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The Science Educator

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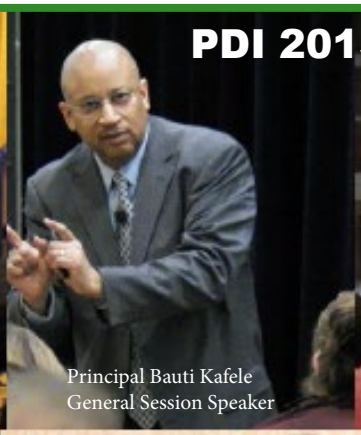

From the Executive Director

Happy 2016!

Well...it is the beginning of the new year and for the first time in my life I am not making any resolutions. They would only be broken. I would only feel discouraged.

So, what am I going to do? ... I am going to do a good turn daily. I am going to take each day one at a time and give something to someone and make a difference in their life.

So, today, I want to bring to you the best *Science Teacher* newsletter that can be read. Why do I say this? Because Jean Foss, Newsletter Editor works countless hours to provide to members a valuable resource.

Are you a member of VAST because you cannot wait to get the next newsletter with the greatest "stuff" in it?

Now that I have given you the best thing ever for today, what can you do? You can give someone a membership to VAST so that they can receive this membership benefit.

Just think, you only have to give this to one person and you will instantly make a difference in their world and their student's.

Thanks for passing on this good turn.

Susan Booth, **EdS**

Next Year's PDI

Doubletree by Hilton Hotel, Williamsburg,
November 17 - 19, 2016
Theme: Faces of Science in Virginia

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President's Corner

Kathy Frame
M.S.
VAST President
2016

Welcome to 2016! VAST is already in preparation for the 2016 Professional Development Institute in Williamsburg November 17 to 19. So be sure to mark your calendars NOW and start thinking about what you might present at the conference. Each of you has magic that you do in your classroom that would be valuable to the people who will be at the VAST PDI.

The theme for this year's PDI is the Faces of Science in Virginia. The theme is intended to showcase the rich resources of science that you use in your classrooms that are found in our wonderful state of Virginia. The focus areas for this theme are the environment, industry, research, and the community. I can already hear your minds thinking of how you use these areas of Virginian science in your classroom.

The VAST PDI speakers are in place and each will speak to the theme of the Faces of Science in Virginia from their vantage point. They include:

- **Ellen Stolan** (confirmed), NASA Chief Scientist who resides in Richmond, VA

- **Trevor Frost,** National Geographic Explorer, conservationist, filmmaker, photographer who also resides in Richmond, VA, enjoys kayaking in the James River in his free time.

- **Karen Ostlund** (confirmed), UTEACH Primary/Hands-On Science, past NSTA president, Lecturer at The University of Texas at Austin, who resides in Austin, TX

- **Dianna Cowern** (confirmed), internationally and nationally recognized physics enthusiast and brainstorming wizard who created Physics Girl who calls San Diego, CA her home

- **Richard Louv** (invited, but not confirmed), journalist and author of eight books, including ***Last Child in the Woods: Saving Our Children From Nature-Deficit Disorder*** and ***The Nature Principle: Reconnecting with Life in a Virtual Age***. His books have been translated into 13 languages and published in 17 countries, and helped launch an international movement to connect children and their families to nature.

I invite you to attend at least one of the VAST Board Meetings. The Board is the individuals you elected in November and who are appointed to the Board whom you have entrusted with present and future decisions and policies for VAST. As a member of VAST, your presence and ideas are invaluable. Mark your calendar for at least one Board Meeting!

2016 Board Meetings:

Location: Science Museum of Virginia (Richmond) at 10 AM. All meetings are on Saturday.

- January 30
- March 19
- May 21
- October 1
- November 16 (PDI)

The 2016 VAST Board looks forward to working for VAST!

Wishing the best teaching year ever!

Kathy


Region
3


Region
6


Region
5


Region
8


Region
4


Region
7


Region
1


Region
2
2

VAST's Regions Ready to Ignite Membership and Professional Development

Susan Bardenhagen, Region IV Director and Regional Director Coordinator

VAST has promoted regional events at our PDIs for the past several years with team roller coaster and earth-quake-proof building projects, "meet your regional director" sessions, and most recently- reserving the conference hall with prizes. Historically, VAST had regional groups like NVAST which organized local professional development events; recently, directors have coordinated with local jurisdictions, college/university partners, and regional informal science education centers to host mini-conferences.

Based on the registration roster, we identified the attendees' home regions and invited them to the event prior to the PDI by email. With newly-elected directors and board members, regional directors met with their members to discuss regional needs and get suggestions. The percentage of attendees who came to the Washingtonian Grand Ballroom, based on sign-in sheets, are as follows: Region I: 10%; II: 7%; **III: 41%;** IV: 4%; V: 9%; VI: 17%; **VII: 44%;** and VIII: 32%.

All in attendance were eligible for the "**Worm Keeper Box** valued at $475" and within each region a gift certificate for co-author, VJAS representative to the VAST Board, Julia Cothron's new 2 volume-book set sponsored by Kendall Hunt. The NEW two-volume book, ***STEM Research for Students*** is a vital resource for K-12 teachers, higher education faculty, and their students with Volume One, Understanding Scientific Experimentation, Engineering Design, and Mathematical Relationships, and Volume Two, Creating Effective Science Experiments, Engineering Designs, and Mathematical Investigations.

The regions' winners were: Region I: Jennifer Falin of Louisa County HS, Region II: Anne Mannarino of Regent University, Region III: David Holt of Rappahannock HS, Region IV: Michelle Plunkette of Potomac Falls HS, Region V: Cheryl Lindeman of Randolph College, Region VI: Elizabeth Larson of Morningside ES, Region VII: Kara Hale of Marion HS, and Region VIII: Catherine McCormick, graduate student at Longwood. Region I's Alice Scheele, from Hanover County, won the **Worm Box.**

Our Membership Chair, Barbara Adcock, immediate Past-President, Shirley Sypolt, and College and University Chair. Suzanne Donnelly, each lead their regions' discussions (I, II, and VIII), encouraging members to share ideas for involvement in VAST and professional development opportunities. Region III's Sherrie Roland and Leslie Lausten, and Region V's Eric Pyle introduced the newly elected directors for their regions. Passing their torches, they will continue supporting science educators on the VAST Elementary Committee and as the NSTA Preservice Director. Region IV's Susan Bardenhagen, VI's Tom Fitzpatrick, and VII's Diane Tomlinson rallied their colleagues with established professional development and mini-conferences.

For 2016, we plan to ensure each member's connection to their region and other science educators, to coordinate opportunities for professional development, and seek grant and corporate partnerships to support science education across the state. Encouraging creative strategies to spark workshops and mini-conferences has resulted in many events since 2000. For VAST's first board meeting on January 30th, your eleven regional directors are already working on a plan to not only budget funds for regional events, but also synergize our talents and ideas. We'll keep you posted!

Check Out Your Region!

Susan Bardenhagen, Regional Director Coordinator

As a VAST member- if you live in Virginia, you reside in one of the eight VA Department of Education designated regions and if you live in an adjacent state and work in Virginia, you teach in one of these regions. We endeavor to offer our VAST membership grassroots support. Let us introduce you to your region and build on that relationship to enhance your networking across the state.

