Physics
Standing Waves

Name:_____

Keys:
1) Make sure your hands are on the ground.
2) Make sure the pulse travels back and forth a couple of times.
3) Mark the ends of slinky on the ground with tape.
4) Leave a meter stick on the ground for your video.

Length of stretched slinky:

L=_____

Find the wave speed of your stretched slinky by measuring the speed of a single pulse. Do more than one trial and use the average.

Pulse wave speed:

v =_____

Now create standing waves for each of the harmonics below.
1) Insert a picture of the standing wave.
2) On the picture, label the nodes (N) and anti-nodes(AN).
3) Fill in the missing values.
4) Show work.

First Harmonic

Picture

λ = _____ L = _____

f = _____ T = _____

v = _____

Work:

Second Harmonic

Picture

λ = _____ L = _____

f = _____ T = _____

v = _____

Work:

Third Harmonic

Picture

λ = _____ L = _____

f = _____ T = _____

v = _____

Work:

Fourth Harmonic

Picture

λ = _____ L = _____

f = _____ T = _____

v = _____

Work:

Questions:

The speed of any wave depends on the medium in which it is travelling. Since the medium (the slinky) is the same for the initial pulse you sent, and for all of your harmonics…the wave speed should the same for all of your standing waves. How did your data turn out?

For standing waves on strings, each harmonic frequency is a MULTIPLE of the first harmonic's frequency. The first harmonic's frequency (f_1) is called the FUNDAMENTAL FREQUENCY. Complete the table below using your data from above.

		Value from your data	(Harmonic #) x (f_1)	% difference
First harmonic	f_1			
Second harmonic	f_2			
Third harmonic	f_3			
Fourth harmonic	f_4			

%Diff = (T-E)/T x 100%