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# The Science Educator

Spring 2012

A publication of VAST, The Virginia Association of Science Teachers

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## Dr. Kenneth Wesson, to Speak at VAST 2012 PDI

**“If it’s your job to develop the mind, shouldn’t you know how the brain works?” is the basic premise of Wesson’s research, speeches and workshops.**

VAST will hold its annual Professional Development Institute on November 7-10, 2012, at the Williamsburg Hotel, in Williamsburg, Virginia. Our organization will be celebrating its 60th anniversary. On Thursday, November 8th at 5:30 pm, Delta Education will sponsor featured speaker, Kenneth Wesson, who works as an educational consultant for preschool through university institutions and organizations. An expert on the neuroscience of learning and methods for creating classrooms and learning



**Next Generation Success: Teaching Students to Think Scientifically**

environments that are “brain considerate,” Wesson regularly addresses educational organizations and institutions. His work is frequently referenced in *Parents Magazine* and the journal, *Brain World*. Wesson regularly addresses counseling associations, school districts and parenting organizations on establishing “brain-considerate” learning environments across the country. Recently, Kenneth was a keynote speaker at the 2012 NSTA STEM Forum and Expo.

(Courtesy of Delta Education)

## Discovery’s Final Flight



Courtesy of Richard Scholberg

History is made: Shuttle *Discovery* over Centreville, VA, April 17, 2012. Traffic halts as infants, children, adults, police, and fire fighters pause on Highway 29 in tribute to a noble mission. See page 13. “Science For All”





## From the Exectutive Director:

Here we are again. The end of the school year. Did I hear you holler...Benchmark? End of the Nine weeks test? SOL? AP? Exam?  
Did you hear the thud!?! That was the sound of the student, not the teacher.  
The teacher is trying to collect the data.  
If this isn't a science project in the making then I don't know what one would be.  
Make time to love your science and share your enthusiasm of teaching with your students.  
These scores will be fine. You will meet the minimum. You may even exceed it! Most of all you need to create the next scientist.  
Have them pursue their scientific interests because for you that did not start until after Labor Day and now have had to have all your teaching done before testing...  
Have a month...did I say a month...now to be really creative.  
Because the tests will be done and scores will be tallied.  
So, exceed your wildest dreams and do real scientific research that you did not have time for during the rest of the year.  
Who knows...you may have the next Nobel winner waiting to burst out.

*Susan Booth*

## Help Us Celebrate 60 Years of VAST at This Year's PDI!

**Can you believe that VAST is 60 years of age?! It's true! We are planning a wonderful celebration at this year's PDI . . . so now is the time to start making plans to join us! We will be at the Williamsburg Marriott, from 7 – 10 November 2012. Our Theme is: Designing Your Way Through Science.**

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## From the desk of the President



Hello, Spring and here comes Summer! It's SOL season, and many of you are focused on reviews for that important end-of-semester/year test. Best wishes to all and may all your students score above the 80<sup>th</sup> percentile!

In this letter I'm going to tell you (1) about my adventures at the USA Science and Engineering Expo, and also (2) give you an update on the IRS regulations for non-profits that engage in lobbying activities (such as our recent successful efforts opposing Senate Bill 185 that proposed to eliminate science SOL testing in 3<sup>rd</sup> grade).

USA Science and Engineering Expo 2012. I just returned from representing VAST and W&M at the second USA Science and Engineering Expo in Washington, DC (April 26-28). The VAST Regional Director for Region 4 (the NOVA area), Susan Bardenhagen, was there as well, telling folks all about VAST and what we have to offer for science educators.

This event, held at the Washington, DC, Convention Center, was a BLAST! VAST was given space in the NSTA booth, and, while Susan worked at one table, two groups of VAST student members – W&M and VCU – took three-hour time slots for hands-on activities for the families attending the Expo. VCU's students made straw clarinets, illustrating various aspects of the science of sound. Dr. Jacqueline McDonnough, VCU Professor and former VAST Regional Director for Region I, accompanied her students. JMU was set up at a booth in another area of the Convention Center.



The William & Mary VAST group: Rob Schupbach, Courtney Mann, me, Gertrude Okeyere, and Robin Shaulis. It's the end of the day and we're still smiling!

At the USA Science and Engineering Expo 2012.



VAST Region IV Director, Susan Bardenhagen, demonstrating conservation of momentum and energy to visitors to the VAST table at the Expo.

I expect you'll see a report from the JMU and VCU folks in this or a subsequent newsletter, and from any other Virginia groups whom I've not named. For more photos from the Expo, visit the VAST Website. Virginia science education was well-represented at this national event.

W&M students made ice cream, inviting all who came up to the table to investigate the possible variables, using ice, salt, and movement to cause a liquid solution to become solid. The science talk flowed naturally from the experience. Some questions I heard from children and parents were, "Why do we need to use salt? What does it do?", "Is it OK that my ice is melting?", and "How do I know if my ice cream is ready?"



W&M students made ice cream, inviting all who came up to the table to investigate the possible variables, using ice, salt, and movement to cause a liquid solution to become solid. The science talk flowed naturally from the experience. Some questions I heard from children and parents were, “Why do we need to use salt? What does it do?”, “Is it OK that my ice is melting?”, and “How do I know if my ice cream is ready?”

*I learned that, when you announce in your teacher voice “WE’RE MAKING ICE CREAM OVER HERE”, crowds gather!*

The W&M future teachers quickly learned to ask their audience how they could use their senses to tell what state of matter the creamer was, before freezing. Children (and parents) were quizzed on the three basic states of matter and asked what could cause matter to go from liquid to solid. Energy exchange was the theme of the experiment, and, through carefully posed questions, children were guided to think about how energy is transferred and what causes the various states of matter. Please do keep in mind though that all this good science questioning was going on while mobs of families crowded the table. We estimated that, in three hours, we assisted over 200 individuals (more than one ice cream per minute!!) in making ice cream and in talking through some of the science at work behind the experience.

Here is the basic recipe we used for each participant:

- One sandwich-sized baggie that zips
- One single serving container of flavored coffee cream (International Coffee© or similar – we used French Vanilla flavor)
- Ice (we used crushed and cubes)
- Salt (we used iodized table salt, non-iodized table salt, fine sea salt, and coarse sea salt)

**Directions:** Fill the baggie 1/3 full with ice, place a creamer packet inside, pour some salt on top, seal and shake. After about 3-5 minutes, eat the creamer like ice cream. You’ll know it is ready when the creamer no longer “sloshes” around inside. Our participants just licked it out, no spoons needed.

The W&M pre-service teachers, three elementary and one secondary education, came away from this experience saying, “This was like a ‘best day’ teaching!”, “I needed this!”, and relating stories of their interactions with children. There was the young man who followed all the directions and answered all the questions with a look of puzzlement coupled with concentration. He opened his frozen confection and his face lit up in understanding, “I get it!” he exclaimed, “the salt helps it freeze!” and

then he ate his ice cream. There was the three-year-old who came back, 30 minutes after making his ice cream, to ask if we knew any plant biologists. He had a question for a plant biologist – “When do leaves die?” He wanted to know if leaves were dead immediately when they fell or were picked or blown from a tree; were they dead when they turned brown; just WHEN were they dead? I wish you all could have seen W&M secondary biology education major, Robin Shaulis, kneeling on the Convention Center floor with this tiny scientist, solemnly discussing with him the various aspects of dead-ness and leaves.

Senate Bill 185 and the Legality of VAST’s Political Activities. At our last VAST Board meeting, we celebrated the tabling of Senate Bill 185. We are grateful for the alliance we enjoyed with other education advocates, and relieved that this battle ended in favor of elementary science as well as elementary social studies. Some of our members raised the question of the legality of non-profit organizations, such as VAST, in political activity, asking if we risk losing our non-profit status by lobbying against a specific bill. I have looked at the IRS regulations about this and believe we’re OK on this. *The IRS regulations clearly forbid non-profits from advocating for, or opposing, a specific candidate or political party.* We did not and will not do this. The IRS regulations limit the amount of lobbying a non-profit organization may engage in; the products and work that VAST members committed to Senate Bill 185 does not come close to the level of expense outlays the IRS sets as the cutoff. We are working with other organizations similarly positioned (NSTA, Virginia Mathematics and Science Coalition) to determine how to keep our momentum going while meeting IRS regulations. Until next time! Happy Scienc-ing!

Juanita Jo



Behind the table you’ll see Rob, Courtney, me, Gertrude, and Robin. As soon as one child finished, another stepped into place. It was non-stop science! And what a crowd!

FREE  
Wi-Fi  
in hotel  
rooms  
and  
meeting  
spaces!



FREE  
Wi-Fi  
in hotel  
rooms  
and  
meeting  
spaces!

## Register Early for Your PDI Hotel Room

### VAST 2012 PDI @ Williamsburg Hotel November 7-10, 2012

#### VAST 2012 PDI Hotel Accommodations :

**Single/Double Rate: \$94 per night plus 10% tax and occupancy rate \$2.00**

**Rate is available for three days before and after the PDI**

**Complimentary Parking • Group rate cut-off date: October 17, 2012**

**To Register: Visit the website [www.thewilliamsburghotelccom](http://www.thewilliamsburghotelccom), put in the group arrival dates and click “Book Now.” The group code to enter is 368973. You may also make reservations by calling 757-220-2500 and ask for the Virginia Association of Science Teachers discount.**

**Please be certain to secure your room for the VAST PDI 2012. The advantages are many: You will spend more time learning, networking, and socializing and less time commuting and you will be assured the VAST group rate.**

**Williamsburg Hotel, 50 Kingsmill Rd., Williamsburg VA 23185**

**Special Note:** The Williamsburg Marriott has changed its name from the Williamsburg Marriott, but not its great service, hotel accommodations and VAST Contract.

