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<http://www.VAST.org>

Check the web for news, conference updates, registration, and forms.

The Science Educator

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Dr. Carol Tomlinson

SPARKING INNOVATION: ENHANCING STUDENT LEARNING



VAST Professional Development Institute



Dr. Diandra Leslie-Pelecky



Dr. Adolph Brown



Jon Bergmann



Andrés Ruzo

VAST PDI 2014 Update

New Event! Just for Elementary Teachers-Elementary Science Palooza!

You don't want to miss the biggest science party for elementary teachers this year! VAST listened to your suggestions and comments to bring you this event. There will be plenty of elementary sessions on Friday, but for two hours on Saturday morning, elementary teachers will have the opportunity to learn and pick up free lessons from your peers!

Think of it as science on speed dating! Every twenty-five minutes, you will have the opportunity to go from station to station picking up ideas for not only your grade level, but others! If you can't come for the entire conference, don't worry! VAST has a special one day rate for Saturday, November 22nd for you! Plan on coming and spending the day with VAST and other elementary teachers celebrating the fact scientists are born in elementary thanks to all you do!

Science Auction!

Back by popular demand, the science auction will take place this year. Here is how it works, as you attend the various sessions, exhibitors, and other events at the 2014 VAST PDI, you will earn VAST Bucks. These bucks can then be used on Friday, November 21st to purchase gently used materials for your classroom. VAST knows budgets are tight and we want to help you acquire the materials you need to do science successfully in your school!

(more page 20)

Friday Night Awards Dinner

If you are planning on coming to the conference, spend some time celebrating your peers! Enjoy a nice meal and time with new friends while you cheer on colleagues who have done outstanding work this past year. Dinner is only \$35 and tickets are going fast!

Hotel Update

We are so excited about the PDI this year and it seems you are as well! With so many registrations already this summer, we have had to open some more rooms at other hotels. Please check the VAST website for more information on hotel spaces in the area! (more page 9)

From the Executive Director



VAST MEMBERS:

For the latest updates on the VAST PDI GO TO
<http://www.VAST.org> !

Concurrent Sessions are posted on the web and will be updated as new information is available. Find the latest on hotels, and program schedule.

Don't Forget

Register before September 1st for the Early Bird rates!

Make reservations to stay in Roanoke now!
Rooms are going fast!

IF you get this newsletter in time, then please check the date to see if you have time to submit VAST award and VAST mini-grant applications.

Susan Booth

Encourage New Science Teachers Support 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.

To make a tax-deductible contribution please send your donation directly to the treasurer, Jimmy Johnson, 12141 Winns Church Rd, Glen Allen, VA, 23059; check payable to VAST, "First Timers Award Endowment".

Thank you!!!

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

Contents:

- | | |
|---|---|
| 1. <i>Sparking Innovation</i> - PDI 2014 Update | 13-29. PDI Concurrent Sessions |
| 2. Executive Director, Contents | 20. Friday Night PDI Festivities! |
| 3-4. President's page - VAST Retreat | 31-33 Science For All - George Dewey |
| 5. Welcome to Virginia's Science Educators from Va. DOE | 33. VABT |
| 6. PDI Schedule | 34. Region 4 - Regional PDI |
| 7-8. PDI Pre-Conference Workshops | 35-37. Role of Laboratory in K-12 Science - VAST Position Statement |
| 9. PDI and Hotel Registration | 37. Science Matters |
| 10-11. VAST PDI Speakers | 38. Corporate Benefactors and Members |
| 11. Smokey the Bear at the PDI! | 39. Leadership, DOE Teacher Direct |
| 12. VAST Ballot 2014 | 40. Mission and Forms |



The Virginia Association of Science Teachers (VAST) is here for you!



Shirley Sybolt, VAST President

VAST Leadership Retreat 2014 Your Organization at Work!

Even though VAST has 62 years of history as a state science organization, the organization felt that it was time to take a look at how it is organized and to consider where the organization wants to be in the near future, in five years, in ten years, etc.

Recently, 19 members of the VAST Board of Directors participated in a leadership retreat at Camp Piankatank in Middlesex County, Virginia. This retreat was held on July 26th and 27th. Board members arrived early at this camp and moved into their bunkhouses before gathering together for meetings in Edwards Hall.

The purpose of the initial meeting at this leadership retreat was to start the process of creating a strategic plan for our organization. The aim of this retreat was for our retreat facilitator to better understand VAST as an organization and to help us establish a clear direction for the future. Our retreat facilitator, Stephanie Enzmann, started the meeting by establishing ground rules of conduct for all participants.



Next Stephanie had all participants do a **quick write** with the topic “What does an ideal science classroom look like?” The **quick write** generated lots of great ideas:

- noisy, with students working together to solve a problem
- students listening to each other and sharing their own ideas
- everyone participating & collaborating
- students touching, doing things, and trying to figure out how things work
- visually stimulating
- a place where students see themselves as scientists
- students engaged and asking questions

- evidence of learning and understanding
- students using inquiry, making observations, following the scientific process
- students involved in real-world experiences in a safe environment
- integration with other subjects: Math (data collection), Writing (recording procedures in sequential order), Reading (recording steps in a process and drawing conclusions)
- clear expectations for all students
- experiences are connected to the real world
- the teacher is a facilitator, not a lecturer
- curriculum, instruction, and assessment are deliberate and aligned
- evidence of diversity, curiosity, and teamwork

After the **quick write** activity, Stephanie shared a motivational video, TED Talks: **Ideas Worth Spreading- Your Own Personal Why** by Simon Sinek. This video clip reinforced why some businesses are successful and others are not and the video emphasized that successful companies focus on selling their “why”, not their “what” or their “how”. This video also explained how great leaders are able to inspire action. Stephanie emphasized that all good teachers get their students to believe what he/she (the teacher) believes; she stated that the students will always know whether or not their teacher believes that they “can learn and understand science”. She shared an affinity diagram and explained that this type of diagram is an instructional strategy that helps to facilitate the organization of multiple ideas under different topics. The affinity diagram will be used to begin to look at Strategic Objective/goals for VAST’s future.

In small groups, retreat participants thought about and shared their responses to several prompts:

- What is my personal why?
- What is my purpose for being a science teacher?
- What is VAST’s why and what is VAST’s purpose?

This last prompt generated several shared thoughts by retreat participants:

- creating opportunities
- being inspirational
- show-casing excellence
- providing resources
- generational appeal, something for everyone, peer associations
- professionalism
- effective ways to communicate with all members

Next, retreat participants walked around the room and participated in a “drive-by” activity in which they used Post-It notes to respond to 4 prompts:

1. What are the challenges for VAST?
2. What are the potential innovations?
3. What are the lessons learned?
4. Other considerations?

Summer Summer Reflections: *Teachers can Change the World for a child!*

All Post-It notes were then collected by the facilitator and resorted by things they had in common. These groupings became big ideas for further reflection and these ideas will be revisited at future VAST Board meetings.

Next Stephanie reviewed the goals of our retreat, which were: to identify the common purpose of VAST, to review the current mission, and for Board members to begin thinking about a clear vision for VAST. After review of our mission, we all realized that our organization lacks a clear vision of where we want our organization to go in the future. Stephanie led discussions about our organization's core values and asked us what we wanted to do next. We all agreed that our organization needs a clear vision and a specific strategic plan to help us realize our vision as a statewide science organization. In future meetings to create a strategic plan for VAST, we will continue to work to establish a shared purpose for VAST (a clear vision), a mission statement that represents the current organization, and clear direction for the future.

We were all grateful to Stephanie for sharing her time and experience with us in helping our organization start to establish a strategic plan that will increase its effectiveness. We look forward to working with Stephanie in the future to strengthen our organization and to make VAST even more supportive of our statewide membership.

After lunch we all said good-bye to Stephanie and took a few hours to relax and network through informal conversations, as most of the afternoon was rainy and a few of our pre-dinner outdoor activities were canceled.



Shortly after dinner, we were able to reschedule our canoeing trip on the Piankatank River and 10 of our retreat participants canoed out to the island owned by the camp. This adventuresome group had fun paddling across the river where they beached the canoes on the island and walked across the island to explore the backside of this river island. In the shallows on the far side of the island several retreat members discovered moon snails on the reeds and blue crabs and small fish feeding in the shallows. As the sun started to set, these explorers paddled back to the mainland.

Retreat participants that did not go canoeing had time to visit and get to know each other better while hanging out at the overlook above the river, which gave them an awesome birds eye view out

across the river. Canoeing and hanging out at the river's overlook ended as the sun sank beyond the horizon.

Next all retreat participants gathered in Edwards Hall and had a great time creating original designs on their retreat t-shirts. It was amazing to see all the different designs that individuals came up with and to note the long periods of time in this room where there was complete silence as everyone concentrated on thinking/designing and applying their best artistic talents to a clean slate (a white t-shirt). Retreat participants enjoyed walking around the room and admiring all the great ideas that the others had come up with to represent this VAST leadership retreat.

As we stepped out of Edwards Hall, into total darkness on our way to the campfire site above the river, we walked through a chorus of thousands of tree frogs singing their many songs. At the campfire, retreat participants had fun making and eating S'mores (graham crackers and Hershey chocolate bars glued together with melted marshmallows). Yum!

Finally we ended this incredible evening by walking back to the river's overlook and looking up at the multitude of stars and planets; what an awesome night to star gaze as it was a new moon. While stargazing, a retreat member shared his Google Sky app with everyone. It was really amazing to see how quickly the different stars, constellations and planets could be identified, just by holding the electronic device up towards different sections of the sky. Way cool! We even saw shooting stars!

Sunday morning after breakfast, everyone participated in another information gathering session. During this round robin session, retreat participants rotated in small groups to four different topic posters:

- SOA's/Advocacy
- Why be a VAST member?
- Regional PD Guidelines
- VAST motto/slogan

After the four rotations were completed, everyone came back together in whole group and held discussions about items listed on each of the four posters. A lot of great ideas were generated by this brainstorming activity and these ideas will all be shared with all Board members at future Board meetings. These ideas will be used to help our organization better meet the needs of its members in the future.

After an awesome lunch of homemade quiche and apple cobbler with ice cream, all the retreat participants loaded their vehicles and headed home to different parts of the state.

This leadership retreat was an awesome way to get a lot of organizational work completed and a rare opportunity for our board members to have fun, and the time, to network/visit with each other in a beautiful, relaxed, natural environment.

As the VAST Board continues to work towards identifying ways to be even more supportive of our statewide membership, we'd like our members to make comments and suggestions on how "we" can support "you". Check us out on the VAST website at <http://www.vast.org> and please email your suggestions to me at: ssypolt@hampton.k12.va.us. (See page 29 for more photos)



COMMONWEALTH of VIRGINIA

DEPARTMENT OF EDUCATION

P.O. BOX 2120

RICHMOND 23218-2120

DATE: May 2, 2014

TO: Science Educators

FROM: Eric M. Rhoades, Director
Office of Science and Health Education

Barbara Young, Science Specialist
Office of Science and Health Education

Jim Firebaugh, Science and Mathematics Specialist
Office of Science and Health Education

SUBJECT: 2014 Virginia Association of Science Teachers
Professional Development Institute

The Virginia Association of Science Teachers (VAST) has spent the past year planning for the 2014 Professional Development Institute (PDI) that will be held November 20-22, 2014 at the Hotel Roanoke and Conference Center in Roanoke, Virginia. This year's VAST PDI supports the 2010 ***Science Standards of Learning*** (SOL) by offering over 200 concurrent sessions, several field trips, and nationally known keynote speakers. Educators will be able to hear exciting speakers, network with fellow science teachers from all over the state, gain new ideas to enhance their content knowledge, and experience cutting-edge technology. This PDI provides educators the opportunity to earn recertification points and they may choose the option of earning college credit.

