# Magnetic Navigation: Make a Compass

Navigation at sea is serious business. Without landmarks to judge a ship's position, other means must be found to accurately travel between one location and the next. In the Navy, navigation Quarter Masters and the ship's Navigator keep the Commanding Officer and the Bridge Watch team continually updated on the ship's position, planned movement, and any hazards. To keep track of the ship's location, the Navigation team plots the ship's position through celestial navigation, GPS, radar and visual means. At home you can create your own navigational tool using just a few objects, and a little bit of magnetism!

## Build Your Own Compass

1. Magnetize the needle: Stroke the needle on the magnet 30– 40 times. Stroke in the same direction, rather than back and forth.
2. Carefully float the leaf in the cup of water.
3. Place the magnetized needle in the center of the leaf, making sure the leaf continues to float. The magnetized needle will align itself with the earth's magnetic field to point north to south. Test this by carefully turning the cup and watching for the needle to realign itself.
4. If the needle doesn't move back into North/South alignment, repeat Step 1.
5. Figure out which way is north: Since the magnetized needle points from north to south, you can't use it to figure out where east and west are located until you know which end of the needle points north.
   Go outside!
   - If it is morning, turn until the sun is to your right. The end of the needle pointing away from you is pointing north.
   - If it is afternoon, turn until the sun is to your left. The end of the needle pointing away from you is pointing north.

### Materials

**Cup of Water**

**Small Leaf**

**Needle**

**Magnet**

## What's Happening?

Compasses work so effortlessly because their design allows the magnet to respond freely to Earth's magnetic field. Earth itself is like a giant magnet and the small magnet of your needle will align itself accordingly, with the north end of the needle drawn to Earth's magnetic North Pole.



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