

# What is a Magnet?

## Teacher's Notes

<b>Main Topic</b>	Magnetism
<b>Subtopic</b>	Magnetism
<b>Learning Level</b>	Elementary
<b>Technology Level</b>	Low
<b>Activity Type</b>	Student - Inquiry

Description: Students will investigate a permanent magnet and create a temporary magnet.

Required Equipment	Test tube, stopper, iron filings, bar magnet, compass
Optional Equipment	

### Educational Objectives

- Describe properties of a permanent magnet and create a temporary magnet.

### Concept Overview

In this investigation, students will first experiment with an ordinary bar magnet and describe its effects on a compass and a tube of iron filings.

The second part of the lab challenges students to create a temporary magnet out of the tube of iron filings, and show that it is magnetic using the compass. Then they will demagnetize the tube and hypothesize about how they could demagnetize the bar magnet (without actually doing so).

A magnetic material is made magnetic when the individual domains (metal atoms, usually) are aligned, so that the tiny magnets strengthen each other rather than counteracting each other in a random pattern. This alignment can be accomplished by exposing the material to a strong magnetic field for a short time (or a weak one for a long time). In the case of this lab, the best way to magnetize the tube is to stroke it in one direction 50 times with one end of the bar magnet. Then the iron filings will align and act like one large magnet, attracting the compass needle. The tube may be demagnetized simply by shaking it.

A bar magnet can be demagnetized by strong jarring, or by heating. Both of these can disrupt the pattern of magnetic domains.

### Lab Tips

If students manage to demagnetize your bar magnets, they can be restored by exposure to a strong magnet, such as the Remagnetizer.

Bar magnets can also be demagnetized by improper storage. Be sure to store them in pairs, with opposite poles together.

# What is a Magnet?

Name: \_\_\_\_\_

Class: \_\_\_\_\_

## **Goal:**

Investigate a permanent magnet and create a temporary magnet.

## **Materials:**

Test tube, stopper, iron filings, bar magnet, compass

## **Procedure:**

1. Describe what effect the bar magnet has on the compass.
2. Fill a test tube about 2/3 full of iron filings and stopper the top.
3. Describe what effect the bar magnet has on the tube of iron filings.
4. Experiment with the tube and the magnet together. Can you treat the tube so that it becomes a magnet, and affects the compass as the bar magnet did? Describe your method for creating a magnet.
5. Now describe your method for demagnetizing the tube.
6. How could you demagnetize the bar magnet? Make suggestions, but do not actually attempt to demagnetize the bar magnet.