Educators at every level of science will find many topics of interest with which to build their expertise. VAST, a professional association with over 2000 members, advocates for high-quality science instruction for all students at all levels. The PDI provides an avenue for communication among all members of the science teaching community.

We encourage science educators to take the opportunity to use the VAST PDI as a part of their professional development plan in order to expand and promote excellence in science education, as well as science literacy in Virginia.

For more information regarding the Virginia Association of Science Teachers or the annual PDI, please visit **www.vast.org** or contact Susan Booth, Executive Director at **susan.science@gmail.com**.



VAST Professional Development Institute (PDI) 2014

Hotel Roanoke
November 20 - 22

Schedule:

Thursday, November 20, 2014

8:00 a.m.-8:30 a.m.

8:30 a.m.-3:00 p.m.

3:00 p.m.- 7:30 p.m.

3:45 p.m.-5:15 p.m.

5:30 p.m.-6:45 p.m.

7:00 p.m.-8:00 p.m.

8:00 p.m.-9:30 p.m.

Registration Desk for Pre-Conference/Short Courses Opens

Pre-Conference Ticketed Workshop: ***Differentiating Instruction: Planning Instruction that Supports Academic Success with Carol Tomlinson***

Registration Desk Opens For Short Courses/ Conference Registration
Free Short Courses Open **Pre-Registration required

General Session I: Dr. Adolph Brown

Ticketed Dinner

A Night with the Exhibitors

Friday, November 21, 2014

7:00 a.m.-6:00 p.m.

7:00 a.m.-8:30 a.m.

8:00 a.m.-9:45 a.m.

10:00 a.m.-11:00 a.m.

11:15 a.m.-12:15 p.m.

12:15 p.m.-1:30 p.m.

1:45 p.m.-2:45 p.m.

3:00 p.m.-4:00 p.m.

4:15 p.m.-5:30 p.m.

6:00 p.m.-7:15 p.m.

7:45 p.m.- 9:00 p.m.

9:15 p.m.-10:30 p.m.

Registration Desk Open

Continental Breakfast

General Session 2- Official opening Ceremony/Keynote:
Differentiation and Mindset - Carol Tomlinson

Concurrent Session 1

Concurrent Session 2

Meet your Regional Directors

Concurrent Session 3

Concurrent Session 4

Concurrent Session 5

Ticketed Awards Dinner

General Session 3: Keynote: ***Flip Your Classroom: Reach Every Student in Every Class Every Day*** - Jonathan Bergman

Auction/dance

Saturday November 22, 2014

7:00 a.m.-10 a.m.

7:00 a.m.-8:15 a.m.

8:00 a.m.-10:00 a.m.

10:05 a.m.-11:05 a.m.

11:20 a.m.-12:10 p.m.

12:10 p.m.-1:00 p.m.

1:00 p.m.:2:00 p.m.

2:15 p.m.-3:30 p.m.

Registration Desk Open

Continental Breakfast

General Session 4 VAST Membership Meeting.

Keynote: ***Inspiring Every Student Everyday*** – Andres Ruzo

Concurrent Session 6

Concurrent Session 7

Exhibits and Lunch

Concurrent Session 8

General Session 5/Keynote: ***Science and Nascar***- Dr. Diandra Leslie-Pelecky

DRAFT

VAST PDI 2014 PRECONFERENCE



The VAST Preconference will be value intensive this year. Please make the effort to come to Roanoke on Thursday and stay through Saturday. There will be over a hundred concurrent sessions on Friday and Saturday, but Thursday workshops will offer opportunities for more in-depth learning of skills and experiences.

Pre-Conference Workshop- Thursday November 20, 2014

Dr. Carol Tomlinson

8:30 a.m. -3:00 p.m.

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

Cost:

VAST Members: \$75

Non-Members: \$95

Students: \$75

(registration required)

Teams: \$150 for 4 (Administrator +3 Teachers)* This price is only for attendance at the pre-conference event.

This price includes a continental breakfast. Lunch will be on your own.



Free Short Course Workshops- Thursday November 20, 2014

3:45 p.m.-5:15 p.m.

• Why are Pencils Yellow? - Elementary Teachers

Presenter: Dr. Jenny Sue Flannagan

Why are pencils yellow? How were diapers made and how do they connect to matter?

Thinking critically begins the moment we become curious, ask questions, and seek to find the answers to questions. Through experiments associated with topics such as matter, electricity, and other great activities, teachers will learn how to build research opportunities to unlock the scientific discoveries of the past. (grade level focus - elementary) Free Materials!

• Who asks the QUESTIONS?- Middle School Teachers

Presenter: Anne Moore

The content may be different, but the inquiry process is the same! Come experience various lessons and topics across the grade levels of middle school that will support teams in building a vertical articulation of inquiry modules. Hands-on activities will guide your tour through general, life, and physical science topics.

• Student Research: Yes, There Is a Role in Today's Classrooms! - Middle/High School Teachers

Presenter: Dr. Julia Cothron

The Next Generation Science Standards advocate scientific research experiences for all students, with such experiences an integral part of course-related classroom and field experiences at the secondary level. Building upon her classic work, Dr. Cothron will offer updated strategies for helping students move from investigation to experimentation, modifying classroom labs to emphasize scientific inquiry practices, a "scientific research brief" to support team mini-projects within the classroom and using multiple forms of assessment to support student growth and success.

Free Short Course Workshops- Thursday November 20, 2014 (continued)

3:45 p.m.-5:15 p.m.

• Leadership Matters:

Building a Differentiated Science Program by Developing Teacher Expertise - Administrators

Presenter: Dr. Kelly Hedrick

If the goal is the development of expertise in responsive teaching, how do we all get there? Some folks will take the expressway, while others need the scenic route. It is important to understand the stages and needs of the learner at every step toward expertise in responsive teaching. Everyone will need support, information, and opportunities for growth along the way. In this session, participants are given a tool for thinking about the journey toward expertise in differentiation and methods for guiding colleagues. For anyone who is responsible for staff development and assisting others in responsive teaching, this session provides a framework for developing expertise in differentiation among a wide range of educators including administrators.

• Inquiry: How Simply Changing the Question Can Shift the Focus - Biology Teachers

Presenter: Stephen Biscottee

Repeat after me: “All students can do inquiry. Inquiry is not a one-time thing. Inquiry increases student interest and learning. I will attend this short course.” The presenter will take the participants through the process of turning a traditional cookbook lab lesson into a student-centered inquiry-based learning opportunity grounded in the Virginia Standards of Learning (and not just the inquiry ones). Working in small groups by content area, participants will develop (and leave with) an inquiry activity for their classroom based on their own standards, resources, and students. Samples for each content area will be provided, but participants are encouraged to bring their own materials (lessons, cookbook labs) to reconstruct.

• Exploring Inquiry with Factors Affecting Enzyme Activity - Biology Teachers

Presenter: Jeremy Dove

In this short course teachers will examine different ways their students can use the various levels of inquiry to explore several factors affecting enzyme function. Teachers will explore how cook book labs can be modified to allow for students to truly “investigate and understand” SOL topics and gain a deeper understanding of content.

• Creating Inquiring Minds in a Limited Time Frame - Chemistry Teachers

Presenter: Tammy Stone

Science teachers know that authentic experiments and experiences are the paramount way to develop critical thinking and foster the nature of science. In today’s age of assessments though, how does a teacher make chemistry real and relevant so that their students are inquiring, and investigating while covering all of the chemistry standards of learning. This session will explore lesson plan ideas and labs that have been successfully used in chemistry classes to help all students inquire and investigate while being successful on the standards of learning.

Free Short Course Workshops- Friday, November 21, 2014

10:00 am.- 12:00 p.m.

• Rigor and Learning Engagement through Quality Curriculum & Instruction - Administrators

Presenter: Dr. Kelly Hedrick

Where do rigor and engagement come from? With science standards as our platform, but we have to align them with big ideas, student-centered learning strategies, and scaffolding techniques to support a range of learner needs. This is a tall order, but completely possible. In fact, when working with a range of learners it is a moral imperative! In this session, participants will identify where big ideas come from through concept-based curriculum and look at a model for aligning worthy learning targets with instructional strategies and scaffolding methods in the science classroom. The result is a rigorous curriculum delivered through differentiated instruction.

• Analyzing Experimental Data: Looking Through Different Lenses - All

Presenter: Dr. Julia Cothron

For years, I’ve listened to their arguments: science teachers say they integrate mathematics in the classrooms, mathematics teachers say “no, it’s not mathematics, its computation”. Building upon her classic work with data analysis, and using recommendations from the Next Generation Science Standards, Dr. Cothron will offer strategies for going beyond algorithmic approaches for data analysis including defending data collection techniques, explaining methods of data analysis, using mathematics and arguing from evidence.

Come to the Hotel Roanoke for the VAST PDI Sparkling Innovation: Enhancing Student Learning November 19-22, 2014



Registration for VAST PDI

FULL PDI Registration includes admission to all general and concurrent sessions (Thursday afternoon-Saturday afternoon) exhibits, and continental breakfast Friday and Saturday. Nonmember registration includes annual VAST membership.

PDI Registration

Early bird must be ordered and paid by October 18, 2014

Current Member Registration:

- \$150.00 - Member Early bird professional registration (Full Conference Th afternoon-SA)
- \$75 Pre-Conference Workshop with Carol Tomlinson

Nonmember Registration:

- \$175.00 - Nonmember Early bird professional registration (Full Conference Th afternoon-SA; includes a 1 year VAST membership)
- \$100 Pre-Conference Workshop with Carol Tomlinson

Student Registration:

- \$70.00 - Early bird student registration (Includes annual membership)
- \$30 Pre-Conference Workshop with Carol Tomlinson

Standard Registration After October 18th, 2014

- \$180.00 - Member Standard professional registration (Th afternoon-SA)
- \$100-Member Pre-Conference Workshop with Carol Tomlinson
- \$205.00 - Nonmember Standard professional registration (Th afternoon-SA; includes 1 year VAST Membership)
- \$125-Nonmember Pre-Conference Workshop with Carol Tomlinson
- \$100.00 - Standard student registration
- \$110-Student Pre-Conference Workshop with Carol Tomlinson

PDI Presenters Registration

Early Bird Option must be ordered AND PAID BY

September 1, 2014

- \$130.00 - Member Early Bird presenter registration
- \$50-Member Pre-Conference Registration for Carol Tomlinson
- \$155.00 - Nonmember Early Bird presenter registration
- \$75-Nonmember Early Bird Presenter Registration for Carol Tomlinson

Please registration on the VAST website.

To register go to:

<http://www.vast.org/annual-pdi.html>

Hotel Reservations

(updated 7.25.14)

The Hotel Roanoke at this time has sold out the block. However, two nearby Holiday Inn hotels have rooms for VAST attendees:

- **Holiday Inn Express** (Roanoke Civic Center) VA at 540-982-0100. The **Group Name Code is VAS**. Room rate is \$109.90 tax included. You will receive complimentary Deluxe Continental Breakfast to include pancakes, fruit, coffee, etc. We are currently working on a shuttle as well.

- **Holiday Inn Valley View**, 3315 Ordway Drive, Roanoke, VA 24017. Individuals will call the hotel direct 540-362-4500 or toll free reservations number 1-855-561-7967. Please use the group code provided when making all reservations. Individuals may also book reservations by going online to www.holidayinn.com/roavalleyview & entering the **Group Code VAS** as well as using the direct link that is provided by email to group.

A major credit card or advance deposit is required to guarantee all individual reservations.

