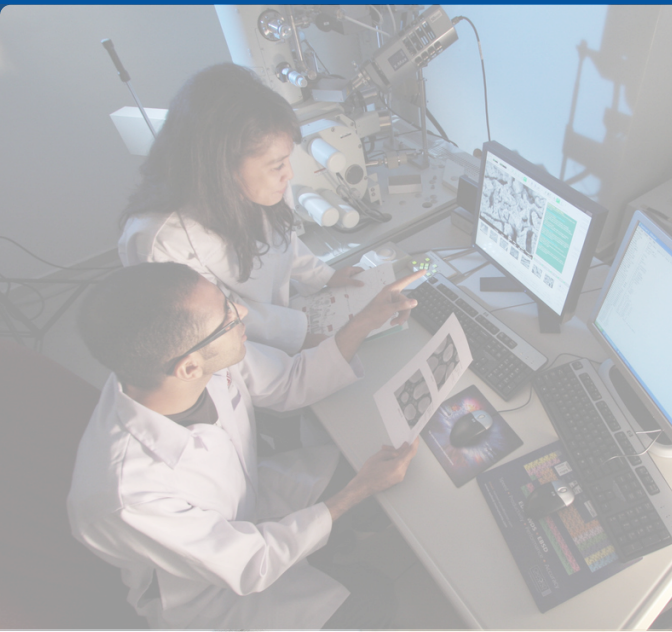


# *STEM Internships & Work-Based Learning Opportunities in Massachusetts: A Landscape Analysis*



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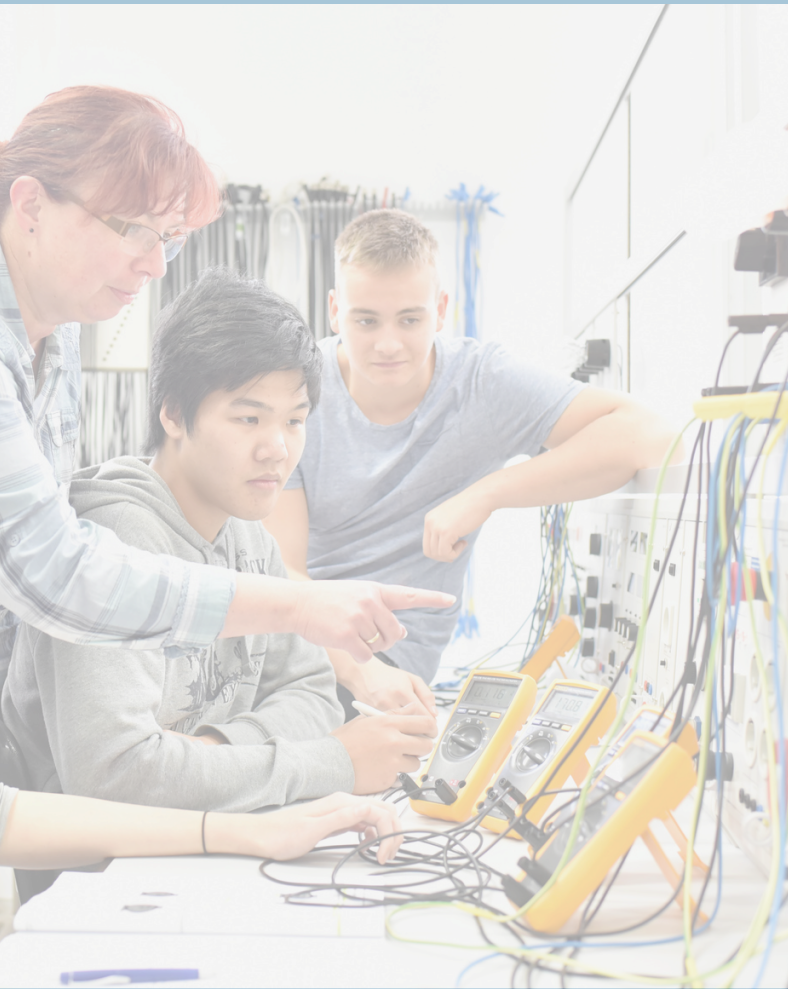
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# Introduction



The demand for skilled professionals in science, technology, engineering, and mathematics (STEM) fields continues to grow, underscoring the importance of robust STEM education pathways for high school students. In Massachusetts, a range of programs aim to bridge the gap between classroom learning and real-world application through internships and work-based learning experiences. Several statewide initiatives offer these opportunities, including, but not limited to, Connecting Activities, Innovation Career Pathways, Early College, Career Technical Education programs, and programs offered through Regional STEM Networks.

While these programs offer valuable opportunities for students to engage in STEM-focused internships and work-based learning experiences, they do not reach all students across the Commonwealth. The quality and accessibility of programs vary significantly across different regions, creating an uneven landscape of opportunities for students interested in STEM careers. For instance, students in urban areas or regions with strong STEM industry presence may have greater access to internships and work-based learning opportunities through well-connected STEM networks and more readily available public transit. These students benefit from close proximity to technology companies, research institutions, and higher education partners. Conversely, students in rural or economically disadvantaged areas often face significant barriers to accessing these same opportunities. Limited transportation, fewer local STEM employers, and underfunded schools can restrict students' participation in valuable STEM internships and work-based learning experiences.

