Heat

**Key Concepts:**

1. Temperature depends on particle movement
2. **Energy flows from warmer to cooler objects until *EQUILIBRIUM* (the temp is the same)**

or…

Energy moves from a higher concentration to a lower concentration until equilibrium.

1. The transfer of energy as heat can becontrolled**.**

**Definition:**

Heat is a flow of energy from an object at a high temperature to an object at a lower temperature.

This flow continues until equilibrium.

*Example:*

1. *Put ice in a warm drink*
2. *Does the ice melt because it is getting warmer or does the coldness of the ice cool the drink?*
3. *Answer, the heat from the warmer drink moves into the colder ice. The heat energy leaves the drink and flows to the ice, thus lowering the temperature of the liquid drink.*

**Kinetic Theory of Matter**

All particles (molecules) that make up matter are constantly in **motion**!

**Thermal Expansion**

When heat energy is added to many solids, liquids, and gasses, the molecules move faster making them spread farther apart. This makes the object (solid, liquid, or a gas) larger.

**Energy moves as heat in three ways**…

* **Conduction**
* **Convection**
* **Radiation**

**Radiation:**  
The process by which heat travels as energy in an **electromagnetic wave**.

**CONVECTION**

* Energy movement in *liquids* or *gasses only.* Typically circular. Happens because of temperature differences
* This process transfers heat energy by the movement of large numbers of particles.
* The particles move in the same direction (a circular current).
* Convection is responsible for most winds.
* Remember:

- Heated particles are less dense (lighter).

- Cooler particles are more dense (heavier).

**CONDUCTION**

* Conduction is the process that moves heat energy form hot to cold in solids.
* Conduction between two objects that are touching.

-The objects must have temperature differences.

-The objects must be touching

*-Example, hold an ice cube and heat is conducted from your hand into the ice cube.*

* For conduction to occur in one object…

-There must be temperature differences in the object.

-*Example, heat one end of a metal spoon, and the heat travels to the other end.*

**Conductors**

* Materials that transfer energy between objects easily.
* Metals make good conductors.
* *Examples: iron, copper, bronze, nickle*

**Insulators**

* Materials that do not transfer heat very well. They can be used to prevent the transfer of heat.
* *Examples: wood, plastic, foam.*