Measuring "g" by Free Fall

Procedure

Briefly, but completely, describe the procedure you used – and include labeled sketches.

Data

Arrange your data in a neat and organized manner, with appropriate headings and units. Note which station, as well as mass and type (plastic or metal) of marble used. Do two trials for each distance. Record both trials, but graph only the average times.

Graphs

Using appropriate scales, labels and units, graph your data. If it's linear, find the best fits line and its equation. If it's not, figure out how to make a second graph linear, and then find its best fits line.

Questions

1) What is your equation for the best fits line of your linear graph? (Show your work)

2) Write the formula using the variables y for vertical height and t for time, and the equation from the previous question. Use your formula to predict the time required for an object to fall 2.0 m, and to predict the distance an object falls in 2.0 s.

3) What is the kinematic formula that actually relates y with t if the object has a non-zero initial velocity? Simplify the formula if the object begins at rest.

4) Use the slopes of your lines to calculate your experimental value for "g". Use 9.8 m/s^2 as the accepted value and find the percent error for your experimental results.

5) Ask other groups for their percent errors, and which type of marble they used. Did the mass or type of marble seem to make a difference in accuracy? Explain why or why not.

Error Analysis

Thoroughly explain what the main sources of error are for this lab, and how you would correct them.