

Title: Acceleration Lab

Objectives:

- ❑ Determine the speed of the car at various locations on the ramp
- ❑ Determine the rate of acceleration of the car on the ramp through calculations and using a graph.

EVERY person is responsible for their own lab report!!

Due Thursday Sept 20 by 11:59 pm

I. Title

II. Objectives

III. Raw Data Table

IV. Calculated Data
Table

V. 2 Graphs Section

–Position vs. Time

- distance A to B & avg. time A to B

–Velocity vs. Time

- Speed @ B & avg. time A to B

–Scroll down for help with graphing in
Google Forms

VI. Conclusion & Evaluation

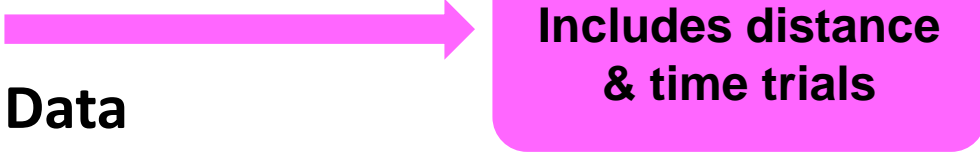
–Scroll down for help with conclusion
& evaluation

**Acceleration
Lab**

TURN IN on Google Classroom
- *one* document

2 Data Tables:

- Raw Data
- Calculated Data



Includes distance
& time trials

(7 columns across, 7 down)

Distance A to B

Avg. Time at A

Avg. Time at B

Avg. Time AB

Speed at A

Speed at B

Acceleration

2 Graphs:

Position vs. Time

use: distance A to B & avg. time A to B
&

Velocity vs. Time

use: Speed @ B & avg. time A to B

ACCELERATION LAB

Calculations

5 cm is the wing of the car

This is what passes through the light beam in order to record time of the car.

$$\text{Initial Speed} = \frac{5 \text{ cm}}{\text{avg. time at A}}$$

$$\text{Final Speed} = \frac{5 \text{ cm}}{\text{avg. time at B}}$$

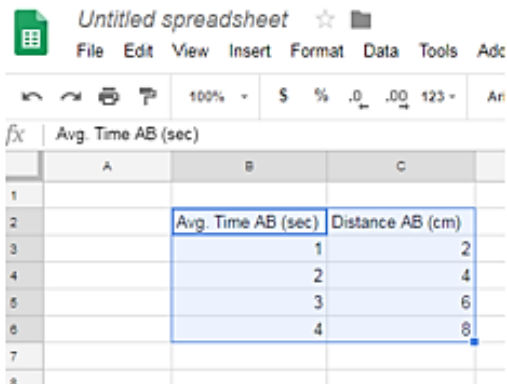
Initial Speed is Speed @ A

Final Speed is Speed @ B

$$\text{Acceleration} = \frac{\text{Final Speed} - \text{Initial Speed}}{\text{avg. time A to B}}$$

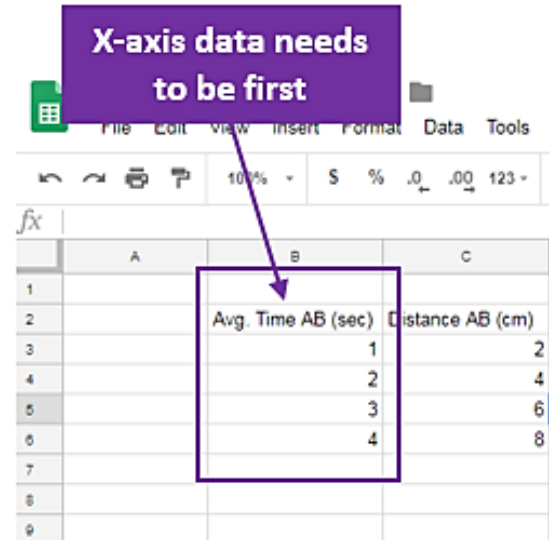
Graphing on Google Sheets

1. Create a data table like the one to right. Use YOUR data (I put in fake numbers, do NOT USE MY NUMBERS!) Make sure you have included units in your column headers!!