Parking

The following is The Hotel Roanoke & Conference Center - a DoubleTree by Hilton Hotel's 2013 parking fee structure:

Overnight Hotel Guest:

Self Parking: \$7.00 Valet Parking: \$12.00

Daily Parking: Self Parking: \$1.00 - \$6.00

Note: Prices are subject to change without prior notification.

Hotel Updates!

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

About Downtown Roanoke

Click here for information on food and other events going on in downtown Roanoke.

<http://www.downtownroanoke.org/dining>

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 to the VAST website and watch for VAST Newsletters and E-Notes!

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 and credentialed administrator, full tenured university professor, university dean and businessman, Dr. Brown has studied and worked along side highly successful leaders and educators. He has taken his over 25 years experience and 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.

Adolph Brown is a leading authority on Educational Excellence and Leadership Development and is an International speaker. He has overcome an upbringing of extreme poverty and violence, welfare, fatherlessness, and a single-mother led household. Dr. Brown earned multiple degrees from the College of William and Mary in psychology and anthropology, graduate study in child and family development and community/clinical psychology with an emphasis in group dynamics.



Dr. Adolph Brown

Friday Keynote

Dr. Carol Tomlinson - *Differentiation and Brain Research*

In this session, Dr. Carol Ann Tomlinson will discuss the key principles of differentiation and how they are connected to brain research. Curriculum and instruction for struggling and advanced learners, effective instruction in heterogeneous settings, and encouraging creative and critical thinking in the classroom have been special interests throughout Dr. Tomlinson’s career.

Dr. Carol Ann Tomlinson is the author of over 200 articles, book chapters, books, and other professional development materials.

She was a public school teacher for twenty-one years and a program administrator of special services for struggling and advanced learners for an additional twelve years. Dr. Tomlinson was Virginia’s Teacher of the Year in 1974. More recently, she has been a faculty member at the University of Virginia’s Curry School of Education, and she is Codirector of the University’s Institutes on Academic Diversity. She was named Outstanding Professor at Curry School of Education in 2004 and received an All University Teaching Award in 2008.

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.

Jon Bergmann co-wrote the book on the Flipped Classroom that inspired educators internationally and is available from ISTE Press (2012). He received the Presidential Award for Excellence for Math and Science Teaching in 2002 and was named Semi-Finalist for the Colorado Teacher of the Year in 2010. Jon Bergmann blogs at flipped-learning.com and you may see and hear his TED Talk at http://www.ted.com/speakers/jon_bergmann



Dr. Carol Tomlinson



Jon Bergmann

VAST Professional Development Institute

Speakers 2014 (continued)

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.

A member of the physics department at the University of Texas at Dallas, Dr. Diandra Leslie-Pelecky is the author of *The Physics of NASCAR* that describes the sophisticated and complex world of stock car racing. In her lab she is working on a nanomedical project. She is developing a chemotherapy using nanoparticles that hopefully will cluster harsh drugs on the surfaces of cancerous tumors, while not harming the good cells. If successful, her treatment will reduce the tumors, but not leave patients sick and bald.



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.

When he was young, Andrés spent summers in Nicaragua on his family's farm which just happens to be on top the Casita Volcano. Later he attended Southern Methodist University and his earlier first hand experiences with the volcano motivated him to take a volcanology class. His personal connection to the discipline was further strengthened when he opened his text to find a photo of the Casita Volcano. These were just coincidences, but they created Andrés passion for geology. He is particularly interested in the geothermal energy and how it can be harnessed to solve the earth's environmental, economic and social problems.



SMOKEY IS COMING TO THE VAST PDI

PLAN TO HAVE YOUR PICTURE TAKEN WITH SMOKEY!

SMOKEY'S STORY

Dressed in a ranger's hat, belted blue jeans, and carrying a shovel, he has been the recognized wildfire prevention symbol since 1944.

One spring day in 1950 in the Capitan Mountains of New Mexico, a little cub had been caught in the path of the fire. He had taken refuge in a tree that was now nothing but a charred, smoking snag. His climb had saved his life but left him badly burned on the paws

and hind legs. The firefighters removed the little bear cub from the burned tree and a rancher, who had been helping the firefighters, agreed to take the cub home. The cub needed veterinary aid and was flown to Santa Fe where the burns were treated and bandaged. The firefighters who rescued the little bear cub call him Hot Foot Teddy but his name quickly was changed to Smokey Bear.



Ballot

The Nominating Committee presents the following slate of officers for election at the VAST Annual Meeting, Saturday, November 17, 2014 in Roanoke. Elected officers will begin their terms January 1, 2015.

Nominating Committee for 2014: Brita Hampton, Andy Jackson, Eric Pyle, Juanita Jo Matkins, and Shirley Sypolt
Nominating Committee Chair for 2014: Brita Hampton

For President Elect (2015) This officer will become President in 2016

Kathy Frame Yes No

Kathy Frame is a lifetime educator with 15 years of classroom experience in biology and chemistry. She has 25 years of national experience with teachers, students, and the public in microbiology, biotechnology, independent science research and other sciences as a professional curriculum designer and provider, author, and speaker. Her national experience includes nine years as the National Association of Biology Teachers' Director of Education and six years as the Vice President of Education and Your World Editor-in-Chief for the Biotechnology Institute. She is currently the director of the USA Biology Olympiad for the Center for Excellence in Education, president of the Virginia Association of Biology Teachers and director of the Virginia Outstanding Biology Teacher Award. Kathy is a lifetime member of VAST and serves as the Biology Chair on the VAST Board.

For Secretary (2015-2018)

Robin Curtis Yes No

Robin is currently adjunct faculty at the College of William & Mary as a University Supervisor and Instructional Coach. She was the NSTA District VIII Director from 2006-2009. She was a nationally recognized science teacher in 2005 and VAST President in 2002. She has served on several NSTA and VAST committees.

For Director, Region 2 (2015-2017)

Adrienne Sawyer..... Yes No

For Director, Region 4 (2015-2017)

Susan Bardenhagen..... Yes No

Susan is a grade 2-5 elementary and grade 6-8 Math & Science teacher. Susan has been a VAST member since the '80s, PDI presenter, Region 4 Director since 2011, and Regional Director Coordinator since January, 2014; as an Educator Associate of AIAA and Conference Coordinator for AAUW, she coordinates judging of Science Fairs/STEM Festivals. Susan coordinated the Region 4 2012 STEM and 2014 STEAM conferences.

For Director, Region 6 (2015-2017)

Tom Fitzpatrick..... Yes No

Tom is starting his 28th year with Roanoke City Public Schools, twenty-one years as a middle school science teacher and seven years as PK-12 Science Supervisor. He was a Virginia Regional Teacher of the Year in 2006 and he is a state facilitator for Project WILD, Growing up WILD, and Project Learning Tree.

For Director, Region 8 (2015-2017)

Pam Aerni Yes No

Pam is an educator with 23 years of experience teaching science and math in preschool through middle school. She is a former assistant professor in teacher preparation and is passionate about science and math education with others.

Proposed additions to VAST's Operating Procedures:

At its July 26, 2014 meeting, the VAST Board approved the following:

1. A change of the definition of VAST members: "Regular members are those currently in the field of science education or other individuals interested in improving science education."
☐ Approve ☐ Do Not Approve
2. A change in the role of the President Elect: The President Elect shall serve as the co-Chairperson of the standing Conference Committee (working closely with the PDI chair) for the purpose of planning, scheduling, and execution of the conference scheduled for the year of his/her term of office."
☐ Approve ☐ Do Not Approve

If you will not be present at the Annual Meeting, please cast an absentee ballot. Deadline for receipt of ballots is November 2, 2014. Return your completed ballot to: Brita Hampton, 1401 Goose Landing, Virginia Beach, VA 23451

VAST Professional Development Institute 2014

Hotel Roanoke

Sparkling Innovation: Enhancing Student Learning!

November 19-22, 2014

Concurrent Sessions for Friday and Saturday!

Dates, times and locations will be published later.

Be STEM Minded

STEM/Environmental Education: Integration and Innovation

Pack your backpack and get set to be amazed on a wonderful expedition with Kaleela as your guide to discover and explore "GreenScapes"™ using eco-friendly recyclable objects to build habitats based on science, mathematics, and technology.

Engineering

Kaleela Thompson

Pre-K - 2 Grades

Children's Engineering Throughout the Curriculum

STEM/Environmental Education: Integration and Innovation

Engineering

Susan Eckenrode, John Wayland Elementary School

Pre-K - 2 Grades

Are you having trouble incorporating children's engineering into the 4 core areas? We will create parachutes and marshmallow towers using money to purchase our materials. We will look at the pop-up card and how it can be used in many ways. Participants will come away with many ideas to use in their classrooms with very little prep time needed.

See the World Like a Scientist

Connecting the Dots: Virginia Science Standards and Your Classroom

Diane Dodge, Garrisonville Elementary

Students are natural scientists. Their curiosity is endless. Guiding them to observe the world around them with a scientific lense, and to ask questions that lead to discovery is our job. Learn how to incorporate science throughout the day using morning meeting routines, I wonder questions and guided observation.

General Science

Pre-K - 2 Grades

Kathy Carpenter, Margaret Brent Elementary;

Mission STEM: A cross-curricular approach to engage young students

Linking Science and Other Content Standards

Join us for a highly interactive workshop that focuses on inquiry-based, cross-curricular learning, incorporating science, mathematics, and language arts. The session will include engaging hands-on STEM activities for Pre-K to 3rd grade students, that support national and state standards, and that can be immediately implemented in the classroom.

General Science

Pre-K - 2 Grades

Tom Custer, Zula International

Jumpstarting STEM in Preschool

STEM/Environmental Education: Integration and Innovation

School

Come learn how simple STEM lessons will enrich daily activities and allow young learners to explore, which we all know they were born to do! By providing indoor and outdoor STEM learning environments, children will get an early start to making those critical connections to the field of STEM. Participants will get a copy of the lessons presented as well as engage in a few fun hands-on activities. Learn how simple it is to get preschool children excited about STEM!

General Science

Pre-K - 2 Grades

Heather Newton, Bullfrogs and Butterflies

10 Minutes or Less for Science Success K-5

Connecting the Dots: Virginia Science Standards and Your Classroom

Learn how you can break the standards into manageable, bite-sized chunks of instruction that will fit with any curriculum, useable by any teacher, and embed consistent science standards language in every classroom. Scientific Minds and our Science Starters are proven to improve student state test scores, especially with underserved populations. All attendees will receive free materials.

General Science

Pre-K - 2 Grades

Edward Rock, Scientific Minds, LLC

Primary STEM Challenge (Grades K-2): Humpty Dumpty Rides Again

STEM/Environmental Education: Integration and Innovation

Education

You all know the story about Humpty Dumpty falling and the futile efforts of the King's men. Fast forward to 2014 and join us for a design challenge as we revisit Humpty as he has taken on the role of a crash test dummy. His fate is in your hands.

Physics/Physical Science

Pre-K - 2 Grades

William Metz and Kip Bisignano, Delta

The H₂O's of Chemistry: Basic Concepts Taught Through Investigation

Connecting the Dots: Virginia Science Standards and Your Classroom

and Jennifer Maeng, University of Virginia

Virtually every aspect of life involves chemistry! In this session, led by members of UVa's Chemistry LEAD Program, elementary teachers engage in hands-on, inquiry-based activities focusing on fundamental chemistry concepts. Additionally, we describe an opportunity at UVa for teachers to participate in other inquiry-based chemistry investigations appropriate for K-5 students.

Chemistry

Pre-K - 5 Grades

Paisley Trantham, Jeffery Myers, Michael Nguyen

S'COOL, NASA Earth science aligned to your classroom standards!

Connecting the Dots: Virginia Science Standards and Your Classroom

How do clouds affect our weather and climate? The Student Cloud Observations On-Line (S'COOL) Project has students investigate the answer to that question through collaborate research with NASA Scientists. S'COOL is an authentic science experience and real world application for the classroom aligned to Virginia Standards of Learning.

