

**U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY**

HEARING CHARTER

STEM Education in Action: Learning Today... Leading Tomorrow

**Thursday, June 16, 2011
10:00 am – 12:00 pm
2318 Rayburn House Office Building**

1. Purpose

On Thursday, June 16, 2011, the Committee on Science, Space, and Technology will hold the first in a series of hearings to highlight Science, Technology, Engineering, and Math (STEM) education activities across the Nation, their role in inspiring and educating future generations, and their contribution to our future economic prosperity. The first hearing, *STEM Education in Action: Learning Today...Leading Tomorrow*, will showcase the finalists, parents, teachers, and mentors of the ExploraVision Awards National Competition, sponsored by Toshiba and the National Science Teachers Association.

2. Witnesses

Dr. Karen Lozano, Professor at University of Texas Pan American, Parent to Pablo Vidal and Mentor to the i.streets (Intelligent Streets) Discovery Montessori School Team

Master Pablo Vidal, 3rd grade student at Discovery Montessori School and member of the i.streets (Intelligent Streets) Team

Mrs. Brenda Conwell-Dudley, Parent to Jack Dudley and Mentor to the HEADS UP! Virginia Virtual Academy Team

Master Jack Dudley, 6th grade student at Virginia Virtual Academy and member of the HEADS UP! Team

Ms. Amy Attard, Science Teacher and Coach to the I-TBS: Intra-Trachea West Hills Middle School Team

Miss Claudia Cooper, 7th grade student at West Hills Middle School and member of the I-TBS: Intra-Trachea Team

Ms. Anne Manwell, Science Teacher and Mentor to the 3Drenal: Kidney Bio-Printer Stuyvesant High School Team

Miss Alison Reed, 10th grade student at the Stuyvesant High School and member of the 3Drenal: Kidney Bio-Printer Team

3. Overview

- ExploraVision is a science competition for grades K-12. Students are asked to research a technology of their choice and explore what that technology could be like in 20 years. Teams explore how their visions of technology could work and what breakthroughs are necessary to make their ideas a reality. The competition is sponsored by Toshiba and the National Science Teachers Association (NSTA).
- In the U.S., student mastery of STEM subjects is essential to thrive in the 21st century economy. As other nations continue to gain ground in preparing their students in these critical fields, the U.S. must continue to explore a variety of ways to inspire future generations. Finding ways to improve STEM education activities beyond the scope of the Federal government, including using best practices derived from non-federal sources, is key to the future prosperity of the Nation.

4. Background

ExploraVision Competition

Now in its 19th year, ExploraVision is a science competition that encourages K-12 students to work in groups of two to four assisted by a teacher and a mentor to simulate real research and development teams. Students are asked to research a technology of interest and explore what that technology could be like 20 years from now. The technology could be something as basic as a water fountain to something as complex as nanotechnology. Teams investigate how their visions of technology could work and what breakthroughs are necessary to make their ideas become reality. Since 1992, more than 287,000 students have competed in this hands-on competition, sponsored by Toshiba and the National Science Teachers Association (NSTA), which inspires students and fuels imagination.

ExploraVision is designed for students of all interest, skill, and ability levels. The competition is open to students enrolled in public, private, or home school in the United States and Canada. Students compete in four entry categories: Primary Level (Grades K-3), Upper Elementary Level (Grades 4-6), Middle Grade Level (Grades 7-9), and High School Level (Grades 10-12). Judges rate teams on creativity, scientific accuracy, communication, and feasibility of vision. Teams are organized into six regional areas of the United States and Canada. A judging committee selects 24 teams, one for each grade-level category in each of the six regions. All 24 regional winning teams must complete a website for its future technology and prototype. Out of those 24 teams, a national judging committee consisting of leading science educators, as well as science and technology experts, selects eight finalist teams. From those finalists, the judges award four first-place and four second-place prize winners¹.

¹ Data collected from ExploraVision website www.ExploraVision.org

Prizes include the following:

Students

- First Prize (4 teams): \$10,000 U.S. Savings Bond for each student
- Second Prize (4 teams): \$5,000 U.S. Savings Bond for each student
- National Finalists (8 teams): An expense paid trip to Washington, D.C. in June for ExploraVision Awards Weekend for each national winning student and his/her parents/guardians
- Regional Winners: A Toshiba Camileo™ Camcorder for each student and an awards ceremony for each regional winning team at its school where the team will receive a winner's banner, plaque and other gifts
- Honorable Mention (500 teams): A unique prize and certificate for each student
- All Participants: A certificate of participation, entry gift and a special discount on Toshiba computer products for every student whose team submits a complete entry

Coaches and Mentors

- National Finalists: An expense paid trip to Washington, DC in June for ExploraVision Awards Weekend for the coach and mentor of each national winning team and a one-year NSTA membership to coaches of the national winning teams
- Regional Winners: A Toshiba Camileo™ Camcorder for the coach and mentor of each regional winning team
- All Participants: A special discount on Toshiba computer products, certificate of participation and an entry gift for each coach and mentor of every team that submits a complete entry

Schools

- Regional Winners: A Toshiba laptop for each of the schools of the regional winning teams

Toshiba America, Inc.

