SCIENCE EDUCATION POLICY

Well-educated scientists and engineers drive innovations that allow the United States to maintain its competitive edge in the global marketplace and improve the well-being of citizens worldwide. Science, including chemistry, is central to how people address problems at local, regional, national, and global levels. Preparing current and future students with the skills necessary to address rapidly evolving challenges requires investment at all levels of STEM (science, technology, engineering, and mathematics) education. It is vital that every student attains an appropriate level of science understanding to be prepared for current and future challenges and opportunities.

To achieve a robust and sustained pipeline of STEM talent, policymakers should pursue the following three objectives:

1. Promote lifelong, rigorous education of science concepts and practices in formal and informal settings to improve citizens' understanding of science and its role in society.
2. Provide adequate state and federal support for science education, as well as pre- and in-service teacher preparation and continuing education, to strengthen the quality of teaching which will enhance student learning.
3. Encourage students of all backgrounds, particularly those from underrepresented groups, in the pursuit of education and careers in STEM fields.

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

Science Education System

- Promote science literacy by ensuring that science is a core subject and taught at every level of education.
- Provide for the development of evidence-based methods and curricular materials for teaching chemistry.
- Support the use of curricula that emphasize interdisciplinary aspects of chemistry, and the role of science in solving particular national and global challenges.
- Ensure that standards of learning are rigorous and broadly applicable.
- Encourage the expectation that all students have the opportunity to develop career appropriate STEM competencies.
- Ensure that facilities, including scientific information and library resources, support quality education by being well equipped, accessible, and up-to-date.
- Endorse hands-on laboratory science experiences that develop specific skills and recognize that computer-simulated activities are not equivalent replacements.
- Ensure federal, state, and local resources are equitably distributed to traditionally underserved and underrepresented communities.

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.

- Foster 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 chemical concepts at all levels of chemistry instruction.
- Create effective, alternative pathways for second-career opportunities in the chemistry enterprise.

K-12 Science Education

- Recruit, retain, value, and reward a diverse community of teachers who are well prepared in their science and education backgrounds, and offer them lifelong professional development opportunities to improve their 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.
- Require science educators to obtain necessary safety training to facilitate learning in the laboratory and to conduct chemical demonstrations.
- Include current teachers as full participants in the design of programs for professional and curricula development.
- Improve coordination of formal and informal learning opportunities between teacher education programs and STEM departments at higher education institutions.
- Encourage interactions and partnerships between schools, teachers, students and STEM industries, businesses and professionals in order to provide experiential learning, enhanced teaching opportunities and appropriate role models.

Higher Education

- Incentivize efforts that improve the capability of higher education institutions to recruit and retain students, especially those from underrepresented groups, into the STEM fields.
- Promote coordination of programs between two-and four-year institutions to provide students who enter education at a variety of institutions with options for pursuing STEM degrees.
- Expand undergraduate research experiences by supporting summer and academic-year research projects and collaborations with industry, other academic institutions, government labs, and international partners.
- Invest in, promote, and reward educational research in STEM subjects that guide the development and evaluation of model programs, tools, and methods for improving the teaching and learning of science.
- Support the use of research-based practices for teaching undergraduate and graduate students, including the expectation that faculty are educated in these practices.
- Require institutions to provide comprehensive safety training and protocols in both teaching and research laboratories.

By meeting these objectives, the United States will have a continuously refreshed pool of educated students, informed citizens, and a prepared workforce ready to address challenges and opportunities.