

Swamp Cooler Worksheet

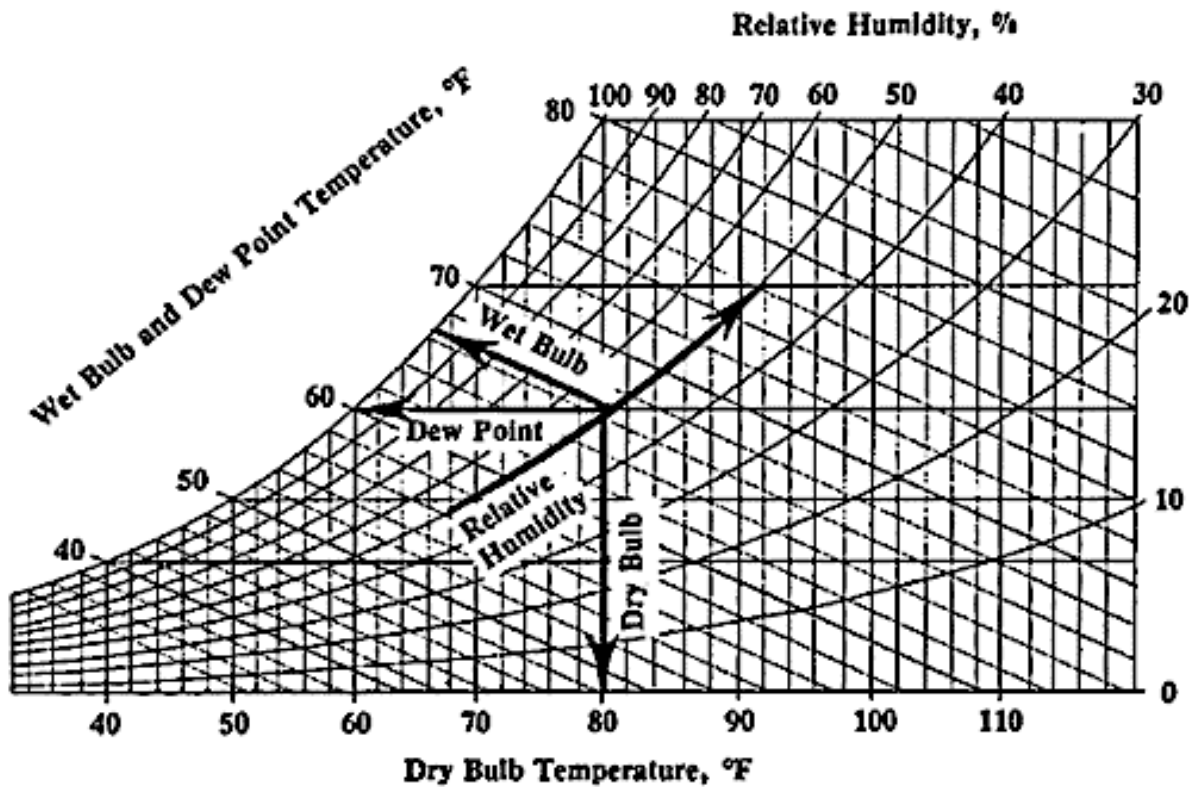
Part 1 — Psychrometrics

How to use a psychrometric chart: To use this chart, we must be given two independent values to locate our point of measure. If given, for example, wet bulb and dry bulb temperatures, we find the point on the chart at which those values line up and then read the dew point temperature and relative humidity.

Example: Find the dew point temperature and relative humidity inside a room with a measured wet bulb temperature of 60° F, and a measured dry bulb temperature of 75° F.

Dew point temperature: $\approx 52^\circ\text{ F}$

Relative humidity: $\approx 45\%$



Part 2 — Design

We want a device that effectively cools supply air by using an evaporative cooling technique. Under the constraints of the materials below, design a device to accomplish this task.

2A. In the table below, list the function of each specific part of the device.

Material	Function
Electric Fan	
Paper towels	
Cardboard	
Water (from spray bottle)	

2B. Provide a basic sketch of your design:

2C. How could you make use of a circulating pump to improve the design and functionality of your device?

Part 3 — Build

Part 4 — Test and Analyze

4A. Record your observations in testing your swamp cooler design.

4D. Use the 5,000-ft psychrometric chart to solve the following problems:

1. Find the wet bulb and dry bulb temperatures inside a room with a relative humidity of 70% and a dew point temperature of 62° F.
 - a. Wet Bulb =
 - b. Dry Bulb =

2. Find the relative humidity and dew point temperatures in a room, given a wet bulb temperature of 54° F, and a dry bulb temperature of 79° F.
 - a. Relative humidity =
 - b. Dew Point =

3. Find the dew point temperature inside a room with a relative humidity of 55% and a dry bulb temperature of 70° F.
 - a. **Relative Humidity =**
 - b. **Dew Point =**