Furthermore, there is currently no statewide vision or strategic plan for integrating these STEM opportunities comprehensively across the Commonwealth. This lack of a unified approach means that efforts to provide STEM experiences for students can be fragmented and inconsistent. While individual programs and regional networks strive to make a difference, the absence of coordinated support and guidance at the state level hampers their ability to scale and reach all students equitably.

# Introduction

This guide will delve into the current landscape of state-funded STEM-focused internships and work-based learning opportunities available to high school students in Massachusetts. By examining these programs in detail, we aim to highlight the specific learning opportunities they provide, the types of industry partnerships they promote, and the skills and experiences students gain through participation. Additionally, this guide will explore the offerings of Regional STEM Networks across Massachusetts, assessing how these networks support students in a variety of cities and town and the disparities that may exist in terms of access and quality.

We will provide a comprehensive overview of the strengths and limitations of each STEM-focused initiative, identifying best practices and successful models that can be replicated and scaled. This guide will showcase examples of effective collaborations between schools, employers, and higher education institutions, and how these partnerships can benefit students.

Furthermore, this guide will point out critical areas for growth, emphasizing the need for a more coordinated and inclusive approach to STEM work-based learning experiences across the Commonwealth. We will offer policy recommendations aimed at bridging the gaps in access and quality, such as ensuring students have access to paid internship opportunities, enhancing transportation options for rural students, standardizing quality, and fostering statewide collaboration among stakeholders. **By addressing these challenges, Massachusetts can ensure that all students, regardless of their background or location, have equitable access to high-quality STEM internships and work-based learning experiences.** Our goal is to provide policymakers, educators, and industry leaders with a full understanding of the state-funded STEM internship and work-based learning landscape as well as recommendations for system improvement. In this way, we hope to spark collaborative action in creating a more inclusive, effective, and systemic approach for helping students channel their STEM interest into pathways toward future careers.

## Defining Work-Based Learning

The Massachusetts Department of Elementary and Secondary Education (DESE) defines work-based learning (WBL) as “the immersive work experiences that prepare students for choices about postsecondary education and careers, and WBL is the culminating experiences of the Massachusetts Career Development Model.” DESE describes a student’s progression through the spectrum of career development experiences in the following chart:

Self-Discovery	Career Awareness	Career Exploration	Career Immersion
Middle School grades 6–7	Middle School Grades 7–8	Middle/High Grades 8–10	High School Grades 10–12
Students discover who they are to align career interests	Students learn about the world of work, including its broad range of industries and occupations	Students learn through activities and work experiences that help them explore career options	Students engage in immersive work experiences that prepare them for choices about postsecondary education and careers
<ul style="list-style-type: none"> <li>• Personal Interests</li> <li>• Skills</li> <li>• Talents</li> <li>• Passions</li> <li>• Self-awareness Activities</li> </ul>	<ul style="list-style-type: none"> <li>• Career Speakers</li> <li>• Career Days</li> <li>• Career Fairs</li> <li>• Career Interest Inventories</li> <li>• Career Search Reports</li> </ul>	<ul style="list-style-type: none"> <li>• Job Shadowing</li> <li>• Informational Interviews</li> <li>• Job Skills Portfolio</li> <li>• Community Service</li> <li>• Service Learning</li> <li>• Leadership in Career Clubs</li> <li>• Contextual Learning</li> <li>• Coursework</li> <li>• Labor Market Information</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Work-based learning Capstone Projects</b></li> <li>• <b>Internships</b></li> <li>• <b>Pre-Apprenticeship</b></li> <li>• Entrepreneurial Enterprise</li> <li>• <b>Work-based learning Simulations</b></li> <li>• <b>Credit-bearing WBL</b>, such as <b>Clinical Experiences</b></li> <li>• Part-Time Employment</li> <li>• <b>CTE Cooperative Education (Coop)</b></li> </ul>

For this report, the Rennie Center is concentrating solely on defining, assessing the availability, and analyzing state-funded '**career immersion**' activities across the Commonwealth.

## Connecting Activities

The **Connecting Activities** (CA) initiative is currently the largest state-funded internship program in Massachusetts. It is funded by a line item in the Massachusetts state budget that has steadily increased from just over \$2 million more than a decade ago to approximately \$7-8 million annually. Managed by the Department of Elementary and Secondary Education, the CA program establishes public-private partnerships through sixteen local workforce investment boards (**MassHire State Workforce Boards**) that connect schools and businesses, providing students with structured work-based learning and career development experiences.



These partnerships help students gain academic and employability skills, aligning with the initiative's goal of enhancing college and career readiness. The program includes matching grants to support students, prioritizes high-quality pathways, and offers both paid and unpaid internship opportunities. When internships are paid, it is the employer's responsibility to pay students' wages.

The initiative aims to increase student participation in work-based learning experiences, such as internships and pre-apprenticeships, aligned with student interests and MyCAP documentation (see below). It seeks to expand employer partnerships with schools to offer career development opportunities, particularly in high-wage, high-demand fields, including many STEM-focused sectors. Connecting Activities also seeks to enhance equity and access for underserved student populations, including those from low-income backgrounds and areas with high youth unemployment. The program promotes broader MyCAP implementation and hosts annual regional convenings to update schools on workforce data, best practices, and resources.

