

WAVES

CHAPTER 15

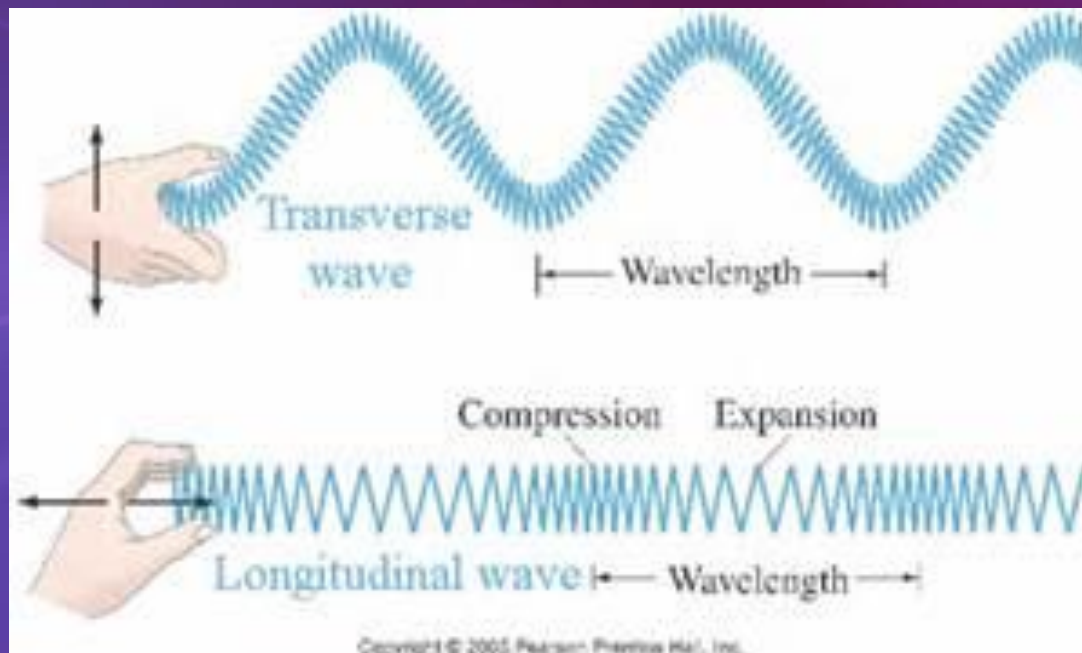
15.1 What Are Waves?

- Mechanical waves are produced when a source of energy causes a medium to vibrate.



15.1 What Are Waves?

- Mechanical waves are classified by how they move. There are two types of mechanical waves: transverse waves and longitudinal waves.



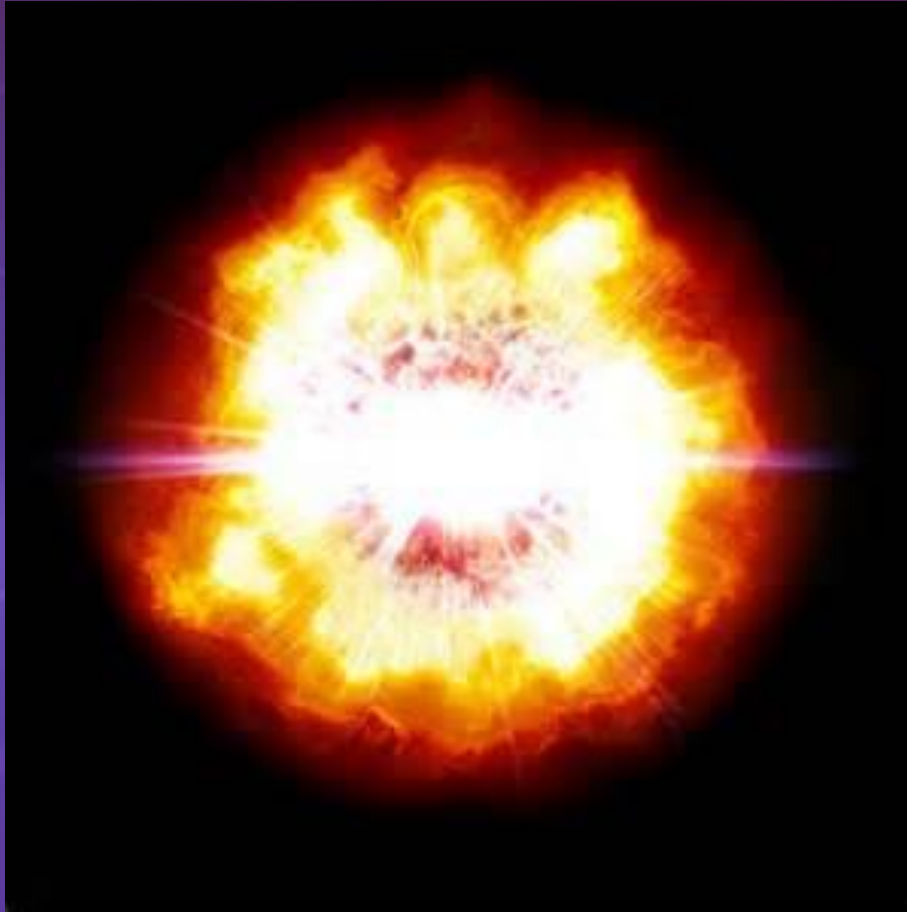
wave

- A DISTURBANCE THAT TRANSFERS ENERGY FROM PLACE TO PLACE.



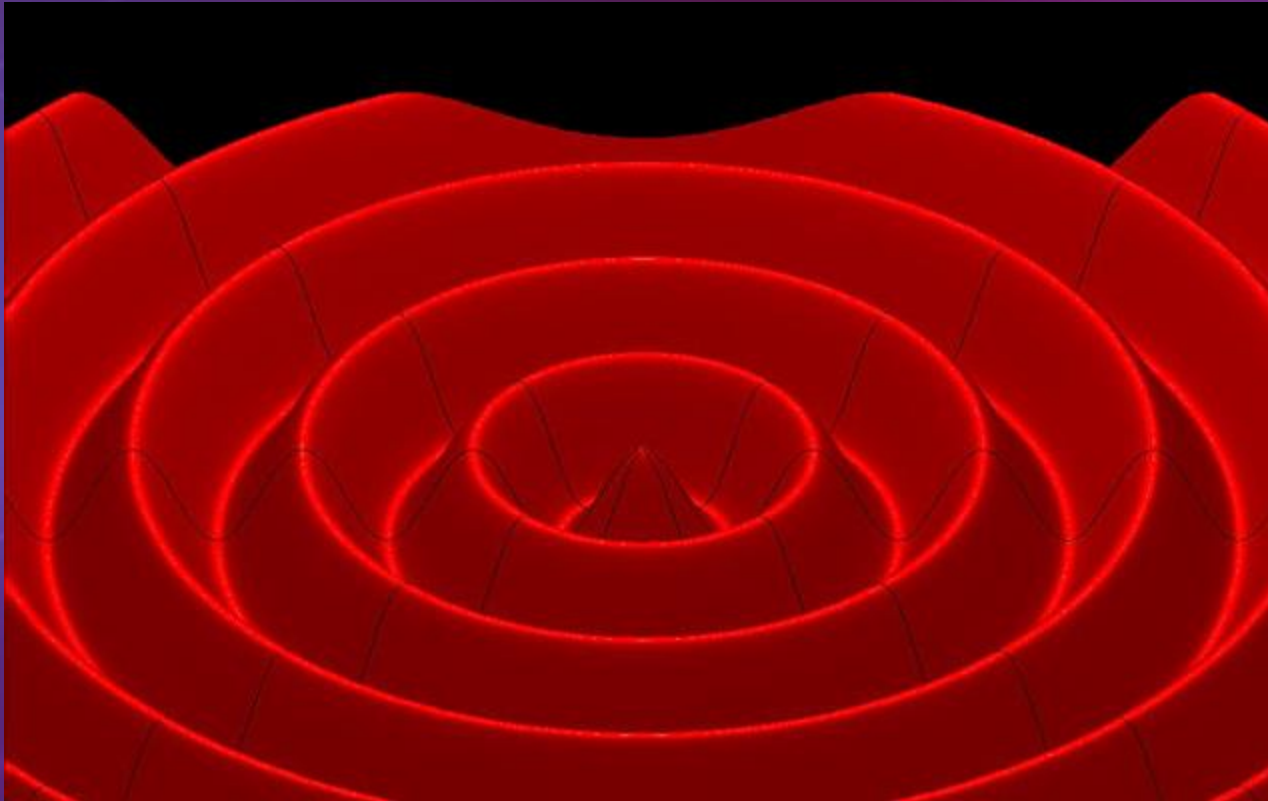
energy

- The ability to do work or cause change.



medium

- The material through which a wave travels.



mechanical wave

- A wave that needs a medium through which to travel.



