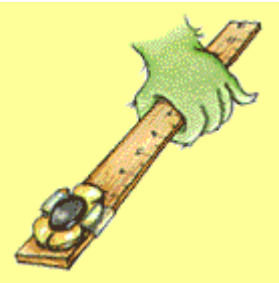
Metals and Magnetism

Metals are the only substances that are magnetic. The most common magnetic metal is iron. You don't see too many products made of pure iron but you do see a lot of products made of steel. Since steel has a lot of iron in it, steel is attracted to a magnet. In the following activity, "steel" a glance at the objects a magnet finds most attractive!

Materials:

- Magnet (not flat sheet type)
- Wooden or stiff plastic ruler
- Tape
- Key
- Metal paper clip
- Metal spoon
- Aluminum foil ball
- Hair pin
- Safety pin
- Penny
- Nickel
- Dime
- Quarter
- Jar lid
- Bottle cap
- Nail



METAL OBJECT	PREDICTION	RESULT
KEY		
METAL PAPER CLIP		
METAL SPOON		
ALUMINUM FOIL BALL		
HAIR PIN		
SAFETY PIN		
PENNY		
NICKEL		
DIME		
QUARTER		
METAL JAR LID		
METAL BOTTLE CAP		
NAIL		

Procedures:

1. Use the tape to attach the magnet to the ruler so that the magnet is facing away from the ruler as shown. This is your magnet wand.
2. Place your metal objects in a row and predict which ones are magnetic and which ones are not. If you think the object is magnetic write "Yes" in the box next to the object under Prediction. If you think it is not magnetic, write "No" in that box.
3. Now, touch the first object with the magnet on your magnet wand. If the object is magnetic, write "Yes" in the box for that object under Result. If it is not magnetic, write "No" in the same box. Do the same thing for the rest of the objects.

How many of your predictions were correct? Of the objects that were magnetic, what metal do you think most were made of? Was the aluminum foil ball magnetic? Try an unopened soda pop can. Now try an unopened tuna or other can. What metal do you think these cans are made of?

Think about this ...

You found out that certain metals, but not all, are magnetic. But did you know that if your magnet is strong enough, the magnetism can work all the way through a magnetic object so that another magnetic object can stick to the first? If you can find a strong enough magnet try this: Attract a safety pin to your magnet. Once it is stuck, see if another safety pin will stick to the bottom of the first. The stronger your magnet, the more safety pins it should hold!

Where's the Chemistry?

The most common magnetic materials are the metals iron, cobalt, and nickel or combinations of these with other materials. To make any of these substances into magnets, the material to be magnetized is placed into a device called a magnetizer. The magnetizer has a powerful electric current traveling through coils of wire. The electricity of the magnetizer creates a strong magnetic field, which magnetizes the material.

The American Chemical Society develops materials for elementary school age children to spark their interest in science and teach developmentally appropriate chemistry concepts. The *Activities for Children* collection includes hands-on activities, articles, puzzles, and games on topics related to children's everyday experiences.

The collection can be used to supplement the science curriculum, celebrate National Chemistry Week, develop Chemists Celebrate Earth Day events, invite children to give science a try at a large event, or to explore just for fun at home.

Find more activities, articles, puzzles and games at www.acs.org/kids.

Safety Tips

This activity is intended for elementary school children under the direct supervision of an adult. The American Chemical Society cannot be responsible for any accidents or injuries that may result from conducting the activities without proper supervision, from not specifically following directions, or from ignoring the cautions contained in the text.

Always:

- Work with an adult.
- Read and follow all directions for the activity.
- Read all warning labels on all materials being used.
- Wear eye protection.
- Follow safety warnings or precautions, such as wearing gloves or tying back long hair.
- Use all materials carefully, following the directions given.
- Be sure to clean up and dispose of materials properly when you are finished with an activity.
- Wash your hands well after every activity.

Never eat or drink while conducting an experiment, and be careful to keep all of the materials used away from your mouth, nose, and eyes!

Never experiment on your own!

For more detailed information on safety go to www.acs.org/education and click on "Safety Guidelines".