Allowable uses of funds include staffing, supplies for educational activities, student transportation, and regional meeting costs. These grant funds are specifically available to the 16 MassHire Workforce Boards, and while they cannot be used to pay students directly, they are intended to build capacity for expanding internships in each MassHire Workforce Board region.

## MyCAP Overview

My Career and Academic Plan (**MyCAP**) is a student-centered, multi-year planning tool that helps students plan for academic, personal/social, and career success with guidance from a caring adult in their school and input from parents/guardians. By identifying interests, goals, barriers, and supports, MyCAP maps out the necessary academic plans and skill development for postsecondary success, starting as early as sixth grade. While MyCAP is required for schools seeking state designation for their early college and innovation career pathway programs, this tool also supports district goals like MassCore completion, increased AP course participation, improved student engagement, and higher graduation and postsecondary enrollment rates.

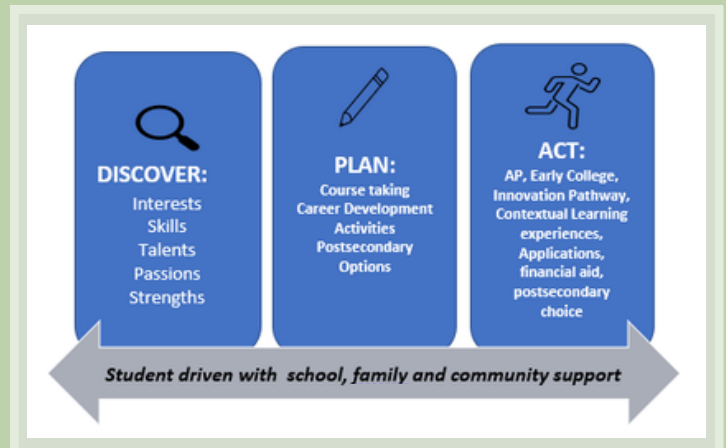


Image Source: [Department of Elementary and Secondary Education](#)

### Strengths

The Connecting Activities program presents several promising opportunities for enhancing career readiness among students across Massachusetts:

- **CA reaches a diverse student population** across various geographical regions and types of high schools, providing valuable experiences through events such as health career days, manufacturing career days, and construction job expos, which schools and students highly appreciate.
- **The MassHire workforce boards are well-positioned to connect students and employers** since they often are the hub of the strongest employer relationships in the region.
- **There is the potential to further integrate work-based learning into MyCAP.** By embedding work-based learning more strategically into MyCAP, rather than treating it as a separate initiative, the program can create a more seamless experience for students and schools. This integration would benefit students by providing a structured career development sequence from middle school through high school, culminating in capstone projects or internships.

### Challenges

The Connecting Activities program faces several challenges that impact its effectiveness:

- **Transportation issues** and associated costs often hinder students' ability to participate in work-based learning opportunities, especially in rural or underserved areas.
- **Scheduling difficulties** arise from the variety of high school timetables, which differ based on district schedules, block systems, and credit requirements, complicating the coordination of internships and other programs.
- **Building and maintaining relationships with industry partners** can be challenging due to the diversity in industry types and locations, as well as frequent turnover among key contacts.
- **The quality and expectations of internships vary widely** throughout the program, and while there are many STEM-focused opportunities, reliable data distinguishing between STEM and non-STEM internships is lacking, complicating efforts to track and improve these experiences.



### Interview Takeaways

Staff connected to the program have noted that while Connecting Activities holds significant potential, it is marked by considerable uncertainty. Each of the sixteen workforce boards in Massachusetts operates with a different approach, leading to **substantial variation in program implementation** across districts.



There is a **lack of clarity regarding how data is collected and utilized**, and it has been several years since an annual report was released to provide insights into the program's effectiveness.

Although standardized templates for planning work-based learning experiences are available, there is **no clear system for holding workforce boards accountable** for measuring success, which further complicates efforts to evaluate and enhance the program's impact.

## Regional STEM Networks

The state's Regional STEM Networks, established in 2004, link educators, community leaders, and industry partners to engage students in STEM. Managed by the Department of Higher Education and the Governor's STEM Advisory Council, they facilitate local STEM activities and share information on funding opportunities, regional events, internships, and work-based learning experiences for students.



Each network across Massachusetts is hosted by an institution of higher education and/or a MassHire State Workforce Board, and each is led by a dedicated director. Networks measure success through various metrics like the number of youth reached, STEM opportunities supported, and survey feedback from participants. However, data collection and reporting are not consistent across all networks.

The following information outlines what is provided by each Regional STEM Network, detailing what is publicly available on their program offerings, internships, work-based learning opportunities, STEM learning resources, and training opportunities for STEM educators.

### Berkshire STEM Network

*Hosted by the Massachusetts College of Liberal Arts (MCLA)*



The Berkshire STEM Network aims to enhance student success in STEM subjects, preparing them for higher education and careers in fields such as healthcare, technology, and engineering. It provides access to a free STEM Library at MCLA's Feigenbaum Center for Science and Innovation, offering a range of educational materials. Additionally, the network collaborates with local businesses, educational institutions, and cultural organizations to strengthen the STEM community in Berkshire County.



