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The Science Educator

Spring 2015 A publication of VAST, The Virginia Association of Science Teachers Vol. 63, No.4

VAST PDI November 19 to 21, 2015

Westfields Marriott Washington Dulles, Chantilly

As I write this, it is 261 days until the 2015 annual VAST PDI in Chantilly, VA. Your VAST Board is hard at work to make this the best PDI ever! The theme is **"Designing Inquiring Minds"**. As in all of Virginia, Northern Virginia, too, is about **"Designing Inquiring Minds".** Here is a brief, virtual field trip of some of these places that are within a few miles of the Westfields Marriott Conference Center that are focused on **"Designing Inquiring Minds"** and of historical significance. In addition, there are highlights of planned field trips and the VAST 2015 Art Contest.

Kathy Frame, President-elect

A Brief Virtual Field Trip:

Chantilly, VA - Innovation

Center for Innovative Technology: CIT seeks to close innovation gaps in the Commonwealth and the nation by focusing on new technologies, entrepreneurs and technology companies that make innovation happen.

HHMI's Janelia Research Campus is a leading biomedical research center where outstanding scientists from diverse disciplines use emerging and innovative technologies to pursue biology's most challenging problems.

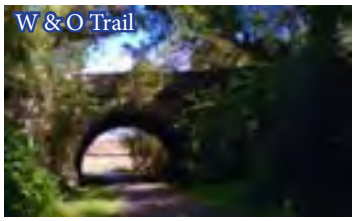
Chantilly, VA - History

Sully Plantation the home of Richard Bland Lee, Northern Virginia's first congressman, was built in 1794.

Frying Pan Park is a working farm. Free to the public. Excellent resource for K to 3 teaching materials on site and K-4 Outreach. Milk a cow, collect eggs…

Udvar-Hazy Museum is a massive structure with open, hangar-like settings that accommodate large aircraft and spacecraft, as well as entire collections of aviation and space artifacts.

Washington and Dominion (W&O) Trail is an excellent 45-mile paved rail trail through the Northern Virginia counties for biking and walking with a parallel horse trail.



VAST 2015 Field Trips

Estimated field trip costs to include all materials and transportation are indicated.

Janelia Farms: Dr. Maryrose Franko, Science Program Manager, will provide an introduction of the HHMI Research Facility and a walking tour (4 hours) Limit: 15. Cost $24.

Geology of Great Falls National Park: Meadowlark Park Staff will lead a field trip to the Falls to interpret the unique geology of the Fall (4 hours). Limit 15. Cost: $36.

Chesapeake Bay Foundation Stream Side (Site TBD) Field Investigation led by Bill Portluck to conduct water quality data collection and analysis and biotic sampling. Limit 18. Cost: $36.

VAST 2015 Art Contest

VAST invites all Pre-K to 12 artists/young scientists in public and private schools and youth organizations to showcase their artistic talent to help the public understand the VAST PDI theme: **"Designing Inquiring Minds".**

Postmark Deadline April 28, 2015. For full details, see page 6.

From the Executive Director

Have You Ever Asked Yourself....

Have you ever asked yourself, "Why?" Well of course you have ;-) If you are excited, surprised or frustrated, you wonder why. As I watch the weather forecast, I have ask myself why and the answer is because...simply because.

It has happened because of the why. So that is why, once again, we have come up with an outstanding program for the PDI. Your "whys" will be answered and you will have answers because you care about the "why".

Please join us for another exciting year and send in your proposals, get your leave approved now, get your room and make sure SAVE the DATE is circled on your calendar!

"Designing Inquiring Minds"
VAST 2015 Professional Development Institute
November 19-21, Westfields Marriott, Chantilly

Susan Booth, EdS

Save the Date!

Announcing the 2015 VAST PDI!

When: Thursday November 19 to Saturday November 21, 2015
Where: Westfields Marriott Washington Dulles,
14750 Conference Center Drive, Chantilly, Virginia
MAKE SURE YOU SHARE THIS NEWSLETTER WITH YOUR PRINCIPAL BECAUSE OUR PRECON AND FUTURE SPEAKERS WILL HAVE ADDED VALUE FOR THEM....

Dr. Frederic Bertley, Principal Kafele, Dave Burges and
Shah Selbe, a National Geographic Speaker, to name a few.... See more on page 4.

Make your tax-deductible gift today. Make a real difference by supporting Virginia Science Educators!

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President's Message

Jenny Sue Flannagan, Ed.D.
VAST President

Recently I completed a very tough challenge that pushed me both physically and mentally. Believe it or not, I could not have done it without the help of science and engineering! My goal was to run the Glass Slipper Challenge at Disney World. This challenge consisted of completing a 10K (6.2 miles) on Saturday and then turning around and running a half-marathon (13.1) on Sunday for a grant total of 19.3 miles! How did science and engineering help me get me through?

To answer this question, you have to know this-my training was done 100% outside, during the months of November-February (I can't stand to run on a treadmill!). As you know, we did have some cold temperatures in January. In fact, I ran a couple of times when it was 22 degrees outside. How did I survive running in the cold? Well, it all has to do with the history of textile development!

Science and Textile Development

Many of our greatest inventions have come from studying the natural world and the plants and animals that live in it. We know from science that insulation is the key to staying warm while doing any physical activity in cold weather. Insulation or thermal insulation is the term used to describe any product that reduces heat loss or heat gain by providing a barrier between areas that are significalty different in temperature. We insulate our homes to keep them warm in the winter to protect pipes from freezing as well as insulating them so in the summer our homes are protexted from getting too warm.

But our body's are heat producing machines as well! Normally the temperature of our environment is often lower than our own body temperature (core: 98.6; skin: 92 degrees Farenheit), and thus our bodies are constantly emitting heat into the atmosphere. The largest part of our heat loss occurs through our skin. Our bodies and the bodies of many mammals and birds are covered with hair (feathers). Most humans do not have a great deal of hair on their body and so we use clothing.

History of Textiles:

Textiles are defined as the yarns that are woven or knitted to make fabrics. In ancient civilizations, textiles consisted of materials from plants and animals. The use of textiles has links to many cultures throughout the world and have been an integral part of human daily life. We know from history the earliest instances of cotton, silk and linen being to appear around 5,000 BC in India, Egypt and China.

Anicient cultures manufactured clothing to not only represent their culture and even status, but to protect from weather. Did you know that in 1836 Charles Macintosh invented a method for using rubber to waterproof fabrics.

A common misconception that many young children hold is the notion that clothing produces heat by itself. But we know this is not true-clothing only prevents body heat from escaping. By trapping this heat, we are able to warm the layer of air between the skin and clothing.

Big Idea: Science and Engineering makes the impossible possible

In first grade, the Virginia Science Standards of Learning calls for our students to know that body coverings include hair, fur, feathers, scales, and shells and classify organisms according to these differences. Then in Grade 3, students learn about the different environments in which these organisms live and how these body coverings serve as adaptations for survival. Introducing students to the history of textile development while study Eqypt and China in grades 2 and 3 is a perfect way to make connections between the work of scientists and how engineers have taken the understandings gleaned from scientific research and applied it to solving problems.

But the other key point I want to make is this-there is a purpose for the standards and what our students are learning. As scientists learned about how animals, including ourselves, had natural ways to protect against heat loss or heat gain, they begin to experiment and design fabrics that took advantage of this understanding. In the winter, the goal is to keep warm. Having damp clothes in the summer may be a good thing in order to keep you cool, but in the winter, damp clothing next to the skin can be deadly because it reduces insulation.

Thanks to the development of cold gear synthetic fabrics, running with nothing more than a heavy sweatshirt kept me toasty warm on those long runs and enabled me to accomplish my goal! Without understanding how animals kept warm, we might not have the development of fabrics that keep us warm today! This is the reason teaching science in elementary is so important! It opens up understanding the real world to our students. It also give a purpose for why engineers do what they do!

Hopefully spring will be here soon and this cold, snowy season will be just another memory making even!

