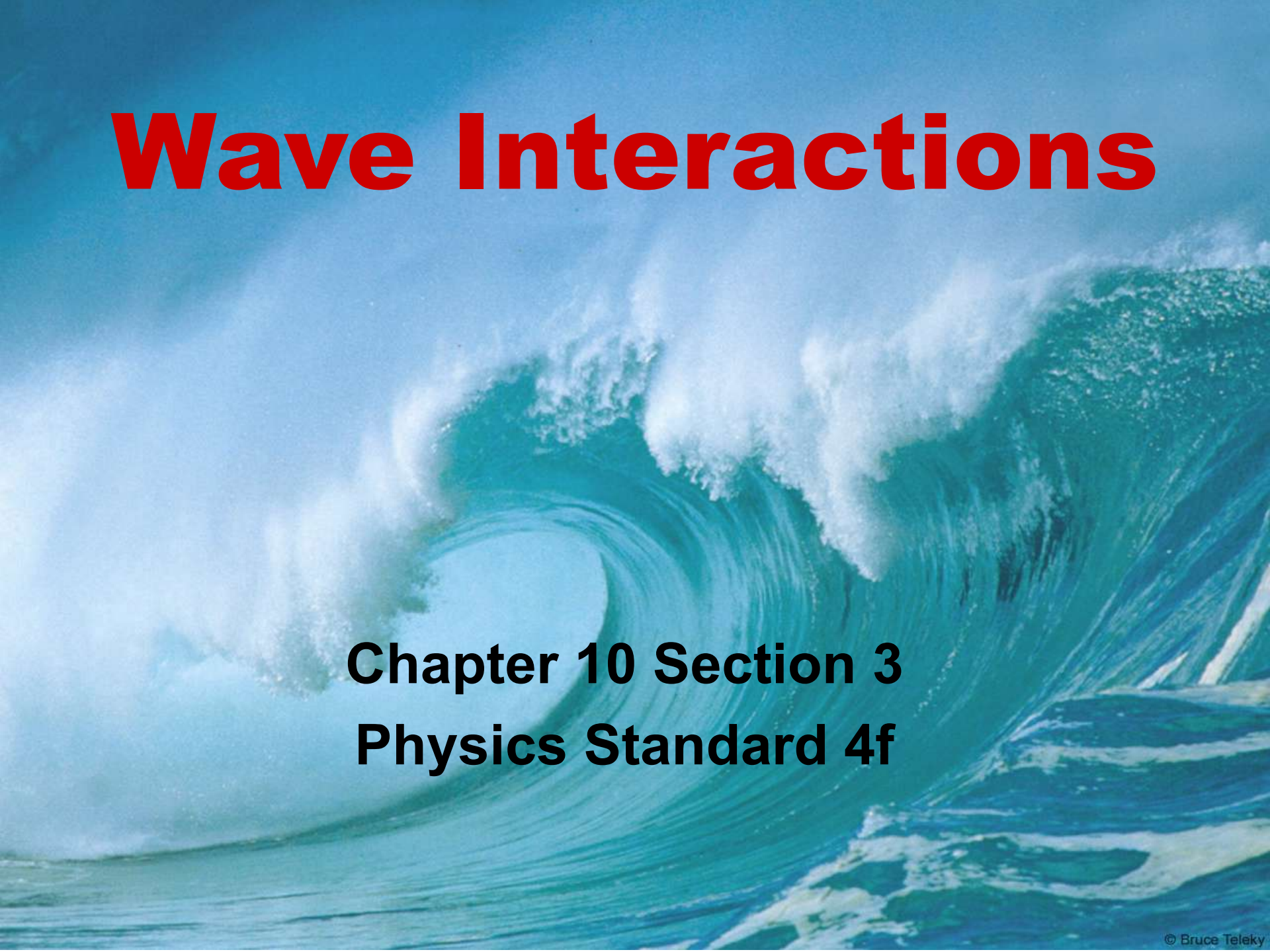
Wave Interactions

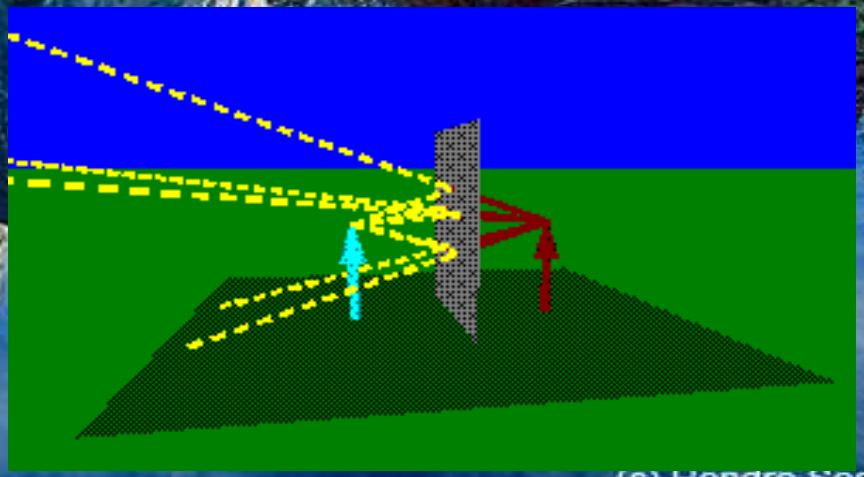


Chapter 10 Section 3

Physics Standard 4f

Reflection

- Bouncing back of a wave when it meets a surface.
- When wave medium are free (not attached), they will reflect the wave.
- If wave medium is attached, it will turn wave upside-down and then reflect.

