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The Science Educator

Early Spring 2014 A publication of VAST, The Virginia Association of Science Teachers Vol. 62, No.4

2014 Annual PDI

November 19-22, 2014, Hotel Roanoke, Roanoke, Virginia

Sparkling Innovation: Enhancing Student Learning

Why attend the 2014 PDI?

By Dr. Jenny Sue Flannagan,
President Elect

With all the changes going on in education these days, it is hard to know if we are coming or going! Sometimes I know I feel like it is a different buzz word every week that I am required to know and be implementing. From 21st Century Learners to disruptive technology, who can keep up these days with the new edubabble!

VAST however, is committed to providing current up-to-date information to help science teachers teach more effectively. This year's PDI theme, Sparking Innovation-Enhancing Student Learning, will provide teachers and administrators with access to timely and relevant practices that will improve student learning. From our pre-conference workshop to PDI breakout sessions, teachers will have the opportunity to dig deeper into practices that work!

This year, along with all the great sessions you have come to know and love on Friday and Saturday, VAST will



Carol Tomlinson

offer another full day of learning opportunities on Thursday! You do not want to miss out. Mark your calendars to join us on Thursday, November 20th for the following session:

8:30 a.m. -3:30 p.m.

(Pre- PDI Registration Required)

Carol Tomlinson

Differentiating Instruction: Planning Instruction that Supports Academic Success for All Learners in Math and Science

Come spend the day with Carol Tomlinson, national expert on Differentiation. As teachers we know academic diversity is a given in most classrooms today. Students from

varied cultures, language groups, and economic strata sit side-by-side and bring with them a broad range of readiness levels or entry points, interests, approaches to learning, and motivations to learn. Understand how in many settings, the goal of teachers is to help the full range of students succeed with complex, high-level curriculum.

Participants will:

- Explore the non-negotiables of effective differentiation using classroom video clips, lesson plans, articles, discussion, and presentation.
- Investigate the implications of those non-negotiables for classroom practice.
- Leave with strategies for developing more challenging and responsive heterogeneous classrooms.

Presenters Needed

Share your good ideas! Influence science beyond your classroom, school, and district. Recertification points for presenting are available through your district. Please submit a session proposal for the 2014 VAST PDI! Proposals must be submitted by April 20, 2014. Late proposals will be considered on a space-available basis. Presenters will be notified by June 15th at the earliest and no later than August 1, 2014. A special discounted rate is provided for up to four

presenters per session, however, all presenters are required to register for the PDI by September 5, 2014 to qualify for the reduced rate. Presenters will receive registration information via email in August. Note: Commercial presenters must be registered as exhibitors (www.vast.org).

Deadline for submission: April 20, 2014!
<http://www.vast.org/presenters.html>

From the Executive Director



OMGosh.....snow, snow and more snow...if you have dug out then congratulations! What a start to the new year. But, do not fear...you will hear... all the science things you need to know for the upcoming school year.



SCIENCE will ROCK your WORLD! VAST will be having the best PDI ever and you need to be a part of it, so volunteer with your regional director or subject chair or submit a proposal for presentation or volunteer to be a part of the events at the PDI.

Susan Booth

WE NEED YOU :-)



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!!!

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Shirley Sypolt



The Virginia Association of Science Teachers (VAST) Is Here for You! You Are Invited to Attend!

Event: The 2014 VAST PDI (Professional Development Institute)

Where: Hotel Roanoke

Dates: November 19-22, 2014

Registration begins soon- check the web site <http://www.vast.org>

Wanted : presenters at the 2014 VAST PDI! <http://www.vast.org/presenters.html>





Who should participate: this is *your* personal invitation

To be: A presenter

Where: Hotel Roanoke

Theme: *Sparkling Innovation: Enhancing Student Learning*

Strands:

-  Connecting the Dots: Virginia Science Standards & Your Classroom
-  STEM/ Environmental Education: Integration & innovation
-  Linking Science and Other Content Standards
-  Leadership for effective Science Instruction in Virginia

***Sign up now and share your great idea(s) with others-
check the web site at www.vast.org***

Why should you participate in the 2014 VAST PDI?

VAST is a statewide organization for science educators. Classroom teachers, at all levels, should be as active as possible in decision-making and the leadership of this organization. We are always looking for new voices and new points of view, so consider serving on one of our many VAST committees: Elementary, Middle, Biology, Chemistry, Earth Science, Physics, Colleges & Universities, Communications, Environmental Literacy, and Informal Learning, just to list a few. Check out our VAST web site at www.vast.org and let us know what else we can add to this site to make it easier for you to find information you need about science education in Virginia. What would you like to see us doing that we are not already doing? Also, make the decision to come to Hotel Roanoke and be a presenter. Use this opportunity to showcase your awesome ideas with others.

My goals this year as the President of VAST are: (1) increased participation in VAST by science teachers across our state, (2) increased participation of our youth in science through VAST, and (3) to support high quality, hands-on, and appropriate science education throughout Virginia.

I want to hear from you! The entire state of Virginia is broken into eight VAST regions, each with a VAST Regional Director. **VAST is here for you!** We want to know what kind(s) of support you need from us. How can we make science teaching easier for you as a science educator at all levels? Please contact me at my school email: ssypolt@hampton.k12.va.us and let me know how we (as a state wide organization) can support you as a science educator.

Shirley Sypolt
VAST President

VAST Professional Development Institute

Speakers 2014

**November
2014!**



Reaching all students? Differentiation? Engineering? How about Flipping?

Do any of those topics interest you? We have a wide range of speakers this year that will provide you with a wealth of free information from nationally recognized speakers that will be included in your registration price! For more information go the VAST website and watch for VAST Newsletters and E-Notes!

Pre-Conference I - November 20, 2014 8:30 a.m.-3:30 p.m.

Dr. Carol Tomlinson - *Differentiating Instruction: Planning Instruction that Supports Academic Success for All Learners*

Academic diversity is a given in most classrooms today. Students from varied cultures, language groups, and economic strata sit side-by-side and bring with them a broad range of readiness levels or entry points, interests, approaches to learning, and motivations to learn. Understand how in many settings, the goal of teachers is to help the full range of students succeed with complex, high-level curriculum.

Participants will:

Explore the non-negotiables of effective differentiation using classroom video clips, lesson plans, articles, discussion, and presentation.

Investigate the implications of those non-negotiables for classroom practice.

Leave with strategies for developing more challenging and responsive heterogeneous classrooms.



Thursday Keynote

Dr. Adolph Brown - *Use Core Competencies Needed for Success and Combine Academic and Citizenship*

Dr. Adolph Brown is the Founder, President, and CEO of The Leadership & Learning Institute. As a former public school educator & credentialed administrator, full tenured university professor, university dean & businessman, Dr. Brown has studied and worked along side highly successful leaders and educators. He has taken his over 25 years experience and has developed core competencies that are expressed in everything successful business leaders and educators do.

This keynote will explore the pedagogy of the marginalized, while exposing hidden biases. This talk will bridge the "academic curriculum" of reading, writing, and arithmetic with the "citizenship curriculum" of a student's personal classroom experiences.

Friday Keynote

Dr. Carol Tomlinson - *Differentiation and Brain Research*

In this session, Dr. Tomlinson will talk about the key principles of differentiation and how they are connected to brain research.

Friday Keynote

Jon Bergmann - *Flip Your Classroom: Reach Every Student In Every Class Every Day*

Learn from Flipped Classroom Pioneer Jon Bergmann as he walks through his transformation from a twenty year lecturer to a flipped class pioneer. He will take you on his journey and show how the flipped class can transform today's educational climate. The Flipped Class allows teachers to have more face-to-face time with students, allows for real differentiation, causes student to take responsibility for their learning, and allows students to master material.

Saturday Keynote

Dr. Diandra Leslie-Pelecky - *How to Include STEM in Your Curriculum*

Science, technology, engineering, and mathematics play a unique role in motorsports. While other sports can be analyzed for STEM themes after the fact, racing is one of the few sports in which you must get the science, math, and engineering right in order to win. Motorsports are also unique in showcasing engineers on television, radio, and on the web, thus providing role models for those students constantly asking, "When am I ever going to use this?" Join Dr. Diandra Leslie-Pelecky as she introduces some existing classroom resources and addresses the biggest challenge in using real-life situations to teach STEM topics: What to do when the approximations and simplifications are non-negligible as they are on a racetrack.

Saturday Keynote

Andrés Ruzo - **Geoscientist** - **A National Geographic Young Explorer Grantee.** Andrés works to promote the use of geothermal as an alternative energy source. Andrés will share his adventures traveling around the world as he studies geology and collects data. His work is inspiring and demonstrates how real science can benefit local and global communities.



Get Ready For PDI 2014:

November 19-22, 2014

Hotel Roanoke, Roanoke, Virginia



PDI Theme 2014: Sparkling Innovation: Enhancing Student Learning

Innovation has been defined as people using their imagination, experience, curiosity, instincts and relationships to develop and implement ideas that create value. With the rise in emphasis in S.T.E.M. career fields and the need to have more students go into these careers, educational experts have pointed out the key ingredient needed is education.

Fostering the ability for students to be innovative begins with changing our mindset on how we do science. The experience we give students can foster curiosity or crush it. Do we support students and equip them to see the learning in failure or do students walk away seeing failure as the end result. This year's professional development institute will allow teachers to share best practices, celebrate accomplishments, and discuss new learning and teaching practices to enrich student learning experiences so Virginia science educators can develop the next generation of innovative scientists.

