

**Physics**  
**PhET - Waves on a String**

Name \_\_\_\_\_

Date \_\_\_\_\_

1. Open the Waves on a String Simulation from PhET.
2. Set the damping to zero.
3. Change the setting to “**oscillate**” rather than manual. Choose “**no end**” rather than fixed end. Set **tension** to **high**. Check the “**ruler**” and “**timer**” boxes.
  - a. Do not change the amplitude or tension settings during this experiment.
  - b. Leave the damping setting at zero.
  - c. Use the ruler to measure the wavelength (**in meters!**) of your wave. To accomplish this, it works best if you **pause** the wave motion to get your measurement. Drag the ruler to move.
  - d. For five different frequencies, measure the wavelength of the wave produced. Record the frequencies and wavelengths in a table below:

Tension setting = \_\_\_\_\_

Amplitude setting = \_\_\_\_\_

**To find wave speed, multiply frequency and wavelength!**

Trial	Frequency (Hz)	Wavelength (m)	Wave Speed (m/s)
1			
2			
3			
4			
5			

- e. Using logger pro, create a graph of **wavelength vs. frequency**.
  - \* Draw a sketch of the resulting graph that includes all necessary components.
  - \* Write the general equation for the line.
  - \* Write the translated equation for the line.
  - \* What is the relationship between frequency and wavelength? (*write a sentence*)
  - \* If you double the independent variable, what happens (be specific) to the dependent variable?
  
- f. Using logger pro, create a graph of **wave speed vs. frequency**.
  - \* Draw a sketch of the resulting graph that includes all necessary components.
  - \* Write the general equation for the line.
  - \* Write the translated equation for the line.
  - \* What is the relationship between frequency and wavelength? (*write a sentence*)
  - \* If you double the independent variable, what happens (be specific) to the dependent variable?

- g. Repeat this experiment for a different string tension (*middle setting or higher*). Summarize your results. How does tension affect wave speed?

Tension setting = \_\_\_\_\_  
 Amplitude setting = \_\_\_\_\_

Trial	Frequency (Hz) <b>Do not exceed 50 Hz!</b>	Wavelength (m)	Wave Speed (m/s)
1			
2			
3			
4			
5			

- h. Repeat this experiment for a different amplitude and the same tension used previously in part g. Summarize your results. How does amplitude affect wave speed?

Tension setting = \_\_\_\_\_  
 Amplitude setting = \_\_\_\_\_

Trial	Frequency (Hz) <b>Do not exceed 50 Hz!</b>	Wavelength (m)	Wave Speed (m/s)
1			
2			
3			
4			
5			