

NAME \_\_\_\_\_  
PHYSICS A/R - PERIOD \_\_\_\_\_DATE \_\_\_\_\_  
MR. LEACOCK

## LABORATORY 9

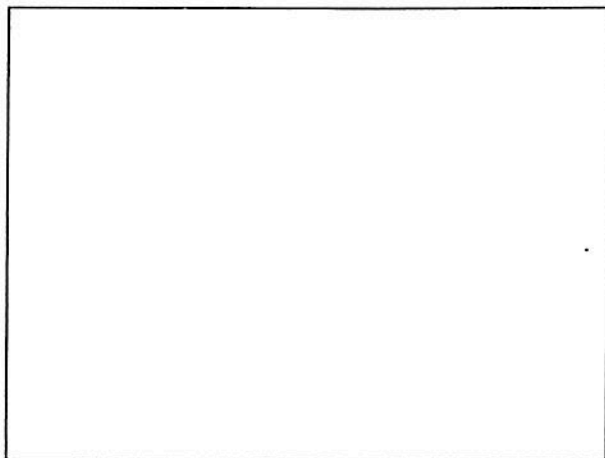
### Pendulum 1

#### Objectives

1. To determine the period of a pendulum.
2. To determine whether the period of a pendulum depends the mass of its bob.
3. To determine whether the period of a pendulum depends upon the amplitude of its swing.
4. To determine whether the period of a pendulum depends upon its length.

#### Diagram

Draw the pendulum apparatus in your lab notebook.



#### Procedure

##### Part 1 - Mass

1. Find the mass of each of the bobs, noting the material it is constructed .
2. Attach the lightest bob to the bottom of a string so the bottom of the bob is 1 meter from the top of the pendulum. Note this above your data table.
3. Pull the pendulum back exactly 20 cm from its rest position. This is the amplitude of the pendulum. Note this above your data table.
4. Release the pendulum and time how long it takes for the pendulum to make eight complete cycles.
5. Find how much time it takes for the pendulum to complete one complete cycle. This is the **period** of the pendulum. Note it in your data table.
6. Repeat steps #2 through #6 using the other five pendulum bobs, using the lightest first and moving toward the heaviest.

Pendulum Length \_\_\_\_\_ Amplitude \_\_\_\_\_



Material	Mass (g)	Time for 8 Cycles	Period (s)
Cork			
Wood			
Aluminum			
Steel			
Brass			
Lead			

**Part 2 - Amplitude**

1. Set up a data table including amplitude, time for 8 cycles, and period. Leave room above for additional information.
2. Set up your pendulum with the steel ball as its bob and length of 1.0 meter. Note the material, mass and length above your data table.
3. Pull back the pendulum 10 cm, release it and time how long it takes for the pendulum to complete 8 cycles.
4. Find the period of the pendulum.
5. Repeat steps #3 and #4, but alter the amplitude to 20 cm and 30 cm.

Pendulum Length \_\_\_\_\_ Mass \_\_\_\_\_

Amplitude	Time for 8 Cycles	Period
10 cm		
20 cm		
30 cm		

**Part 3 - Length**

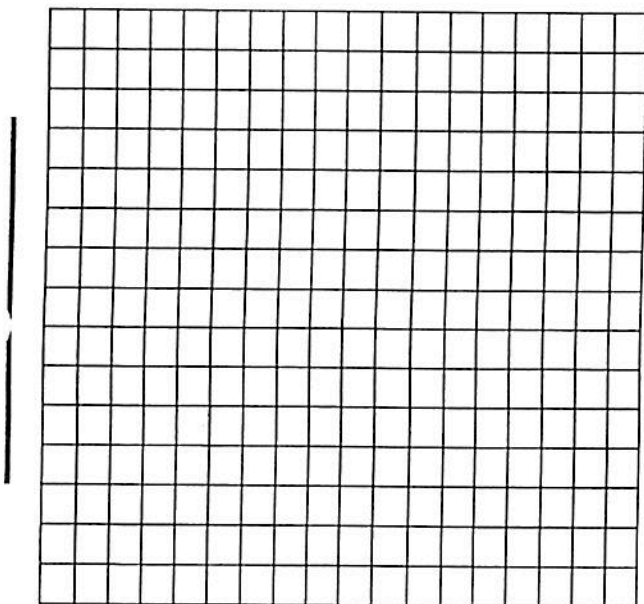
1. Set up a data table including length, time for 8 cycles, period, and the square root of length
2. Set the pendulum as in Part 2, noting the information above the table as before.
3. Find the time it takes for the pendulum to cycle 8 times (you can take this information from previous data).
4. Change the length of the pendulum to 0.36 m, 0.64 m, 1.00 m and 1.44 m, each time using the steel ball and 20 cm amplitude. Enter the data and complete the data table.



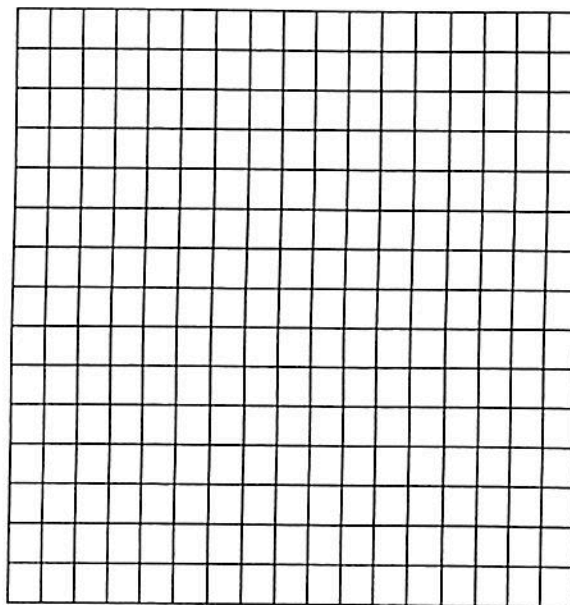
Pendulum Mass \_\_\_\_\_ Amplitude \_\_\_\_\_

Length	Time for 8 Cycles	Period (s)	☆Length
0.36 m			
0.64 m			
1.00 m			
1.44 m			

5. Graph period vs. Length.



6. Graph period vs. square root of length.



**Questions**

1. What factors appear to affect the period of a pendulum? Why?



2. Using your graphs, Can you determine the relationship between length of a pendulum and its period?

3. Look at the design of this laboratory. Explain why the lab is set up as it is. How do you think the lab might be changed or improved, if any? What changes could be made which would invalidate the experiment?

