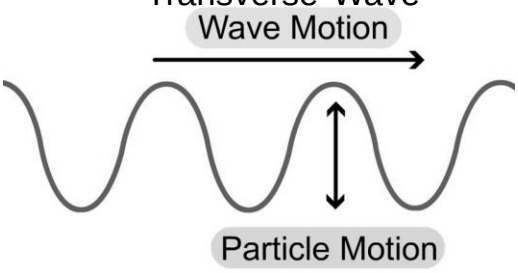
Waves: Introduction and Types

Name _____

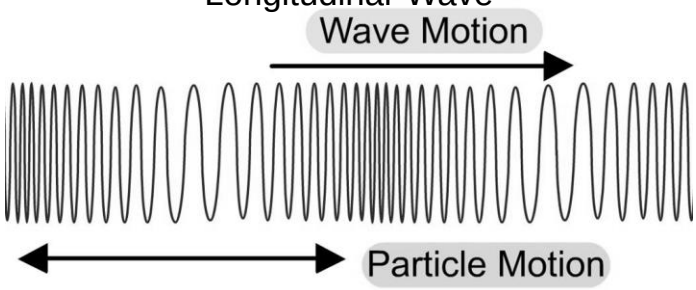
Instructions: Read through the information below. Then complete the statements at the bottom of the page using the BOLD words from the page.

A wave is a transfer of energy through a medium from one point to another. Some examples of waves include; water waves, sound waves, and radio waves. Waves come in two different forms; a **Transverse** Wave which moves the medium *perpendicular* to the wave motion, and a **Longitudinal** Wave, which moves the medium *parallel* to the wave motion.

Transverse Wave



Longitudinal Wave

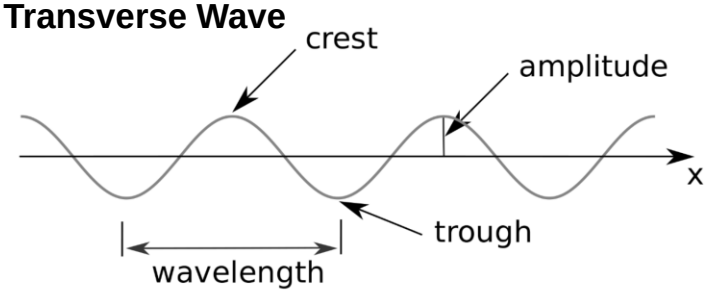


Examples of Transverse waves would be a vibrating guitar string or electromagnetic waves, while an example of a Longitudinal wave would be a "Slinky" wave that you push and pull.

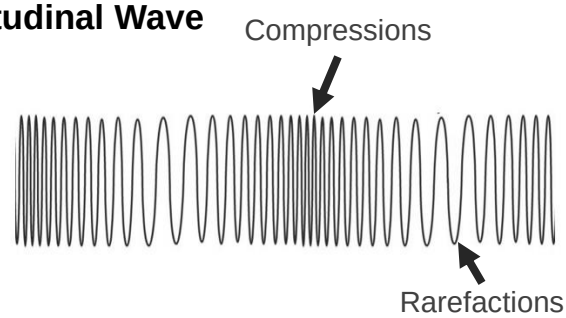
Waves have several properties which are represented in the diagrams below. In a Transverse wave the **Crest** and Troughs are the locations of maximum displacement up or down. The **Amplitude** is the measurement of maximum displacement. The **Wavelength** is the distance of one complete wave cycle. For example; the distance from crest to crest or trough to trough would be 1 wavelength.

In a Longitudinal wave, areas of maximum displacement are known as **Compressions** and **Rarefactions**. The stronger the wave, the more compressed and spread out the wave medium becomes.

Transverse Wave



Longitudinal Wave



Fill in the statements using the BOLD words from the above information.

1- Wave motion that is Parallel to wave direction describes a _____ wave.

2- A _____ is the maximum upwards displacement in a Transverse wave.

3- One complete wave cycle is referred to as a _____.

4- Wave motion that is Perpendicular to wave direction describes a _____ wave.

5- A _____ or _____ is the maximum displacement in a Longitudinal wave.