General Session Speakers
VAST PDI 2015

Check the VAST Website and the May/June Newsletter for more information about the 2015 VAST PDI Speakers. **http://www.vast.org/annual-pdi.html**

Principal Kafele - An internationally known and an outstanding educational speaker and consultant. Principal Kafele is in demand as a speaker for transforming the attitudes of at-risk student populations in America. He regularly conducts conference keynote addresses and professional development workshops. He works to close what he coined, the "attitude gap" – the gap between those students who have the will to strive for academic excellence and those who do not.

Dave Burgess - New York Times Best-Selling author Dave Burgess uses a unique combination of magic and humor to create a program that will transform the way you look at your role as an educator. You will learn how to dramatically increase student engagement, design wildly creative lessons, and build a course that is a life-changing experience for your students.

Shah Selbe - Sponsored by National Geographic, Shah created FishNET, to detect and track illegal, unreported, and unregulated fishing worldwide. He is a satellite propulsion systems engineer at Boeing Space and Intelligence Systems and the Southern California region representative of Engineers Without Borders. Shah Selbe believes technology is the one tool powerful enough to catch the culprits who catch the fish, and threaten the populations of the world's fish populations by illegal fishing.

Dr. Fredrick Bertley - Dr. Bertley is a scientist from the Franklin Museum in New York . He will speak on the need to develop inquiring minds in our students and how to motivate students into STEM careers.
At the Franklin Museum Dr. Bertley oversees both research-based projects and program development and implementation projects. He has directed K-12 Professional Development, Learning Technologies, and Youth Programs that include STEM Scholars, Partnerships for Achieving Careers in Technology and Science (PACTS) and The Franklin Institute's magnet high school, Science Leadership Academy.

"Designing Inquiring Minds"

VAST 2015 Professional Development Institute
November 19-21, Westfields Marriott, Chantilly

VAST Wants YOU to Present

VAST needs you! Share your good ideas! Submit a session proposal for the 2015 VAST PDI. Information for presenters can be found on the VAST website on the "annual PDI" page.

Attendees at the 2014 PDI commented that they would like to see more sessions for high school teachers, particularly in chemistry and physics. Teachers of these subjects are encouraged to submit proposals.

Proposals are submitted online and are due by May 1. Each session may have a maximum of four presenters listed in the program. Presenters will be notified by August 1 regarding their proposals. VAST cannot guarantee a slot for proposals that are submitted after the May 1 deadline. All accepted presenters must be registered and paid by September 5 or their session will be dropped. Commercial presenters must be registered as exhibitors and pay the $150.00 session fee in addition to the standard exhibit fee.

Contact John Kowalski at **jkowalski@rvgs.k12.va.us** with any questions regarding concurrent session presentations.

John Kowalski, Ph.D, PDI Chair

Go to Presenter interactive form on VAST website.

VIRGINIA ASSOCIATION OF SCIENCE TEACHERS 2015 ART CONTEST

VAST invites all Pre-K to 12 artists/young scientists in public and private schools and youth organizations to showcase their artistic talent to help the public understand the VAST PDI theme: **"Designing Inquiring Minds".**

Winners

Posters will be grouped in the following categories: **Kindergarten through 3rd Grade**, 4th through 6th Grade, **7th through 9th Grade,** and **10th through 12th Grade**. First, Second, and Third places will be awarded in each category. The top 12 artworks will be displayed throughout VAST's Annual Professional Development Institute (PDI) in Chantilly, VA, on the VAST web site (www.vast.org), and recognized by the VAST president during the PDI. One first place winner will appear in the 2016 Spring issue of the S*cience Educator*.

Judging Procedure

A panel of artists, teachers, and scientists will judge each submission based on the criteria below.

Judging Criteria

- 1. Clear message conveyed by the text and artwork.
- 2. The VAST PDI poster theme "Designing Inquiring Minds" is addressed.
- 3. Creativity, originality and artistic quality.
- 4. Visual clarity — easily read.
- 5. Bright and colorful.

Poster Specifications

- Posters must be submitted on poster or illustration board. Overall dimensions must be 8.5 by 11 inches (21cm by 28 cm).
- All artwork must be original. Copyrighted characters, such as Superman, or copyrighted clip art, or copyright-free clip art will not be accepted.
- Any medium may be used with the exception of glitter. Chalk, charcoal, and pastel must be sealed with a fixative spray to prevent smearing and smudging. Keep in mind most posters may be on public display and should be easy to see or read.
- Three-dimensional entries will not be accepted. Nothing may be glued, stapled, or attached to the artwork in any way. Framed, matted, or laminated artwork will not be accepted. The use of lettering, numbering, or a corporate logo in any language on the front of the poster is not allowed with the exception of the VAST logo.
- Stenciled, traced, computer-generated, or commercially manufactured stick-on lettering or graphics is prohibited.
- Decision of the judges is FINAL.
- All posters will become the property of the Virginia Association of Science Teachers.
- Posters will be judged on both the clarity of the message and the quality of the art.
- Your name, age, email, & phone number M**UST** be on the back of the artwork.

All submissions must be postmarked by Thursday, April 30, 2015.
Mail submissions to:

Kathy Frame
VAST President-Elect/ PDI Committee
13112 Nestlewood Court
Oak Hill, VA 20171-3904
president.elect@vast.org

2015 VAST PDI Hotel and Travel Information

2015 Annual PDI

November 19 Precon, November 20 - 21, 2015 PDI

Westfield Marriott 14750 Conference Center Drive Chantilly, VA 20151

About Westfields Marriott:

The Westfields Marriott Washington Dulles combines elegant hotel accommodations with a sophisticated meeting venue in Chantilly, VA. This conference center hotel offers convenient access and is located near the Dulles Expo Center, Dulles International Airport and a short drive to downtown Washington, DC. The National Air and Space Museum, Virginia wineries and the Wolf Trap Center for Performing Arts are all within 10 miles of this premier getaway. The hotel in Chantilly, VA, also features access to the Signature Westfields Golf Club by Fred Couples. Enjoy a variety of hotel services and amenities, including a fitness center, indoor & outdoor pool and our newly renovated onsite restaurant, Wellington's. With 40,000 sq ft of state-of-the-art meeting space and 31 meeting rooms, the Westfields Marriott hotel is dedicated to helping you make the most of your conference in Northern Virginia.

Room reservations:

The room rate is $109.00 for single and double occupancy with a 12% occupancy tax (totaling $122.08). Self-parking is complimentary and valet parking is $25.00 for overnight guests and $15.00 for event day parking. The deadline for room reservation is October 28, 2015. Don't wait! Make your reservation online or call 1-800-228-9290.

Make your reservation on line

Exhibitor PDI information

Exhibitors are encouraged to register to exhibit at the VAST PDI. What a wonderful way to meet your customers. Teachers K-16, administrators, informal science educators, and principals will search the hall for your products and services.

Click on the button to find out more and to register today.

Exhibitor PDI information

Use this one apparatus in your Chemistry, Biology, and Physics labs. The Bluetooth® and USB connectivity enable use with your iPad, tablets, and computers, making this a powerful, intuitive tool for your spectrometry needs. FREE Spectrometry software included.

GET FREE SOFTWARE AND DATA FILES HERE

PASCO | think **science**

pasco.com/spectrometry

** Android app available May 2015.*

The Inquiring Mind of Eugenie Clark

The Shark Lady

May 4, 1922 to February 25, 2015

Dr. Eugenie Clark was an eminent marine science researcher, teacher, and role model who cared deeply for the ocean and its inhabitants. She had tenacity, keep observation skills, an inquiring mind, and did not have a "stop button"—she took her last dive at the age of 92!

At the age of 9, Eugenie Clark's lifetime passion for the ocean and its inhabitants began with watching fish at the New York Battery Aquarium. She was not content to just watch fish and began collecting them. By the age of 13, she had hundreds of fish in aquaria. After receiving her degree in zoology, she wanted to learn even more, but was discouraged from pursing further studies

Undeterred she learned to scuba dive while working at Scripps Institution of Oceanography in La Jolla and went on to earn her doctorate from New York University. In 1951, she received a Fulbright scholarship to Egypt where she collected 300 species of fish to include three new species. With this success, she wrote her first book Lady with a Spear about the experience. Anne Vanderbilt, a wealthy supporter of her after reading her book, invited her to set up a marine research site in Florida. Today, that site is one of the leading marine research centers in the world, the Mote Marine Laboratory and Aquarium. Her career continued with cutting-edge research, discoveries, teaching, and inspiring future generations about their very important role in marine research and the preservation of the ocean and its species.