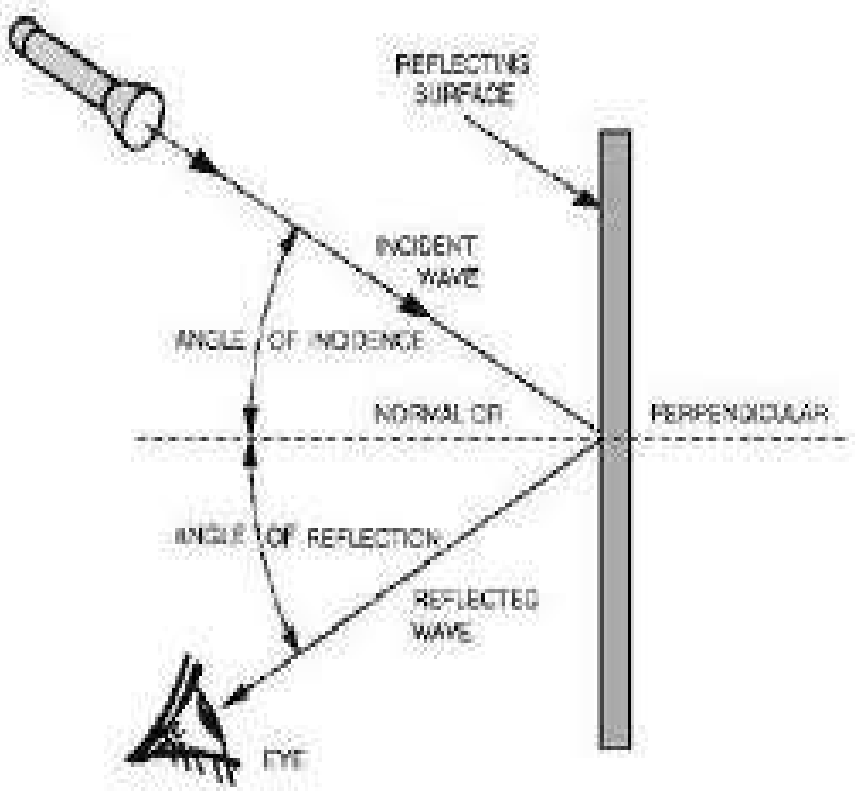


Reflection

- Reflection occurs when an object or a wave hits a surface through which it cannot pass, and it bounces back
  - Examples:
    - Shouting in an empty gym
    - Looking in a mirror
- The law of reflection: the angle of incidence equals the angle of reflection

