Name _____ Physics

Traveling Wave Lab

Objective:

- To determine what variable controls the speed of a transverse wave in a coil spring

Materials:

- Wave-Demo Spring; Measuring Tape or string; Stopwatch; Masking Tape

Introduction:

Energy can be transmitted from one location to another by several methods. One such method of transmitting energy is by wave motion. Waves do not transport mass from one point to another; instead, a disturbance travels between the points. A single traveling disturbance is called a pulse. Another type of wave is called Periodic and consists of a succession of displacements which follow each other at regular intervals in a medium. Both of these wave types will be classified as Traveling Waves. Transverse waves are those in which the disturbance is 90 degrees (perpendicular) to the direction of the wave.

Procedure

1. Have two students hold the wave spring at opposite ends such as that the spring has a moderate tension.
2. Make a distance between 4 – 6 meters on the floor using masking tape for trial #1
3. Generate s pulse with a small amplitude down the spring and allow it to make (4) trips
4. Record the time it takes to make 1 trip by dividing the time for (4) trips by 4 and place this in the table
5. Repeat pulse generation at this distance for a medium and a large pulse amplitude
6. Repeat these steps for a new distance between 6 – 8m (SIMPLY STRETCH SPRING TO NEW DISTANCE, DO NOT LET OUT MORE SPRING)

Making a Pulse – Data Table 1

Velocity of a Pulse		**Trial #1 (4 – 6m)**	**Trial #2 (6 – 8m)**
Length of a Stretched Spring			
Time for a Pulse to Make (1) Trip Across the Spring (seconds) Use (3) Different Pulse Amplitudes	Small Amp		
	Med Amp		
	Large Amp		
Average Time for the (1) Trip (seconds)			
Velocity of the Pulse (m/s)			

Analyzing the Data

1. Calculate the velocity of the wave pulses using the equation for average velocity (v = d/t). Be sure to use the time for a single pulse. SHOW ALL WORK BELOW.

Trial #1 (4 – 6m)

Small Amplitude	Medium Amplitude	Large Amplitude

Trial #2 (6 – 8m)

Small Amplitude	Medium Amplitude	Large Amplitude

Questions

1. Is the speed of the pulse on a transverse spring wave of a given length a constant (approximately)?

2. Which type of spring generates a faster pulse? Loose or taut?

3. What happens to the shape of the reflected pulse?

4. Does the speed of the pulse depend on amplitude size?