



# EARLY STEM LEARNING AT EDC

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**EDC** Learning  
transforms  
lives.

## How do we grow children's sense of wonder about their world?

From birth to age eight, children take the first steps in a lifelong learning journey. Promoting STEM knowledge and skills during early childhood—using the latest research-based approaches in varied settings, such as in school, at home, and in afterschool programs—not only prepares children for later learning but is an opportunity to capitalize on young children's natural curiosity and desire to understand their world.

Research indicates that building on children's natural inquisitiveness takes careful attention to their motivation and persistence, as well as to the cognitive factors that affect learning. With support from NSF and the Heising-Simons Foundation, we are studying the relationship between math learning and mastery motivation, and are helping to expand the research base of effective interventions to promote preschool children's early math learning.

Through this work, EDC will impact over 2,000 low-income preschoolers by providing professional development to Head Start programs on the use of mathematics- and persistence-related games, and by supporting families' at-home participation in mathematics-related activities.

## What do educators need to support early STEM learning?

Teachers are crucial to young children's learning. Unfortunately, research shows that many teachers are not well prepared to teach STEM to young children in developmentally appropriate ways.

Teachers may lack an adequate grounding in relevant STEM knowledge or in pedagogical strategies that support the learning of that knowledge. They may have difficulty discerning how to help all students achieve standards-based STEM learning outcomes in a rapidly changing educational landscape. Or, more fundamentally, they may underestimate what young children are capable of learning. As a result, teachers may not provide many opportunities for children to make sense of numbers, patterns, and relationships, or to interact with the scientific phenomena or practices that set the stage for later learning.

To some extent, these issues reflect a gap between what researchers are discovering and what practitioners are able to implement in their classrooms. EDC is committed to strengthening and reframing the relationship between research and teacher practice in STEM education in formal and informal settings. As a major partner in the Research + Practice Collaboratory, EDC's team is developing and studying a model of research-practice collaboration to



improve student learning of mathematics in the early grades using interactive mobile technologies. The initiative is contributing to the research base about what works in early STEM learning, in supporting elementary school teachers with STEM pedagogy and content knowledge, and in supporting children from low-income families who may have less access to STEM experiences.

EDC also is committed to helping teachers interpret and apply educational standards that reflect our growing understanding of what children are capable of learning. For instance, in Chicago, we are providing professional development to general education and special education teachers in grades K–5 to significantly increase their capacity to help all students achieve standards-based learning outcomes in mathematics. And in Massachusetts—in response to the state's new K–12 Digital Literacy/Computer Science Standards—we are working with teachers across the state to integrate computational thinking into science and mathematics learning in grades 1–6.

# What can be done to support STEM learning for *all* children?

**As early as kindergarten, there are painfully real achievement gaps between white and minority children and between children from higher- and low-income households, but we need not accept these gaps as inevitable.**

It is essential to build school-home-community partnerships that give all children the opportunity to engage in authentic scientific explorations and mathematical thinking.

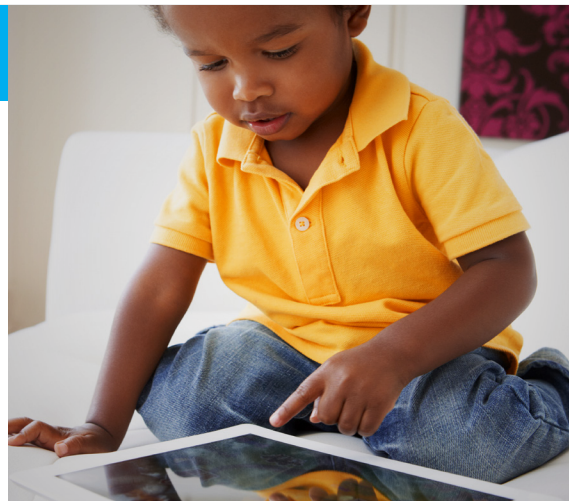
Our organization has a special focus on meeting the needs of children from disadvantaged communities and of dual language learners, on engaging and supporting families, and on building the capacity of educators and communities to sustain improvements. A federal i3 development grant has given us the opportunity to use the engaging context of science to support the literacy and academic success of young English language learners.

Working with Hartford Public Schools and the Connecticut Science Center, we are providing 100 pre-K and first-grade teachers and coaches with professional development, and engaging 2,000 families in their children's early science and literacy learning through classroom explorations, family events, and family "toolkits" to extend science exploration at home.

Likewise, with federal grants and with funding from private foundations, EDC has committed more than \$5 million to identify developmentally appropriate strategies and tools for using technology and media to support STEM learning among children in low-income communities that historically have had less support for early engagement with STEM content and practices. EDC is achieving this in formal and informal settings in partnership with researchers, media producers, and educators who are using iterative co-design processes to inform the development of evidence-based curricular programs and professional development resources.



# Can technology make a difference in young children's STEM learning?



**Yes, but technology alone is not enough.**

Digital resources, such as narrative-rich videos, mobile apps, and online games with built-in assessments, can play productive roles in preschool teaching and learning, but they require thoughtful integration. Technology tools, even the best-designed ones, can never replace human interaction or good teaching. Children, especially young children, need caring and knowledgeable adults to help them navigate and learn about the world, and this includes the world of technology.

Much of our work emphasizes the role that adults play in mediating young children's use of digital games and videos. We try to reflect this approach to technology in our research, and also in any kind of guidance we provide to educators. Through the U.S. Department of Education's Ready To Learn Program and a \$15 million program of research, for example, we have the opportunity to help PBS and the Corporation for Public Broadcasting create better services for young children and their families, especially in communities where there are high concentrations of poverty.

# Who is needed to create long-lasting early STEM programs?

**Everyone—from those living in the White House to those living with the support of local housing authorities.**

Promoting STEM knowledge and skills during early childhood requires a systematic approach and the combined efforts of many committed partners. In the United States and around the world, we work to create strong, coherent pre-K–Grade 3 systems and to advance knowledge of how to improve early learning. In partnership with federal and state agencies, private foundations, and community-based and direct-service organizations, we implement innovative early childhood programs that build numeracy, science, and literacy skills, that excite interest in learning, and that help educators, volunteers, and parents enrich early learning.



## Education Development Center, Inc.

EDC is a nonprofit organization that creates and delivers effective programs, services, materials, and products to improve learning and teaching, health and human development, and economic opportunity for people of all ages worldwide. Collaborating with both public and private partners, we strive for a world where all people are empowered to live healthy, productive lives. EDC is committed to education that builds knowledge and skill, makes possible a deeper understanding of the world, and engages learners as active, problem-solving participants. While the issues we address are diverse, all that we do is united by our conviction that learning is the liberating force in human development. Founded in 1958, EDC currently employs 1,200 staff in the United States and around the world, including teachers, health and social science professionals, mathematicians, professional development experts, scientists, researchers, and management and technology specialists.

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