Graphing Motion
(Using PhET Simulation "The Moving Man")

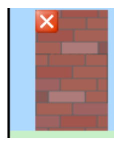
Name: ____

Setup

1. Open the simulation: https://phet.colorado.edu/sims/cheerpj/moving-man/latest/moving-man.html?simulation=moving-man

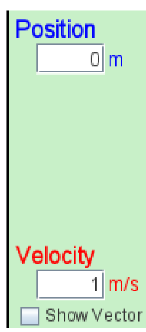
2. Select the "Charts" tab at the top of the window.

3. Click the "X" on one of the walls to remove the walls.



Part A - Graphing Motion with Constant Velocity

1. Set "Position" to 0 and "Velocity" to 1.



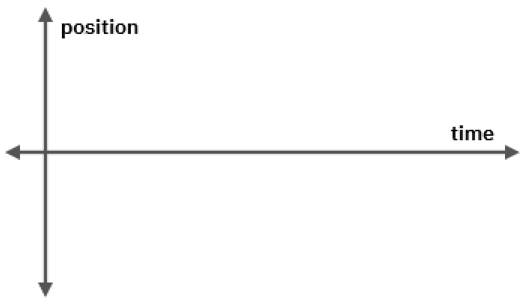
2. Click the play button. 

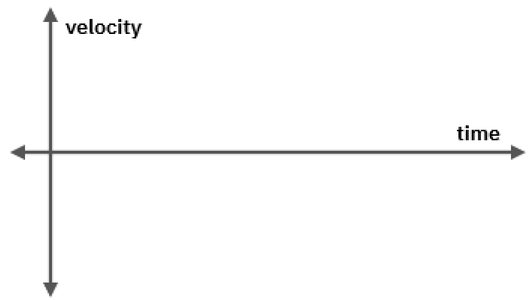
3. As the man moves, graphs of position vs time and velocity vs time are drawn.

   After the timer has run for approximately 15 seconds press the pause button. 

   Did the man move to the right or the left? _________________

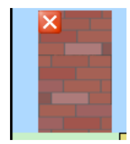
4. Sketch the shape of the graphs on the following axes.



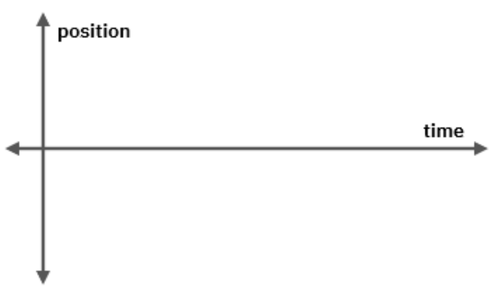
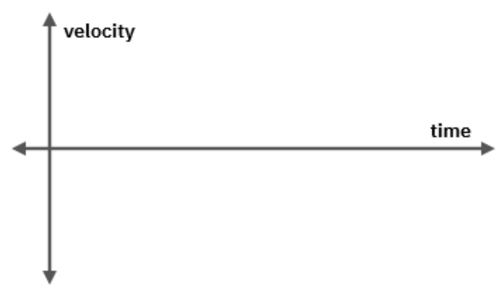
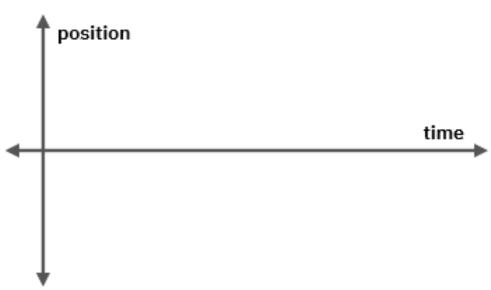
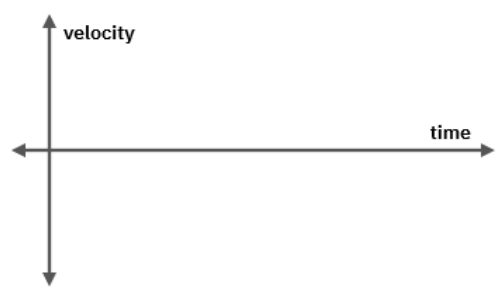


