SPRING 2009

PENNSYLVANIA STEM notes

Building a Competitive Future for the Commonwealth

inside:

Pennsylvania Joins the Real World Design Challenge

In order to solve the engineering challenges of the future, we need to focus on preparing future engineers today. One way to improve our efforts is to immerse students in the process of solving real-world problems by applying their knowledge of science, technology, engineering and mathematics to actual scenarios that allow them to practice creative thinking, problem solving, and team collaboration—all of which are aspects of STEM literacy that are essential to the success of our future workforce.

The U.S. Department of Energy is partnering with a number of states to roll out the Real World Design Challenge, a new program that will allow students in grades 9 – 12 the opportunity to work in teams to solve real-world engineering problems. The precise nature of the Challenge will change from year to year, but the underlying design principles will remain constant. Each year, a new challenge will be issued focusing on a different area of engineering. This year's Challenge will focus on aeronautics and energy usage.

Student team members from Commonwealth Connections Academy celebrate Pennsylvania's participation in the U.S. Department of Energy's Real World Design Challenge along with Gerald L. Zahorchak, Secretary of Education and Dr. Ralph K. Coppola of Parametric Technology Corporation.

"This program gives students an honest and immediate answer to that age old question," 'When am I ever going to use this?'," says Brenda Hittle, Mechanical Engineering teacher at Mercer County Career Center, one of the participants in the Northwest STEM Region. "Students in the Real World Design Challenge are going to learn that the work they have the potential to do can impact the real world in so many positive ways."

Governor Edward G. Rendell and Secretary of Education Gerald L. Zahorchak announced that Pennsylvania will be one of the first ten states to participate in the new program, which will be coordinated in the Commonwealth through the Pennsylvania STEM Initiative and its five regional STEM Networks.

Schools who participate in the Real World Design Challenge will be provided with cutting-edge engineering software from Parametric Technology Corporation (PTC) and will have the opportunity to send selected teachers for specialized training. "The software that PTC is providing is the missing piece we have been looking for," says Dr. Clyde Hornberger, Executive Director of the Lehigh Career & Technical Institute. "We are thrilled that Pennsylvania was chosen to participate in this program."

nextSTEP: For more information on the Real World Design Challenge, go to www.pasteminitiative.com or contact your regional STEM Network coordinator.

PENNSYLVANIA STEM INITIATIVE

The Pennsylvania STEM Initiative develops and deploys statewide strategies and resources designed to enhance the Commonwealth's education and workforce development efforts targeted at the development of a globally competitive science, technology, engineering and mathematics (STEM) workforce.

The work of the Initiative is accomplished through five regional STEM networks working in partnership with a statewide Leadership Team. The Pennsylvania STEM Initiative is made possible by the National Governors Association and the Team Pennsylvania Foundation, in cooperation with five Pennsylvania state agencies and a network of public and private partners.

For more information on the Pennsylvania STEM Initiative, visit www.pasteminitiative.org or contact Sue Mukherjee, State Lead at 717.772.1326 or via email to smukherjee@state.pa.us.

- **Commonwealth of Pennsylvania**
  Edward G. Rendell, *Governor*
- **Team Pennsylvania Foundation**
  Wendie DeMatteo Holsinger, *Co-Chair*

STEM schools: *education* update

The Pennsylvania STEM Initiative is working diligently to identify and implement solutions that, in cooperation with the Pennsylvania Department of Education, Pennsylvania's Inspired Leadership Regions, and the Commonwealth's educators, make the difference in providing STEM educational opportunities for all Pennsylvanians.

Report Released on STEM Education in Southwest PA

The Southwest STEM Network partnered with Carnegie Mellon University's Leonard Gelfand Center for Service Learning and Outreach and the Intermediate Unit 1 Center for STEM Education to develop a definitive report on the state of STEM education in Allegheny, Washington, Greene and Fayette counties. Through research that included focus groups and surveys conducted with educators throughout the region, the report demonstrated that greater awareness of STEM needs to be developed among educators – and that educators are eager to work with postsecondary partners to introduce students to STEM career pathways and higher educational experiences. The focus group sessions utilized the "Rising Above the Gathering Storm" report produced by the National Academies, and widely considered a benchmark report on STEM. Partners in the Southwest region will use this report to identify opportunities to move STEM education forward in the region. The research was made possible through a grant from the Claude Worthington Benedum Foundation.

nextSTEP: The report is available for viewing or downloading online at www.cmu.edu/gelfand-center. For more information about the Southwest STEM Network, contact Barry Nathan at 412.918.4241 or via email to bnathan@catalystconnection.org.

