

Make Your Own Magnet



Focus: Students explore how to magnetize materials and follow a procedure to make their own temporary magnets.

Specific Curriculum Outcomes

Students will be expected to:

- 21.0 follow a simple procedure [GCO 2]
- 42.0 investigate how to magnetize magnetic materials [GCO 1/3]

Performance Indicators

Students who achieve these outcomes will be able to:

- predict and identify objects which can be magnetized
- follow a procedure to make a temporary magnet

NOTES:

Attitude Outcome Statements

Encourage students to:

- appreciate the importance of accuracy [GCO 4]

Cross-Curricular Connections

English Language Arts

Students will be expected to:

- use writing and other forms of representation to explore, clarify, and reflect on their thoughts, feelings, experiences, and learnings; and to use their imaginations [GCO 8]

Getting Organized

Components	Materials	Before You Begin	Vocabulary
• Student Magazine, pages 16–17	• magnet and paper clips • bar magnets (one per pair of students), a key, scissors, coins, a spoon, brass paper fasteners, aluminum foil, metal jar lid, iron nails, paper clips, washers, bolts, loose staples • variety of magnets of different types and sizes (e.g., bar, horseshoe, donut, ring) • students' Science Journals		• magnetic • magnetize

Science Background

- The materials that magnets attract are also the materials that make good magnets. Iron, cobalt, or nickel (or their alloys) are used to make permanent magnets.
- When a magnetic metal object is attracted to a permanent magnet, it also becomes a magnet. It can attract other magnetic objects but only while it is touching a permanent magnet. This is called induced magnetism.
- Magnetic materials can be magnetized to acquire the properties of magnets temporarily.

Possible Misconceptions

- Students may think that all metal objects can be magnetized. Testing a variety of metal objects will allow students to recognize that this isn't the case.

ACTIVATE

Induced Magnetism

Demonstrate how magnetic materials act as temporary magnets when they are in contact with a magnet. Use a magnet to attract a paper clip (or another magnetic item), then use that paper clip to attract another until there is chain

of several paper clips hanging from the magnet. Ask:

- **Why are the paper clips attracted to each other?** (each paper clip becomes a temporary magnet, but they get weaker the longer the chain grows/the further away they are from the magnet)
- **Do you think a magnetic object can act as a magnet without staying in contact with a magnet?**
- **Do you think you could make a magnet?**

CONNECT



What Can Be Magnetized?

Introduce pages 16–17 of the Student Magazine and read the introductory text with the students. Ask them to predict which of the materials shown can be magnetized. Students will explore this actively in the following activity and can support or revise their predictions. Ask:

- **Can all metal objects be magnetized?** (No, only magnetic metals can be magnetized.)

Add the word “magnetize” to the Word Wall.

Testing Objects

Provide pairs of students with a bar magnet and various objects (such as a key, scissors, coins, a spoon, brass paper fasteners, aluminum foil, a metal jar lid) including some that have been identified previously as being magnetic (such as iron nails, paper clips, washers, and bolts). Invite students to explore whether they can magnetize the objects (turn them into magnets) to attract other magnetic items (without staying in contact with a magnet). After testing, students can report their findings to the class. Prompts for discussion might include:

- **Were you able to magnetize any or all of the objects?**
- **What materials can be magnetized?**
- **Why can only certain materials be magnetized?**
- **What procedures did you use?**
- **What procedure worked best?**
- **What would you do differently next time?**
- **What did you notice about the strength of the magnetic attraction for the objects?**

Make a Magnet

Have students follow the procedure on page 17 of the Student Magazine to magnetize a paper clip and turn it into a temporary magnet. Provide students, working individually or in pairs, with a bar magnet and some paper clips.

Step 1: Have students drag a magnet down the length of the paper clip. This is one stroke. Dragging in the same direction each time, have students stroke the paper clip 20 times.



Step 2: Students can test the paper clip to see if it has become a magnet and record their observations in a manner of their own choosing (e.g., using a graphic organizer, a checklist, or creating a digital video). Ask:

- **Will it pick up other objects (e.g., loose staples)? If yes, how many?**

Step 3: Have students stroke the paper clip 10 more times and then test the strength of the paper clip again. Remind students to record their observations. Ask:

- **How strong can you make your magnet?**



Invite students to repeat the procedure using an increasing number of strokes. Ensure they continue to record their observations. Ask students to record any new questions they may have on the I Wonder Wall.

CONSOLIDATE

Altering Aspects

Invite students to investigate any new questions they may have by altering aspects of the procedure used to magnetize the magnetic objects, for example:

- using a different type or size of magnet
- using a different magnetic object to see if all magnetic materials magnetize equally
- increasing or decreasing the number of strokes used



Remind students that it is important to record their observations and results in their Science Journals.

EXPLORE MORE

How To

Students can create a “How to” procedure (written or as a video) to teach others how to magnetize objects.

Does Closeness Count?

Students can design a process to determine if an object can become magnetized from being placed near a magnet using a strong permanent magnet and a magnetic object such as a paper clip.