

How does your school plan to use the Devon Science Giants grant?

Receiving the Devon Science Giants Grant would allow Cottonwood Elementary to implement a robotics program. Through the robotics program we would be able to improve student engagement within the STEM concepts. The vision for our program is HANDS ON, MINDS ON. Students would be able to design, build and program robots. This opportunity would enhance students' ability to problem solve, collaborate, compute, engineer, and think critically. Robotics programs would run as an extended learning opportunity (ELO). ELO is available for students before or after school and is enriched through infusing STEM concepts. An ELO team of certified teachers will provide instruction.

The world we live in is changing at such a fast pace, there is no way we can imagine the future we are preparing our students for. Our students need to be able to synthesize, apply and innovate with the information they are learning. Receiving this grant would open up a world of possibilities for our students and prepare them for their future. STEM is an excellent way to give students the needed skills to be successful learners, problem-solvers, and innovators of the 21st century. STEM challenges students to apply knowledge to use the engineering process in order to design a solution to a real-world problem or scenario through computer programming, hands-on experimentation, creativity, critical thinking, collaboration and communication.

Our school feels the excitement for STEM, from a robotics program, would extend into the classroom by providing all students with focused, sustained, and purposeful STEM-rich learning experiences. The curriculum we currently teach can be enhanced and extended when creating problem solvers in today's society. Robotics will be an added benefit to science and math concepts occurring within our curriculum.

The robotics program will be assembled into two levels. The first one will focus on grades k-2 and the second on grades 3-6. At the primary level students will engage in building, imagination, and construction. The intermediate level will be enhanced with innovation, design construction, and computer coding.

Describe existing resources being used at the school to foster student interest in science.

Most resources, currently used to foster student interest in science at Cottonwood Elementary School, are visual and auditory. A vast array of science materials in the building, come from the district curriculum office and are mandated to be returned upon completion of the unit. All teachers receive materials from this center, which is designed to house shared equipment and sent to individual schools when needed. This science center is located forty-five minutes away, however items can be shipped out weekly. Since science materials are not stored in the building, teachers must plan well in advance and cannot immediately enrich a lesson with materials readily available.

Current practices of sharing of information through books, videos, discussions, guest speakers, community experts in the STEM field, and field trips all support the visual/auditory learner. These account for the vast majority of science experiences at Cottonwood, leaving limited opportunities for kinesthetic, hands-on learning. Students at our school are seeing these experiences more in the form of technology through the use of computers, iPads, and laptops. They are missing out on the experience to design, build, collaborate and construct using their creativity and creative thinking capabilities. Many students need these skills that the STEM environment provides in order to gain a deeper knowledge and understanding of concepts being taught. The addition of a robotics program will boost teamwork and problem-solving skills, while helping kids learn how abstract concepts, like mathematics, engineering, and computing actually works in practice.

Explain why your school deserves to win the Devon Science Grants Award and describe how you would quantify success.

In an energy-rich community, it's easy to see why STEM education is so important. Many students in this community will grow up and work in a STEM-related work field. Research has shown that children who experience STEM education early on will be best equipped in understanding STEM concepts later in their academic careers. As educators, we must integrate STEM lessons into our daily curriculum, giving children a chance to develop a stronger understanding of these skills, as well as cultivate a future interest. The students at Cottonwood Elementary School have had limited access to STEM materials and education. Many students are low socioeconomic status and receive services from Title I.

In the past, students at Cottonwood have performed low in math and science on MAP and state assessments. This validates the need for Cottonwood teachers and students to focus on STEM education and its implementation at our school. This grant would allow our youth the tools and vital materials necessary to succeed in STEM. It would open up a new world of learning, problem-solving, critical thinking, creative design, and exploration that typically hasn't been found within the walls of Cottonwood.

