

Connecticut STEM Careers Partnership

**U.S. Department of Labor Employment and Training Administration
STEM Opportunities in the Workforce System Initiative Grant Proposal – Phase II
Connecticut Workforce Development Council**

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**Connecticut STEM Careers Partnership
STEM Opportunities in the Workforce System Initiative – Phase II
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Abstract Summary

Project Description. The *Connecticut STEM Careers Partnership* will create a statewide, virtual *STEM Center* to support systematic replication of successful models that prepare Connecticut's disadvantaged youth and dislocated workers for high-wage careers in *advanced manufacturing, engineering, computer science, and other STEM-related fields*. The STEM Center will serve as an entry point, resource and knowledge-sharing hub, meeting place, and classroom for the STEM-related activities of the One Stop System and its partners. The Center will provide information and service access to thousands of workers and hundreds of employers through a user-friendly web portal. Individuals can utilize the virtual STEM Center anywhere they can access the Internet: in their homes, at public libraries and schools, and through dedicated access points to be created at One Stop Career Center, Adult Education, and Community College computer labs.

The Partnership will leverage the virtual STEM center by implementing five activities targeting *disadvantaged youth* and *dislocated workers*: 1) Five newly hired *STEM Coaches* will implement STEM Center activities regionally and connect regional efforts to statewide activities and resources. STEM Coaches will coordinate a statewide STEM workforce audit; 2) *STEM Mentors* will provide individual academic and career support to help advance mentees along STEM career pathways using a virtual mentoring tool and face-to-face mentoring; 3) Replication of a proven, scalable employer-driven *technology-based learning (TBL) model* will reduce barriers to training such as transportation, scheduling, and cost; 4) a customized online planning tool for designing personal educational and career pathway plans will produce *Individual Educational and Career Blueprints*; 5) The Partnership will *grow the P-20 STEM talent pipeline* by strengthening connections between STEM education and workforce efforts.

Partnership. All five Connecticut WIBs, via their collaboration in the Connecticut Workforce Development Council, form the core STEM Careers Partnership. The proposed project solidifies

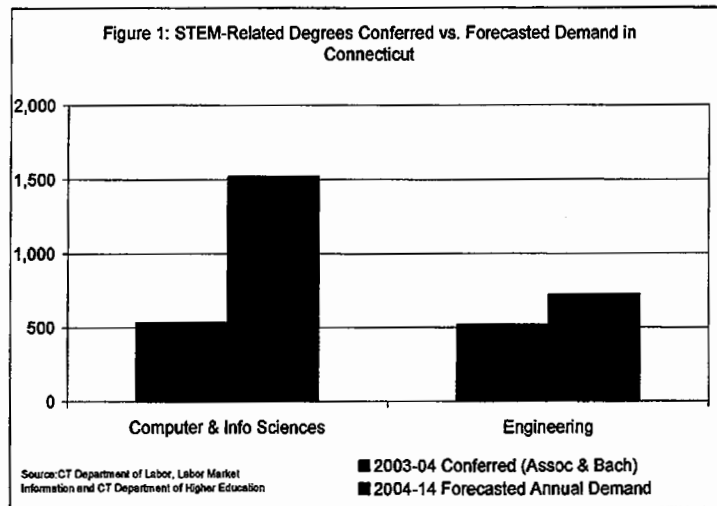
connections between current STEM education initiatives and CTWorks One Stop Career Centers statewide, increases partner synergy and returns on investment, and leverages more effectively multiple federal and state funding sources. Eighteen (18) One Stop Centers throughout Connecticut serve as in-person implementation sites. An existing collaborative body, the CT Workforce Coordinating Committee, will convene a STEM Careers Work Group and provide project oversight across core partners. The CT Distance Learning Consortium will develop and maintain a virtual STEM Center web portal and its tools. The CT Community College and Adult Education systems will review training programs, refer students, and share STEM Center web portal resources. The state Office for Workforce Competitiveness, the State Departments of Education and Higher Education, and the Technical High School System will facilitate connections to the education continuum. The CT Center for Advanced Technology, CT Business & Industry Association, CT Department of Economic and Community Development, and nine regional Chambers of Commerce will support employer outreach and ensure responsiveness to industry and economic development trends. STEM-related employers statewide will share their short- and long-term workforce skills needs to help design industry-relevant training programs.

Outcomes & Impact. The STEM Careers Partnership will result in 680 participants achieving WIB and/or Community College certificates and/or college credit through completion of STEM programs. The Partnership will improve outreach, advising and supports that increase the number of individuals enrolling in STEM programs and proceeding along defined career pathways.

Budget & Management. The Eastern Connecticut Workforce Investment Board (EWIB), the first-ever recipient of the USDOL ETA “e3” top Recognition of Excellence award, serves as applicant and fiscal agent. On behalf of the Connecticut Workforce Development Council, EWIB requests \$2 million to implement the *Connecticut STEM Careers Partnership*. The grant will conservatively leverage **\$2.06 million** in cash and in-kind contributions.

I. Statement of Need/Context

Aerospace and manufacturing represent pillars of Connecticut's economy that supplied high-quality, high-paying jobs for decades. These and other industries face labor shortages in job categories requiring science, technology, engineering and math (STEM) skills due to a diminishing supply of labor (e.g., retirement of skilled workers, fewer young workers) and a growing jobs-skills mismatch that reaches into our educational pipeline (Figure 1). The next decade, prior to large scale retirements of skilled workers, represents a pivotal time for Connecticut to grow its pipeline of talented young workers and re-tool



the skills of its mid-career workers as the economic diversification process gains traction.

Growth in lower-wage service jobs and loss of high-wage manufacturing jobs continues to reshape the state and regional economy. The 2006 median wage for jobs gained in the five fastest-growing sectors represented a 70% earning replacement (\$45,717 v. \$67,847) compared to the five Connecticut employment sectors with the largest employment losses.¹ Additionally, cost of living increases outpace wage gains, resulting in underemployment. For example, during the first half of this decade, housing costs in Connecticut rose 63.6% while wages rose only 18.5%.²

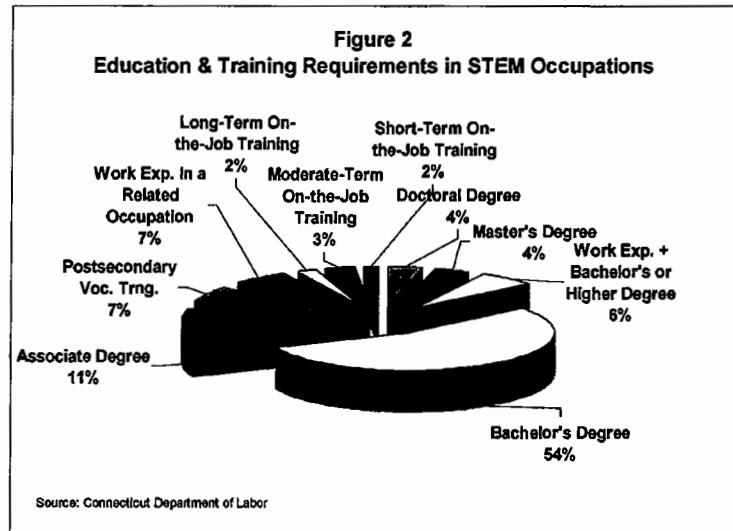
Moreover, a talented generation of Baby Boomers near the end of their careers while a smaller and less-skilled population of young and mid-career workers exists to fill replacement and newly created jobs. Connecticut employers clamor for workers with STEM skills to maintain and grow their market share. A 2005 Connecticut Business and Industry Association (CBIA) survey found

¹ Connecticut Department of Labor, CT Economic Digest, August 2007.

² HOMEConnecticut.

that 20% of Connecticut manufacturers report “extreme difficulty” filling engineering vacancies. The occupations eligible for USDOL funding will grow 69% faster than all Connecticut occupations from 2004 to 2014 (Attachment A).³ Nearly half of the State’s 60 fastest-growing occupations require a solid math/science education,⁴ and two of three jobs based on STEM skills require a Bachelor’s or higher (Figure 2).

Too many young workers lack job-specific technical STEM skills as well as basic math and science skills. More than 50% of students



seeking Connecticut Community College certificates require remedial math or English coursework. One in three incoming college freshmen takes at least one remedial course.⁵ Young immigrants⁶ and minority populations,⁷ including disadvantaged youth and dislocated workers, represent an increasingly valuable workforce asset; educational achievement gaps between white and minority students, however, limit their career potential. The proposed project will provide both basic and technical, job-specific STEM skills to these populations.

Young and mid-career workers face barriers (such as transportation and scheduling conflicts) to access the training and education they need. Other barriers limit advancement: family obligations, inability to afford training, and uncertainty about how to navigate a complex education and training

³ CT Department of Labor, Labor Market Information projections.

⁴ *Connecticut Workforce Demands and the Implications for Education*, Connecticut Department of Labor, July 2003.

⁵ Capital Workforce Partners. 2007. *The State of the Workforce in North Central Connecticut*

⁶ Connecticut gained 75,991 international immigrants, most of them Hispanic, between April 1, 2000 and July 1, 2005. Roughly 25% of Hispanic immigrants in Connecticut are 20 to 39, compared to 12% of U.S.-born non-Hispanic whites. (Immigrants in Connecticut: Labor Market Experiences and Health Care Access, The Urban Institute, November 2005)

⁷ From 2000 to 2004, Connecticut’s Hispanic and African-American populations grew by 16% and 12%, respectively. (U.S. Census Bureau)

system. The proposed program’s education, counseling, and mentoring opportunities accessible through face-to-face sessions and virtually (email, web portal), will reduce these barriers.