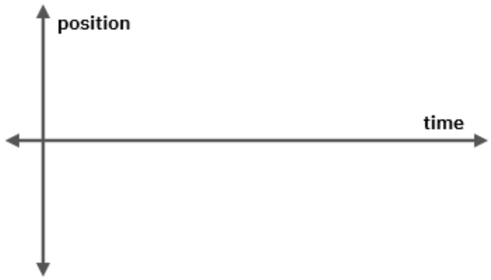
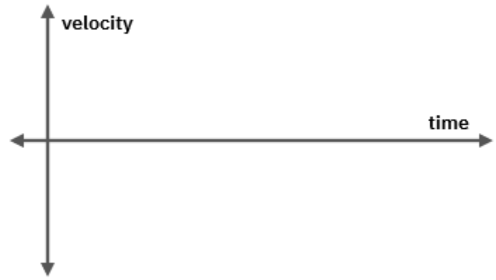
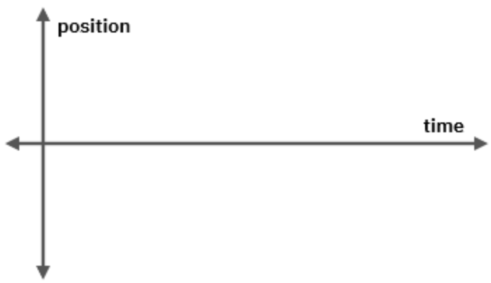
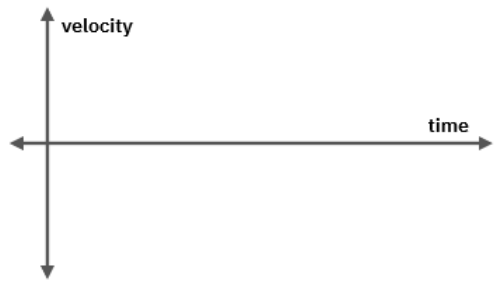
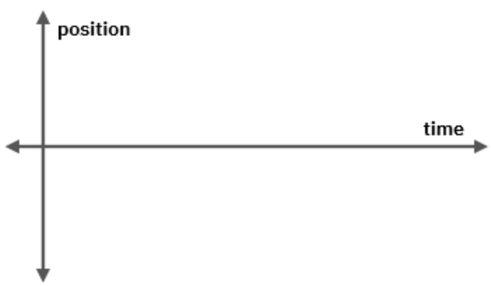
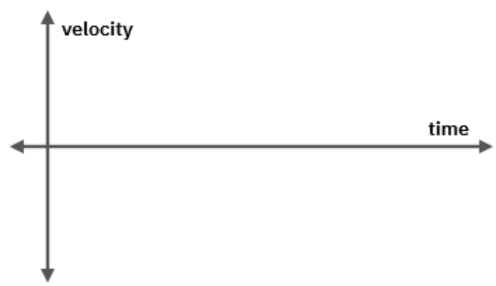
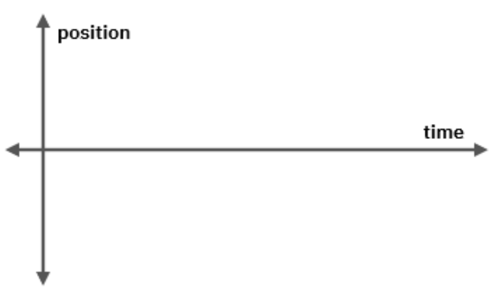
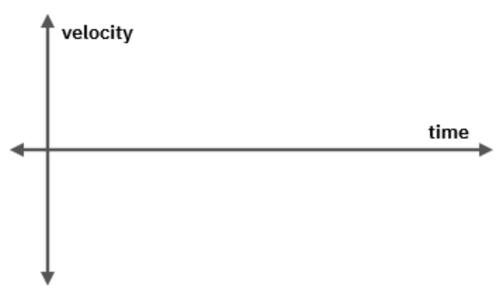
5. Click “Reset All.”

