Dropping Marbles

Your name: _____ Lab Partner #1 _____ Lab Partner #2 _____

Use the cardboard pieces to cushion the marble impact!

We will drop two marbles of different weights from 3 different heights of 2.00 m, 1.50 m and 1.00 m and try to measure the free-fall time. We will graph the data in two different ways and end up with an estimate for the acceleration of gravity at the surface of the earth. Write times to 0.01 s and try to make the drop height accurate to 1 cm. The time measurements are very difficult because of our reaction times. Do you best.

Statistical calculations will be done using the program at *http://yosemitefoothills.com/Calculator* .

Object: small marble Weight: _____kg Height: 2.00 m

Times for 10 drops (ms) Average: _____ Standard Deviation: _____

Object: small marble Weight: _____kg Height: 1.50 m

Times for 10 drops (ms) Average: _____ Standard Deviation: _____

Object: small marble Weight: _____kg Height: 1.00 m

Times for 10 drops (ms) Average: _____ Standard Deviation: _____

Object: large marble Weight: _____kg Height: 2.00 m

Times for 10 drops (ms) Average: _____ Standard Deviation: _____

Object: large marble Weight: _____kg Height: 1.50 m

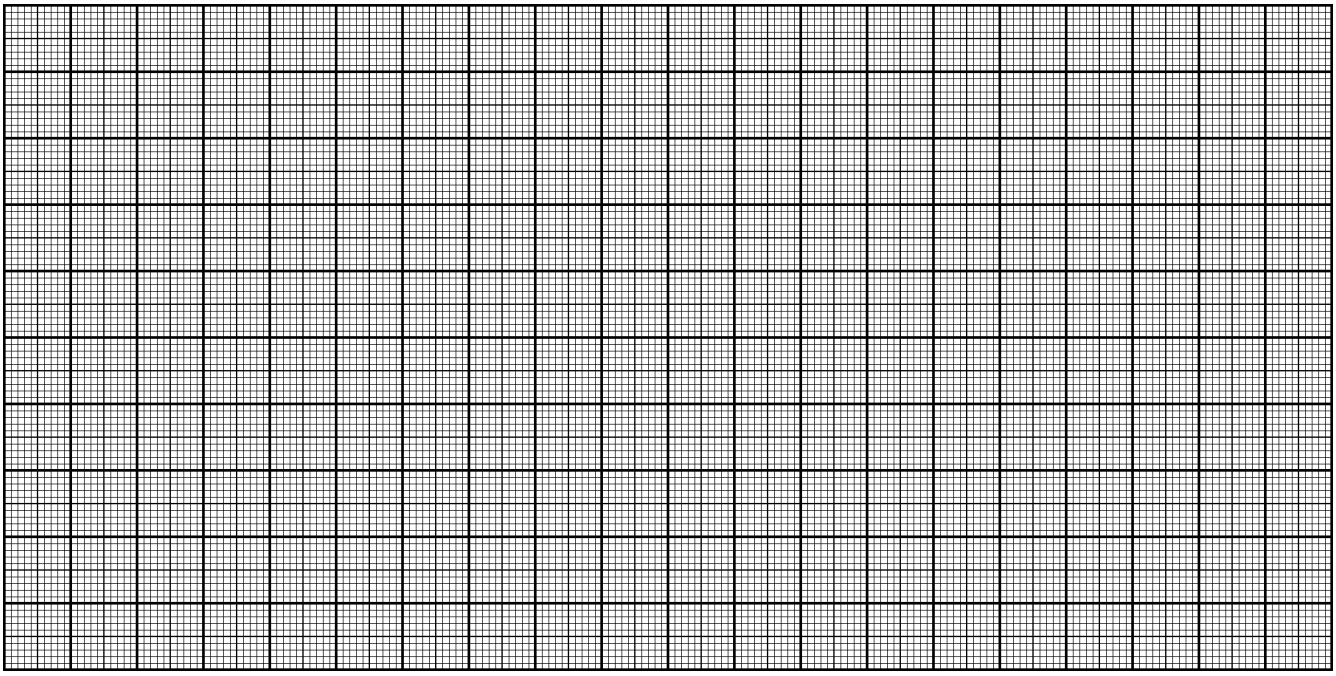
Times for 10 drops (ms) Average: _____ Standard Deviation: _____

