

# Governor's STEM Academy Brief



Office of Career and Technical Education

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The purpose of the monthly brief is to provide information, resources, and a networking vehicle to support the STEM (science, technology, engineering, and mathematics) Academies in Virginia.

## GOVERNOR'S STEM ACADEMIES SPOTLIGHTS

During the study of marine engineering, students at George C. Marshall Governor's STEM Academy in Fairfax County have finished building and programming robots that are being converted to power vessels. The robots are Arduino controlled, programmed in C++. Students are now working on converting the robots into surface ships and underwater robots.

Engineers from the Naval Surface Warfare Center (NSWC), Carderock serve as mentors to the students and evaluate their about ship designs. Students are using bilge pumps, modifying them to provide propulsion for the surface ships or leaving the pumps intact to use them as water jets for propulsion. For a culminating activity, the students will take their surface ships and submersible robots to the David Taylor Model Basin at NSWC, Carderock and deploy them in the 140' tank.

In manufacturing, knowledge of mechanical, fluid, electronic and programming systems can be used to help keep machines and assembly lines operating smoothly. With these foundational skills and knowledge attained in high school, students may pursue any number of career paths in mechatronics and engineering.

## MANUFACTURING CAREER CLUSTER

**Current articles and news** of various aspects of the manufacturing sector, visit sites such as [Assembly](#) (see links to [Industries](#), [Technologies](#), and [Industry Week](#)); [Advanced Materials and Processes](#); and [Manufacturing Automation](#) (see technology options for topics such as software and networks, including cybersecurity issues).

**Materials in manufacturing** resources include [PCA: Cement & Concrete Basics](#), [USDA: Forest Products](#), [Nanotechnology in Sports Equipment: The Game Changer](#), [Materials World Modules](#), [Society of the Plastics Industry](#), and [New Materials International](#).

**Make**, a magazine from [MakerMedia](#), features do-it-yourself projects employing technologies such as 3D printing, Arduino, and Raspberry Pi, as well as trending articles for hobbyists and professional manufacturers.

**View [Practical Machinist](#)** for articles and videos on manufacturing technology.

**Recent and emerging trends and issues** introductory resources for the manufacturing cluster include the following:

- Lean manufacturing: [Lean Manufacturing Resource Center](#)
- Green manufacturing: [Green Ideas for Manufacturing Companies](#) and [BusinessKnowledgeSource.com: Manufacturing](#)
- Virtual reality and augmented reality: [PWC: For US Manufacturers, Virtual Reality Is for Real](#) and [PWC: The Road Ahead for Augmented Reality](#)
- Additive manufacturing: [Additive Manufacturing](#), [EOS Additive Manufacturing](#), [3D Printing Industry](#), [3D Printing Basics](#), [LiveScience: 3D Printing](#), and [PWC: The Road Ahead for 3-D Printers](#)
- Robotics: [PWC: Service Robots: The Next Big Productivity Platform](#)

**Lesson plans and other teaching resources** on [manufacturing](#), [materials](#), and related topics, search [TryEngineering](#), [FLATE's Wiki](#), [ASM International: Teacher Resources](#), [GoWelding](#), and [Nano.gov: Manufacturing at the Nanoscale](#).

**Careers related to the Manufacturing Career Cluster** include the following:

[CareerME : Your Career in Advanced Manufacturing](#), [Chron: The Types of Jobs in the Manufacturing Sector](#), [Got Skills? Think Manufacturing](#), [Starting a Manufacturing Company](#), [Precision Metal Forming Association Educational Foundation](#), [Careers in Advanced Manufacturing Technologies](#), [Monster: Manufacturing Careers](#), [Careers in Welding](#), [GoWelding.org](#), [Precision Machined Products Association: Careers](#), [Explore CNC Machining Career Video](#), [snagajob: Assembler Job Description](#), [Chron: Types of Drawing and Drafting Careers](#), [College Board Big Future—Career: Drafters](#), and [Quality Control Inspector](#), [Dream it do it Virginia](#).

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