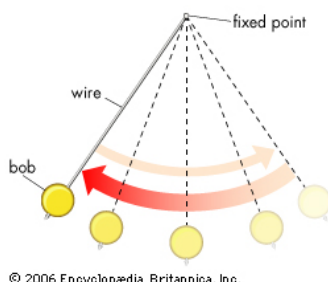


Testable Question for this lab: Which will affect the number of oscillations of a pendulum more, changing the mass at the end, or changing the length of the string?

Background Information (read this before beginning the lab):

A pendulum is traditionally defined as an object that hangs from one fixed point. When the object is set into motion, it is free to swing. A pendulum can be made from a length of cable or wire with some weight attached at one end (often called a bob). The other end is attached to a fixed point. See the simple diagram below.



The swinging motion of a pendulum is due to the force of gravity generated by the Earth's mass. One full swing is referred to as an oscillation (when it goes back and forth). The amount of time it takes to complete an oscillation is called the period. Today you will be testing how changing the mass of the object at the end (the bob) and changing the length of the string, affects the number of **full oscillations** that occur during a 20 second time frame.

Procedure:

Step 1: After reading the background information above, locate your **Lab 1 Data Sheet** (Google Classroom) and type a hypothesis for this testable question in the box provided at the top. Remember to use the terms if, then and because. Also, be sure it is a full sentence and use commas to break it up.

Step 2: Choose some roles/jobs for everyone in the group. The roles/jobs include:

1. Timer
2. Dropper (person who releases the bob)
3. Holder (this person holds the meter stick steady)
4. Observers (more than one person). Observers count the oscillations.

Step 3: Complete Experiment 1 as described below.

Attach the deflated balloon (about 4 grams) to the binder clip (be sure it doesn't drag when released) and have the Dropper pull it up so it is even with the top of the meter stick and the string is tight. When they release it, be sure that the timer begins to time the 20 seconds, while the observers count the oscillations. Record this data in the **Experiment 1 Table** of your **Lab 1 Data Sheet**. Repeat this for 3 trials, and then record the average in the table (round to nearest whole number

-no decimals needed). To average it, just add the numbers and divide by 3, and then round it. Repeat this experiment with both the pink eraser (20 grams) and the white eraser (40 grams) and record the data.

Step 4: Complete Experiment 2 as described below.

Attach the pink eraser to the binder clip. This time, you will have the mass remain the same, and the key difference will be that someone will shorten the string by half during each trial. The first trial will be the same as before with a full length string. Then you will shorten it in half. Simply do this by choosing someone to hold the string against the edge of the meter stick, so that the object only hangs half way down. Then shorten it by half again. Record all data in the **Experiment 2 Table** of your **Lab 1 Data Sheet**.

Step 5: Once all data is collected in the two tables, type out answers to the Data Analysis Questions on your **Lab 1 Data Sheet**. Then complete the October Lab Questions which will be posted separately as a Google Form.

Here is the Scoring Guide for this lab (25 Points):

Hypothesis= 3 points

2* for being present and logical

1* for using if, then, because format

Experiment 1 Table=3 points for being totally filled in

Experiment 2 Table= 3 points for being totally filled in

Data Analysis Question 1= 3 points

1* for being a complete sentence with punctuation

2* for a full and accurate answer

Data Analysis Question 2= 3 points

1* for being a complete sentence with punctuation

2* for a full and accurate answer

Data Analysis Question 3= 3 points

1* for being a complete sentence with punctuation

2* for a full and accurate answer

Lab Questions which will be posted separately in Google Classroom: 7 points