

INQUIRY SCIENCE

Grades 4–5

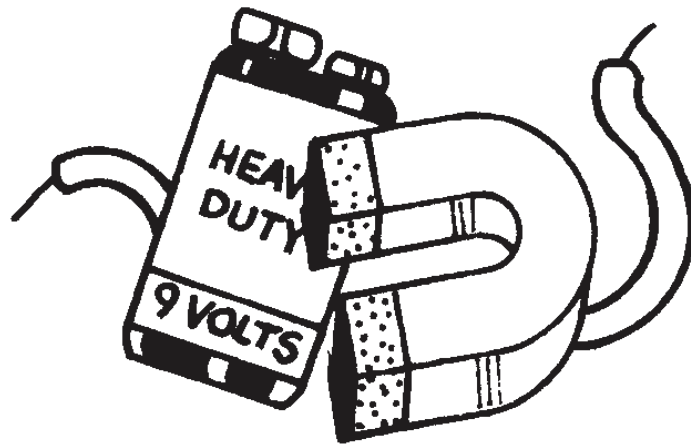
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Electricity & Magnetism



Magnetic Attraction

Gearing Up

Open a can in front of the class with an electric can opener. Lead the students to wonder why the can stayed suspended while the can opener worked. A magnet holds the can in place. You may wish to carefully allow each child a chance to attach a can to the can opener. Brainstorm other familiar things that might contain a magnet.

Process Skills Used

- predicting
- recording data
- observing
- classifying
- graphing

Guided Discovery

Background for the teacher:

A magnet is an object that attracts (brings near) metals such as iron and steel. The ends of a magnet are called poles. A magnet has a north pole and a south pole. Opposite poles attract; the north pole of one magnet attracts the south pole of another magnet. Like poles repel; the north pole of one magnet pushes away the north pole of another magnet.

Materials needed for each group:

magnets

objects to explore: wood block, thread, steel pin, aluminum foil, copper wire, paper clip, penny, shoelace, plastic straw, steel wool, nail, metal can, metal spoon

Directions for the activity:

Have students fill in the prediction column of the data table to indicate whether items will be attracted to magnets. Then, allow them time to explore and find out which items are attracted to magnets. Have the students sort the objects into two groups: items that are attracted to magnets, and those that are not.

Responding to Discovery

Lead students to make conclusions as to what items are attracted to magnets. Help students to realize that all metals are not magnetic.

Applications and Extensions

Think about how magnets are used to make our lives easier. Write about some magnets we use in everyday life.



Real-World Applications

- Discuss how inventors use magnets.
- Discuss when you wouldn't want a metal to be magnetic.



Name _____

Magnetic Attraction

- First, make a prediction, then test each item. Hold each item next to the magnet to determine whether it is magnetic. Write your observations below on the chart.

Item	Your prediction	Is it magnetic?	What is it made of?
wood block			
thread			
steel pin			
aluminum foil			
copper wire			
paper clip			
penny			
shoelace			
steel wool			
nail			
metal can			
metal spoon			
plastic straw			

- Were there any items that surprised you? _____
- What did you observe about the magnetic items? _____
- Sort the items into two groups. Draw a picture of each item in its proper category.

magnetic

non-magnetic

Making a Compass

Gearing Up

You probably have the walls in your classroom labeled north, south, west, and east. Ask the students to explain how they know the north wall is north other than “My teacher says it is.” Lead them to ask for proof. You can provide proof with a compass. Obtain several different styles of compasses to show that they all point to north.

Process Skills Used

- following directions
- observing
- recording data

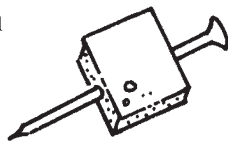
Guided Discovery

Background for the teacher:

The compass has been used for a long time to help navigators find directions. A magnetic compass is an instrument that indicates direction. The compass needle always points to the magnetic North Pole. When you have established north, you can determine the other directions by their relationship to north. In this lesson, students will make their own compass.

Materials needed for each group:

a magnet straight pin
small square of Styrofoam
(from a meat tray)
plastic bowl water
loose staples in a dish
(one for the whole class)



Directions for the activity:

Demonstrate to students that the pin is not a magnet by holding the pin in a container of loose staples. Then have each group rub the head of a pin back and forth 40 times on one side of the magnet. Then have them put their magnetized pins in the dish of staples again to show that it is now a magnet. Once the pin is magnetized, students poke it through the Styrofoam square so that the pin is sticking out on both sides. Float the Styrofoam with the pin in a horizontal position in a bowl of water. The water should be just deep enough so that the pin and Styrofoam move freely. Be sure that all magnets are put away as they will interfere with the compass. Instruct the students to turn the pin in either direction. They will find that it will turn back to the original direction. The pin is pointing to north and south poles.

Responding to Discovery

Ask students what might happen if a magnet were placed near the pin once it was in the water.

Applications and Extensions

How might a compass be useful for finding constellations?

Real-World Applications

- Discuss how hikers use a compass and a map.
- Discuss how pilots use a compass to navigate.