

Name: _____

Course Section: _____

DEW POINT, RELATIVE HUMIDITY & CLOUD ALTITUDE LAB ACTIVITY

1. Understanding the Concept

Before you begin this Lab you should be familiar with the following terms & definitions:

- a) Adiabatic Rate
- b) Relative Humidity
- c) Dew Point
- d) Wet & Dry Bulb Thermometers

2. Dew Point & Relative Humidity Lab

2.1 Materials needed:

- Two (2) thermometers
- Some toilet paper or tissue
- Calculator
- eye dropper with water
- Wet & Dry Bulb Tables

2.2 Temperature Conversion Formula

Write down the temperature conversion formulas for °C to °F & °F to °C conversions.

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2.3 Procedure:

1. Go outside with both thermometers
2. Attach moistened (wet) tissue or toilet paper to the end (bulb) of one of your thermometers. (Leave the other one as is).
3. Make sure both thermometers are hanging in the air and do not touch the ground or other objects. Keep the tissue on the wet bulb thermometer moist. Don't let it dry out, but don't let it be sopping wet either.
4. After about five minutes read and record the temperature of both (wet & dry bulb) thermometers. Do NOT read the wet bulb thermometer right after you have applied a drop of water (wait at least a minute, but make sure the tissue is still moist).

Units	Dry Bulb Temperature	Wet Bulb Temperature
°C		
°F		

5. Use the attached Wet / Dry bulb tables to establish current Relative Humidity & Dew Point!

Date & Time:		
Dew Point Temperature	Relative Humidity	
°C	°F	%

6. CLEAN UP WHEN DONE!

3. Address the following questions in your Lab report! Underline the answers in your report and reference your underlined answers to the appropriate question number:

1. Why are you able to deduct Relative Humidity & Dew Point by measuring temperature with a wet and a dry bulb thermometer? (How does this work?)
2. What does this measurement signify? (With other words, what is it good for?)

Dew Point Temperature (Fahrenheit) Table

Dew Point temperature in Fahrenheit based on known values of wet and dry bulb temperatures.

Dry bulb temperature	Wet Bulb Depression (F) [Dry bulb-wet bulb]										
	1.0	2.0	3.0	4.0	5.0	6.5	8.0	10.0	12.5	15.0	20.0
35	32.7	30.1	27.4	24.4	21.1	15.3	7.9	-	-	-	-
37.5	35.3	32.9	30.3	27.5	24.5	19.2	12.9	1.0	-	-	-
40	37.9	35.6	33.2	30.6	27.8	23.0	17.4	7.4	-	-	-
42.5	40.5	38.3	36.0	33.6	31.0	26.6	21.5	13.0	-	-	-
45	43.1	41.0	38.9	36.6	34.1	30.0	25.4	17.9	4.5	-	-
47.5	45.7	43.7	41.6	39.5	37.1	33.4	29.1	22.4	11.1	-	-
50	48.2	46.3	44.4	42.3	40.1	36.6	32.7	26.6	16.8	1.8	-
52.5	50.8	49.0	47.1	45.1	43.1	39.7	36.1	30.5	21.9	9.7	-
55	53.4	51.6	49.8	47.9	45.9	42.8	39.4	34.2	26.5	16.2	-
57.5	55.9	54.2	52.5	50.7	48.8	45.8	42.6	37.8	30.7	21.8	-
60	58.5	56.8	55.2	53.4	51.6	48.7	45.7	41.2	34.7	26.8	-
62.5	61.0	59.4	57.8	56.1	54.4	51.6	48.7	44.5	38.5	31.3	8.6
65	63.6	62.0	60.4	58.8	57.1	54.5	51.7	47.7	42.1	35.6	16.4
67.5	66.1	64.6	63.1	61.5	59.9	57.3	54.7	50.9	45.6	39.5	22.9
70	68.6	67.2	65.7	64.2	62.6	60.1	57.6	53.9	49.0	43.3	28.5
72.5	71.2	69.7	68.3	66.8	65.3	62.9	60.4	57.0	52.2	46.9	33.5
75	73.7	72.3	70.9	69.4	68.0	65.7	63.3	59.9	55.4	50.4	38.1
77.5	76.2	74.9	73.5	72.1	70.6	68.4	66.1	62.8	58.5	53.7	42.3
80	78.8	77.4	76.1	74.7	73.3	71.1	68.8	65.7	61.5	57.0	46.3
82.5	81.3	80.0	78.6	77.3	75.9	73.8	71.6	68.5	64.5	60.2	50.1
85	83.8	82.5	81.2	79.9	78.5	76.4	74.3	71.3	67.4	63.3	53.8
87.5	86.3	85.1	83.8	82.5	81.1	79.1	77.0	74.1	70.3	66.3	57.3
90	88.9	87.6	86.3	85.0	83.7	81.7	79.7	76.9	73.2	69.3	60.7
92.5	91.4	90.1	88.9	87.6	86.3	84.4	82.4	79.6	76.0	72.3	64.0
95	93.9	92.7	91.4	90.2	88.9	87.0	85.0	82.3	78.8	75.2	67.2
97.5	96.4	95.2	94.0	92.8	91.5	89.6	87.7	85.0	81.6	78.0	70.3
100	98.9	97.7	96.5	95.3	94.1	92.2	90.3	87.7	84.4	80.9	73.4
102.5	101.5	100.3	99.1	97.9	96.7	94.8	92.9	90.4	87.1	83.7	76.4
105	104.0	102.8	101.6	100.4	99.2	97.4	95.6	93.0	89.8	86.5	79.3
107.5	106.5	105.3	104.2	103.0	101.8	100.0	98.2	95.7	92.5	89.2	82.3
110	109.0	107.9	106.7	105.5	104.3	102.6	100.8	98.3	95.2	92.0	85.2
112.5	111.5	110.4	109.2	108.1	106.9	105.1	103.3	100.9	97.8	94.7	88.0
115	114.0	112.9	111.8	110.6	109.5	107.7	105.9	103.5	100.5	97.4	90.8

