

Virginia Career and Technical Education: Science, Technology, Engineering and Mathematics (STEM)



Virginia Department of Education, Office of Career, Technical, and Adult Education

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Virginia's 16 Career clusters and career assessments help students investigate careers and design their plan of study to advance their career goals. Within each career cluster, there are multiple career pathways that represent a common set of skills and knowledge, including academic, technical, and career readiness skills that lead to credentials necessary to pursue a full range of career opportunities from entry level to management, including technical and professional career specialties. CTE actively partners with business and industry to design and provide high quality, dynamic programs to meet current, emerging, and projected labor market needs. Relevant work-based learning opportunities and leadership development offered through career and technical student organizations are incorporated into the academic and career plan.

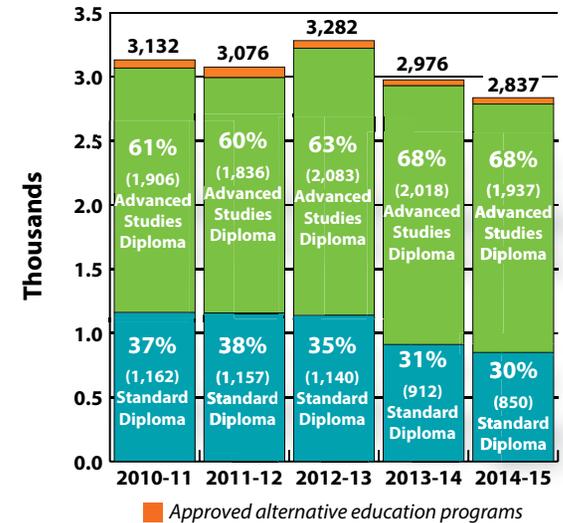
A CTE completer is a student who has met the requirements for a CTE concentration and all requirements for high school graduation, or an approved alternative education program. A concentration is a coherent sequence of state-approved courses. Students may take additional CTE courses that will enhance their career pathway goals. Completion of certain skill sets and coursework enables students to participate in Board-approved external examinations that test essential employability and technical skills. Students who earn these credentials are eligible to earn verified credit towards graduation requirements.

Beginning in 2013-2014, first time ninth grade students are required to earn a Board-approved career and technical education credential to graduate with a Standard Diploma.

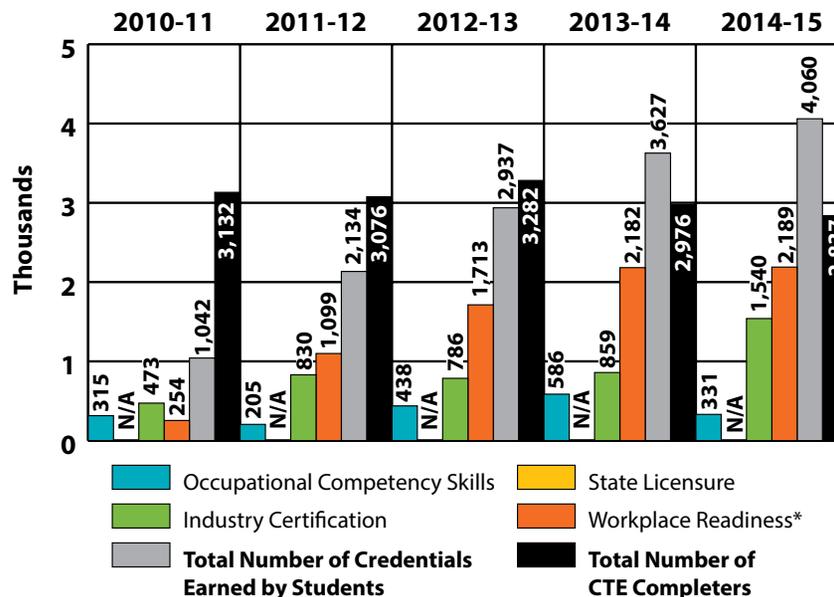
Types of credentials include:

- **Full Industry Certification** – from a recognized industry, trade, or professional association;
- **Pathway Industry Certification** – specific stackable credentials from a recognized industry that lead to a full industry certification;
- **Occupational Competency Skills Assessment** – a national standardized assessment of skills/knowledge in a specific career and/or technical area;
- **State License** – required for entry into a specific occupation; and
- **Workplace Readiness Skills for the Commonwealth Certification** - for essential employability skills recognized by Virginia employers.

