

INVENTORcloud OVERVIEW

According to the AST2 INVENTORcloud curriculum, there are four basic steps in the process for strong STEM education. First, students access dynamic curriculum through the INVENTORcloud's virtual collaborative learning environment's suite of hardware and software technologies. Secondly, students collaborate to solve real-world challenges by creating virtual prototypes using computer-aided design programs, while applying their newly learned knowledge. Next, students turn their virtual prototypes into reality by remotely accessing the INVENTORcloud's rapid prototyping equipment lab. Virtual plans are soon transformed into 3-D products. And finally, the INVENTORcloud gives students the creative, collaborative, and technical skills necessary to succeed in 21st century careers.

The INVENTORcloud™ Program is an integrated, comprehensive educational program that offers project-based learning in a unique, technology-rich environment for students.

Students can...

- access dynamic curriculum through INVENTORcloud's virtual collaborative learning environment's suite of hardware and software technologies.
- collaborate to solve real-world challenges by creating virtual prototypes using computer-aided design programs.
- turn their virtual prototypes into reality by remotely accessing the INVENTORcloud's rapid prototyping equipment lab.

INVENTORcloud gives students the creative, collaborative, and technical skills necessary to succeed in 21st century careers.

INVENTORcloud provides teachers the opportunity to work with state-of-the-art educational, communication, and advanced manufacturing technologies along with industry experts and post-secondary educators. Integrating these technologies into 21st century classrooms allows you to prepare your students for career success, building the skills they need to become tomorrow's leaders and innovators. INVENTORcloud supports coursework in STEM, liberal arts and fine and performing arts and is more effective than traditional test book teaching methods in stimulating student interest, promoting positive student attitudes, and instilling life-long learning, communication and problem solving skills.

Professional development is offered to teachers for both curriculum implementation as well as technology and equipment operation. Training can be provided in a hands-on setting and supplemented with online resources. Teachers learn how to use all aspects of the INVENTORcloud curriculum, STORM technology and how to integrate the rapid prototyping equipment and remote access of digital manufacturing equipment. Through the INVENTORcloud technology, teachers have in-class access to academic and industry professionals to augment their educational resources.

What are the Benefits?

- Engaging, inquiry driven interdisciplinary curriculum in a rich technology environment that encourages creativity, design and innovation
- Access to cutting edge design tools, scientific and manufacturing equipment located remotely or on-site
- Partnerships with colleges, universities, and industries providing access to resources that help inspire students to pursue STEM-related careers and post-secondary education options
- Attracts students underrepresented in traditional STEM classes and builds collaboration, critical thinking, and communication skills
- Augments teachers' resources and expertise with academic and industry professionals
- Access to equipment and technology not readily available in most educational settings

An overview of the curriculum at each grade level is as follows:

Grade 3: Exploring the Engineering Way – This course provides an introduction to engineering and the careers of engineers, designers and architects. It also teaches students about working in teams, brainstorming, and problem solving. Students learn the design process which they apply in project-based learning activities using solid modeling programs and 3D printers. Projects include building a car, designing a toy and a bird house with an option to collaborate with 4th grade students to build a “bird lab.”

Grade 4: Problem Solving Through Collaboration – Students study engineers who have impacted humanity, exploring fascinating designs and how their project engineering impacts the future. Team work and building is emphasized with team roles and learning to collaborate to solve problems. Students study human history, specifically how humans have adapted to their surroundings to survive. Using solid modeling programs, 3D printers and prototyping equipment, teams will design and build a prototype of a river vehicle and a device that will allow mankind to continue to adapt to changes in the environment.

Grade 5: Engineering Force, Motion, and Space – Creativity, innovation, and communication are emphasized as students study energy. Students look at man's role as it relates to energy use and study alternative energy resources. Students design and build projects to solve energy-related issues. Learning creative problem solving, students study transportation and energy issues by analyzing and building a “better” bicycle and designing and building a bridge.

Grade 6: Engineering and Earth Science – This course focuses on 21st century skills necessary for success across the curriculum and for those planning to study STEM with an interest in STEM careers. Students study how engineers and scientists use creativity problem solving and teamwork to solve problems. Earth sciences and the forces of environmental energy are surveyed. This course culminates with a capstone project in which teams research, design and prototype an item that can minimize carbon emissions, harness the energy of a natural source or otherwise use energy in an unique manner.

Grade 7: Designing Solutions for Today and Tomorrow – Students will have an in-depth study of the design process, including influential designs of the 20th and 21st centuries. They study the steps in the design process and learn about copyrights and patents as they study inventions. The role of the customer

or audience is studied – identifying the potential users of the product and evaluating products designed for specific users. Teams will re-design an existing product, to improve or adapt to a specific user group. Students evaluate and discuss real-life design teams, seeing how successful teams work together. Students will study critical thinking in decision making and problem solving, and learn to write a problem statement. The iteration process (build, test, evaluate, refine, rebuild) will be studied as students understand the value of this process.

Grade 8: All Things STEM – This course explores the importance of STEM disciplines in our country, economy and careers. Students learn “Why STEM is COOL” with examples of will.i.am and FIRST. The outlook for STEM careers is discussed and compared to non-STEM occupations. This course explores science fiction tools that have become reality and then, students will create their own futuristic product to solve problem. Students focus intently on the design process, including viewing NASA projects, and learn to employ the design process in designing a robot for enhancing human well-being.