What Is a Magnet?

1. Make copies of Student Resource 1.1, Vocabulary, and distribute to students. Discuss the definitions with students as terms come up throughout the section.

2. Ask: What is a magnet? (a material that attracts steel, iron, cobalt, and nickel) Survey the class to find out how many students have used magnets. Discuss how the magnets are used. (Likely responses will include use of magnets to hold items on a refrigerator.) Ask: What happens as the magnet is brought near a refrigerator door? (It is pulled toward the door.) Explain that this “pull” is a force of attraction. Ask: What is a force? (a push or a pull) Point out that magnets exert forces on objects even when they aren’t touching. That’s because magnetic force acts even at a distance.

What Materials Do Magnets Attract?

Objectives

- Students predict what materials a magnet will attract and then test their predictions.
- Students identify materials that are attracted to a magnet.

Materials

For the class

- 2 pc. aluminum foil
- 2 brass brads
- 16 index cards
- 2 magnetite
- 16 magnets, ferrite
- 1 *marker
- 2 nails
- 2 paper clips
- 2 *pennies
- 16 plastic trays
- 2 rivets, iron
- 2 silver jewelry or other objects

*Not provided in kit
What Materials Do Magnets Attract? (continued)

**Student Resource**
- 1.2 Testing for Magnetic Attraction

**In Advance**
- Place one sample of each material to be tested in a separate plastic tray. Make two trays for each item. Use an index card to label the type of metal found on each tray:
  - aluminum foil: aluminum
  - brass brad: brass
  - iron: iron rivet
  - “magnetite rock”
  - nail: steel
  - paper clip: steel
  - penny: copper and zinc
  - silver jewelry (or other object): silver
- Set up 16 stations around the room, each containing one tray.

**Inquiry Focus**
- Predict

**Step 3:** Never place magnets near audio or video tapes, diskettes, TVs, VCRs, computers, or other magnetic media.

**Teaching Tip**
- Discuss what kinds of materials are attracted to magnets.
  - Ask: What kinds of materials are attracted to magnets? (Students may say that metals are attracted to magnets. Accept all answers for now.) Tell students that they will conduct some experiments to find out.

**2. Distribute the Student Resource and have students make predictions.**
  - Make copies of Student Resource 1.2, Testing for Magnetic Attraction, and distribute to students. Have students read the list of metals in the table and then fill out the Prediction column.

**3. Prepare students to test materials.**
  - Provide each pair with a ferrite magnet. Tell students they will be moving around the room to test their predictions. Explain that they should test the metal at each station with the magnet. If the metal is attracted to (pulled toward) the magnet, they should write Yes in the Test Result column of the table. If the metal is not attracted to the magnet, they should write No.
4. Discuss students’ observations.
   Ask: **What metals did the magnet attract?** *(iron and steel)*
   Remind students that only certain metals are magnetic, or attracted to a magnet. These include iron, cobalt, nickel, and steel. Point out that steel is a blend of materials that includes iron and carbon. Ask: **Did the magnet attract the magnetite?** *(yes)* **Why?** *(Magnetite is naturally magnetic.)* Tell students that magnetite contains iron, a metal that is magnetic.

### Is Cereal Magnetic?

**Teacher Demonstration**

<table>
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**Objectives**
- Students observe that some cereals contain iron.

**Materials**
* For the teacher
  - *breakfast cereals* (including Whole Grain Total™)
  - 1 magnet, cow
  - 1 *overhead projector
  - 1 Petri dish
  - *water
* *Not provided in kit*

**Inquiry Focus**
- Observe
Is Cereal Magnetic? (continued)

1. **Set up materials.**
   Place a Petri dish on an overhead projector. Carefully fill the Petri dish with water.

2. **Students make observations.**
   Break apart some of the pieces of cereal that are NOT Total™ and not high in iron. Float these pieces on the water in the Petri dish. Turn on the projector. Hold the cow magnet near a piece of the cereal without touching it. Tell students to observe the cereal as you move the magnet toward the edge of the Petri dish. (The cereal piece will not be pulled.) Now repeat with small pieces of the Whole Grain Total™ flakes. (The flake pieces are pulled by the magnet.) Turn off the projector.

3. **Discuss students’ observations.**
   Show students the Nutrition Facts label of the Total™ cereal box. Explain that this label tells buyers what nutrients are in the cereal and the amounts of these nutrients in one serving. Ask a volunteer to read aloud each of the nutrients listed. Ask: **Which nutrient is attracted to a magnet?** (iron) Explain that the cereal flakes contain iron, a nutrient needed by humans in their diet. Repeat the experiment using other cereals students brought in.

4. **Assessment**
   Ask: **Why were the flakes of cereal attracted to the magnet?** (The iron in the cereal is attracted to the magnet; it is magnetic.)

### Extension

**Seeing Iron in Cereal**

Pour a cup of Total™ cereal flakes into a blender with two cups of milk. Holding one end of the cow magnet against the blender vessel, turn on the blender for 30 seconds. Tell students to closely observe the area of the blender nearest the magnet. (Black particles can be seen near where the magnet is located.) Remove the magnet quickly and have students observe what happens. (The black particles fall to the bottom of the blender.) Tell students that the black particles are pieces of iron that separated out of the cereal as it was blended.
Section Assessment

1. Set up enough materials stations around the room to allow one-third of the class to work alone at a station during the hands-on portion of the assessment.

2. Make copies of Student Resource 1.3, Section 1 Assessment, and distribute to students.

3. Divide the class into three groups. While one group is working at the stations to complete the hands-on portion of the assessment, the other two groups can be completing the top part of the assessment. Rotate the groups through the stations until each has completed the hands-on portion of the assessment.

4. Discuss the answers as a whole-class activity.

Materials

For each station:

- magnet, ferrite
- plastic tray containing one aluminum foil, brass brad, iron rivet, and paper clip

Student Resource

- 1.3 Section 1 Assessment

Student Resource 1.3 (p. 11)

Vocabulary

1. What is a magnet?
   - a material that attracts iron, steel, cobalt, and nickel

Magnetic Attraction

2. A student uses a magnet to find out which nail is iron and which nail is aluminum. Which drawing shows the aluminum nail? Circle your answer.

Identifying Magnetic Materials

Test each material in the tray to see if it is attracted to the magnet. Write Yes next to each material the magnet attracts. Write No next to each material the magnet does not attract.

- aluminum foil
- brass brad
- rivet
- paper clip

7. Which objects contain iron, steel, cobalt, or nickel?
   - rivet and paper clip