

TERRA MINI-GRANT APPLICATION 2015-2016 SCHOOL YEAR

A. SCHOOL AND APPLICANT INFORMATION

Submission Date:	September 26, 2015	School Year: 2015-2016
School Name:	Spessard L. Holland Elementary School	
Type of School:	Public	
Student Enrollment:	430	Number of Teachers: 35
Range of Grade Levels at School:	K through 6	% Eligible for Free/Reduced Lunch:
School Mailing Address:	50 Holland Court, Satellite Beach, Florida 32937	
County:	Brevard	
Principal Name:	Rick Sheppard	
Principal's Email Address:	Sheppard.rick@brevardschools.org	
Applicant Name:	Rick Sheppard	
Applicant's Phone #(s):	Schools Main #321-773-7591	Direct # (ext. or cell)
Applicant's Email Address:	Sheppard.rick@brevardschools.org	
Applicant's Affiliation to School/Organization	Principal	
If Applicant is a Teacher, please list:	Teacher's Grade Level(s): K-6	Teacher's Subject(s) Area: Elementary Education (all subject areas)
If Parent/Community Volunteer or Other non-school staff, please list School Contact as a Co-Applicant:	Co-Applicant Name: Laura Harris	Co-Applicant Affiliation to School/Organization: Teacher
If Co-Applicant is a Teacher, please list:	Teacher's Grade Level(s): K-6 Support	Teacher's Subject Area(s): Reading/Language Arts/Mathematics/Science/Social Studies

B. PROGRAM INFORMATION

Please list the focus area(s) for this TERRA Mini-Grant request.	STEM	Technology	Professional Development	
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C. PROJECT INFORMATION

Project Title:	STEM Education for Primary Grade Students			
Project Start Date:	January, 2016	Project End Date:	May, 2016 (on-going after conclusion)	
# of Students Participating:	@250	Grade Levels of Students Participating:	Kindergarten, First, Second and Third Grades	
Mini-Grant Abstract (300 word max): Briefly describe what your proposed project is about. Abstracts of winning proposal will be viewable at www.terraonline.org				
<p>Today's primary grade classrooms retain some of the hallmarks of classrooms throughout the years; calendar activities, tables for small group learning, and big books for a class read aloud. Alongside those staples are newer additions. The computer center may have replaced the housekeeping center. Wooden blocks are no longer the only building supplies available. Large varieties of math manipulatives, are standard fare. Education is always changing and as the focus on STEM in the classroom increases across grade levels, the types of activities and learning experiences students in primary grades have access to must expand to keep pace and meet expectations.</p> <p>This project seeks to provide a platform for the development of STEM activities for students in grades K, 1, 2 and 3 using the "Sphero" and "Ollie" devices and an android device. "Sphero's"/"Ollies" are easy to use for both teachers and students, providing an optimal platform for exploration and discovery through an inquiry approach to the implementation of primary STEM activities.</p>				

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Mini-Grant Project Proposal (1500 word max)

Please explain how your proposed project/activity will enhance learning for your students. Include the following:

- 1) How is your project innovative? (25 points)
- 2) How will it fit into your curriculum (include standards)? (10 points)
- 3) How will it encourage long-lasting change in your classroom, school or community? (20 points)
- 4) How will technology be utilized? (20 points)
- 5) What evidence will you collect to show student gain? (10 points)
- 6) How will participants share your project results with the community? (15 points)

Picture a kindergarten classroom. Kids gather around the sand table, exploring the sand, letting the grains run between their fingers. The teacher passes out some props- marbles, rulers, boxes and cups-and lets students explore freely for a few minutes. The kids excitedly dig in, filling cups with sand and pouring it out, burying marbles, and turning the rulers into shovels and rakes. Then she says: "I have a challenge for you today. How fast can you make the marbles roll?" Kids start rolling marbles across the sand, only to find the marbles quickly get stuck, hung up on miniature sand dunes. Then one student tries putting his marble on a ruler. It rolls much faster. Then another props his ruler up on a cup and the marble flies. The teacher watches quietly as the kids explore. Afterward, the teacher and her students gather on the rug to talk about their observations. She asks: "What did you design out of your tools that make the marble roll fastest?" "What do you think makes the marble slow down?" "Why do you think the marble rolls faster on the ruler than in the sand?" Sand tables have long been a staple of early education. It is the way we plan a classroom activity and the questions we invite children to explore that turn an ordinary play activity into savvy and pointed STEM education. This teacher's methods are not only innovative, but also an essential segue into her students' future academic and professional success. As we look at today's classrooms the "sand table" has expanded to include a variety of materials and technologies. The idea of "coding" (or learning how to "program" a device or tool to complete a specific task) has become an educational buzz word. "The Hour of Code," and other such activities have been widely embraced by teachers and schools across the country.

