Investigating Constant Motion

Brief Introduction

In this investigation of motion, you will be collecting data about your motion as you walk. First you will be using motion detectors and LoggerPro data collection software. You will use LoggerPro to create graphs of your body's position vs. time and velocity vs. time.

Pre-Lab

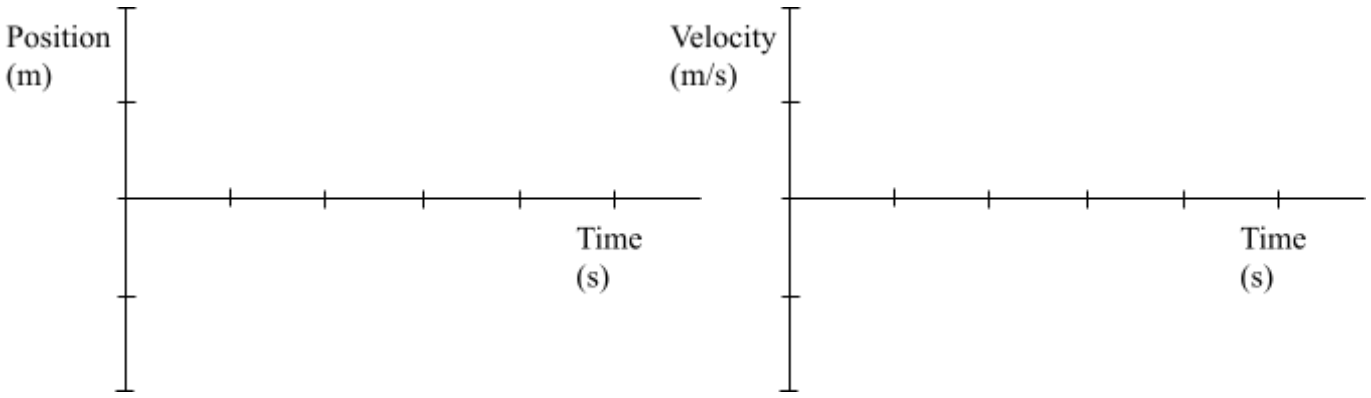
First you will need to set-up the computer data-collection

Data Collection

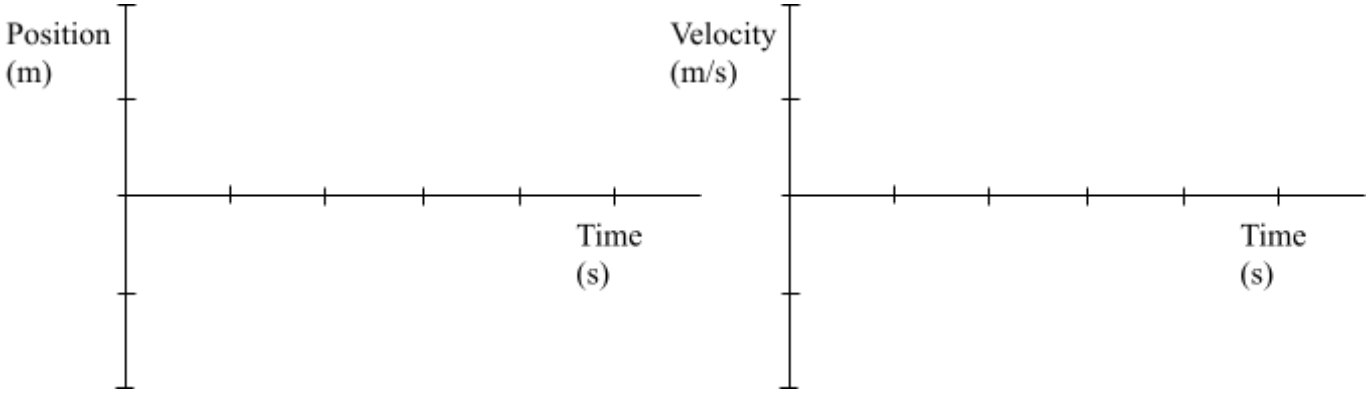
After completing each trial you should make a sketch of the following:

