

Waves 2

① ③

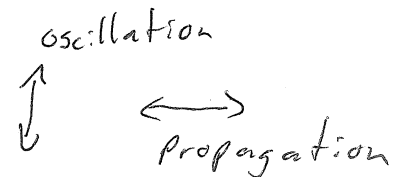
Types of Waves

Transverse Wave

- propagation and oscillation are perpendicular

Examples

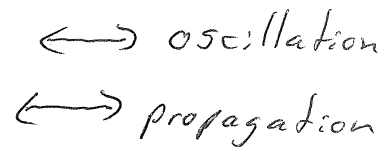
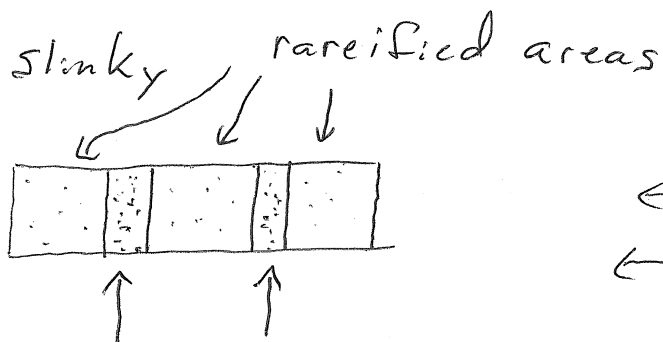
String waves



Longitudinal Wave

- propagation and oscillation are parallel

Examples



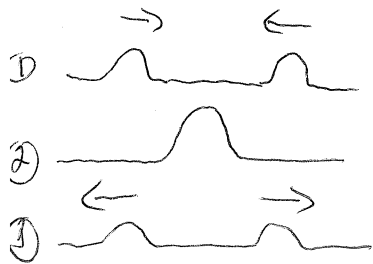
Compressed Areas

Wave Properties

Superposition

- Waves, like vector quantities, sum to yield a net wave.

Demo: Slinky



* In any given medium, only the net wave is observed.

Interference

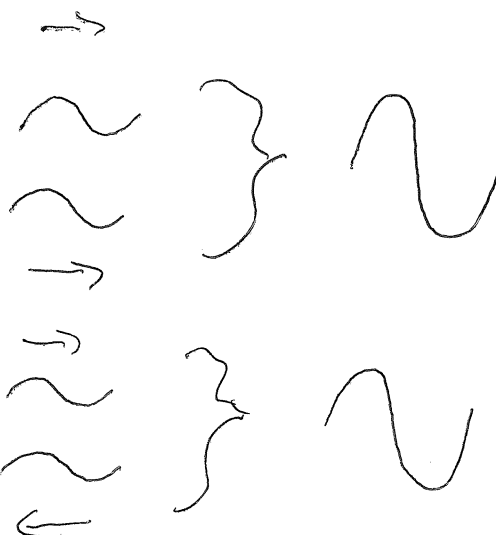
- Constructive Interference

+ occurs when waves are

Demo: Thin Film Interference



In phase



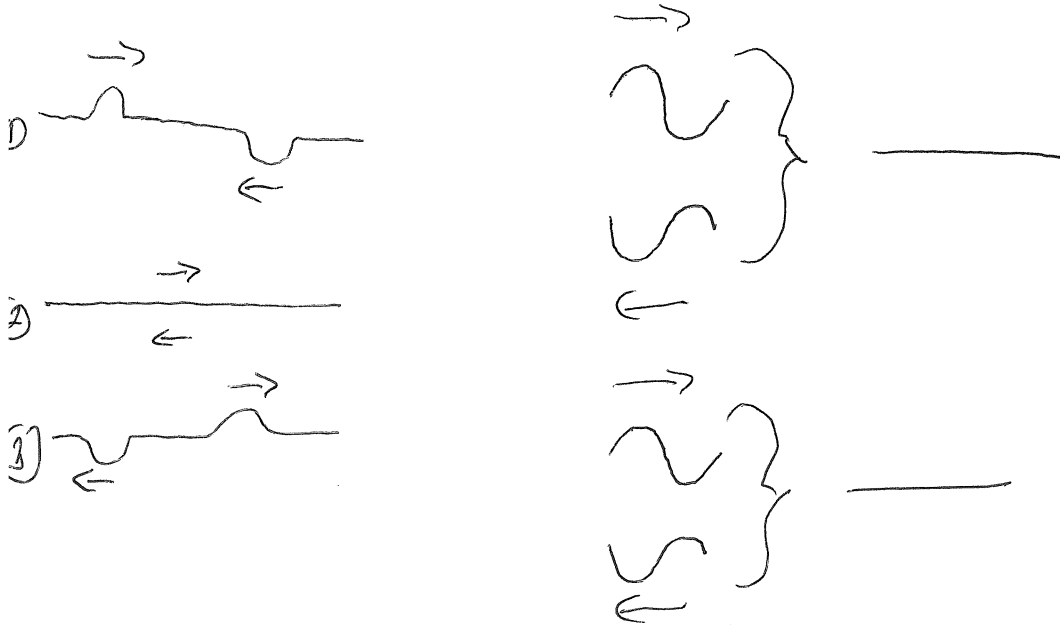
Demo: Slinky

See above

- Destructive Interference

+ occurs when waves are out of phase

Demo: Slinky



* Most cases involve a situation that exists between total constructive interference (no phase difference)

