



# LEARNING **FIRST** ALLIANCE

Strengthening public schools for every child

## APPRENTICESHIPS MESH HANDS-ON WORK EXPERIENCES WITH ADVANCED ACADEMIC COURSES

The Apprentice School at Newport News Shipbuilding uses real-world experiences and academic classes to educate the next generation of manufacturers

Set on the James River in the midst of the weathered gray, industrial backdrop of one of the nation's largest shipyards, Newport News Shipbuilding's Apprentice School boasts a gleaming new facility and an education model that is seeking to boost the nation's economy.

The Apprentice School brings some 800 students to learn manufacturing skills—not for the assembly-line jobs of the 1950s, but for high-tech, high-skilled, and high-paying jobs building aircraft carriers and massive U.S. Naval and commercial ships. This type of apprentice model—where students work while attending classes to hone their crafts—is common in Europe but rare in the United States, often because of the expense to the employer. In Switzerland, for instance, about 70 percent of students undertake an apprenticeship after high school.

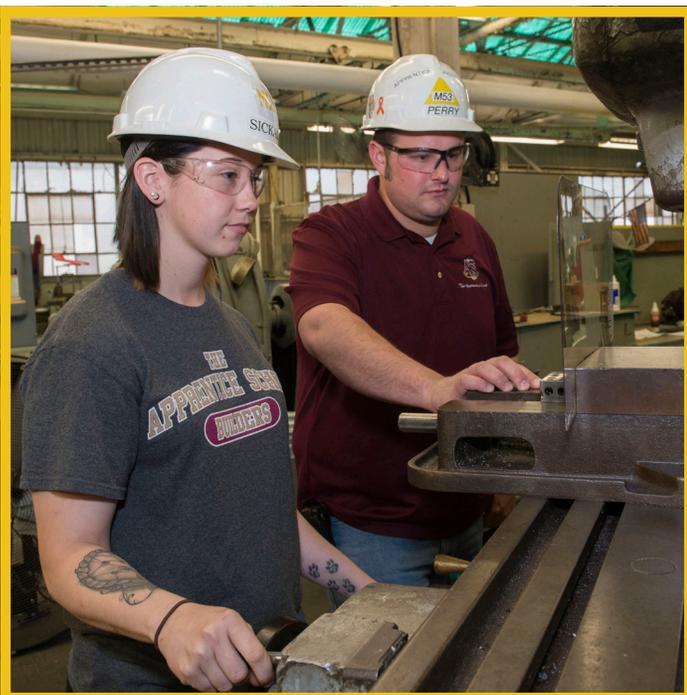
But if the U.S. manufacturing sector is going to continue to rebound, employers need workers with high-level STEM and academic knowledge, critical

thinking abilities, and a strong work ethic, representatives from the field say. And these growing businesses are increasingly looking to the nation's public school systems to give students the skills they need to earn certifications and degrees that will make them viable candidates for new jobs. Newport News Shipbuilding, for one, plans to hire several thousand new employees with STEM skills in the next decade to add to its current base of about 22,000 employees.

Apprenticeships are not a new concept—in fact, blue-collar professions have relied on apprenticeships for decades to train workers as electricians, plumbers, ironworkers, and many more. The Apprentice School was founded in 1919 to help train workers for sometimes grueling physical work at the shipyard.

What's changed in recent years is technology—with more advanced equipment, there's a need for a workforce capable of designing, building, and operating the systems that now do much of the manual work. Admission to The Apprentice School can be as competitive as some of the nation's elite universities: About 4,000 students and workers apply, but each year only about 300 are accepted. A minimum requirement is the ability to obtain a security clearance and credits in at least four courses: Algebra I and II, geometry, advanced math, physics or principals of technology, chemistry, computer science, mechanical drawing, or vocational/technical shop. That just gets a student in the door—most applicants have higher-level coursework and the school favors those who have Advanced Placement (AP) credits, noted Everett Jordan, the school's director.

Until recently, nearly all of the students were male and entered directly from high school, said Jordan. Now, about 17 percent are female, and more than half have had military or postsecondary experiences—some even have bachelor's degrees and some are middle aged. All are looking for an intensive, hands-on experience that pays well, starting at \$17.08 an hour with benefits after 90 days.



