***C, frequency and wavelength***

* Wave speed, frequency and wavelength have a mathematical relationship.
  + Using **c = λ x ƒ**, frequency or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can be found.
    - Example: what is the wavelength of a wave of light if it has a frequency of 3.2 x 1014 hertz?

***Wave speed, frequency and wavelength practice***

* Using v = λ x ƒ or,
  + find the frequency of a 4.00 x 10-11 m wavelength of the violet light.
  + find the wavelength of a sound wave with a frequency of 440Hz. (Sound travels at ≈ 330 m/s).

***Light Particles and Planck’s constant***

Particles of Light

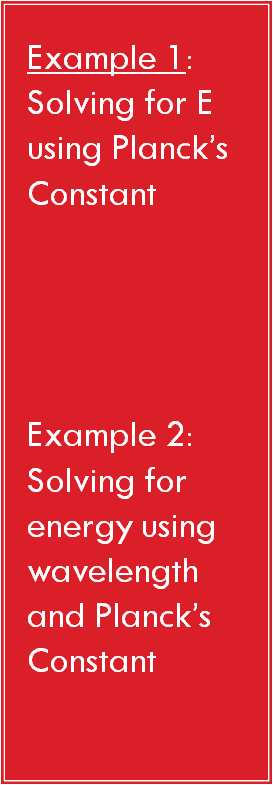
* Scientists in the early 20th century showed that electromagnetic radiation was composed of particles we call **\_\_\_\_\_\_\_\_\_**.
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and Albert Einstein.
  + Photons are particles of light energy.
* One wavelength of light has that with that amount of energy.

Planck’s Constant

* Planck ’s constant is a physical constant reflecting the sizes of energy \_\_\_\_\_\_\_\_\_\_ (photons) in quantum mechanics.
  + It is named after Max Planck, one of the founders of quantum theory, who discovered it in 1900.
* The equation is ***E = h x ƒ***where

*E* = \_\_\_\_\_\_\_\_\_\_, *h* = Planck’s constant

(6.63 x 10-34 J ●s), and *f* = frequency.

***Using Planck’s equation, E = h x ƒ***

* What is the energy (Joules) of Violet light with a

frequency = 7.50 x 1014 s-1?

* Find the energy of light, wavelength is 4.06 x 10-11 m.

***Energy, wavelength and frequency practice***

Answer the following problems. Remember that h = 6.6 x 10-34 J● s. Energy = h x ƒ

* What is the energy of a quantum of light with a frequency of 7.39 x 1014 Hz?
* The energy for a quantum of light is 2.84 x 10-19 J. What is the frequency of this light?