According to Sonja Fordham, a former student of Clark's who became the founder and president of the nonprofit Shark Advocates International in Washington, "Dr. Clark introduced her students, colleagues, and much of the rest of the world, to the wonder, diversity, and vulnerability of sharks. She was a role model for women, not only as a scientist but as a fearless adventurer."

Dr. Eugenie Clark will continue to not only be an inspiration, but also a role model to all who wish to purse a career in science. She is a prime example of what we, as teachers, strive for each of our students to achieve…an inquiring mind and the confidence to pursue their dreams.

Image Source: **U.S. Department of Labor and/or http://www.dol.gov." per http://www.dol.gov/dol/aboutdol/copyright.htm**

NATIONAL ASSOCIATION OF BIOLOGY TEACHERS
2015 OUTSTANDING BIOLOGY TEACHER AWARD PROGRAM

Outstanding biological/life science teaching is essential to modern society and to human survival in the future. Such teaching exists, and the NABT Outstanding Biology Teacher Award program represents a specific way to recognize such excellence. NABT invites you to participate in its OBTA program.

Criteria for Selection

1. Candidates must be presently teaching biology/life science and must have devoted a significant portion of his/her career to the teaching of biology/life science
2. Candidates from public, private, and parochial schools are eligible
3. A minimum of three years of teaching experience is mandatory before applying for the OBTA award
4. Candidates need not be members of NABT
5. Unsuccessful candidates may be re-nominated from year to year.
6. Candidates may receive the award more than once, after 10 years.

Schedule

March 15 - National deadline for OBTA nominations.
March 30 - Virginia OBTA Nomination Deadline Virginia OBTA Application Packets should be requested from ***VA OBTA Director Kathy Frame at*** **chuckframe@aol.com** .
May 1 - Recommendation Forms, Candidate Record Forms, and Supplementary Candidate Forms be completed by interested Teachers. ***Return in a PDF format to Kathy Frame, at*** **chuckframe@aol.com** .
June 15 - Selection of OBTA recipient.
June 22 - VA OBTA Recipient Notification.

Nominations Open for the 2015 VAST RISE Awards

Know someone who should be recognized for their work in science education?
The Virginia Association of Science Teachers is now seeking nominations for the 2015 VAST Recognition In Science Education (RISE) awards.
VAST recognizes excellence in the following categories:

- Elementary (preK-5)
- Middle school (6-8)
- Biology
- Chemistry
- Earth Science
- Physics
- Environmental Science
- At-Risk Students (K-12)
- Resource Teacher (examples: Technology, Science Resource, Etc.)
- Science Educator (non K-12 classroom) Examples Science Supervisor, Information Education, Principal, Etc.)
- University/College Faculty
- Community Partnership (example: Local Business, Government, Non-profit Organizations, Etc.)

Note: Nominees do NOT need to be a member of VAST.

Awardees will be recognized at the November 2014 VAST PDI and will be reimbursed up to $150 to attend the conference.
The deadline for nominations is August 20, 2015. The nomination forms are available on the VAST website:

http://www.vast.org/vast-awards.html

Help us celebrate individuals who deserved to be recognized for the wonderful work they do in our schools.
Join me in acknowledging their contributions to the greater good.

Applications

Timothy Couillard
VAST Awards and Grants Committee Chair

VAST Mini-grant Program Accepting Applications for 2015

Got an innovative idea that needs some seed money? Need support for an innovative professional development activity?
The VAST Awards and Grants committee is now taking applications for the 2015 Mini-grant program.
The VAST grant program includes the VAST Education Mini-grant, the Tidewater Alliance of Chemistry Teachers' (TACT) Chemistry Education Mini-grant, and the American Institute of Professional Geologists (AIPG) Mini-grant.
Team applications are welcome, however one person must be designated as the Project Director. To qualify for the Mini-grant program, the Project Director must a) be a current member of VAST (dues paid for 2015), b) have a minimum of three years of experience as an elementary or secondary science classroom teacher, and c) be currently employed as a classroom teacher in the Commonwealth of Virginia.
The Awards and Grants committee is looking for projects that will directly impact student learning in the science classroom. Proposals will be evaluated the originality, creativity, and cost effectiveness of the proposals. Ideally, the projects that are funded will provide the students with new experiences and make possible new scientific investigations.
Mini-grant funds may be spent for supplies, equipment, printing, and other materials essential to the project. Mini-grant funds are not intended for student travel (field trips) or for the personal remuneration of the grant recipients. All materials will become the property of the school/school system in which the Project Director is employed at the time the grant is awarded.
The deadline for submissions is June 1, 2015. The applications are available on the VAST website:

http://www.vast.org/grants.html

We look forward to supporting your ideas for enhancing your students' science experience!

Applications

Timothy Couillard
Awards and Grants Committee Chair

Virginia Department of
EDUCATION

Science and Environmental Literacy

As part of the 2014 Chesapeake Bay Watershed Agreement, the states of Virginia, Maryland, and Pennsylvania, Delaware, New York, and West Virginia along with the District of Columbia, the Chesapeake Bay Commission, and the U.S. Environmental Protection Agency, reaffirmed their long-term commitment to "protect and restore the Chesapeake Bay's ecosystem." This Agreement, signed by Governor Terry McAuliffe in June 2014, commits the Commonwealth to meet the goals and outcomes set forth in the multijurisdictional compact. The commitments are the Goals and Outcomes that the signatories will work on collectively to advance restoration and protection of the Chesapeake Bay ecosystem and its watershed.

Of the eleven goals, the 2014 Agreement includes an education goal and outcomes which extend to all localities and watersheds in the Commonwealth, and include the target of environmental literacy for all students by graduation. The following is the 2014 Chesapeake Bay Watershed Agreement's Environmental Literacy goal and outcomes:

GOAL:

Enable every student in the region to graduate with the knowledge and skills to act responsibly to protect and restore their local watershed.

Student Outcome

Continually increase students' age-appropriate understanding of the watershed through participation in teacher-supported, meaningful watershed educational experiences and rigorous, inquiry-based instruction, with a target of at least one meaningful watershed educational experience in elementary, middle and high school depending on available resources.

Sustainable Schools Outcome

Continually increase the number of schools in the region that reduce the impact of their buildings and grounds on their local watershed, environment and human health through best practices, including student-led protection and restoration projects.

Environmental Literacy Planning Outcome

Each participating Bay jurisdiction should develop a comprehensive and systemic approach to environmental literacy for all students in the region that includes policies, practices and voluntary metrics that support the environmental literacy Goals and Outcomes of this Agreement.