Sidenote: What if my numbers are not on the table?

Use a graph to extrapolate the missing numbers!

Wet Bulb Depression to Relative Humidity Table (Celsius)

- Select Dry Bulb Temperature in first column
- Select Wet Bulb Depression (Dry Bulb - Wet Bulb) Column
- Determine Relative Humidity (%)

Go to Dry Bulb	Wet Bulb Depression (C)																			
	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	9.5	10
10	94	88	83	77	72	66	61	56	50	45	40	35	31	26	21	16	12	7	3	-
11	94	89	83	78	73	67	62	57	52	47	42	38	33	28	24	19	15	11	6	2
12	95	89	84	79	73	68	63	59	54	49	44	40	35	31	26	22	18	14	9	5
13	95	89	84	79	74	69	65	60	55	51	46	42	37	33	29	25	20	16	12	9
14	95	90	85	80	75	70	66	61	57	52	48	43	39	35	31	27	23	19	15	11
15	95	90	85	80	76	71	67	62	58	54	49	45	41	37	33	29	25	22	18	14
16	95	90	86	81	76	72	68	63	59	55	51	47	43	39	35	31	28	24	20	17
17	95	91	86	82	77	73	68	64	60	56	52	48	44	41	37	33	30	26	23	19
18	95	91	86	82	78	73	69	65	61	57	53	50	46	42	39	35	32	28	25	21
19	95	91	87	82	78	74	70	66	62	58	55	51	47	44	40	37	33	30	27	24
20	96	91	87	83	79	75	71	67	63	59	56	52	49	45	42	38	35	32	29	26
21	96	91	87	83	79	75	72	68	64	60	57	53	50	47	43	40	37	34	30	27
22	96	92	88	84	80	76	72	69	65	61	58	54	51	48	45	41	38	35	32	29
23	96	92	88	84	80	77	73	69	66	62	59	56	52	49	46	43	40	37	34	31
24	96	92	88	84	81	77	73	70	66	63	60	57	53	50	47	44	41	38	35	32
25	96	92	88	85	81	77	74	71	67	64	61	57	54	51	48	45	42	40	37	34
26	96	92	89	85	81	78	75	71	68	65	61	58	55	52	49	46	44	41	38	35
27	96	93	89	85	82	78	75	72	68	65	62	59	56	53	50	47	45	42	39	37
28	96	93	89	86	82	79	76	72	69	66	63	60	57	54	51	49	46	43	41	38
29	96	93	89	86	82	79	76	73	70	67	64	61	58	55	52	50	47	44	42	39
30	96	93	89	86	83	80	76	73	70	67	64	61	59	56	53	50	48	45	43	40
31	96	93	90	86	83	80	77	74	71	68	65	62	59	57	54	51	49	46	44	41
32	97	93	90	87	83	80	77	74	71	68	66	63	60	57	55	52	50	47	45	42
33	97	93	90	87	84	81	78	75	72	69	66	63	61	58	55	53	50	48	46	43
34	97	93	90	87	84	81	78	75	72	69	67	64	61	59	56	54	51	49	47	44
35	97	93	90	87	84	81	78	75	73	70	67	65	62	59	57	54	52	50	47	45

ESTIMATION OF CLOUD ALTITUDE

It is possible to estimate the altitude of the cloud base by employing dew point measurements. Include all answers and calculations in your Lab report. In order to be successful, you must know something about the following:

1. What is *adiabatic rise*?
2. What is the adiabatic rate for:

°F and feet	°F	ft
°C and meters	°C	m

- First, you will need your measurements for current temperature and dew point temperature. Transfer your answers into the boxes shown in the graphic below.
- With the values from the table above and the temperatures recorded in the graphic below, you have everything needed to estimate cloud base altitude. Show in detail how you have solved for altitude using your established values. Also record your answers in the graphic below!