### Pioneer Valley STEM Network

*Hosted by Westfield State University*

The Pioneer Valley Science, Technology, Engineering, and Mathematics Network (PVSTEM NET) serves Hampden, Hampshire, and Franklin counties. Community members in Pioneer Valley can utilize PVSTEM NET to engage with regional STEM news, at-home STEM learning opportunities, and both offer and apply to regional STEM internship and job opportunities.

### Central MA STEM Network Ecosystem

Hosted by Worcester Polytechnic Institute (WPI)



The Central MA STEM Network ([CMSN](#)) Ecosystem leverages community strengths to enhance STEM education, providing educators with resources to develop STEM competencies in all learners through partnerships with PK-12 districts, higher education, businesses, non-profits, and other organizations. Together, they work collaboratively to support educators and build a robust STEM workforce.



### MSEN MetroWest STEM Education Network

### MetroWest STEM Network

Hosted by Framingham State University

Established in 2007, the MetroWest STEM Education Network ([MSEN](#)) encompasses K-12 schools, higher education institutions, industry partners, advocacy groups, and non-profits from over 40 cities and towns in the MetroWest region. Based at Framingham State University and hosted at the McAuliffe Center for Integrated Science Learning, MSEN restructured its governance in 2018 to include an advisory committee and a group of "Community Partners" dedicated to supporting and enhancing the network's STEM initiatives, such as the [Perspectives of Earth](#) paid internship program.

### Northeast STEM Network

Co-Hosted by Merrimack College and Salem State University



The Northeast STEM Network cultivates interest and engagement in STEM education and careers. The network offers community members STEM resources such as the [Merrimack College STEM LibGuide](#), student-developed [research](#), and [virtual job shadowing](#) opportunities.



### METRO NORTH REGIONAL STEM Network

### Metro North STEM Network

Hosted by the Metro North MassHire Workforce Board

The Metro North Regional STEM Network aims to support the daily efforts of STEM educators. The network offers information; a [STEM resource and curricula portal](#) for students, educators, and regional STEM professionals; and a robust portal of high school [STEM internships and work-based learning opportunities](#) with updated, regional experiences for local students.



### Boston STEM Network

Hosted by the Boston Private Industry Council (PIC)

The Boston STEM Network acts as a central hub to connect K-12 educators, higher education institutions, community leaders, and industry partners. Its goal is to inspire and engage students with opportunities in STEM fields through STEM-focused learning and STEM career readiness experiences. The Network is a partnership with Boston Public Schools, United Way of Massachusetts Bay and Merrimack Valley, Boston After School and Beyond, and the Boston Private Industry Council.



### Southeast STEM Network

Hosted by the CONNECT Partnership & Bridgewater State University

The Southeast Massachusetts STEM Network acts as a regional hub to connect educators, community leaders, and industry partners to inspire and energize students about STEM opportunities. The network offers programs for STEM-focused learning, professional development for educators, regional job fairs and conferences, and "STEM Star" career exploration opportunities.

### Cape Cod Regional STEM Network

Hosted by Cape Cod Community College



The Cape Cod Regional STEM Network serves as the central hub for the region's STEM learning ecosystem, uniting educators, school districts, businesses, and community members to foster interest and achievement in STEM fields on Cape Cod, the Islands, and across Plymouth County. Many of its programs focus on the Blue Economy, leveraging the region's natural resources and historical legacy while integrating STEM and innovations to empower coastal communities. The network's school resources, project examples, professional development opportunities, internship portal, and event opportunities are extensive, up to date, and accessible.





### Strengths

The STEM Regional Networks in Massachusetts exhibit several key strengths, particularly in helping students prepare for their future academic, professional, and personal endeavors.

- **Development of Transferable Skills:** These networks provide students with opportunities to work on real projects alongside professionals, not just engaging in busy work. This hands-on experience in a stimulating work environment helps students understand and apply theoretical knowledge in practical settings, significantly improving their problem-solving skills. Students often enter these programs shy and quiet but leave as confident individuals capable of promoting their compelling ideas. This transformation is profound, with some employers expressing immediate interest in hiring students due to their evident growth and capabilities.
- **Exposure to Various Careers:** While the primary focus is on STEM, these networks also expose students to non-STEM careers, broadening their horizons. This is particularly beneficial for issues like climate change, where understanding its importance and knowing how to address it requires interdisciplinary knowledge and skills.
- **Real-World Applications:** The students work on real projects, often in partnership with other organizations like MassEnergize and GeoFilmingNetworks, addressing specific technical roles and needs in STEM sectors. This not only makes their work meaningful but also demonstrates the real-world impact of their contributions.
- **Family Engagement:** Networks promote family engagement in students' experiences and use outreach tools like family surveys to identify ways that students are learning and growing through their participation in work-based learning. In particular, surveys measure and emphasize students' communication skills developed through internships and work-based learning experiences.
- **Innovative Approaches:** Instead of taking students to companies, these networks often bring professionals to the students, breaking down barriers and providing a more accessible learning environment. Using on-campus labs and inviting different companies each week allows students to interact with various professionals and industries, reducing liability concerns and enhancing the learning experience.