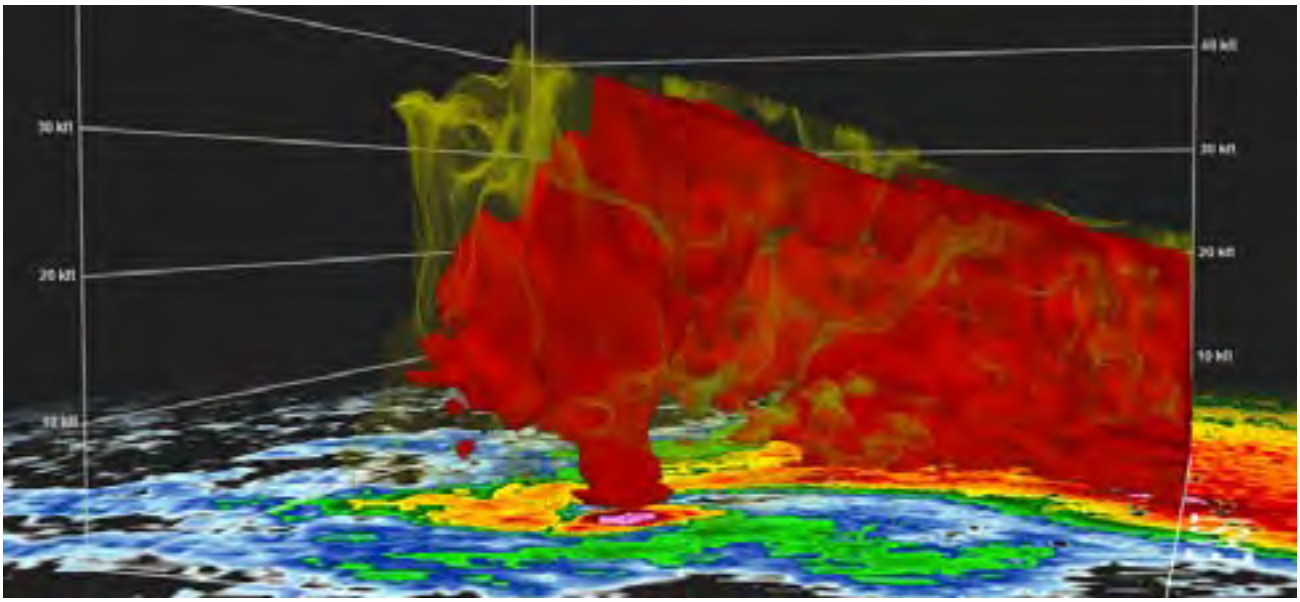
A management strategy is being developed to offer approaches to meet these outcomes. The Chesapeake Bay Education Workgroup has been working over the past months to develop a draft management strategy which will be open to public comment later this month.

Many organizations, including state agencies and nongovernmental organizations, are developing focused efforts to support the Agreement's environmental literacy goal. The focus in Virginia will be using the Virginia Science Standards of Learning. The science standards provide a focused treatment of key physical, biological, and planetary science concepts from kindergarten through the high-school grades. These concepts build sequentially and create a comprehensive foundation for the post-secondary world that students will enter upon graduation. Each agency will be in support of the science standards using the environment as a context for learning. The Office of Science and Health Education has created a preliminary resource document titled Foundational Concepts for Environmental Literacy, Responsible Citizenship, and Career Readiness in the 2010 Science Standards of Learning that allows science educators to see how the science standards offer the foundation for teaching ecology principals and environmental concepts.

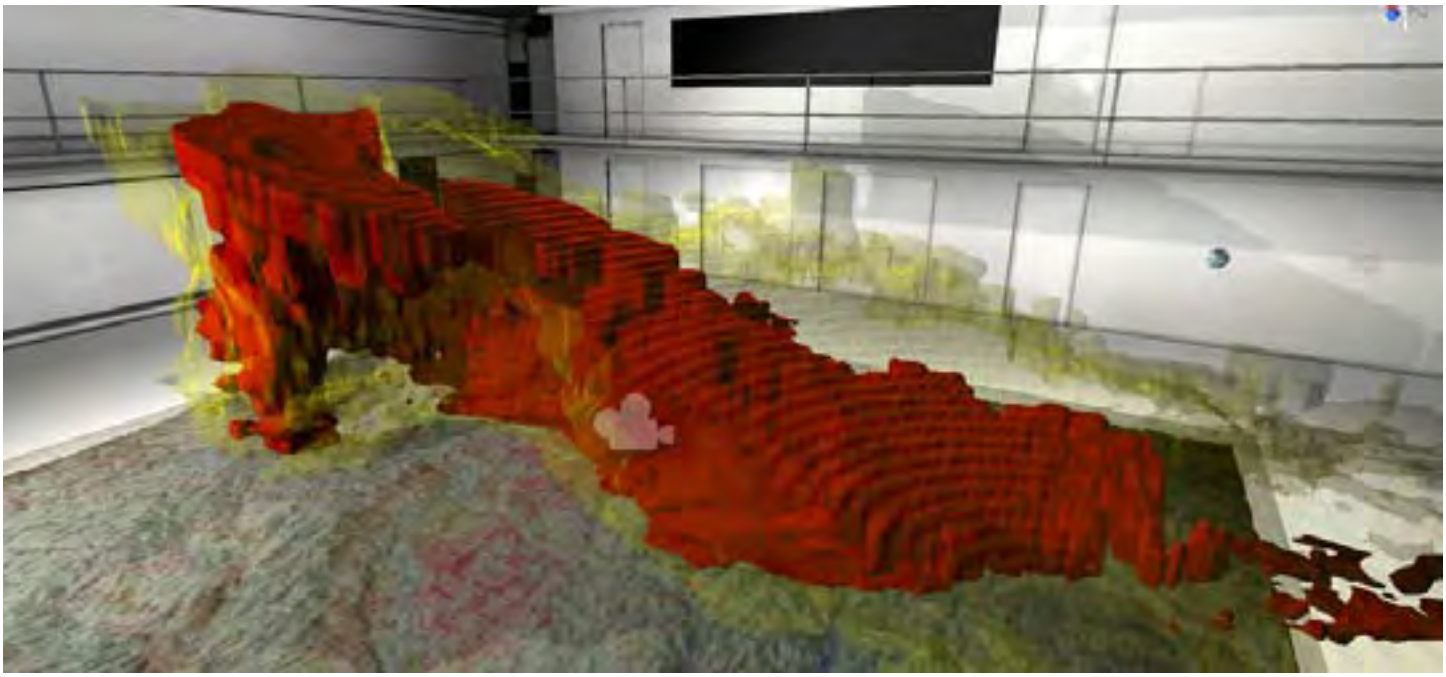
The Office of Science and Health Education will be sharing more details over the coming months about resources and other information regarding the Governor's commitment to science and environmental literacy. Please visit the Science Instruction page on the Virginia Department of Education's website in the coming weeks and months for more information. **http://www.doe.virginia.gov/instruction/**

Virginia Tech: Re-creating a Tornado in 3-D
A More Effective Way to Study Storms

News from Virginia Tech's College of Natural Resources and Environment



Flat-screen depictions of the Moore, Oklahoma tornado offered limited perspectives.



Re-creating the storm in the Cube at the Moss Arts Center enables researchers to see the entire storm in 3-D, which offers great potential for research into how storms form.

BLACKSBURG, Va., Feb. 9, 2015 – When The Weather Channel meteorologist Jim Cantore stepped into an EF-5 tornado (http://www.weather.com/tv/shows/amhq/video/walk-into-a-virtual-tornado-at-virginia-tech-with-jim-cantore-and-dr-greg-forbes) re-created in 3-D in a four-story immersive installation at Virginia Tech, his perspective was that of someone 7,000 feet tall. Beneath him was the landscape of Moore, Oklahoma. Around him was the storm that killed 24 people in May 2013.

With support from Virginia Tech's Institute of Creativity, Arts, and Technology (http://www.icat.vt.edu), a student and faculty team from the geography department in the College of Natural Resources and Environment (http://cnre.vt.edu) created the storm in the Moss Arts Center facility known as the Cube — a highly adaptable space for research and experimentation in immersive environments.

Cantore was tipped off by Kathryn Prociv, a Virginia Tech geography graduate who is now a producer at The Weather Channel.

She had been a storm chaser with the Virginia Tech team for three years before completing her master's degree research on the effects of changes in land surfaces on rotating storm intensity in the Appalachian Mountain region.

When Prociv asked her former instructor Dave Carroll what was happening at her alma mater, he told her about the tornado re-creation in the Cube. Cantore promptly made arrangements to visit, accompanied by Greg Forbes, The Weather Channel's severe weather expert.

Real weather delayed the visit a few months, but on Feb. 6 Cantore was immersed in the re-created storm and broadcasting live.

The project was born when Bill Carstensen, professor and head of the Department of Geography (http://geography.vt.edu), told Benjamin Knapp, director of the Institute of Creativity, Arts, and Technology, about Carroll's 3-D images of storms.

"We could build a tornado in the Cube," Carstensen told Knapp during intermission at an event at the Moss Arts Center. Knapp urged him to write a proposal. Subsequently, a $25,000 Science, Engineering, Art, and Design grant from the institute made it possible to hire Kenyon Gladu of Troutville, Virginia, a junior majoring in meteorology, and Trevor White of Henrico, Virginia, a master's student in geography.

