



## Foundation For Allen Schools Grant Application

**Scholarship Fund Amount: \$0**

Application #: AP199837

Applicant First Name: Mardalee

Applicant Last Name: Burwitz

Applicant Email Address: mardalee.burwitz@allenisd.org

Gender:

Cell Phone #:

High School:

Post Secondary School:

Application Status: Submitted

### Application Questions and Answer

Question	Answer
Preferred name/name that you go by:	Mardalee
Best phone number to reach you at:	+12144220672
Campus	Curtis Middle School
Grade(s)	8;7
I have co-applicants:	Yes
Please provide your work-related Facebook contact information.	
Please provide your work-related Twitter contact information.	@BurwitzMathCMS
Name of Grant	TI Rovers - Going the Distance with Math
Please select the MAIN curriculum area your grant addresses.	Math – Secondary

Does your grant have a technology component?	No
Will other campuses be involved/impacted?	No
Will other grades be involved/impacted?	No
How many students will be involved in this grant?	650
Are there any additional funds available for this grant?	No
	MB
<p>What is the problem, need or opportunity that this grant will address? Describe the impact of this project on your students.</p>	<p>Principally, scientific exploration asks questions. Students deciding to go into scientific careers need to gain the tools in their mathematical toolkit to analyze and question the data from their experiments. Students need to learn the skills while working in groups. More problem based, open-ended questions help students learn self-regulation, build community and the ability to work in groups. Students need a chance to struggle with a problem that does not have just one correct answer. The TI Rovers are a great tool to allow students to experience all of this. The TI-Innovator™ Rover is an educational robotic vehicle that students program with their TI graphing calculators to explore topics in math, science, coding and STEAM. Programming Rovers to move is a great way to explore topics and concepts to promote collaborative problem-solving. The TI Rovers will play a part in both the Algebra 1 and Math 8 classes. Algebra 1 students will utilize the robotic vehicles to measure varying speeds using distance and time. Math 8 students will create pathways for the vehicles to follow while manipulating the exterior angles to drive. An offshoot of the TI Rovers will be an introduction to coding and an opportunity for interested students to create code to drive the machines.</p>
	<p>The project will be implemented using Problem Based Learning (PBL) where an interesting, open-ended problem is posed. Students will work in groups to test hypotheses such as “when will the two Rovers traveling from different directions “crash” into each other, and at what speeds will</p>

How will the project or program be implemented? Describe activities and tasks. Who is the target population and in what ways will they benefit?

cause this collision at a certain time. Students will also design maps (lines) and angles and test the Rover to see if it can follow the map given a set of directions using measurement and exterior angle movements. Both of these activities are based and modified from the Texas Instruments website: <https://education.ti.com/en/activities/innovator/math>. The initial, target populations are Algebra 1 PreAP students and on-level Math 8 students. Ti Rovers can be utilized in other subject areas such as Science and STEM courses and shared by other interested educators. This past semester, the fall of 2019-2020, we borrowed a set of Rovers from Texas Instruments. The students were engaged, working together to find solutions to questions posed from three TI-Education lessons: "Rover Rate", "Two Rovers Leave the Station" and "Drive the Line Challenge". In the "Rover Rate" problem, students used the Rover and the provided files to explore the relationship between distance, rate and time. The students related their findings to the actions of Rover. Students realized they had the ability to apply this relationship to control how the Rover drives a given path. Rover Rate could be used both in honors algebra (A.2B), on-level math 8 (8.5F) and 8th grade science classes. In the "Two Rovers Leave the Station...", students used the Rover to help illustrate an intersection point of two lines. Students crashed two Rovers into each other. The crash used the horizontal distance from the origin,  $s(t)$ , as the dependent variable and time,  $t$ , as the independent variable. The velocity was the slope of the linear equation, and the starting distance from the origin was the initial position. The problem would be used in the spring semester for honors algebra as a summative activity after teaching solving systems of linear equations (A.3G, A.3F). In the "Drive the Line Challenge", students explored multiple representations of position, velocity and time to write code to navigate a set of challenges. This project was used in on-level Math 8 with a focus on the external angles. (8.2D) We want to incorporate the TI rover activities we piloted last November into our Honors Algebra 1 and Math 8 curriculum. We observed with our Algebra 1 PreAP class, that we had deep discussions about the hows and whys when graphing distance, time, and the resulting rate. Students' misconceptions that we observed and were able to correct: 1. The placement of distance and time on the graph 2. How it related to the change in vertical over

