



Completing the 25<sup>th</sup> Anniversary year for PRCST leads us into a very busy future. One bright note ended the year: The Keynote Speaker at our Anniversary celebration, Dr. Devra Davis, the founding director of the Center for Environmental Oncology at the University of Pittsburgh Cancer Institute, was selected for honorable mention by the Carnegie Science Center Awards in May for creating both the Environmental Health Trust, an independent think tank devoted to studying and reducing environmental hazards and the World's first Center for Environmental Oncology. Kudos to Dr. Davis!

Making Professional Development opportunities for teachers relevant remains a primary aim for PRCST as we provided summer workshops that included: Energy – The Sun and Beyond, Elementary GLOBE, Exploring Climate Change, and using the *Environment and Health: A Systems Approach* kit developed by PRCST. (See directions) While this program has been very successful over the three year development period, there is a challenge in scaling up and introducing systems thinking into new schools/environments. It should be about adapting what you already have. But variations in each educational site can include how teachers prepare content, what pedagogical style is used, and even the school/classroom culture – precluding a “recipe” for scaling.

Dian Schffhauser, in T.H.E Journal-June/July 2009 quotes Harvard University's Christopher Dede and Microsoft's Allyson Knox who have found that scaling encompasses five dimensions:

1. Spread to more users
2. Depth – deep transformative, consequential changes in instructional practice, leading to improved educational outcomes for students.
3. Sustainability – maintaining changes over a substantial period.
4. Shift – when school and teachers assume ownership of the innovation.
5. Evolution – ongoing revision of the innovation by those adapting it.
6. She adds a sixth dimension – emotion, asking people to take something that was highly successful (their own work) and modify it – the hardest thing to do.

With a focus on #2, along with the other dimensions, integrating a systems thinking approach can be exciting, if difficult, for teachers bound by textbooks and test mandates. However, adaptations can actually quite easily bring systems thinking into current lesson plans. And a story can always provide a rich entry.

Bringing current, accurate and relevant basic research and applications into the classroom provides a viable venue for engaging students as they witness first-hand the impact on their lives and life styles. Example: Who would have thought that a Danish scientist studying ion transport across frog skin in the 1950s would later have a major impact on understanding human disease. After all it was research into how frogs absorb salt from pond water! What a story!

Yet – it was this discovery that twenty-some years later his techniques and theories helped scientists learn that cystic fibrosis involved a defect in the movement of the salt chloride across the bronchial lining.

*Adapted from The fall 2009 Spectator – University of Iowa*

*Understanding the value of basic research and the application to everyday life can bring science alive for students.*

*"I believe in scientific inquiry for its own sake.*

*I think the history of science gives ample examples that pure investigation has enormous benefit...*

*I can't tell you what this might be good for, but learning about nature is important. And lovely things turn up."*

*James Van Allen (1914-2006)*

*University of Iowa Professor Emeritus and  
Discoverer of the Van Allen Radiation Belts*

Bridging research and current applications helps strengthen for students the need to enter the STEM careers. In today's time of economic stress, there is a special need for ways to recruit students from diverse backgrounds into STEM careers – some from low economic situations. White Sox outfielder Ron Kittle has said, "I'm so poor I can't even pay attention". While this can evoke amusement, it can also reflect the status of some students – who indeed have difficulty paying attention. Using a "story" and bringing relevance to the lesson may help students focus and increase their learning.

## DIRECTIONS

### EPA Offers Tips on How to Protect Eyes, Skin from the Sun's Harmful Rays

#### *Download sun safety information on smartphones*

**WASHINGTON** – In recognizing Ultraviolet (UV) Safety Month, the U.S. Environmental Protection Agency (EPA) is providing tips and tools to people of all ages that will protect them from the sun's harmful rays. Overexposure to the sun can cause skin cancer and eye damage during any time of the year, regardless of skin color.

EPA launched an application for smartphones that gives users mobile access to the daily UV index forecast in their area. This application provides Americans with a new way to check the sun's intensity and plan outdoor activities accordingly. The app provides users with a numeric index ranging from 0 to 11+ (higher numbers indicate greater amounts of skin-damaging UV radiation), and tips to protect the skin and eyes.