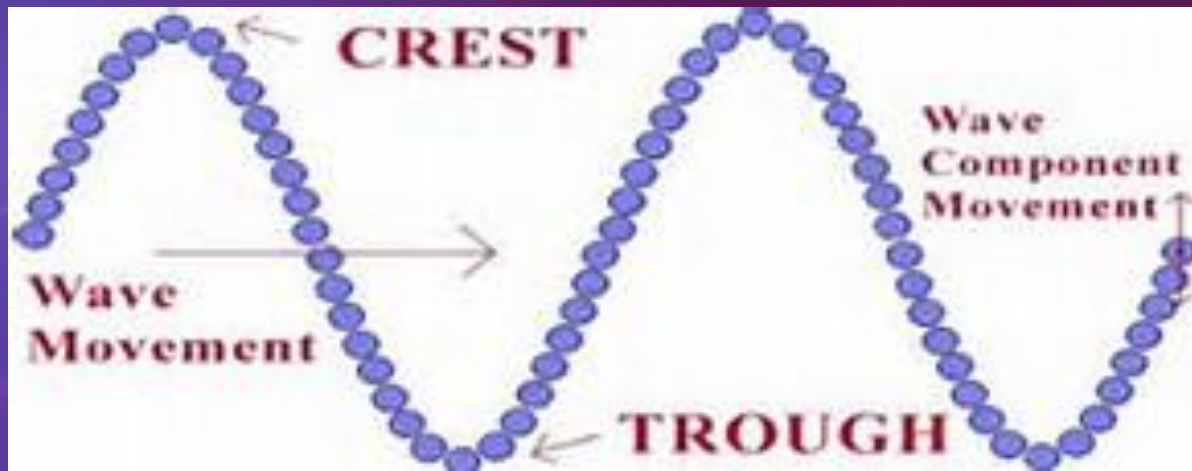
vibration

- A repeated back and forth or up and down motion.



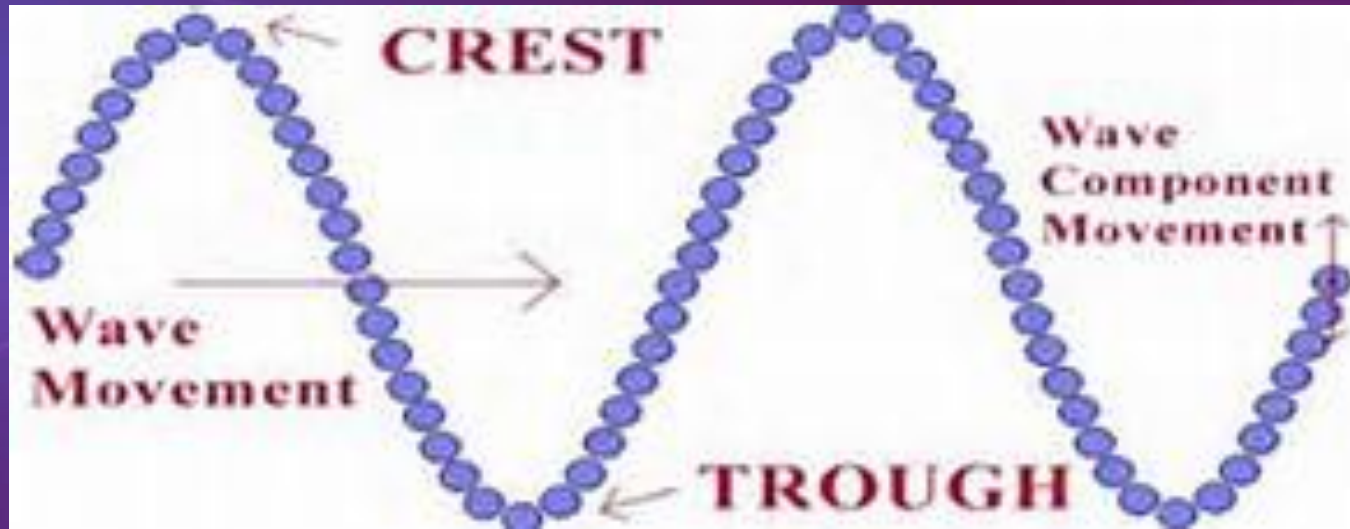
transverse wave

- A wave that moves the medium in a direction perpendicular to the direction in which the wave travels.



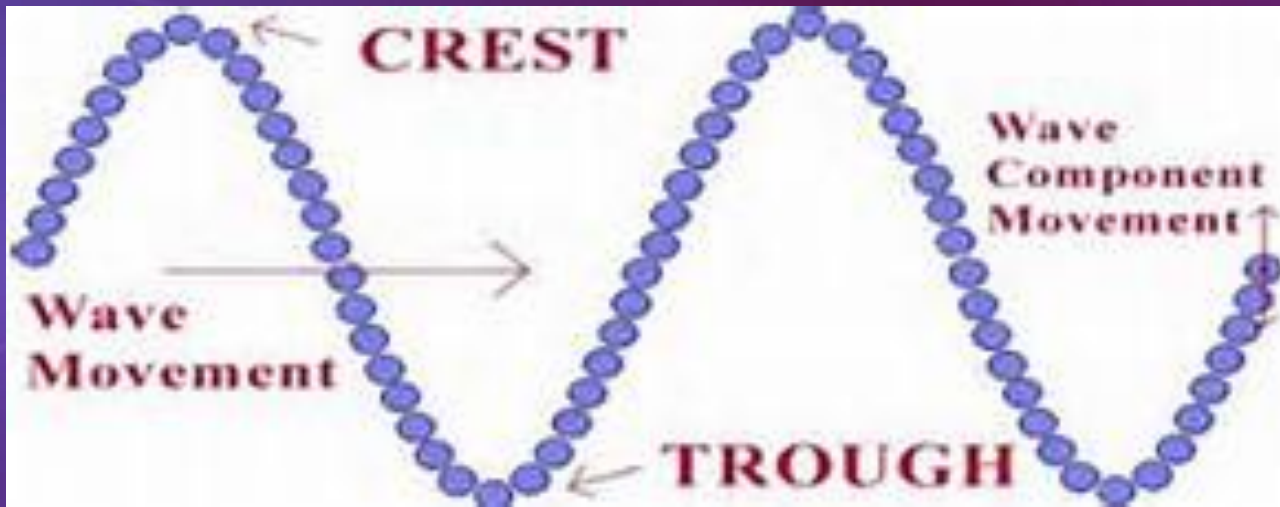
crest

- The highest part of a transverse wave



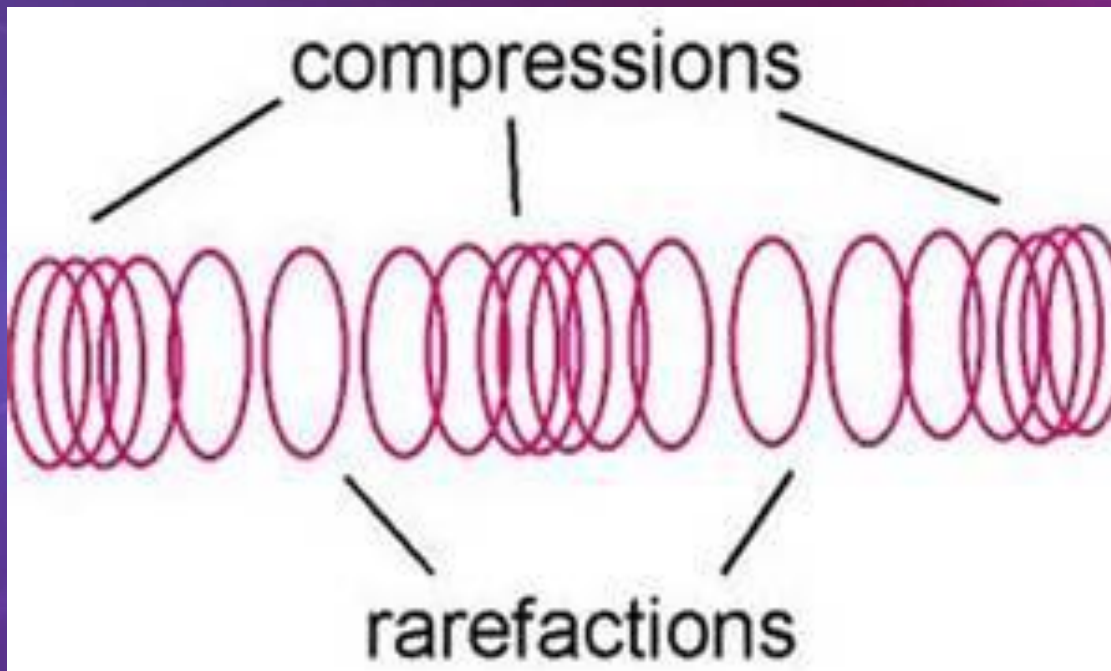
trough

- The lowest part of a transverse wave.



