Lesson: The Spinning Snake - How Air Pressure Creates Wind

Materials Needed

- A glass bottle with a narrow opening (like a soda bottle)
- A small bowl of ice cubes
- A mug of warm water (not boiling, just warm to the touch)
- A piece of paper (cardstock or construction paper works best)
- Scissors
- A pencil and a piece of string or thread (about 12 inches long)
- Tape
- Crayons or colored pencils

Lesson Plan (20 Minutes)

Part 1: The Big Question - Why Does the Wind Blow? (3 minutes)

Goal: To activate prior knowledge and create curiosity.

1. **Ask Makenna:** "You've felt the wind before, right? Where do you think it comes from? What do you think wind actually *is*?"
2. Listen to her ideas. There are no wrong answers here!
3. **Explain Simply:** "That's a great thought! Wind is really just air moving from one place to another. Today, we're going to become scientists and figure out *why* it moves. It has to do with temperature, just like hot summer days and cold winter days."

Part 2: The Spinning Snake Experiment - See the Wind in Action! (10 minutes)

Goal: To demonstrate that warm air rises and cool air sinks, creating air movement (convection).

Step 1: Create the Snake (3 mins)

- On the piece of paper, draw a spiral that looks like a coiled snake. Start from the outside and spiral in. Make it about 3-4 inches across.
- Have Makenna color or decorate her snake.
- Carefully cut along the spiral line, from the outside in, until you have a paper snake.
- Poke a small hole in the "head" of the snake (the center of the spiral) and tie the string through it. Tape for security if needed.

Step 2: Set Up the "Weather" (2 mins)

- Place the bowl of ice next to the mug of warm water.
- **Ask for a prediction:** "We have cold air over the ice and warm air over the mug. What do you think will happen if we hold our snake over the ice? What about over the warm water?"

Step 3: Test and Observe (5 mins)

- **Test the Cold:** Have Makenna hold the snake by the string so it dangles about an inch above the ice. It shouldn't move very much. Observe for a minute.

- **Test the Warm:** Now, have her move the snake and dangle it about an inch above the warm water in the mug. The snake should start to slowly spin!
- **Discuss the "Why":** As she watches it spin, explain what's happening. "The warm water is heating the air above it. Hot air is lighter than cold air, so it rises up. As that warm air rises, it pushes on the paper snake, making it spin! This is exactly how wind works. The sun heats a part of the Earth, that warm air rises, and cooler air rushes in to take its place. That rush is the wind we feel!"

Part 3: Meteorologist's Report - Draw What You Learned (7 minutes)

Goal: To assess understanding through creative application.

1. **The Task:** "You're a meteorologist now, Makenna! Your job is to explain why the snake moved. On a new piece of paper, can you draw our experiment?"
2. **Instructions for the Drawing:**
    - Draw the mug of warm water.
    - Draw red, wavy arrows going UP from the water to show the hot air rising.
    - Draw the snake spinning above the rising hot air.
    - Draw the bowl of ice.
    - Draw blue, wavy arrows going DOWN over the ice to show the cool air sinking.
    - At the bottom, help her write one sentence explaining what happened, like: **"Hot air rises and cool air sinks, which creates wind!"**
3. **Wrap-up:** Praise her fantastic scientific drawing and observation skills. Connect it back to the real world: "So next time you feel a breeze, you can imagine you're standing between a warm spot and a cool spot on the Earth!"

Teacher Notes & Differentiation

- **For Extra Support:** You can pre-draw the spiral on the paper for her. When explaining the concept, use a simple analogy like a hot air balloon: "It's just like a hot air balloon! They fill it with hot air to make it rise." Use sentence starters for the final drawing report.
- **For an Extra Challenge:** Ask a follow-up question: "What do you think would happen if we used a wider bottle? Or colder ice water? How does a fan in a room move air?" This encourages further critical thinking about the variables. You could also introduce the terms "High Pressure" (cold, sinking air) and "Low Pressure" (warm, rising air).
- **Safety:** Ensure the warm water is not hot enough to burn. Adult supervision is recommended for handling the water and scissors.