Citing the fact that Florida has over 20,000 computer science jobs open and just under 2,000 graduates to fill the demand; and the fact that by 2020 there will be one million more computing jobs than students with the education needed to fill these jobs, Gary Chartrand, Chair of the Florida State Board of Education recently proposed that all Florida schools include "coding" as a required part of the curriculum at every grade level. The Bureau of Labor Statistics predicts that computer science and IT jobs will continue to grow into 2020, but the current and future U.S. workforce may not be prepared. Code.org statistics indicate that just 1 in 10 high schools offer computer science classes. Certainly there is a need for our students to acquire the skills necessary to enter the workforce. Teaching coding and programming concepts to primary grade students is a way to introduce design-based learning concepts. When you teach something how to think or be or act, you really are thinking about how you yourself think or act-you're reflecting on your learning. Coding also touches on a handful of skills students develop as they enter school.

Communication and self-expression: Programming is a non-verbal way to represent thoughts or personality on a screen. Sequencing and order: Children focus greatly on patterns and ordering, including learning how to create and discern patterns, telling stories, etc. This more mathematical or structured way of thinking lends itself nicely to coding, where students can see the immediate effects of changing a sequence or order.

Problem solving: Primary grade students learn as much about social behavior as they do about academics, and coding helps them develop social skills when they collaborate with peers. "Problem solving is excellently addressed when we introduce programming into the curriculum. So while we have a societal and pedagogical basis for introducing coding to students, what we are missing is a platform for implementing a coding curriculum accessible to young children. There is clearly a gap in interesting computing programs, and in making the lessons accessible for the teachers, who may not be as comfortable with technology as are their students, as well. That's where a simple robotic ball ("Sphero") and its relative "Ollie" comes into play. A wide variety of free and low-cost apps available, "Sphero's" and "Ollie's" can be used for open-ended exploration of concepts or as a creative and innovative way to reinforce basic skills and concepts. These devices will serve two purposes, to introduce students to STEM activities, and to provide teachers with a platform to create STEM lessons using materials that are easy to learn, operate and integrate into the adopted curriculum.

To implement this project, the "Sphero" SPRK (spark) program will be utilized to provide teacher training and student classroom experiences with math, science and programming, as well as engaging student's imagination in areas such as critical thinking and story-telling. My goal is to work closely with teachers to develop STEM activities that integrate with classroom content, from such basic activities at learning shapes, colors, letter, number and sight word recognition, science concepts such as force and motion, sequencing activities using "Draw-n-drive" and advanced applications such as basic programming using the Sphero software developer kits and low-level API (application programming interface). Therefore, this project has two major objectives. First, to provide primary grade students with "coding" activities and a means to reinforce classroom content through coding, and secondly, to educate teacher in ways to integrate STEM lessons into daily classroom content. STEM integration is the goal -not to create a stand-alone STEM program as an addition to the school day. While the "Sphero" and "Ollie" may at first glance to be a "connected toy," it's a lot more. By fusing technology with robotics, it can teach and inspire tomorrow's inventors and

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innovators. Programming (coding) isn't easy, but with the right tools and environment, it can be done by even our youngest students.

I propose to work closely with teachers and students to introduce core lessons to support the Florida Standards. Beginning with the SPRK core lessons will provide experience and familiarity with the Sphero robot, and lead to the development of STEM challenges appropriate for students in grades K, 1, 2 and 3. . Our school has been deeply involved in the development of curriculum using the

"Literacy Design Collaborative" framework, and this project will integrate in a seamless way. As a part of preparing for this grant, I visited Belle Terre Elementary School in Palm Coast, Florida and observed a first grade classroom using "Sphero's" as a component of their daily instruction. While at first glance it seems like a simple concept, a ball that students controlled via tablet or phone, it was inspiring to see first graders reinforcing classroom content, problem solving and strategically coding to solve real world problems. In the lesson that I observed, students were collaborating, problem solving, practicing classroom content and engaging with technology. The level of sophistication in language, perseverance in problem solving, and creativity on the part of students, and the conversation with the classroom teacher and school principal about the instructional implications of this tool led me to submit this proposal.

