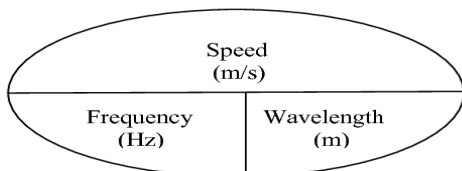# Speed /Frequency / Wavelength

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

Speed (m/s) = Frequency x Wavelength
Frequency (Hz) = Speed ÷ Wavelength   **Wavelength (m) = Speed ÷ Frequency**

```
        _____
       /          Speed            \
      (            (m/s)            )
       _____|_____/
       |  Frequency   |  Wavelength |
        \   (Hz)      |     (m)    /
         _____|_____/
```

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

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

3. What is the wavelength (in meters) of the electromagnetic carrier wave transmitted by The Sports Fan radio station at a frequency of 640 kHz?(Hint: convert kHz into Hz by multiplying by 10^3.)

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

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

6. A helium laser emits light with a wavelength of 633 nm. What is the frequency of the light?

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

8. An FM radio station broadcasts at a frequency of 107.9 MHz. What is the wavelength of the radio signal?
            (Hint: First, convert Mega Hertz [MHz] into Hertz by multiplying by 10^6)

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 =

Frequency = 20,000 Hz : Wavelength =