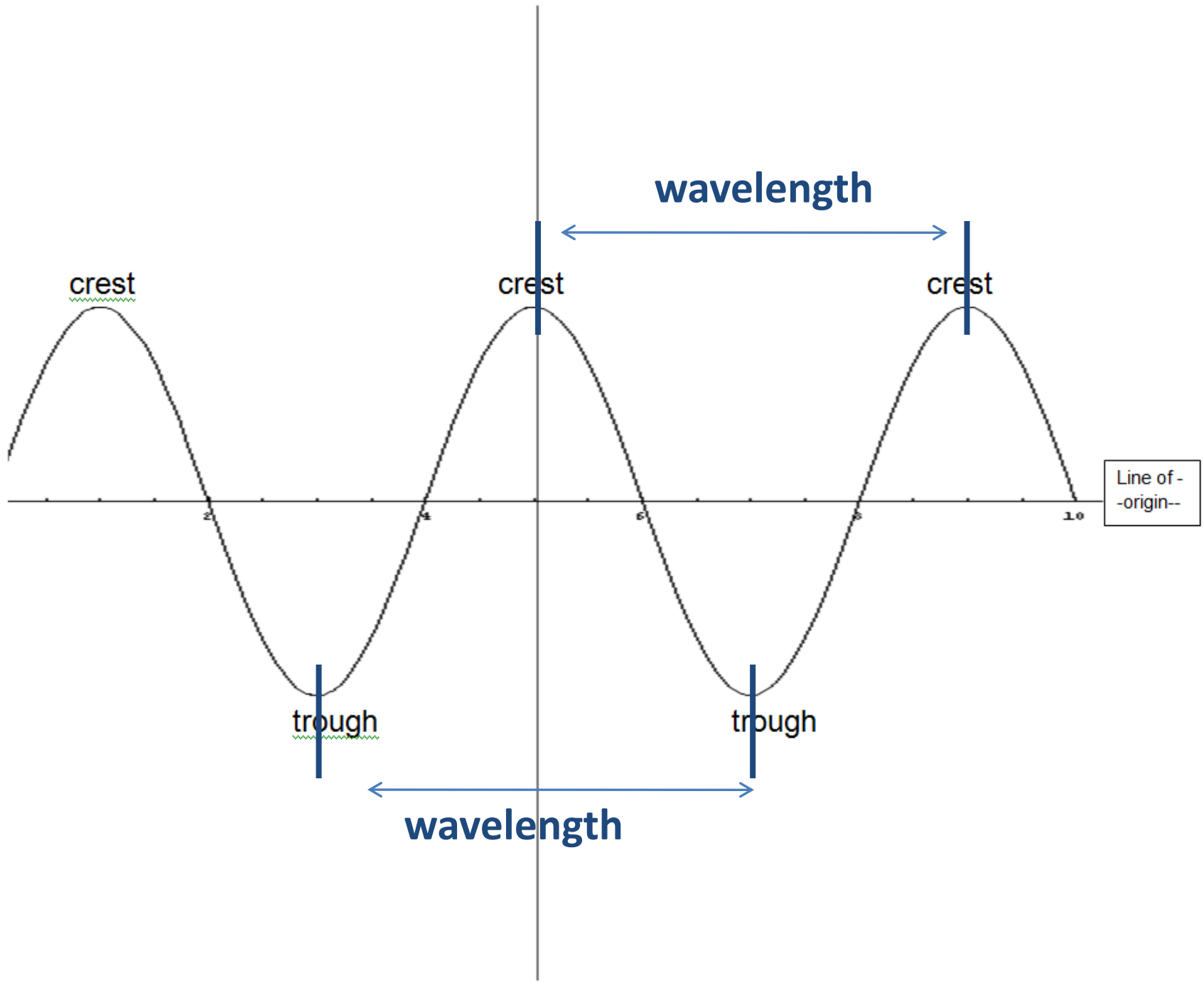


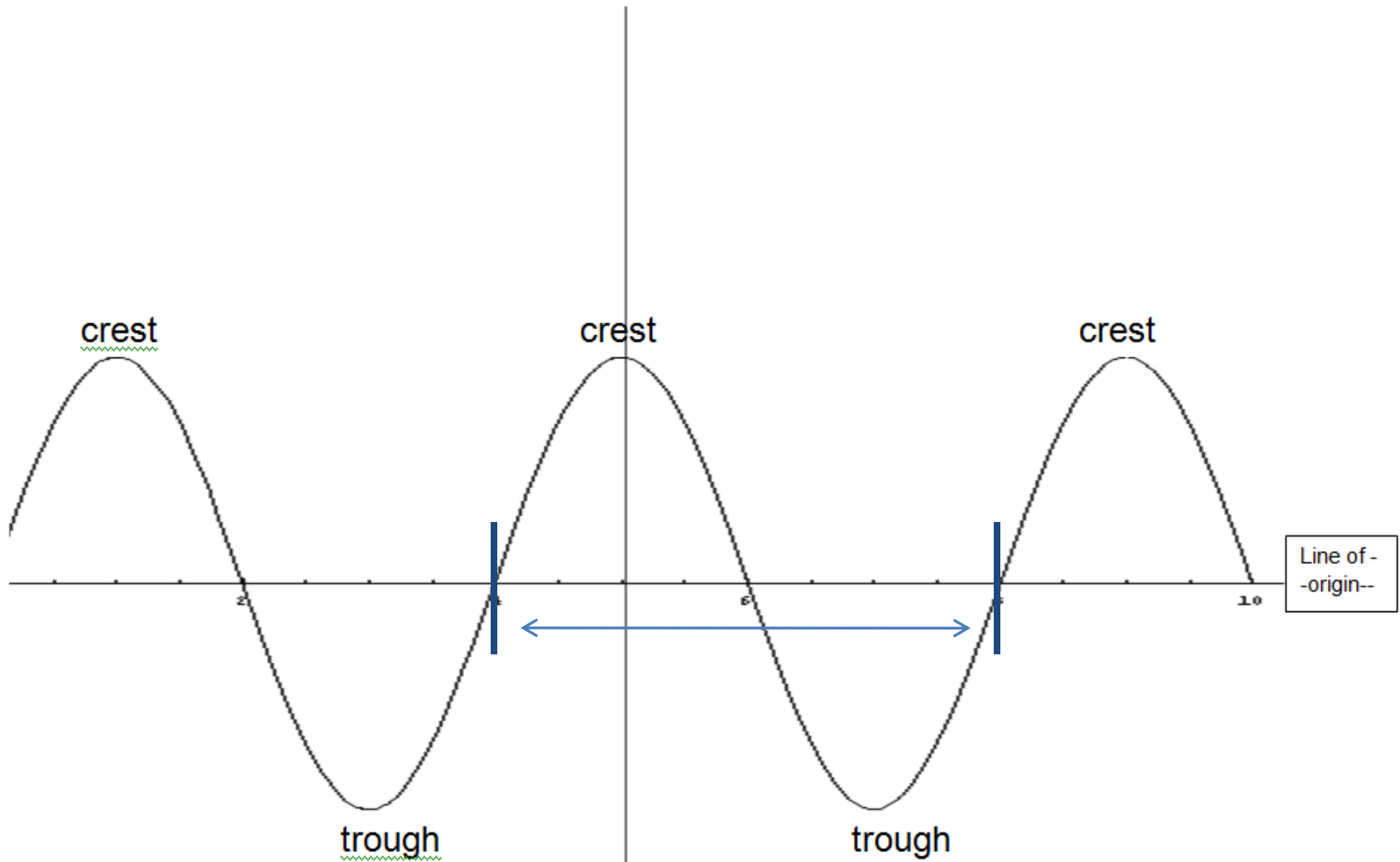
# **Anatomy of a Wave**

8/31/15

# Housekeeping

- 5 digit ID
  - Please write a 5 digit ID of your choosing on your Sound and Waves HW.