Connecticut claims home-field advantage to many world-class employers, (e.g. Yale Scientific Research Program, University of Connecticut Fuel Cell Center, Pfizer, and United Technologies)

Table 1

| <i>Top 5 Most Difficult Positions to Fill</i> | |
|---|---|
| 1 | Skilled Professional Technician |
| 2 | Skilled Machinists and Other Manufacturers |
| 3 | Engineering |
| 4 | Sales |
| 5 | Customer Service |
| <i>Top 4 Most In-Demand Employee Skill Sets</i> | |
| 1 | Technical, mechanical, and manufacturing related skills |
| 2 | Professional or "soft" skills such as communication, teamwork, and leadership |
| 3 | Overall employability (work ethic, punctuality) |
| 4 | Advanced computer, scientific, research and development, and engineering skills |
| Source: 2008 CBIA Survey - Availability of Skilled Workers in Connecticut | |

several of which project a significant need for engineers and other professionals with STEM skills to fuel growth. Connecticut’s advanced manufacturing, engineering, and computer science enterprises rely heavily on qualified STEM workers to drive growth. In Connecticut, 5,440 manufacturing firms employ 192,400 workers, generate \$13.13

billion in wages and salaries, and contribute \$23.55 billion (12% of the overall total) to the gross state product.⁸ On average, Connecticut manufacturers post 75 new jobs each week, and Connecticut manufacturing exports grew 65% (to \$8.6 billion from \$5.2 billion) from 1990 to 2004.⁹

Beyond the manufacturing industry, the US Department of Defense (DoD) invested \$7.8 billion in Connecticut in 2006, the 6th highest level of per capita federal investment.¹⁰ United Technologies (parent company of Sikorsky) realized revenues of \$54.8 billion in 2007 due to strong demand for aerospace and defense-related manufacturing output.¹¹ Pfizer recently centralized its Southeastern Connecticut research headquarters (1,500 employees), and has established a New Haven-based research facility to increase collaboration with Yale University researchers. Simultaneously, Yale purchased 137 acres of property and 1.5 million square feet of space (at the former Bayer site) to

⁸ CT Business and Industry Association – Jobs, the Economy and Doing Business in Connecticut: Myths vs. Facts 2008

⁹ UMASS Miser; The Connecticut Center for Advanced Technology (CCAT), 2007

¹⁰ FY 2006 Federal Procurement Report

¹¹ Yahoo! Finance Company Profile

expand its scientific research capacities. Return on these investments relies on STEM talent.

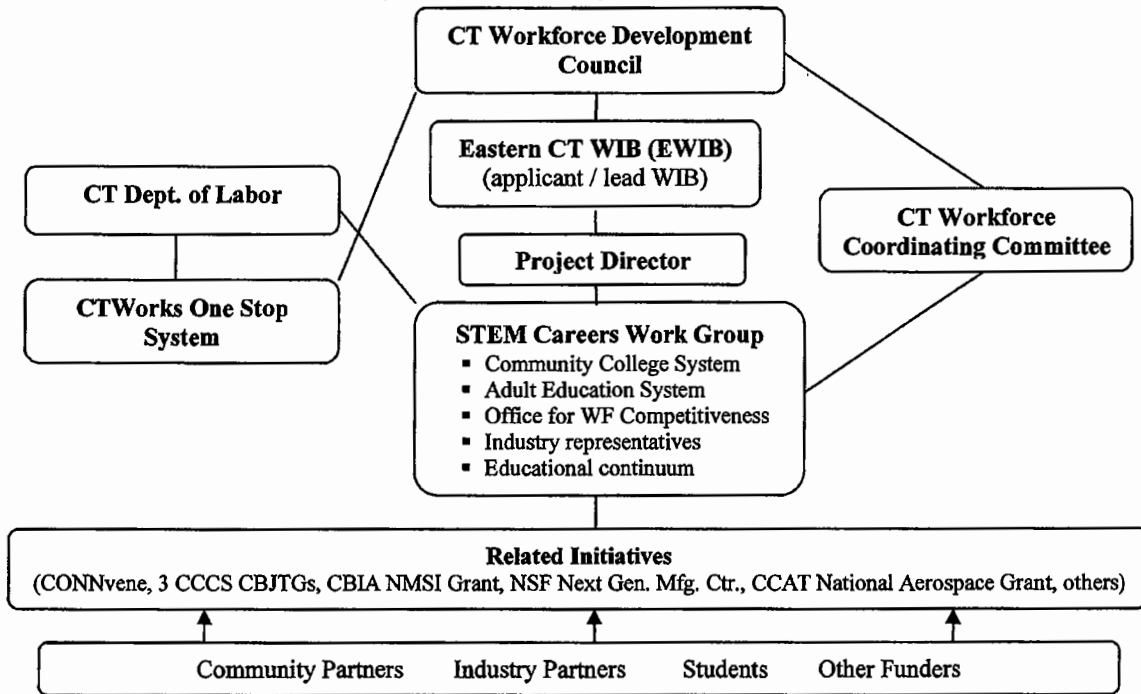
Investment in the **Connecticut STEM Careers Partnership** will produce a short- and long-term multiplier effect by providing disadvantaged youth and dislocated workers with enhanced STEM-focused coaching and training. Grant resources will support replication of successful employer-driven technology-based learning models to train STEM workers. A statewide, virtual **STEM Center** will support systematic replication of successful models and facilitate improvement in worker STEM skills to better meet employer needs and support economic diversification.¹²

2. Strategic Partnerships. A solid foundation of STEM initiatives exists across Connecticut's educational continuum, and momentum continues to grow. In 2005, Governor Jodi Rell launched CONNvene, "a statewide initiative to inspire and encourage Connecticut students' interest and achievement in STEM." A National Science Foundation grant to the Connecticut College of Technology supports the Regional Next Generation Manufacturing Center, which cultivates highly skilled workers for the new manufacturing workplace. CBIA received a National Math and Science Initiative (NMSI) grant to prepare high school students in math and science while encouraging them to explore science and technology-based careers. The Connecticut Center for Advanced Technology (CCAT) National Aerospace Leadership Grant from DoD includes an initiative to develop the advanced manufacturing workforce. Finally, the Community College System administers three USDOL Community-Based Job Training Grants (CBJTGs) focused on nursing, allied health, and advanced manufacturing. (See Attachment C for details on these and other efforts.)

The **STEM Careers Partnership** will solidify connections between these initiatives and One Stop Centers statewide, increasing partner synergy and returns on investment and leveraging federal and state funding more effectively. Figure 3 shows project connections with partners and initiatives.

¹² For example, Connecticut employs roughly 15% of fuel cell industry workers around the world. We will target this as an emerging industry, as each \$1 invested in fuel cells results in a \$4 return in terms of market potential and job creation. Source: University of Connecticut

Figure 3. Partnerships and Connections



The virtual STEM Center creates a nexus of STEM activities across partners and sectors, providing information, networking tools, and applications that will support continuous deepening and improvement of STEM education and training offerings. The Partnership will bring new and accessible training, advising, mentoring, and educational and career planning opportunities to Connecticut. Our workforce investment, educational continuum, and industry partners will conservatively leverage **\$2.06 million** in cash and in-kind contributions (See Commitment Letters).

CT Workforce Investment System. The **Connecticut Workforce Development Council**¹³ represents a collaboration of all five regional Workforce Investment Boards (WIBs). The WIBs will deliver the Partnership’s One Stop services (see Section 3) and offer Individualized STEM Training Accounts. The existing **Connecticut Workforce Coordinating Committee (CWCC)** will convene a **STEM Careers Work Group** to oversee project implementation across One Stop system core partners. The CWCC focuses on implementing strategies to address the needs of low-wage workers.

¹³ The Eastern Connecticut Workforce Investment Board (EWIB) serves as grant applicant.

The CT Department of Labor (CTDOL) partners with the WIBs to deliver a range of Wagner-Peyser and WIA core and intensive services across 18 One Stop Centers statewide. CTDOL will recruit candidates for participation in the Partnership's STEM counseling and training activities, provide Labor Market Information to guide ongoing project planning, and analyze ES202 wage data to measure the achievement of wage increase goals. As the Governor's lead agency for workforce policy, the state **Office for Workforce Competitiveness (OWC)** leads efforts to strengthen school/business connections around science and technology-based careers through the CT Career Choices program. OWC will support connections to the Governor's initiatives, including the P-20 Council under formation through a National Governor's Association initiative.

Continuum of Education. The Partnership engages the full continuum of education from Pre-K through 20. These partners hold several years of collaborative history to define a continuum of STEM resources and educational experiences in the state through the CONNvene process.

The State Department of Education (SDE), which oversees work to enhance the PreK-12 system and the Adult Education System, will facilitate Partnership connections across the education continuum. The state's 47 **Adult Education** programs affiliated with local school districts and alternative high schools, the core providers of remedial education services for disadvantaged youth and dislocated workers, will refer students to the Partnership and review and adjust their curricula to improve acquisition of the foundation skills for STEM careers. Based on skills and interest assessments completed at the One Stops or Adult Education programs, Adult Education providers will adjust student advisement processes, develop additional articulation agreements with community colleges which build on existing relationships (see Attachment B), and promote the virtual STEM Center web portal to their students through their computer labs. Adult Education providers will provide basic skills remediation and English language instruction for those not ready for degree programs as well as technical training high school completion through the National External

Diploma or GED instruction. The **CT Technical High School System** will inform its guidance counselors of our Partnership's processes and contribute to and promote the portal. **The State Department of Higher Education** will promote the Partnership across four-year colleges to promote articulation agreements with high schools and the Community Colleges.

