Name_____

Class_____Date_____

Force and Acceleration

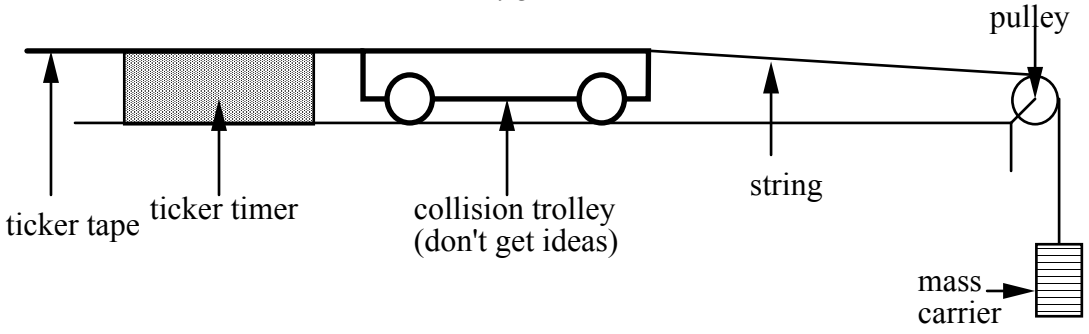
Aim
To observe the difference between accelerated and uniform velocity.
To investigate how the net force on an object affects its resulting acceleration.

Introduction
The mass being moved by the object will be kept constant throughout this experiment, so that force and acceleration can be observed.
This experiment will be analysed in two parts. First the acceleration of the mass will be determined from the velocity-time graph, for each force used. Then a graph of force v acceleration will be used to determine the relationship between force and acceleration.
Data will also be collected for motion which is caused by a force, and then that force will be removed.

Equipment
Ticker Timer
Ticker Tape
Trolley
Pulley that can be clamped to the bench
String for the pulley
500g of masses
Graph paper

Method
1. Set up the apparatus shown in figure 1. The mass carrier should be carrying 500g, and the length of the tape should be just less than the distance from the bottom of the mass carrier to the floor.

figure 1



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2. Use the ticker timer to record the motion of the trolley as the mass falls to the floor. Label the tape A. Repeat, so that you have three sets of readings for the one mass.
3. Remove 100g from the carrier, and place this on the trolley, then repeat step 2, labelling the tape B.
4. Continue decreasing the mass by 100g, until you have sets of data ranging from masses of 500g to 200g (tapes A to D).
5. Reset the mass carrier to 500g. Place an obstruction (eg a chair) in position to stop the mass after it has fallen half the total distance to the floor. The trolley should not be adjusted in any way. Use the ticker timer to record the motion of the trolley as the mass falls as far as the obstruction, and the trolley continues to move due to its inertia. Label the tape E.
6. Draw a velocity time graph for each ticker tape (A to D), on the one sheet of paper. Determine an average acceleration from the line of best fit, for each suspended mass.
7. Plot a graph of force (calculated from the mass of the suspended masses) against acceleration, from the data from the graphs.
8. Draw a velocity/time graph for tape E. Determine the acceleration before and after the weight hit the chair.

Interpretation
This lab will be evaluated for data collection, data analysis and evaluation, as well as manipulation, using the IB criteria.