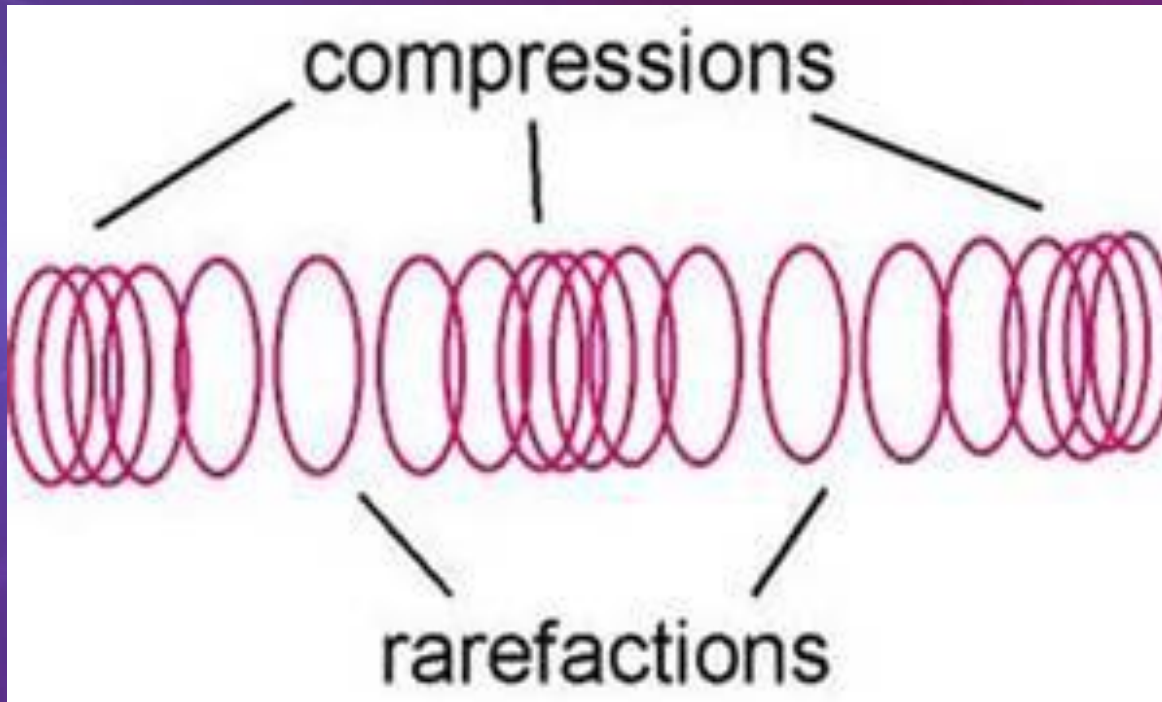
longitudinal wave

- A wave that moves a medium in a direction parallel to the direction in which the wave travels.



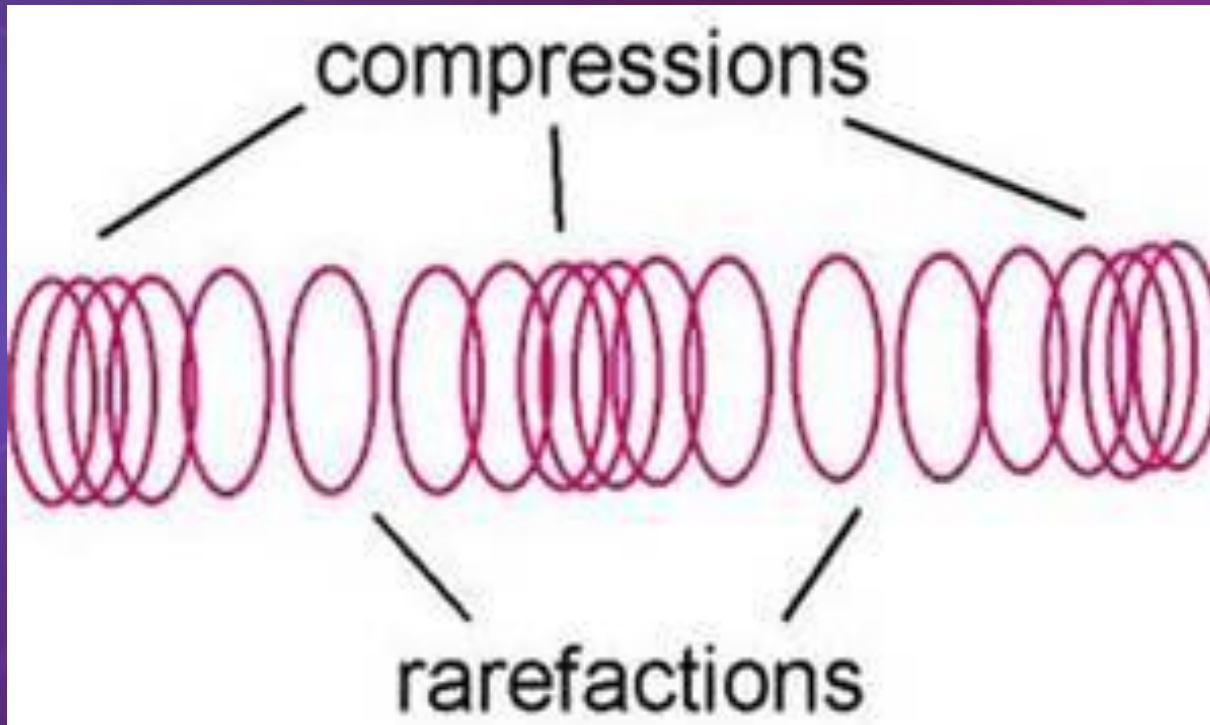
compression

- The part of a longitudinal wave where the particles of the medium are close together



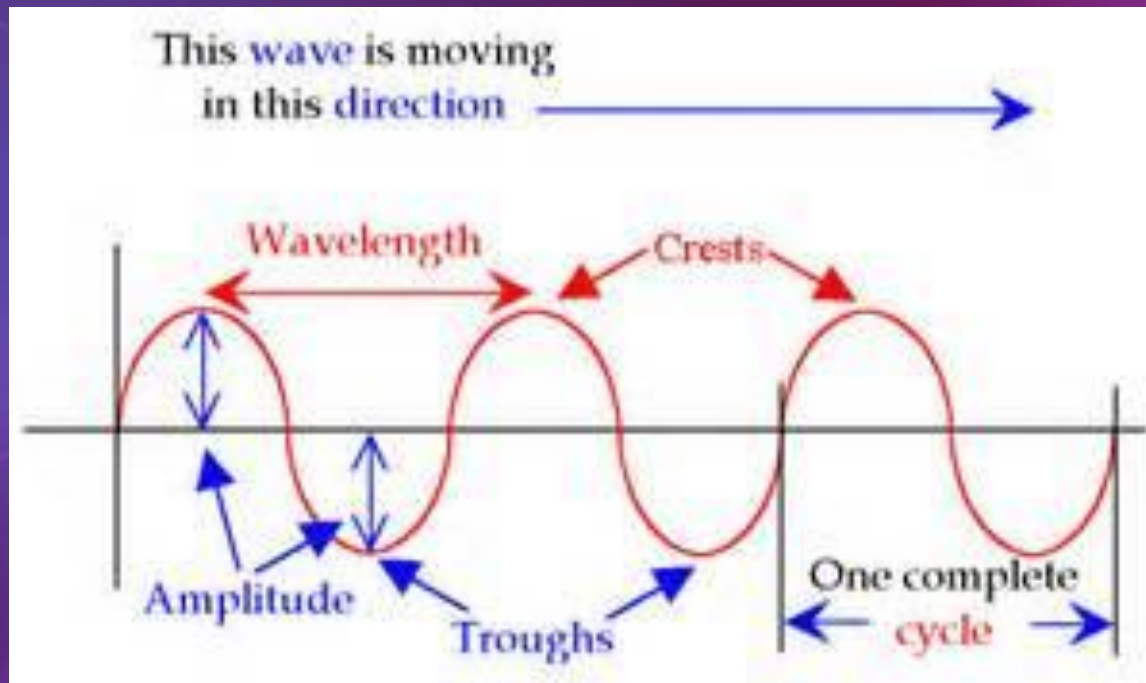
rarefaction

- The part of a longitudinal wave where the particles of the medium are farther apart.



15.2 Properties of Waves

- The basic properties of waves are amplitude, wavelength, frequency, and speed

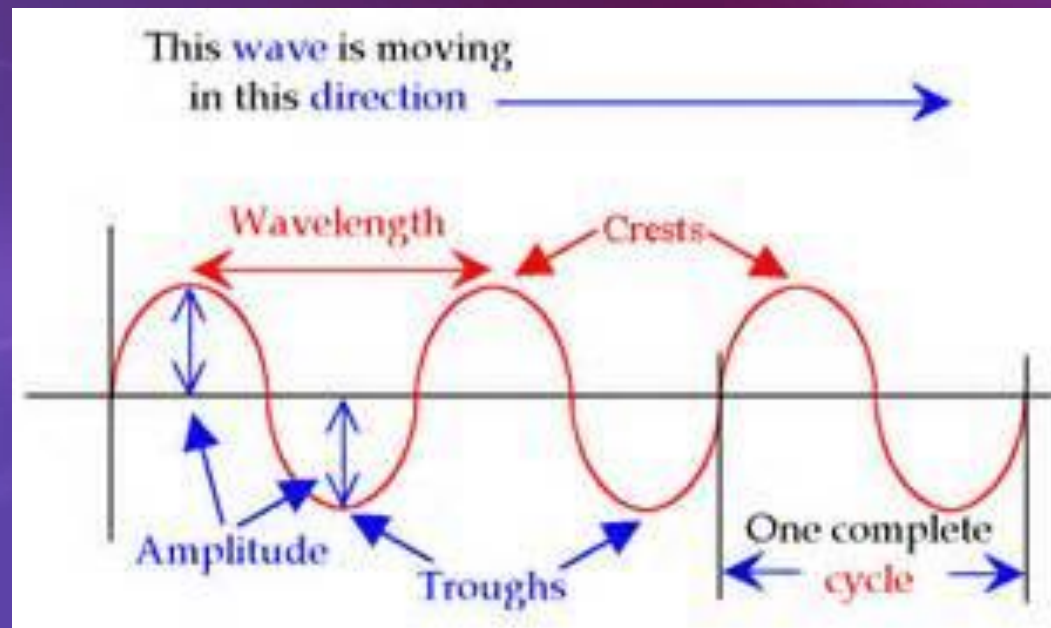


15.2 Properties of Waves

- The speed, wavelength, and frequency of a wave are related to one another by a mathematical formula:
- $\text{Speed} = \text{Wavelength} \times \text{Frequency}$