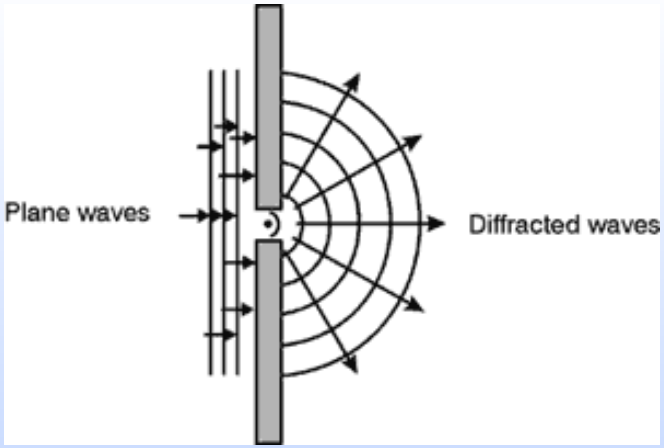
The Law of Reflection

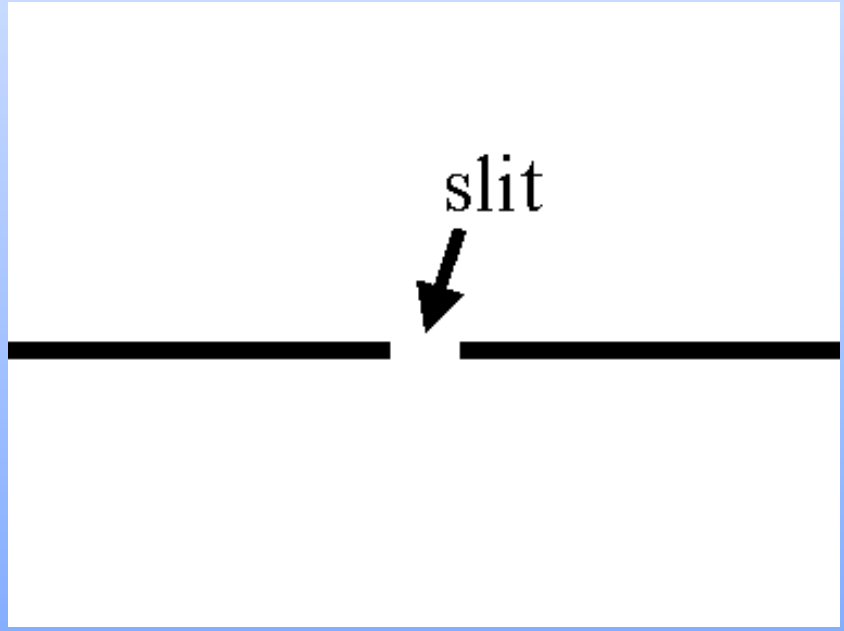
- The arrow labeled incident wave (incoming wave) represents the wave moving towards the surface at an angle
- The arrow labeled reflected wave represents the wave that bounces off the surface at an angle
- The dashed line labeled normal is drawn perpendicular to the surface at the point where the incoming wave strikes the surface
- The angle of incidence is the angle between the incoming wave and the normal
- The angle of reflection is the angle between the reflected wave and the normal
- Angle of reflection= Angle of incidence



Diffraction

- Bending of waves as they pass an object's edge or opening.
- Original wave bent

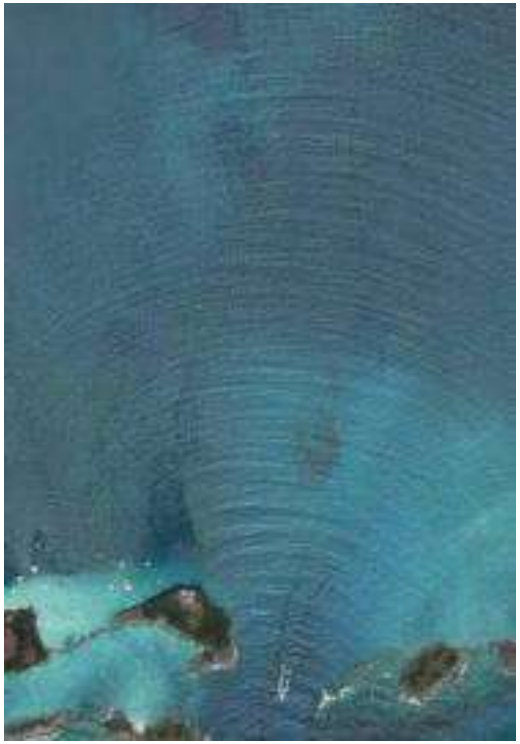




Diffraction

Diffraction

- Diffraction occurs when a wave bends around a barrier or passes through an opening in a barrier, it bends and spreads out