Region 1 - Central Virginia COUNTIES: Charles City, Chesterfield, Dinwiddie, Goochland, Hanover, Henrico, New Kent, Powhatan, Prince George, Surry, Sussex; CITIES: Colonial Heights, Hopewell, Petersburg, Richmond.
Laura Casdorph (2016-18) is the secondary science specialist for Henrico County Public Schools and works as an adjunct professor in the physics department at Reynolds Community College. Laura taught high school chemistry and physics for 10 years and served as the Co-Director of Science for Virginia Advanced Study Strategies for two years prior to becoming the science specialist.
Carolyn Elliott (2016-18) is a 7th grade Science teacher at Goochland Middle School. She began her career in Newport News, then moved to Clover Hill HS in Chesterfield County where she taught biology, journalism, and photojournalism. Carolyn also worked for the State Council of Higher Education where she hosted and produced the public radio program With Good Reason, which features professors from Virginia's colleges and universities. She is currently pursuing a master's degree in gifted education. **Region1@vast.org**

Region 2 – Tidewater COUNTIES: Accomack, Isle of Wight, James City-Williamsburg, Northampton, Southampton, York; CITIES: Chesapeake, Franklin, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach.
Adrienne Sawyer (since 2013) is the Supervisor of Elementary Science in Chesapeake City Public Schools. In 2015, she coordinated a special professional opportunity for elementary Science teachers with the Elizabeth River Project and earned a grant that hosted the tall ship, American Rover, down river with environmental and conservation activities. She also supported rising 6th graders from Chesapeake middle schools who were chosen to attend the Pathfinder program with interactive STEM activities. **Region2@vast.org**

Region 3 - Northern Neck COUNTIES: Caroline, Essex, Gloucester, King George, King William, King and Queen, Lancaster, Mathews, Middlesex, Northumberland, Richmond, Spotsylvania, Stafford, Westmoreland. CITIES: Colonial Beach, Fredericksburg, West Point.
Michael Pratte (2016-18) has taught in Stafford County Public Schools since 1995 and is in his third year as K-12 Science Coordinator. He is National Board Certified; Vista-NCA trained, and was the recipient of the 2013 Earth Science Award for Outstanding Science Teaching. He plans and implements the annual multi-session 3 day Math & Science Institute, hosts county symposiums and consistent PD for teachers, and facilitates field experiences for K-12 learners.
Craig Vann (2016-18) is also a Stafford County teacher and has worked at Rodney Thompson Middle School since 2001. He teaches 7th grade Life Science, is in his eleventh year as Department Chair, and is also the Lead Science Teacher. **Region3@vast.org**

Region 4 - Northern Virginia COUNTIES: Arlington, Clarke, Culpeper, Fairfax, Fauquier, Frederick, Loudoun, Madison, Orange, Page, Prince William, Rappahannock, Shenandoah, Warren; CITIES: Alexandria, Falls Church, Manassas, Manassas Park, Winchester.
Susan Bardenhagen (since 2011) has 40 years experience in grades 2-8 (including 6th and 7th grade Science) in New York, Maryland, and Virginia. She is a founding member of the Battlefields of NOVA Council of Teachers of Mathematics and has coordinated the STEM, now STEAM Careers SUCCESS! Conference since 1991. A presenter for regional, state, and national Math, Science, Social Studies, and special needs conferences, Susan is also a musician and VP-Program of the PW Arts Council. **Region4@vast.org**

Region 5 – Valley COUNTIES: Albemarle, Amherst, Augusta, Bath, Bedford, Campbell, Fluvanna, Greene, Highland, Louisa, Nelson, Rockbridge, Rockingham; CITIES: Buena Vista, Charlottesville, Harrisonburg, Lexington, Lynchburg, Staunton, Waynesboro.
John Almarode (2016-18) is a former high school science teacher in Augusta County where he also worked with a STEM outreach program for students in grades PreK-8. As a faculty member at JMU, he now teaches science methods courses in the inclusive early childhood and elementary education programs. His research focuses on interest and engagement in classrooms, which offers him the opportunity to work with many schools and school districts across Virginia. John holds a Ph.D. and has the distinction of being a Sarah Miller Luck Endowed Professor of Education.
Tammy Stone (2016-18) is the Pre-K-12 science coordinator for Rockingham County Public Schools and works as an adjunct instructor in the chemistry department at James Madison University. She taught high school

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chemistry for sixteen years prior to becoming the science coordinator. She was the recipient of the 2005 VAST Chemistry Award for Outstanding Science Teaching and the 2013 Virginia American Chemical Society's Franklin D. Kizer Distinguished High School Chemistry Teacher Award. Region5@vast.org

Region 6 – Western COUNTIES: Alleghany, Botetourt, Craig, Floyd, Franklin, Henry, Montgomery, Patrick, Pittsylvania, Roanoke; CITIES: Covington, Danville, Martinsville, Roanoke, Salem.
Tom Fitzpatrick (since 2015) is the Science Supervisor PreK-12 for Roanoke City Schools. He has 21 years of middle school Science and high school Earth Science experience. Tom is a certified trainer with the Jason Project. He is also a trainer with Project WET, Project WILD, and Project Learning Tree.
Region6@vast.org

Region 7- Southwest COUNTIES: Bland, Buchanan, Carroll, Dickenson, Giles, Grayson, Lee, Pulaski, Russell, Scott, Smyth, Tazewell, Washington, Wise, Wythe; CITIES: Bristol, Galax, Norton, Radford.
Diane Tomlinson (since 2003) is an adjunct professor in the Education Department at Emory & Henry College where she teaches science and mathematics methods courses. She retired from Russell County Schools where she was the elementary/middle school science specialist, grant writer, and program director for the school division. She continues to write grants and work as a program evaluator for state-funded grants in education. Diane worked for the past three years as a VISTA instructional coach through the Virginia Tech cohort and Corresponding Secretary for the Virginia Math Science Coalition. She is a Ph.D. candidate at Virginia Tech and plans to complete her doctoral program this school year. Region7@vast.org

Region 8 – Southside COUNTIES: Amelia, Appomattox, Brunswick, Buckingham, Charlotte, Cumberland, Greensville, Halifax, Lunenburg, Mecklenburg, Nottoway, Prince Edward.
Pam Aerni (since 2013) has 25 years of teaching experience- including preschool, middle school, and higher education. She taught math and science at the middle school level for 10 years; at Longwood University, she taught the method courses for math, science, and social sciences for the partnership program; and as an instructional coach for the Tidewater Team for Mathematics, Pam worked with a number of school divisions to improve their instructional practices in mathematics education. Currently, she is the K-12 Mathematics Instructional Specialist in Dinwiddie County Public Schools. Region8@vast.org

More VAST PDI photos:

VAST President, Dr. Jenny Sue Flannagan and NSTA President, Dr. Carolyn Hayes. Dr. Hayes is the president of the National Science Teachers Association (NSTA). She began serving her one-year term on June 1, 2015.

VAST Board member and VAST webmaster, Dr. Denny Casey serves as NSTA District VIII Director. District VIII includes Kentucky, Virginia, and West Virginia.

