**Moving man simulation**

Navigate to [PhET Simulation (colorado.edu)](https://phet.colorado.edu/sims/cheerpj/moving-man/latest/moving-man.html?simulation=moving-man) Click on the simulation and start it. Make sure that you are under the charts tab and not introduction.

**Objective: Explore position and velocity graphs of an object moving in different ways.**

**Constant velocity:**

Using position slider, put the man under the tree. Set the velocity at the value of your choice, but be sure to record it.

Click the play button to set the man in motion until he hits the wall and then hit the pause button to stop the recording.

Use the playback feature to answer the following questions:

1. What happened to the blue position slider as the man moved across the screen?

The slider moved upward at a constant rate.

2. What happened to the red velocity slider as the man moved across the screen?

The slider did not move.

Use the playback feature again to record the man’s position and velocity in a data table at 0.5 s to 5 s

|  |  |  |
| --- | --- | --- |
| Time (s) | Position (m) | Velocity (m/s) |
| 0.0 |  |  |
| 0.5 |  |  |
| 1.0 |  |  |
| 1.5 |  |  |
| 2.0 |  |  |
| 2.5 |  |  |
| 3.0 |  |  |
| 3.5 |  |  |
| 4.0 |  |  |
| 4.5 |  |  |
| 5.0 |  |  |

Plot your data in the graphs and then write a conclusion about what your data shows. Consider discussing the shapes, slopes and reasonability levels in your conclusion.

**Paste your GeoGebra graph here:**

**Constant Acceleration**

Reset all the values to zero and use the position slider to set the man to stand near the tree. Set the velocity at 0 m/s and the acceleration at a value of your choice, but be sure to record it.

Click the play button to set the man in motion until it hits the wall and then hit the pause button to stop recording.

Use the playback feature to answer the following questions.

1. What happened to the blue position slider as the man moved across the screen?

The slider moved upward at a non-constant rate

2. What happened to the red velocity slider as the man moved across the screen?

The slider moved upward at a constant rate.

Use the playback feature again to record the man’s position, velocity, and acceleration in a data table at 0.5 s intervals through 5 s.

|  |  |  |  |
| --- | --- | --- | --- |
| Time (s) | Position (m) | Velocity (m/s) | Acceleration (m/s2) |
| 0.0 |  |  |  |
| 0.5 |  |  |  |
| 1.0 |  |  |  |
| 1.5 |  |  |  |
| 2.0 |  |  |  |
| 2.5 |  |  |  |
| 3.0 |  |  |  |
| 3.5 |  |  |  |
| 4.0 |  |  |  |
| 4.5 |  |  |  |
| 5.0 |  |  |  |

Plot your data in the graphs and then write a conclusion about what your data shows. Consider discussing the shapes, slopes and reasonability levels in your conclusion.

**Paste your graph from GeoGebra:**

**Final summary**

What happens to the man when he is accelerating? What is the difference between an object with constant acceleration and an object with constant velocity? What do the slopes of each graph describe? How accurate is your data? What new predictions can you make with your data?

The man’s position increases exponentially when he has a constant acceleration, yet his position increases linearly when has a constant velocity. An object with constant acceleration has a linearly increasing velocity, while an object with a constant velocity has no acceleration and linealy increasing position.

The slope of a position vs time graph describes velocity and the slope of the velocity vs. time which describes acceleration.

If the students graphed properly, when they compare their results to the graphs in the simulation, their data should be relatively accurate.

They should now predict several accelerations and velocities repeating the same process on geogebra to check results.