**Measuring Dewpoint Temperature – Lab**

Ever wonder why water can be seen dripping down a cold bottle of water or pop, or why the grass is wet in the morning during the fall, or why after a thunderstorm the temperature of the air is cooler? This lab will help you find these answers!

In this lab, students will become familiar with the weather-related concept *Dewpoint Temperature.* Through lab exercise, students will determine the dewpoint temperature in two locations: 1) in the classroom 2) outside and apply this information to several critical thinking questions.

**What is Dewpoint Temperature?**

Dewpoint Temperature is:

The temperature at which the air, when cooled, becomes saturated and the water vapor in it condenses into water droplets or, if the temperature is cold enough, into ice crystals.

**Your Task:**

To find out the Dewpoint temperature at two separate locations.

**Materials:**

Thermometer

250 ml Beaker

Water

Ice cubes

Recording table

**Procedure - READ ALL STEPS BEFORE BEGINNING EXPERIMENT!!**

1. Fill a 250ml glass beaker half way with room-temperature water.
2. Record the current the temperature of your initial water in the table provided.
3. Place several ices cubes in the beaker (approximately 2 to 4 depending on the size).
4. Every 30 seconds, record the water temperature and observations in your table.
5. Keep the thermometer in the beaker at all times. Stir frequently to distribute the cool water).
6. The moment condensation begins to form on the outside of the glass, stop and take the thermometer reading. – this is your dewpoint temperature – record.

**Classroom Experiment:**

|  |  |  |
| --- | --- | --- |
| **Time** | **Temperature of water °F** | **Observations** |
| 0 seconds (initial air temperature) |  |  |
| 30 seconds |  |  |
| 60 seconds (1 minute) |  |  |
| 90 seconds |  |  |
| 120 seconds (2 minutes) |  |  |
| 180 seconds |  |  |
| 360 (3 minutes) |  |  |
| 420 seconds |  |  |
| 500 seconds (4 minutes) |  |  |

|  |  |
| --- | --- |
| **Dewpoint Temperature** |  **°F** |

**Outside Experiment**:

|  |  |  |
| --- | --- | --- |
| **Time** | **Temperature of water °F** | **Observations** |
| 0 seconds (initial air temperature) |  |  |
| 30 seconds |  |  |
| 60 seconds (1 minute) |  |  |
| 90 seconds |  |  |
| 120 seconds (2 minutes) |  |  |
| 180 seconds |  |  |
| 360 (3 minutes) |  |  |
| 420 seconds |  |  |
| 500 seconds (4 minutes) |  |  |

|  |  |
| --- | --- |
| **Dewpoint Temperature** |  **°F** |

**Questions:**

1. Below are five locations and weather data:
	1. Which locations have reached their dewpoint temperature?
	2. Predict the atmospheric conditions at the location(s). *(hint: is it raining? Referring to definition would be helpful).*

|  |  |  |
| --- | --- | --- |
| **Location** | **Current Temperature °F** | **Dewpoint Temperature °F** |
| Philadelphia | 59 | 59 |
| Orlando | 71 | 55 |
| Charlotte | 63 | 59 |
| New York City | 57 | 57 |
| Washington DC | 64 | 54 |

1. Referring to the dewpoint definition provided and the data collected from question 1, fill in the blanks:

The Dewpoint temperature signifies the air temperature at which \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ will occur. For example, if Washington DC had a current air temperature of 52°F and a dewpoint temperature of 34°F , the air would have to cool \_\_\_\_\_\_\_\_\_ °F for rain to occur.

1. From your experiments and questions above, what must happen to the air temperature in order for the air to become saturated?
2. Warm air can hold more water molecules before becoming fully saturated than cooler air, which of your experiment locations will reach dewpoint first?
3. The weather in Washington DC has been very hot and humid. A cold front comes into the area, bringing along with it cold air. What weather can be expected? Why?
4. Explain the process in your own words, as to what led to the condensation of water on the outside of the glass beaker. (In this response you should include: What was the ‘cooling’ agent? How did this cooling agent impact the temperature of the glass? and the temperature of the air directly in contact to the beaker? Also, refer to the information in question 4).
5. If you did this activity again tomorrow and found that the dew point had increased, would this indicate that there was more moisture (water vapor) in the air or less? Why? (Assume the air temperature is the same.)