**How Do You Dew?** A lesson on Condensation

Engage

Have you ever gotten out of the shower and tried to look in the mirror to comb your hair and the mirror was all covered with water? You probably rubbed off the water with your hand or a towel so that you could see yourself, but did you ever wonder how it happened?

Discuss evaporation and condensation. Have students give examples of the processes of evaporation and condensation that they may have seen (e.g., water boiling, rain puddles shrinking, water vapor from our breath condensing on the windows, looking like clouds of smoke on a cold winter day, etc.).

Discuss how heat is involved in these processes. For example, if you heat water to 100° C (at sea level), it turns into water vapor. As it cools, the molecules slow down and return to a liquid state. Remind students that the sun is the main source of heat that causes these processes to occur.

Explore

Have one student pour a half-spoonful of vanilla into a small bowl and place it in the center of the group. Instruct the group to lean their heads over the bowl and try to smell the vanilla. Inquire –how is it possible to smell the scent of the liquid vanilla? (The molecules float through the air into our nose.) Compare how the vanilla evaporates and the molecules travel through the air in the same way that water vapor does.

Ask: What happens if heat and wind is applied to the vanilla? The teacher can demonstrate using a hair dryer to provide heat and wind, making the vanilla evaporate quickly. Compare this process to the way the sun creates heat and wind to causing water to evaporate. *This is a good point to explain how to measure with a thermometer and record data in a journal.*

* Give each group an empty jar and tell them to measure and record the temperature inside of it.
* Ask each group to fill the jar half-full of cold water. Then measure and record the temperature again.
* Add ice until the jar is almost full. Have students measure and record the temperature one more time. Add food coloring or punch powder.

Option: To help students see how water molecules are always moving, add food coloring one drop at a time. Add the drops in this order: red, blue, yellow. Watch each drop spread out into the water before adding one drop of the next color.

Explain

Screw the lid onto the jar to prevent the water inside from escaping. Illustrate the experiment in journals. Then take turns using a magnifying glass to see if there is any water forming on the outside surface of the closed jar. Explain that the temperature of the water inside when the first droplets appear is the dew point, or the temperature at which condensation has occurred. Also discuss where the water came from and what this process is called (condensation). Students can blow softly toward the jar to help provide water vapor. The results will vary depending on the humidity in the classroom.

*This is a good point to discuss the misconception of condensation. We don’t see condensation on the jar. What we see are droplets of water. Condensation is the process that caused the water to appear.*

Draw a second picture of the jar, showing droplets of water on it.

Demonstrate how a hair dryer can be used to blow hot air on the outside of the jar until the water disappears. Discuss where the water went and what this process is called (evaporation).

Draw a third picture of the jar with the droplets missing. Include the hair dryer or the sun as the source of heat. Include labels for all of the objects in the pictures (e.g., jar, water, ice, droplets, hair dryer or the sun).

Extensions:

* Test to see if breathing slowly on the jar causes droplets to appear faster.
* Check to see if the water on the outside of the jar is the same color as the colored water in the jar. Use a napkin to wipe off the outside of the jar, then unscrew the lid and carefully dip another napkin into the colored water. Compare the color of the napkins.

Evaluate

Review the drawings of the experiment to check for understanding and any misconceptions.

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