

EXEMPLARY APPLICATION #1

This document is an actual grant proposal that was submitted to SEF for the 2019-20 grant application year. Our sincere thanks to Liz Dorgan of Scituate Public Schools for her willingness to share her work with future SEF applicants. This work is the property of Liz Dorgan and Scituate Education Foundation and may not be copied or resubmitted by another applicant.

Please note that SEF makes minor changes to its application from year to year and that the current application questions may differ slightly from this example.

APPLICATION 1920

Proposal Title: Engineering in Elementary

Name of Applicant(s): Elizabeth Dorgan

School(s)/Department/Organization Represented: All Scituate Elementary Schools

Applicant's title or role within organization:: Elementary STEM teacher

Primary Contact Name: Elizabeth Dorgan

Primary Contact Email Address: (reserved)

Primary Contact Phone: (reserved)

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For SPS Teacher Applicants, have you discussed this proposal with your school Principal or Department Head? For non-SPS Applicants, have you discussed this proposal with your organization's President or other Board of Directors member? : Yes
Date Submitted: 3/30/2019

If you answered "yes" to the question above, please provide that individual's name and contact information below.:Kathy Elich, Rebecca Kelly

1. Proposal Title: Engineering is Elementary

2. Proposal Summary: Next year we will be working with grades 3-5 on a year long basis. This gives us, the STEM teachers, time to integrate an engineering unit with the classroom teachers.

The Museum of Science has an amazing program called Engineering in Elementary. It has a variety of novel based units that match up to all the STE standards in Massachusetts. Engineering in Elementary units consist of three components: teacher guides, storybooks, and materials kits. Teacher guides include four detailed lesson plans, one context-setting storybook, background content, teacher tips, suggestions for English Learner differentiation and grade level adaptation, and duplication masters for student handouts and assessments.

In addition to purchasing the three units, it is important for the teachers to attend the Educator Institute at the museum for training. This is a three day workshop over the summer. We would send two teachers to the training.

All of the EIE Units tie into the STE standards.
We would purchase the following units.

Gr. 3 - Marvelous Machines

Machines make work easier—as students learn when they read about a visit to a potato-chip factory in the storybook *Aisha Makes Work Easier*. This unit guides students to think like industrial engineers as they explore the surprising variety of simple machines people use every day. Students also explore the pros and cons of assembly lines compared to making things by hand, then measure the force it takes to complete a task with and without a simple machine to help. Finally, they put their data to the test, combining a series of simple machines to create an assembly-line subsystem for a model potato chip factory.

Gr.4 - Catching the Wind: Windmills

Mechanical engineering involves the design of anything with moving parts. In this unit, students will think like mechanical engineers—and also use their understanding of air as wind—to design and create wind-powered machines. The storybook *Leif Catches the Wind* introduces students to wind turbines that generate renewable energy. Students will study how common machines such as mechanical pencils and egg beaters work, then use their mechanical engineering skills to design sailboats and windmills that catch the wind. (very appropriate for Scituate)

Gr. 5 - A Long Way Down: Designing Parachutes

This unit introduces students to aerospace engineering—and how aerospace engineers use their knowledge of astronomy to design space technologies. Starting with the storybook *Paulo's Parachute Mission*, students learn about a boy from Brazil who designs a parachute to get a large, heavy fruit down from a tree. Students apply their knowledge of drag (air resistance) and conditions on other planets to engineer a model parachute that's "mission ready" to land a payload on a planet with an atmosphere much thinner than Earth's.

3. Grade level(s)/Ages of targeted participants:: Grades 3-5

4. Total number of participants expected:: 720

5. What is the goal or desired outcome of your proposal?: We plan to launch a pilot program to integrate engineering and science education for third through fifth grade students in four schools, reaching 720 students over the year.

6. SEF grants are intended to foster innovative thinking and collaboration, to solve problems, to enhance skill development, and/or to promote lifelong learning. Please tell us how your grant addresses any one or more of these goals. (Please limit your answer to 300 words or the equivalent of about one double-spaced page.): If you've ever watched children at play, you know they're fascinated with building things—and with taking things apart to see how they work. In other words, children are natural-born engineers. When children engineer in a school setting, research suggests several positive results:

Building Science and Math Skills

Engineering calls for children to apply what they know about science and math—and their learning is enhanced as a result. At the same time, because engineering activities are based on real-world technologies and problems, they help children see how disciplines like math and science are relevant to their lives.

Classroom Equity

Research suggests that engineering activities help build classroom equity. The engineering design process removes the stigma from failure; instead, failure is an important part of the problem-solving process and a positive way to learn. It is equally important that there's no single "right" answer in engineering; one problem can have many solutions. When classroom instruction includes engineering, all students can see themselves as successful.

21st Century Skills

Hands-on, project-based learning is the essence of engineering. As groups of students work together to answer questions like, "How large should I make the canopy of this parachute?" or, "What material should I use for the blades of my windmill?" they collaborate, think critically and creatively, and communicate with one another.

Career Success

Classroom engineering activities often require students to work in teams where they must collaborate and communicate effectively. In the 21st century, these skills will be critical for career success in any field.

Research also shows that when engineering is part of elementary instruction, students become more aware of the diverse opportunities for engineering, science, and technical careers—and they are more likely to see these careers as options they could choose.

This finding is important at a time when the number of U.S. college students pursuing engineering education is decreasing. Early introduction to engineering can encourage many

capable students—but especially girls and minorities—to consider engineering as a career and take the necessary science and math courses in high school.

Engaged Citizens

Finally, consider some of our nation's most pressing policy issues—energy, healthcare, the environment. Engineering and technological literacy will be critical for all U.S. citizens to make informed decisions in the 21st century.

7. How will you measure the success of the proposed project? Please be as specific as possible.: Each unit comes with a pre and post assessment. In addition, these will be topics assessed on the Science MCAS in grade 5.

These projects will be part of the STEAM Spectacular event.

8a. Total funds requested:: \$11210.00

8b. If SEF is unable to fully fund your proposal, would you accept partial funding for this proposal?: Yes

8c. If your answer to 8b is YES, please briefly describe how reduced funds would change your proposal, e.g. it would be offered to fewer participants, certain materials would not be purchased, etc.: We would only order 1 unit to start for one grade.

9. Please provide an itemization of expected costs, including substantiation for all costs. (Please do not provide website links. Should you need to provide supplemental information, including screenshots, please share documents via Dropbox): Catching the

Wind (Grade 4 all schools)

Teacher Guide (2) -\$110.00

Materials Kit (8) - \$2,880.00

A Long Way Down (Grade 5 all schools)

Teacher Guide (2) -\$110.00

Materials Kit (8) -\$2,880.00

Marvelous Machines (Grade 3 all schools)

Teacher Guide (2) -\$110.00

Materials Kit (8) - \$4,120.00

Teacher Educator Institute (MOS training)

July 17-19 (2 teachers)

\$1,000.00

9a. If you wish to provide documentation to support your answer to question 9, please use Dropbox and provide a link for us to access files in the space below. Please do not provide any files except those which are directly related to the cost of your proposal. :

10. Have you identified any sources for co-funding this project? (e.g. internal budgets, PTOs, Private Grants, etc.) If yes, please provide details and indicate if those funds are readily available, i.e. already committed, to this project.: No

11. Agreement: I understand that by submitting this application and, if SEF approves it, by receiving a grant award that I must use all awarded funds in a manner directly reflective of this application. Funds may not be used in any manner other than that specified in this application. I also understand that I will be required to complete a post-project evaluation. Grant award recipients may also be invited to share their post-project evaluations at an SEF Board of Directors meeting or other community event. Additionally, I agree that SEF may use content from this grant application and from any post-project evaluation as part of its marketing and/or fundraising efforts.