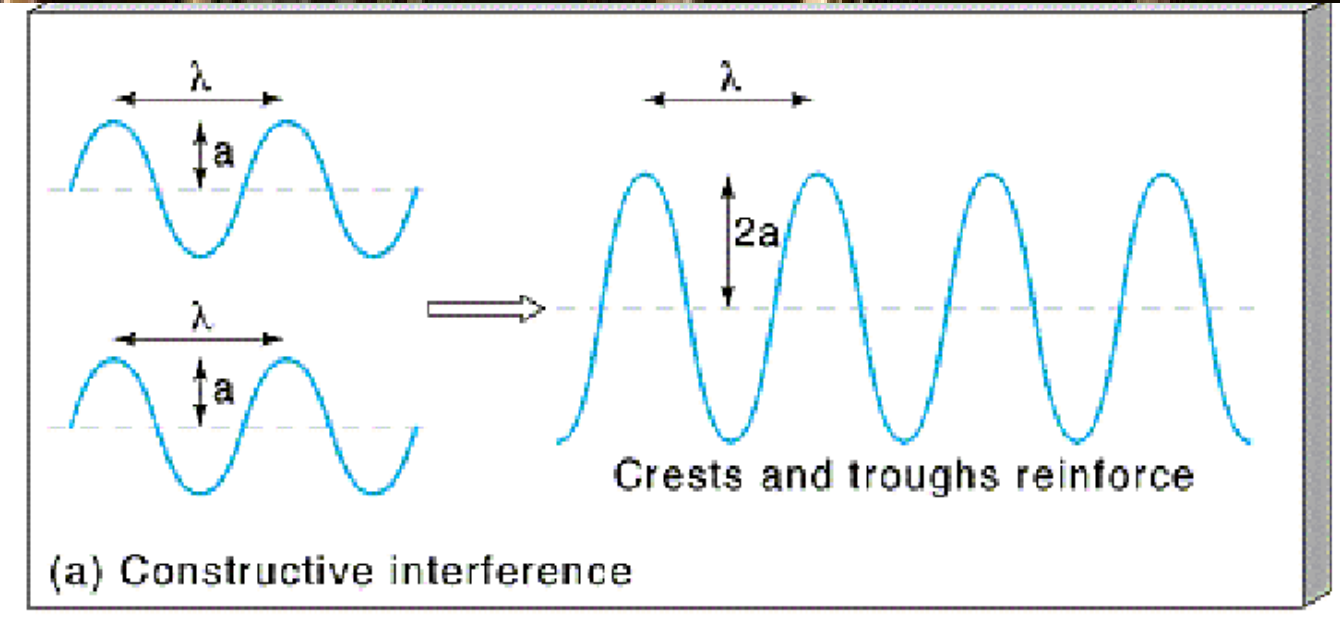
Refraction

- Bending of waves as they pass from one medium to another.
- Ex: light traveling through water then air.
- Light bent when enters water.

