

Waves II

Properties of Waves

Reflection – When a wave encounters the interface between two media, some or all of the wave may be reflected.

Phase is not changed if pulse on a rope strikes a less dense medium.

Phase is changed 180 degrees (inverted) if pulse of a rope strikes a more dense medium.

Law of Reflection: When a wave strikes an interface, the angle of incidence measured to the normal of the interface is equal to the angle of reflection.

Refraction: If a wave strikes an interface between two media where it has different speeds, the transmitted wave will be bent (i.e. refracted).

Snell's Law of Refraction:

Diffraction: When a wave encounters an obstacle, the wave front will bend around the obstacle (Diffract).

For a wave encountering an aperture, the amount of bending is small if the wavelength of the wave is much smaller than the aperture.

For a wave encountering an aperture, the amount of bending is large if the wavelength of the wave is approximately the same size or larger than the aperture.

Interference: When two waves run into each other the waves create a new wave which is the linear superposition (addition) of the two original waves.

If we have two waves traveling in the same direction with the same frequency and wavelength, this interference can cause either a larger wave (constructive interference) or a smaller wave (destructive interference). This is a uniquely wave phenomenon (tell-tale sign that you are dealing with waves).