ACTIVITY 5

Magnetism

BROWARD COUNTY ELEMENTARY SCIENCE BENCHMARK PLAN

Grade 1—Quarter 1
Activity 5

SC.A.1.1.1
The student knows that objects can be described, classified, and compared by their composition (e.g., wood or metal) and their physical properties (e.g., color, size, and shape).

SC.H.1.1.1
The student knows that in order to learn, it is important to observe the same things often and compare them.

SC.H.1.1.2
The student knows that when tests are repeated under the same conditions, similar results are usually obtained.

SC.H.1.1.3
The student knows that in doing science, it is often helpful to work with a team and to share findings with others.

SC.H.1.1.5
The student uses the senses, tools, and instruments to obtain information from his or her surroundings.

ACTIVITY ASSESSMENT OPPORTUNITIES

The following suggestions are intended to help you identify major concepts covered in the activity that may need extra reinforcement. The goal is to provide opportunities to assess student progress without creating the need for a separate, formal assessment session (or activity) for each of the 40 hands-on activities at this grade level.

1. Display the common food containers from the previous activity's assessment, and ask students to predict which containers might be attracted to a magnet and which might not. Record students' predictions on the board. Then test each container, and compare the results to students' predictions. (Note for the Teacher: "Tin" cans are actually steel cans coated on the inside with the element tin. Steel is magnetic, but tin is not. However, so little tin is used that the cans will still be attracted to the magnet.)

2. Use the Activity Sheet(s) to assess student understanding of the major concepts in the activity.

In addition to the above assessment suggestions, the questions in bold and tasks that students perform throughout the activity provide opportunities to identify areas that may require additional review before proceeding further with the activity.

ACTIVITY 5

Magnetism

OBJECTIVES

Students predict and observe whether various objects are attracted to a magnet. They then classify the different objects as magnetic or not magnetic.

The students

- operationally define *magnetism*
- predict and observe whether objects are attracted to a magnet
- sort various objects as magnetic or not magnetic

SCHEDULE

About 40 minutes

VOCABULARY

magnet
magnetic

MATERIALS

For each student

1	Activity Sheet 5
1 pair	safety goggles*

For each team of four

1	button, any shape/color
1	candle, birthday
1	magnet
1	paper clip, large
1	rubber band
1	tray, sorting
1	washer, small
1 piece	wire, insulated, with stripped ends

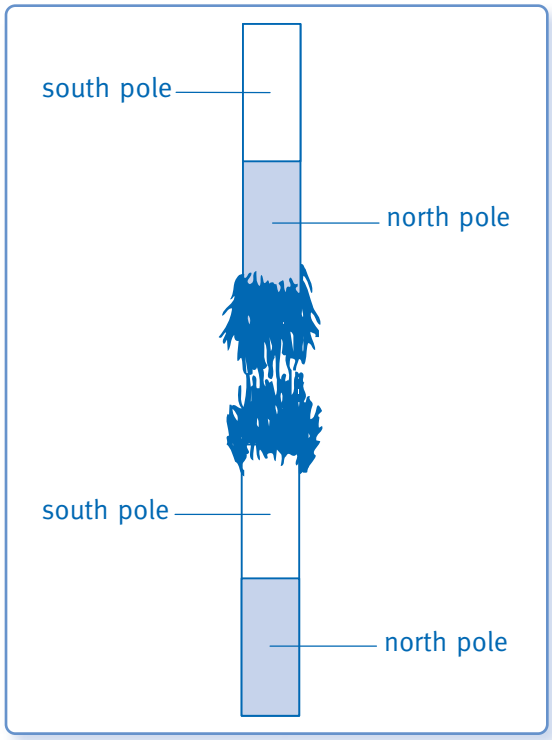
For the class

1 roll	aluminum foil
1	metal samples, p/16
1	pencil eraser, rubber
1 pair	scissors*
1	tack, metal*
1	wood samples, p/16
	Delta Science Reader, *Properties*

