Chapter 5

1. Define energy:
   The ability to do work

2. Review … what is work? Why is energy measured in the same units as work?
   Work is a force applied a given distance, it takes energy to do work. There is a direct connection between work and energy

3. What are the five main forms of energy, how does it work (definition?) and give one example.
    1. <u>Mechanical Energy</u> – The energy associated with motion
       - Ex. Water in a waterfall, a car travelling at 50 mph

    2. <u>Chemical Energy</u> – Energy required to bond atoms together, released when bonds are broken.
       - Ex. Fuel in a rocket has stored chemical energy. Converts to heat energy when the fuel is   burned.
       - Starting a fire releases chemical energy in the form of heat.
       - Playing a sport uses the chemical energy stored in your muscles obtained from food.

    3. <u>Heat Energy</u> – The internal motion of atoms. The faster the molecules move, the more heat energy is produced.
       - Ex. Friction converts mechanical energy to heat energy. i.e. rubbing hands together
       - Heat energy causes ice cream to melt and drip down your hands

    4. <u>Electromagnetic Energy</u> – Energy produced by moving electric charges
       - Ex. Power lines carry electromagnetic energy into your home in the form of electricity
       - Electric Motors are driven by electromagnetic energy
       - Light – each color represents a different amount of electromagnetic energy
       - Also carried by X-rays, radio waves and laser light

    5. <u>Nuclear Energy –</u> Heat and light energy released when the nucleus of an atom splits or fuses with another is nuclear energy, nuclear energy is the most concentrated form of energy
       - Ex. Sun's energy is from fusion reaction between Hydrogen and Helium

4. It is energy you must pay for on your electric bill. Electric companies usually express the total amount of energy used in kilowatt-hours (kWh) – the flow of 1 kilowatt of electricity for 1 hour. How many joules of energy do you get when you pay for 1 kWh? (1 joule = 1 watt x 1 second; 1 kW = 1000 watts; 1 hour = 3600 seconds).

$$1 \text{ kw*h} \times \frac{3600 \text{ seconds}}{1 \text{ hr}} \times \frac{1000 \text{ watts}}{1 \text{ kw}} \times \frac{1 \text{ joule}}{1 \text{ watt* } 1 \text{ second}} = \boxed{3,600,000 \text{ Joules}}$$