Motion Lab
Collect Data

You may have heard the story about Galileo dropping objects off the leaning Tower of Pisa to compare how fast they fell. While there's no proof that Galileo actually used the Tower for his experiments, he did roll balls down ramps, or inclined planes, and measured their speeds. You can learn more about an object's acceleration by measuring the speed of a marble as it rolls down a ramp.
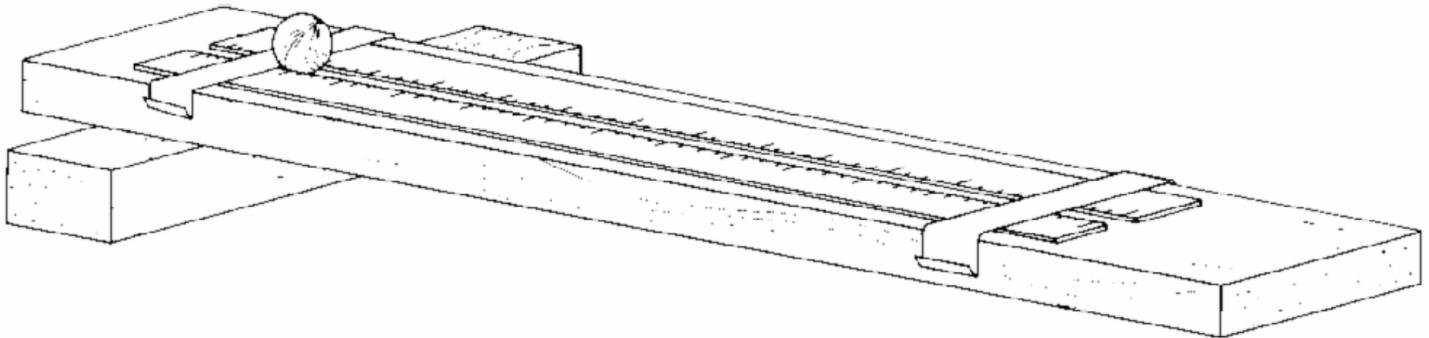

Figure 1 An Inclined Plane

Materials

Book	2 meter sticks	tape
plank about 1.5 meters long	large marble	stopwatchtable

Part A

Prepare an inclined plane and complete Data Table 1 to show the speed of a falling ball.

1. Look at Figure 1. Build an inclined plane by placing a book at one end of the table. Rest one end of the plank on the block of wood and the other end on the table to form your inclined plane.
2. Place the meter sticks 1 to 2 cm apart on the inclined plane. Try rolling the marble down the inclined plane between the meter sticks. Adjust their position if necessary. If the ball doesn't roll, increase the height of the high end of the inclined plane. Tape the meter sticks to the inclined plane.
3. Roll the marble down the inclined plane.
4. Use the stopwatch to time how long the marble takes to reach each of the following marks on the meter stick: 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100 cm. Repeat the trials with the ball until you have measured the time for all the distances.
5. Record the time you measure for each distance on Data Table 1. Calculate the speed of the ball for each distance by dividing the distance (meters) by the time (seconds). To find the distance in meters, divide the number of centimeters by 100.

Data Table 1

Distance (cm)	Time (s)	Distance (m)	Speed (m/s)
10			
20			
30			
40			
50			
60			
70			
80			
90			
100			

Part B

Plot the information from Data Table 1 on the grid below. Plot time on the x-axis and speed on the y-axis. Connect the data points. Use the information on the graph to answer the following questions. Add a title to your graph.

1. What does the curve on the graph indicate?

2. What's the difference between the starting speed and the final speed?