Gladu worked with radar data and White did the programming to retrieve the needed NEXRAD (Next-Generation Radar) data and render it appropriately. Institute staffer Run Yu of Beijing, China, a computer science doctoral student in the College of Engineering, placed the storm in the cube.

"We decided to produce that tornadic supercell because it was a catastrophic event," said Carroll. He was south of Moore with the Virginia Tech storm chase team at the time it occurred. The team members can often safely position themselves within a mile of a storm, but not in that instance.

"It formed in the suburbs of Oklahoma City. We couldn't engage the storm because of the hazards in that environment — traffic, people fleeing," he said. "We had to back off."

"People on the ground could not observe that storm from all angles and directions," said Carstensen. "But NEXRAD radar captured data throughout the storm. It provided hundreds of thousands of data points in 3-D with several attributes at each data point, including the intensity of precipitation and the direction and speed of floating particulates.

"Our meteorology degree program ties in geospatial science with weather data — to meld atmospheric data with ground data. Geospatial science can register ground data — the rolling hills of Oklahoma and the land cover, such as agriculture, prairie, forests, and urban development. So in this re-creation of the Moore storm, there is the land cover on the ground and the storm above in perfect position."

The Cube allows complete tracking of where a subject is standing, moving, and looking. An Oculus head-mounted display provides an image of what the subject would see from any vantage point. If there are two people in the cube, they will see each other as avatars and will be able to see different points of view and exchange information.

"Eventually, you will be able to zoom in, to control the scale of what you see," said Carstensen.
"It's like a game environment in which you are embedded in the computer," explained Carroll. "You can then study storms from different perspectives than in the field. You can peel away the outer layers of rain so you can see the business end of the storm. It is a more effective way of looking at storm structure."

"It will be a valuable tool for researchers, forecasters, and students," said Carstensen.

The ultimate goal is to bring real-time radar into the Cube — "real time" in this instance being only a four- or five-minute delay. Carstensen and Carroll met with Mike Kleist, a Virginia Tech mathematics graduate who is now vice president of engineering at Weather Services International (WSI), a weather graphics software company.

"Mike said real time was absolutely doable," said Carstensen. "We could visualize the whole East Coast, or any place that has been mapped, overlain by a snow storm, or a storm surge model."

"This has great potential for emergency managers," said Carroll.

Related Links

i "Research field experience will take students to highest peaks of North, South America" (http://www.vtnews.vt.edu/articles/2014/03/030714-cnre-mountaincourse.html)
ii "The Moss Arts Center comes to life" (http://www.vtmag.vt.edu/winter14/masterpiece-moss-arts-center.html)
iii "Meteorology research investigates the skies by coming down to earth" (http://www.research.vt.edu/resmag/2012summer/weather.html)

This story can be found on the Virginia Tech News website: http://www.vtnews.vt.edu/articles/2015/02/020915-cnre-tornadoincube.html

REGION II

Making Natural Connections to the Chesapeake Bay – Register Now!

VAST and the Elizabeth River Project (ERP) have created a spring training for teachers in Region 2! These April and May workshops offer PK-6 teachers the opportunity to learn about environmental literacy, stewardship and outdoor activities through placed-based explorations at the ERP's 40-acre Paradise Creek Nature Park and award winning Learning Barge, America's Greenest Vessel. Experience how to utilize a natural environment as a classroom and engage students in investigative activities that result in a new generation of stewards. Certificate of attendance is provided for recertification points. Teachers in Region 2 have first priority for registration.
Additional information, contact Adrienne Sawyer **Adrienne.sawyer@cpschools.com** and check the VAST website for registration details.

REGION VI

3rd Annual Southern Virginia STEM-H Summit – Register Now!

The Summit, hosted by the Southern Virginia Higher Education Coalition, provides an opportunity for regional students, educators, and community and business leaders to come together for the promotion and betterment of STEM- H education. The Educator and Community/Industry Leader Day, April 1, is packed with fantastic workshops for K-12 educators. Educator attendees will leave energized and well equipped with new resources and curricula for classroom implementation.

From 8:00am to 4:15 pm, there is a full day of K-12, STEM-H educator workshops scheduled along with a keynote presentation, networking with regional community & industry leaders, and the first SOVA STEM-H Education & Industry Achievement Awards, where we will recognize exemplary education efforts being made by businesses, educators and other organizations in Southern Virginia.

Check out the lineup of workshops:
http://www.sovastem-h.org/index.php/program/87-educator-industry-day.

Registration is open through March 25. Register here:
http://www.sovastem-h.org/index.php/registration.

REGION IV

"Inspiring a Love of Science with S.T.E.A*.M."

Susan Bardenhagen, Region IV Director, region4@vast.org

This February, nearly 40 educators and artists convened for Region IV's professional development in STEAM integration hosted by Manassas City Schools.

The keynote presentation, "Thinking like Artists and Designers," was given by Richmond's VA Museum of Fine Arts adjunct educator, Margaret Hancock. Her presentation explored the underlying concepts of art and design as they connect to the action verbs science teachers use to encourage discovery. VAST member, Mary Van Dyke commented in her blog, "Margaret updated us to our digital ecologically-aware age with images from Patrick Dougherty's ***Stickwork*** and the architecture of ***Rural Studio.***"

Being mesmerized by the physics and geometry of a recent modern dance piece, I contacted Analeah Stamps, the choreographer, to create the interlude for the conference,

"STEAM-Powered Dance – A Collaboration of Force & Motion." Ms. Stamps had the audience join the dancers on stage to see the moves, interact with dancers, and consider how their students who were dancers could be empowered to share their craft with classmates. One science teacher who is also her school's Dance Team coach is planning to use technology for stop-motion analysis of the dancers for a future STEAM presentation!

"Science is a Way of Thinking…" led by Rich Evans, editor for the Tumblr Science Community and blog, "Sagan Sense," mused why the youth of today require the fuel of STEAM to steer humanity's future. Rich created the documentary, "I Want to Be an Astronaut," the first film to achieve an orbital premiere aboard the ISS.

Andrea Brothers presented "Scientist & Violinist Working for a Technology Company." She uses an electron microscope to detect

imperfections in microprocessors present in all our computers and other devices. Mary took a "selfie" mirrored in one of the discs Andrea shared.

Three different school district's programs were featured in breakout sessions: Shenandoah County's Robin Orndorff, ITRT, and Alice Bauserman, first grade teacher, shared "STREAM – Let the Ideas Flow," to show how they incorporate STEM with Reading and the Arts.

Continued....

Fairfax County middle school teacher, Angela DeHart presented "Ideas for highlighting the STEAM in CTE Class – Tips from the Trenches." She stated, "STEAM asks us to create a holistic learning environment that teaches students how to apply school-based lessons to the 'real' world in a fun, hands-on way." Angela brought a wealth of projects and examples from her classes to share and to stress how Project Based Learning was effective in her instruction.

FCPS' STEAM Education Specialist, Scott Settar, presented, "STEAM: A National Overview and Local Vision" for grades PK-12. Participants discussed major trends in STEAM education including the engineering design process, problem-based learning, maker spaces and performance-based assessments.

Laura Angle, former director of the USA Science & Engineering Festival's STEM Education Outreach and founder of "Students4STEM," gave a thought provoking, "Engineering 101." She asked, "What is the difference between science achievement and engineering failure?" Session attendees discussed the crosscutting principles and framework of NGSS and why industry has been a driving force behind NGSS.

Dr. Changwoo Ahn, GMU Associate Professor in Environmental Science & Policy, gave an encore presentation, "EcoScience + Art." He led attendees on a tour of the collaboration between Environmental Science and Art for sustainable earth stewardship education.

We promoted VAST's PDI and interested participants entered a raffle for a free VAST membership. The VAST banner tablecloth will be a "torch passed" to Leslie and Sherrie for their region III workshop on March 14.

