# WHERE IS NORTH? THE COMPASS CAN TELL US...

**Objectives**

The students will:
Build a compass.
Determine the direction of north, south, east, and west.

---

**Standards and Skills**

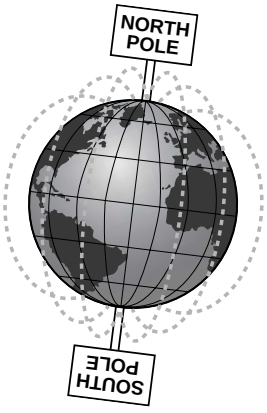
**Science**
Science as Inquiry
Physical Science
Earth and Space Science
Science and Technology

**Science Process Skills**
Observing
Inferring
Making Models

**Mathematics**
Connections
Verifying and Interpreting Results
Prediction

---

**Background**




The compass has been used for centuries as a tool for navigation. It is an instrument that aligns a free pivoting bar magnet (called the needle) in Earth's magnetic field.

Since the invisible lines of the magnetic field are oriented in a north/south direction, the needle will orient itself in a north/south direction. The other cardinal points of the compass (east, west, and south) are defined in relation to north.

Pilots use a compass to determine direction when flying airplanes. Boaters, hikers, and hunters are examples of other people who rely on compasses.

**Materials**

Paper clips
Fourpenny (4p) finishing nail
Shallow dish or pan 15-30 cm diameter
Liquid soap
Magic markers
Styrofoam cup, .25 L capacity
Scissors
Magnet

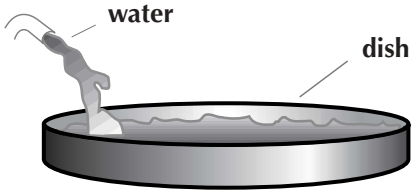
**Management**

Students can participate in this activity in a variety of ways:

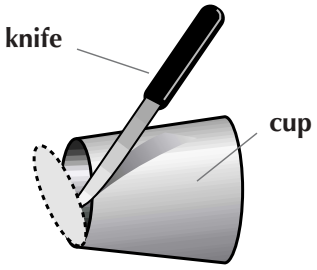
1. Students can build a single class compass.
2. Teams of 3-5 students can build team compasses.
3. Students can build individual compasses.

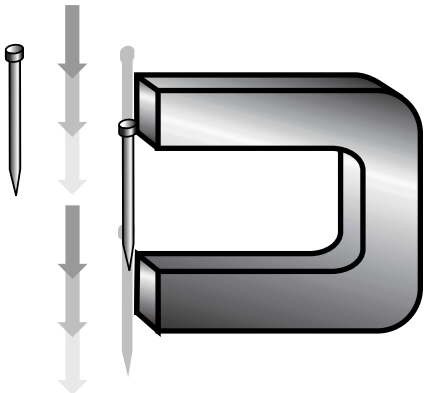
**Activity**

1. Fill a shallow dish with water.
2. Cut the bottom out of the cup and float it on the water.




3. Place one drop of liquid soap in the water. This will reduce the surface tension friction and will keep the Styrofoam disk from attaching itself to the container wall.
4. Magnetize the compass "needle" by rubbing it in one direction on a small magnet.



**magnetizing nail**

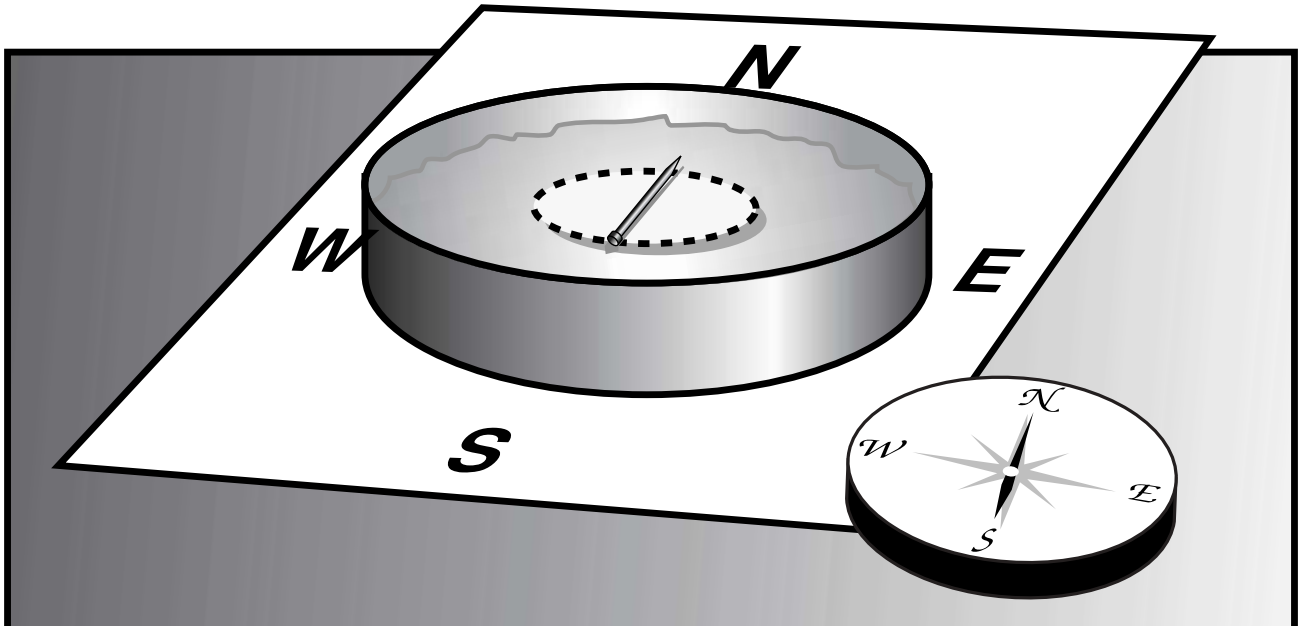
5. Place the magnetized compass needle on the floating Styrofoam disk. To minimize compass errors, place the compass away from metals, magnets, or electrical wiring.

6. Ask students to observe the compass needle as it aligns parallel with the invisible magnetic field.

7. Discuss ways to verify which end of the needle is pointing north and which end is pointing south. (Sunrise, sunset, shadows, commercial compass).

8. Place a piece of metal near the compass and observe changes in the needle orientation.

9. Write or cut the letter N and position to indicate the north direction. Follow this by placing the letters S, E, and W around the edges of the compass.




**Assessment**

Identify an object in the classroom and ask students to state what direction the object is from the compass.

**Extensions**

1. Hide "prizes" at different locations in the classroom. Have students locate the prizes using a compass while following teacher's directions (north, south, southeast, etc.).

2. Name different areas of the school, and have students determine the area's cardinal direction (north, south, etc.).

# Where is North?