1. The position vs. time graph
2. The velocity vs. time graph

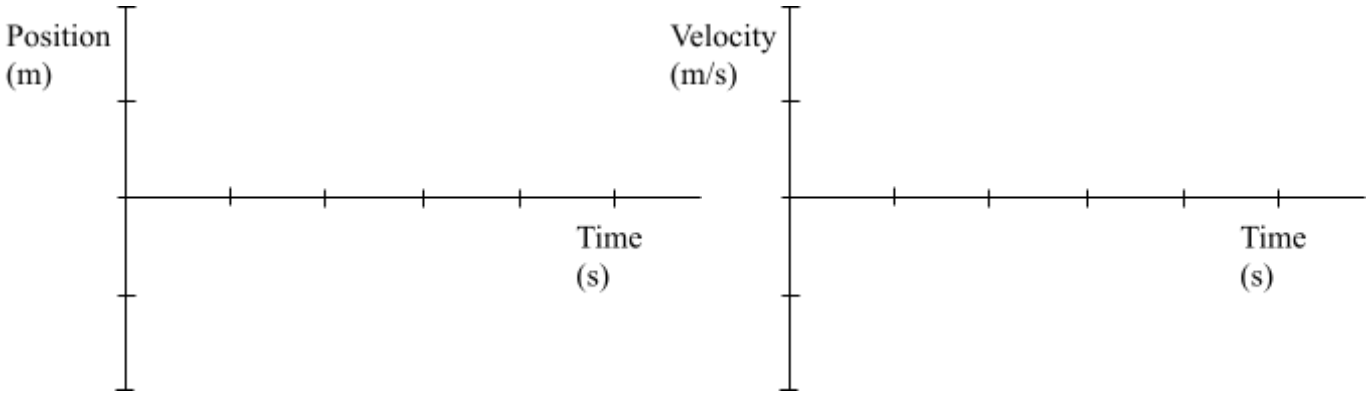
Trial #1: Walk in a straight line at a constant regular walking pace for 4 seconds.



Trial #2: Walk in a straight line, in the same direction as in #1, but this time walk at a constant fast pace for 4 seconds.



Trial #3: Walk in a straight line, in the same direction as in #1, but this time walk at a constant slow pace for 4 seconds.



Questions about Trials 1-3

1. How do the position vs. time graphs differ between the three trials?

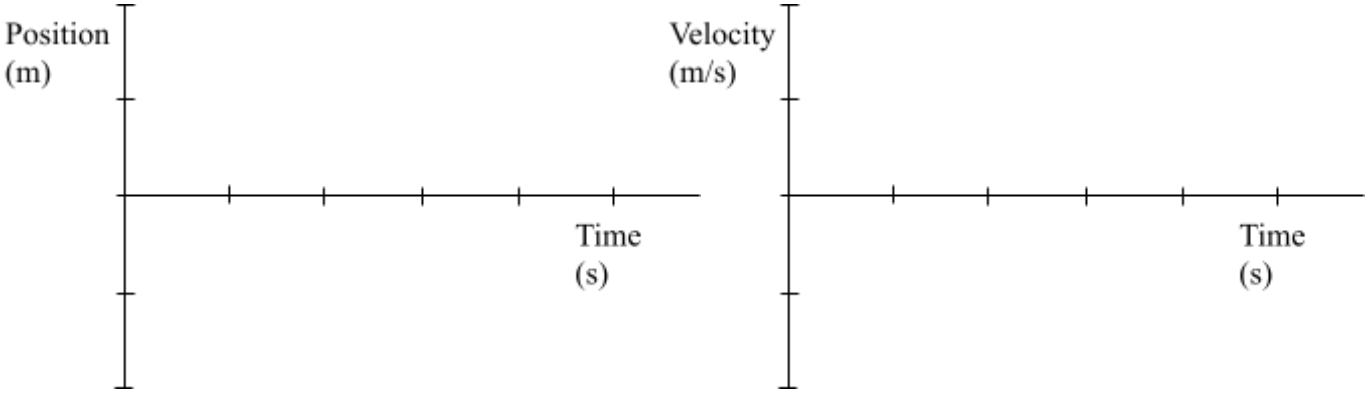
2. What is similar about the position vs. time graphs in all three?

