

652-1000 (05-035) Dew Point Apparatus

Warranty and Parts:

We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Intended for children 13 years of age and up. This item is not a toy. It may contain small parts that can be choking hazards. Adult supervision is required

How to Teach with the Dew Point Apparatus:

Concepts Taught: Condensation; Dew Point

Curriculum Fit: Heat and Thermodynamics

Additional Materials Needed:

- Rubbing alcohol (isopropyl alcohol) OR nail polish removal (acetone)

Experiment: Calculation of Relative Humidity

1. To assemble the apparatus: (1) insert the right angle glass tube into the rubber stopper and attach the aspirator bulb to the other end; (2) insert glass outlet tube in second hole opposite the tube with the aspirator bulb; and (3) insert the thermometer in the middle hole.

Note: It may be advantageous to attach a piece of rubber tubing to the outlet tube to carry away the fumes. Also, the thermometer must be below the level of the surface of the liquid in the cup, while the outlet tube and tube from the aspirator should be above the surface.

2. Fill the container about 1/3 full of either rubbing alcohol or nail polish remover.
3. Place the rubber stopper in the container.
4. Use the aspirator bulb to force air over the liquid in the container. As the air is forced over the liquid, it will vaporize.
5. The vapor will absorb heat, lowering the temperature of both the liquid and the container, and at some point the temperature of the container will become cool enough for moisture in the air to condense on it.
6. At this point (condensation on the container), stop pumping the aspirator and record the temperature.
7. Allow the container to sit until the condensation disappears, and again record the temperature. Repeat steps 3-7 one more time for a total of three trials.
8. Calculate the average temperature. This is your dew point.

Average temperature (dew point) = _____ °C

9. Using the table below, calculate the relative humidity.

Table 1 Dew Point Index

Temperature (°C)	Water (g/m ³)
10	9.330
11	9.395
12	10.574
13	11.249
14	11.961
15	12.712
16	13.505
17	14.339
18	15.218
19	16.144
20	17.118
21	18.143
22	19.222
23	20.355
24	21.546
25	22.796
26	24.109
27	25.487
28	26.933
29	28.450
30	30.020
31	32.040
32	33.449
33	35.274
34	37.167
35	39.137
36	41.279
37	43.475
38	45.751
39	48.138

a) Find the temperature of the room (°C) and record below.

Temperature = _____ °C

b) Find the maximum amount of water that the air could hold at that temperature from Table 1 above and record below.

Water = _____ g/m³

c) Using the dew point (°C) from step 8 above to find the maximum amount of water that the air could hold at that temperature from Table 1, and perform the following calculation:

$$\text{Relative Humidity (\%)} = \left(\frac{\text{Water in Air Dew Point (g / m}^3\text{)}}{\text{Water in Air Room Temperature (g / m}^3\text{)}} \right) (100)$$

Relative Humidity = _____ %

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