

---

## Synopsis: Magnet Makers

---

In this activity we will try to make permanent magnets out of small nails by:

- Using a large permanent magnet
- Directional rubbing

### Standards

#### *4<sup>th</sup> Grade*

**1b.** Students know how to build a simple compass and use it to detect magnetic effects, including Earth's magnetic field.

**1c.** Students know electric currents produce magnetic fields and know how to build a simple electromagnet.

**1f.** Students know that magnets have two poles (north and south) and that like poles repel each other while unlike poles attract each other.

#### *9-12<sup>th</sup> Grade*

**5f.** *Students know* magnetic materials and electric currents (moving electric charges) are sources of magnetic fields and are subject to forces arising from the magnetic fields of other sources.

### Driving Questions

1. How Does a Compass Work?
2. How can we make a permanent magnet?

### Learning Objectives

- 1.) Students will learn how to make a permanent magnet.

## Magnet Makers

### Procedure

Work in groups of 2.

#### *Part A: getting ready*

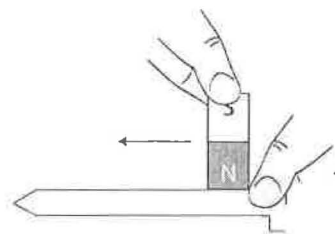
1. Collect a few nails.
2. Check your nails with a compass to make sure they are not magnetized.

#### *Part B: Da Big Magnet*

1. Put a nail on the big classroom magnet.
2. Let it sit for a minute.
3. Use a compass to test the nail to see if it is magnetic. Write your observation in your notebook. Identify a North and South pole.
4. Return the nail to the big classroom magnet. Let it sit there for ~1 hour.
5. Use a compass to test the nail to see if it is magnetic. Write your observation in your notebook. Identify a North and South pole.

#### *Part B: Rub a dub dub . . .*

1. Obtain a 4 nails and a strong, labeled magnet from your magnet kit.
2. Hold the nail by the head.
3. Rub the nail,
  - a. **from head to tip**, along the **north pole** of a strong magnet. ONLY RUB IN ONE DIRECTION.
4. Repeat this 30 times, always rubbing from eye to tip along the same portion of the magnet.
5. Use a compass to test the nail to see if it is magnetic. Write your observation in your notebook. Identify a North and South pole.
6. Repeat with a new nail:
  - b. **from head to tip**, along the **south pole** of a strong magnet
  - c. **from tip to head**, along the **north pole** of a strong magnet
  - d. **from tip to head**, along the **south pole** of a strong magnet



Use your data to fill in the table. Indicate which end is the North pole and which end is the South pole for each nail.

	Head	Tip
a. Head to Tip; North Pole		
b. Head to Tip; South Pole		
c. Tip to Head; North Pole		
d. Tip to Head; South Pole		

Share your findings with neighboring groups.

7. Just for fun... Bang one of your magnetized nails with a hammer. Is it still a magnet?

---

## Instructor Notes: Magnet Makers

---

This activity is very simple and should not take too long. You may want to include elements of “Electromagnet Challenge” or “Compass Tweak” to include making permanent magnet using an electromagnet.

### *Safety*

This activity has little to no risk associated with it. Common sense care should be taken when handling the nails and potentially the hammer.

### **Materials**

- Nails
- Compass or set of compasses
- Magnet Kit
- paperclips
- Big classroom magnet and/or strong magnet from Magnet Kit
- hammer

### **Notes**

---

---

---

---

---

---

---

---

---

---

