

# TERRA MINI-GRANT APPLICATION

## 2015-2016 SCHOOL YEAR

**The Technology Education Research & Redesign Alliance (TERRA)** is a non-profit organization whose mission is to mobilize the resources, knowledge, and capacity of individuals, foundations, business and industry in shaping and facilitating educational policy, practice, and research for increased achievement in a global environment.

**What this funds:** TERRA's Mini-Grants are intended to support school-based projects in grades pre-K through 12 that are consistent with TERRA's mission, and have a positive impact on education by using technology. These grants should fund initiatives that utilize technology in a new and innovative way or sustainability initiatives seeking to encourage and support creative, local environmental education and stewardship activities.

**Who can apply:** Florida public, charter, and private schools and educators are eligible to apply.

**Amount awarded:** A total of \$50,000 will be made available for a limited number of awards ranging from \$500 to \$3,000. Grant applications may be submitted for the 2015-2016 school year by midnight September 30, 2015. The TERRA Grant Committee will review proposals and make funding recommendations to the TERRA Board of Directors.

**What we are looking for:** TERRA seeks applications for projects in which students participate in learning experiences that utilize technology in an innovative way or promotes environmental sustainability. **Funding is intended to encourage and support creative activities that build on the unique assets and strengths of individual education communities.** As part of this project, individual receiving awards will be required to share what they learn with the broader community through outreach such as public events, presentations and displays and/or media engagement. Preference will be given to projects with matching funds or in-kind services.

### Details:

- **The deadline for the 2015-2016 school year is September 30, 2015. Applications received after this date will not be considered.**
- Financial assistance is limited to \$3,000 per school, per year.
- Grants will be made to schools to fund the project specified in the proposal.
- Grantees will be required to submit an interim report and a final report using an electronic form provided by TERRA.
- The Teacher/Applicant listed is whom we will contact regarding your application.
- Inquiries should be submitted via email to: [grants@terraonline.org](mailto:grants@terraonline.org).

### Application Instructions:

- To apply, please submit this completed form by September 30, 2015.
- Fill out the form completely
- Gather appropriate signatures. Applications without signatures will not be considered.
- Submit signed proposal via e-mail to [grants@terraonline.org](mailto:grants@terraonline.org) with your school name contained in the filename.
- We will confirm receipt of your application within 2 weeks via email. If you have not heard from us, please contact us at [grants@terraonline.org](mailto:grants@terraonline.org). Awards will be sent within one month of application deadline.

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## A. SCHOOL AND APPLICANT INFORMATION

|   |  |   |
|---|--|---|
| <b>Submission Date:</b>   | 08/24/2015                                     | <b>School Year:</b> 2016  |
| <b>School Name:</b>   | Buchanan Middle School                         |   |
| <b>Type of School:</b>  | <input checked="" type="radio"/> <b>Public</b> | <input type="radio"/> <b>Private</b> <input type="radio"/> <b>Charter</b> |
| <b>Student Enrollment:</b>  | 700-750  | <b>Number of Teachers:</b> 65   |
| <b>Range of Grade Levels at School:</b>   | 6-8  | <b>% Eligible for Free/Reduced Lunch:</b> 76                              |
| <b>School Mailing Address:</b>  | 1001 W Bearss Ave Tampa FL<br>33613            |   |
| <b>County:</b>  | Hillsborough                                   |   |
| <b>Principal Name:</b>  | Scott Hilgenberg                               |   |
| <b>Principal's Email Address:</b>   | Scott.hilgenberg@sdhc.k12.fl.us                |   |
| <b>Applicant Name:</b>  | Walter Watts                                   |   |
| <b>Applicant's Phone #(s):</b>  | 813-975-7600                                   | 352-410-5583  |
| <b>Applicant's Email Address:</b>   | walter.watts@sdhc.k12.fl.us                    |   |
| <b>Applicant's Affiliation to School/Organization</b>   | Technology teacher (Bioengineering)            |   |
| <b>If Applicant is a Teacher, please list:</b>  | Teacher's Grade Level(s): 6-8                  | <b>Teacher's Subject(s) Area:</b><br>Technology/Bioengineering            |
| <b>If Parent/Community Volunteer or Other non-school staff, please list School Contact as a Co-Applicant:</b> | <b>Co-Applicant Name:</b>                      | <b>Co-Applicant Affiliation to School/Organization:</b>                   |
| <b>If Co-Applicant is a Teacher, please list:</b>   | <b>Teacher's Grade Level(s):</b>               | <b>Teacher's Subject Area(s):</b>   |

