Key - Worksheet – Wave Properties and Math

1. To make a wavelength of rope shorter, one should shake the rope at a __**higher**_____ *(higher or lower)* frequency.

2. The primary difference between an electromagnetic wave and a mechanical wave is that a(n) _**electromagnetic**__ wave can travel through empty space, while the other cannot.

3. Waves carry _**energy**____ but does not carry the _**medium**___ with it.

4. The energy of a wave depends on its ___**amplitude**_____.

5. In a __**transverse**_____ wave, the medium vibrates up and down as the wave moves horizontally. In a __**longitudinal**_____ wave, the medium moves back and forth as the wave moves horizontally.

6. The speed of a wave depends on the __**medium**_____. It can be calculated by multiplying __**frequency**_____ X _____**wavelength**_____.

7. Wave _**frequency**____ (*frequency or velocity)* is the number of vibrations per second of a part of the medium.

8. As the wavelength of a wave increases, the frequency of the wave _**decreases**_.

9. The frequency of a certain color of light is 4.2×10^{14} Hz. The speed of light is 3.0×10^{8} m/s. Find its wavelength.

   $v = f\lambda$
   3.0×10^{8} m/s = 4.2×10^{14} Hz $\times \lambda$
   $\lambda = 7.1 \times 10^{-7}$ m

10. A wave has a period of 12.0 s. The distance between a crest and the adjacent trough is 2.00 m.

    a. What is the frequency? **f = 1/T f = 1/12.0 f = 0.083 Hz**
    b. What is the wavelength? **2.00 x 2 = 4.00 m**
    c. What is the velocity? **v = fλ v = 0.083 x 4.00 v = 0.33 m/s**