	A	B	C
1			
2		Avg. Time AB (sec)	Distance AB (cm)
3		1	2
4		2	4
5		3	6
6		4	8
7			
8			
9			

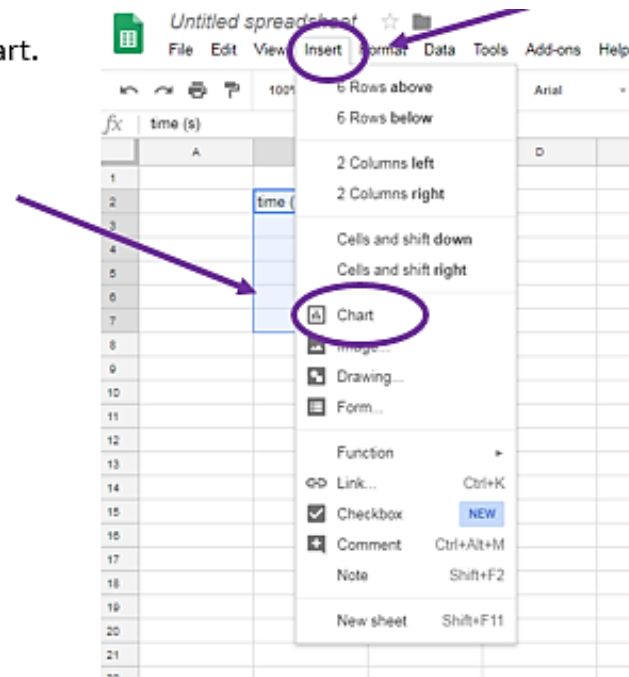
2. Highlight your data table. It should look like this when done properly. DO NOT HIGHLIGHT EXTRA BOXES!



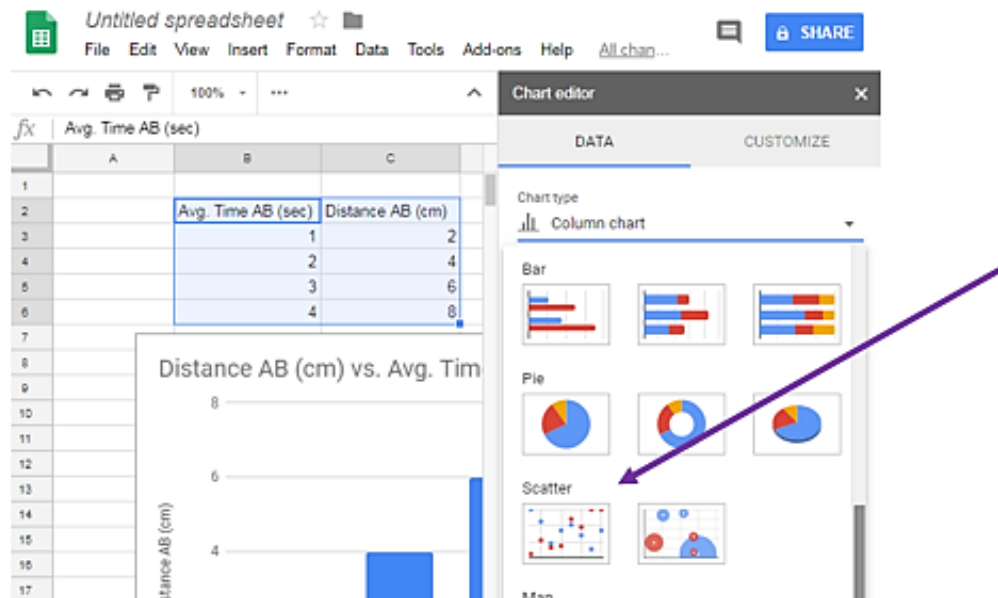
X-axis data needs to be first

	A	B	C
1			
2		Avg. Time AB (sec)	Distance AB (cm)
3		1	2
4		2	4
5		3	6
6		4	8
7			
8			
9			