## B. PROGRAM INFORMATION

|   |                |                |  |  |  |
|---|----------------|----------------|--|--|--|
| <b>Please list the focus area(s) for this TERRA Mini-Grant request.</b> | 3d integration | Bioengineering |  |  |  |
|---|----------------|----------------|--|--|--|

## C. PROJECT INFORMATION

|   |                                |  |  |  |  |
|---|--------------------------------|--|--|--|--|
| <b>Project Title:</b>   | <b>3d Printing at Buchanan</b> |  |  |  |  |
| <b>Project Start Date:</b> 10/01/15   |                                |  | <b>Project End Date:</b> 06/01/16                  |  |  |
| <b># of Students Participating:</b> 200 +   |                                |  | <b>Grade Levels of Students Participating:</b> 6-8 |  |  |
| <b>Mini-Grant Abstract (300 word max):</b>  |                                |  |  |  |  |
| Briefly describe what your proposed project is about. Abstracts of winning proposal will be viewable at <a href="http://www.terraonline.org">www.terraonline.org</a>  |                                |  |  |  |  |
| My proposed project is to add a Makerbot Replicator Mini and Makerbot Digitizer to the arsenal of technology at Buchanan Middle School. Students at Buchanan have been using <b>Auto</b> software to render three dimensional objects for years. Lessons have been created for cross curricular units to properly implement 3d printing across the school. The ability to actually print/render the items they create and invent will only create a bigger spark of learning and creativity. Being able to create three dimensional objects will also allow them to take concepts from Science (3d DNA modeling, etc...), Technology, Engineering (invention, etc...) and Math (Scale, etc...) and make them a reality. |                                |  |  |  |  |

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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)

The project is innovative at Buchanan because our use of 3d printing and scanning covers all the subject areas student learn during their day while at school. The 3d printing is not just focused on technology or math but across an entire of team of teachers for a cross curricular approach.

See example below:

After reading **The Breadwinner**

#### Identify

The marketplace becomes an important location for Parvana. Here, she is able to make money from her skills as a reader and letter-writer. She can also buy Nan bread and vegetables for her family. You are going to develop, build and sell a simple mechanical toy for 3-5 year olds. This toy must meet the following constraints:

The toy must fit in an imaginary 5cm X 5cm X 5cm cube.

The toy must have proper working drawings and scaled.

The toy must also be 3d rendered using appropriate software.

#### Setup

Ground yourself in information about the project. Ask: "What is really important about this project?" and "What criteria will make a successful project?"

Gather related background information. Research existing toys and disassemble some toys to see how they work.

Create an annotated bibliography of at least 10 sources during the project.

Brainstorm potential solutions and develop sketches. Remember, there are no "bad" ideas in a brainstorming session. Record all thoughts on paper.

Create a Gantt chart to help your time management.

Use a decision matrix to choose the best solution.

#### Execute

Plan the building solution with your team.

Keep stretching and recording ideas to improve your design. These may become references later.

Prepare models using various production techniques. Build mockups of the solution, using different ways to carry out the building. You may try many ways of doing something before you find the best way.

Meet with your team to discuss product development. Analyze your progress and consider ways to improve fit and finish.

#### Evaluate

Evaluate the design by having several people use the redesigned toy. Ask for feedback on the effort required to perform common tasks with each.

Modify design if necessary.

#### Share

You will trade your toys at the market just as Parvana did in the story.

The approach above allows complete unity across the board of academic classes.

See just a few of the standards learned below:

Science- SC.6.N, SC.7.N, SC.8.N (Nature of Science)

Math- MAFS.6.G, MAFS.7.G, MAFS.8.G (Geometry)

Language Arts- LAFS.6.RL/ LAFS.6.SL, LAFS.7.RL/ LAFS.7.SL, LAFS.8.RL/ LAFS.8.SL (Literature and Speaking)

Social Studies- SS.6.C (Civics and Government)

Students at Buchanan will see how classes are connected not disconnected as many think. This approach allows a deeper meaning of what it is to learn for life. Math, Science, Technology, Language Arts are everywhere together.

As seen in the above lesson- the unit culminates with a market place where students create a market place from the middle east as interpreted from the book. The students will create items to trade while at the market place. The 3d printer will allow them to create/scan objects they have made for the market place.

Evidence of gains will be gathered in a variety of ways. There are the standard assessments for each class (assignments, quizzes and tests that accompany each subject covered); but a rubric will also be utilized during the marketplace to help show real gains during the unit end.

