

The Young Scientist: Teaching and Learning Science in Preschool Classrooms

Background

In 2000, Education Development Center, Inc. (EDC), began work on the NSF-funded project The Tool Kit for Early Childhood Science Education. That work—a collaboration between teachers, professional developers, scientists, and science educators—resulted in the *Young Scientist Series*, a comprehensive curriculum designed to improve science teaching and learning for children ages 3–5. Each curriculum unit includes a teacher’s guide and multimedia professional development materials. The units include *Discovering Nature with Young Children*, *Building Structures with Young Children*, and *Exploring Water with Young Children*. According to Redleaf Press’s website, *The Young Scientist Series* “supports children’s early development of important science-inquiry skills, as well as early literacy and math skills. Comprehensive units on nature, structures, and water introduce children to lifelong critical-thinking abilities such as questioning, investigating, discussing, and formulating ideas and theories.” A second product of this work is a book for teachers, *Worms, Shadows, and Whirlpools*, which describes the nature and appropriate content of science for this age level along with illustrative classroom vignettes. The development of these materials was guided by several principles about young children’s science learning:

- Children ages 3–5 are capable of challenging science inquiry.
- Young children are motivated to make sense of the physical world around them.
- Young children’s science inquiry must occur in the service of interesting and meaningful science content.
- Documentation of and reflection on experiences and observations are critical to children’s meaning making.
- Teachers play a critical role in supporting and guiding children’s science learning,

In addition, the materials take into account the context of early childhood teaching and learning and a research-based understanding of how children learn. They therefore are based in children’s work and play, are integrated with daily experiences, draw from the child’s world, and emphasize collaboration, use of language, representation, and mathematical thinking. Despite the fact that it was developed before the *Next Generation Science Standards* (NGSS), *The Young Scientist Series* is aligned with concepts and practices of the NGSS and, thus, continues to be relevant.

Documented Results

A small evaluation of the materials, focusing on teacher change and satisfaction, was conducted during the life of the project. Two projects initiated since the end of the original project have contributed to the understanding of the impact of professional development and inquiry-based science in the classroom:

- The development of the Science Teaching Environment Rating Scale (STERS), a tool to help teachers and administrators look for indicators of effective teaching practice and classroom culture that support science learning. This was funded by the United States Department of Education (ED).
- An additional ED-funded project (in progress), *Foundations of Science Literacy* (FSL), was designed to research the effects of professional development on teaching practice. Using the *Young Scientist Series* as a foundation, EDC science educators have developed three more

extensive stand-alone credit-bearing courses, one for each of the original *Young Scientist* topics—*Exploring Water*, *Building Structures*, and *Discovering Nature*. These courses are currently in use, and the research is being conducted with PreK teachers in the Hartford, CT, area in collaboration with the Connecticut Science Center. Preliminary findings from this research indicate that teachers who use these products successfully meet more of the criteria from the STERS than do control teachers.

- A second component of FSL is to conduct research on the effects of professional development on student outcomes. This research is being conducted in classrooms of Hartford-area teachers enrolled in the FSL courses and is in its early stages.

Potential Applications

Science has long been neglected by many teachers and programs that serve 3-5 year old children. The emphasis on literacy and numeracy and social and physical development as well as the lack of science and science teaching knowledge of teachers of young children have resulted in a serious lack of challenging science curricula at this level. The *Young Scientist Series* is one of a few curricula in PreK science that also are aligned with the practices and content of the NGSS. *The Young Scientist Series*, as well as *Worms*, *Shadows*, and *Whirlpools*, continue to be used by teachers and programs.

For More Information

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Foundations of Science Literacy website: <http://foundationsofscienceliteracy.org/>