Achievement test data is most widely used as a measure of accountability to gauge success for STEM programs. The opportunity for success for all students is endless and we hope to see growth in student achievement in all subject areas. Test data, however, does not tell the whole story. The mission of our project is to provide a challenging learning environment focused on math, science, and technology, encourage discovery, and foster a culture of innovation and design. Although it is difficult to measure interest, problem-solving abilities, creativity, and exploration, it is essential to do so given the importance of preparing students to be leaders in STEM innovation; and not just be good test takers.

Criterion for our program encompasses a variety of aspects. Such skills as the ability to solve problems and work effectively in teams, indicators of student engagement (participation in before/after school programs, research experiences and partnerships with community entities) as well as the kinds of knowledge and skills measured on state assessments, are at the forefront of our program and will be the best testament of the success of the robotics program.

If awarded the Devon Science Giant Grant, is the proposed program or project sustainable?

With sustainability as the fastest growing aspect of education in the 21st century, having an understanding of the global world will make our kids future leaders in today's society. Computer coding, programming, and technology are all growing at an extremely fast pace and it is vital we, as educators, keep current with best practices and methodologies for our students. Having a robotics program within our school brings greater opportunities to our students and a deeper understanding of the world around them. Robotic devices are in our everyday lives; from automatic soap dispensers to children's toys. Robots are an engaging, hands-on way of teaching children important concepts like science and math. Even though the robots used in classrooms don't engage in impossible feats and tasks, they are quickly becoming popular in getting children interested in STEM (Science, Technology, Engineering and Mathematics) subjects that can lead to careers later in life.

Recently, in our school district, there has been a push to incorporate more STEM related topics and teaching. Educators are being encouraged to provide STEM-focused learning to all students, not just gifted or "techie" kids. The STEM skill set is to be embedded and relevant to every student's school experience. A robotics program falls in line with these expectations. It prepares students to think critically and solve complex problems, adapt to new technologies, and to communicate and collaborate with their peers. The administrator in our building has an extensive background in science and encourages all teachers in our building to cultivate STEM literacy across all disciplines; as this is best practice. (STEM literacy is the ability a student possesses to apply understanding of how the world works within and across the areas of science, technology, engineering and math.) He understands the need to train students to transfer and apply knowledge and skills across the curricular spectrum rather than isolating each subject area.

To sustain this program's longevity at Cottonwood, a group of science-minded teachers have come together to embark on being a school of change. STEM concepts will be taught in and out of the classroom. A robotics program has been designed with all students in mind and will be used as an Extended Learning Opportunity (ELO). District and school funds will be used to help maintain the ELO program by providing extra resources and run transportation for students. Partnerships will be created with local area businesses and community members to help foster the interest and expertise of those involved. The STEM committee will continue to work towards finding additional grants, offering professional development to Cottonwood teachers, conducting a book study on STEM skills, implementing a STEM-infused school culture, and working closely with the public library to offer similar STEM experiences that foster lifelong learning. We believe students, parents, teachers and the community working together creates an atmosphere conducive for students to grow academically and develop the confidence to be leaders in our community.

Please attach a detailed budget.

Item Description	Quantity	Unit Price	Total Cost:
3D Pen	15	\$49.00	\$735.00
ABS Filament	20	\$20.00	\$400.00
Ozobot EVO	10	\$99.00	\$990.00
Lego Mindstorms EV3 Core Set 2 Students/set	15	\$389.95	\$5,849.25
EV3 Expansion Set - 2 Students/set	15	\$101.95	\$1,529.25
Boost Creative Toolbox	5	\$159.99	\$799.95
Pneumatics Add-on Set 2 Students/set	3	\$73.95	\$221.85
Lego Education WeDo 2.0 Core Set - 2 Students/set	15	\$175.95	\$2,639.25
Simple & Powered Machine Set - 2 students/set	3	\$169.95	\$509.85
EV3 Space Challenge Set - 6 students/set	1	\$225.95	\$225.95
Renewable Energy Add-on Set	3	\$115.95	\$347.85
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