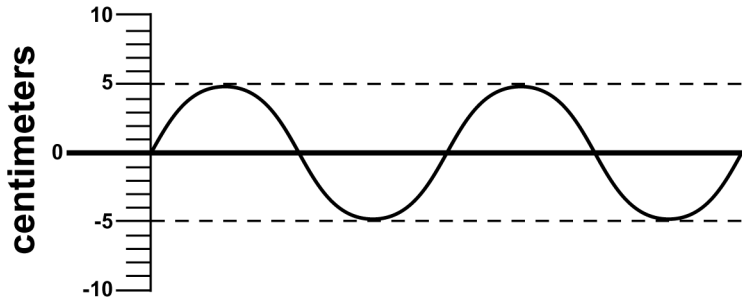
Name: _____

Skill Sheet 14.1 Waves

What is a wave? How do you calculate the speed of a wave? In this skill sheet you will review how to answer these questions as you review wave properties.

1. The parts of a wave

1. On the graphic below label the following parts of a wave: one wavelength, half of a wavelength, the amplitude, the crest, and the trough.



2. In the graphic above, how many wavelengths are represented?

_____

3. Define *amplitude* of a wave in your own words. What is the amplitude of the wave in the graphic?

_____

4. How do you calculate the *frequency* of a wave?

_____

5. If took 0.05 seconds for the number of wavelengths in the graphic to pass a certain point, what is the frequency of this wave?

_____

2. The speed of a wave

Below is the formula for the speed of a wave. Use this formula to answer the questions on the next page. Recall that the frequency of a wave equals 1/period. Be sure to show your work.

The speed of a wave

Speed (m/sec) → $v = f \lambda$ ← Wavelength (meters)

Frequency (hertz) → f

$$\text{Speed} = \frac{\text{Distance Traveled}}{\text{Time Taken}} = \frac{\text{Wavelength}}{\text{Period}} = \text{Wavelength} \times \left(\frac{1}{\text{Period}}\right)$$

Speed = Wavelength x Frequency

1. The speed of a wave can be calculated by multiplying the frequency by the wavelength. You can also calculate wave speed by dividing wavelength by the period of the wave. Why does this make sense?

2. The frequency of a wave is 40 Hz. The speed of the wave is 100 meters per second. What is the wavelength of this wave?

3. The wavelength of a wave is 50 centimeters. The frequency is 100 Hz. What is the speed of this wave?

4. The frequency of wave A is 250 hertz and the wavelength is 30 centimeters. The frequency of wave B is 260 hertz and the wavelength is 25 centimeters. Which is the faster wave?

3. Identifying harmonics

Let's say you have a machine that supports a 3 meter piece of string. Using this machine you can measure the frequency at which the string vibrates at each harmonic. Table 1 is partially filled with data. Use your understanding of harmonics to fill in the rest of the table.

Harmonic #	Frequency (Hz)	Wavelength (m)	Speed of the Wave Frequency times wavelength (m/sec)
1 (fundamental)	**3**		**18**
2	**6**		**18**
3		**2**	
4	**12.0**	**1.5**	**18**
5	**15.0**		**18**
6		**1.0**	

1. When you are looking at a vibrating string, what is the easiest way to determine its harmonic?

2. What is the wavelength of the fundamental harmonic of a string that is 5 meters long?