Hotel Information!

For information on hotel and travel to this year's conference, go to:

<http://www.vast.org/hotelinfo.html>

We Need You! Submit Your Proposal to Present today!

Share your good ideas! Submit a session proposal for the 2014 VAST PDI! Click here to submit.

https://docs.google.com/forms/d/1njhPjRLLyOSSIRDv-KVfUl-9QYFQ0PP4yE8NRBYUjmQI/viewform?usp=sharing&edit_requested=true

Proposals must be submitted by April 20

Late proposals will be considered on a space-available basis. Presenters will be notified by August 1, 2014, of the status of the proposals. A special discounted rate is provided for up to four presenters per session, however, all presenters are required to register for the PDI by September 5, 2014 to qualify for the reduced rate. Presenters will receive registration information via email in August. Note: Commercial presenters must be registered as exhibitors.

<http://www.vast.org>

Deadline for submission: APRIL 20, 2014!

For more information on presenting at the conference and to find details on the conference strands, click here.

<http://www.vast.org/presenters.html>

VAST Advocacy



VAST Advocacy builds on VAST's Mission statement which in part says: "VAST is a comprehensive educational organization dedicated to the nurturing and advancement of superior science education." Your organization with your input is a voice for Virginia Science teachers. The VAST Advocacy committee uses its time, energy, experience, and knowledge to educate and influence governmental bodies and other organizations to bring about changes in laws, policies, and programs for the benefit of high quality science education in Virginia. Virginia Association of Science Teachers as a 501.3c

organization is nonpartisan and does not involve itself in supporting individual candidates or parties financially or otherwise.

If you want to stay informed and involved, please visit the VAST web site for the most current information.

<http://www.vast.org/advocacy.html>

The VAST Advocacy page provides background information and concerns about current legislative and other policy issues. Please visit the page often.

Life Science Educators: Your Opportunity to be Recognized! Outstanding Biology Teacher Award: Virginia

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.

In addition, Virginia OBTA's are recognized at the VAST Annual PDI and at the annual Virginia Association of Biology Teachers Conference. Deadlines follow. For an application, please contact Kathy Frame: - chuckframe@aol.com

March 31 - Virginia OBTA Nomination Deadline

May 7 - Recommendation Forms, Candidate Record Forms, and Supplementary Candidate Forms be completed by interested teachers and returned to: **Kathy Frame, VA OBTA Director - 13112 Nestlewood Court - Oak Hill, VA 20171**

June 15 - Selection of OBTA recipient

June 22 - VA OBTA Recipient Notification

The National Association of Biology Teachers (NABT) recognizes outstanding life science educators and their students through 15 awards. Though NABT membership is always encouraged both for nominator and nominee, certain awards have specific requirements for membership. Please visit <http://www.nabt.org/websites/institution/index.php?p=631> for a complete list and to check those requirements for your specific award category. Most award deadlines are March 15.

Update on Modeling Instruction Content Teaching Academies at James Madison University

Thanks to support from the Virginia Department of Education, James Madison University, and school divisions statewide, Modeling Instruction Training for Physics, Chemistry, Biology, and Physical Science will return to the JMU Content Teaching Academy in 2014. This year both Introductory and Advanced academies will be offered. The program was recently featured in state and local media: <http://goo.gl/OOyBlf>

Contact Joe Mahler for additional information at joe.m.mahler@gmail.com.

The VIP Spring Meeting

The Virginia Instructors of Physics are hosting their annual spring meeting on April 26th 2014, 8 AM-3 PM

Events will include the annual business meeting, elections, general share session, lunch on the Corner, and an afternoon Make & Take.

Southeastern Section meeting of the Geological Society of America

You are invited by the to participate in the Southeastern Section meeting of the Geological Society of America. The meeting is being hosted this April in Blacksburg, VA. For a list of field trips and more information please go to:

<http://www.geosociety.org/sections/se/2014mtg/fieldTrips.htm>

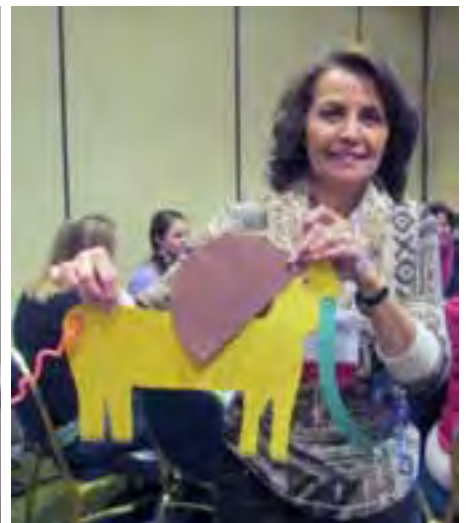
Teachers as Students, and Then as Teachers Again, Oh My!

Shirley Sypolt

As all of you already know, teaching is all about taking classes, learning new things, and then taking the time to share those experiences with your students and even with other teachers and/or administrators. This adventure started last summer when I took a James Madison University course at my school called ISAT 501 Workshop in Technology: Children's Engineering. Throughout this course, professors from JMU shared their expertise in incorporating STEM experiences into the elementary classroom. As the adult students in this class, we had a great time learning how to write design briefs (from scratch) and how to make simple levers and linkages and simple pneumatic systems to add movement to models that we had created. We also learned how to do numerous types of pop-ups that turned simple projects into very creative/interactive models and how to use simple tools for crafting our products. After completing the JMU summer course I found myself redoing my teaching methods with my 2nd graders this school year by combining more skills from different subjects into numerous STEM challenges. It is amazing to see how involved and how

creative and adventuresome these young boys and girls are becoming and the best part is that it's not an "add-on to the curriculum," instead it's something to do "in a better way" to promote student understanding and learning.

I had the pleasure recently of being a presenter at the Virginia Children's Engineering Convention in Richmond on February 20 & 21st. While there, I presented a STEM design challenge that I had created during my summer course called Adaptation Artistry- STEM, which I had adapted from the Project WILD activity, Adaptation Artistry. Attendance in this session was phenomenal and it was awesome to see how involved all the teachers and administrators were at designing and making his/her own animal adapted to a futuristic environment. Participants were totally involved in making their animals and did an awesome job of showing their animal creations to the whole group and explaining the various physical adaptations his/her animal had for surviving in a futuristic/polluted environment. Participants even had fun "making up very creative scientific names" for their animals.



Presenting at this conference was an awesome opportunity for me to connect with teachers and administrators from across the state of Virginia. Please try this activity with your students and feel free to “adapt” it to suit your children and your grade level. I am sharing the entire design brief with you and would love to hear back from you if you incorporate this challenge into your teaching. I’d also love to see some

pictures of you doing this activity with your students. You can email me at ssypolt@hampton.k12.va.us and a couple of pictures here

Shirley Sypolt
VAST President
Cooper Magnet Elementary School, Hampton,
Virginia

For the complete lesson with a guided portfolio of handouts and evaluation rubric, go to :
<http://vast.org/Adaptation ArtistrySTEMWeb.pdf>

Adaptation Artistry - STEM



Design Brief Background:

We have studied animal adaptations and the physical changes that animals need to undergo in order to adjust to their living and nonliving environment. We’ve also studied how habitats can change over time due to many influences. You now have the opportunity to show that you understand the difference between physical and behavioral adaptations.

Challenge:

It is now 100 years in the future and humans have not treated the Earth kindly. They have not recycled, reused, or reduced the amount of garbage and the Earth is littered with lots of trash. You will work with a partner to design and create an animal that has adapted to living in this type of polluted environment. You will present your animal to the class, telling us about the physical adaptations your animal has and how these adaptations help your animal survive in its futuristic environment.

Criteria:

Your animal must:

- o have at least 4 physical adaptations
- o have at least one moveable body part
- o be between 10” - 18” in length and height
- o create an index card with your name, your animal’s common name, scientific name, a list of its physical adaptations

- o be able to describe how each adaptation helps your animal survive
- o be neat and creative

Materials:

- | | |
|----------------------|---------------------------|
| * construction paper | * small boxes, containers |
| * craft sticks | * paper fasteners |
| * tape, glue | * recyclable materials |

Tools:

- scissors
- ruler
- crayons, writing utensils

.....

Science SOL – 2.7a The student will be able to describe physical adaptations that help animals adapt to seasonal changes

Science SOL – 2.5a The student will be able to describe how living organisms are interdependent with their living & non-living environment

Science SOL – 2.5c The student will be able to identify how habitats can change over time due to many influences

SLT -7 The attributes of design

- adapted from the *Adaptation Artistry* activity, Project WILD K-12 Curriculum & Activity Guide



The Young Scientist Challenge

<http://www.youngscientistchallenge.com/>

On October 8, 2013, 10 middle school students from around the country delivered a presentation in front of a live web audience, about the research project that they had been working on, with 3M scientist mentors, for the past 6 months. This was the culmination of a two-day gathering that tested the students' ability to work in groups (that included taking and giving advice/criticism), as well as communicate their ideas and findings.

The Discovery Education/3M Young Scientist Challenge was held in St. Paul Minnesota at the 3M Innovation center, which is a showcase of the lifeblood of 3M. This facility with its design to foster innovation and generous room allowed the students to work on challenges separate from their research and gave them the opportunity to collaborate with fellow students and research scientist from 3M.

