

Name 1: _____

Name 2: _____

Date: _____

Challenge #4: A Way Out

Overview

Up to **two** students can work on this challenge. Remember each team member must contribute to at least one the completion of one of the physics components for one challenge and the completion of one of the engineering components for another challenge. This challenge is about **kinematics**. You will be asked to do the following:

1. Determine the total distance traveled by your rover
2. Determine the average speed of your rover
3. Determine the displacement of your rover
4. Determine the average velocity of your rover

Total Distance

The total distance is determined by adding every element of motion for your rover, all of the “legs of the journey.” For example, if your rover moved around in a complete square, every line of that square – the perimeter – would be the total distance traveled.

Use a ruler and any other necessary tools to determine the distance of your rover (in meters) and write it below.

Total Distance (d): _____

Average Speed

Time how long it takes your rover to complete the maze, including the bonus sections. Make sure your rover is able to do it four times consecutively and complete the table below.

Trial	Time(s)
Average Time:	

To determine your average speed, use the following equation (and the average time from above):

$$v = \frac{d}{t}$$

Please calculate your average speed and write it below.

Average Speed (v): _____

Displacement

The displacement is the shortest path your rover needs to take to complete the maze. See if you can draw a straight line from the start of the maze to the end using a meter stick; ignore all bonus point sections your rover reaches or does not reach. Write down the displacement below.

Displacement (Δx): _____

Average Velocity

The average velocity of your rover is determined by the following equation:

$$v = \frac{\Delta x}{t}$$

Luckily, you already have data on how long it takes for your rover to complete the maze, so use the equation above and write your average velocity below.

Average Velocity (v): _____

***Exceeding Proficiency:** If you determine the average acceleration for the following part on your own, and it is correct or reasonable, you will receive exceeding proficiency.*

Use the space below, and what you know from previous elements of this component of the challenge, to determine your average acceleration. Write your final value below.

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Average Acceleration (a): _____

Point System (TEACHER ONLY - CIRCLE ONE)

Not Yet (0pts) (50%)	Approaching Proficiency (10pts) (60%)	Somewhat Proficient (20pts) (70%)	Proficient (30pts) (85%)	Exceeding Proficiency (40pts) (100%)
You have not correctly completed any of the elements of this challenge component.	You have correctly completed at least one element of this challenge component.	You have correctly completed half of the elements of this challenge component.	You have correctly completed all of the elements of this challenge component.	You have additionally and correctly completed the independent element of this challenge component.
Comments:				

