

Cloud in a Bottle

High and Low Air Pressure

Name _____

Date _____ Period _____

Purpose

To find the connection between air pressure and the weather forecast.

Part I: Cloud in a Bottle

Materials

- 2 Liter plastic soda bottle with cap
- long safety matches
- warm tap water

Safety Instructions



Safety goggles should be worn at all times.

Procedure

1. Put a small amount (about 50 mL) of warm water into the plastic bottle.
2. Light a match. Blow it out and then hold it inside the bottle to collect some smoke.
3. Quickly remove the match and put the cap tightly on the bottle.
4. Shake the bottle to add moisture to the air inside.
5. Squeeze the bottle firmly, then release. Repeat. Observe the air inside the bottle.
6. Repeat the experiment, this time with 50 mL of cold water.
7. Next, repeat the experiment with a dry bottle. Do not add water. Simply create smoke, close the bottle, and squeeze and release.

Observations

1. What did you observe inside the bottle when you squeezed and released the bottle?

2. What gas law was operating during this experiment? Explain.

3. If P decreases and V increases when the bottle is released, what do you think happens to T ? What evidence do you have?

4. What happened when you used cold water in the bottle?

5. What did you observe when you used a dry bottle?

6. Low-pressure areas are the result of air rising into the atmosphere from Earth's surface. Explain how this might result in cloud formation over a low-pressure area.

7. High-pressure areas are the result of air falling from high altitudes and expanding. Explain how this might result in clear skies over a high-pressure area.

8. **Making Sense** What did you learn about cloud formation from today's activity?

9. **If You Finish Early** Meteorologists sometimes measure the air pressure in millibars. Suppose the air pressure is 980 millibars for a given location. Convert the air pressure to atmospheres of pressure. (1 atm = 1013 mb.)