3. How do the velocity vs. time graphs differ between the three trials?

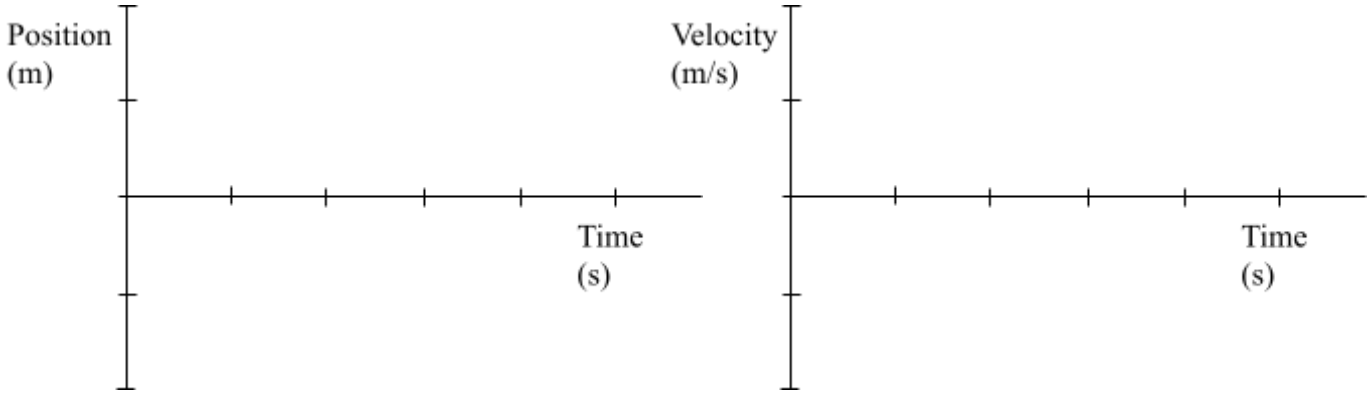
4. What is similar about the velocity vs. time graphs in all three?

Make Predictions: Trials #4-6 will be nearly identical to Trials #1-3, but this time you will be walking in the opposite direction. Prior to conducting Trials 4-6, predict what the position vs. time graphs, and the velocity vs. time graphs for each trial will look like.