#### Link to the VAST Website for Up-to-date PDI Information

**VAST Website:** [http:// www.vast.org](http://www.vast.org)

**Presenter Proposal:** [http://education.jlab.org/vast/presentation\\_proposal.php](http://education.jlab.org/vast/presentation_proposal.php)

**VAST PDI (Under construction)** <http://www.vast.org/annual-pdi.html>

**VAST Membership Form:** <http://www.vast.org/membershipform.html>

**Exhibitors please contact Susan at:** [susan.science@gmail.com](mailto:susan.science@gmail.com)

**Proposals  
must be  
submitted  
by June 15,  
2012.**



## William F. (Bill) Stevens



Bill Stevens demonstrates Eduware software at the VAST PDI 2010.

William F. (Bill) Stevens, a long time VAST friend passed away on February 20th, 2012. Bill, a former teacher, started his own business, Eduware, an educational software company based in Smithtown, NY. Eduware supports students, teachers and science education. To VAST, Bill is known primarily for his “First Timers” Award which offers a one time registration for a science teacher. He will be sorely missed, but his memory will live on with VAST

honoring and supporting those whose accomplishments enhance science education who have three years of experience or less.

Please consider making a tax-deductable contribution to keep the dream alive. Donations can be directly sent to the treasurer, Jimmy Johnson, 12141 Winns Church Rd, Glen Allen, VA, 23059.



NOBCChE will be offering at their annual conference Sept. 25-28, 2012, below is a short synopsis of each program.

**College Fair:** More than 30 of the nation's premier STEM universities are expected to attend. Past participants in NOBCChE events have included: Auburn, Cornell, Georgia Tech, MIT, Notre Dame, Purdue, Texas A&M, University of California at Davis, University of Maryland, and the University of Michigan. Workshops will be offered on a variety of timely topics including obtaining financial aid and scholarships. Contact us about transportation.

## National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCChE)

**Learn more and register:** <http://www.nobcche.org/college-fair>

**Science Bowl/Science Fair:** Students from the Mid-Atlantic and throughout the nation will display their science knowledge, compete for prizes and recognition, and enhance their college credentials. Students will compete in Junior (6th to 8th grade) and Senior (9th to 12th grade) Divisions. Research projects previously submitted to other Fairs are acceptable for the Science Fair. Resources, training materials and other support are available for Science Bowl teams. There also will be a non-

competitive poster session for 3rd to 5th grade students dubbed Step up to Science. Bringing a group of 8 or more? Contact us about transportation.

**Learn more and Register:** <http://www.nobcche.org/nobcche-science-fair>

**Teachers Workshop:** We are offering tracks for elementary, middle and high school science teachers with national experts providing information on developing science topics, teaching strategies, experiments and more.

**Learn more and register:** <http://www.nobcche.org/teachers-workshop>

## Getting Ready For The PDI . . . And We Could Not Do It Without Our Sponsors!



Have you ever wondered how we get the amazing speakers at our PDI? It is quite a neat process to say the least!

It all started with you, our members! The first thing we did was ask for your suggestions — and let me tell you, ya'll had a ton of suggestions this year! From there, we contacted the speakers to see if they were willing and able to present at our PDI. Once they said yes, it was on to the next step, which is looking for sponsors. I must say, VAST is supported by the most amazing people and organizations and they have come through like gangbusters this year!

Our first general session presentation will be Thursday evening. **Ken Wesson** will be our speaker and he is sponsored by **Delta Science**. On Friday, we have two general sessions presentations ~ one is the morning and one in the evening. **Heidi Schweingruber** and **Stephen Pruitt** will give our morning presentation and they are sponsored by **VSELA**. **William Kelso** and **Adriana Ocampo** will be our evening speakers and they are sponsored by **NASA**. Saturday continues the fun with a morning and afternoon session. **Jennifer Seydel** who will be sponsored by **VRUEC** will give the morning presentation. Our final general session presentation will be given by **Mireya Mayor** on Saturday afternoon and will be sponsored by **National Geographic Learning**.

We could not put on our PDI without our sponsors! They continue to go above and beyond to help us make our PDI the best it can be. Thank you to our sponsors ~ **Delta Science, VSELA, NASA, VRUEC and National Geographic Learning!** Thank you Sponsors, for your continued support of science education in the state of Virginia! And a special thank you to **Dominion** for their overall support of our VAST speaker presentations! Thank you Sponsors, for your continued support of science education in the state of Virginia!

So, as you can see, Members, we have a terrific line up of speakers. Make sure you mark your calendars now for the 2012 VAST PDI ~ November 7 – 10, in Williamsburg! You won't want to miss a single minute of it!





2012 VAST Professional Development Institute  
Williamsburg, November 7-10, 2012  
*Designing Your Way Through Science.*

## Who is Your VAST Regional Director?



**Director, Region 1, Kim Dye**  
804-798-6762  
kdye@hcps.us

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412-779-7609  
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**Director, Region 3, Jerri Piacsesi**  
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**Director, Region 7, Diane Tomlinson**  
276-889-4421  
dtomlinso@verizon.net

**Director, Region 8, Diane Layne**  
434-757-2284  
dlayne@mcpsweb.org

### PDI 2012: Meet Your Regional Director for a Chance to Win a New Vernier LabQuest® 2 !

Regional Directors will be introduced at the Friday morning General Session (2). They will be giving out a special ticket for a drawing for the Vernier LabQuest®2. Take your ticket to the Vernier Booth, get a demonstration of the LabQuest®2 and you are entered to win! The drawing will be held at the last General Session (5) on Saturday afternoon.



*Proudly Supporting*

## Virginia Science Teachers

Win an Vernier LabQuest® 2 !

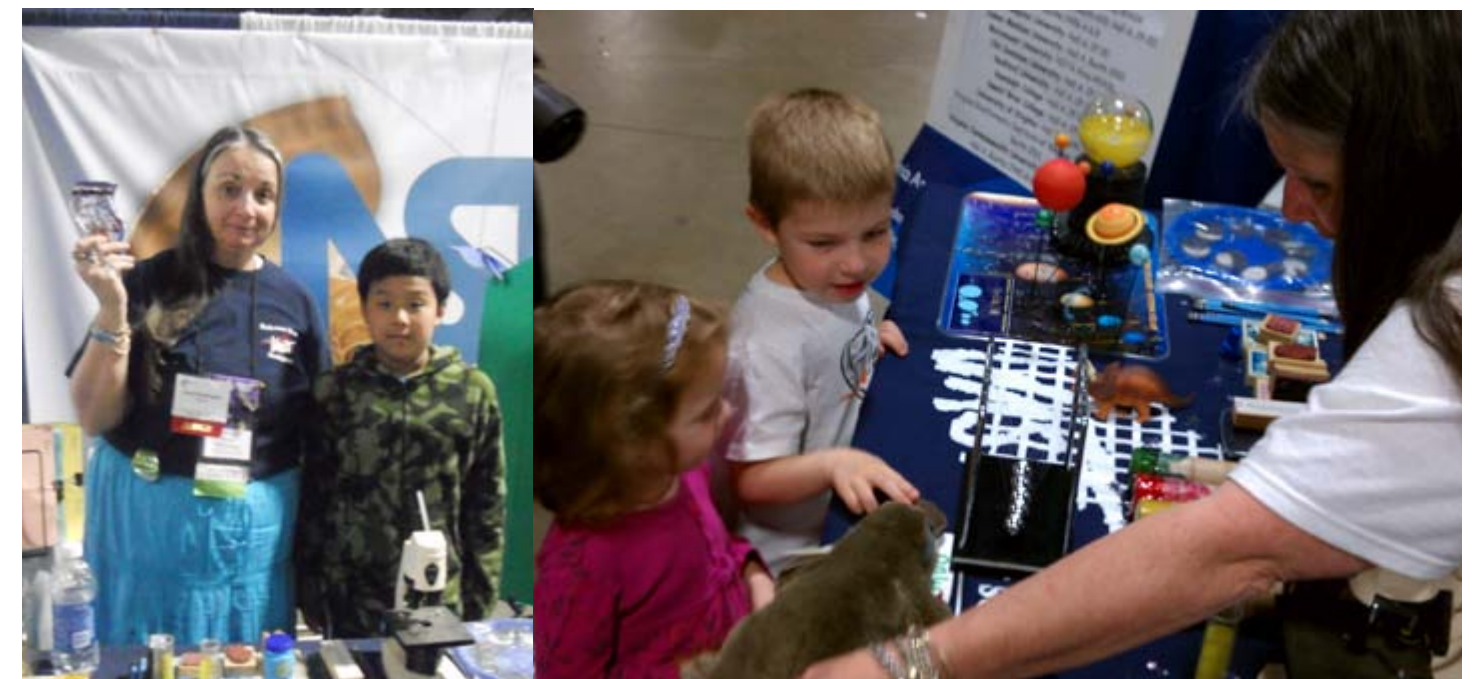
Can be used with an Apple iPad and other mobile technology.

**Sponsors of “Meet Your Regional Directors” !**



The second USA Science & Engineering Festival was so awesome! Estimates were that there were over 159,000 people in attendance over the three days. The number of students participating in the Sneak Peak Friday program doubled from the 2010 event to nearly 28,000. Science Education is thriving in Virginia.

Susan Bardenhagen represented VAST all three days with an activities table showing students different subjects within Science for which VAST has designated committees—Environmental Science, Earth & Space Science, Chemistry, Biology, and Physics. Newton’s cradle was a “hit” as was the solar system working model. On Saturday and Sunday, we collected data on which of the five science subject areas was the children’s favorite— asking children as young as 5 and up through college. This led to interesting conversations with kids and parents. Her students will be preparing pictographs for their math lessons with the data collected. Also, four VAST memberships were raffled with almost one hundred contacts collected from some of the teachers and parents who visited the booth.



Courtesy of Ed Rock of NSTA

## Second USA Science & Engineering Festival

Susan Bardenhagen, VAST Region IV Director  
Union Mill ES, Fairfax County Public Schools

### Virginia’s was Well Represented at the National Festival

#### Virginia’s K-12 Schools Introduce our Future Scientists & Engineers to the Wonders of SCIENCE!

Ft. Belvoir Elementary School  
Herndon Middle School  
Jefferson Middle School’s Robotic Team  
Thomas Jefferson High School for Science & Technology  
Newington Forest Elementary School  
Rocky Run Middle School

#### Virginia’s Colleges and Universities Produce Scientists & Engineers Supporting Our Country’s Future!

College of William & Mary  
George Mason University  
Hampton University  
James Madison University  
Marymount University  
Old Dominion University  
Radford University  
Randolph College  
Sweet Briar College  
University of Virginia  
Virginia Bioinformatic Institute at Virginia Tech  
Virginia Commonwealth University School of Engineering





# Layered Snacks & “Simon Says” = Mastery of Earth’s Layers

MiaLynn DiDomenico

5<sup>th</sup> grade teacher, Oceanair Elementary, Norfolk Public Schools

*Learning Objective: The student will investigate and understand how Earth’s surface is constantly changing. Key concepts include the basic structure of Earth’s interior.*

As a struggling Science and Math student all my life, I value the importance of integrating meaningful, engaging lessons to motivate each and every one of my 5<sup>th</sup> grade learners. I have spent countless hours researching innovative methodologies, inventive activities, and real-life, real-world ties to our Science curriculum and units of study to implement in my classroom. My passion is definitely in the classroom; however, my ultimate purpose is to make learning as rewarding and pleasurable as possible especially when it comes to those hard-to-teach or hard-to-master topics!

From previous years’ experience, teaching the layers of the Earth was a daunting task because it was so difficult for the students to imagine being inside the Earth. (Although, we know that cannot happen realistically.) This unit had always been taught later in the year, so it allowed for extra preparation and planning time, but at the start of the 2011-2012 school year, our district’s 5<sup>th</sup> grade pacing guide had been revised and I was starting the school year with our unit of study: “The Earth.”

Without delay, I began my daily web searches for new and improved ways to get my students to master the Virginia Standards of Learning objectives, essential vocabulary and questioning. After several days of finding lessons that would be ideal for the average student who performed well across all subject areas, I knew I needed to employ my expertise and resources in order to create a ground-breaking start to this unit. Stimulating my students’ minds and scientific curiosity was key for building student participation and what better way to do so then by incorporating FOOD into my Science lessons!

I sat down with the district pacing guide and Enhanced Scope and Sequence from the Virginia’s Department of Education and I started planning out the first week of our unit, “The Earth’s Layers.” I played around with my four main ingredients to represent the four layers and ultimately I choose Oreo cookies (crumbled), cherry pie filing, pudding, and apple sauce. I chose these ingredients because of the makeup of each layer; crumbled Oreos (crusty/dry): crust, apple sauce with cinnamon hearts (thick, flowy substance with pockets of magma): mantle, pudding (thick liquid): outer core, and cherry pie filing (HOT): inner



core. Integrating Math would be a natural fit for this lesson since the students would have to measure out each layer of their scientific dessert.

**ENGAGEMENT:** To create the layers of the Earth in this anticipatory lesson, the students needed to decide which measuring cup would be used for each ingredient. Ultimately, the students would need to compute the following ingredients: ¼ cup of Oreo cookie crumbles, 1 cup of apple

sauce (cinnamon hearts are optional for magma), ½ cup of pudding, and 1/3 cup of cherry pie filling. Following the measurement, the assembly of the edible Earth would be teacher guided as I explained the composition and location of each layer. At the same time as I was introducing each layer (working from the inside out), the students were pouring the yumminess into a clear, plastic drinking cup.

After each of the four layers were introduced and explained and edible Earth was ready to eat, the students had to first use non-linguistic representations to illustrate their model. One of my school’s focus strategies is Writing Across the Curriculum, therefore, before we could dig into our learning treat, the students were given a writing prompt: how can you explain the location and composition of the four layers of the Earth to your family after today’s lesson? The writing sample was graded with a scoring rubric and counted towards a writing and science grade.

**EXPLANATION:** The following day we revisited the layers of the Earth with a science reading passage and as a whole-group, we read the passage, summarized the main idea and details of each paragraph, and took notes in our Interactive Notebooks. (Summarizing and note-taking is our school’s second priority strategy.) Being aware of my students’ learning styles, I was conscious about connecting a kinesthetic activity with our Science study.

To begin with, I introduced the four body movements to the students; crouch on the floor in a ball (inner core), sit on your knees (outer core), stand up (mantle) and hands in the air (crust). On the inside of our classroom door, I posted these four body motions as a visual reminder of the layers of the Earth. We played several rounds of “Simon says…” and this activity was used to engage or informally evaluate the

10. learners throughout the unit of study.

**EXPLORATION:** The remainder of the first week of our unit was the students exploring the similarities and differences among the unique layers of the Earth. To accomplish this learning task, I integrated technology with the use of teacher-made power point presentations, www.studyjams.org (Scholastic), www.solpass.org and other grade-appropriate videos on www.unitedstreaming.com (Discovery Education).

**EXTENSION:** To extend the students’ learning further, at the end of the unit, they were assigned a two week take-home project that would be scored with a grading rubric and counted as an assessment and homework grade. The two projects that connected to the Earth’s layers that the students could choose were: 1. Make a cross-section of a volcano or a cross-section of the Earth. Use different colored clay, pebbles, rocks, etc. (or anything else you can think of). Use toothpicks with little labels on them to put into the layers OR 2. Make a diagram on a paper (8 1/2” by 11” — regular paper-sized) or poster board. Label all the different layers. Make a poster; each poster should have a title, labels, and captions describing each layer or section, color, and be extremely NEAT!

**EVALUATION:** In order to assess the students’ mastery of content during this week of the Science unit, students were given an assessment that required them to label a picture of the inside of the Earth, include the depth of each layer as well as the makeup of each section. Additionally, students were required to write three additional learned facts about the Earth. In our building, we administer Common Monthly Formative Assessments at each grade level for each subject area. The Earth’s layers were also assessed on this evaluation. Furthermore, at the end of the quarter, the students were also administered the District Benchmark Assessment which was an additional tool used to measure student mastery of the objectives taught.

In my opinion from student observations and ticket-out-the-door responses, the kick-off to this unit was a success! Students were engaged and excited about Science and Math which has carried with them thus far in the school year. In fact, I have built in Science Fun Friday’s strictly for lab-style teaching and learning!

*Note: In the future on the weekly assessment, I would ask the students to order the fractions (measuring cups) they used to measure the ingredients.*

## Awards and Mini-Grants Available From VAST

www.VAST.org



**VAST MINI-GRANTS:** The VAST Creative Teaching Mini-grants are intended to provide seed money for innovative curriculum activities which will expand learning opportunities for science students. Visit the VAST web site and select “Grants”.

**The project director must be a member of VAST – dues paid through 2012**

**DEADLINE: June 1, 2012**

**AIPG MINI-GRANT:** The Virginias Section (VA & WVA) of the American Institute of Professional Geologists established this grant in order to improve the teaching of geology in the schools (K-12), Public and Private. Visit the VAST web site and select “Grants”.

**The project director must be a member of VAST – dues paid through 2012**

**DEADLINE: June 1, 2012**

**AWARDS:** Recognize an outstanding science educator that you know. Nominate an educator in one of the 12 categories. Visit the VAST web site and select “Awards”.

**Nominees need NOT be a member of VAST.**

**DEADLINE: August 20, 2012**

*If you have difficulty accessing the forms, or have questions, please email  
Don Foss (Committee Chair).  
fossd1@comcast.net*





## The Planet in the Machine

By Diane K. Fisher and Tony Phillips



CloudSat is one of the Earth-observing satellites collecting data that will help develop and refine atmospheric circulation models and other types of weather and climate models. CloudSat's unique radar system reads the vertical structure of clouds, including liquid water and ice content, and how clouds affect the distribution of the Sun's energy in the atmosphere. See animation of this data simulation at [www.nasa.gov/mission\\_pages/calipso/multimedia/cloud\\_calip\\_mm.html](http://www.nasa.gov/mission_pages/calipso/multimedia/cloud_calip_mm.html).

