Name:_____

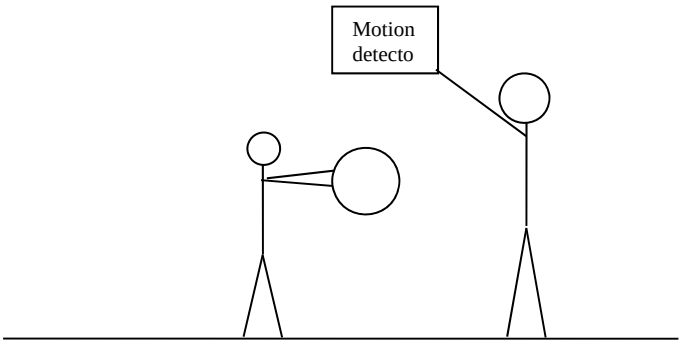
Investigating the Ball Bounce

Brief Introduction

Up until this point in the semester, your models have been descriptive. You can basically model the motion of objects. Today, you will begin including the causes of the motion in your models. In this investigation you will be examining the motion of a bouncing ball. You will be using motion detectors and data collection software. You will create graphs of position vs. time, velocity vs. time, and acceleration vs. time.

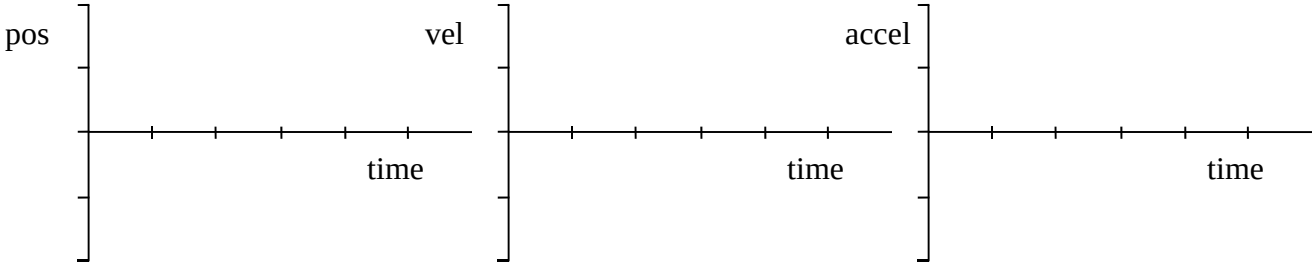
Pre-Lab

The set-up for this investigation will be as shown in the diagram below. You are going to hold the motion detectors above the ball and then drop the ball. You need to collect data as the ball bounces twice (this may take some practice).



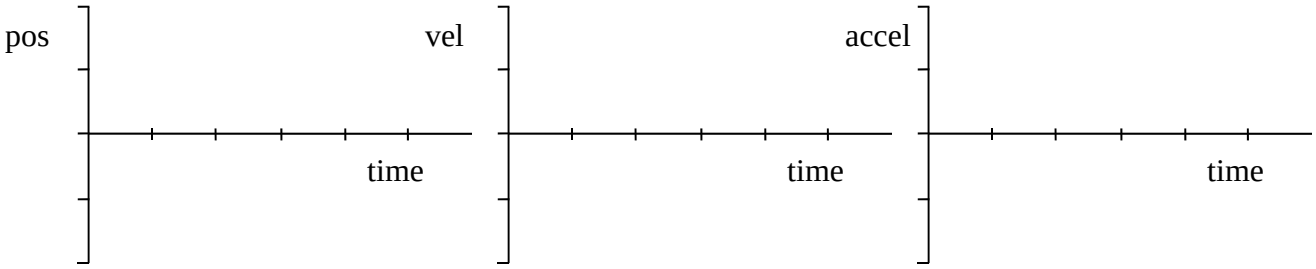
The end result for this investigation will be a complete model of the ball bounce, beginning immediately after the ball is dropped, until the ball has reach its maximum height after the second bounce. But prior to collecting the data, you have to predict the outcome of the ball bounce. On the axes provided predict the position vs. time, velocity vs. time, and acceleration vs. time graphs for the ball from the time it is dropped until it reaches its maximum height after the second bounce. Make sure to label the part of the graphs where the ball bounces.

Prediction of Ball Bounce:



Predicted Motion Map for Ball Bounce

Actual Data from Ball Bounce:



Motion Map for Ball Bounce

Questions from Ball Bounce

1. Did your predictions match the data? How were they different?

2. What was most difficult to predict? Why?

3. What models will you use when you construct your complete model of the ball bounce (the entire motion, not just the bounce)? What happens to the ball during that time period?

4. Can you represent that?

5. Based on your answers to questions 3 and 4, can you explain why the ball doesn't bounce as high?