6. Click the “X” on one of the walls to remove the walls.



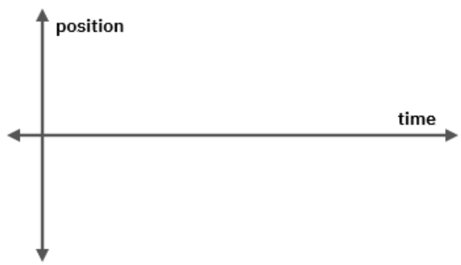
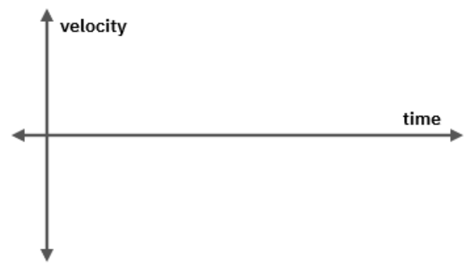
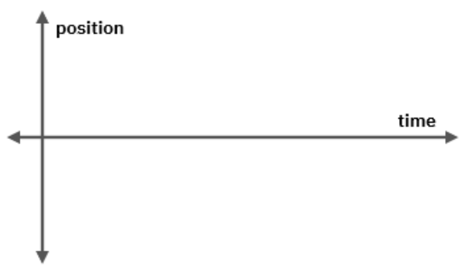
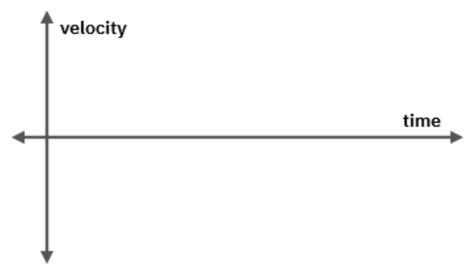
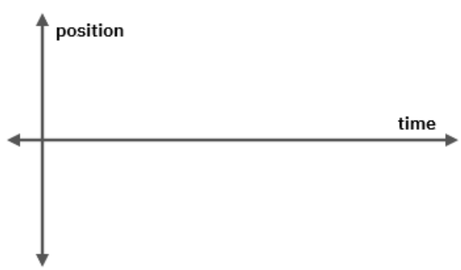
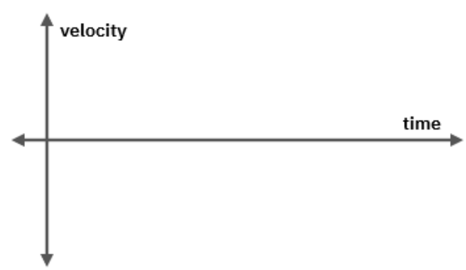
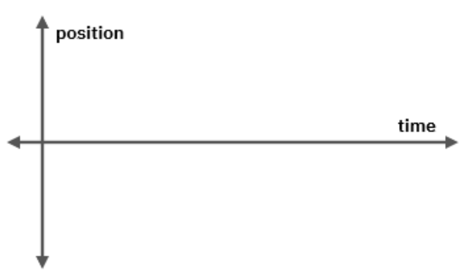
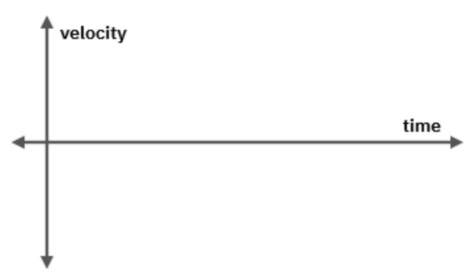
7. Set the position and velocity to the values in the table and run the simulation for approximately 15 seconds. Record the direction of motion and sketch the shape of the graphs on the axes. Reset the simulation and remove the walls after each run.

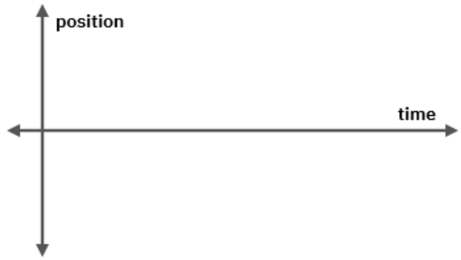
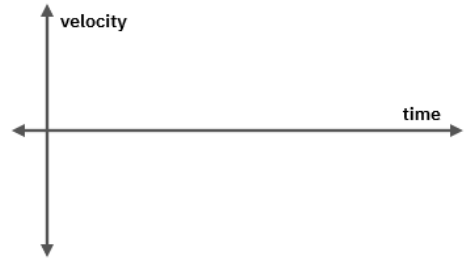
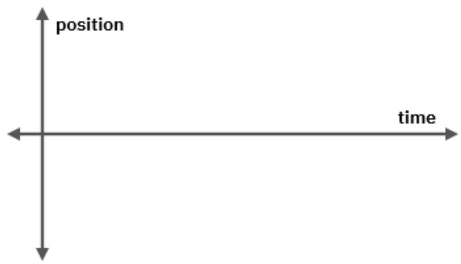
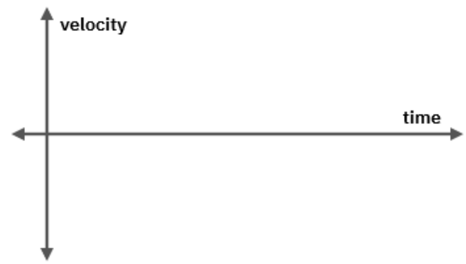
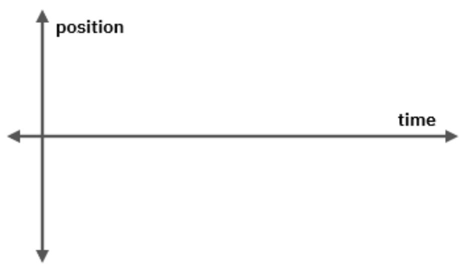
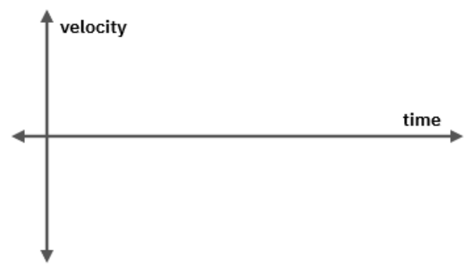
<table>
<tr><th>Settings</th><th colspan="2">Graphs</th></tr>
<tr><td>Position = 0
Velocity = -1</td><td rowspan="2"></td><td rowspan="2"></td></tr>
<tr><td>Direction:
___________</td></tr>
<tr><td>Position = -10
Velocity = 1</td><td rowspan="2"></td><td rowspan="2"></td></tr>
<tr><td>Direction:
___________</td></tr>
</table>