The Connecticut Community College System (CCCS) consists of 12 Community Colleges with a total credit enrollment of 48,434, and 39,162 in non-credit programs. The CCCS will coordinate activities at individual colleges to ensure that the Partnership builds on and complements the Colleges' work serving disadvantaged student populations through three USDOL CBJTGs. CCCS System Office staff will conduct ongoing training program review, convene college-level staff as needed, and refine articulation agreements with high schools and four-year institutions. System staff and the Project Director for Project SMART, a CBJTG focused on advanced manufacturing, will coordinate work on these two connected initiatives to maximize return on investment. Individual colleges will promote Pell Grants for STEM-related fields, offer student advisement, and facilitate the enrollment of students on credit and non-credit courses of study leading to STEM careers. Three colleges participating in Achieving the Dream, an initiative to increase the success rate of non-traditional students, will share their expertise in engaging disadvantaged youth.

The Connecticut Distance Learning Consortium (CTDLC), a collaborative providing distance learning and related tools to 95 high schools, colleges, universities, state agencies, and nonprofits nationally, will develop and maintain the virtual STEM Center web portal and its tools, including a menu of technology-based learning (TBL) courses, a virtual STEM mentoring tool, and a customized version of their web-based ePortfolio system for use as a Career Blueprint tool.

Education Intermediaries. The **CT Academy for Education in Math, Science, & Technology**, a school district and teacher training and technical assistance organization which leads CONNvene, will assist the design of the web portal and connect the Partnership to other STEM

resources. The **CT Center for Science and Exploration**, a major new science and technology museum positioned as the hub of a network of science museums and informal learning efforts across the state, will market the Partnership to a broad audience to raise awareness of and support for its larger goals. **NY WIRED** will provide technical assistance to replicate statewide the successful technology-based learning (TBL) program operated by the Eastern Connecticut WIB.

STEM Industries. STEM-related employers across the state will share their short- and long-term workforce skills needs and help design industry-relevant training programs. **The CT Center for Advanced Technology (CCAT)**, a federally-supported intermediary to the advanced manufacturing sector, offers technical assistance, educational development projects, and federal procurement assistance. CCAT, the lead employer outreach partner in the CCCS Project SMART CBJTG, will help develop content and functionality for the STEM web portal and connect the project to employers in CCAT's statewide advanced manufacturing and technology networks. **The CT Business & Industry Association (CBIA)** and its Educational Foundation hold more than a decade of experience advancing STEM educational and training reform. CBIA recently secured a \$13 million NMSI grant to help high school students pursue science and technology-based careers. CBIA will support collaborative curriculum and program development efforts with the Community Colleges, CCAT, and STEM employer members. **Nine Regional Chambers of Commerce**, collectively representing more than 8,000 businesses, including STEM-related fields, will promote and market the project to their members through their web sites, newsletters, fax blasts, and events. **The CT Department of Economic and Community Development (DECD)** targets state resources and technical assistance to high-growth industries, including those requiring STEM skills. DECD will connect the Partnership's work with the priorities emerging from its new strategic plan.

3. Project Design and Implementation. The Connecticut STEM Careers Partnership will provide 1,000 disadvantaged youth, dislocated workers, and low-wage workers enhanced coaching

and training to gain skills necessary for advancement along STEM career pathways. Thirty-six (36) employers will participate intensively through a customized, innovative, technology-based learning (TBL) program that will target training towards employer needs and bolster the competitiveness of Connecticut's STEM-related businesses.

The Partnership will operate a statewide, virtual *STEM Center* that provides information and service access to thousands of workers and hundreds more employers. The STEM Center, supported by the physical presence of STEM Coaches in One Stop Centers, will serve as an entry point, resource and knowledge-sharing hub, meeting place, and classroom for the STEM-related activities of the Connecticut One Stop System and its Community College and Adult Education partners. The Center's user-friendly web portal will disseminate regional, state, and national STEM activities and information, and will help to engage dislocated workers and disadvantaged youth in STEM training. The portal will seamlessly link to existing virtual STEM-related programs and resources and will create and compile new education and career resources for employers, teachers, guidance counselors, parents, dislocated workers, and students. The portal will strengthen the visibility of and connections among various federally- and state-funded STEM efforts (described in Section 2 and Attachment C) by providing a statewide online STEM presence not available through these other projects. Many of our partners will promote the portal by posting links on their websites and referencing it in newsletters and other communications (see Commitment Letters). The Project Director and STEM Careers Work Group will execute a targeted marketing, communications, and outreach strategy to help the portal reach our target populations, including employers.

CTDLC will develop and maintain the technological components of the STEM Center. A virtual center addresses many barriers to accessing training facing Connecticut's disadvantaged youth and dislocated workers. Customers can access the center wherever they can access the internet; for

at least eight out of ten Connecticut adults, this means home access,¹⁴ a significant selling point for the under- and unemployed in a state with the fourth-highest gas prices in the nation.¹⁵ The ability to take classes, communicate with counselors, and access career information reduces scheduling conflicts.¹⁶ Equally important, the virtual STEM Center makes a previously daunting education and training system accessible and welcoming by locating a vast array of STEM-related educational and career information on one web portal and by integrating and aligning the STEM Center's activities with a variety of live teaching, coaching, and mentoring components.

All five WIBs will create multiple access points to the STEM Center within One Stop public computer labs, and additional marketed and assisted access points will be available through computer labs at 47 Adult Education programs, 12 Community Colleges, and more than 100 public libraries across the state. Collaboratively, the five WIBs comprise the Connecticut Workforce Development Council (CWDC), which builds a comprehensive, statewide, integrated workforce development system through joint planning and develops the capacity of the state's One Stop Career Centers. Building around the virtual STEM Center, the Connecticut STEM Careers Partnership will coordinate five primary activities to enhance STEM-focused coaching/training for disadvantaged youth, dislocated workers, and low-wage workers. The Program Logic Model (page 11) illustrates connections between needs and resources and the Partnership's strategies and expected outcomes.

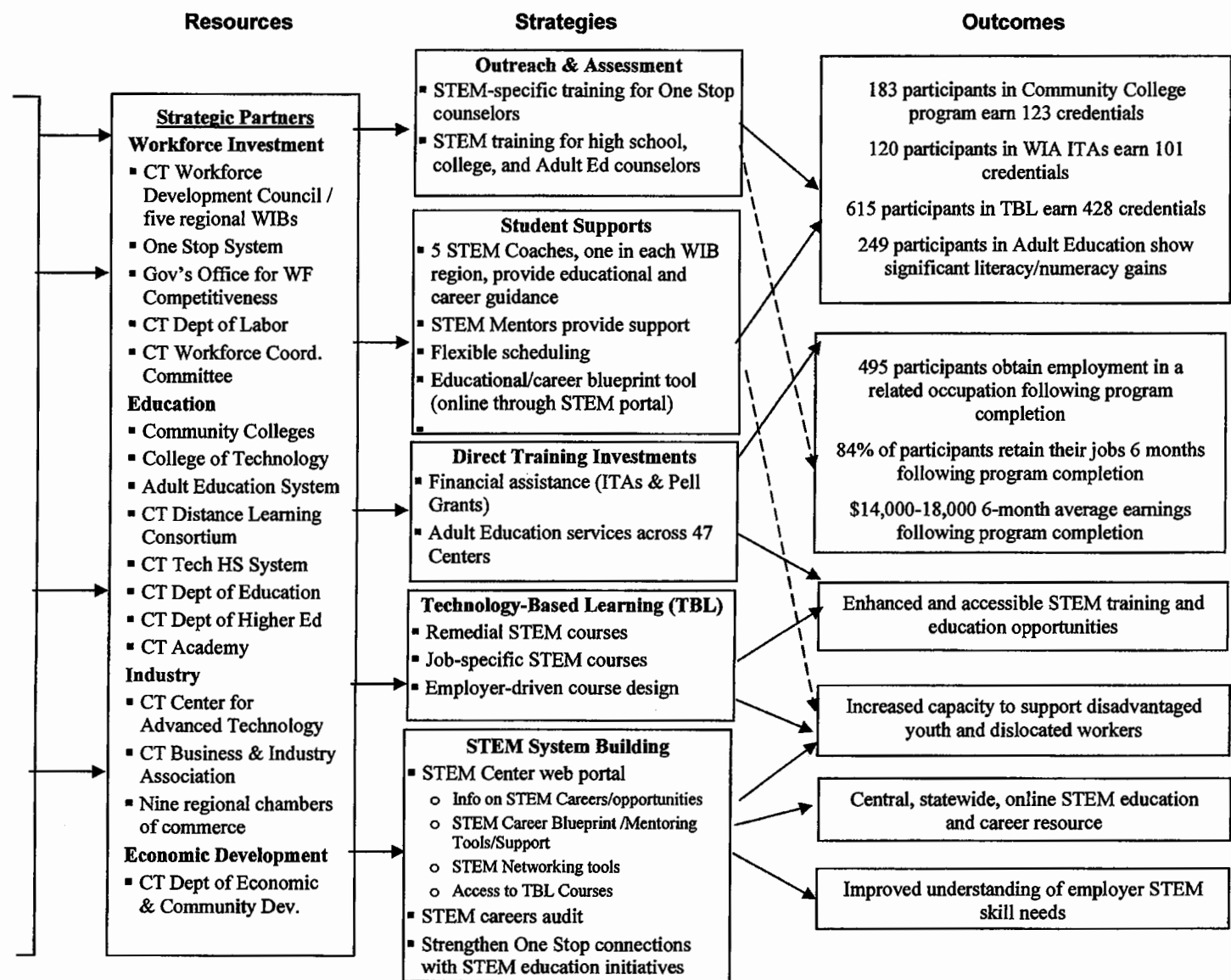
Activity 1: Hire five experienced WIA STEM Coaches to implement STEM Center activities regionally and connect regional efforts to statewide activities and resources. The STEM Coach position builds on a successful Health Career Advisor model used in one of the Community College CBJTGs. Coaches will provide STEM-dedicated academic and career guidance to One Stop

