

# INSTRUCTIONAL TECHNOLOGY GRANT PROPOSAL

**Name of Applicant:** Morgan Green

**District/School:** Cherokee County School District- Creekview High School

**Date:** April 14, 2017

**Total Cost of Project:** \$922.81

**Title of Project:** Bringing History to Life with 3-D Printing

**To what organization will you submit this grant application in the future?:-** Cherokee County Educational Foundation- IMPACT GRANT- <http://cherokeek12.net/ccef-impact-grant-application/>

- I. Why is this project important (In 2-3 paragraphs, describe the need for the project and its relevance to the shared vision for instructional technology)?
- II. What would you like to accomplish (In 2-3 paragraphs, describe the project and list instructional objectives/project outcomes.)?

Answers to I and II are as followed:

Bringing history to life with 3-D printing will revolutionize my history and geography classes. I envision two major uses of this technology. One of the projects will allow students the opportunity to examine and hold artifacts from multiple time periods that previously would not be possible, while the other would be student-centered around the project and problem-based learning. Within my world history and US history classes, students will be examining artifacts and changes in technology by printing the tools and being able to compare and contrast the advancements. This would also be beneficial when studying the battlefields of the Civil War to show why certain battles were won and lost over the physical geography of the land. This project is not something that will just occur in one unit, the impact that this investment has on my classrooms will greatly impact my students and provide them with an opportunity to engage in the material. Smithsonian X 3D provides a large library of designs that can be incorporated into geography and history classes. Not only does this printer give students tangible reproductions of history that were not once available, they can design their own models and development cross-curricular skills and make predictions about what could have happened in history and what did happen.

The other way the 3-D will be used is to create more student-centered activities. Using the 3-D printer in my classroom students will be able to reach a higher LoTi level (<https://www.loticonnection.com/loti-framework>) more consistently and meet the needs of the ISTE NETS-S standards (<https://www.iste.org/standards/standards/for-students-2016#startstandards> ). Not only will the students be able to examine the artifacts, students will then be creators of their own work when they create their own 3-D design. This would allow for my students to participate in more project

and problem-based learning opportunities. 3-D printing gives students from a variety of backgrounds to engage in the projects and the models and reaches across all learning styles to have an investment from the students on their projects.

With my history classes, students can examine primary documents to then create models based on what the students read in the classroom. Students can create battlefields and historical places for more inquiry-based learning practices to improve student achievement. Students can examine the cause and effect of history to draw conclusions. Students in my geography classes will create models of areas we are studying. A major player in geography is the human-environment interaction, which students will be able to create models of the way the land is and show how that impacts people. More so, students will look at current real world problems and the United Nations Sustainable Development Goals to create 3-D models of the issues and propose solutions to these problems, or create a new tool that could be incorporated. Students will also bring awareness to these real-world issues. Students will be able to design and develop actual solutions and work together to share this with the community. The doors that will be opened with this will allow students to use critical thinking skills, teamwork, problem-solving, and real-world application. The students' engagements in the classroom will increase with authentic learning not only by bringing history and geography to life but also through the design and create models using the 3-D printer.

CCSD's Five-Year Strategic Plan outlines a systemic focus on increasing student achievement. Within the focus, there are action plans that outline the analysis and assessment of students and teacher use of technology for enhancement and new implementation. The 3-D printer will be able to accomplish and continuously go in the direction of the district. Creekview High School echo's the goals of the CCSD. Creekview's School Improvement Plan further promotes consistently incorporating 21<sup>st</sup> Century technology in the classrooms to increase student achievement. Through these projects, the students will be incorporating cross-curricular skills such as writing with the writing across the curriculum initiative, and technology skills. Students will also use the tools taught through the Microsoft Innovative Educator certification and the Office 365 tools that the students have access to use in the classroom. By bringing a 3-D printer in the classroom, students will be able to break down the walls of the classroom to examine and study artifacts, tools, civilizations, and ultimately create a new and better understanding of the world around them. Also, giving the students an opportunity to design solutions to world problems, local problems, investigate alternative effects of the past. The student's goals and objectives are listed below.

- Students will use the 3-D printer to analyze and draw conclusions on historical events by looking at printed object, landscapes, tools, artifacts.
- Students will develop their own plans for local and world issues to create an authentic learning environment.
- Students will design and create solutions to real world problems using the 3-D printer to create an authentic learning environment.
- Students will use the 3-D printer to analyze historical events and determine alternative outcomes and draw conclusions from their analysis.
- Students will bring awareness to historical issues and current issues by developing community awareness through their 3-D designs and implementation.
- Students will create websites to explain and display their conclusions to the community.

- Students will use the tools from Office 365 and Canvas to collaborate and design a plan for their 3-D design.
- Students will examine the cause and effect of events in history by analyzing the 3-D model.
- Students can examine primary documents to create designs based on their readings.