In addition to this new app, EPA has issued "Health Effects of Ultraviolet Radiation," a fact sheet intended for older adults and their caregivers. The fact sheet describes how UV radiation plays a role in the development of age-related macular degeneration and skin cancer.

Skin cancer is the most common form of cancer in the United States. More people were diagnosed with skin cancer in 2009 than with breast, prostate, lung, and colon cancer combined. One American dies every hour from skin cancer. Overexposure to UV radiation may suppress proper functioning of the body's immune system and skin's natural defenses. All people, regardless of skin color, are vulnerable to the effects of UV radiation.

To download the UV Index smartphone app: <http://www.epa.gov/enviro/mobile/>  
More information on the SunWise program: <http://www.epa.gov/sunwise/>

More information on EPA's Aging Initiative and to download the fact sheet:  
<http://www.epa.gov/aging/index.htm>

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**What programs have been proven to help students achieve?** Johns Hopkins University's [Best Evidence Encyclopedia](#) (BEE) website helps educators answer that question with free, easy-to-read reviews of reading, math, ELL, and other programs for grades K-12. Visit the BEE now to view a new report on effective early childhood education programs.

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### **Chemistry Demonstrations for the First Day of School**

Flinn Scientific's "Teaching Chemistry" Video Series includes online videos of proven "Opening Day" chemistry demonstrations for the first day of school. You can view these videos and learn from master teachers who share some of their favorite activities to welcome students and introduce them to the wonders of chemistry.

There are two "Opening Day" video courses. Each course includes four videos. Viewing passes (Catalog No. EL8000) are \$5.95 per course and give you unlimited 60-day 24/7 viewing. Unused viewing passes never expire. Complete instructions for each demonstration and activity are printable as PDFs.

To view free previews of both "Opening Day" courses go to <http://elearning.flinnsci.com/> and click on "View Chemistry Video Topics" then "Opening Day Demonstrations."

Viewing passes may be purchased using a credit card or school purchase order.

For more information please contact: Flinn Scientific, Inc., P.O. Box 219, Batavia, IL 60510

1-800-452-1261; E-mail: [flinn@flinnsci.com](mailto:flinn@flinnsci.com)

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### **Conceptual Framework for New Science Education Draft Seeks Public Comments**

The National Research Council's (NRC) highly anticipated [draft](#) of the Conceptual Framework for New Science Education Standards was released and is open for comment from stakeholders.

Supported by a Carnegie Corporation grant, the framework is being developed in order to guide the development of next generation science education standards. (The NRC published their existing K-12 science education standards over a decade ago.) Additionally, the intent of the committee is that the framework will also serve as a broader guide ([read more...](#))

[[This is a content summary only, click on the article title above to read the complete story at the Triangle Coalition Legislative News site. Also, while there, you'll find our exclusive STEM Ed. Bill Database, recent appropriations updates, and other STEM education news coverage.]]

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### **LetsMove - A Note from Michele Obama**

"As a mother, I know there is nothing more important than a child's health. But today, obesity threatens the health of one out of three American children. That's why we launched *Let's Move!* -- a nationwide effort to solve the challenge of childhood obesity within a generation. .... I'm excited to introduce the new and improved [LetsMove.gov](#) -- an online resource for parents, teachers and community leaders to help our children eat better and become more active: "

Here are a few new features on the site that you should check out:

- [Simple steps](#) to success for parents, teachers, local officials, community leaders and chefs with easy, achievable ways to make changes in your day to day lives to improve the health of our nation's kids;
- The *Let's Move!* [blog](#) with the latest news, events and videos that are easy to share with friends and family;
- Ideas and resources for parents and families to get moving in the [great outdoors](#);

- Links to *Let's Move!* on [Facebook](#) where you can connect and share tips with others that are concerned about this issue; and
- Healthy, affordable [weekly menu plans](#) and video cooking demonstrations for busy families created by some of the country's top chefs.

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## Participate in Science Game Design.

Immune Attack (IA1.0) is a learning game that anyone can play. Download it [HERE](#). (WindowsXP or later).

