Cooling by Evaporation

Apparatus

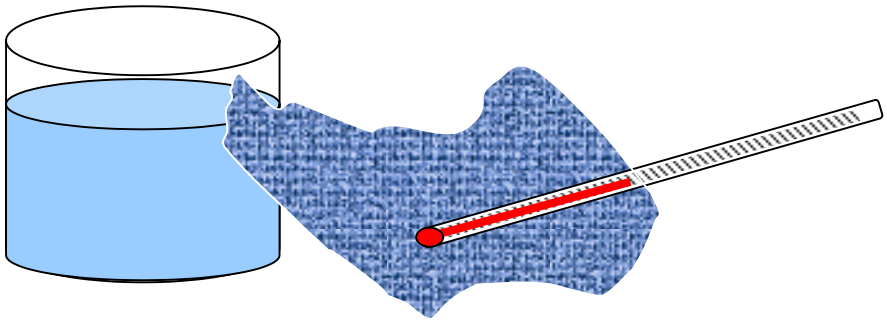
face washer, water (at room temperature), thermometer

Action

The students dip the face washer into water and squeeze out the excess. They then measure the temperature of the face washer. The students then wave or flap the face washer around for 30 seconds to a minute, and measure the temperature again.

The Physics

Evaporative cooling is a very effect means of cooling, and the temperature of the wet face washer will be measurably lower. Temperature is a measure of the average kinetic energy of the molecules of the face washer and water. The actual kinetic energies have a distribution of values, and those molecules with a high kinetic energy may break the bonds linking them to the rest of the water, and leave the surface – this is evaporation. The remaining water molecules have a lower average kinetic energy, and hence a lower temperature. Another way to look at it is to say that it takes energy (latent heat) to evaporate the water, and some of this must come from the face washer, hence cooling it down.



Accompanying sheet

Cooling by Evaporation

Dip the face washer in water and then squeeze most of the water out.
Measure the temperature of the moist washer.

Now wave the washer in the air.

Measure the temperature again. Has it changed? Explain why.