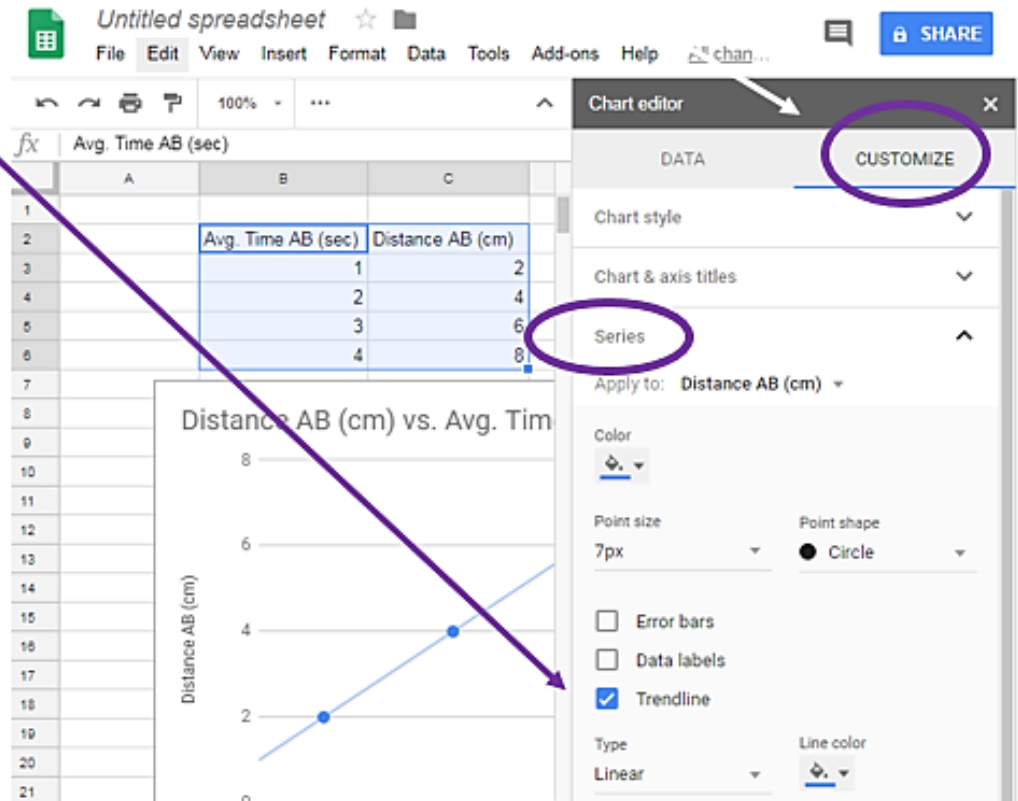
3. Click on Insert and then Chart.



4. This will give you a bar graph but we need a **scatter plot**. In order to change this, click on “Chart Type,” and scroll down until you see scatter. Click on scatter when you find it.



5. Still under "Chart Type" - You will need to add a Trendline to this graph. In order to do this, click on Customize, then Series, then Trendline.



