Physics

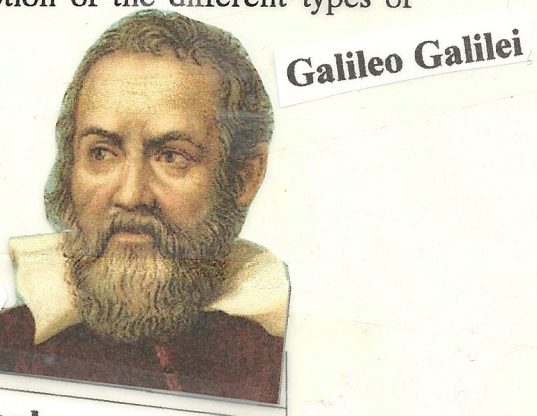
name _____ blk _____

Inv-1 Diluting Gravity with Galileo

sheet # _____

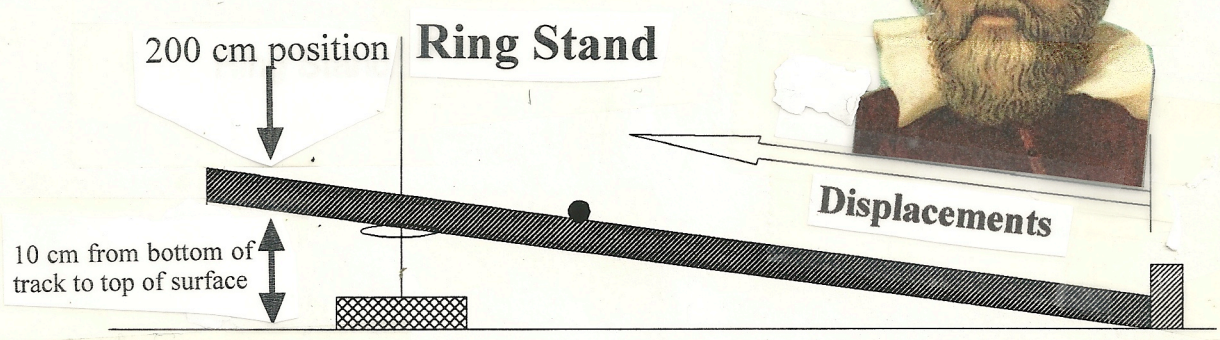
Introduction

A motionless race car is on a starting line. A few seconds later, it has crossed the quarter mile finish line. A flagged peg is inserted into a glacier. A year later, it is 20 feet away from where it was originally inserted. Both the race car and the glacier peg have moved. How are their motions alike? How can the movement of **any** object be described? This investigation will concentrate on leading you to the description of the different types of motion objects can have.



The Exploration

Set up the equipment as shown in the diagram below:



Use the ring stand to raise the bottom of the track so that the bottom is 10 cm off the floor or table top at the 200 cm position.

You will be varying the initial position of the steel ball. The track is marked starting at 200.0 cm from the origin and continuing every 25.0 cm. In addition, there is a mark at 12.5 cm from the origin. You will be measuring the time required for the ball to travel each of those nine distances.

1. Begin taking data by placing the ball at the 200.0 cm mark. To start the ball the same way each time, place a ruler in front of the ball and when your partner is ready to begin timing, quickly pull the ruler away from the ball. At the the time of release, the timer should start the stop watch. To help you know when to stop timing, another partner should hold a vertical ruler at the origin. When the ball strikes the ruler, the timing stops. Make three measurements of time to as many decimal places as possible. Record those values in the table on the back.

2. Gather the same data as before, but this time start the ball at the position that will allow it to travel a distance of 175.0 cm. Make three more measurements of time and record them in the table on the back.

3. Repeat the data gathering process for each of the other distances. Record the data.

Table I

Distance(cm)	times	Avg. time(s)	Average Velocities
200.0			
175.0			
150.0			
125.0			
100.0			
75.0			
50.0			
25.0			
12.5			

The Idea (Answer all questions in **complete** sentences.)

Make a graph of distance on the incline against **average** time. Put distance on the vertical axis of the graph and time on the horizontal axis.

a. What is the shape of the line on your graph? (Is it straight? Is it curved? If curved, how does it bend - downward as you go right, or upward, etc. If you think it resembles a curve you've learned in math, give the name of that curve.)

b. How does the distance change as the time increases?

c. According to the graph, what was happening to the ball on the track?