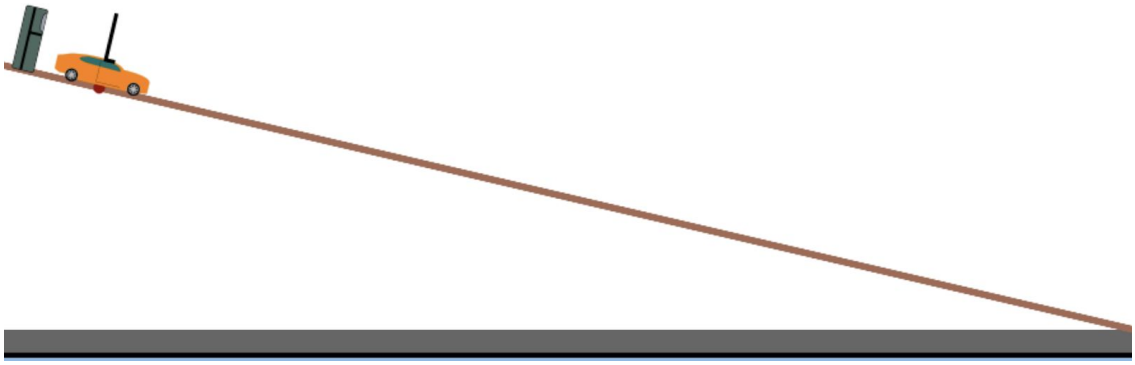
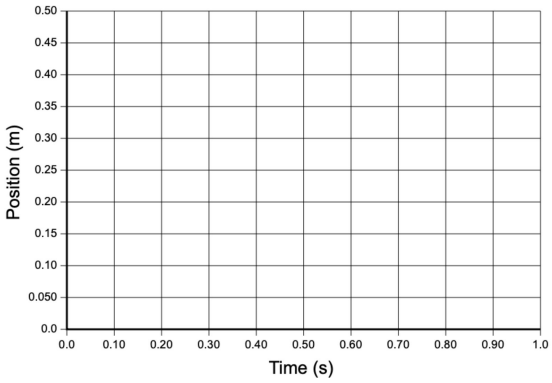
Predicting Speed on an Inclined Plane

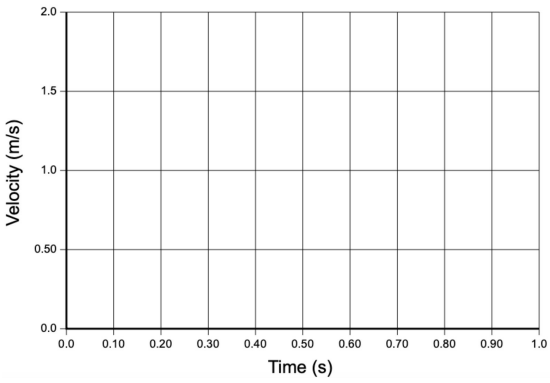
Purpose: The purpose of this lab see if you can determine the acceleration of an object on an inclined plane than then use that acceleration to find the speed of the same object after traveling a certain distance down that inclined plane.

Part 1: You will be using a short-range motion detector to plot out position vs. time and velocity vs. time graphs for your car on the incline. This incline is not located on Earth.



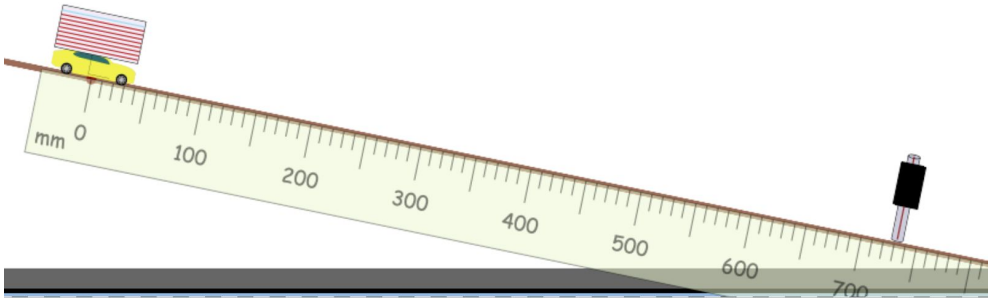
Draw out your graphs for position vs. time and velocity vs. time for the valid data collected by the motion detector. Don't include data that occurs after the car leaves the range of the detector.





Use your velocity vs. time graph to find the acceleration. Show your work in the space below.

Part 2: You will now be returning the car to its starting location and a photogate will be placed at a random distance from the center of the car. Determine the distance from the center of the car to the center of the photogate. The car will have the same acceleration you determined in part 1.



Use the equation $x_f = x_i + v_i t + 0.5at^2$ to find the time it takes the center of the car to reach the center of the photogate. Show this work below.

Use the equation $v_f = v_i + at$ to find the speed of the car when its center is passing through the photogate. Show this work below.

Now start the car moving down the ramp a second time and record the time when the index card first enters and then exits the photogate. Record this data in the chart below.

	Latest			
	Time (s)	State 1		
1				
2				
3				
4				

The index card has a width of 7.5 cm. Use this along with the entry and exit times to find the average speed of the car when passing through the gates. Record this work below.

Find the percent error between your predicted speed and your calculated speed. Record this work below.