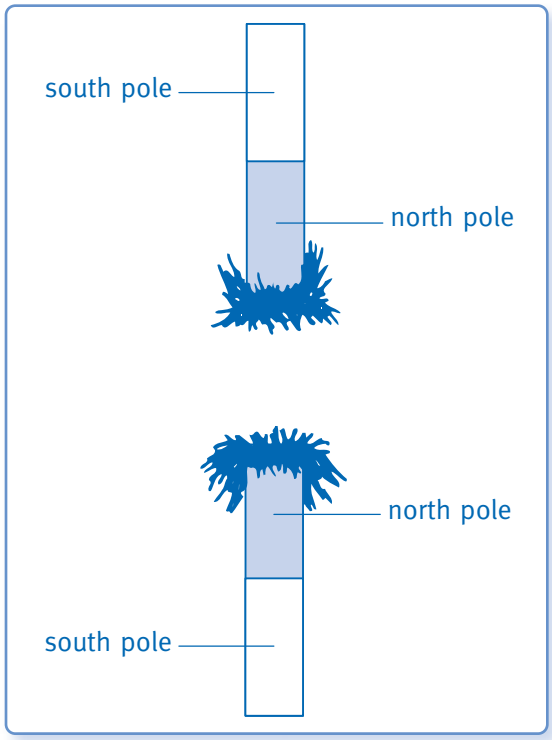
*provided by the teacher

PREPARATION

1. Make a copy of Activity Sheet 5 for each student.
2. Cut eight 3-cm × 3-cm (1-in. × 1-in.) or larger squares from the roll of aluminum foil.
3. You will need a rubber pencil eraser, a magnet, and a metal tack for a class demonstration. Borrow a magnet from one of the sorting trays.
4. From the package of metal samples, remove eight steel strips, one for each team. (The package of metal samples also contains eight brass strips, but only the steel strips are attracted to a magnet.) From the package of wood samples, remove eight wood strips, one for each team. (It does not matter which type of wood you use for this activity.)
5. Each team of four will need the following items on a sorting tray: an aluminum foil square, a button, a birthday candle, a magnet, a large paper clip, a rubber band, a steel strip, a small washer, a piece of wire, and a wood sample.



▲ ***Figure 5-1.*** *Iron filings attached to the poles of two magnets show how unlike poles attract.*



▲ ***Figure 5-2.*** *Iron filings attached to the poles of two magnets show how like poles repel.*

BACKGROUND INFORMATION

Magnetism is an invisible force that pulls together certain objects. A ***magnet*** is defined as an object that has the property of attracting iron or metals containing iron.

Objects are either ***magnetic*** or ***not magnetic.*** A magnetic object is attracted to a magnet; an object that is not magnetic is not. Most, but not all, metals are magnetic. Iron has the strongest magnetic attraction of the metals. Nickel and cobalt, and alloys or mixtures made of iron and these metals, such as steel, are also magnetic. Aluminum, copper, and gold are not magnetic, thus, the saying, "Everything that sticks to a magnet is metal, but not all metals stick to magnets."

The two areas of a magnet where the force of the magnet is the strongest are called the magnet's ***poles.*** All magnets have a north and a south pole. The poles of a bar magnet are located on either end of the magnet. Unlike poles (north pole/south pole, or south pole/north pole) of two magnets always attract each other (see Figure 5-1); like poles (north pole/north pole, or south pole/south pole) of two magnets always repel each other (see Figure 5-2).

The reason that magnetic materials are attracted to magnets is this: In the presence of magnets, the atoms that comprise a magnetic object align in such a way as to make the object a temporary magnet itself, complete with poles. One pole of the magnet is attracted to the opposite pole of the magnetic object. As a result, they stick together. In objects that are not magnetic, the atoms of the object are unaffected by the presence of the magnet. As a result, no poles are formed, and the magnet is not attracted to the object.

