Science, Technology, Engineering, & Mathematics

The Science, Technology, Engineering, & Mathematics (STEM) program, spanning grades preK–16, offers a diverse portfolio of projects that enhance teaching and learning across all STEM subjects, including the less commonly addressed fields of technology and engineering education.

Through cutting-edge research, evaluation, curriculum development, and professional development, STEM increases understanding on issues such as technology literacy, the use of simulations to enhance student learning and assessment, and science and mathematics learning. The SimScientists team won the 2012 award for research paper of the year from the prestigious National Association of Research in Science Teaching.

STEM's Making Sense of SCIENCE project continues to publish professional development courses for middle school science teachers. These courses prepare teachers for the new Common Core and Next Generation Science Standards.

Selected Highlights

- Awarded a federal i3 Validation grant to study the effectiveness of using an innovative early math program on a statewide scale in California.

- Empowered diverse learners by widely disseminating innovative, evidence-based curricula and professional development into all education settings. For example, Aim for Algebra is designed for after-school as well as in-school use with students who struggle with algebra. Making Science Accessible to English Learners offers research-based guidance and tools for effective instructional practices. Professional development by the K–12 Alliance has increased achievement in writing and science for low-income student populations having high proportions of English language learners.

- Created strategies for increasing the priority of technology and engineering (T&E) in STEM education. Led specification of the national framework for developing the first-ever 2014 National Assessment of Educational Progress assessment of students’ T&E literacy.

- Further advanced state-of-the-art research and evaluation that investigates high-profile, high-leverage phenomena in STEM education. Launched an NSF-funded efficacy study of selective STEM specialty schools. Served as external evaluator for seminal programs and projects that span all of the STEM fields. Client types include colleges and universities; federal, state, and local government organizations; nonprofits; and corporations and foundations such as Google, Hewlett, PBS, Synopsys, Intel, and Wikipedia.

Selected Success Stories

WestEd Evaluation Helps Businesses Gauge Efficacy of STEM Learning Programs

The business community in the United States is taking a particular interest in STEM (science, technology, engineering, and math) education. Change the Equation (CTEq) is a nonpartisan, nonprofit initiative of CEOs that helps the business community support improved STEM education. WestEd served as an independent reviewer of design principles, and used the principles to evaluate more than 40 STEM education programs.

Following the review, WestEd built STEMworks, a database of programs that meet the design principles. The goal of STEMworks is to help focus funding and support on rigorous, successful STEM education programs.

WestEd Report Shows The Electric Company Lights Up Summer Learning

Today’s kids enjoy entertainment franchises that span movies, books, and video games. Think Harry Potter. That same package of media might help kids learn, as well.
WestEd served as the evaluator for a new multimedia math program for summer schools from PBS, CPB, and Sesame Workshop. This program, targeting first and second graders, is based on The Electric Company television show. This initial study showed impressive student gains in numeracy skills, mathematics vocabulary, and phonics skills. Additionally, the project now works with families in low economic communities to empower parents to support their children’s learning from the CPB-PBS activities enacted through digital tools.

### Selected Services

**K–12 Alliance Professional Development**
This program includes Content Institutes to increase participants’ science or mathematics knowledge and pedagogical skills for teaching science to Lesson Studies in teachers’ classrooms to teacher-leader development.

**Making Sense of SCIENCE**
Making Sense of SCIENCE helps teachers learn how to implement Understanding Science professional development courses in their school, district, local education agency, university, or school reform organization.

**Math Pathways & Pitfalls Institute**
Teachers attending this institute learn ways to help students overcome pitfalls, boost learning of key mathematics standards, and develop academic language. The institutes also highlight crucial strategies for working with diverse learners.

**The Making Science Accessible to English Learners Professional Development (and parallel resources and services for mathematics)**
Workshop participants engage in a hands-on, student-centered model lesson as they learn research-based teaching strategies for English learners.

**Evaluation of STEM projects and products**
Staff evaluate large and small endeavors across the nation, from assisting small cutting-edge projects or serving as external evaluator in high-profile projects, to monitoring fidelity of implementation for impact studies, conducting pilot studies during product development, or conducting experimental efficacy studies of more advanced products.

### Selected Resources

- Examining Mathematics Practice through Classroom Artifacts
- Field Guide to Geometric Transformations, Congruence, and Similarity
- How Can Simulations Be Components of Balanced State Science Assessment Systems?
- Making Sense of SCIENCE K–8 Professional Development Courses
- Math Pathways & Pitfalls K–8 Intervention Curriculum
- STEM Teachers in Professional Learning Communities: From Good Teachers to Great Teaching

### Selected Projects

**National Center on Cognition & Mathematics Instruction**
The National Center on Cognition & Mathematics Instruction at WestEd is redesigning an existing mathematics curriculum in ways that will substantially improve student outcomes.

**Understanding Science for Teaching**
Understanding Science is a nationally field-tested professional development program designed to help teachers learn major concepts of K–8 science; examine how children make sense of those concepts; and analyze and improve their teaching practice.