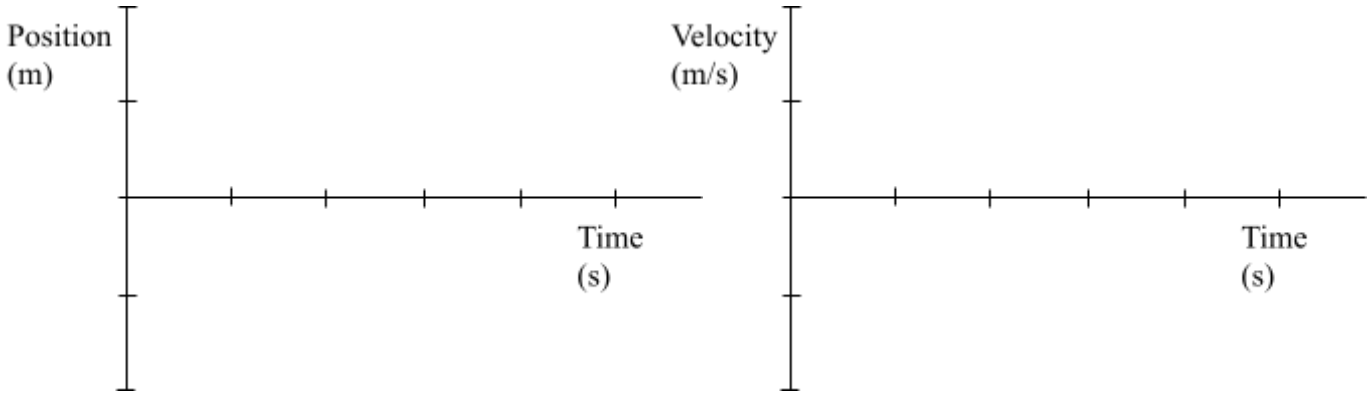
Prediction for Trial #4



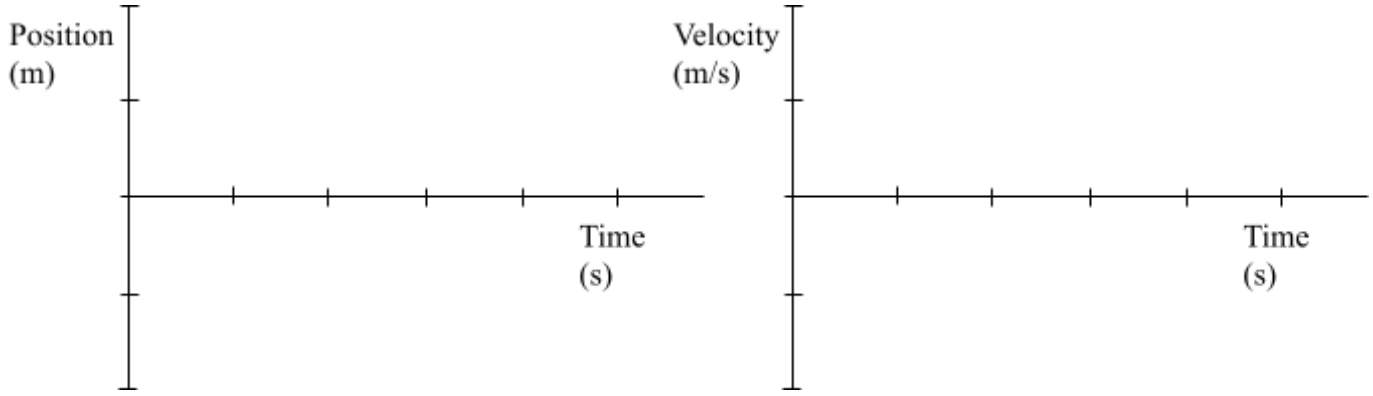
Prediction for Trial #5



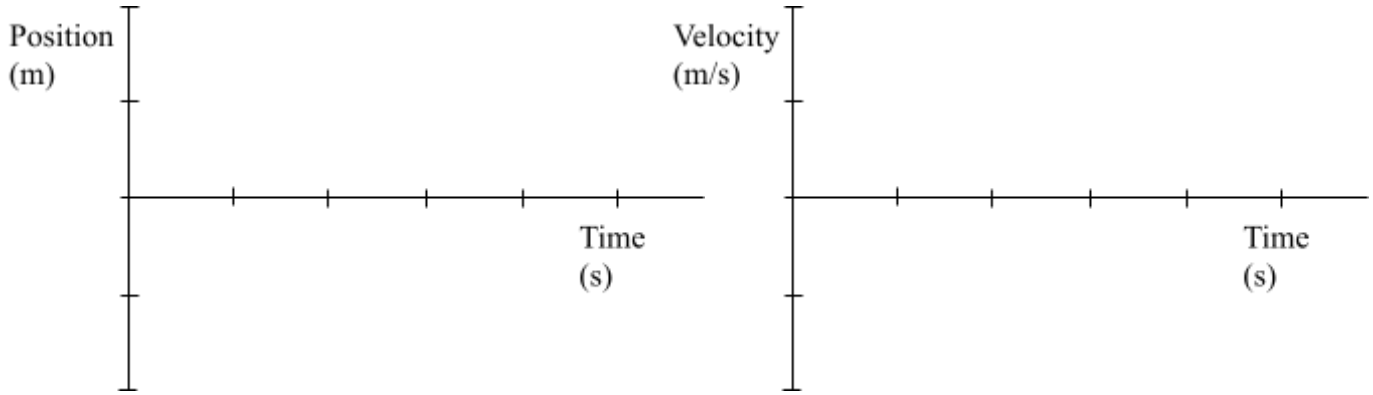
Prediction for Trial #6



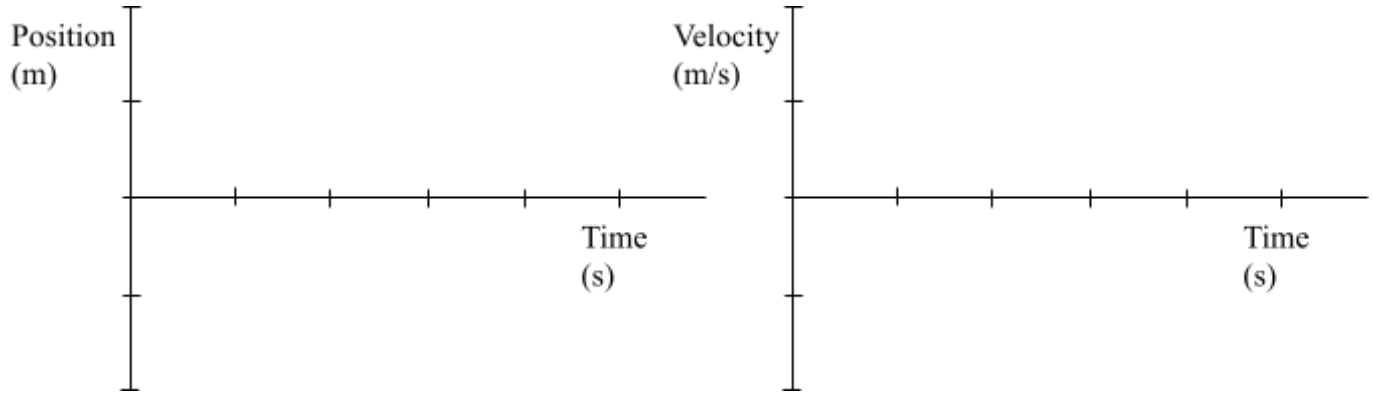
Trial #4: Walk in a straight line at a constant regular walking pace for 4 seconds, this time walking opposite the direction of #1.



Trial #5: Walk in a straight line, in the same direction as in #4, but this time walk at a constant fast pace for 4 seconds.



Trial #6: Walk in a straight line, in the same direction as in #4, but this time walk at a constant slow pace for 4 seconds.



Questions about Trials #4-6

1. Did your predicted position vs. time graphs match the data you collected? How did the data differ from your predictions?