I had the opportunity to attend and to serve as a judge of these students in their various challenges, and was impressed through and through! Our hosts, Discovery Education and 3M were very generous and gave every support imaginable to the judging process. 3M's innovation center was an absolutely amazing facility filled with approachable scientists that were as excited to share what their work entailed, as we were to see it. The students were such a great group of youngsters that I just grin when I

think about their excitement, curiosity, and desire to dig and ask questions. It truly was an honor to be in the midst of these students and in them I have complete faith in the brightness of our future. My fellow judges were an impressive and professional group that I was humbled to serve with. They came from across the country with varied backgrounds and a love for science as well as a willingness to give of their time and energy in a most professional manner to assist in this event.

The Discovery Education 3M Young Scientist Challenge is an innovative competition that gets at the heart of what the modern scientist is. I would encourage you to research this competition at YoungScientistChallenge.com and encourage your students to follow their questions and perhaps they too can have their day to explain their research in front of a live web audience.

--Julian Barnes,
2013 Young Scientist Challenge Judge

Julian Barnes, VAST Vice President
Coordinator of Science
Roanoke County Schools
vice.president@vast.org

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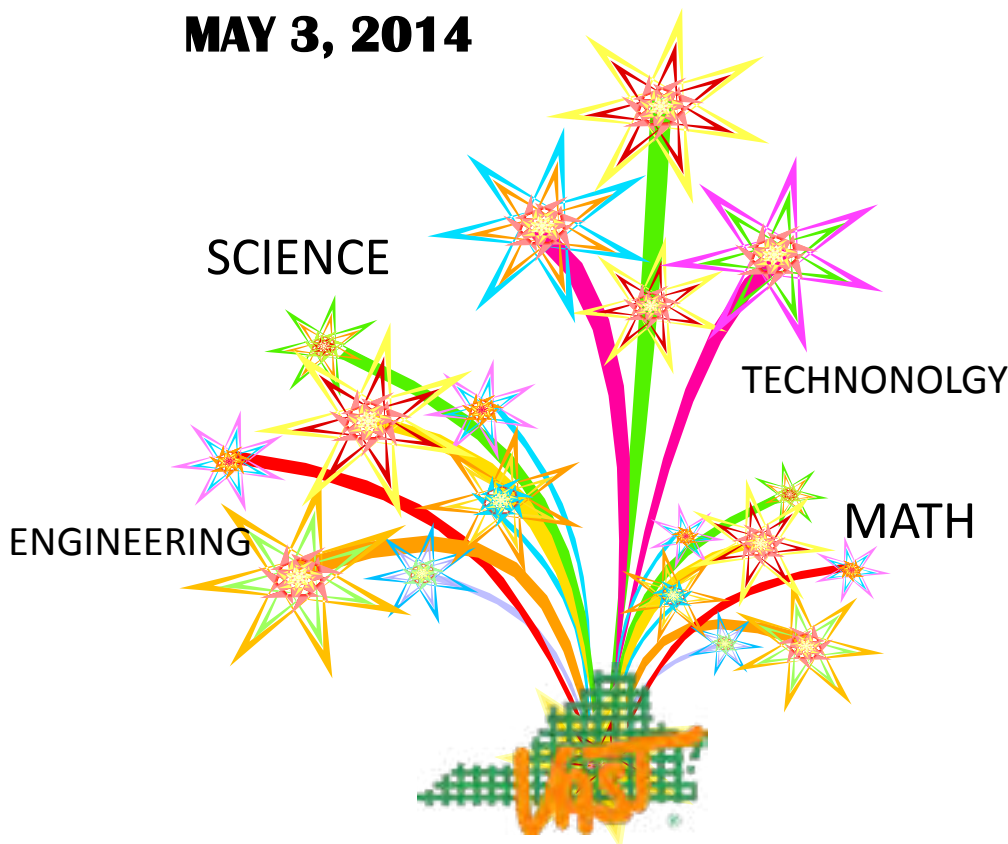
VAST Regional Reports



Region III:

SAVE THE DATE!!

MAY 3, 2014



**VAST Region 3
Professional Development Conference
May 3, 2014
UMW Grad. Center, Stafford VA**

*Come **SPARK** your learning with Hands-on and Minds-on approaches
featuring **S.T.E.M.**!*

More info check out VAST Region 3 on Facebook
or contact

Sherrie rolandsl@staffordschools.net
Leslie Laustenla@staffordschools.net



Sherrie Roland and Leslie Lausten
Region III Directors
region3@vast.org

Region I

Region I

Held a Regional Meeting
January 14th 2014 @ MSiC 8:30
am-1:00 pm

Kim L. Dye,
VAST Region I Director
region1@vast.org

Region II:

Region 2 has a new Facebook
page. Please visit and join our
community at:

www.facebook.com/Region2VAST

A great recertification opportunity
for Region 2 public school science
teachers has been made available.
Dr. Maynard Schaus, Virginia
Wesleyan College NS&M Division
Chair and Professor of Biology, is
offering a field experience to Belize
Marine TREC on Ambergris Caye.
The trip is during the 2015 summer
semester. If you have any questions
or need more information, please
contact Dr. Schaus at:

mschaus@vwc.edu

Adrienne Sawyer
Region II Director
region2@vast.org

Region IV:

March 22nd is the 24th annual
"Girls + Math + Science =
SUCCESS!" Conference. It's a
STEM careers conference for
students in grades 5-12 and the
adults in their lives that includes
both traditional and non-tradi-
tional roles in STEM areas and
strategies for adults to support
their children's aspirations while
emphasizing the important role
STEM subjects have in every
student's education.

Susan Bardenhagen
Region IV Director
region4@vast.org

Be An Active VAST Member!

How can you be more involved in VAST? Why not contact one of the Directors and ask if you could serve on a committee that matches your interests.

<http://www.vast.org/board-information.html>

As you scroll down the VAST Board page on the web, you will find the Regional Directors. Contact the one who leads in the area where you live and/or teach. The emails are listed and they would love to make contact with you.

If you would prefer to work towards your curriculum level or subject area, you will find these Directors listed also with their emails. We are looking for new ideas and more ways to increase communication, expertise and experience. You may be just the expert we need to move VAST forward. We promise you will find your efforts valued.



Join the VAST community on line. "LIKE" the **Virginia Association of Science Teachers** so the latest science educational news will appear on your page.



Fishing for STEM



There is a new STEM activity related to the history of fishing on the Virginia Department of Game and Inland Fisheries website. With very few mosquitoes, normally warm spring weather and hungry fish, March is normally a great month for fishing.

To download the lesson, the link is:

<http://www.dgif.virginia.gov/education/fishing-to-survive.pdf> or just go to www.dgif.virginia.gov/education and scroll down and it under the *Wild About Math* booklets.

The objectives of the lesson are:

Students will:

- 1) investigate historic and modern methods of fishing;
- 2) develop a method to catch fish using found objects based on a scenario and
- 3) use an interdisciplinary approach to solving a problem/issue.

Suzie Gilley
Wildlife Education Coordinator /
Project WILD State Coordinator
VA Dept of Game and Inland Fisheries



VAST Mini-grant Program Accepting Applications for 2014

Got an innovative idea that needs some seed money? The VAST Awards and Grants committee is now taking applications for the 2014 Mini-grant program.

The VAST grant program includes the VAST Education Mini-grant, the Tidewater Alliance of Chemistry Teachers' (TACT) Chemistry Education Mini-grant, and the American Institute of Professional Geologists (AIPG) Mini-grant.

Team applications are welcome, however one person must be designated as the Project Director. To qualify for the Mini-grant program, the Project Director must a) be a current member of VAST (dues paid for 2014), b) have a minimum of three years of experience as an elementary or secondary science classroom teacher, and c) be currently employed as a classroom teacher in the Commonwealth of Virginia.

The Awards and Grants committee is looking for projects that will directly impact student learning in the science classroom. Proposals will be evaluated the originality, creativity, and cost effectiveness of the proposals. Ideally, the projects that are funded will provide the students with new experiences and make possible new scientific investigations.

Mini-grant funds may be spent for supplies, equipment, printing, and other materials essential to the project. Mini-grant funds are not intended for student travel (field trips) or for the personal remuneration of the grant recipients. All materials will become the property of the school/school system in which the Project Director is employed at the time the grant is awarded.

The deadline for submissions is June 1, 2014. The applications are available on the VAST website:

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

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

Timothy Couillard
Awards and Grants Committee Chair

The Virginia Mathematics & Science Coalition Announces the Winners of the 2014 Programs that Work Awards

The Virginia Mathematics & Science Coalition is pleased to announce the winners of the 2014 Programs that Work Awards. This prestigious award yearly recognizes exemplary mathematics, science, and integrated science, technology, engineering, and

mathematics (STEM) programs for which there is evidence of a positive impact on student or teacher learning. The eleven 2014 award-winning projects from across the state were recognized on January 13, 2014, in Richmond, VA, at the Virginia General Assembly Building and at the Library of Virginia.