VAST Awards 2015

Timothy Couillard, VAST Awards and Grants Chair

From Left to Right:
Dr. Kristian Hargadon, Laura Akesson, Tara Brunyansky, Rebecca Musso, Leslie Moring, Noah Ashbrook

VAST Recognizes the 2015 RISE Award Recipients

On November 20, 2015, VAST recognized its 2015 recipients of the VAST Recognition In Science Education (RISE) Awards. Awardees were nominated by members of their community and selected by the VAST Awards and Grants Committee. Please join us in congratulating each of this year's recipients for representing the best in science education in the Commonwealth of Virginia.

The window for 2016 RISE award nominations will open on February 1. The nomination deadline is August 20. For more information, please visit www.vast.org .

Below we've included excerpts from the awardees' nominations.

RISE Award for Outstanding Middle School Teacher
Rebecca Musso

Rebecca exemplifies the title of teacher and Science coordinator through tireless effort and student achievement. Rebecca incorporates STEM principles through ongoing projects that leverage the engagement of professional scientists while allowing students to experience the excitement of science themselves. Continuous recognition from students, parents and colleagues as well as high levels of student achievement in the classroom and at science fairs demonstrate the quality of Mrs. Musso's teaching efforts.

RISE Award for Outstanding Earth Science Teacher
Noah Ashbrook

Noah Ashbrook is one of a kind. Having taught for eight years at Virginia High School, the difference he has made is tremendous. Noah's infectious energy and love for teaching has not only impacted the students and the science department but the entire school.
Noah is our Earth Science teacher and just by talking to him, you can tell he loves his subject. You can hear the activity and excitement through the walls and student laughter on a daily basis. Students will do work for Noah when they would not work for other teachers.

There are teachers who are good with students, but it is rare to find a teacher who inspires students and teachers. Noah is one of those teachers. As his colleagues say, he is as rare as some of his minerals.

RISE Award for Outstanding Biology Teacher
Leslie Moring

Mrs. Moring is an innovative and engaging Biology teacher. She implemented a biannual science fair at her high school, which is completely funded by online donations so that ALL science students may participate and incur no cost. She is dedicated teacher staying after school to tutor students. She incorporates interactive labs in her lessons, using food and materials relevant to her students. She has great success both academically and beyond like students writing a children's book explaining the Germ Theory or learning about the industrial revolution so that they could understand natural selection and the peppered moth).

RISE Award for Outstanding Physics Teacher
Laura Akesson

Laura Akesson 's teaching philosophy has evolved over a 15-year teaching career to involve the interconnectedness of not only math and science, but of math, science, music, history, art, language, business, coding, photography, sport, psychology, and sociology.

In 2009, she founded Science Overdrive, a non-profit organization that offers free professional development for K-8 science teachers.

Last year in Richmond, she gave a TED talk at TEDxRVA titled "Returning Curiosity to Schools: The 'Un-SILOing' of Education"

Currently, she works at the Steward School, teaching physics and biomedical design, serving as the academic dean for the Bryan Innovation Lab.

RISE Award for Outstanding Chemistry Teacher
Tara Brunyansky

Tara Brunyansky is an amazing educator. She runs a top notch AP Chemistry program at James River High School. She maintains high expectations while at the same time going out of her way to support her students as they wrestle with the challenge that is AP Chemistry.

Ms. Brunyansky continues to innovate through her development of her own Forensic Chemistry curriculum. This hands on approach to applied chemistry is a great example of how science can be used to kindle curiosity and inspired the further pursuit of science beyond high school.

Tara's excellence in the classroom has already received high praise and recognition. This past year Tara was recognized as James River High School Teacher of the Year, Chesterfield County Teacher of the Year, and Virginia Region 1 Teacher of the Year.

***

VAST RISE Awards are presented to spotlight the excellent work done by science educators across the Commonwealth. They recognize service to science education in the individual's school, school system, and the VAST district in which they work. The awards are grouped in twelve distinct categories:

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

The number of awards to be given each year will be determined by the Awards Selection Committee based on the qualifications of the nominees. The awardee are invited to attend the VAST PDI and will be recognized at the annual VAST PDI banquet.

See the VAST webpage for more information about VAST Awards and Grants:

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

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

Camilla Walck, Stephanie Sowers, and Robert Carroll were recognized as Virginia 2015 finalists for the Presidential Award for Excellence in Mathematics and Science Teaching.

State Finalists for Presidential Math & Science Teaching Award Are Recognized at the VAST PDI

Eric Rhoades, Director of the Science and Health Education at the Virginia DOE.

Five Virginia teachers were selected as Virginia finalists for the 2015 Presidential Award for Excellence in Mathematics and Science Teaching. Eric Rhoades, Director of the Science and Health Education recognized three of the five finalists at the VAST PDI. The award is regarded as the nation's top honor for mathematics and science teachers and recognizes teachers who develop and implement high-quality instructional programs that improve student learning.

The 2015 Virginia finalists — five public school teachers in grades 7-12 — are:

Robert Carroll — Plaza Middle School, Virginia Beach, for science
Blythe Samuels — Powhatan High School, Powhatan County, for mathematics
Kelle Scott — Robinson Secondary School, Fairfax County, for mathematics
Stephanie Sowers — Peasley Middle School, Gloucester County, for science
Camilla Walck — Princess Anne High School, Virginia Beach, for science

Selection committees convened by the Virginia Department of Education chose the finalists from among 80 mathematics nominees and 78 science nominees.
President Obama is expected to announce the 2015 winners next year. The winners will receive $10,000, a presidential certificate and a trip to the nation's capital for a series of recognition events and professional development activities.

The Presidential Award for Excellence in Mathematics and Science Teaching program is administered by the National Science Foundation on behalf of the White House. Each year, the award alternates between teachers in grades K-6 and teachers in grades 7-12.

The program was established by Congress in 1983 and authorizes the president to bestow awards each year to honor outstanding mathematics and science teachers in the 50 states, District of Columbia, federal territories, Puerto Rico and Department of Defense schools.

Do you know a teacher who deserves to be nominated? Consider nominating yourself. To find out more about this award program go to **https://www.paemst.org** .

More Award Winners Are Honored at the VAST PDI

The 2015 Virginia OBTA winner is

Jamie Durbin Carpenter

Princess Anne High School,
Virginia Beach

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 National Association of Biology Teachers (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 of Carolina Biology Supply Company at the Honors Luncheon held at the NABT Professional Development Conference, receive gift certificates from Carolina Biological Supply Company, resources from other sponsors, and award certificates and complimentary one-year membership from NABT.

ECL Miller Science Teacher of the Year Award

Virginia Junior Academy of Science

Dr. Barbara Bonsall Wood

Thomas Jefferson High School for Science and Technology

Dr. Barbara Bonsall Wood has inspired students and colleagues for more than 15 years with her passion for life sciences. Her goal was to teach others to see the elegant, natural relationships among sciences and the world to appreciate the infinite complexity and order of life. Biology Lead Teacher for Thomas Jefferson High School for Science and Technology, Dr. Wood developed the innovative IBET curriculum now taught to all freshmen that integrates applied biology research, technology, and technical writing. Dr. Wood taught 100-plus students per year in IBET Biology, AP Biology, and post-AP DNA Science. She contributed to the professional community through service on the National Consortium for Specialized Secondary Schools of Mathematics, Science and Technology and teacher mentoring at TJHSST. Dr. Wood has sponsored more than 40 participants and award winners at VJAS and Intel Science Fair, as well as a dozen finalists at Fairfax Regional Science Fair and Virginia State Science Fair. It is the intangible spirit of continuing to learn and to try despite failure that most embodies Dr. Wood's teaching. A student summed up "I am incredibly blessed to have such an amazing mentor who has supported me and assisted me through every ambitious project. I am proud to be one of many students to benefit from Dr. Wood's mentoring."