¹⁴ Conservative estimate based on: 74.9% of U.S. households had Internet access at home as of February 2004 (Nielsen//NetRatings) and New England has the highest internet penetration rate of any region of the U.S. ("Internet Use by Region in the United States," Pew Internet & American Life Project)

¹⁵ Source: www.gasbuddy.com

¹⁶ CTDLIC operates the Connecticut Virtual Learning Center, which offers online supplemental courses to public high schools as a complement and alternative to courses taken in traditional schools. Visit www.ctvirtuallearning.org

cut STEM Careers Partnership Logic Model



customers, including connecting them to training and skills assessments. Coaches will train One Stop, Community College, and Adult Education job/guidance counselors to advise customers/students on STEM-related academic and career pathway opportunities and in the effective use of the STEM Center web portal. Coaches will coordinate a new STEM-focused program component that each of the five WIBs will add to their One Stop Summer and Year-Round Youth Program to engage disadvantaged youth in STEM educational and career planning. Community College advisors will present incoming General Education students and disadvantaged students targeted by the Achieving the Dream initiative with STEM career options.

STEM Coaches will work with WIB leadership and CCAT through the existing Project SMART CBJTG committee structure and engage regional chambers of commerce, industry associations, and employer partners in a statewide STEM workforce audit to be completed during Year 1 of the grant. This audit will provide specific employer guidance on STEM and related skills required by Connecticut employers. Audit findings will inform the training added in Years 2 and 3; resources will target industries and occupations with the highest current and projected hiring needs.

Activity 2: STEM Coaches will recruit, orient, match, and oversee *STEM Mentors* who will provide individual academic and career support to dislocated workers and disadvantaged youth to help them advance along a STEM career pathway. Numerous partners, including the five WIBs, CCAT, nine regional chambers of commerce, and others (see Commitment Letters), will tap their vast employer networks to recruit working and retired STEM professionals and advanced-degree students to volunteer as Mentors, coordinated with and supplementing Project SMART's "Roving Mentor" function. Our web portal will assist with Mentor recruitment and work by providing information about the mentor program including video testimonials from Mentors and mentees, data highlighting the importance of mentoring to workforce development, an online STEM Mentor registration form, and online tools to facilitate the mentoring relationship.

CTDLC and CCAT will customize a virtual mentoring tool to complement face-to-face mentoring, allowing Mentors and mentees to “meet” virtually. Virtual mentoring will give our Partnership a recruiting advantage over competing volunteer and professional development opportunities for busy STEM professionals. Our customized virtual mentoring tool will: a) include asynchronous and synchronous meeting tools; b) create a repository of previous Mentor responses, enabling the crafting of “best” responses to recurring mentee questions and allowing Mentors to learn from each other, and c) contain a scheduling feature allowing Mentors to let mentees know when they are available for virtual “office hours.”

Activity 3: Replicate a proven, employer-driven, technology-based learning (TBL) model that is readily scalable and addresses barriers to training for disadvantaged youth and dislocated workers.

Our program will replicate and expand statewide a successful TBL model operated by EWIB (our lead partner). EWIB field-tested the program with General Dynamics Electric Boat (EB) to close skills gaps in 200 drafting applicants. With academic support from Community College coaches, 60 applicants completed online courses chosen by EB for their relevance to the position, qualifying for hire as drafters and putting them on a high-wage career path. The Partnership will replicate this approach for large employers needing to fill ten or more positions for a particular occupation.

Large employers¹⁷ will first choose offerings from our general TBL course menu, and will then work with STEM Coaches to identify additional courses that selected applicants will need to qualify for hire. Three ways exist to create customized course packages: 1) locating and licensing online versions of the courses; 2) working with CTDLC to convert live courses into online courses; and 3) using employer input to create the TBL course from scratch working with CCAT and higher education partners. The STEM Center course menu will list customized training programs, and

¹⁷ The TBL program model will include adaptations that allow (smaller) employers who need to fill less than ten job openings. Adaptations include bundling existing courses and/or other packages as well as more flexible (yet appropriate) use of the full menu of TBL courses.

employers will notify selected applicants that they will be hired contingent on their successful completion of the training program. The TBL model will target dislocated workers by reaching out to those eligible for Trade Adjustment Assistance (TAA), which provides benefits to individuals adversely affected by imports or production shifts to certain countries.¹⁸ Leveraging TAA funds will provide a sizable in-kind contribution to support TBL training. Training programs and credentials will be offered through the WIBs or as part of a Community College certificate or degree program.

Employer skills demands will shape specific TBL offerings; CCAT will coordinate employer outreach across multiple initiatives. The Partnership will use occupational projections and reports of current and anticipated labor shortages from employers to focus training activities on filling skills gaps in the advanced manufacturing, engineering, and computer science fields while remaining responsive to emerging demand from other fields. Training offerings – particularly remedial science and math and basic computing and Internet¹⁹ programs – will prepare workers to secure and succeed in jobs across the full spectrum of STEM-related fields, and will lay the groundwork for further study and career advancement.²⁰ Most TBL offerings will result in industry recognized licenses, certificates, or credentials (e.g. WIB and Community College certificates, college credit).

CTDLC will administer the virtual component of statewide replication and use the portal to develop a menu of online STEM courses, employer-specific programs, and assessment and evaluation tools. Disadvantaged youth and dislocated workers will use the portal to search for information by type of career, interest or skill, employer, educational institution, or geographic area. Searches will lead directly to links to appropriate assessments, training programs, individual programs, and other relevant information. STEM Coaches will coordinate live aspects, including

¹⁸ Between July 1, 2007 and June 30, 2008, a total of 2,217 Connecticut individuals were identified as potentially eligible to apply under certified petitions and 1,261 eligibility determinations were issued in response to submitted applications.

¹⁹ Our course menu will include the Internet and Computing Core Certification (IC3) program, a validated, standards-based training and certification program for basic computing and Internet knowledge and skills.

²⁰ Examples of foundational STEM courses to be offered through the Community Colleges as part of the TBL program include Nuclear Engineering Technology, Manufacturing Engineering Technology, Mechanical Engineering Technology, Environmental Engineering Technology, Computer Science Technology, Engineering, and Technology Studies.

advising and academic support and working with CCAT and existing partnership mechanisms to recruit employers and customize programs to meet employers' stated needs. STEM Coaches will work with individual students and workers but will also support partners' employer recruitment efforts led by CCAT, the WIBs, and regional chambers of commerce, and supported by other partners and program information for employers on the web portal. Our Community College and Adult Education partners will support the TBL program by reviewing course content and supplementing online courses with classroom learning for participants needing further training.

Activity 4: Develop individual *Educational and Career Blueprints* for disadvantaged youth and dislocated workers. Our TBL program fast tracks individuals on a short-term career pathway focused on gaining the STEM skills needed to qualify for specific jobs. For longer-term planning purposes, participants will develop individual blueprints to serve as templates for designing a personal educational and career pathway plan. CTDLIC will customize its ePortfolio online planning tool for this purpose. ePortfolio enables individuals to create a portfolio of their education, experience, and goals, and share it virtually with their Coaches and Mentors, who will work with them on an academic and career development framework that is added to the portfolio. Currently, 34 institutions of higher education, including all 12 Connecticut Community Colleges, use ePortfolio. The Project SMART Pathways Committee, which defines career pathways in advanced manufacturing, will contribute content to the Career Blueprint tool and identified pathways. Individuals can build their Blueprint even after they complete training through our Partnership.

Using our Blueprint tool, individuals will configure "virtual resumes" with digital artifacts (documents, audio files, computer programs, photos, and videos) that demonstrate attainment of specific STEM skills to share with employers via web link. Customers will "tag" their portfolios with keywords indicating the demonstrated STEM skills; employers will then search our portfolio bank by keyword to find individuals with the skills they need.

CTDLC will add three complementary personality, aptitude, and interest self-assessments²¹ to ePortfolio to engage all customers and to help dislocated workers in particular determine how their skills can transfer to careers in STEM. After completing these assessments themselves, individuals will work with their Mentors and Coaches to understand the implications of the results for a possible STEM educational and career pathway.

Activity 5: Grow the P-20 STEM talent pipeline by strengthening connections between P-20 STEM education efforts and our workforce initiative. Engaging the P-20 education system leverages extensive public education investments, supports longer-term economic realities by preparing the workforce for the high-wage jobs of the future, and aligns One Stop efforts with substantial funding for Connecticut STEM-related educational and economic development activities (Attachment C). STEM Coaches will forge connections with P-20 educational partners by: a) raising awareness of out-of-school STEM learning activities via the STEM Center web portal and by sponsoring statewide annual STEM meetings; b) engaging business and professional associations to market STEM careers and opportunities to parents and students; c) working with CCAT, CT Academy and other partners to provide high school guidance counselors with tools to promote STEM careers; d) strengthening connections between school systems and businesses (e.g. internships, company visits, job shadowing, teacher externships) in coordination with related business outreach efforts,²² and e) expanding partnerships with two- and four-year colleges to improve P-12/higher education articulation. This approach builds on multiple STEM-related initiatives in the state, including the Community College System's dual enrollment High School Partnership Program, which helps high school students build their STEM skills for college-level study and STEM careers.

