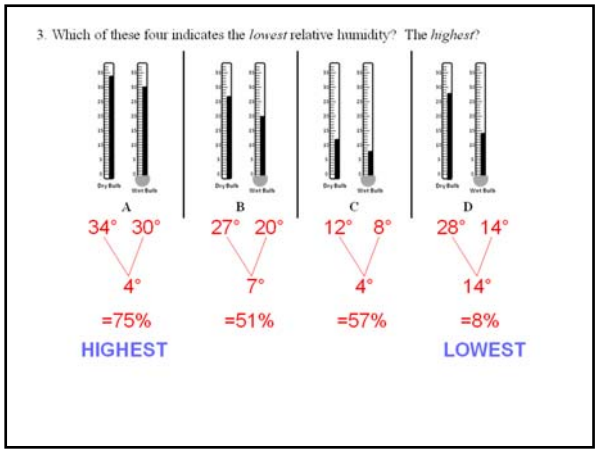
Atmosphere And Humidity

Yes, temperature can be measured with a thermometer. But did you know you can also measure relative humidity with a thermometer?

This lesson also sneaks in some background information about earth's atmosphere.

Materials- thermometer, cotton ball, water



1. Warm students up with the following fill in the blank statements. (This is available as a Student Handout- see last page.)

Have you ever heard of "dry heat"? Relative humidity refers to how ___saturated___, or filled to capacity with water vapor, the atmosphere is.

The air you're breathing right now is about 1% ___water___ ___vapor___, 21% is ___oxygen___, and 78% is ___nitrogen___. There are also some solid dust particles in there and even a few liquid droplets.
Earth's atmosphere goes up ___500___ km (300 miles). Right now you're reading this paper in the ___tropo___sphere. Above that is the ___strato___sphere, followed by the ___meso___sphere and the ___thermo___sphere. The ___exo___sphere is at the very top.

It's also available as a PowerPoint.

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2. To help students remember the order of layers of the atmosphere, write this acronym down and challenge them to come up with a saying. The sillier the better.

Think of a catchy phrase to help you remember the layer names	
T	the
S	spaghetti
M	monster…
T	
E	

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3. Distribute thermometers to student groups and have them record the "dry" temperature of it.

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4. Give each group a wet cotton ball and show them how to lay it on the bulb of the thermometer.

After doing so, have them come back to their seats so we can do some practice problems.

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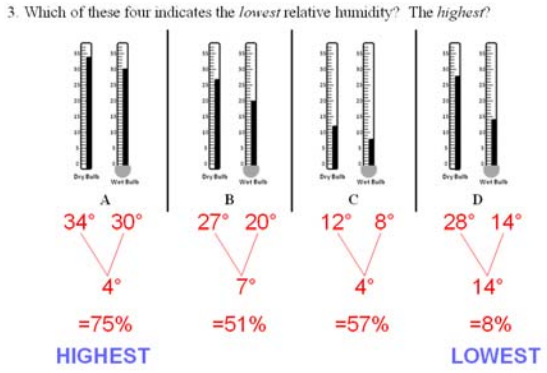
5. When humidity is high, the temperature difference between a wet and dry thermometer is only a few degrees. When humidity is low, the temperature drops a lot (10 or more degrees) when the bulb becomes wet.

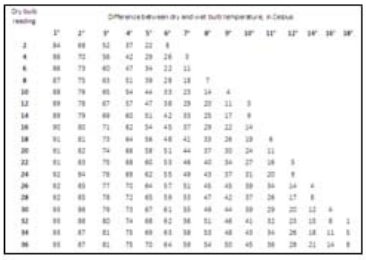
Give students 4-5 practice problems where they are given a dry and wet bulb temperature and asked to provide the humidity. Use the chart below.



Dry bulb reading	Difference between dry and wet bulb temperature, in Celsius														
	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	14°	16°	18°
2	84	68	52	37	22	8									
4	86	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					
16	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	45	39	34	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

6. After that practice, your students now know exactly what to do when they check their "wet" thermometers.

Pull up a site like weather.com and compare what they say with what students get.



