

**U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE AND TECHNOLOGY
SUBCOMMITTEE ON RESEARCH AND SCIENCE EDUCATION**

HEARING CHARTER

Federal STEM Education Programs: Educators' Perspectives

**Tuesday, May 15, 2007
10:00 a.m. – 12:00 p.m.
2318 Rayburn House Office Building**

Purpose

The purpose of this hearing is to inform the Subcommittee of educators' experiences working with science, technology, engineering, and math (STEM) education programs for K-16 students supported by federal R&D mission agencies: National Aeronautics & Space Administration (NASA), National Oceanographic & Atmospheric Administration (NOAA), National Institute of Standards & Technology (NIST), Environmental Protection Agency (EPA), and Department of Energy (DOE). This hearing will explore whether such issues as the lack of coordination between the agencies, difficulty by educators in finding information about the programs, and the absence of robust evaluation techniques hinder the potential of the federal programs for improving STEM education in America. Most importantly, the hearing will highlight how the federal R&D mission agencies can best contribute to raising the level of scientific literacy of all students.

Witnesses

Ms. Linda Froschauer, President, National Science Teachers Association
Mr. Michael Lach, Director of Mathematics and Science, Chicago Public Schools
Dr. George D. Nelson, Director, Science, Technology, and Mathematics Education, Western Washington University
Mr. Van Reiner, President, Maryland Science Center
Dr. Iris Weiss, President, Horizon Research, Inc.

Overarching Questions

- What are the experiences of educators in finding and leveraging resources for STEM education from the federal R&D mission agencies? What challenges have they encountered?
- What do educators perceive to be successful STEM education programs at the federal R&D mission agencies? How do they determine success? What should the agencies improve?
- What support that the federal R&D mission agencies could provide would have the most impact on improving STEM education?

Background

A multitude of studies over the past twenty years have documented the downward slide of American students' proficiency and participation in science, technology, engineering and mathematics (STEM) fields. In October 2005, the National Academies released the report *Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future* which warned that "the scientific and technological building blocks critical to our economic leadership are eroding at a time when many other nations are gathering strength." The authoring committee deemed the highest priority action to be vast improvement of science and mathematics education in order to increase the number of students interested in and prepared for entering careers in STEM fields.

The scientific and technical expertise of the R&D mission agencies has been applied to varying degrees and with varying success to programs and activities relevant to improving STEM education. Currently, the STEM education programs at these agencies for K-16 grades are relatively small and vary widely in methods, target audiences, evaluation measurements, and funding. In an inventory of STEM education programs, the Academic Competitiveness Council (ACC) identified approximately \$39 million in FY06 appropriated funds at the federal R&D mission agencies for K-12 programs and \$6.6 million for undergraduate programs.

Until recently, the agencies have developed their programs independently and without a strategic plan for accomplishing a set of overarching goals and objectives. Unfortunately, this led to a need for each program to discover a cadre of "best practices" on its own rather than collaborating with other program and agency experts. Each program also developed a unique method of evaluation, making a comparison of effectiveness across the programs impossible. Lastly, the agencies have had trouble building widespread awareness of their programs among teachers nationwide.

In response to these issues, the National Science and Technology Council, which serves as the principal body for coordinating federal research and development, has re-established the Education and Workforce Development subcommittee to encourage the agencies to share knowledge and develop a federal strategic plan for effectively

increasing STEM proficiency nationwide. The plans for this new federal coordination and planning activity will be reviewed by the Subcommittee in a subsequent hearing.

The Subcommittee recognizes that critical guidance for how to improve the federal STEM education programs must come from the people who work directly with teachers and students. The witnesses for today's hearing were chosen because of their experience working with these programs and have been asked to provide insight from the field on what the agencies are doing well and where they need to improve.

Specific Questions for the Witnesses

Ms. Linda Froschauer

- In your experience, what are the federal R&D mission agencies doing well in their respective STEM education programs? What could they do better? Can you give examples of any particularly effective programs?
- How do your teacher members learn about STEM education programs sponsored by the federal research and development agencies?
- What resources of the agencies would be most valuable in supporting your teacher members in the classroom?

Mr. Michael Lach

- How do you find resources for improving science and mathematics education in the Chicago Public Schools?
- What resources have you garnered from the federal R&D mission agencies? How has this contributed to improving your students' understanding of science?
- What type of support that the federal R&D mission agencies could provide would have the most impact on STEM education for your teachers and students in Chicago Public Schools?

Dr. George D. Nelson

- In what ways can federal R&D mission agencies contribute most effectively to improve K-12 STEM education? Can you give examples of any particularly effective programs?
- At the undergraduate level, what type of support could the federal R&D mission agencies provide that would recruit more students into pursuing careers in the physical sciences?
- How does the lack of coordination and overarching strategy for STEM education programs hinder the agencies from making an impact?

Mr. Van Reiner

- Please describe the informal education programs that you have partnered with federal R&D mission agencies to provide for school-aged children.
- How well do the federal R&D mission agencies develop evaluation methods to determine the effectiveness of informal STEM education programs?
- What informal education activities should the federal R&D mission agencies increase to help raise the level of scientific literacy in American students?

Dr. Iris Weiss

- Do you feel that the federal R&D mission agencies develop evaluation methods for STEM education programs that demonstrate effectiveness? What recommendations would you give for improving their evaluation methods?
- To what extent do the federal R&D mission agencies incorporate best practices which have proven to be effective in STEM education into their programs?
- Based on your research on teacher training and professional development, what guidance would you give for developing programs for pre-service and in-service STEM teachers?