

Name: _____

Date: _____

Velocity, Frequency, and Wavelength of a Transverse Wave

Objective: To calculate the velocity of a pulse wave. To determine the frequency and wavelength of a wave and calculate its velocity from this data.

Procedure:

Part A: Velocity of a Pulse

1. Carefully lay the slinky down on the floor. Have one person in the group hold an end and a second person stretch it out to about 3 to 5 meters.
2. Have one person hold an end still. Another person should move the slinky end to end quickly to generate a pulse wave. The amplitude should be around 20 cm. Repeat a few times to observe how the pulse appears. Sketch this wave on a separate sheet of paper and label the parts of the wave.
3. Measure the distance from one end of the slinky to another. Use a stopwatch to time the pulse from one end to the other. Repeat this for a total of five trials. Compute the velocity of the pulse – using distance and time.

Part B: Frequency of a Wave

1. One person should make waves by moving the slinky side to side at a constant rate. Another person should observe (from a particular location on the floor) – at least 1 meter from the start – the number of waves that pass in a period of 30 seconds. Record the necessary values in the data table.
2. Repeat this process for waves of different velocities. This can be changes simply by changing the rate which the slinky is moved from side to side.

Part C: Wavelength, Frequency, and Velocity

1. As in part B, have one person move the slinky from side to side while another person records the number of waves during a 30 second span. Do not stop moving the slinky after 30 seconds. Another person should measure the distance between crests in order to find wavelength. This will take coordination and possibly a few “trial trials.”
2. Repeat the step above by moving the slinky such that waves of a higher frequency and lower frequency are created. Once again, record the wavelength.

Data:

Part A: Distance between endpoints of the slinky: _____

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Average
Time for pulse to travel (s)						
Velocity of pulse (m/s)						

Part B:

Wave Motion	Number of Waves in 30 s	Frequency (Hz or waves/second)	Period (seconds/wave)
1 st			
2 nd			
3 rd			

Part C:

Wave Motion	Number of Waves in 30 s	Wavelength (m)	Frequency (Hz or waves/second)	Period (seconds/wave)	Velocity (m/s)
1 st					
2 nd					
3 rd					

Average Velocity _____

Average Velocity from Part A _____

Calculations:

Part A – Velocity for each trial and average

Part B – Frequency and Period

Part C – Frequency, Period, and Velocity