Digital Green

ISSN 1945-7405
http://www.VAST.org
Check the web for news, conference updates, registration, and forms.

The Science Educator

Spring 2013 A publication of VAST, The Virginia Association of Science Teachers Vol. 61, No.4

Virginia Science Teachers Named Regional Winner in the Shell Science Lab Challenge

First Row: Left to Right: David Horta, Alan Booth 2nd Row: Left to Right: Elizabeth Ciancio (Teacher), Bhakti Desai, Milan Brooks, Michayla Rice, Alyssa Causey, Cassie Villarreal, Joyce Corriere (Teacher)

It all started with Eric Rhoades and his weekly Science Reminder.... which then led to the VAST newsletter, website and E-blasts to give notice of this wonderful opportunity....and the story begins....

HAMPTON, Va. — February 28, 2013 — Elizabeth J. Ciancio and Joyce H. Corriere, science teachers at Hampton High School in Hampton, Va., have been named regional winners in the Shell Science Lab Challenge, a competition for middle and high school science teachers. Sponsored by the Shell Oil Company and administered by the National Science Teachers Association (NSTA), the competition encouraged teachers (grades 6-12), who have found innovative ways to deliver quality lab experiences with limited school and laboratory resources, to share their approaches for a chance to win a school science lab makeover support package valued at $20,000. Ciancio and Corriere are one of 18 regional winners named, from which five national finalists will be chosen, and from the national finalists a grand prize winner will be selected.

As the oldest of four high schools in the area, Hampton High School's science classrooms have not been renovated for several years and lack many essentials. The classrooms have no working safety shower or eyewash station for the chemistry classes, for example, and lack sufficient chemicals. With a budget of only $300 per teacher per year that must pay for equipment for three science classes, Ciancio and Corriere must seek creative ways to meet their students' needs. So their students use a virtual online lab bench to test their experiments.

Ciancio and Corriere would like to have the chemistry classrooms fully renovated to support not only lab safety, but also more effective teaching for all, focused on inquiry, collaboration, and project-based learning. Their vision is to integrate science, technology, engineering, and mathematics (STEM) and to have students work in teams on challenging experiments.

"We are truly amazed by the regional winners' ingenuity," said Dr. David Evans, Executive Director, NSTA. "These science educators—with limited resources and funding—have come up with some incredible ideas and creative approaches to providing high-quality lab experiences for their students."

"Inquiry-based learning and hands-on experimentation are key elements for encouraging student interest in science," said Dr. Frazier Wilson, Vice President, Shell Oil Company Foundation, Manager, Social Investment. "The Shell Science Lab Challenge strives to support inquiry-based instructional practices of our science teachers and excite students about the wonders and possibilities of science through active learning that emphasizes questioning, data analysis, and critical thinking. Exemplary science teaching is more relevant when it occurs in a quality lab environment where science concepts can be explored by students."

To enter the Shell Science Lab Challenge, science teachers of grades 6-12 in the United States and Canada were asked to describe their school's current laboratory resources, explain why the school's laboratory facilities might be classified as "limited" resources, and describe their approach to science education instruction utilizing their school's current lab facilities. A panel of science educators then reviewed and selected the top entries.

As a regional winner, each teacher and their school will receive science lab equipment, Shell cash grants, membership to the NSTA, and support to attend an NSTA conference. VWR is also supporting the Shell Science Lab Challenge by providing equipment to the winners.

STAY TUNED to see what happens next .....

From the Executive Director

What more could a teacher want....

Here in VA we are very lucky to have the Virginia Department of Education (VDOE) listening to the needs of approximately 100,000 K-12 public school educators. By creating "TeacherDirect", we are provided with Standards of Learning (SOL) resources and information directly to the classroom. Teachers – and other interested parties, such as school administrators and parents – may subscribe to receive free weekly "TeacherDirect" email updates.

"Teachers are enthusiastic about receiving information directly from VDOE on new and existing SOL resources that will help them – and their students – be successful in meeting the commonwealth's expectations for learning, achievement and critical thinking," Superintendent of Public Instruction Patricia I. Wright said. "I want teachers to know about a new SOL resource or professional development opportunity as soon as the information is available so they and their students can benefit sooner rather than later."

Weekly updates will link teachers directly to pertinent content in the new TeacherDirect section of the VDOE website. TeacherDirect content is organized for easy and speedy reference:

- SOL News contains weekly updated items of interest to classroom teachers, including new instructional resources and upcoming professional development opportunities;
- SOL Events includes a searchable professional-development calendar of conferences, webinars and institutes that support the SOL program; and
- SOL Library contains catalogs of all SOL-related VDOE resources available to English, mathematics, science and history and social science teachers.

We want to thank the VDOE for being proactive in supporting our scientific efforts in the Commonwealth.

Go TEAM!!!

Susan Booth

VAST PDI 2013

Norfolk, Virginia

November 14 - 16, 2013

In this Issue:

More Questions? http://www.VAST.org

Contents:

President's Page:

"So, I Wrote a Grant . . ."

And thus began the adventures of Dr. Mireya Mayor! As I am sure you remember, Dr. Mayor was our final General Session speaker at the 2012 PDI, which was held in Williamsburg last November. I was struck by how "writing a grant" changed her life . . .

Growing up as a first-generation Cuban-American in Miami, Florida, Mireya's family was not a get-your-hands-dirty kind of family. Things changed when she started studying primates in her college anthropology class. She was intrigued that animals, which had never been studied before, were on the verge of extinction. She felt compelled to do something . . . so, she wrote a grant to study them.

Years later and one miraculous discovery of a new species of mouse lemur in Madagascar, the now Fulbright scholar, National Science Foundation Fellow, National Geographic Emerging Explorer and NATGEO WILD Television Channel host has inspired countless scientists, teachers, students and children around the world to make a difference. And it all started with a grant. Amazing!

A grant. It can change a life. It can inspire a soul. It can change the world.

Dr. Mireyer Mayor at Williamsburg 2012.

What would you do with a grant? Who could you inspire? How could that impact your classroom? Your school? Your community? Your world?

Hard to believe, but a simple grant really can do all of these . . . and VAST is here to help! VAST have Mini-Grants, did you know that? We do and it is simple to apply!

Log on to our website (**http://www.vast.org**) and click on the Grants link at the top. You will see the VAST Mini-Grant for Teaching information. These grants provide seed money for innovative curriculum activities which expand learning opportunities for science students. The grant requirements are simple: The teacher must be a VAST member, have taught elementary or secondary level for a minimum of three years and must be currently employed as a teacher.

We are looking for projects that will directly impact student learning, are original, creative and cost effective. Grants will be awarded in the range of $200 - $500. Mini-Grant funds may be spent on supplies, equipment, printing and other materials essential to the project but are not intended for student travel or for personal remuneration of the grant recipients.

The deadline for this year's Mini-Grants is 1 June 2013. This is the time to start thinking about your project and grant money. How can VAST help you achieve your goals? How can we support your creative ideas? We can do this with our Mini-Grants. Get thinking now and submit the paperwork (hard copy or on line) . . . You never know who you will inspire or how you will change the world!

PS ~ On our website, you will also learn about the TACT Mini-Grant to Enhance Teaching of Chemistry as well as the AIPG Russ Wayland Mini-Grant to Improve Teaching of Geology . . . It's all about improving Science teaching and learning . . . Let's get to it!

Brita Hampton
VAST President

From the desk of
Shirley Sypolt,
President-Elect
VAST PDI
Committee

The 61st VAST PDI is coming in November 2013!

It's not too soon to start planning for the 61st Professional Development Institute of the Virginia Association of Science Teachers. This year, the VAST PDI will be held at the Norfolk Waterside Marriott in Norfolk, Virginia on November 14 - 16. Come help us celebrate the sustainability of science in the Commonwealth of Virginia. Online registration will be available after June 1 on the VAST website at ***http://www.vast.org*** .

Theme: *Sustaining Science!*

This theme reflects the idea that, as teachers of science, we need to continue to support and encourage one another to create quality lesson plans, activities, and experiments to be used in all teaching environments. As teachers, our goal is to help all students fall in love with learning and to encourage these students to ask questions about how things work and how they make these things better. By doing this, we can create a sustainable future through science education.

Consider sharing your expertise and experience by submitting a proposal to support one of the 2013 VAST PDI strands. If you have LOTS of ideas to share, you can submit multiple proposals.
Please submit your proposal at before June 1, 2013!

Strand #1: Understanding Environmental Literacy Across the Disciplines
Understanding how our environment connects us to everything around us is critical. Share your passion about the environment through presentations of ideas and methods that inspire students to increase their own levels of environmental literacy.

Strand # 2: Empowering Science Learning Through STEM
Share your great ideas and activities about connecting Science, Technology, Engineering, and Mathematics into their established curricula. Using STEM-related processes, students will become innovative learners to enhance the sustainability of life on Earth.

Strand # 3: What Works in Today's Science Classrooms
Contribute to this strand's patchwork of hands-on and minds-on activities and instructional methods that work in both formal and informal teaching situations and support the science of sustainability at all levels of education.

Shirley Sypolt

Be A VAST PDI Presenter in 2013!

Will you be a Presenter this year? Share your knowledge, skills and experience with your colleagues and thus the students of science in the Commonwealth. It is worth the effort. You and your audience gain from the experience. Click below for an interactive Presenter Form.

https://docs.google.com/forms/d/1njhPjRLLyOSSIRDv-KVfUl9QYFQ0PP4yE8NRBYUjmQI/viewform

The Virginia State House (1788)
CC http://www.flickr.com/photos/tonythemisfit/3296828688
Tony Fischer Photography

Legislative Update: VAST Advocacy Continues to Have a Positive Impact on Science Education Legislation

Several bills came before the General Assembly during its 2013 session that could have profoundly affected science education in Virginia. VAST's advocacy specifically revolved around our mission statement, bullets 1 and 3 which states that VAST

" ***as a comprehensive educational organization dedicated to the nurturing and advancement of superior science . . . . .provides leadership by***

1. Promoting the study of science at all grade-levels; and

3. Advocating high quality science instruction for all students at all grade levels.

As we communicated with our membership, legislators, and the public, we relied upon our highly acclaimed position paper, **The Value of Science Education in Pre-K through Elementary School**, approved by our membership in November 2010, as well as a vote by the VAST Board in January 2013 to "oppose legislation that would allow less accountability for the K-3 Science Standards of Learning … "

VAST in conjunction with a major partner, the Virginia Mathematics and Science Coalition, and many others, concentrated on **three bills and one budget amendment** that came before the 2013 Session of the Virginia General Assembly. All of these dealt with some type of **waiver or reduction for a year or more in the third grade** Standards of Learning Assessments in Science (as well as in History and Social Science). Below is a summary of these four issues.

