

# SCIENCE

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# EDITORIAL

## K-12 Education and Support for Science

There is growing concern in the scientific community over waning support for science from Congress and the public at large, especially with respect to basic research. In a recent interview [*Science* 268, 966 (1995)], Secretary of Energy Hazel O'Leary captured the essence of the problem when she asked, "Why does my mother care?" An apt question, to which an important corollary can be posed: What value will basic research have for coming generations? Why should they care? And that, I believe, is a more important and easier case to make. The young adults who graduate from high school each June are children of the continuing technological revolution. They have been raised on the fruits of technological innovation, and as its primary beneficiaries they will expect and seek its continuation. Through hands-on experience in the classroom and in their extracurricular activities, the nation's youth are more at home than their elders with computers; with biotechnology; with advances in communication, transportation, and medicine; and with public health measures. But their support for basic research cannot be taken for granted.

The movement for reform of science education in grades K through 12 is now in its second decade. Two of its stated goals are to prepare citizens to work more effectively in a high-tech environment and to promote the scientific literacy of the public. From the viewpoint of the scientific community, there is a third essential objective: to ensure strong and continuing public support for the scientific enterprise. To this end, all possible steps to enhance the scientific literacy of the young must be taken by the established scientific community—for its own good and for that of the society it so admirably serves.

What then should we be doing? First, scientists should intercede in K-12 education. There is a role to play for every member of the scientific community, whether it is raising money to enhance school science programs, serving in the classroom, or aiding the local science museum. Such commitments contribute more than does attendance at any committee meeting or symposium to discuss the problem of improving science education. Second, we should intercede primarily to reinforce teachers, especially those at the elementary and middle school levels, whose science background is often weak or nonexistent. Scientists, who have at best limited exposure to students, can amplify their efforts by working with teachers. Third, we should identify and promote a few good programs for teachers. Summer internships in industrial and university laboratories are powerful confidence builders for teachers whose science background is weak. The National Science Resources Center, sponsored by the National Academy of Sciences and the Smithsonian, offers a program that prepares teachers and school districts to entirely replace elementary school science texts with hands-on experiments. Fourth, we must develop ways to make it clear that basic research is the foundation for advances in technology, and that major investment in the first is essential in order to reap the enormous rewards of the second. The young are clearly capable of grasping this crucial point, and its articulation should be a key element of science education. It should have a prominent place in the national science standards.

Finally, scientists and engineers should realize that the classroom is not the only center for science education. Science museums, which offer the essence of hands-on learning gained at one's own pace, are undergoing remarkable growth. Recent figures reported by the Association of Science and Technology Centers show annual attendance approaching the 100 million mark—roughly the same as attendance at all major U.S. sporting events combined! These centers offer exceptional opportunities for scientists and engineers to intercede in science education.

A healthy future for the scientific establishment lies in the hands of forthcoming generations, and their education is in our hands. The young are inherently optimistic. We must share and promote their optimism and encourage their belief in the promise of the scientific enterprise.

Richard L. Hinman

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