Object: large marble Weight: _____kg Height: 1.00 m

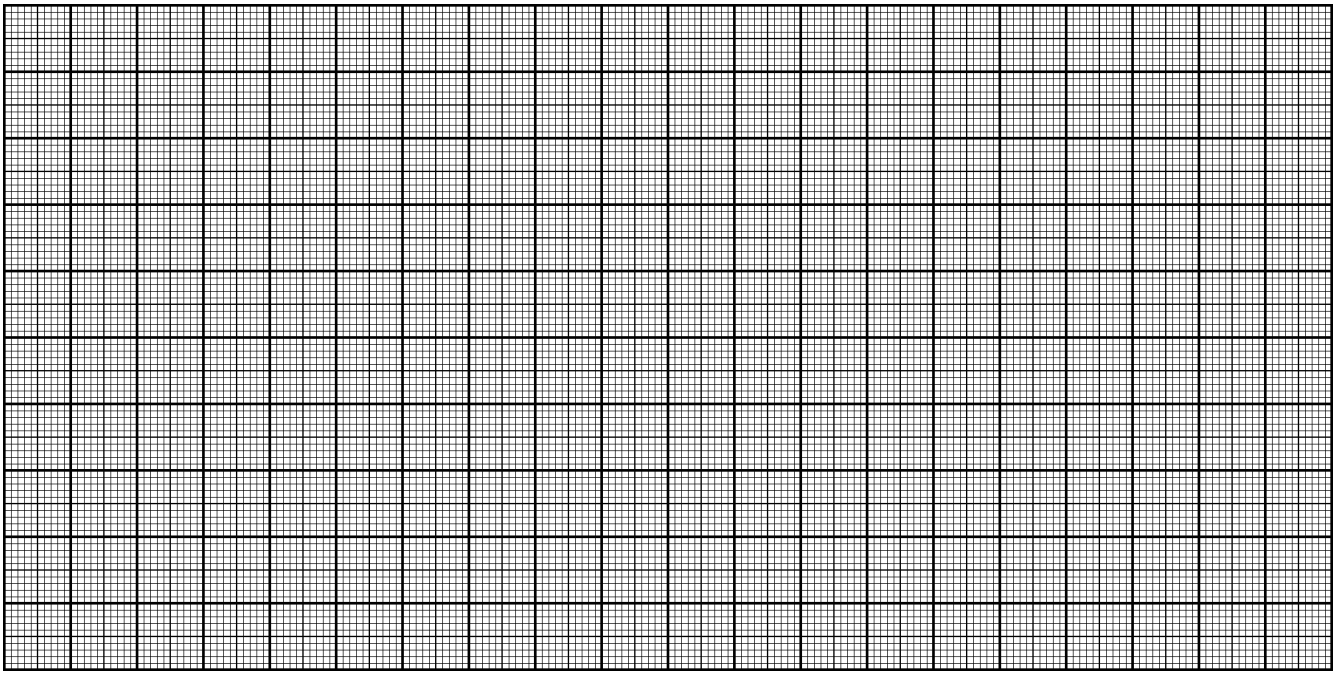
Times for 10 drops (ms) Average: _____ Standard Deviation: _____

Graph of Results for dropping small marble - follow instructor's advice on labeling:

