

Teacher Notes
“Dew” You Get the Point
Concept Development

GEOMES Topic: Earth’s Air and Water: Meteorology

Lab setup:	none	easy	<u>moderate</u>	difficult
Reasoning level:	easy	<u>moderate</u>	difficult	
Time required:	20-40 minutes	<u>40-60 minutes</u>	60-90 minutes	
Process skills:	<u>measuring</u>	<u>interpreting data</u>	<u>inferring</u>	

Objective: Students will measure the dew point and discover the relationship between dew point and relative humidity.

National Science Education Standards:

Content Standard: Earth and Space Science - Structure of the earth system

Materials: metal can (1 per student group) room temperature water
thermometer ice (preferably crushed)

Watch Out!

Caution students on the proper use of thermometers, especially if mercury thermometers are being used. Mercury is a toxic substance. It is a health and environmental hazard if it is spilled.

Teaching Strategies:

Coffee cans work well for this activity, since they hold a relatively large amount of water and are made of metal. Make sure you have a large quantity of ice available. Crushed ice is much more effective in this activity, since it is important that the water temperature cools slowly. Large ice cubes will result in the water cooling too quickly, particularly if the metal cans are small. Crushed ice can be added in small amounts. It is very important to start with water that is at room temperature or warmer. You don't want to get condensation to form on the cans before any ice is added.

Stress to students that the first onset of dew occurs when a very thin film of moisture appears on the outside of the can. This is most easily noticed by rubbing your finger across the can to look for the signs of a thin film.

One of the most important components of this lab is taking measurements from various locations that have different relative humidities. It might be helpful to have relative humidity calculation charts available so students can calculate the relative humidity. However, this is not necessary to complete the activity. Since relative humidity is temperature dependent, dew point is a more quantitative measure of the amount of water vapor in the atmosphere.

If your school does not have an indoor swimming pool, use a locker room instead. Run the hot water in the showers for several minutes before class to make the relative humidity in the room very high. If this is not an option, a gym where a lot of physical activity has recently

occurred will have a higher humidity. If your classroom is air conditioned, take some data outside, which should have a higher relative humidity.

Students should be able to conclude on their own that the areas with high relative humidity (pool, locker room, gym, etc.) will have a higher dew point. The dew point is the air temperature at which water will condense at a higher rate than it evaporates. This results in dew, frost, or cloud formation. When the air temperature and dew point at the surface are the same, either heavy dew, frost, or fog will form.

Sample Data and Observations:

Data Table: Condensation Temperature of Various Locations

Location	Air Temperature	Trial 1	Trial 2	Trial 3
Classroom	72.0 °F	53.0°F	55.0 °F	55.0 °F
Locker Room	80.0 °F	70.0 °F	70.0 °F	71.0 °F

Sample Responses to Go Figure

1. A metal can was used because it conducts heat much more quickly than glass or plastic substances. Therefore, the temperature of the surface of the can is the same temperature as the temperature of the water inside the can.
2. The water is condensing because the temperature of the air right next to the outside of the can is being cooled to the dew point temperature, which is the temperature at which water vapor will condense onto surfaces.
3. The condensed water is coming from water vapor in the atmosphere.
4. Ideally, students measuring the dew point where there is high relative humidity should measure a higher dew point as well. In an area with a high dew point (high relative humidity), condensation occurs at a higher temperature because there is a higher quantity of water vapor in the atmosphere.