

STEM EAST

(12 Counties)

PROGRAM PROFILE

“We are advancing the economy here by helping young people know what to do when they don’t know what to do.” – STEM EAST partner

“Our business and industry understand that if they want a different product, then they have to invest in getting it.” – STEM EAST partner

What Is the STEM East Program?

The STEM East Network (STEM East) is a collaborative focused on ensuring that students across a 12-county region in Eastern North Carolina have opportunities to engage in real-world science, technology, engineering, and mathematics (STEM) learning that directly aligns with career opportunities. STEM East is specifically determined to provide ample opportunities for problem-based and inquiry learning for students who are in school, out of school, online, and at home. From this perspective, leaders think of the acronym STEM as standing for Strategies That Engage Minds. The collaborative includes 12 school districts, regional businesses, economic development organizations, private foundations, youth programs, local governments, and other community and regional organizations.

Who Are the Partners and What Are Their Roles?

- **Superintendents of school districts:** Serve on the Eastern North Carolina Employers and Superintendents Council, where they collaborate with regional STEM employers.
- **Employers:** Regional industry leaders who contribute ideas, time and funding to implement innovative education and workforce development programs.
- **Museums and science centers:** Deliver “STEMtastic” activities for students and families. STEM East hosts a quarterly convening of eastern North Carolina museums and science centers to help strategize alignment of programs with schools and after-school programs.
- **After-school and summer programs:** Provide informal learning environments for students. STEM East has helped secure funding for STEM after-school (Science Action Clubs) and summer programs through Burroughs Wellcome Fund grants.
- **NC East Alliance (regional economic development organization):** Serves as the backbone organization for STEM East.
- **Kenan Fellows Program:** Offers opportunities for teachers to expand their STEM knowledge and skills while being prepared as leaders.
- **NC State University’s Friday Institute for Educational Innovation:** Provides evaluation support.



AUTHOR
Anita Brown-Graham
nclIMPACT at the UNC School of Government



AUTHOR
David Brown
nclIMPACT at the UNC School of Government



AUTHOR
Emily Williamson Gangi
nclIMPACT at the UNC School of Government



AUTHOR
Nathalie Santos
nclIMPACT at the UNC School of Government



P-12



POSTSECONDARY



WORKFORCE

STEM EAST
(12 COUNTIES)

myFUTURENC

How Does the Program Work?

Superintendents from member school districts serve on the Eastern North Carolina Employers and Superintendents Council, where they collaborate with regional STEM employers. Together they determine what programming is needed to provide students with the education and skills required for the regional workforce.

Figure 1 presents an overview of that workforce's educational attainment, compiled from Census estimates for the 12 counties associated with STEM East.

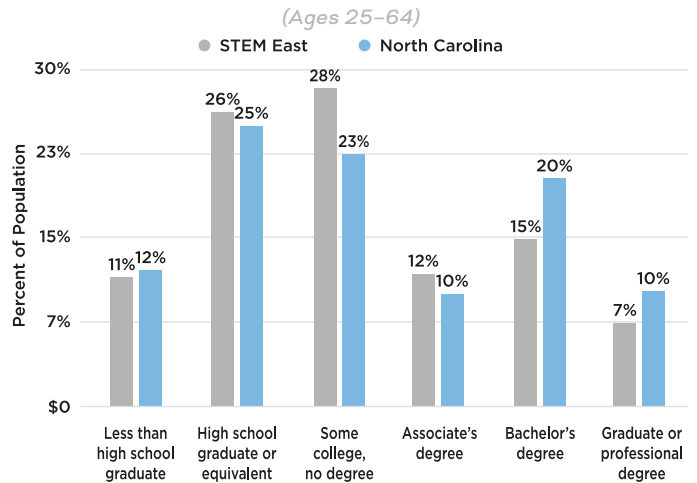
Figures 2 and 3 present data on industry change, 2002–2017, for two of the counties served by STEM East. As the charts indicate, each county has its own mix of technical jobs that have been gained or lost over time (and may now be growing again, even if the chart shows a net loss since 2002).

As a result of this focus by leaders on both the supply and demand sides of the talent pipeline, STEM East investments have supported STEM labs in more than 90 percent of STEM East middle schools. The labs provide a unique method for skills development and STEM career exploration and act as a college and/or career pathway focal point for students. Regional employers directly support these labs and programs. In many cases, employers are integral to the design of specific modules used to sharpen needed workforce skills. These employers understand that they are creating their future talent pipeline

These school district programs are bolstered by the support of national experts on STEM curriculum. For example, staff from each of the STEM East school districts have attended the Strategic Planning Institute hosted by the Smithsonian Science Education Center using grant funds from partners at Duke Energy and the North Carolina Science, Mathematics, and Technology Education Center. Each institute session focuses on providing training on relevant materials and resources, curriculum design, managing change, and tactics for building community involvement. While at the Institute, each school district team works to create a K-12 STEM education strategic plan that aligns its disparate efforts, including, but not limited to, core STEM curriculum and career/technical education programming. The planning instruction has been invaluable to each district, and cross-district collaboration has emerged as one of the many positive spillover effects.

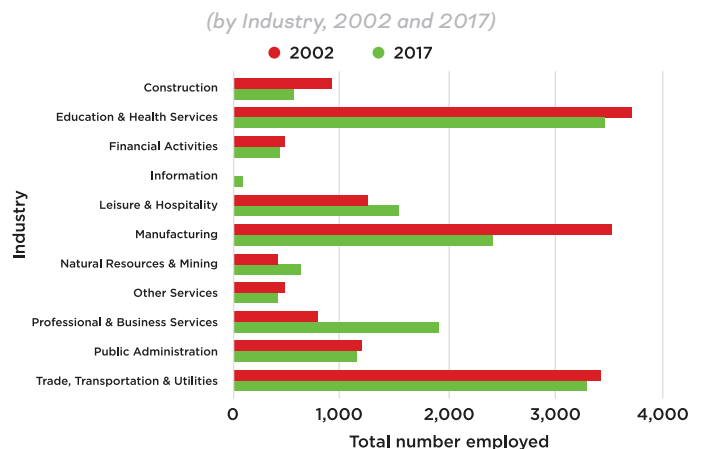
STEM East also makes materials available to school districts. Each participating district has been invited to take part in the pilot implementation of a kit-based inquiry science curriculum by the North Carolina Science, Mathematics, and Technology Education Center. Participating classroom teachers have been provided training in inquiry teaching and are given access to kit curriculum.

FIG. 1: STEM EAST EDUCATIONAL ATTAINMENT



Source: U.S. Census Bureau, 2012–2016 American Community Survey 5-Year Estimates.

FIG. 2: BEAUFORT COUNTY EMPLOYMENT



Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages.



P-12



POSTSECONDARY



WORKFORCE

STEM EAST
(12 COUNTIES)

myFUTURENC

Importantly, leadership across STEM East school districts starts with these classroom teachers. Significant resources are directed toward helping teachers continually improve their ability to effectively guide student instruction. The following two examples are illustrative. First, STEM East has partnered with N.C. State University's Kenan Fellows Program to help identify and recognize master teachers as Fellows. Fellows are provided with opportunities to expand their STEM knowledge and skills while being prepared as teacher-leaders to guide instructional planning and professional development. Second, using a grant from the Golden LEAF Foundation, STEM East has partnered with the North Carolina Business Committee for Education to implement the Teachers@Work program. STEM East teachers participate in summer externships with participating regional employers to better understand the demands of the changing workforce and develop lessons that challenge students to demonstrate mastery of content to solve real-world problems through problem-based and inquiry learning activities. These teachers earn industry credentials and bring their insights back to the classrooms to share with students and other instructional staff.