The STEM Regional Networks in Massachusetts excel in equipping students with critical skills, exposing them to a range of career opportunities, and fostering strong partnerships between education and industry.



### Interview Quotes

Interviews with Regional STEM Network Managers raised the following takeaways regarding strengths:

“  
*Fundamentally, a major strength is helping students develop skills transferable to the next internship, academic opportunity, or profession. We break down the barriers that exist between companies and schools in our region.*  
”



“  
*Our relationships with schools and teachers are strong. Our regional meetings bring together a variety of folks: after school programs, collaboratives, and other support groups that all impact students in STEM.*  
”

### Challenges

Regional STEM Networks face several challenges in their efforts to provide high-quality, accessible work-based learning experiences for students, such as:

- **Institutional Coordination and Collaboration:** There can be a lack of effective communication and collaboration between different institutions and organizations. For instance, while some networks have strong employer connections, others may struggle with isolation or lack of engagement from neighboring employer partners.
- **Flexibility in Pathways:** Ensuring flexibility in work-based learning pathways is a challenge, as the networks must try to adapt to students' evolving interests and career goals alongside rigid academic pathway programs of study. Without this adaptability, students risk being locked into specific tracks too early, limiting their ability to explore diverse fields or pivot as needed.
- **Transportation Barriers:** A lack of reliable transportation is a significant challenge for student participation in STEM programs run by the networks, particularly in regions without strong public transit systems. This barrier restricts access to long-term programs and internships, which often depend on carpooling or informal arrangements.
- **Access to Meaningful Work Experiences:** High school students often face challenges in securing internships due to age limitations and the lack of staff at companies to supervise them. Employers may not have the resources to accommodate high school interns, making it difficult for the networks to provide practical work experiences.
- **Funding Uncertainty:** The networks rely on the Massachusetts state budget through the [STEM Pipeline Fund](#), a line item that can fluctuate annually. This variability complicates long-term planning and sustainability, limiting the ability to maintain and expand programs, which in turn impacts their quality and reach.



### Interview Quotes

Interviews with Regional STEM Network Managers raised the following takeaways regarding challenges:

*There are many groups, programs, and organizations that provide students with STEM-based work opportunities, but the collaboration among and between them is lacking. Most especially across public and private organizations.*

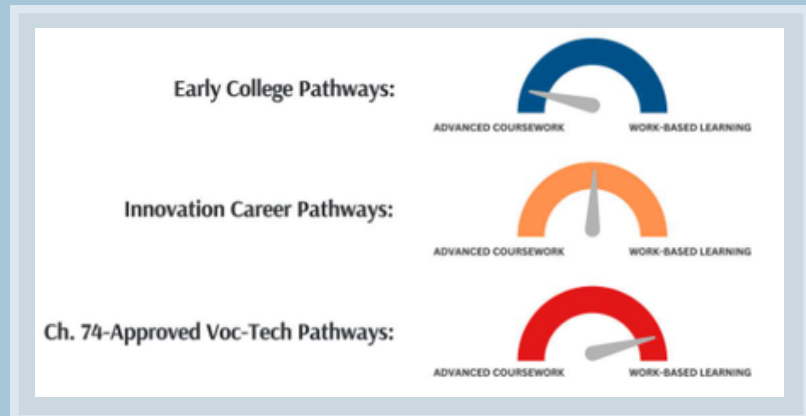


*Some of the other STEM organizations and local collaboratives are doing wonderful things, but they never talk to us. They have the real connections to employers, but there's no direct connection to us and students.*

## State-Designated STEM Pathways

Though far from universal, numerous opportunities exist for schools to offer STEM college and career pathways to interested students. These pathways have varied in size, location, accessibility, and sector over the years. Since 2016, Massachusetts state education agencies have taken intentional steps to expand the process of creating state-designated pathway programs, which schools and districts can use to benefit students, communities, and local economies. Alongside the Chapter 74-approved **Career Technical Education** programs that have long existed across the state, **Early College** and **Innovation Career Pathway** programs have begun to proliferate in Massachusetts communities, offering new ways for students to get involved in STEM-focused college and career pathways.

Each state-designated pathway offers students a varying degree of access to college-level credit attainment and STEM work-based learning and internship opportunities. Just as they differ in their partnerships, requirements, and structure, each pathway also equips students with a unique skillset and range of future options following program completion. The image to the right compares the three pathways across two dimensions: the emphasis on advanced coursework versus work-based learning.



## Pathways Guiding Principles

To achieve state designation, applicants must undergo a rigorous process to ensure their pathway aligns with five guiding principles: equitable access, guided academic pathways, enhanced student support, connection to career, and effective partnerships. **The principles most crucial for STEM-focused work-based learning experiences are the pathway's connection to career, equitable access, and its partnerships with regional employers.**



- **Career Technical Education** (Chapter 74-approved) programs provide the most comprehensive occupation-level exposure, providing students with the opportunity to train for specific jobs, with extensive hands-on experience through cooperative (co-op) education, career exploratory courses, and work-based learning experiences.
- **Innovation Career Pathways** offer sector-specific academic and work-based learning opportunities where students engage in a focused sequence of courses and must complete a 100-hour internship or capstone project within their chosen sector. All currently accepted sectors are STEM-focused.
- **Early College** programs primarily focus on credit-bearing college courses in subjects such as math and English. While beneficial for future STEM careers, they do not directly require sector-specific coursework or work-based learning experiences.



