Name _____ Date _____ Period _____

HUMIDITY

Complete the following activities to learn more about humidity.

Activity I - Where Did it Come From?

Materials
beaker, thermometer, water, ice, stop watch

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. What is the difference between the water temperatures with and without ice?

10. Where did the water come from?

Activity 2 - Is it Dry or Wet?

Materials:

sponge, water, pie tin, beaker, teaspoon, calculator

Procedures:

11. Squeeze the sponge, making sure there is not water in it, keeping in mind that the goal is not to destroy the sponge.
12. The sponge is a model of the air around us. As a team, decide who is going to hold the sponge above the pie tin, who will add the teaspoons of water, and who will keep tally marks of how many teaspoons are added to the sponge before it begins to drip, who will write the tally marks on the other three team member's papers.
13. The team member in charge of the sponge, needs to hold it comfortably above the pie tin to catch falling water
14. The team member in charge of adding water will add 1 teaspoon of water at a time to the sponge until water begins dripping from the sponge.
15. The team member in charge of tally marks, use the table below to record how many teaspoons are added to the sponge.
16. The team member in charge of filling the other team member's tally marks, gather their papers and keep count of teaspoons of water.

Teaspoons of water tally marks	

17. Stop adding water as soon as drips of water fall from the sponge. This means the sponge is saturated and cannot hold any more water.
18. **If the sponge is a model for the air around us, what do you think the dripping water represents?**

19. Congratulations, the team just used a scale to measure/predict how much water is in their sponges and how close they are to dripping. Meteorologists can measure how close is it to raining by using a humidity scale for water present in the air.

20. How many spoonfuls of water did it take for your sponge to be 100% saturated? (This means it cannot hold any more water and it is ready to drip.) _____spoonfuls

21. Use the following calculation to determine the percent saturation for the sponge at each stage (number of spoonfuls) of adding water.

    # of spoonfuls ÷ total # of spoonfuls for saturation X 100% = percent saturation (%)

    Example calculation: If the sponge was saturated with 15 spoonfuls of water, for 9 spoonfuls, the calculation is 9 ÷ 15 X 100% = 60% saturation.

| Teaspoons of water	% Saturation	Teaspoons of water	% Saturation	Teaspoons of water	% Saturation
1		8		15	
2		9		16	
3		10		17	
4		11		18	
5		12		19	
6		13		20	
7		14		21	

Analysis Questions

22. What happens to the percent of air saturation as more teaspoons of water are added to the sponge?

23. How does this activity show humidity in the air?

Activity 3 -Relative Humidity vs Air Temperature

Use the data table to create fill out the 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

Water in Air vs Air Temperature
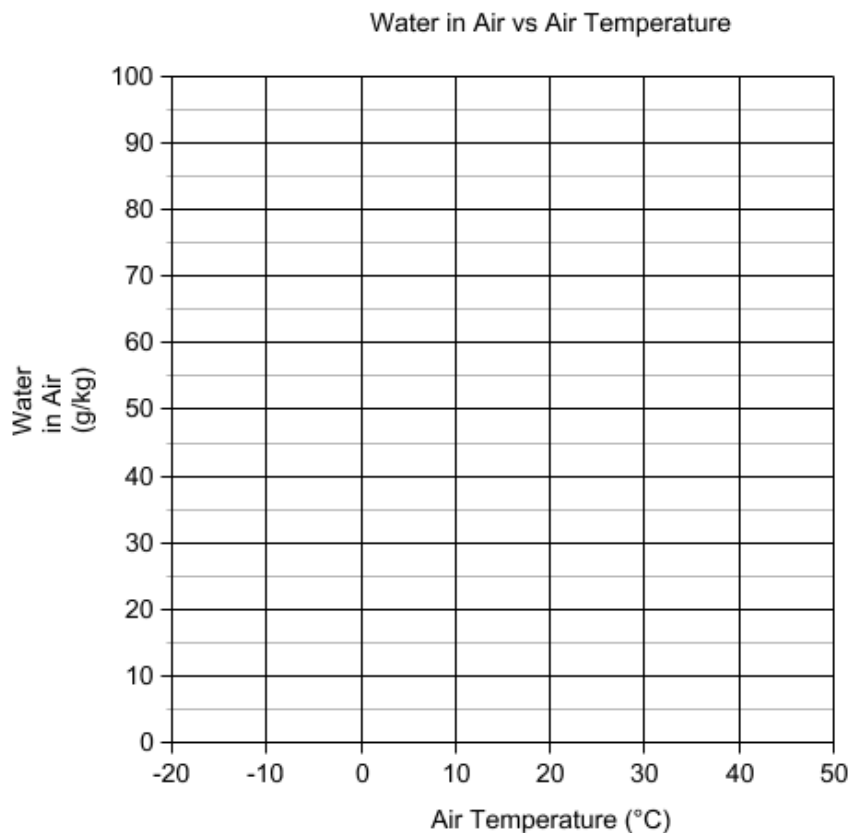
Analysis Questions

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

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

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

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

28. What do you notice happens to the amount of water air can hold with temperature changes?