Earth/Space Science

Pre-K - 5 Grades

Sarah Crecelius, NASA Langley Research Center

Applying Science with Children's Engineering

STEM/Environmental Education: Integration and Innovation

Children's engineering is a wonderful way for your students to apply what they have learned in science. Learn how to use children's engineering to assess your students' real learning. Come away with ideas to use in every SOL strand of science, as well as some ready to use design briefs!

Engineering Pre-K - 5 Grades

Barbara Adcock Pocahontas Elementary

Enchanted Engineering: Discover the STEM in Fairy Tales

Linking Science and Other Content Standards

County Schools

Learn how to engineer "happily ever after" and "once upon a time" with our integrated STEM activities. Handouts! Freebies! Resources!

Engineering Pre-K - 5 Grades

Wendy Goldfein and Cheryl Nelson, Fairfax

Go Girl Engineers! Club: How to Engage Girls in Engineering

STEM/Environmental Education: Integration and Innovation

Lianna Moss-Everhart, Rural Point Elementary School, Hanover County

Learn how to incorporate engineering into the curriculum through starting a girls' engineering club. Participants will receive design brief resources for the classroom or a club session, participate in engineering activities, and learn the ins and outs of starting a club from the ground up!

Engineering Pre-K - 5 Grades

Connecting Children to Nature: Addressing Their Nature Deficits

STEM/Environmental Education: Integration and Innovation

Only aware and engaged citizens can address America's environmental issues. Children form values early, yet many are screen-bound and lack formative contact with nature. Consider an approach focused on naturalist intelligence and critical consciousness, building on students' outdoors experiences to foster biophilia, interest, and motivation. Presenter's 2014 book will be introduced.

Environmental Science Pre-K - 5 Grades

Michael Bentley, Virginia Museum of Natural History

We All Need Trees

STEM/Environmental Education: Integration and Innovation

Learn what the forests of Virginia provide for us. Virginia Project Learning Tree has prepared kits of sample Virginia forest products to support the PLT activity, We All Need Trees. These kits are available at this session and at the Virginia PLT exhibit.

General Science Pre-K - 5 Grades

Lisa Deaton, Virginia Dept. of Forestry

Inquiry Across the Grade Levels

Connecting the Dots: Virginia Science Standards and Your Classroom

In this lesson, teachers will learn how to develop their own inquiry based lesson by experiencing lessons that have been designed to get students doing inquiry based science.

General Science Pre-K - 5 Grades

Jenny Sue Flannagan, Martinson Center

Elementary Science Palooza

Linking Science and Other Content Standards

Come and experience the fun of being an elementary science teacher! Through various activities, teachers will walk away with lesson ideas to take back to your school and your classroom! Sessions will be offered for every grade level and there will be door prizes!

General Science Pre-K - 5 Grades

Jenny Sue, Flannagan, Martinson Center

STEM! I Just Don't Have the Time During my Science Block!

STEM/Environmental Education: Integration and Innovation

Elementary School

This hands-on session will provide attendants with classroom-tested strategies to effectively incorporate STEM lessons in your classroom. We will address the time management concerns that convince many teachers that STEM won't work in their classroom. Let us show you how to teach your students to achieve while having fun.

General Science Pre-K - 5 Grades

Elizabeth Petry, Tayloe Brooks, and Megan Megan, Mack Benn, Jr.

K-5 Project-based Learning and STEM

Leadership for Effective Science Instruction in Virginia

Colohan, Virginia Beach Public Schools

Project-based Learning is the perfect vehicle for launching STEM initiatives in the elementary classroom. Learn how one school division is implementing STEM design briefs with increasing complexity from kindergarten through grade 5.

General Science Pre-K - 5 Grades

Meghan Raftery, Teresa David and Matthew

STEMulating Minds for Success

STEM/Environmental Education: Integration and Innovation

Participants will be immersed in hands-on activities guaranteed to engage students. All STEM briefs begin with literature as attendees imagine, plan, create, and have fun as they complete STEMulating science based challenges.

General Science Pre-K - 5 Grades

Adrienne Sawyer, Chesapeake Public Schools

Schnekser-ize Your Science Classroom

Connecting the Dots: Virginia Science Standards and Your Classroom

Ever wonder how to LOGISTICALLY enhance, promote, and produce rigor, relevance, technology, and cross-curricular connections in your science instruction? Meet a K-5 Science teacher who breaks down barriers and makes science truly all encompassing. Examples of plans/activities, student generated samples, and handouts provided. Optional: bring your own technological device.

General Science Pre-K - 5 Grades

Becky Schnekser, Cape Henry Collegiate

Inquiry or Bust!!!

Connecting the Dots: Virginia Science Standards and Your Classroom

Hands-on inquiry instruction can seem hard to achieve in a classroom, but it is not impossible. It is actually quite easy once you understand what inquiry based science instructions looks like in a classroom. This session will give you simple, easy ideas to help achieve this in your classroom.

General Science Pre-K - 5 Grades

Christina Wade, Dupont Elementary School

Pre K-5

Integrating Reading into Your Science Block

Linking Science and Other Content Standards

Reading comprehension strategies should be incorporated into science learning experiences. This presentation will demonstrate how using before, during, and after reading comprehension strategies can be used to increase student learning. Edmund Burke stated "To read without reflecting is like eating without digesting."

General Science Pre-K - 5 Grades

Julia Wilshire, Norfolk Public Schools

VDOE Science Instruction and Assessment Update - Elementary School

Connecting the Dots: Virginia Science Standards and Your Classroom

Tyler Waybright, Virginia Department of Education

VDOE instruction and assessment specialists offer updates on instruction and assessment resources and programs. Learn about professional development, instruction, and assessment resources available to elementary school science teachers.

General Science Pre-K - 5 Grades

Barbara Young, Virginia Department of Education;

Infusing an Elementary Classroom with S.T.E.A.M Power

STEM/Environmental Education: Integration and Innovation

The presenter will model how exciting it is to infuse science, technology, engineering, and mathematics instructional strategies with the arts, using kits of manipulatives made from everyday materials. This will be an interactive, synergistic workshop with ideas for elementary teachers who might team teach, flexibly group, or departmentalize.

Math in Science Pre-K - 5 Grades

Susan Bardenhagen, VAST Regional IV Director

Math and Science Buddies (K and 5)

Linking Science and Other Content Standards

Margaret Brent Elementary School

Learn to plan and facilitate math/science buddies. Join us for lessons plans, take aways, and ideas that can be easily implemented. See how students partner up and work on self-guided learning opportunities that allow both to reach the content on their academic level through hands on, authentic learning lessons.

Math in Science Pre-K - 5 Grades

Stephanie Warren and Kathy Carpenter,

Roller Coaster Engineering in the Elementary Classroom

STEM/Environmental Education: Integration and Innovation

Lesnak, and Peter Sheldon, Randolph College

Roller Coaster Ups and Downs: Discover how potential energy is converted to kinetic energy at various points along the track, and the physics behind a roller coaster: acceleration, centripetal force, energy, force, inertia, momentum.

Physics/Physical Science Pre-K - 5 Grades

Peggy Schimmoeller, Sydney Hensen, Katherine

Rocket Launchers and Wind Tubes: Engineering in Elementary Science

STEM/Environmental Education: Integration and Innovation

This presentation describes and demonstrates the construction and use of compressed air rocket launchers and fan-powered wind tubes in elementary science classrooms. Handouts describing the construction process and ideas for classroom use are provided. Links to the engineering/design process are emphasized.

Engineering Pre-K - 8 Grades

George Meadows, University of Mary Washington

Pre K-8

A Portable Environmental Education Kit

STEM/Environmental Education: Integration and Innovation

This session describes and demonstrates a portable environmental education kit developed for use in afterschool programs at a public library. The kit is contained in a garden wagon that can be pulled from site to site. Photographs and video of its use are presented.

Environmental Science Pre-K - 8 Grades

George Meadows, University of Mary Washington

Linking Science Instruction to Literacy

Linking Science and Other Content Standards

University

Are you frustrated with the literacy levels of your science students? Are you having difficulty helping your students understand their science reading materials? Join us to learn instructional strategies that help increase students word identification skills, recall, and comprehension.

General Science Pre-K - 8 Grades

Edith Rudd and Trina Spencer, Virginia State

York-Poquoson Monarch Initiative: School Gardens Case Study

Leadership for Effective Science Instruction in Virginia

Fisheries; Abbie Martin, York County School Division; Barbara Dunbar, VA Coop. Extension Master Gardener/Master Naturalist

Outdoor classrooms are a highly effective tool for science instruction. The York-Poquoson Monarch Initiative—a partnership of VA Cooperative Extension, the VA Dept. of Game & Inland Fisheries, and York County Schools—implemented 11 schoolyard habitats in 2013 and provided mentoring and training. This panel shares their successes and challenges.

Environmental Science Pre-K-12 Grades

Carol Heiser, VA Dept. of Game & Inland

Pre K-12

Renewable Energy for Your School: Resources and Technology

STEM/Environmental Education: Integration and Innovation

This workshop will focus on wind and solar energy resources and technology for the classroom. We will showcase kits available from the Center for Wind Energy, as well as activities, lesson plans, curricula and books. The second half of the workshop will focus on how schools can get technology such as wind turbines, met towers, weather stations and solar panels on their campus.

Environmental Science Grades PreK - 12

Remy Pangle, Center for Wind Energy at JMU

“3. Referee? Not Me!”

This session will give teachers tools to engage their students and increase students’ motivation in the science classroom. Teachers will learn how to diffuse statements such as this is boring and science is stupid without confrontation giving them more time to teach. More time on task equals more content covered and higher test score.

General Science Grades PreK - 12

Barbara Burch, Hopewell City Schools

Visit the Virginia Museum of Natural History Without Leaving Your Classroom!

Connecting the Dots: Virginia Science Standards and Your Classroom

Museum of Natural History

Participants will explore how VMNH connects with learners at a distance to explore scientific topics using inquiry methods that will spark imaginations, enhance curricula, and support STEM education and Virginia Standards of Learning.

General Science Grades PreK - 12

Denny Casey, and Glenda Hairston, Virginia

How Skype and Cinderella Can Be Used in the Elementary Classroom to Make Connections to Arctic Research and Culture

Leadership for Effective Science Instruction in Virginia

Hardwick, and Erica Martin, Radford University

This session focuses how student teachers experienced scientific research and how those experiences helped to foster K-12 student understanding of research being conducted in Barrow, Alaska. We will share how elementary students thought a scientist should look, their attitude towards science and how Cinderella is viewed based her culture.

General Science Grades PreK - 12

Mythianne Shelton, Victoria, Holdaway, Taylor

Spending Too Much Time on Discipline?

Learn a common sense approach to classroom discipline that will give teachers their teaching time back. They can stop giving up instructional time to handle the things that steal opportunities for teaching and learning. Students and teachers can share in the educational process in a calm, positive, and respectful atmosphere.

General Science Grades PreK - 12

Jeannine Tate, Jeannine Tate, Education Consulting

Research Skills for Teachers: The Classroom and Beyond

Connecting the Dots: Virginia Science Standards and Your Classroom

This presentation will focus on basic quantitative research skills that teachers can utilize to conduct studies in classrooms and schools for the purpose of determining the effectiveness of instructional techniques and curricula.

General Science Grades PreK - 12

Scott Watson, Liberty University

Learning Physical Science through Engineering

STEM/Environmental Education: Integration and Innovation

Science/Portsmouth Public Schools

Teachers will learn how to incorporate engineering design into their science classroom by building a rubber band car and a “brushbot.” This lesson is typically taught in the physical science classroom to help students learn how to apply scientific concepts to real-world situations.

