

10. Add 200 g to the cart and repeat steps 4-9.
11. Add another 200 g to the cart for a total of 400 g riding in the cart and repeat steps 4-9.
12. Solve for the average velocity, v_{avg} .
13. Knowing the conservation of mechanical energy equation in the preliminaries, graph v_f^2 vs. $\frac{x_i^2}{M}$.
(No error bars are necessary for this graph.)
14. Use the LINEST function to determine the slope and the uncertainty in the slope, which will be the spring constant k .
15. Also, how close to zero is the intercept? Is it zero within uncertainty?

Equipment list: aluminum track, PAScar, photogate.