The story goes that a butterfly flapping its wings in Brazil can, over time, cause a tornado in Kansas. The “butterfly effect” is a common term to evoke the complexity of interdependent variables affecting weather around the globe. It alludes to the notion that small changes in initial conditions can cause wildly varying outcomes.

Now imagine millions of butterflies flapping their wings. And flies and crickets and birds. Now you understand why weather is so complex.

All kidding aside, insects are not in control. The real “butterfly effect” is driven by, for example, global winds and ocean currents, polar ice (melting and freezing), clouds and rain, and blowing desert dust. All these things interact with one another in bewilderingly complicated ways.

And then there's the human race. If a butterfly can cause a tornado, what can humans cause with their boundlessly reckless disturbances of initial conditions?

Understanding how it all fits together is a relatively new field called Earth system science. Earth system scientists work on building and fine-tuning mathematical models (computer programs) that describe the complex inter-relationships of Earth's carbon, water, energy, and trace gases as they are exchanged between the terrestrial biosphere and the atmosphere. Ultimately, they hope to understand Earth as an integrated system, and model changes in climate over the next 50-100 years. The better the models, the more accurate and detailed will be the image in the crystal ball.

NASA's Earth System Science program provides real-world data for these models via a swarm of Earth-observing satellites. The satellites, which go by names like Terra and Aqua, keep an eye on Earth's land, biosphere, atmosphere, clouds, ice, and oceans. The data they collect are crucial to the modeling efforts.

Some models aim to predict short-term effects—in other words, weather. They may become part of severe weather warning systems and actually save lives. Other models aim to predict long-term effects—or climate. But, long-term predictions are much more difficult and much less likely to be believed by the general population, since only time can actually prove or disprove their validity. After all, small errors become large errors as the model is left to run into the future. However, as the models are further validated with near- and longer-term data, and as different models converge on a common scenario, they become more and more trustworthy to show us the future while we can still do something about it—we hope.

For a listing and more information on each of NASA's (and their partners') Earth data-gathering missions, visit <http://science.nasa.gov/earth-science/missions/>. Kids can get an easy introduction to Earth system science and play Earthy word games at <http://spaceplace.nasa.gov/ecosphere>.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

## SCIENCE FOR ALL

### Contact

Discovery consists in seeing what everyone else has seen and thinking what no one else has thought.  
—Albert Szent-Görgy

I believe  
The greatest gift  
I can conceive of having  
from anyone  
is  
to be seen by them,  
heard by them,  
to be understood  
and  
touched by them.  
The greatest gift  
I can give  
is  
to see, hear, understand  
and to touch  
another person.  
When this is done  
I feel  
contact has been made.

“Making Contact”  
by Virginia Satir  
1976

There we all were, a motley mix of ages, talents and backgrounds, over a hundred-odd students, teachers, and administrators in front of our high school, lining the highway, looking southward into the sky, itself a broken mix of blue and gray-white clouds. We had known for over a week now about some time on Tuesday the 17<sup>th</sup> of April, and, as the day approached and excitement mounted, the window narrowed to between 10 and 11 o'clock in the morning. Cars began pulling over to the curb in anticipation when a student suddenly exclaimed, “There it is!” and a wave of pointing arms followed his to a place low over the tree tops.

Like thousands of others in D.C. and surrounding towns in Maryland and Virginia, we were pausing in tribute, riveted in silence punctuated by random shouts, cheers, applause as the space shuttle *Discovery* was carried on her final flight, passive now atop the supportive body of NASA's specially-designed Boeing 747. Our school faces the



Courtesy of NASA

southern approach route taken by aircraft landing at Dulles International Airport, the same spot where I had witnessed the supersonic British-French Concorde make its final landing on 12 June, 2003. Now, *Discovery* would join that noble aircraft in the cavernous enclosure of the Steven F. Udvar-Hazy Center of the Smithsonian Institution.

*Discovery* actually made three passes by our school: en route to circle around Washington, (with three complete loops around Capitol, White House, and mall), then one loop around Dulles, then the final approach for landing. She looked travel-worn and weary compared to her relatively pristine carrier. *Discovery*, the work horse of NASA's 6-shuttle fleet, survived 39 missions, with over a year's total time spent in 5830 orbits around the earth. Like the warrior's sword with notches in its blade from many battles, and unlike the shiny blades of swords on parade which never see conflict, *Discovery's* skin had been burned, charred and cracked in 39 departures and re-entries after



logging over 150 million miles of useful and exciting travel. Like the deep-furrowed beauty in aged skin which may cover 90 or 100 years of human experience and adventure, the outer appearance of the shuttle belied the youthful spirit and aspirations within. As some of us felt the wave of emotion move up from our chest to our eyes, I found my own thoughts soaring back over more than a century.

My father was born in 1900 and lived to see the automobile come into its own, the Wright brothers’ Dayton, Ohio experiments take flight at Kitty Hawk, North Carolina on that December morning in 1903, commercial jet travel replace most of the propeller-driven aircraft, lunar landings in the 1960’s and 1970’s, and the infancy of the shuttle program, all before he died in 1981. In fact, following the prototype, *Enterprise’s*, first suborbital mission in August of 1977, *Columbia* made the first space shuttle flight on 12 April 1981, 9 days before Dad’s 81<sup>st</sup> birthday, just two months before he died. What a life!

For me, my thoughts raced back to 1969 on 20 July when, after two and a half weeks of a self-imposed “blackout” while camping in Alaska’s Denali wilderness, I happened to turn on the car’s radio the day I broke camp. The first sounds I heard were the words of President Nixon speaking to Neil Armstrong on the moon’s surface, that “one giant leap for mankind” moment at the first lunar landing! Like similar moments in the lives of many of us, that was forever engraved in my heart and mind. Part of this torrent of space history memories for me were the events in the 30-year history of the shuttle program as before me now, on my study bulletin board, remains the badge I had worn in 1996 as a guest of NASA for the June launch of *Columbia* at Cape Kennedy. From Apollo to *Atlantis* and beyond, what an adventure!

When *Columbia* first took flight that 1981 spring, who would have anticipated its demise in the 1 February 2003 landing approach over Texas which claimed the lives of all seven astronauts? Next in the fleet came *Challenger* whose tenth mission included Christa McAuliffe, NASA’s first teacher in space, who gave her life along with six other crew members in the fiery launch explosion on 28 January 1986. In August of 1984 *Discovery’s* first flight was followed by 38 more, ending in February of 2011, 27 years of successful missions, including placement of the Hubble Space Telescope in low earth orbit in 1990. *Atlantis*, first launched in October of 1985, became the first shuttle to dock with the Russian space station, Mir, in 1995; in 2009 she was used for Hubble’s final (4<sup>th</sup>) servicing mission. *Endeavor*, the sixth shuttle, debuted in May of 1992, performed the first servicing mission to Hubble in order to correct the optics (1993), and in 1998 became the first shuttle to carry

a major U.S. component for the International Space Station. She took her final flight last May, 2011. The 35-year drama ended officially with *Atlantis’* final space station flight last July 2011.

Back in my classroom that April Tuesday, my reverie was broken in the midst of an animated class discussion of what students had just seen, parents who signed their sons or daughters out of school to drive closer to the Dulles runway, teachers who excused a student here, another there, so they could walk outside to stare, my nephew’s elementary school teacher who brought her entire class outside to see that famous final flight....Ashley looked me in the eye and quietly asked, “What’s a shuttle?”

Suddenly reality clicked in: of course, none of my 11<sup>th</sup> and 12<sup>th</sup> grade students with birth dates in 1995 (!) were even born when *Enterprise* soared from drawing board and computer program to reality in 1977. In fact, their parents were mostly born just about the time the Appollo lunar program was in its infancy. After Ashley assured me she was not joking, the whole tenor of our class discussion changed, and in the days following I found myself doing some deeper thinking about our whole educational enterprise, including the importance of instilling a sense of the history of science in our students.

Gene Roddenberry’s Starship Enterprise, for which NASA’s ship was christened after a vigorous write-in campaign to President Ford, had the famous five year mission, “...to boldly go where no man has gone before.” (1966) In our exaggerated eagerness to measure our students’ acquisition of scientific content, to measure in our schools what seems fundamentally unmeasurable, to clothe our teachers in more and more layers of accountability, are we really expanding our children’s horizons and understanding? Is not **discovery** what science – what **doing** science – is all about? In this season of seeming endless testing, Szent-Györgyi’s comment reminds us of our shuttle, *Discovery*, as well: “Discovery consists in seeing what everyone else has seen and thinking what no one else has thought.” Albert Szent-Györgyi discovered vitamin C and the components and reactions of the citric acid cycle. He received the Nobel Prize in Medicine in 1937, a short time after scientists had scoffed at Robert Goddard and his absurd dreams of rocket-powered space travel. *The New York Times* wrote its infamous unsigned editorial on 13 January 1920 admonishing Goddard:

That Professor Goddard with his “chair” in Clark College and the countenancing of the Smithsonian Institution, does not know the relation of action and reaction, and of the need to have something better than a vacuum against which to react – to say that would be absurd. Of course he

Continued....

only seems to lack the knowledge ladled out daily in high schools.

