

Name: _____ Block: _____

LAB: DEW YOU KNOW THE DEW POINT?

INTRODUCTION: Have you ever brought a cold glass of lemonade outside in the summer and watched drops of liquid run down the outside of the glass? Surely you didn't miss while pouring and soak the outside of the glass yourself! This occurs when the air temperature is cooled enough to form condensation. The specific temperature to which the air temperature is cooled is called the dew point. As long as there is water vapor in the air, there is a dew point; the closer the dew point temperature is to the air temperature, the more likely it is that precipitation will occur. In this lab you will use 2 different methods to find the dew point temperature of this classroom. The first method requires you to form condensation on a metal cup, the second entails the use of a sling psychrometer.

MATERIALS: METAL CUP, CELCIUS/FARENHEIT THERMOMETER, ICE CUBES, WATER, SLING PSYCHROMETER

PART ONE: ADDING ICE**PROCEDURE #1:**

1. Before you begin, record the starting air temperature
2. Fill cup ½ way with water
3. Add 2-3 pieces of ice in the cup every 1 minute
4. Once you add ice IMMEDIATELY START to stir ice with the thermometer
5. Watch carefully for condensation to appear on the side of the cup. You can see it best by running your finger down the side of the cup and looking for a light streak through the mist on the cup.
6. Record the temperature AS SOON AS CONDENSATION APPEARS in the table below in C°.
7. Clean up equipment and add data to the class data on the board

INDIVIDUAL DATA:

| AIR TEMPERATURE C° | DEW POINT TEMPERATURE C° |
|-----------------------|-----------------------------|
| | |

CLASS DATA:

| | | | | | | | | | |
|----------------------|--|--|--|--|--|--|--|--|--|
| Dew point temp. (°C) | | | | | | | | | |
|----------------------|--|--|--|--|--|--|--|--|--|

Average dew point temperature: (show work!)

PART 2: SLING PSYCHROMETER**PROCEDURE #2:**

- 1.) Record the dry bulb temperature (no cloth)
- 2.) Dip the cloth of the wet bulb thermometer in the small glass beaker of room temperature water to wet the cloth on the wet bulb. Slowly rotate the psychrometer for about 2 minutes, or until the temperature stops dropping.
- 3.) Record the wet bulb temperature
- 4.) Repeat 2 more times

DATA:

| | Trial #1 | Trial #2 | Trial #3 |
|---------------------|----------|----------|----------|
| ^Dry bulb temp | | | |
| ^Wet bulb temp | | | |
| ^*Dew point temp | | | |
| ^*Relative humidity | | | |

* use ESRT's to find dew point and relative humidity

^ convert to Celsius

QUESTIONS:

- 1.) What units is dew point measured in? _____ Relative humidity? _____
- 2.) What was the dewpoint temperature of the classroom when using
 - a. A metal cup and adding ice _____ °C (class average)
 - b. Sling psychrometer _____ °C (3 trial average)
- 3.) Why is there a discrepancy in your results? What factors could have caused an error in your dew points?

- 4.) What is the average relative humidity for the classroom? (average your results from trials 1,2 & 3) Show your work!
- 5.) What two measurements must you find on the dew point temperature chart to figure out the dew point?
 _____ and _____

- 6.) Why can't the dewpoint ever be higher than the air temperature?
- 7.) Calculate the relative humidity with the data below:
- | | |
|--|---|
| a. $\text{H}_2\text{O}_{(g)} = 4.1 \text{ gm}$ | b. $\text{H}_2\text{O}_{(g)} = 18.6 \text{ gm}$ |
| Capacity = 22.5gm | Capacity = 19.7gm |
- 8.) What is the dewpoint when the dry-bulb temperature is 24°C and the wet-bulb temperature is 15°C ?
9. As the difference between the dewpoint temperature and the air temperature decreases, the probability of precipitation
1. decreases
 2. increases
 3. remains the same
10. Which combination of air temperature and dewpoint temperature would most likely occur in humid air?
1. air temperature 10°C , dewpoint temperature -4°C
 2. air temperature 15°C , dewpoint temperature 3°C
 3. air temperature 24°C , dewpoint temperature 23°C
 4. air temperature 26°C , dewpoint temperature 10°C