

TERRA MINI-GRANT APPLICATION 2015-2016 SCHOOL YEAR

A. SCHOOL AND APPLICANT INFORMATION

Submission Date:	September 18, 2015	School Year: 2015-2016
School Name:	R.L. Stevenson Elementary	
Type of School:	<input checked="" type="radio"/> Public <input type="radio"/> Private <input type="radio"/> Charter	
Student Enrollment:	485	Number of Teachers: 35
Range of Grade Levels at School:	K-6	% Eligible for Free/Reduced Lunch: 13.3%
School Mailing Address:	1450 Martin Blvd.	Merritt Island, FL 32952
County:	Brevard	
Principal Name:	Michael Corneau	
Principal's Email Address:	corneau.michael@brevardschools.org	
Applicant Name:	Stacey O'Connor	
Applicant's Phone #(s):	Schools Main # 321-454-3550	Direct # (ext. or cell) 321-298-5426
Applicant's Email Address:	oconnor.stacey@brevardschools.org	
Applicant's Affiliation to School/Organization	Media Specialist	
If Applicant is a Teacher, please list:	Teacher's Grade Level(s): K-6	Teacher's Subject(s) Area: Media/STEM
If Parent/Community Volunteer or Other non-school staff, please list School Contact as a Co-Applicant:	Co-Applicant Name: Tracey Hertzog, Matt Mertz, Arienne Rivera, Angela Schoon,	Co-Applicant Affiliation to School/Organization: Colleagues/Classroom Teachers
If Co-Applicant is a Teacher, please list:	Teacher's Grade Level(s): 4,5 and 6	Teacher's Subject Area(s): All

B. PROGRAM INFORMATION

Please list the focus area(s) for this TERRA Mini-Grant request.	<input type="checkbox"/> STEM/STEAM	<input type="checkbox"/> Math	<input type="checkbox"/> Science/Technology	<input type="checkbox"/> English/Language Arts
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C. PROJECT INFORMATION

Project Title:	Discovering, Designing, and Dreaming in 3D		
Project Start Date: November 1, 2015	Project End Date: May 24, 2016		
# of Students Participating: 225	Grade Levels of Students Participating: 4 th , 5 th , and 6 th		
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>In the near future, the 3D printer will revolutionize the way we live, the way we work, and how we live. Imagine being able to create an idea in your mind and transform it into a tangible object within minutes. Having the 3D printer will allow our fourth, fifth, and sixth graders to do just that. In this proposal, students will have the opportunity to learn how to dream and create in 3D. Students at our school are critical thinkers and problem solvers that thrive when they are engaged with real-world lessons that challenge their thinking. Our school is focused on STEAM and what better way to incorporate science, technology, engineering, arts, and mathematics than with 3D printing technology. Student engagement and learning will thrive when students can engineer and print their own designs using a variety of coding websites. Our students are the future engineers, teachers, doctors, scientists, and artists. Our enthusiastic students need the opportunity</p>			

TERRA MINI-GRANT APPLICATION 2015-2016 SCHOOL YEAR

to be enriched with digital tools that will prepare them for the future. By receiving this device it will propel their learning to whole new level. Students will have the opportunity to learn how to code using a variety of resources and websites from the simple to the complex to create and print 3D images. Students will be presented with real-world engineering challenges that they will have to problem solve and will ultimately create their solutions with a 3D printer. They will learn how to think outside the box and will brainstorm their own ideas and will design their own inventions of how 3D printing will enhance our future. Students will learn how to think abstractly to solve real-world problems. They will understand how reading, writing, math, science, and social studies interconnect in our world through the lens of 3D printer technology.

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)

- 1) This project is innovative because it involves the creation of Maker Spaces with 3D printers in schools. Students will use 3D printers to learn and show mastery of specific math and science standards through inquiry using S.T.E.A.M. (Science, Technology, Engineering, Arts, and Math) principles. Students will also use creativity and innovation to solve real-world engineering challenges.
- 2) The 3D Engineering Challenges fit into the 4-6 grade level curriculum by targeting specific math and science standards integrated with an engineering challenge. Students will enhance their math and science skills while using the 3D printer software to create 3D models specific to an engineering challenge aligned to grade level standards. Students will also create a presentation to share their engineering solution with others. A rubric will also be used to assess writing, speaking, and listening standards in the presentation. Standards that will be taught include:

MAFS.4.MD.1.3: Apply the area and perimeter formulas for rectangles in real world and mathematical problems.

SC.4.N.1.8

Recognize that science involves creativity in designing experiments.

MAFS.5.MD.3.5: Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.

SC.5.N.1.3

Recognize and explain the need for repeated experimental trials.

MAFS.6.RP.1.3: Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

SC.6.N.1.5 Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.