Physics/Physical Science Grades PreK - 12

Heather Groffy and Dara Brinkman, Office of

What Happens at the Virginia General Assembly?

Attendees will learn how to navigate the General Assembly website as well as the structure of both House and Senate Committees that most affect education. In addition there will be suggestions on what to do if you want to contact a legislator about pending legislation either in person, via e-mail, or by phone. All of this will be followed by an over-view of how the VAST Advocacy Committee works to support science education through involvement in the General Assembly committee meetings as well as the State Board of Education. The presenter is currently co-chair of the VAST Advocacy Committee.

General Science Grades PreK - 12

Delores Dalton Dunn, DDD Consulting

Chesapeake Bay Foundation’s Educational Opportunities

Connecting the Dots: Virginia Science Standards and Your Classroom

For more than 30 years, CBF’s award-winning environmental education program has been one of the cornerstones of our efforts to reverse the Bay’s decline. Participants in this presentation will learn of CBF’s educational programs for students, teachers and principals. All programs are designed to support state standards of education and are based from the official definition for a “meaningful watershed education experience” as defined by the Chesapeake Bay Program.

Environmental Science Grades PreK - 16

Cindy Duncan, Chesapeake Bay Foundation

What about “Sustainability” Calls Out for Clear Minded Thinking?

STEM/Environmental Education: Integration and Innovation

Discussions of the next big “sustainability things” might include: the food-energy-environment nexus, What is healthy soil? What if we each were to live to be 150? How do people limit growth?

General Science Grades PreK - 16

Jim Disbrow, The Millennium Project

Pre K - 12

Most Levels

Pre K - 16

Exclusively for Preservice Teachers

Leadership for Effective Science Instruction in Virginia

General Science

Grades PreK - 16

Suzanne Donnelly, Longwood University; Tricia

Easterling, Radford University; Patti Horne, Longwood University

Calling all pre-service teachers! As part of its mission, learn how VAST can help you while completing your licensure program and throughout your science teaching career. Local and statewide opportunities await those who are committed to improving science education. Come learn how VAST can launch you into your career as a science teacher and score some goody bags and door prizes to boot. Your advisors are invited to this session, too!

Pre K-16

Rigor and Learning Engagement through Quality Curriculum and Instruction - Administrators

Linking Science and Other Content Standards

General Science

Grades PreK - 16

Kelly Hedrick

Where do rigor and engagement come from? With science standards as the platform, but we have to align them with big ideas, student-centered learning strategies, and scaffolding techniques to support a range of learner needs. Participants will identify where big ideas come from through concept-based curriculum and look at a model for aligning worthy learning targets with instructional strategies and scaffolding methods in the science classroom.

Real Science, Real Fast! Inquiry for Elementary School!

Connecting the Dots: Virginia Science Standards and Your Classroom

Biology/Life Science

Grades 3 - 5

Spencer, Virginia State University; Sarah Melissa Witiak, Virginia State University

Leslie Whiteman, Virginia State University; Trina

This session will provide hands-on demonstrations of fun, fast, inquiry-based science lessons suitable for elementary school students.

Grades 3-5

SAGE III on ISS: NASA Lessons Meeting Virginia Standards

Connecting the Dots: Virginia Science Standards and Your Classroom

Earth/Space Science

Grades 3 - 5

Engage students in atmospheric science by demonstrating science, engineering and math concepts through hands-on activities and classroom videos.

Kristyn Damadeo, NASA Langley Research Center

STEMulate Student Learning by Infusing Engineering Design into the PBL Model

Linking Science and Other Content Standards

Engineering

Grades 3 - 5

Virginia Tech/VISTA

Anita Deck, Amy Bordeaux, John Richardson,

Inspire thinking, collaboration, creativity, and problem-solving with STEM-focused PBL. Discover key engineering components in NGSS, including conceptual shifts, disciplinary core ideas, and practices to effectively wield the standards as a transformative tool for classroom instruction. Join us in discovering hands-on, engineering design, and cross-curricular authentic projects to STEMulate student learning!

Differences in Teaching Engineering Design: Findings and Suggestions for Response to the NGSS and Integration of Engineering into Science Education

STEM/Environmental Education: Integration and Innovation

Engineering

Grades 3 - 5

Virginia Tech; David Long, George Mason University

Michael Grubbs, Virginia Tech; Tyler Love,

Implementation of engineering content and the engineering design process in K-12 education is increasingly requiring educators to pursue professional development training. The purpose of this presentation is to report findings on a recent science professional development across four sites in Virginia. Exemplar practices and activities will be provided along with specific suggestions and recommendations for incorporating engineering design and engineering concepts into elementary classrooms.

FOSS STEM Investigation (Grades 3-4): Saving Halloween

STEM/Environmental Education: Integration and Innovation

Engineering

Grades 3 - 5

It is Halloween night and Sheldon Gooding's costume, a complete superhero outfit, has been ready for weeks. He simply cannot wait until it gets dark to transform himself into "BARFO THE WONDER-LIZARD". Attend this STEM workshop to see what might ruin his night and how you can save Sheldon's adventure.

William Metz and Kip Bisignano, Delta Education

Hands-On Science, Inquiry, the Nature of Science, and STEM

Connecting the Dots: Virginia Science Standards and Your Classroom

General Science

Grades 3 - 5

County Schools

Robin Gafa and Courtney Berard, Isle of Wight

Want to create more engaging and meaningful experiences for students by incorporating hands-on activities and inquiry into lessons? Learn effective strategies to help your students behave like real scientists.

Grades 3-5

Integrating Science in the Upper Grades

Linking Science and Other Content Standards

General Science

Grades 3 - 5

Roland, Grafton Village Elementary

Leslie Lausten, Hartwood Elementary; Sherrie

Take a peek into our classrooms where we will share our unique approach of using science as the core, and how to integrate reading, writing and math on a daily basis.

Planet FOSS: Lights, Camera, Action... Assessing Science with Pics

Linking Science and Other Content Standards

Education Data can take a variety of forms and the processing and interpretation of this information is an essential skill particularly at the middle school level. This workshop uses photos representing the content of science. Bring your cell phones, turn them on and let's see what science data we will capture. Come prepared to venture outside.

General Science

Grades 3 - 5

William Metz and Kip Bisignano, Delta

Hooked on Worms: A Slimy, Slippery Adventure!

Connecting the Dots: Virginia Science Standards and Your Classroom
Public Schools

"Why couldn't Batman go fishing? Robin ate all his worms!" Join us for a fun-filled session. We will dig into the endless ways worms can be incorporated into lessons and activities that support the upper elementary science SOLs. All participants will leave the session with ideas for hands-on lessons, activities, and resources. Participants will also build a choice chamber and be given a list of ways to use it. We will also collaborate with peers to generate exciting ideas of how worms can be used in the science classroom.

General Science

Grades 3 - 5

Kimberly Nierman and Nina Valdivieso, Suffolk

Science in Elementary School

Do you feel uneasy about doing science in the elementary school? This session will help you to develop your skills!

General Science

Grades 3 - 5

George Ruby, VBCPS

Good Science+Open Ended Design= Integrative STEM Ed.

STEM/Environmental Education: Integration and Innovation
Harrisonburg City Schools

Want to see an example of an Integrative STEM education unit that has been teacher tested and student approved? Then visit us to see some of the scientific investigations done with fourth grade students and see if your car measures up to a 4th grader's.

Physics/Physical Science

Grades 3 - 5

Amy Sabarre and Suzanne Glichrist-Thompson,

Physics is Elementary with VIP

Connecting the Dots: Virginia Science Standards and Your Classroom
Harrisonburg City Public Schools

This session will connect the dots from the Grade 3-5 SOLs to your students, physical science in middle school, Physics in high school and beyond. This workshop features hands-on activities that can be put immediately into use in the classroom with low cost and easy execution.

Physics/Physical Science

Grades 3 - 5

Jeff Steele, Liberty High School; Andrew Jackson,

Inquiry By Engineering Design

STEM/Environmental Education: Integration and Innovation
Williams, and Jessica Stephenson, Virginia Tech

Upper elementary and middle school teachers will be engaged in hands-on activities based upon an instructional model that fuses inquiry with the engineering design process. To facilitate transfer, teachers will receive instruction on the model and be invited to critique its applicability for their instructional planning.

Engineering

Grades 3 - 8

Brenda Brand, Mary Kasarda, Christopher

IT Field Books: CER Reflection with Written Expression

Linking Science and Other Content Standards
School, Botetourt County Public Schools

Important Thing Field Books scaffold students' scientific writing to advance skills and promote creativity. Students explore journalistic style and substance, while developing the ability to make claims, cite evidence, and use reasoning. Teachers use the tool to formatively assess student understandings, and to incorporate student questions in inquiry-driven experiences.

General Science

Grades 3 - 8

Wendy Grimshaw, Central Academy Middle

Angry Birds & 3D Printing

STEM/Environmental Education: Integration and Innovation
Old Dominion University

Join us for an interactive session as we present how a group of middle school students learned physical science through design in a uniquely engaging lesson. Bring your computer and design your own!

Physics/Physical Science

Grades 3 - 8

William McConnell and Daniel Dickerson,

STEMtastic Resources for Enhancing Student Learning

Linking Science and Other Content Standards
LLC/King George County Schools

In this STEMtastic session attendees will learn about and receive resources that will help them enhance learning among students of all learning levels. As well, attendees will examine resources that incorporate math, science, technology, and language arts to create rich interdisciplinary learning experiences! Topics covered include the Chesapeake Bay Experience (incorporating environmental science and language arts), small-scale activities that address SOLs across the curriculum, funding sources, and state- and nation-wide professional development opportunities. This session is awesome for science, math and technology teachers in grades 5-8.

