

# Ch 14. Heat

# I. Heat as Energy Transfer

Common units:

calorie (cal): amount of heat necessary to raise the temperature of  
1 gram of water by 1°C

kilocalorie (kcal) 1 kcal = 1000 cal

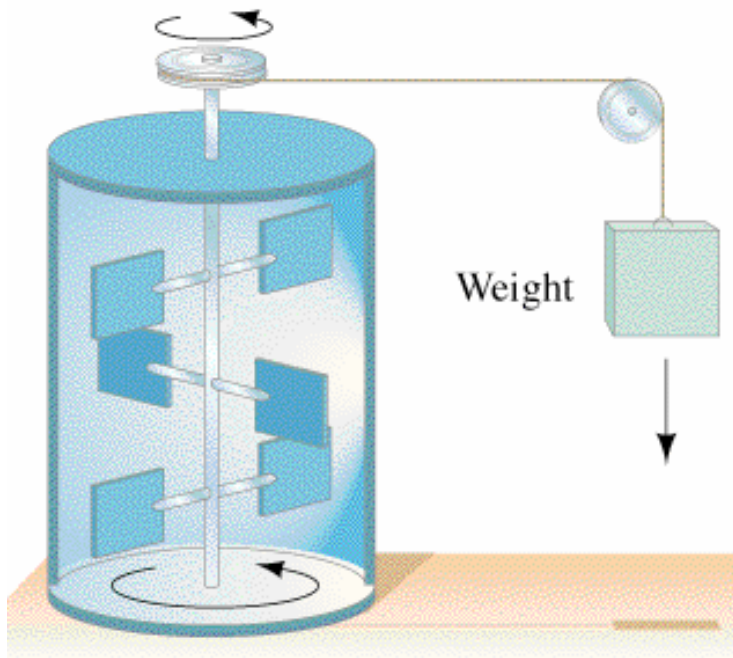
Calorie dietary usage, = 1 kcal

British thermal unit (btu)

amount of heat necessary to raise the temperature of  
1 lb of water by 1°F

1btu = 252 cal

# Mechanical Equivalent of Heat



$$4.186 \text{ J} = 1 \text{ cal}$$

Heat is **energy** that's **transferred** from one body to another because of a **difference in temperature**.

Like water, flows from high to low (temperature).

Not the energy a body contains.

## II. Specific Heat

Heat transfer  $Q=mc\Delta T$

Specific heat  $c$ : J/kg-C°

	kcal/kg -C°	J/kg -C
Water	1	4200
Wood	0.4	1700
Aluminum	0.22	900
Lead	0.031	130

# Calorimetry

**Isolated system: Energy conserved**

Heat Lost = Heat Gain

$$\Sigma m_i c_i \Delta T_i = \Sigma m_j c_j \Delta T_j$$

$$\text{Heat Gain} = mc(T_f - T_i)$$

$$\text{Heat lost} = mc(T_i - T_f)$$