Lab 15-2 : **Simple Pendulum**

Purpose: 1. To determine which of the following three factors affects the period (**T**) of a pendulum: a) the **mass** of the bob b) the **angle** the pendulum is pulled back or c) the **length** of the pendulum.
2. To determine an equation from a straight line graph that relates that factor to the period, **T**.

Procedure:

Part I: Determining which factors affect the period.

You must determine if mass, release angle, or length affect the period of a pendulum. One of these will have a dramatic effect on the period; the other two will not.

1. Set up two pendulums using l00 gram masses. Hang them side by side from a bar set up between two stands. Make them the same length. Pull them back to angles that are quite different. Record the angles. Let the pendulums go, and time how long it takes each to swing back and forth 10 times. In either case, don't let the angle get larger than 45º.
2. Replace one of the 100 g masses with a 200 g mass, thus making one twice as massive as the other. Keep the lengths the same for each. Pull them back to the same angle and release them. Time how long it takes each to swing back and forth 10 times. Record in the data table.
3. Set up two pendulums and make one short and one long. Time how long it takes each to swing back and forth 10 times. Record in the data table.

Part II: Determining the mathematical relationship for the period.

4. Now that you have found the factor that affects **T** you will vary that factor for seven trials. For each of these trials, record in the second data table the time for 10 back and forth swings, and also the value you are changing.
5. Graph the data plotting **T** vs. (the factor). If your graph does not come out to be a straight line, re-graph as necessary to make it so and then write the equation. Your original graph and the modified graph (if necessary) must be included with this lab.

Data:

Part I:

	Time for 10 cycles (s)	Period (s)
Angle 1 =		
Angle 2 =		
Mass 1 =		
Mass 2 =		
Length 1 =		
Length 2 =		

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Part II:

Time for 10 cycles (s)	period, **T** (s)	factor varied. Insert it here

Conclusion:

1. What is your equation for the period of a pendulum?

2. Using a 100 gram mass, calculate how long the pendulum would have to be in order for its period to be l second? How long would it have to be if a 200 g mass was used?

3. Discuss the effect of air resistance on the period of a pendulum.