The Nature of a Wave
Lesson Notes

Learning Outcomes
- What is a wave?
- How is wave motion different than other types of motion?

What is a Wave?


- A wave is a repeated and periodic disturbance of a medium.
- The source of all waves is a vibrating object.
- The vibrating object introduces a disturbance into the medium that travels outward from the source.
- Sine waves have a **crest** (high) and a **trough** (low).

Waves are Everywhere?
Where do you see waves in your world? List as many as you can think of.

Particles Vibrate About Fixed Positions
You must distinguish between the what the particles do and what the pattern does.

Individual **particles** of the medium vibrate about a fixed position, ...

… while a visible **pattern** moves from one location to another.

A vibration = a wiggler in time

A wave = a wiggle in time extended through space.

How Do Mechanical Waves Move?
- Mechanical waves propagate through a medium by means of **particle-to-particle interaction**.
- For a Slinky wave: coil 1 pulls on coil 2; coil 2 pulls on coil 3; coil 3 pulls on coil 4; … and so forth.
- **NOTE**: The particles of the medium do NOT move through the medium; waves propagate when a particle interacts with its neighboring particle.

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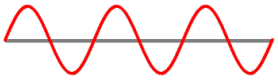
Waves are Energy-Transport Phenomenon

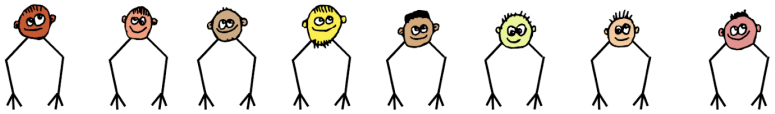


Two means of moving energy from one location to another:

1. Object motion (e.g., throw a baseball)
2. Wave motion

Wave motion: energy enters the medium at the source and moves through the medium by particle-to-particle interaction.

Waves transport energy without transporting physical material.



Explain what's wrong with Richard:

Review:

A wave is …

- A wiggle in time that extends across space
- A periodic and repeated disturbance of the medium
    - … in which particles vibrate about a fixed position,
    - … transporting energy from one location to another
    - … by means of particle-to-particle interaction.