

Fan Cart Lab

In this lab you will be analyzing the motion of a fan cart to determine the relationship between mass and acceleration. You will measure the acceleration of the fan cart in the presence of different masses. The force that the fan applies to the cart will remain constant. You will then plot the data to determine the relationship between mass, acceleration and force.

1. Measure the mass of the fan cart.
2. Set the fan speed on the fan cart to a certain setting. Make sure keep it at this setting for the entire experiment. Also make sure to plug in the fan cart in between runs but unplug the fan cart when taking a measurement.
3. Measure the acceleration of the empty fan cart using the motion detector by taking the slope of the v vs. t graph.
4. Record the required data in the Acceleration, Total Mass and $1/(\text{Total Mass})$ columns below for each test.
5. Repeat steps 3 and 4 for four more times with a different mass on the cart each time. Place your data in the table below.

Acceleration (m/s^2)	Total Mass (kg)	$1/(\text{Total Mass})$ (1/kg)

Questions:

1. Use the data in the table above to create a graph that appears to have a linear relationship. Insert a linear fit line in the graph. Substituting in the x and y variables in the fit equation for the variable that you used to make the graph, what is your equation?
2. What do you believe the slope of your line represents?
3. Does your data make sense based on what you experience in your daily life for objects of different masses? Write a once sentence conclusion about the relationship between mass and acceleration for a given force based on your data.