- Waiver bills **SB1364** and **SJ306** died after considerations by several committees. Both bills were intended to be studies to determine the affect of third grade SOL assessment waivers in science and in social studies on the Standards of Learning assessment scores in mathematics and reading. The emphasis was definitely on reading and the research designs in both proposals had considerable weaknesses in the opinion of VAST Board members. In addition to opposing the two bills which were very similar except for oversight and funding, we utilized the opportunity during the process to educate many folks about the importance of science in the primary years, the impact of the loss of science (STEM) building blocks as students moved up the grades, as well as about the benefits of the integration of science and reading.

- In addition, a very late **budget amendment** became part of the proposed Senate budget. This amendment would have eliminated third grade assessments **in all schools both in science as well as in history and social science** by changing line items in the education portion of the budget. It would, if passed, have had far reaching implications. This amendment was not moved forward by the House and Senate Budget conference committees and, therefore, not approved by the General Assembly as part of the final budget. Since this it was not part of the Governor's initiative, every expectation is that this amendment is dead for this year.

- The fourth issue that addressed waivers was **HB2144.** After passing through several committees it was approved by the General Assembly. It moves forward and will certainly be signed by the Governor since it is part of his reform. This bill allows for the waivers in 38 designated schools all of which have 75% of their students not passing the SOL reading assessments. The schools must apply to VDOE, must have a reading

specialist, must have a reported summative test in the waived subject, and must provide an accountability plan which allows for 30 minutes of daily instruction in the waived subject. VAST has assurances that it will be "at the table" when the procedures for the 30 minute accountability are written.

Thanks to ALL the host of VAST members, friends, and organizations who helped with this endeavor. Many wrote letters, e-mailed, or called their state legislators; others did research and/or prepared to speak/spoke before General Assembly; still others helped write and send e-blasts. It was an effort of MANY, MANY persons who care about science education in Virginia.

We cannot just rest on our laurels, however, and now need to keep abreast of regulations coming before the State Board of Education and ABTEL (it appears there will be proposed changes in teacher licensure). In addition many legislators need information on what role VAST plays, particularly on the professional development we provide. We also need to provide them and the public additional information on research-based best practices. VAST can use your help! Volunteers anyone?

Delores Dalton Dunn
VAST Ad Hoc Advocacy Committee Chair
dudunnn@aol.com

Do We Need Science Education in Elementary Schools? Of Course We do!

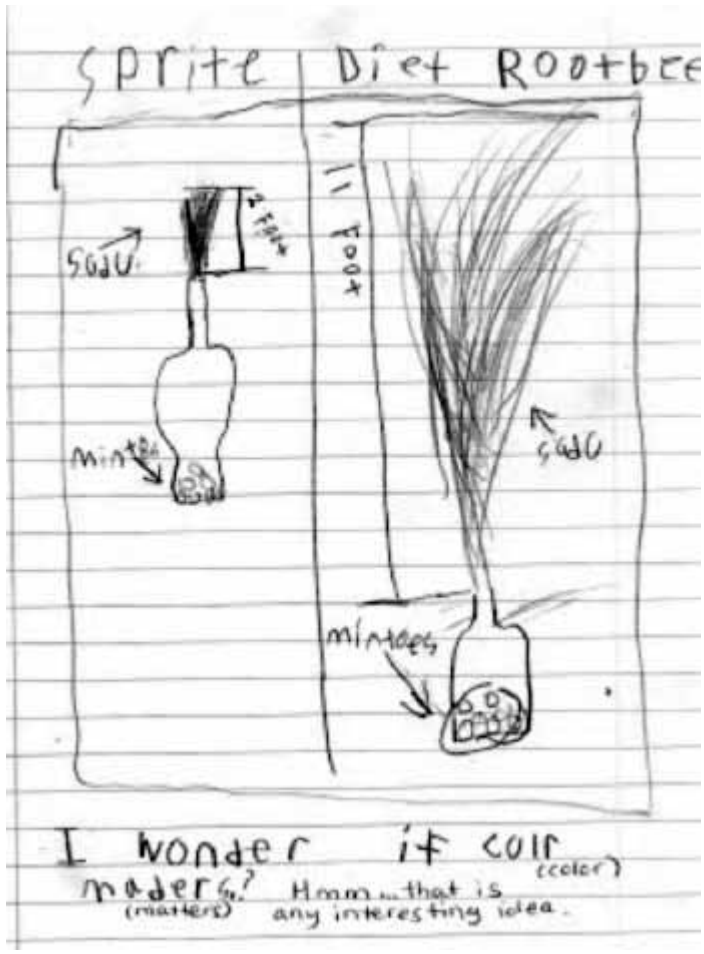
Leslie Lausten, NBCT EC GEN, M.Ed in Science Education,
Region 3 Co-Director of VAST

Recently, there has been a lot of buzz in the elementary schools about how we need to boost our math and reading scores. Many administrators and districts have created mandatory schedules with the majority of the day carved out to support these areas. We pull kids out of regular instruction for intense intervention. When do you think that happens? They are usually pulled out during our science or social studies time, right? Does this improve our scores? The answer is plain and simple – sometimes. Do you know what has been proven to raise math and reading scores in the

elementary grades? Let me share my story with you.

Five years ago I changed grade levels. For years I had taught in the primary grades; first grade, Multiage K-1 and ended my primary years teaching in second grade. I felt it was time for a challenge. I packed up my classroom and made the big walk down the hallway where the upper elementary classrooms were. My first year in fourth was a learning experience. I had always been a constructivist teacher in the primary grades; inquiry was my tool of choice. When I walked into those doors of upper elementary, I thought "I've got this!" Reality hit, however, when the same kids who used to love and hug on me now looked at me with bored eyes. You see, my school is considered a rural school and is Title one. We pull from a large apartment complex that provides many transient students. In the past I have had classroom where poverty is indeed a huge factor in these students' lives. At the same time, I have many middle class families where ADHD and video addiction is running rampant. Focus and attention is more and more difficult to achieve. Sound familiar to any of you?

I struggled the first year to find the right balance between the content and the inquiry, between the developmental stages and the discipline and in the changes needed in my classroom management. Needless to say, my math and reading scores were not the best. My success rate was less than the mandated benchmark needed at the time. (I believe it was 82% at the time.) Following the release of the SOL scores, I met for lunch with my science coordinator, a close colleague and Kip Bisignano, from Delta Education. I expressed my concerns and frustrations about the year. I knew that deep in my heart I had not provided the best learning experience for my students. It was time to regroup and recharge.



The next year I put a few changes in place. First, I implemented more time for science. I decided that in order to engage these students who really didn't want to be engaged, I should start the day with a problem. That's right – science first thing in the morning. I also asked for a full 45 minutes of science instruction daily. I decided that I would incorporate more language skills into my science block by using science notebooks, content/vocabulary strategies and oral language. Kip helped me along this path as I little by little we bought more FOSS and Seeds of Science kits for our school. I incorporated science texts into my reading block where we made connections to the content we were exploring each day. The first year, my math and reading scores soared. Reading was 94% and has stayed there for the past four years. Math also increased and has fluctuated between 86% and 92% over the years. Another result that has happened is that through

staff development, more teachers in my school are also teaching in this manner. In fact, our science SOL scores in 5th grade have gone from the worst in the county to the best scores since we have implemented these changes.

As the years have gone on, I have tweaked my program to include more opportunities for cross curricular connections as well as my newest endeavor – infusing critical thinking strategies into each curriculum area. My students are engaged and highly motivated as I expose them to the world of science, STEM opportunities for their future and as we watch and discuss higher level clips about topics such as the Mars Rover Curiosity, wind power in Denmark, and how magnets are really made in factories. I do not treat my students as if the material is too difficult, instead I give them the tools to carry it forward. It is not unheard of to walk into my room and hear a debate about type of scientific theory or idea. Our relationships are built on trust and acceptance and a pact that boredom is not allowed in our room.

Why am I sharing this with you? Well I truly think that the answer to creating 21st Century learners in our classrooms is the very thing many administrators are trying to get rid of. Science education needs to begin in Kindergarten through discovery of objects in nature and the real world. The more our kids experience, the better prepared they are to take on the world. While listening to non-fiction book is an easy way to check the box that teachers have taught a concept, that doesn't mean the kids have learned it. We need to get out there and provide opportunities for our students to be scientists – in the classroom, in the school yard and on field trips. After all good Science Education builds dendrites and brain cells in a way no other subject can. It sparks our children's creativity and makes them want to question. It allows their brains to make connections as the brain is constantly searching for patterns. It creates a sense of wonder and possibility that our children are often lacking. They

learn patience as they sometimes have to wait and observe rather than get that quick immediate feedback that they crave. They feel a sense of ownership and pride as they discuss the reactions and results from the day.

Is Science Education really needed in elementary schools? Of course it is…fight for it in your buildings. The results, and more importantly our students, are worth it.

Leslie Lausten,
NBCT EC GEN, M.Ed in Science Education,
Region 3 Co-Director of VAST
http://www.sciencegal-sciencegal.blogspot.com

VAST PDI
Norfolk, Virginia
November 14 - 16, 2013

High-Speed Internet
Meeting Rooms & Public Areas: Wireless
Guest Rooms: Wireless
Discounted Daily Group rate $4.95

NORFOLK WATERSIDE MARRIOTT

VAST PDI

Earliest Group Check-in: Tue Nov 12, 2013
Check-out: Sun Nov 17, 2013
Special rate available until: Tue Oct 22, 2013
Standard King or Double $109.00 per night Book Standard King or Double at Norfolk Waterside Marriott for $109.00 per night

Online registration for the VAST PDI 2013 will be available after June 1 on the VAST website at www.vast.org.

Use this link to make online reservations with the VAST Group Rate:
http://www.marriott.com/hotels/travel/orfws-norfolk-waterside-marriott/?toDate=11/17/13&groupCode=SCTSCTA&stop_mobi=yes&fromDate=11/12/13&app=resvlink

Check the VAST website often for updates and more information.

The 61st Professional Development Institute (PDI) of the Virginia Association of Science Teachers will be held at the Norfolk Waterside Marriott in Norfolk, Virginia on November 14 - 16. Register early for a room at the convention hall. You will enjoy maximum time at the conference, receive the VAST discount and you help support VAST by filling our contracted rooms.

