Name: _____
Date: _____ Period: _____

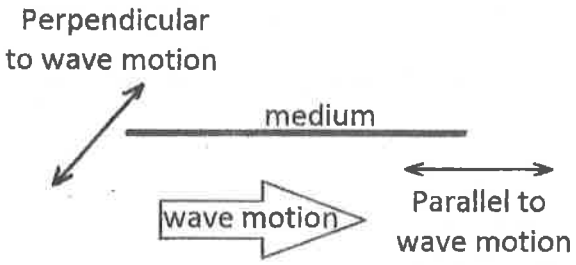
Basic Waves (Slinky) Lab

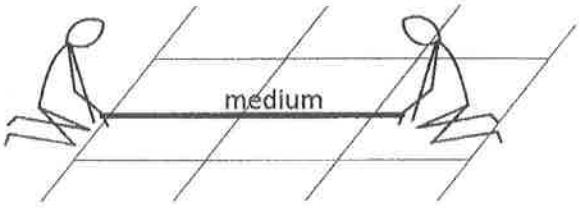
Pre Lab:

1. Define *Longitudinal Wave* and make a labeled sketch of one. *There should be three labels.*

2. Define *Transverse Wave* and make a labeled sketch of one. *There should be five labels.*

Materials: Slinky or spring stopwatch meter stick





Procedure:

1. Stretch the slinky between two group members without making it too tight. Make sure the slinky is lying on the floor.
2. Create a *longitudinal wave pulse* by pushing the slinky forward parallel to itself. The slinky should still be in a straight line and the wave pulse (squished up part) should travel to the other end of the slinky.
3. Measure the distance that the wave travels between people (the length of the slinky) in meters and record this distance in Data Table #1 (on the back of this paper).
4. The third person should time the wave through this distance, from one person to another. Enter this time into Data Table #1.
5. You will record the time it takes the longitudinal wave to travel from one person to another for a total of three separate times. These times will not be exactly the same but should be close to each other.
6. Average these times and enter the average in Data Table #1. To average the times add them up and divide by three:

$$\text{Average Time} = \frac{Trial\,\#1 + Trial\,\#2 + Trial\,\#3}{3}$$

7. Calculate the speed of this longitudinal wave using the equation:

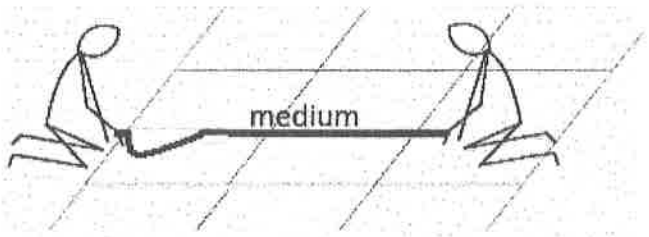
$$\text{speed}\left(\text{m}/\text{s}\right) = \frac{\text{distance traveled (m)}}{\text{time (s)}}$$

8. Record the speed of this longitudinal wave you calculated into Data Table #1 in meters per second.

Data Table #1: Longitudinal Wave

Time #1 (s)	*Time #2 (s)*	*Time #3 (s)*	*Time Average (s)*	*Distance (m)*	*Average Velocity (m/s)*

9. Now create a *transverse wave pulse* by pushing the slinky perpendicular to itself. You should be making a single wave pulse by moving the slinky to the side and back to its original position. The wave pulse should still be along the floor, *no part of the wave should be above the floor*.



10. Measure the distance that the wave travels between people (the length of the slinky) in meters and record this distance in Data Table #2.
11. The third person should time the wave through this distance, from one person to another. Enter this time into Data Table #2.
12. You will record the time it takes the transverse wave to travel from one person to another for a total of three separate times. These times will not be exactly the same but should be close to each other.
13. Average these times and enter the average in Data Table #2. To average the times add them up and divide by three:

$$\text{Average Time} = \frac{Trial\,\#1 + Trial\,\#2 + Trial\,\#3}{3}$$

14. Calculate the speed of this transverse wave using the equation:

$$\text{speed}\left(\frac{\text{m}}{\text{s}}\right) = \frac{\text{distance traveled (m)}}{\text{time (s)}}$$

15. Record the speed of this transverse wave you calculated into Data Table #2 in meters per second.

Data Table #2: Transverse Wave

Time #1 (s)	*Time #2 (s)*	*Time #3 (s)*	*Time Average (s)*	*Distance (m)*	*Average Velocity (m/s)*

Conclusion Questions:

1. Did a transverse or longitudinal wave pulse travel faster? Support your answer using the data you collected.

2. Different groups had different slinkies of different lengths and sizes. Do you think that every longitudinal wave made in your class traveled at the same speed in everyone's slinky? Why or why not?