As our school seeks to implement a STEM component into our instructional program, we need a platform that we can utilize to introduce our students to these activities. Our staff needs training and opportunities to explore STEM with their students and to then develop activities that are unique to our student's needs and abilities. I strongly believe that "Sphero" can be our initial platform and can launch our staff into this area of curriculum development and instructional innovation.

In a major effort to help fuel the science, technology, engineering, and mathematics (STEM) pipeline in the United States, schools across the country have been given the charge to increase efforts in strengthening science literacy throughout the PreK-12 curriculum. If we are to be successful in building science literacy in our youth, thereby strengthening the future of our STEM professions, we must search for viable means to achieve this objective. Predicting a student's success in learning depends on several variables among which are the students' interest in the subject matter, motivation or will to take action to learn the subject matter, and background knowledge, or schema, about the subject. Teachers play a critical role in each of these areas as they work to maximize learning outcomes in their students by motivating and engaging them in science. An exploration of the role of the teacher in promoting science among students is therefore an important step towards building science literacy in our youth.

Since early childhood experiences in science influence a person's academic interest in science later in their schooling, elementary teachers can contribute profoundly to their students' lifelong attitudes about science. One of the many expectations placed upon most elementary teachers is that they should be able to teach science. An enthusiastic teacher using true inquiry methods will usually succeed at stimulating the students' interests in science. It is thus an important task to inspire teachers to enjoy science, while also supplying them with a strong science content knowledge and the pedagogical skills for teaching science. Unfortunately, by the time they graduate high school and reach the university level, most students prefer other subjects to science. Science is often perceived as difficult and many students thus avoid it. Creating a structured format to introducing STEM to our teachers and students is therefore, a critical component to the success of any implementation. Based on my observations at other schools, I believe that STEM can be a transformational experience for both our students and teachers. The level of student engagement and on-task behaviors that I observed in the classroom, as well as the quality of student talk and problem solving, is exactly what we as educators desire for our students. In my conversation with the classroom teacher, she stated that since beginning STEM integration, her approach and thoughts about teaching have changed. She seeks a more authentic approach to teaching and learning. It is this transformational structure that we wish to emulate.

The evaluation of this project would be two-fold: A teacher and student survey would be conducted prior the beginning of the project to determine teacher and student attitudes toward STEM and to assess teacher perceptions of student behaviors related to skill acquisition, problem solving ability, collaborative abilities etc. First semester benchmark assessment scores in mathematics and language arts would be reviewed for comparison to determine if problem solving abilities have demonstrate an increase..

A post survey will be conducted at the end of the school year, as well as anecdotal notes by teachers regarding the effectiveness of the "Sphero" in developing both content, speaking and listening, and collaborative skills among students.

Student work will be demonstrate to parents and community through informational nights, student-led-conferences, etc.

D. BUDGET: Describe all costs associated with your project activity. *(Attach additional pages if necessary)*

Service/Item Description	Cost
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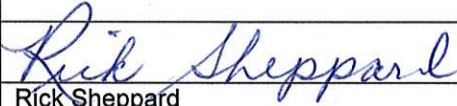

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5 "Sphero" SPRK devices @ 129.99 each	\$649.95
5 "Ollie" devices @ \$99.99 each	\$499.95
10 Kindle Fire HD Tablets @ 169.99 each	\$1699.90
Total Cost of Project	\$2849.80
Amount requested from TERRA:	\$2849.80
If matching/additional funds have been identified to help pay for your project, please list →	Source:
	Amount: \$
If any goods or services have been donated for this project, please list →	Source:
	Goods/Services:

E. COMMITMENT

By submitting this application and signing below, you agree to the following:

- TERRA is not liable for any injuries or losses that may occur as a result of participation in the proposed project.
- The applicant is responsible for submitting an interim report and a final report using an electronic form provided by TERRA. Schools that do not submit an interim report and a final report will not be eligible for future funding opportunities.
- Equipment purchased using mini-grant funds will become the property of the school receiving funds.

Applicant's Name:	Rick Sheppard		
Applicant's Signature:		Date:	9-26-15
School Administrator/ Principal's Name:	Rick Sheppard		
School Administrator/ Principal's Signature		Date:	9-26-15