



The Moving Man Simulation – Constant Speed Motion

PSI Physics – Kinematics

Name: _____

Date: _____ Period: _____

Objectives:

- Recognize graphs of position vs. time and of velocity vs. time for constant velocity motion
- Determine the velocity from the slope of the position vs. time graph
- Determine the distance traveled from the area under the velocity vs. time graph

Materials:

- Computer

Procedure:

- This lab is based on Interactive Simulations from University of Colorado at Boulder. Use your web browser to go to: <http://phet.colorado.edu/en/simulation/moving-man>
- Select either “download” or “run”.
- Click the “Charts” tab.

For each run:

- Click “Reset all”.
- Set the assigned velocity, press start, and make sure that you stop the man before he hits the wall.
- For each velocity, sketch the position vs. time graph, and velocity vs. time graph in the table at the end. Pay close attention to the beginning points and the slope of your graphs.

Analysis: Part 1

1. In each of your velocity vs. time graphs, how does velocity change with respect to time?
2. Referring to your table, what happens to your velocity vs. time graphs as the velocity is increased?
3. As velocity is increased, how does each of your position vs. time graphs change?



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Velocity	Position vs. Time graph	Velocity vs. Time graph
$v = 1 \text{ m/s}$		
$v = 1.5 \text{ m/s}$		
$v = 2 \text{ m/s}$		
$v = 2.5 \text{ m/s}$		



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Analysis: Part 2

Click “reset all” and set the velocity of the man to 2.5 m/s. Run the program, and make sure to stop the man before he hits the wall. Record the distance and time traveled.

Using the time, and distance:

1. Calculate the slope of the distance vs. time graph.

- a) How does it compare to the man’s velocity?

- b) Given the results of a), write an expression for the velocity in terms of distance and time.

Using the time, and velocity:

2. Calculate the area under the velocity vs. time graph.

- a) How does the area you calculated compare to the distance the man traveled?

- b) Given the results of a), write an expression for the distance in terms of velocity and time.

Note: Due to the error within the simulation, if your answers are within 0.2 in the above questions, you can consider your results to be accurate.



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Analysis: Part 3

1. Find a way to make the man move to the left.
 - a) Describe briefly what you did.

 - b) Sketch (i) the position vs. time graph and (ii) the velocity vs. time graph below

 - c) How are these graphs different from the graphs you sketched in the table?

 - d) For the velocity you used, how does the area between the velocity line and the x-axis of the velocity vs. time graph compare to the distance traveled?

 - e) How does the slope of the position vs. time graph compare to the velocity you used?