Name _____ Date _____ Page _____

Humidity Notes

We already know that evaporation allows water to change into a gas and rise into our atmosphere. Eventually, it will condense into clouds when cooler temperatures are near. Well, what happens if the water vapor stays close to the ground where we are?

We use the term _____ to describe the evaporated water or *water vapor* in the air.

Humidity can _____ from place to place. The amount of water vapor that air can hold depends on _____. The _____ the air, the _____ water vapor it can hold. Think about it, warm air is less dense so it has more room for water vapor.

When the air is holding as much water vapor as possible at a certain temperature it has reached _____. Think about a sponge, at some point it can no longer hold any more water. Well, the air has its limits too and the deciding factor is the temperature. The temperature at which this saturated air starts to condense onto surfaces or into precipitation is called the _____ _____.

Early in the morning, the air temperature usually cools, which allows water to condense. When this cooling and condensing causes water to form on grass and other surfaces, we call it _____. If there is enough water vapor that condenses you can get clouds close to the ground which are called _____.

Similar to dew forming on grass, water vapor must have something to condense on to form _____ in the upper layers of the _____. As water vapor rises into cooler air, it condenses on _____ and other particles. The water drops and ice crystals are so light, they stay _____ and collect more water forming clouds. The droplets/crystals continue to stay aloft until they become too heavy and fall as _____.

One final aspect of humidity that we are probably all familiar with is _____ _____ which measure how much water vapor is actually there compared to how much water vapor air can actually hold. Think about your grade on a test. Your grade is a comparison of how many you got right to how much you could have earned. So, an 86% means you got 86 out of 100 possible points. Relative humidity is similar. 86% relative humidity means the air is holding 86% of the water it could hold at that _____ _____. The _____ the air, the more water vapor it can hold.

Relative humidity is measured with a _____ _____. It compares two thermometers, one with a dry bulb and one with a wet bulb. As water evaporates from the _____ _____, it cools the thermometer. When you compare the two thermometers, the bigger the temperature difference, the less humid the air is because humid air doesn't have a lot of room for water to evaporate. You need to know the _____ _____ and the _____ _____ reading in order to calculate relative humidity.

Draw pictures that will help you remember humidity, relative humidity and dew point.

Humidity	Relative Humidity	Dew Point

Atmosphere Investigation

Date: _____ **Time:** _____
Location: _____ **Observer:** _____

Air Conditions

Raleigh Durham International Airport

Temperature _____ Air Pressure _____ Relative Humidity _____
Wind Speed _____ Wind Direction _____ Heat Index _____

Salem Middle School

Temperature _____ (dry bulb) _____ (wet bulb)
Difference in two bulb readings _____

Calculating Relative Humidity

Using your temperature readings and the following charts, determine the relative humidity and heat index for Salem Middle School.

Relative Humidity Chart (%)

Temp Dry Bulb (°C)	Difference Between Dry Bulb and Wet Bulb Temperatures (°C)													
	1	2	3	4	5	6	7	8	9	10	12	14	16	18	20
2	84	68	52	37	22	8									
4	85	70	56	42	29	26	3								
6	86	73	60	47	34	22	11								
8	87	75	63	51	39	28	18	7							
10	88	76	65	54	44	33	23	14	4						
12	89	78	67	57	47	38	29	20	11	3					
14	89	79	69	60	51	42	33	25	17	9					
15	90	80	71	62	54	45	37	29	22	14					
18	91	81	73	64	56	48	41	33	26	19	6				
20	91	82	74	66	58	51	44	37	30	24	11				
22	91	83	75	68	60	53	46	40	34	27	16	5			
24	92	84	76	69	62	55	49	43	37	31	20	9			
26	92	85	77	70	64	57	51	45	39	34	23	14	4		
28	92	85	78	72	65	59	53	47	42	37	26	17	8		
30	93	86	79	73	67	61	55	49	44	39	29	20	12	4	
32	93	86	80	74	68	62	56	51	46	41	32	23	15	8	1
34	93	87	81	75	69	63	58	53	48	43	34	26	18	11	5
36	93	87	81	75	70	64	59	54	50	45	36	28	21	14	8
38	94	88	82	76	71	65	60	56	51	47	38	31	23	17	11
40	94	88	82	77	72	66	62	57	52	48	40	33	26	19	13
42	94	88	83	77	72	67	63	58	54	50	42	34	28	21	16
44	94	89	82	78	73	68	64	59	55	51	43	36	29	23	18

Heat Index Chart (Temperature & Relative Humidity)

RH (%)	Temperature (° F)															
	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
90	119	123	128	132	137	141	146	152	157	163	168	174	180	186	193	199
85	115	119	123	127	132	136	141	145	150	155	161	166	172	178	184	190
80	112	115	119	123	127	131	135	140	144	149	154	159	164	169	175	180
75	109	112	115	119	122	126	130	134	138	143	147	152	156	161	166	171
70	106	109	112	115	118	122	125	129	133	137	141	145	149	154	158	163
65	103	106	108	111	114	117	121	124	127	131	135	139	143	147	151	155
60	100	103	105	108	111	114	116	120	123	126	129	133	136	140	144	148
55	98	100	103	105	107	110	113	115	118	121	124	127	131	134	137	141
50	96	98	100	102	104	107	109	112	114	117	119	122	125	128	131	135
45	94	96	98	100	102	104	106	108	110	113	115	118	120	123	126	129
40	92	94	96	97	99	101	103	105	107	109	111	113	116	118	121	123
35	91	92	94	95	97	98	100	102	104	106	107	109	112	114	116	118
30	89	90	92	93	95	96	98	99	101	102	104	106	108	110	112	114

***Note:** Exposure to full sunshine can increase HI values by up to 15° F*

80-90° F	**Fatigue possible with prolong exposure and physical activity.**
91-104° F	**Sunstroke, heat cramps, and heat exhaustion possible.**
105-129° F	**Sunstroke, heat cramps, heat exhaustion possible likely, and heat stroke possible.**
130° F or Greater	**Heat stroke highly likely with continued exposure.**

Questions

1. Why does high humidity make it difficult to cool down on hot days?

2. How would you expect the relative humidity to change as you move from a room with high temperature to a room with a lower temperature? Both rooms have the same amount of water vapor.

3. Explain how a sling psychrometer is used to measure humidity.

4. Explain how humidity is related to cloud formation.