2015 Donna Sterling Exemplary Science Teaching Award Winner Elementary (K-6)

Jaclyn Clayton

Nuckols Farm Elementary School,
Henrico County Public Schools

Donna Sterling was a visionary science educator with a passion for working with science teachers and developing habits of inquiry-based teaching. Most recently, her leadership in the Virginia Initiative for Science Teaching and Achievement (VISTA) focused on elementary and secondary teacher professional development. This award recognizes that exemplary teachers engage in continuous improvement, and is designed to support a professional development plan for the improvement of science teaching. In 2015, the award was given to an exemplary elementary teacher. The award will alternate between elementary and secondary in future years.

The awardee, Jaclyn Clayton, will receive a total of $4000. In addition, travel costs will be reimbursed to attend the 2015 VAST PDI to receive the award and to the 2016 VAST PDI to present a session on the professional development experience and outcomes. The awardee will receive $3000 at the VAST PDI in 2015. The remainder will be awarded after the awardee presents at the next VAST PDI and also submits an article to either the newsletter *The Science Educator* or the *Journal of Virginia Science Education*.

VAST Lifetime Achievement Award 2015

Dr. Juanita Jo Matkins

The College of William and Mary

Dr. Matkins has taught from middle school to college students with an unwavering love of science and excellence. She has served on the VAST Board, as editor, president, and Outreach chair. She has brought her college students to the PDI and was very involved with the creation and implementation VISTA.

This special award is given in recognition of Dr. Matkins' many contributions to science education in Virginia and her dedication to VAST's mission.

Mission: The Virginia Association of Science Teachers (VAST) is a community of Science educators whose mission is to:

- ***inspire students,***
- ***provide professional learning opportunities,***
- ***build partnerships,***
- ***advocate for excellence at the school, local, state and national level.***

From the desk of Shirley Sypolt, President-Elect

VAST PDI Committee

VAST PDI 2016 is Coming in November!

I'm excited about being the VAST President-Elect once again and having the opportunity to be the next VAST President when we return to Hotel Roanoke in 2017. I really enjoyed talking to all of the awesome science teachers that joined us at the 2016 VAST PDI in northern Virginia. Thanks to everyone that attended and I enjoyed visiting with numerous veteran and first time attendees.

It's not too soon to start planning to attend the 2016 Professional Development Institute of the Virginia Association of Science Teachers. This year the VAST PDI will be held at the Doubletree by Hilton Hotel in Williamsburg, Virginia on November 17 - 19. Come help us celebrate **The Faces of Science in Virginia**. Online registration will soon be available on the VAST website at **www.vast.org** .

The 2016 VAST PDI will showcase the richness of science resources that are available to you through the numerous science organizations and companies found throughout Virginia. **The Faces of Science in Virginia** PDI will have four focus areas: the environment, community, research, and industry.

If you have great science ideas to share with everyone please consider signing up on the VAST website as a presenter and coming to share your awesome ideas at the upcoming science PDI. Remember, you can present "by yourself" or "as a team." We love seeing our veteran presenters come back and we're always excited with the number of "first time" presenters that we always have.

Fill out a presenter's application at **www.vast.org** .

The 2017 VAST PDI is now being planned
Over the next few months, I will be planning the 2017 VAST PDI which will be held at the Hotel Roanoke November 16-18, 2017. I'd love to hear from the VAST general membership! Now is the time for you to express your ideas and thoughts to help our PDI Committee plan the PDI for 2017. I'm currently accepting suggestions for our PDI "theme" for the 2017 science conference and I'd love to hear what kinds of sessions you'd like to see us providing for Virginia's science teachers. The VAST PDI's are designed to support formal and informal classroom science teachers; so please take a few minutes to let us know what we can do to help you, with "teaching science to students of all ages."
After receiving the suggestions, the PDI Committee will select a theme and three to four "science focus areas."

Please email your thoughts and suggestions to me at **ssypolt@hampton.k12.va.us**,

Shirley Sypolt

VAST President-Elect

Future PDIs

2016	Doubletree by Hilton Hotel, Williamsburg, November 17 - 19
2017	Hotel Roanoke, Roanoke, November 16 - 18
2018	Doubletree by Hilton Hotel, Williamsburg, November 15 - 17
2019	TBA
2020	Doubletree by Hilton Hotel, Williamsburg, November 19 - 21

2016 Annual PDI

November 17-19, 2015

Double Tree by Hilton, 50 Kings Mill Road, Williamsburg, VA 23185

Faces of Science in Virginia

The 2016 Virginia Association of Science Teachers (VAST) Professional Development Institute (PDI) theme is ***The Faces of Science in Virginia***. It builds upon last year's PDI them ***Designing Inquiring Minds***. ***Faces of Science*** showcases the rich Virginia science resources that are available to you through the many science organizations and companies in Virginia. You may already be using some of these resources in your classrooms, but VAST wants to expose you to more and VAST also wants you to your colleagues how you use these resources with your students as a VAST presenter. (Click here for more information about presenting)

Last year's PDI provided opportunities for teachers to develop their ability to engage their students in effective science practices, while encouraging the growth of an inquiry mind-set in their students. What better way to develop critical thinkers who engage in effective science practices than to experience science first hand! ***Faces of Science*** will focus in the areas of science in **Environment, Industry, Research, and Community**.

2016 VAST PDI Strands for Proposals

Virginia Science in the Community

Virginia Science in the Community involves the whole community—students, families, educators, and the public—through science education programs that provide multiple pathways for student learning. Presenters showcase K-12 activities in the all areas of science and related STEM disciplines that unite science curriculum at the local level and are adaptable as core components of the curriculum. Examples include programs for schools, families and the public and exhibitions for museums and science centers. Initiatives are meant to provide a window on the nature of science and the lives of modern-day science in Virginia, with special emphasis on not just what is known about science but how it has come to be known.

Goal: To provide sessions that focus on the science in Virginia in the community.

Virginia Science in the Environment

Virginia Science in the Environment places emphasis not only the science of the environment, but also on Environmental Literacy as stated in the Virginia Environmental Literacy Plan "Having the knowledge, skills and dispositions to solve problems and resolve issues individually and collectively that sustain ecological, economic and social stability." Virginia's rich array of unique environments have drawn scientists from around the world to study conservation biology, ecosystem restoration, earth science, biogeochemistry, environmental policy, law, and economics in the state. Organizations such as the Chesapeake Bay Foundation, Smithsonian Conservation Center, National Science Foundation, and others have adapted their findings for the students and teachers K-12.