Attendees from Norfolk, Arlington, Shenandoah, Fairfax, Manassas, and Prince William included elementary classroom teachers and assistants, Math/Science Resource and STEM teachers, middle school science and CTE teachers, outdoor educators, an art teacher, a librarian, an elementary principal, and our VAST President, Dr. Jenny Sue Flannagan from Regent University.

Post surveys and evaluation overwhelmingly noted that the event was inspiring, interesting, and gave the teachers additional ways to incorporate STEAM into their instruction. Many acknowledged the passion the presenters expressed in what they shared. The event culminated with door prizes for each attendee, donated by Micron Foundation, VAST, NSTA, and items I collected from the 2014 USA Science & Engineering Festival.

REGION VI

Regional Science Fairs

STUDENT SCIENCE

Tom Fitzpatrick, Region VI Director, region6@vast.org

Students in region VI have been participating local science fairs this winter, culminating in the Western Virginia Regional Science Fair and the Blue Ridge Highlands Regional Science fair held February 28 and March 6 and 7.

Winners move on to the Virginia State Science Fair on March 27 and 28, 2015 and the International Science and Engineering Fair in Pittsburgh, PA in May.

Visit **https://apps2.societyforscience.org/ssp-affiliate-fair/index.cfm** for more information.

Summer 2015 Program

Teachers of grades 3 - 8:
Come explore electricity and magnetism, and teachin practices to support classroom integration of these topics!
Pick your favorite location and time

UVa Charlottesville Workshop
July 13-24, 2015

JLab Newport News Workshop
July 27-August 7, 2015

- Academic year follow-up
- Receive: $1500 stipend ($1000 in the summer, $500 near the end of the academic year)
- Free Electricity, and Magnetism Kit (more than $100 value)
- Earn 3 graduate credits for UVa PHYS 6263
- Free Housing for non- commuters
- Free VAST PDI registration
- Network with fellow science teachers

For more detail go to the link
http://people.virginia.edu/~ral5q/classes/UVa-JLab/summer/

Apply Now!
UVa Professional Development:
July 13-24, 2015
http://2015uvaapp.questionpro.com

JLab Professional Development:
July 27-August 7, 2015
http://2015jlabapp.questionpro.com

Application due by 5:00 pm April 17, 2015

Teachers Share the Science of Trees with Dominion's Project Plant It!

Each spring, science takes center stage in hundreds of elementary schools throughout Virginia as third-graders learn about the impact of trees on the ecosystem with Project Plant It!, the program created by Dominion Resources, parent company of Dominion Virginia Power.

Now in its ninth year, Project Plant It! provides teachers with a variety of nature-based lesson plans and activities to help students connect with the environment. All of the instructional materials—including the teacher's guide with many interactive science lesson plans, posters, a website with educational videos and games, and more—support learning standards in STEM subjects such as math and science.

In April, each participating student receives a redbud tree seedling in honor of Arbor Day. This inspires children to plant their very own tree and care for it over the years.

"The many instructional benefits of Project Plant It! are a big reason why teachers embrace this program every year," said Kim Dye, lead science teacher specialist for Hanover County Schools and a VAST Region 1 director. "Students get a real-world experience that makes science come alive for them."

Three educators in Virginia shared why they look forward to Project Plant It!.

From Joy Greene, E.A.G.L.E.S. Center Coordinator (Eastern Area Grounds for Learning Environmental Science) for Prince William County Schools' Office of Student Learning:

"Research has shown that authentic hands-on learning experiences have a tremendous positive impact on student achievement. Through Project Plant It!, our students learn about the value of trees, including how they help to moderate climates, create clean air, provide homes for wildlife and prevent soil erosion. Also, Project Plant It! offers a cross-curricular approach to environmental education. In addition to collaborative science research projects, students have written stories and songs and created artwork about trees.

From Laura Marshall, third-grade teacher at Grange Hall Elementary School in Chesterfield County:

"The program encourages students to take initiative and be proactive about planting the redbud seedling with their families. The students really enjoy going outdoors to practice their math/science skills in investigation, measurement and analysis. We're reading a book called "***Pay It Forward***" and this program is a great example of inspiring the next generation to improve the world they live in by planting trees."

From Leslyn Shaw, a third-grade teacher at Richard Bowling Elementary with Norfolk Public Schools:

"The students get very excited about this program because it comes when we are studying about habitats. We're always looking at the big tree outside our window and discussing the wildlife that make their home in it and what would happen if the tree was destroyed by fire or drought. Also, the games, videos and activities on the program's website are lots of fun. For example, there's a scavenger hunt that helps the children realize all of the things made from trees or that are provided by trees."

NEW this year is a contest to find the educator who most creatively teaches Project Plant It! in the classroom. Details about the contest can be found at **www.ProjectPlantIt.com** starting in mid-to-late March. For more information about Project Plant It!, visit the website or Facebook page.

Sara Hunt

VJAS College Scholarships for High School Students

If you have students who plan to present their project on May 21 at James Madison University, encourage them to review and apply the various scholarship opportunities. To receive a scholarship a student must apply. Find details in the VJAS Handbook, 2014-15, available at http://66.147.244.216/~vacadsci/vjas-1_files/handbook.html

College and University Scholarships. Use the VJAS Handbook, 2014-15 (pp. 46-49) to learn details about scholarships. If eligible, students must submit a completed application by April 25, 2015. Use the "Scholarship Application: Bethel and Virginia Colleges & Universities" form located in the handbook appendix. Submit a separate application for each scholarship.

- **Hampton University** - $2,000 per year for four years; apply if senior planning to attend;
- **Old Dominion University** - $2,000 scholarship for first year, which may be renewed; apply if senior planning to attend.
- **Randolph College** - $2,000 per year for four years; apply if rising sophomore or junior planning to attend.
- **Randolph-Macon College Scholarship** - $2,000 per year for four years; apply if junior or senior planning to attend.
- **Virginia Commonwealth University Scholarship** - $2,000 for first year; apply if senior planning to attend.
- **Virginia Wesleyan College Scholarship** - $2,000 per year for four years; apply if rising sophomore or junior planning to attend.
- **ANY college or university** - $1,000 for first year; awarded to a high school student winning a first place, but you must apply for this scholarship from funds raised by Bethel High School students.

Environmental Scholarships. For information, read the VJAS Handbook, 2015 (pp. 44-46). Then, apply using the "VEE Application for the F. & S. Lewis and H. Mackenzie Scholarships" form located in the appendix. Because the application involves multiple components, check your application using the "Checklist for Environmental Scholarship Requirements. " Application packets are due by April 30, 2015.

- The Francis and Sydney Lewis Environmental Science Scholarship - $14,000 four-year scholarship to a high school student with an environmentally-related project in any category,
- The Henry W. Mackenzie, Jr. Environmental Scholarship - $5,000 four-year scholarship to a high school student whose project makes a significant contribution to environmental science related to the James River Basin and Chesapeake Bay; all projects on these topics are eligible, regardless of category.

Dr. Julia H. Cothron, VJAS Awards & Scholarship Committee

Technology to the Rescue! –or- Wait! That Wasn't Supposed to Happen!

Nick Swan
6th Grade Science Teacher, H.B. Andrews PK-8 School

Greetings VAST members! I am very excited to have the opportunity to share with you some of my trials and tribulations of using technology in the science classroom. As the Apple ID and IPad Inventory manager of my school (Hampton City Schools 1:1 initiative), I frequently have teachers both new to the profession and well-seasoned alike ask me questions on how to implement and manage student and instructional usage of 21st century devices. For my inaugural column, I wanted to share a couple of important tidbits I often dispense first to anyone seeking my advice on trying any new technology in the classroom.

1. The 5 P's--Prior Preparation Prevents Poor Performance!

This super-simple maxim pretty much means don't wait until the "day of" to try running a new app or piece of equipment. The odds are slim that everything you were counting on working will do so when the pressure is on. Let's say you're trying out teaching your students how to use a new app. Make sure all your instructions, from downloading the app to making a new account and launching it successfully, work without a hitch. Anticipate questions and problems—there WILL be some, and begin researching your solutions ahead of the "big event." Even if things start to go wrong during implementation, if you have practiced and rehearsed, you will maintain the perception of control. And as all teachers know, being a calm captain at the helm of your classroom is a top priority!

