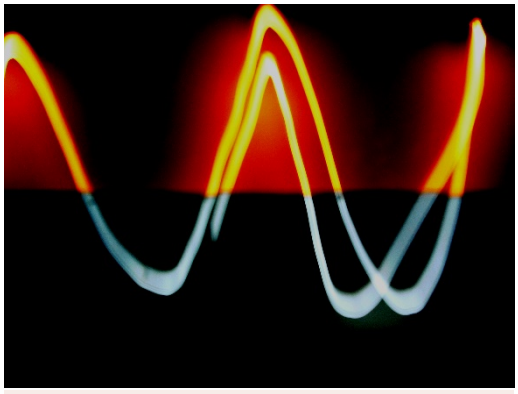
Reflect

Have you ever thrown a rock into the water and watched the ripples of movement along the surface? You caused a wave. The very large surface waves you see in the ocean are caused by disturbance from the wind. Waves are everywhere. Waves are not only water waves; they can be sound and light waves. A wave is a regular pattern of motion. A wave can be characterized by its properties or behaviors.

wave: a regular pattern of motion

Wave Motion: How waves travel

Two types of waves exist: transverse and longitudinal. In a transverse wave, the particles in the medium move up and down, according to the wave motion. Transverse waves are what come to mind when you think of a wave. Examples of transverse waves are the vibrations of a string on a guitar. A light wave is also an example of a transverse wave. In a longitudinal wave, the particles in the medium move parallel or in the same direction as the wave's motion. Examples of longitudinal waves are the push and pull movements of a slinky when you and a partner hold it at each end. A sound wave is also a longitudinal wave.



Motion of a transverse wave

Motion of a longitudinal wave

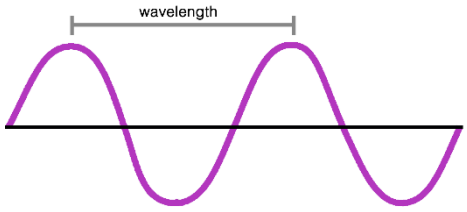
Reflect

Wave Behavior

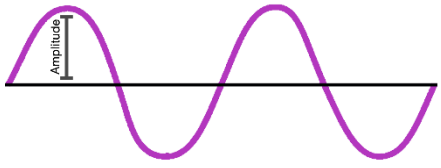
The medium through which a wave travels affects how that wave travels. A medium is the substance or material that carries the wave. A medium can be a solid, liquid or gas. Transverse waves and longitudinal waves travel differently, depending on the medium. Transverse waves move through solids. Longitudinal waves can move through all mediums.

medium: the substance or material that carries a wave

Wave Characteristics



wavelength: the horizontal distance between two repeating waves



amplitude: is the height of a wave

Waves transfer energy through particles when they move. A wave's wavelength and amplitude is a measure of how much energy that wave is carrying. The wavelength is the horizontal distance between two repeating waves. The amplitude is the height of a wave.

When waves hit different objects, they can be reflected, absorbed, refracted or diffracted. Reflection changes the wave's direction. When an ocean wave hits a seawall, the water is reflected. You may stand in a room where you hear your voice echo. The echo is the reflection of the sound from your voice bouncing off a surface. When a wave is absorbed, an object or material will take in some of the energy, so less of the energy will be reflected.

A wave that is refracted changes direction when it moves from one medium to another medium. A wave is diffracted when it bends around an obstacle in the same medium.

Look Out!

DID YOU KNOW?

Echolocation
Animals such as dolphins and bats use reflected sound waves to locate objects.

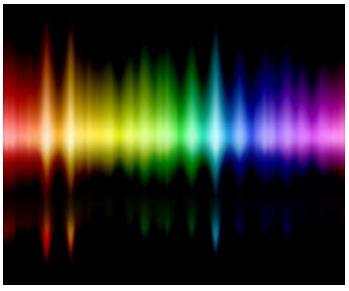
Earthquakes
Earthquakes create waves called seismic waves. Earthquakes can produce both transverse and longitudinal waves.

Dolphins use reflected sound waves to locate objects.

During an earthquake, the epicenter sends out waves that shake the ground back and forth.

Try Now

Research other types of waves that you may encounter.



Electromagnetic Waves

Doppler Effect

Surface Waves

Connecting With Your Child

Observing Wave Characteristics: Creating A Wave Model

You and your student will create a wave model using household materials to observe characteristics of a wave.

Materials you need include:

- 80 straws or wooden skewers
- Masking tape

Directions:

On a flat surface, roll out approximately 10 ft. (120 in.) of masking tape. The sticky side of the tape should face up. Place all the straws along the tape. The center of each straw should be placed along the length of the tape, evenly spaced 3 or 4 inches apart.

Once the straws have been placed along the length of the tape, roll out another 10 ft. of tape on the top of all the straws so that each straw is secured between the two pieces of tape.

Carefully lift the wave model from the floor or table. Each of you should hold a side of the wave model and stretch out the prop, creating tension.

Demonstrate the activities below and take note of the movement of energy along the length of the tape when you create a disturbance.

- When one person gently taps one end of the wave model what happens?
- When one person gently taps one end of the wave model, what happens to the wave when it gets to the other end of the tape?
- Take note of the speed of the waves when you loosen the tension of the tape. Does the wave travel faster or slower? What happens when the tape is extended, creating tension between the two people? Does the wave travel faster or slower?
- Take notice of the characteristics of the waves when both people slightly twist each end of the wave model. Point out the wavelengths along the wave model to your partner. How can you control your wave model to observe the amplitude of the waves?