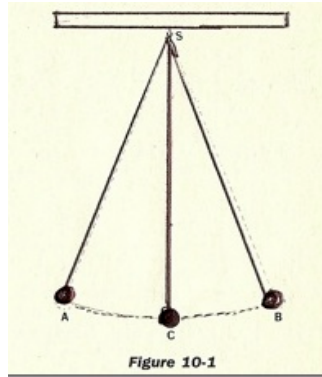


LAB 10, THE PENDULUM

Name _____ Period _____

A **simple pendulum** consists of a small, dense mass (called a bob) suspended by a nearly weightless cord from a point about which it can swing freely. Such a pendulum is shown in Figure 10-1. The point about which the pendulum swings, S, is called the center of suspension.



As the pendulum swings from A to B and back again to A, it makes a complete vibration, or cycle. The time required for a cycle is the period of the pendulum. The displacement of the pendulum is its varying distance from C. The arc AC, representing the maximum displacement of the bob from C, is the amplitude of vibration. The length of a simple pendulum is measured from the center of suspension to the center of gravity of the pendulum bob.

PROCEDURE:

1. Set up a pendulum with a mass as a bob. Measure the time in seconds required for 20 cycles of the pendulum bob. Keep the amplitude in all trials between 5° and 10° .
2. Measure the length in cm from the center of suspension to the center of the bob. Record the data.
3. Do one more trial using a different length. Record the period and length.
4. Replace the bob with one having a different mass. Record the length in cm and the mass in grams.
5. Keeping the length constant, do one more trial with a bob of different mass. Record the data.

Note: Because g is in meters, your lengths must also be in meters. $m = \text{cm}/100\text{cm/m}$.

Data Table

Trial	Mass (g)	Length (cm)	Length (m)	Time (s)
1
2
3
4

CALCULATIONS:

1. Showing your method, (1,2,3,4), Compute the period of the pendulum for each trial. **HINT: the period is the time for ONE cycle, so divide the TIME for 20 cycles by 20.**

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2. Using the equation for the *Period of the Pendulum*, compute the value of g for each trial.

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3- Using **9.8 m/s²** as the accepted value for g, compute the percent error for each trial. **HINT: Percent error = your error/accepted value X 100%. The accepted value is 9.8 m/s².**

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Calculations Table

Trial	Period (s)	g (m/s²)	Your Error (m/s²)	Percent error %
1
2
3
4

QUESTIONS:

1. What is the relationship between the mass of a pendulum bob and its period of vibration?

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2. What is the relationship between the length of a pendulum and its period?

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3. How could a pendulum be used to measure altitude?

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CRITIQUE: