INNOVATION LAB INSPIRES AND EMPOWERS STUDENTS

DEVELOPING A PREK-12 STEM LAB FROM THE GROUND UP

For an independent school to create a full-fledged Innovation Lab typically associated with STEM or engineering schools may have seemed like a daunting task.

At Nansemond-Suffolk Academy (NSA), students are engaged in personal growth, inspired to discover their passion and empowered to make a difference in the world. In an effort to create an innovative, collaborative learning environment that all students can take advantage of, no matter their grade level or area of study, the school built a sophisticated Innovation Lab. This lab has become an epicenter of excitement on campus.

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Elizabeth Joyner
STEM Learning and Innovation Specialist
Nansemond-Suffolk Academy

An Interdisciplinary Approach to Liberal Arts

NSA took technologies once traditionally considered vo-tech or industrial arts and built an entirely new model for a liberal arts education. The school's Innovation Lab features 3D printers that offer a wide variety of printable materials, a 3D scanner, laser cutters, a vacuum former, an injection molder, and a CNC router, mill and lathe.

"We're continually weaving more technical teaching tools, like CAD software, into our liberal arts coursework in a way that sparks creativity and innovation," said Elizabeth Joyner, STEM Learning and Innovation Specialist at NSA. "We are also able to incorporate other 21st century learning skills into our projects, like collaboration and critical thinking in seamless ways."

NSA's art classes turn STEM into STEAM by 3D printing cameras and laser cutting intricate Day of the Dead artwork. Second graders 3D model and print rain gauges as an extension of their science unit on weather.

History classes build trebuchets and use laser cutters to make signage representative of the Declaration of Independence. The seventh grade STEM class creates board games for third and fourth graders using 3D printers and laser cutters. Even the French club is involved, 3D modeling the Eiffel Tower.

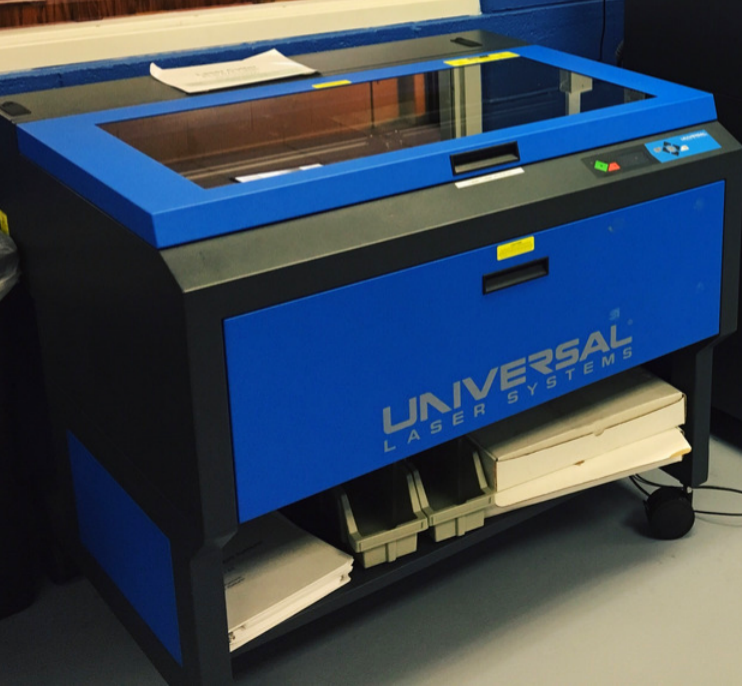
PreK-12 Project-Based Learning

With more than 800 students enrolled at NSA, it is important that the Innovation Lab functions in a variety of different capacities, depending on the subject area taught and developmental appropriateness of the equipment's process.

"We are continuously honing our pedagogy and design challenges so that we provide students with developmentally-appropriate STEM skills and knowledge," said Joyner.

Students in the Lower School work with NSA's Science Lab teacher to explore basic engineering and science practices. Middle School students move on to develop 3D modeling and graphic design skills and are given access to equipment in the lab, like Stratasys 3D printers and Universal Laser Systems. Upper School students enrolled in the Academy's Design Thinking and Prototyping class and the Independent Study class can use CNC machines and other advanced technologies in the lab.

School clubs are also involved. The Lower School's Little Inventors Club gets students started learning basic electrical engineering design skills and brainstorming new inventions that could change the world. The Upper School's ASSIST3D Club works with eNable to 3D print and assemble prosthetic hands for those in need.



Independent Study and Internships Inspire Student Autonomy

Students who have successfully completed the Design Thinking and Prototyping class are eligible for NSA's internship program. This program encourages students to use design and fabrication to directly benefit stakeholders within the school.

Students often create teaching models that can then be incorporated back into the curriculum. Interns have developed equipment guides and sample lessons, modeled the use of technology with other classes in the school, and created design competitions for Upper School students. This internship program helps students actualize the skills and talents they will need post-graduation.

Preparing for the Jobs of Tomorrow

Located just southwest of the Hampton Roads area, Suffolk, Virginia is a hub for military and the aerospace industry. Raytheon, Northrop Grumman, Lockheed Martin, the U.S. Joint Forces Command, and a large concentration of Department of Defense facilities are located in and around the city.

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NSA's Innovation Lab seeks to prepare students for careers in these fields and others that may not even exist today. After the first year of the lab's opening, the school saw more students graduate and move on to competitive engineering and aerospace programs at prestigious universities.

"Most makerspaces at the lower and middle school level are primarily kit-based or center on a particular curriculum outcome," said Joyner. "We want to create a space comparable to a university lab that gives students the most robust education possible and stimulates our local economy. We're pushing beyond traditional liberal arts education to solve 21st century problems."