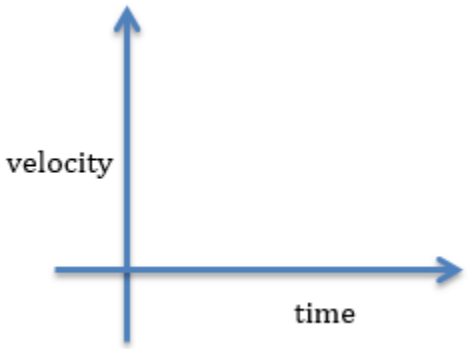
Name: _____ Section #: ____ Date: _____

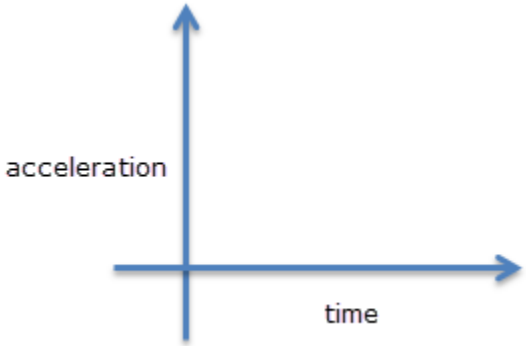
Newton's First and Second Law

Experiment 1

Prediction 1

When a cart moves at a constant velocity, what is the shape of the velocity vs. time graph and the acceleration vs. time you expect to be produced? Make a sketch on the graphs below.





After the Experiment

Does the experimental graph resemble the one you predicted? Write the major points of your discussion.

Prediction 2

Considering the track is frictionless, what force should be applied to maintain constant velocity motion of the cart after the initial push? Draw a force diagram to help explain your answer.

Experiment 2

Show Your Work

Calculate the experimental mass of the system (cart + hanging weight) using the value of the slope reported for the graph of acceleration vs. magnitude of the net force. Calculate the uncertainty in the experimental mass of the system using the value of the uncertainty in the slope. Calculate the percent discrepancy between the experimental mass reported above and the value of the mass measured with the balance.

Experiment 3

Show Your Work

In the Inlab, predict the acceleration of this cart if the force magnitude is given. Discuss with your group which mass should be used to find the acceleration of the cart: mass of the cart or mass of the whole system. Does your data support the mathematical model for Newton's Second Law? If the percent discrepancy between masses is less than 10%, use the experimental mass of the cart, M_{exp}, to predict its acceleration, a'. Otherwise, use the mass measured with the balance.

Have your TA sign this worksheet below and then upload it to the Inlab.

TA Signature: _____