Virtual Lab: Waves  
Science 8  
Ch. 10 Characteristics of Waves  

NAME: ____________________________  
DATE: ____________________________  
HOUR: ____________________________  

CLASS LAB REPORT WRITE UP  

SCIENTIFIC METHOD: MODEL OR GUIDE USED TO SOLVE PROBLEMS AND TO GET INFORMATION.  

LAB title: 

Virtual Waves  

Problem or Question you want to answer by doing the LAB:  

How does plunger size (amplitude) and speed effect wavelength and frequency?  

Previous Knowledge of the LAB before doing the LAB:  

1. Fill in the table below, then add the letters to the triangle to correctly display the wave speed equation.  

<table>
<thead>
<tr>
<th>Letter Symbol</th>
<th>Stands for</th>
<th>Unit used to measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>v</td>
<td>Velocity</td>
<td>m/s</td>
</tr>
<tr>
<td>f</td>
<td>Frequency</td>
<td>Hz</td>
</tr>
<tr>
<td>( \lambda )</td>
<td>Wavelength</td>
<td>m</td>
</tr>
</tbody>
</table>

2. List the three formulas that can be derived (gotten from) the triangle.  

\[ v = f \cdot \lambda \]  
\[ f = \frac{v}{\lambda} \]  
\[ \lambda = \frac{v}{f} \]  

3. What are the parts to a transverse wave?  
   1. Crest  
   2. Trough  
   3. Wavelength  
   4. Amplitude  
   5. Line of Rest  

4. What are the parts to a longitudinal/compression wave?  
   1. Compress  
   2. Rarefraction  
   3. Wavelength  
   4. Amplitude  
   5. Frequency  

5. If the speed and frequency of a wave increase, what happens to the wavelength?  

Hypothesis (answer the investigation question above in a complete sentence. Start out with a “I think ...” statement and end with “I think this because ...” statement):  

I think the (greater/smaller) the plunger (amplitude) and the (faster/slower) the speed, the wavelength will (increase/decrease) and the frequency will (increase/decrease). I think this because  

Materials needed to do the LAB:  

Procedure (step by step instructions to how you will find the answer to the question, be so detailed that someone else could duplicate your work):  
1. Use the grid to measure the wave’s amplitude & wavelength. (Click the magnifying glass to see a detailed view of the wave).  
2. Use the timer to measure the wave’s frequency. (Click the magnifying glass to see a detailed view of the wave).  
3. Record your measurements in the table.  

Defining the Variables:  

Independent Variable: Plunger Size / Plunger Speed  
Dependent Variable: \( \lambda + f \)  

Constants: Plunger Speed / Plunger Size / Water (tank, amount, temperature)  
Control: Small slow plunger
Observations/Recording Data taken during the LAB:
Organize/Analyze your data using a Graph/Table/Chart to present your findings. (REMEMBER TO SHOW WORK & LABEL!)

<table>
<thead>
<tr>
<th>Plunger Size</th>
<th>Plunger Speed</th>
<th>Amplitude (cm)</th>
<th>Wavelength (λ) (cm)</th>
<th>Frequency (f) (Waves/Sec)</th>
<th>Wave Speed (λ x f) (cm/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small</td>
<td>Slow</td>
<td>1</td>
<td>1.5</td>
<td>0.23</td>
<td>3.45</td>
</tr>
<tr>
<td>Medium</td>
<td>Slow</td>
<td>2</td>
<td>1.5</td>
<td>0.23</td>
<td>3.45</td>
</tr>
<tr>
<td>Large</td>
<td>Slow</td>
<td>3</td>
<td>1.5</td>
<td>0.23</td>
<td>3.45</td>
</tr>
<tr>
<td>Small</td>
<td>Fast</td>
<td>3</td>
<td>4</td>
<td>0.68</td>
<td>4.08</td>
</tr>
<tr>
<td>Medium</td>
<td>Fast</td>
<td>3</td>
<td>6</td>
<td>0.68</td>
<td>4.08</td>
</tr>
<tr>
<td>Large</td>
<td>Fast</td>
<td>3</td>
<td>6</td>
<td>0.68</td>
<td>4.08</td>
</tr>
<tr>
<td>Small</td>
<td>Super Fast</td>
<td>1</td>
<td>3</td>
<td>1.36</td>
<td>4.08</td>
</tr>
<tr>
<td>Medium</td>
<td>Super Fast</td>
<td>2</td>
<td>3</td>
<td>1.36</td>
<td>4.08</td>
</tr>
<tr>
<td>Large</td>
<td>Super Fast</td>
<td>3</td>
<td>3</td>
<td>1.36</td>
<td>4.08</td>
</tr>
</tbody>
</table>

Analyze your data
1. How does the plunger size affect the wave amplitude? As plunger size increased, amplitude increased.
2. When plunger speed stayed constant, what happened to the wavelength and frequency? No change.
3. When plunger speed increased, what happened to the wavelength? λ ↓
4. When plunger speed increased, what happened to the frequency? f ↑
5. When the plunger size and amplitude increased, what happened to frequency and wavelength? Nothing changed λ + f - stayed constant.
6. What relationship exists between the amplitude of a wave and the amount of disturbance in the water? Greater the amplitude - the higher the disturbance - More Energy
7. What relationship exists between the wave frequency and the wavelength? As λ ↓ f ↑

Conclusion: Answer the investigation question in a complete sentence that restates part of the question and includes a correct answer (2 points); include evidence in the form of numbers to support your conclusion (1 point); reference to your hypothesis by explaining if your hypothesis was/was not supported and why/why not (2 points).

How does plunger size (amplitude) and speed effect wavelength and frequency?

Plunger size does not effect wavelength + frequency, plunger size only changes amplitude. As Plunger size increased from S-M-L (at slow speed) amplitude increased from 1-2-3cm while wavelength stayed constant at 15cm + frequency at 0.23 Hz.

Plunger speed affected the wavelength + frequency by increasing speed slow-fast-superfast, wavelength decreased from 15cm-4cm-3cm and frequency increased from 0.23 Hz - 0.68 Hz - 1.36 Hz. My hypothesis was or wasn't supported in that I guessed.