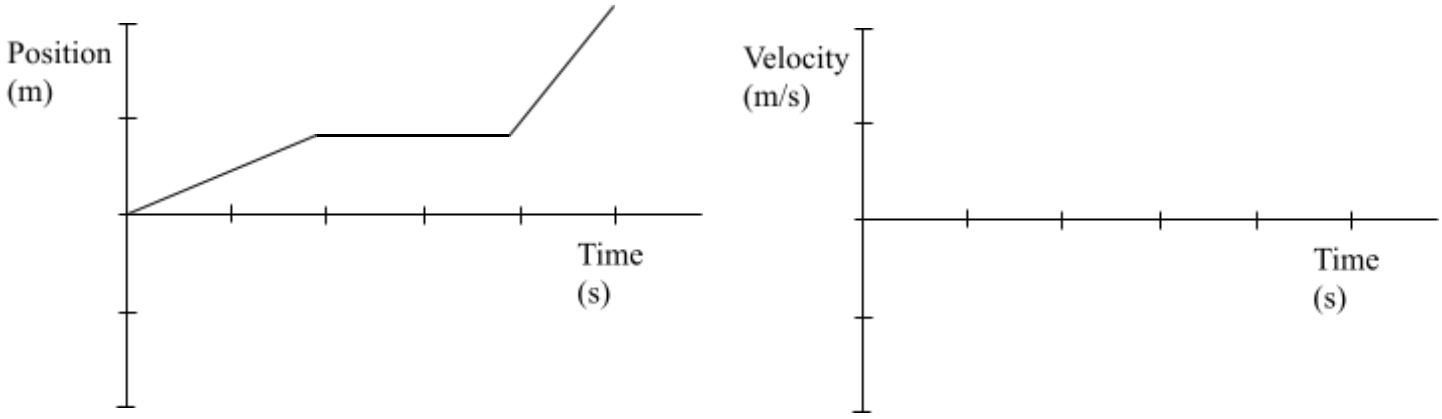
2. Did your predicted velocity vs. time graphs match the data you collected? How did the data differ from your predictions?

3. Using the data from all trials, what rules can you make about the position vs. time graphs and the motion of an object?

4. Using the data from all trials, what rules can you make about the velocity vs. time graphs and the motion of an object?

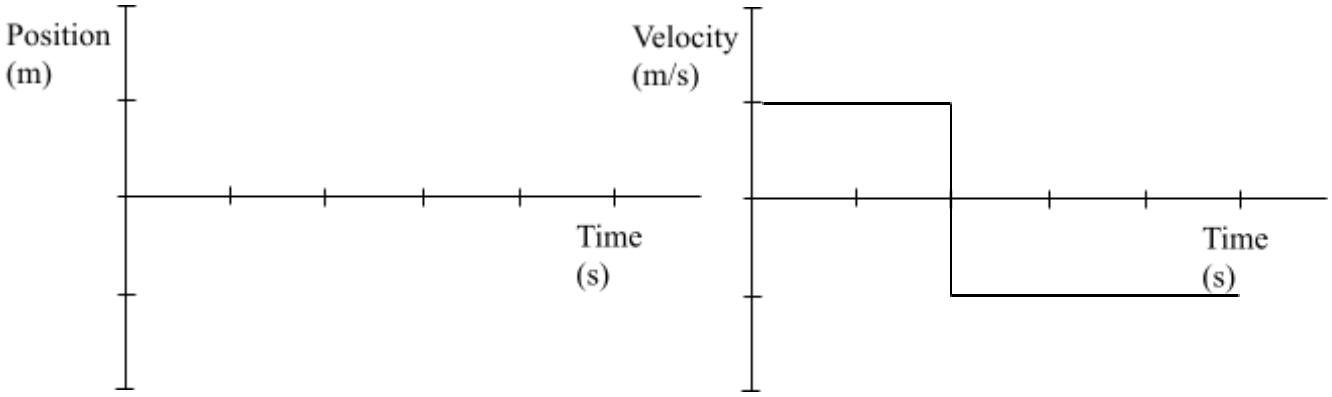
In each of the next four trials, you have to try to move in a way such that you match the given representation and fill in the other two representations. (i.e. you are given a velocity vs. time graph and have to move to create the same velocity vs. time graph)

Trial #7:



