Thermometer and moist wick

1. Observe the initial temperature.
2. Moisten the wick by dipping it into the bottle of water.
3. Holding the handle of the temperature probe tightly between your fingers, use a rapid shaking motion of your wrist/arm to move the probe up and down in the air.
4. Observe the temperature.
5. Continue shaking the probe until you find the temperature is no longer changing.
6. Explain what you observe.

Effect of Evaporation on Temperature

Summary – This activity investigates the effect of evaporation on temperature. A digital thermometer with a remote probe is used. You could also use a sling psychrometer for this demonstration. A sling psychrometer consists of 2 thermometers mounted side by side on a device that allows you to twirl the thermometers through the air. The remote probe of the digital thermometer (or the bulb end of one of the thermometers on the sling psychrometer) is covered by a wicking material that is moistened with water. This demonstration measures the wet bulb temperature, the coldest air temperature you can reach by evaporating water into it.

Materials Needed

- A digital thermometer with a remote probe or a sling psychrometer
- Water that is at same temperature as the environment in which you will make the measurement

Scientific Questions
How does evaporation affect temperature?

Possible Hypothesis

- Evaporation has no effect on temperature
- Evaporation causes warming
- Evaporation causes cooling

Set up

- Using a water bottle to hold the water for moistening the wicking works well.

Notes

- A digital thermometer works very well for this demonstration because it has a rapid response to temperature changes and is very easy to read.
- If using a sling psychrometer: though the temperatures on the 2 thermometers should be identical before moistening the wick and twirling, often they are not. This can lead to discussions about the importance of instrument calibration and accuracy.
- Evaporation requires the input of energy and results in the cooling of whatever provides the energy. In this case, heat flows out of the temperature probe (or thermometer bulb) under the wicking. Likewise, the input of energy is required to melt ice.
- A sling psychrometer is pictured below.