The Federation of American Scientists (FAS) Learning Technologies Program is collaborating with [Muzzy Lane Software](#) to create a series of games for middle school science! We are looking for designers, teachers or students who are interested in joining our conversation about making effective learning tools. To join, go to [The ClearLab Project](#) and register.

[FAS Educational Technology Program](#) is collaborating with [Muzzy Lane Software](#) to create a series of video games that help middle school students and teachers prepare for middle school science proficiency exams. The collaboration is intended to draw in teachers, students, game designers and anyone interested to contributing to the design of the games. Since middle school science covers a wide range of topics (Physical, Chemical, Earth and Life sciences) there is something to interest everyone. The collaboration is called The Clear Lab Project, and is funded by a SBIR grant from DARPA to Muzzy Lane. To get involved, go to the project website, <http://clearlabproject.com/>. Soon, you will be able to access our very first draft of a game design. You can also find a "Game Design Template," which is a list of the necessary components of an excellent video game design draft.

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## **Operation: Tectonic Fury - JASON's New Geology Curriculum**

The JASON Project is pleased to announce the launch of our latest middle-school science curriculum, *Operation: Tectonic Fury*. Featuring [prominent scientists](#) from NOAA, The Smithsonian Institution, the U.S. Department of Energy's Oak Ridge National Laboratory and the National Energy Technology Laboratory, this exciting unit takes your students from the top of Mount St. Helens to the depths of a West Virginia mine in search of answers to Earth's oldest mysteries. [Learn more about Operation: Tectonic Fury](#)

### **Available in Print and Free Online Editions**

*Operation: Tectonic Fury* is available free online as either an interactive Web site, or as free PDF downloads for printing. Additionally, print editions can be purchased from JASON's online store.

[Explore the Online Edition](#) | [Download a PDF](#) | [Purchase Print Editions](#)

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## Milestones In Toxicology

To recognize the 50th anniversary of the Society of Toxicology (SOT), the National Institute of Environmental Health Sciences (NIEHS), the National Toxicology Program (NTP), the journal Environmental Health Perspectives, and SOT are teaming up to create a special poster, banner and website featuring the <sup>3</sup>Milestones in Toxicology.<sup>2</sup>

The <sup>3</sup>Milestones<sup>2</sup> will feature the most prominent, significant people, discoveries and events that have shaped the field of toxicology.

"From Paracelsus' declaration that 'the dose makes the poison' to high throughput assays, many people, discoveries and events have shaped the modern field of toxicology," said NIEHS/NTP Director Linda Birnbaum, Ph.D., the first female to lead the NTP and the first toxicologist to head an NIH institute. "We think this will be a great resource to highlight the formative milestones in our field, and we're excited to have the community help us shape the project by providing input."

Interested people can nominate their choice(s) for the project and vote on others' submissions by visiting the Web site below.... established for the project. A commemorative poster, banner and web site will be available during and after the 2011 SOT conference to individuals, schools, and other public and private institutions.

Help select the top milestones in toxicology!

Visit our Web site at the following URL often to nominate and vote for your favorite choice(s).

<http://www.niehs.nih.gov/news/events/highlight/sot/2011-milestones.cfm>

## SCIENCE SNIPPETS

**10/90 Research Gap in Health Research** – described the observation that 90% of research funds targeted health issues of 5% of the world's population – reported and acted upon. Some chronic conditions were nonexistent in the 1990 report. Since then, much attention has been focused on diseases and conditions of under-nutrition.

However the rising epidemic of obesity and related diseases has refocused attention on chronic diseases. Chronic noncommunicable diseases, which include cardiovascular disease and stroke, cancer, diabetes, and chronic respiratory diseases account for 60% of deaths worldwide. – 80% occur in low-middle-income countries. These individual will not benefit from the advances in health research unless their genotypes and cultural environments are included in biomedical research.

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**How Facts Backfire** – If people are furnished with the facts, they will be clearer thinkers and better citizens. If they are ignorant, facts will enlighten them. If they are mistaken, facts will set them straight. – Truth will out???? Maybe not.. See the article in the Boston Globe:

[http://www.boston.com/yourtown/milton/articles/2010/07/11/how\\_facts\\_backfire/](http://www.boston.com/yourtown/milton/articles/2010/07/11/how_facts_backfire/)  
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**LEED Ratings Missing Human Health** – In the Kansas City Star Human Network blog (6/15) Melissa Hinch-Ownby writes about a recent report that suggests an important area is missing in the LEED rating system– human health. The report from Environment and Human Health Inc. identifies several health threats that are overlooked : indoor air quality and drinking water. The use of artificial turf was also identified as a third threat, but is in a category of its own.

