Name 1: _____

Name 2: _____

Date: _____

Challenge #5: Surface Navigation with Lunar Rock

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 displacement of your rover
2. Determine the average velocity of your rover
3. Determine the acceleration of your rover

Displacement

The displacement is the shortest path your rover needs to take to traverse the lunar surface model. Place a meter stick with one end where your rover starts and the other where it ends up across the model with the rock. Measure the distance from end to end and write it below.

Displacement (Δx): _____

Average Velocity

Time how long it takes your rover to travel from one end to the other with the rock, 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 velocity, use the following equation (and the average time from above):

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

Please calculate your average velocity and write it below.

Average Velocity (v): _____

Average Acceleration

To determine your average acceleration, please remember that:

$$a = \frac{v - v_0}{t}$$

Use the equation above and write your average acceleration below.

Average Acceleration (a): _____

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

Using your knowledge of forces (specifically Newton's second law), determine what the net force of the rover is in the space below and write your final answer below it.

Net Force (F_{net}): _____

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:				