and

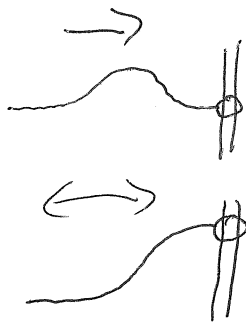
total destructive interference (180° or π rad phase difference)

Boundary Interactions

Reflection

- Portion of a wave that is redirected into a medium at a boundary.

Free-end Reflection



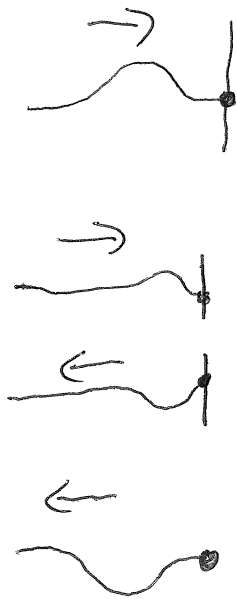
Wave pulse is reflected on the same side as it was incident.



* This is considered an in-phase reflection.

Also occurs at a boundary between a more dense medium and a less dense medium where the wave travels from the more dense to the less dense medium.

Fixed-End Reflection



Wave pulse is reflected on the opposite side as the wave was incident.

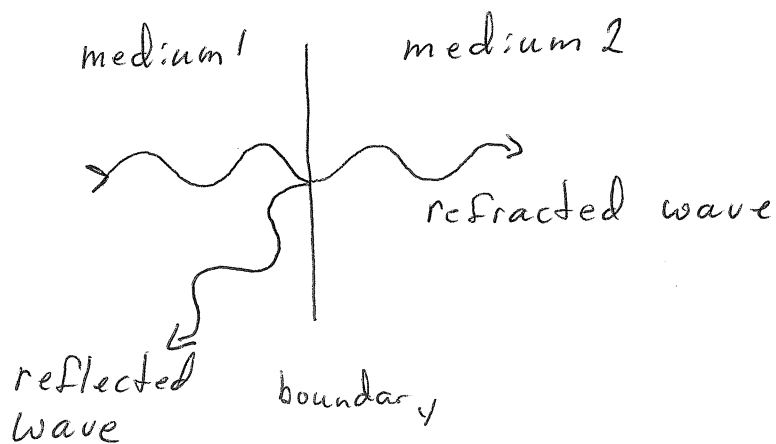
* This is considered an out-of-phase reflection.

180° or π radians

* Also occurs at a boundary between a less dense medium and more dense medium where the wave moves from less dense to more dense.

Refraction

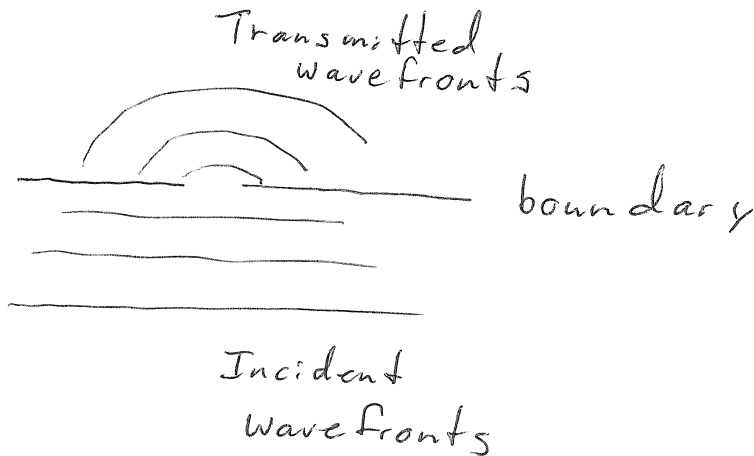
- Portion of a wave that is transmitted at a boundary.



* A refracted wave may change velocity and wavelength when it changes from medium 1 to medium 2, but frequency is always preserved.

Diffraction

- The bending or spreading of a wave as it passes through a small opening or around a sharp corner



* As the opening approaches the wavelength λ of the wave, diffraction is evident.