

2007

Do the Dewpoint!

STORM Project

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Activity 11
Do the Dew Point
Level 1

Concepts:

- Condensation occurs when water vapor changes into a liquid.
- Deposition occurs when water vapor changes directly to a solid form without changing first to a liquid.
- The Dew Point Temperature is the temperature at which water vapor condenses.

Objectives:

1. Students will observe examples of condensation and deposition.
2. Students will observe, record, and analyze data.

National Science Education Standards: All students should develop: abilities necessary to do scientific inquiry, properties of earth materials, and changes in earth and sky.

Teacher Notes:

To reach the activity maps go to <http://www.uni.edu/storm/activities/level1/>

Dew point is the temperature to which air must be lowered to make it saturated, or when it can hold no more water molecules. (This is known as 100% relative humidity, or saturation.) At this point the additional water molecules will condense from water vapor (gas) to dew (liquid droplets). Condensed water vapor on cool surfaces is **dew**. The dew that covers grass in the morning comes from moisture in the air. During the night when the temperature drops, water vapor condenses on the grass and other surfaces that become cooled. When the temperature is below freezing, frost forms instead of dew. Frost is not frozen dew. Rather, water vapor changes directly into crystals of ice.

Engage:

Show the students a frozen can of juice. Ask the students to describe the appearance of the can and respond to the questions on their answer sheet.

Why did the ice form? (Ice is a frozen form of water.)

Ask students if they have ever seen dew.

Where did the water come from?

The following activity can be done if your students have not done a similar activity in their science program:

In this activity, you will compare room air temperature and the dew point temperature. The greater the difference between room and dew point temperatures, the lower the relative humidity. The closer the temperatures, the higher the relative humidity.

Materials: Metal cans (soup cans work well), thermometers, ice, salt, water at room temperature, stopwatch or clock with second hand

Safety note: Be sure that there are not sharp edges around the rim of the can.

Teacher notes: Show students how to correctly hold the thermometer and remind them to record the temperature of the water in Fahrenheit. Students will need a copy of the Dew and Frost worksheet, an empty metal can, thermometers, ice cubes, and salt.

Part I: Water/Ice

1. Empty cans and place them on paper towels.
2. Have students record the room temperature.
3. Add three ice cubes to the can.
4. Record the temperature of the air inside the can.
5. Continue recording the temperature every 30 seconds for 2 minutes.
6. Tell students to watch the outside of the can.
7. Each group should record the temperature at which the moisture (dew) formed on the outside of the can. (This is the dew point temperature of the room)

Answer the following questions on your worksheet:

1. What happened to the outside of the can?
2. What do you call this water if it forms on grass, cars and other objects?
3. Where do you think that this water came from?

Part II: Ice/Salt

1. Empty cans and place them on paper towels.
2. Have students record the room temperature.
3. Add three ice cubes to the can.
4. Record the temperature of the air inside the can.
5. Pour salt over the ice and record the temperature of the air inside the can.
6. Continue recording the temperature every 30 seconds for 2 minutes.
7. Tell students to watch the outside of the can.
Each group should record the temperature at which the ice (frost) formed.

Answer the following questions on the worksheet:

1. What happened to the water on the outside of the can?
2. What do you call this when it forms on grass, cars or other objects?
3. Where do you think this water came from?
4. How could you figure out where the water came from?

Explore:

On the activity website, click on the Sky, Temp, Dew Point, Weather map. Display or print this map for students to observe. Ask them what the symbols mean. What is something new that they see? Students should observe that there are two numbers on the left side of the station model circle. The upper one is familiar – air temperature, but the lower left number has not been used before. This is the dew point temperature for the town or city represented by the station model. Ask students what they think the new numbers represent.

Explain: Tell students that dew point information is regularly collected at weather stations because knowing the amount of water vapor in the air is important to weather forecasters. Using the Sky, Temperature, Dew Point, Weather map, ask students to answer the following questions:

1. What are the temperature and the dew point temperature for the station model nearest your school?

2. Is there a small or large difference between these two temperatures?
3. Where are the dew points the lowest on the map?
4. Where are the dew points the highest?

Extend:

Show students the Sky, Temp, Dew Point, Weather, Wind, Fronts map from the activity website.

Ask them to study the map and answer the following questions:

1. Are dew points generally higher or lower in the air behind cold fronts, compared to the air ahead of the fronts? (generally lower behind cold fronts)
2. What do they notice about the weather in cities where the temperatures and dew points are close to the same? (often there is fog or haze or rain/snow in these areas)

Evaluate:

1. Collect student sheets and experiment data sheet.

For Further Inquiry:

Ask students if they think dew points are always higher in coastal areas than further inland.

Have students design an investigation to answer this or any other question they might have about dew points.