

## Pendulum Lab

Standards: Science SI-E-A2, SI-E-A3, SI-E-A4, SI-E-A5, SI-E-A6, SI-E-B4, SI-E-B5, SI-E-B6, PS-E-B2, PS-E-B3, PS-E-B4.

### **Experiment #1**

In the pendulum lab, choose a position to start the pendulum at each time in the experiment. Record the starting position here: \_\_\_\_\_

Using the different lengths of rods at this station, complete the chart below. Be sure to start the pendulum in the same place each time and use the timer to time one full swing.

<u>Rod Length</u>	<u>Time for One Full Swing</u>
<u>Short</u>	_____
<u>Medium</u>	_____
<u>Long</u>	_____
<u>Longest</u>	_____

Look at the data you collected. What can you conclude about the length of the pendulum rod and how long in seconds it takes the pendulum to make one full swing? \_\_\_\_\_

\_\_\_\_\_

### **Experiment #2**

Choose a position to start the pendulum at each time and record it. \_\_\_\_\_

Try 1 weight on each on each different rod length and record the time in seconds that it takes the pendulum to make one full swing. Then try 2 weights on each different rod length and record your results.

<u>Rod Length</u>	<u>Time for One Weight</u>	<u>Time for Two Weights</u>
<u>Short</u>	_____	_____
<u>Medium</u>	_____	_____
<u>Long</u>	_____	_____
<u>Longest</u>	_____	_____

Look at the data you collected. What can you conclude about the amount of the weight and how long in seconds it takes the pendulum to make one full swing? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Variable Length Pendulum

Standards: Science SI-E-A1, SI-E-A2, SI-E-A3, SI-E-A4, SI-E-A5, SI-E-A6, SI-E-B2, SI-E-B3, SI-E-B4, SI-E-B5, SI-E-B6, PS-EB2, PS-E-B3.

### **Experiment #1**

Follow the directions at this station. Use the chart below to record your observations.

Length of Pendulum	Speed of Swing (Slow, Medium, Fast, Really Fast)
20 inches	
15 inches	
10 inches	
5 inches	

What can you conclude about the length of the pendulum and its speed?

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### **Experiment #2**

Do the math!

1. Measure the pendulum's length on the ruler. Enter this number into the calculator.
2. Divide this number by 12 to change inches to feet.
3. Then divide by 32 and press =.
4. Press the square root symbol and multiply by 3.14.
5. Multiply by 2 and press=.

This tells the time in seconds it takes your pendulum to make one complete swing (or period).

Double check your answer by going to the Pendulum Lab. Set the pendulum at the same length as you chose Did it work?

## Fourier Analyzer

Standards: Science SI-E-A2, SI-E-A3, SI-E-A4, SI-E-A5, SI-E-A6, SI-E-B2, SI-E-B3, SI-E-B4, SI-E-B5, SI-E-B6, PS-E-C1.

### Experiment #1

1. Press start. Choose a note on the keyboard at the bottom by clicking on it.
2. Click on each wave form and listen to how the sound changes.
3. Next, click on “take apart and rebuild the wave”. What can you say about the sine wave (curved wave) as the pitch increases? \_\_\_\_\_  
\_\_\_\_\_
4. Repeat the steps with higher and lower notes. Are there any differences? \_\_\_\_\_  
\_\_\_\_\_
5. Now try your own wave! Put the pointer in the top part of the screen. Push the button and roll the ball to make a wave. Then push “take apart and rebuild the wave”.

You can also change the harmonies by turning the dials using click and drag with the button and the ball.

Draw a picture of what your wave looked like on the screen.

