



# The World is One Big Magnet!

**Supplies:**

- One bar magnet, with marked poles,
- One magnetic compass
- (Optional items, a sewing needle, a bowl of water and a disc of waxed paper or Styrofoam.)



**Age or Grade:** Grades 2 and up

**Time:** 10 Minutes

**Background:** A magnetic field surrounds the earth. This magnetic field has two poles—a north and a south. Just like opposite poles of a magnet will be attracted to each other, a magnet that is allowed to turn freely will be attracted to the magnetic poles of the earth. This is the principle that a compass uses to point north. The needle of a compass is a magnet, and the needle is allowed to turn freely. It will align itself with the magnetic poles of the earth. The magnetic poles of the earth are close to the geographical poles, but not in exactly the same location. This means that a compass points to the magnetic pole, but not true north/south. To navigate with a compass, it is necessary to correct the compass reading to true north/south. The exact correction depends on where you are relative to the poles. In Virginia, the correction is very small—approximately 2 degrees.

**Project Goal:** Investigate and understand characteristics of magnetism and magnetic fields.

- What to Do:**
1. Step outside. Using the compass, determine each direction: North, South, East, and West.
  2. Place a bar magnet on a piece of paper.





## Virginia 4-H STEM @ Home Activity

3. Move a compass around the bar magnet placing a dot each time the arrow changes direction.
4. Observe and write down how your compass needle reacts as you move it around the bar.
5. Electrical appliances generate magnetic fields. Take your compass and move it towards different electrical devices in your home (refrigerators, stereos, lamps), write down what happens with your compass needle when you do this.

### Reflect:

1. Why does the needle point north/south?
2. How can you tell which way is north and which is south? [Hint: How could you use the bar magnet to find out?]
3. How could objects with strong magnetic fields influence a compass?

### Apply:

1. What would you use a compass for?
2. Where have you seen a compass used at?
3. What is a time in which it would be important to use a compass?

### Going Further:

Create homemade compass: Magnetize a sewing needle. To do this, stroke the needle **IN THE SAME DIRECTION** (not back and forth!) 50 times with the magnet. Next, place a disk of Styrofoam or card stock in the bowl of water and place the magnetized needle on the disk. The disk and needle should be able to float freely. The needle will point north /south. Compare it to your compass.

### Notes for Parents or Helpers:



**Please keep all small objects that could be choking hazards out of the reach of children under five years of age, as well as pets!**



**Keep MAGNETS away from electronic devices (telephones, television screens, computers, tablets, pacemakers, etc) as well as credit cards, video tapes or anything with magnetic data.**

*Adapted from the Virginia 4-H In-School and School Enrichment Curriculum-Electricity*  
<https://www.sites.ext.vt.edu/resources/4h/4hpubs/pdfs/388-800.pdf>



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