Slinky wave lab

Name_____ Date:_____ Per:_____

Be Careful with your slinky to not get it tangled. Only shake it on a flat table top.

1) Measure the length and tension (tension is the stretching force in newtons) of stretched slinky:

T = _____ L = _____

2) Once you have set the length/tension of the slinky DON"T CHANGE IT!
Why not? What will this have an effect on?

3) Measure the speed of a wave pulse traveling down the slinky using a stopwatch (show measurements and calculations using units and draw a picture)

4) Make the following standing waves on your slinky. For each standing wave, draw a **picture**, Calculate the **wavelength** and the **frequency** *should be* and then measure them experimentally (using a stopwatch and meterstick). Calculate the % error between the expected and actual.

Fundamental (1^{st} harmonic): Number of wavelengths:_____
Picture: Expected: Actual: % error:

First overtone (2^{nd} harmonic): Number of wavelengths:_____
Picture: Expected: Actual: % error:

Second overtone (3^{rd} Harmonic): Number of wavelengths:_____
Picture: Expected: Actual: % error

5) Create a Longitudinal wave with the slinky. Measure it's speed. Draw a longitudinal wave showing 2 full wavelengths.

Challenges:

Find the highest frequency at which you can make a sustainable standing wave:
Number of wavelengths:_____
Picture: Expected: Actual: % error:

Experimentally determine the mathematical relationship between the speed of the wave and the tension in the slinky. Outline your procedure, record data in an organized table, and show calculations below. Hint: you may need to make a graph!