STEM Smart: A Snapshot

STEM Smart was a National Science Foundation–supported dissemination effort that translated two National Research Council (NRC) consensus reports into practitioner-friendly guidance and convenings for K–12 STEM leaders. The NRC reports—*Successful K-12 STEM Education: Identifying Effective Approaches* (2011) and *Monitoring Progress Toward Successful K-12 STEM Education: A Nation Advancing?* (2013)—outlined what high-quality STEM learning looked like and proposed indicators to track system progress. **CADRE (the Community for Advancing Discovery Research in Education) at EDC curated and spread those findings through regional "STEM Smart" meetings, a public website, briefs, and newsletters.**

The *Successful K-12 STEM Education* (2011) report synthesized research on effective instruction, coherent curricula, teacher capacity, and supportive school conditions, offering actionable recommendations for districts and states. The *Monitoring Progress* (2013) report complemented the first report with a focused set of indicators related to students' access to quality learning, educators' capacity, and policy/funding, to help education systems to gauge movement toward the vision outlined in the first report.

CADRE operationalized the reports by:

- **Convening** nine regional STEM Smart meetings (beginning in 2011) to surface research-backed exemplars of the reports' guidance and connect researchers, practitioners, and policymakers.

- **Creating resources**—including ten STEM Smart Briefs and session program descriptions—that distilled key issues and research for K–12 STEM.

- **Maintaining a public website** that housed events, agendas, downloadable reports, and a library of NSF-funded materials for educators.

- **Sharing STEM education opportunities and resources via the STEM Smart newsletter from 2011 – 2025.**

Access STEM Smart archives to learn more about the regional meetings, briefs, and newsletters.

A Closer Look: "Pathways to Middle-Skill Occupations and Beyond," held at Olin College on May 12, 2014 in Needham, Massachusetts

CADRE's STEM Smart effort included nine regional meetings from 2011–2016, held in Philadelphia, Seattle, Chicago, Las Vegas, Baltimore, Atlanta, Washington, Needham, and San Francisco. Looking closer at the event in Needham provides insight into how the meetings were designed.

CADRE gathered federal, state, higher-ed, K–12, nonprofit, and industry leaders in Needham, Massachusetts for a regional meeting at Olin College of Engineering to examine evidence-based strategies and showcase programs focused on career and technical education (CTE) pathways into middle-skill STEM roles. Topics included: skill development for middle-level occupations: STEM academies, CTE high schools, community college–university–industry partnerships and pathways, student internships and teacher externships, as well as developmental mathematics, project-based

learning, programs for special populations, regional technical-education resource centers, and the maker movement. These topics were covered during plenaries, breakout sessions, a student expo, and a closing panel, with meeting materials posted on the STEM Smart website for reuse. A companion STEM Smart Brief—*CTE Pathways to STEM Occupations* anchored the middle-skill focus.

The breakout sessions were organized around three themes:

1) Effective Instruction

Breakouts emphasized instruction that built on students' ideas and engaged them in the practices of science, math, and engineering. Sessions on problem-/project-based learning, "Making is Learning" (materials exploration, tool literacy, FabLab), and math pathway redesign showed how authentic problems, iterative design, and coherent progressions deepened core ideas and skills. These strands aligned with NRC guidance on rigorous tasks, formative evidence of learning, and coherence across grades.

2) Equal Access to Quality STEM Experiences

Consistent with NRC calls to broaden participation, sessions highlighted strategies to interest women and girls in STEM, Universal Design and assistive technology to support learners with disabilities, and school models (e.g., STEM academies, New Tech) that scaffolded inclusive, authentic learning.

3) Supportive Infrastructure for STEM Learning

The meeting elevated system supports the NRC said mattered as much as teacher qualifications: teacher externships and student internships that braided coursework with industry needs; "stackable" credentials and community-college pathways aligned to local labor-market data; and networked initiatives (e.g., FabLab/FabNet, GLOBE) that built capacity for authentic data use and engineering design.

The evaluation of the meeting found that a strong majority of participants and presenters said they benefited by learning new information during the breakout blocks and having the opportunity for valuable networking—evidence that the convening both spread research-based practices that could help attendees plan concrete changes in programs, instruction, and partnerships.

"I got a lot of ideas and materials from my breakout sessions, which will allow us to better design programs and identify partners." —Participant

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Taken together, STEM Smart's regional convenings, targeted briefs, and open website extended the reach of NSF's DRK-12 investments by translating the NRC's research-based findings into actionable, portable practices. By archiving agendas, presentations, and tools—and by connecting educators, researchers, policymakers, and industry—CADRE's strategy was positioned to help school systems improve instruction, expand access, and attend to infrastructure while monitoring progress against the NRC's indicators. In doing so, the effort sought to amplify the impact of NSF-funded research and support evidence-guided improvement in K–12 STEM education nationwide.