

Deeper Understanding Version

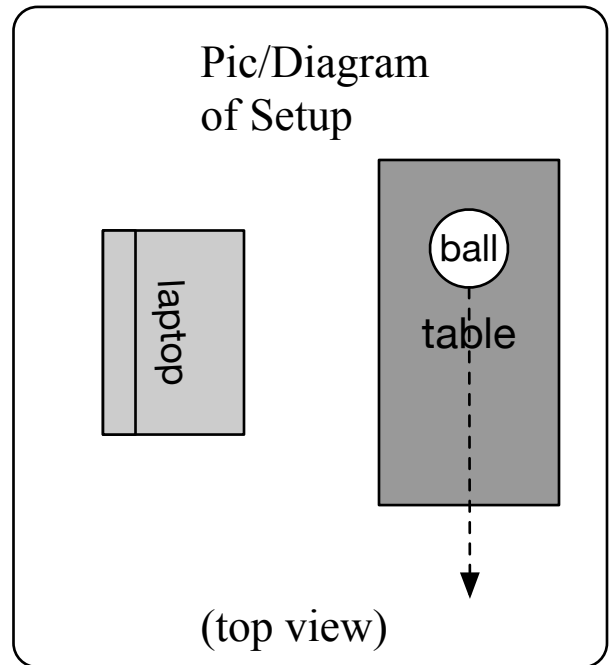
PURPOSE: To use Logger Pro to determine the motion of, and net forces on, an object.

Materials:

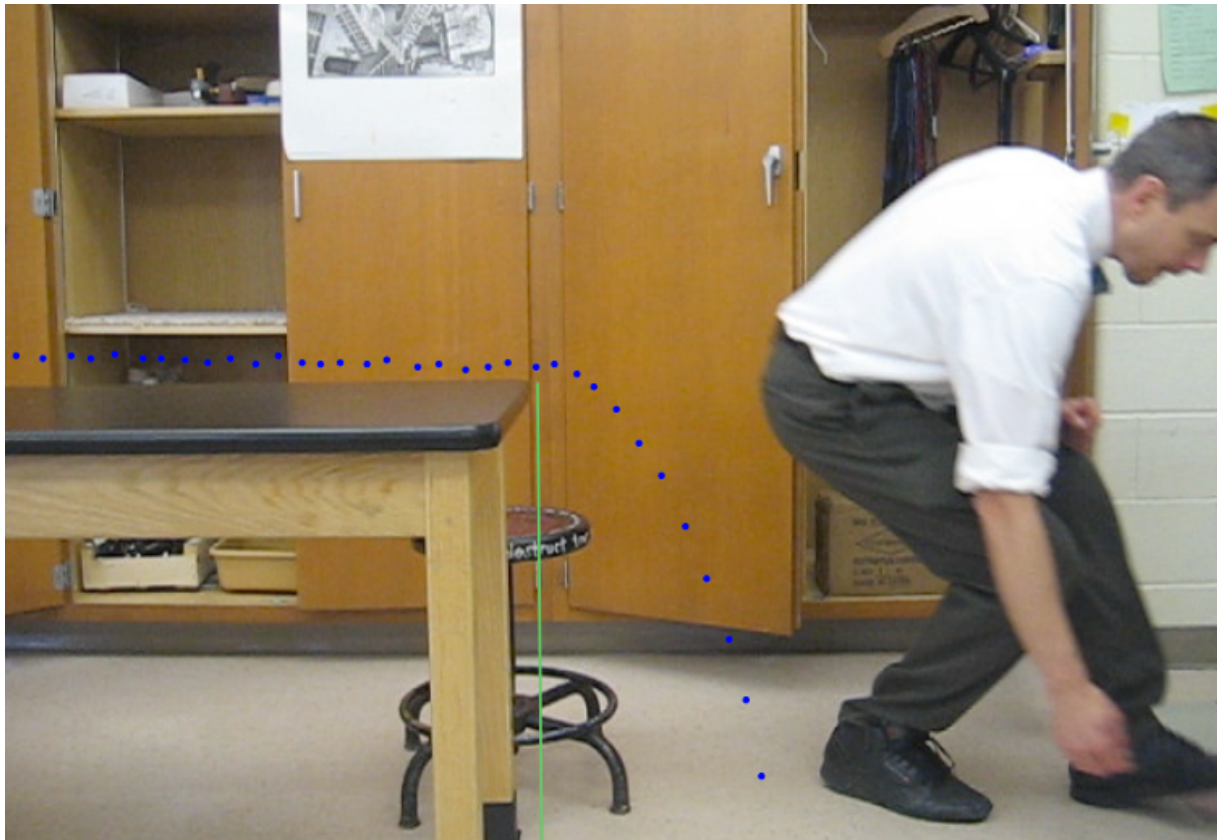
Ball, Table, Laptop with Logger Pro

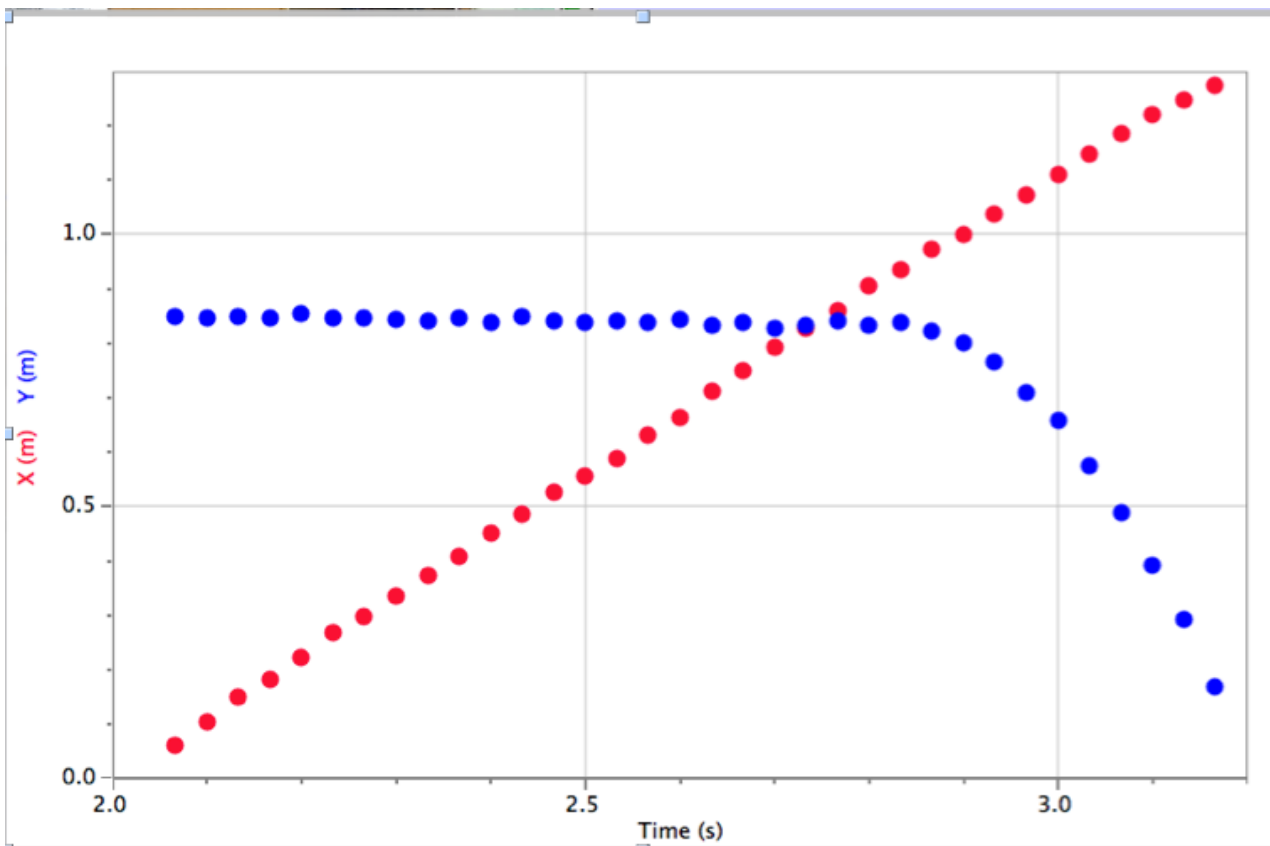
Procedure:

- 1) Set up the laptop so that it is filming from the side.
- 2) Start Logger Pro in video capture mode.
- 3) Roll the ball across the table and let it go off the table.
- 4) Stop Logger Pro video capture mode.



Data:





ABCD Analysis: Top of the Table

A: On top of the table, the ball was doing a constant speed in both the x and y directions which require no Net Force in the x or y direction.

C: On top of the table, the dot pattern shows that the dots are mostly the same distance apart. On the graph, both x and y show straight lines before it left the table at around 2.7 seconds.

B: When dot pattern dots are the same distance apart, the object is moving at a constant speed. On a graph, constant speed shows up as a straight line. According to the First Law of Motion, constant speed requires no Net Force.

D: There are two lines of evidence (dot pattern and graph), so even though the spacing in the dots do vary a little, the conclusion is a little stronger.

ABCD ANALYSIS: OFF OF THE TABLE

A: Off of the table, the ball had constant speed in the x direction which means no Net Force in the x direction. But the ball was speeding up in the y direction which requires a Net Force in the y direction.

C: Off of the table, the dot pattern dots mostly get farther and farther apart. On the x direction graph, the line continues straight. On the y-direction graph, the line starts to curve after the ball leaves the table.

B: When dots get farther and farther apart, that indicates a speed up. On a motion graph, straight means constant speed, while curving means a change in speed. According to the First Law of Motion, constant speed requires no Net Force, but a changing speed requires a Net Force.

D: There are two lines of evidence (dot pattern and graph), so even though the spacing in the dots do vary a little, the conclusion is a little stronger.