

Humidity & Precipitation (558-560)

Humidity (the amount of water vapour in the air) is different from *Relative Humidity*.

Relative Humidity is how much vapour is actually in the air divided by how much could be held (the maximum). Then multiply by 100 to get percent. See Fig. 1. on page 558.

$$\text{Relative Humidity} = \frac{\text{Present Concentration}}{\text{Maximum Concentration}} \times 100\%$$

$$\text{Present Concentration} = \text{Relative Humidity} \times \text{Maximum Concentration}$$

Relative Humidity is measured using a *Psychrometer*, which contains two thermometers, one wet bulb and one dry bulb. Evaporation pulls heat away from the wet bulb thermometer and cools it. The difference can be used to look up relative humidity. The table below shows the different relative humidities for different readings.

Dry Bulb (°C)	Number of degrees difference between the wet- and dry-bulb readings (°C)									
	1	2	3	4	5	6	7	8	9	10
10	88%	77	66	56	45	35	26	16	7	--
11	89	78	67	57	47	38	28	19	11	2
12	89	79	68	59	49	40	31	22	14	5
13	89	79	69	60	51	42	33	25	16	9
14	90	80	70	61	52	43	35	27	19	11
15	90	80	71	62	54	45	37	29	22	14
16	90	81	72	63	55	47	39	31	24	17
17	91	82	73	64	56	48	41	33	26	19
18	91	82	73	65	57	50	42	35	28	21
19	91	82	74	66	58	51	44	37	30	24
20	91	83	75	67	59	52	45	38	32	26
21	91	83	75	68	60	53	47	40	34	27
22	92	84	76	69	61	54	48	41	35	29
23	92	84	77	69	62	56	49	43	37	31
24	92	84	77	70	63	57	50	44	38	32
25	92	85	77	71	64	57	51	45	40	34
26	92	85	78	71	65	58	52	46	41	35
27	93	85	78	72	65	59	53	47	42	37
28	93	86	79	72	66	60	54	49	43	38
29	93	86	79	73	67	61	55	50	44	39
30	93	86	80	73	67	61	56	50	45	40
31	93	86	80	74	68	62	57	51	46	41
32	93	87	80	74	68	63	57	52	47	42
33	93	87	81	75	69	63	58	53	48	43
34	93	87	81	75	69	64	59	54	49	44

Questions: (See Figure 1, p.558 for)questions 1 and 2, and use the table above for question 3)

1. At 30°C, air is 60% saturated. What is the concentration of water vapor in the air?

2. What is thre relative humidity if air at 5°C contains 1.1 g water vapor/kg dry air?

3. Find the relative humidity for each of the following psychrometer readings.
 - A. Dry Bulb Reading = 24°C Wet Bulb Reading = 20°C Relative Humidity = _____%
 - B. Dry Bulb Reading = 15°C Wet Bulb Reading = 8°C Relative Humidity = _____%
 - C. Dry Bulb Reading = 30°C Wet Bulb Reading = 32°C Relative Humidity = _____%

Precipitation (page 556-557)

1. Name the forms of Precipitation which fall into each of these categories:

Solid	Liquid	Mixture of Solid/Liquid

2. Starting with evaporation, list the changes of state that occur in order to form each of the following.

- A. Dew _____
- B. Frost _____
- C. Drizzle _____
- D. Snow _____
- E. Ice Pellets _____

3. If a car is left outside overnight, would you expect dew or frost to form in each case below? Explain.

	Daytime High (°C)	Dew Point (°C)	Nighttime Low (°C)	Dew or Frost ?	Reason
A	19	9	7		
B	13	6	8		
C	4	-3	-4		

Low Pressure System and Bernoulli's Principle: (p. 544, 547)

1. State Bernoulli's Principle: _____

2. Jet Streams are fast-moving winds in the upper atmosphere:
 - A. What type of pressure (high or low) do these winds create? _____
 - B. Due to the jet streams, air near the surface is pulled (upward or downward ??) _____
 - C. This creates a (low or high) pressure area near the ground _____
3. In the Northern Hemisphere, upward moving air in a low pressure system begins to swirl (clockwise / counterclockwise) due to the rotation of the earth, or the _____ effect.
4. In the Southern Hemisphere, low pressure systems rotate _____.