

G LAB:

1. Experimentally determine the value of g (acceleration due to gravity). Use two methods:

a) How height affects g . Dropping or throwing up an object a known distance and accurately and precisely timing it. Make several trials at several different heights.

To use the Motion Detectors to help you, use pages 77-78 in text as a guideline.

Notes:

- use a height of at least 2-5 meters. -start the dropping object from at least 20 cm away from the motion detector. -use the trace function to copy down at least 5 (including starting and ending) distance/time points of each drop. -use the analyze menu to select just the dropping region of the distance graph, then sketch the distance, velocity and acceleration graphs, using the trace function to find points and/or best fit lines/curves.

Remember that the SLOPE of the (best fit line to the) Velocity Time Graph should give you ACCELERATION. -collect data in a neat and organized fashion, and use it to produce a good conclusion as to the value of g .

Make a graph of height vs. ACCELERATION (g)

b) how angle affects g . The RAMP method. Let something (car, ball, etc...) freely roll down a ramp/driveway/air track. Do several trials at different lengths and angles. Using the known distance and measured time, determine the acceleration.

$$D = \frac{1}{2}AT^2$$

Measure the angle (use trig if needed, sine theta equals Vertical/Hypotenuse). Do it again for another ramp, another angle... Make a graph of angle vs. acceleration.

Extrapolate on your graphs to find the acceleration (g) for 90 degrees!! -collect data in a neat and organized fashion, and use it to produce a good conclusion as to the value of g .

c) how some other factor of your choosing affects g (mass, surface area, type of material, etc...)-collect data in a neat and organized fashion, and use it to produce a good conclusion as to the value of g .



FOR EACH EXPERIMENT, Each Individual Person should write a lab report.

Each section should have:

A problem statement

Procedure

Description of experiment, variables, and why it was conducted well or poorly

Results, with calculations and/or graphs

Conclusions: On how close you came to the actual values, what your percentage error was, what the sources of error might have been. (discuss accuracy AND precision).

