

Name _____ Date _____ Period _____

WATER IN THE AIR

Activity 1 – Where Did it Come From?

Materials

Glass beaker, thermometer, water, ice, timer

Procedures:

1. Observe the beaker and check for cracks or holes.
2. Fill the beaker half way with water.
 - a. Look for leaks; make sure there is no water on the outside of the beaker.
3. Use the thermometer to measure the classroom air temperature and record the temperature in the data table below.
4. Measure the temperature of the water and record in the data table below.
5. Add a small amount of ice to the beaker and start the stop watch. Continue observing the beaker until little drops of water form on the outside of the beaker, then stop the stopwatch and record the time it took for the drops to form in the data table below. (**Hint** the beaker will start to look cloudy as the tiny droplets form)
6. Measure the temperature of the water with the ice and record in the data table below.

Classroom Temperature (C)	
Water Temperature (C) Before Ice	
Time for drops to form on beaker (min)	
Water temperature with ice (C)	

Analysis Questions

7. What was the difference between the classroom air temperature and the water temperature before ice was placed in the water?

8. How long did it take for little drops to form on the beaker?

9. Where did the water come from that formed on the outside of the beaker?

Activity 2 – Finding Relative Humidity in the Classroom

In this activity you will use a sling psychrometer to determine the relative humidity of the air in the classroom.

Materials:

Sling psychrometer, water, stop watch

Procedure:

1. The thermometer with the cloth is called a wet-bulb thermometer. Wet the cloth with room temperature water.
2. Spin the psychrometer for 20 seconds. Read both thermometers. Record the temperatures in the Table 1. Subtract the wet-bulb temperature from the dry bulb temperature and record the difference in the Table 1.
3. Continue spinning the psychrometer and checking the temperatures until there is no further change or until two minutes have past. Record those temperatures as final temperatures in Table 1. Subtract the wet-bulb temperature from the dry-bulb temperature. Record the difference in Table 1.

Observations:

Table 1 – Measuring Relative Humidity

	Dry-Bulb Temperature (C)	Wet-Bulb Temperature (C)	Temperature Difference (C)
After 20 Seconds			
Final after 2 minutes			

Analysis Questions

4. Which of the two thermometers measures the air temperature?

5. Use the table on the right to determine the relative humidity in the classroom. _____

6. What is the relationship between evaporation and relative humidity?

7. Would you expect the temperature of the wet-bulb thermometer to be higher on a humid or on a dry day? Explain.

8. Why do people from southwestern states, like Utah, claim, "Oh it's 100 degrees today, but it's a dry heat?"

9. Does a great difference in temperature between dry-bulb and wet-bulb thermometers indicate a high humidity or low humidity? Explain your answer using the graph

DRY-BULB TEMPERATURE (°C)	DIFFERENCE BETWEEN DRY-BULB AND WET-BULB TEMPERATURES (°C)									
	1	2	3	4	5	6	7	8	9	10
-4°	77	55	33	12						
-2°	79	60	40	22						
0°	81	64	46	29	13					
2°	84	68	52	37	22	7				
4°	85	71	57	43	29	16				
6°	86	73	60	48	35	24	11			
8°	87	75	63	51	40	29	19	8		
10°	88	77	66	55	44	34	24	15	6	
12°	89	78	68	58	48	39	29	21	12	
14°	90	79	70	60	51	42	34	26	18	10
16°	90	81	71	63	54	46	38	30	23	15
18°	91	82	73	65	57	49	41	34	27	20
20°	91	83	74	66	59	51	44	37	31	24
22°	92	83	76	68	61	54	47	40	34	28
24°	92	84	77	69	62	56	49	43	37	31
26°	92	85	78	71	64	58	51	46	40	34
28°	93	85	78	72	65	59	53	48	42	37
30°	93	86	79	73	67	61	55	50	44	39
32°	93	86	80	74	68	62	57	51	46	41
34°	93	87	81	75	69	63	58	53	48	43
36°	94	87	81	75	70	64	59	54	50	45

RELATIVE HUMIDITY (%)

Activity 2 -Relative Humidity vs Air Temperature

Use the data table to create LINE graph and answer the questions below.

Air Temp. (°C)	Water vapor in air (g/kg)
-20	0.75
-10	1.8
0	3.8
10	7.8
20	15
30	27.7
40	49.8
50	94.2

Analysis Questions

10. About how much water can air hold at -8 °C?

11. About how much water can air hold at 23°C

12. How warm is it when air can hold about 60 g/kg of water?

13. How warm is it when air can hold about 91 g/kg of water?

14. What do you notice happens to the amount of water air can hold when the temperature gets cooler?

Water in Air vs Air Temperature