The eleven winning 2014 Programs that Work awardees included:

Awardee	Title of the Program	Type of Program
Spotsylvania County Public Schools	Mad About STEM	Teacher and Student – Middle School
VA Space Grant Consortium	Virginia Aerospace Science and Technology Scholars	Student – High School
Randolph College	Randolph College Science Festival	Community
James Madison University, Department of Geology & Environmental Science	Bachelor of Arts in Earth Science	Student – Higher Education
Loudoun County Public Schools	STEM Summer Camp	Student – Elementary School
Albemarle High School, Albemarle County Public Schools	Math Engineering and Science Academy	Student – High School
Providence Elementary School, Fairfax County Public Schools	Providence STEM Lab	Student – Elementary School
Hartwood Elementary School, Stafford County Public Schools	Engineering Lab and Design Studio	Student – Elementary School
Edward E. Drew, Jr. Middle School, Stafford County Public Schools	Meaningful Watershed Experience	Student – Middle School
Virginia Commonwealth University, College of Humanities & Sciences	Virginia Mathematics Specialist Program	Teacher
Gloucester High School, Gloucester County Public Schools	Gloucester High School STEM Team	Student – High School

Programs that Work awardees are recognized in mathematics, science, and integrated STEM in the areas of student programs and teacher education programs. Programs must be focused on one or more STEM areas and applicants are evaluated on the extent to which the program:

- represents innovative, exemplary programs that have proven effective with all students or teachers;
- demonstrates the important science, mathematics, and/or STEM concepts, skills, and processes students and teachers learned as a result of the program; and
- Documents the impact of the program on teaching and learning of the science, mathematics, and/or STEM concepts.

Programs that Work awardee programs must have been conducted for a minimum of two full years, must include an evaluation component, and must demonstrate that the program is sustainable and can be replicated by others.

The Programs that Work Awards program has been conducted by the Virginia Mathematics & Science Coalition for 10 years.

The Virginia Mathematics & Science Coalition (VMSC) is a private, nonprofit 501 (c) (3) organization dedicated to achieving excellence in mathematics and science education for Virginia's K-12 and higher education students.

The Coalition has a board of 30 members representing corporate, educational, governmental, non-profit and scientific institutions. A support staff provides additional expertise and increases geographical and educational diversity. Collaboration with other organizations provides strong links for addressing ongoing mathematics, science, and STEM educational concerns.

Currently, Coalition members are involved with more than \$50 million in grants from national, state and regional funders. These grants involve many of Virginia's public institutions of higher education and almost every school district in the state, with several districts linked to multiple grants.

VAST Biology Section

Kathy Frame, VAST Biology Committee Chair

All things biology are at your fingertips through the VAST Biology Section! VAST members receive periodic updates in the latest curriculum, biological research, and issues related to teaching the life sciences; content updates; PDI opportunities; and student mentorships, internships, national competitions, and summer study and research opportunities via the VAST Newsletter, Tweets, Website, and E-blasts.

Through the Biology section, members are asked to respond to issues in the classroom related to biology teaching and to represent the state of Virginia at the national level in biology-related organizations, such as the Ecological Society of America and National Association of Biology Teachers (NABT). Each year, the NABT identifies a Virginia life science teacher for its coveted Outstanding Biology Teacher Award (OBTA). OBTA winners are recognized at the state level at the annual VAST PDI and at the national level at the NABT National PDI. On a state level, the VAST Biology Section connects directly with the Virginia Association of Biology Teachers (VABT) to offer content specific professional development, field trip opportunities, and other resources.



Back view of the home of a person who is frequently in biology news headlines.

For more information, visit:

<http://www.english-heritage.org.uk/daysout/properties/home-of-charles-darwin-down-house/>



Aerial view of the Smithsonian Biological Conservation Institute. For more information, visit: <http://nationalzoo.si.edu/scbi/>

International Smithsonian Biological Conservation Institute - This year September 12 to 14, VABT will host with the VAST Biology section and VAST Region IV a three-day program at the International Smithsonian Biological Conservation Institute at the Blanding Experimental Station in Front Royal, VA. Through this conduit, VAST is able to introduce the life science teachers of Virginia to the many resources and contacts that enrich their teaching and their students' appreciation for the field of biology and the opportunities of being a VAST member.

Consequences: From Darkness to Light



Cellist, Vedran Smailović, plays amid the destruction of the National Library, Sarajevo, 1992.



Pakistani schoolgirl, Malala Yousafzai, youngest person ever nominated for a Nobel Peace Prize.

To whoever is not listening to the sea
this Friday morning, to whoever is cooped up
in house, office, factory or woman,
or street or mine or harsh prison cell:
to him I come, and, without speaking or looking,
I arrive and open the door of the prison,
and a vibration starts up, vague and insistent,
a great roar of thunder sets in motion
the rumble of the planet and the foam,
the groaning rivers of the ocean rise,
the star vibrates swiftly in its corona,
and the sea beats, dies, and goes on beating.

So, drawn on by my destiny,
I ceaselessly must listen to and keep
the sea's lamenting in my consciousness

I must feel the crash of the hard water
and gather it up in a perpetual cup
so that, wherever those in prison may be,
wherever they suffer the autumn's castigation,
I may be present with an errant wave,
I may move passing through windows,
and hearing me, eyes may lift themselves
saying "How can I reach the sea?"
And I shall broadcast, saying nothing,
the starry echoes of the wave,
a breaking up of foam and quicksand,
a rustling of salt withdrawing itself,
the grey cry of sea-birds on the coast.

So, through me, freedom and the sea
Will call in answer to the shrouded heart.

—The Poet's Obligation
by Pablo Neruda

Well before dawn, whose arrival he seemed determined to announce, the mockingbird's silvery cadence had wakened me from a light sleep. Aptly named *Mimus polyglottos* by taxonomists who know such things, this avian spirit called in the darkness, seeming too importunate to be simply written off by a genetic code. "Listen to me, listen to the deeper voices, listen to others, listen within you, listen beyond you... Listen. Listen as deep as the deepest ocean depths, listen as high as you can imagine – without bounds, without restriction... listen to unsung voices, listen to the children, listen to the sea, listen to "the rumble of the planet and the foam..." listen as "the star vibrates swiftly in its corona," beyond the science of diffraction and distracting exactitude.

Listen to the "starry echoes of the wave...the rustling of salt withdrawing, the grey cry of the sea-birds on the coast." For we carry the sea in our veins, the chemistry of our evolution and our connectedness.

Listen to the wisdom and the hope in the lives of people like Vedran Smailović and Malala Yousafzai.

On May 27, 1992 during the Bosnian War, starving townspeople in Sarajevo were waiting in a long line outside a bakery when a mortar exploded in their midst, shattering bones and bodies along with brick and mortar and stones: 22 lives vanished.

continued

Something between despair and hope filled the heart of a young musician who had witnessed the devastation from his window in the square. Vedran Smailović, a cellist with the Sarajevo Opera, would walk out into the rubble at 4 pm in full concert attire for the next 22 days and play in honor of those who perished and for those who survived. With burned out buildings and charred vehicles and terrified townspeople, with bombs and bullet flying, Vedran Smailović played pieces like Tommaso Albinoni's *Adagio in G Minor* from heart to heart, from soul to soul, because he listened to the depths, the hearts, the fears – and the hopes – of those whose lives had been lost.

Because he listened and responded to this brave musician's tribute to what is right and decent, even in the midst of wartime cruelty, British composer, David Wilde, wrote a piece for solo cello, *The Cellist of Sarajevo*. As writer and musician Paul Sullivan put it¹, Wilde "poured his feelings of outrage, love, and brotherhood" into his composition which was first performed by cellist Yo-Yo Ma at the International Cello Festival in Manchester, England, in April of 1994. In the audience sat Vedran Smailović whose story and response from Yo-Yo Ma brought tears, clapping, shouting, cheering from the audience in what Sullivan described as an emotional frenzy. He concluded his account: "Whether we create it or simply listen, music is a gift that can soothe, inspire, and unite us, often when we need it most – and expect it least."

"So, drawn on by my destiny, / I ceaselessly must listen to and keep / the sea's lamenting in my consciousness."

Twenty years later, on October 9, 2012 at the age of 15, Malala Yousafzai was riding to school in the back of a small truck over the muddy and irregular Haji Baba Road in Mingora in Pakistan's beautiful Swat Valley, near the Afghan border. Ever since she was 11, she had joined her father as an outspoken advocate for schooling for girls. She and friends had been attending the Khushal Girl's High School and College, hidden away behind an innocuous doorway in a wood-cutters enclosure. For, despite Pakistan's army having driven the Taliban from the area in 2009, there remained a significant number of terrorists and raiders to frighten and intimidate the population. The Taliban's harsh interpretation of Islamic law banned many personal freedoms, including music, dance, and schooling for girls and banished women from public without their husbands or fathers. Enforcement included brutalities like public beatings, torture, even beheadings. Malala's family was always under pressure and threat, including her father's close friend who had been shot in the face the preceding August.

Thinking the Taliban would never come for a small girl, even after her pickup had been stopped by two masked men in the road, Malala nevertheless found herself the victim of a gunshot through her left eye socket and shoulder from the trembling hand which wielded the revolver. Flown to England, after weeks of surgery and recovery, Malala emerged more energized than ever. After being the youngest person ever nominated for a Nobel Peace Prize, she addressed the United Nations Youth Assembly in July of 2013 on her 16th birthday. Here is a little of what she said:

"They will not stop me...I don't mind if I have to sit on the floor at school. All I want is an education. And I am afraid of no one... The terrorists thought that they would change my aims and stop my ambitions, but nothing changed in my life except this: Weakness, fear, and hopelessness died. Strength, power, and courage were born. I am the same Malala. My ambitions are the same. My hopes are the same, and my dreams are the same...So let us wage a global struggle against illiteracy, poverty, and terrorism, and let us pick up our books and pens. They are our most powerful weapons. One child, one teacher, one book, and one pen can change the world."

Decades earlier, the anthropologist, Margaret Mead, had said much the same thing: "Never doubt that a small group of thoughtful, committed people can change the world. Indeed, it is the only thing that ever has."