PDE Standards Aligned Systems Continues to Support STEM

In order to provide Pennsylvania educators with a clear and consistent framework for building curricula and defining educational programs, the Pennsylvania Department of Education (PDE) has been deploying a methodology called Standards Aligned Systems (SAS). The concept behind SAS is that research has consistently demonstrated that there are six elements that define a 'great school'. These six elements are (1) clear standards, (2) fair assessments, (3) a curriculum framework, (4) aligned instruction, (5) comprehensive materials and resources, and (6) effective interventions to meet the needs of all learners. Building a process of educational leadership which addresses all six of these cohesively, from the state level down to the classroom level, is what Standards Aligned Systems seeks to accomplish. Within this framework, PDE has begun by creating SAS models and resources for educators that focus on the following four subject areas: literacy, mathematics, civics/social studies, and science & technology. Clearly, two of these are directly STEM-related and all four are critical to the success of STEM education efforts. Within the science & technology subject area, SAS defines five content areas and four process areas that are essential to successful STEM education in Pennsylvania classrooms.

nextSTEP: For more information on Standards Aligned Systems and Pennsylvania's strategy for science and technology education, go to www.pde.state.pa.us/sas.

STEM strategies: WORKFORCE DEVELOPMENT

Alongside education, the other key pillar of the Pennsylvania STEM Initiative is the partnership with workforce development partners including the Pennsylvania Department of Labor & Industry and the state's network of Workforce Investment Boards.

Workforce Professionals Discuss STEM Future for Lancaster County

The future of the technology sector in Lancaster County was the focus of the tenth annual Lancaster County workforce summit held on December 4, 2008. Citing a gradual decline in the percentage of Lancaster County's technology sector employment, Scott Sheely, Executive Director of the Lancaster County WIB, said that Lancaster County needs to do more to create an environment that supports technology and innovation, beginning with increased efforts to build a STEM workforce. Sheely's comments were part of a broader briefing which highlighted national and Statewide projects in STEM. Sue Mukherjee, Special Assistant, Office of the Secretary, PA Department of Labor and Industry and Dr. Carol Adukaitis, STEM Program Manager, State System of Higher Education, were joined by Dr. Brenda Becker, Superintendent of the Hempfield School District and Andrew Garner, Youth Coordinator of the Workforce Investment Board who briefed those in attendance on the impact of program initiatives on K-12 education in Lancaster.

nextSTEP: To learn more, go to www.lancastercountywib.org and click on the STEM link, or contact Allison Felix of the Central STEM Network at 814.472.3871 or via email to centralstem@francis.edu.

WIB Industry Partnerships Focus on STEM

One of Pennsylvania's strongest workforce development opportunities rests in the powerful network of Industry Partnerships that have been formed throughout the Commonwealth under the Rendell administration. WIB Industry Partnerships are collaborative partnerships that bring together businesses and workforce development partners in a given sector to focus on issues ranging from incumbent worker training to the development of an adequate future pipeline of workers for the sector. The IPs are administered in partnership with Pennsylvania's 23 Workforce Investment Boards.

Industry Partnerships throughout Pennsylvania are focusing on STEM as a strategic priority. Two examples include the Delaware County Healthcare Consortium, which is investing in promoting STEM education for adults and youth in Southeastern Pennsylvania to develop critical math skills necessary for careers in healthcare, and the Northeastern Pennsylvania Pre-Apprenticeship Initiative which helping students interested in construction careers prepare for the science, technology and mathematics components of a comprehensive exam and interview process. In addition, the 3 Rivers Clean Energy Partnership convened an energy industry workforce summit this year that focused on helping the region's three Regional Career Education Partnerships (RCEPs) develop a strategic action plan with a focus on STEM workforce development.

nextSTEP: More information on Pennsylvania's Industry Partnerships is available online. Go to www.paworkforce.state.pa.us and click on Workforce Professionals.

STEM inclusion: focus on women+minorities

One of the objectives of the Pennsylvania STEM Initiative is to increase the number of women, minorities and individuals from underrepresented populations who are actively engaged in STEM education and career exploration, and who ultimately become members of Pennsylvania's STEM workforce.

NGCP Presents to State, STEM Leaders

Officials with the National Girls Collaborative Project (NGCP) met with state and regional STEM leaders on November 7, 2008 at Penn State Harrisburg to officially launch the NGCP's partnership with the Pennsylvania STEM Initiative. Through this partnership, NGCP is providing resources to support development of programs that engage girls in science experiences and STEM occupational exploration. This effort is partly underwritten by funds from the National Science Foundation.

nextSTEP: To learn more about NGCP's partnership with the Pennsylvania STEM Initiative, contact Tanza Pugliese of the Pennsylvania STEM Initiative at 717.233.1375 or via email to tanza@teampa.com. Details on the NGCP initiative are also available online at www.ngcproject.org.

Urban STEM Policy Group Meets

The Franklin Institute in Philadelphia hosted a summit titled "Theory to Practice: Strategies for Successfully Engaging Underrepresented Students in the Pennsylvania STEM Pipeline" on December 3, 2008. The program consisted of two half-day sessions focused on regional policy makers and educators/practitioners and featured a keynote presentation by Dr. A. Wade Boykin who is a member of the Presidential Commission/National Math Advisory Board. The summit was also supported regionally by the Temple University Center for Intergenerational Learning and the Philadelphia School District's B.E.S.T. Robotics Initiative.

nextSTEP: To learn more about upcoming programs in the Philadelphia area, contact Tony Girifalco of the Southeast STEM Network at 215.464.8550 or via email to ajg@dvirc.org.