Completers Graduated with Standard and Advanced Studies Diplomas



Credentials Earned by CTE Students



NOTE: Completers may participate in one or more Board-approved credentialing test(s). Not all completers participate in the credentialing tests. There are age restrictions set by certain credentialing entities which would prohibit the student from testing until after high school. The cost of credentialing tests ranges from \$10 to \$300 per test.

*Prior to 2010-11, Workplace Readiness Skills assessments were included in the Industry Certification category.

Source: Virginia Department of Education

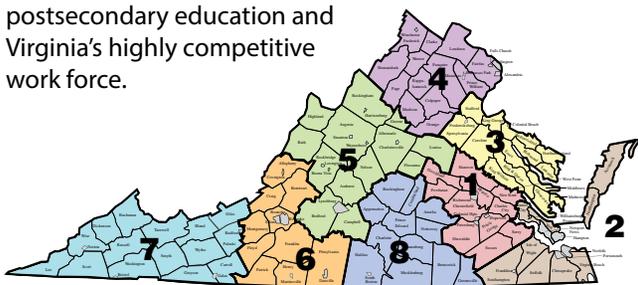
Virginia Career and Technical Education: Science, Technology, Engineering and Mathematics (STEM)

continued

The **Science, Technology, Engineering and Mathematics (STEM) Career Cluster** prepares you for careers using science, technology, engineering, and mathematics skills. Jobs within this career cluster conduct in-depth research to provide solutions to a variety of technical problems within many different fields. Over the next decade, jobs aligned with advancing technology are predicted to boom as new career opportunities open. Individuals with college degrees and experience working with high-tech laboratory equipment have the most potential for success within this industry.

Virginia high school students learn the essential academic skills that are critical for all careers and the foundational skills needed for careers in STEM. They begin to specialize in a field of interest as they complete a coherent sequence of courses within a pathway.

Secondary students who complete these rigorous and relevant pathway programs are ready for entry into postsecondary education and Virginia's highly competitive work force.



Selected Statewide Occupational Projections

Selected Occupation	2014 Median Wage ¹	2022 Projected Employment ²	Predominant Education Level ³
Civil Engineers	\$79,760	10,495	Bachelor's or more
Mechanical Engineers	\$90,450	8,504	Bachelor's or more
Electrical Engineers	\$89,670	6,865	Bachelor's or more
Architectural and Engineering Managers	\$138,150	6,660	Bachelor's or more and Work experience
Electronics Engineers	\$105,470	5,636	Bachelor's or more
Aerospace Engineers	\$120,450	5,222	Bachelor's or more
Industrial Engineers	\$82,860	4,243	Bachelor's or more
Nuclear Engineers	\$86,180	2,434	Bachelor's or more
Computer Hardware Engineers	\$116,130	2,320	Bachelor's or more
Computer Scientists	\$116,440	2,219	Bachelor's or more
Biological Technicians	\$40,220	1,329	Bachelor's or more
Chemical Engineers	\$104,620	1,275	Bachelor's or more
Petroleum Engineers	\$135,050	1,101	Bachelor's or more
Marine Engineers	\$88,420	1,096	Bachelor's or more
Biochemists and Biophysicists	\$82,460	737	Bachelor's or more
Geoscientists	\$91,220	616	Bachelor's or more
Health and Safety Engineers	\$87,900	580	Bachelor's or more
Environmental Engineering Technicians	\$43,020	537	Some college/Associate Degree
Materials Engineers	\$90,920	448	Bachelor's or more
Microbiologists	\$62,590	417	Bachelor's or more

¹ Wage data from the US Bureau of Labor Statistics Occupational Employment Statistics Program; ² Estimates from Virginia Labor Market Information. Occupational Projections (long-term) for Multiple Occupations in Virginia in 2012-2022. Retrieved via <https://data.virginialmi.com>; ³ Predominant level of education and training information created by Trailblazers, based on US BLS occupational education and training data

Source: Virginia Employment Commission, Virginia Occupational Employment Projections 2014-2022

Science, Technology, Engineering and Mathematics (STEM) 2014-2015 Enrollments**

Pathways	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7	Region 8
Engineering and Technology	12,808	25,267	10,609	45,261	8,158	7,910	6,229	2,549
Science and Mathematics	6,713	15,286	6,372	27,930	4,933	4,814	4,379	1,425

** NOTE: Duplicated Pathway student enrollments Source: Virginia Department of Education