

TEMPERATURE AND HEAT

Temperature- a measure of the average value of the kinetic energy of the molecules in random motion. (SI unit for temperature is Kelvin (K)).

Thermal expansion- almost all substances expand when they are heated and contract when they are cooled - exception water.

Thermal energy- Sum of the potential and kinetic energy of all the particles in an object; thermal energy of an object increases as the temperature increases.

Temperature Conversion Equations	
$\frac{^{\circ}\text{F} \rightarrow ^{\circ}\text{C}}{^{\circ}\text{C} = \left(\frac{5}{9}\right)(^{\circ}\text{F} - 32)}$	$\frac{^{\circ}\text{C} \rightarrow ^{\circ}\text{F}}{^{\circ}\text{F} = \left(\frac{9}{5}\right)(^{\circ}\text{C}) + 32}$

Heat- thermal energy that flows from something at a higher temperature to something at a lower temp.

Specific heat- amount of heat needed to raise the temp of 1 kg of some material by 1°C .

Specific Heat of Common Materials	
Substance	Spec heat ($\text{J}/\text{kg}^{\circ}\text{C}$)
Water	4,184
Wood	1,760
Carbon	710
Glass	664
Iron	450

Thermal Energy Equation

(Q) change in thermal energy (J) =
mass (kg) \times Δ temp ($^{\circ}\text{C}$) \times
(c) specific heat ($\text{J}/\text{kg}^{\circ}\text{C}$)

$$Q = m(T_f - T_i)c$$

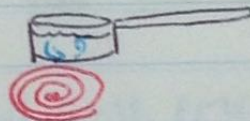
TRANSFERRING THERMAL ENERGY

Thermal energy is transferred from place to place by:

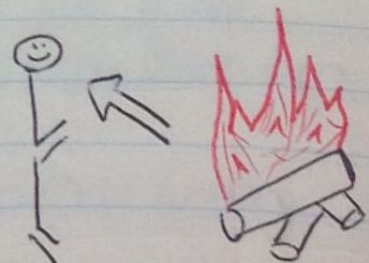
CONDUCTION	CONVECTION	RADIATION
transfer of thermal energy by collisions between particles in matter.	transfer of thermal energy in a fluid by the movement of warmer and cooler fluid from place to place.	transfer of energy by electromagnetic waves.

Conduction occurs in solids, liquids, and gases. metals are the best conductors of heat.

Convection occurs in fluids. Rising of warmer fluid and sinking of cooler fluid forms a convection current.



The transfer of energy by **radiation** is most important in gases.



Insulator - material in which heat flows slowly.

Examples of materials that are **insulators** are wood, some plastics, fiberglass, and air.