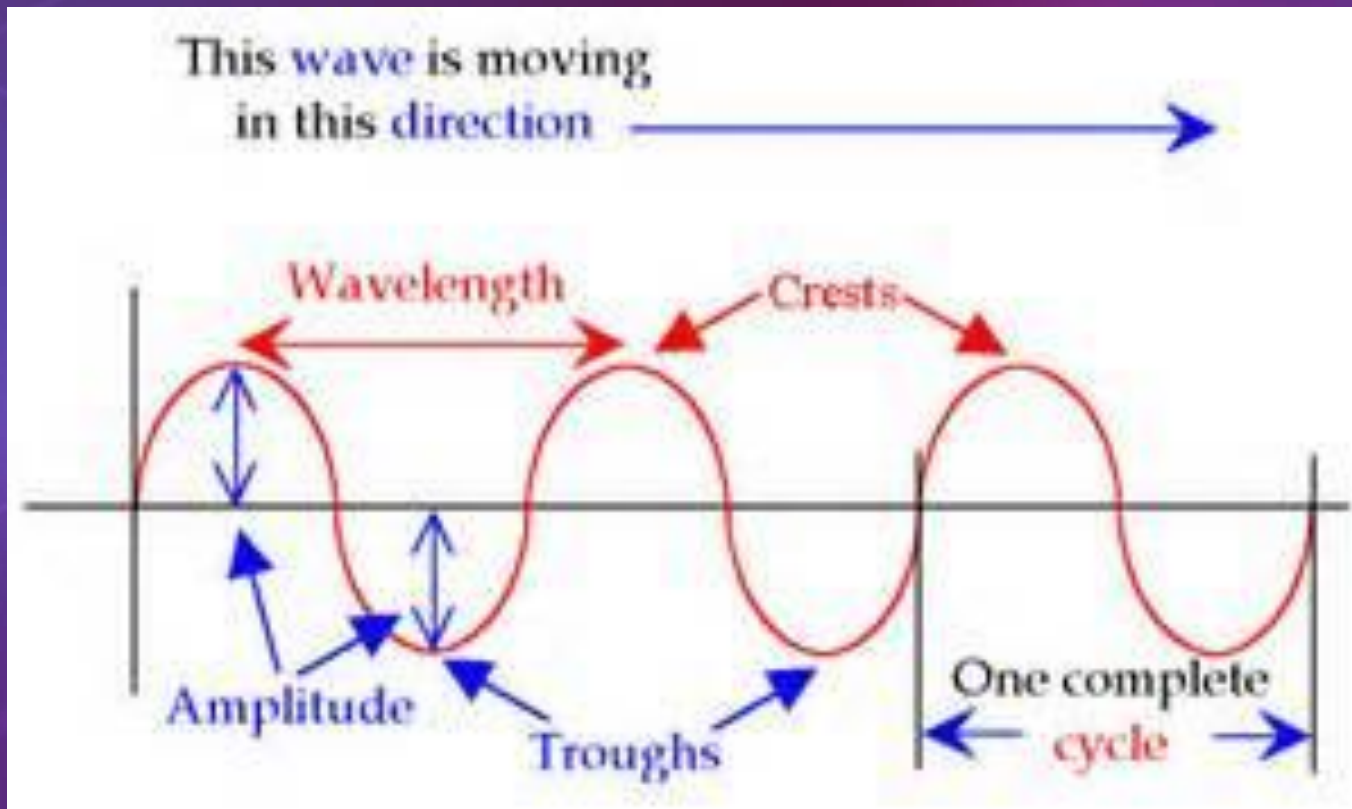
amplitude

- The maximum distance the particles of a medium move away from their rest positions as a wave passes through the medium.



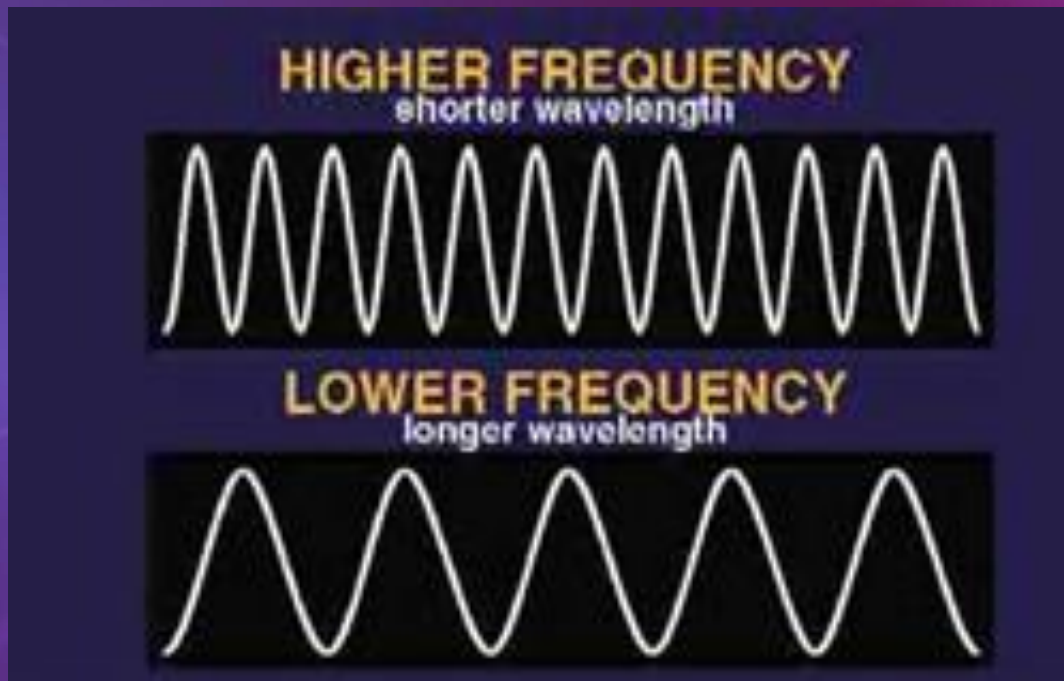
wavelength

- The distance between two corresponding parts of a wave.



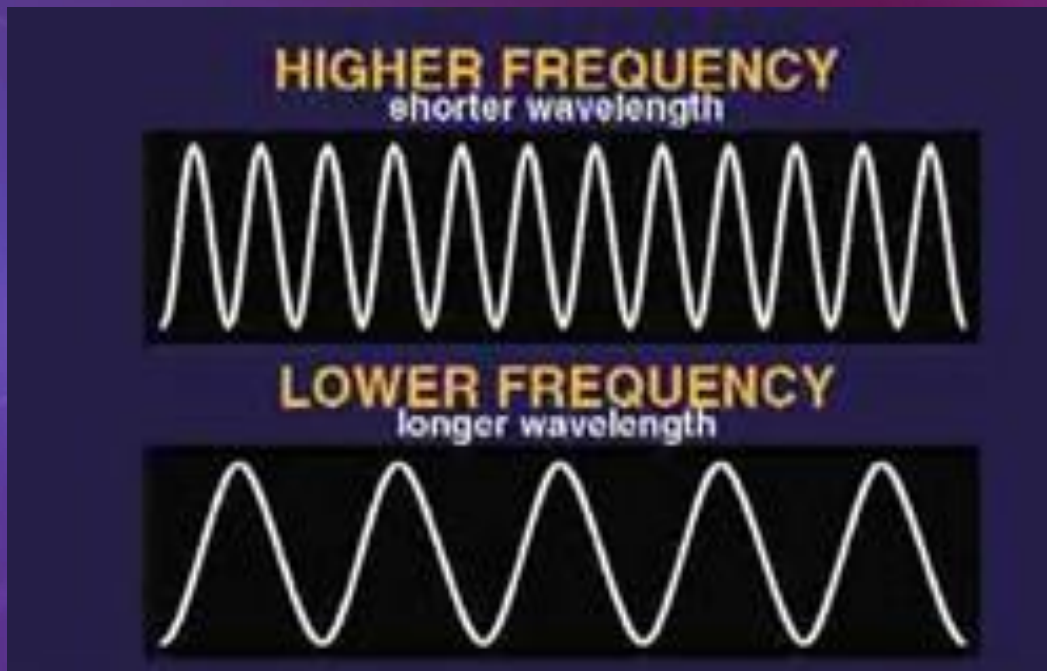
frequency

- The number of complete waves that pass a given point in a certain amount of time.



