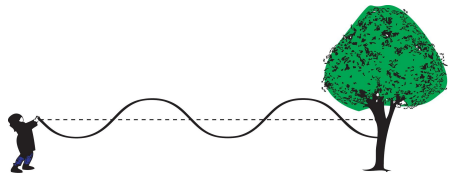


Introduction to Properties of Waves

Reflect

Waves travel through materials as vibrations and transmit energy. All waves transmit energy, not matter, although nearly all waves travel through matter. Waves are created when a source material sets up wave-like disturbances that spread away from the source of the disturbance. This means, of course, that every wave starts somewhere.

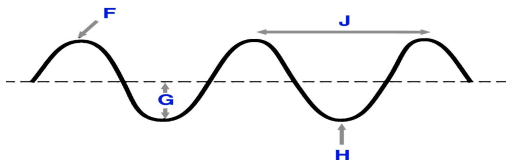
Where is the source of the wave below? Can you explain why the rope is creating a wave form?



Waves can be compared by the way they behave. Waves have a repeating pattern that gives them a shape and length. These characteristics allow us to describe wave behavior, and, therefore, categorize waves with our descriptions. Waves change their behavior as they travel through different types of matter. To be able to use these wave properties, we must first understand how each wave is measured. Do you see any characteristics in the waving rope above that might help us describe a wave?

Wave behavior can be measured by the distance between peaks (wavelength), the size of the peak (amplitude), or the speed of the peaks (frequency). Sound and earthquake waves are examples of waves. These and other waves move at different speeds in different materials.

All waves have -
Frequency: The rate at which a vibration occurs that constitutes a wave.
Amplitude: the size of the peak of a wave
Wavelength: the distance between the peaks of a wave



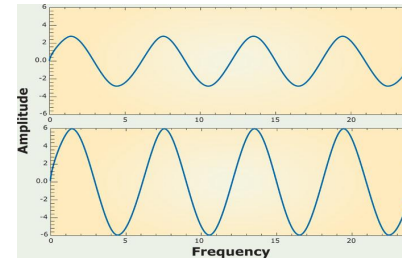
Amplitude: The height of a wave.
Wavelength: The distance between adjacent crests.
Trough: The lowest point of a wave.
Crest: The highest point of a wave.

Take a Closer Look
 Can you use the wave vocabulary to label the parts of the wave shown above?

F. G.
 H. J.

Introduction to Properties of Waves

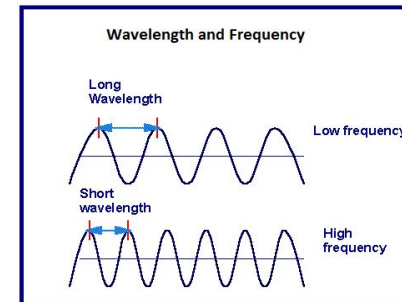
Reflect



Low Amplitude

High Amplitude

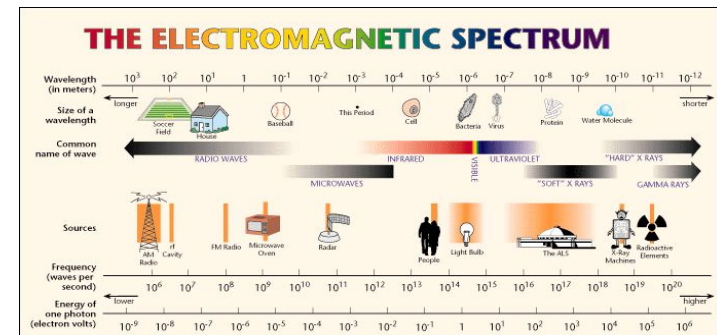
Note: As frequency goes up, wavelength goes down!



Low Frequency
 High Wavelength

Low Wavelength
 High Frequency

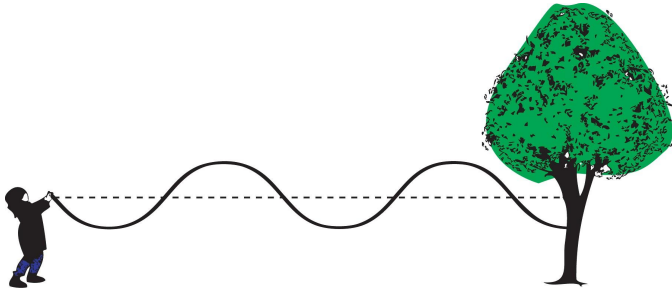
Electromagnetic Waves: Visible light is one example of electromagnetic radiation. Electromagnetic radiation is energy that travels via particles called photons. Different photons are associated with different wavelengths. In order of decreasing wavelengths, they are called radio waves, microwaves, infrared, visible light, ultraviolet, X-rays, and gamma rays. Photons with shorter wavelengths carry more energy than do photons with longer wavelengths. Gamma rays are the highest energy photons, while radio waves are the lowest energy photons.



Introduction to Properties of Waves

Connecting With Your Child

Provide your child with a rope or string and a stationary object like a tree or doorknob.



Your child's task will be to vary their arm movement to create waves of different amplitude, wavelength, and frequency.

Ask your child to first create a wave with large amplitude, then a wave with a small amplitude. Ask your child how he/she changed the arm movement to change the amplitude.

Next, ask your child to create a wave with high frequency, then a wave with low frequency. Ask your child how he/she changed the arm movement to change the frequency.