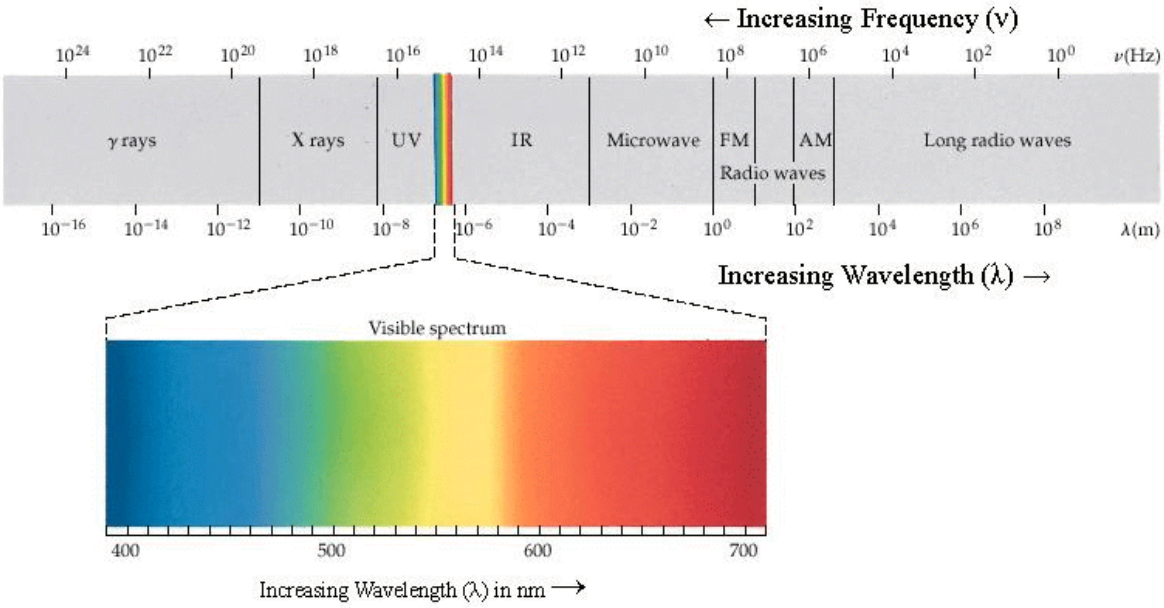
Electromagnetic Radiation

- electromagnetic spectrum shows all different types of electromagnetic radiation



- light is a small portion of all electromagnetic radiation
- like sound, light as a frequency and wavelength
- travels fast (3×10^8 m/s), takes light 0.133 s to travel the distance around the earth, 8 min and 23 s to reach us from the sun
- electromagnetic radiation travels in a wave/particle package called a photon
- a photon has a wave/particle duality (could be thought of as a wavy particle)

- electromagnetic radiation can be thought of as a self propagating electromagnetic disturbance that follows the rectilinear propagation of light (i.e. light travels in straight lines)

- follows the relationship:

$$c = \nu\lambda$$

where: c = the speed of light (3×10^8 m/s)

ν = frequency (s^{-1})

λ = wavelength (m)

- also, the energy of the photon follows:

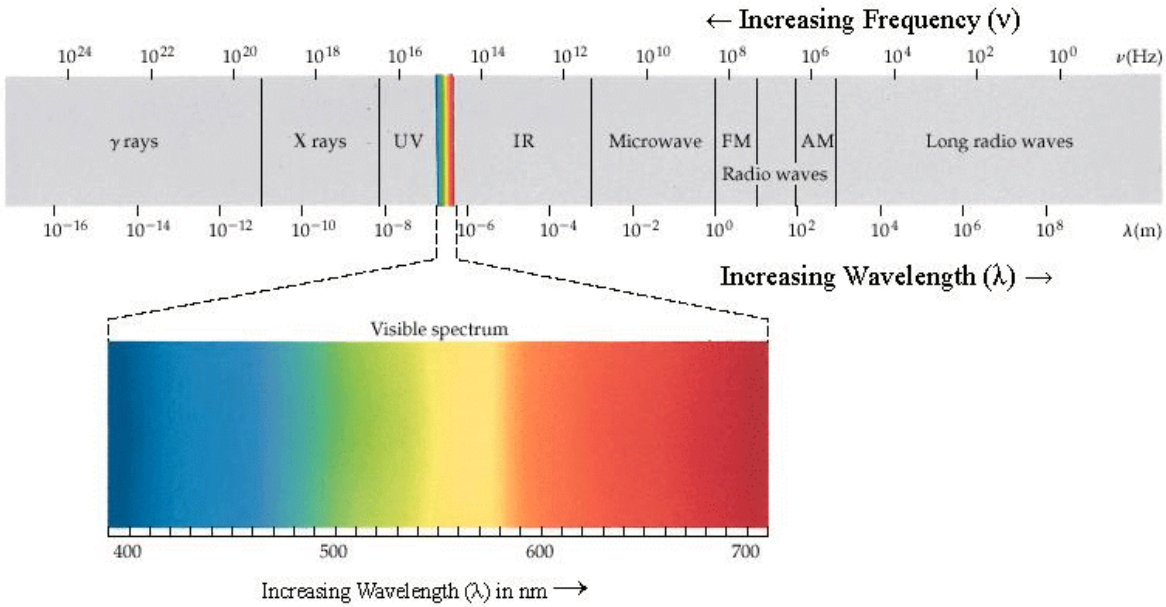
$$E = h\nu$$

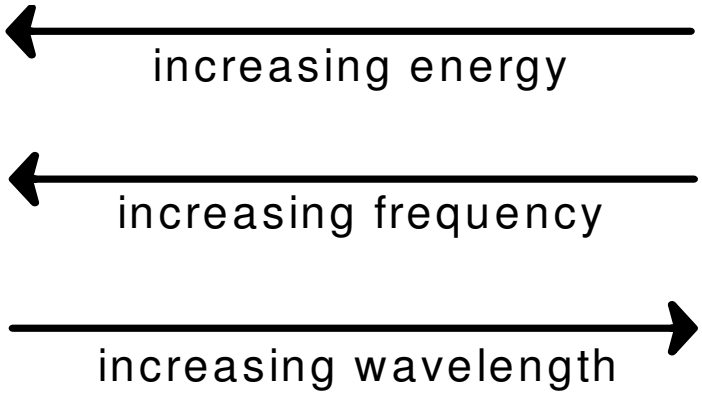
where : E = energy per photon (J)

ν = frequency (s^{-1})

h = 6.626×10^{-34} (Js)

- from the above equations it follows that:





– this means that every photon has a specific energy, frequency and wavelength and corresponds to a particular colour of light or type of radiation

- in order of decreasing energy types of electromagnetic radiation are:
  - gamma rays
  - X-rays
  - ultraviolet
  - visible
  - infrared
  - microwaves
  - radiowaves

- for light order of decreasing energy is:
  - violet
  - blue
  - green
  - yellow
  - orange
  - red