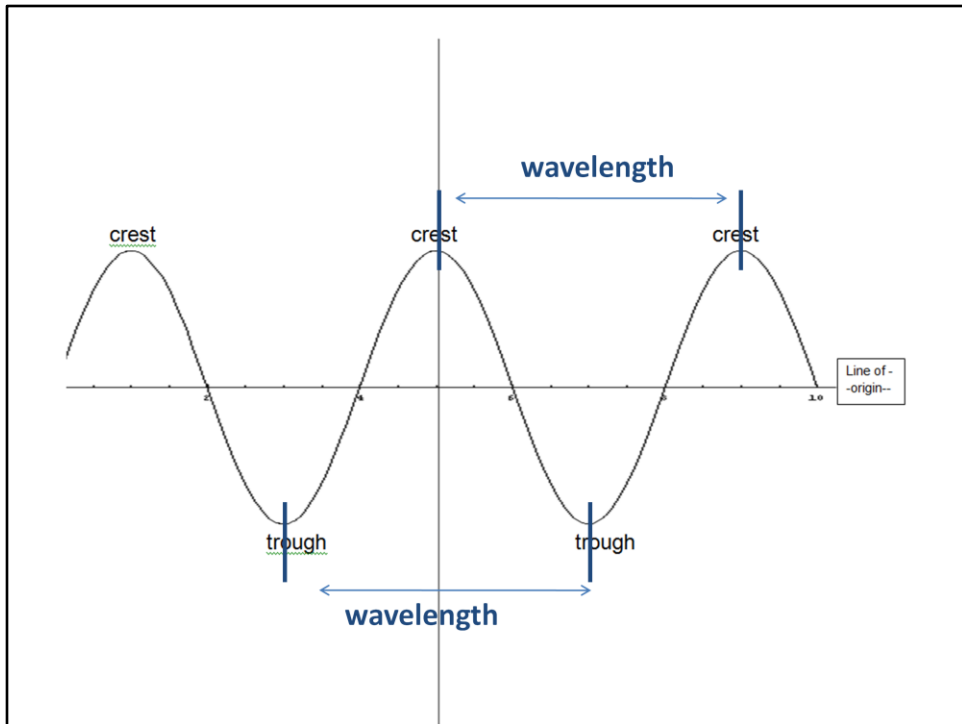
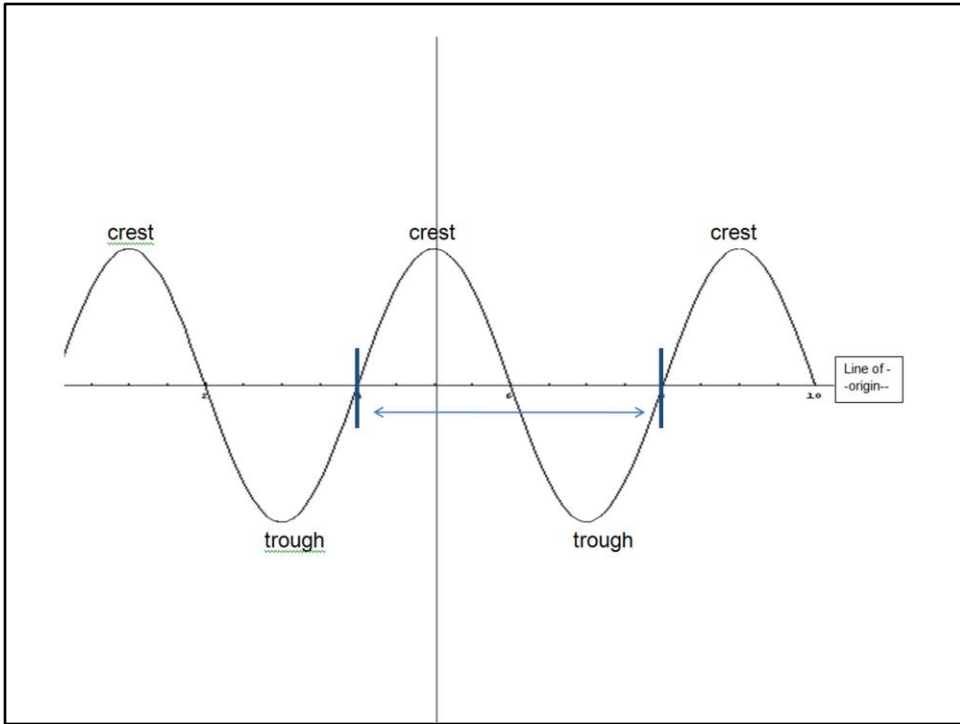