STEM profile:

Harrisburg University of Science and Technology – In December of 2001, Harrisburg University of Science and Technology (HU) became the first new higher educational institution chartered in Pennsylvania at the dawn of the new century. The founders of HU formed the unique institution specifically to bring together cutting-edge science and technology instruction; state-of-the-art facilities; integration with its urban environment; and an educational model that is built to respond to the needs of business and provide students with immersion in the real-world application of their studies. In other words, HU is Pennsylvania's 21st century STEM university. The University received its charter from the Pennsylvania Department of Education in 2005. HU promptly accepted its inaugural class that August, with the first graduates celebrating their achievements in May of 2008.

Harrisburg University and the Pennsylvania STEM Initiative are ideal partners in numerous ways. The University's focus on experiential learning and career development is aligned with programs like the Real World Design Challenge and the STEM philosophy that hands-on experience is the most effective way to engage students with complex subject matter. Experiential learning not only teaches content knowledge, but also enhances the students' ability to reason and problem-solve. As with the Pennsylvania STEM Initiative, HU is a public-private partnership that is funded by contributions from private citizens, corporations, and government entities. It has hosted many STEM programs and is an active participant in the Central STEM Region as well as in statewide leadership roles.

nextSTEP: Find out more about Harrisburg University at www.harrisburgu.net.

STEMcenters:

NEWS OF THE NETWORK AND BEYOND

NORTHWEST REGION TO HOST SPRING FORUM – Lorenzo Simonelli, CEO of General Electric Transportation, will be the keynote speaker at a major forum on STEM being hosted by Northwest STEM Network in Erie on April 21, 2009. The forum will explore efforts to promote STEM in the Northwest region as well as the connection between STEM and health services and "green collar" career pathways. For more information, contact Ken Borland at 814.449.6477 or via email to borlandkb@verizon.net.

STATES, NGA MEET TO REVIEW STEM PROGRESS – Representatives of statewide STEM teams from each of the six states participating in the National Governors Association STEM grant program met in Washington on January 26–27, 2009 to share progress, discuss best practices, and report on major accomplishments. Panelists and presenters from Colorado, Hawaii, Minnesota, Ohio, Pennsylvania and Virginia were joined by experts from the NGA, Intel Foundation, Gates Foundation and the Organization for Economic Cooperation and Development (OECD) to learn about STEM educational benchmarking and sustainability strategies across the U.S. and worldwide.

ASSET MAPPING MOVES FORWARD – Under the leadership of Barry Nathan and Liz Nilsen of Catalyst Connection, an architecture has been developed and is being refined to support the statewide asset mapping process that will begin in January of 2009. The purpose of the asset mapping methodology is to provide a common framework for defining, categorizing and reporting on STEM assets identified throughout Pennsylvania. A version of the asset mapping database will also be made available on the new Pennsylvania STEM Initiative website.

RICCARDS SUPPORTS REGIONS ON STRATEGY – Patrick Riccards of Exemplar Strategic Communications has begun collaborating with the five Pennsylvania STEM Network regional points of contact to help define and develop the long-term strategy for the Pennsylvania STEM Initiative. This process will prepare Pennsylvania's STEM effort to sustain its efforts over a ten-year period and beyond. Riccards formerly worked with the National Governors Association, the U.S. Department of Education and the National Institute for Literacy.

NATIONAL LEADERS FOCUS ON STEM – A nationwide partnership of business leaders and technology associations continues to press the STEM imperative as a leading public policy priority for the United States. The Tapping America's Potential (TAP) campaign was formed in 2005 with the goal of doubling the number of college-educated STEM graduates by the year 2015. TAP released a progress report in 2008 titled "Gaining Momentum, Losing Ground" which indicates a continued need for emphasis on STEM education in the U.S. For more information, go to www.tap2015.org.

New Website Provides Resources for STEM Partners

The Pennsylvania STEM Initiative has launched a new website at **www.pasteminitiative.org** that incorporates many valuable capabilities and will serve as a growing platform for STEM information, resources and links across the Commonwealth. The new site provides a number of interactive tools for users. The news and events center provides current updates on events and activities on a statewide level as well as specific to one or more of the five Regional STEM Centers. In addition, users can locate their STEM region through a clickable map or via a directory of Pennsylvania's 67 counties. Once a region has been selected, a color-coded landing page specific to that region provides news, events, documents and resources as well as regional updates and contact information. The site's new resource directory provides a central repository for source documents, program guides, regional reports and other updates. In addition, the site will soon host a dynamic, searchable database of STEM programs driven by data collected through the STEM asset mapping process. And a new media center will provide access to a video communications tutorial and archived resources from previous STEM meetings and workshops.

PENNSYLVANIA STEM INITIATIVE

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