

3D Printing Brings Learning To Life For Future Engineers At Urbandale High School

Urbandale High School students are designing and producing 3D-printed supplies for immediate use by utilizing knowledge in science, technology, engineering and mathematics

URBANDALE, Iowa – April 28, 2015 – The future is the present at [Urbandale High School \(UHS\)](#) as students in Marc Hermon’s Intro to Engineering and Design (IED) course are not only learning, but mastering, innovative science, technology, engineering and mathematics (STEM) concepts. Students are actively engaged in critical thinking and problem solving as they develop designs on paper and turn them into reality by using the SE U-Print 3D printer as part of the [Project Lead The Way \(PLTW\)](#) initiative. A student’s computer-generated drawing can be converted into an appropriate file type and sent to a 3D printer where the actual physical object can be printed in ABS plastic. The printing takes place with a click of a button—but it’s everything that leads up to it that is attracting the ongoing attention of students, teachers, parents and state leaders.

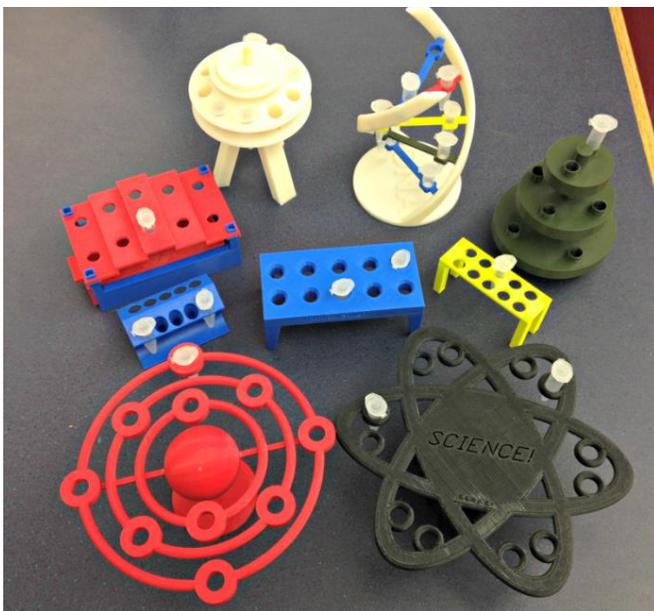
After weighing many applications, the South Central STEM Regional Advisory Board, a local division of the Governor’s STEM Advisory Council, recently accepted Urbandale High School’s application to implement additional PLTW Computer Science and Software Engineering courses due in large part to the high school’s exemplary STEM program. The Urbandale Community School District will receive support from the state’s Step-Up Initiative which is focused on increasing student interest and achievement in STEM and promoting economic development in the state. Beginning this fall, students will have the opportunity to register for several new Computer Science and Software Engineering courses that will provide dual-credit with DMACC.

“Implementing the use of a 3D printer has very much improved the spatial intelligence of Urbandale students,” said Hermon. “Spatial intelligence is the ability to draw accurate conclusions from observing a three-dimensional environment. It involves interpreting and making judgments about the shape, size, movement and relationships between surrounding objects, as well as the ability to envision and manipulate 3D models of things that are not immediately visible. For my students to take one of their two-dimensional concepts and bring it to life in a solid three-dimensional object is an invaluable learning experience.”

Earlier this year, the UHS biology department contacted Hermon and his IED students as they were in need of microcentrifuge test-tube holders. Several IED students accepted the challenge and submitted designs along with functional and cost analysis presentations. Hermon then printed the unique and creative test-tube holders on the 3D printer which will be put to use in next year’s AP Biology course.



Urbandale High School Intro to Engineering and Design students displaying their test-tube holders created on a 3D printer: Bobby Parsons, Jacob Eisbrenner, Sarah Feldotto, Reid Schroeder, Matt Stogdill, Tim Ngo, Cameron Canada and Tony Ruffalo.



3D Printed Test Tube Holders

More recently, IED classes have chosen products to reverse engineer. One such product was a wooden Ellipsograph found in the room of a student's English teacher. UHS student, Lee Chinyama, reverse engineered the Ellipsograph to work better, then printed it using the 3D printer and gave the more efficient product back to his teacher. View a computer animation of Chinyama's project:

<https://youtu.be/SmsRrZCtiD8>

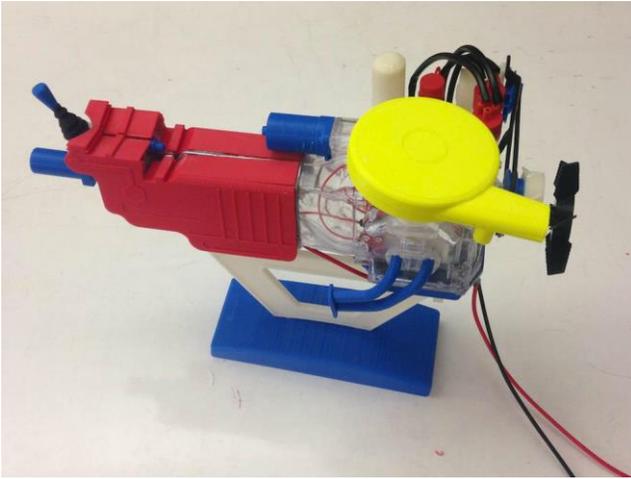


Urbandale High School Intro to Engineering and Design student, Lee Chinyama, displaying his reverse engineered Ellipsoidograph created on a 3D printer.

Another IED team took on a rather daunting challenge from Hermon which involved reverse engineering all of the parts of a scale model Mazda Rotary Engine. The motor was then assembled using the 3D printed parts, rather than the actual parts that came in the kit. A hush came over the room when the motor was attached to a power supply as students hoped it would work, and much to their delight, it worked perfectly. View the motor in action: <https://youtu.be/oH9CnuLPPhM>



Urbandale High School Intro to Engineering and Design students displaying their reverse engineered Mazda Rotary Motor created on a 3D printer. Front Row: Ryan Jackson, Jacob Eisbrenner, Jace Walley, Nick Scharingson, Tim Ngo. Middle Row: Chase Freund, Ben DeKruyf, Jacob Mellott, Alec Sheppard, Jack Scieszinski. Back Row: Trevor Miller, Jared Witke, Garrett Shipley.



Reverse Engineered 3D Printed Working Motor

The importance of STEM within K-12 education is evident when considering the following: by the year 2020, there will be 1 million more jobs in computer science than there are actual computer science students; currently, only 2 percent of all STEM college degrees are in computer science yet 60% of STEM jobs require computing; careers in computer science rank second, fourth and eighth on the top 10 average salary offers for students with a Bachelor's degree. Not only will there be a greater demand for STEM expertise, but there will be a shortage of qualified workers.

In order to meet the demands of a competitive, global workforce, students must be introduced to STEM concepts in a way that invokes interest and engagement. Intro to Engineering and Design STEM programs at UHS meet this need as they are representative of the district's aim to transform education in order to make it more engaging, relevant and meaningful for students. What could have simply been a class discussion about design and engineering a decade ago is now transformed into learning complex, hands-on theories and activities that are immediately applied through the use of a 3D printer. This type of learning environment—where students have greater input, ownership and voice in their learning—may be unique in education, but is not unique in Urbandale, as actively engaged students can be found throughout every classroom in the district. To learn more about how Urbandale is transforming education, visit: Showcase.UrbandaleSchools.com

About Project Lead The Way

Project Lead The Way (PLTW) is a 501(c)(3) nonprofit organization and the nation's leading provider of K-12 science, technology, engineering, and math (STEM) programs. PLTW's world-class, activity-, project-, and problem-based curriculum and high-quality teacher professional development model, combined with an engaged network of educators and corporate partners, help students develop the skills needed to succeed in our global economy. More than 6,500 elementary, middle, and high schools in all 50 states and the District of Columbia currently offer PLTW courses to their students. For more information, visit PLTW.org

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About Urbandale Community School District

The Urbandale Community School District includes portions of Des Moines and Urbandale, Iowa. The district serves over 3,900 students in six elementary schools, one middle school and one comprehensive high school. The Urbandale district supports an increasingly diverse student population where 50 languages are spoken. Building on the existing foundation of excellence in education, Urbandale is transforming education throughout the district. By implementing innovative [Quality/Continual Improvement](#) strategies that create learning environments that more fully engage, challenge and motivate students, Urbandale is taking transformation from theory into practice. Urbandale prepares students for becoming lifelong learners and is a school district that brings learning to life for everyone. To learn more, visit: UrbandaleSchools.com

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