

Standing Waves – Investigation

Name: _____ Date: _____

INTRODUCTION

Standing waves are produced when periodic waves with the same frequency, wavelength and speed interfere with one another. Standing waves can be created in many ways. In this investigation a slinky will be used to demonstrate standing waves.

EQUIPMENT

1 stop watch, 1 slinky, 1 Newton Meter, 2 pieces of tape.

PROCEDURE

1. Mark out 5 meters on the floor with two pieces of masking tape.
2. Stretch the slinky to the 5 meters and put a tension of 3 N on the slinky. Keep this tension throughout the experiment.

PART 1

1. Send a single pulse down the slinky. Measure the time for the pulse to go to one end and return.

| Number of lengths of slinky | Distance (m) | Time (s) | Speed (m/s) |
|-----------------------------|--------------|----------|-------------|
| 2 | | | |
| 2 | | | |

Average Speed: _____

PART 2

1. Set up a standing wave at each of the **harmonic frequencies** of the slinky. Record your data in the data table.

| Standing Wave type | # of nodes | # of antinodes | Wavelength, λ (m) | Frequency, f (Hz) | Velocity (m/s) |
|---|------------|----------------|---------------------------|-------------------|----------------|
| Fundamental Frequency (1 st Harmonic), f_1 | 2 | | | | |
| 2 nd Harmonic, f_2 | 3 | | | | |
| 3 rd Harmonic, f_3 | 4 | | | | |
| 4 th Harmonic, f_4 | 5 | | | | |

Average Speed: _____