Charles Keller, who studied language acquisition in school children in the 1960’s, once commented about our schools, “I wonder where the wonder went.” Surely part of the answer must lie in the way in which we ladle out information each day.

The late astronomer, Carl Sagan, wrote a science fiction story, *Contact*, in 1985 in which he expounded on the adventure of the first human contact with another civilization across the reaches of space and through a worm hole in our own galaxy. In 1976, on the bicentennial of our nation, before the first *Enterprise* launch, Virginia Satir had published her volume of verses of which “Making Contact” is a part. Curiously entwined in my thoughts about her poignant line, “The greatest gift I can give is to see, hear, understand and to touch another person,” is the realization that I was teaching about Newton’s Third Law at the time of the last flight of *Discovery*: you cannot touch without being touched.

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](mailto:george.dewey@fcps.edu) .



Courtesy of Jeffrey D. Spring



**Associated Microscope Inc** is on **Virginia State Contract** for sales of the following brand of microscopes:

**Swift, National, Leica, Accu-Scope & Unitron**

**Associated Microscope Inc.** provides **On Site Service & Repair** of microscopes, balances & spectrophotometers



# VAST 2012 PDI • *Designing Your Way Through Science* General Sessions Speakers

Thursday ~ 8 Nov 2012 ~ 5:30 PM ~ Ken Wesson

Sponsored  
by:  **Delta Education**  
...because children learn by doing.®

**Title ~ Next Generation Success: Teaching Students to Think Scientifically**

**Bio ~ Kenneth Wesson** - Please see page 1. Kenneth Wesson, an educational consultant for preschool through university institutions and organizations is an expert on the neuroscience of learning and methods for creating classrooms and learning environments that are “brain considerate”. Please see page 1 for more.

Friday ~ 9 Nov 2012 ~ 8:00 AM ~ Heidi Schweingruber and Stephen Pruitt

Sponsored  
by:  **VSELA**  
VIRGINIA SCIENCE EDUCATION LEADERSHIP ASSOCIATION

**Bio ~ Heidi Schweingruber, Ph.D.** is the deputy director of the Board on Science Education (BOSE) at the National Research Council (NRC). She co-directed the study that produced the 2007 report *Taking Science to School: Learning and Teaching Science in Grades K-8* and served as research associate on *America's Lab Report: Investigations in High School Science* (2005). She is currently co-directing the project to create a conceptual framework for new science education standards. Prior to joining the NRC, Dr. Schweingruber worked as a senior research associate at the Institute of Education Sciences in the U.S. Department of Education where she served as a program officer for the preschool curriculum evaluation program and for a grant program in mathematics education. She was also a liaison to the Department of Education's Mathematics and Science Initiative and an adviser to the Early Reading First program. Previously, she was the director of research for the Rice University School Mathematics Project, an outreach program in K-12 mathematics education, and taught in the psychology and education departments at Rice University. She has a Ph.D. in psychology (developmental) and anthropology, and a certificate in culture and cognition from the University of Michigan. (Courtesy of website ~ [http://www7.nationalacademies.org/bose/bose\\_staff.html](http://www7.nationalacademies.org/bose/bose_staff.html))



**Bio ~ Stephen Pruitt, Vice President, Content, Research and Development.**

**Stephen Pruitt** was named Vice President for Content, Research and Development in November of 2010. He joined Achieve as the Director of Science in July of 2010. In addition to his new role, he will continue to lead the development of the *Next Generation Science Standards*. Stephen began his career as a high school Chemistry teacher in Georgia, where he taught for 12 years. In 2003, he joined the Georgia Department of Education (GaDOE) as the Program Manager for Science. He served in that role for four years before becoming Director of Academic Standards, where he oversaw the continued implementation of the Georgia Performance Standards in all content areas. In 2008 he became the Associate Superintendent of Assessment and Accountability, responsible for directing all state assessments and overseeing the No Child Left Behind accountability process. In April 2009, Stephen became Chief of Staff to State School Superintendent Kathy Cox, coordinating the work of the agency and a variety of projects such as Georgia's third-ranked Race to the Top application. In addition to his state-level work, Stephen also served as President of the Council of State Science Supervisors and a member of the writing team for the College Board's Standards for College Success Science Standards. Most recently, he served on the National Academies of Science's Committee on Conceptual Framework for New Science Education Standards, which has developed the Framework for K-12 Science Education. This document is the basis for the development of the Next Generation Science Standards. A native Georgian, Stephen earned a bachelor's degree in chemistry from North Georgia College and State University, a master's in science education from the University of West Georgia, and a doctorate of philosophy in chemistry education from Auburn University. (Courtesy of website ~ <http://www.achieve.org/staff-stephen-l-pruitt-phd>)



# VAST 2012 PDI • *Designing Your Way Through Science* General Sessions Speakers

Friday ~ 9 Nov 2012 ~ 6:30 PM ~ William Kelso and Adrianna Ocampo

Sponsored  
by: 

**Bio ~ Dr. William M. Kelso, Ph.D., CBE, FSA,** Dr. William Kelso is the director of archaeological research and interpretation for the Jamestown Rediscovery Project, at Historic Jamestowne. In 1994, Dr. Kelso began archaeological excavations at Historic Jamestowne in search of the remains of the 1607 James Fort, thought by most people to have long been destroyed by river erosion. The Fort was soon discovered and became the centerpiece of the 400th anniversary of the founding of Jamestown in 2007. Dr. Kelso directs a team of archaeologists who continue to explore this significant American landmark. He directed archaeology at Carter's Grove; at Thomas Jefferson's homes: Monticello, and Poplar Forest and was the Virginia Commissioner of Archaeology. He has authored numerous articles and his books include: *Jamestown : The Buried Truth*; *Jamestown Rediscovery I-VIII*; *Kingsmill Plantations: Archaeology of Country Life in Colonial Virginia*.; and *Archaeology of Thomas Jefferson's Monticello: Artifacts of Everyday Life in the Plantation Community*. (Courtesy of Dr. Kelso)



**Bio ~ Adriana Ocampo ~ NASA HQ Science Mission Directorate, Program Executive**

**Ms. Ocampo Uria**, as the NASA HQ Program Executive for the Science Mission Directorate, is responsible for the Juno mission to Jupiter and NASA collaboration in European Space Agency's (ESA) Venus Express mission. In 1998 to 2002, she worked in the Office of Space Science and the Office of External Relations as a Program Executive for Space Science missions with international collaboration (i.e. ESA, IKI, ISAS, CONAE, etc), among which included missions with the European Space Agency (ESA), Russia, Japan and Argentina. As a Program Executive she was responsible for the development, integration, implementation and budget for these missions (i.e. CLUSTER, XMM, INTEGRAL, ASTRO-E MAP, SWIFT). She was also the Russian (and all the former Soviet Union independent countries), Spain, Portugal and Latin America desk officer for NASA's Office of External Relations. During her tenure at NASA Headquarters she also worked in the Office of Earth Science in the Solid Earth and Natural Hazards Division.



Previously to working at NASA HQ, Ms. Ocampo was a research scientist at the California Institute of Technology's Jet Propulsion Laboratory (Caltech/JPL), where she had worked since 1973. In 2005 she was the Investigation Scientist for the Mars Odyssey Gamma Ray Spectrometer/High Energy Neutron Detector/MARIE and also worked for the Mars Program Science Division and the Solid Earth and Natural Program. From 2002 to 2004 she was a senior research staff member at the European Space Agency (ESA), conducting research in comparative planetology of Solar System bodies. She was a member of the Mars Express Project Scientist Team developing and implementing the payload-commissioning plan. She also acted as the deputy project scientist for Venus Express, developing science operation architecture and an educational outreach plan. (Courtesy of website ~ <http://oeop.larc.nasa.gov/hep/lwon/LWONbios/hq-AOcampoUria.html>)

Saturday ~ 10 Nov 2012 ~ 9:15 AM ~ Jennifer Seydel  
Sponsored  
by: 

**Bio ~ Jennifer Seydel** brings 30 years of experience as an educator to her role as Treasurer/Secretary for the Green Schools National Network. She is currently a School Designer for Expeditionary Learning, a non-profit education reform organization that partners with existing schools and opens new schools with the goal of preparing children and youth for success in an ever changing world. Expeditionary Learning includes 165 schools who serve over 40,000 students and 4000 teachers in 29 states. Jennifer consults with the growing number of green schools within the EL network.



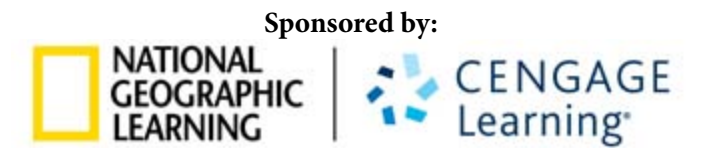
Prior to her work with Expeditionary Learning, Jennifer was an Associate Professor of Education at Springfield College in Springfield, Massachusetts. As the Director of the S.A.G.E. Project, a college-community collaboration founded to address the needs of highest risk high school students in Springfield, Massachusetts, Jennifer designed the S.A.G.E. M.Ed. program, a graduate degree in Education and Counseling. The seventy students who graduated from this program have gone on to become leaders and change agents in many urban school districts in New England.