Science Learning Takes Root with Project Plant It!

Dominion's Project Plant It! blossoms with new ways to engage elementary students in learning about trees and the environment. The program has earned the prestigious Public Awareness of Trees award from the Arbor Day Foundation and also received an award from the Virginia Association of Science Teachers.

A beautiful redbud tree, which is the species of tree seedling that the students enrolled in Project Plant It will receive this year to plant at home on Arbor Day.

Paulin Cheatham, the spokesman for Dominion's Project Plant It, receiving the Community Partnership Award at the VAST convention in November 2012.

In January, teachers in participating school systems received a kit with lesson plans, posters, stickers and other instructional tools. All of the teaching materials align with state learning standards for math, science, language arts and social studies.

Science educators will be delighted with a new lesson plan in the 2013 Teacher's Guide that helps students understand how energy impacts their daily lives and also about the differences between renewable and non-renewable energy sources.

The Understanding Energy lesson plan consists of four activities:

Activity #1: Sources of Energy – Teachers will create an Energy Toolbox of materials that represent renewable and non-renewable energy sources. As the teacher holds up an item, students discuss whether it's an example of renewable or non-renewable energy.

Activity #2: Home Energy Audit – Students are asked to walk through each room in their homes and make a list of all items that use energy in any of its forms. Students can share their findings in a group discussion.

Activity #3: Energy Reports and Class Quizzes – Students are divided into 5 energy teams to research solar, wind, water, fossil fuels and nuclear energy sources. Each team shares 10 interesting facts about their energy source and creates an energy quiz based on the facts shared.

Activity #4: Energy Conservation Tips – Students are asked to research simple tips to help conserve energy. If possible, students can share a conservation tip-of-the-day during the month of April over the school's PA system.

Dr. Jean Young, a VAST member and Curriculum and Instruction Specialist for Spotsylvania County Schools, enthusiastically endorsed the new lesson plan. "The activities are student-centered and relate well to SOLs about energy," she said. "I look forward to sharing this lesson plan with our teachers when it's time to start studying Project Plant It!"

The cornerstone of the program is the distribution of a redbud tree seedling, a tree species that's native to Virginia, to each participating student on Arbor Day (April 26).

The website, www.projectplantit.com, features videos and interactive games about trees. Project Plant It! is provided by Dominion at no cost to schools. For more information, visit the website or Facebook page.

Virginia Junior Academy of Science

The 2013 VJAS Research Symposium will be held at **Virginia Tech, May 21-23.** Students arrive on **Tuesday** afternoon and get settled in the dorms. After dinner students will hear Marc Edwards, the Charles Lunsford Professor of Civil Engineering at Virginia Tech, who teaches courses in environmental engineering and applied aquatic chemistry. Paper presentations occur on **Wednesday** and then students enjoy the "Dinner with the Scientists." After dinner and hearing Patricia M. Dove, the C.P. Miles Professor of Science in the department of Geosciences at Tech, students can choose from among several activities to mix and chill out. The Awards Ceremony is on **Thursday.** First Place winners are then invited to present their research to the Sections of the Virginia Academy of Science.

Check the VJAS website for detailed information: **www.vjas.org**. If you've never been to a meeting consider coming this year and experience the very best in student research.

We need your help. If you have some time to devote to our young scientists and want to consider judging, contact Susan Booth at susan.science@gmail.com.

Get the most out of the Symposium and VJAS. Consider the following:

- Apply to be a Junior Academy Officer.
- Apply for a Special Interest Award or Scholarship. Look over all of the special awards available for award winning papers.
- Nominate a teacher or colleague for the E. C. L. Miller Science Teacher of the Year award. This is given to the most outstanding teacher nominated each year. The prize is Membership in VAST and a trip to the VAST PDI in November.
- Get all the information you need at www.vjas.com, and make sure you meet the April 25 deadline.
- If you have never participated – come and visit. You will be impressed by the quality of research done by Virginia students.

For a new Teacher Resource on the VJAS website:
http://66.147.244.216/~vacadsci/vjas-1_files/t_opportunity.html

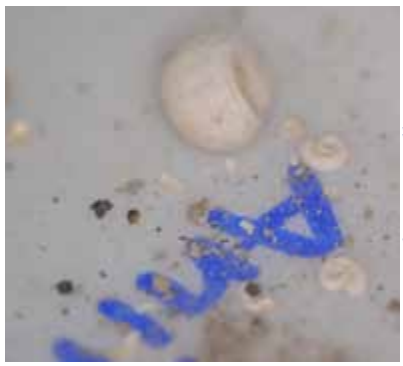
See you in May at Virginia Tech. It's the place where our best young scientists will be.

Middle School Students are Paleontologists For a Day!

STEM Education Alliance

Karen Hogue, Project Specialist
STEM Education Alliance, William and Mary

Twenty-six sixth grade students from Williamsburg-James City recently participated in the **STEM Education Alliance's** inaugural RealScience Fest. The RealScience Fest provides **STEM (Science, Technology, Engineering, and Mathematics)** activities that engage students in real, rigorous scientific research.



STEM Education Alliance

Students who attended the RealScience Fest became paleontologists for a day by participating in the Mastodon Matrix Project. The remains of a mastodon were discovered in Hyde Park New York in 2000, when the homeowners drained a backyard pond. After the initial excavators' major findings and preliminary dig were complete, volunteers led by the Paleontological Research Institution (PRI) removed 22,000 kilograms of soil from the dig site. The soil continues to be processed through a program designed by the PRI research team, aptly called the Mastodon Matrix Project. The Project allows amateur researchers to examine the soil, discovering and cataloging shells, sticks, rocks, and perhaps even bone fragments. During RealScience Fest, sixth grade students received instructions from PRI and spent a day sifting, sorting and identifying materials found in the soil. Remains were carefully recorded, labeled and bagged. These finding were then returned to PRI where information about the sixth graders' finds will contribute to the paleontologists' research.

In addition to cataloging materials from the mastodon project, the students learned about **STEM** careers through discussions with experienced scientists. Students learned what a typical day at work is like for a scientist, as well as how **STEM** careers play a part in products used every day.

Want to follow the PRI Mastodon Matrix Project? Visit their website, **http://www.museumoftheearth.org/research.php?page=Mastodon_Research/Mast_Matrix**

http://www.museumoftheearth.org/research.php?page=Mastodon_Research/Mast_Matrix

To learn more about **STEM Education Alliance**, visit our website at **http://stem.wm.edu**, follow us on Twitter, or Like us on Facebook.

STEM Education Alliance

GreenSTEM@VCU - Integrative STEM education with a focus on energy and the environment using high quality service-learning techniques for Middle School science, mathematics and technology teachers.

GreenSTEM@VCU includes an online open-access video series and curriculum materials designed to introduce students and teachers to Service-Learning and environmental STEM topics:

Service- Learning Units:
- Introduction to Service-Learning
- Partnerships
- Youth Voice
- Reflection

Environmental STEM Units:
- Alternative Energy
- Solar Energy
- Runoff
- Carbon Sequestration

GreenSTEM@VCU also offers a Teacher Academy that begins with three intensive on-site days focusing on the hands-on activities and topics. The teachers complete the in-service training through a series of online lessons using the GreenSTEM@VCU video series and curriculum materials. **The GreenSTEM@VCU** project Wiki continues to provide a forum for communication and support. **Registration Information for the 2013 GreenSTEM Teacher Academy will be available in March 2013.**

Visit to access the **GreenSTEM** Video and lesson plans and for Academy information

NSTA offers an innovative newsletter called **The STEM Classroom**. It's free to all, and you can see past issues and sign up here if you like: **http://www.nsta.org/publications/archive-stem.aspx**. It will give you some good ideas.

Numbers and (human) Nature

> I know of no safe depository of
> the ultimate powers of the society
> but the people themselves; and if we
> think them not enlightened enough to
> exercise their control with a wholesome
> discretion, the remedy is not to take it
> from them, but to inform their discretion.
> — Thomas Jefferson
> (from a letter to William Charles
> Jarvis, September 28, 1820)

The (sadly) late Theodore Sizer (Founder, Coalition for Essential Schools) commented about Jefferson's words that they were to him "a reminder of what education in a democracy can and should and must be." In the present atmosphere of political disharmony and paralysis these words bear special relevance. Particularly for us in education, in our eagerness to quantify student progress and teacher success, especially around issues of equity, it is important to be alert to our need for making measurements in addition to how we interpret them. Our attitude and facility toward measurement affects us, from the classroom to the superintendency.

Our fascination with measurement and its interpretation has deep roots in human history, at least as old as the ancient Greeks. Johannes Kepler paid homage to mathematical antiquity in a 17th Century essay:

> Geometry has two great treasures: one is the Theorem of Pythagoras; the other, the division of a line into extreme and mean ratio. The first we may compare to a measure of gold, the second we may name a precious jewel.

He thus links the geometrical work of Pythagoras in the 6th Century BCE to that of Euclid and his Divine Proportion 200 years later. Euclid's Divine Proportion, whereby a line is divided such that the ratio of the smaller section to the larger is the same as the ratio of the larger to the whole line, becomes the basis for the five-fold symmetry of the pentagon and for the Golden Triangle and Golden Rectangle as seen in the interpretation of the logarithmic spiral of the chambered nautilus. In fact, the 17th Century mathematician, Jacob Bernoulli (Daniel's father) called the logarithmic spiral "Spira Mirabilis." There is a mathematical connection between the Divine Proportion and the Fibonacci sequence seen in the displacement of leaves around a stem, petals in the lotus and rose, or spirals of pine cone or sunflower.

Kepler, born eight years before Leonardo da Vinci died, and Galileo, born seven years earlier, seem worthy successors to the mathematical principles imbedded in nature. Leonardo, perhaps like none other, epitomizes the combination of artistic and scientific talent as illustrated in his famous drawing of the Vitruvian Man. Around 1490 Leonardo created his sketch and comments (interestingly written in mirror writing) based on the geometry described in the 1st Century BCE book by the Roman architect, Marcus Pollio Vitruvius. The man inscribed within the circle and square such that his extended fingers align with the top of his head and legs spread just enough to lower the head by one-fourteenth of his height has a host of ratios assigned to him, including:

- From the hairline to the bottom of the chin is 1/10 the height of the man;
- From below the chin to the top of the head is 1/8 the height of the man;
- From above the chest to the top of the head is 1/6 the height of the man;
- The distances from below the chin to the nose and the eyebrows and the hairline are equal to the ears and to 1/3 of the face.