Spoon appears to be cut

Interference

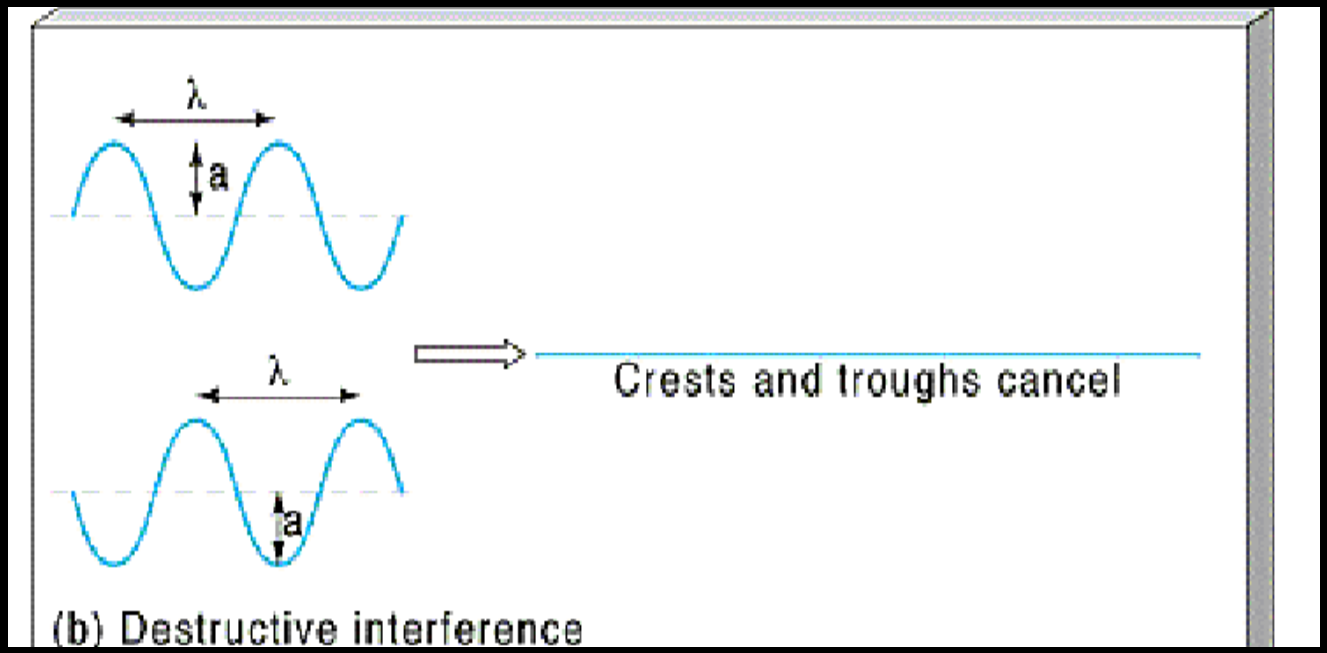
- Combo of 2 or more waves that exist in the same place at the same time.
  - **Constructive interference**: 2 waves combine so that resulting wave is bigger than the orig. waves



