Make Your Own Homemade Compass

Grade: 5th Grade | **Topic:** Homemade Compass | **Measurement:** US Customary (cups, ounces, inches, etc.)

Purpose

To learn how magnets can be used to find direction. This experiment shows how a simple compass works using everyday materials.

Hypothesis

If a magnetized needle is placed on water so it can move freely, then it will point toward the Earth's magnetic north.

Materials

- A small sewing needle or straight metal pin
- A small bar magnet or a strong refrigerator magnet
- A shallow bowl or small plastic container
- Water (about 1 cup)
- A piece of cork or a small piece of foam (about 1 inch thick)
- Paper towel
- Pliers or tweezers (optional, for safety handling needle)
- Permanent marker (optional)

Procedure

1. Carefully rub the needle on one side of the bar magnet about 30 times in the same direction. This will magnetize the needle. Always rub in one direction, not back and forth.
2. Fill the shallow bowl with water about halfway (around 1/2 inch deep).
3. Cut a small slice of cork or foam to about 1 inch in diameter and about 1/8 inch thick. This will hold the needle.
4. Using the permanent marker, you can mark one side of the cork to remember which side is north.
5. Carefully push the needle through the middle of the cork slice so it lies flat and balanced.
6. Place the cork with the needle gently on the water surface in the bowl.
7. Watch carefully as the needle rotates and settles pointing in a certain direction.
8. Compare the direction your needle points with a known compass or by observing the sun's position.
9. Record what direction the needle points and what you notice.

Results

The needle on the cork floats and slowly turns until it points toward the magnetic north-south direction. One end of the needle consistently points north.

Conclusion

The magnetized needle aligns itself with Earth's magnetic field, acting like a compass needle. This simple homemade compass can help you find directions without using electronics.

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Learning Objectives

- Understand that magnets have poles that interact with Earth's magnetic field.
- Learn how a floating magnet can align itself with Earth's north and south poles.
- Practice building a simple tool to find direction using common household items.
- Observe and record how the compass needle moves.

Teacher Notes:
Key Concept: Magnets have north and south poles that interact with Earth’s magnetic field. When free to move, a magnetized needle aligns with the Earth's magnetic field, pointing toward magnetic north and south.
Answer/Explanation: By rubbing the needle with a magnet, the needle becomes magnetized with its own north and south poles. When placed on water, the needle can turn freely and aligns itself along Earth's magnetic lines, showing a simple way compasses work.
Teaching Tips:

- Remind students to always rub the needle in one direction to magnetize it properly. 2. Use caution when handling the needle to avoid poking fingers. 3. Show students how to identify landmarks or the sun to verify compass direction. 4. Encourage students to try the compass in different rooms or outside to observe changes.

Relevant Standards: NGSS 3-5-ETS1-2: Generate and compare multiple solutions to a problem., NGSS 4-PS3-2: Make observations to provide evidence that energy can be transferred., NGSS 5-ESS1-1: Support an argument that differences in the apparent brightness of the sun are due to Earth’s rotation.

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Name: _____

Date: _____

Experiment Title:

Purpose: *(I wonder...)*

Hypothesis: *(I think...)*

Materials:

Procedure:

Results: *(What happened?)*

Conclusion: *(I learned...)*

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