Simple Pendulum Experiment

Subject: Physics | Grade: Grade 10

Objective:

To investigate the relationship between the length of a simple pendulum and its time period, and to determine the acceleration due to gravity (g).

Materials:

- Retort Stand
- Split Cork
- Thread (approx. 1m)
- Bob (Metal Sphere)
- Stopwatch
- Meter Rule

Procedure:

1. Set up the pendulum by attaching the bob to the thread and suspending it from the clamp.
2. Measure the length (L) from the point of suspension to the center of the bob.
3. Displace the bob slightly (small angle < 10 degrees) and release it.
4. Measure the time taken for 20 complete oscillations.
5. Calculate the time period T (Time/20).
6. Repeat the experiment for different lengths (e.g., 30, 40, 50, 60, 70 cm).
7. Plot a graph of L vs T^2.

Discussion Questions:

1. How does the time period change as the length increases?
2. From the gradient of your L vs T^2 graph, calculate g.
3. Why must the angle of oscillation be small?
4. Does the mass of the bob affect the time period? Explain.