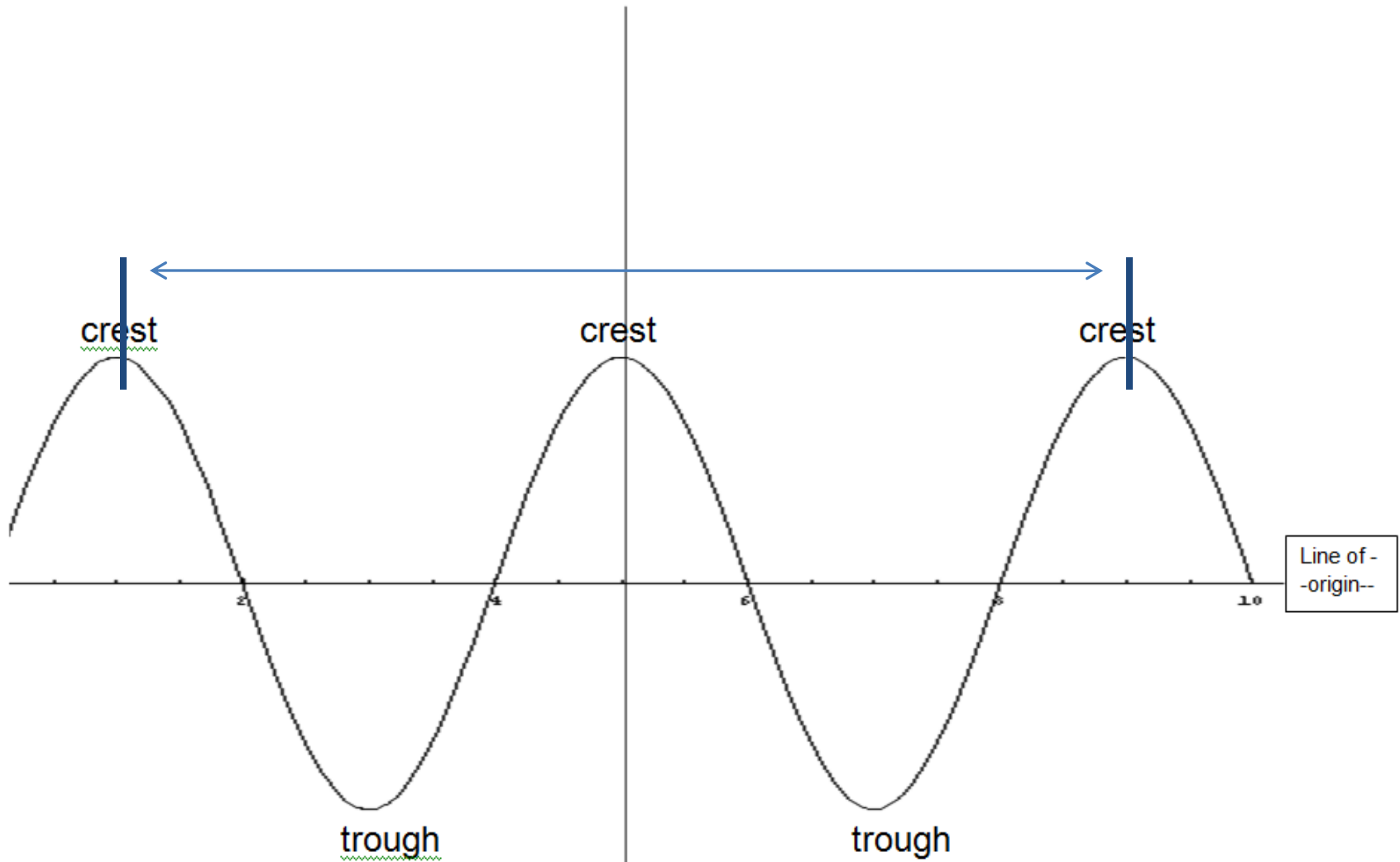




Is this a wavelength?

**A. Yes**

B. No



Is this a wavelength?

A. Yes

**B. No – it is 2 wavelengths**

Sound (2.19)

File Help

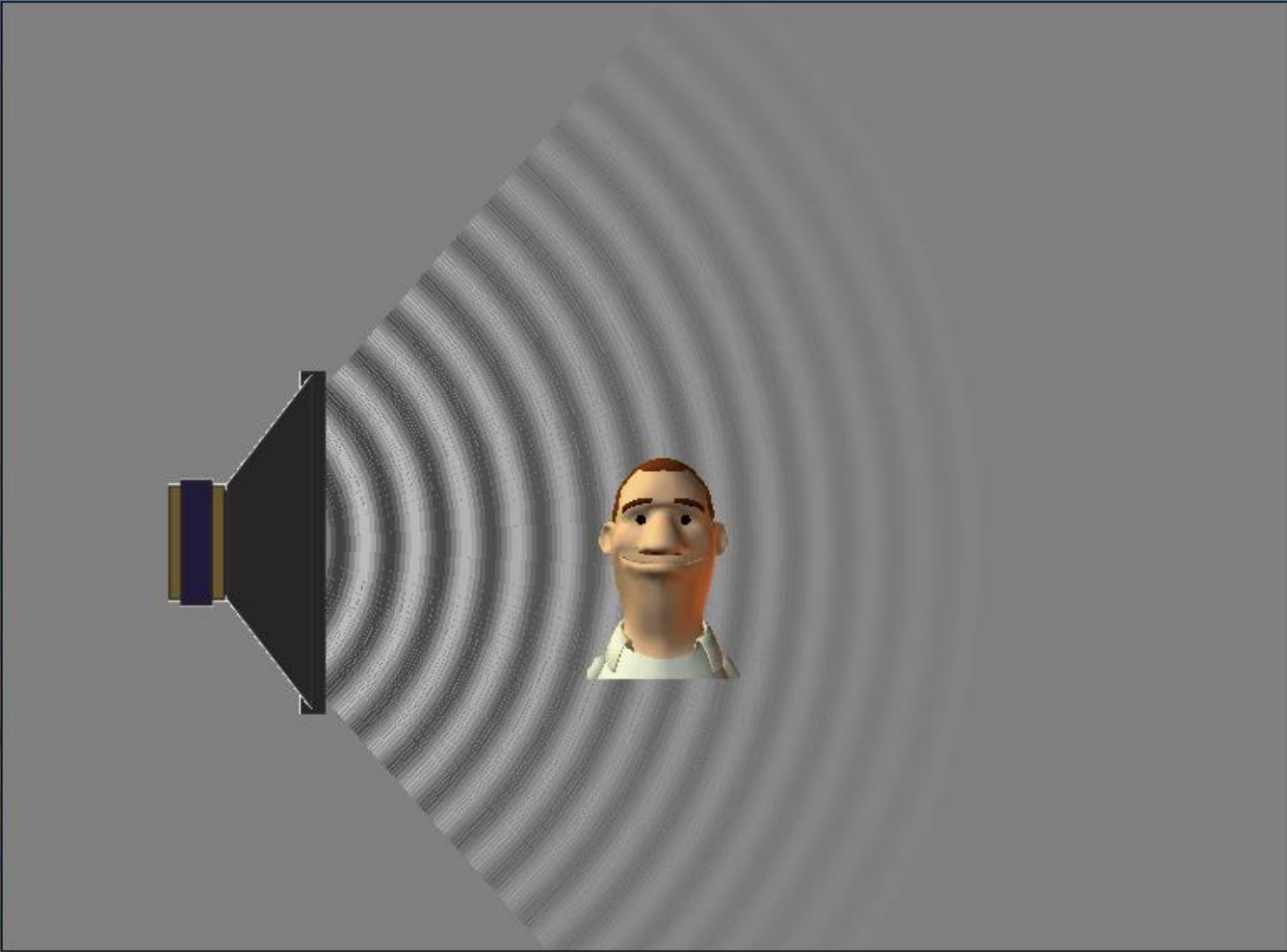
Listen to a Single Source   Measure   Two Source Interference   Interference by Reflection   Listen with Varying Air Pressure   **PHET**