III. In what ways is this project an example of exemplary technology integration (In 2-3 paragraphs discuss your project regarding one or more of the following: LoTi, SAMR, TPACK, TIM, etc.)?

By getting a 3D printer, my classrooms would be able to reach exemplary levels of technology integration. The opportunities that this printer will give my students will make them creators and designers in their education. Instead of just reading about the information or learning from practice based skills, they will be asked to examine the artifacts, draw their own conclusion, and solve problem-based activities. The 3D printer brings a multitude of options to increase the LoTi and SAMR in my classroom.

Students will reach high levels of LoTi through the use of the 3D printer. With the multiple projects that we will be using the printer for students will have opportunities to integrate the expand their projects through the entire school year. By the end of the school year, students will reach the highest LoTi level by solving authentic problems and reach out to the community to share their results.

Similarly, SAMR will start out with low levels and build to allow them to transform their learn so they could modify and redefine their level of achievement through the use of technology. The use of the 3D printer will vary depending on the topic. In the history class, students can create artifacts and use the templates online to print out. From these models that are created students can make predictions about the event that we are studying. With my geography students, they will reach high levels of SAMR by solving a project/problem-based project. Students will take a problem and develop a solution that they can create, design, and print on the 3D printer. This will allow students to participate in an authentic learning task.

IV. How will you complete the work? (Describe how the project will be completed.)

- A. Describe how the instructional objectives/project outcomes will be met (2-3 paragraphs).  
 Through the various problems that the students will be looking at students will not only be creators of their own learning, they will also investigate and dig deeper into topics. When students can examine a model of a historical event in their hands, it opens up their minds to the possibility of what could have been and help them reach higher-order thinking skills.

Moreover, students will design their own solutions to real-world problems by examining all factors and possibilities before creating a model for their problem. Students will learn how to research and support their ideas. Students will also learn how to promote and bring awareness to their issue by creating an awareness campaign at school and in the world both locally and globally. Students will learn how to connect and communicate with the organization about their project to gain assistance or promote their ideas. The opportunities

that the 3D printer will bring to my classroom are endless. Students will be able to learn from multiple learning styles through the use of the 3D printer as each student plays a part in the development, design, and production of their model and solution.

B. Describe the time involved (project length including the amount of time each day/week).

This 3D printer will be used for the entire school year. It will be designed that each student will minimum create one model with the printer if not more. I want each student to reap the benefits of its use. We will be working in small groups and pairs to create an authentic learning environment. Since this is a yearlong project, I will not be able to estimate how much time each day/week the students will be working with the 3D printer. I envision the students creating some small models first, before selecting a larger project to investigate and promote through the community and on social media, which would then lead up to their model of the solution using the 3D printer. I believe that we would increase our use of the 3D printer as the school year comes to a close.

C. Describe the people involved (grade level/subject & # of students, teachers and/or staff, other stakeholders).

Students in 5 class sections (30-32 students per class period) will be utilizing the 3-D printer for both teacher-centered and student-centered work. These students will be in my world history, US history, and world geography classes. This is not something that just my students can benefit from because of the designs we create other teachers can borrow them to use in their classroom. Depending on what issues that my students focus on in their projects the audience could be localized or it could reach national and perhaps international organizations. I plan to have my classes to determine the issues that have the most impact. By analyzing historical models created with the 3-D printer, students could showcase why certain civilizations were successful, create models to explain visually electoral colleges and to examine battle tactics that were used. With all the effort, students are putting into these designs, I would reach out the organization that they are focusing on or the historical site to share my student's work. I would also like to teach my students how to do this as well, so they are learning real world skills. I plan to have a night where parents and community members can come to listen to the students' projects and give students the opportunity to bring history to life for the community. I would also post their project and websites to social media platforms to reach more people. Collectively, I would like for each student to share their project on a Flipgrid board, or compile short videos of each student's project. This would enable us to reach a large audience and have more of an impact. The estimated number of people impacted would be 500- 1000 people.

D. Describe the materials needed for the project.

Below are the specific materials that are needed for the project. They include the 3D printers and the filament used to make the models.

- XYZprinting da Vinci mini 3D Printer, 5.9" x 5.9" x 5.9"

- XYZprinting RFPLCXUS04E da Vinci Jr. & mini Series Filament, PLA (NFC), 600 g, Clear Green
- XYZprinting RFPLCXUS00B da Vinci Jr. & mini Series Filament, PLA (NFC), 600 g, Nature

IV. What is the timeline for assessing accomplishments and objectives/project outcomes (In 1-2 paragraphs, describe program evaluation procedure.)?