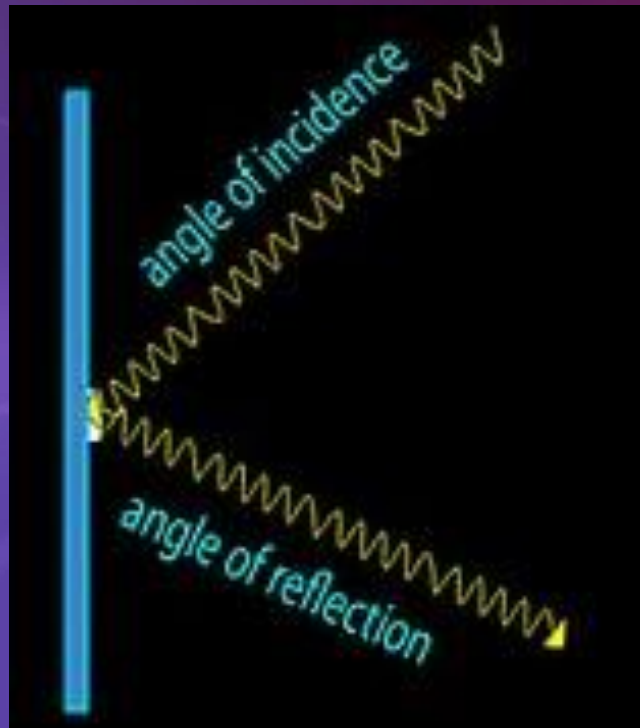
hertz (Hz)

- Unit of measurement of frequency
- $1 \text{ Hz} = 1 \text{ wave/second}$



15.3 Interactions of Waves

- When an object or a wave hits a surface through which it cannot pass, it bounces back.



15.3 Interactions of Waves

- When a wave enters a new medium at an angle, one side of the wave changes speed before the other side, causing the wave to bend.



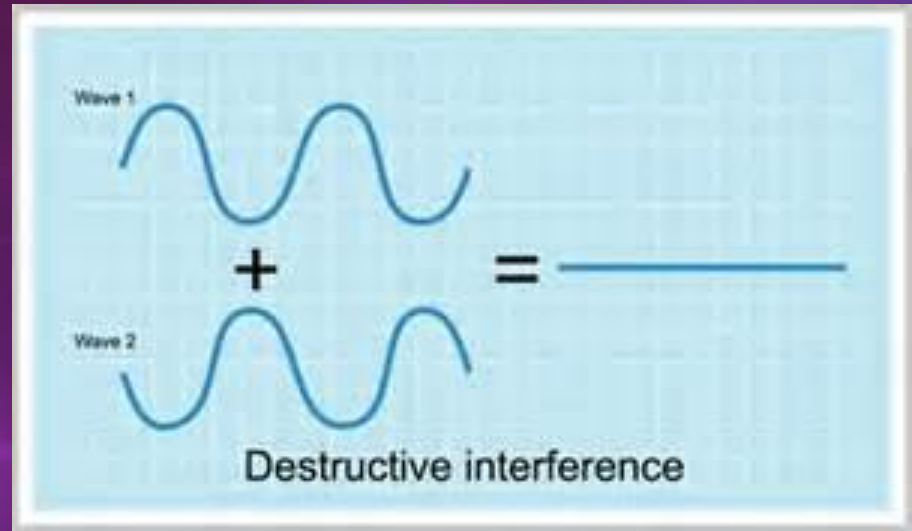
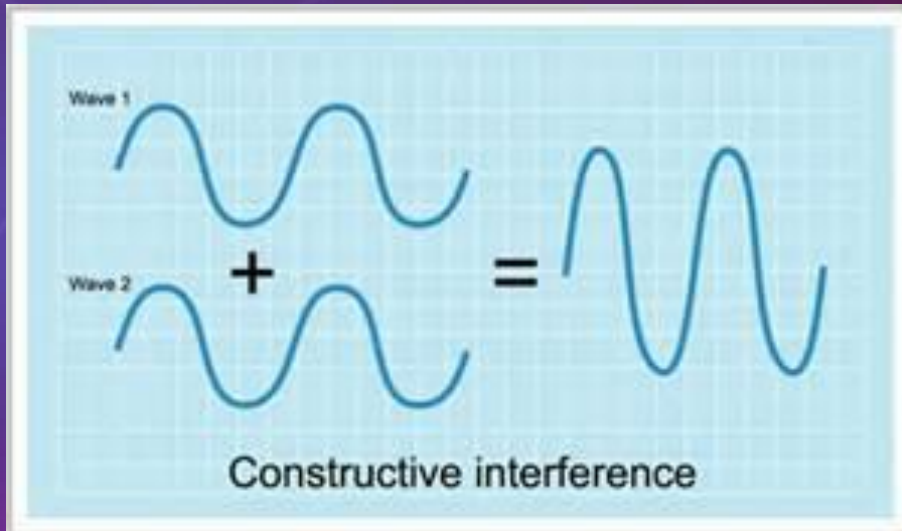
15.3 Interactions of Waves

- When a wave moves around a barrier or through an opening in a barrier, it bends and spreads out.



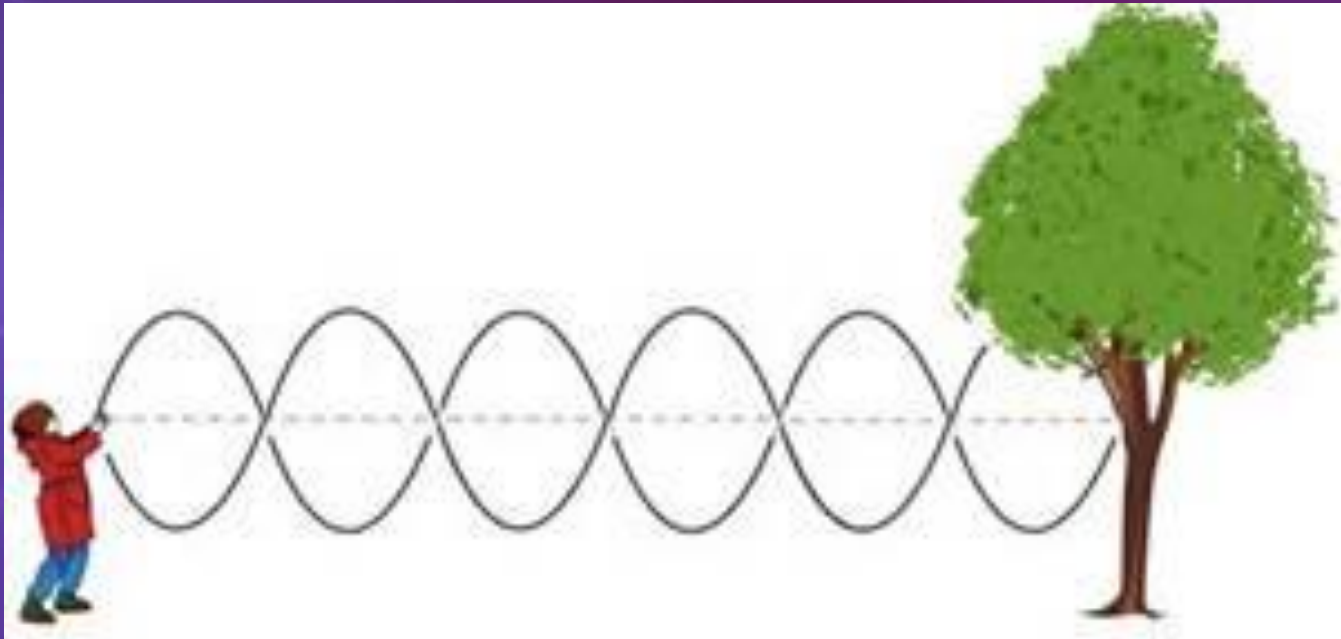
15.3 Interactions of Waves

- There are two types of interference: constructive and destructive



15.3 Interactions of Waves

- If the incoming wave and a reflected wave have just the right frequency, they produce a combined wave that appears to be standing still.



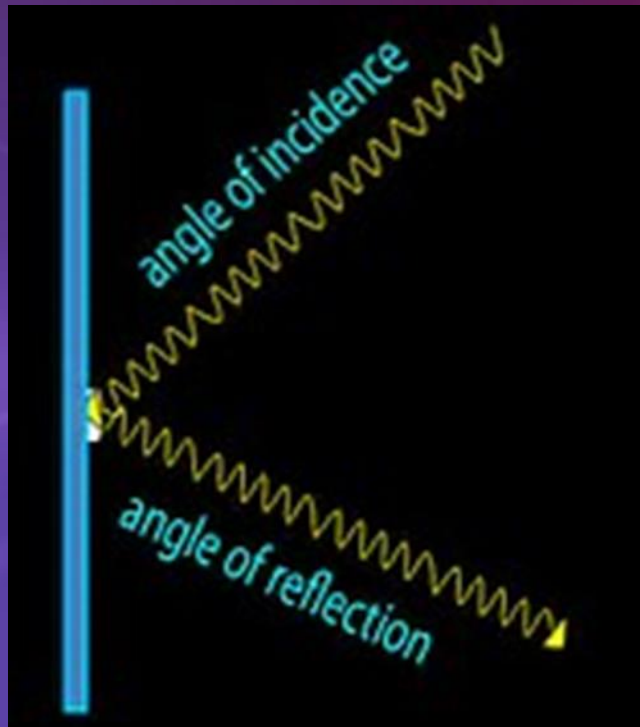
reflection

- The bouncing back of an object or a wave when it hits a surface through which it cannot pass.



law of reflection

- The rule that the angle of reflection equals the angle of incidence.



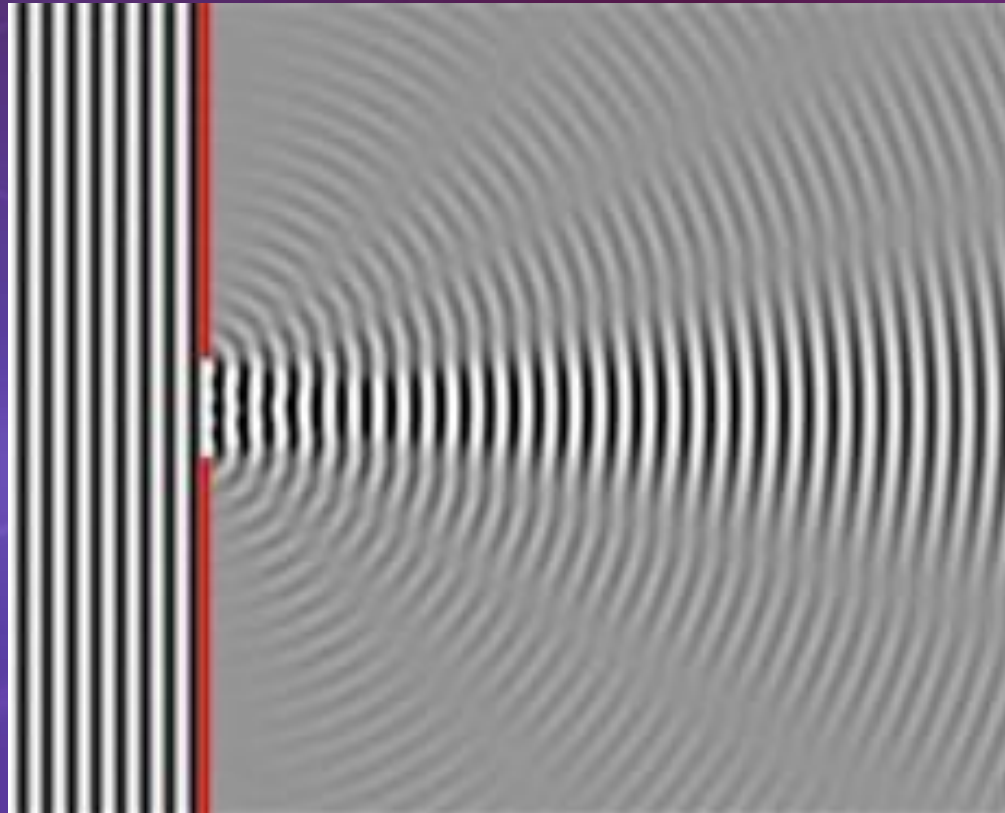
refraction

- The bending of waves as they enter a medium at an angle.



diffraction

- The bending of waves as they move around a barrier or pass through an opening



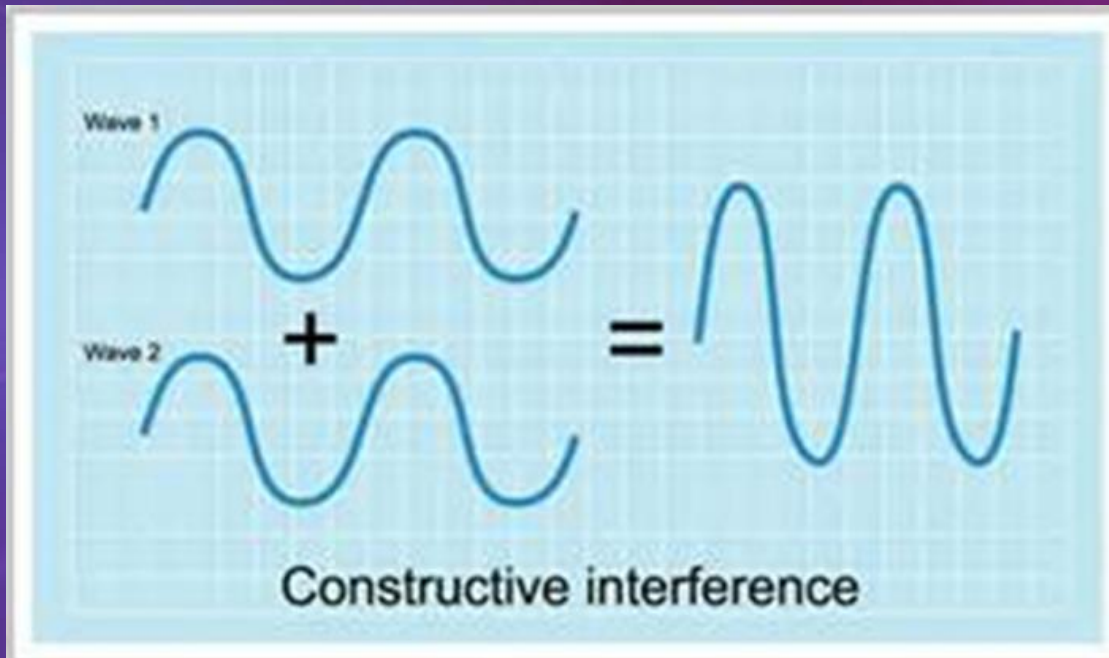
interference

- The interaction of waves that meet.



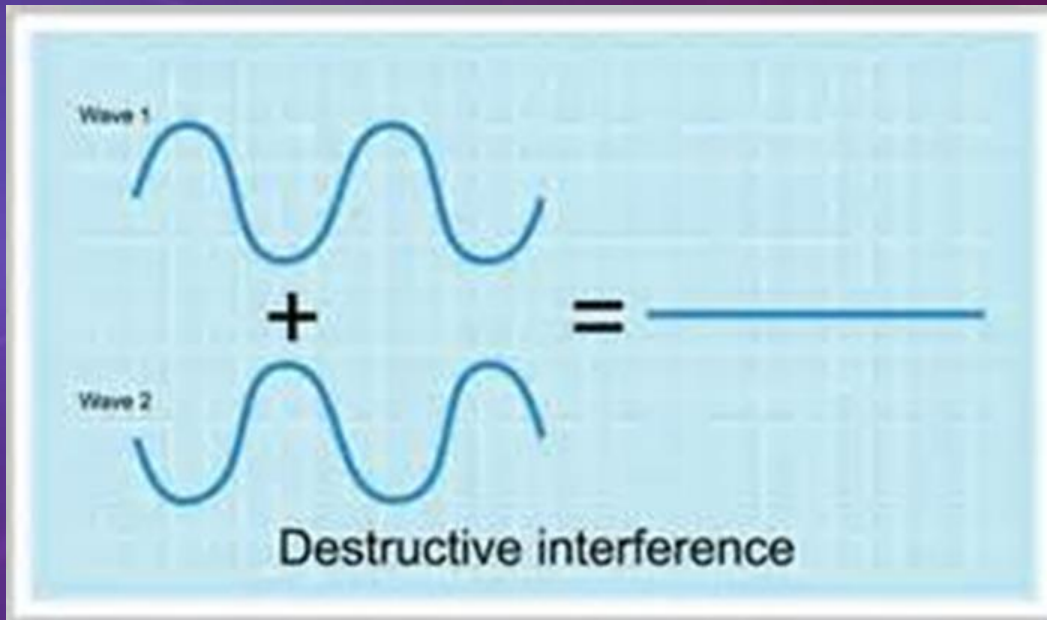
constructive interference

- The interference that occurs when waves combine to make a wave with a larger amplitude.



destructive interference

- The interference that occurs when two waves combine to make a wave with a smaller amplitude.

