'Spring'time Exercise

In each portion of this lab, you and your lab partner will sit facing one another some distance apart on the floor with one of two types of springs stretched between you. While one person holds their end of the spring firmly to the floor their partner will shake their end of the spring once to cause a pulse to travel down the spring medium. The purpose of this lab is to see how that pulse behaves.

How far apart lab partners sit is different for each lab group depending on the type and length of spring used. Please do not stretch the spring so much that it will not return to its original shape. Eight to ten squares between partners should provide the stretch needed to complete the lab.

All four parts (A through D) of this lab are independent of one another and can be done in any order.

Part A

Take the slinky and stretch it between the two partners (remember, less than 10 tiles). Sit with the slinky resting along one of the lines on the tile floor. One partner will be the "wave pulse" and the other partner will be the "fixed" end (holding the slinky still). The "wave pulse" partner should place a single wave pulse on the spring (either a crest or a trough). This is done by quickly jerking one end of the slinky sideways and back across one of the tile squares. Do this a few times and watch as the wave pulse travels down the slinky and reflects off the other partner. **Answer questions 1-2 on your answer sheet.**

Part B

Continue to use the slinky for this exercise. Now you and your partner will simultaneously shake one pulse from each end of the spring. Both pulses should be shaken on the same side of the spring. After you shake the pulse, hold your end still and watch what happens. If truly shaken simultaneously, the pulses from each

end will meet somewhere in the middle. Do this a couple of times and **then answer question 3 on your answer sheet.** Now, try the different combinations that are given in the data table under **Part B** of your answer sheet. **Draw a picture of the 2 waves traveling towards one another. Draw another picture of what happens at the exact moment they meet. Complete the data table.**

Part C

In this section, you will be testing the factors that affect the speed of the wave on the spring. Think about what factors may affect the speed of the wave on the spring. Write these down under Part C of the answer sheet and then devise a way to systematically test these. Please test out at least 2 factors.

Part D

Now test to see if this same variable affects longitudinal waves. Use only the slinky for this exercise. One partner should hold their end stationary. The other partner should give the slinky a sharp jerk forward toward the other lab partner. For each trial (3 in all), measure x and t, then calculate speed. **Complete the data table.** Looking at the results for Part D, write a sentence summarizing your results.

Part E:

Calculate the speed of a standing wave using $v=f\lambda$. If you have not yet been shown what a standing wave is, then ask your teacher to show you. **Complete Part E of your data sheet.**

Name(s): _____

_____

Date: __/__/__ Hour: _____

Springtime exercise answer sheet

Part A

1. What happens to the pulse/bump when it is reflected off the other partner?

2. Sketch of:

Pulse before reflection: Pulse after reflection:

Part B

3. What happens when the two waves are at the same point on the slinky?

Data Table

Partner 1	**Partner 2**	Draw a picture of the **two** waves traveling towards one another **before** they meet.	Draw a picture of the slinky at the **exact** moment the waves meet.
Crest	Crest		
Trough	Trough		
Crest	Trough		
1 ft crest	2 ft trough		

Part C

What factors do you think affect the speed of a wave on a spring?

How will you test these?

Variable I: _____
(divide the table into however many columns you need)

	Calculated speed

Variable II:_____

	Calculated speed

Results: What affects/does not affect the speed of a wave?

Part D

Trial			Calculated Speed

Results:

Part E
Draw a picture of your standing wave.

How many wavelengths does your standing wave represent?

Using your stopwatch, measure the frequency of your standing wave.

What is the speed of the wave on your spring?