AS Physics   Name_____

Enrichment – 1D Kinematics

Instructions

1D Kinematics is the study of motion without looking at the interaction of multiple dimensions or the forces involved. This assignment has 2 options: an experiment and a program. You may choose to do one or both.

Experiment

From class we already know that the acceleration of free-fall is 9.81m s^{-2} (assuming no air resistance). Design an experiment to determine the acceleration of free-fall. Your experiment should follow the lab report format, up to the "evaluation of data" section (with a full data table, graph, line of best fit, etc.). The equation of your line should be used to determine the acceleration due to free-fall. Hint: your line of best fit should be of the form $s = ut + \frac{1}{2}at^2$.

  Submit the following:
1. Written description of your experiment (including a diagram of your apparatus)
2. A video of you doing the experiment
3. Data table (at least 6 data points)
4. Graph
5. Line of best fit
6. Values and explanations for the y-intercept and the slope (see lab rubric for ideas of what to include in your "conclusion")

VPython

In this activity you will use a computer program to demonstrate and analyze the motion of various scenarios. BEFORE beginning this lesson you need to complete the VPython Directions document (also posted on the weebly). I expect a high comment-to-code ratio in all code submissions.

Go to ***glowscript.org***, and click on the ***Sign In*** link in the upper right corner.
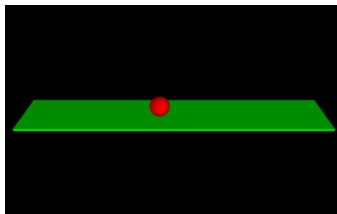
- Make an object that starts on one end of your "ground" and that accelerates at a different rate.
- Create two objects and have one move at a constant velocity while the other accelerates.
- Allow the constant velocity object a 5 second head start before the accelerating object begins.
- Use SUVAT to predict how long it will take for the second object to overtake the first one. Submit your written work along with your program.

Resource used to create this activity: Computer Science for Teachers conference