Gravity Lab ***Name*** _____

Do Now: Vocabulary

Gravity is _____
_____.

Velocity is_____
_____.

Acceleration is _____
_____.

Lesson: The acceleration due to gravity is constant on all objects, regardless of mass or weight. It equals

$$g = 32.2 \text{ ft/s}$$

We can calculate this number by measuring the time for a ball to fall from a measured height, and using the formula

$$v = (g/2)\, t$$

where

- v is the speed of the ball
- t is the time for the ball to fall
- g is the constant of gravity

This is the equation of a _____, with slope equal to _____.

Experiment:

Equipment:

- Lego NXT brick, motor, and touch sensor in "release setup"
- Meter stick

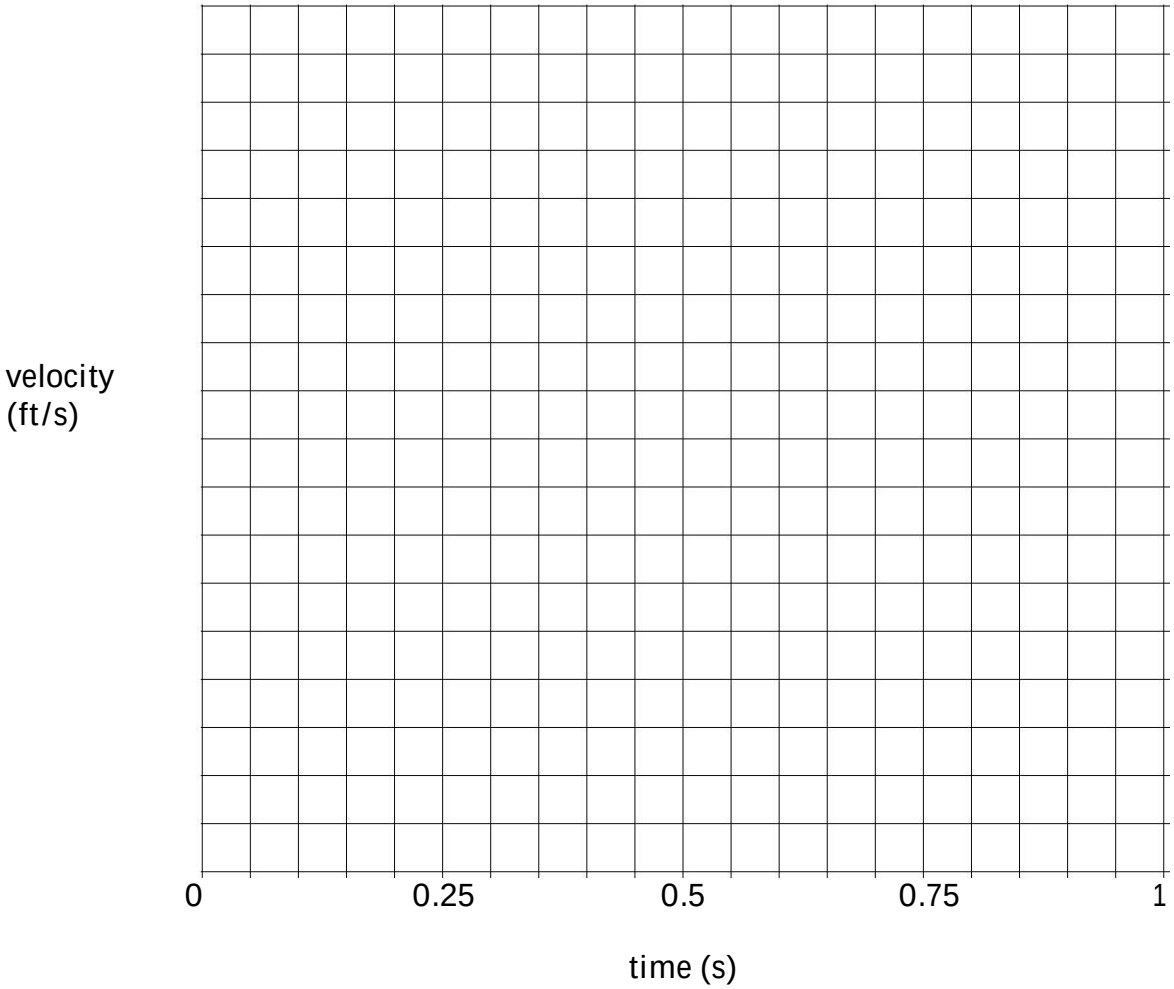
Procedure: Using the experimental setup, release the ball from different heights and record the time it takes for the ball to hit the base plate. This time will be displayed on the LEGO NXT brick, in seconds. Measure the velocity of reach drop height using the formula:

$$v = \text{height} / \text{time}$$

Record data here.

Data point	***height***	***time***	***speed (height / time)***
Example	10 ft	5 s	10 ft/5 s = 2 ft/s
1	1 ft		
2	2 ft		
3	3 ft		
4	4 ft		
5	5 ft		

Analysis: Plot your data points (*time, velocity*) on the graph below. Don't forget to label the axes.



Plot your data points (time, velocity) again, using a spreadsheet program (e.g. Microsoft excel). Add a best fit line to your data (linear regression or trend line) in excel) and generate an equation, as well as the R^2 value for this line.

Equation of best fit line (y=mx +b): _____

The slope of the best fit line is :_____ ft/s^2

Question: How does the slope of your best fit line compare to the standard value of *g*?