by using clues and landmarks – using the world around us in a similar way to wayfinders on the ocean.

For this activity, you need to devise a game of ‘wayfinding’ within the boundaries of the school – basically, set up a treasure hunt. To find the ‘treasure’, the students will need to establish compass points to get direction. To devise a compass, you will need a sunny day and preferably a day where the Moon is visible in the sky. You could check the Moon phases for this using [www.rasnz.org.nz/in-the-sky/lunar-phases](https://www.rasnz.org.nz/in-the-sky/lunar-phases) (New Zealand only) or

[www.timeanddate.com/moon/phases/new-zealand](https://www.timeanddate.com/moon/phases/new-zealand) (select the country you want). The Moon will be more visible in the day sky as its orbit takes it closer to the Sun – that is closer to the new moon phase (the beginning of the lunar cycle as it travels around the Earth).

**What you need**

* Access to the article [Wayfinding](https://www.sciencelearn.org.nz/resources/630-wayfinding)
* Copies of the student handout [Compass template](#handout)
* Treasure (treats or confirmation that they have reached the destination)

**What to do**

1. Read the article [Wayfinding](https://www.sciencelearn.org.nz/resources/630-wayfinding) as a class or in small groups. Discuss wayfinding. Explain to students that they are going to try wayfinding on land (at school) using compass directions.
2. If you need to teach cardinal compass points, explain that N, S, W and E are points of direction and helpful when explaining a direction – particularly when wayfinding. An activity for learning about the cardinal points can be found in [Navigating by the stars](https://www.sciencelearn.org.nz/resources/636-navigating-by-the-stars).

***Making compasses***

1. Homework: Early the next morning, have students look for the Sun. (Tell them to avoid looking straight into the Sun – it can damage their eyesight.) They need to find the point on the horizon where it rose and try to remember the general direction – fix that point as east – and see if they can identify buildings or landmarks in the distance towards where the Sun came up. This will help them set compass points at school.
2. Have students make a school compass using the [compass template](#handout) and using the open space in the school as the starting point.
* Students find the position of the Sun. If the Moon is visible, fix a line between the Sun and the Moon and extend it beyond to both horizons for E and W. An intersecting line that crosses at the zenith (straight above you) will give you N and S. If the Moon is not visible, students need to use their knowledge of approximately where the Sun rose to determine where E is.
* Look for landmarks as far away towards the horizon points of E, W, N and S as you can. The further away you get from where you are, the more accurate your compass points will be. Navigators identify places on the horizon – however, they get an unobstructed view to the horizon because they are on the ocean. Unfortunately, the horizon on land is more obscured by objects such as hills, trees and buildings. If the landmarks are too close, your compass point will change when you move a few steps from your starting point. Your N landmark may become NE and then E as you move. If you identify landmarks at a good distance, moving around the area of the school should keep your landmarked points roughly in the right direction.
* Students draw or write these landmarks onto the compass template at the appropriate cardinal points. Do the same for NE, NW, SE and SW (if possible).

***Making the treasure hunt***

1. To devise clues for the treasure hunt, you will need to start from the same point that the compasses are set from. Using your school compass, make a number of clue cards for the students to follow. Make 6–7 different sets of cards (each set on different coloured paper for easy recognition). Groups of 4–5 students could follow their coloured clue cards. This will allow small groups to go in different directions (preventing the whole class rushing for the same clues) and will therefore create more of a challenge in that the class will not be following just one or two leaders.
2. You need to make a series of clue cards (about 10 in each set) that cause the students to navigate around the school ending up at a particular destination. The destination could be the same for all groups if you want or they could be different. The clue cards you devise will depend on your environment. You can be quite specific or somewhat vague, depending on your age group. As an example they may look something like:
* Card 1: Take 20 large steps N. (At this point there will be another clue card – on a building/post/fence/wherever.)
* Card 2: Take 25 large steps E – look for large blue door. (This is where the next clue will be.)
* Card 3: Face SE, take 10 large steps. Look down.
* Card 4: Go S as far as you can. Check out the fence in front of you.

***The treasure hunt***

1. Set out the clues for each of the groups before school or at a time when the students are not around. The treasure hunt should then be carried out as soon as possible after setting up before clues are moved by others who may spot them.
2. Take the class to the starting point and give the first clues to each of the groups. Let them wayfind their way to the treasure or end point of the game. The final destination may have a surprise or treat or just congratulations on completing this mission!
3. As a class, discuss the good points and difficulties with wayfinding. (A good point might be that you don’t need any devices or maps – just a knowledge of how to find N, S, W and E. A difficulty might be finding landmarks at a good distance from your starting place because tall objects obscure the horizon. Direction is not very accurate or specific – you may get a general direction but then you might need to hunt around for clues.)

**Extension activity**

* Students choose a destination in the school (such as the library). From the same starting point as for the last activity, each student devises a list of instructions using compass points (N, S, W, E, NE, SE, SW and SE) and numbers of steps (distance) to reach that destination. Some instructions could contain clues such ‘go N until you find a red door’ etc. The instructions are then passed on to a partner without telling them where they will end up. The partner then follows the instructions using their knowledge of the compass points within the school to see if they can reach the ‘unknown’ destination.

**Student handout: Compass template**

Establish N, S, W and E. Look for landmarks on the horizon at those points and draw or write them onto your template. Then look for the halfway marks between each of these points (NE, SE, NW and SW) and find landmarks at these points too. Landmarks should be as close to the horizon as possible. The more distant they are, the more accurate your compass points will be.

