Name:_____Period: _____ Date due : _____ EN: _____

INTRODUCTION SLINKY LAB

Waves are _____ occur all over the natural world. Light, sound, radiation, water ripples, etc. all occur as wave phenomena. There are two main types of waves that are found in the physical world: transverse waves, and longitudinal waves. Wave phenomena abide by the same rules regardless of the **media** it is transferred through – or in other words, there are not separate characteristics for light waves, or sound waves, or water ripples. Because of this we can investigate the characteristics of all waves using a coiled spring (slinky).

MEDIUM: _____

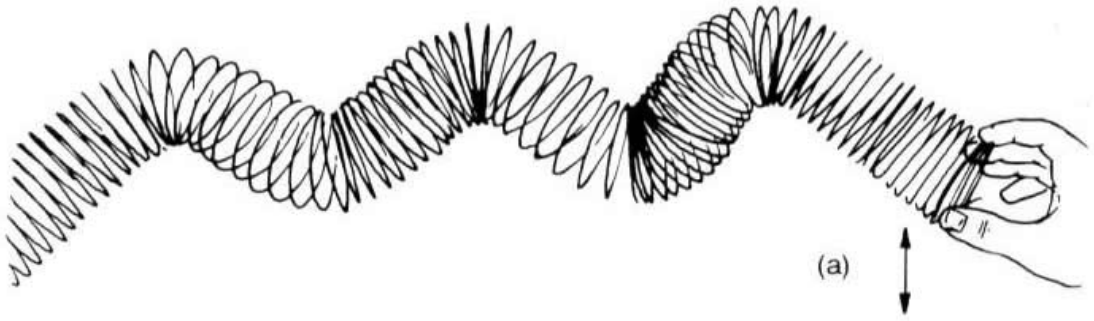
Ex. Sound media : _____, _____ , _____

PART 1: TYPES OF WAVES

LONGITUDINAL WAVE: also known as a compression wave … a longitudinal wave is a wave in which the vibrational displacement occurs in the same direction as the motion of the wave.

Create a longitudinal wave pulse by creating a disturbance in a direction parallel to the direction of the wave motion. Describe what happens to the medium (slinky) as the pulse travels from one end to the other. (Hint: discuss energy and material)

TRANSVERSE WAVE: a transverse wave is a wave in which the vibrational displacement occurs in a direction perpendicular to the motion of a wave.



Generate a transverse wave pulse by moving your hand quickly to either the left or the right. Describe the motion of the medium as the pulse moves through it

PULSE: a _____ disturbance in a _____ that moves along in a wave.

WAVELENGTH: the length of a single _____.

AMPLITUDE: the maximum amount a disturbance is from a wave's _____ position.

FREQUENCY: the _____ at which wave pulses pass a point.

PART II: WAVE CHARACTERISTICS: stretch the spring 2 to 3 meters out on the floor for the following questions. Be sure not to tangle the slinky. Use diagrams!

1. Record the time it takes to get to the other end. Repeat this several times changing the height (*amplitude*) of the pulse each time and recording the time from one end of the slinky to the other. How does changing the amplitude of the pulse affect how long it takes to get from one end to the other?

2. Now try generating more than one pulse. **Slowly** move you hand side to side at a **constant** rate. Describe what you see. (increase, decrease, remains the same)

   Speed: _____ Frequency: _____ Wavelength: _____

3. Now move you hand side to side at a faster rate and describe what you see. Include in your description what happens to the speed, frequency and size (wavelength) of the wave pulses.

   Speed: _____ Frequency: _____ Wavelength: _____

4. Now change the tension in the slinky. Gather about a quarter of the slinky in your hands making this the "end" and then stretch the remaining slinky 2 to 3 meters like before. Make a wave pulse with as close to an identical disturbance as you did above and record the time it takes to get to the other end. Repeat this again making the slinky even tighter. Describe how this changing the tension affects the characteristics of the wave (wavelength and speed).

PART III. WAVE REFLECTIONS

1. Have your partner hold one end of the slinky strongly. Send one strong pulse to your partner and let it reflect back. This is a fixed end reflection because the end of the slinky is not allowed to move. What do you notice about the shape and motion of the reflected wave as compared to the incoming wave? DIAGRAM!

Procedure:

1. Stretch the spring across the floor about 3 meters. Be sure to keep this distance unless directed.
2. One partner holds one end of the spring secure while the other partner will create a single wave pulse by shaking the other end of the slinky back and forth on the ground.
3. Another partner will use a stopwatch to measure the time needed for the wave to travel from one end of the spring to the other.
4. Record the time in the data table.
5. Repeat two more times.
6. Calculate the speed of waves 1,2 and 3 in your data table by using the formula speed = distance/time. Find the average speed for the waves 1,2 and 3.

DATA TABLE 1

Wave Property Measurement SHOW YOUR WORK V = wavelength x frequency			
Wave Trial	Spring Length	Wave Time	Wave Speed
1	3 m		
2	3 m		
3	3 m		
AVG			
CLASS AVG			

CHALLENGE: For the above experiment how could you determine the wavelength?

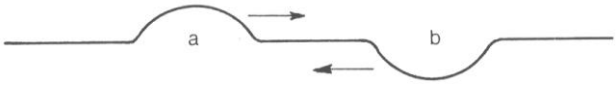
Discuss how your group's speed compared to the class average speed? Explain what would cause this discrepancy.

CONCLUDE AND APPLY

1. Was the wave speed different for the three different pulses created? Why or Why not?

2. Why would you average the speeds of the three different pulses to calculate the speed of waves on your spring?

MULTIPLE WAVE INTERACTION

Scenario 1 	
Scenario 2 	

Refer to the scenarios above for the following questions:

1. Which scenario will result in Constructive interference? Scenario 1 / Scenario 2 Circle one

2. Which scenario will result in Destructive interference? Scenario 1 / Scenario 2 Circle one

3. Draw a diagram of two waves interacting that would result in a single wave that has a lower amplitude that either of the two original waves.