Name: _____ Section #: ____ Date: _____

Waves on Strings

Part 1: Traveling Waves on a Slinky

Prediction

A transverse pulse will be launched in the Slinky when it is stretched to 20 ft and 30 ft. The time it takes the pulse to travel from one end to another will be measured. How do you think time and velocity will change, if at all, as the length of the Slinky increases? Write down the major points of your discussion.

After the Experiment

Do your experimental results match what your group predicted?

Part 2: Standing Waves on a String

Prediction

How would you expect the frequency to change as the number of antinodes increases?

Run Part 2 of the experiment. Be sure to save a screenshot of your graph with the curve fit parameters applied. Be sure that all parameters are visible on the graph. Complete all required calculations in the Inlab before you proceed to Part 3.

After the Experiment

How accurate was your prediction?

In the Inlab, calculate the resonant frequency, f_{pred}, where you can observe the given number of antinodes. Show your calculation below. Check it experimentally.

Part 3: Constant Wavelength

Prediction

Sketch the shape of the frequency vs. square root of tension graph.

Run Part 3 of the experiment. Be sure to save a screenshot of your graph with the curve fit parameters applied. Be sure that all parameters are visible on the graph. Complete all required calculations in the Inlab before you proceed.

After the Experiment

How accurate was your prediction?

Data Analysis. Calculations.

Show all your work (**equations and calculations**) that you did to get the answers submitted in each part of the Inlab.

Part 1: Traveling Waves on a Slinky

Calculate the experimental speed of pulse 1 and pulse 2.

Calculate the theoretical speed of pulse 1 and pulse 2.

Calculate the percent discrepancy between the theoretical and experimental speed for each length of Slinky.

Part 2: Standing Waves on a String

Calculate wave velocity for each resonance frequency. Does it stay constant?

Use the slope of the f vs. n graph to calculate the experimental speed in the string.

Calculate the percent discrepancy.

Calculate the experimental speed in the string.

Calculate uncertainty in the experimental speed.

Calculate the theoretical speed and the discrepancy.

Part 3: Constant Wavelength

Calculate the wavelength for $n = 1$.

Calculate the theoretical slope of the graph of frequency vs. square root of tension.

Calculate the percent discrepancy between experimental and theoretical values of the slope.

Calculate the expected value of the tension based on the experimental value of the slope of the frequency vs. square root of tension graph.

Have your TA sign this worksheet below and then upload it to the Inlab.

TA Signature: _____