Frequency: 500 Hz

Amplitude

Audio Control

- Audio enabled
- Speaker
- Listener



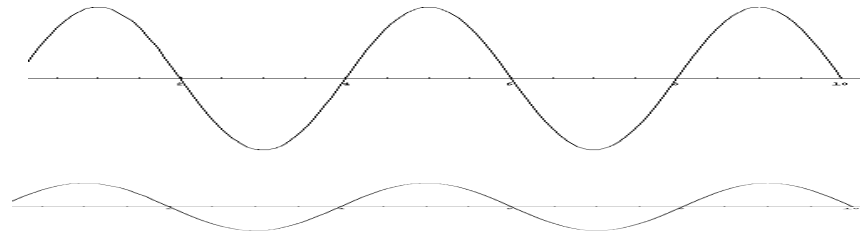
||   ▶

Help!

# What is

- **Amplitude?**

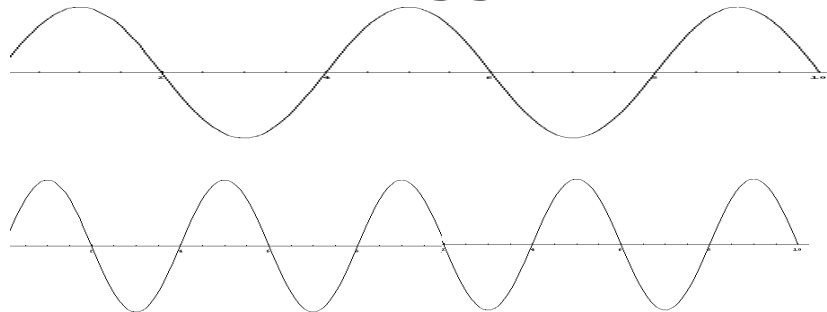
- How high/low the crests/troughs are.



Lower amplitude

- **Frequency?**

- Rate of the wiggle

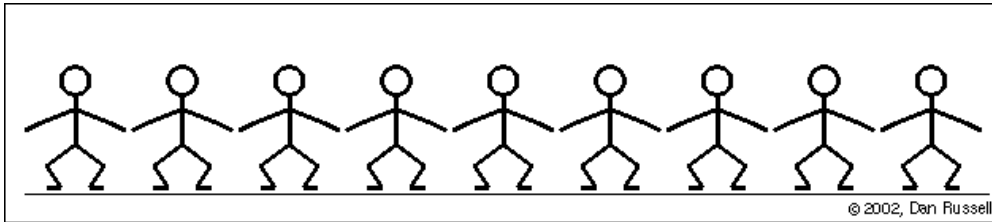


Higher frequency

# Waves travel

Do the wave

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



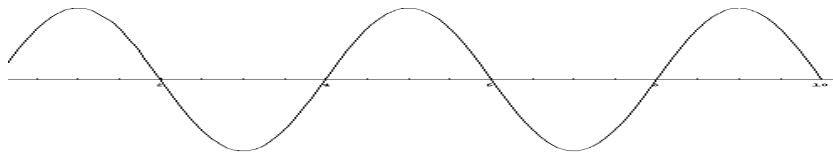
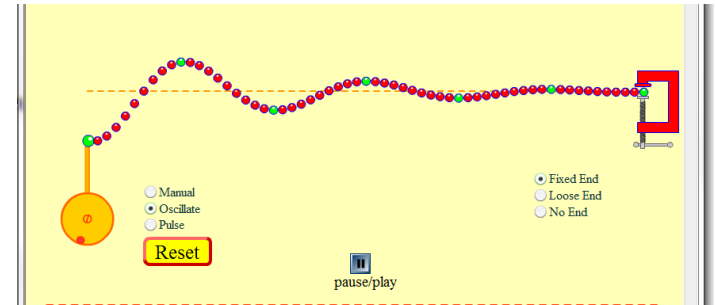
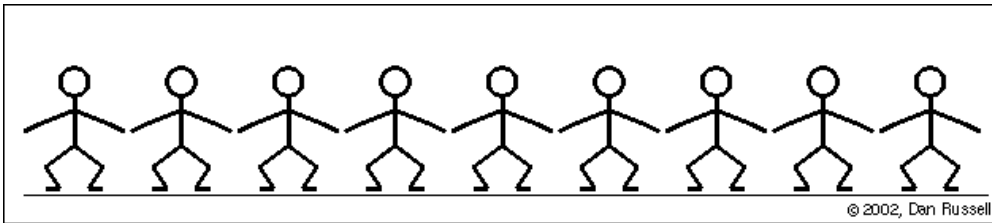
- **People move up and down as the wave's energy goes past.**

