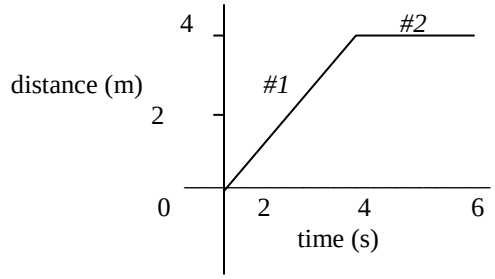
Name _____ Hour _____

Motion Graphs - Problems and Mini Lab

PROBLEM 1:Distance vs. Time Graph This is the graph of Perry moving away from Dr. Doofenshmirtz.

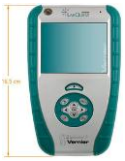


1a) The slope of a distance vs. time graph has units of _____, so it represents_____.

1b) What is Perry's velocity in segment *#1 (from 0-4 sec.)?* (Just find the slope!) _____

1c) What is Perry's velocity in segment *#2 (from 4-6 sec.)?* (Just find the slope!) _____

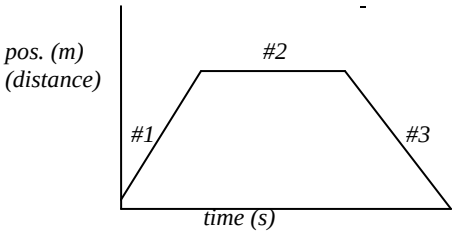
1d) A flat line on the graph means the object is _____.



Mini Lab- Fun With Distance vs. Time Graphs using a LabQuest

*Turn on LabQuest (top left corner) that has dark green motion detector attached.
*Hit button in the turquoise circle w/3 sheets of paper on it until **File Graph Analyze** are on the top of the screen.
***Face the wall. When you're ready, tap the green play button on the screen and it will start graphing your motion.
***Want to try it again? Hit the green play button again. ☺ You may discard your data.

2a) Play with it and try to make **your top RED graph** that looks something like the one below. (Your lines will not be as straight.) You will need to walk forward, backward or stand still to match the different segments.



What we had to do to match that segment of the graph:

#1 _____

#2 _____

#3 _____

SUMMARIZE PART A: Distance vs. Time graphs

1. What units would the slope be in for a **distance vs. time** graph? _____
2. What quantity does the slope of a **distance vs. time** graph measure? _____
   (i.e. distance, speed, or acceleration, etc.)
3. What would you do to make your **distance vs. time** graph have a **horizontal line**? _____

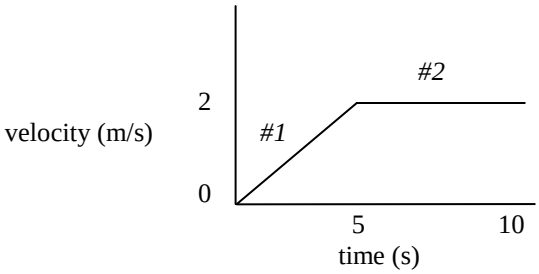
Make sure everyone in your group can do this. Your teacher will pick one of you. Teacher's initials: ☐

☺ **Give your LabQuest to another group or plug it in by the sinks and move onto Velocity vs. Time graphs**

Name _____ Hour _____

Problem 3: Velocity vs. Time Graphs

This is the graph of Scooby Doo running to get Scooby snacks.



3a) The slope of a velocity vs. time graph has units of_____, so it represents _____.

3b) What is Scooby Doo's acceleration for segment *#1 (from 0-5 sec.)*? (Just find the slope!) _____

What is Scooby Doo's acceleration for segment *#2 (from 5-10 sec.)*? (Just find the slope!) _____

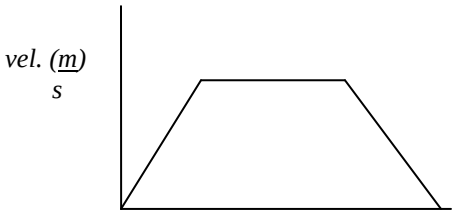
3c) A flat line on a velocity vs. time graph means the object is _____.

3d) Calculate how far Scooby Doo traveled by solving for the area under the line. *(Hint: Break it into a right triangle and a rectangle.)*

3e) The area under the line on a velocity vs. time graph has units of _____, so it represents the object's _____.

3f) Use the $\mathbf{\Delta x = v_i \Delta t + 1/2 a \Delta t^2}$ equation to measure the distance traveled during segment #1 by plugging in numbers from the graph for your variables.

*Explain what you would have to do to match the graph below. (Remember, velocity on y-axis!)



#1 _____

#2 _____

#3 _____

SUMMARIZE PART B: Velocity vs. Time Graphs

1. The slope of a velocity vs. time graph has units of _____ and measures _____
2. A horizontal line on a velocity vs. time graph means the object is _____
3. The area under the line (solved for using either shapes or 1-D motion equations) has units of _____, so it represents the object's _____.