

Wave Speed Activity

Objective: To investigate the speed of wave pulses through different media

Procedure A

1. Stretch a spring to a length of at least 3 meters.
2. A third person will measure the length of the spring.
3. One of the people holding the spring will send a wave pulse down toward the other person.
4. One member of the lab group will use a stopwatch to record the time for the pulse to travel from one person to the other, and back to the original person again.
5. Repeat this 3 more times for accuracy.
6. Calculate wave speed using distance/time.

Length of Spring (m)	Total Distance Traveled by Pulse (2x the Spring Length)	Total Time to Travel Back and Forth (s)	Wave Speed (m/s)

Procedure B

1. Repeat the steps in **Procedure A** for springs of different lengths.

Length of Spring (m)	Total Distance Traveled by Pulse (2x the Spring Length)	Total Time to Travel Back and Forth (s)	Wave Speed (m/s)

Length of Spring (m)	Total Distance Traveled by Pulse (2x the Spring Length)	Total Time to Travel Back and Forth (s)	Wave Speed (m/s)

Procedure C

1. This time you will use a slinky rather than a long spring. Rather than sending a transverse wave pulse, you will send a longitudinal pulse by compressing a small section of the slinky. When you let go, you should notice the compression move down the length of the slinky and back. Repeat the same steps from **Procedure A**.

Length of Spring (m)	Total Distance Traveled by Pulse (2x the Spring Length)	Total Time to Travel Back and Forth (s)	Wave Speed (m/s)

Procedure D

1. Go back to the long spring and make the spring as long as any one of the three lengths you had before. This time, give your spring a large amplitude pulse. Repeat the steps from **Procedure A**. Do the same thing a second time but with a very small amplitude.

Big Amplitude

Length of Spring (m)	Total Distance Traveled by Pulse (2x the Spring Length)	Total Time to Travel Back and Forth (s)	Wave Speed (m/s)

Small Amplitude

Length of Spring (m)	Total Distance Traveled by Pulse (2x the Spring Length)	Total Time to Travel Back and Forth (s)	Wave Speed (m/s)

Questions:

1. Show an example calculation for finding wave speed from one of your trials.
2. Describe what happened to the speed of the wave in Procedures A and B when the length of the spring increased. Explain why you think this occurred.
3. How did the speeds of the longitudinal pulse and the transverse pulse compare? Should they be similar? Explain your answer.
4. How did changing the amplitudes affect the speed of the transverse wave? Explain your answer. Make sure you compare speeds when the springs were all the same length.
5. Describe your observations from watching the wave pulse travel back and forth.

Items to include in your response:

What happened to its frequency, amplitude, etc. after each reflection.

Did the wave slow down over time?

Did the wave change which side of the spring it traveled on after each reflection?