The following activities will be implemented:

- * Students will initially learn about the 3D printer by finding articles, videos, and websites related to 3D printers.
- * The media specialist will instruct students on how to use TinkerCAD and other websites related to coding and designing 3D images that can be printed.
- * The art teacher will work with students on creating original artwork on the 3D printer based on art principles of design. The work will be showcased at our winter school performance.
- * Students will visit local businesses with 3D printers and learn from guest speakers how they are used in the real-world.
- * The media specialist will work with classroom teachers on grade level STEM/STEAM engineering challenges with a focus on math priority standards.

TERRA MINI-GRANT APPLICATION 2015-2016 SCHOOL YEAR

* Students in grades 4, 5, and 6 will complete a STEM/STEAM engineering challenge based on a real-world scenario focusing on grade level math and science standards. The engineering challenge will focus on students demonstrating real-world application with the math priority standard identified above. Students will use the STEM/STEAM model consisting of:

Step 1: Identify the Problem

Step 2: Research the Problem

Step 3: Develop Possible Solutions

Step 4: Select the Best Possible Solution

Step 5: Construct a Prototype

Step 6: Test and Evaluate the Solution (Gather Data)

Step 7: Communicate the Solutions

Step 8: Redesign (and repeat steps)

* Students will create a presentation and will share their engineering challenge results with students in other grade levels. Student presentations will be assessed with a rubric on writing, speaking, and listening standards.

- 3) This project will encourage long-lasting change in the classroom and school by inspiring innovation and creativity. Our school would like to integrate more S.T.E.A.M. (Science, Technology, Engineering, Art, and Math) Our vision for our school is to transform the media center into a Maker Space. This is a place where students that explore and use innovation to solve real-world problems. This project will allow students to learn about and experience new technologies. This project will begin our annual Maker Faire sparking creativity. Students will learn about how 3D printers can be used to solve problems using innovation and creativity. This project will also inspire long-lasting change by developing relationships with several local businesses that use 3D printer technology. These businesses will be an integral part of the project as it will provide students and understanding of how 3D printers are used in the real world. Hopefully, this project will be the foundation of future relationships with these business partners. We are also hoping that the 3D printer will also spark interest to acquire more 3D printers. We hope students will learn to use more sophisticated coding websites such as CAD and AUTOCAD to create their own digital designs in 3D.
- 4) Students will use various technologies throughout this project. Students will be using Google Chromebooks and laptops to research complex informational text on 3D printer technology. Students will share their knowledge by posting websites, videos, and other information related to 3D printer technology on school social media site Edmodo. Students will use a 3D software program called Tinker CAD in conjunction with the 3D MakerBot Desktop Printer to create 3D models. The models that the students create will be part of a solution to a specific real-world engineering challenge. They will utilize computers to research and collaborate throughout this learning experience. Students will use 21st century skills while enhancing their technological skills.
- 5) This project will assess students in grades 4-6 through the use of scales to assess student understanding and competency. Through the use of scales, student's mathematical skills will be evaluated as they apply their knowledge in a real-world engineering challenge. The scale we will be based on a 4 point score. A score of 4 would signify mastery and beyond. A three would be on grade level at the highest level. If a student scores a 2 they would need further instruction and support in mathematics, while a 1 would need extensive intervention. In addition to the math scale, a rubric would also be utilized to assess the writing, listening, and speaking portion of the project. The rubric would also be based on a four point system: exemplary, proficient, developing, and novice. The district science Body of Knowledge (BOK) test will also be administered to assess if the students understood the science concepts integrated in the STEM/STEAM engineering challenge.
- 6) Participants will share their engineering challenges and solutions in a Maker Faire at the end of the year. Members from our school community as well as community members will be invited including: Parker Brothers, Maker Space Melbourne and NASA. These businesses will be invited to our school for career day and for our end of the year Maker Faire. Students will have an opportunity to share their innovative designs that they create with the 3D printer. Community partnerships will be developed throughout this project through guest speakers, field trips, and skype sessions.

**TERRA MINI-GRANT APPLICATION
2015-2016 SCHOOL YEAR**

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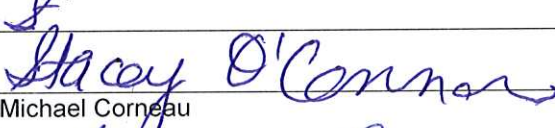
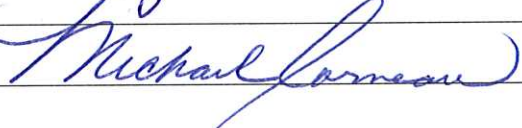
D. BUDGET: Describe all costs associated with your project activity. *(Attach additional pages if necessary)*

Service/Item Description	Cost
MakerBot Replicator 2X	\$2,499.00
Small 10 Pack Filament Bundle: Buy 9, Get 10/4 Large Spools of Filament	\$400.00
Shipping	\$100.00
Total Cost of Project	\$2,999.00
Amount requested from TERRA:	\$2,999.00
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:

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:	Stacey O'Connor		
Applicant's Signature:		Date:	9-18-15
School Administrator/ Principal's Name:	Michael Corneau		
School Administrator/ Principal's Signature		Date:	9-18-15