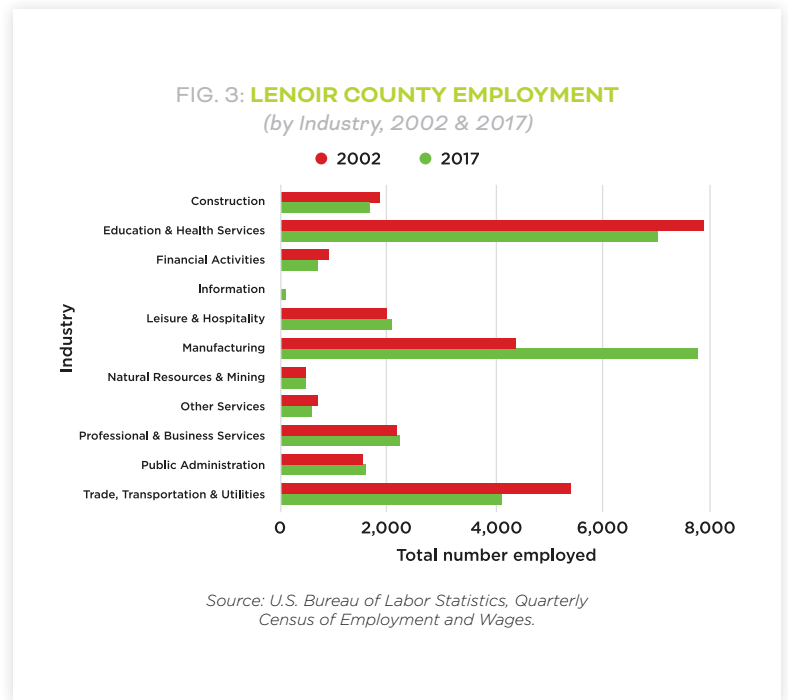
Significantly, STEM East partners pursue opportunities as a single network, a subset of the network, and individually. Each partner retains the necessary autonomy to pursue unique interests but is also able to use the network and its partners to meet individual and collective goals.

What Is the Governance Structure?

STEM East is managed by the NCEast Alliance, a regional economic development partnership. Superintendents from member school districts serve on the Eastern North Carolina Employers and Superintendents Council, where they collaborate with regional STEM employers.

Is the Program Data Driven?

STEM East school districts all agree to gather and analyze impact data on student learning and effective implementation with the help of external funding. The N.C. State University Friday Institute is working with the districts to create a program evaluation plan. Through funding from the Golden LEAF Foundation, the Friday Institute has assisted each district in creating a program logic model and sustainability plans that include evaluative procedures for revision and improvement. The focus on data extends across programming and aids districts in embedding the science of continuous improvement into instructional practice to increase student outcomes and enhance students' career and college readiness to increase economic mobility.



What Are the Indicators of Success?

The most insightful indicators are the growing numbers of school districts and companies seeking to be involved with STEM East. Business and industry professionals see STEM East as a pipeline for their future workforces, while schools regard the network as a lifeline to connections that provide currency to educational offerings. When employers noted that they could not fill machining jobs, one school district responded by opening a program that covered this sector of the workforce at one of its high schools. As one interviewee indicated, “Industry needs are ever changing, and STEM East helps me to stay up to date with those changes.”

The second indicator of success is one that makes STEM East partners particularly proud: despite constant change in school district leadership, no school district has ever sought to leave the network. Partners see this sustainability as evidence of the value the network brings to education leaders. One of the original partner superintendents recently moved to a new district outside of the current footprint and immediately petitioned STEM East for district membership, clearly demonstrating the value of the relationships fostered by the STEM partnership.

The third important indicator is the number of other regional STEM networks forming across the state as a result of leaders in other regions seeing evidence of STEM East’s impact. STEM East is a member of the nationally recognized STEM Ecosystem project, where it provides a model for organizing regional STEM partnerships.

What Is the Promise of the Strategy for Increasing Educational Attainment in North Carolina?

STEM East is building a network focused on preparing students for work and life. It prides itself on focusing on “Strategies That Engage Minds.” It is linking problem- and inquiry-based learning models to job opportunities, with the expectation that all students will benefit from its programs, irrespective of whether they pursue a traditional STEM discipline after high school or enroll in college.

Equity of access to STEM experiences is at the core of the STEM East network vision. The experience of one program in Greene County suggests that the students who might benefit the most are those who often face significant challenges — those with Individual Education Plans and those for whom English is a second language. In another program in Craven County, female students demonstrated higher science gains than male students. STEM East recently took a team to Howard University to pursue strategies for recruiting and retaining minority STEM educators.

The breadth of the network is illustrative of the future of education — learning counts wherever it happens. By engaging out-of-school programs, such as the Boys and Girls Clubs, and cultural community assets, such as museums, the program is maximizing the opportunities for students to get aligned approaches to STEM. Students are also encouraged to make use of online resources.

There is research to support STEM East’s claim that its approaches are leading to greater student engagement, skills development, and knowledge attainment. Sixth- and seventh-grade students taking a STEM elective in one county scored 20.1 percent higher on the 2016–17 Measures of Academic Progress (MAP) science test than did members of a control group at a nearby middle school.



STEM EAST
(12 COUNTIES)

myFUTURENC