



# STEM in the National Career Clusters<sup>®</sup> Framework

Achieving a vision of Career Technical Education (CTE) that is accessible and supportive to every learner without limits requires a cohesive, flexible, and responsive career preparation ecosystem that aligns systems and removes barriers between and across programs and learner levels. It also calls for fully connected systems through which each learner can skillfully navigate their own career journey and explore, decide on, and prepare for dynamic and evolving careers.

STEM (science, technology, engineering, and math) is an orientation to a career that focuses on the application of each of these discipline areas to an overarching sector. Once its own standalone Career Cluster, labor market data and employer input indicated that this orientation can be applied to any number of careers, so it was distributed into a variety of different Career Clusters in the modernized [National Career Clusters Framework](#).

This reorganization ensures that learners of all ages can see the direct application of a STEM orientation in a variety of industries, making potential career pathways more relevant and aligned with the needs of a given job market. While no longer a standalone Career Cluster, STEM remains a vital lens for a CTE learner to view their career future. STEM emphasizes critical thinking, problem-solving, and innovation—skills that are foundational across a broad range of careers rather than being confined to a standalone category.

## Overview

Every learner can and should have the opportunity to explore, access, and enter a STEM occupation. Regardless of the sector or a learner's geography, STEM opportunities are available across a wide range of industry areas and in every Career Cluster. Many states, through cross-agency and cross-sectoral collaboratives, have made STEM a vital and valuable part of their workforce development strategy, often focusing on addressing a lack of gender and racial diversity in the STEM workforce and pipeline.

At the national level, federal initiatives such as the [STEMM Opportunity Alliance](#) have created national strategies for expanding STEM opportunity across silos for all learners, regardless of geographic, racial, socioeconomic, and other backgrounds. To support these initiatives, the modernized National Career Clusters Framework intentionally de-siloed STEM, expanding spaces for STEM-oriented careers in every Career Cluster. This expansion enables CTE to serve as a cornerstone in the strategy for increasing opportunity and access in STEM.

Including workers of all educational levels across all sectors, the STEM workforce represents almost a quarter of the total U.S. workforce.<sup>1</sup> The United States' STEM workforce is one of the fastest growing occupational areas, with STEM-oriented occupations expanding at almost 3 times the rate of non-STEM occupations.<sup>2</sup>

More than half of members of the STEM workforce do not have a bachelor's degree, earn 60% more annually and are employed at higher rates than non-STEM workers without a bachelor's degree.<sup>3</sup>



STEM careers require a focus on a wide range of interdisciplinary skills, and many CTE programs focus heavily on the applied and technical learning that is required for a STEM career. Focuses on design-thinking and problem-based learning, use and continuous learning of new technologies to support innovation, and data-driven decisionmaking are a few of the specific overlaps between many high-quality CTE programs and what is needed for success in a STEM career.

### Examples of STEM Fields in each Career Cluster

Career Cluster	Examples of STEM-Oriented Fields
Advanced Manufacturing	CNC/Precision Machining Mechanical Engineering Robotics Semiconductor Manufacturing Textile Production
Agriculture	Agricultural Engineering Agricultural Repair Botany Food Science Marine Biology Veterinary Science
Arts, Entertainment, & Design	Digital Animation Graphic Design Lighting Design Sound Engineering Stage/Set Design and Construction
Construction	Architecture Civil Engineering Drafting Surveying Welding

## Examples of STEM Fields in each Career Cluster

Career Cluster	Examples of STEM-Oriented Fields
Digital Technology	Applied Data Science Cloud Computing Cybersecurity Drone Technology Network Development Programming
Education	CTE Education STEM Education Student Health Counseling
Energy & Natural Resources	Climate Resilience GIS Mapping Natural Resource Conservation Solar Engineering Wastewater Systems Engineering
Financial Services	Actuarial Science Financial Analysis Financial Planning Investment Banking Insurance
Healthcare & Human Services	Biomedical Science Biotechnology Research Health Informatics Nursing Sports Medicine

## Examples of STEM Fields in each Career Cluster

Career Cluster	Examples of STEM-Oriented Fields
Hospitality, Events, & Tourism	Brewing Ecotourism Hotel Technology Nutrition
Management & Entrepreneurship	Auditing and Regulation Budget Analysis Business Management Business Technology
Marketing & Sales	Growth Forecasting Market Analysis & Research Media Analytics Sales Analysis
Public Services & Safety	Economics Fire Science Military Science
Supply Chain & Transportation	Automotive Maintenance Aviation Technology Marine Transport Logistics Engineering Supply Chain Management

## Interdisciplinary Nature

Most CTE programs of study that prepare learners to enter STEM careers have skill transferability in terms of the key skills they impart between and across sectors. As a skill learned in many Career Clusters, data analysis, for example, can be applied to and contextualized within a wide variety of industry areas and fields, including financial services, management, health care, and manufacturing.

Design thinking, an iterative process that requires learners to think about who is using a product and its economic viability, requires creativity and problem-solving; fields that use design thinking include agriculture, manufacturing, energy and natural resources, and supply chain and transportation. The ubiquity of digital technology skills and careers was a primary driver of the creation of a Cross-Cutting Digital Technology Career Cluster, recognizing the increasing application of new and emerging technologies across all sectors.

Many of these interdisciplinary skills are recognized in the Career Ready Practices, which undergird CTE programs and advocate for the skills needed to be prepared for any career future. Specific Career Ready Practices that align directly with the interdisciplinary skills needed for STEM careers include the following:

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Think critically to make sense of problems and persevere in solving them (e.g., analytical thinking, research skills, logical reasoning, and continuous improvement).

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Use digital skills and technologies to enhance productivity and make data-informed decisions (e.g., data analysis, adaptability to new technologies, technology integration).

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Demonstrate a creative and innovative mindset (e.g., brainstorming, design thinking, and creative problem-solving).

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Act as a good steward of organizational and personal finances and resources (e.g., risk assessment, cost-benefit analysis, and resource conservation).

## Organizations to Know

The following organizations provide additional information about STEM fields and how to integrate them into educational programming:

[National Science Foundation—Broadening Participation in STEM](#)

[STEMM Opportunity Alliance](#)

[STEMconnector](#)

[U.S. Department of Education—You Belong in STEM](#)

[K-8 STEM Career Competencies: Developing Foundational Skills for the Future of Work \(Education Development Center, 2021\)](#)

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<sup>1</sup> National Science Foundation National Science Board. (n.d.). The STEM labor force of today: Scientists, engineers, and skilled technical workers. National Center for Science and Engineering Statistics.  
<https://nces.nsf.gov/pubs/nsb20212/executive-summary>

<sup>2</sup> Office of Occupational Statistics and Employment Projections. (2024, August 29). Employment projections: Employment in STEM occupations. U.S. Bureau of Labor Statistics.  
<https://www.bls.gov/emp/tables/stem-employment.htm>

<sup>3</sup> National Science Foundation National Science Board. (n.d.). The STEM labor force of today: Scientists, engineers, and skilled technical workers. National Center for Science and Engineering Statistics.  
<https://nces.nsf.gov/pubs/nsb20212/executive-summary>