Goals: To provide sessions that

- **Provide scientifically based research on the effective integration of environmental literacy and environmental science in the science curriculum.**
- **Model effective environmental programs science and literacy connections at the elementary, middle, and high school levels.**

Virginia Science in Industry

Session proposals within this strand focus on showcasing how the industries in Virginia provide state-of-the art research in areas such as poultry science, wine, medicine, ship building, aerospace, cybersecurity, energy, data centers, food processing, IT, and automotive, understanding of scientific concepts. These industries have provided education outreach opportunities for students and teachers through curriculum, training programs, internships, and job shadowing.

Goals: To provide sessions that:

- **Showcase the ways that industry has brought science to the classroom.**
- **Showcase the use of applications and other technology tools to help students make connections between industrial science, their daily lives, safety, and future opportunities in the workforce.**

Virginia Science in Research

Session proposals within this strand focus on showcasing the use of researched based practices and how they have impacted the science classroom through research experiences for teachers and students in leading universities, government research facilities, commercial companies, and not-for profit research groups.

Goal: To provide sessions that

- **Modeling the use of research based practices in science.**
- **Presenting ideas or research that illustrates how best practices impact student achievement and future employment.**

Improving Science Curriculum With 3D Printing

Julie Bryant, 3D Printing Specialist at Dynamism.com

Becoming smaller and easier to use, 3D printers are revolutionizing a variety of fields. They've been utilized to create prosthetic limbs, and new breakthroughs in medical science allow for printing functioning organs. **NASA** has even used 3D printers to create a revolutionary rocket engine injector. Clearly, 3D printers are in the future for many industries, but how can that future be explored in a classroom? Desktop 3D printers may not be able to print a brand new kidney, but they do allow for a unique, interactive learning experience that not only enriches standard curriculum, but also prepares students for technology that could very well be a part of their daily lives in the real world. From biology to physics, these little machines can create the keys to a new level of learning through fun, interactive projects.

Understanding molecular structures is important in biology and chemistry classrooms, and is a building block for more advanced concepts. 2D illustrations of atomic bonds can be frustrating for students who aren't visual learners. Some students need to feel and interact with a concept, and that's where 3D printers come in. Free 3D modeling software, such as **TinkerCAD** and **123D Design**, allows anyone to create simple designs without any formal 3D design training. Students or teachers can use this software to create digital atoms, which, when printed, will snap into place to illustrate where bonds take place. For those less technologically inclined, websites like **Thingiverse.com** have free, downloadable molecular structures that can be used for student interaction. Regardless of the process, this brings an otherwise intangible concept directly into the hands of students.

The same issue can be applied to studying the human body. Diagrams of a heart, for example, allows only for the study of a flat representation of the actual organ. Dissection may not be the most viable option for every classroom, due to time or space restrictions, and that's where 3D printers come in. Many are capable of printing an accurate model heart, allowing for close study of each chamber. Again, some amazing models can be found on **Thingiverse.com**, so detailed 3D modeling can easily be skipped. For an in depth study of anatomy, be it a human's or an animal's, a pre-made model can be broken down into smaller pieces. These pieces can be printed and fitted together by students as a class-wide project that studies various parts of the body. The same concept can be applied to the skeleton and the digestive system.

Otherworldly concepts can also be studied via 3D printing. Grasping ideas relating to space can be a challenge, since star systems and even some of our neighboring planets, are so massive and seemingly unreachable. It can be mind blowing, even to professional astronomers. A team at **NASA** had been observing the aftermath of the system Eta Carinae, which is known for erupting twice in the 19th century for reasons unknown. It is comprised of two stars, spewing massive amounts of gas into space to create a nebula. To further their understanding, **NASA** utilized 3D modeling to recreate the system, referencing images from the Hubble Telescope. These models, along with different systems, are available for download so others may 3D print them for hands-on, conceptual study. These models, of course, can find a home in any astronomy classroom. Various other astronomy projects can also be tackled in the classroom. To demonstrate their understanding of suns and planets, students can team up to create their own solar system with 3D modeling, and then 3D print the planets to scale.

What else is there to be done? Model cars, visual representations of equations, puzzles, models made to be destroyed in physics experiments…. the possibilities are endless. 3D printers are a tool that allows unlimited expression of ingenuity and creativity, and everyone from professional engineers to amateur artists are finding more and more uses. Will your classroom be a part of the revolution?

VJAS Update

We are off to a New Year and we hope that you are ready to help prepare students with their VJAS research projects. As you know it is very important that you join as a member so that you do not miss anything. The deadline is quickly approaching and it makes it flow smoother in the office if you do it early instead of waiting until you mail the papers for review. Also, when writing the paper please make sure you follow the format and label the headings consistently, as well as providing the necessary safety certifications. The following are a reminder of dates to come:

Deadline for affiliation with VJAS: School & Individual Memberships and Membership Fees **January 15.**

Each student is expected to pay a **$15 Student Entry Fee** and that each school will collect the Student Entry fees and submit a single check to VJAS to cover those fees along with the papers.

Each Head Sponsor is reminded to complete the School Entry Form according to the instructions provided in the Handbook and Appendix.

Please also include a printed copy with the papers and email an electronic version to the VAS/VJAS office.

Deadline for submitting papers and Student Entry Fees: last Wednesday in February (i.e., **February 24, 2016**)

Susan Booth, EdS

The Virginia Junior Academy of Science Scholarships

The Virginia Junior Academy of Science encourages your participation. Please look http:www.vjas.org at the opportunities that are available to your students. We would like to hi-light the Virginia Environmental Endowment SPECIAL SCHOLARSHIPS. These scholarships are determined by special panels of judges at the VJAS Research Symposium.

THE FRANCES AND SYDNEY LEWIS ENVIRONMENTAL SCIENCE SCHOLARSHIP

Description: This four-year college scholarship may be awarded to the student whose project presented at the VJAS Research Symposium evidences the most significant contribution in the field of Environmental Science.
The purpose of the award is to stimulate interest in environmental sciences and to enable promising young students to pursue undergraduate studies in a related field. The Virginia Environmental Endowment (VEE) and the VJAS offer this scholarship in tribute to the outstanding and generous services of VEE Directors Emeriti, Frances A. Lewis and Sydney Lewis.

THE HENRY W. MACKENZIE, JR. ENVIRONMENTAL SCHOLARSHIP

Description: This $5,000 four-year college scholarship may be awarded to the student whose project presented at the Research Symposium evidences the most significant contribution in the field of Environmental Science dealing with the James River Basin and Chesapeake Bay. The purpose of the award is to stimulate interest in environmental sciences and to enable promising young students to pursue undergraduate studies in a related field. Virginia Environmental Endowment (VEE) and the VJAS offer this scholarship in tribute to the outstanding and generous services of Judge Henry W. MacKenzie, Jr. one of the founding directors of VEE who has a great interest in the James River and the Chesapeake Bay.

Judges are Needed:

VJAS would like you to help by being a judge. What a wonderful way to learn more about this wonderful way to support student excellence. For more information please go to: http://www.vjas.org/judges-information.html

Safety Alert:

Chemistry Methanol-Based Flame Test Safety Alert

Information and alternatives:
http://www.nsta.org/safety/flametests.aspx

Teacher Resources

Podcasts Promote Careers in Minerals and Mining

Podcasts Dig Deep Into Careers in Minerals Aiming to promote awareness about mining and minerals, the Minerals Education Coalition (MEC) of the Society for Mining, Metallurgy & Exploration Foundation offers educational resources focusing on the ways that science, technology, engineering and mathematics are used by mining professionals throughout the industry.