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**NOAA offer 20 environmental education games** – including humpback whale migration, ocean literacy, recycling, invasive species and a virtual ocean expedition to track gray whales. <http://games.noaa.gov>

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**Butter-Flavor substitutes raise alarms** – Diacetyl has been used for a long time to give microwave popcorn and other foods a buttery taste. Preliminary studies from NIOSH (National Institute for Occupational Safety and Health) suggest that a popular substitute, 2,3-pentanedione causes the same tissue damage. “It is a little less water-soluble, so it might be better able to reach the deep lung”, said Dr. Ann Hubbs, a toxicologist at their lab in Morgantown, W.VA. More research is needed. See <http://www.dispatch.com/live/content/business/stories/2010/05/12/butter-flavor-substitutes-also-raise-alarms.html?sid=101>

Some food companies still use diacetyl, according to the national Flavor and Extract Manufacturers Association. However, many popcorn producers have abandoned diacetyl in favor of other flavorings. Some companies have even focused on the chemical's removal in ad campaigns and on product packaging.

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**Huge CO2 Storage Potential in China** – U.S. and Chinese researcher have found that China has enough underground storage capacity to hold more than 100year's worth of the nation's anticipated carbon dioxide output. China has 1,620 large stationary CO2 emissions sources, generating 3.8 billion metric tons of CO2 per year – surpassing the U.S. stationary source emissions by more than 1 billion tons per year. (from Chemical \* Engineering News ISSN 0009-2347 Oct, 19, 2009 Vol. 87, No. 42, p. 27)

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**Great Pacific Garbage Patch** – continues to grow as the vast collection of plastic between Hawaii and San Francisco swirls around in the North Pacific Gyre. A positive glimmer is the recent announcement that a Dutch architecture company plans to construct a massive island made from this garbage patch – a “Recycled Island” that is supposed to clean out this pollution and create habitable land. A portion of this land is to be set aside for agriculture so residents could be self-sufficient in food production. Can it be??? (There are actually five gyres building).

The centre of the North Pacific Gyre is relatively stationary region of the Pacific Ocean (the area it occupies is often referred to as the [horse latitudes](#)) and the circular rotation around it draws waste material in. This has led to the accumulation of [flotsam](#) and other debris in huge floating 'clouds' of [waste](#) which have taken on informal names, the **Great Pacific Garbage Patch**, the **Eastern Garbage Patch** or the **Pacific Trash Vortex**. While historically this debris has [biodegraded](#), the gyre is now accumulating vast quantities of [plastic](#) and [marine debris](#). Rather than biodegrading, plastic [photodegrades](#), disintegrating in the ocean into smaller and smaller pieces. These pieces, still [polymers](#), eventually become individual molecules, which are still not easily digested. Some plastics photodegrade into other [pollutants](#). The floating particles also resemble

[zooplankton](#), which can lead to them being consumed by [jellyfish](#), thus entering the ocean [food chain](#). In samples taken from the gyre in 2001, the mass of plastic exceeded that of zooplankton (the dominant animalian life in the area) by a factor of six. Many of these long-lasting pieces end up in the stomachs of marine birds and animals. From the internet - <http://www.wiserearth.org/article/bea19ef898eca1e2c820690bf8d22640>

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## ENVIRONMENTAL ISSUES – Natural and Man-made Events

2010 is certainly presenting the world with some thorny and critical environmental problems.

1. The Iceland volcanic eruption not only influenced the air quality of a large portion of that area, but it interrupted days and days of international travel. How we depend on travel and meeting schedules! And seldom is there a Plan B for such interruptions as volcanic disturbances.

