Magnetic Metals

By David S. Heroux

SAFETY SUGGESTIONS

- Do not eat or drink any of the materials used in this activity.
- Check with an adult before testing any materials, as magnets can sometimes scratch surfaces. Be sure not to test electronic equipment.

Introduction

In this activity, you will use a magnet to explore household items to determine which ones are magnetic. Several metals are attracted to magnets — the most common of which is iron. Many household items are made of steel, which is mostly made up of iron. You will then use your magnet to create a temporary magnet out of paperclips. A magnetic field is a force that can attract some metals.

Materials

- small magnet from a craft store or other location (not a soft "sheet magnet")
- household items listed in the table below
- 3-4 small metal paperclips
- marker

Procedures

PART I

1. Use a magnet to determine which items are attracted to the magnet and which are not attracted. Enter your data in the table below.
2. Find at least two other metal things in your house that are attracted to your magnet and add them to your data table.

PART II

Now you are ready to turn one of your items into a temporary magnet!

1. Make sure your paperclip is attracted to the magnet. Plastic paperclips don't work at all, and plastic-coated ones don't work well.
2. Use a marker to mark one end of the paperclip.
3. Hold the marked end of the paperclip in one hand and the magnet in the other.
4. Slide the end of the magnet along the paperclip.
5. Lift the paperclip slightly away from the magnet and bring it back to the start.
6. Very quickly repeat the motions for 30 to 60 seconds. Time or count how many swipes it takes.
7. Repeat steps 3 through 6 with another paperclip.
8. Now test your paperclip. Pick up one of the paperclips and touch it to either end of the paperclip. Test an untreated paperclip the same way. Use the box to the right to write what you observe. Did you create a magnet?

Additional Experiments

- How long does the temporary magnet last (how long are the two attracted)?
- How many paperclips can you get to attract to each other?
- What is the minimum number of strokes it takes to make them attract?

How does it work? / Where's the chemistry?

Most magnets are made of an iron compound call magnetite. Several metals are attracted to magnetic fields. Magnets are also made from metals such as **iron** (Fe), **cobalt** (Co), and **nickel** (Ni). Natural magnets are called lodestones and are made mostly of iron. Magnets work because they have electrons that interact with each other and with a magnetic field. In Part II of this activity, you used a magnet to make something magnetic by lining up the electrons in the iron atoms of the paperclip.

What did you observe?

PART I

Item	Attracted to magnet? (Yes or No)
Soda can	
Soup can	
Frying pan	
Spoon	
Glass jar lid	
Coin	
Metal paperclip	
Aluminum foil	

PART II

What did you notice happened to the paperclip in Part II?

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