During her K-12 teaching career, Jennifer taught physical education, health, biology, and special education at the elementary and high school levels. During summers, she led youth on wilderness and cycling adventures for various youth development organizations. She was also the Director of Staff Development and Training for a Chaddock, a large social service agency in Quincy, Illinois. (Courtesy of Jennifer Sydel)



General Sessions Speaker

Saturday ~ 10 Nov 2012 ~ 2:00 PM ~ Mireya Mayor



Bio ~ Mireya Mayor

Dr. Mireya Mayor is a scientist, explorer, wildlife correspondent, anthropologist and inspirational speaker who will be of interest to all. Mireya, a Ph.D. in anthropology, has reported on wildlife and habitat issues to worldwide audiences for more than a decade. A former NFL cheerleader for the Miami Dolphins, Mireya grew up in a big city and as the only daughter of Cuban immigrants, she couldn't join the Girl Scouts as a little girl because her family thought it was too dangerous. In spite of this, she went on to become the first female wildlife correspondent for the "Ultimate Explorer" series on National Geographic Television, and has spent more than ten years exploring some of the wildest and most remote places on earth, often armed with little more than a backpack, notebooks and hiking boots. Since then, Mireya has slept in remote jungles teeming with poisonous snakes, gone diving with great white sharks, been charged by gorillas and chased by elephants, and that's just in the last few months.



Mireya's curiosity and love for animals started very early on as a child. Since she could crawl, Mireya had birds, fish, dogs, cats, parrots, rabbits, turtles, and a little chicken named Maggie. But it was in 1996, while attending the University of Miami that she realized that her passion for animals could become a career. In order to fulfill a science credit, Mireya wanted to register for a woman's biology course, but the class was full. After scrolling down the course list she chose an anthropology course, not entirely knowing what that meant. That choice would forever change her life.

Anthropology fascinated her, particularly her professor's stories of chasing monkeys in the wild. After learning of wild animals on the brink of extinction whose most basic behavior and habits were unknown, Mireya, then only 22, applied for her first

grant. Though a Miami Dolphins Cheerleader and model, she received the grant and went on to spend that summer in the remote jungles of Guyana, one of the most unexplored regions of the world at that time. The following year she journeyed to the wilds of Madagascar into areas so remote, that she often found herself surrounded by local villagers who had never seen a foreigner before her arrival. Against all odds, and following in the footsteps of renowned scientists who had tried and failed, Mireya completed the first ever long-term and genetic studies of two of the most critically endangered primates in the world, Perrier's sifaka and the Silky sifaka. Feeling as if she had found her calling, Mireya has spent anywhere from 3 to 10 months at a time in Madagascar since then.

In 1999, National Geographic was doing a story in Madagascar and asked Mireya to say a few words about the lemurs. Impressed by her passion for the subject, down to earth delivery of scientific knowledge and distinct background of NFL cheerleader-turned-scientist, National Geographic offered Mireya the opportunity of a lifetime and her dream job: a staff wildlife correspondent position, complete with her own office. She has since gone underwater with six-foot Humboldt squids, scoped out gorillas in Central Africa, swam with great white and six-gilled sharks, and worked with leopards in Namibia (just to name a few projects).

In 2005, Mireya received two Emmy Award nominations for her work on the television series "Ultimate Explorer". Mireya was later named an "Emerging Explorer" in 2007 by the National Geographic Society which selects rising talents, "the next generation of visionaries" who push the boundaries of adventure and global problem solving, inspiring people to care about the planet.

Mireya also starred in Mark Burnett's eagerly anticipated 8-part series Expedition Africa: Stanley & Livingstone (History Channel) as one of four explorers to retrace the nearly 1,000-mile trip of Henry Stanley & David Livingstone. Armed with only a compass and old maps, the explorers faced challenging terrain, conflicting team dynamics, and diverse wildlife.

Mireya is now one of the hosts on National Geographic's new channel Wild! You can currently catch her series "Wild Nights with Mireya Mayor" and her documentary special "Mystery Gorillas".  
(Courtesy of website ~ [http://mireyamayor.com/?page\\_id=3](http://mireyamayor.com/?page_id=3))

Superintendent's Memo #078-12 Virginia Science Standards Institutes (VSSI)

The Virginia Department of Education (VDOE), Office of Standards, Curriculum, and Instruction, is pleased to announce the 2012 Virginia Science Standards Institutes (VSSI). The Virginia Department of Education, in collaboration with the Virginia Museum of Natural History (VMNH), the Science Museum of Virginia, and six other state agencies, will conduct two Institutes this summer. These six-day summer learning experiences for kindergarten through third-grade teachers and administrators are designed to support the implementation of the Science Standards of Learning (SOL). The two Institutes will model exemplary science instruction, especially focusing on kindergarten through third-grade science SOL content and processes using cross-curricular instruction, student teams, and inquiry-based, project-based, and place-based learning. Teachers participating in a VSSI will work with a vertical school/division team to design a school/division instructional unit framework during the week. They will then be able to use the vertical instructional unit framework in their school/division during the school year. In order to facilitate a vertical team format for the VSSI, school divisions/schools are asked to send a team of kindergarten through third-grade teachers and an administrator to the Institute. The schedule for the VSSI is as follows:

- Hungry Mother State Park**  
July 8-13, 2012 [http://www.dcr.virginia.gov/state\\_parks/hun.shtml](http://www.dcr.virginia.gov/state_parks/hun.shtml)
- Bear Creek Lake State Park**  
July 22-27, 2012 [http://www.dcr.virginia.gov/state\\_parks/bea.shtml](http://www.dcr.virginia.gov/state_parks/bea.shtml)
- Hungry Mother State Park**  
July 8-13, 2012 [http://www.dcr.virginia.gov/state\\_parks/hun.shtml](http://www.dcr.virginia.gov/state_parks/hun.shtml)
- Bear Creek Lake State Park**  
July 22-27 [http://www.dcr.virginia.gov/state\\_parks/bea.shtml](http://www.dcr.virginia.gov/state_parks/bea.shtml)

If you need additional information about the 2012 Virginia Science Standards Institutes, please contact Barbara Young, science specialist, office of standards, curriculum, and instruction, by e-mail at [Barbara.Young@doe.virginia.gov](mailto:Barbara.Young@doe.virginia.gov), or by telephone at (804) 225-2676.



Opportunities from the Virginia Department of Education

Superintendent's Memo #118-12 Science SOL Institutes

The Virginia Department of Education (VDOE) is pleased to announce K-12 Science Standards of Learning (SOL) Institutes to be held in July and August 2012, at four regional locations around the Commonwealth. The four Institutes are designed to provide an advanced level of support for school division curriculum and instructional leaders as they begin their first year of implementation of the 2010 Science Standards of Learning. The Institutes will focus on deepening participants' understanding and application of the rigorous practices and critical reasoning skills embedded in each science standard. The Institutes will provide participants with examples of how effective science instruction may be enhanced for students in each grade range and how teachers can improve student achievement in content areas of greatest challenge. These one-day Institutes (8:30 a.m. – 3:30 p.m.) will be offered in a train-the-trainer professional development format for science coordinators, instructional supervisors, professional development personnel, division lead science teachers, and other administrators with responsibility for science education. Registration is limited to four participants from each school division. Division teams of four participants should be structured so there is one designated participant for each of the following grade-band sessions within each Institute:  
Kindergarten – Grade 2; Grade 3 – Grade 5; Grade 6 – Grade 8; and Grade 9 – Grade 12.

Geology of Virginia CD ROM to Web site Survey

We know you have lots to do, but we would request you take a few minutes to offer some feedback regarding a potential project Dr. Jon Tso at Radford has been taking on. He is working to convert the Geology of Virginia CDs to a website. Please click on the following link to complete the survey.  
<http://www.survey.outreach.vt.edu/TakeSurvey.aspx?SurveyID=725K5m7>

Trees-to-Products Summer Teachers' Program

The **Trees-to-Products** teachers' summer program is designed to provide teachers with factual and credible information about Virginia's hardwood forests. The program links concepts to the Virginia Standards of Learning (SOLs) and includes training in Project Learning Tree activities. Hardwood forest management techniques and forest products industries will be examined in detail. The goal is to offer teachers an in-the-field tour of sustainable forest management techniques. These management practices provide raw materials for processing at local forest products industries and also wildlife habitat, recreational opportunities, and sustain forest health to maintain the viewshed and water quality. The wood products produced are widely used. Teachers will see and learn about the sustainable and renewable resource of trees and how trees are converted into a variety of everyday products. Program activities are in Wise County, and lodging will be provided in the City of Norton and/or the Town of Wise. For more information, visit <http://anr.ext.vt.edu/enviroandnatres/programs/trees-to-products.html>

White-tailed Deer Resources for Science Standard of Learning 2.4: Life Cycles

The white-tailed deer is common throughout the Commonwealth. For this reason and the natural interest that students have in the white-tailed deer, the Virginia Department of Education listed it as an example of a mammal's life cycle. This page is designed to provide additional resources on Virginia's deer for students and teachers.

The second grade science life cycle standard states:

2.4. *The student will investigate and understand that plants and animals undergo a series of orderly changes as they mature and grow. Key concepts include animal life cycles; and plant life cycles.*

The Curriculum Framework contains additional information for the teacher, and includes what students are expected to know about life cycles. Once you have linked to the second chapter of the Curriculum Framework, scroll through to page 14 to view Standard of Learning 2.4. Thank Suzie Gilley for her work to bring this resource to second grade teachers.

