Magnets Point the Way!

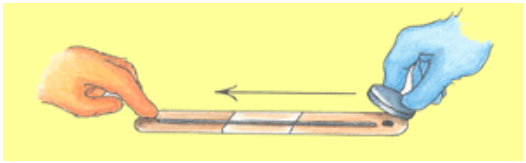
When you use a compass to see which way is north, south, east, and west, you are really using a magnet. The little moving pointer in a compass is actually a small magnet! The needle lines up and points in a certain direction because Earth itself has magnetism and acts like a magnet too! Let's see how Earth's magnetism affects the magnet in a compass.

Materials:

- Strong magnet
- Compass
- 2 Popsicle sticks
- 2 Paper clips
- Tape
- Pen
- Disposable Styrofoam cup
- Bowl
- Water

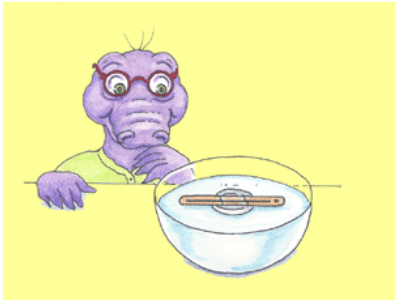
Procedures:

1. Unbend the 2 paper clips until they are straight. Tape each paper clip to a Popsicle stick as shown.
2. Use a pen to make a dot or some other mark at one end of the Popsicle stick.
3. Take a strong magnet and place it on the paperclip at the end with the mark. Move the magnet along the paper clip all the way to the other end. Lift the magnet up and place the same end of the magnet back on the end of the paper clip with the mark. Move the magnet along the paper clip in the same direction as before.



4. Repeat step 3 about 10 times with each paper clip. This should make each paper clip into a magnet.
5. Place a compass down on the table. Usually, the colored end of the needle is the north pole of the compass needle magnet and points toward North. Turn the compass until "N" on the compass is lined up with the colored end of the needle.

6. Bring the marked end of one of your paper clip magnets close to the compass. If the marked end repels the colored end, the marked end is a north pole and you should mark it "N". If the marked end attracts the colored end of the compass, the marked end is a south pole and you should mark it "S".
7. Break off the bottom of a Styrofoam cup and float it in a bowl of water. Place your paper clip magnet on the cup bottom as shown. You have made your own compass!



8. Test it with your other paper clip magnet.

Think about this ...

Here's something that seems a little crazy. The north pole of a compass magnet points toward the north. But a magnet's north pole is supposed to be attracted by another magnet's south pole. Does this mean that Earth's south magnetic pole is actually up north? Believe it or not, that's the way it is. Earth's south magnetic pole is near Earth's geographic north. Earth's magnetic north pole is near Earth's geographic south. That's why the north pole of a compass points toward north because that's where Earth's south magnetic pole is located and they attract.

Where's the Chemistry?

Scientists believe that Earth's magnetism may come from the molten iron surrounding Earth's solid inner core. It seems that this slowly moving material may create electric currents that produce Earth's magnetism. Like any other magnet, Earth's magnetism has a North and South Pole.

The American Chemical Society develops materials for elementary school age children to spark their interest in science and teach developmentally appropriate chemistry concepts. The *Activities for Children* collection includes hands-on activities, articles, puzzles, and games on topics related to children's everyday experiences.

The collection can be used to supplement the science curriculum, celebrate National Chemistry Week, develop Chemists Celebrate Earth Day events, invite children to give science a try at a large event, or to explore just for fun at home.

Find more activities, articles, puzzles and games at www.acs.org/kids.

Safety Tips

This activity is intended for elementary school children under the direct supervision of an adult. The American Chemical Society cannot be responsible for any accidents or injuries that may result from conducting the activities without proper supervision, from not specifically following directions, or from ignoring the cautions contained in the text.

Always:

- Work with an adult.
- Read and follow all directions for the activity.
- Read all warning labels on all materials being used.
- Wear eye protection.
- Follow safety warnings or precautions, such as wearing gloves or tying back long hair.
- Use all materials carefully, following the directions given.
- Be sure to clean up and dispose of materials properly when you are finished with an activity.
- Wash your hands well after every activity.

Never eat or drink while conducting an experiment, and be careful to keep all of the materials used away from your mouth, nose, and eyes!

Never experiment on your own!

For more detailed information on safety go to www.acs.org/education and click on "Safety Guidelines".