Activity: Condensation Lab

Name: _____

Name: _____

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Teacher Tip: It is recommended that these activities be carried out over two class sessions. The first session is part 1 and second session is part 2.

Materials needed (for groups of 2-3 students):

- A clean, clear 2 liter plastic bottle
- An eye dropper or other container for water
- A strip thermometer for every bottle (available at fish stores)
- A box of wood matches
- Paper to record data
- Tape

Pre-Lab Discussion Questions

1. Prior to the activities discuss the following questions:
   - What makes air warm?
   - What happens to warm air?
   - What makes air cold?
   - What happens to cold air?
   - What are clouds?
   - How are clouds made?
   - What 3 things are necessary to form clouds?
   - What is fog?

Session 1: Temperature changes in a closed pop bottle

Procedure:

1. Tape the temperature strip into the bottle so that you can read it.
2. Then screw the bottle cap on tightly and lay the bottle on its side so you can easily read the temperature strip.
3. Read and record the initial temperature of the air inside the bottle.
4. Then use both hands to squeeze the bottle as hard as you can for one minute.
5. Read and record the temperature of the air inside the bottle

Follow Up Questions:

1. What happened the temperature when you squeezed the bottle.
2. What happened to the temperature when you stopped squeezing the bottle?

Session 2: Making a cloud-in-a-bottle

Procedure:

1. Open the bottle and pour in a few drops of water. Screw the bottle cap on tightly. Swirl the water around the inside of the bottle so that most of the inside of the bottle is wet. Squeeze and hold the bottle. Observe and record the temperature again. What happened?
2. Lay the bottle on it's side, open the bottle, and push down to flatten the bottle to about 1/2 it's normal size. Have someone light a match, blow it out, and put the match into the bottle while it is still smoldering. Quickly release the sides of the bottle and put the cap on tightly. Now tightly squeeze the bottle as before for about 1 minute. Quickly let it pop open.
3. Record your observations

Explanation:
What happens? Hopefully, a cloud formed. In this experiment you saw water molecules condense into a cloud in the bottle. When you squeezed the bottle the air pressure in the bottle increased which raised the temperature. The warmer air caused the water in the bottle to evaporate (it became water vapor) and you could not see it. When you let the bottle pop out the air pressure in the bottle was lowered and so was the temperature. This caused the water molecules to condense into a cloud.

Wrap Up
After the activities, have students answer the question below in writing:

1. In your own words explain what we did in these two activities. What do you know about the relationship between air temperature, air pressure, condensation, and the formation of clouds?