"So, through me, freedom and the sea / Will call in answer to the shrouded heart."

Like Margaret Mead and others, Parker J. Palmer was a recent recipient of the William Rainey Harper Award for his distinguished writing. An educator of the heart as well as the mind, Palmer is author of nine books, including the Tenth Anniversary Edition of *The Courage to Teach* and his newest volume, *Healing the Heart of Democracy*. Here he lists five habits of the heart which he finds essential to democracy²:

- We must understand that we are all in this together.
- We must develop an appreciation of the value of "otherness."
- We must cultivate the ability to hold tension in life-giving ways.
- We must generate a sense of personal voice and agency.
- We must strengthen our capacity to create community.

Common to all of these habits of the heart is the thread of listening, deeply listening and responding to our physical and emotional need for community and connectedness – the sort of thing that disruptions due to flood or snowfall can bring out as we work with neighbors (whom we may not even know) to help and repair and rebuild. All of these habits of the heart are present in the responses of Vedran Smailović and Malala Yousafzai to threats or disaster.

Aside from the muscular military responses to conflict (whether Vietnam, Iraq, or presently Russia and the Ukraine), there are economic, social and environmental responses arising from conflicts of interest which we face when the first two habits are ignored. This can take the form of ocean fishing rights, political tensions which are decidedly not life-giving (Egypt, Syria, Iran, Israel/Palestine, China/Tibet/Uyghurs), or disregard for the global effects of energy exchange. In 2007 *The New York Times* began an article on the deadly extremes of China's pollution: "No country in history has emerged as a major industrial power without creating a legacy of environmental damage that can take decades and big dollops of public wealth to undo." For instance, there is controversy between the coal industry in Powder River Basin in Wyoming and the governors of Washington State and Oregon about shipping coal across the Northwest to the proposed

continued

world's largest coal shipping port in order to send the fuel to China. Meanwhile, Australia approved construction of one of the world's largest ports capable of sending 10,150 coal freighters per year across the Great Barrier Reef by 2020. This is assuredly not what Palmer has in mind for the first three habits of the heart. These three habits are supported by four factors Palmer identifies as central to human cultural evolution: language, art, religion, and education. These civilizing factors all require of us an unusual amount of attentiveness: deep listening. Palmer emphasizes the work of Shelly Taylor (*The Tending Instinct*, 2003) where the so-called "fight or flight" instinct with its kill-or-be-killed metaphor is replaced, or at least supplemented, by a "friend and befriend" response to stress. As he reflects on the observation of Alexis de Toqueville (*Democracy in America*) 150 years ago, Palmer comments on the social effects of the controlling power of industrialization and centralization over the decentralized agrarian society of 19th Century America. Toqueville imagined a condition of the "privatized individual" we see so much today:

"Each [person], living apart, is a stranger to the fate of all the rest; his children and his private friends constitute to him the whole of mankind. As for the rest of his fellow citizens, he is close to them, but he does not see them; he touches them but he does not feel them; he exists only in himself and for himself alone; and if his kindred still remain to him, he may be said at any rate to have lost his country."

Consequences: think *sequence, sequential, sequel, non-sequitur* – the Latin reminds us of following along with or after an event. How difficult it is, especially today, to anticipate the results which follow along after our often well-intended actions. Consequences harbor both threat and promise, it seems, along with the unintended. Today this has both local and global implications, decidedly negative when we do not cultivate habits of the heart. We destroy people, sometimes literally, when we ignore them or deny our instinct to friend or befriend.

The Poet's Obligation – the teacher's obligation – resonates with those deeper chords in the instrument of our minds and hearts. Vedran Smailović and Malala Yousafzai speak from beyond Sarajevo or Pakistan, would we only listen.

Listen to the sea within us.

"I ceaselessly must listen to and keep the sea's lamenting in my consciousness...
So, through me, freedom and the sea
Will call in answer to the shrouded heart."

The Buddha's last words: Make of yourself a light.

Acknowledgments:

1. Sullivan, Paul. 1996. "The Cellist of Sarajevo." *Hope Magazine*, March/April.
2. Palmer, Parker J. 2011. *Healing the Heart of Democracy: The Courage to Create a Politics Worthy of the Human Spirit*. San Francisco, CA: Jossey-Bass.

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

Nominations Open for the 2014 VAST RISE Awards

Know someone doing fantastic work in the Science Education field?

The Virginia Association of Science Teachers is now seeking nominations for the 2014 VAST Recognition In Science Education (RISE) awards.

VAST recognizes excellence in the following categories:

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

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

Awardees will be recognized at the November 2014 VAST PDI and will be reimbursed up to \$150 to attend the VAST PDI. The deadline for nominations is August 20, 2014.

Nomination forms are available on the VAST website: <http://www.vast.org/vast-awards.html>

We look forward to recognizing the wonderful work done in our Science Education community!

Timothy Couillard, VAST Awards and Grants Committee Chair

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

NASA and JAXA Launch New Satellite to Measure Global Rain and Snow

Steve Cole, NASA Headquarters

The Global Precipitation Measurement (GPM) Core Observatory, a joint Earth-observing mission between NASA and the Japan Aerospace Exploration Agency (JAXA), thundered into space at 1:37 p.m. EST Thursday, Feb. 27 (3:37 a.m. JST Friday, Feb. 28) from Japan.

The four-ton spacecraft launched aboard a Japanese H-IIA rocket from Tanegashima Space Center on Tanegashima Island in southern Japan. The GPM spacecraft separated from the rocket 16 minutes after launch, at an altitude of 247 miles (398 kilometers). The solar arrays deployed 10 minutes after spacecraft separation, to power the spacecraft.

“With this launch, we have taken another giant leap in providing the world with an unprecedented picture of our planet’s rain and snow,” said NASA Administrator Charles Bolden. “GPM will help us better understand our ever-changing climate, improve forecasts of extreme weather events like floods, and assist decision makers around the world to better manage water resources.”

The GPM Core Observatory will take a major step in improving upon the capabilities of the Tropical Rainfall Measuring Mission (TRMM), a joint NASA-JAXA mission launched in 1997 and still in operation. While TRMM measured precipitation in the tropics, the GPM Core Observatory expands the coverage area from the Arctic Circle to the Antarctic Circle. GPM will also be able to detect light rain and snowfall, a major source of available fresh water in some regions.

To better understand Earth’s weather and climate cycles, the GPM Core Observatory will collect information that unifies and improves data from an international constellation of existing and future satellites by mapping global precipitation every three hours.

“It is incredibly exciting to see this spacecraft launch,” said GPM Project Manager Art Azarbarzin of NASA’s Goddard Space Flight Center in Greenbelt, Md. “This is the moment that the GPM Team has been working toward since 2006. The GPM Core Observatory is the product of a dedicated team at Goddard, JAXA and others worldwide. Soon, as GPM begins to collect precipitation observations, we’ll see these instruments at work providing real-time information for the scientists about the intensification of storms, rainfall in remote areas and so much more.”

The GPM Core Observatory was assembled at Goddard and is the largest spacecraft ever built at the center. It carries two instruments to measure rain and snowfall. The GPM Microwave



GPM lifts off to begin its Earth-observing mission.
Image Credit: NASA/Bill Ingalls

Imager, provided by NASA, will estimate precipitation intensities from heavy to light rain, and snowfall by carefully measuring the minute amounts of energy naturally emitted by precipitation. The Dual-frequency Precipitation Radar (DPR), developed by JAXA with the National Institute of Information and Communication Technology, Tokyo, will use emitted radar pulses to make detailed measurements of three-dimensional rainfall structure and intensity, allowing scientists to improve estimates of how much water the precipitation holds. Mission operations and data processing will be managed from Goddard.

“We still have a lot to learn about how rain and snow systems behave in the bigger Earth system,” said GPM Project Scientist Gail Skofronick-Jackson of Goddard. “With the advanced instruments on the GPM Core Observatory, we will have for the first time frequent unified global observations of all types of precipitation, everything

from the rain in your backyard to storms forming over the oceans to the falling snow contributing to water resources.”

“We have spent more than a decade developing DPR using Japanese technology, the first radar of its kind in space,” said Masahiro Kojima, JAXA GPM/DPR project manager. “I expect GPM to produce important new results for our society by improving weather forecasts and prediction of extreme events such as typhoons and flooding.”

The GPM Core Observatory is the first of NASA’s five Earth science missions launching this year. With a fleet of satellites and ambitious airborne and ground-based observation campaigns, NASA monitors Earth’s vital signs from land, air and space. NASA also develops new ways to observe and study Earth’s interconnected natural systems with long-term data records and computer analysis tools to better see how our planet is changing. The agency freely shares this unique knowledge with the global community and works with institutions in the United States and around the world that contribute to understanding and protecting our home planet.

For more information about NASA’s Earth science activities this year, visit:

<http://www.nasa.gov/earthrightnow>

For more information about GPM, visit:

<http://www.nasa.gov/gpm> and
http://www.jaxa.jp/projects/sat/gpm/index_e.html

Dominion Inspires Young Tree-Planters with Project Plant It!

This spring, thousands of future environmentalists are learning about trees and their many important benefits to the ecosystem with Dominion's Project Plant It! program.

Nearly 30,000 elementary students throughout Virginia will participate in the free program geared towards children who are bursting with curiosity about the natural world. Project Plant It! provides a variety of educational activities, both inside the classroom and outdoors, for students to get up-close and personal with one of Mother Nature's most versatile inhabitants.