6- An Ocean wave would be an example of a _____ wave.

7- The distance from one trough to another trough is called a _____.

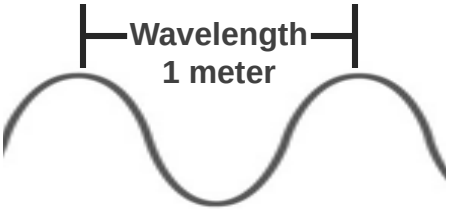
8- The measurement of displacement is called a wave's _____.

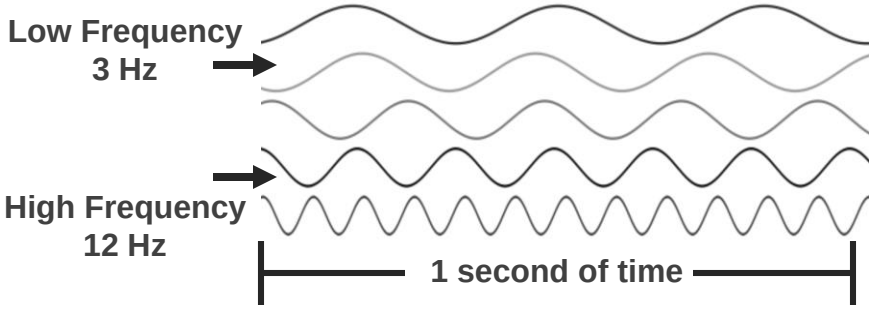
Waves: Velocity and Frequency

Name _____

Instructions: Read through the information below. Then complete the calculation problems at the bottom of the page.

The velocity of a wave can be calculated if you have enough information. First you need to know the *Wavelength*, or the length of one complete wave cycle. This could be measured Crest to Crest, Trough to Trough, or any other complete cycle of a wave. The second aspect you need is the wave *Frequency*, or the number of waves or vibrations produced per second. The frequency is measured in Hertz and the Wavelength is measured in meters.





The equation for calculating the velocity of a wave is:

Velocity = Wavelength x Frequency $v = \lambda \times f$

This equation works for any wave form, water, sound, or radio waves.

EXAMPLE: A wave as a Wavelength of 5 meters and a Frequency of 10 Hz.
What is its velocity?

V = 5 x 10 → V= 50 meters per second

Solve using the wave velocity equation: (*Show your equation set up and math work)*

1- A wave has a Wavelength of 12 meters and a Frequency of 10 Hz.
What is its velocity?

2-A wave has a Wavelength of 3 meters and a Frequency of 15Hz.
What is its velocity?

3-A wave has a Wavelength of 18 meters and a Frequency of .5 Hz.
What is its velocity?

4- A wave has a Wavelength of .5 meters and a Frequency of 100 Hz.
What is its velocity?

Waves: Introduction and Types

Name _**MASTER KEY**_

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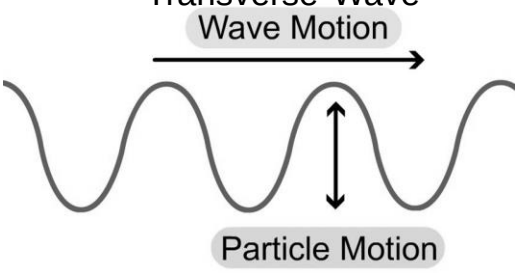
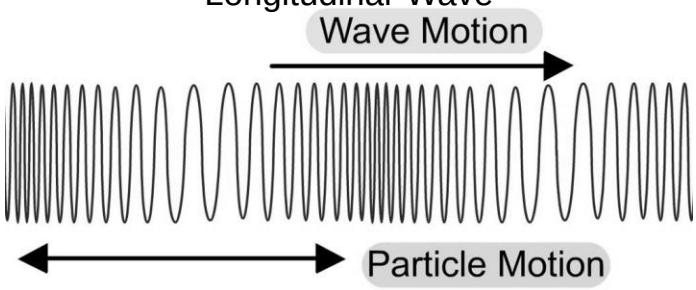


