PHYSICS NAME_____
Groh / McKinley Hour_____ Partner 1_____Partner 2_____

Acceleration Lab

PURPOSE: The purpose of this lab is to solidify the concept of acceleration of an object. We will be rolling a sphere down a ramp and collecting data on distance traveled and time.

HYPOTHESIS:

IF_____

THEN_____

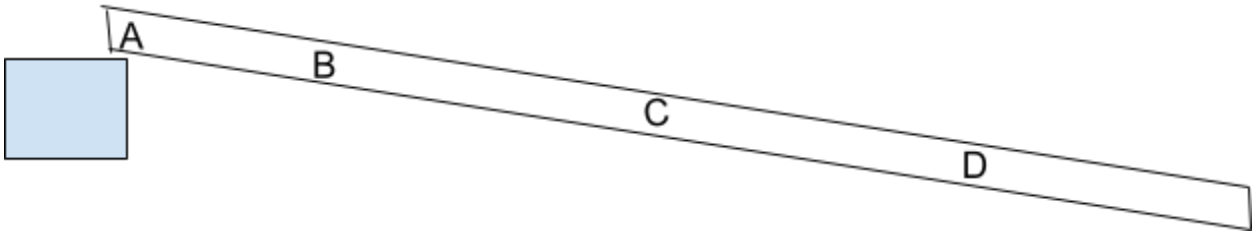
BECAUSE_____

MATERIALS:

Sphere	Metal Track	Blocks	Stopwatch	Measuring tool
Paper	Pencil	Calculator	Tape	Sharpie

PROCEDURE:

Set up a metal track with a block of styrofoam under one end. As shown:



Mark three (3) ***equal*** **length** (include units) sections of the track with tape.
Record the length of the sections: _____cm _____ m
Put the tape directly on the bottom of the track where the marble will roll to avoid parallax

Time how long it takes the sphere to roll the distance of the **FIRST** section **A-B**.. Perform this ten (10) times and record the data

Next, Time how long it takes the sphere to roll the distance of the **SECOND** section **B-C**.. That is, from the beginning of the second section to the end of the second section. NOTE: Start the sphere at the top of the first section just like the first trial. Perform this ten (10) times and record the data.

Next, Time how long it takes the sphere to roll the distance of the **THIRD** section **C- D.**. That is, from the beginning of the third section the the end of the third section. NOTE: Start the sphere at the top of the first section just like the first trial. Perform this ten (10) times and record the data.

Lastly, collect and record the time it takes the sphere to roll down all three sections **A- D** of the ramp. Perform this five times and record data.

DATA TABLE for times of rolling a sphere down three different sections of a steel track (ALL times in SECONDS)

TIME (seconds)

Trial	Section 1 AB	Section 2 BC	Section 3 CD
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
Average			

Time Data for rolling down all 3 sections of ramp

TIME (seconds)

Trials	Time (seconds)
1	
2	
3	
4	
5	
Average	

Velocity Data Table for sphere rolled down a steel ramp _____cm = _____m

TIME (seconds)

	Section 1	Section 2	Section 3	Section 4 **AD**
Velocity (m/s)				

ANALYSIS:
Use the average time calculation from each section to calculate the average velocity for each section and record it in the table. *Show all work in this section.*

Based upon the velocities from each section what can you say is happening to the sphere as it rolls down the ramp? (Use a physics word)
Using a complete sentence, explain what is happening to the sphere?_____

_____

Calculate the acceleration of the sphere
Use the formula $\mathbf{x = v_i t + \frac{1}{2} a t^2}$
Using a complete sentence, what is the value of v_i? WHY?

_____

_____

Knowing what happens to $v_i t$, what does the formula become? _____

Solve the formula for **a**. Write it here:_____

Calculate the acceleration of the entire trip by using the average time for all three sections and the previous formula. *Show work here:*

Acceleration Lab PART II:On Your OWN

Design, conduct and analyse a variation of this experiment that tests changing one of the variables to see how it affects the acceleration. Think about what variables you could change and brainstorm with your group what you would like to try and how you think it will affect acceleration. **You will need Teacher approval for this section before you do the lab.**

HYPOTHESIS:

IF_____

THEN_____

BECAUSE_____

PROCEDURE: List / explain changes to the original procedure

DATA TABLES: Create all necessary data tables necessary to complete your lab.

ANALYSIS: Show all calculations and formulas needed.

DISCUSSION/RESULTS: Write the following in Paragraph form: Did your hypothesis hold up? If not, why do you think it didn't. Include any sources of error for this lab.