## STUDENTS DRAWN TO 'LEARN AND EARN' MODEL

The school has a full-time academic team, some holding PhDs and with military experience in nuclear physics, naval architecture, and marine engineering.

A common theme among students here is that they want postsecondary experiences and a well-paying, stable career, but they were concerned about the amount of debt they would incur at a four-year college. Others say they just didn't have the desire to go to college—they were ready to go to work but knew they needed a more advanced skill set. They were attracted to The Apprentice School because programs run four to eight years in basic specialties such as machining, pipefitting, and welding, and advanced studies to become a cost estimator, marine engineer, or nuclear test technician. Students also can earn associate degrees in business administration, engineering, or engineering technology; or bachelor's degrees in mechanical or electrical engineering through Old Dominion University that will help lead to higher-level jobs.

Raven Sickal was one of many who realized her desire to go to Virginia Tech or another four-year university would mean years of student loans. She had taken a career-technical program at her high school in Williamsburg, Va., and was thrilled to be admitted to The Apprentice School because she wanted the work

experience and pay. She is now enrolled in a Computer Integrated Manufacturing program and plans to pursue a degree.

James Adkins is another student who saw the potential of taking on an apprenticeship. A recent graduate of Charles City High School in Virginia, he had taken AP and advanced classes but didn't want to immediately go to college. Now working as an electrician, he's planning to seek his bachelor's degree in electrical engineering. "I knew a traditional college wasn't for me, I'm

more of a hands-on person," he said.

The Apprentice School gives students an intense orientation before they begin work, and Melissa Wheeler, a dimensional control instructor, points out that students must be prepared for rigorous working conditions and long hours in hot and cold

weather. A few students have left during the orientation or after the first few weeks of work, she said. Yet for those who thrive, the career experience is invaluable. "It's not easy, but it is rewarding."

If students decide to seek employment elsewhere—and there is no contractual obligation to continue to work for Newport News Shipbuilding—they have gained work experience that is highly sought after by other employers in this area. Most Apprentice School

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James Adkins and Raven Sickal, students at The Apprentice School

graduates stay with Newport News Shipbuilding, school leaders say.

“If you go to school, everyone is still looking for the actual experience and you have to search for a career. It’s a Catch-22,” said Wheeler, who is an Apprentice School graduate.

### EMPLOYERS SEEK PROBLEM SOLVERS, CRITICAL THINKERS

In fact, entering The Apprentice School with a degree or postsecondary experience is not necessarily a benefit because most classroom instruction does not apply to the type of work at the shipyard, said Nicholas Perry, also an Apprentice School alumni, who teaches Industrial Machining.

He added that students need to have not only a high-level understanding of STEM subjects but also soft skills that include critical thinking and problem solving. “Decisionmaking is a critical skill—many students have never had to think through things,” Perry said.

At the beginning of an apprenticeship, students rotate through several different pathways before deciding which skill will be their specialty. Core classes for most professions include technical math, physical science, and introductory computer science.

Given the high number of applicants for limited

spots, craft training manager Vince Warren said high-level math, chemistry, and physics is mandatory. For soft skills, the instructors often look for applicants with unorthodox experiences, such as Eagle Scouts, part-time work experience, and farming. “Chances are, if they lived on a farm and know how to repair things as a farmer, they tend to do pretty well here,” he said.

Although all students work 40-hour weeks (work begins at 7 a.m.) and attend classes, there are plenty of social and athletic activities that make it feel like a college—the school has a gym and sports teams that have won state and divisional championships. And

while the surrounding area is barren of restaurants and nightlife, a developer recently built a new apartment complex for apprentices who want to live right next to work.