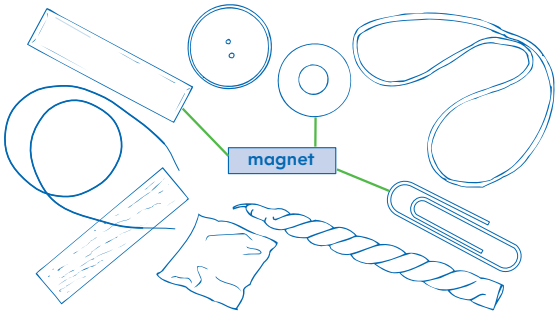
Unlike some of the previous activities, the manner of sorting in this activity is not particularly subjective; objects are either magnetic or not magnetic. However, as always, allow students to create their own relative groupings so long as they can justify them.

▼ **Activity Sheet 5**

Magnetism

1. Look at the objects on your tray. What objects do you think will stick to a magnet? Draw a picture of them.

2. Which objects stuck to the magnet? Draw a line from the magnet to each one.



Guiding the Activity

		Additional Information
1	Write the word *magnet* on the board and tell students that a **magnet** is an object that attracts some kinds of metal. Hold up a metal tack. Ask, **What do you think will happen when I move the tack and the magnet together?**	*Accept all predictions.*
	Place the tack on the table and slowly move the magnet toward it. When the two touch, lift up the magnet with the tack stuck to it. Ask, **What happened when the magnet and the tack touched each other?**	*Students should say that the tack stuck to the magnet.*
	Hold up the rubber pencil eraser. Ask, **What do you think will happen when I touch the magnet to this eraser?**	*Accept all predictions.*
	Place the rubber pencil eraser on the table and slowly move the magnet toward it until the two objects are touching. Lift the magnet to show that the eraser does not stick to it. Ask, **What happened when the magnet and the eraser touched each other?**	*Students should say that the magnet and the eraser did not stick together.*

Guiding the Activity

Additional Information

2 Write the word *magnetic* on the board and help students define *magnetic*.

*Students should understand that, in this instance, something is **magnetic** if it sticks to a magnet, and something is not magnetic if it does not stick to a magnet.*

Tell students that the property of objects they will investigate today is whether or not they are magnetic.

Return the magnet to the correct tray.

3 Distribute a copy of **Activity Sheet 5** to each student and a sorting tray of objects to each team. Give students time to examine the objects on their trays.

Tell students to predict which objects they think will stick to the magnet. Students should record their predictions in question 1 of their activity sheets.

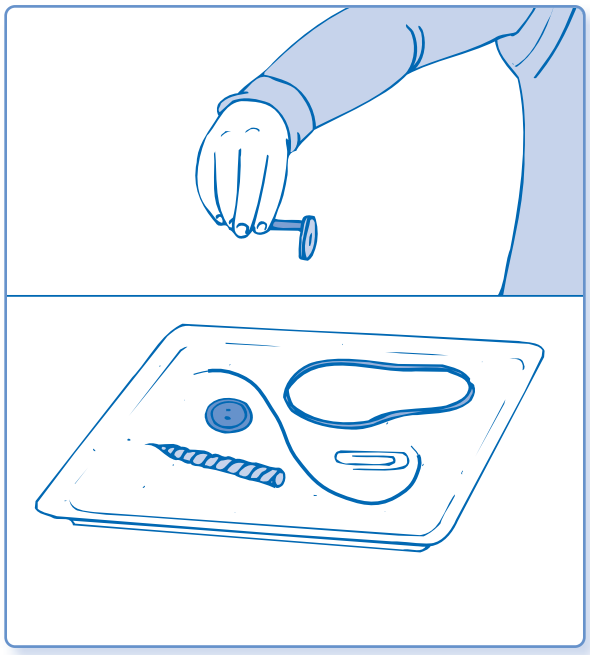
Help students read the instructions on their activity sheets.

Then have students test all of the objects on their trays and divide the objects into two groups, *magnetic* and *not magnetic* (see Figure 5-3).

Have students test the exposed ends of the wire, not the insulated portion.

Tell students to record their results on their activity sheets by drawing a line from the magnet to each object that stuck to it.

Again, help students read the instructions on their activity sheets.



