

Magnetism

Strand Force, Motion, and Energy

Topic Investigating magnets

Primary SOL K.3 The student will investigate and understand that magnets have an effect on some materials, make some things move without touching them, and have useful applications. Key concepts include

- a) magnetism and its effects;
- b) useful applications of magnetism.

Related SOL K.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which

- a) basic characteristics or properties of objects are identified by direct observation;
- g) a question is developed and predictions are made from one or more observations;
- k) objects are described both pictorially and verbally.

Background Information

A magnet has two ends called poles, one of which is called a north pole and the other is called a south pole. The north pole of one magnet is attracted to the south pole of a second magnet, while the north pole of one magnet is repelled by the other magnet's north pole. One way to state this is that like poles repel and unlike poles attract. Repulsion is the force that pushes like poles of magnets apart. Magnetic compasses contain a small weak magnet often called the needle. The north end of a magnetic compass always points roughly toward Earth's North Pole. If you think of Earth as having a bar magnet inside of it, the south end is located at Earth's North Pole. This is due to the makeup of the inside of Earth.

If you could cut a bar magnet in half, you would get two new, smaller magnets, each with its own north and south pole. Magnets will attract certain metals (iron-bearing, nickel, and cobalt). Magnets have an effect on some items and can cause them to move. Some items are not affected by magnets and remain stationary. Because some metals are attracted to magnets, magnets have many simple, useful applications in the home such as with can openers, magnetized screwdrivers, magnetic cabinet door latches, and magnetic games. The force of a magnet can move something without actually touching it. Students will be introduced to the vocabulary *attract/repel*, *non-attraction*, *metal*, and *nonmetal* in grade two. The focus of the investigations in this standard should be on the concepts, not the terminology.

Safety Note: Keep magnets away from electronic devices such as computers, watches, and clocks, as they can damage these items even with brief contact.

Materials

- Magnets (several different types if they are available)
- Large plastic zip bags, one per student and each containing the following:
 - a piece of paper

- pencil
- metal paper clip
- coated or plastic paper clip
- metal washer
- steel nail with rounded tip
- plastic spoon
- cork
- steel wire
- penny
- refrigerator magnet
- safety pin
- metal screw
- pictures of items attracted and not attracted by magnets

Vocabulary

magnet, attract, repel, not attract, metal, iron, steel, aluminum, copper

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Introduction

1. Give each student or small group of students a magnet and bag of materials. Ask them to sort the objects in the bag into two groups using any method they wish. Give students ample time to sort in a variety of ways and then share how they sorted.
2. Listen to different explanations, but call attention to the groups that sorted by “picked up” and “didn’t pick up.” Take note of the different terminology students use to describe these groups, such as *sticks, doesn’t stick, attracts, doesn’t attract*, and so forth.

Procedure

1. Have students put the materials back in their bags, and introduce the terms *magnet, attract*, and *not attract* in the context of the sorting activity.
2. Have students use their magnets to test other objects in the classroom to see if they are attracted to or are not attracted to the magnet. Be sure to explain the safety rules concerning magnets.
3. Have students go back to the materials and look at the ones that are attracted to the magnet. Talk about what they have in common, getting to the idea of metal and nonmetal. Talk about the penny. Ask: “Why isn’t it attracted to the magnet?” Talk about different types of metals such as aluminum, copper, steel, and iron.

Observations and Conclusions

1. Have students put all materials away except for the magnets. Give students several minutes to play with the magnets and see how the magnets react with one another. If you have ceramic magnets, let students try to put two of them on a pencil. Discuss what happens.
2. Brainstorm some places that magnets are used. Show students examples such as tools and refrigerator magnets.

Assessment

- **Questions**

Allow students to use magnets to answer.

- How far away can your magnet be and still attract an object?
- Can your magnet attract something through paper, cloth, wood, or other items?
- How big an object will your magnet pick up?
- Which type of magnet in our room seems the strongest?

- **Journal/Writing Prompts**

- Record in your science journals “Things I Learned about Magnets.” (Note to teacher: Check to see what ideas they remember and what concepts they can illustrate and explain in their own words.)

- **Other**

- Have students sort pictures in two groups: things magnets attract and things magnets do not attract.

Extensions and Connections (for all students)

- As a homework assignment, have students go on a magnet hunt at home. They should draw and/or list all of the places they found magnets and things that use magnets in their homes (e.g., games, tools, refrigerator magnets).
- Have students test magnets in sand, in water (make sure to place the magnet in a sealed baggie first so it will not rust), and under a table. Ask: “Can it still attract an object?”
- Put magnets and various objects in the science center with which students may experiment.

Strategies for Differentiation

- Use large, easy-to-hold magnets.
- Include some bags of items that are larger in size for students to manipulate easier.
- Provide stations to spread out items instead of having items in bags.
- Limit the number of items in bags or stations.
- Have students do sorting activities in small groups.
- Have students work together to create vocabulary cards using magazines, clip art, and drawings.
- Have students physically demonstrate their vocabulary using their magnets.
- Have students physically demonstrate their vocabulary understanding by using their bodies.
- Have students keep a picture journal of items that are attracted and not attracted to magnets.
- Use premade labels for “sticks” and “doesn’t stick” and “attracts” and “doesn’t attract” that include picture cues. Put these labels on boxes to make it easier to sort.