

FINDING THE SPEED OF A CART**PURPOSE**

1. to measure precisely and accurately
2. to correctly ascertain the uncertainty in measured quantities
3. to determine the speed of the cart

PROCEDURE

1. Practice giving the cart a push so that it moves with uniform motion along the track. DO NOT leave your hand on the cart
2. Attach a piece of ticker tape to the cart and run the tape through the ticker timer
3. Give the cart a push (DO NOT LEAVE YOUR HAND ON THE CART) while holding down the button on the timer

DATA ANALYSIS**Step 1: Mark the Dots**

1. Put a tick through the first good dot.
2. Mark every 3rd tick after that

Step 2: Measurement

1. Measure the position of each marked dot relative to the starting point. Record it in the table

Step 3: Graph

1. Create a position vs. time graph for your cart using Logger Pro
2. Use the software to create a line of best fit (Analyze → linear fit) and determine the average velocity of the cart for the entire trip
3. Sketch your graph and record the slope in the space beside the data table below.

DATA**Table 1:** _____

Time ± _____ (s)	Position from Starting Point ± _____ (cm)
0.000	
0.050	
0.100	
0.150	
0.200	
0.250	
0.300	
0.350	
0.400	
0.450	
0.500	

ANALYSIS:

1. Use the values in your table to determine the velocity of the cart for the following time intervals. Show all your work and round correctly:
 - a. 0.050 s – 0.200 s

 - b. 0.100s – 0.300s

2. Estimate the uncertainty in the values of velocity calculated above. Explain your reasoning.

3. Comment on any differences or similarities between your answers for 1a, 1b and the slope of your line.

4. State the instrumental uncertainty of the time and the position. (\pm ___ cm or \pm ___ s)

5. What other uncertainties could contribute to the results of this lab? How much do you think each one affected the average velocity (i.e. \pm ___ m/s)