The latest of these educational offerings is a series of MEC podcasts with industry experts, showing students how an interest in STEM subjects can lead to a rewarding career in the mining industry.

The series (http://www.mineralseducationcoalition.org/careers-mining) is accompanied by additional resources, including mining careers flyers, booklets, PowerPoint presentations, and a link to mining and mineral related job opportunities. For more information about longtime Earth Science Week program partner MEC, visit www.MineralsEducationCoalition.org .

Visualize Your Water Challenge! Challenge Opens January 2016

Are you a high school educator in the Great Lakes Basin or Chesapeake Bay Watershed? If so, get ready to enter your student(s) in the Visualize Your Water Challenge. Sign up today to learn more about this exciting geographic information systems (GIS) data visualization challenge about nutrient pollution. This challenge will equip your students with new technology skills and broaden their understanding of their environment. The Grand Prize winner will have an opportunity to attend the 2016 ESRI Education Conference in San Diego, CA and will be published in ESRI's Mapping the Nation book.

This challenge is hosted by the U.S. Geological Survey, U.S. Environmental Protection Agency, U.S. Department of Education, Great Lakes Observing Systems and ESRI (provider of GIS software to the White House ConnectED Initiative) and supports the work of the Challenging Nutrients coalition. Visit the Web site and request your free ArcGIS school account today!

Table of Contents

Teacher Resources

Join the 2016 JASON Argonaut Team!

JASON Learning is seeking a diverse, creative, and adventurous group of students and educators to venture into the field to conduct research with JASON scientists and engineers. Are you or someone you know up to the challenge of becoming one of our next JASON Argonauts?

http://www.jason.org/argo2016

UVA-JLAB Physical Science and Physics Resources

Since 2012 the University of Virginia Physics Department has partnered with Jefferson Lab to offer summer professional development programs for physical science and physics teachers. These programs grew out of initiatives sponsored by the Virginia Department of Education's Mathematics and Science Partnership grant program. The professional development programs included both instructions for hands-on laboratory activities, exploration of teaching methods, creating lesson plans, and seminars on the latest physics research.

The resources and activities designed to teach the Virginia Science Standards of Learning during the professional development are made available on this Web site : http://galileo.phys.virginia.edu/outreach/ProfessionalDevelopment/UVa-JLab/teacher_institute/ so that teachers throughout the Commonwealth can have access to new teaching materials for instructing their students.

VAST Board members "Making VAST Buck packets" for the auction before the PDI.

Environmental Literacy

A new Web page on the VDOE Web site has been developed to help teachers, schools, and school divisions stay informed about Virginia's environmental literacy resources, opportunities, and efforts. The Environmental Literacy (**http://www.doe.virginia.gov/instruction/environmental_literacy/index.shtml**)

Web page provides information and resources about the following:

- The Standards of Learning and Environmental Literacy;
- School Programs in Action and Sustainable School Programs;
- Virginia's Environmental Literacy Challenge;
- Teaching Resources and Professional Development Opportunities• Grant Opportunities; and
- More.

Please let us know what other items you would like to have added to the Environmental Literacy Web page.

Visualizing My Earth

AGI and the Center for Geoscience and Society are pleased to extend the celebration of Earth Science Week 2015 with the announcement of a new contest. **The Visualizing My Earth Challenge** invites full-time secondary and postsecondary students (ages 14 and older) to submit visual representations of natural phenomena from a geoscience perspective.

The Visualizing My Earth Challenge invites students to apply their Earth science knowledge to a photo in a way that represents data visually. Using any of a variety of techniques, students can modify or add information to the image. Changes should turn the photo into an image that enhances the viewer's ability to visualize a part of one or more Earth systems in important ways.

Each entry must include one visualization, one brief written statement, and one completed entry form. International entries are welcome. All entries must be submitted in English. The deadline for electronic submission is 5 p.m. EST, January 29, 2016, using the designated online platform. Cash prizes up to $300 will be awarded in each age group (14 to 17 years, 18 years and older).

For contest details and registration, please visit https://visualizingmyearth.skild.com .

Planning a Fieldtrip? There's an Ap for That!

A resource is now on the web to help educators plan fieldtrips, www.ClassTrips.com, which lists hundreds of day and overnight field trips for PreK- through High School-level groups. Visitors to ClassTrips.com can search by geographic area or the distance they want to travel. There are also field trip Lesson Plans to assist in maximizing the educational value of the trip.

ClassTrips.com was created in 1976 and is currently #1 on Google and Yahoo for field trips. Here is a direct link to the Virginia section.

http://www.classtrips.com/region-landing/2058/school-field-trips-in-virginia

To review on ClassTrips.com, you will find:

- 100's of day and overnight field trips for PreK–College-level groups.
- Easy searching by geographic area or distance to travel.
- Field trip Lesson Plans.
- In School-School Assembly Programs

Any suggestion for improving the site or venues that we might list, please let me know. Again thank you for your help in getting the word out about ClassTrips.com to science teachers.

Third Annual STEM Educator's Workshop Educate, Engage, Inspire!

For Elementary and Middle School Teachers and Homeschool Educators
February 26, 2016
8:30 a.m. - 3:00 p.m. Workshop
3:00 - 6:00 p.m. STEM Bonus Round

STEM Educators Workshop: Educate, Engage, Inspire!

Join elementary and middle school educators on February 26, at JMU, to learn about hands on STEM activities and resources that can be applied in the classroom. Register today!

CLICK to Register!

SCIENCE FOR ALL George Dewey

Perspective: A Sense of Wonder

"Run, run as fast as you can!
You can't catch me. I'm the Gingerbread Man."
– *St. Nicholas Magazine*, May 1875

For more than forty-five years it has become something of a family tradition to bake around four dozen gingerbread men for family and friends. The recipe is somewhat apocryphal but came into my mother's hands sometime in the 1940's. Together with her notes and written advice on spices used and baking temperatures and times, the finished "golden boys" are individually wrapped and delivered by hand or U.S. mail to anticipating children – that includes adults who still nourish their inward child. Handling and rolling the dough is always a challenge – flour type, age, humidity, thickness of rolled dough, type of cookie sheet and oven temperature and timing. The fun part is to see how each boy assumes his own particular personality as various raisins provide the final touch. Of course, there are the occasional spinal, head, or limb injuries creating a tension between my dear wife who hopes for maximum breakage (she gets the pieces), and the baker who strives for minimum amputations in manufacture and in shipping. The whole process is exacting and, yes, time-consuming, but rewarding –a time away from mall-madness to the relative quiet of one's own kitchen and sheltie who also keeps an anticipatory eye on things.

Regardless of tradition, though in this case Judeo-Christian, this is the time of year when many cultures celebrate the child. Coupled with festivities in dance and worship for the birth of Child and New Year, children are the focus of our gifts and our care. It is adults' chance in a northern-hemisphere season of darkness to celebrate the enlightening gift of children, especially in a world it would seem (according to the media) preoccupied, if not filled with violence and tragedy toward our children.