It seems this fascination – for some a preoccupation – with the nature of numbers is a part of our human nature. Where this numerological neurology prejudices our scientific studies has been abundantly described in Stephen Jay Gould's 1981 book, *The Mismeasure of Man*. In it Gould describes the shadowy search for a "g" value which uses factor analysis to arrive at a measurement for human intelligence. Where this ran into trouble, of course, was in the 19th Century attempts at concluding racial inferiority in IQ by comparing the cranial volume of skulls from Africa and other areas to those of Europeans. As happened with the evolutionary distortions of Social Darwinism, so here were experimental results twisted to support the notions of racial superiority or inferiority. In our enthusiasm for quantifying such a multifaceted quality as intelligence we run the risk of reification of intelligence theory or, worse, failing to realize that simple correlation rarely indicates causation. [Flawed statements like: More intelligent people have higher incomes, so having a higher income makes one more intelligent.] It is interesting that the Jungian-based Myers-Briggs array of sixteen combinations of psychological preferences does not use a numerical scale for type analysis.

Perhaps this can serve as useful background for interpreting a short 20. February 2013 *Washington Post* article on the release in February of the 9th annual "AP Report to the Nation" by the College Board[1]. The by-line read: "AP exams: Maryland No.1, Virginia slips in national ranking." How might one react to "slips?"

Over the ten year period 2002-2012 Virginia ranks 7th in the *percent increase* in AP scores of 3 or higher (10.4% compared to

7.0% for the U.S.). In 2012, 60% of Virginia AP students scored 3 or higher. During the past ten years Virginia's annual growth in AP-takers as a percent of total student population has lagged a bit behind the national percent increase. However, until last year, Virginia's annual growth percent for students scoring 3 or higher has exceeded or kept pace with the U.S. trend. [See Table A for comparisons.]

AP participation and success (3+) for all subjects
Average annual percent increase since previously reported date

Year	U.S.		VA	
	%/yr	%/yr 3+	%/yr	%/yr 3+
2002	—	—	—	—
2007	9.4	7.8	8.8	8.6
2011	7.5	7.0	6.5	7.0
2012	5.0	6.0	4.0	5.0

Table A

For the 2012 year in the six science Advanced Placement Exams, Virginia seems to have fared less well. Except for Environmental Science, Virginia has lagged significantly behind the U.S. percent of scores 3 or better, particularly in physics and biology. [See Table B for comparisons.]

2012 Distribution of science AP scores, success (3+)
National and Virginia

Subject	% of Exam Scores 3+	
	U.S.	VA
Biology	48.6	44.6
Chemistry	52.5	51.4
Environmental Science	48.9	49.4
Physics B	58.4	50.6
Physics C Mechanics	75.6	69.5
Physics C E & M	71.1	65.8

Table B

There continue to be problems with low participation and equity gaps. Of those students who demonstrate high potential for success in an AP class (as determined by PSAT/NMSQT scores) only 40% are participating nationally, a bit better (42%) in Virginia. African American students make up 23.8% of Virginia's 2012 graduating class[1], while 13.2% took any AP exam, 7.4% achieving 3 or higher. Since 2011 Virginia has made progress decreasing the gaps between the student population represented by African Americans and those African Americans actually taking an AP exam, similarly with those students succeeding with a score of 3 or higher. However, this is not true of Virginia's Hispanic/Latino student population where the gap increased: Hispanic/Latino students made up 8.3% of the graduating class but only 7.7% and 7.1% of these were participating or successful (3+), respectively.

While it may be true that Virginia has slipped from 3rd to 5th place nationally in the percentage of its students' success (3+) on AP exams (27.2%), the significance of the 0.1% difference with 4th place Florida (27.3%) is moot, or even between 3rd place Massachusetts with 27.9%. What is curious is the *Post* quote from Charles Pyle of Virginia's Department of Education, "What's happened is we have been surpassed by a couple of states that have done some things on the ground to increase participation." The College Board in collaboration with the National Math and Science Initiative (NMSI) has implemented an incentive program in 9 states. Virginia and Massachusetts are two of these (along with Connecticut and Colorado who are also among the top ten AP success states, but ranked below Virginia). This might suggest Virginia has done something on the ground to improve its success rate as well. In addition, last December the College Board also created an AP STEM access program in an effort to encourage underrepresented female and minority participation in science and mathematics courses. One hopes Virginia will seize the opportunity here, too.

A colleague of mine who teaches AP Physics once commented that he believed the whole point to AP was to enable his kids to stretch themselves and to be given the opportunity to think deeply about a subject or idea regardless of their score on the exam. Last fall in *Education Week*, Alfie Kohn [*The Case Against Standardized Testing, The Homework Myth*] addressed the issue of our over-reliance upon numerical rankings and scores to the detriment of accurately assessing student, teacher, or institutional progress[2]. Readily acknowledging the utility and necessity of quantification (how many students in a class, the percentage of AP scores 3 or higher), he feels we substitute *measuring* for assessment: "We've forgotten that assessment doesn't require measurement, and, moreover, that the most valuable forms of assessment are often qualitative (say, a narrative account of a child's progress by an observant teacher who knows the child well)…rather than a standardized test score." Further, "Pretty soon the question of what our whole educational system ought to be doing gives way to the question of which educational goals are easiest to measure." He summarizes three points: we miss the forest while counting trees, we become obsessed with winning, and we deny subjectivity. We may think there is a difference between an 79 and an 80 at the top of a test whose construction and scoring are heavily weighted with a teacher's subjective criteria. This problem is exacerbated by what Kohn describes as an institutionalized distrust of teachers' judgments.

continued....

There is wisdom in Jefferson's words of informing, not removing, the discretion of those in charge of our democracy (read *education*). Numbers certainly seem to be a part of (human) nature, yet over-reliance upon them, like over-reliance on the technology of communication at the expense of personal contact, can lead to serious distortions of student/teacher/institutional progress if not a general repudiation of what it is that makes us human in the first place. This is the two-fold message of Degas' ballerina. She was dancing an interpretation full of creative, but constrained, spontaneity from the ideas of the composer and choreographer. And Degas, the artist, interpreted the interpretation with masterful brush strokes upon a canvas to create something most of us would call beautiful. What measurement would we make of beauty? Or of the neighborhood in which we might choose to live? Or of the partner with whom we choose to live? Perhaps the ability to choose is more significant than quantification.

That is not to say there is no beauty or satisfaction in numeracy and measurement; artist and teacher acknowledge the qualities leading to any judgment within the limitations of our human nature. The dance in life goes on.

References:

1. College Board, *The 9th Annual AP Report to the Nation,* Feb. 13, 2013, http://www.collegeboard.org
2. Kohn, Alfie, "Schooling Beyond Measure," *Education Week*, Sept. 19, 2012, http://www.edweek.org

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 .

Region IV Mini Drive-in Workshop:

This July, Region IV is planning the second annual, mini, drive-in workshop:

**** AIR, EARTH, WATER as S.T.E.A.M. from the FIRE within… ****

Add the relevant connections of the Arts to all four components of STEM education = STEAM. Now add a fieldtrip, related workshops and presenters, and environmental literacy, too! We hope to have corporate support in addition to securing grants.

More Region IV News:

- **The three region IV Wind Energy NEED kits have been shared through one jurisdiction's elementary schools, middle school technology and science programs, another elementary school. The high school kit is heading to a southern district in the region. One might say the kits are "breezin'" through the region!**
- **The third USA Science & Engineering Festival has been scheduled!**

April 26-27, 2014!

HOLLYWOOD COMES TO DC: MEET ADVISORS TO "HOUSE, MD," "BREAKING BAD" AND "BIG BANG THEORY"!

- **Science Fairs are alive and well across the region. Please contact the region IV director if you need help securing judges!**

Susan Bardenhagen, Region IV Director
region4@vast.org

VAST Regional Opportunities

Region V Mini PDI:

Please save May 11th for a wonderful day of outdoor adventure and professional development. The VAST Region V Regional PDI will be held at Camp Horizons just a few miles North of Harrisonburg, Virgina. Details still under development, but we know we will have:

- A fabulous lunch prepared by Camp Horizons' Chef
- A beautiful location to participate in environmental education
- Water quality testing from elementary methods to professional grade equipment techniques
- Outdoor environmental education with Betty Gatewood
- Presentation on the Next Generation Science Standards by Andy Jackson

Keep checking **http://vast-regionv.wikispaces.com/** for more details to be added and look for information in upcoming VAST e-blasts

Andrew S. Jackson, Region V Director
region5@vast.org

New From NASA!

Bonnie Murray, Education Specialist,
NASA Langley Research Center bonnie.murray@nasa.gov

Math Rocks: A Lesson in Asteroid Dynamics

http://www.jpl.nasa.gov/education/index.cfm?page=368 (see website for downloadable worksheet, answers, and other resources)

About this activity:

A "real-world" lesson in asteroid-related math developed by JPL educator Dr. Ota Lutz with help from JPL scientist, Paul Chodas, to get students thinking like NASA scientists.

Subjects/Standards: Algebra, Geometry, Trigonometry, Asteroids & Comets

Grades: 9-12

Lesson:

On Feb. 15, 2013, a small asteroid entered Earth's atmosphere over Chelyabinsk, Russia, and startled onlookers with its fiery appearance and shockingly loud noise. NASA estimates the asteroid was approximately 17 meters in diameter with a mass of approximately 11,000 metric tons and traveled approximately 18 kilometers per second. Infrasound stations nearby and as far away as Antarctica detected the low-frequency sound waves generated by the meteor. The infrasound data indicates that the event, from atmospheric entry to the meteor's airborne disintegration took 32.5 seconds. The entry angle to horizontal was about 15° and the terminal part of the fireball was at about 20 km altitude.

1. What is the straight-line distance the meteor traveled through Earth's atmosphere?
2. Compute the volume of the asteroid, assuming it was nearly spherical.
3. Compute the density of the asteroid. What does this tell you about the physical composition of the asteroid? Is it primarily ice? Rock? Iron?
4. How much energy was released by the event? Give answer in Joules and kilotons.
5. At what altitude did atmospheric entry occur? What layer of the atmosphere is this?

Meteor whose fireball exploded above Chelyabinsk city and caused damages to buildings and injured hundreds of people. Photo taken a minute after seeing the blast, on 2, 15, 2013 in Yekaterinburg, Sverdlovskaya Oblast, RU, about 200 km distance.

