Sound and Light Name _____

Slinky Waves Partners: _____ Slinky #_____

Materials: Long slinky, stop watch, tape measure, spring scale, analytical scale

Each group will use a slinky to investigate wave speed. **Be very careful not to bend the slinky or to get the slinky tangled!** They are very difficult to fix after they get bent, and they are difficult to get untangled.

I. General Wave Speed Equation

Stretch out the slinky on the floor to one specific length. Make a standing wave of one, two and then three loops with the slinky while keeping the length constant. For each trial (1 loop, 2 loops, and 3 loops), make measurements to determine the frequency and the wavelength of the wave. Use Excel to organize your data and make repeated calculations. Use the general wave speed equation to calculate the speed of the waves for each trial. Summarize your data here:

# of loops	Frequency	Wavelength	Speed

Does the speed of the wave depend on the frequency? Explain.

II. Wave Speed for a String or Spring

Make single-pulse waves on the slinky for multiple lengths, time them, and then calculate wave speed.

Length	Time	Speed

Does the wave speed vary as the slinky is stretched? Explain.

What properties of the medium are affected by changing the length of the slinky? Explain.

The relationship that you will test explicitly is that of the wave speed to the ratio of the tension in the slinky to its linear mass density. Stretch out the slinky on the floor. For three different lengths, make a standing wave and take measurements to determine the frequency and the wavelength of the wave. Also make measurements of the tension in the slinky and its linear mass density. Using Excel, construct a data table that will present your data in an organized fashion. Be sure the headings include proper units. Use Excel to create a graph with power curve fit.

How is the speed of a wave dependent on ratio of tension to linear mass density? Explain.