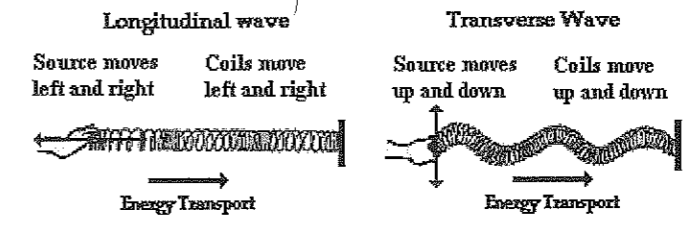


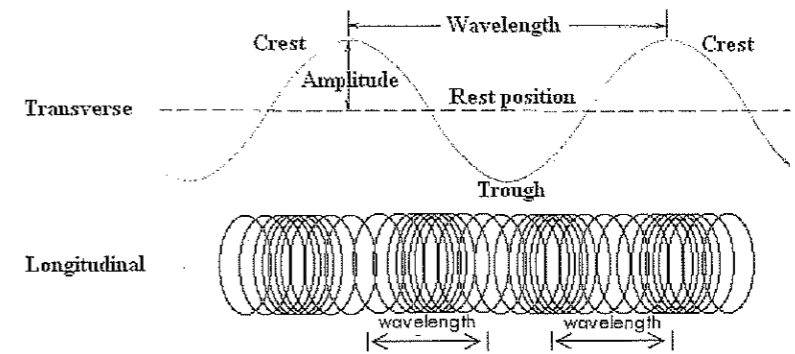
### Slinky Wave Lab

#### Background

A wave can be described as an energy disturbance that travels through a medium from one location to another. Waves, simply put, are energy moving from one place to another. As the wave moves through the medium (water, slinky, air), energy is being passed from one particle to the next. Waves occur around us every day. Some common places we experience waves are in ocean waves, electromagnetic radio, and earthquakes.

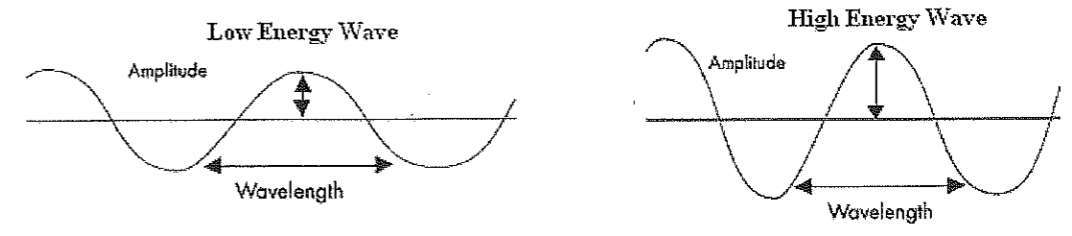


In addition to being a great toy, the Slinky is an excellent device for creating and studying waves. A slinky can easily demonstrate the two basic types of waves, transverse and longitudinal. In a transverse wave the particles move perpendicular to the direction the wave is moving. In a longitudinal wave the particles move at parallel directions to the direction of wave travel.



There are three basic characteristics used to describe waves.

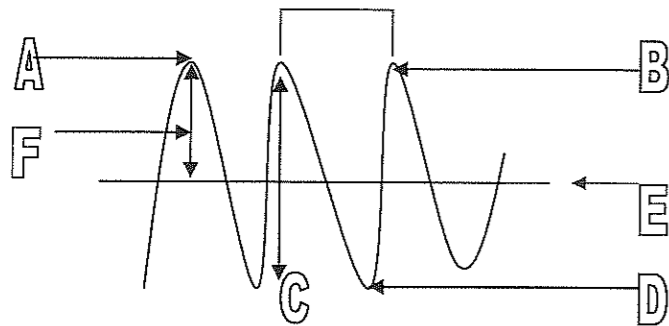
1. Frequency - The number of waves produced in a given time period. This is usually measured in waves per second called hertz (Hz).
2. wavelength - The period/length of a wave. This can be measured easily from crest to crest or from trough to trough. (m)
3. Amplitude - The height or depth of a wave. The amount of energy carried by a wave is related to amplitude. A high energy wave is characterized by high amplitude; a low energy wave by low amplitude.