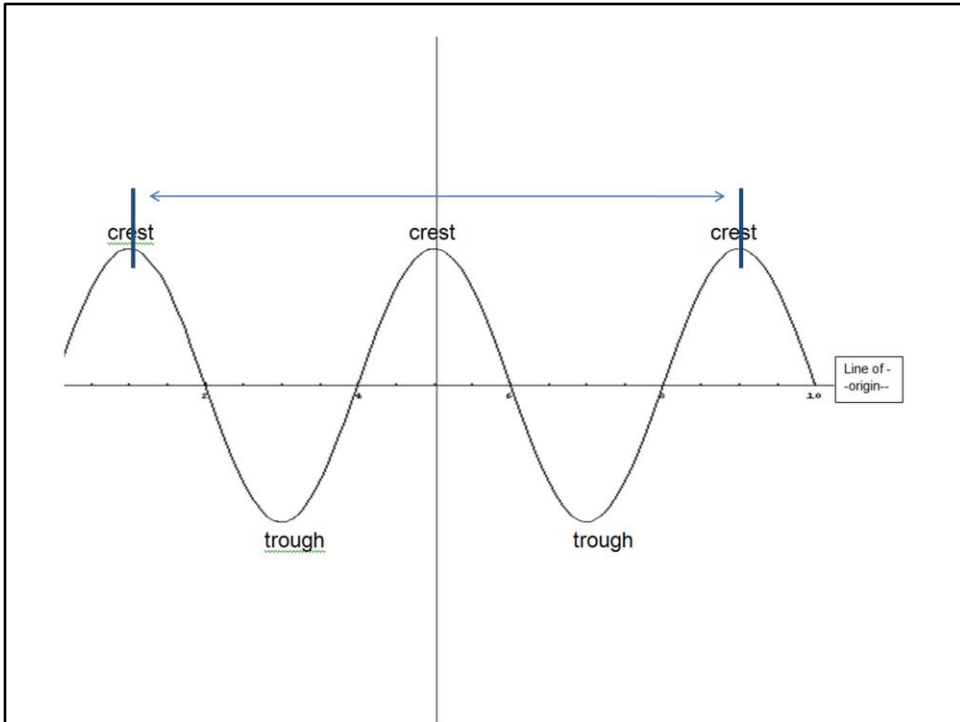
# Partner activity



Define a wavelength as the length between adjacent crests. Show both the first two wavelengths on the slide.



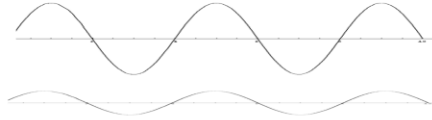
Ask the class if this is also a wavelength? It is.



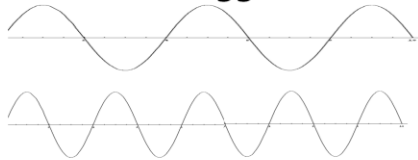
Ask the class if this is a wavelength. It is actually 2 wavelengths.

# What is

- Amplitude?
  - How high/low the crests/troughs are.



- Frequency?
  - Rate of the wiggle



Define amplitude then show the 1<sup>st</sup> wave. Ask students to describe what the same wave would look like with a smaller amplitude. If they've done the "Wave Basics" homework, they should be able to do this.

Next define frequency. Then show the wave and ask students what it would look like with a smaller frequency.

# Waves travel

Do the wave

- **Did the wave make it across the room?**
- **Did the people who started it move across the room?**



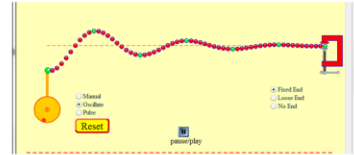
- **People move up and down as the wave's energy goes past.**

**Waves are energy**

Have the class do the wave. Then show the animation and talk about wave travel. How the energy moves across the room but the people only move up and down. Describe the people as the “medium” that the wave moves through/on.

# Types of Waves

## Transverse Waves



## Longitudinal Waves

[Transverse, Longitudinal, and Periodic Waves](#)

The link at the bottom is a site that has very nice animations. However, it requires Apple Quicktime to run.

## Source, Receiver, Medium

- People Wave
- Slinky
- Wave on a string
- Water -Wave Interference Sim
- Sound

Ask what the source, receiver and medium is for each of these types of waves. You can show the PhET Interactive Simulations “Wave Interference” simulation as a visual of water waves if desired.



## Source

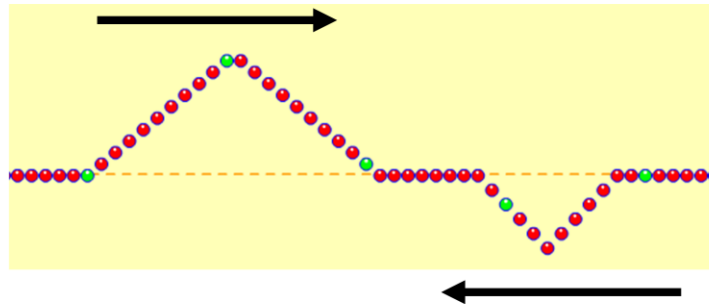
- [http://www.iris.edu/hq/programs/education\\_and\\_outreach/videos#H](http://www.iris.edu/hq/programs/education_and_outreach/videos#H)

I used this lesson to introduce earthquakes so showed video H on this page. Epicenters and focus. We talk about the source of the earthquake.

How do waves add?

Use the PhET Wave on a String simulation: [Phet.colorado.edu](https://phet.colorado.edu) and asked how the waves add? Example on next slide.

Sketch what you think the pattern will look like



After students draw their predictions, ask for them to share with the class. Then show the results on the simulation.

To demonstrate: I used the Pulse feature with Zero damping. First I set the wave characteristics, then pulsed and paused quickly. Then I reset the characteristics and sent another pulse. Quickly, I paused again and used the Step feature for slow motion. You can cycle through the waves interactions many times by stepping.

# **Resonance**

The natural frequency of an object

# Resonance

- Swing

<http://www.youtube.com/watch?v=l4FPK1oKddQ>

- Pasta/raisin demo

The frequency an object likes to vibrate at

# Resonance

The frequency an object likes to vibrate at

- Wave on a String (A=3, f=50, Damp = 0, Tension = high)
- Tall vs. Short Building damage

[http://www.iris.edu/hq/programs/education\\_and\\_outreach/videos#0](http://www.iris.edu/hq/programs/education_and_outreach/videos#0)

Use the settings give above to show resonance with the Wave on a String simulation.

This video shows a nice demo of different building heights resonating at different frequencies. I stop the video at the points where the speaker says he asks his students to predict, then I ask my students to predict.