**Mechanical Wave Simulator Online Lab**

***Instructions****: Follow the instructions below, record your observations and data in your journals.*

**Procedure**

1. Go to **Mechanical Wave** [**Simulator**](http://www.physicsclassroom.com/Physics-Interactives/Waves-and-Sound/Simple-Wave-Simulator/Simple-Wave-Simulator-Interactive)
2. You will be using this simulator to collect qualitative and quantitative data regarding longitudinal and transverse waves.
   1. You can make the simulation window larger using the arrow in the bottom right corner.
3. Using the grey box in the upper right corner of the graphing area, switch between longitudinal (sound) and transverse (rope) waves. **Answer the following questions**:
   1. Compare the motion of the **green** particles in longitudinal and transverse waves.
   2. In what direction is the **energy** transfer for each type of wave? How do you know?
   3. How does the motion of the **red** particles differ between longitudinal and transverse waves?
4. Make sure that the simulation is switched to **longitudinal waves**. We will now look at the relationship between wave properties.
5. Look at the wave properties located in the **teal box** on the bottom left of the simulator. **Answer the following questions qualitatively (no numbers)**:
   1. What wave properties (if any) change when you alter the **amplitude** of the wave?
   2. What wave properties (if any) change when you alter the **speed** of the wave?
   3. What wave properties (if any) change when you alter the **frequency** of the wave?
6. **Create a data table** that quantitatively shows how changing the frequency affects the wavelength of the wave.
   1. You need a minimum of **12 different frequencies** in your table
   2. Record the **uncertainties** provided on the board for frequency and wavelength.
   3. Be sure to include at least **2 trials**
   4. Below the table, **record a single measurement** of the constant wave properties: wave speed and amplitude.
7. Using the data from data table 1, **calculate** the period of the wave and record this and your wavelength in a **second data table**.
8. Create a **Wavelength vs. Period graph** (wavelength on the y-axis).
   1. Include a **best fit line** and include an **equation** for your line *with appropriate variables* from our Unit 6 equations.
   2. Next, **calculate the slope** on your line *with appropriate units*.
9. Answer the following **analysis questions**:
   1. What **wave property** is represented by the slope of the line?
   2. **Calculate the** **percent error** of you slope compared with the expected value given in the simulation.