In fact, as all science teachers know, trees are the ultimate multi-taskers: They make oxygen and clean air, provide shelter for birds and wildlife, prevent soil erosion and can be strategically planted to help reduce heating and cooling costs, among other attributes.

The cornerstone of the program is the distribution of a redbud tree seedling to each participating student to plant in honor of Arbor Day, which is typically the last Friday in April. "The redbud is native to Virginia and grows well throughout the state," said Paulin Cheatham, Project Plant It! spokesman for Dominion, the parent company of Dominion Virginia Power. "It is one of the first trees to bloom in the spring and is easily identified by its beautiful pink blossoms and distinctive red-tinged leaves."

The science lesson plans in the Teacher's Guide for Project Plant It! support the state standards of learning in this subject. Some of the educational and interactive topics include: Know Your Tree Terminology, Tree-Tac-Toe, Identify the Parts of a Tree, Identify the Parts of a Leaf, Planting a Tree and Understanding Energy, among others.

"Each and every year, Project Plant It! continues to effectively engage students by connecting them with nature," said Jo McElwain of the Arbor Day Foundation. "Project Plant It! puts Eastern Redbud trees into the hands of the next generation of tree-planters who will always cherish the memory of planting a tree and watching it grow."

The Arbor Day Foundation, which inspires people to plant, nurture and celebrate trees, has partnered with Dominion's Project Plant It! since the program was established in 2007. This organization is responsible for planting, growing, packaging and shipping the more than 250,000 tree seedlings that have been distributed to students in several states where Dominion conducts business.

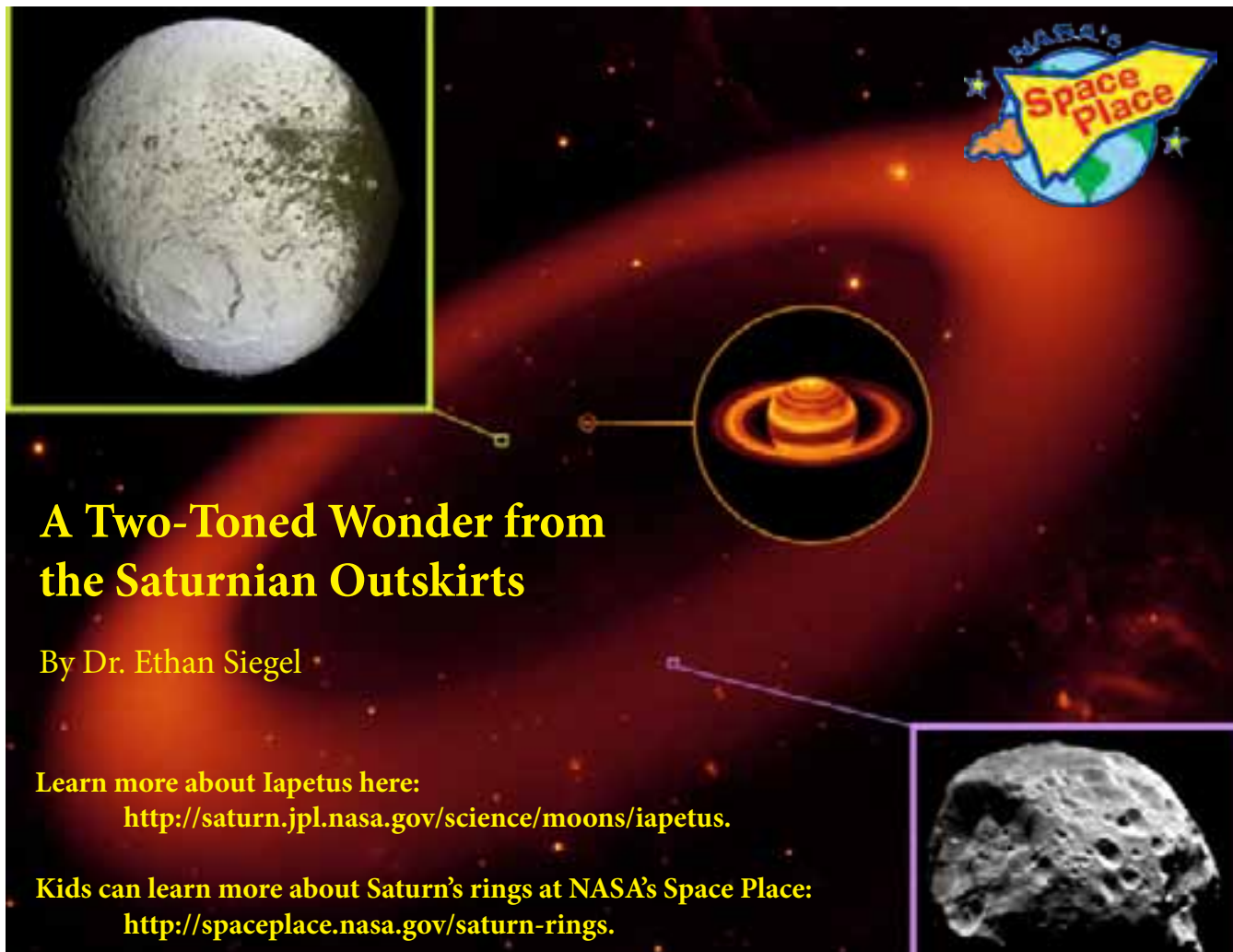


Science teachers in statewide school systems that were enrolled in Dominion's Project Plant It! program received a kit of instructional materials including lesson plans, posters, stickers and other items. Students will receive their own redbud tree seedling to plant in honor of Arbor Day. For more information and to download lesson plans at no cost, visit www.projectplantit.com.

The website features videos and interactive games about trees. **www.projectplantit.com**

For example, there's a leaf matching game that teaches students how to identify the leaves found on different tree species. Another game finds students racing against time to complete a jigsaw puzzle of a tree and learn some cool tree trivia in the process. Several videos help students learn how to plant trees correctly and how to care for them.

Project Plant It! is provided by Dominion at no cost to schools, teachers or students. For more information, visit the website or "Like" Project Plant It! on Facebook.



A Two-Toned Wonder from the Saturnian Outskirts

By Dr. Ethan Siegel

Learn more about Iapetus here:

<http://saturn.jpl.nasa.gov/science/moons/iapetus>.

Kids can learn more about Saturn's rings at NASA's Space Place:

<http://spaceplace.nasa.gov/saturn-rings>.

Saturn & the Phoebe Ring (middle) - NASA / JPL-Caltech / Keck; Iapetus (top left) - NASA / JPL / Space Science Institute / Cassini Imaging Team; Phoebe (bottom right) - NASA / ESA / JPL / Space Science Institute / Cassini Imaging Team.

Although Saturn has been known as long as humans have been watching the night sky, it's only since the invention of the telescope that we've learned about the rings and moons of this giant, gaseous world. You might know that the largest of Saturn's moons is Titan, the second largest moon in the entire Solar System, discovered by Christiaan Huygens in 1655. It was just 16 years later, in 1671, that Giovanni Cassini (for whom the famed division in Saturn's rings—and the NASA mission now in orbit there—is named) discovered the second of Saturn's moons: Iapetus. Unlike Titan, Iapetus could only be seen when it was on the west side of Saturn, leading Cassini to correctly conclude that not only was Iapetus tidally locked to Saturn, but that its trailing hemisphere was intrinsically brighter than its darker, leading hemisphere. This has very much been confirmed in modern times!

In fact, the darkness of the leading side is comparable to coal, while the rest of Iapetus is as white as thick sea ice. Iapetus is the most distant of all of Saturn's large moons, with an average orbital distance of 3.5 million km, but the culprit of the mysterious dark side is four times as distant: Saturn's remote, captured moon, the dark, heavily cratered Phoebe!

Orbiting Saturn in retrograde, or the opposite direction to Saturn's rotation and most of its other Moons, Phoebe most probably originated in the Kuiper Belt, migrating inwards and eventually

succumbing to gravitational capture. Due to its orbit, Phoebe is constantly bombarded by micrometeoroid-sized (and larger) objects, responsible for not only its dented and cavity-riddled surface, but also for a huge, diffuse ring of dust grains spanning quadrillions of cubic kilometers! The presence of the "Phoebe Ring" was only discovered in 2009, by NASA's infrared-sensitive Spitzer Space Telescope. As the Phoebe Ring's dust grains absorb and re-emit solar radiation, they spiral inwards towards Saturn, where they smash into Iapetus—orbiting in the opposite direction—like bugs on a highway windshield. Was the dark, leading edge of Iapetus due to it being plastered with material from Phoebe? Did those impacts erode the bright surface layer away, revealing a darker substrate?

In reality, the dark particles picked up by Iapetus aren't enough to explain the incredible brightness differences alone, but they absorb and retain just enough extra heat from the Sun during Iapetus' day to sublimate the ice around it, which resolidifies preferentially on the trailing side, lightening it even further. So it's not just a thin, dark layer from an alien moon that turns Iapetus dark; it's the fact that surface ice sublimates and can no longer reform atop the leading side that darkens it so severely over time. And that story—only confirmed by observations in the last few years—is the reason for the one-of-a-kind appearance of Saturn's incredible two-toned moon, Iapetus!

