

2023 FUNDED PROGRAMS

Novel Engineering

Shippensburg Area School District, Franklin County

Grades 2-8, STEM

Amanda Kirkpatrick

Novel Engineering is an opportunity for students in grades 2-8 to enhance their skills as a reader and writer while also integrating their reading background knowledge and depth of understanding with the use of STEM technology. Students will read and discuss stories and/or novels and then use a 3d printer to design and create tangible solutions to a problem from the story. Approximately 70 students will be involved in this program initially (grades 2-8).

Challenges:

Novel Engineering will have students enhancing not only their reading and writing skills, but their problem-solving skills as well. Identifying problems from the books that the characters face and then designing and creating solutions could help them make connections to how they can do the same when faced with problems in their lives.

This project will provide ways for students to demonstrate their understanding of the knowledge gained from the book as well as providing them an opportunity to display their thinking using creative and innovative ideas. It will also encourage them to explore and gain skills that involve computer programming, digital design as well as the engineering design process, all skills that are valuable in today's ever growing technology based world.

Empowering the Next Generation of Makers

Waynesboro Area School District/Mowrey Elementary, Franklin County

Grades 3-5

Keith McCray

The goal of the *Empowering the Next Generation of Makers* is to increase student engagement/achievement in STEM activities by introducing 21st Century technology into the classroom. The project will use Flashforge 3D printers, taking students' ideas and making them a reality, providing opportunities for students to utilize emerging technology while developing fundamental STEM skills. This project will target approximately 185 Mowrey Elementary students in grades 3-5. 53.01% of students in Mowrey are identified as economically disadvantaged. Learning programming empowers kids. 3D designing and printing puts students in control bringing their ideas into reality and through experimentation builds proficiency in sequencing skills, measurement, problem solving, logical thinking, communication, and critical thinking. The project also includes professional development and coaching for teachers.

To Mars and Beyond! - 5th Grade

Overview: This project will encompass cross-curricular standards (ELA, Physical Science, Earth Science, and STEM) and employs the Design Thinking Process. Students will begin by taking a virtual field trip to Mars using accessmars.withgoogle.com to build background knowledge about the geography, weather and perils of the red planet. While exploring the planet students will complete a See, Think, and Wonder organizer. The next step is making connections to non-fiction text and reading the article which documents the perils of traversing terrain 77 million miles away. (This is the Empathize step in the DTP). The students will be recording their connections citing evidence from their virtual field trip. Students then watch a news report on the Artemis missions - which are the precursor missions to colonizing the moon and ultimately sending an astronaut to Mars - to build background knowledge on what the dangers of the trip itself and identify the engineering dilemmas of constructing a vehicle that can make the trip and then explore the terrain of a far-off planet. (This is the Define step in the DTP, where students formulate the question they are trying to answer or the problem they are trying to solve). Students will then begin to research the evolution of space travel and vehicles used to generate different ideas that could be used to help the construction of the next space vehicle. (Ideate step in DTP). After their research, students will diagram their vehicle paying close attention to measurements and details. The students will then transfer their 2-dimensional diagram to a rendered 3D model using TinkerCad. (Prototype step in DTP). Finally, they will print their designs and complete any assembling of their vehicle to ensure its functionality (Test step in DTP). Students then reflect upon their process, their successes, and failures, hypothesize about the probability of their design working and then construct and submit a proposal in a bid to win the contract for the hypothetical construction of their space vehicles.

Simple Tools - 4th Grade

Overview: This project will encompass cross-curricular standards (ELA, Physical Sciences, and STEM) and employs the Design Thinking Process. Students will begin with the read aloud *Timeless Thomas* which chronicles the inventions of Thomas Edison. During this time, students are focused on the Design Thinking Process that is evident in Edison's constant reflections and improvements upon his inventions. (Empathize step in the DTP). We will then discuss how some of Edison's inventions have impacted our lives and what we would like to see invented (Define step in the DTP). Students will then set out to design prospective tools that could be used to make their lives easier/better. They will create scientific diagrams of their inventions using labels and measurements (Ideate step in DTP). The students will then create a 3D model of their invention using TinkerCad and print out their model using the Flashforge printers. (Prototype Step in the DTP). The students will then construct an informative text about their invention and develop a sales pitch that can be presented to other teachers and/or administrators in a mini-shark tank style activity.

Fossil Folly - 3rd Grade

Overview: This project will encompass cross-curricular standards (Writing, Earth Science, Art, and STEM). Students will begin with completing the writing process for a narrative writing piece about a fictional animal. After completing the publishing step, students will construct a scientific drawing of a fossil from their fictional animal. Students will then take their design and create a 3-dimensional model of their diagram, paying close attention to measurements to ensure it would be to scale and design so that it includes characteristics related to their animal. Students will then print their fossil using the Flashforge 3D printer. Finally, students will present their animal's fossil and story to the class either in person or by recording a short infomercial style video.

Expanding the Boundaries of Learning with VR

Chambersburg Area School District/Chambersburg Senior High School, Franklin County
Grades 9-12
Melissa Engel-Unruh

This program will expand the boundaries of learning by collaborating with core content teachers (history, science, math, English, language) to use Class VR, standalone virtual reality headsets built specifically for classrooms. The headsets will include a student-friendly interface, embedded educational resources, and simple-to-use teacher controls. With these headsets, students can access thousands of educational virtual reality resources and lesson plans that are aligned with state standards in various content areas. These resources include 360-degree photos, 360-degree videos, 3D models, and explorable virtual scenes. Because of the vast array of resources available, students/teachers will collaborate in areas such as:

- History - Explore 3D images of the WWI trench experience with a history class
- Science - Experience a 360 video of a solar eclipse with a science class
- Math - Explore a 3D model of a hexagonal paraboloid with a math class
- English - Explore the setting of the novel To Kill a Mockingbird with an English class
- Language - Explore 3D images of locations in Germany with a German class

The goal is to have VR technology to expand the boundaries of learning, raise student engagement, and increase knowledge retention. VR content is available in all main subject areas. Thus, approximately 2,000 students could utilize this technology.

VR uses experiences that create a psychological presence that gives students the sense of "being there." Professional development sessions for department will also occur (Ex: English, Math, Science, Social Studies, World Languages, etc.

Innovation: VR 360-degree images and videos provide an engaging and immersive way to deepen learning. Students are given unique experiences to visit remote places, see historical monuments, or experience locations they couldn't in real life. 3D models allow students to get up close with content, such as a beating heart or an ancient artifact, as if it were in the palm of their hands

Value added to curriculum: The Class VR headsets come with a constantly growing library of thousands of curriculum-aligned virtual reality resources for use across all subjects and age ranges.

Advanced academic in nature: Class VR also allows teachers and students to create content, from 360-degree photos and videos to 3D models and explorable scenes.