The STEM Careers Work Group will plan for sustainability after grant funding ends through a

²¹ The Myers-Briggs Type Indicator, the Strong Career Enrichment Test, and the Career Ability Placement Survey.

²² Including the Office for Workforce Competitiveness' Connecticut Career Choices program, the educational component of a statewide strategic plan to develop Connecticut's technology workforce.

combination of WIB, State, and employer contributions (based on the proven value of our programs). In addition, the web portal will be maintained by existing CTDLIC and WIB staff.

See the Project Timeline (after the Technical Proposal) for a detailed work plan and timeline.

4. Outcomes and Impact. The STEM Careers Partnership will result in 651 participants – primarily disadvantaged youth and dislocated workers – achieving credentials ranging from Associates Degrees to Certificates for shorter-term training through completion of STEM programs at the Community Colleges, at WIA TA vendors, or through TBL Programs. A Summary of Outcomes follows the Technical Proposal.

Training Outcomes during the grant period include: 1) Tuition assistance for STEM programs provided to: a) 150 college students (Pell Grants); b) 120 students through WIB ITAs; and c) 615 TBL program participants;²³ 2) 305 students obtain STEM remedial help through Adult Education programs, with 249 achieving significant (as defined by the STEM Careers Work Group) literacy/numeracy gains; 3) 495 participants enter employment in an industry related to their training; 4) 414 achieve 6-month job retention; 5) participants achieve 6-month Average Earnings of \$14,000-18,000, depending on program; and 6) 521 participants receive promotions and/or wage gains following program completion.

Capacity Building Outcomes during the grant period include: 1) A statewide virtual STEM Center created, strengthening partnerships and aligning efforts among the five WIBs, 18 One Stops, and current STEM education initiatives statewide; 2) STEM web portal created, serving as a statewide resource and knowledge-sharing center for students, workers, employers, training providers, and coordinators; 3) Web portal receives 15,500 unique visitors (including disadvantaged youth and dislocated workers not previously engaged in training); 4) Five STEM Coaches hired to coordinate STEM Center activities and support 1,000 participants with counseling and career

²³ This is in addition to the 439 students receiving tuition assistance for STEM-related careers in manufacturing through Project SMART, which the Partnership will assist in recruiting and preparing for success.

planning;²⁴ 5) 120 STEM Mentors from higher education and STEM employers work with 180 participants (aided by virtual mentoring tool); 6) STEM individual Educational and Career Blueprint tool developed with 600 participants uploading online portfolios and 425 participants completing Blueprints; 7) Technology-Based Learning programs reviewed, offered, or developed through CTDLIC and NY WIRED; 8) Work-based learning experiences integrated into Community College and WIA ITA programs; 9) Statewide audit of STEM skills required by employers and present in workforce completed; 10) Enrollment and completion outcomes in programs tracked through WIA Business Systems; 11) All tools and processes fully documented to promote dissemination to other regions, and 12) Partnership activities continue beyond the grant period. See the Summary of Outcomes for Impact Outcomes.

5. Program Management, Organizational Capacity, and Budget. The **Eastern Connecticut Workforce Investment Board (EWIB)** will serve as the lead and fiscal agent. EWIB serves 41 municipalities with 412,000 residents and a labor force of over 220,000, and consistently sets the standard across Connecticut WIBs for meeting and exceeding performance benchmarks. EWIB draws upon its track record of managing entrepreneurial initiatives and a vibrant, private sector driven Board for leadership. EWIB earned the 2004 USDOL ETA top Recognition of Excellence award in the “e3” Partnerships category for its innovative approach to training workers for jobs of the future; building coalitions among employers, education and economic development, and reaching the hardest-to-serve populations. EWIB prioritizes the cultivation of a workforce skilled in science, technology, engineering, and math to drive economic expansion: EWIB recently received a USDOL Regional Innovation Grant to map the supply of and demand for engineering and technical workers in Eastern Connecticut, and to develop a strategic plan to address labor supply shortages and job skills mismatches targeting the manufacturing, defense, and maritime

²⁴ STEM Coaches are expected to also work with employers and to train 200 One-Stop counselors during the grant period.

industries. Also, EWIB coordinates the Eastern CT STEM Council, which connects and brings to scale various regional and state efforts to enhance STEM learning outcomes, and supports the Community College CBJTGs. EWIB's Executive Director and Director of Strategic Development will each contribute 5% of their time (more during project planning and start-up) in-kind to provide guidance. The EWIB Director of Finance will manage the project's contracts and finances. EWIB has a 20-year history of managing grants under JTPA, WIA and State of Connecticut regulations. EWIB works collaboratively with the other four WIBs to develop an integrated statewide workforce development system through the Connecticut Workforce Development Council.

EWIB will hire a full-time Project Director to: a) supervise regional STEM Coaches; b) work with CCAT and other partners to coordinate outreach to STEM-related businesses and ensure that project activities respond directly to employers' needs; c) manage partner relationships and close coordination with allied initiatives, and d) create required reports. The Project Director will report to EWIB Executive Director John Beauregard. Attachment D lists grant-funded staff positions.

The Connecticut Workforce Coordinating Committee (CWCC), whose mission is to "create a coordinated user-friendly (workforce) system that responds to employer needs with fast, flexible and comprehensive education and training solutions," will add oversight of this project to its charge (see Figure 3 on page 5 for project structure). To minimize the time and cost of additional meetings, the CWCC, which already includes all of our core partners,²⁵ will form a STEM Careers Work Group that will meet quarterly on the same day as CWCC meetings. The STEM Work Group will coordinate with the Project SMART committee structure to maximize employer outreach and career pathway development investments. The Work Group will report to the full CWCC and will hold responsibility for overseeing the STEM Careers Partnership. The Project Director will staff Work

²⁵ CWCC members include the five Workforce Investment Boards, the Office for Workforce Competitiveness, the Connecticut Community Colleges, the Connecticut Adult Education system, the Connecticut Business & Industry Association, and the state departments of Education, Economic and Community Development, and Labor.

Group meetings. Key Work Group members will include John Beaugard, CCCS Workforce and Economic Development Director Gail O'Keefe (with guidance from CCCS Chief Academic Officer Paul Susen), and Maureen Wagner, who manages Connecticut's Workforce Education Initiative for the Adult Education System (see Attachment E for resumes).

The requested USDOL funding, combined with significant cash and in-kind contributions leveraged from partners and related initiatives, results in a budget sufficient to meet project goals.

Data and Tracking Systems. The State participant tracking system, CT WIA Business Systems (CTWBS), will track participation in the program and all activities and outcomes of the project. CTWBS currently tracks participation and outcomes data for Wagner-Peyser, Jobs First Employment Services (JFES), and WIA's Adult, Dislocated Worker, and Youth programs.

6. Regional STEM Analysis and Asset Mapping. The development of a statewide strategy to promote STEM holds priority status at the highest levels in Connecticut. STEM development efforts began in earnest in 2005 through the Governor's CONNveve planning process, which included an analysis and inventory of state STEM-related activities across: a) the PreK-20 continuum (revamped PreK-12 science curriculum standards, a network of 14 math and science magnet schools, the SDE high school reform proposal which would require an additional year of math and science for high school graduation, the CCCS College of Technology, Yale's \$1 billion investment in its science and engineering research and teaching capacity); b) informal learning environments (the Partnership has created an inventory of more than 90 STEM learning resources across Connecticut; 14 science and technology museums will be supported by the CT Science Center); c) workforce efforts (three CCCS CBJTGs focused on health care and advanced manufacturing and secured in partnership with the WIBs); and d) economic development efforts including the State Cluster Initiative and the Governor's Commission for the Economic Diversification of Southeastern Connecticut, both of which emphasize STEM fields.

Connecticut STEM Careers Partnership
STEM Opportunities in the Workforce System Initiative – Phase II

Project Timeline

| Tasks | 2009 | | | | 2010 | | | | 2011 | | | |
|--|------|----|----|----|------|----|----|----|------|----|----|----|
| | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| Project Management | | | | | | | | | | | | |
| Project Director hired | █ | | | | | | | | | | | |
| STEM Careers Work Group formed | █ | | | | | | | | | | | |
| STEM Careers Work Group meets quarterly to oversee project and coordinate with partners | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| CT Workforce Development Council meets monthly to coordinate WIB and One Stop activities | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| All tools and processes fully documented to promote dissemination to other regions | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Outcome Tracking and Evaluation | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Enrollment and completion outcomes in programs tracked through WIA Business Systems | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Evaluation process designed and contractor secured | █ | █ | | | | | | | | | | |
| Evaluation reports to Partnership | | | | █ | | | | █ | | | | █ |
| STEM Center | | | | | | | | | | | | |
| Virtual STEM Center web portal created | | | █ | | | | | | | | | |
| Web portal marketing campaign executed | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Multiple access points to portal available in all CT One Stop Centers | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Marketed and assisted access points to portal available at all 12 CT Community Colleges, 47 Adult Ed program, and public libraries | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| 15,500 unique visitors visit web portal | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Activity 1: STEM Coaches | | | | | | | | | | | | |
| One Stop STEM Coaches hired in each of five WIA regions | | █ | | | | | | | | | | |
| Coaches train One Stop, Community College, and Adult Ed counselors on STEM pathways and use of STEM Center web portal | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Coaches coordinate new, STEM-focused Summer and Year-Round Youth Program component | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Statewide STEM workforce audit conducted | | █ | █ | █ | | | | | | | | |
| Program offerings adjusted to respond to audit findings | | | | | █ | █ | █ | █ | | | | |
| Coaches help connect participants with ITA, Adult Ed, and Colleges Courses (see Summary of Outcomes) | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |

| Tasks | 2009 | | | | 2010 | | | | 2011 | | | |
|--|------|----|----|----|------|----|----|----|------|----|----|----|
| | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 | Q1 | Q2 | Q3 | Q4 |
| Activity 2: STEM Mentors | | | | | | | | | | | | |
| CTDLC and CCAT customize virtual mentoring tool for STEM Mentor program | █ | █ | | | | | | | | | | |
| Mentor orientation and training program developed | | █ | | | | | | | | | | |
| STEM Coaches coordinate Mentor recruitment with assistance from partners | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| 120 Mentors complete 1-year mentorships with 180 students | | | | | | | █ | █ | █ | █ | █ | █ |
| Activity 3: Technology-Based Learning (TBL) | | | | | | | | | | | | |
| CTDLC uses web portal to develop online menu of TBL courses | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Keyword searches created for students and employers | █ | █ | | | | | | | | | | |
| Initial menu of TBL courses created with input from partners and employers | | | █ | | | | | | | | | |
| Disadvantaged youth, dislocated workers, and others take TBL courses | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| STEM Coaches coordinate employer recruitment with assistance from partners | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Customized course packages created for specific employers based on demand | | | | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| 615 participants take TBL courses to gain 428 industry-recognized credentials | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Activity 4: Educational and Career Blueprints | | | | | | | | | | | | |
| ePortfolio customized to created Blueprint tool | | | █ | | | | | | | | | |
| Coaches and Mentors trained to assist students with blueprint development and use | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| 600 students upload portfolio of education, experience, and goals | | | | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| 425 students work with Coaches and Mentors to complete educational and career blueprints | | | | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Activity 5: Connect to P-20 STEM Education | | | | | | | | | | | | |
| Web portal includes links to out-of-school STEM learning opportunities | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Coaches recruit industry groups to market STEM careers to K12 students | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| High school guidance counselors given tools to promote STEM careers | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Work with business outreach efforts to strengthen school/business connections | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |
| Work with educational continuum to expand STEM articulation agreements | | | █ | █ | █ | █ | █ | █ | █ | █ | █ | █ |

Summary of Outcomes

STEM Careers Partnership activities will result in outcomes in the areas of training, capacity building, and impact on statewide efforts to improve the STEM talent pipeline. The breadth and strength of the Partnership, which builds on ongoing relationships and resources, will ensure that STEM efforts are well-coordinated and effective. Table A-1 projects outcomes for ETA Common Measures. Table A-2 details assumptions behind participation outcomes for Partnership processes. Table A-3 describes training activities and results across all STEM programs. The first three training components are projected to result in credentials that meet WIA criteria. Table A-4 presents capacity building outcomes.

Table A-1: Projected Outcomes - Common Measures - Three Year Grant Period

| | Number Receiving Credentials ^ψ | Entered Employment in Industry Related to Training | | Average Earnings & | Number Receiving Promotions and/or Wage Gains ## | | Employment Retention (6 month) | |
|--------------------------------------|---|--|------------|--------------------|--|-----|--------------------------------|-----|
| | | Number | % | | Number | % | Number | % |
| Community College STEM Programs | | | | | | | | |
| Associates Degrees | 23 | 20 | 88% | 18,000 | 19 | 85% | 18 | 90% |
| Certificate Programs | 100 | 80 | 80% | 15,000 | 80 | 80% | 64 | 80% |
| WIA Individualized Training Accounts | 101 | 75 | 75% | 14,000 | 80 | 80% | 60 | 80% |
| TBL Programs | 428 | 320 | 75% | 16,000 | 342 | 80% | 272 | 85% |
| Total | 651 | 495 | 76% | | 521 | | 414 | |

^ψ Credentials include WIB credentials, other industry-defined credentials, or Comm. College certificates/degrees.

& Total earnings in the second quarter plus total earnings in the third quarter after the exit quarter

divided by the number of adult participants who exit during the quarter. Estimates based on CTDOL data.

gains compared to previous jobs

Table A-2: Total Participation in STEM Careers Partnership Support Activities

| Program | Projected Total Enrollment | | | |
|---|----------------------------|------------|------------|--------------|
| | Year 1 | Year 2 | Year 3 | Total |
| Individuals Working with STEM Coaches** | | | | |
| Average Number working with each of 5 STEM Coaches | 55 | 65 | 90 | |
| New Individuals in Year | 55 | 65 | 80 | |
| Continuing Individuals | | 40 | 50 | |
| Total Caseload for Year Across 5 WIBs | 275 | 525 | 650 | |
| Total Unduplicated Working with STEM Coaches | 275 | 325 | 400 | 1,000 |
| Individuals Working with STEM Mentors | | | | |
| STEM Mentors Engaged / Active (Cumulative) | 40 | 80 | 120 | |
| Unduplicated Number of Mentees | 40 | 60 | 80 | 180 |
| Individuals using STEM Career Blueprint tool ## | 150 | 200 | 250 | 600 |
| Individuals completing STEM Career Blueprints | 75 | 150 | 200 | 425 |
| Use of STEM Center web portal | | | | |
| Unique Users | 500 | 5,000 | 10,000 | |
| Registered Users | 300 | 800 | 1,500 | |

** Includes only those working intensively with Coaches over a period of time.

Coaches will provide short term guidance and information to many more individuals.

Table A-3: Total Participation, Enrollment and Completions

| Program | Projected Total Participation/Enrollment | | | | Projected Completion Rate | | | Projected Completions | | | Total |
|---|--|------------|------------|--------------|---------------------------|------------|------------|------------------------------|------------|------------|------------|
| | Year 1 | Year 2 | Year 3 | Total | Year 1 | Year 2 | Year 3 | Year 1 | Year 2 | Year 3 | Total |
| Community Colleges | | | | | | | | | | | |
| <i>New Enrollments in Community College Science / Engineering / Technology Programs</i> | | | | | | | | | | | |
| STEM Associates Degree Programs ** | 12 | 20 | 25 | 57 | | | | | 8 | 15 | 23 |
| STEM Credit Certificate Programs ** | 7 | 14 | 20 | 41 | 71% | 79% | 80% | 5 | 11 | 16 | 32 |
| STEM Non-credit Certificate Programs | 15 | 30 | 40 | 85 | 80% | 80% | 80% | 12 | 24 | 32 | 68 |
| Sub-total, Community Colleges | 34 | 64 | 85 | 183 | | | | 17 | 43 | 63 | 123 |
| WIA Individualized Training Accounts (STEM) | 30 | 40 | 50 | 120 | 80% | 84% | 86% | 24 | 34 | 43 | 101 |
| Technology-Based Learning (TBL) Programs | | | | | | | | | | | |
| <i>Company-based</i> | | | | | | | | | | | |
| Number of STEM Employers engaged in TBL | 10 | 12 | 14 | 36 | | | | | | | |
| Average Number of Participants per Employer | 12 | 12 | 14 | | | | | | | | |
| Total Participants, Company-based TBL | 120 | 144 | 196 | 460 | 60% | 70% | 75% | 72 | 101 | 147 | 320 |
| <i>Individually Initiated</i> | | | | | | | | | | | |
| Participants in Individually Initiated TBL | 40 | 50 | 65 | 155 | 60% | 70% | 75% | 24 | 35 | 49 | 108 |
| Subtotal, TBL Programs | 160 | 194 | 261 | 615 | 60% | 70% | 75% | 96 | 136 | 196 | 428 |
| Subtotal, College, ITA and TBL Programs (result in Credential) | 224 | 298 | 396 | 918 | | | | 137 | 212 | 302 | 651 |
| Adult Education | | | | | | | | Number Showing Gains# | | | |
| <i>Dislocated Workers - Literacy / Numeracy Gains</i> | | | | | | | | | | | |
| New Individuals Enrolled in Year (as a result of Partnership) | 35 | 50 | 70 | 155 | | | | | | | |
| Continuing Individuals | | 20 | 30 | 50 | | | | | | | |
| Total Participants for Year | 35 | 70 | 100 | 205 | | | | | | | |
| Total Unduplicated Enrollment | 35 | 50 | 70 | 155 | 78% | 80% | 85% | 27 | 40 | 60 | 127 |
| <i>Youth Achievement of Literacy / Numeracy Gains</i> | | | | | | | | | | | |
| New Individuals Enrolled in Year (as a result of Partnership) | 40 | 50 | 60 | 150 | | | | | | | |
| Continuing Individuals | | 20 | 30 | 50 | | | | | | | |
| Total Participants for Year | 40 | 70 | 90 | 200 | | | | | | | |
| Total Unduplicated Enrollment | 40 | 50 | 60 | 150 | 78% | 80% | 85% | 31 | 40 | 51 | 122 |
| Subtotal, Adult Education programs | 75 | 100 | 130 | 305 | 78% | 80% | 85% | 59 | 80 | 111 | 249 |
| Total, All Programs | 265 | 334 | 441 | 1,040 | | | | 179 | 249 | 349 | 777 |

** 150 Pell Grants issued over grant period to support participants in Community College degree and credit certificate programs

No. of participants showing significant gains on CASAS Assessment (levels to be defined by STEM Careers Work Group).

