Lab 7-1: **Slinkies**

Purpose: To make observations of wave phenomenon using a slinky.

NOTE: Be careful with the Slinky, as it easily becomes knotted and useless!

1. Stretch out the slinky between you and your partner. There are two types of waves you can create with the slinky: longitudinal and transverse.
   Transverse Pulse*:* Shake the slinky rapidly from side to side. Describe/draw what you see.

   Longitudinal Pulse*:* Give the slinky a quick push and then pull it back. Describe/draw what you see.

2. Keeping the slinky somewhat loose between you and your partner, send a wave **pulse** down to your partner by giving the slinky a very rapid side to side motion. Observe the following as the pulse travels to your partner:

   - Does the shape change?
   - Does the speed of pulse change?
   - Does the amplitude of the pulse change?

3. Repeat number 2 for a variety of pulses. Try long wavelengths vs. short wavelengths. Try large amplitudes vs. small amplitudes. What happens?

4. Does the speed of a wave depend on its amplitude or wavelength?

5. Now tighten the slinky between you and your partner. Send a pulse to your partner. What happens to the speed of the pulse? Tighten it more. What happens?

6. Have your partner hold their end of the slinky tightly to the floor. Send a wave pulse of large amplitude down and carefully observe the reflected wave that comes back to you. Look at the wavelength, shape, amplitude and which side of the slinky the wave is on when it reflects back as compared to when it came down. What happens?

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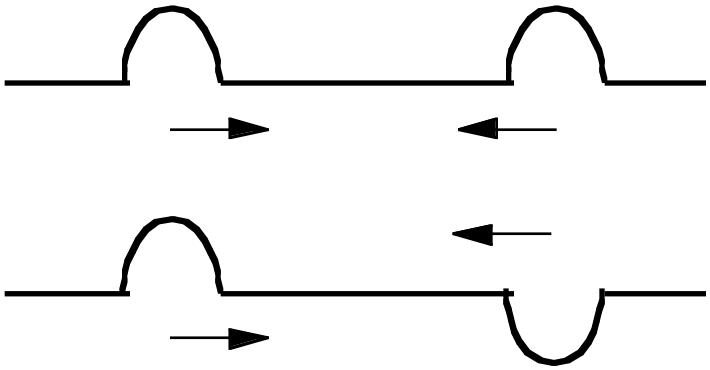
7. Tie a string about 2 meters long to one end of the slinky. Have your partner hold the end of the string, so that the end of the slinky is free to move. Send a wave pulse of large amplitude down to your partner and again observe the wave that is reflected back to you. What happens. (Note: this can be tricky to see, so be careful.)

8. Now we want to look at how waves interfere with each other. Have your partner send a longitudinal pulse to you at the same time that you send a transverse pulse to your partner. What happens when the pulses hit each other?

9. Now you and your partner must send transverse wave pulses to one another. Each of the diagrams below represents the pulses to be sent. Draw what happens the *instant* the two waves are on top of each other and then what happens after the waves have interfered with each other.



10. Now send continuous waves down the slinky by shaking your hand back and forth.
    a. If you shake your hand with a higher frequency, what happens to the wavelength?

    b. If you shake your hand with a lower frequency, what happens to the wavelength?

    c. If you keep the frequency of your shaking constant, but make the amplitude bigger, what happens to the wavelength?

    d. If you keep the frequency of your shaking constant, but make the amplitude smaller, what happens to the wavelength?