

# Wave Interaction

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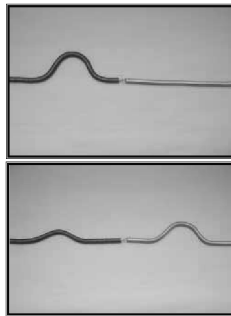
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## Wave Boundaries

- **Boundary**
  - Change in medium
  - Part of the wave is transmitted, part is reflected.
- **Incident Wave**
  - Incoming wave that strikes the boundary
- **Reflected Wave**
  - Wave returning to the initial medium
- **Transmitted Wave**
  - Wave entering new medium



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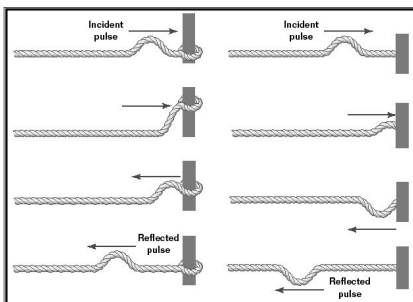
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## Reflection

- **Example**



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## Changing Mediums and Reflection

- The amount transmitted and reflected depends on the medium.
- A large difference in then medium results in a large amount of the wave being reflected.

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## Density of the Medium and Reflection

- When a wave passes from a less dense to a more dense medium, the reflected wave is inverted. (like fixed end reflection)
- When a wave passes from a more dense to a less medium, the reflected wave remains upright. (like open end reflection)

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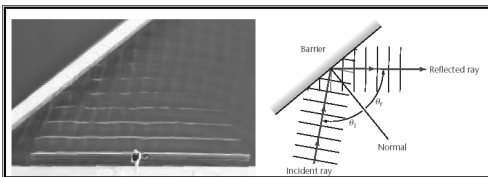
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## Reflection in Two Dimensions

- Angle of Incidence = Angle of Reflection



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## Interference

- Interference, also called superposition, occurs when two or more waves pass each other in the same medium.
- How it works
  - the displacement of the medium caused by two or more waves is the sum of the displacements of the individual waves

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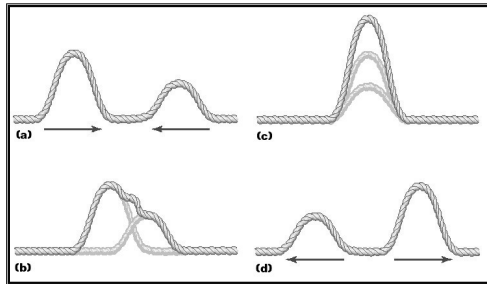
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## Constructive Interference

- Example



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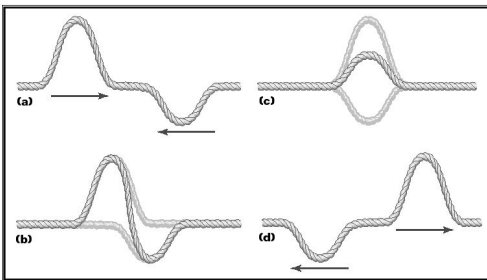
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## Destructive Interference

- Example



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## Standing Wave

- A wave pattern that results when two wave of the same frequency, wavelength, and amplitude travel in opposite direction and interfere



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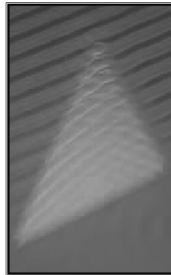
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## Refraction

- Change in direction of waves at a media boundary
- The speed of the wave changes as it enters the new medium, causing the change in direction.



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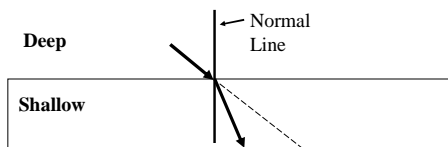
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## Refraction (cont.)

- As a water wave travels from deeper water to shallow water, the wave bends towards the normal.



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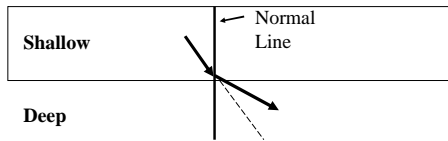
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## Refraction (cont.)

- As a water wave travels from shallow water to deep water, the wave bends away from the normal.



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## Refraction (cont.)

- As the velocity of a wave decreases in a new medium, the wavelength of the wave decreases.
- The frequency remains the same, satisfying the wave velocity equation

$$v = \lambda f$$

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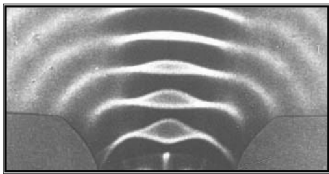
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## Diffraction

- Spreading of waves around the edge of a barrier



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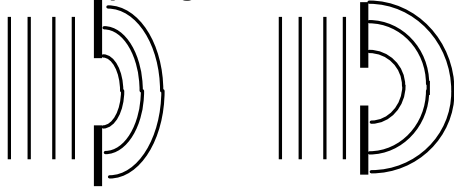
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## Diffraction (cont.)

- The amount of diffraction depends on the relative size of the wavelength and the opening.



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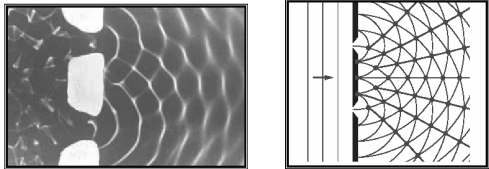
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## Diffraction

- Diffraction from two openings in a barrier produces interference



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**Return to Honors Physics**  
**Notes**

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