Proposals must be submitted by June 15, 2012.

**Presenters Needed for the VAST PDI**

*The 2012 PDI Theme: "Designing Your Way Through Science"*

*When: November 7-10, 2012 @ Williamsburg Hotel*

*Come and share those great ideas with other science teachers at the 2012 PDI!*

*We are looking for presentations that cover all SOLs and every concept under the sun.*

*You know you have a presentation or two inside waiting to come out!*

**On-line Presenter form :** [http://education.jlab.org/vast/presentation\\_proposal.php](http://education.jlab.org/vast/presentation_proposal.php)

*Presenter Forms on www.VAST.org*

18.



## Summer Research Opportunity for Teachers and Rising High School Seniors at Virginia Tech

Virginia Tech is hosting an opportunity this summer for teachers and another for rising high school seniors to conduct research in bio-inspired science and engineering based on how insects pump fluids. Sponsored by the NSF, students and teachers will experience real-world research and gain high-tech skills. You will work with Virginia Tech's eight research teams to understand the mechanics and physiology of how fluids move in the multiple systems in insect bodies. This understanding is hoped to be used to design new engineering devices potentially with biomedical applications. This event is planned for June 4 - July 27, 2012 and will be held on the Virginia Tech, Blacksburg campus. There is \$1,400 stipend for students; \$6000 for teachers. Submit your application to Dr. Jake Socha, [jjsocha@vt.edu](mailto:jjsocha@vt.edu), Dept. of Engineering Science and Mechanics. Include 1.) a cover letter explaining why you want to participate and 2.) your resume. Teachers are provided room and board, are expected to be on site Monday to Friday.

### WindWise Curriculum Workshop Registration

The WindWise Curriculum: Wind Energy Workshop for Teachers is being held on Friday, June 22th from 9:00 am to 3:00 pm at Virginia Center for Wind Energy's Technology Drive lab space. To register for this workshop email or fax the following information to Remy Pangle before Monday, June 8th, 2012.

Remy Luerssen Pangle, Director of Education and Outreach, Virginia Center for Wind Energy

James Madison University,  
1401 Technology Drive, Suite 120, MSC  
4905, Harrisonburg, VA 22807  
540-568-8768 office 540-568-2761 fax  
540-383-9248 cell

[www.windpowerVA.org](http://www.windpowerVA.org)  
[aeer.cisat.jmu.edu](mailto:aeer.cisat.jmu.edu)

### Third Annual Chemistry Demonstration Workshop

<https://sites.jmu.edu/chemdemo/2012/05/03/third-annual-chemistry-demonstration-workshop/> at JMU. This year we have scheduled our event for Friday July, 20th from 9am - 3pm. If you are thinking about attending, keep that date open!

## More Opportunities for Teachers and Students

### The Science of Nuclear Energy and Radiation – 4-day Teacher's Workshop

American Nuclear Society and VCU's Department of Mechanical and Nuclear Engineering will be hosting a 4-day Teachers Workshop, "The Science of Nuclear Energy and Radiation." The workshop will be held July 16th-July 20th at VCU, and is being marketed to both science and math teachers. More information here.

Some of the topics included in the workshop are:

- Radiation: Basics, Biological Effects, and Beneficial Uses
- Nuclear Energy and Technology
- Nuclear Power Plant Basics and Safety
- Using Geiger Muller Counters
- Energy Source Comparison and Careers in Nuclear

### 2012 Tapestry Summer Workshops for Virginia Teachers

The TAG project (Teachers Attracting Girls to Computing) is offering an opportunity this summer for Computer Science teachers to participate in a workshop centered around strategies, research-based practices, and field-tested good ideas for teaching computer science in a way that reaches all students regardless of sex or ethnicity. For more details:

<http://www.cs.virginia.edu/tapestry/>

If you are interested in

- Attracting more and diverse students into your high school Computer Science classes;
- Influencing the perceptions of students, parents, guidance counselors, administrators, and other teachers on the importance of your courses and the opportunities they provide;
- Engaging your students in the exciting and rewarding field of computing; or
- Sharing strategies, practices, and good ideas for teaching computer science.

Then we invite your teachers to apply to our summer workshops on attracting and engaging diverse high school students to computer science. Honorariums of \$1,000 will assist attendees with time and travel costs, and show our appreciation for their participation in the assessment of the workshop program and activities.

### Teacher Workshops:

#### Stream Ecology and Natural History of Virginia's Headwater Streams

Bull Run Mountains Conservancy will host two 1-day workshops for middle and high school teachers on Stream Ecology and Natural History. Teachers will be taught the foundational concepts of stream ecology and how to monitor the health of a stream. The trainings will include a classroom component and then we will spend the afternoon conducting a stream investigation along Catlett's Branch in the Bull Run Mountains. Teachers will receive an instructional booklet, a PowerPoint presentation to use in their classrooms, a field guide to aquatic macro-invertebrates, and a net to use for sampling with their students.

The workshops will be offered:

- Friday July 13th, 9am – 3pm
- Friday July 20th, 9am – 3pm

The instructional material will be aimed at middle and high school students.

Each session will be capped at 10

participants. Due to generous support

from the **Chesapeake Bay Restoration**

**Fund**, the cost to participants will

be only \$20/person. Please contact

BRMC at 703-753-2631 or at [info@](mailto:info@brmconservancy.org)

[brmconservancy.org](http://www.brmconservancy.org/calendar.html#se2012) to register or register online at <http://www.brmconservancy.org/calendar.html#se2012>.

Michele Thieme, Research Director

Bull Run Mountains Conservancy

703-732-5930

### FREE Nanotechnology Coloring Book

A new Nanotechnology Coloring Book is available for free download from NanoSonic, an American company that designs and produces nanomaterials. It helps fourth-to-fifth grade students learn about the tiny world of nanoscale with line drawings, brief descriptions of the illustrations, questions and several exercises. An Answers sheet is provided for teachers and parents. The Nanotechnology Coloring Book is being translated into French, German, Spanish and Chinese which will be available soon.

<http://www.nanosonic.com/664/nano-technology-coloring-book.html>

This coloring book, funded in part by NASA, was designed by Robin Rogers, Andrew Teates and Sally Green of NanoSonic, Inc. and reviewed by Virginia public school teachers.

# Teacher Workshop

## 7-12th Grade: Exploring Earth Science

National Park Service  
U.S. Department of the Interior

Shenandoah National Park  
Education Division



## Workshop Description

### Exploring Earth Science in Shenandoah National Park

Tuesday, August 7–Wednesday, August 8, 2012

Geology and earth science teachers! What better way to prepare for the new school year than to learn how to use Shenandoah National Park for investigating earth science with your students? Join us on August 7 and 8, 2012 for a hands-on teacher workshop that will feature two units of *Exploring Earth Science in Shenandoah National Park: An Integrated Curriculum Guide for Grades 7-12*. Workshop participants will receive the complete curriculum guide with lesson plans and materials for using the park to study a variety of earth science topics. Several lessons meet *Meaningful Watershed Education Experience* (MWEE) requirements. The workshop includes field-based instruction on two units, *Protecting Our Water Resources* and *The Changing Face of Stony Man*, plus an overview of four additional lesson plans in the curriculum guide.

## Fees and Registration

The workshop is FREE. Reservations are required and space is limited to 20 participants. The workshop will be held in Shenandoah National Park. Overnight lodging is included with your reservation. Please register by June 30, 2012.

To register or for more information, contact Shenandoah National Park's Education Office by email: [shen\\_education@nps.gov](mailto:shen_education@nps.gov) or phone: 540-999-3500, ext. 3489.

## Curriculum Description

*Exploring Earth Science in Shenandoah National Park* provides the materials and training necessary to use Shenandoah National Park to enhance earth science and geology instruction. The curriculum guide contains six complete lesson plans that include pre- and post-visit activities and field-based investigations in Shenandoah National Park. Teachers must attend an instructional workshop to receive the materials and training. Lesson plan descriptions can be found on the park's website at <http://www.nps.gov/shen/forteachers/exploring-earth-science.htm>

[www.nps.gov/shen](http://www.nps.gov/shen)





Virginia Association of Science Teachers, Inc.  
2012 AWARDS NOMINATING FORM

Please make time to recognize the accomplishments of an individual who has “made a difference” in science education - nominate them for an Annual VAST Award. Nominees do NOT need to be a member of VAST. Awardees will receive an engraved plaque at the November 2012 PDI and will be reimbursed up to \$150 for VAST conference (PDI) expenses. Awardees will be selected by a committee appointed by the VAST President.

Nominations are due by August 20, 2012.

Procedure: (This form can be filled out on-line from the VAST Web site (www.vast.org))

- 1. Fill in the information requested in (A) and (B) - above.
- 2. Select the appropriate category (C), (D) or (E) - below.
- 3. Attach as many pages as needed to describe the major accomplishments, student learning, and/or any other activity for which you are nominating this person.

Nomination Information: (Please type, print, or fill in on-line)

A. Nominee

Full Name: [Dr., Mr., Mrs., Ms] \_\_\_\_\_

School Division/Employer: \_\_\_\_\_

School: \_\_\_\_\_ E-mail Address: \_\_\_\_\_

Home Phone: \_\_\_\_\_ Business Phone: \_\_\_\_\_

Home Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_ Zip: \_\_\_\_\_

B. Nominator

Full Name: [Dr., Mr., Mrs., Ms] \_\_\_\_\_

School Division/Employer: \_\_\_\_\_

School: \_\_\_\_\_ E-mail Address: \_\_\_\_\_

Home Phone: \_\_\_\_\_ Business Phone: \_\_\_\_\_

Home Mailing Address: \_\_\_\_\_

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Category: (Choose a single category from the options below.)