**Waves carry energy**



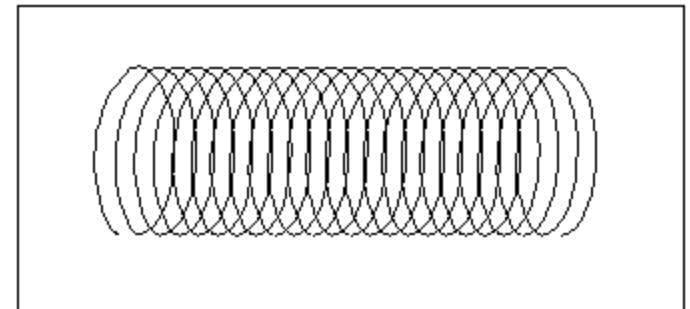
# Types of Waves

## Transverse Waves



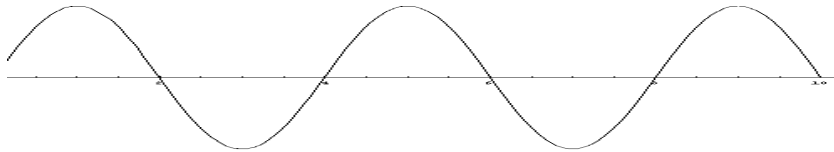
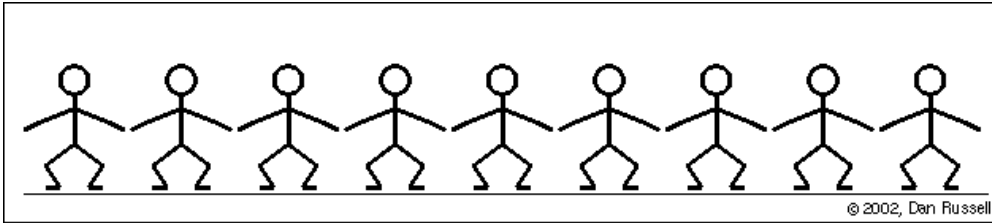
## Longitudinal Waves

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

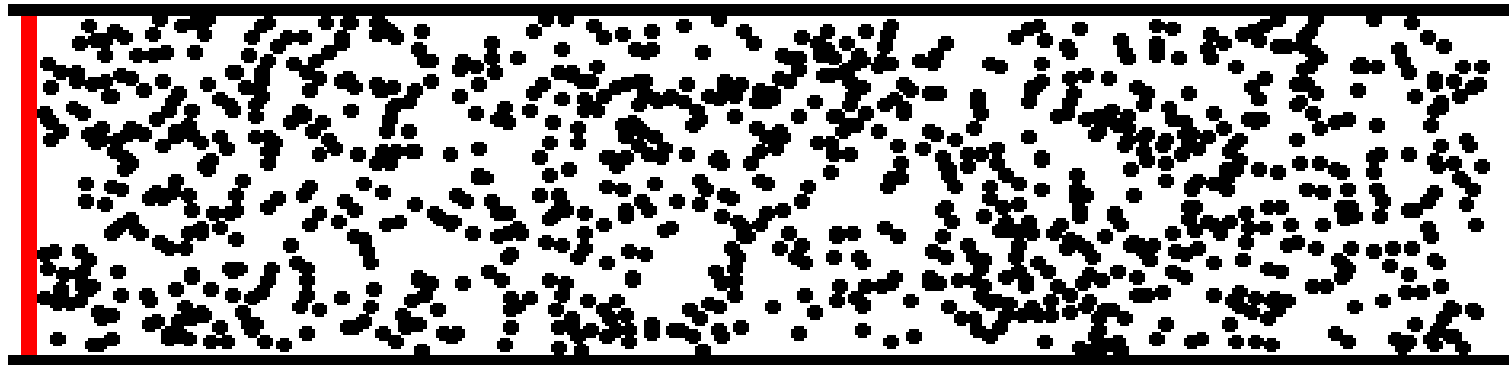


# Types of Waves

## Transverse Waves

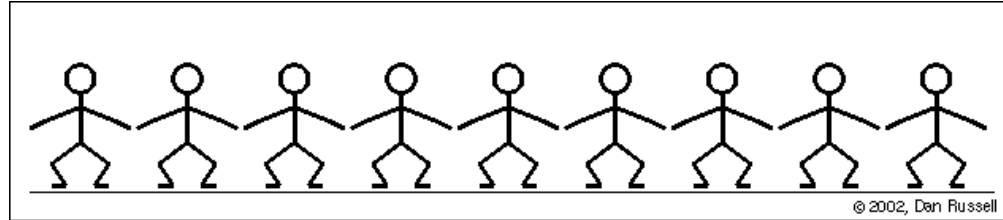


## Longitudinal Waves



# Source, Receiver & Medium

- People Wave



What is the *Source*?

first person

What is the *Receiver*?

last person

What is the *Medium*?

all the people

# Source, Receiver & Medium

- Wave on a String

What is the *Source*?

