



**The Science and Communication Program:  
Upper-Elementary Science Curriculum Reform**

by

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Because of a serious lack of science learning in elementary schools, science educators have been under increasing pressure to make changes in course content that will increase students' science preparedness. A notable science curriculum reform text is the American Association for the Advancement of Science's *Benchmarks for Science Literacy: Project 2061*, a book proposing a comprehensive restructuring effort to improve the science literacy of the nation's students. *Benchmarks for Science Literacy* provides a framework consisting of standards for science literacy for grades K–12. These standards serve as the basis for the Science and Communication Curriculum Reform Project, supported by the Laboratory for Student Success, one of the U.S. Department of Education's 10 regional educational laboratories. The project seeks to cultivate science literacy among young children by engaging teachers in a learner-centered, teacher-facilitated approach to education, providing integrated interdisciplinary links to science knowledge development in the elementary grades. The Science

and Communication Program, a subcomponent still in its pilot phase, targets the science education of third- to fifth-grade students and teachers. To achieve reform in science curriculum, this program aims to restructure three vital areas of science education: curriculum enhancement, resource development, and the science education of elementary school teachers.

The framework of the program is closely aligned with the existing grades K–2 component, the Head Start on Science and Communication Program. As a means of enhancing current elementary science education, the curriculum content of the upper-elementary program is founded on national science benchmarks and supported by the science standards of four major urban school systems. In addition to curriculum enhancement, the Science and Communication Program identifies the best resources needed for teachers to provide a science-rich learning environment in their classrooms.

The Science and Communication Program provides an inquiry-based, interdisciplinary approach to elementary science education,

fostering development of students' reading, writing, and mathematical skills. The curriculum is divided into four subject areas: life, earth, physical, and technological sciences. Students are introduced to each science concept through their reading of a fictional story. The story imparts to students the background information needed to solve the research questions posed regarding the science topic of the module, and the questions encourage students' self-exploration of scientific concepts.

**Professional Development**

During the 1st year of program development, the primary objective was to gather data on current practices in science education. First, curriculum development needs were assessed and program participants were identified. Next, the curriculum scope and content were refined and further developed. The culmination of the 1st year was a 3-day professional development workshop with 17 teachers from five key cities.

In order to participate in the Science and Communication Program, grades 3–5 teachers

implementing the Adaptive Learning Environments Model—an inclusive, instructional delivery system designed to meet the diverse needs of students in regular classroom settings—were nominated by school administrators. The teachers were surveyed to determine their commitment to science education, scientific knowledge base, and skills in implementing a science-rich environment in their respective settings. Teachers were also questioned on their current knowledge of national science standards, as well as standards outlined by the state and school district.

Through the professional development of teachers, the program aims to improve the quality of elementary science education. The purpose of the 3-day professional development workshop was to present teachers with procedural knowledge in science education, thereby offering higher academic accomplishment for elementary students through standards-based, science-rich classroom environments.

During the workshop, teachers were instructed on the development of science-rich learning environments, including classroom resources and lesson plans. The Science and Communication Program training included sessions on science curriculum and alignment with school and state standards, and, in addition, promoted a constructivist approach to science learning in the elementary classroom. Participants also took part in an all-day seminar at The Franklin Institute Science Museum in Philadelphia.

Seminar facilitators introduced the museum as a classroom resource to attendees.

At the professional development workshop, teachers were asked for input on the first unit of the Science and Communication Program. The group discussed all aspects of the pilot curriculum. Participants read and assessed the story “Gidget’s Journey: An Exploration of the Human Body.” The group also modeled proposed science activities pertaining to the story. Currently, these teachers are in the process of pilot testing the first module. Results will be reported by the end of Summer 2002.

### **Modules**

The first developed module in the life sciences series is titled “Gidget’s Journey: An Exploration of the Human Body.” The module contains the story, all the background information students and teachers need, as well as the vocabulary and curriculum standards relevant to the story. To begin the first module, teachers have students answer pre-assignment questions suggested by the science content of the story they will read. Then, students read the story. During their reading, students are introduced to the various organs and systems by reading about how Gidget and her dog, Madame Curie, travel through the body in a bubble jet. Next, students begin module explorations by investigating various science questions related to the story. After the students have completed all their investigations, they use the questions provided to reflect in their science journals. At the conclusion of the module, the

students take the post-assignment test.

There will be a total of 12 modules (four per grade level) in the life, earth, physical, and technological sciences. Other modules currently being developed include “Wrigley’s Voyage,” a tale of a boy and his earthworm friend exploring beneath the earth, and “Quasar and Solara Return to Earth,” which tells the adventures of two space-traveling sisters.

### **Conclusion**

Gaining knowledge about scientific processes and principles while increasing cognitive, linguistic, and literacy skills is a challenging and important task. Information is acquired either through explicit, teacher-directed methods or through exploratory, child-centered methods; it cannot be assumed that one method of learning is better than the other or that one should replace the other. Not all children learn in the same way and they may not learn equally well using only one method. Often, we find that it is best to combine more than one method to help children learn to their potential. In an effort to motivate children to explore, understand, analyze, and create, teachers are encouraged to combine both explicit and exploratory teaching methods. This gives students basic information that can pique their curiosity for continued exploration. The Science and Communication Curriculum Reform Project and the Science and Communication Program unite language development and science inquiry with a multifaceted curriculum in order to meet the diverse needs of teachers and students in the 21<sup>st</sup> century.