3. **Constructing Graphs**   Use your data to plot the following graphs for each trial. On each graph, label the axes and indicate the trial number. Use a graphing calculator, computer, or graph paper.

   a. position versus time
   b. velocity versus time
   c. acceleration versus time

4. **Organizing Data**   Use the values for the average acceleration for all four trials to find the average value.

5. **Evaluating Results**   Use the accepted value for the free-fall acceleration given in the text and the average of your results from item 4.

   a. Determine the absolute error of your results using the following equation:

$$\text{absolute error} = |\,\text{experimental} - \text{accepted}\,|$$

   b. Determine the relative error of your results using the following equation:

$$\text{relative error} = \frac{(\text{experimental} - \text{accepted})}{\text{accepted}}$$

CONCLUSIONS

6. **Making Predictions**   Based on your results, how long would it take a 1000 kg mass to reach the floor if it were dropped from the same height as the masses in this experiment?

7. **Analyzing Graphs**   Calculate the slope of each velocity-time graph from item 3b.

8. **Evaluating Results**   Find the average value for the slope of the velocity-time graphs. What is the relationship between this value and the values you found for the average accelerations of the masses?

EXTENSION

9. **Designing Experiments**   Devise a plan to perform this experiment to study the motion of an object thrown straight up into the air. Make sure you take into account any special safety requirements or equipment you might need to use. If there is time and your teacher approves your plan, perform the experiment. Use your data to plot graphs of the position, velocity, and acceleration versus time.