General Science

Grades 3 - 8

Phyllis Shepherd, Eyes on Academics Educational,

Grades 3-5

Grades 3-8

Max Axiom Graphic Science Linking Science and Other Content Standards Meet “Max Axiom, Super Scientist” as he presents science content aligned to the Virginia SOLs providing experiments and activities involving authentic problem-solving with real-world solutions while integrating literacy, content vocabulary and content-specific writing. Participants will receive a student text with lesson plan.	General Science	Grades 3 - 12
	Kaz Kuzminski, Capston Classroom	
What Grows in the Garden of a Student’s Mind? Linking Science and Other Content Standards Wake up your student’s creativity and natural curiosity! In this hands-on activity, students select a type of garden such as medicinal, decorative, or environmental site management to create. They design, implement, and analyze the effectiveness of their garden design using art, engineering, mathematics, historical research, and science.	Biology/Life Science	Grades 3 - 12
	Kathy Frame, Papillon Education Services, LLC	
Semi-Annual Virginia Earth Science Teachers Association Connecting the Dots: Virginia Science Standards and Your Classroom Discussion will include where VESTA has been and where it is heading and what is new in Earth Science. We will include a discussion of legislative issues applying to science as a whole and earth science in particular.	Earth/Space Science	Grades 3 - 12
	Gale Baker, Loudoun County Public Schools	
Wash Out or Game On? Predicting Weather with Clouds & Highlights of Spanish Resources STEM/Environmental Education: Integration and Innovation	Earth/Space Science	Grades 3 - 12
	Marile Colon Robles and Bonnie Murray, NASA Langley Research Center	
VESTA Shar-a-thon Connecting the Dots: Virginia Science Standards and Your Classroom Looking for some different ideas for your Earth Science related lesson? Have a unique activity which you use in meteorology, geology, oceanography, or astronomy? Then come join other earth science teachers as we share ideas and lessons for these topics.	Earth/Space Science	Grades 3 - 12
	Margaret Greene, VESTA	
Education Takes Root STEM/Environmental Education: Integration and Innovation Bluestone Middle School What can happen when students put their heads together to make a difference? Come and see how our students got involved in their community by creating a community garden, outdoor classroom, and nature trail.	General Science	Grades 3 - 12
	Natasha DeVenuti and Jennifer Bowry,	
What is So Critical About Thinking? And Will It Hurt? Linking Science and Other Content Standards Most people cannot articulate or operationalize what critical thinking means. This session will demonstrate several ways to introduce, teach and develop some of the sub skills required to think critically - even to young learners.	General Science	Grades 3 - 12
	Tricia Easterling, Radford University	
Unlocking Potential for Informal Learning Leadership for Effective Science Instruction in Virginia Field trip experiences are not always taken advantage of by educators or students. Come and explore ways to improve learning opportunities in informal settings. Make field trips richer and more positive for you and your students and learn how to build better consumers of lessons outside of the classroom setting.	General Science	Grades 3 - 12
	Chuck English, Science Museum of Virginia	
Scientific Exploration with Simulations Connecting the Dots: Virginia Science Standards and Your Classroom Experimental design is one of the most important scientific concepts, yet often a difficult one for students and teachers to master. In “Scientific Exploration with Simulations”, participants will see how using computer simulations like ExploreLearning Gizmos and other web-based scientific simulations, can make teaching experimental design and independent research easy, manageable and fun.	General Science	Grades 3 - 12
	Aron Fristoe, ExploreLearning	
Sky Art: Sharing Nature’s Beauty and the Science Behind It Linking Science and Other Content Standards Engage students in atmospheric science concepts by using art, photography and social media as a gateway.	Earth/Space Science	Grades 3 - 16
	Kristyn Damadeo, NASA Langley Research Center	
Robots Rock and STEM Rules STEM/Environmental Education: Integration and Innovation Come see how Virginia Beach City Public Schools utilizes a cross-curricular approach to teaching STEM concepts across grade levels. This session highlights the STEM Robotics Challenge in which over 425 robots and nearly 1000 students completed a sustainability challenge. Find out how technical literacy and STEM are interconnected to the engineering design process.	Engineering	Grades 3 - 16
	Charles Hurd, Virginia Beach City Public Schools	

Grades 3 - 12

Grades 3 - 16

Special Friday Night Event 2014 PDI

November 21, 2014

8:00 pm - 10:00 pm • Auction

**DANCE • DISK JOCKEY
AUCTION
MUSIC • FUN**

SCIENCE AUCTION



How about an Auction? There is seldom a better floor show for a group of science teachers than to see them bidding against each other for that one thing they could really use. The best part is that to participate, it will cost you exactly nothing. That's right – NOTHING! Besides, real money isn't good at the auction!

Do you have a box of glassware sitting in the back of your stockroom, that has only a future of collecting dust? Maybe you have old telescope that you would love to use, if only you could find a replacement part? Wouldn't it be great to be able to trade these and other surplus bits with your fellow teachers of science, and have a good time doing it?

VAST BUCKS

Everybody that registers for the PDI will find in their packet a bundle of money! Now mind you, it is not real money! They are VAST Bucks, good only at the auction to be held Friday night, November 9th, during the breaks in the evening mixer. When else have you had the chance to burn through hundreds and thousands of other people's money?

HOW TO EARN MORE VAST BUCKS

All that you have to do to "earn" VAST Bucks is to:

- (a) Register for the conference,
- (b) Visit the exhibitors during the open hours of the Exhibit Hall up through Friday evening. You may need remind them to give you some VAST Bucks!!
- (c) Take advantage of various activities noted in the program, or
- (d) Donate some items for the auction.

Everytime you do any one of these things you will earn more VAST Bucks to spend!

A FEW RULES TO FOLLOW

- First, and foremost is safety – if the item is not safe to use, then consider disposing of this item another way. Please don't donate such items. On the other hand, if an item is broken and could be repaired or is useful for parts, tag it as such.
- Second, don't bring chemicals to the auction. There are just too many safety and storage issues, and besides, passing off a problem to someone else just isn't nice!
- Third, you need to make sure that if you are "buying" something, you intend to use it in the teaching of science and not selling it at your next yard sale.
- And Fourth, is permission, make sure that any item you donate is yours to donate OR that you have permission to donate the item for our auction. Finally, you need to make sure that anything you buy you can carry away. We don't deliver and we don't store, so if you bought it, you're taking it that evening!



TOSHIBA | NSTA

LOVE SCIENCE?
... THEN ENTER
EXPLORAVISION!



For more information and to sign up, please scan the QR code or visit www.exploravision.org/scienceeducator



The **Toshiba/NSTA ExploraVision** STEM competition inspires K-12 students to envision the technologies of the future.

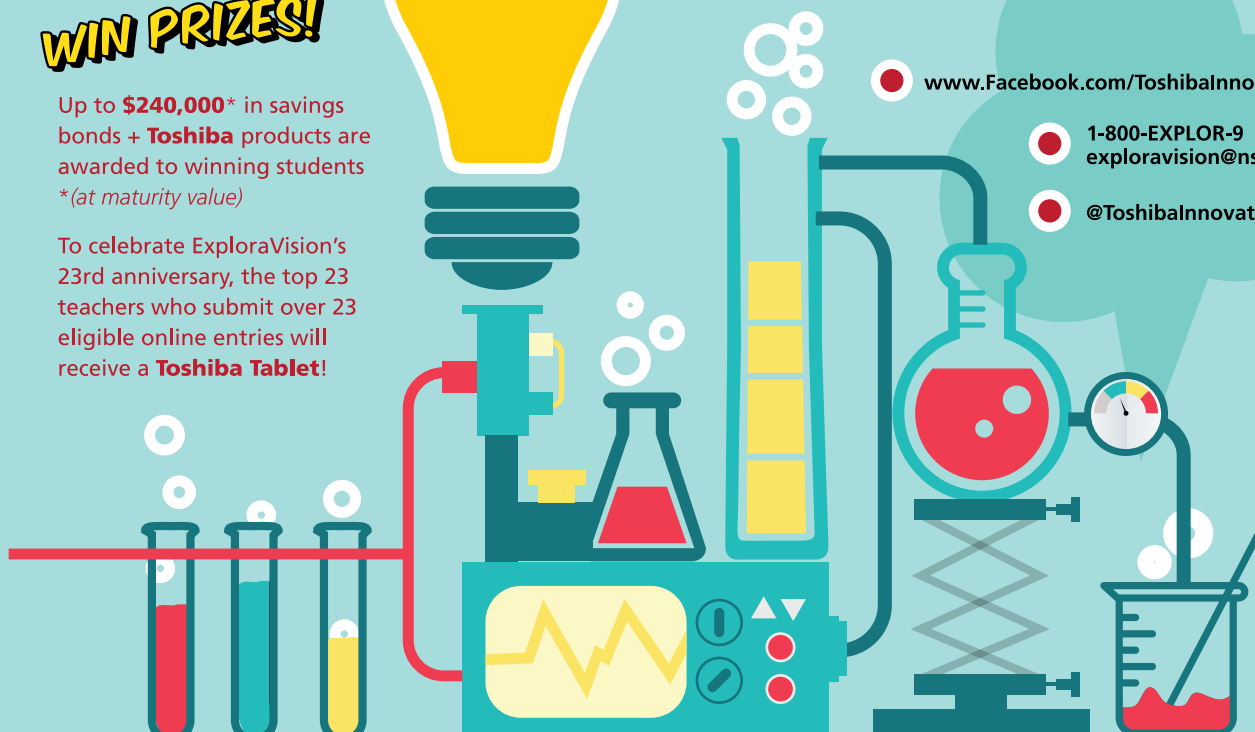
ExploraVision lets your students engage in hands-on learning, problem solving, critical thinking, and collaboration.

Great News! ExploraVision offers students the scientific and engineering learning experience central to the **Next Generation Science Standards**.

WIN PRIZES!

Up to **\$240,000*** in savings bonds + **Toshiba** products are awarded to winning students
**(at maturity value)*

To celebrate ExploraVision's 23rd anniversary, the top 23 teachers who submit over 23 eligible online entries will receive a **Toshiba Tablet!**



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NSTA

Through **Toshiba's** shared mission partnership with **NSTA**, the Toshiba/NSTA ExploraVision competition makes a vital contribution to the educational community.

Exploring Green Energy Technologies with Real-Time Data

STEM/Environmental Education: Integration and Innovation

High School; Delia Heck, Ferrum College

Learn how to access real-time data and teacher-made lesson plans correlated to Virginia Standards of Learning and National Science Standards using a new Dashboard for the Center for Energy Efficient Design located in Franklin County, VA. Lessons are STEM and green technology friendly, cross-curricular, and K-12.

Environmental Science

Grades 3 - 16

Carla Barrell and Amy Shaver, Franklin County

Integrating Your iPad with Vernier Technology

Linking Science and Other Content Standards

Software and Technology

Using data-collection technology builds deeper student understanding of critical concepts in science and increases test scores. See how Vernier sensors, including our Go Wireless Temp, supports science inquiry in classrooms using iPad. This technology empowers students to collaboratively collect and independently analyze their data.

General Science

Grades 3 - 16

Jackie Bonneau and Patty Rourke, Vernier

Make Your Science Labs Wireless and Paperless

Connecting the Dots: Virginia Science Standards and Your Classroom

The same probes you've been using become bluetooth wireless. Use these with your iPad to collect and analyze data in the lab or field.

General Science

Grades 3 - 16

Carla Johnson, PASCO Scientific

21st Century Probeware Playground

Connecting the Dots: Virginia Science Standards and Your Classroom

Drop in and see how easy it is to use wireless probes and an iPad to collect data to solve an inquiry challenge.

General Science

Grades 3 - 16

Carla Johnson, PASCO scientific

What's the "E" in STEM Education?

STEM/Environmental Education: Integration and Innovation

Science educators will explore ways to incorporate the "E" for engineering into science lessons. STEM inquiry-based activities will include various approaches that allow students to explore the ways scientists and engineers approach everyday problems. Evaluating interviews with young engineers will provide insight about their K-12 learning experiences.

General Science

Grades 3 - 16

Cheryl Lindeman, Randolph College

VIP Share session

Connecting the Dots: Virginia Science Standards and Your Classroom

Mark Dodge, HB Woodlawn

Members of the Virginia Instructors of Physics share ideas and lab activities that they have recently incorporated into their classrooms. Come see what's new and pick-up innovative ideas for labs! This session is a great way to connect with other physics teachers and to re-energize your teaching.

Physics/Physical Science

Grades 3 - 16

William Chamblee, Washington-Lee High School;

How to Be a Bat Biologist – Project Edubat

STEM/Environmental Education: Integration and Innovation

Recreation

Learn how data on bat populations is collected in the field and receive a Project Underground activity about bat field biology. Measure, weigh, identify, and record information on bats. Hear the continuing story of the WNS fungus in cave bats and about bat education materials available through Virginia State Parks.

Biology/Life Science

Grades 3 - 16

Carol Zokaites, Dept. of Conservation and

Literacy Approach in Science: Evolving Students as Writers and Public Speakers in Science

Linking Science and Other Content Standards

This session will focus on writing and public speaking on topics of science. The session will highlight the inter-relationships of writing and speaking and will prepare teachers to enhance learning in their classroom through literacy. Participants will be given strategies on utilizing the types of discussions (reasoning, debate, cause-effect, etc.) to have in a science class. Also, participants will learn different types of tools (graphic organizers, online resources, etc.) to help students develop logical thoughts and arguments.

