

Project Overview

In North Carolina, much has been done at the state level in the area of **Science, Technology, Engineering, and Mathematics (STEM)** and Career Technical Education to develop curricular opportunities for students in grades 6–12 in response to an explosion of highly sought after STEM careers. However, these statewide efforts to provide engaging and regular STEM curricular opportunities were not widespread at the elementary level. In 2021, the [Region 6 Comprehensive Center](#) (RC6) began a project to supplement work underway at the SEA level for grades 6–12 with support for the implementation of rigorous, evidence-based, and project-based STEM education targeting K–5 students.

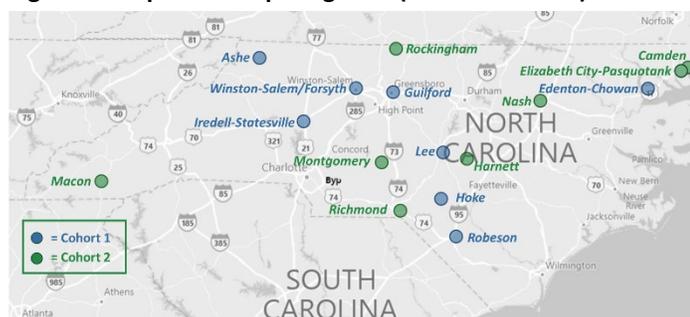
This project’s approach to building the capacity for elementary teachers to deliver more rigorous and engaging STEM education utilizes an engineering design process whereby teachers present students with challenging tasks (that require critical thinking, collaboration, communication, and creativity). As elementary-level students regularly work through these hands-on, engineering tasks in small groups, they learn to problem-solve and work effectively in teams.

Through this RC6 project, “Building Engineers in North Carolina’s K–5 Classrooms,” the RC6 is providing intensive support to two cohorts of eight North Carolina LEAs as they plan and implement improved STEM instruction at the elementary level. To date, as a result of the RC6 support provided to the 16 LEAs, there is momentum growing across the state for improving STEM elementary education.

RC6 Approach and Support Provided

The RC6 began by selecting two cohorts of LEAs who recognized they had gaps in the area of STEM elementary education. Priority was given to LEAs with barriers to STEM implementation due to limited local capacity (e.g., as experienced by LEAs in rural settings). Of the 16 LEAs across the two cohorts, the majority (12) are located in geographically rural areas (Figure 1).

Figure 1. Map of Participating LEAs (Cohorts 1 and 2)



In 2021–22, the RC6 provided training and other individualized support, such as site visits to leadership teams from the Cohort 1 LEAs. The training focused on helping the LEAs develop two-year implementation plans for improving STEM instruction in elementary classrooms. The RC6 also planned and held the first RC6/North Carolina Department of Public Instruction (NCDPI) joint conference to support K–5 educators in exploring the use of high-quality STEM instruction in their classrooms.

Figure 2 describes the two components of RC6 support in the state: individualized local support provided to two cohorts of LEAs and a statewide conference to encourage interest and engagement in STEM education at the elementary level.

Figure 2. The RC6 “Building Engineers in North Carolina K–5 Classrooms” Project Activities

LEA Cohort Support	Statewide Support
<ul style="list-style-type: none"> ➤ The RC6 engaged in a needs-based recruiting process to identify potential LEA participants. ➤ Each of the 16 LEAs selected formed a leadership team (small planning/ implementation team of 6–10 representatives). ➤ The RC6 guided the LEAs through a process of identifying the science and math standards in which students were in most need of help. ➤ Each LEA team created a locally-driven 2-year implementation plan describing how they will implement high-quality STEM instruction at the elementary level to support the targeted standards, with a focus on connecting to local STEM pathways available to students in grades 6–12. ➤ The RC6 facilitated meetings of the cohorts so that LEA teams could share successes and challenges and receive support (e.g., professional development, implementation support, material/resource needs). 	<ul style="list-style-type: none"> ➤ The RC6 planned and implemented the first annual 2-day “Building Engineers in K–5 Classrooms Conference” in 2022. The conference was designed to build broad momentum among K-5 educators throughout the state, particularly targeting staff from the 16 cohort LEAs. ➤ Target audience: K–5 educators interested in exploring the use of high-quality STEM instruction in their classrooms. ➤ Day 1 included 46 concurrent sessions, a keynote speaker, and networking opportunities. ➤ Day 2 offered an elementary robotics/engineering showcase in which 350+ students presented their STEM-related projects and skills. ➤ In 2022, over 170 participants from 40 LEAs attended the conference.

