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May 6, 2010

The Honorable Tom Harkin
Chairman
Committee on Health, Education,
Labor and Pensions
United States Senate
428 Senate Dirksen Office Building
Washington, DC 20510

The Honorable Mike Enzi
Ranking Member
Committee on Health, Education,
Labor and Pensions
United States Senate
428 Senate Dirksen Office Building
Washington, DC 20510

Dear Chairman Harkin and Ranking Member Enzi,

The American Institute of Physics (AIP), the American Association of Physicists in Medicine (AAPM), the American Association of Physics Teachers (AAPT), the American Astronomical Society (AAS), the American Geophysical Union (AGU), the American Physical Society (APS), the Acoustical Society of America (ASA), AVS: Science & Technology of Materials, Interfaces, and Processing (AVS), and the Optical Society of America (OSA) are pleased to offer the following comments on the reauthorization of the Elementary and Secondary Education Act (ESEA).

Our organizations ask that your committee implement these recommendations:

- 1) Include science in any accountability measure while recognizing the importance of laboratory and inquiry based learning.
- 2) Include language in Title IIA directing school districts to set aside a portion of the Teacher Quality funds for science professional development programs and reauthorize the Math and Science Partnership program (Title IIB) at \$450 million.
- 3) Create an office at the Department of Education to oversee the Department's science, technology, engineering, and mathematics (STEM) education programs.

The rationale and explanations for these three recommendations are as follows:

1) Science Education is a Foundation for College and Career Readiness

Put science on equal footing with other subjects for which testing is a required component of school accountability measures; encourage flexibility in assessment methods.

Member Societies

American Physical Society
Optical Society of America
Acoustical Society of America
The Society of Rheology
American Association of
Physics Teachers
American Crystallographic
Association
American Astronomical Society
American Association of
Physicists in Medicine
AVS The Science & Technology
Society
American Geophysical Union

Other Member Organizations

Sigma Pi Sigma Physics
Honor Society
Society of Physics Students
Corporate Associates

Since the adoption of the No Child Left Behind (NCLB) Act in 2002, dramatic reductions in science instruction have been a damaging unintended outcome of standardized testing in reading and mathematics—the only two subjects that count toward a school’s measure of success, Adequate Yearly Progress (AYP). As the Center on Education Policy noted in *Choices, Changes, and Challenges: Curriculum and Instruction in the NCLB Era*, 44 percent of school districts report cutting classroom time for science.

While schools began testing for science in the 2007-2008 school year, the results of those tests are not required to be counted in the AYP measure.

There is currently no incentive for states to include science assessment results under NCLB, a fact that both President Barack Obama and Education Secretary Arne Duncan have noted on several occasions. Of greater concern as we move towards reauthorizing ESEA, there remains no incentive to do so under the Department of Education’s ESEA blueprint.

It is noteworthy that in the years since NCLB was enacted, neither U.S. fourth nor eighth graders have shown any significant gains in science achievement, according to the Trends in International Mathematics and Science Study (TIMSS). In 2007, the most recent year for which TIMSS data is available, U.S. eighth graders scored below ten nations in science assessments, including Hungary, the Czech Republic, and Slovenia.

These figures are even more alarming when data from the Department of Labor’s Bureau of Labor Statistics is considered. As the White House noted in an overview of Fiscal Year 2011 STEM budget requests, delivering a world-class science education must become a national priority as “over 80 percent of the fastest-growing occupations (such as those in the healthcare- and computer-related fields) are dependent on knowledge of mathematics and science.”

If schools continue to have the option to not count science, the trends described above will continue and the impact will worsen. An entire generation of students will have gone through the U.S. K-12 system without the benefit of a world-class science education that would prepare them to be college or career ready in the 21st century.

That is why our organizations urge your committee to require schools to include science in any accountability measure. Recognizing the importance of laboratory and other inquiry based learning methods, we also request language to encourage states to assess science comprehension by means other than a single high stakes test.

2) Recruiting, Training, and Retaining High Quality Science Teachers Must Be A National Priority

Authorize programs that encourage students trained in science fields to become K-12 teachers, and dedicate funding for high quality science teacher professional preparation and development at every level.

The single most important factor in a classroom is the teacher. Science teachers must have deep content knowledge and content-specific pedagogical training that allows them to teach effectively using methods that are shown by research to dramatically improve learning and close the achievement gap.

We also know that our nation needs to recruit far more science teachers, particularly in under-served rural and urban areas. As the National Academy of Sciences 2007 *Rising Above the Gathering Storm* report warned, “highest priority” should be given to “annually recruit[ing] 10,000 science and mathematics teachers.” In fact, less than half of all fourth and eighth graders are taught science by a teacher with a science background, as noted in the National Science Board’s *Science and Engineering Indicators 2010*. That same report found that almost half of “public school fifth grade students were taught science by teachers who reported no [professional development] in science.”

Our organizations ask that you authorize and expand programs that recruit and incentivize students trained in science subjects to become K-12 science teachers.

We also ask that your committee direct school districts to set aside a portion of their Teacher Quality (NCLB’s Title II A) funds for science professional development programs that support high quality, subject-specific teaching practices. This is especially important during difficult financial times when excessive flexibility may allow districts to siphon off funds that would otherwise go to science specific professional development for other uses.

Separately, we further request that your committee reauthorize the Math and Science Partnership (MSP) program (NCLB’s Title II B) at the Department of Education, at or above the previously authorized amount of \$450 million. The Department of Education’s MSP program brings the resources of higher learning and industry together with teachers to improve teacher content knowledge and teaching skill—benefiting 56,000 teachers nationwide, impacting over two million students in fiscal year 2006 alone.

3) Coordinate the Nation’s Investment in STEM Education

Create an office at the Department of Education to oversee the Department’s STEM education programs, coordinate with other agencies with STEM education programs like the National Science Foundation, and liaison with Congress and other stakeholders.

In 2007, the Department of Education-led Academic Competitiveness Council (ACC) completed its report on the federal government's investment in STEM education. That report found over 100 STEM education programs across 12 federal agencies, accounting for approximately \$3.12 billion in fiscal year 2006. The Department of Education's STEM investments account for over 20 percent of that figure. The ACC report recommended greater coordination among federal agencies with STEM education programs.

The Department of Education's ESEA blueprint, calls for supporting programs with proven measures of success. The Department of Education could greatly benefit from STEM education research and development already funded by other agencies, like the National Science Foundation, and archived in the National Science Digital Library and elsewhere. For example the NSF-funded PhysTEC program has established physics teacher preparation programs that provide models for replication and scaling-up, per the Department's ESEA blueprint.

Through its 10 Member Societies, AIP represents more than 127,000 scientists, engineers, and educators. AAPM is the premier organization in medical physics, a broadly-based scientific and professional discipline encompassing physics principles and applications in biology and medicine and represents more than 7,000 members. AAPT is the largest organization of physics educators in the U.S., representing 10,000 precollege and post-secondary physics teachers. The AAS is the major organization of professional astronomers in North America with more than 7,000 members. AGU is a society of over 58,000 Earth and space scientists worldwide. APS represents more than 46,000 physicists from academia, government, and industry. The ASA is the premier international scientific society in acoustics, with 7,500 members worldwide. AVS represents more than 4,000 scientists and engineers from academia, government and industry. OSA unites more than 106,000 professionals in the global optics community through its programs and initiatives.

Our organizations look forward to working with your committee to ensure the promise of a quality science education for our nation's children.

Respectfully,

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