

Name \_\_\_\_\_

Date \_\_\_\_\_

Period \_\_\_\_\_

# Basic Wave Lab

## Background

Waves have been described as "wiggles in space and time". Waves are a traveling disturbance that transmits energy without transferring matter.

In this lab you will observe, measure and describe properties of two types of waves: Transverse and Longitudinal.

## Materials (per group)

Slinky

Stop Watch

Meter stick

Data Sheet

## Part 1: Observe two wave types

- A. Transverse waves Travel at right angles to the direction of the disturbance (vibration). Use your slinky top create a transverse wave. Stretch out the slinky and move (vibrate) one end up and down while your partner holds the other end. **DO NOT OVER EXTEND THE SLINKY.**

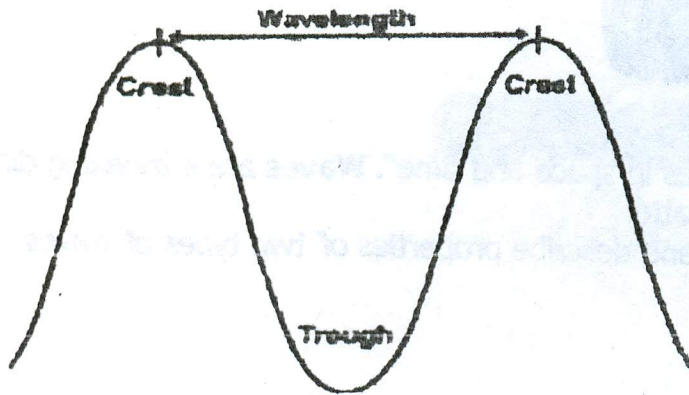
Sketch your wave here

- B. Longitudinal waves travel by particle vibration parallel to the direction in which the wave is moving. Stretch out the slinky as in part A. Compress and release one end of the slinky while your partner holds the other end. **DO NOT OVER EXTEND THE SLINKY.**

Sketch your wave here

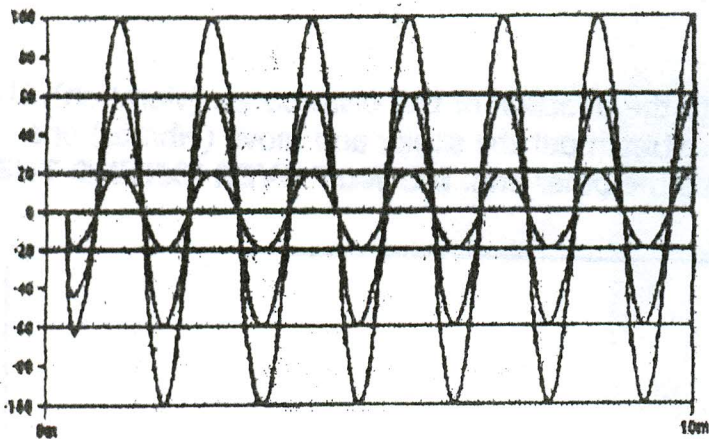
## Part 2: Wavelength and amplitude

A. Observe the figure below and write a definition for wavelength in the box provided.



Write a definition for wavelength

B. Observe the figure below and write a definition for Amplitude in the box provided.



High  
amplitude

Medium  
amplitude

Low  
amplitude

Write a definition for amplitude.

C. Use a slinky to create transverse waves with high, medium and low amplitudes. Sketch each of your waves in the box below.

Describe how you varied the amplitudes of the waves.

What is the relationship between energy (how fast you vibrated) and wave amplitude?

**Part 3: Frequency**

A. Wave frequency ( $f$ ) is the number of waves passing a point per second. Frequency is measured in a unit called Hertz, or Hz. Use a slinky and a stopwatch to vary your wave amplitudes and complete the table below.

Amplitude	# Of waves counted in 10 seconds	Frequency (#of waves divided by 10 seconds)
High		
Medium		
Low		

How does amplitude affect frequency?

**Part 4: Longitudinal wave speed**

A. Wave speed is the distance a wave travels over a period of time. It is usually calculated in meters per second (m/s).

1. Stretch a slinky to 2 meters
2. Start a longitudinal wave from one end of the slinky to the other.
3. Record the time it takes for the wave to travel from one end to the other and back again. Repeat three times and calculate an average.

	Distance (m)	Time (s)	Speed (m/s)
Trial 1			
Trial 2			
Trial 3			

Average speed (**SHOW YOUR CALCULATIONS**)