CC Alex Alishevskikh- http://www.flickr.com/photos/alexeya/8475569087/

Also check out this new resource from NASA:

Eye2Eye: Focus on Next Generation Air Transport

http://www.nasa.gov/offices/education/programs/national/dln/special/AirtrafficControl.html

This is a newly released (Yes, hot off the press!) addition to the DLN catalog. In the **Eye2Eye** series, each module will highlight content from a different area of study. This inaugural edition focuses on the science of flight and the career of Air Traffic Control. It is a compilation of resources that include an online simulator where students gain valuable practice with basic algebra skills, a suite of online simulators to allow experimentation with various science and math concepts, a package of lesson plans with hands on activities and many other valuable web resources. For those interested in exploring the career of ATC, several video interviews with an ATC are also included.

Bonnie Murray, DLN Education Specialist, NASA Langley Research Center, MS – 400, Hampton, VA 23681

Virginia Outstanding Biology Teacher Award

Every year, the **Outstanding Biology Teacher Award (OBTA)** program attempts to recognize an outstanding biology educator (grades 7-12 only) in each of the 50 states; Washington, DC; Canada; Puerto Rico; and overseas territories. Candidates for this award do not have to be NABT members, but they must have at least three years of public, private, or parochial school teaching experience. A major portion of the nominee's career must have been devoted to the teaching of biology/life science, and candidates are judged on their teaching ability and experience, cooperativeness in the school and community, inventiveness, initiative, and student-teacher relationships. OBTA recipients are special guests at the Honors Luncheon held at the NABT Professional Development Conference, receive microscopes from Leica Microsystems, gift certificates from Carolina Biological Supply Company, and award certificates and complimentary one-year membership from NABT.

For an application package for the state of Virginia, please contact Kathy Frame, VA OBTA Director at chuckframe@aol.com by **March 15, 2013.**

Project CRESST: Enhancing Clinical Research Education for Science Students and Teachers

an innovative curriculum designed to enhance Middle and High School Students' research skills and awareness of the importance of healthy lifestyle choices.

Who: **Middle and High School Teachers** (Science/ Heath& PE Teacher Teams are encouraged to apply.)

What: A Professional Development Academy that combines a week-long summer workshop in the classrooms, labs and facilities of Virginia Commonwealth University with "in your classroom" implementation throughout the fall semester.

- Interact with scientists at the VCU Center for Clinical and Translational Research and researchers, faculty and staff from Virginia Commonwealth University
- Explore the CRESST curricular materials through inquiry-based hands-on activities and Incorporate content materials and inquiry-based investigations into your classroom instruction
- Receive up to $250 in classroom supplies and resources
- Earn three graduate credits from Virginia Commonwealth University or a $500 stipend upon the successful completion of the Academy requirements. Credit or stipend will be awarded at the completion of the fall semester.

When: Summer Workshop - July 15–19, 2013, 8:30 am–4:30 pm
Follow-up session November 2, 2013, 10 am – 4 pm

These include:

- Lunch and snacks
- Complementary on-campus parking
- On-campus housing and most meals for teachers from outside the Richmond area

Application Deadline: April 29, 2013

For more information or to register, visit www.cresst.vcu.edu

This project was supported by the National Center for Research Resources and the Division of Program Coordination, Planning, and Strategic Initiatives of the National Institutes of Health through grant number R25OD010983-03.

Youth Conservation Camp (YCC)

Youth Conservation Camp (YCC) is a week long summer conservation camp for Virginia high school students held on the campus of Virginia Tech each July. The Virginia Association of Soil and Water Conservation Districts has sponsored this program for 36 years which brings together 50 interested students for a week of learning about Virginia's natural resources from conservation professionals and faculty from Virginia Tech. Most of the instruction is hands-on and outdoors.

2013 Youth Conservation Camp will be held July 14-20, 2013 at Virginia Tech in Blacksburg, VA. Scholarship opportunities may be available through your local Soil & Water Conservation District. YCC is open to all Virginia high school students enrolled in grades 9-12 during the current school year. To apply, contact your local Soil & Water Conservation District or visit **http://vaswcd.org/conservation-camp** .

SunWise with SHADE Poster Contest

Last year, over 12,000 students learned about sun safety and UV radiation by submitting posters to the **SunWise with SHADE** poster contest. We are looking forward to another great contest this year and invite your students to participate for the chance to win a shade structure for their school and a family trip to Disney World. Poster submissions are due **April 1, 2013**. The contest is organized by the U.S. Environmental Protection Agency **SunWise program and the SHADE Foundation of America** to teach children about the science of UV radiation and sun safety.

Please join us in spreading the word about this contest and raising awareness of the importance of sun safety. More information is available at **www.shadefoundation.org/poster-contest.php**. **SunWise** is a national environmental and health education program that teaches children and their caregivers how to be safe in the sun through the use of classroom, school, and community components. Over 31,000 schools and 5,700 community partners have joined the program since its launch in May 2000. For more information, please visit **www.epa.gov/sunwise.**

Guide for the North American Conservation Education Toolkit

The Association of Fish and Wildlife Agencies and the Pacific Education Institute has just released the latest guide for the North American Conservation Education Toolkit. It helps teachers and students explore technologies used by natural resource scientists. Download the 100 page guide at **http://www.pacificeducationinstitute.org/workspace/resources/technology-guide-final.pdf**

Soon this guide will be placed on the AFWA website along with the other guides developed for Field Investigations.
For other guides go to **Conservation Education Toolkit on http://www.fishwildlife.org/index.php?section=conservation_education&activator=25**

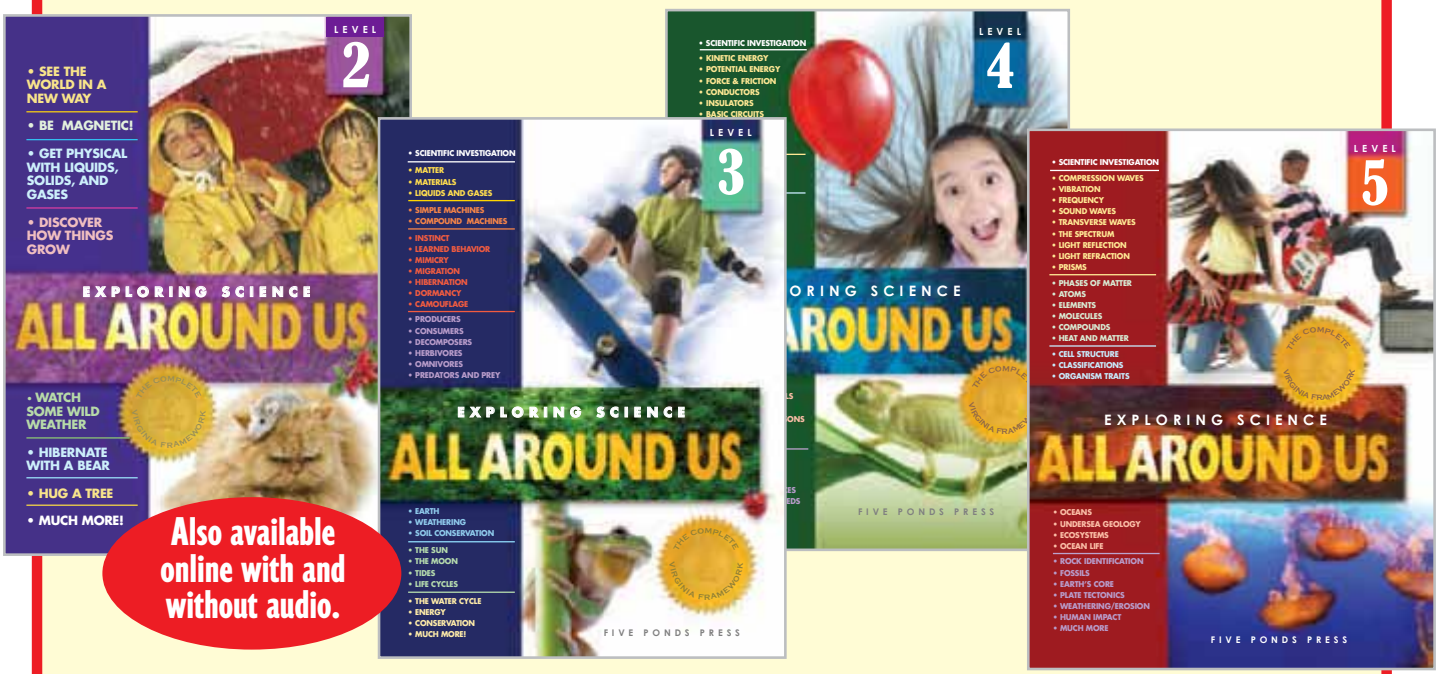
http://www.pacificeducationinstitute.org/workspace/resources/technology-guide-final.pdf

http://www.fishwildlife.org/index.php?section=conservation_education&activator=25

"Please create a Science series that presents the Virginia Framework like the OUR WORLD series does for Social Studies."

That was the request we heard from around the state as we hosted teacher training sessions for the many districts that adopted the **OUR WORLD** series of books for History and Social Science.

We listened! **EXPLORING SCIENCE ALL AROUND US** student books for Grades 3, 4, and 5 are shipping now. Grade 2 will be available this summer.



Five Ponds Science books have been extensively checked and thoroughly researched and reviewed by a team led by Jill Sible, Ph.D. and Giti Khodaparast, Ph.D., both of whom are esteemed faculty members at Virginia Tech in Blacksburg. With bright colorful photos and engaging text that exactly follow the new Virginia Framework—all supported with an extensive online teacher program—**EXPLORING SCIENCE ALL AROUND US** is the right choice for your students.

Please call Laura Buckius in Virginia Beach at 877 833 0603 x103 or email Laura@FivePondsPress.com for free samples and to preview online at www.fivepondspressbooks.com

FREE SAMPLES!

Free Conservation Education Toolkit

The Association of Fish and Wildlife Agencies and the Pacific Education Institute has just released the latest guide for the North American Conservation Education Toolkit. It helps teachers and students explore technologies used by natural resource scientists.

You can download the 100 page guide at **http://www.pacificeducationinstitute.org/workspace/resources/technology-guide-final.pdf** http://www.pacificeducationinstitute.org/workspace/resources/technology-guide-final.pdf

Within a few weeks this guide will be placed on the AFWA website along with the other guides developed to help with Field Investigations.
You can access the other guides here **Conservation Education Toolkit** click on the North American Conservation Education Toolkit on the left. **http://www.fishwildlife.org/index.php?section=conservation_education&activator=25**
http://www.fishwildlife.org/index.php?section=conservation_education&activator=25

Engage Elementary Students to Read Science

How about encouraging your students to love and care for our waterways and oceans? Check out this article on Science Matters at **http://ideastations.org/articles/mermaid-hales-teaches-children-how-to-help-save-bay-2013-03-04**
http://ideastations.org/articles/mermaid-hales-teaches-children-how-to-help-save-bay-2013-03-04
to see how a child's passion can become an adult's activism. You can even have a Mermaid come and read to students.