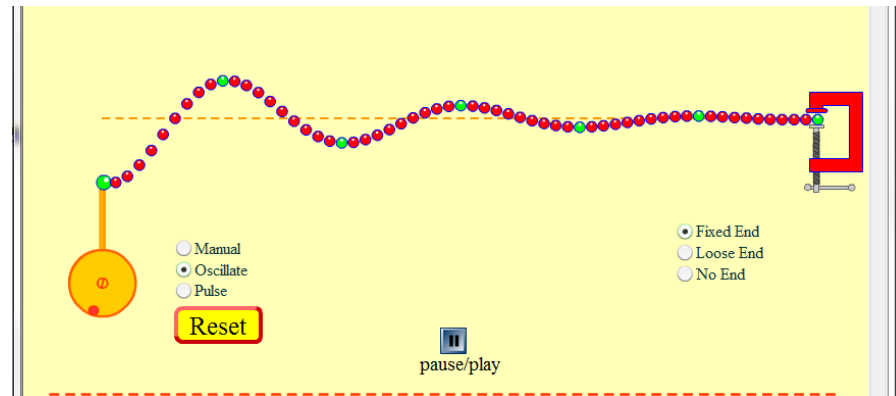
Orange Pump

What is the *Receiver*?

Clamp

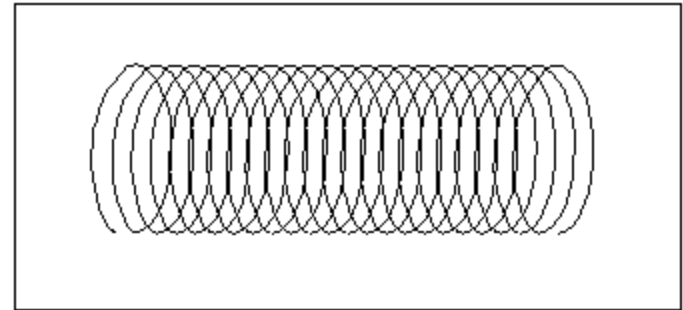
What is the *Medium*?

The string of red beads



# Source, Receiver & Medium

- Longitudinal slinky wave



What is the *Source*?

start of slinky

What is the *Receiver*?

start of slinky

What is the *Medium*?