Table A-4: Capacity Building Outcomes

| Outcome | Projected Date of Completion | Estimated # of Individuals Impacted |
|--|---------------------------------------|--|
| Statewide virtual STEM Center created linking the five WIBs and all their One-Stops | January 2009 | 25,000 through information and/or participation |
| STEM Center web portal completed | July 2009 | Est. 15,500 unique users; many more impacted through use of portal by partners to advance STEM education |
| Five STEM Coaches hired | April 2009 | 1,000 extended interaction; at least 2,000 additional with information |
| 200 One-Stop counselors trained | Ongoing | Will make STEM information available to 4,000+ customers over the grant period |
| 120 STEM Mentors serve at least one year as Mentors | Ongoing, first group starts July 2009 | 180 mentees (disadvantaged youth, dislocated workers, low-wage workers) |
| STEM individual Educational and Career Blueprint tool completed | July 2009 | 600 use STEM Career Blueprint; 425 complete full Career Blueprints with help from STEM Coaches and Mentors; many more use Career Blueprint Tool for informational purposes |
| Extensive array of Technology-Based Learning programs reviewed, offered, or developed through CTDLC and NY WIRED | Ongoing as needed | 615 direct participants; many more gain access to TBL through other partners and processes. |
| Work-based learning experiences offered through Community Colleges, WIA ITA, and TBL Component (employer-based and individual) | Ongoing as needed | 425 of 918 total participants across three components |
| Statewide audit of STEM skills required by employers and present in workforce completed | January 2010 | Extensive impact across partner system (continuum of education; workforce system) |
| Enrollment and completion outcomes in programs tracked through WIA Business Systems | July 2009 | All participants and policy makers (through better data) |
| All tools and processes fully documented to promote dissemination to other regions | Ongoing, complete by December 2011 | Many in other regions as well as increased support in CT due to successes |

Impact. Through its outreach, convening and coordination activities and the virtual STEM Center, the Partnership will improve alignment and coordination of regional STEM workforce preparation, education, and training activities, and advance workforce system knowledge of and activities in STEM education and training. Additional outcomes will include improved articulation agreements across high schools, two- and four-year institutions; expanded employer involvement in training, mentoring, and project design; new resources and partnerships as anticipate in letters of commitment; and increased participation by disadvantaged youth and dislocated workers through newly defined career pathways in STEM fields they thought beyond their reach. The Partnership looks forward to sharing these innovations with other regions to advance the field.

Attachment A – Connecticut STEM Occupational Projections – 2004-2014

Note: The occupations below come from the USDOL guidance, and represent occupations eligible for intervention

| Occupational Title | Employment 2004 | Employment 2014 | Total Annual Openings | Total Employment Change | % Change | Average Annual Wages |
|--|------------------|------------------|-----------------------|-------------------------|--------------|----------------------|
| Total, All Occupations | 1,760,691 | 1,910,869 | 57,533 | 150,178 | 8.5% | |
| Total STEM Occupations in CT | 139,850 | 157,080 | 4,386 | 17,230 | 12.3% | |
| Accountants and Auditors | 20,522 | 23,372 | 672 | 2,850 | 13.9% | \$70,278 |
| Computer Software Engineers, Applications | 6,845 | 9,047 | 288 | 2,202 | 32.2% | \$87,373 |
| Computer Systems Analysts | 9,600 | 11,352 | 284 | 1,752 | 18.3% | \$79,816 |
| Network Systems/Data Communication Analysts | 3,194 | 4,435 | 162 | 1,241 | 38.9% | \$70,607 |
| Computer Support Specialists | 7,356 | 8,441 | 199 | 1,085 | 14.7% | \$52,932 |
| Network and Computer Systems Administrators | 4,246 | 5,308 | 153 | 1,062 | 25.0% | \$69,162 |
| Computer Software Engineers, System Software | 3,804 | 4,831 | 140 | 1,027 | 27.0% | \$87,662 |
| Computer and Information Systems Managers | 4,519 | 5,174 | 148 | 655 | 14.5% | \$111,769 |
| Database Administrators | 1,873 | 2,451 | 77 | 578 | 30.9% | \$75,872 |
| Graphic Designers | 2,985 | 3,375 | 79 | 390 | 13.1% | \$49,122 |
| Architects, Except Landscape and Naval | 1,696 | 2,023 | 52 | 327 | 19.3% | \$81,891 |
| Cost Estimators | 2,756 | 3,070 | 93 | 314 | 11.4% | \$62,205 |
| Construction Managers | 3,451 | 3,738 | 91 | 287 | 8.3% | \$93,441 |
| Civil Engineers | 3,249 | 3,520 | 79 | 271 | 8.3% | \$76,554 |
| Industrial Engineers | 3,419 | 3,667 | 108 | 248 | 7.3% | \$75,614 |
| Compliance Officers, Exc. Agric., Construction, Health & | 2,712 | 2,954 | 88 | 242 | 8.9% | \$60,669 |
| Engineering Managers | 3,422 | 3,630 | 89 | 208 | 6.1% | \$107,189 |
| Environmental Engineers | 744 | 922 | 31 | 178 | 23.9% | \$75,408 |
| Electrical Engineers | 2,179 | 2,355 | 60 | 176 | 8.1% | \$78,567 |
| Computer Specialists, All Other | 1,146 | 1,305 | 29 | 159 | 13.9% | \$73,838 |
| Electronics Engineers, Except Computer | 1,622 | 1,770 | 47 | 148 | 9.1% | \$78,298 |
| Biochemists and Biophysicists | 1,404 | 1,539 | 57 | 135 | 9.6% | \$85,267 |
| Biological Technicians | 1,009 | 1,126 | 29 | 117 | 11.6% | \$48,586 |
| Natural Sciences Managers | 980 | 1,081 | 29 | 101 | 10.3% | \$100,285 |
| Electrical and Electronic Engineering Techs | 2,279 | 2,366 | 56 | 87 | 3.8% | \$54,873 |
| Computer and Information Scientists, Research | 346 | 422 | 12 | 76 | 22.0% | \$108,084 |
| Actuaries | 956 | 1,031 | 48 | 75 | 7.8% | \$98,265 |
| Chemical Technicians | 805 | 880 | 28 | 75 | 9.3% | \$43,888 |
| Chemists | 1,868 | 1,942 | 69 | 74 | 4.0% | \$71,619 |
| Engineers, All Other | 1,485 | 1,557 | 36 | 72 | 4.8% | \$77,648 |
| Microbiologists | 917 | 989 | 36 | 72 | 7.9% | \$58,001 |
| Aerospace Engineers | 3,567 | 3,635 | 95 | 68 | 1.9% | \$75,728 |
| Biological Science Teachers, Postsecondary | 828 | 895 | 25 | 67 | 8.1% | NA |
| Chemical Engineers | 451 | 516 | 20 | 65 | 14.4% | \$84,772 |
| Operations Research Analysts | 881 | 944 | 26 | 63 | 7.2% | \$73,302 |
| Engineering Techs, Except Drafters, All Other | 836 | 898 | 26 | 62 | 7.4% | \$55,823 |
| Nuclear Medicine Technologists | 335 | 393 | 12 | 58 | 17.3% | \$71,103 |
| Environmental Engineering Technicians | 214 | 257 | 9 | 43 | 20.1% | \$46,201 |
| Computer Programmers | 7,213 | 7,254 | 174 | 41 | 0.6% | \$80,074 |
| Mechanical Engineering Technicians | 1,290 | 1,330 | 31 | 40 | 3.1% | \$50,206 |
| Physicists | 335 | 374 | 15 | 39 | 11.6% | \$78,288 |
| Industrial Engineering Technicians | 953 | 991 | 24 | 38 | 4.0% | \$54,481 |
| Mathematical Science Teachers, Postsecondary | 468 | 504 | 14 | 36 | 7.7% | \$61,336 |
| Materials Engineers | 887 | 920 | 27 | 33 | 3.7% | \$82,160 |
| Civil Engineering Technicians | 435 | 468 | 12 | 33 | 7.6% | \$61,357 |
| Computer Hardware Engineers | 321 | 352 | 8 | 31 | 9.7% | \$76,636 |
| Engineering Teachers, Postsecondary | 294 | 323 | 10 | 29 | 9.9% | NA |
| Hydrologists | 93 | 120 | 4 | 27 | 29.0% | \$57,753 |
| Health and Safety Engineers, Except Mining Safety | 322 | 348 | 10 | 26 | 8.1% | \$72,878 |
| Materials Scientists | 207 | 232 | 9 | 25 | 12.1% | \$77,751 |
| Computer Science Teachers, Postsecondary | 511 | 535 | 14 | 24 | 4.7% | \$69,172 |