### Strengths

State-designated pathways use several key strategies to maximize the benefits of STEM work-based learning experiences for students, including:

- **Industry Partnerships:** Many programs emphasize building connections with local and regional employers, ensuring that students gain relevant, up-to-date experience in their chosen STEM fields. These partnerships facilitate internships, capstone projects, and other work-based learning opportunities.
- **Equitable Access:** All pathways prioritize equitable access, particularly for underrepresented and underserved student populations. By eliminating barriers to participation, these programs ensure a diverse range of students can benefit from STEM opportunities.
- **Hands-On Learning Opportunities:** The programs incorporate hands-on learning through internships, capstone projects, and technical courses, allowing students to apply STEM concepts in real-world settings. This practical experience is crucial for understanding and retaining STEM knowledge.
- **Academic and Career Preparation:** The pathways prepare students both academically and professionally, ensuring they are ready for post-secondary education and STEM careers. Guided academic pathways and enhanced student support services help students navigate their education and career choices effectively.



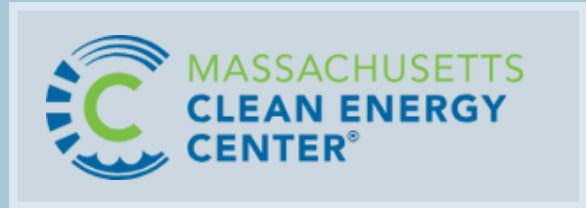
### Challenges

While each of the pathway programs offers great potential to expand STEM work-based learning and internship opportunities, significant barriers can hinder both access and quality, such as:

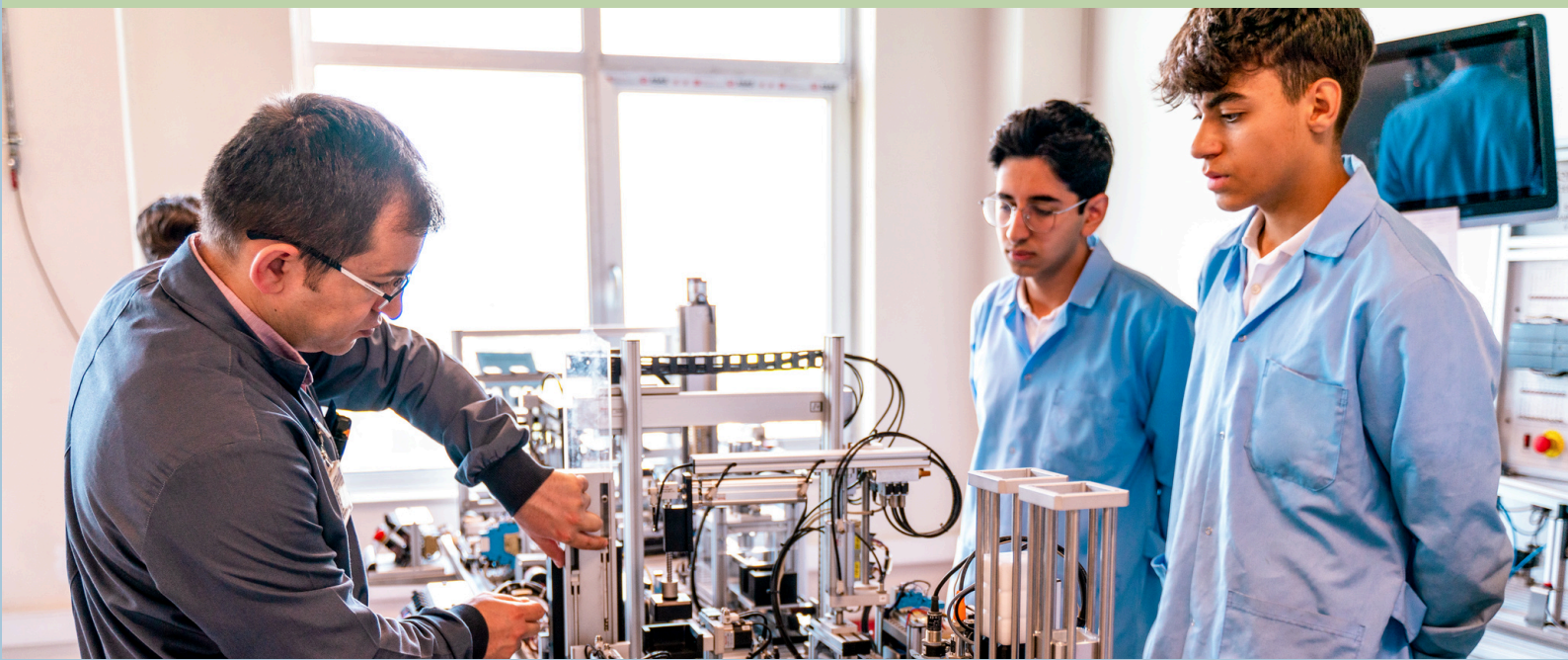
- **Transportation Issues and Costs:** Many students face difficulties accessing work-based learning sites due to transportation barriers, which can limit their ability to participate in STEM opportunities.
- **Scheduling Conflicts:** Varying high school schedules, including different district requirements and block scheduling, make it challenging to integrate work-based learning experiences consistently across school districts.
- **Availability of Industry Partners:** The number and type of industry partners vary by region and sector, making it difficult to build and maintain consistent relationships that provide quality STEM internships and work-based learning opportunities.
- **Dependence on Individual Relationships:** Partnerships with industry often rely heavily on specific individuals, and changes in personnel can disrupt communication and the continuity of student opportunities.
- **Inconsistent Internship Quality:** The quality, type, and expected results of internships vary widely, and there is unreliable data on the quality of the internships, leading to inconsistent learning experiences for students.

