

# Physics 123 Prelab 1:

## Kinematics in One Dimension

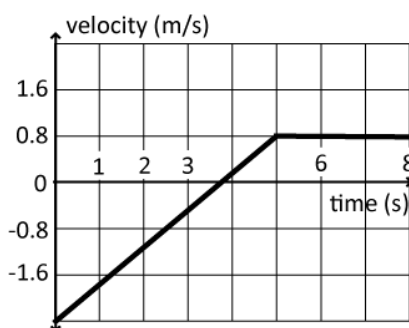
### Physics 123: Electricity and Magnetism

Instructor: Professor Andrew Boudreaux, Andrew.Boudreaux@wwu.edu

*This prelab is due at the beginning of your lab period. Explain your reasoning for each of the questions below. Please work individually and do not discuss your ideas with other students or your instructor. You will receive credit for explaining your thinking, with no penalty for incorrect or incomplete responses. During lab, you will revisit the prelab questions and discuss them with your partners.*

The global X-Prize competition seeks to “inspire a new generation of viable, super-efficient vehicles that help break our addiction to oil and stem the effects of climate change.”

Suppose that the team from WWU, which entered the 2010 competition, is asked to use their vehicle *Viking 45* to reproduce as closely as possible the  $v$  vs  $t$  graph shown at right.



- At time  $t = 2$  s:
  - is the acceleration of Viking 45 *positive, negative, or zero*? Explain.
  - is Viking 45 *speeding up, slowing down, or moving with constant speed*? Explain.
- For the interval from  $t = 0$  s to  $t = 5$  s, the slope of the velocity graph is constant and has a numerical value of 0.64. Using everyday language write a complete *interpretation* of the physical meaning of this number (*i.e.*, explain the specific information the number 0.64 conveys about this motion.)
- Write an equation for the position  $x$  of Viking 45 as a function of time  $t$ . Your equation should be valid for the time interval from  $t = 0$  s to  $t = 5$  s. It should contain only  $x$ ,  $t$ , and numerical constants. You may assume that  $x = 0$  at time  $t = 0$ .
- For the interval shown in the graph, did Viking 45 have a change in the direction of motion? In other words, was there a *turn-around*? If so, at what time did the turn-around occur, and was the acceleration at the turn-around *positive, negative, or zero*?
- Read the lab syllabus. Then use the back of the page to describe: (i) one aspect of this approach to learning and teaching that sounds interesting, and (ii) one concern.