Every parent senses the hope and promise embodied in a newborn child, yet not without a humbling sense of anxious care that all will "come 'round right" as the old Shaker song has it. Rachel Carson puts it this way in her little book, *The Sense of Wonder:*

> A child's world is fresh and new and beautiful, full of wonder and excitement. It is our misfortune that for most of us that clear-eyed vision, that true instinct for what is beautiful and awe-inspiring, is dimmed and even lost before we reach adulthood. If I had influence with the good fairy who is supposed to preside over…all children I should ask that her gift to each child in the world be a sense of wonder so indestructible that it would last throughout life, as an unfailing antidote against the boredom and disenchantments of later years, the sterile preoccupation with things that are artificial, the alienation from the sources of our strength.

© Whole Child Leon

Carson wrote these words 60 years ago at a time when many parents and educators still looked at children as miniature adults, childhood as something to be endured until more responsible adulthood would arrive on the scene. In her convocation address at Wheelock College in September 1964, Dr. Alice Keliher decried turning young people toward the old: a Wisconsin community using McGuffey's Readers (1840 !) in classwork claiming they instilled patriotism and kindness toward animals; or headlines proclaiming "Bright Children Can Save Nation," so hurry them along with extended school days/years, get to the "right college" earlier; or how to teach 10-month-old babies to read; or a superintendent who boasted in print he had taken the "play" out of kindergarten; elementary schools eliminating "frills" like trips to fire stations or post offices or even recess; an elementary principal's letter to parents explaining all marks would be a letter grade lower to motivate students to work harder; or, finally, an article entitled "Why Waste Our Five-Year-Olds?" implying children are some sort of "adult instrumentalities" not to be wasted. These are adults "who are annoyed at the time consumed by the normal behaviors of childhood." Dr. Keliher concludes with her comments on the prevalence of battered children and the widespread (mis)use of tranquilizing drugs on children.

These remarks were made half a century ago when the U.S. population was only 190 million (323 million today). Now we have laws requiring teachers to be vigilant for signs of child abuse and behavioral maladjustments in our schools, but the heart of the problem continues to be a denial of the rights and requirements of childhood. We like to manage our children. Jacob Bronowski in his *Ascent of Man* addresses the "long childhood" in which our species has uniquely evolved. In one section he comments concerning the great civilizations from Egypt through the Middle Ages, "…by one test they all fail: they limit the freedom of the imagination of the young." Concerning the nomadic cultures, like the Persian Bakhtiari, "For most of history, children have been asked simply to conform to the image of the adult…the girls are little mothers in the making. The boys are little herdsmen. They

They even carry themselves like their parents." Is our habit of dressing our elementary school children like miniature adults (from sports to graduation) much different?

In 1992, just a year before he died, the physician/biologist/poet, Lewis Thomas, made some pertinent remarks in his customarily sensitive and insightful style in his last book, *The Fragile Species*, concerning the way our society treats children. Thomas traces the incredibly broad evolution of life on our planet from those archeobacteria some 3.7 billion years ago, through his "rough scientific guess" of about 100,000 years ago for human speech, and writing a mere evolutionary heartbeat of 10,000 years ago. Thus he reminds us of our common *humanity*, from the Indo-European root, *dhghem*, meaning simply "earth." Certainly the cognates like "humus," "humane," or "humble" should remind us to be considerably more aware if not sensitized to the developmental needs and proclivities of our children. Too often we persist in the Victorian and early 20th-Century picture of children as young adults in the making, waiting to be filled with facts and information, as though "early childhood is a primitive stage of life" that will be outgrown. With this disparaging bias toward sequential development [more on this later], "we keep overlooking…the sheer tremendous power, unique in the brain of a young child, never to be matched again later in life, for *learning*." He cites the ability (along with Stephen Jay Gould) of a child 3-4 years old to master three or more different languages simultaneously, as, for example, Turkish immigrant children living in Germany, teaching their parents how to speak good German. Lacking the kind of mental development encouraged by the crucial experiences of affection and respect (Thomas's words), children mature into adolescence with skewed concepts of the world. In fact, modern MRI evidence has shown that the super-abundance of unused neurons and neural synapses in children's brains are actually pared back during adolescence.

In his May 1995 column, "This View of Life"[2], in *Natural History* magazine, Stephen Jay Gould makes the point, in his molluscan research as in linguistic development, that less complex does not necessarily mean more primitive. In his several trips to Curaçao (the Dutch island off the coast of Spanish-speaking Venezuela), he became interested in the evolution of their creole language, Papiamentu. The sociopolitical bias of ranking modern "primitive" languages as being on the path between first human language and modern Indo-European tongues (like English) run counter to the less condescending notion that invention of language arises from "within us as shared properties of all people." Specifically, he found a leading language authority had made the point that creoles are largely created by children from pidgin basics "by grafting it onto the universal grammar that…all human beings inherit as a product of the evolutionary development of our brains." [This is based on Noam Chomsky's generative theory.]

Gould includes an interesting analogy to the "trap of equating small with simple or primitive" in the world of fractal geometry where curves are self-similar regardless of scale. In the example of determining the eastern coastline of North America, the total length on an 11 x 17 sheet of paper may be the same as that of Acadia National Park off the coast of Maine, or of a chart of one of Acadia's beaches when measured around each pebble. The result one obtains depends on the scale which is chosen where no particular scale is ranked higher or lower than the other. He concludes, "The beach [outline] is not simpler than the whole coastline, and the beach does not build the coastline by degrees." By analogy, one does not rank one language as more primitive (in any sense but "primary") or a child as an immature adult when one acknowledges differences in scale or complexity.

We come 'round again to Carson's and Thomas's concern about childhood sense of wonder and brain and language development. Children are not computer servers waiting to be filled with terabytes of information, a mere station-stop on the way to Grand Central. In the June 2015 *Scientific American*, the cover feature describes the neurological development of the "Amazing Teen Brain." Rather than brain growth itself, it is the interconnections (number and strength) and the dendritic myelination of neurons which accounts for the mismatch between teenage impulsivity and more controlled behavior. The limbic region (impulsivity, risk-taking) develops earlier (age 10-12) than the prefrontal (behavioral control, judgment) region (ages 20-25). MRI scans have led to a far deeper understanding of brain and behavioral development in pre-teens and teens. Again, evidence that childhood and adolescence are unique times biologically as well as socially in human growth and development.

Over and over we see how crucial the early stages in personal growth and maturation are in those childhood years where learning is stimulated by affection and respect. The May 2015 issue of *Phi Delta Kappan* addresses the importance of play and the Common Core. Contrary to earlier examples with which this column began, periods like recess and creative play are increasing in popularity. What are "frills" to some (like art and music programs in our schools) research seems to show are necessary for the healthy neurological and behavioral development of children and teens. As one professor put it, "Play is not a luxury. Play is a necessity. Children need the freedom and time to play." To counter the presumptive pressures toward Common Core Standards where reading and math instruction have squeezed out much of play, many schools are offering apps, virtual worlds, and video games in addition to other less-structured after-school and in-school programs such as "play shops." Playful learning is not to be discarded, but encouraged.

