

MECHANICAL SNAKE

Purpose: to investigate the factors which affect waves in springs

Materials: long slinky, long narrow spring, stopwatch, meter stick

Procedure: (Remember to record data and observations for all experiments)

1. Velocity experiment with slinky:

a) Stretch the slinky to 5 meters on the floor, measure and record the time and distance to calculate the speed of a transverse pulse—do this for 3 good trials.

b) Repeat step 1.a using a stretch of 8 meters—record all data.

2. Reflection experiment:

a) Have one person hold one end of the slinky firm against the floor. Have another person send a sharp single transverse pulse from the opposite end. Upon reflection did the displacement of the pulse stay on the same side? Record your observations.

3. Superposition experiments:

a) Using the slinky, send a transverse pulse from both ends at the same time. Observe carefully to see if the pulses pass through each other or reflect from each other when they collide. Try pulses of the same size together and different sizes together. Record your observations.

b) Repeat experiment 3.a) with the slinky using a longitudinal pulse from each end.

c) Using the slinky, send equal size pulses from each end at the same time. Observe what happens to the size of the combined displacement of the pulses when they meet.

PUT SLINKY AWAY--GET NARROW SPRING

4. Velocity experiment with narrow spring:

a) Stretch the narrow spring to 4 meters on the floor, measure and record the time and distance to calculate the speed of a transverse pulse—do this for 3 good trials.

b) Repeat step 4.a using a stretch of 6 meters—record all data.

c) Repeat 2.a) for the narrow spring.

d) Repeat 3.c) using the narrow spring. Record all observations.

5. Standing wave experiments:

a) Using the narrow spring up in the air, make a transverse standing wave by moving it back and forth (or up and down). Observe what happens when you shake the spring spring faster and slower. Make a drawing of your observations of both the fast and slow experiments.

b) Repeat the motions in step 5.a) but now record the number of shakes per second (frequency) and the length from node to node. Do this for 3 different rates of vibration. Record your observations and data.

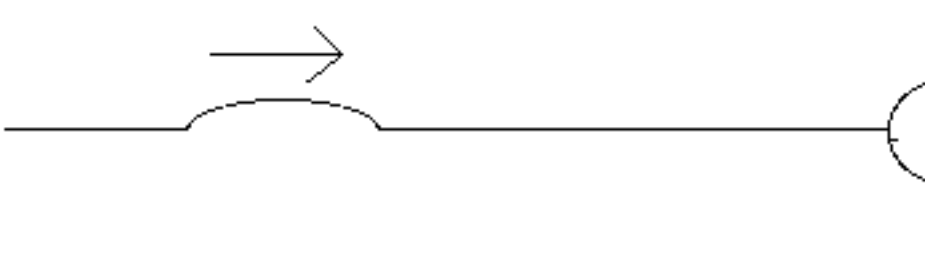
Mechanical Snake

Questions

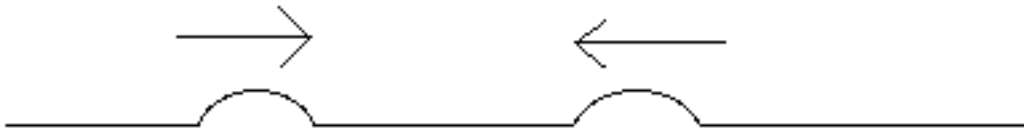
- 1.a) Did stretching the slinky affect the wave's velocity?
b) Did stretching the narrow spring affect the wave's velocity?
2. Compare your wave velocity results with other groups.
Should the results be the same?
Why or why not?

You may wish to use a drawing to answer the following.

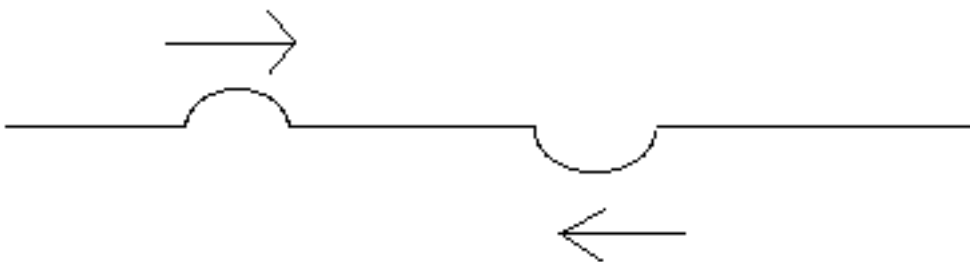
3. What happens when the wave pulse is reflected off the wall?



4. What happens when two wave pulses of equal size meet?



5. What happens when the two wave pulses, as seen below, meet?



6. Write a Summary!!!!