Water-Cycle Diagram for Kids

The U.S. Geological Survey (USGS) and the Food and Agriculture Organization of the United Nations (FAO) have teamed up to create a water-cycle diagram for kids and elementary and middle schools. It is available in a number of languages.

http://ga.water.usgs.gov/edu/watercycle-kids.html

SpectraSnapp turns an iPhone into a Spectroscope! FREE

Download the free SpectraSnapp app, follow the easy instructions to build a simple add-on for your iPhone's camera, and point it at anything that glows! The SpectraSnapp app breaks apart the incoming light into its separate wavelengths. You will see how different kinds of light sources have their own unique signatures. Use the comparison tool in the app to match your spectra sample to a library of common sources, and you can tell what's generating that light! Astronomers use this same technique to figure out what elements make up distant stars. Download SpectraSnapp for Free » Go to the Aps store and search for SpectraSnapp.

Make Your Own Infographics

Create and share infographics and interactive charts in minutes with this website. K–college teachers will find templates and instructions for presenting data creatively. Learn how to produce customizable, interactive online charts, embed videos into articles and presentations, and present information in engaging ways. Your data will never look the same again!

Dig Into Earth Science Education with USGS

The U.S. Geological Survey (USGS), a longtime Earth Science Week partner, offers a wealth of information on virtually every Earth science topic, from natural resources and hazards to geospatial data.

The USGS education web site (http://education.usgs.gov) includes lesson plans and other resources for K-12 students, educators, and others. Just in time for the Earth Science Week 2013 theme of "Mapping Our World," for example, GIS Lab focuses on using Geographic Information Systems to teach spatial analysis, and GPS Class provides lessons on Global Positioning Systems in education.

USGS has thousands of free images and over 69,000 searchable publications such as maps, books, and charts online. If what you're looking for still proves elusive, just "ask a geologist" (http://walrus.wr.usgs.gov/ask-a-geologist). And don't forget to check out the USGS podcast series, CoreCast, featuring stories and insights on climate change, satellite monitoring, human health, wildlife disease, and more (http://www.usgs.gov/corecast).

Science Practice Items Clicking on a link for the Practice Items will launch the items in a browser window.

Grade/Course	Practice Items	Practice Items – Audio	Practice Item Guides (PDF)
Grade 3	Practice Items	Practice Items – Audio	Guide
Grade 5	Practice Items	Practice Items – Audio	Guide
Grade 8	Practice Items	Practice Items – Audio	Guide
Biology	Practice Items	Practice Items – Audio	Guide
Earth Science	Practice Items	Practice Items – Audio	Guide
Chemistry	Practice Items	Practice Items – Audio	Guide

http://www.doe.virginia.gov/testing/sol/practice_items/index.shtml

Virginia SOL Resources from the DOE

Click on the yellow link to go to the DOE Page.

Field Test Opportunity for Grades 9-12 Science Teachers

We are still accepting applications for field-test teachers for **Energy: A Multidisciplinary Approach for Teachers (EMAT), an NSF-funded,** graduate-level professional development course for teachers that is focused on energy-related concepts.

Field-test teachers are critical in helping us design and improve teacher programs like EMAT. Click on the following link to access the application and for more information. **http://www.bscs.org/emat**

Application Deadline - March 31, 2013

In order to take part in the EMAT field test, teachers must agree to participate in a process that involves

- administering pretests and posttests to students
- collecting parental consent forms from students
- filming themselves (using a camera provided by BSCS) teaching an energy-related lesson of their own choosing
- taking the online EMAT course for 10 weeks during the summer of 2014
- filming themselves teaching the same energy-related lesson of their own choosing
- answering questions about the EMAT course in online surveys

Participating teachers will need a computer and Internet access to complete the course.

Teachers receive a $400 stipend for their participation over the two-academic-year period and 3 graduate credits from Montana State University for completing the EMAT course. Please direct questions to Karen Askinas at **kaskinas@bscs.org**

Using Significant Digits in Chemistry (PDF)

This technical assistance document provides some basic rules for determining significant digits and using significant digits in calculations. Visit **http://www.doe.virginia.gov/instruction/science/resources/tech_assistance_significant_digits.pdf** to download or view this document.

VAST PDI
Norfolk, Virginia
November 14 - 16, 2013

Celebrate National Wildlife Week with NWF on March 18-24

National Wildlife Week is National Wildlife Federation's longest-running education program designed to teach and connect kids to the awesome wonders of wildlife. This year theme is "Branching Out for Wildlife "celebrating trees and their importance to wildlife and people. Download free posters, wildlife trading cards, educational activities and more! Read More **http://www.nwf.org/National-Wildlife-Week.aspx**

http://www.nwf.org/National-Wildlife-Week.aspx

LUNAR WORKShOPS - EDUCATORS!

Sponsored by the Lunar Reconnaissance Orbiter Mission

Session 1: June 24-28, 2013
Session 2: July 8-12, 2013
NASA Goddard Space Flight Center
Greenbelt, MD

Grade 6–9 science teachers are invited to attend one of two free workshops focused on lunar science, exploration, and how our understanding of the Moon is evolving with the new data from current and recent lunar missions. The Lunar Reconnaissance Orbiter (LRO) has allowed scientists to measure the coldest known place in the Solar System, map the surface of the Moon in unprecedented detail and accuracy, find evidence of recent lunar geologic activity, characterize the radiation environment around the Moon and its potential effects on future lunar explorers.

Workshop participants will learn about these and other recent discoveries, reinforce their understanding of lunar science concepts, gain tools to help address common student misconceptions about the Moon, interact with lunar scientists and engineers, work with LRO data, and learn how to bring these data and information to their students using hands-on activities aligned with grade 6-9 National Science Education Standards and Benchmarks.

Workshop participants will have the opportunity to tour the LRO Mission Operation Center and the Goddard spacecraft testing facilities.

For more information and to register, visit **http://lunar.gsfc.nasa.gov/lwe/**

Climate Literacy and Energy Awareness Network (CLEAN)

http://cleanet.org/index.html

Free Digital Teaching Resources on Climate and Energy

This digital collection of 500+ vetted teaching materials for grades 6 - 16 includes activities, visualizations, and videos on climate science, climate change, and energy concepts. These free resources are appropriate for courses in biology, chemistry, physics, environmental science or engineering, geology, and geography. Only materials accepted by our review panels of scientists and educators are included. Search the collection **http://cleanet.org/clean/educational_resources/index.html**

http://cleanet.org/clean/educational_resources/index.html

by topic, resource type, or grade level. Learn about how to teach (**http://cleanet.org/clean/literacy/index.html**) concepts in climate and energy using literacy principles. This amazing resource was created with NSF funding.

http://cleanet.org/index.html

It's an amazing collection. Check out the interactive animations (PhET) on glaciers, for example! You can search by topic, type of resource, and more.

Valerie Sloan, Ph.D., CLEAN Team

NSTA New Science Teacher Academy

Administrators with an eye on classroom performance can take advantage of cost-free professional development for new middle and high school science teachers in their district/state. Here is what is offered through NSTA's exemplary program, the New Science Teacher Academy. (**http://www.nsta.org/academy/**)

Selected teachers will participate in professional development that blends online learning activities with face-to-face experiences. Each teacher has a mentor, web-based activities and resources, one-year membership in NSTA, and an all-expenses paid trip to NSTA's National Conference on Science Education in April 2014, (lodging, travel, meals and registration). Second through fifth year, secondary science teachers are eligible and applications to the Academy must be received by August 1, 2013.

2013 Products and Prices for Agricultural Science Classrooms

These products align to the National Agriculture, Food, and Natural Resources (AFNR) Career Cluster Content Standards.

	List Price	Special Pricing	Item Number
AG-Animal Science Bundle 1 Tracking the Spread of Infectious Diseases Natural Selection and Antibiotic Resistant Bacteria Bacteria Study	$186.90	$149.52 Savings $37.38	AG-S08
AG-Genetics Bundle 1 Strawberry DNA Extraction The Molecular Model of DNA and it's Replication Corn Crop Genetics	$245.65	$196.52 Savings $49.13	AG-S01
AG-Genetics Bundle 2 Genetic Concepts Selective Breeding Heredity and Environment	$188.40	$150.72 Savings $37.68	AG-S02
AG-Natural Resources 1 Modeling and Investigating Watersheds Modeling Stream Erosion and Deposition Making and Interpreting Topographical Maps	$319.85	$255.88 Savings $63.97	AG-S03
AG-Natural Resources 2 Copper Mining and Extraction Biology and Chemistry of Soils Qualitative Introduction to Water Pollution	$389.45	$311.56 Savings $77.89	AG-S04
AG-Power Systems Bundle 1 Biofuels: Investigating Ethanol Production & Combustion Modeling and Comparing Fossil Fuels	$286.45	$229.16 Savings $57.29	AG-S05
AG-Power Systems Bundle 2 Investigating the Design & Output of Wet Cell Batteries Investigating Photovoltaic Cells	$291.00	$232.80 Savings $58.20	AG-S06
AG-Plant Science Bundle 1 Photosynthesis, Plants and Food Seed Staining Photosynthesis & Cellular Respiration	$209.45	$167.56 Savings $41.89	AG-S07

LAB-AIDS®
17 Colt Court
Ronkonkoma, NY 11779

p. 800.381.8003
f. 631.737.1286
www.lab-aids.com

For more information about the Bundle Packages and/or to contact your LAB-AIDS Regional Manager, visit our website.

13 Must-see Stargazing Events of 2013

Ron Shaneyfelth
Astronomy teacher, Landstown High School, Virginia Beach, Va.

A special list of astronomical sky events was posted on various websites shortly after the new year began for 2013. It is simply titled as "13 Must-see Stargazing Events in 2013." Here are the major events listed for this year.

EVENT 1 - January 21 - Extremely close Jupiter-Moon Conjunction
This event has obviously already occurred by the time this article is published. You may actually have noticed this event with Jupiter located very close to the waxing gibbous Moon. Conjunctions happen more often than many other night sky events, but they are exciting to see when they occur (and you know about them before they occur).