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Teacher Resources:

CRESST

Project CRESST: Enhancing Clinical Research Education for Science Students and Teachers Professional Development 2014 Academy - July 14 - 18, 2014
Virginia Commonwealth University,
Richmond, VA

The CRESST Academy is a Professional Development Academy for Middle and High School Teachers utilizing an innovative curriculum designed to enhance students' research skills and awareness of the importance of healthy lifestyle choices. The Academy 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. CRESST is supported by a grant from SEPA (NIH), so there is no registration fee. Participants receive graduate credit or a stipend plus \$250 to purchase program related supplies.

Presenters: VCU faculty, researchers and staff and CRESST Academy Fellows

More information about Project CRESST may be found at

<http://www.cresst.vcu.edu>

Coming in Fall 2014 DNA Ahead Game & More: 3-in-1 Adventures in DNA

This 3-IN-1 fun-filled educational Board Game, Book-Alike, and Creativity Kit offers a comprehensive tour of DNA science with close-up views of scientists and their world along the way. It covers how DNA and advances in DNA science affect nearly every aspect of your life: the foods you eat; medical diagnoses & treatments; choices associated with reproduction; crime detection & courtroom evidence; as well as the availability of DNA-based information about your relationship to other species, your family ancestry, your genetic predispositions to diseases & other traits — AND the role of DNA in making you . . . You!

Visit **webste** for a peak!

<http://www.dnaahead.com/> The author Dorothy Seminow has provided a PDF of the GMO cards to be used for educational purposes.

Toshiba Foundation Grant

Toshiba America Foundation grants fund the projects ideas and materials teachers need to innovate in their math and science classrooms. The foundation is interested in funding projects designed by teachers or small teams of teachers for use in their own schools. The Toshiba America Foundation believes science and mathematics are exciting fields in which all students can succeed with the proper tools and instruction. Wanted: Classroom Innovators! Toshiba America Foundation accepts applications from teachers who are passionate about making science and mathematics more engaging for their students.

Deadline: August 1, 2014. For more information and details on how to apply, visit the Toshiba Grants & Funding page.

National Park Service Videos - Explore Climate Change

The National Park Service invites you to view videos on a variety of climate change topics, including citizen science, sea-level rise, glaciers, and more! Additional videos, currently in production, will be featured online in the coming months.

Through these educational videos, teachers and students can learn the basics about climate change topics, explore the National Park Service's unique position in responding to climate change, understand the challenges of managing parks in the face of climate change, and find out more about the science behind climate change. See the videos online at <http://www.nps.gov/subjects/climatechange/photosmulti-media.htm> and <http://www.youtube.com/channel/UCAeQ9FnOCpJG-KLXf47Xj9Q>.

2014 Lunar Workshop for Educators

NASA's Lunar Reconnaissance Orbiter mission is sponsoring a workshop for science educators of students in grades 6-9. This workshop will focus on lunar science, exploration and how our understanding of the moon is evolving with new data from current and recent lunar missions. The workshop will take place July 14-18, 2014, at NASA's Goddard Space Flight Center in Greenbelt, Md. Participants will receive a \$200 stipend to help offset travel expenses.

For more information, please visit:

<http://lunar.gsfc.nasa.gov/lwe/>

National Association of Geoscience Teachers

Eastern Section Spring Conference May 15-18, 2014

Hosted by James Madison University
"A Billion Years Between Friends: A Record
of Earth Systems in the Virginia Blue Ridge,
Piedmont, and Valley & Ridge"

Eric Pyle, Conference Host

Contact Eric Pyle, pyleej@jmu.edu

Thursday night will include a light reception followed by an exclusive show in the John C. Wells Planetarium, presented by Shanil Virani.

Friday morning the newest and best ideas for teaching Earth science will be shared during the concurrent sessions and the JMU Mineral Museum will be open.

Friday afternoon IRIS has offered to provide an educator workshop, which is significant considering the recent Louisa M5.8 earthquake. A collection of inquiry-based, data-rich classroom modules will be introduced.

Friday afternoon features a local field trip with two stops. Frazier Quarries will provide a local plant tour in the Edinburg Limestone quarry, from which the bulk of the original JMU campus is built. Frazier Quarries local plan shows not just a wonderful dark micrite that weathers light gray, but it also shows complex secondary calcite veins, some of which contain purple fluorite. The second stop will be a brief hike up Mole Hill, an Eocene volcanic neck composed of basalt last with mantle-sourced olivine and spinel.

Friday dinner will be on your own, but we will have the annual Geo-Auction.

Saturday Day-Long field trips:

Saturday offers a choice of two day-long field trips. Trip 1 takes us into the distant past, traversing the late-Proterozoic metavolcanic rocks, into the core of the Blue Ridge, and then on into the Piedmont, including some of the diverse terranes that were accreted onto the flanks of Laurentia. Trip 2 will also start at the Blue Ridge, but travel west across the Page Valley and Massanutten Mountain, ending in the peaks of the Valley & Ridge. For each trip, we will filter the experience through the complexity of Earth systems. Collecting is allowed at some, but not all locations.

For more information:

<https://sites.google.com/site/esmeetings/>

Teacher Resources:

The Geological Society of America Field Trips

VAST Teachers are invited to participate in the Geological Society Field Trips. Lorrie V. Coiner, co-chair of the field trip committee for the Southeastern Section meeting of the Geological Society of America (which is being hosted this **April 10-11** in Blacksburg, VA) sent VAST the link to a list of field trips available in case any teachers are interested. Find the list at: <http://www.geosociety.org/sections/se/2014mtg/fieldTrips.htm>

Lorrie V. Coiner, Geologist
Division of Geology and Mineral Resources
Virginia Department of Mines, Minerals, and Energy

Last Child in the Woods Author Richard Louv @ Longwood

Longwood University invites you to a presentation by Richard Louv on Monday, April 7 at 4 PM. The presentation will be in Jarman Hall on the Longwood campus. Directions to campus can be found here: <http://www.longwood.edu/directions.htm>

Mr. Louv is author of the national bestseller *“Last Child in the Woods”* which sparked a national debate that spawned an international movement to reconnect kids and nature. He coined the term nature-deficit disorder; influenced national policy; and helped inspire campaigns in over eighty cities, states, and provinces throughout North America. In his recent book, *“The Nature Principle”*, Mr. Louv delivers another powerful call to action—this time for adults. Please join Longwood on April 7 for this presentation which will be followed by a reception.

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 grant for their school and a trip to Washington, D.C. Poster submissions are due April 1, 2014.

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: <http://www2.epa.gov/sunwise/sunwise-shade-poster-contest>

SunWise is a national environmental and health education program. For more information, please visit: <http://www.epa.gov/sunwise>.

“One Species at a Time”, Podcast Darwin’s Rove Beetle

In 1832, during his voyage on the HMS Beagle that would provide fuel for his revolutionary insights about evolution, Charles Darwin collected an enormous number of specimens—including a rove beetle he collected in Argentina that was “rediscovered” in a museum drawer in 2008. This beetle was recently described as a new species and named in Darwin’s honor. Although remote areas of the world are rich sources of still undescribed species, previously unrecognized species can be discovered even in very unremote regions in Europe. Listen to Encyclopedia of Life’s One Species at a Time podcast

Download Shutterbugs: Wiggle and Stomp! Free App!!!

Aligned with the Next Generation Science Standards, Common Core and Previous National Standard

Lions! Pandas! Naked mole rats? Come visit them all at the Smithsonian’s National Zoo in this new free app available for iPad, Android tablets, or can be played online. Shutterbugs is designed with both home and classroom use in mind.

Download from the Apple App Store or from Google play.

Free: Available for iPad, Android tablets, or can be played online.

More information:

http://www.ssec.si.edu/games/about?utm_source=Free+Webcast+and+Teaching+Resources+&utm_campaign=2013-11&utm_medium=email

about searching for new species in familiar places.

Read the article: <http://www.pensoft.net/journals/zookeys/article/6624/abstract/darwin>

Listen to the podcast: <http://podcast.eol.org/podcast/new-species-old-world>

Meet the scientists in the podcast: <http://podcast.eol.org/scientists/new-species-old-world-meet-scientists>

The One Species at a Time podcast series is supported by the Harvard Museum of Comparative Zoology.

Coming in Fall 2014 - DNA Ahead Game & More: - 3-in-1 Adventures in DNA

This 3-IN-1 fun-filled educational Board Game, Book-Alike, and Creativity Kit offers a comprehensive tour of DNA science with close-up views of scientists and their world along the way. It covers how DNA and advances in DNA science affect nearly every aspect of your life: the foods you eat; medical diagnoses & treatments; choices associated with reproduction; crime detection & courtroom evidence; as well as the



availability of DNA-based information about your relationship to other species, your family ancestry, your genetic predispositions to diseases & other traits — AND the role of DNA in making you . . . You!

Visit <http://www.dnaahead.com/> for a peak
The author Dorothy Seminow has provided a PDF of the GMO cards to be used for educational purposes.

Teacher Resources:

2014 Lunar Workshop for Educators

NASA's Lunar Reconnaissance Orbiter mission is sponsoring a workshop for science educators of students in grades 6-9. This workshop will focus on lunar science, exploration and how our understanding of the moon is evolving with new data from current and recent lunar missions. The workshop will take place July 14-18, 2014, at NASA's Goddard Space Flight Center in Greenbelt, Md. Participants will receive a \$200 stipend to help offset travel expenses.