2 Graphs

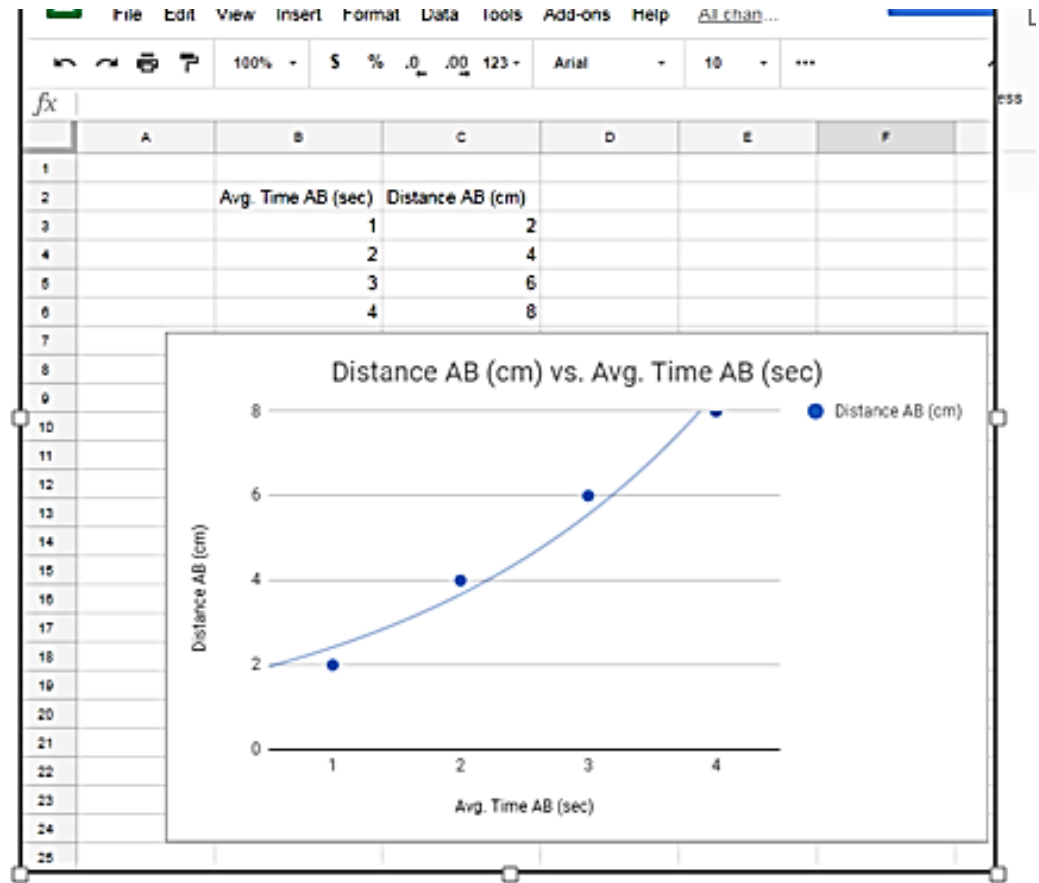
POSITION VS. TIME GRAPH

Change the "trend line type"
exponential

VELOCITY TIME GRAPH

Change "trend line type" to linear

6. When you are done, you can click on the X on the Chart editor and you will have your final graph.



You should only have one line on each graph.

If you have 2 lines graphed and need help come see me.

Conclusion and Evaluation *[typed in paragraph form]*

In your own words – not as a group. If yours are similar to other group members then you will not receive credit for this section. Everyone writes differently. Be authentic in your writing!

- State and justify a conclusion based on a reasonable interpretation of the data.
- Include the following questions in your conclusion section [paragraph form]:
 - Looking at the position vs. time graph you created is it a straight or curved line? Give an explanation of what your line illustrates.
 - What is the vertical-intercept of your velocity vs. time graph? What does this represent about the cart?
 - Does the car accelerate as it rolls down the ramp? Justify your answer.
 - What does the slope of your velocity vs. time graph tell you about the cart?
 - Is the acceleration of the car changing as it moves down the ramp? Explain your answer using what you know about the slope of a straight line.
- Evaluate your entire lab for limitations, weaknesses and errors. ***Although sloppy technique or human error is a source of error, it is NOT AN ACCEPTABLE source of error.***
- Provide suggestions on realistic improvements to the lab.

ACCELERATION LAB

Typed: Title, Objectives, 2 Data Tables, 2 Graphs, Conclusion & Evaluation

Every person is responsible for their own lab report
Turn In on your classes Google Classroom
DO NOT share!!

The screenshot shows the 'Your work' section in Google Classroom. At the top right, it says 'Assigned'. Below that, it says 'Files you add or create can be viewed and edited by your teacher'. There is a file named 'Slide4.JPG' with a thumbnail and the text 'Image'. Below the file, there are two buttons: 'ADD' and 'CREATE'. The 'ADD' button is open, showing a dropdown menu with three options: 'Google Drive', 'Link', and 'File'. A pink arrow points to the 'Link' option. To the right of the 'TURN IN' button, there is a pink circle around the button, and a pink arrow points to it from the right.