EVENT 2 - February 2-23 - A great chance to see Mercury
Mercury is normally 'impossible' to see due to its proximity to the Sun. This month, Mercury is far enough from the Sun to be visible in the western sky shortly after sunset. The best chance to view it would be right after sunset on February 16th. Be careful of the bright Sun even at sunset!

EVENT 3 - March 10-24 - Comet PANSTARRS is visible
This comet was discovered in June, 2011. It is expected to be bright enough to see low in the west-northwest sky right after sunset. The comet will be very close to the right of the crescent Moon during the evening of March 12th. By the way, PanSTARRS stands for the Panoramic Survey Telescope & Rapid Response System. It is a prototype telescope design for a wide-field imaging facility being tested on Mount Haleakala (on Maui) developed at the University of Hawaii's Institute for Astronomy. A major goal of the Pan-STARRS program is to discover and investigate Earth-approaching asteroids and comets that could pose a danger to our planet.

EVENT 4 - April 25 - Partial Lunar Eclipse
This eclipse will be a VERY MINOR PARTIAL lunar eclipse. Unfortunately (even if you really wanted to see it), this lunar eclipse will NOT be visible from North America. Plan to travel to either Europe, Africa, Australia, or Asia to view it.

EVENT 5 - May 9 - Annular Eclipse of the Sun
Who would NOT want to view a rare eclipse of the Sun . . . with good eye protection? Here is ANOTHER eclipse during 2013 that will not be visible from North America. You can travel to Hawaii to see a PARTIAL eclipse of the Sun at 3:48 Hawaii time. Aloha!

EVENT 6 - May 24-30 - A "Dance of the Planets"
Mercury, Venus, and Jupiter will put on quite a show for the last week in May shortly after sunset. Look towards the west-northwest sky very soon after sunset each night. Venus and Jupiter will be so close from night to night that you might think they will eventually 'touch' each other. Venus is expected to be about six times brighter than Jupiter.

EVENT 7 - June 23 - The BIGGEST Full Moon of 2013
The Moon officially becomes Full at 7:32 EDT. At 7:00 pm, the Moon will be at its closest distance to Earth in 2013. It will be 221, 824 miles away which is why it will be called the "Supermoon" of 2013. The tides will definitely be affected that day and night.

EVENT 8 - August 12 - The Perseid Meteor Shower
This annual meteor shower is considered by many astronomers to be the best such shower each year. Some years, observers will see up to 90 meteors per hour. This year, the Moon will set during the evening which will provide skygazers with a great dark sky. Keep in mind the best piece of equipment to use to view meteors is a lounge chair on which you can lie down and look up at the night sky without straining your neck. Don't worry about using a telescope or binoculars to view these fast moving 'shooting stars' in the night sky - just look up and enjoy the sights!

EVENT 9 - October 18 - Penumbral Lunar Eclipse
Will North America finally get to view an eclipse this year? YES! Unfortunately, it will not be a type of lunar eclipse in which the Moon gets very dark. At the peak for the eclipse, only 76 percent of the Moon will be in the lighter part of Earth's shadow. The central and eastern United States will be able to see this eclipse.

EVENT 10 - November 3 - A Hybrid Solar Eclipse
Wow, a FOURTH eclipse for 2013! This is a very unique eclipse in that the eclipse will change from one type ('annular') to another ('total'). What are the chances we can see this eclipse? Those who are interested in seeing it, have safe ways to view it, and live along the Atlantic coast will see the Moon's dark disk moving away from the Sun at sunrise. Yawn!

EVENT 11 - THE BIG EVENT OF THE YEAR - From Mid-November through December - Comet ISON!
A comet was discovered on September 21, 2012, by two amateur astronomers. It was named ISON after the instrument used to discover the comet (part of the International Scientific Optical Network). The comet's location as compared to Earth and the Sun could make this comet the brightest on seen by anyone currently alive and able to view it. It would be visible in the morning AND evening sky and might become bright enough to be seen in daylight.

EVENT 12 - December (all month) - Venus is dazzling
Venus is normally the brightest of other planets seen from Earth. It will be brighter this month than all of 2013 and 2014. It will easily be seen in the evening sky as you look southwest. On December 5th, Venus will be very close to the Crescent Moon. Venus will not be this bright again until 2012.

EVENT 13 - December 13-14 - The Geminid Meteor Shower
This meteor shower was 'amazing' for skywatchers in 2012. Unfortunately, in 2013, the Moon will be extremely bright each night which will make it extremely difficult to see meteors. BUT, the Moon will set at about 4:30 am which will provide you with a completely dark sky for about an hour. Some locations in the country will be dark enough whereby 120 meteors per hour could be seen.

Hopefully, this article has you excited about the major night sky events for 2013. Even if you don't get to view these events, you can always just enjoy the wonders of your night sky. As always, keep looking up!

This article was written by Ron Shaneyfelt, a high school astronomy teacher at Landstown High School in Virginia Beach, Virginia. Ron still assists NASA-Langley's informal education office as an 'Educator-in-Residence' while teaching astronomy.

Climate Science Symposium at VSELA's November Meeting

Candace Lutzow-Felling
Director of Education, State Arboretum of Virginia/
Blandy Experimental Farm
NSTA Board of Directors, Director of Informal
Science Education

Gypsy moths are invasive forest defoliating insects. Dr. Kyle Haynes is investigating the effects of climate change on these insect populations in the eastern United States.

- ***What are the key scientific findings about climate and climate change?***
- ***What do educators need to know to teach about climate science effectively?***
- ***What professional development resources are available to deepen understanding about climate?***
- ***What resources are available to help develop climate science lessons and curricula?***
- ***What climate data is accessible for use by classroom teachers?***
- ***Are there on-going scientific investigations that welcome student participation?***

These questions will be explored during VSELA's second Climate Science Symposium, November 13 and 14, in Williamsburg, Virginia just prior to the VAST PDI.

During VSELA's first Climate Science Symposium, held in May 2011, VSELA members surveyed the foundations of climate science, examined the interconnection of earth's main systems & processes, explored several global and regional climate data sets, and discussed climate science teaching strategies. Ecologist Kyle Haynes took us into the field where he explained and demonstrated the methods he uses to investigate climate change impacts on populations of forest defoliating insects that can damage native tree species. NOAA climate science educator, Frank Niepold, shared the importance of climate science literacy and introduced us to several NOAA climate science resources during the spring Symposium which helped us to develop ideas for integrating climate science into science curricula at several grade levels.

Climate science is an integrative science that embraces STEM. To illustrate:

Science. Understanding how Earth's climate changes over time in response to different factors requires an understanding of the whole of the earth system: the atmosphere, the oceans, the land and its water, all the living things within the earth's system and the interactions among them all.

Technology. Various land, ocean and space-based instruments are used for collecting climate data and computer systems are commonly used to aid in the analysis of the large, complex data sets typical to this science.

Engineering. Knowledge of climate and its effects on earth's systems is important for the design of roads, development of water supply systems, reducing the impacts of avalanches and floods on towns and cities, and many other climate-related challenges that human societies need to solve.

VSELA members Anne Larrick and Jason Calhoun analyzing data during VSELA's 2011 climate symposium

Mathematics. Climate data sets are summarized and analyzed using equations and statistical methods and mathematical models help scientists understand the linkages among complex climate data sets.

This fall's Climate science Symposium will focus on learning about and developing skills in using climate science resources created for the education community. We will explore and examine professional development resources designed to deepen educators' understanding about climate change, resources available to help develop climate science curricula and lessons, and we will become familiar with climate data sets accessible for use by classroom teachers and on-going scientific investigations that welcome student participation.

Continued.....

Climate Science Symposium at VSELA's November Meeting

Continued:

Dr. Kyle Haynes will be the featured speaker for our second Climate Science Symposium. Dr. Haynes is a ecologist who's current research focuses on the population dynamics of herbivorous forest insects. Primarily, he studies species that feed on tree foliage and sometimes reach abundances high enough to cause widespread tree mortality and ecosystem damage. One of his current pursuits is to examine the effects of climate change on the severity and frequency of population outbreaks in these forest defoliating insects. Dr. Haynes is a Research Professor with the University of Virginia Department of Environmental Science and Blandy Experimental Farm, a UVa ecology field research station.
VSELA's Climate Science Symposium developer and coordinator is Candace Lutzow-Felling, an ethnobotanist , conservation biologist, and environmental science educator. Candace has researched botanical folklore and medicinal practices in the U.S Virgin Islands and southern Illinois and has analyzed botanical materials from prehistoric and historic archaeological sites in the Midwest and the Hawaiian Islands. Most recently, she investigated the population genetic, biological, and ecological diversity among natural populations of Acacia koa, an endemic forest tree in the Hawaiian Islands. Interspersed with her science research career, Candace has taught science to and developed science curricula for students in grades 6, 8, 10, and 12. At present, she serves as the Director of Education at Blandy Experimental Farm & the State Arboretum of Virginia melding her science research and science education experiences to create and administer environmental science education programs for preK-12 teachers and students.

Plans for this fall's Climate Science Symposium are shaping up! Other presenters have been invited to share their climate science and education knowledge during the Symposium. We will keep you informed as plans continue to develop!
VSELA's Climate Science Symposium is made possible by generous funding from the National Science Foundation and a Virginia Naturally/VRUEC/VAST MWEE Partner Grant.

Encourage New Science Teachers by Supporting the Eduware "First Timers" Awards!

Your contribution to the Eduware "First Timers" Awards Endowment for excellence in science education will make a difference. VAST hopes to honor and support those whose accomplishments enhance science education. A donation from Bill Stevens of Eduware, Inc., has made it possible for VAST to award to new teachers the cost of the registration to a VAST PDI. By contributing to these efforts, you are supporting the attendance of new, vibrant members to our professional development institute, (PDI). This fund supports those PDI registrations from teachers who have three years of experience or less.

In order to increase the endowment's principle, we need your support for this program. VAST members and non-members may make a voluntary pledge to the endowment. Together we can all make a difference by helping to support the expenses of the new educators so that they may continue in the field.

Please make a pledge today. This is just one way to support new science educators and quality science education for years to come. VAST is a 501c3 organization and is eligible to receive tax exempt donations.

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

To make a tax-deductable contribution please send your donation directly to the treasurer, Jimmy Johnson at :

Mr. Jimmy Johnson,
12141 Winns Church Rd,
Glen Allen, VA, 23059

and make your check payable to VAST. Please let Jimmy know that your check is a contribution for the "First Timers Award Endowment".