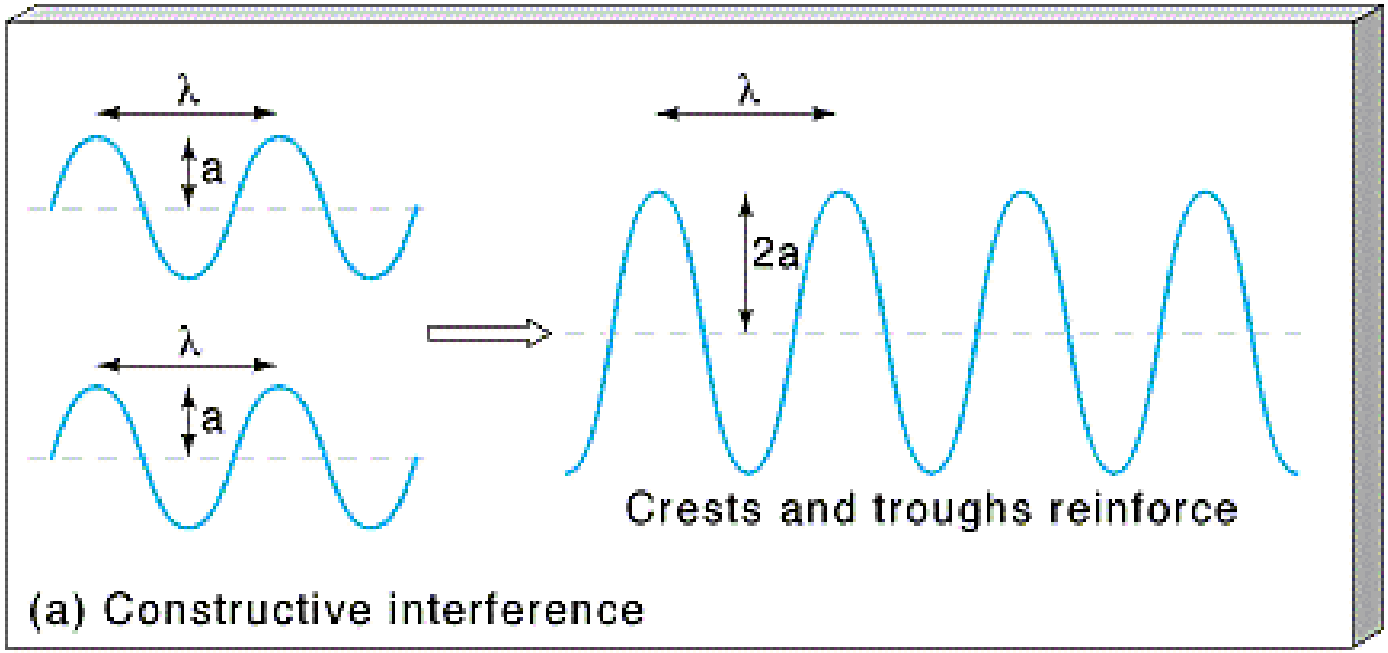
Waves travel at same frequency

Destructive Interference

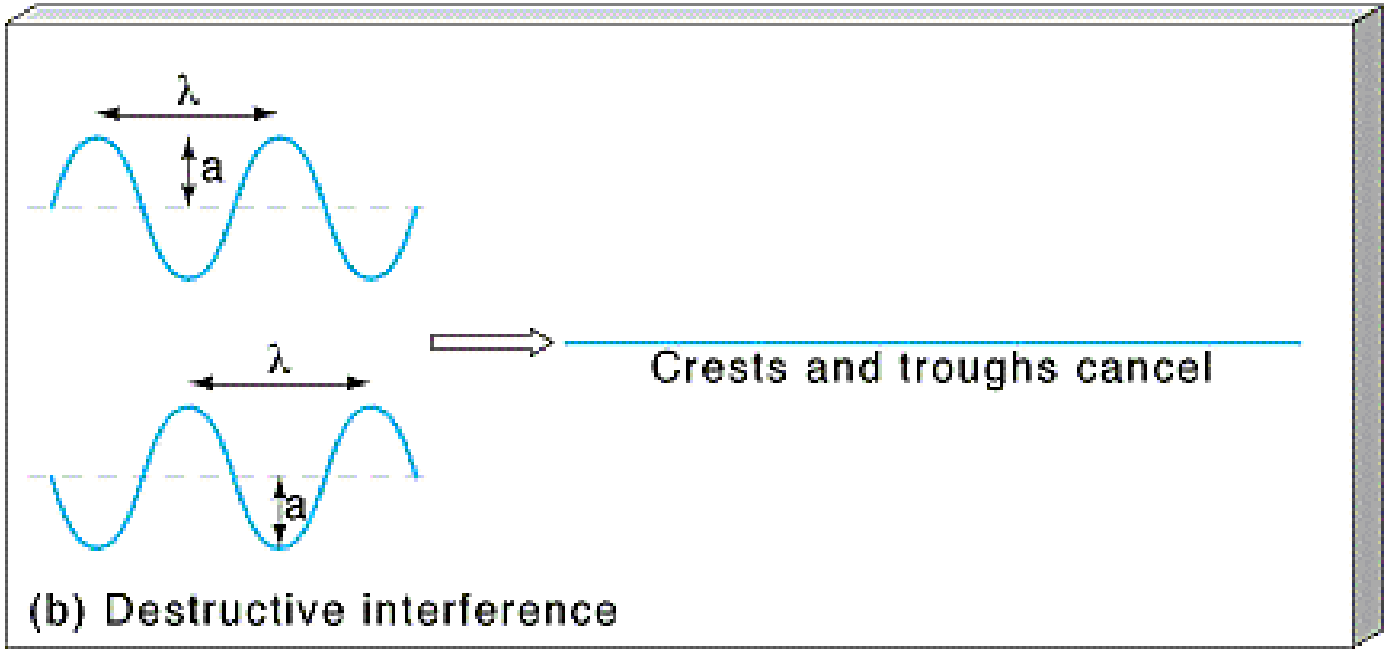
- 2 waves combine so that resulting wave is smaller than the largest of orig. waves.



Waves travel at diff. frequencies



(a) Constructive interference



(b) Destructive interference

Doppler Effect

- Observed change in frequency of a wave when the source of the wave is moving.
- Occurs in light and sound waves.