Newton's Second Law

As you work through the steps in the lab procedure, record your experimental values and the results on this worksheet. Use the exact values you record for your data to make later calculations.

Part 1 - Data

What is the length of the flag on the cart?

What is the mass of the hanger?

Complete the data table below.

Data Table 1

Trial #	m_1 (kg)	m_1g (N)	v_1 (m/s)	v_2 (m/s)	Δt (s)	a (m/s^2)
1						
2						
3						
4						

CHECKPOINT 1: Ask your TA to check your table values before proceeding.

Part 2 - Calculations

Use Excel to create a graph of $m_1 g$ versus acceleration. (When making the graph, be sure to use the numbers you entered in the above table with no additional rounding or decimal places.)

Use the trendline option to draw the best fit line to your data and determine the slope and y-intercept.

What are the slope and y-intercept of the plot of $m_1 g$ versus acceleration?

What is the total mass as calculated from the slope?

What is the physical significance of the y-intercept?

What is the total mass M of your system as determined from the mass of the cart, weight hanger and added masses?

What is the percent difference between the value of M obtained from the slope of the graph and M_{measured}?

Is the measured value of M in close agreement with the value obtained from the slope? (Consider your percent difference exactly as you have entered it.)

What are some of the sources of uncertainty in this lab? (Select all that apply. *Note: The order of these options may be different in the WebAssign question.*)

- The track was not leveled properly.

- The hanger hit the floor before the cart passed photogate 2.

- The total mass used was not the same for all trials.

- The distance between the two photogates was too short to allow for proper acceleration of the cart.

CHECKPOINT 2: Ask your TA to check your Excel worksheet and graph.