Unit 6: Energy
Content Outline: Forms of Energy (6.2)

I. **Energy** and **Work** can be calculated:
   A. Because of the *direct* connection between energy and work, energy is measured in the same unit as work; **joules(J)**
   B. **PE_{grav} = mass(m) x gravity(g) x height (h) = PE_{grav} = m*g*h; gravity= 9.8m/s^2**
   C. **KE = ½ x mass (m) x speed^2 (v^2) = KE = ½ m*v^2**
   D. **Work = Force (F) x Displacement (d) =W = F x d**

II. Energy Exists in different *forms*:
   A. **Mechanical** – energy due to an objects *ability to move*.
      1. Moving your textbook from your backpack to your desk.
   B. **Thermal (Heat)** – the internal *motion of atoms* is called thermal energy because moving particles produce heat.
      1. Thermal energy *causes changes in temperature* and *phase* of any form of matter.
      2. Also caused by **friction**(two objects rubbing *against* each other).
   C. **Electromagnetic** – *light energy* transmitted through space in the form of electromagnetic waves.
      1. Gamma rays, X-rays, ultraviolet rays, infrared rays etc.
   D. **Sound** – is produced when an object is made to *vibrate*. Sound energy *travels out as waves* in all directions. Sound needs a *medium* to travel through, such as air, water, wood, and even metal.
      1. Voices, whistles, horns and musical instruments can produce sound energy.
   E. **Nuclear** – *the nucleus of an atom* is the source of nuclear energy.
      1. When the *nucleus splits* (**fission**), nuclear energy is released in the form of heat and light energy.
      2. Nuclear energy is also released when nuclei *collide at high speeds and join* (**fusion**).
      3. Nuclear energy is the *most concentrated form of energy*.
   F. **Chemical** – energy *stored in the chemical composition* of matter.
      1. Striking a match, combining vinegar and baking soda to form CO_2 gas, breaking light sticks releases chemical energy.
   G. **Electrical** - Energy produced by *electrons moving through a substance.*
      1. Electrical energy lights our homes, run motors, and makes our TVs and IPods work.