

Finding Relative Humidity

Thermometers are used to measure temperature. Thermometers can also be used to find relative humidity. Relative humidity is the amount of water vapor in air compared to the amount of water vapor that the air can hold. The amount of water vapor that air can hold depends on the temperature; the warmer the air, the more water vapor it can hold. Air is said to be saturated when it cannot hold any more water.

One type of instrument used to find relative humidity is a psychrometer. A psychrometer consists of two thermometers, with the bulb of one thermometer covered with a wet cloth. Water evaporates from the wet cloth, which lowers the temperature. Relative humidity can be found by subtracting the temperature on the wet-bulb thermometer from the temperature on the dry-bulb thermometer and using a relative humidity chart.

Dry-Bulb Temperature – Wet-Bulb Temperature (°F)

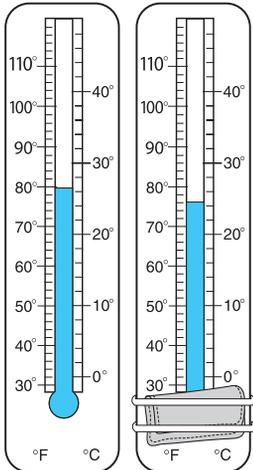
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40	92	83	75	68	60	52	45	37	29	22	7											
45	93	86	78	71	64	57	51	44	38	31	18	6										
50	93	87	80	74	67	61	55	49	43	38	27	16	5									
55	94	88	82	76	70	65	59	54	49	43	33	23	14	5								
60	94	89	83	78	73	68	63	58	53	48	39	30	21	13	5							
65	95	90	85	80	75	70	66	61	56	52	44	35	27	20	12	5						
70	95	90	86	81	77	72	68	64	59	55	48	40	33	25	19	12	6					
75	96	91	86	82	78	74	70	66	62	58	51	44	37	30	24	18	12	7	1			
80	96	91	87	83	79	75	72	68	64	61	54	47	41	35	29	23	18	12	7	3		
85	96	92	88	84	80	77	73	69	66	63	56	50	44	38	33	27	22	17	12	8	4	
90	96	92	89	85	81	78	74	71	68	65	58	52	47	41	36	31	26	22	17	13	9	
95	96	93	89	86	82	79	76	72	69	67	60	54	49	44	39	34	30	25	21	17	13	

Choose the correct word or phrase to complete each sentence.

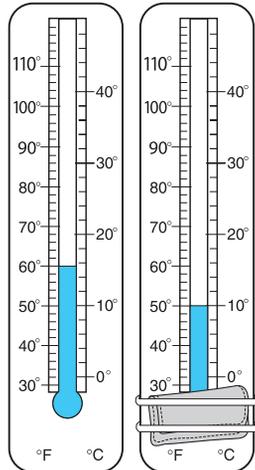
- 1 An instrument made from two thermometers to measure relative humidity is called a ■.
- 2 To find relative humidity, the bulb of one thermometer is covered with a ■.
- 3 Water ■ from the wet cloth, causing a lower temperature reading on the wet-bulb thermometer.
- 4 A large difference between the temperatures on a wet-bulb thermometer and a dry-bulb thermometer means ■ humidity.
- 5 When the air holds 100% of the water it is capable of holding, the air is ■.
- 6 The amount of water vapor that air can hold depends on the ■.

What is the relative humidity for each of the following readings?

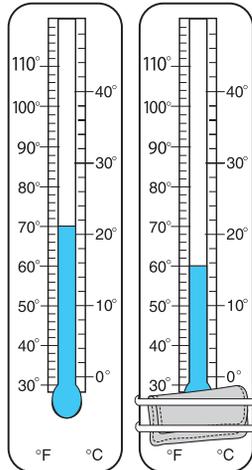
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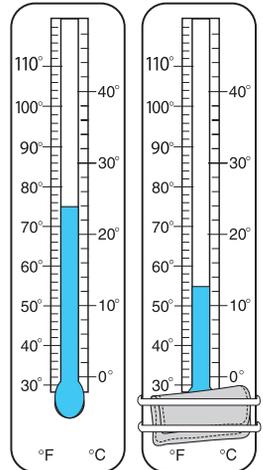
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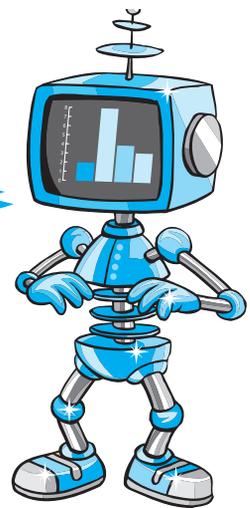


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- 11 If the relative humidity is 80% and the dry-bulb thermometer reads 85°F, what would you expect the temperature on the wet-bulb thermometer to be?
- 12 If the relative humidity is 65% and the dry-bulb thermometer reads 55°F, what would you expect the temperature on the wet-bulb thermometer to be?

The higher the humidity, the smaller the difference between the temperatures shown on the wet-bulb thermometer and the dry-bulb thermometer.



Answer Box

A	B	C	D	E	F
saturated	55%	83%	24%	49°F	wet cloth
G	H	I	J	K	L
evaporates	80°F	low	psychrometer	temperature	48%

Investigating Further



Research how to make a psychrometer, construct one, and then use it measure the relative humidity for several days. Were you more comfortable on a cool, damp day; a cool, dry day; a hot, damp day; or a hot, dry day?