Attachment B – Sample of STEM-Related Articulation Agreements

| To | Type | Description |
|--|---|--|
| University of Connecticut | Two Year College to Four Year College | Graduates of Connecticut’s Community Colleges who earn an associate’s degree with at least a B average are guaranteed admission to the University of Connecticut through a new program entitled the Guaranteed Admissions Program. The program began at three pilot sites, Three Rivers, Manchester and Quinebaug Valley Community Colleges, and is open to any liberal arts or other approved major including horticulture, veterinary technician and environmental engineering technology. |
| Connecticut State University System | Two Year College to Four Year College | Any CCCS student, prior to completing 15 credits of coursework, can apply for guaranteed admissions to a State University (Central, Eastern, Western, or Southern). |
| Northwestern Connecticut Community College | Adult and Continuing Education to Community College | Education Connection is the Regional Educational Service Center in northwest Connecticut and offers adult education programs. The agreement with Northwestern Connecticut Community College specifically recruits students interested in health careers, and agrees to provide support services such as e-tutoring and counseling, and remedial education classes. |
| Quinebaug Valley Community College | Adult and Continuing Education to Community College | EASTCONN is the Regional Educational Service Center in northwest Connecticut. Adult Education students are referred to Quinebaug (with campuses in Danielson and Willimantic) by EASTCONN staff for participation in STEM and other programs. |
| Gateway Community College | Adult and Continuing Education to Community College | New Haven adult and continuing education students who are no more than 4 credits from completing a diploma will be provided academic training and support services in exchange for educational facilities and faculty and staff compensation. |
| Gateway Community College | Adult and Continuing Education to Community College | ERACE broadens opportunities for students in adult education by creating a bridge between adult education programs and post-secondary education and training opportunities. Gateway provides for dual or concurrent enrollment for the students, and facilitates the admissions and financial aid process. |
| Manchester Community College | Adult and Continuing Education to Community College | Manchester Community College provides opportunities for Vernon Regional Adult Education students who are interested in health careers with academic and personal support needed for success, and assists them through the application and financial aid process. |

Attachment C – Related Connecticut STEM Initiatives
(Connecticut STEM Careers Partnership Partner Organizations Highlighted in Bold)

| Description | Audience |
|---|--|
| State Level STEM Policy Initiatives | |
| <p>ior’s initiative supported by the National Governor’s Association to articulate a planning process to establish a collaborative, is system of education from preschool through post-graduate work (20th grade). The primary goals of a P-20 Council are to e education and ensure more students graduate from high school, succeed in college and are ready for the modern workforce. xcess will align and allocate resources across the education continuum to more effectively identify and achieve outcomes</p> | <p>Pre-K to 20 students statewide</p> |
| <p>te Board of Education’s Ad Hoc Committee on Secondary School Redesign recommends new state requirements for high graduation including: a core curriculum of required courses, including STEM courses; the embedding of 21st Century learning ch as communication and teamwork skills into model curricula, and state-administered end-of-course examinations; locally tered end-of-course performance tasks; student success plans with career path options; and a senior year demonstration project. ssioner Mark McQuillan: “Higher education, government and business leaders have been calling for more rigor and more g programming at the high school level to assure that our students develop the skills necessary to compete on the college campus he international workplace.”</p> | <p>High school students statewide</p> |
| <p>vide Pre-Kindergarten through baccalaureate degree (PreK-16) initiative facilitated by the CT Academy for Education in Science, & Technology to improve student interest and achievement in STEM to better meet Connecticut’s 21st Century ic development, quality of life, and workforce preparation needs. A series of forums were held to: tify strategies to improve student interest and achievement in STEM education, with emphasis on eradicating achievement gaps te a coordinated and comprehensive business and industry support program sider various policy initiatives ment a statewide public awareness campaign about STEM education opportunities. te a blueprint to focus federal, state and local resources on STEM improvement</p> | <p>PreK-16 students statewide</p> |
| Major Statewide Grant-funded STEM Initiatives | |
| <p>DL Community Based Job Training Grant that builds industry driven productivity curriculum and delivering productivity training o based technical education for incumbent and dislocated workers and new entrants into the workforce.</p> <p>ART Initiative builds the capacity of the Connecticut Community College System (CCCS) to train populations currently presented in the manufacturing and related technologies workforce through the creation/expansion of three certificate is.</p> <p>Facing multiple barriers to success receive tuition assistance, academic and social support, and exposure to evidence-based ; that promote success in educational and workforce settings. With assistance from the CCCS’ lead partner, the Connecticut for Advanced Technology, the initiative supports three Manufacturing Workforce Specialists; development of an industry-assessment tool; strategic marketing and recruitment efforts; statewide “Roving Mentors” who reinforce classroom lessons by ng students on the job; and intensive pre-developmental education.</p> | <p>Community College students and dislocated workers statewide</p> |

| Description | Audience |
|--|---|
| <p>grant coordinated by the Connecticut Business and Industry Association Education Foundation that helps fund training intensive programs for Advanced Placement (AP) and pre-AP courses and exams. The program seeks to increase Connecticut students' participation and achievement in AP courses and better ensure their success in college. A major goal of the program is to help students to excel in math, science and English while encouraging them to explore science and technology-based careers</p> | <p>High schools statewide</p> |
| <p>of the Connecticut Business and Industry Association that prepares technical high school students for careers and community college education in manufacturing through rigorous technical curriculum and industry involvement for teachers and students</p> | <p>Vocational high schools statewide</p> |
| <p>ional Center for Next Generation Manufacturing addresses the need for highly skilled workers in the new manufacturing industry by building programs that provide resources to educators and students interested in learning new technologies in manufacturing. The Center is directed by the Connecticut College of Technology (COT), a virtual organization representing technology curriculum geared toward engineering and technician training offered at Connecticut's 12 community colleges. These curriculum courses give students credit toward engineering and technician training at designated Connecticut public colleges and universities, including Central Connecticut State University, the University of Hartford, University of Connecticut, Fairfield University, University of Southern Connecticut State University and Charter Oak State College.</p> | <p>Community College students statewide</p> |
| <p>g in 2009, the Science Center will create high-impact learning experiences for children and families, and create interest in science at a young age. Programs include extensive teacher professional development, coordination and development of curriculum materials, and a partnership with the State Office for Workforce Competitiveness to connect informal science education to career exploration and awareness activities.</p> | <p>Hartford, State</p> |
| <p>Connecticut Center for Advanced Technology leads this US Department of Defense initiative to develop the aerospace industry talent pipeline which includes efforts to address talent pipeline challenges in STEM fields.</p> | <p>Statewide and Massachusetts</p> |
| <p>STEM Intermediary and Professional Development Organizations</p> | |
| <p>Academy provides leadership and technical assistance for high quality learning of mathematics, science, and technology for all students. The CT Academy's mission is to join with educators and others to attain continuous improvement in mathematics and science education for ALL students – with emphasis on eliminating achievement gaps. The Academy delivers data-driven professional development services and measurement tools to educators and serves as a statewide advocate, broker, and catalyst for academic success for all students. They collaborate with and provide technical assistance to Connecticut school districts, the State Departments of Education and Higher Education, and the Governor's Office and partner with other educational organizations and deploy a cadre of qualified consultants to help increase the effectiveness of local education systems.</p> | <p>P-20 education, Statewide</p> |
| <p>mission is to “to strengthen technology-led competitiveness through collaboration with industry, government, and academia.” The educational division supports programs and partnerships with local businesses and higher education institutions that advance economic and technological literacy, while promoting training of the emergent workforce needed for global competitiveness. CCAT focuses in both K-12 and higher education focus on developing student interest in engineering and manufacturing opportunities, and promoting innovation and enterprise. CCAT is a central partner in the Community College System's Skills for Manufacturing and Technologies (SMART) Initiative that addresses critical occupational shortages in advanced manufacturing.</p> | <p>Statewide, P-20 Education</p> |

| Description | Audience |
|---|--------------------------------------|
| <p>Education Foundation is a nonprofit affiliate of CBIA which cultivates a skilled, knowledgeable workforce in Connecticut by enhancing educational policies and practices, stimulating career development and exploration, and promoting job training to match employer needs. The Foundation has secured federal and state resources for STEM education (see descriptions of NSF grants) and works with the educational continuum in curriculum development, teacher professional development, and connection to industry.</p> | Statewide |
| <p>Identifies and studies issues and technological advances of concern to the people of Connecticut, and provides unbiased, expert information on science- and technology-related issues, including STEM education, to state government and other Connecticut institutions. Conducted a study for the Legislature (through the CT Academy) to identify the best practice characteristics of supplementary programs outside the formal education environment and supports multiple student competitions in STEM fields of study.</p> | Statewide |
| <p>Efforts to improve mathematics and science education for all students through high-quality professional development programs for teachers.</p> | Teachers statewide |
| STEM Curriculum Resources and Enhancements | |
| <p>National organization to encourage middle and high school students to major in engineering, PLTW focuses on professional development for middle and high school teachers. 67 schools in Connecticut offer the PLTW curriculum.</p> | Middle and high schools statewide |
| <p>Supported by the University of Connecticut and part of the national program of the Academy of Applied Science. Has enhanced student motivation, stimulated original research and promoted the setting for scientific meetings.</p> | High school students statewide |
| <p>Rotating, custom-designed mobile laboratory outfitted with the latest in bioscience equipment, computers and supplies, the BioBus visits schools and community events throughout Connecticut to present hands-on experiences in the life sciences above and beyond the traditional classroom curriculum. Sponsored by Connecticut United for Research Excellence (CURE).</p> | K-12 students and teachers statewide |
| <p>Helps underrepresented students discover their potential through science, math and technology. CPEP distinguishes itself in its focus on training and implementing extraordinary hands-on experiences that ignite the intellectual curiosity of its students. STEM related programs channel this intellectual curiosity into the potential pursuit of STEM related career choices.</p> | K-12 students in 10 cities and towns |
| <p>Collaboration with school districts, (NASA's) business partners, college and universities, informal science centers, other educational providers, and NASA in an effort to improve science, mathematics and technology K-16 education in Connecticut</p> | Teachers in Eastern CT and statewide |
| <p>Increases student interest in and awareness of engineering and technology-based careers — with student competitions, assessment tools, career resources, an e-newsletter, and more — as well as resource materials for parents and counselors. Sponsored by the University of Connecticut.</p> | K-12 Students statewide |