

First Law of Thermodynamics

$$\Delta U = Q + W$$

U – Internal (Thermal) Energy

Q – Heat adsorbed by the System

$W=Fd$ – Work done by external forces (Force * Displacement)

Conservation of Energy Revisited:

$$E_{kin} + E_{pot} + U = const$$

*“In thermally isolated system ($Q=0$),
Total Energy (Mechanical+Internal) is conserved”*

Homework

As you know, when it is really hot, people start sweating. This is our way of cooling: when the sweat evaporates, it takes a lot of energy. Typically, a human consumes about 2000 kcal (kilo-calories or “big” Calories) of energy from food per 24 hours. Most of this energy ends up in the form of heat that has to be removed.

Imagine that sweating is your only way of removing this heat (say, air has the same temperature as human body and does not cool you at all). Calculate, how much sweat needs to be evaporated in 24 hours to remove all the heat generated by a person.

You'll need to know the heat needed to vaporize one kg of water (google latent heat of evaporation).