Longitudinal Wave



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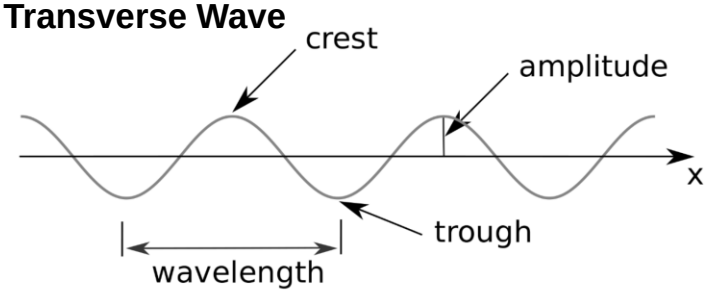
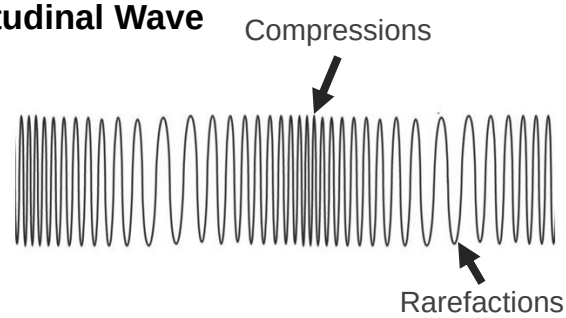


Longitudinal Wave



Fill in the statements using the BOLD words from the above information.

1- Wave motion that is Parallel to wave direction describes a _ **Longitudinal** _ wave.

2- A **Crest** is the maximum upwards displacement in a Transverse wave.

3- One complete wave cycle is referred to as a **Wavelength** .

4- Wave motion that is Perpendicular to wave direction describes a **Transverse** wave.

5- A **Compressions** or **Rarefactions** is the maximum displacement in a Longitudinal wave.

6- An Ocean wave would be an example of a **Transverse** wave.

7- The distance from one trough to another trough is called a **Wavelength** .

8- The measurement of displacement is called a wave's **Amplitude**

Waves: Velocity and Frequency

Name _**MASTER KEY**_

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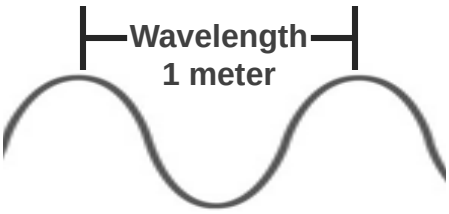

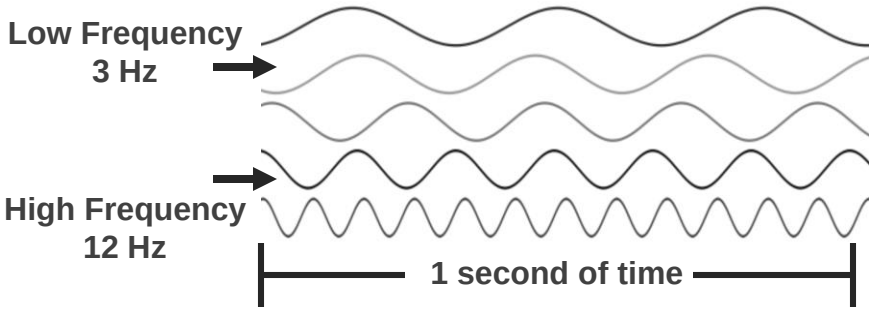

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Solve using the wave velocity equation: (*Show your equation set up and math work)*

1- A wave has a Wavelength of 12 meters and a Frequency of 10 Hz.
What is its velocity?

V = 12 x 10 = 120 mps

2-A wave has a Wavelength of 3 meters and a Frequency of 15Hz.
What is its velocity?

V = 3 x 15 = 45 mps

3-A wave has a Wavelength of 18 meters and a Frequency of .5 Hz.
What is its velocity?

V = 18 x .5 = 9 mps

4- A wave has a Wavelength of .5 meters and a Frequency of 100 Hz.
What is its velocity?

V = .5 x 100 = 50 mps