As mentioned earlier, a timeline for assessing the accomplishments and objectives will not be possible as the 3D printer is something that we will utilize all school year. I would like to start off with a smaller project that is not as in depth to help build the students skills. The plan would be to have the students be able to research and use/design on the 3D printer by November/December. In January, I would like for them to select a topic/problem to begin researching and development a plan of action to bring awareness their topic and complete the project by April/May timeline. Along the way, students will have a portion of the project to turn in each month to keep them progressing. Each month, I will meet with each group to discussion their objective and outcomes to ensure they are on track, provide feedback/suggestions, and to review their design/project. This will allow me to make sure they are meet their marks so that they do not wait until the last minute and to help them grow along the way through their project. Since it is largely student-based, I want them to take ownership of their learning and allow me to facilitate and improve their skills.

V. How will the students be impacted by the project (In 2-3 paragraphs, include details regarding how the impact on students will be assessed and reported to students, parents, teachers, and others.)?

Students will be connecting with the appropriate organization that relates to their project. As the 3-D printer will be used throughout the entire school year, the projects and organizations will vary. My U.S. and World History classes will be focusing on historical sites, alternative conclusions, and examining the cause and effect. Students can also create and design their own versions of historical sites using primary sources to compare to the remnants of today. Students will work together using the Office 365 tools and Canvas to collaborate within their classes. These tools also provide us with the ability to collaborate across multiple sections, which can increase our collaboration, especially on a specific topic. I would to also collaborate with other history classes, English, and CTAE course to further the cross-curricular skills that my students will be using my classes. Students in these classes can then refine their writing skills in their English classes, work on their designs using their skills that they learn in CTAE classes to then tie the project together through learning about the history and impact that it had or for my geography students, learn to create a solution to these problems.

As mentioned earlier, I plan to contact the historical sites and organizations that specific work with the projects that my students create to provide input and feature the students work. I would also publish their work onto social media accounts and share the collective videos with the community both local and global. I plan to have a night where the parents and community members are invited to view the projects that the students have worked so diligently on. Students will be setup with their projects as parents and community members walk around and have the students share their information about their learning process and what they discovered. By creating an event, such as this, students are also preparing themselves for their senior project presentations that they will give later in their high school career.

Students will also share information within the classes on the mini-projects that we do to gain some practice prior to the large exhibit with the community members.

I believe that bringing a 3D printer into the classroom will open up the doors for students. The skills that it will require them to use will give them the opportunity to learn more, improve their critical thinking skills, and teach them how to put plans into action. I would like to track how student engagement improved by using the 3D printer and how their achievement did as well. I would use test scores and other formative assessment through the multiple projects. As a conclusion to the final project, I would have the students write a reflection about what they learned, how the 3D printer impacted them, and for them to share about their projects. This would bring the entire process full circle. After all of the small checks along the way, the students will be able to reflect and see the overall impact that this project had on them and the community.

VI. What is the proposed budget? Include information on the following:

- A. Materials/supplies
- B. Equipment
- C. Total Cost of Proposed Project
- D. Additional Funding Sources

Item	Price	Quantity	Total Price
XYZprinting da Vinci mini 3D Printer, 5.9" x 5.9" x 5.9"	\$272.99	3	\$818.97
XYZprinting RFPLCXUS04E da Vinci Jr. & mini Series Filament, PLA (NFC), 600 g, Clear Green	\$25.96	1	\$25.96
XYZprinting RFPLCXUS00B da Vinci Jr. & mini Series Filament, PLA (NFC), 600 g, Nature	\$ 25.96	3	\$77.88
Total			\$922.81

V. List your supporting references.

ISTE Standards FOR STUDENTS. (n.d.). Retrieved April 27, 2017, from <https://www.iste.org/standards/standards/for-students-2016#startstandards>

LoTi Framework. (n.d.). Retrieved April 27, 2017, from <https://www.loticonnection.com/loti-framework>

SAMR. (n.d.). Retrieved April 27, 2017, from <http://www.schrockguide.net/samr.html>

**INSTRUCTIONAL TECHNOLOGY GRANT PROPOSAL  
EVALUATION FORM/SCORING RUBRIC**

**Total Points (out of 200):** \_\_\_\_\_

1. Impacts a variety of skill levels and/or learning styles or impacts an important target population.

Possible number of points: 40 \_\_\_\_\_

2. Clearly, identifies standards and learning objectives/project outcomes being addressed.

Possible number of points: 40 \_\_\_\_\_

3. Pedagogically sound, based on research and/or best practices.

Possible number of points: 40 \_\_\_\_\_

4. A Clear plan for assessment of project and goals with examples of implementation methods.

Possible number of points: 40 \_\_\_\_\_

5. Impacts large number of students and/or can be recycled/reused.

Possible number of points: 40 \_\_\_\_\_

General Comments: