Teacher instructions for Slinky Wave Lab

The slinky wave lab gives you an alternative to the Phet simulation. The first option involves students physically manipulating a slinky and making measurements. There is a second option that provides students to make more accurate measurements and complete some calculations. However, this activity requires using video cameras (could be cell phones) and computers.

Below I have included instructions on how the measurements can be accomplished if you have groups of four students.

1. **How to test frequency and wavelength**

Option One: Students should tape several sheets of printer paper together and place them on the table or floor. They should stretch the slinky across the paper. Have one student be in charge of creating the wave by moving the slinky. The faster the student moves their hand, the greater the frequency. Students need to keep a consistent frequency during each trial. The second student should hold the opposite end of the slinky stationery. A third student must be in charge of determining the frequency. They should keep track of the time and count the number of waves created within a 30-second window. At the end of that time, the student can determine the frequency by dividing the count by 30 to get the number of waves per second. To determine the wavelength, the fourth student must mark the beginning and end of a wave. It would be helpful if this person had access to different color writing utensils so they could mark several waves within a single trial. To determine the wavelength, the student needs to measure the distance between the marks for a single wave.

Option Two: A group of three students could do this activity if they have a device that records video. While two students are dealing with the slinky, the third would be standing above and recording (it helps if the slinky is on the floor). Then the students can determine the frequency and wavelength from the video.

2. **Frequency and amplitude**

Option One: This investigation can be carried out much like the one above. The first student should keep the frequency consistent in each trial. The only difference is that the fourth student must mark the top and bottom of a wave to determine amplitude.

Option Two: The same as #1. The only exception is students should be measuring amplitude from the video.

3. **Amplitude and wavelength**

Option One: This investigation is similar to the two above. However, the third student does not have to keep track of time. Instead, this person should either be marking the top and bottom of the wave to get amplitude or the start and finish of the wave to get wavelength. The fourth student will mark the other element. Again, the first student must attempt to keep the amplitude consistent during each trial.

Option Two: The same as #1. The exception is that students will need to determine the amplitude and wavelength from the video.