Name:

Partner:

Physics 12
M. Lam

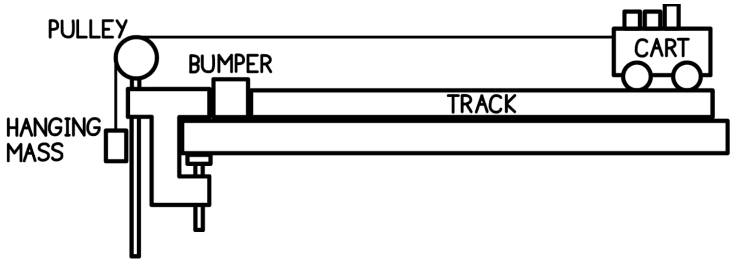
Newton's Second Law Lab

Block:

Introduction
The objective of this lab is to use a multi-body system to determine the relationship between acceleration and total mass of a system.

Equipment
Pasco cart
low-friction track
table clamp pulley
bumper (rubber stoppers)
hooked weights
string
stopwatch
electronic balance

Apparatus



Experimental Method
Describe how your data is collected. Your method must Include any steps necessary to reduce experimental uncertainty.

Questions to consider:
1. Will acceleration be measured directly or calculated using other measurements?
2. What quantities need to be measured? What equipment is required to make these measurements?
3. What is the independent variable? What is the dependent variable?
4. What quantities will be kept constant?

Tips:
- Ensure the track is level. Some of the tracks may have a levelling screw. If needed, you can use paper to raise one side track.
- You can use some tape to prevent the masses from flying out of the cart.
- Check the clamp throughout the lab to ensure it is still attached securely to the table.

Data
Include a table of the raw data. Include all calculated data for the linearized plot.

Analysis and Discussion
Determine the relationship between acceleration and total mass of a system. Your report should include the following:

- A plot of the original data
- A linearized plot
- The equation of your best fit line
- The slope of your best fit line (include units)
- The experimentally determined net force on the system
- The theoretical net force on the system and percent error
- A discussion of the sources of error

Conclusion

Acceleration is _____ proportional to _____. The net force on the system was determined experimentally to be _____ N, a _____ % error when compared to the actual net force of _____ N.

Component	Criterion	Weight	Mark
General	*Complete word-processed lab report with proper structure and formatting*	1	
Experimental Method	*A valid procedure which can be used to determine the relationship between acceleration and mass*	1	
	Method to reduce experimental uncertainty	1	
Data	*Data quality and presentation*	2	
Analysis and Discussion	*Plot of the original data*	1	
	Linearized plot	1	
	Slope of the linearized plot with correct units	1	
	Comparison of the experimental to the theoretical net force	1	
	At least two <u>significant</u> sources of error	1	
TOTAL		10	