The Tokyo-based Toshiba Corporation is a leading innovator and diversified manufacturer and marketer of advanced electronic and electrical products, spanning information and communications equipment and systems, Internet-based solutions and services, electronic components and materials, power systems, industrial and social infrastructure systems, and household appliances. Toshiba employs over 14,000 people in North America. Toshiba America, Inc., is the holding company for five Toshiba operating companies in the United States, with operations in 13 states and the District of Columbia.²

National Science Teachers Association (NSTA)

Founded in 1944, the Arlington, Virginia-based National Science Teachers Association (NSTA) promotes excellence and innovation in science teaching and learning. NSTA's current membership includes more than 60,000 science teachers, science supervisors, administrators, scientists, business and industry representatives, and others involved in science education. NSTA seeks to provide opportunities for scientific literacy, excellence in teaching, learning through collaboration, and research that will enhance and improve science education for all students.³

² <http://www.toshiba.com/tai/>

³ <http://www.nsta.org/>

STEM Education and the Federal Government

A consensus exists that improving STEM education throughout the Nation is a necessary condition for preserving our capacity for innovation and discovery and for ensuring U.S. economic strength and competitiveness in the international marketplace of the 21st century. The National Academies *Rising Above the Gathering Storm* report placed major emphasis on the need to improve STEM education and made its top priority increasing the number of highly qualified STEM teachers. This recommendation was embraced by the House Science, Space, and Technology Committee following the issuance of the report and was included in the 2007 *America COMPETES Act*. The 2010 *America COMPETES Reauthorization Act* continues this priority.

Beyond activities authorized in *America COMPETES*, President Obama has called for a new effort to prepare 100,000 science, technology, engineering, and math (STEM) teachers with strong teaching skills and deep content knowledge over the next decade. As a component of achieving this goal, the FY12 Budget Request proposes an investment of \$100 million through the Department of Education and the National Science Foundation (NSF) to prepare effective STEM teachers for classrooms across America. This proposal also responds to a recommendation by the President's Council of Advisors on Science and Technology (PCAST) to prepare and inspire America's students in science, technology, engineering, and mathematics.⁴

In addition, the FY12 Budget Request proposes \$90 million for the creation of an Advanced Research Projects Agency – Education (ARPA-ED) with the mission of driving transformational improvement in education technology.⁵

The President's new "Educate to Innovate" campaign leverages Federal resources with over \$700 million in private-sector resources. The goals of the program are to increase STEM literacy so that all students can learn deeply and think critically in science, math, engineering, and technology; move American students from the middle of the pack to top in the next decade; and expand STEM education and career opportunities for underrepresented groups, including women and girls.

With specific regard to K-12 STEM education funding beyond what has already been identified, the FY12 Budget Request calls for \$206 million for the Department of Education's proposed Effective Teaching and Learning in STEM program; \$60 million (28 percent) increase for NASA's K-12 education programs; \$300 million for an "Investing in Innovation" program (expansion of a Department of Education American Reinvestment and Recovery Act program); and \$185 million for a new Presidential Teaching Fellowship program.

The FY12 Budget Request devotes \$3.4 billion to STEM education programs across the Federal government.⁶ The 2010 *America COMPETES Reauthorization Act* called for the creation of a

⁴ White House Office of Science and Technology Policy, *Winning the Race to Educate Our Children*, STEM Education in the 2012 Budget, p.1

⁵ White House Office of Science and Technology Policy, *Winning the Race to Educate Our Children*, STEM Education in the 2012 Budget, p.1

National Science Technology Council (NSTC) Committee on STEM Education to coordinate federal STEM investments. The first-year tasks of the committee are to create an inventory of Federal STEM education activities and develop a 5-year strategic Federal STEM education plan. The inventory, as well as a similar Government Accountability Office (GAO) survey requested by the Committee on Education and Workforce, is currently underway and results are expected before next year.

The GAO survey is an update of one last prepared by the Office in 2005. In a 2007 inventory of Federal STEM education programs, the Academic Competitiveness Council (ACC) identified 105 programs and approximately \$3.12 billion in FY06 appropriated funds across the Federal agencies for STEM education at all levels, including 24 programs designed for K-12 students funded at approximately \$574 million. However, the ACC set parameters on its inventory, limiting the programs for inclusion to those “primarily intended to provide support for, or to strengthen, science, technology, engineering, or mathematics education.” As a result, the ACC inventory excluded many educational activities supported by the Federal R&D mission agencies that are managed through larger research programs and offices, including major research facilities, and that do not show up as separate line items in the budget.

In the 112th Congress, the Science, Space, and Technology Committee will continue to hold oversight hearings and briefings on STEM education activities across the Federal government and will closely monitor the scope and findings of both the NSTC and the GAO Federal STEM education inventories.

⁶ White House Office of Science and Technology Policy, *Innovation, Education, and Infrastructure: Science, Technology, STEM Education, and 21st Century Infrastructure in the 2012 Budget*, p. 2.