

SCIENCE EDUCATION POLICY

Science understanding and expertise are essential to the function of modern society and are foundational within science education. Understanding scientific concepts and processes, especially in chemistry, helps address complex daily challenges. Scientists and engineers who represent a wide range of abilities and experiences, drive economic innovation and enhance global well-being. Preparing learners with scientific knowledge and skills to contribute to society and to address health, environmental, and economic challenges requires investment at all levels of STEM (science, technology, engineering, and mathematics) education.

Policymakers should pursue the following three objectives:

1. Promote lifelong education of evidence-based scientific concepts and practices to improve understanding of science and its role in society.
2. Ensure access to high-quality education and careers in STEM fields for all students.
3. Provide robust local, state, and federal support for both science education and lifelong science teacher education.

To work towards these objectives, investments must be made systematically in three fundamental areas of science education.

U.S. Education System

- Promote science literacy by ensuring that science is taught as a core subject, that students are given opportunities to conduct hands-on laboratory experiments safely, and that learning standards are meaningful and broadly applicable.
- Provide for the development of evidence-based methods and curricular materials and emphasize interdisciplinary instruction.
- Promote the expectation that all students develop career-appropriate STEM competencies and provide opportunities for alternative second-career pathways in science.
- Require in-person, participatory experimental laboratory experiences for students of all abilities, advance the learning of science, develop students' problem-solving and critical thinking skills, and inspire students to pursue STEM careers.
- Recognize that although web-based and computer-simulated activities serve as valuable supplements and temporary alternatives when in-person learning is not possible, these substitutes are neither equivalent to nor suitable as long-term replacements.

The American Chemical Society (ACS) Board of Directors Committee on Public Affairs and Public Relations adopted this statement on behalf of the Society at the recommendation of the Society Committee on Education. ACS is a non-profit scientific and educational organization, chartered by Congress, with more than 230,000 chemical scientists and engineers as members. The world's largest scientific society, ACS advances the chemical enterprise, increases public awareness of chemistry, and brings its expertise to state and national matters.

- Ensure universal access to up-to-date STEM facilities and resources, including but not limited to laboratories, equipment, instrumentation, scientific information, artificial intelligence, library resources, and broadband access.
- Require institutions to provide comprehensive and up-to-date safety training to promote a positive safety culture in both teaching and research laboratories.
- Ensure educators cultivate safe environments in classroom and laboratory settings.
- Support the development and implementation of green and sustainable science instruction and laboratory experiences at all levels of the education system.

K-12 Science Education

- Recruit, retain, value, and reward a well-prepared community of teachers and offer lifelong professional development opportunities to improve content knowledge and pedagogical skills.
- Strengthen existing STEM teacher education programs by emphasizing the use of evidence-based instructional methods and up-to-date science content knowledge.
- Engage teachers as full participants in the design of programs for professional and curriculum development and include resources for a variety of learning environments and student challenges.
- Promote both formal and informal learning opportunities and access to STEM experiences.
- Support partnerships between schools, teachers, students, STEM industries, businesses, and professionals to provide experiential learning, enhanced teaching opportunities and mentorship.

Higher Education

- Improve the capacity of colleges and universities to recruit and retain all students and faculty in STEM. Expand resources for and access to undergraduate research experiences. Invest in educational research across STEM disciplines to guide the development and evaluation of model programs, tools, and methods for advancing teaching and lifelong learning.
- Encourage and provide resources for faculty to both learn about and implement evidence-based practices for teaching undergraduate and graduate students.
- Promote the coordination of programs among two- and four-year institutions and chemical and related industries to provide students with a variety of options for pursuing STEM careers.

A public that understands science and a workforce with expertise in science, all of whom represent the full spectrum of our population, will be poised to address health and environmental challenges and drive economic growth through innovation.