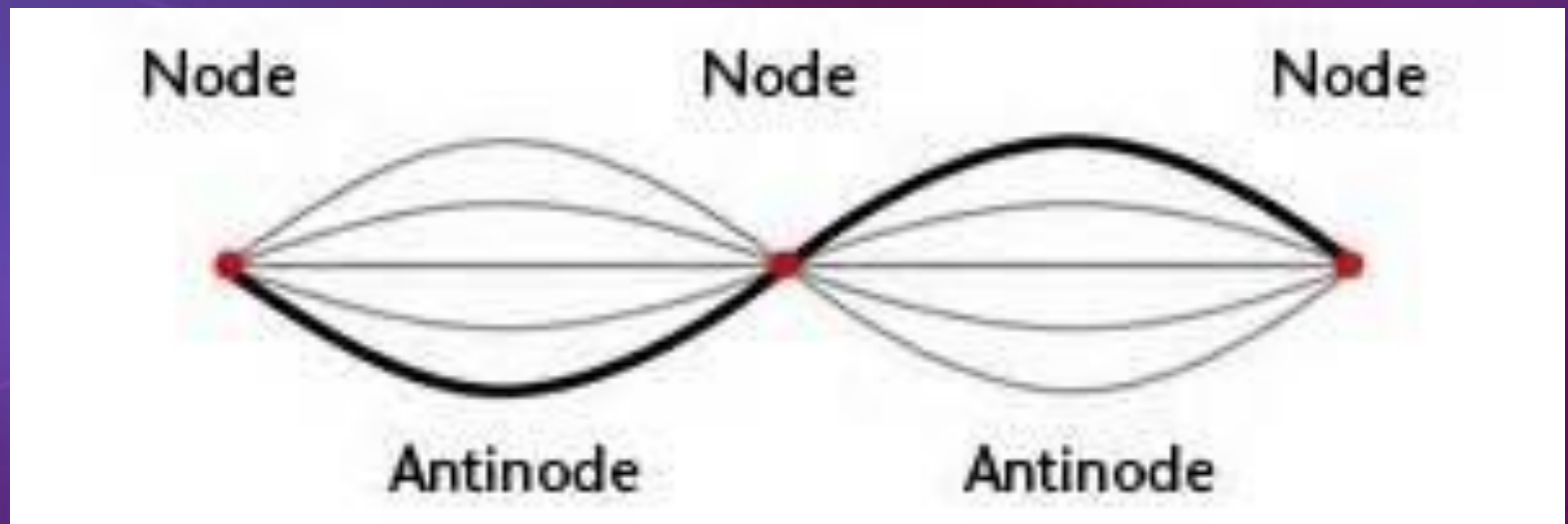


standing wave

- A wave that appears to stand in one place, even though it is really two waves interfering as they pass through each other.

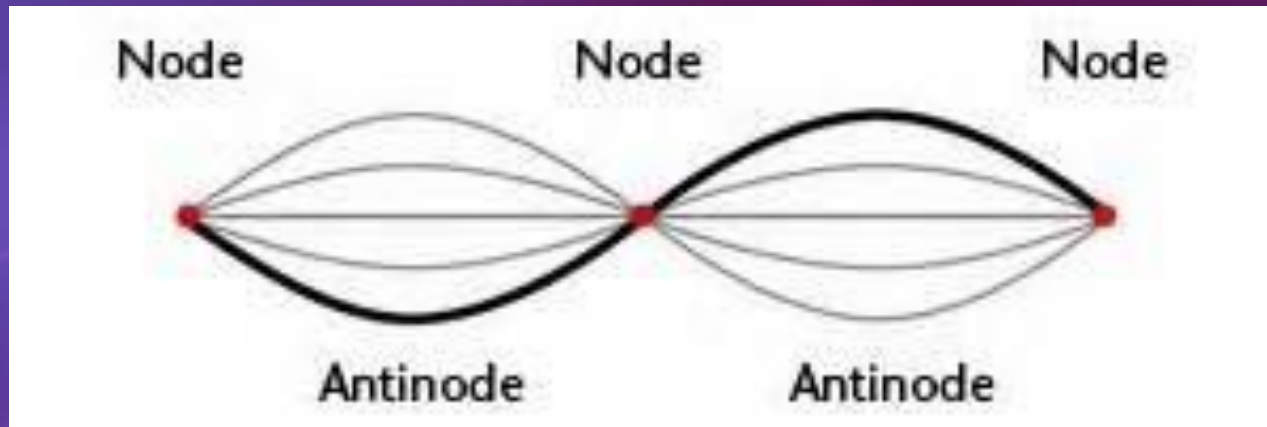
node

- A point of zero amplitude on a standing wave.



antinode

- A point of maximum amplitude on a standing wave.



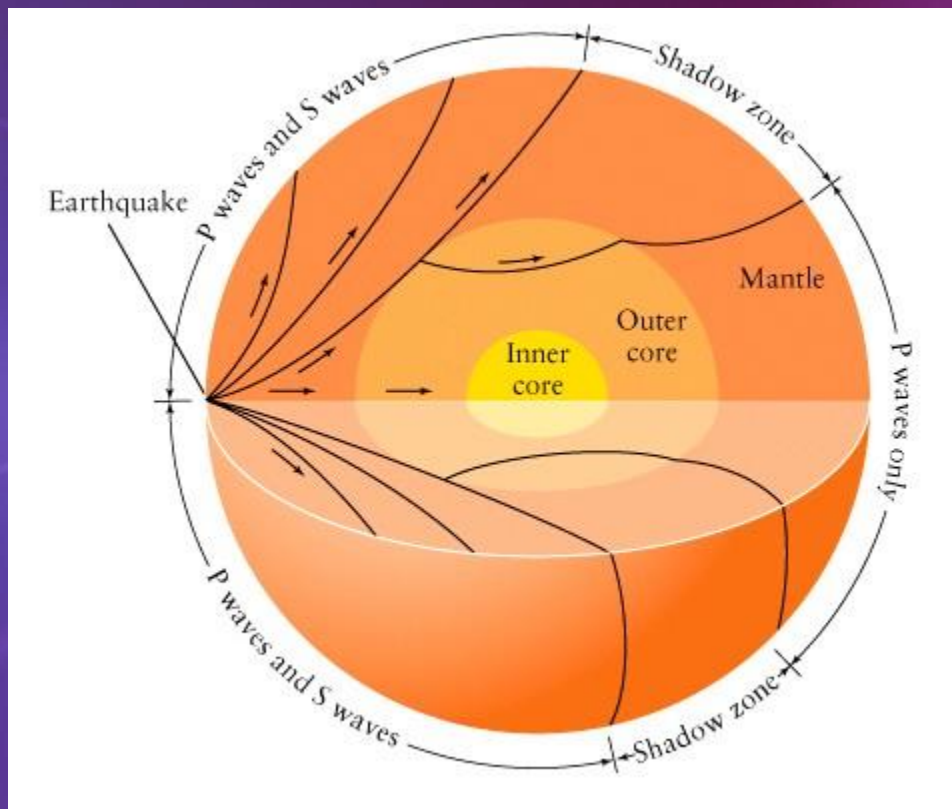
resonance

- The increase in the amplitude of a vibration that occurs when external vibrations match an object's natural frequency.



15.4 Seismic Waves

- Seismic waves include P waves, S waves, and surface waves.



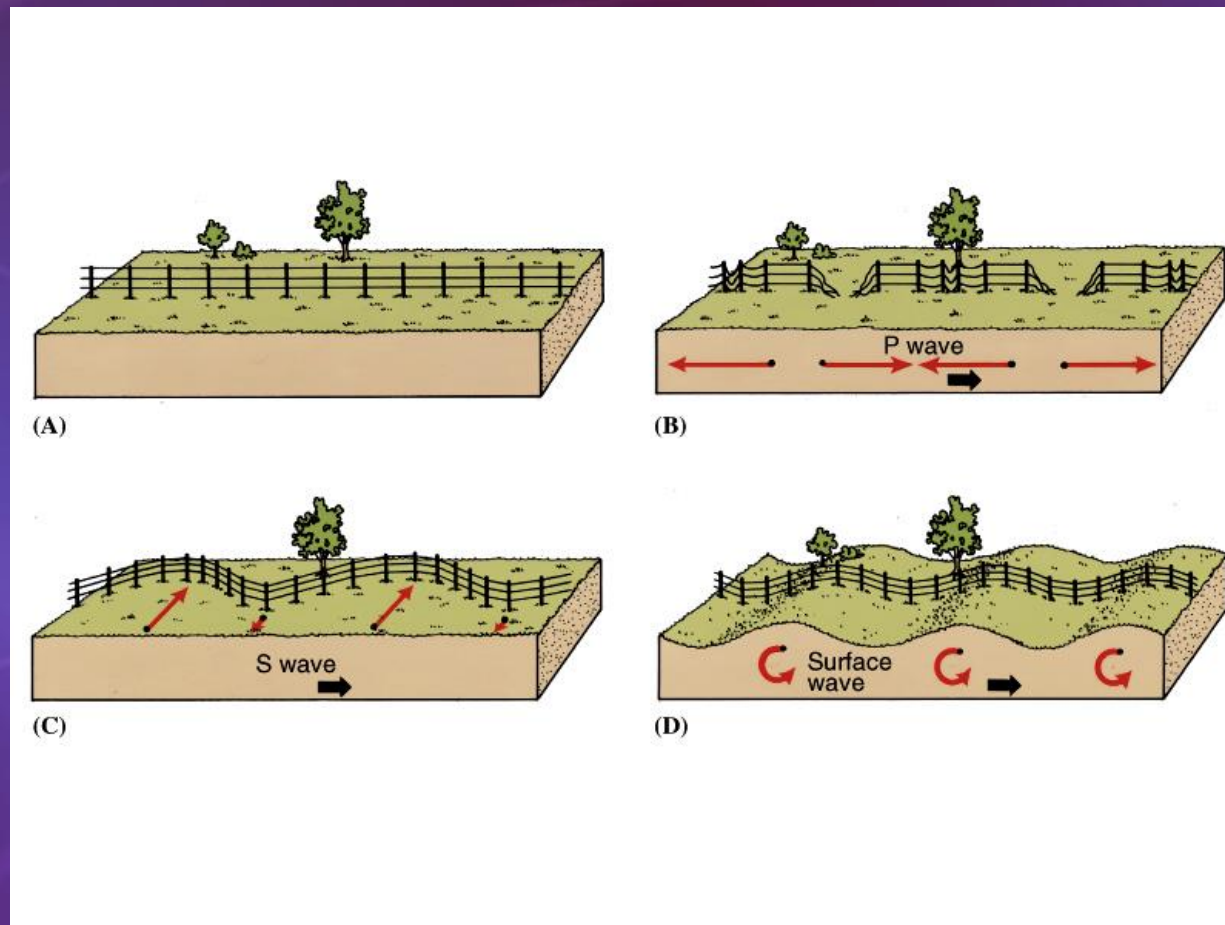
15.4 Seismic Waves

- A seismograph records the ground movements caused by seismic waves as they move through Earth.