Height (m) vs Time (s) small marble



Height (m) vs Time Squared (s^2) small marble

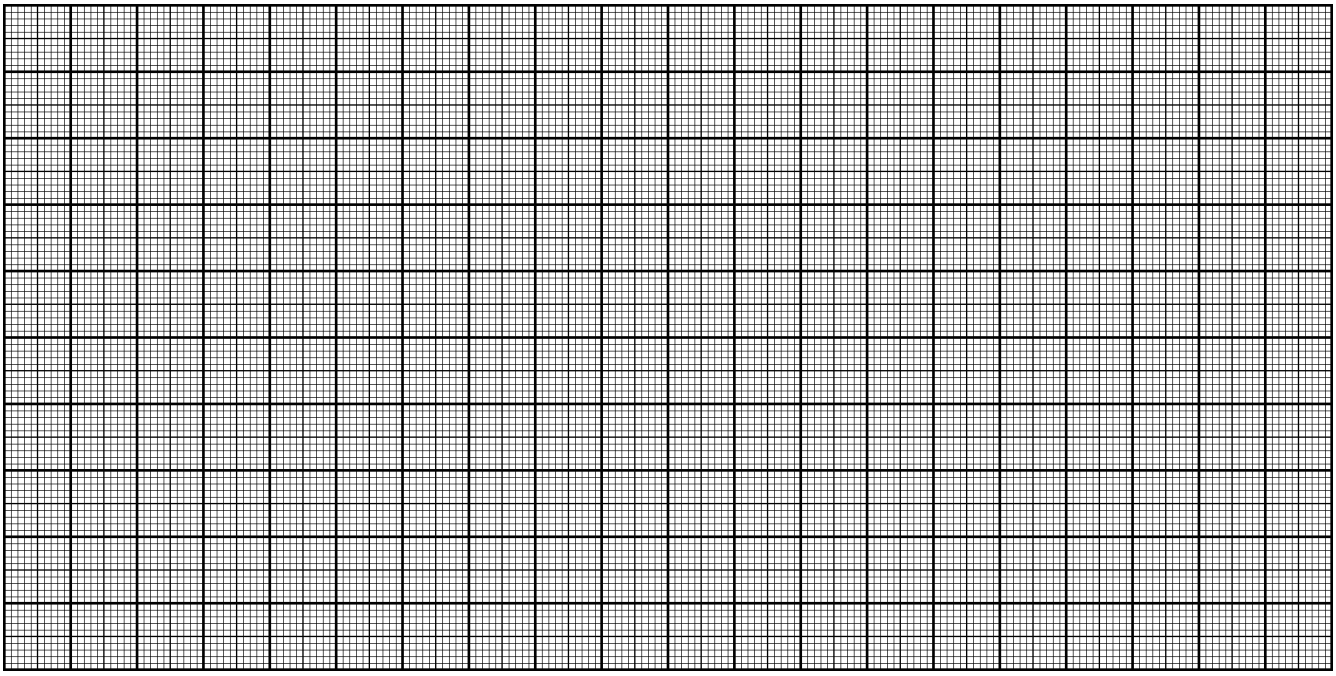


Slope: _____ m/s^2 Standard deviation of slope: _____ m/s^2

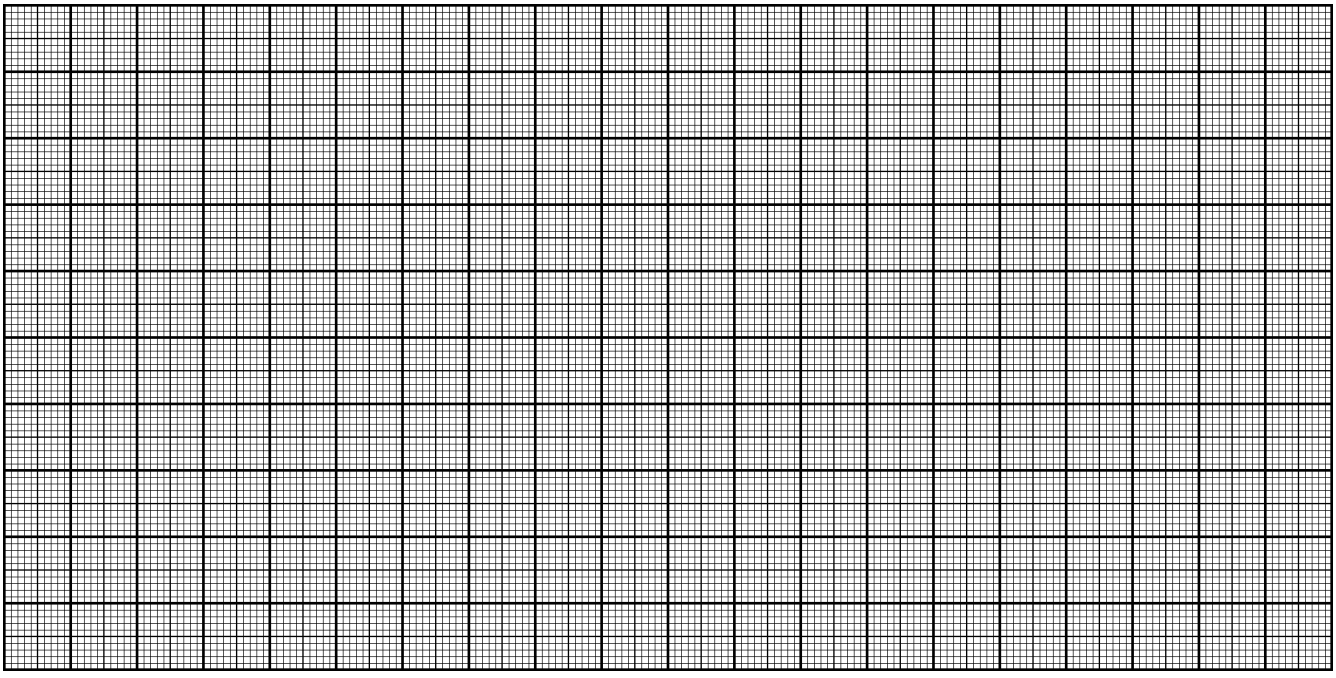
Acceleration of gravity at earth surface $g = 2 \times \text{slope}$ = _____ m/s^2

Graph of Results for dropping large marble - follow instructor's advice on labeling:

Height (m) vs Time (s) large marble



Height (m) vs Time Squared (s^2) large marble



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