

Moving Man - Velocity vs. Time Graphs

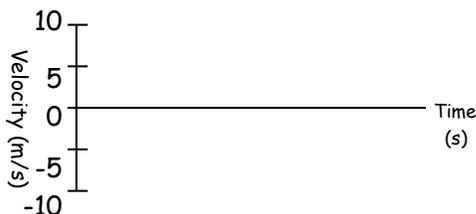
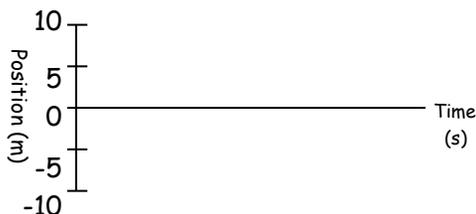
Procedure – Go to <http://www.colorado.edu/physics/phet> and find “The Moving Man” simulation under the category of “motion.”

1. After “The Moving Man” is open leave the position graph and the velocity graph open but *close the acceleration graph* by clicking the symbol in the upper right hand corner of the graph.

Investigate Moving Man by dragging the dude around with your mouse. This will give you very jumpy data, especially in the acceleration graph – why? Now try making the man move using the slider arrows. Use the playback features to look at the graphs.

2. For each of the six scenarios below, **PREDICT** what the position vs. time and velocity vs. time will look like. Don’t be afraid to be wrong – and don’t cheat by looking at Moving Man first!

A) A man moving from the center of the screen (0 m) to the house (8m) at a slow, steady pace.



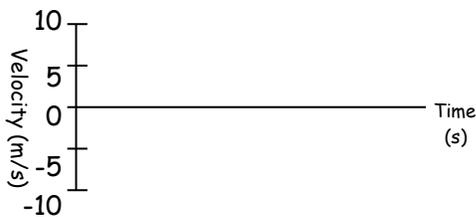
Explain your reasoning for the appearance of the graphs:

B) A man moving from 0 to the house at a faster pace than above.



Explain your reasoning for the appearance of the graphs:

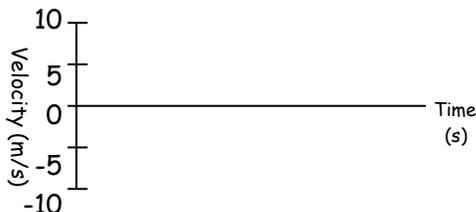
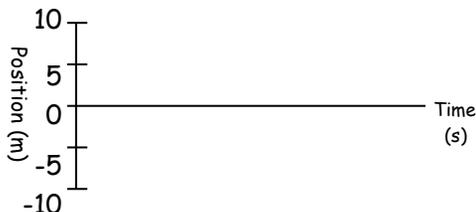
C) A man standing still at 4 m.



Explain your reasoning for the appearance of the graphs:

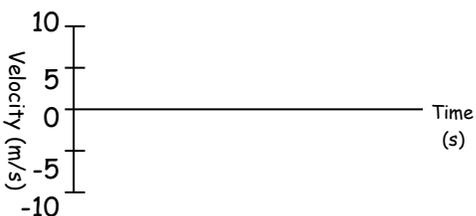
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D) A man moving from 0 to the house at a fast pace then moving back to 0 at a slower pace.



Explain your reasoning for the appearance of the graphs:

E) A man moving from 8 m to the tree m at a fast pace.



Explain your reasoning for the appearance of the graphs:

F) A man moving from 0 to the house, speeding up as he walks.



Explain your reasoning for the appearance of the graphs:

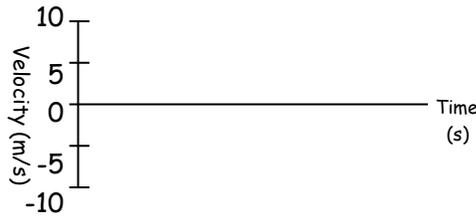
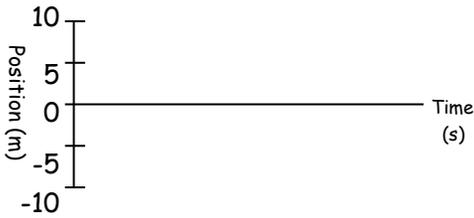
3. Use the *Moving Man* simulation to verify or correct your predicted graphs with a different colored pen and correct your explanations as needed.

4. Make new distance vs. time and velocity vs. time charts for each of the following scenarios. Predict what you think the graphs will look like, and then use *Moving man* to verify or correct your predicted graphs and reasoning with a different color pen.