Now go get your wet bulb reading and calculate the humidity in the room

Come back and visit InteractiveScienceTeacher.com to upgrade this lesson with:

PowerPoint- lead your students through the lesson click-by-click


Have you ever heard of "dry heat"? Relative humidity refers to how saturated, or filled to capacity with water vapor, the atmosphere is.

The air you're breathing right now is about 1% water vapor, 21% is oxygen, and 78% is nitrogen. There are also some solid dust particles in there and even a few liquid droplets.

Earth's atmosphere goes up 500 km (300 miles). Right now you're reading this paper in the tropo sphere. Above that is the strato sphere, followed by the meso sphere and the thermo sphere. The exo sphere is at the very top.

Think of a catchy phrase to help you remember the layer names

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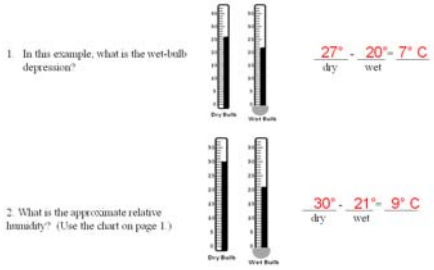
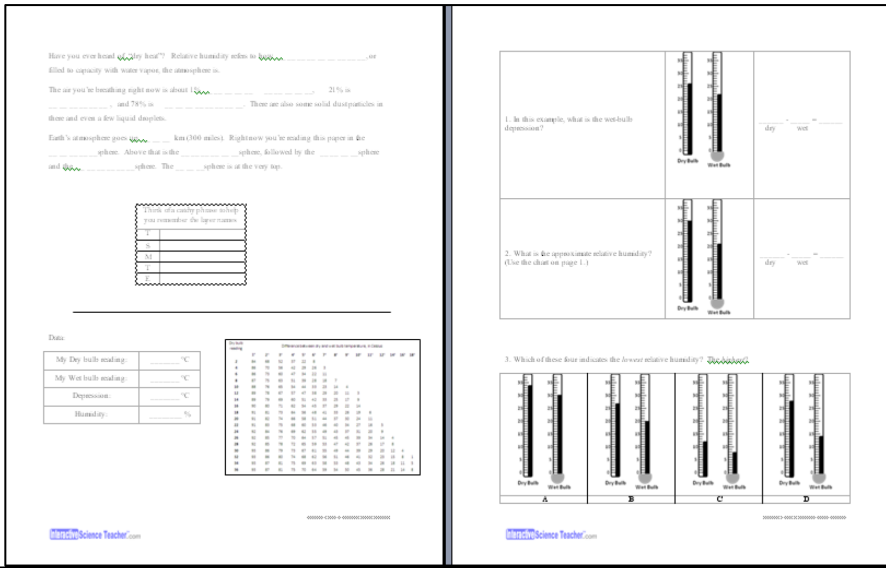

1. In this example, what is the wet-bulb depression? 27° dry - 20° wet = 7° C

2. What is the approximate relative humidity? (Use the chart on page 1.) 30° dry - 21° wet = 9° C

3. Which of these four indicates the *lowest* relative humidity? The *highest*?

A	B	C	D
34° 30°	27° 20°	12° 8°	28° 14°
4°	7°	4°	14°
=75%	=51%	=57%	=8%
HIGHEST			LOWEST

Student Handout



Have you ever heard of "dry heat"? Relative humidity refers to how _______________, or filled to capacity with water vapor, the atmosphere is.

The air you're breathing right now is about 1% _______________, 21% is ____________, and 78% is _______________. There are also some solid dust particles in there and even a few liquid droplets.

Earth's atmosphere goes up _____ km (300 miles). Right now you're reading this paper in the ________sphere. Above that is the __________sphere, followed by the _______sphere and the __________sphere. The _____sphere is at the very top.

Think of a catchy phrase to help you remember the layer names	
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Data:

My Dry bulb reading:	______ °C
My Wet bulb reading:	______ °C
Depression:	______ °C
Humidity:	______ %

1. In this example, what is the wet-bulb depression? _____ (dry) - _____ (wet) = _____

2. What is the approximate relative humidity? (Use the chart on page 1.) _____ (dry) - _____ (wet) = _____

3. Which of these four indicates the *lowest* relative humidity? The highest?

A B C D