Name \_\_\_\_\_ Date \_\_\_\_\_ P \_\_\_\_\_

This is a transverse wave.

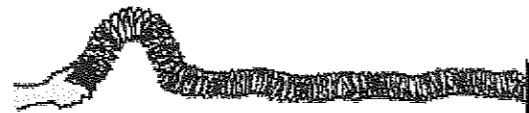
- A: peak    B: wavelength  
 C: peak to peak amplitude                  D: trough  
 E: equilibrium line                              F: amplitude



**Materials:**  
Slinky, meter stick, pencil

**Purpose:**  
The purpose of the lab is to study the types of waves and their properties using a slinky.

- Procedure:**
1. Select a lab partner and gather the lab materials.
  2. On a smooth floor, stretch the slinky out between you and your partner, to a length of about four meters. (*Caution – Do not over stretch the slinky!*)
  3. Send a single wave to your partner (see below).



4. Observe what happens to the wave when it reaches your partner's end. Observe the reflected wave.
5. Move one end of the slinky back and forth on the floor repeatedly (see diagram below). Observe what happens as you vary the rate at which your hand moves or vibrates.



6. Next create a series of waves by moving your hand towards and away from your partner (see the diagram below). Observe this wave and how it travels.
7. Answer the questions on the answer sheet.

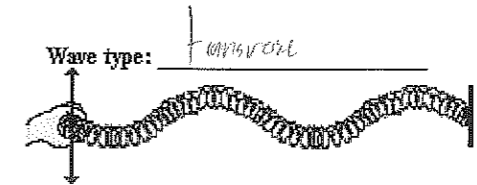
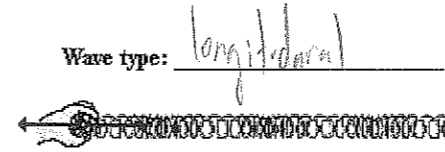


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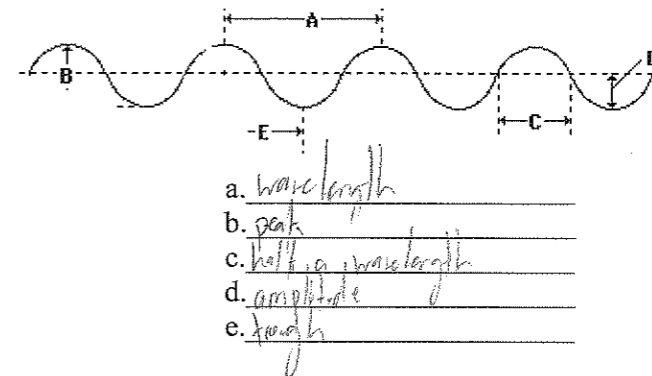
### Slinky Wave Lab - Answer Sheet

**Questions:**

1. What is a wave? a transfer of energy with no net transfer of matter
2. Label the diagrams below with the appropriate wave type.



3. Identify the parts of the wave below



4. What happens to the frequency of the waves when you increased the rate of vibration (how fast your hand moved back and forth).  
increase
5. What happens to the wavelength when you increase the rate of vibration (how fast your hand moved back and forth).  
decrease
6. What is the relationship between wavelength and frequency?  
smaller wavelength = higher frequency
7. Are the waves created in step 5 transverse or longitudinal?  
transverse
8. Are the waves created in step 6 transverse or longitudinal?  
longitudinal
9. For each wave produced did any of the spring coils actually travel from one end of the slinky to another? nope
10. If the wave coils did not travel than what did? the energy