Interactive Lecture Demonstrations

 Prediction Sheet**—Kinematics 1—Human Motion**

**Directions:**   Write your name at the top to record your presence and participation in these demonstrations.  For each demonstration below, write your prediction on this sheet before making any observations. You may be asked to send this sheet to your instructor.

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| **Demonstration 1:**  The positive direction is toward the right. (A) Sketch below on the left axes your prediction of the *position-time* graph for a person moving to the right at a steady (constant) velocity.  On the right axes sketch your prediction for a person moving to the left at a steady (constant) velocity. |
| A screenshot of a social media post  Description automatically generated |
| (B) Sketch below on the left axes your prediction of the *velocity-time* graph for a person moving to the right at a steady (constant) velocity.  On the right axes sketch your prediction for a person moving to the left at a steady (constant) velocity. |
| A screenshot of a cell phone  Description automatically generated |
| Only after you have made your predictions, open **The Moving Man** simulation:<https://phet.colorado.edu/sims/cheerpj/moving-man/latest/moving-man.html?simulation=moving-man> On the upper left, select **Charts**. Remove the **Acceleration** graph by clicking on the  in the upper righthand corner. Use the slider to set the velocity at around +1 m/s. Click on A close up of a logo  Description automatically generated to start graphing. When the man reaches the right limit and stops quickly move the velocity slider to about -1 m/s. When the man reaches the origin again, click on A picture containing clock  Description automatically generated to stop graphing. 1.   Compare your observed position-time graphs to your predictions. If they don't agree, explain.   2.   On a position-time graph, what tells you if the motion is in the positive or negative direction? Explain.    3.   Compare your observed velocity-time graphs to your predictions. If they don't agree, explain.    4.   On a velocity-time graph, what tells you if the motion is in the positive or negative direction? Explain |
| **Demonstration 2:**  The positive direction is toward the right. Sketch on the axes below your predictions for the *position-time* and *velocity-time* graphs of a person to the right at approximately three times the speed of Demonstration 1. |
| A screenshot of a cell phone  Description automatically generated | Describe in words your prediction of how the *position-time* graph changes when the speed is three times as fast.Describe in words your prediction for how the *velocity-time* graph changes when the speed is three times as fast. |
| Only after you have made your predictions, use **The Moving Man** simulation to test them. Click onA screenshot of a cell phone  Description automatically generated and thenA picture containing screenshot, framework, monitor, clock  Description automatically generated.Again, remove the **Acceleration** graph by clicking on the  in the upper righthand corner. Use the slider to set the velocity at around +1 m/s. Click on A close up of a logo  Description automatically generated to start graphing. When the man reaches the right limit and stops, quickly slide him back to the origin and click on A picture containing clock  Description automatically generated to stop graphing. Use the slider to set the velocity at around +3 m/s, then click on A close up of a logo  Description automatically generatedto start graphing, and stop when he reaches the right limit.  1.  Compare your observed position-time graphs for the original motion and for moving three times as fast, and also compare to your predictions. What is different?   2.   On a position-time graph, what tells you if the motion is fast or slow? Explain.    3.   Compare your observed velocity-time graphs for the original motion and for moving three times as fast, and also compare to your predictions. What is different?    4.   On a velocity-time graph, what tells you if the motion is fast or slow? Explain.   |
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| **Demonstration 3:**  Sketch on the axes below prediction of the *velocity-time* graph produced when a person—            • walks in the positive direction slowly and steadily for 6 seconds            • then stands still for 6 seconds            • and then walks in the negative direction steadily about twice as fast as before |
| A close up of a piece of paper  Description automatically generated |
| Only after you have made your predictions use **The Moving Man** simulation to test it. Click onA screenshot of a cell phone  Description automatically generated and thenA picture containing screenshot, framework, monitor, clock  Description automatically generated.Again, remove the **Position** and **Acceleration** graphs by clicking on the in the upper righthand corner of each. Use the slider to set the velocity at around +1 m/s. Click on A close up of a logo  Description automatically generatedto start graphing.  After 6 sec, click on A picture containing clock  Description automatically generatedto stop graphing. Use the slider to reset the velocity to 0, start graphing, and stop after 6 more sec. Use the slider to reset the velocity to about -2 m/s, start graphing, and stop after 6 more sec. Be sure to keep this graph for use in Demonstration 4.Compare your observed velocity-time graph to your prediction. If they don't agree, explain why. |
| **Demonstration 4:** Predict the *position-time* graph for the motion in Demonstration 3 on the axes below.  (Align the distance and velocity graphs correctly in time.) A screenshot of a cell phone  Description automatically generated |
| Only after you have made your predictions return to **The Moving Man** simulation to test it. Click on to display the position-time graph for this motion.Compare this observed position-time graph to your prediction. If they don't agree, explain why. |