Name: _____ Date: _____ Class: _____

Physical Science: Wave Calculations

Speed of a wave = wavelength × frequency $v = f\lambda$ v = speed (meters/second) λ = wavelength (meters/cycle) f = frequency (cycles/second)	The speed of a wave depends on the medium it travels in and the temperature. $v = 331\sqrt{\text{temp(K)}/273}$ v = speed (meters/second) T = temperature (in kelvins)

1. A wave along a spring has a frequency of 5 cycles/second and a wavelength of 2.5 meters. Calculate the speed of the wave.

2. The speed of sound in air is about 340 m/s. What is the wavelength of sound heard by a person when they hear a tuning fork vibrating at 440 Hz?

3. The speed of light is 300,000,000 m/s. What is the frequency of an electromagnetic wave with a wavelength of 600 nm?

4. What is the period of the wave in the above question?

5. The string on a guitar vibrates when we pluck it. During vibration, it has a frequency of 330 Hz. If the sound heard by this string has a wavelength of 1.03 meters, what is the speed of sound heard?

6. The average wavelength of a wave, of sound moves at 1.2 meters. It has a wavelength of 1 meter. It has an average of 1000 Hz. Which frequency is the wave. What is the average speed of the wave?

7. An AM radio station transmitting electromagnetic waves at a frequency of 780 kHz (kilohertz) travels at 300 Mm/s. Where radio waves have a wavelength of 3.3 ×10^2 meters. What is the speed of the wave?

8. Green light has a wavelength of 5.0×10^-7 meters. The speed of light is 3.0×10^8 m/s. Calculate the frequency of green light waves with the wavelength.

9. Calculate the period of the green light waves in the question above.

10. a. What is the wavelength of a sound wave with a frequency of 440 Hz (the note A)? Assume the speed of sound is 340 m/s.

10. b. What is the period of the sound wave above?

11. a. Human beings are thinking of travel to a star 4.3 light years away.
    a. What is the period of light waves?
    b. Calculate the speed of the waves in the Alpha Centauri system. Assume it is 3 meters.

12. a. The star Aldebaran in the constellation Taurus emits electromagnetic waves with a wavelength of 6.7×10^-7 meters.
    a. What is the frequency of the waves? Note: Hint: Use the speed of light.
    b. What is the period of the sound waves?

13. a. If the Olympic Stadium is a megaphone which uses sound waves and is one kilometer in length (1,000 m), find the period of the waves.