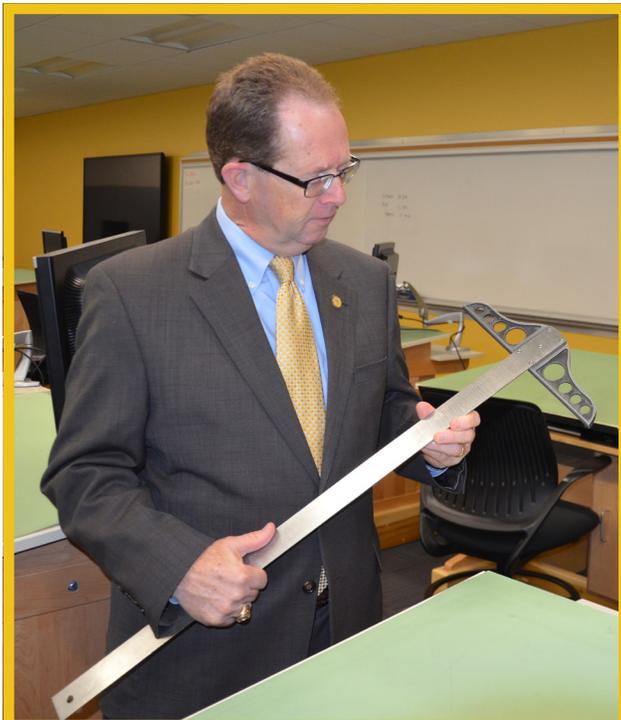
“The value of this experience is pretty difficult to quantify,” said Jordan.

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### CTE ADVOCATES CALL FOR MORE PROGRAMS

The American School Counselor Association (ASCA) has worked to ensure students have a wide variety of options to pursue once they graduate high school, and in recent years school counselors have shifted more focus to apprenticeships and broader career-technical programs, said ASCA Associate Director Jill Cook.



Everett Jordan, director, The Apprentice School



Melissa Wheeler and Nicholas Perry, instructors

ASCA also has collaborated with Swiss officials to better understand the country's apprenticeship and career-technical education models. Cook said she was impressed by the number of young women who were taking part in apprenticeships when she recently visited sites in Zurich.

While there are definite differences between the U.S. and Switzerland's education systems and culture, she believes school districts could build similar programs. Starting a conversation between business and school district leaders is key, she said.

"It sounds so silly and easy but it has to start with some conversations," Cook said. "We can't do an apprenticeship model exactly like the Swiss, but we can sit down and talk about options."

There are national initiatives to build partnerships between public schools and companies that need skilled workers, including Apprenticeship 2000, which seeks to connect companies and qualified students.

One state-based nonprofit is trying to persuade more companies to adopt the Swiss apprenticeship model for U.S. students. CareerWise Colorado brought together businesses, industry associations, school districts and policymakers to integrate these types of experiences into the curriculum. The group is testing a pilot program with four school districts and two charter organizations this year, and plans to have 20,000 students participating in 10 years.

More than 65 Colorado companies will create apprenticeships in eight occupations across four industries--tech, business operations, financial services, and advanced manufacturing--based on their talent needs, said the group's director of K-12 and training center partnerships, Lauren Trent. During the three-year program students will earn up to 60 college credits and about \$30,000 in wages.

"We've had to engage deeply with students and families to explain the opportunity to them, but once they hear about the value of apprenticeships, they're hooked!" she said. "There's a great degree of excitement in our implementing communities."

Apprenticeships as well as career-technical education courses are sometimes criticized as locking students into a particular field or relegating students to lower-level jobs than their capabilities.

"We have a society that doesn't look favorably on apprenticeships and trades, and not giving us fair consideration," said Warren. But school counselors and other advocates are working to show that focusing on the upper-level STEM courses and real-life experiences can help prepare students for an even broader range of opportunities in higher education and workplaces.

At Newport News, Warren added, an engineering student may spend a day in a physics or computer lab, then go to work on a submarine at 7 a.m. the next day. "We really do offer education with a purpose."

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**—EVERETT JORDAN, DIRECTOR**

**For more information:**

Visit LFA's webpage on Career and Technical Education ([www.learningfirst.org/](http://www.learningfirst.org/)) which is continuously updated with new resources, success stories and commentaries from our members and other like-minded organizations.

The Apprentice School at Newport News Shipbuilding: [www.as.edu](http://www.as.edu)

ASCA: [www.schoolcounselor.org](http://www.schoolcounselor.org)

CareerWise Colorado: [www.careerwisecolorado.org/](http://www.careerwisecolorado.org/)

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