The RC6 approach considers the development of strong partnerships as essential for the long-term sustainability of this statewide initiative. To implement the support activities described above, the RC6 partnered with established STEM networks to help ensure the alignment of STEM priorities across the state. The RC6’s partnerships with NCDPI and these STEM networks are critical to making the LEAs feel their work in improving K–5 STEM instructional opportunities is valued and sustainable.

Project Outcomes

By incorporating both LEA-based and statewide activities, this project has helped North Carolina make significant strides in just two years. Establishing a collaborative support model has provided LEAs with resources and materials to plan for and implement high-quality, structured elementary STEM programs. The project’s support to 16 LEAs is intended to increase their capacity to provide high-quality STEM education to K–5 students such that they will have increased interest in and access to college and career STEM pathways in later grades.

In terms of evaluating project progress, the RC6 monitors the 16 LEAs’ progress toward their two-year implementation plans. The LEA plans are regularly reviewed and revised to focus on desired local outcomes (e.g., number of teachers trained, number of NC standards supported with new instructional activities, and number of engineering/robotics tasks utilized in classrooms). In addition, the RC6 administered a participant satisfaction survey after each cohort’s kick-off training. Results from both surveys were overwhelmingly positive, with 100% of respondents (n=40 for each cohort) agreeing or strongly agreeing that the training provided them with an understanding of why this work is important and a strong belief that it will benefit their LEAs and students.

Finally, the RC6 external evaluators collected additional feedback in winter 2022 via a focus group with a sample of Cohort 1 participants to gather perceptions of the professional development provided by the RC6. Below are three themes that emerged, with sample quotes from participants.

- 1 LEA participants noted that **the opportunity to build connections** with other schools/LEAs was valuable, particularly for rural LEAs where STEM has not always been a priority.

"In the past, we haven't been able to get connections to counties that are doing STEM. But now with this cohort, we are getting more connections to counties that are doing STEM. In the past, STEM was largely focused on urban counties, but now STEM is also reaching rural counties."

"[The RC6] has allowed us to make connections with others who are working on STEM. STEM is not always the priority in all of the districts and sometimes in the county you are the only one working on STEM. Now, through this, more people in the state are talking about STEM."

- 2 LEAs also appreciated the RC6's **support in developing a formalized plan**, commenting that having a formalized planning process that was SEA-supported helped with teacher buy-in.

"One thing I really appreciate about [the RC6] is the focus on the district to have a developed plan.... We have trained all of the teachers now on the engineering design process. It didn't feel like something extra was being added to their plate."

"[This work has given us] validity too, and the formalization that we are a cohort being 'sponsored' by DPI."

- 3 Interviewees mentioned that the project support (the RC6 working directly with LEAs) has **promoted awareness of the importance of STEM** across LEAs and statewide.

"[The RC6] is always there, super responsive to answer questions and come and help. Having someone to call is huge."

"At the state level, there is only one person at STEM besides what [the RC6] is doing. What the [the RC6] is doing is helping with the grassroots movement."

In summary, feedback after the first year indicates that the two-pronged RC6 approach of providing "deep" support (individualized support to 16 LEAs) and "broad" support (annual STEM conference to promote the statewide need for more rigorous and engaging STEM instruction at the elementary level) is working well for North Carolina. High-quality STEM education is necessary in the elementary years for students of all backgrounds to have an interest in and opportunity to pursue STEM career pathways as they move through their secondary school education and beyond.

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