SCIENCE EDUCATION POLICY

Science literacy and expertise are essential to the function of modern society. Understanding concepts and processes of science, including chemistry, help to make sense of and to address the complex challenges encountered every day. Scientists and engineers with a diversity of abilities, identities, experiences, and backgrounds drive an innovative economy and improve the well-being of all global citizens. Preparing current and future learners with scientific knowledge and skills to contribute to society and to address global 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 meaningful lifelong education of evidence-based scientific concepts and practices to improve citizens' understanding of science and its role in society.
2. Ensure equity of access to high quality education and careers in STEM fields for students of all backgrounds, particularly those from historically and presently underserved and marginalized populations.
3. Provide robust state and federal support for both science education and lifelong science teacher education.

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

U.S. Education System

- Promote science literacy by ensuring that science is taught as a core subject, students are given opportunities to conduct laboratory experiments, and that standards of learning are meaningful and broadly applicable.
- Ensure federal, state, and local resources are equitably distributed, with priority for underserved and marginalized communities.
- 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 hands-on laboratory experiences that are accessible to 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 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 158,000 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 that facilities - including laboratory equipment, instrumentation, scientific information, library resources, and broadband access - are universally accessible, flexible and up to date.
- Promote a positive safety culture in laboratories by requiring a robust education in chemical health and safety.
- Support the development and implementation of green and sustainable practices at all levels of chemistry instruction.
- Require institutions to provide comprehensive safety training and protocols in both teaching and research laboratories. Ensure educators are equipped to foster safe environments in the classroom and when conducting scientific demonstrations.

K-12 Science Education

- Recruit, retain, value, and reward a diverse and 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 methods and encouraging increased 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 and STEM industries, businesses, and professionals to provide experiential learning, enhanced teaching opportunities and mentorship.

Higher Education

- Improve the capacity at all colleges and universities, including both those designated as well as those not designated as Minority Serving Institutions, * to recruit and retain students and faculty from underserved and marginalized groups.
- Expand undergraduate research experiences and strengthen diversity, equity, and inclusion by supporting research projects and collaborations with education stakeholders.
- Invest in educational research in STEM subjects that guide the development and evaluation of model programs, tools, and methods for improving the teaching and learning.
- Support the use of research and evidence-based practices for teaching undergraduate and graduate students, including the expectation that faculty are educated in these practices.
- Promote the coordination of programs among two and four-year institutions and chemical and related industries to provide students a variety of options for pursuing STEM careers

A scientifically literate public and workforce that represents the full spectrum of our population will be poised to address global health and environmental challenges and drive economic growth through innovation.

*Minority Serving Institutions includes Historically Black Colleges and Universities, Hispanic Serving Institutions, and Tribal Colleges and Universities