How to Make a Compass

Grade Level: 4th – 6th; **Type:** Physics

Objective:

This science project demonstrates how you can make your own compass using a magnetized needle. It also allows you to compare magnetic north and geographic north.

Research Question:

- How can you make your own compass?
- How far off is magnetic north from geographic north?

Did you know that the earth acts like a giant magnet? It even has a magnetic north and south pole. Nope, the magnetic north pole is not at the geographic North Pole – but they're close enough to make a compass that works through magnetism.

Materials:

- Cardboard
- Scissors
- Ruler
- Plastic cup
- Pen
- Needle
- Magnet
- Cork
- Tape
- Water

Experimental Procedure:

1. Cut out a large cardboard circle that is about an inch wider on each side than the mouth of the cup.
2. Cut a smaller circle from the center of the large circle. The smaller circle should be just a bit smaller than the mouth of the cup.
3. Divide the remaining doughnut into four equal quadrants, and label the quadrants with the letters N, S, E, and W.
4. Stroke a needle with a magnet from eye to tip 30 times. Make sure to stroke it in the same direction each time.
5. Cut a cork lengthwise down the middle. Lay the cork so that its new flat (cut) surface faces upwards.
6. Tape the needle to the flat surface, facing it in the same direction as the cork.
7. Fill the cup with water, almost to the rim.
8. Place the doughnut cutout over the mouth of the cup, so that the hole is directly over the water.
9. Place the cork on the water's surface so that the needle is pointing from north to south.
10. Try out your compass, and compare it with the results of a real compass. Alternatively, look at a map of your area to figure out where you are, and see whether magnetic north and geographic north are very different from each other.

Terms/Concepts: Magnetism ; Geographic and magnetic poles; How does a compass work?; How can you magnetize a needle?

References:

Fascinating Science Projects: Electricity and Magnetism, by Bobbi Searle. Pp. 30-31.

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