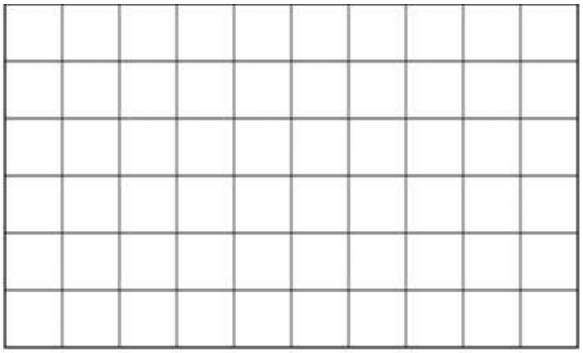
NAME _____ DATE _____

Scenario

Carlos places a constant motion vehicle on the ground and releases it so that the vehicle travels down the hall at 5 m/s *in a straight line for* 10 *seconds.*

Using Representations

PART A: Scale and label the axes on the graph to the right. Draw a velocity vs. time graph of the constant motion vehicle for the first 10 seconds of its motion.



Argumentation

PART B: Collect evidence about the physical meaning of the slope of the graph that could be used to support a claim. Fill in the blanks below.

Evidence: The slope of the velocity vs. time graph is equal to _____ (number) _____ (units). _____ (units) is also the unit for _____ (physical quantity).

PART C: **Claim:** The constant motion vehicle will travel a distance of 50 meters during the 10-second time interval.

Collect evidence about the physical meaning of the area under the line on the graph that can be used to support the claim above. Using the equation for the area of a rectangle (*Area* = *length* × *width*), write an equation (including units) for the area of the rectangle between the velocity vs. time line and the x-axis between $t = 0$ and $t = 10$ seconds.

Evidence: The area under the line of the velocity vs. time graph is equal to _____ (number) _____ (units) × _____ (number) _____ (units) = _____ (number) _____ (units). This area is also known as the _____ (physical quantity) of the vehicle.

Reasoning: Fill in the blanks of the following statement.

The claim makes sense because if the constant motion vehicle is traveling at a velocity of _____ (number) m/s, then each second it will move a distance of _____ (number) meters. After 2 seconds, the vehicle has moved _____ (number) meters. After 3 seconds, it has moved _____ (number) meters. After _____ (number) seconds, it has moved 25 meters.

Quantitative Analysis

PART D: Rewrite the equation for the area of a rectangle (*Area* = *length* × *width*) using the symbols and numbers (with units) from the graph in Part A between $t = 0$ and $t = 10$ seconds.

_____ (letter) = _____ (number (with units)) _____ (letter)

The area under a velocity vs. time graph represents the _____ (physical quantity). (Hint: Use the units.)

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