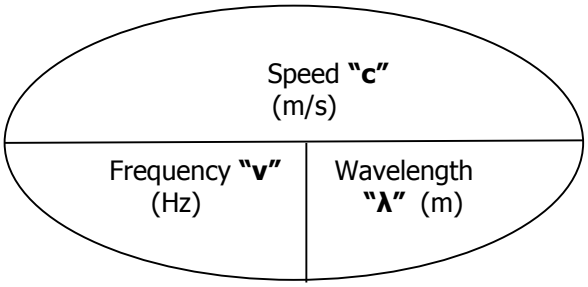
Name: KEY Period:_____

Speed /Frequency / Wavelength

Equation: **Speed of all Electromagnetic Spectrum Waves (c) = 3.0 x 10^8 m/s**

c (m/s) = ν x λ

ν (Hz) = c ÷ λ **λ (m) = c ÷ ν**



1. Violet light has a wavelength of 4.10 x 10^{-12} m. What is the frequency?

7.31×10^{19} Hz

2. Green light has a frequency of 6.01 x 10^{14} Hz. What is the wavelength?

4.99×10^{-7} m

3. What is the wavelength (in meters) of the electromagnetic carrier wave transmitted by <u>The Sports Fan</u> radio station at a frequency of 640 Hz? 4.7×10^5 m

4. Calculate the wavelength of radiation with a frequency of 8.0 x 10^{14} Hz.

3.8×10^{-7} m

5. What is the wavelength of light with a frequency of 7.66 x 10^{14} Hz?

3.91×10^{-7} m

6. A helium laser emits light with a wavelength of 633 nm. What is the frequency of the light? (Hint: 1nm = 1.0×10^{-9}nm)

4.74×10^{14} Hz

7. What is the wavelength of X-rays having a frequency of 4.80 x 10^{17} Hz?

6.25×10^{-10} m

8. An FM radio station broadcasts at a frequency of 107.9 Hz. What is the wavelength of the radio signal?

2.78×10^6 m

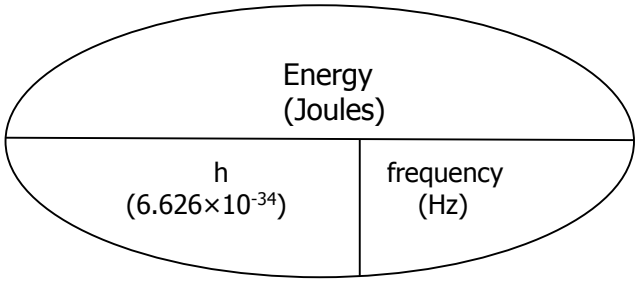
9. If the limits of human hearing are 20 Hz. to 20,000 Hz, what are the sound wavelengths that are associated with both of these two extremes, assuming the speed of sound is 345 m/s.
Frequency = 20 Hz : Wavelength = 1.725×10^1 m

Frequency = 20,000 Hz : Wavelength = 1.725×10^{-2} m

Name: KEY Period:_____

Energy / Frequency / Wavelength

Energy (J) = h ^{x} ν **h (Planck's Constant) = 6.626 x 10^{-34} J · s**



10. Calculate the energy of a photon of radiation with a frequency of 8.5 x 10^{14} Hz.
5.63 × 10^{-19} J

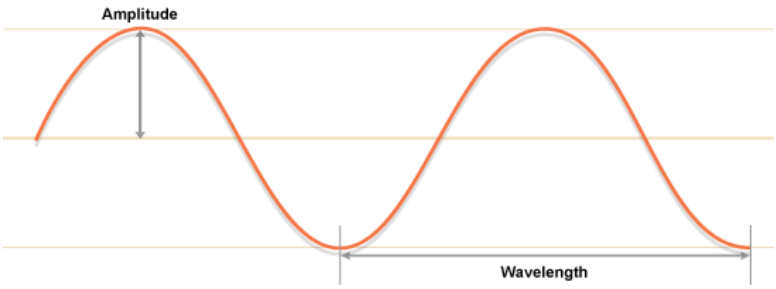
11. Calculate the energy of a gamma ray photon whose frequency is 5.02 x 10^{20} Hz?
3.33 × 10^{-13} J

12. Calculate the energy of a photon of radiation with a wavelength of 6.4 x 10^{-7} m.
3.1 × 10^{-19} J

13. What is the energy of light whose wavelength is 4.06 x 10^{-11} m? Use both equations for this! 4.90 × 10^{-15} J

General Knowledge.

14. Sketch a diagram of a wave and label the amplitude and wavelength.



15. What is the relationship between frequency and wavelength? (Direct or Inverse)
_____INVERSE _____

What is the relationship between frequency and energy? (Direct or Inverse)
_____DIRECT _____