**Thermal Energy Notes**

**Intro** - **Kinetic theory of matter** – That the atoms/molecules of all states of matter are constantly in motion.

I. **Temperature** - the average kinetic energy of the atoms or molecules of a substance.

 A. Temperature scales – have to be reproducible

 1. Fahrenheit –

 - 0º F the coldest temperature they could get salt water.

 - 100º F was human body temperature

 - **212**º F was the temperature at which water boiled

 2. Celsius – (Centigrade)

 - 0 ºC was the freezing point of water

 - 100 ºC was the boiling point of water

 - 100 degrees works well with decimals and metric system

 3. Kelvin – no degrees

 - 0 K is absolute zero (-273º C). Temperature at which there is no kinetic energy in the atoms.

 1K = 1˚C

II. Thermal Energy

 -The KE + the PE of the molecules of an object.

 A. The closer atoms are, the less potential energy there is.

 B. The farther apart atoms are, the more potential energy.

 C. When heated, atoms move faster (↑KE) and move farther

 apart (↑PE)

 D. Mass & Thermal Energy

 1. If 2 objects have the same mass and temperature they have

 the same thermal energy.

 2. If 2 objects have different masses and are the same temperature, the larger mass has more thermal energy.

 E. **Heat** is thermal energy that flows from a higher temperature

 to a lower temperature.

 1. Measured in J or calories.

 - one calorie is the amount of heat required to raise the temperature of one cm3 of water 1˚C.

 1 cal = 4.18 J

 1 food **C**alorie – 1kcal or 4,184 J

 What is cold?

 -absence of heat