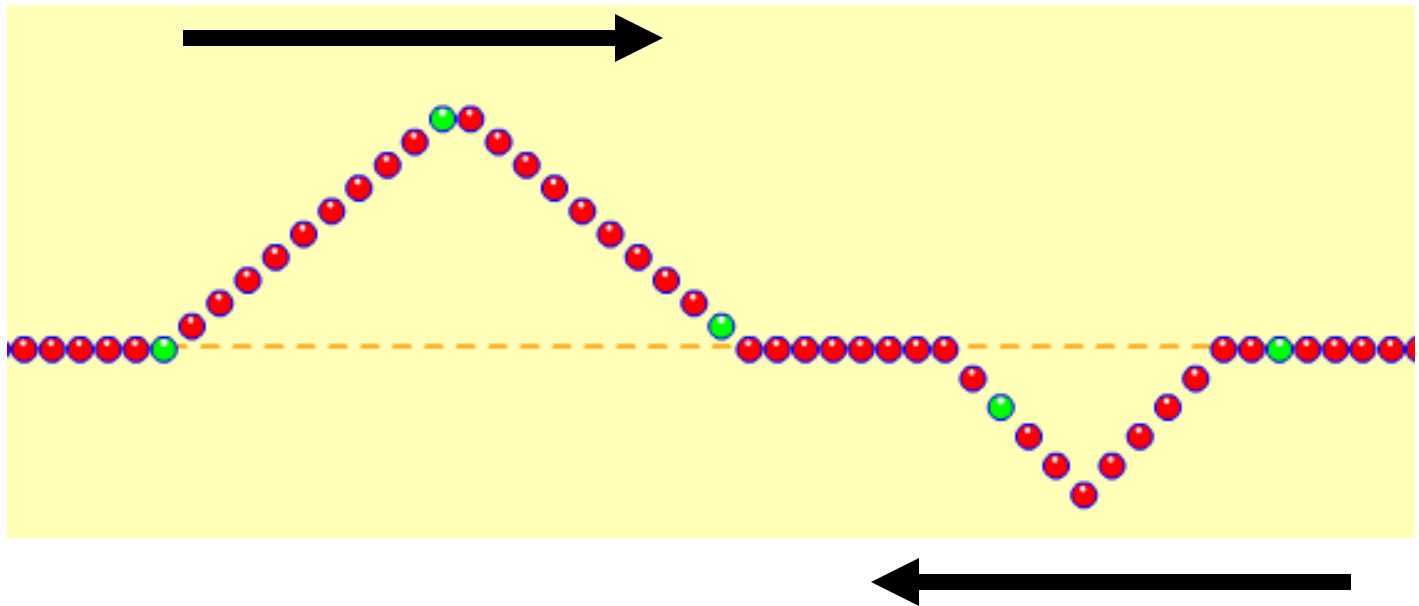
The slinky

# Source

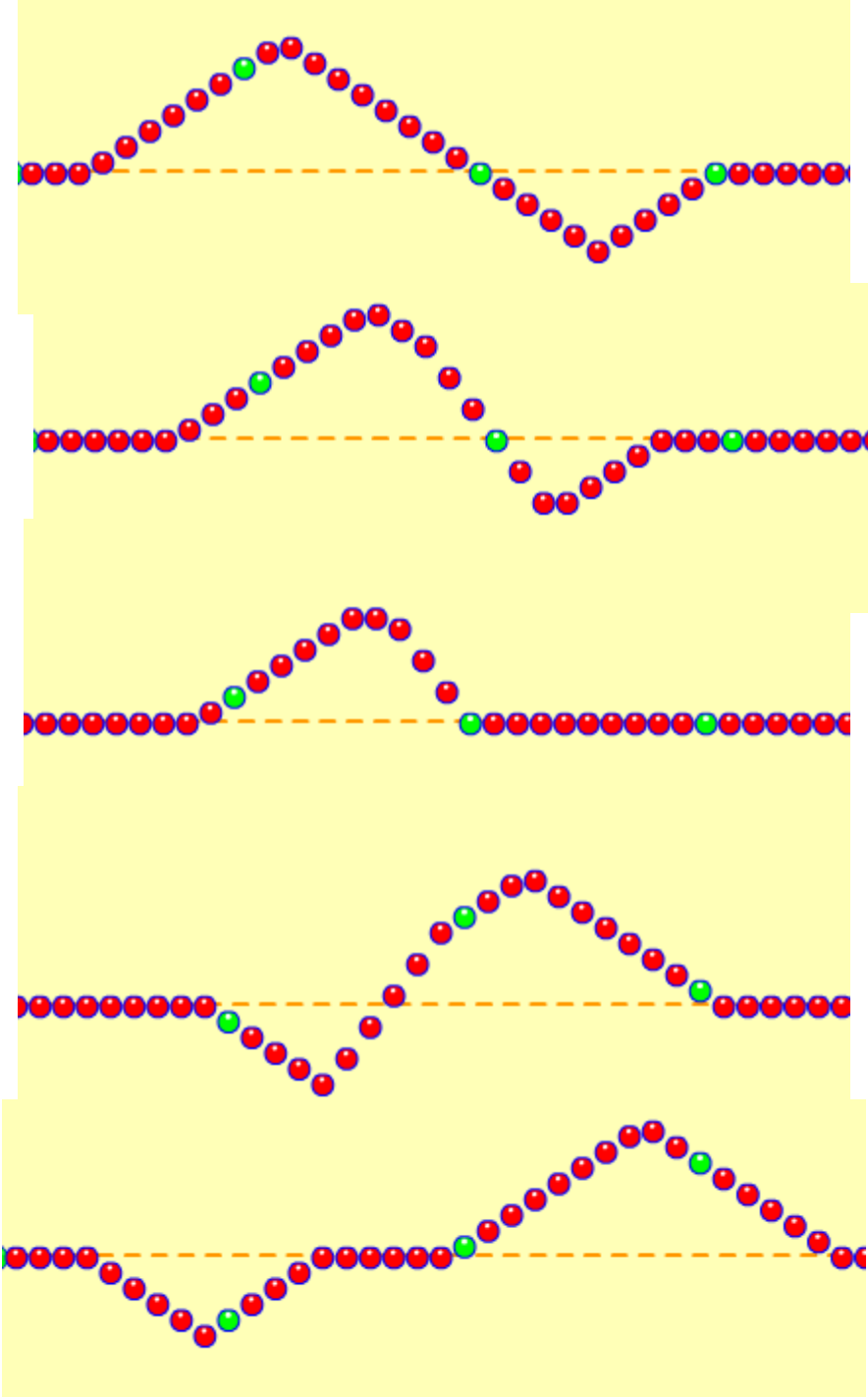
- <https://www.youtube.com/watch?v=Wji8cNpFhas>

