

Chapter 2 Lesson 3 Notes: Energy and Matter

1. **Energy:** the ability to do work or cause change.
 - a. Every chemical or physical change in matter includes a change in energy.
 - b. Remember – Conservation of Matter (Mass) and Energy.
 - c. Forms of Energy Include: thermal, chemical, electromagnetic, electrical, kinetic.

2. **Thermal Energy:** the total energy of all of the particles in an object
 - a. **Temperature:** a measure of the average energy of the random motion of particles of matter.
 - Temperature depends on the form of energy and state of matter (ex. solid has less than a gas).
 - b. Temperature and Thermal Energy is not the same thing, but is related to the AMOUNT of thermal energy an object has.
 - c. Thermal energy always flows from warmer matter to cooler matter.
 - d. When Matter Changes – thermal energy is either released or absorbed.
 - Endothermic Change: energy is taken in.
 - Exothermic Change: energy is released (ex. combustion gives off heat and light energy).

3. **Chemical Energy:** energy stored in the chemical bonds between atoms.
 - a. Examples: food, fuel, cells.
 - b. When chemical changes occur, chemical bonds are broken and new bonds are formed.
 - c. Chemical Changes usually involves a transformation between chemical and thermal energy.

4. **Electromagnetic Energy:** energy that travels through space as waves.
 - a. Chemical Changes can also give off electromagnetic energy in the form of light.
 - b. Some chemical and physical changes can be CAUSED by electromagnetic energy.
 - c. **Electrical Energy:** energy caused from electrically charged particles (electrons) move from 1 atom to another.
 - i. Electrical energy can cause chemical changes.

During a chemical change, chemical energy may be changed to other forms of energy. Other forms of energy may also be changed to chemical energy.