# 2020 FUNDED LIFT GRANT APPLICATION

TITLE Mr.

FIRST NAME Adam

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PROJECT INFORMATION PART I

PROJECT TITLE Empowering Future Engineers

SCHOOL NAME Rocky River Elementary

SCHOOL CATEGORY

Elementary

WHICH PART OF THE EMPOWERED FRAMEWORK DOES YOUR PROJECT ADDRESS?

All Three

PRINCIPAL Sherry Richardson

SUBJECT

Elementary General

NUMBER OF STUDENTS IMPACTED BY YOUR PROJECT

300+

DO YOU WORK WITH STUDENTS ON A DAILY BASIS?

Yes

HAVE YOU RECEIVED A LIFT GRANT IN THE PAST?

No

GRANT AMOUNT REQUESTED $1500

WILL YOU ACCEPT PARTIAL FUNDING?

Yes

WHERE ELSE HAVE YOU APPLIED TO FOR THIS PROJECT?

OTHER Burroughs Welcome Fund PRISM grant

PROJECT INFORMATION PART II

PLEASE EXPLAIN YOUR IDEA. WHICH OF THE THREE FOCUS AREAS DOES YOUR PROJECT ADDRESS? HOW WILL YOUR LIFT PROJECT CHANGE THE LIVES OF UCPS STUDENTS? HOW WILL THE FUNDS BE USED? WE SUGGEST A MINIMUM OF 100 WORDS IN THIS FIELD.

The "Empowering Future Engineers" project is a series of engaging units that allow students to connect to meaningful experiences through highly effective instruction, collaborate with each other in a classroom environment that encourages risk-taking, and creativity by solving relevant and meaningful problems while incorporating math, science technology and engineering. Every student in each grade level will partake in an engineering unit in their STEM class. These units will motivate student learning by putting students into real world situations in which they expand their creative minds to grow their understanding of science, engineering, and math. The plan is that every year, students will take part in an engineering unit that is built on what they learned in the previous year. Starting in kindergarten with a more basic unit and introduction into engineering and then ending when they are in 5th grade with a culminating engineering project that will combine what they learned

each year. The funds from this grant will allow me to purchase the specific materials needed for each grade level that will be used to reach the goals set forth in this grant. This grant will change the lives of my students because, by having a problem based learning project throughout every grade as well as hands on materials, the atmosphere of the school will become one of “I can figure anything out” and student confidence will soar. This project will also support the strengthening of math, science, and problem solving skills throughout the building and I predict it will carry into the core classes in every grade level. At the culmination of the project, we will have a school wide Engineering Day, in which the students will have the opportunity to teach the staff, parents, family, and other stakeholders all that they learned, problems they faced and overcame, and how they plan to use what they learned in the future.

WHAT ARE THE GOALS AND OBJECTIVES FOR THIS PROJECT?

The goal of the “Empowering Future Engineers” project is to foster excitement and appreciation of STEM in all K-5 students through the use of problem based learning opportunities by connecting math and science to the field of engineering through a vertically aligned K-5 curriculum. There are 4 sub-goals that will assist in meeting the overall project goal. Subgoal 1 is students will master skills of collaboration with their learning teams. Students will be given ample opportunities to work together to problem solve and engineer designs and solutions to problems that engineers face on a daily basis. Sub Goal 2 is students will strengthen their problem solving abilities. This goal is one of the most important goals because students often do not know how to struggle through problems. They are always looking for someone to "save" them. This goal will help them build independence and perseverance in the face of a struggle. Sub-goal 3 is students will master the state math and science objectives that are grade appropriate and connected to the project. The standards put forth by the state will be the foundation in which these units are built on. They will go hand-in-hand with the state math and science standards. Finally, Sub-goal 4 is to learn about and analyze the skills used by engineers by learning about and applying the Engineering Design Process. They will use this process as they move through the unit and complete their project. Students will complete these goals every year, over a 6 year period. Each grade levels project will vertically align with the following grades’ project and the activities will be scaffolded to maximize learning.