Thank you!!!

VISTA Opens New Opportunities for Retirees and Part-Time Teachers

By Arthur Polton

Arthur Polton

As a retiree with over 35 years of experience I have greatly enjoyed being a VISTA coach. VISTA hires part-time and retired teachers to serve as paid instructional coaches at one of four sites across the state.

My coaching responsibilities have allowed me to tap into my teaching background and offer guidance to teachers who are incorporating VISTA strategies into their science instruction. I observe and record lessons quarterly and offer feedback to my assigned teachers. As a "guide on the side" I can provide feedback, usually very positive, and ideas to improve their instruction. It is rewarding to see the growth of the teachers I coach.

Coaching has been a great way for me to continue to educate, communicate and celebrate. To learn how you can become a VISTA coach, visit **http://vista.gmu.edu/coach**.

VISTA offers retired and part-time teachers paid opportunities to help improve science teaching across Virginia.

Helping New Middle and High School Science Teachers Move to the Next Level

Matt Smith, a high school chemistry teacher, participated in VISTA's Secondary Teacher Program for the past two years.

For two years, VISTA provides new middle and high school science teachers with just-in-time support and "big picture" research-based teaching coursework. A unique aspect of the program is the community of practice support, including an in-class coach who provides feedback and helps the new teacher plan, teach, and problem-solve about teaching. Teachers receive free professional learning opportunities, free coaching and mentoring, and the facilitation of a statewide community of practice.

Randomly selected treatment participants in this program attend two three-credit graduate courses from VISTA designed specifically for early career teachers. The courses, delivered one each year for two years, focus on how to effectively teach inquiry-based science, how to use student performance to drive future instruction, and how to adapt instruction for diverse learners while using technology effectively to support inquiry. Teachers receive two full years of coaching support.

Middle and high school science teachers entering their first or second year of teaching are eligible to participate in the program. For information or to apply, visit **http://vista.gmu.edu/middle.**

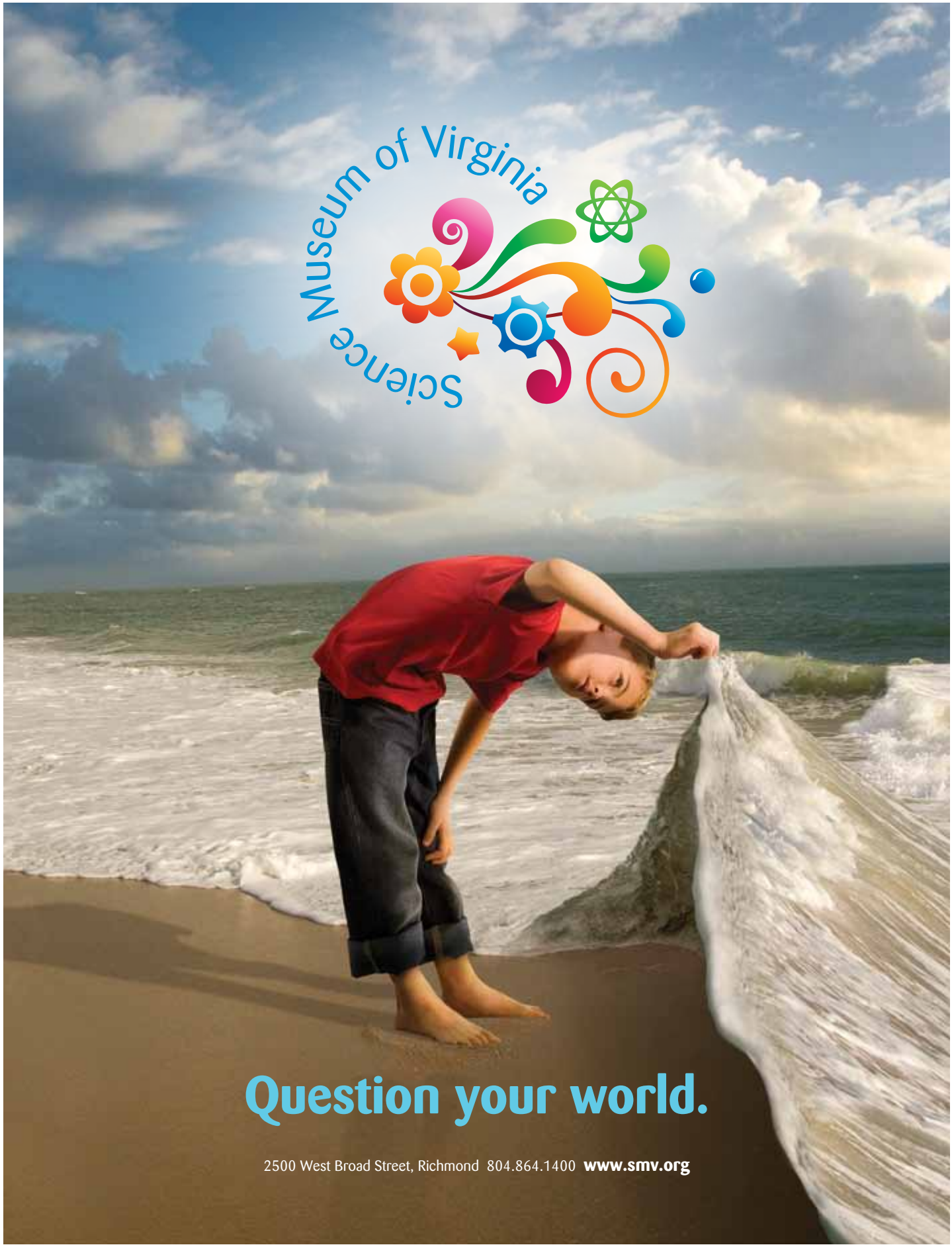
Leadership Development for New Science Division Coordinators

High-performing teachers are typically chosen to be school division science coordinators but are often given little guidance as they step into that role. This professional development program focuses on supporting new science coordinators and is a key part of the effort to build the state infrastructure in support of effective science teaching and learning. Participants in this program work to hone science leadership skills, develop inquiry-based science strategic plans at the division level, develop effective teacher and leadership capacity through science communities of practice, and use data to make program decisions and improve student achievement.

School division personnel who have been responsible for the development of primary and secondary science curricula and science teacher professional development in all schools in their division for five years or less are eligible to apply. For information or to apply, visit:

http://vista.gmu.edu/new_science_coordinators.

Participants in this year's VISTA New Science Coordinator Academy.


Science Museum of Virginia
Question your world.
2500 West Broad Street, Richmond 804.864.1400 www.smv.org

"Working Together to Promote Quality Science Education"

Many thanks for the support of science education by our Corporate Benefactors and Corporate Members.

VAST Benefactors

Achieve3000
1091 River Avenue
Lakewood, NJ 08701
www.achieve3000.com

Jefferson Lab
628 Hofstadter Road, Suite 6
Newport News, VA 23606
www.education.jlab.org

Delta Education
80 Northwest Boulevard
Nashua, NH 03063
www.delta-education.com

Science Museum of Virginia
2500 West Broad Street
Richmond, VA 23220
www.smv.org

Discovery Education
One Discovery Place
Silver Springs, MD 20910
www.discoveryeducation.com

Virginia Naturally
Dept of Environmental Quality
PO Box 1105
Richmond, VA 23220
www.VaNaturally.com

Eduware, Inc.
50 Elm Street
Huntington, NY 11743
www.eduware.com

Vernier Software & Technology
13979 SW Millikan Way
Beaverton, OR 97005
www.vernier.com

VAST Corporate Members

Associated Microscope
P.O. Box 1076
Elon, NC 27244
www.associatedmicroscope.com

Biome in A Box
4401 Wind River Run
Williamsburg, VA 23188
www.biomeinabox.com

BioRad Laboratories
2000 Alfred Nebel Drive
Hercules CA 94547
www.bio-rad.com/

Bowman Environmental Services, LLC
3170 Beaumont Farm Road
Charlottesville, VA 22901
BowEnvSer@embarqmail.com

Busch Gardens/
Water Country in USA
One Busch Gardens Blvd.
Williamsburg, VA 23187-8785
www.buschgardens.com
www.buschgardens.org

CPO Science
P.O. Box 3000
Nshua, NH 03061
www.cpo.com

Flinn Scientific Inc.
P.O. Box 219
Batavia, IL 60510
www.flinnsci.com

Fisher Science Education
Part of Thermo Fisher Scientific
1523 W Philadelphia St. Fl 2
York, PA 17404
www.fisheredu.com

Five Ponds Press
477 South Rosemary Ave, Suite 202
www.fivepondspress.com
West Palm Beach, FL 33401

Lab-Aids, Inc.
17 Colt Court
Ronkonkoma, NY 11779
www.lab-aids.com

PASCO Scientific
10101 Foothills Blvd.
Roseville, CA 95747
www.pasco.com

Regent University
1000 Regent University Drive
Virginia Beach, VA 23464
www.regent.edu

Teacher Canvas, LLC
P.O. Box 7682
Hampton, VA 23666
www.teachercanvas.com

Virginia Junior Academy of Science
2500 W. Broad Street
Richmond, VA 23223
www.vjas.org

Virginia Space Grant Consortium
600 Butler Farm Rd. S-200
Hampton,VA 23666
www.vsgc.odu.edu

2013 VAST Leadership

Is Your Address Changing?

Be sure to let VAST know your new contact information. Neither the post office or the Internet will forward our newsletters. Please e-mail Maria Cooper, Membership chair: **maria.cooper@pps.k12.va.us**

VAST Regional Directors:

Forms

Are you looking for VAST forms? Please go to the VAST website and click on "Forms" to find what you are looking for. You will find forms for:

Membership Form for 2013-14
VAST Nominating Form 2013
VAST Advertising Form 2013
VAST Corporate Membership Form 2013

MINI-GRANT FORMS 2013:

VAST Mini-Grant Form • AIPG Geology Mini-Grant Form • TACT Chemistry Mini-Grant Form

http://www.vast.org

Our Mission:

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

VAST is a nonprofit organization by educators for educators.

- Affiliated with the Virginia Math Science Coalition
- A State Chapter of the National Science Teacher's Association

Next Deadline for *The Science Educator* for articles, letters to the editor, or labs is:
May 1, 2013.

The next issue of The Science Educator will be a Green Digital issue, sent to you by the middle of May. Please look for it at that time and check the VAST website if you do not receive your copy.

Please consult the website for up to date information, VAST forms for awards and mini-grants, and current PDI information. www.vast.org