## Quasi-Public Organizations

The Massachusetts Clean Energy Center (MassCEC), chaired by the Massachusetts Executive Office of Energy and Environmental Affairs (EEA), offers valuable internship opportunities for students through two key programs: the Technical Trades Work and Learning Program and the Clean Energy Internship Program. As a quasi-public agency, MassCEC manages the state's Renewable Energy Trust Fund to foster the growth of the clean energy sector. Through its two internship programs, students get hands-on experience and training in renewable energy and clean technology, preparing them for careers in the rapidly expanding clean energy industry. By participating, students gain practical skills and industry knowledge, contributing to the development of a skilled workforce for Massachusetts' clean energy future.



The Massachusetts Life Sciences Center (MLSC) offers valuable internship opportunities to high school students through its High School Apprenticeship Challenge. Co-chaired by representatives from the Executive Offices of Economic Development and Administration and Finance, this program facilitates and funds paid internships for underrepresented and low-income high school students across Massachusetts, creating over 100 new internship opportunities annually. By subsidizing intern wages for small life sciences companies and research institutions, the program enables these organizations to hire paid interns, fostering industry connections and skill development. Additionally, the program offers pre-internship lab training for some school districts, focusing on biotechnology/biomedical fields and the development of professional skills.



The following sections highlight examples of programs that exemplify effective practices in STEM education and work-based learning.

## Accessible & Reliable Communication

The **Cape Cod Regional STEM Network** provides exemplary resources and connections that bolster STEM opportunities in the region. The following sections of its website are particularly useful for students, employers, and educators:

- **Jobs and Internships Board:** This webpage provides details on accessible internship and job opportunities posted by employers, helping students find trustworthy and updated work opportunities.
- **Projects and Materials:** The website provides tangible, reliable, and updated examples of inquiry-based STEM education. Each example is posted by an educator in a local school and includes a unit guide for teachers. This section demonstrates how STEM networks can share best practices and resources across schools to maximize STEM learning.

The screenshot displays two sections of the Cape Cod Regional STEM Network website. The top section, titled "JOBS & INTERNSHIPS", features a search bar with a "Go!" button and a "Add Job Or Internship" button. Below the search bar, there is a listing for "Aquaculture Internships" with details such as "Posted 02/14/2024" and "Application Deadline: 02/24/2024". The bottom section, titled "PROJECTS & MATERIALS", includes a filter and reset button and three images of STEM projects: "STEM UNIT: Building pH Sensors", "STEM UNIT: Redox Applications in", and "STEM UNIT: Engineering Sea".

A recent [report](#) by American Student Assistance (ASA) discusses the importance of establishing a statewide communication platform with information about work-based learning opportunities. States such as Nevada, North Carolina, and Rhode Island have implemented statewide websites that match students with work-based opportunities.

## Mentorship during Paid Experiences

[Research](#) shows the immense benefits of youth mentoring, including increased academic performance, better attendance, lower drop out rates, and higher classroom engagement. **MetroWest STEM Education Network** offers a project-based team mentorship and internship program called [Perspectives of Earth - Team Mentorship \(PETM\)](#). Through this paid internship, high school students work on real-world environmental projects, collaborate with peers and are mentored by STEM professionals.

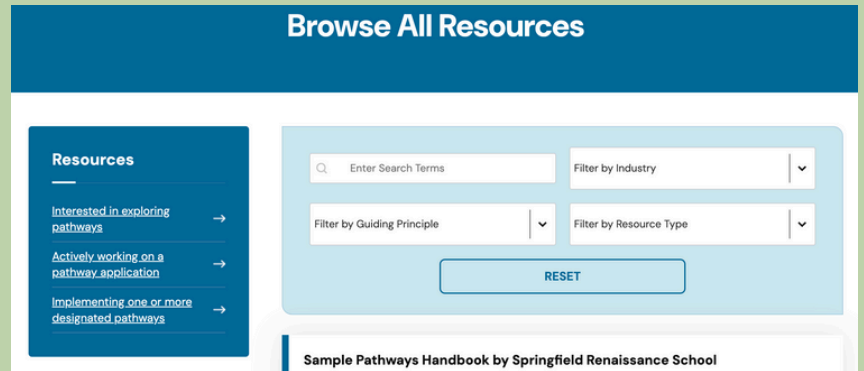
The screenshot shows the MetroWest STEM Education Network website. The logo "MSEN" is prominently displayed, along with the text "MetroWest STEM Education Network". Navigation links include "About Us", "Initiatives", "Partnerships", "Resources", and "Communication". The main heading is "PERSPECTIVES OF EARTH - TEAM MENTORSHIP". Below this, the text reads: "Receive Training for a Summer Paid Internship and Participate in Community Service! Perspectives of Earth - Team Mentorship (PETM) is a project-based, team mentorship program where students work on real-world multifaceted environmental projects by integrating STEM and communication strategies."