C. Classroom Teacher:

- ☐ Elementary (K-5)
- ☐ Chemistry
- ☐ At-Risk Students (K-12)
- ☐ Middle School (6-8)
- ☐ Earth Science
- ☐ Environmental Science

- ☐ Biology
- ☐ Physics
- ☐ Resource Teacher

Examples: Technology, Science Resource, Etc.

D. ☐ Science Educator (non K-12)

Examples: Science Supervisor, Informal Education, Etc.

E. ☐ Science Educator (University/College faculty)

F. ☐ Community Partnership

Examples: Industry. Business, Politicians, other organizations, etc.

Nominations must be received or postmarked by August 20, 2012

If not done on-line, return all nomination materials to:

Donald Foss, 109 Saint Ives Road, Charlottesville, VA 22911 fossd1@comcast.net

VAST PDI Preconference Workshops for Elementary and Middle School



Delta Education plans to offer workshops on Thursday, November 8, 2012 at the VAST PDI in Williamsburg. Make plans today to come Thursday. Specific times will be available soon. Watch for more information on the VAST web page or ib an e-note.

FOSS Elementary Institute: The Science-Centered Classroom

Presenters: Leslie Lausten and Sherrie Roland, Stafford County Public Schools

With so much to cover and so little time during the school day and even the school year, making connections across the curriculum is no longer an option, but a necessity. In this institute, learn strategies and scaffolds for listening, speaking, vocabulary, reading and writing skills to support hands-on investigations and content learning. Identify math concepts and activities that support the understanding of science concepts. Learn about the features of FOSS including content area reading, inquiry-based investigations, STEM-related activities, and instructional technology that support cross-curricular integration. Participants will walk away with materials and strategies to begin fostering a science-centered classroom and an increase in student engagement and achievement. Materials provided for all participants.

FOSS Middle School Institute: Raising the Rigor through Inquiry and Literacy

Presenter: Dr. Bill Metz, Educational Consultant

Preparing the next generation of citizens and scientists to meet the needs of the 21st Century, requires students to go beyond memorization of science facts and to view science as a way of thinking and solving problems. The FOSS Middle School Program features inquiry-based investigations and opportunities for asking questions and solving problems using the scientific processes. In this institute, participants engage in hands-on FOSS investigations as well as learn easy to use strategies and scaffolds for incorporating literacy into the science classroom. Materials provided for all participants.

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# 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 2012-13    Hotel Registration for the PDI  
PDI Registration Interactive Form VAST Nominating Form 2012  
VAST Advertising Form 2012    VAST Mini-grant Form 2012  
AIPG Geology Award Form 2012

<http://www.vast.com>

On-line PDI Presenter form :

[http://education.jlab.org/vast/presentation\\_proposal.php](http://education.jlab.org/vast/presentation_proposal.php)

Presenter forms  
due June 15th!  
Do it Today!



## Virginia Association of Science Teachers, Inc.

### MEMBERSHIP FORM

The VAST dues-year runs from January 2012 to January 2013

Join now! Good  
through Jan  
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VAST Membership Form online: <http://www.vast.org/membershipform.html>

Below you will find several dues options. Renew your membership today. A membership card will be mailed. Members get free admission to the Science Museum of Virginia and VMNH, four issues of *The Science Educator*, and VAST e-blasts to keep you informed. Check the website for more.

New Member ☐ Membership Renewal ☐ Membership Update ☐ (E-mail & address or name changes)

Name (first-last): \_\_\_\_\_ HOME PHONE: ( \_\_\_\_\_ ) \_\_\_\_\_

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Address (city) : \_\_\_\_\_ State : \_\_\_\_\_ ZIP: \_\_\_\_\_

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LEVEL (circle one) : Elementary - Middle - High - College - Supervisor - Business - Full-time Student

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PLEASE RETURN THIS FORM - WITH YOUR PAYMENT TO: Please make checks out to VAST.

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

Feb 1, 2012

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#### 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](mailto:maria.cooper@pps.k12.va.us)

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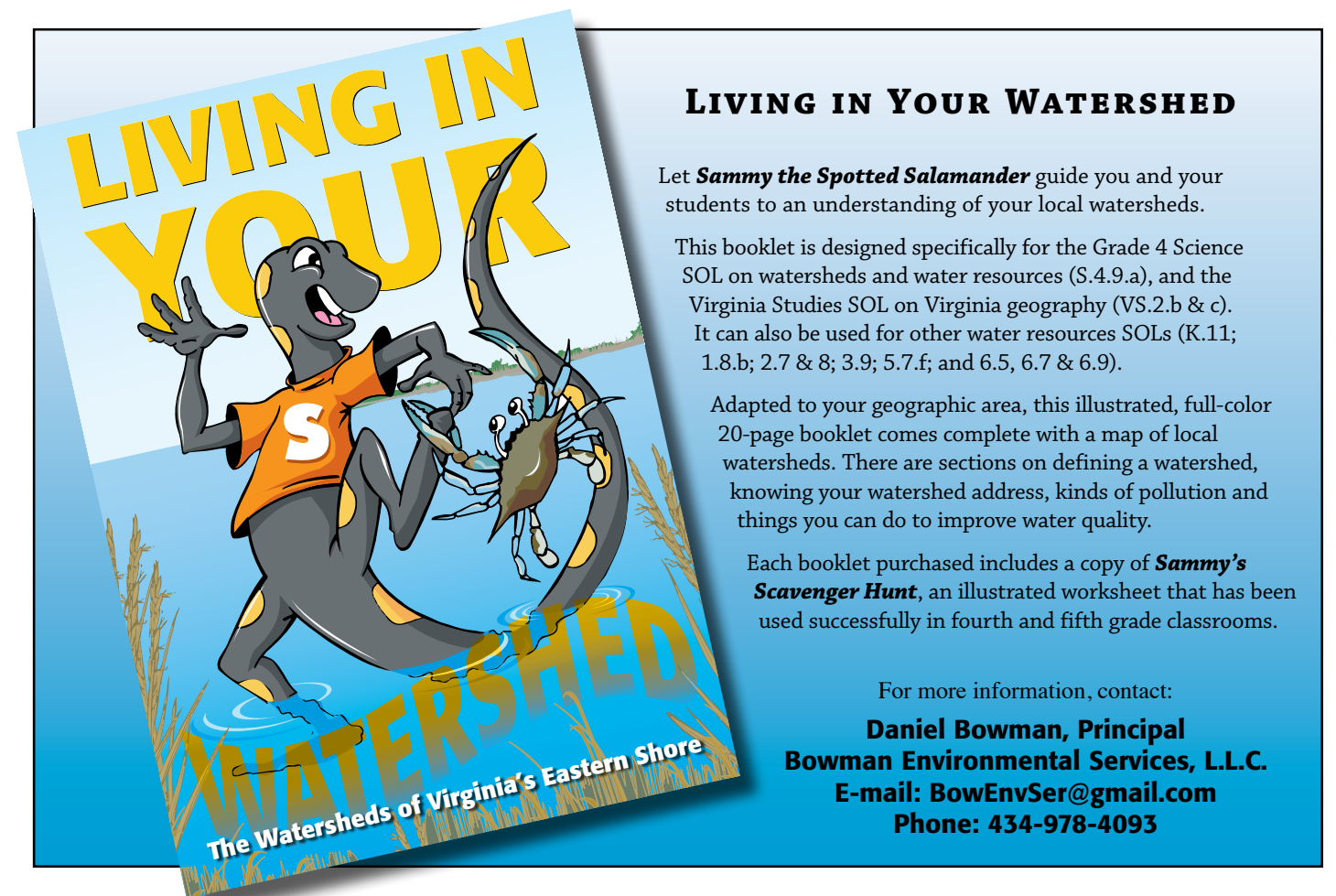
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Let **Sammy the Spotted Salamander** guide you and your students to an understanding of your local watersheds.

This booklet is designed specifically for the Grade 4 Science SOL on watersheds and water resources (S.4.9.a), and the Virginia Studies SOL on Virginia geography (VS.2.b & c). It can also be used for other water resources SOLs (K.11; 1.8.b; 2.7 & 8; 3.9; 5.7.f; and 6.5, 6.7 & 6.9).

Adapted to your geographic area, this illustrated, full-color 20-page booklet comes complete with a map of local watersheds. There are sections on defining a watershed, knowing your watershed address, kinds of pollution and things you can do to improve water quality.

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For more information, contact:

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

Next Deadline for *The Science Educator* for articles, letters to the editor, or labs is:  
**July 20, 2012.**

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

**The next issue of *The Science Educator* will be a hard copy issue, mailed to you by the end of August. Please look for it at that time and check the VAST website if you do not receive your copy.**

VAST newsletter is sent bulk rate, therefore VAST apologizes for any time sensitive information that you may receive late. Please consult the website for up to date information, VAST forms for awards and mini-grants, and current PDI information. [www.vast.com](http://www.vast.com)



## ***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-deductible 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!!!