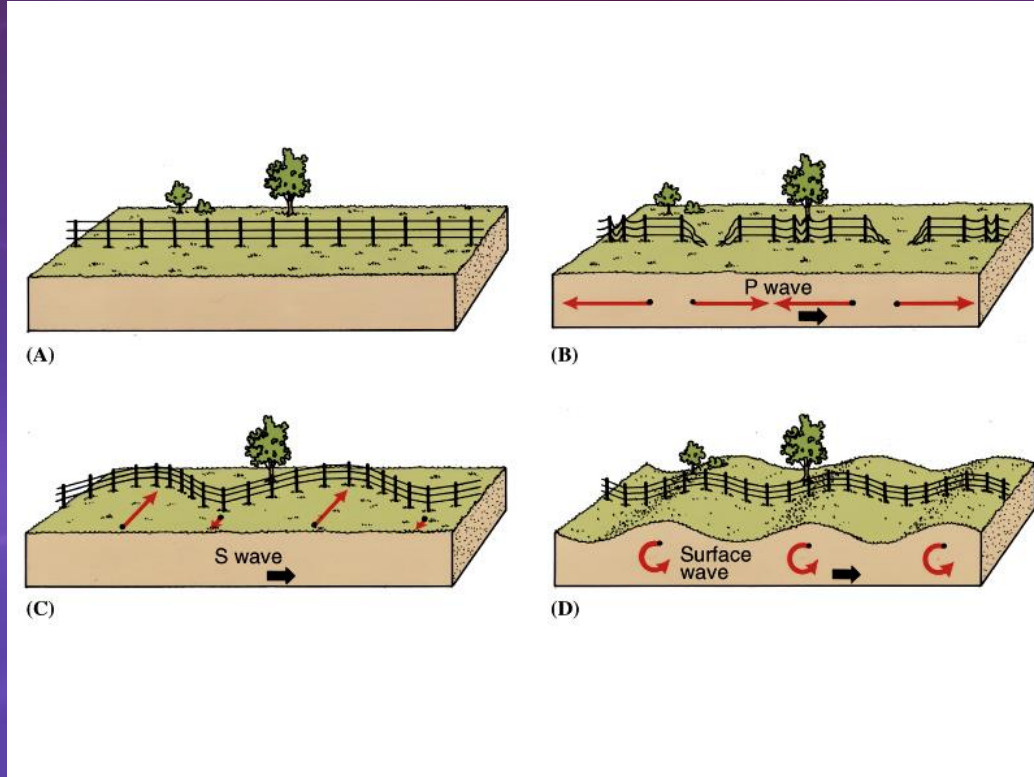
seismic wave

- A wave produced by an earthquake.



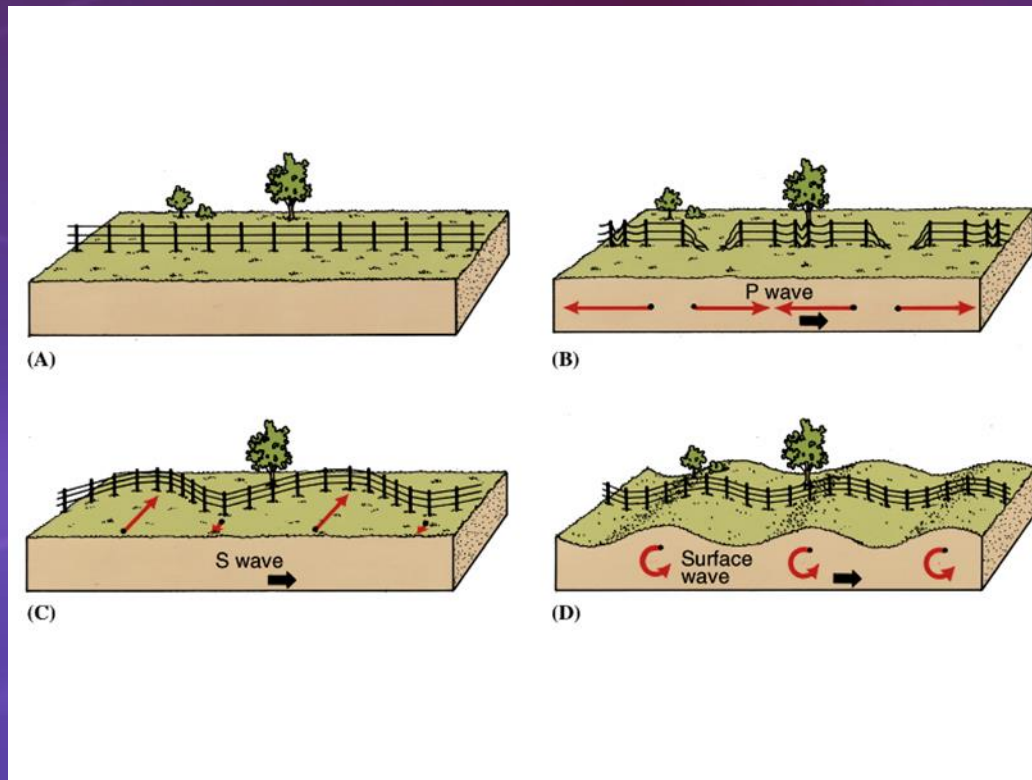
P wave

- A longitudinal seismic wave.



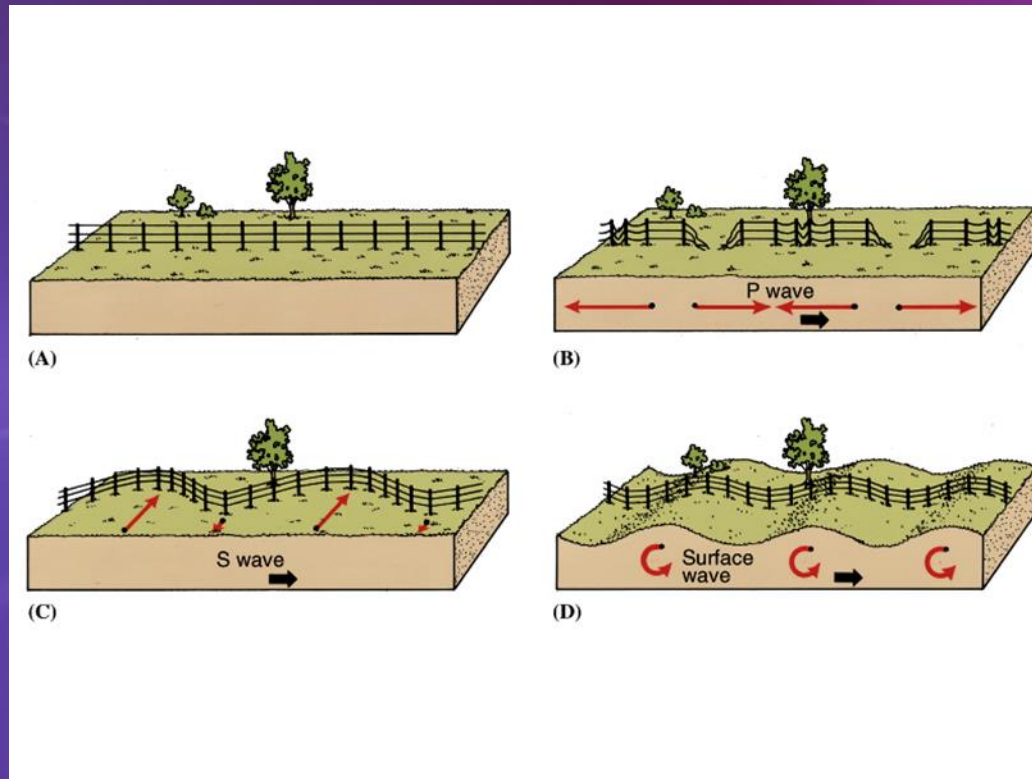
S wave

- A transverse seismic wave.



surface wave

- A combination of a longitudinal wave and a transverse wave that travels along the surface of a medium.



tsunami

- A huge surface wave on the ocean caused by an underwater earthquake.



seismograph

- An instrument used to detect and measure earthquake waves.