G) The man stands still while he talks on his cell phone at the middle of the sidewalk, then walks toward the house at a constant rate trying to get better cell reception. He comes to a sudden stop

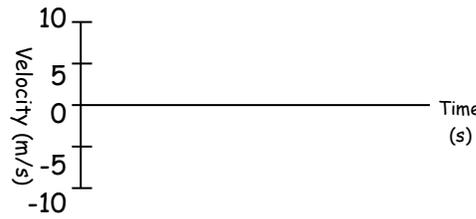
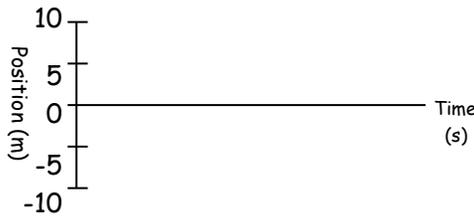
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when the coverage is good (about a meter before the house) and stands still to finish his conversation.



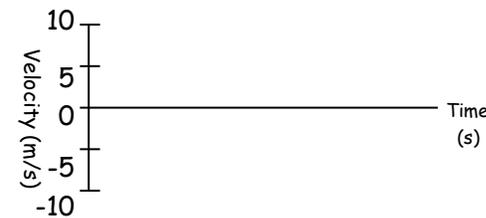
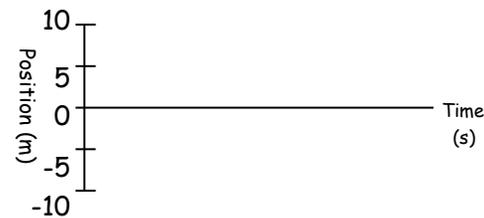
Explain your reasoning for the appearance of the graphs:

H) The man starts close to the tree, stands still for a little while, then walks at a constant rate for a while, then slows gradually to a stop.



Explain your reasoning for the appearance of the graphs:

I) A man wakes up from his nap under the tree and speeds up toward the house. He stops because he is worried that he dropped his keys. He stands still as he searches his pockets for his keys. Once he finds them, he continues calmly to walk toward the house and then slows to a stop as he nears the door.



Explain your reasoning for the appearance of the graphs:

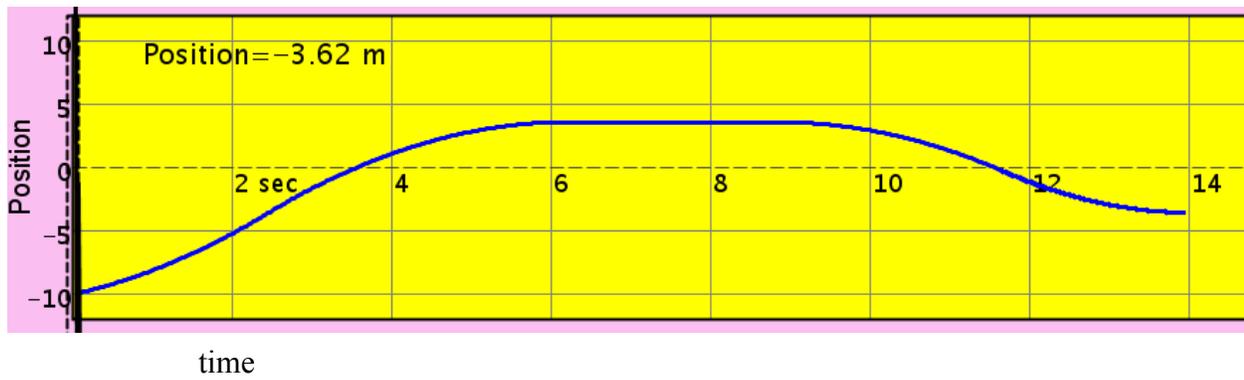
J) The man starts three meters from the house and speeds up as he walks towards the tree.



Explain your reasoning for the appearance of the graphs:

5. Write a possible scenario for the following graph.

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CHALLENGE QUESTION

1) Clear the graphs. Now using the , , and boxes on the left side, type in values for position, velocity and acceleration that will cause the man to start at the left wall, move all the way over very close to the right wall and turn around and come back without hitting the right wall. Click GO to make him start after you have typed values into the boxes. Click STOP once he returns to the left wall. What values for $x =$, $v =$, and $a =$ did you use? Explain why these values are needed to achieve this.

2) Sketch the graphs produced in Step 7 on the axes provided below:



3) Give reasons for the shapes of each of these graphs (use the back of the page if you need to).