See rubric below:

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| Toy (50 Points)   | 2  | 4   | 6   | 8   | 10   |
|---|--|---|---|---|--|
| <b>Working Drawings (Orthographic, Isometric, Oblique, Exploded or Persepctive)</b> | Multiple angles are missing. Scale unclear and drawings are rough.                         | Multiple angles are missing. Scale unclear and drawings are thought out.        | Multiple angles are expressed. Scale unclear and drawings are thought out.            | Multiple angles are expressed. Scale is clear and drawings are thought out.                         | Multiple angles are shown. Scale is clear and drawings are aesthetically pleasing.                   |
| <b>Scaled 3D Computer Model</b>   | Multiple angles are missing. Scale unclear and model is poor representation of prosthetic. | Multiple angles are missing. Scale unclear and model is thought out.            | Multiple angles are expressed. Scale unclear and model is thought out.                | Multiple angles are expressed. Scale is clear and drawings are thought out.                         | Multiple angles are shown. Scale is clear and drawings are aesthetically pleasing.                   |
| <b>Scaled Physical Model</b>  | Model does not meet criteria of instructions.  | Model does not meet scaled criteria of instructions or match 3D computer model. | Model does meet scaled criteria of instructions but does not match 3D computer model. | Model does meet scaled criteria of instructions and matches 3D computer model but lacks aesthetics. | Model does meet scaled criteria of instructions and matches 3D computer model with great aesthetics. |
| <b>Annotated research</b>   | 2 or less annotated research articles.   | 4 or less annotated research articles.  | 6 or less annotated research articles.  | 8 or less annotated research articles.  | 10 or more annotated research articles.  |
| <b>Market place sales pitch</b>   | Idea is unclear with poor grammar.   | Idea is clearer with poor grammar.  | Idea is clearer with proper grammar.  | Idea is thought out and represented well but could be more aesthetically pleasing.                  | Idea is thought out and represented well.  |

The end of the project ends with a market place in the media center at Buchanan. This is a great place for parents, faculty and the media to interact with the students. The lessons are also shared with other schools and academies across the district.

I have provided another project below to help show how the printer/scanner will be utilized all year- not just as a one-time item. As you will see- many standards are touched on throughout the entire project.

### Identify

For many younger students DNA can be a very confusing topic. The book publisher Harper Collins has come to your team to create an interactive book on DNA. On top of making the book the publisher has also asked that your team make a hands on 3d model of DNA to travel from school to school as an educational tool. The book and model that you create must meet the following constraints:

- The book must meet the correct **Flesch Grade-Scale** formula, or the Kincaid formula for the appropriate grade level.
- The book must contain original art that must be scanned in and digitalized or created electronically.
- The book must also contain an idea for students to learn about DNA with a hands on activity.
- The DNA model must have proper working drawings and be scaled appropriately.
- The DNA model must also be 3d rendered using appropriate software.

### Setup

Research the project. Ask: “What are the age limitations of the user? “What must my model contain to be actually understood?”  
Research existing products created for students of the appropriate level. Evaluate the dimensions of your scaled drawings and 3d model.  
Create an annotated bibliography of at least 30 sources during the project.

Brainstorm potential solutions and develop sketches. Sketches will be used to create original art and for the 3d model. Identify ideas that will keep readers interested.

Use a decision matrix to choose the best solution.

### Execute

Plan the solution. What ideas will you use to create a book with original art and an interactive implement? What techniques can be used for production?

Keep stretching and recording ideas to improve your design.

Prepare models using various production techniques. What will your working drawings look like of your DNA model? What 3d rendering software will you use to create your complete model?

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Meet with your team to discuss product development. Analyze your progress and consider ways to improve the books design.

**Evaluate**

Evaluate the design by having several people observe the book and model. Ask for feedback and modify the design if necessary.

**Share**

Have a variety of people read the book and evaluate its approach and effectiveness.

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

| Service/Item Description   | Cost                   |
|--|------------------------|
| Makerbot Replicator Mini Essentials  | \$1869.99              |
| Makerbot Digitizer   | \$799                  |
|  | \$                     |
| <b>Total Cost of Project</b>   | \$2668.99              |
| <b>Amount requested from TERRA:</b>  | \$2668.99              |
| <b>If matching/additional funds have been identified to help pay for your project, please list →</b> | <b>Source:</b>         |
|  | <b>Amount: \$</b>      |
| <b>If any goods or services have been donated for this project, please list →</b>                    | <b>Source:</b>         |
|  | <b>Goods/Services:</b> |

**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.

|  |                  |       |  |
|--|------------------|-------|--|
| <b>Applicant's Name:</b>                               | Walter Watts     |       |  |
| <b>Applicant's Signature:</b>                          |                  | Date: |  |
| <b>School Administrator/<br/>Principal's Name:</b>     | Scott Hilgenberg |       |  |
| <b>School Administrator/<br/>Principal's Signature</b> |                  | Date: |  |