2. Have a backup (but don't over-do it!)

Okay, sometimes servers lock up, power goes out, or somebody leaves their tablet at home. You need to have a technology-free contingency plan. If you were going all-digital, have some paper copies on hand. If you were counting on students all doing the BYOD-thing, have a device or two on standby for them to use. The trick here is having a secondary activity on hand. SECONDARY! The whole point was to use the technology right? If you overdo your standby, how much confidence did you really have in yourself with using the new technology in the first place? In my experience, disruptive students can sense any anxieties or lack of enthusiasm for an activity and really turn things around on a weary teacher. Don't let it happen to you! If you follow tip #1, you've already got #2 on lock!

3. Have fun with it!

In engineering terms, sometimes the most ingenious designs are the simplest. If the technology you're trying makes a simple task harder, befuddles an important concept, is prone to failure or plain old BORING—— don't use it!

Nick's website contains a lot of helpful IPad apps for both curriculum delivery and classroom management.

http://handsontech.weebly.com/

Coming up in May: ***Managing student usage of technology in the classroom!***

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Potholes

Human beings suffer.
They torture one another.
They get hurt and get hard.
No poem or play or song
Can fully right a wrong
Inflicted and endured.

History says, *Don't hope*
On this side of the grave,
But then, once in a lifetime
The longed-for tidal wave
Of justice can rise up
And hope and history rhyme.

So hope for a great sea-change
On the far side of revenge,
Believe that a farther shore
Is reachable from here.
Believe in miracles
And cures and healing wells.

Call miracle self-healing,
The utter self-revealing
Double-take of feeling…

— From ***The Cure at Troy***
By Seamus Heaney

The class began, as all our classes do, with a thought-provoking journal writing followed by a "class meeting" where we arrange ourselves in equal fashion, circular around the room. My colleague, Joe, had projected the prompt: "Potholes are getting bigger this time of the year with freezing and thawing. They can cause a bumpy ride or damage to your car. Describe a situation in your life where there was a 'bumpy ride' and how you got over it."

Louis Braille (1809-1852)

He began the class dialogue himself with an account of a major crisis in his personal life, not yet a year old. Joe's closest friend whom he had known nearly all his life had died last spring of cancer about the same time he had to put down the old dog whose discomfort in life had become too agonizing for pet as well as for family. Jim's death was more than he could take, he told us, and he had to stop teaching. It was Joe's tone and gestures which spoke so movingly to us all and, as I knew more of the details of the trauma and ensuing depression, his story was an especially startling and emotional moment for me as well. Heads turned and thumbs ceased their incessant motion across most keypads. We went around the circle where all but four of the twenty-two tenth graders did their best to open up a bit of themselves to public view. This was all the more remarkable as our class is nearly a mini-United Nations with students' background cultures from Nepal, Costa Rica, Guatemala, American Indian, Pakistan, Afghanistan, El Salvador, Puerto Rico, Ghana, and U.S. A few commented that a particular "pothole" was too personal, but offered another example. Here is a sample (names changed):

Brian: "I have a really hard time talking in front of other people – I get really scared." [He never speaks voluntarily.]
TJ: "When I moved here two years ago I knew no English at all, and I still don't think I speak very well."
Ali: "My best friend was shot, so we moved from DC to Virginia."
Melanie: "My Dad died last year."
Jenny: "I just hate my stepdad."
Marie: "I was expelled from my old school." [She came to us only a month ago from a transition school.]
Miguel: "I don't want to say, because it's too personal; but learning English was the hardest for me when I moved here last year."

For me, I felt encouraged to speak about a serious college illness and the loss of one of my roommates to the scythe of cancer. A 21-year old was not supposed to die.

Joe and I stress, especially in circumstances like these, the importance of confidentiality and of seeking a friend, a counselor, religious leader, or therapist, but above all to communicate where trust is built through sharing. Joe's candor and trust opened the door for many of us, so that some of our most needy students found courage to speak up.

A further example from history might be that of a remarkable young boy who, completely blinded at age five from an accident in his father's shop, persevered with the help of supportive teachers to invent a workable alphabet for the blind just ten years later. Louis Braille attended the Institute for Blind Youth in Paris, a grim facility, formerly used as a prison during the French Revolution. After hearing a lecture by Charles Barbier in 1821 on his complex military code (sonography) which enabled users to read messages at night, Braille decided to simplified and extended the alphabet, adding codes for syllables and punctuation, all when he was only 15 years old.

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The Irish poet and Nobel Laureate, Seamus Heaney, knew about these things in his poet's role in bridging the natural-human, descriptive-emotional realms of which art and poetry serve as prime exemplars.

"Call miracle self-healing,
The utter self-revealing
Double-take of feeling."

Self-healing through self-revealing probably helped my colleague, Joe, more than our students or me, but that is what the human condition and human community are all about: "No poem or play or song / Can fully right a wrong / Inflicted and endured," and yet as we share our burdens, we find they are not so unbearable after all. Our classroom children learned a bit more about the strength which can be gained by making ourselves vulnerable in a trusting atmosphere. History may indeed say "Don't hope," but tidal wave or ripple, the gentleness of water can smooth the hardest rock, that "far side of revenge" can be "reachable from here" as justice or understanding rise up so that "hope and history rhyme."

Seamus Heaney should know. He was born on the cusp of World War II and lived in his 20's and 30's amid the chaos and confusion of "The Troubles," turbulent and violent years in late '60's and '70's between Ulster loyalists and Irish Republicans, a period as full of acronyms and fighting armies as hate and revenge: NICRA, UVF, RUC, IRA, and British army. In his 1995 Nobel lecture, Heaney refers to the Bloody Sunday of 1972, to the poignant interactions between victims as a van is stopped and the travelers lined up against a wall and shot. His canvas is broad in that speech, covering Ulster, Israel, Bosnia, and Rwanda. In fact, *The Cure at Troy* reaches clear back to Sophocles in claiming territory in the human soul "that a farther shore / Is reachable from here."

But one does not have to search deep into history or across national boundaries to find sea-changes in a single nation's history as might be seen with Mahatma Gandhi, Nelson Mandela, Martin Luther King, Jr, or the Dali Lama whose lives have helped right a wrong or found hope "on this side of the grave." It depends on where you look and who is the individual person with whom you are talking, or to whom you choose to listen. It may be a single 19th Century French blind boy or a present-day class of 10th graders.

In November 2013, Ellie Herman posted a blog entitled, "The Day I Knew for Sure I was Burned Out." She was a second-career teacher who had worked for 20 years as a writer for television shows and had taught for 5 years in a Los Angeles charter school serving very low-income students. She refers to her enjoyable and occasionally rewarding work with students, but was finally "pushed out of the door" by a recalcitrant copy machine. On a superficial level one might question the depth of such a person's commitment to teaching as a profession. However, on further reading one discovers the real cause was rather the atmosphere in which her teaching was done: an atmosphere where "everything felt like an emergency…there was no time to *think*…so many students with so many needs all coming at you at once, and you don't have the time each of them deserves." She felt "numb," "suffocating," "could not remember what joy felt like." She refers to the number of instructional hours per year in several countries [Hours spent actually teaching, not including planning, grading, and collaboration.]: Japan 510, Finland 553, S. Korea 609, England 695, U.S. 1,051 hours.[1]

For many of us, we have learned to ignore or assimilate the extrinsic factors in our profession and receive our intellectual and emotional stimulation from those factors which are intrinsic to our vocation: communication in community with students, colleagues, staff and leaders in our schools. The pace and fury of the storms raging about us often distract us from that primary sense of mission which attracted us to teaching in the first place. Between pressures from those who would measure learning with facts rather than clarity of understanding, or from those many other activities and distractions luring children and adolescents from themselves, the burdens have certainly led to a tangible sense of burnout.

But finally, we need to return to our children. What might *they* say? We can focus on the donut or on the hole. Listen to them. Here are three excerpts from our 10th grade responses to a prompt which originated after one of our school's short 20-minute school-wide "Character Education" programs. Students were encouraged to write a "letter to a stranger" giving encouragement.

