

Acceleration Due to Gravity Lab Part I

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Purpose: To determine the acceleration due to gravity by video collection from a ball in free fall.

Procedure:

1. Find a suitable location for dropping your small object. The background should be a consistent colour.
Set up a meter stick to provide a scale.
2. Video the object as it falls from rest. The video must show the entire meter stick as the object falls.
3. Repeat 1 or 2 times to get the 'best possible' video.
4. Use Logger Pro to analyze the video:
Using Logger Pro for video analysis
Login to school network
Desk Tools -> Logger Pro 3
Insert menu -> select movie
Enable video analysis (button on bottom right of video window)
Add points to selected portion of the object
Click the set scale button and click/drag the length of the meter stick (a green line should appear)
Click on the blue Y on the XY axis and select Y velocity
Select the linear fit button at top of screen (near the right hand side)
Record the slope of the graph
5. Copy and paste the graph into a MS Word document

Observations & Analysis

1. Record the acceleration due to 'g' from your graph
2. The accepted value for the acceleration due to gravity is 9.8 m/s^2 . Determine the relative error for your result using:

$$\frac{\text{Experimental Value} - \text{Accepted Value}}{\text{Accepted Value}} \times 100\%$$

3. You decide to do this experiment on Mars. You release the ball 5.0 m from the surface and it takes 1.64 sec. to hit the ground. What is the gravitational acceleration on Mars?