For more information, please visit:

<http://lunar.gsfc.nasa.gov/lwe/>

Understanding Science: How Science Really Works

<http://undsci.berkeley.edu/index.php>

The Understanding Science Website is a resource that would be helpful to any science teacher. It offers a wealth of resources on the nature and process of science. The site has three major components: Understanding Science 101, For Teachers, and a Resource Library. Each component has resources that would be helpful. The Resource Library in particular offers a set of case studies that may be helpful to teachers such as Cold fusion: A case study for scientific behavior.

http://undsci.berkeley.edu/article/cold_fusion_01

NOAA Boosts Teaching About Oceans, Atmosphere

The U.S. National Oceanic and Atmospheric Administration (NOAA) promotes education about oceanic and atmospheric science - and not just during Earth Science Week. NOAA offers resources and opportunities for students and teachers all year long.

On the NOAA Education Resources site <http://www.education.noaa.gov/> you'll find teaching tools and materials on oceans and coasts, climate, weather and atmosphere, marine life, freshwater, and other special topics. A "Climate Science Activity Book," for instance, offers 10 learning activities focusing on essential principles of climate science.

ClimateChangeLIVE

ClimateChangeLIVE distance learning adventure, brings you a wealth of climate change education resources and programs from 27 Federal agencies and non-profit organizations! We offer educators a source of trusted, science-based materials, which are correlated to science education standards.

Website: www.ClimateChangeLIVE.org

Climate Change Project Grant Money

LOOKING FOR GRANT FUNDS?

Looking for grant money for a climate change project? Project Learning Tree and the U.S. Forest Service will be accepting grants for school and/or community projects that address climate change. For information, go to <http://climatechange-live.org/index.php?pid=177>.

Study Plate Tectonics, Rock Cycle Online

The Geological Society of London (GSL) offers a pair of online resources for learning about key geoscience topics. Electronic map-based resources are the focus of GSL's Plate Tectonics page: <http://www.geolsoc.org.uk/Plate-Tectonics> In addition, a site is being launched to accompany GSL's Rock Cycle online module: <http://www.geolsoc.org.uk/rockcycle> The United Kingdom's national society for geoscience, online: <http://www.geolsoc.org.uk/education>

The CLEAN

The CLEAN has added new peer-reviewed resources for teaching climate and energy topics to our CLEAN collection of videos, activities, and visualizations on climate and energy. These resources are searchable by grade, topic, and resource type, and are peer-reviewed for accuracy and effectiveness.

<http://cleanet.org/index.html>

Trees-to-Products

The Trees-to-Products teachers' summer program offers an in-the-field tour of sustainable hardwood forest management techniques and local forest products industries. These forest management practices not only provide raw materials for local mills but also provide wildlife habitat, recreational opportunities, and sustain forest health to maintain the

The Virginia Museum of Natural History Presents Smithsonian Science Now: Interactive Webcasts

The Virginia Museum of Natural History has an exciting opportunity for middle school students! We would like to invite you to register for one of our upcoming **Smithsonian Science Now live, interactive webcasts**. Each webcast will align with the Next Generation Science Standards and Virginia Science Standards of Learning and will focus on connecting students to scientists, increasing students' understanding of science, and inspiring students about STEM education and careers. Be one of the first to register and in addition to the 25-minute webcast led by Smithsonian scientists and staff, VMNH educators and scientists will engage students in a specially developed, educational program to reinforce the content of the webcast. To sign up or for more information, contact discover@vmnh.virginia.gov or call (276) 634-4185. For more information on Smithsonian Science Now and each of the webcasts and to access classroom activities, lessons, readings and other related resources, visit the webcast homepage at: <https://qrius.si.edu/jump/live-qrius-science-webcasts>. VMNH will offer the following six webcasts as outreach programs throughout the Commonwealth.

Thursday, March 27, 11 am & 2 pm:

Human Evolution: Early Human Diets

Thursday, April 10, 11 am & 2 pm:

Biodiversity: Life in One Cubic Foot

Thursday, April 24, 11 am & 2 pm:

Biodiversity: Exploring Deep Ocean Life

Thursday, May 15, 11 am & 2 pm:

Geology: Earth's Deep Interior

Thursday, June 5, 11 am & 2 pm:

Paleobotany: Reading the Tree Leaves

viewshed and water quality. The program links its concepts to the Virginia Standards of Learning and includes training in Project Learning Tree activities (www.plt.org). The full schedule and registration information are available at: <http://www.anr.ext.vt.edu/enviroandnatres/programs/trees-to-products.html>



VISTA Provides Effective Professional Development for Teachers

An independent evaluator report* shows that VISTA positively impacts teachers' beliefs surrounding science instruction, assessment, and how students learn; their confidence in teaching; their classroom practices; and their science content knowledge.

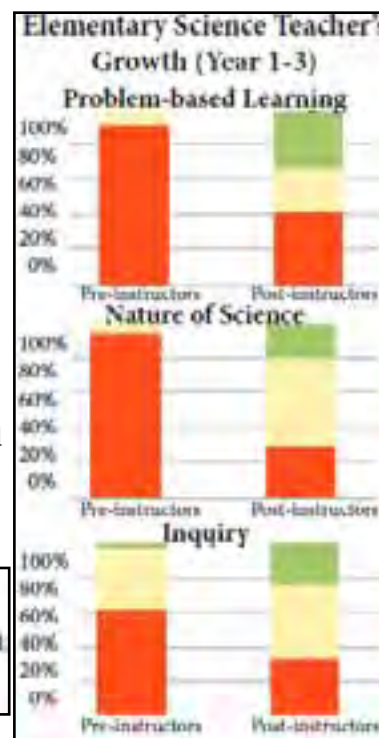
The November 2013 independent evaluator report noted that VISTA's elementary school teachers "found VISTA to be more comprehensive, in-depth...more applied and hands-on, and qualitatively superior when compared with other professional development experiences."

VISTA's professional development programs are empowering over 250 elementary science educators across the state to use an active and engaged style of learning in the classroom and in their community. VISTA teachers will reach over 8,000 elementary students across 47 Virginia school divisions this year alone.

In our third year, VISTA has already made measurable impact within Virginia schools. According to the independent evaluator report, teachers' confidence in inquiry-based instruction and in implementing problem-based learning, as well as their instruction on the nature of science, rose significantly.

The report also revealed that VISTA elementary teachers have markedly increased their confidence in their use of technology to support science learning, particularly in engineering. For more details, click [here](#).

* All citations are from the external evaluation report, VISTA Research and Evaluation Annual Report Year 3, Randy L. Bell, Oregon State University, Tim Konold, Jennifer L. Maeng, Walter F. Heinecke, University of Virginia, November 2013.



Encouraging Women in Teaching Science: Dr. Kurt Michael's VISTA Story

VISTA is now accepting applications for the Science Education Faculty Academy (SEFA) coming up in May 2014. How can SEFA help faculty members? Here is one recent attendee's story:

When Kurt Michael, PhD, joined Liberty University as an associate professor in the School of Education, one of his assignments was to help promote science, technology, engineering, and math (STEM) to education majors. With his background in technology education, it was a natural fit. But, he found it a tough sell to the mostly female elementary education majors at Liberty University: "The majority of pre-service elementary school teachers pursuing licensure at Liberty University are female. These young women are choosing English as their cognate rather than math or science," he said.

Fortunately, his dean encouraged him to attend the VISTA Science Education Faculty Academy (SEFA), a week-long spring program that allows science education faculty from across Virginia to connect and problem-solve together.

Michael said, "It was a tremendous experience that allowed me to meet other science faculty at the collegiate level from across Virginia." As a result of his interaction with other science educators, he quickly found out that other universities were having the same problem convincing female elementary education majors to pursue the sciences.

"We have a problem—why are young women not going into math and science?" he asks. "Introducing science to students at an early age is extremely important. If we are not teaching students to love science at the lower grades, then it may be too late by time they get to high school."

Conversations and questions like Michael's are common at the SEFA Academy. Michael and his fellow attendees engaged in a week-long series of activities that facilitated learning and discussion on this and other topics related to the challenges and

future of science education. As a result, the experience inspired Michael to broaden his research agenda and explore questions related to pre-service elementary school teacher's attitudes toward science. He is now actively researching and publishing on the topic.



In addition, his week at the SEFA academy inspired Michael to spend more time mentoring student teachers and showing them how to incorporate additional hands-on learning opportunities into their classrooms. "Students want hands-on learning; they don't want to be lectured at. I believe a noisy classroom filled with a lot of excitement translates into good science teaching. VISTA helped me really embrace this approach. In fact, some of my student teachers' cooperating teachers are also picking up on the approach and seeing the value of hands-on learning."

The VISTA SEFA Academy is currently accepting applications for the week-long event, which will be held May 19-23 at George Mason University in Fairfax, VA. SEFA is open to faculty members who teach science education or science for educators classes. This free program offers participants a week of networking and professional development along with a \$2000 stipend and all expenses paid to attend the Virginia Science Education Leadership Academy, Nov. 19-20, 2014 in Roanoke, VA. To apply, click [here](#).

Applications Still Open for Several VISTA 2014-15 Programs Join the educators who are innovating science education across Virginia! Applications are still being accepted for new middle and high school teachers, school division science coordinators with five years or less experience, and science education and science faculty. Benefits include free professional development, paid stipends, money to spend on science supplies, and much more. Applications are also being accepted on a rolling basis for VISTA coach positions. Apply today!

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Treasurer

Jimmy Johnson
804-752-7727
treasurer@vast.org

Editor Science Educator

Jean Foss
434-973-3709
newsletter@vast.org

Executive Director

Susan Booth
(757)-874-3349
Fax (757)-874-3349
executive.director@vast.org

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region1@vast.org

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region2@vast.org

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<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

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