
observe
Learn
Interact
change
Achieving the high standards outlined for science education requires and deserves the combined and continued support of all American.

Epilogue

The *National Science Education Standards* describe a vision and provide a first step on a journey of educational reform that might take a decade or longer. At this point, the easy portion of the journey is complete; we have a map. The scientific and education communities have labored to reach agreement on what students should understand and be able to do, how students should be taught, and means for assessing students' understandings, abilities, and dispositions in science. The *Standards* took an insightful and innovative step by suggesting that the responsibility for improving scientific literacy extends beyond those in classrooms and schools to the entire educational system. The real journey of educational reform and the consequent improvement of scientific literacy begins with the implementation of these standards. The National Research Council now

passes the challenge to all those who must assume the ultimate responsibility for reform. Scientists, science teacher educators, state departments of education, local school boards, business and industry, governmental and nongovernmental agencies, school administrators, teachers, parents, and students all have a role to play.

Science teachers have been involved in the development of the science education standards, because they have a central role in implementing them. But it would be a massive injustice and complete misunderstanding of the *Standards* if science teachers were left with the full responsibility for implementation. All of the science education community—curriculum developers, superintendents, supervisors, policy makers, assessment specialists, scientists, teacher educators—must act to make the vision of these standards a reality. Anyone who has read all or part of the *Standards* has some responsibility in the reform of science education. With distributed leadership and coordinated changes in practice among all who have responsibility for science education reform, advances in science education can rapidly accumulate and produce recognizable improvement in the scientific literacy of all students and future citizens.

Recognizing the challenge these standards present, we encourage

- Students to use the *Standards* to set personal learning goals and experience the satisfaction of understanding the natural world;
- Teachers of science to use the *Standards* as the basis for improving science content, teaching, and assessment;

- Science supervisors to use the *Standards* to implement new, long-range plans for improving science education at the state and local levels;
- Science educators to change programs in colleges and universities and develop exemplary materials based on the *Standards;*
- School administrators to focus attention on the need for materials, equipment, and staff development aligned with the *Standards;*
- Those who work in museums, zoos, and science centers to use the *Standards* as an opportunity to collaborate in providing rich science learning experiences for students;
- Parents and community members to use the *Standards* to contribute to their children's science education and generate support for higher-quality school science programs;
- Scientists and engineers to use the *Standards* to work with school personnel to initiate and sustain the improvement of school science programs;
- Business and industry to use the *Standards* to help schools and science teachers with guidance and resources for developing high-quality programs; and
- Legislators and public officials to strive for policies and funding priorities aligned with the *National Science Education Standards.*

The challenge is large, significant, and achievable. It also is too much to place on the shoulders of any one group. Achieving the high standards outlined for science education requires the combined and continued support of all Americans.