As this season celebrates a child's sense of wonder, there is much to recognize and to strive for in our schooling, reminded as we are of the immense evolutionary reach of the unique features of a child's neurological, physical, and emotional growth. Rachel Carson maintains:

> "I sincerely believe that for the child, and for the parent seeking to guide him, it is not half so important to *know* as to *feel*. If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow. The years of early childhood are the time to prepare the soil…What is the value of preserving and strengthening this sense of awe and wonder, this recognition of something beyond the boundaries of human existence?...I am sure there is something much deeper, something lasting and significant. Those who dwell, as scientists or laymen, among the beauties and mysteries of the earth are never alone or weary of life."

Photo credit: S.D. Bouch

As with teachers, Carson knew so well the importance of exploring a world which is at once old but ever new. Ralph W. Sockman puts it this way: "The larger the island of knowledge, the longer the shoreline of wonder."

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> "The most beautiful thing we can experience is the mysterious. It is the source of all true art and science… To know that what is impenetrable to us really exists, manifesting itself as the highest wisdom and the most radiant beauty…this knowledge, this feeling is at the center of true religiousness."
>
> – Albert Einstein

[1.] Gratitude is given to Whole Child Leon for their gracious permission to use this photo. www.wholechildleon.org

[2.] Interestingly, Gould seems to have taken his title from Charles Darwin's closing sentence in the 1859 publication of *The Origin of Species*: "There is grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being evolved."

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

FREE Resources

VIDEOS
LESSONS
More!

Grades K-5, 6-8, 9-12
STEM Life Science
Ecology Energy
Environmental
Physical Science
Natural Resources

Into the Outdoors: What We Offer

How many of you reading this use video as a teaching tool? You may have met with mixed results. Some videos probably excite your students and inspire them to think more critically about a certain science topic. Others are a one-way ticket to dreamland.

Into the Outdoors is a science education television series and educational network, all wrapped into one. We produce 30-minute episodes about a wide variety of science topics, ranging from how Native Americans utilize resources to the science of hibernation to sustainability on farms. Each episode gets broadcast on our twenty-station network. You can view our broadcast partners and times on right here on our website.

We do not just broadcast episodes, however. Each episode gets split into four, extended "Serious Science" videos with a STEM slant to be used in classrooms. Our team of curriculum developers then designs lessons aligned to state and federal standards to companion the videos.

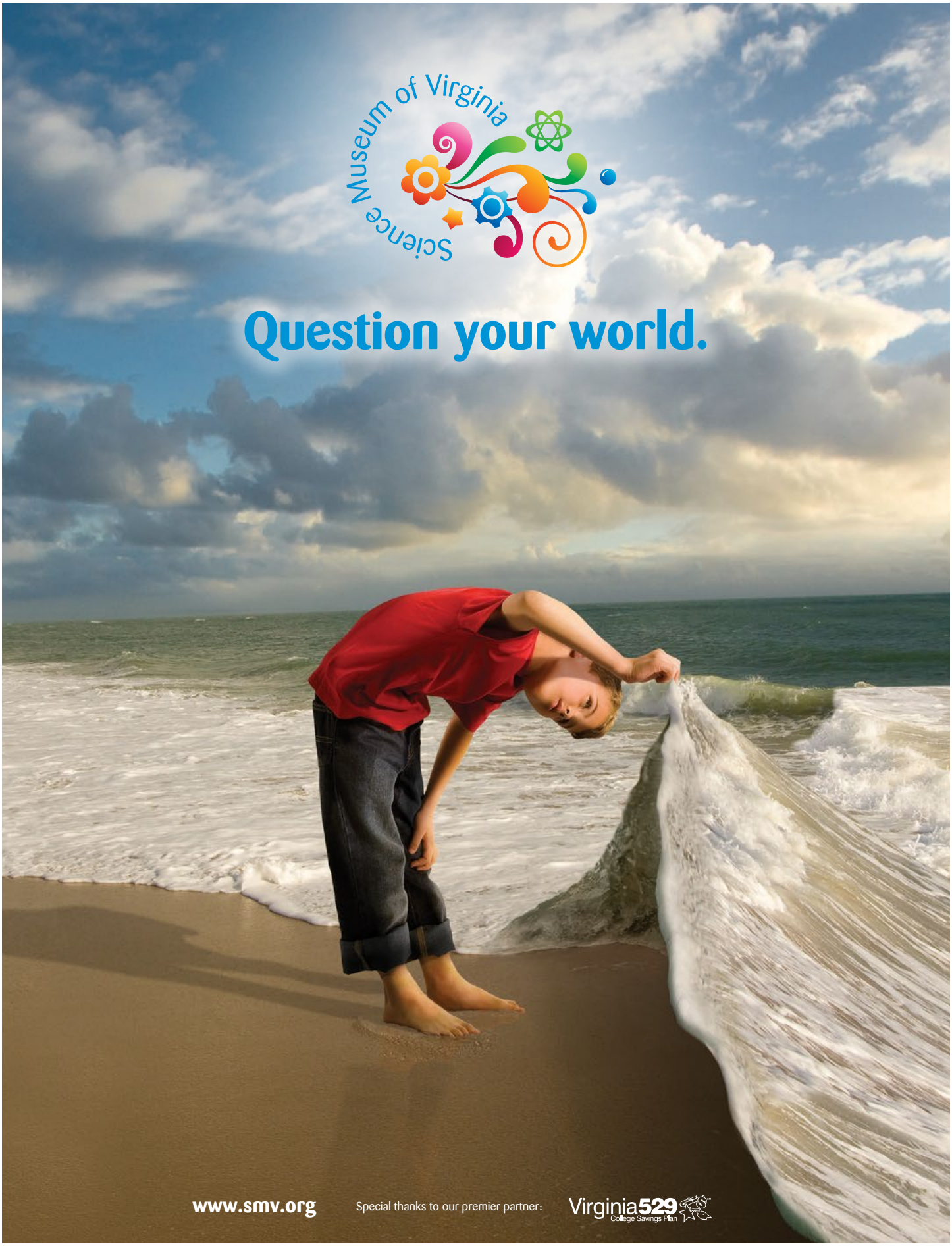
All of our resources may be downloaded for free from our website, and we encourage using our materials in classrooms both as stand-alone activities and as supplements to other topic discussions. We send news of updates to our educational materials, new episodes, or other developments in our quarterly newsletter which you can subscribe to right on our website. A field trip to some of the places we feature may not always be possible but, with us, you can always take your students...*Into the Outdoors*.

Example Lesson:

The elementary and middle school discussion guides give teachers the opportunity to herd their class towards a deeper understanding about how cattle are raised and why beef can be an important part of your diet. If you are a high school student, be sure to check out the additional lesson guide for your age group! Who knew learning could be so tasty? Click below to learn more!

Jump to VIDEOS

Meet the Meat Part 1 (8:3) DOWNLOAD VIDEO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Virginia Beach, VA 23464
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Join the VAST community on line. "LIKE" the Virginia Association of Science Teachers so that the latest science edicational news will appear on your page.
Region 2 has a new Facebook page. Please visit and join our community at:
https://www.facebook.com/Region2VAST.

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

Mission: The Virginia Association of Science Teachers (VAST) is a community of Science educators whose mission is to:

1. inspire students,

2. provide professional learning opportunities,

3. build partnerships,

4. advocate for excellence at the school, local, state and national level.

Please send articles, letters to the editor, or labs by the submission deadline, March 1, 2016, for inclusion in the next digital VAST Newsletter.

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