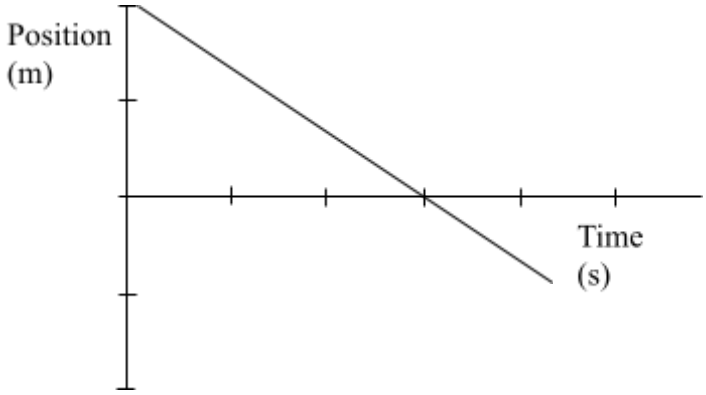
Description of motion from Trial #7

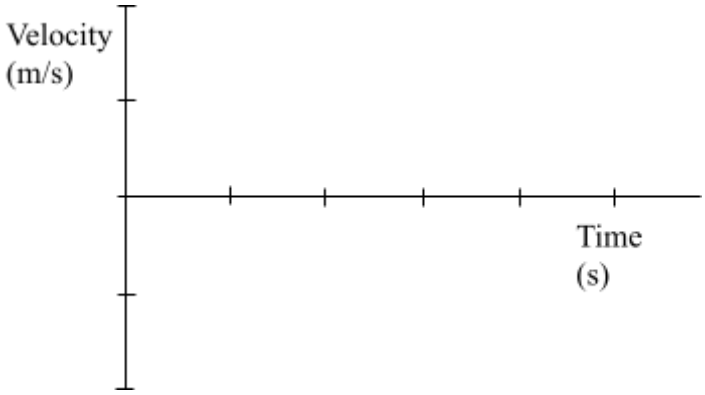
Trial #8:



Description of motion from Trial #8

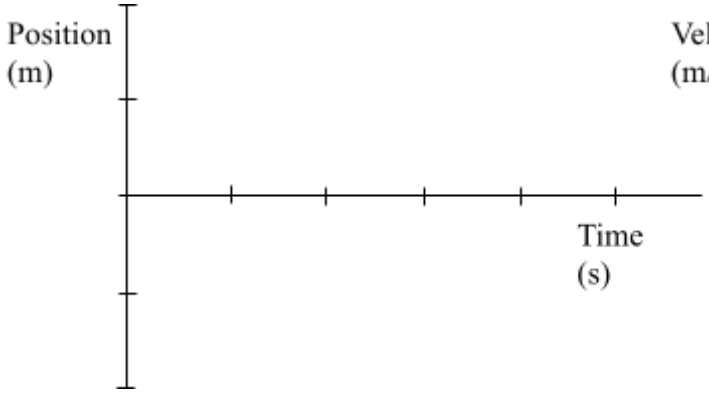
Trial #9:

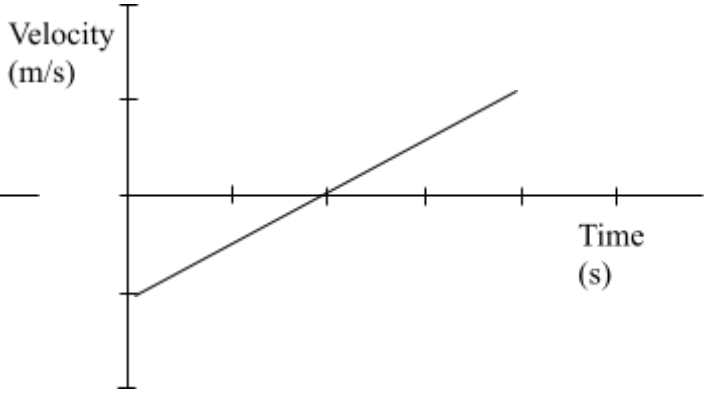




Description of motion from Trial #9

Trial #10:





Description of motion from Trial #10

Questions about Trials 7-10

1. Why couldn't you complete Trial #9?

2. Is negative position possible?

3. How was Trial #10 different than all the other trials?