## Adaptable, Ready-to-Use Resources

The Massachusetts **Innovation Career Pathways** website offers a comprehensive and relevant [resource database](#) to support educators and students pursuing Innovation Career Pathway programs, all of which are currently STEM-focused.

Resources include:

- Sample STEM pathway handbooks prepared by schools with existing programs
- Information on applying for a pathway designation
- Guidance on implementing a designated pathway
- Sample internship contract forms



## Program Standards and Success Metrics

**Career Technical Education (CTE) Frameworks** are used to design instruction and credentials for approved Chapter 74 vocational technical programs. The frameworks are developed using labor market analyses and input from employers and educators. The [frameworks](#) include updated labor market trends, pathways to credentials, instructional resources, and competency-based standards.



These Chapter 74-specific frameworks help CTE educators align learning to industry credentials, allow job seekers to pursue pathways to acquire credentials, and let policy makers understand labor market trends.

In an effort to standardize work-based learning programs and evaluate their effectiveness, [Pennsylvania](#) introduced the **Industry Based Learning Indicator** in 2018 to measure career readiness. This metric looks at the percentage of 12th grade students that score competent or advanced on Industry Standards-Based Competency Assessments, earn at least one industry-recognized credential, or complete a work-based learning experience. This index is a step forward in measuring, tracking, and reporting work-based competencies.



## *A Vision for the Future of STEM Work-based Learning*

Based on research, discussions with the field, and best practices, the following recommendations offer policy changes that can shape a comprehensive vision for STEM work-based learning and internships across Massachusetts. These recommendations aim to address existing challenges and enhance the quality and accessibility of STEM opportunities for all students.

### **Create a Centralized Hub of Information & Opportunities**

A centralized, online hub of STEM work-based learning opportunities would streamline access to information, making it easier for students, educators, and employers to connect with available programs and resources. This would ensure more equitable access to opportunities among and across regional networks and MassHire workforce boards, reduce duplication of efforts, and enhance the coordination of work-based learning experiences statewide.

### **Implement a Process for Issuing Work-Based Learning Credentials**

A formal credentialing system for STEM internships and work-based learning experiences would validate the quality and consistency of opportunities, providing students with recognized qualifications that enhance their experiences and employability. Establishing a credentialing system would require implementing standardized frameworks and success metrics. With clear expectations and established programming, a recognized credential system may also encourage more employers to participate.

### **Foster Regional Collaboration to Increase Access**

Improved collaboration between MassHire workforce boards and Regional STEM Networks would ensure more consistent and high-quality relationships across the state, expanding access to opportunities beyond local networks. Enhanced resource-sharing and collaboration between education and workforce sectors would allow students to benefit from a broader range of internships and work-based learning experiences, and enhance the overall effectiveness of STEM education programs.

### **Create a Unified STEM Pathways Application Process**

A unified application process would simplify the navigation of STEM-focused opportunities for both schools and students, breaking down silos and integrating programmatic options with overlapping goals. This streamlined approach would enable more schools to offer comprehensive STEM programs, reduce bureaucratic obstacles, and allow students to fully benefit from diverse and flexible STEM work-based learning and internship opportunities. Ideally, students should not be limited to their geographic region, local STEM employers, or the academic pathway options that school leadership has chosen when identifying STEM learning experiences that can help them reach their career goals.

# Conclusion

The landscape of STEM-focused internships and work-based learning opportunities for high school students in Massachusetts presents a mix of promise and challenges. While numerous programs and regional networks offer valuable experiences, their reach and impact remain uneven across the state. STEM-focused internships and work-based learning opportunities help students develop essential skills like communication, collaboration, problem-solving, and teamwork. High-quality internships and work-based learning opportunities place students in real-world work environments, equipping them with transferable and valuable skills applicable in various contexts. However, access to these opportunities varies significantly.

The absence of a statewide vision for integrating STEM opportunities exacerbates these disparities, leading to fragmented and inconsistent efforts where individual programs and regional networks operate in isolation. The absence of coordinated support and guidance at the state level hinders the ability of these programs to scale and reach all students equitably.

To address these challenges, the state should create a centralized hub of information and opportunities for STEM work-based learning and internships, implement a process for issuing work-based learning credentials to ensure consistent quality across STEM work-based learning experiences, foster strong regional collaboration to increase access to opportunities, and create a unified STEM pathway application process that would simplify the navigation of STEM programs for students, families, and schools. A streamlined process with clear and consistent deadlines, aligned funding streams, and unified state-level oversight would provide a more strategically aligned and student-centered approach to STEM education in the Commonwealth.

By implementing these recommendations, Massachusetts can create a more equitable and effective system of STEM internships and work-based learning opportunities, preparing all students for future success in STEM fields.



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