WHAT IS YOUR PLAN OF ACTION? HOW DO YOU PLAN TO MAKE THIS PROJECT A REALITY?
The plan of action for this vertically aligned project spans 6 different units across all grade levels. Every year students come to STEM class, they will work on a more challenging and complicated engineering experience until the culminating project in 5th grade. Starting in Kindergarten, students will build common structures using shapes they are learning in math. They will use the easy to connect Magna tiles to learn about how engineers use different shapes while they are construction their structures. This is also where the students will be introduced the Engineering Design process for the first time. In first grade, students will take what they learned in kindergarten and begin building different structures that allow for the movement of objects. They will use the more complicate wooden ramps to experiment with engineering for a purpose. Such as moving an object from one place to another. In second grade, students now focus on engineering more complicated structures. They will use the more complicated Keva planks to build intricate structures and begin to explore and apply different methods engineers sue to build strong structures. In third grade, students will use keva planks to create a complicated ball and track system. The will use all they have learned in the previous years to help complete this project. In 4th grade, students will use more complicated building materials to gain hands-on knowledge of how structures, like specific types of bridges, connect to our lives. They will discover this as they build different working models of bridges and test the strengths of each type. The culminating activity in 5th grade will be the construction of complicated roller coasters using skills learned about engineering, math, and science throughout the other grades. They will have become more confident, learned skills to help with problem solving, built up skills in collaboration and

strengthened their understanding in Math, Science and engineering. Students will see how the subjects are all linked together in a way that helps engineers solve the problems that they do.

WHAT IS YOUR TIMELINE FOR EXECUTING THIS PROJECT?

The materials for this project will be purchased as soon as the funds are made available which I am projecting to be in late October. I will then immediately order the supplies from the various vendors. During the month of November I will finalize the unit map, concept map, and official lesson plans. All supporting materials for the units will be created, printed, and organized. Next, I will figure out any logistical challenges that might exist during the implementation of the project. This project will be ready to start when we return in January. The project will start the first week we are back from winter break with the pretest that will measure the students' beginning level of understanding of the skills and concepts that will be focused on throughout the project. Over the course of the next 8 weeks, students will partake in the "Empowering Future Engineers" project. After 8 weeks of completing the activities and lessons, students will begin to prepare for and conduct an engineering fair. Invitations will be sent to community members, family, and friends in March. The engineering fair will take place in early to mid-April, in person if that is allowed or it will be done virtually if our district is still in its current plan. In addition, the post-tests will be completed by the students at the end of the project and the survey will be completed by the stakeholders in the community after the engineering night. The surveys will help me to tweak any of the lessons for the following year. This will then continue over the course of the next six years, and hopefully beyond, until students have been through the entire vertically aligned unit. This is when we should start to see the final results. These students should show the greatest growth in engineering, math, and science skills because students will have been exposed to the entire 6 years of curriculum.

HOW WILL YOU EVALUATE THE PROJECT EFFECTIVENESS?

To assess this project, a pre-assessment will be given to students to assess their level of understanding of engineering, planning, and collaboration through a self-assessment. Students will also share their level of interest in math science and engineering through an interest inventory. I want to look at both the understanding and application of these skills but also at the interest the students have in the subjects being taught. A rubric will be used to provide an overall scale score that will be compared to the post assessment scale score. The post assessment, which will be the same as the pre assessment, will be given at the conclusion of the unit. The scale scores will be compared for all of the students and I will be looking for an increase in scores to show the effectiveness the units had on the students as well as to see if there was an increase in interest in these subjects. Throughout the project, anecdotal notes will be taken to see where and how students are progressing through the goals. Finally, there will be a survey given to teachers, parents, families, and stakeholders at the Engineering Day. This survey will focus in on the students' ability to talk about and explain their projects and what they learned. It is through these assessment methods that I will be able to evaluate the effectiveness of this project.

HAS YOUR PRINCIPAL APPROVED THIS REQUEST?

Yes

**You may upload a PDF ONLY version of your budget in the file upload field below. NO Excel, JPEG or WORD documents accepted.**

ITEMIZED BUDGET UPLOAD Itemized Budget Final.pdf uploaded.

LETTER OF SUPPORT (OPTIONAL PDF) No file uploaded.

ADDITIONAL COMMENTS