**How do waves add?**

Sketch what you think the pattern will look like







# Resonance

When an object is driven (wiggled or oscillated) at its natural frequency

# Resonance

When an object is driven (wiggled or oscillated) at its natural frequency

# Natural Frequency

The frequency and object likes to vibrate  
at

# Resonance

When an object is driven (wiggled or oscillated) at its *natural frequency*

# Resonance

- Swinging

<http://www.youtube.com/watch?v=I4FPK1oKddQ>

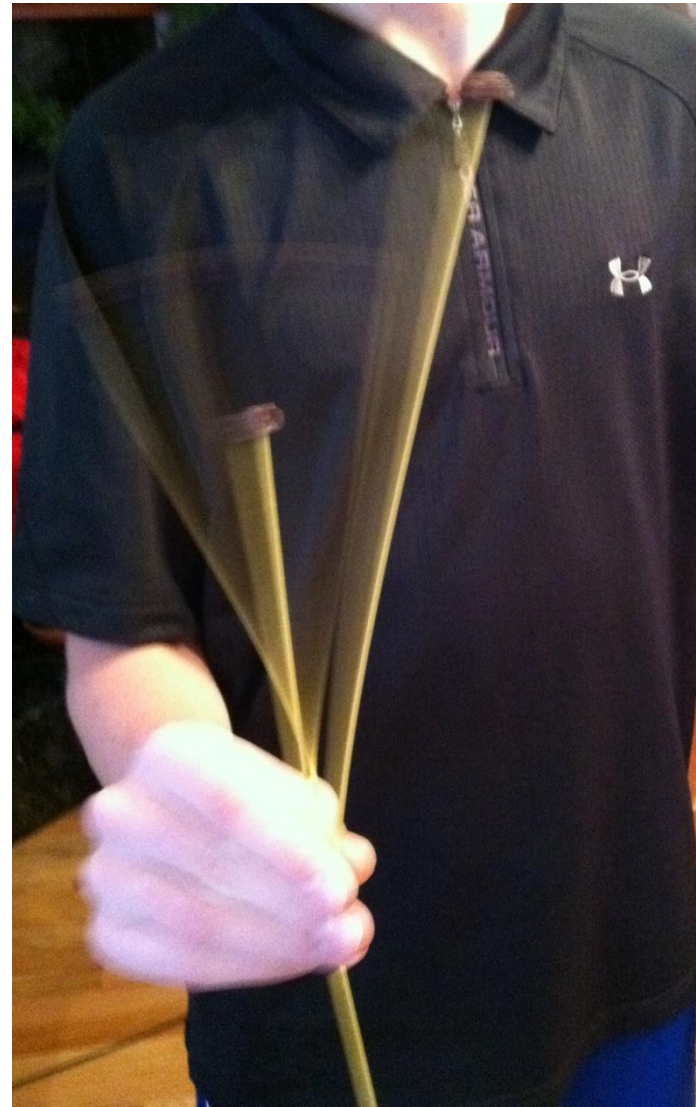


Pushing to match the natural frequency

# Resonance

- Pasta/raisin demonstration

Shaking an object at its  
natural frequency



# Resonance

Wiggling something at its natural frequency

- [Wave on a String](#) (A=3, f=50, Damp = 0, Tension = high)
- HTML [Wave on a String](#) (A=0.16cm, f =0.50 hz, Damp=0, Tens=0)



# Resonance

Shaking something at its natural frequency

- Tall vs. Short Building damage

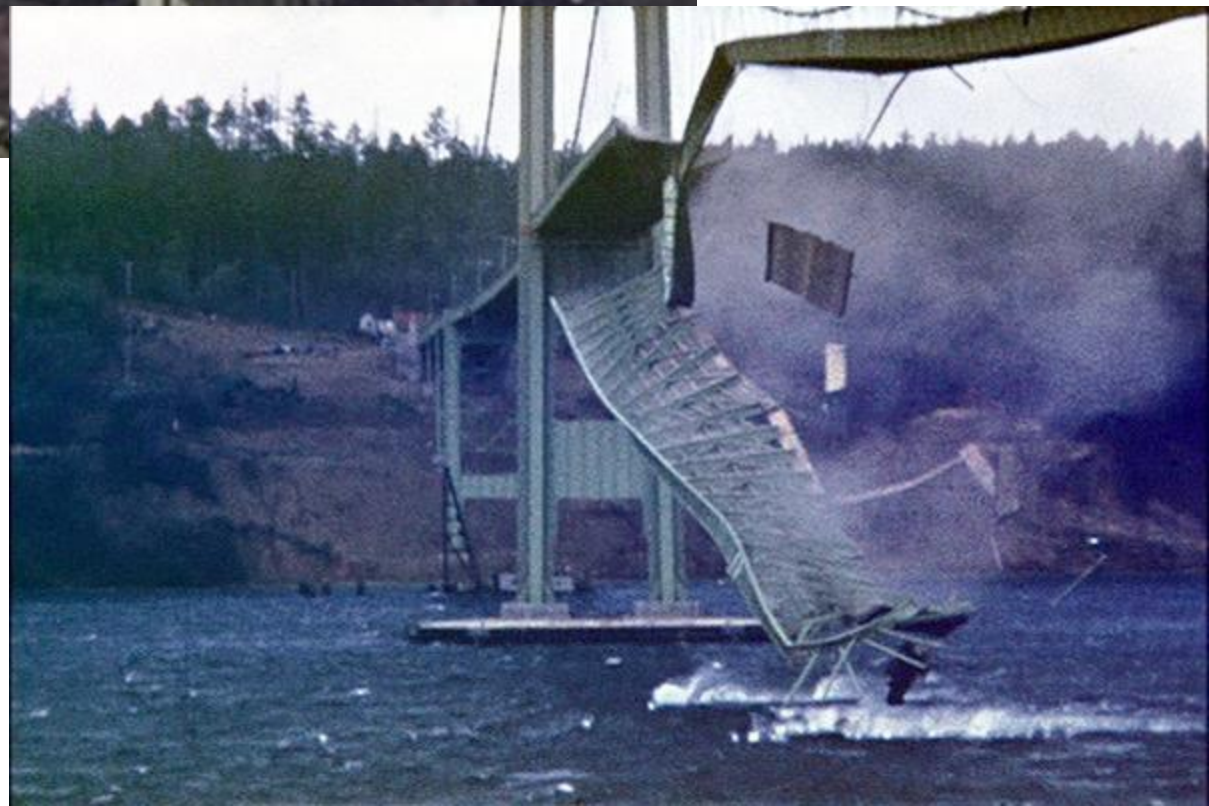
[http://www.iris.edu/hq/programs/education\\_and\\_outreach/videos#O](http://www.iris.edu/hq/programs/education_and_outreach/videos#O)

<https://www.youtube.com/watch?v=OCmzvWEAV10>



# Reading Quiz

- *Oscillation* – movement back and forth at a regular speed. or Wiggle
- *Bats are not blind* – why do people tell us they are?
- *Unwanted resonance*



Engine vibrations can't match natural frequency of the wings