General Science Grades 3 - 16

Dr. Kiana Thomas, Norfolk State University

It's Alive? Or Not? A Learning Cycle Based Lesson Plan

Connecting the Dots: Virginia Science Standards and Your Classroom

University

This session involves participants in the four stages of a learning cycle based lesson designed to investigate the characteristics of living things. This guided inquiry approach is based on the 4E x 2 instructional model (Marshall, 2007) comprised of an engage, explore, explain, and extend portion.

Biology/Life Science

Grades 6 - 12

Robbie Higdon, James Madison

CRESST: A Perfect Match! Science and HPE: Integrating Inquiry

Leadership for Effective Science Instruction in Virginia

Virginia Commonwealth University; Christine Walker, Harper Park Middle School

Discover how teachers of science, health and physical education, and other disciplines can work together to design and implement research projects that investigate health, wellness, and related lifestyle issues. CRESST faculty will model inquiry-based lesson and classroom teachers will share their experiences implementing the CRESST Curriculum to support SOL instruction.

Biology/Life Science

Grades 6 - 12

Suzanne Kirk, Lisa Abrams, Patricia Slattum,

Understanding Earth's Energy Budget Using NASA Resources

None of the Above
Research Center

Come and learn about Earth's energy budget through a variety of interactive classroom ready NASA resources. Participants will get an overview of Earth's energy budget and get hands on examples of materials and lessons that you can bring right back to your classroom, helping student understanding of the misunderstood diagram.

Earth/Space Science
Lin Chambers and Tina Harte, NASA Langley

Visualizing Earth as a System through Interactive NASA Data Sets

STEM/Environmental Education: Integration and Innovation

This session presents the GLOBE Earth Systems Interactive Poster, developed to help students explore the concepts of earth as a system. Teachers will explore the activity and gain access to a teachers' guide that will provide them with a variety of ways to implement the activity in their classroom.

Earth/Space Science
Tina Harte, NASA Langley Research Center

NASA Rockets 2 Racecars: Go Green Edition

STEM/Environmental Education: Integration and Innovation
Langley Research Center

Get your students revved up about science, technology, engineering and math with NASA Rockets 2 Racecars STEM Education program. Begin by exploring solar energy, challenging your students to design an efficient solar oven and discovering how solar energy is currently being used to power a NASCAR track.

Earth/Space Science
Bonnie Murray and Marile Colon Robles, NASA

Nature of Science: How to Adapt Teaching Strategies in Your Classroom

None of the Above

Virginia Tech, Virginia Tech VISTA Teachers

How do you incorporate the nature of science into your lesson plans? Secondary teachers will share approaches and resources that have been effective in teaching the nature of science in their classrooms. These methods will give students opportunities in solving problems collaboratively, as well as providing a foundation for further inquiry.

Environmental Science
Amy Bordeaux, Anita Deck and John Richardson,

The Nuts and Bolts of a Flipped-Mastery Classroom

In a flipped-mastery classroom, students work through the curriculum in a flexible-paced manner where they are expected to master key objectives. It creates an individualized learning experience for each student while still happening in the typical classroom setting. Jon will explain the key components to the flipped-mastery classroom and how to move towards a student-centric mastery classroom.

General Science
Jonathan Bergmann, General Session Speaker

VJAS: Engaging Students in a Meaningful Experience

Linking Science and Other Content Standards
(Retired)

The Virginia Junior Academy of Science (VJAS) provides a unique opportunity for students to showcase their research, display an understanding of STEM disciplines and build their communication skills. Explore strategies for engaging students in meaningful group and individual research projects. Look at examples of middle and high school projects and learn about web-based resources.

General Science
Julia Cothron, MathScience Innovation Center

AMP UP your Practice: Teachers Sharing Classroom Tested Strategies!

Connecting the Dots: Virginia Science Standards and Your Classroom
University

Join the secondary teachers participating at VCU in VISTA as they share their action research studies into a solar system PBL (6th), sound (physical science), oceanography (earth science), SOL boot camp (biology), and stoichiometry (chemistry). Engage in their lessons and learn from their experiences.

General Science
Elizabeth Edmondson, Virginia Commonwealth

Taming the Vocabulary Beast!

Connecting the Dots: Virginia Science Standards and Your Classroom
William County Schools

Learn how to give students, in particular English Language Learners, a leg up in the annual fight against vocabulary by discussing different strategies to present new, complex terms to students and activities to help them apply their content vocabulary effectively!

General Science
Ashley Kourey, Freedom High School, Prince

Chef's Don't Use Cookbooks, Why Should Students?

Leadership for Effective Science Instruction in Virginia

Science activities can take many forms, ranging from the highly structured activities to free explorations with unanticipated results. Cookbook labs continue to be a part of science instruction but serve simply to verify phenomena. This workshop will present a number of strategies that subtly shift cookbook labs towards student-centered inquiry.

General Science
William Metz, (Retired)

Grades 6-12

Grades 6-12

Analyzing Experimental Data: Looking Through Different Lenses

Linking Science and Other Content Standards
(Retired)

Building upon her classic work with data analysis, and using recommendations from the Next Generation Science Standards, Dr. Cothron will offer strategies for going beyond algorithmic approaches for data analysis including defending data collection techniques, explaining methods of data analysis, using mathematics and arguing from evidence.

Math in Science

Grades 6 - 12

Julia Cothron, MathScience Innovation Center,

You Could Be the Next Secondary Science PAEMST Awardee

This year secondary teachers (7-12) are eligible to apply for one of the highest honors in science teaching, the Presidential Award for Excellence in Mathematics and Science Teaching. Learn more about this award program from Virginia awardees and the state coordinator. You could be the next Virginia PAEMST awardee!

General Science

Grades 6 - 12

Eric Rhoades, Virginia Department of Education

Doing Science with Technology in the Secondary Classroom

Leadership for Effective Science Instruction in Virginia

Attendees will conduct mini-science investigations with technology that address VA SOLs standards and emphasize engagement of student with science practices. We will explore how student can use digital photos and videos as evidence to make claims, use online tools for collaborative investigations, and create digital media to present science investigations.

General Science

Grades 6 - 12

Takumi Sato and Cierra Coyner, Virginia Tech

Physics Demo & Activity Buffett

STEM/Environmental Education: Integration and Innovation

A variety of physics demos and labs are presented by several teachers. This is an open session where participants can come and go any time during the session. You will take away handouts and a wealth of ideas.

Physics/Physical Science

Grades 6 - 12

Tony Wayne, Albemarle High School

Strategies to Develop Scientific Thinking & Science Content

Connecting the Dots: Virginia Science Standards and Your Classroom
County Public Schools

Two pedagogical approaches will be presented that will enable teachers to 1) engage students with both the scientific process AND science content simultaneously while understanding how scientific knowledge is generated in different disciplines, and 2) address the INVESTIGATE portion of the VA SOLs so students can increase their understanding.

General Science

Grades 6 - 16

Josh Mosser and Stephen Burton, Loudoun

Puzzling? Connecting the Pieces of Scientific Content and Investigative Practices

Connecting the Dots: Virginia Science Standards and Your Classroom
Old Dominion University

Through two engaging inquiry-based middle/high school investigations teachers will gain further understanding of how to incorporate the SOL objectives under "1. Scientific Investigation" across life science and physical science at the secondary level and will think of ways to explicitly link the practices of science to the content that they teach.

General Science

Grades 6 - 16

Janeen Perry-Campbell and Stephen R. Burgin,

QR Codes to Enhance Science Inquiry

STEM/Environmental Education: Integration and Innovation

This session involves both a demonstration and some hands-on use of QR creators and codes to show how they are effective tools for the science classroom. Teachers will be able to download a free creator and reader and create their own codes for a lesson plan to take with them.

Environmental Science

Grades 6 - 16

Penny Upshaw, Brooke Point High School

Enhancing Teacher Effectiveness Through Modeling Instruction

Leadership for Effective Science Instruction in Virginia

Madison University; Susan Ramsey, Virginia Space Grant Consortium

This presentation will outline key components and goals of the Modeling Instruction Academies offered through James Madison University's (JMU) Content Teaching Academy. The session will end with Q&A time and information on how you can become involved in the Modeling project at JMU.

General Science

Grades 6 - 16

Brian Utter and Eric Pyle, David Long, James

Why & How to Flip Your Science Class

Leadership for Effective Science Instruction in Virginia

Come and find out from the personal experiences of a high school science teacher who has been flipping/blending his class for 3 years, how to manage and organize a flipped science classroom. (It's not about the videos. It's about using technology to adjust the learning cycle.)

General Science

Grades 6 - 16

Tony Wayne, Albemarle High School

Differentiation in the Classroom - While Going Paperless!

Leadership for Effective Science Instruction in Virginia

We will address differentiation in the classroom. How to present in multiple modalities of learning, easily modify materials for special needs kids, and how to transition from paper to digital – or anywhere in between.

General Science

Grades 6 - 8

John Brishcar, Warren County Middle School

Grades 6 - 12

Grades 6 - 16

Grades 6 - 8

Yes - You have to Read in Your Science Class as Well!!

Linking Science and Other Content Standards

Reading comprehension strategies should be incorporated into science learning experiences. This presentation will demonstrate using before, during, and after reading comprehension strategies to increase student learning. Edmund Burke stated "To read without reflecting is like eating without digesting."

Physics/Physical Science

Grades 6 - 8

Adrienne Britton, Norfolk Public Schools

STEM: Successfully Implementing Engineering Aspects of NGSS

STEM/Environmental Education: Integration and Innovation

Spotsylvania County Schools; Erin E. Peters-Burton, George Mason University

The design of activities and role of the instructor are important components of a successful STEM-based learning environment. This interactive session highlights approaches to using STEM activities in classrooms and after school clubs. Ultimately, participants will leave with ideas to implement the engineering aspects of the Next Generation Science Standards.

Engineering

Grades 6 - 8

Dawn Renee Wilcox, Ni River Middle/

VDOE Science Instruction and Assessment Update - Middle School

Connecting the Dots: Virginia Science Standards and Your Classroom

Department of Education

VDOE instruction and assessment specialists offer updates on instruction and assessment resources and programs. Learn about professional development, instruction, and assessment resources available to middle school science teachers.

General Science

Grades 6 - 8

Eric Rhoades and Tyler Waybright, Virginia

Graphing for Understanding through NASA Data

Linking Science and Other Content Standards

Research Center

Use NASA Earth System science data in your classroom to teach your students to better understand graphing practices. This session will show you several graphing techniques to get your students to better understand how to read what the plot is trying to tell them.

Earth/Space Science

Grades 6 - 12

Preston Lewis and Tina Harte, NASA Langley

Expedition Chesapeake: Educating a Watershed One Backyard at a Time

STEM/Environmental Education: Integration and Innovation

Science and the Arts

Whitaker Center introduces Expedition Chesapeake, a ground-breaking initiative which addresses current watersheds issues using the Chesapeake Bay watershed as a case-study. All Expedition Chesapeake learning experiences are arranged in interdisciplinary modules and employ a watershed-perspective to allow students to explore the interdependence of the inhabitants of our nation's largest estuary.

Environmental Science

Grades 6 - 12

Lori Lauver and Meg Burton, Whitaker Center for

Becoming a NOS Ninja

Connecting the Dots: Virginia Science Standards and Your Classroom

Teachers, George Mason University

Come to this hands-on session to learn how to incorporate NOS explicitly and seamlessly into your science lessons!

General Science

Grades 6 - 12

Mollianne Logerwell, VISTA-Mason STP

Inquiry Inquiries: Differentiation & Scientific Practices

Connecting the Dots: Virginia Science Standards and Your Classroom

University of Virginia

Come learn to structure and differentiate inquiry investigations to meet the needs of diverse learners and support development of students' scientific practices including engaging in argument from evidence and evaluating/communicating results. We will provide examples of lessons from across content areas. Participants receive lesson plans for all activities!

