Name(s): _____ Date: _____ Period: _____

Student Handout to Physics Cinema Classics C Wave Propagation-Wave Vocabulary Lessons 2 – 3

To Accompany Activity #6 Using a Wave Simulation to Determine a Relationship

Purpose: Determine the speed of a transverse wave in a Slinky™.
Use the relationship between frequency and wavelength for a transverse wave in a Slinky™.

Procedure:
Go to Lesson 2. View the whole lesson as well as lesson 3, and then place a transparency over the screen and mark the position of a wave's crest on the Slinky™. Record the frames/second.
Advance the movie frame by frame until the next crest is aligned with your mark. Record the frame number below. Go to the last frame in Chapter 2 and record the wavelength below.

Data:

Final frame: _____

Initial frame: _____

Frames/second: _____ Elapsed frames: _____

Wavelength: _____

Calculations:

Elapsed time = _____

Frequency = _____

Velocity = _____

Summing Up:

1. What is the definition of wavelength? Is the wavelength measured on the video the only option for the wavelength? _____ Explain._____
_____
_____

2. As the frequency increases what happens to the wavelength? What mathematical relationship does this represent? How do you know? _____
_____
_____

3. Would changing the frequency rate change the speed you calculated? _____
What factor(s) might? Explain. _____
_____
_____

TEACHER NOTES TO PHYSICS CINEMA CLASSICS C WAVE PROPAGATION-WAVE VOCABULARY LESSONS 2 – 3

To accompany Activity #6 Using a Wave Simulation to Determine a Relationship

Purpose: Determine the velocity of a transverse wave in a Slinky ™.
Develop the relationship between frequency and wavelength for a transverse wave in a Slinky ™.

Procedure:
As an introduction, lead a class discussion reviewing terms like frequency, wavelength, and speed of a wave. Then have students use the worksheet to determine the velocity of a transverse wave in a slinky. Students will need transparencies and markers to collect data for the worksheet. If you have only one monitor for the DVD, students may watch you mark the points on the monitor, and then you can give the students photocopies of your transparency from which to measure data.

Go to Lesson 2 and follow the procedures listed on the student version.

Data:

Final frame: _____

Initial frame: _____

Frames/ second: *48* Elapsed frames: *38*

Wavelength: *1.0 m*

Calculations:

Elapsed time = *38 frames/48 frames/sec =0.79seconds*

Frequency = *1/period = 1/.79seconds = 1.3 Hz*

Velocity = $f\lambda$ = *1.3 m/s*

Summing Up:

1. What is the definition of wavelength? Is the wavelength measured on the video the only option for the wavelength? *No* Explain.
   The wavelength measured is from crest to crest and is not the only point to measure a wavelength. A wavelength is the distance from one point on a wave to the next corresponding point on the wave.

2. As the frequency increases what happens to the wavelength? What mathematical relationship does this represent? How do you know?
   As the frequency increases the wavelength decreases. This suggests an inverse relationship in which one variable increases as the other decreases.

3. Would changing the frequency rate change the speed you calculated? *No*
   What factor(s) might? Explain.
   The speed of a wave is dependent upon the medium. Changing the tension or mass/length would change the speed in a Slinky ™.