**Unit 2 – Activity 5**

**Graphing Constant Velocity Motion**

When dealing with situations of motion in real life, one thing we often have to consider is ***when*** an object will be at a particular position. For example, being able to simulate the motion of your school bus is less helpful for getting you to school on time then knowing when the bus will reach your stop and when it will arrive at school.

The representation of motion which we have been using so far to create simulations is not well-suited to answer these questions because it is not dependent on time at all.

1. Open the simulation found here: <https://tinyurl.com/yc3oumqu>. Complete the code so that it produces a simulation of a bus with an initial position of and a velocity of . Leave both produce-graph and produce-data-table on lines 7 and 8 as false for now.
2. Change delta-t to 5 seconds and edit line 7 so it reads produce-graph = true. Run the simulation and use the graph it produces to determine where the bus was at times and . Change delta-t to 1 second and re-run your simulation. Did where the bus was at times and change with the new delta-t? Does this surprise you?
3. Run your simulation a few more times with different values of delta-t. What happens to the graph of the bus’s position over time as delta-t gets smaller?
4. Set delta-t to 1 second and edit line 8 so that it reads produce-data-table = true. Fill in the data table below and plot the points.

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1. Use a ruler to draw the line which best fits your data. Then determine the equation of that line and write it below.
2. Change the values of initial position and velocity of the bus and run your simulation again. Write the initial position, velocity, data table, graph, and equation on a white board to share with the rest of the class.

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| **Initial Conditions:** | |
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| **Equation:** | |

1. Based on the equations produced by your classmates, do the slope and vertical intercepts of our equations have any physical meaning? What are their units?