The eruption in Eyjafjallajökull ended Sunday May 23<sup>rd</sup> after it had been active two months. After a short stop the eruption in the glacier Eyjafjallajökull began a second time. The top crater of the volcano =10 to 20 times more active than before. Eruption in the 2.000 metre long fissure has melted 200-metre thick ice and the floodwater from it damaged roads. About 800 people had to escape their home at middle of the night.

See news at <http://www.ruv.is/frett/volcanic-eruption-english-version-0>  
[http://http.ruv.straumar.is/static.ruv.is/vefur/gosmyndir\\_eyjafjallajokul.wmv](http://http.ruv.straumar.is/static.ruv.is/vefur/gosmyndir_eyjafjallajokul.wmv)

Ash samples were sent for examination. Preliminary findings indicate that the area around the glacier, and Myrdalsandur, to the east, have been affected. The volcanic ash fell to ground unevenly and sporadically, in some places in a layer up to 3 mm thick. Inhabitants of the area describe the ash as being black to grey in colour and very fine, similar to flour or sugar grains.

International weather observatories in co-operation with the Icelandic Met Office monitored the weather conditions and the projected path of the volcanic ash cloud, which was being carried towards Europe and Scandinavia. Air travel restrictions were implemented in several European countries.

(from the Internet)

2. Earthquake!

Haiti is one of poorest countries in the Western Hemisphere. Eighty percent of residents live in poverty, according to the CIA World Factbook.

[Haiti](#) is one of the most densely populated and least developed countries in the Western Hemisphere.

On Jan. 12, a 7.0 magnitude earthquake killed more than 200,000 people and devastated the capital city of Port-au-Prince. The disaster severely impacted three million Haitians, injuring many and destroying their homes and livelihoods.

The task of rebuilding the country will be far more expensive than simply relieving the suffering there in the short term. (from the Internet)

### 3. Gulf Oil Spill

“The catastrophic explosion that caused an oil spill from a BP offshore drilling rig in the Gulf of Mexico has reached the shoreline. Efforts to manage the spill with controlled burning, dispersal and plugging the leak have so far been unsuccessful, pending the “newcap”. This oil spill has now obtained the dubious distinction of being the [worst oil spill in US history](#), surpassing the damage done by the Exxon Valdez tanker that spilled 11 million gallons of oil into the ecologically sensitive Prince William Sound in 1989. Unlike the Exxon Valdez tragedy, in which a tanker held a finite capacity of oil, BP’s rig is tapped into an underwater oil well and could pump more oil into the ocean indefinitely until the leak is securely plugged.

Updated photos of oil hitting coastlines and the damage throughout the ocean, which poses a serious threat to fishermen’s livelihoods, marine habitats, beaches, wildlife and human health are available.” (From the Huffington Post)

For a complete report on the Alaska spill – see National Geographic, Vol.177. January 1990.

### 4. Climate Change

As early as 1988 an international report urged “Greenhouse Action Now” to avert the clear danger of greenhouse warming. The report is a product of a process initiated and monitored by three major international organizations: The United Nations Environment Program, The World Meteorological Organization, and the International Council of **Scientific** Unions. A conference in 1985 led to two workshops – the second in Bellagio, Italy. A committee of ten experts then produced the report released at press conferences in Geneva, Stockholm, Toronto, and Washington, D.C. (See Science, Vol. 241, 1 July 1988, research News, Pg. 23)

Twelve years later the building and impact of Greenhouses Gases still provokes little more than these early efforts

## DATABASE

**APPS** - For a list of the top ten life science related apps for the iPhone visit

<http://my.biotechlife.net/2009/01/20/top-10-life-science-related-apps-for-the-iphone-and-ipod-touch>

The LabTimer allows for four separate timers with descriptions. Also on the list is Molecules – this lets you rotate, zoom in and out to study 3D models of molecules.

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**Safety in the Science Classroom** – a web portal – was recently launched by the National Science safety Advisory Board. It has a definitive summary of all relevant OSHA training requirements and guidelines. It includes characteristics of an acceptable trainer and topics required, as well as varied legal requirements at both national and state levels.

There is also a list of safety resources for both elementary and secondary schools – agencies and organizations that supply safety resources for k-12 schools. Any for-profit company listed must make available FREE materials or services to K-12 schools!