Dear Stranger,

One of my favorite quotes is, "There are humans among us who exude love like the sun gives off warmth." Is it true?...Well, I like to believe so at least…I think we should have a person in our lives whose presence makes us happy. A person who tells us nice things and laughs at our jokes even if the joke isn't all that funny. Stranger, I want you to find that person. Find that person who is like the sun. Bask in their warmth and love. When you find that person cut out all the terrible people in your life…Stranger, I wish for you to find a person like the sun.

– A girl whose middle name is Marie

Don't reduce yourself to a puddle just because a person you like is afraid to swim and you are a fierce sea to them. You are amazing and deserve the world. I love you.

Every day is a day worth living. Even when you are having a terrible day something will always make it better. If you ever feel as useless as the white colored pencil, you just need to find someone who prefers black paper.

Seamus Heaney would remind us that we "hope for a great sea-change / On the far side of revenge." Healing comes both from without and from within. Just ask Louis Braille, or Joe, or Brian, or TJ, or Ali, or Melanie, or Jenny, or Marie, or Miguel. "Believe that a farther shore / Is reachable from here." Teaching does that.

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1. http://www.washingtonpost.com/blogs/answer-sheet/wp/2014/12/12/teacher-the-day-i-knew

[Try doing your own estimation of hours spent per year. For me, using 36 weeks of 5-class load, including all other instructional meeting times with students plus after school) it came to 891

hours/year. For a job of 40 hr/wk for 36 weeks, this would come to 1440 hr/yr. For a person working 40 hr/wk all year (with 2 weeks' vacation), 50 weeks would come to 2000 hr/yr. Using the 36-week-40-hour model, my 891 hours gives me 549 more hours to spend planning and grading, or about 15 more hours per week. That does not include "extra" time for coaching, clubs, or chaperoning, some of which may be compensated.]

George

A VAST Life Member, George Dewey is a former VAST President and former NSTA District VIII Director. He teaches physics in Fairfax County, NBCT since 1999. He can be reached at george.dewey@fcps.edu.

U.Va. Engineering School Open House

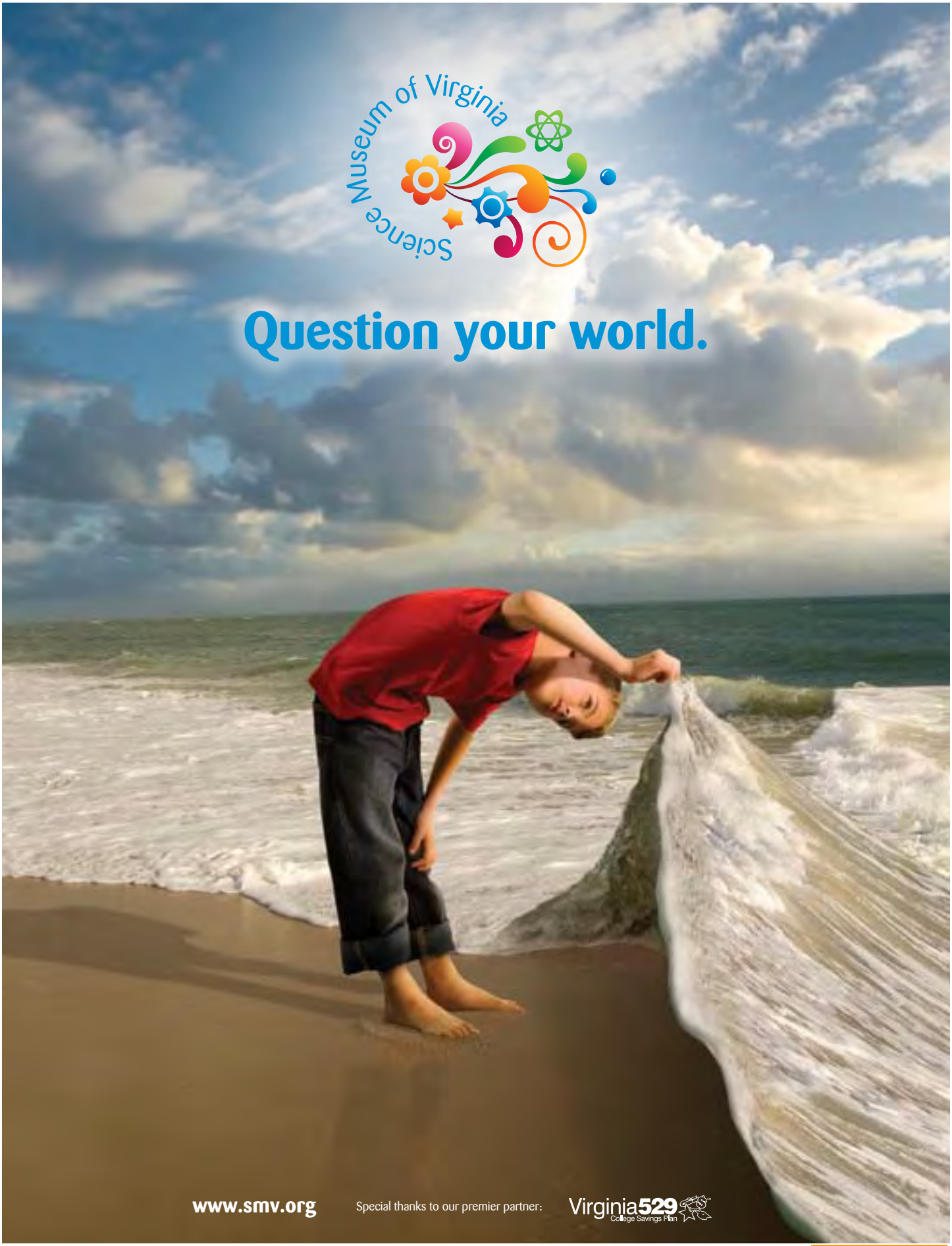
Ever wonder what engineers do? Have you ever thought engineering might be for you or someone you know? Come to the U.Va. Engineering School Open House taking place in and around Thornton Hall on Saturday, March 21, 9am-3pm and find out. The event is free and open to the public. It includes tours, presentations, exhibits and demonstrations by students and faculty. Get more information at:

http://www.seas.virginia.edu/openhouse

The Science of Nuclear Energy Radiation Summer Workshop

The Virginia Section of the American Nuclear Society is organizing, like every summer, a four-day Science Teachers Workshop titled "The Science of Nuclear Energy and Radiation" on July 20-24, 2015 at VCU Engineering in Richmond. More information about the workshop, as well as the registration can be found at:

http://local.ans.org/virginia/3dSTW/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Please consult the website for up to date information, VAST forms for awards and mini-grants, advertising and current PDI information. www.vast.org

VAST is a comprehensive educational organization dedicated to the nurturing and advancement of superior science education.

A. The objective of VAST shall be to advance the study of science, to promote excellence in the teaching of science, and to provide an opportunity for communication among science educators in the Commonwealth of Virginia.

B. Mission Statement: On October 19, 1991 the Advisory Board (henceforth the Board of Directors) developed the following statement:

"The Virginia Association of Science Teachers is a comprehensive educational organization dedicated to the nurturing and advancement of superior science education. VAST provides leadership by:

1. promoting the study of science at all grade levels;
2. supporting conditions which ensure an optimal environment for the teaching of science;
3. advocating high quality science instruction for all students at all levels; and
4. providing an avenue for communication among the members of the science teaching community."

This Mission Statement was reaffirmed on July 29, 2000 and March 8, 2014.

Please update any changes in your P.O. or e-mail addresses by sending in a new membership form as an update. P.O. will not forward the newsletter.

Please send articles, letters to the editor, or labs by the submission deadline, May 1, 2015, for inclusion in the next digital VAST Newsletter.

The Virginia Association of Science Teachers is incorporated in Virginia as a charitable, scientific, and educational organization, is an IRS 501 (c) 3 qualified organization, and is registered with the Virginia Department of Consumer Affairs.