	<p>horizontal distances. 3. Not needing to graph the trial times, but just the averages. 4. Comparing graphs of the various groups and the choice of scale and drawing of three graphs on a coordinate system.</p>
<p>Provide a brief summary for use on the Foundation's website and social media.</p>	<p>Rovers Take Over! Math 8 Ss use skills to drive Ti Rovers by measuring angles and distances as they create maps. Algebra 1 Ss determine rate, time and speed to calculate collisions of Rovers. #TIRovers #StudentsInvolvement #AllenSTEAM</p>
<p>Which Allen ISD goals/TEKS does this project support? Please provide 2 or 3 examples.</p>	<p>Algebra 1 and Math 8 TEKS Process Skills TEKS Students will uses the mathematical process standards to acquire and demonstrate mathematical understanding; 1(B) ...forming plans/strategies, determine justify,and evaluate solutions 1(C) ...utilize tools including manipulatives and technology along with number sense 1(D) ...communicate ideas, reasoning, representations such as diagrams and graphs 1(F) ...analyze mathematical relationships to connect and communicate ideas Algebra 1 TEKS A.2(B) ...calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems; A.3(F) ... graph systems of two linear equations in two variables on the coordinate plane and determine the solutions if they exist A.3(G) ...estimate graphically the solutions to systems of two linear equations with two variables in real-world problems; ; Math 8 TEKS: 8.5(A)... represent linear proportional situations with tables, graphs, and equations in the form of <math>y = kx</math> 8.5(F)... distinguish between proportional and nonproportional situations using tables, graphs, and equations 8.8(D)... use informal arguments to establish facts about the angle sum and exterior angle of triangles, the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.</p>
<p>What specific measurements will be used to evaluate the effectiveness of the project?</p>	<p>We will observe student engagement and connections to real world situations. Purposeful questions and solutions are assessed through both small group and whole class discussions which prove to advance students' reasoning and to help promote problem solving.</p>
	<p>We will use a Problem Based Learning (PBL) implementation. PBL blends content mastery, meaningful work, and personal connections to</p>

<p>What teaching methods will be used to implement this project?</p>	<p>create powerful learning experiences. Texas Instruments TI offers a variety of STEM PBL resources for middle grades that we will use. We will build on our successes with the “Rover Rate” , “Two Rovers Leave the Station”, and “Drive the Line challenge” problems to develop skills that help students understand and connect the principles of science, math, and coding. These activities engage our students in making connections among mathematical representations. Purposeful questions and solutions are assessed through both small group and whole class discussions which prove to advance students’ reasoning and to help promote problem solving.</p>
<p>What is the project timeline and the date of implementation?</p>	<p>The following dates offer a focus for specific skills within our curriculum. However, the Rovers will be utilized at other times throughout the year as students learn specific concepts and TEKS with additional use for enrichment and coding opportunities. Algebra 1: November- exploring distance rate and time problems. January -Graphing Systems of Equations Math 8: October - Exploring distance, rate, and time problems. November - Measuring Exterior angles and distance. With the housing of the Rovers at our school, we will be able to extend their use throughout the year, as we refer back to previous learning, and offer opportunities for inquisitive students to extend their use in enrichment activities such as coding.</p>
<p>Explain how this idea or project enhances/supports Allen ISD curriculum or existing systems.</p>	<p>The Allen Math Hub has an infographic which demonstrates innovative strategies for educators to “look-for” in Allen ISD Math classes. The use of the Rovers in the classroom addresses five of these “look-fors” in Allen Math Classes: engage and inspire students, use deep and rigorous questioning, use collaborative student groups, problem solve make connections. The use of TI Rovers will give students an opportunity to associate the mathematics they are studying with a new technology. The connections made will strengthen their understanding and enrich their learning.</p>
<p>Total Grant Budget Requested:</p>	<p>4780</p>

**Additional Co-Applicants Set Number 1**

Question	Answer
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First Name	Catherine
Last Name	Stolarski
Email	catherine.stolarski@allenisd.org
Campus	Curtis Middle School
Grade:	7;8

**Project Budget Set Number 1**

<b>Question</b>	<b>Answer</b>
Item Type	Instructional Supplies or Resources
List item to be purchased under item category:	TI Innovator Hub and Rover
Unit Cost	239
Quantity	20
Total cost of items in this category:	4780