

Lab 0

Measurements and Uncertainty

You are running an experiment to measure the velocity of a cart rolling down a track. You first measure the mass of the cart 5 different times:

Measurement	Mass
1	251.05 grams
2	249.99 grams
3	251.07 grams
4	251.05 grams
5	251.14 grams

Next, you measure the speed of the cart at the bottom of the track:

Measurement	Speed
1	4.2 m/s
2	3.9 m/s
3	4.1 m/s
4	4.0 m/s
5	4.1 m/s

1. What is your estimate (including uncertainty) of the mass of the cart?
2. What is your estimate (including uncertainty) of the speed of the cart?
3. Suppose your theoretical prediction for the velocity is 4.12 m/s. Is your measurement consistent with this prediction?
4. Suppose your theoretical prediction for the momentum is 1.15 kg m/s. Is your measured value of the momentum consistent with this prediction?
5. Suppose your lab partner runs 5 more trials and finds a speed of 3.97 ± 0.09 m/s. Is their measurement consistent with your own?