Position = 10 Velocity = -1 Direction: ___________		
Position = 0 Velocity = -1 Direction: ___________		
Position = 0 Velocity = 2 Direction: ___________		
Position = 10 Velocity = -2 Direction: ___________		

Part B - Graphing Motion with Constant Non-Zero Acceleration

1. Set the position, velocity, and acceleration to the values in the table, run the simulation for approximately 15 seconds, and then sketch the shape of the graphs on the axes. Reset the simulation and remove the walls after each run.

Settings	Graphs	
Position = -10 Velocity = 0 Acceleration = 1		
Position = 10 Velocity = 0 Acceleration = 5		
Position = 10 Velocity = 0 Acceleration = -1		
Position = -10 Velocity = 1 Acceleration = 1		

Position = 10 Velocity = -6 Acceleration = 1		
Position = -10 Velocity = 6 Acceleration = -1		
Position = 10 Velocity = -2 Acceleration = -2		

Part C - Application

1. What does a position-time graph look like for an object moving with a constant velocity?

2. What does a position-time graph look like for an object moving with a constant non-zero acceleration?

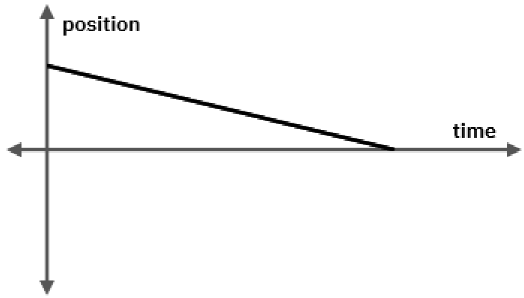
3. What does the slope on a position-time graph tell us about the object's motion?

4. What does a velocity-time graph look like for an object moving with constant velocity?

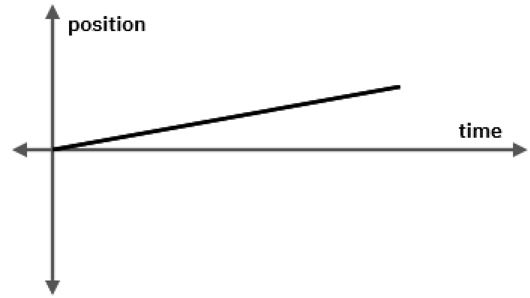
5. What does a velocity-time graph look like for an object moving with a constant non-zero acceleration?

6. Describe the motion shown in each of the following graphs.

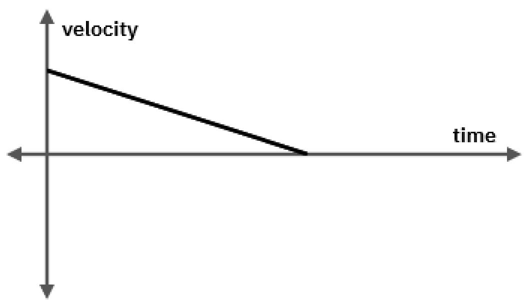
(a)



(b)



(c)



(d)