▲ ***Figure 5-3.*** *Testing for magnetism.*

Guiding the Activity

	Additional Information
4 Stimulate class discussion by asking, **Which objects stuck to the magnet? Which objects did not stick?**	*Students should say that the paper clips, the steel strips, and the small washers stuck to the magnets. They should say that the aluminum foil squares, the buttons, the birthday candles, the rubber bands, the wire pieces, and the wood strips did not stick to the magnets.*
Ask, **Why do you think only some of the objects stuck to the magnet? What property do the objects that stuck to the magnet have in common?**	*Students might realize that the objects that stuck to the magnet were all made of metal. With the exception of the wire pieces and the aluminum foil squares, the objects that did not stick to the magnet were not made of metal.*
Ask, **Did all the metal objects you tested stick to the magnet?** Help students understand that only certain types of metal stick to magnets.	*Students should respond that the aluminum foil squares and the wire pieces did not stick.*
5 As appropriate, read or review page 8 of the Delta Science Reader *Properties*.	

Reinforcement

Provide students with a variety of classroom items, such as pencils, paper clips, pipe cleaners, chalk, paper scraps, scissors, glue sticks, plastic bag ties, and a magnet. Have students first predict which objects will stick to the magnet and then test their predictions.

Science Journals

Have students place their completed activity sheets in their science journals.

Cleanup

Have students return the sorting trays, buttons, birthday candles, magnets, paper clips, pencil eraser, rubber bands, steel strips, small washers, wire pieces, and wood samples to the kit. Discard the aluminum foil squares.

Science at Home

Encourage students to collect a variety of objects and first predict which will be magnetic and then test their predictions using a magnet from home. Caution students never to use a magnet near a computer, stereo system, or telephone.

Connections

Science Challenge

Divide the class into small groups, and ask each group to create a different game using one or more magnets. For example, one group might create a fishing game by suspending a magnet from a string taped to a short pole and using it to pick up paper clips or other magnetic objects; different scores could be assigned based on the number of paper clips or the weight of the objects picked up. Another group might devise a paper-clip-toss game with a target made of magnets of different strengths, with the weaker magnets assigned lower scores. A third group might draw a maze that must be negotiated by a student holding a magnet below the paper to guide a paper clip through the maze, with another student counting slowly to time how long it takes the first student to reach the end of the maze. Encourage students to be creative. When all groups have made their games, hold a "Magnetic Carnival" so students can try one another's games.

Science Extension

Have each student magnetize a nail by stroking it repeatedly in one direction with one end of a bar magnet, then try to pick up paper clips with the nail. (If some students find that the nail did not become strongly magnetized, have them stroke it again for a longer period of time.) Tell students to hit the nail against a hard object and then see whether it will still pick up paper clips. (Striking a temporary magnet will cause it to lose all or most of its magnetism.) Let students try to magnetize other objects—a straightened paper clip, an eraser, a pair of scissors, a plastic or wooden ruler, and so forth. What types of objects can and cannot be magnetized? (Only objects that are attracted to a magnet can be magnetized.)

Science and the Arts

Have students create a bulletin board display or individual posters showing the magnetic and nonmagnetic objects they tested in the basic activity. Tell students to put a large picture of a magnet in the center, surround it with pictures of the objects, and then use colored yarn to connect each magnetic object with the magnet. As students test additional objects in the Reinforcement and Science at Home activities, have them add pictures of those objects to their display or posters.

Science and Language Arts

Invite small groups of students to compose a brief story or skit about what it would be like to be a human magnet. Students could dictate their stories or skits for you to write down or could write them independently with minimal help. Let each group tape-record its story or act out its skit for the rest of the class.

Science and Math

Provide a variety of magnets of different sizes, shapes, and compositions, and use small stickers to label them with different numbers. Have teams test the strength of each magnet by determining how many small paper clips it will attract and hold; help students record their results. Guide each team to make a simple histogram of its results with the vertical axis showing the number of paper clips each magnet held and the magnet numbers noted along the horizontal axis. To make the vertical bar for each magnet, students could tape actual paper clips end-to-end on the histogram or could trace a paper clip as many times as needed. If students are not capable of making histograms themselves, make a class histogram on the board.