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**Design Squad Teacher's Guide - free copy** - PBS's engineering reality competition written specifically for middle level science and technology teachers. Three units that focus on force, electricity, and sound. Visit <http://pbskids.org/designsquad/engineers/newsletter.html>

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**Forensic Teacher Magazine** – especially for HS forensic science, chemistry and biology teachers, has lesson plans, reproducible, rubrics, labs and many inquiry-based activities plus puzzles, mini-mysteries and other features. For a FREE subscription see <http://www.theforensicteacher.com/Home.html>

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**Free Biomedical resources** – A new edition of the Chemistry of Health has many resources and an extensive online resource. ChemHealthWeb – <http://publications.nigms.nih.gov/chemhealth>  
Findings Magazine is at <http://publications.nigms.nih.gov/findings/issues.asp>  
All NIH materials are FREE and available as individual or classroom sets. Downloadable from <http://publications.nigms.nih.gov/order/classroom.html>

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**NOAA offer 20 environmental education games** – including humpback whale migration, ocean literacy, recycling, invasive species and a virtual ocean expedition to rack gray whales. <http://games.noaa.gov>

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**America's Children and the Environment** – Health topics are now available and have been updated to include data through 2008: criteria air pollutants; drinking water contaminants; blood lead; blood cotinine; and asthma. EPA is now working on the third edition of America's Children and the Environment (ACE3). For further information see <http://www.epa.gov/envirohealth/children/ace3.html> in the fall 2010.

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**The Collaborative on Health and the Environment's (CHE's)** primary mission is to strengthen the science dialogue on environmental factors impacting human health and to facilitate collaborative efforts to address environmental health concerns. News and announcements related to environmental impacts on human health, collected from a multitude of sources, especially [Environmental Health News](http://www.environmentalhealthnews.org). To subscribe to this feed, visit [healthandenvironment.org/CHE.xml](http://healthandenvironment.org/CHE.xml).

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**Nautilus Live** - Bob Ballard has launched a web site that allows people to follow the expeditions live and listen to scientists in the control rooms as discoveries are made. <http://www.nautiluslive.org>

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## CALENDAR OF EVENTS

### NSTA 2010 Regional Conferences

**Oct. 28-30**                      Kansas City MO

**Nov. 11-13**                     Baltimore, MD

**Dec. 2-4**                        Nashville, TN

**Mar. 10-13, 2011 San Francisco, CA – National Conference**

### **July 22-23, 2010                      Two-day workshop, Exploring Climate Change**

These workshops will be held at the Carnegie Museum of Natural History (CMNH) sites.

July 22, 2010 – CMNH Powdermill Nature reserve – Rector, PA

July 23, 2010 – Carnegie Museum of Natural History (CMNH) Oakland Site– 4400 Forbes Avenue, Pittsburgh, PA

Contact [konrad@pitt.edu](mailto:konrad@pitt.edu)

**September 18, 2010**            “Water Quality and the Mon” Site and fee TBD.

8:30am-1:00pm                  Four Act 48 Hours                  Contact PRCST: [konrad@pitt.edu](mailto:konrad@pitt.edu)

### **September 29 - October 2, 2010**

The North American Association for Environmental Education (NAAEE) 39th Annual Conference  
Buffalo Niagara Convention Center in Buffalo-Niagara, New York.

**October 10-16, 2010** Earth Science Week 2010 - “Exploring Energy”

**Dec. 1-3, 2010**    PSTA Annual Conference –Hershey, PA - Hershey Conference Center

“H.O.P.E – Humans Observing Planet Earth”

## Many Thanks to Our Contributors

- ❖ Air and Waste Management Association (AWMA)
- ❖ Carnegie Mellon University
- ❖ Carnegie Museum of Natural History
- ❖ Carnegie Science Center
- ❖ NASA – Goddard Space Flight Center
- ❖ NorthCentral Math/Science Consortium
- ❖ PA DEP Education Grant Fund
- ❖ PA PDE – Office of Environment/Ecology
- ❖ PA NASA Space Grant Consortium
- ❖ Spectroscopy Society of Pittsburgh (SSP)
- ❖ Society for Analytical Chemists of Pittsburgh (SACP)
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