Physical Pendulum Lab

Purpose: To calculate the acceleration due to gravity based on measurements of a pendulum's period and distance between pivot point and center of mass.

Materials: Meterstick, photogate, calculator, ring stand, calculator/photogate interface, clamp, paperclip

Procedure:
1. Clamp the paperclip at a height at which the meterstick (pendulum) can swing freely.
2. Place meterstick on paperclip via holes located at various distances from the center of mass.
3. Use the photogate and calculator to record the period of the pendulum at each distance.

Data Analysis:
1. Linearize the data by squaring the period, finding "x" — given by the formula $\left(\frac{\frac{1}{12}L^2 + d^2}{d}\right)$.
2. Graph T^2 vs. X. The slope of the graph is $\frac{4\pi^2}{g}$ based on the linearized formula.

Data: See graph

Calculations: See calculations

Conclusion: The acceleration due to gravity was calculated based off the data and an 18% error was found. This could be due to friction, irregular motion of the pendulum (moved in ellipse