

**Project FOCUS
Best Lessons
THIRD GRADE**

Title of Lesson: Magnets - Make a Compass

Theme: Physical Science

Unit Number: **Unit Title:** Magnets and Magnetism

Performance Standard(s) Covered (enter code):

S3P2. Students will investigate magnets and how they affect other magnets and common objects.

b. Investigate how magnets attract and repel each other.

Enduring Standards (objectives of activity):

Habits of Mind

- Asks questions
- Uses numbers to quantify
- Works in a group
- Uses tools to measure and view
- Looks at how parts of things are needed
- Describes and compares using physical attributes
- Observes using senses
- Draws and describes observations

Content (key terms and topics covered):

Before beginning the activity, review or introduce the following points. Magnets are all around us. Most are made of metals including iron, copper, and nickel. Magnets attract or repel other magnets because of their magnetic fields. This can be explained by imaginary lines of force with two regions where the force is the strongest. These two regions are the magnet's poles. They are usually identified as north and south poles. One magnet's north pole will attract another magnet's south pole, but push away another magnet's south pole. Like poles pushing away from each other is called repulsion. If a magnet is broken in half, both pieces will contain north and south pole. The earth also has a magnetic field. Its poles are at the very top and bottom of the earth and are called the north and south poles. Compasses can tell which direction is north because they contain small iron pieces that interact with the earth's magnetic field and will point north. In the sixteenth century, sailors constructed makeshift compasses using a similar procedure as the one in this lesson to tell what direction they were going. Birds and turtles also use the earth's magnetic field to tell direction when they migrate.

Learning Activity (Description in Steps)

Abstract (limit 100 characters): Students will observe how the earth's magnetic force interacts with a homemade compass.

Details:

First, review concepts of magnets and magnetism as well as the background information (listed above, under Content) with the students.

Fill the bowl about half full of water. Place the plastic lid in the bowl of water so that the lid floats on top. Rest the magnet on the plastic lid so that the magnet is also floating on top the water.

(If the magnet does not float, use a lighter magnet for this activity.) Have the students hypothesize what will happen to the magnet.

The magnet will start to slowly spin in the water. The magnet is now interacting with the earth's magnetic field. Allow the magnet to spin in the water for at least five minutes or until it stops moving. When the magnet stops spinning, the south pole of the magnet will be pointing towards the north pole of the earth.

Let the students come up in groups and arrange the north, south, east, and west labeled squares of paper on the bowl or on the table around the bowl to complete the compass. Have the students write down their observations.

Materials Needed (Type and Quantity):

- Large bowl, preferably circular and plastic
- Plastic lid (I used one from an oatmeal can)
- Bar magnet with north and south poles labeled
- Sticky Tack or some sort of movable adhesive
- Four squares of paper labeled North, South, East, and West

Notes and Tips (suggested changes, alternative methods, cautions):

Caution: Students should not put magnets near electronic devices or personal medical devices, doing so can cause damage to these devices.

Sources/References:

- 1) Originally Submitted by Lauren Snyder, edited by Jessica Valle (2010)
- 2)
- 3)

Optional: Magnetism Review

Please circle the correct answer.

1. How many pole(s) does a magnet have?

- (a) one
- (b) two
- (c) three
- (d) depends on the magnet

2. Like poles _____ . Different poles _____ .

- (a) attract, attract
- (b) repel, repel
- (c) attract, repel
- (d) repel, attract

3. What would happen if you cut a magnet in half?

- (a) It would lose its magnetic field.
- (b) The poles would become separated.
- (c) You would get two separate magnets with their own poles.
- (d) You cannot cut a magnet in half.

Please circle True or False.

- 4. True False Magnets are strongest at their poles.**
- 5. True False The Earth has a magnetic field.**
- 6. True False All metals are magnetic.**
- 7. True False Compasses work by magnets.**
- 8. True False When two unlike magnets interact, this is called repulsion.**