General Science

Grades 6 - 12

Jennifer Maeng and Lindsay Wheeler,

Science Assessment that Works!

Connecting the Dots: Virginia Science Standards and Your Classroom

William & Mary

Motivate your students to learn by using assessment strategies that focus on effective science instruction. W&M VISTA trained teachers will show you how to create effective assessments that emphasize questioning, performance-based learning, and inquiry and teach the SOLs. Leave with a toolbox of ideas and strategies for your science class.

General Science

Grades 6 - 12

Anne Mannarino and Tekita Blackwell, College of

A Beautiful Mosaic: Integrating Students' Cultures in Preservice Science Teaching

Connecting the Dots: Virginia Science Standards and Your Classroom

Commonwealth University

Culturally responsive, standards based teaching aligns students' cultures with rigorous standards-based science content. Secondary science preservice teachers will share culturally responsive, inquiry-based lessons during this interactive session. Attendees will have an opportunity to try out the activities and access lesson plans on-line.

General Science

Grades 6 - 12

Jacqueline McDonnough, Virginia

Grades 6 - 8

Grades 6 - 12

Grades 6 - 12

Bringing Computer Science to Your District

Leadership for Effective Science Instruction in Virginia

Our students may be “digital natives”, but they aren’t born with the skills they’ll need to succeed in the 21st century workforce. Teaching computer science is more important – and easier – now than ever before. Learn what it will take to bring computer science to your district.

General Science

Grades 6 - 16

Norman Marshall, Franklin Military Academy

Flipping the Science Classroom: an Administrator’s Perspective

Leadership for Effective Science Instruction in Virginia

The flipped instructional model has gained popularity as teachers look for new ways to maximize their time and provide hands-on learning for students. In this session, we will discuss the challenges and successes of flipping the classroom from the perspective of a district science coordinator. Emphasis will be placed on how to develop a strong professional development plan and a communication network for teachers.

General Science

Grades 6 - 16

Abbie Martin, York County School Division

Investigating Renewable Energy with Kidwind and Vernier

STEM/Environmental Education: Integration and Innovation

Software and Technology

Learn how to incorporate engineering design principles into lessons focusing on renewable energy using KidWind Wind Experiment Kits and Vernier data-collection technology. These activities from our Renewable Energy with Vernier book, embody the spirit of STEM education through this highly relevant topic.

Environmental Science

Grades 8 - 12

Jackie Bonneau and Patty Rourke, Vernier

Southeastern Forests and Climate Change

STEM/Environmental Education: Integration and Innovation

Learn how scientists have been cross-breeding families of pine trees for the past 50 years to meet the demands of society. These same methods can be used to address climate change impacts. Join us to explore this new Project Learning Tree secondary module, available online at <http://sfrc.ufl.edu/extension/ee/climate/>.

Biology/Life Science

Grades 9 - 12

Lisa Deaton, Virginia Department of Forestry

Problem Based Discovery of Scientific Research

Connecting the Dots: Virginia Science Standards and Your Classroom

Patrick Henry High School

Actively engage students in an inquiry based research project based on da Vinci’s Vitruvian Man!

Biology/Life Science

Grades 9 - 12

Alice Scheele, Miranda Pauley, and Terri Lent.

Flipping the Chemistry Classroom with One Note

Connecting the Dots: Virginia Science Standards and Your Classroom

Learn how to create a virtual notebook for your students using One Note and record those notes using Microsoft Community Clips. Using One Note you can make a virtual account of all of your daily notes, SOL objectives, practice problems, and homework. Students can access your notebook from any device that supports Sky Drive, a free cloud storage App.

Chemistry

Grades 9 - 12

Joyce Kuberek, Tabb High School

Fun Chemistry Labs & Projects

Connecting the Dots: Virginia Science Standards and Your Classroom

William County Schools

Are you a new or tenured chemistry teacher looking for some short, fun and hands-on laboratory activities and projects that reinforce the VA Chemistry SOL essential knowledge and skills? Then, this is a session you will not want to miss.

Chemistry

Grades 9 - 12

Paula Nottingham, Stonewall Jackson High/Prince

Flipped Out for Science-Restructure for Higher Level Thinking

Connecting the Dots: Virginia Science Standards and Your Classroom

School; Jennifer Roman, Jamestown High School; Gina Speight, Grafton High School

‘Flipping’ allows students to watch video lectures at their own pace and gives teachers more time in the classroom. Come learn the tools to create a student led classroom and reach all students. Please join us to find out about this exciting method and our real experiences.

Earth/Space Science

Grades 9 - 12

Courtney Gonzalez-Vega, Jamestown High

Flip Today, Fun Tomorrow: a Hands-On Instructional Session on How We Flipped Out Science Classroom

Warwick, York River Academy

Flip Today, Fun Tomorrow is a hands-on informational session on how to flip your science classroom to maximize exploration and laboratory time. We will be demonstrating one of our flipped lessons and providing tips and tricks on how to successfully flip your science classroom.

Earth/Space Science

Grades 9 - 12

Matthew Warren, Bruton High School; Veronica

Climate Education for a Changing Bay

STEM/Environmental Education: Integration and Innovation

Improve climate literacy within your high school! Participants address climate change topics using locally relevant environmental data and information, while constructing a mock marsh transect.

Environmental Science

Grades 9 - 12

Jaclyn Beck and Sarah Nuss, VIMS/CBNERR

Scaffolding for Success in Biology and Earth Science through Environmental Science Environmental Science Grades 9 - 12
STEM/Environmental Education: Integration and Innovation Elizabeth Hobson, Maury High School, Kim Callahan
Maury High School
Students who have been unsuccessful on standardized science tests in middle school are thrown into a high stakes scenario as high school freshman. This session outlines a foundational environmental science course to prepare students for biology and earth science by scaffolding scientific practices and building background knowledge.

Inquiry in a Bottle Environmental Science Grades 9 - 12
STEM/Environmental Education: Integration and Innovation Sarah Pope, Booker T. Washington High School
Learn how Advanced Placement environmental science students used two liter bottles to explore environmental problems like acid precipitation and eutrophication. Activity can be adapted for grades 3-12. Participants will design a mini ecosystem to take back to class.

VDOE Science Instruction and Assessment Update - High School General Science Grades 9 - 12
Connecting the Dots: Virginia Science Standards and Your Classroom Eric Rhoades, Virginia Department of Education;
Tyler Waybright, Virginia Department of Education
VDOE instruction and assessment specialists offer updates on instruction and assessment resources and programs. Learn about professional development, instruction, and assessment resources available to high school science teachers.

Projects Stemming from Participation at TEP Bite of Science General Science Grades 9 - 12
STEM/Environmental Education: Integration and Innovation Natasha Schuh-Nuhfer, Center for Excellence in Education
This session will feature projects by high school teachers stemming from their participation in a CEE Teacher Enrichment Program Bite of Science session in one of five VA cities. Teachers will share their experience at Bite of Science and implementation of their project or activity, their goals, and lessons learned.

Assembling Inquiry-Based Lesson Plans with Online Resources General Science Grades 9 - 12
Connecting the Dots: Virginia Science Standards and Your Classroom David Slykhuis, James Madison University
We will show you some of the best online resources to make great lesson plans. Sites that will help you engage your students, explore topics, explain concepts, extend knowledge, and evaluate learning. We will demonstrate how to quickly put together great lesson plans, in earth science, biology, chemistry, and physics.

Engaging Young Minds To Be Tomorrow's Innovators Physics/Physical Science Grades 9 - 12
STEM/Environmental Education: Integration and Innovation Arundhati Jayarao self
Join a fun tour with the speaker and take back unique strategies to your classrooms that leverage project-based learning principles to spark the spirit of innovation in students. See how Rube Goldberg Challenge, Chemagination, Exploravision, and other such activities can be turned into exciting classroom material.

New Sample Ecology Curriculum for Virginia Biology/Life Science Grades 9 - 12
Connecting the Dots: Virginia Science Standards and Your Classroom Eric Rhoades, Virginia Dept. of Education; Lisa Deaton, Virginia Dept. of Forestry
This session will review the new sample ecology curriculum developed by a team of Virginia teachers. Learn how to access the lessons and resources that support the curriculum, as well as ways to localize the content for your students.

HHMI's Evolution Resources: Engaging, Easy to Use, and Free Biology/Life Science Grades 6 - 12
Connecting the Dots: Virginia Science Standards and Your Classroom Eriko Clements, Howard Hughes Medical Institute
In this session, we will discuss key concepts in evolution, including genetic evidence of evolution, natural selection, and what transitional fossils reveal about our evolutionary past. Short films and multimedia resources from HHMI bring science to life with inquiry-based investigations, including data collection, analysis, and computation. Participants will obtain free resources.

Teaching DNA and Genomics with HHMI's The Double Helix Biology/Life Science Grades 6 - 12
Connecting the Dots: Virginia Science Standards and Your Classroom Melissa Csikari, Howard Hughes Medical Institute
Follow the trail of evidence that led James Watson and Francis Crick to discover the structure of the DNA molecule through clips of HHMI's short film, The Double Helix. Then learn how current genomic technologies are used to map genotypes and phenotypes. Participants will receive free DVD's, classroom activities that support film, and materials for a hands-on activity that uses real data to help students understand how to link Single Nucleotide Polymorphisms (SNPs) to specific traits in dogs.

Flip-in' Biology, Chemistry and Middle School Science Biology/Chemistry Grades 6 - 12
Connecting the Dots: Virginia Science Standards and Your Classroom Edward Rock, Scientific Minds, LLC
Scientific Minds will show you how you can successfully and easily flip the biology, chemistry, and middle school classroom so that your students view concepts outside the classroom and come to class prepared for collaborative activities. Teachers will be provided with a one-year plan for flip teaching using the Science Starters. All attendees will receive free materials.

Citizen Science and Place-based Environmental Education

STEM/Environmental Education: Integration and Innovation
and Veronica van Montfrans, Virginia Tech

Faculty and graduate students at Virginia Tech will present research and SOL lesson plans on place-based environmental education that involves students in investigating STEM related activities in the community. Research from a summer school program in the Appalachian region involving students, as citizen scientists will be discussed.

Environmental Science Grades 9 - 12
George Glasson, Jessica Stephenson, Mae Hey

9 - 12

Every Rock Has A Story

STEM/Environmental Education: Integration and Innovation
Shenandoah County; Steve Leslie, James Madison University

Discover how students can create geologic field guides using rocks, sediment, and fossils to tell the depositional, paleoclimatic, paleogeographic, and tectonic origins of any site through the use of easily accessible geologic resources and digital products. Take-home materials will be provided. Co-taught by a science teacher and a geologist.

Earth/Space Science 9 - 16 Grades
Chris Kaznosky, Central High School -

Grades 9 - 16

The Environmental Training Ground

STEM/Environmental Education: Integration and Innovation
Dominion University; Laura Nelson, Portsmouth Public Schools

Come learn how high school juniors and seniors designed and fabricated their own instruments in order to conduct authentic scientific studies.

Engineering Grades 9 - 16
Daniel Dickerson and Billy McConnell, Old

What Should Every Red-Blooded American Know About Science?

Leadership for Effective Science Instruction in Virginia

Participants will work as a group to develop a measly 3-5 objectives that encapsulate what every American should know about science. At the end, the objectives developed by Virginia Tech science professors will be revealed to compare for philosophy and alignment. Thinking! Talking! Yes!

General Science Grades 9 - 16
Stephen Biscotte, Virginia Tech

VAST Colleges and Universities Committee Share Session

Leadership for Effective Science Instruction in Virginia

Suzanne Donnelly, Longwood University; Patti Horne, Longwood University; David Slykhuis, James Madison University

This session is an opportunity for university-based science teacher educators and other teacher educators to participate in a professional learning community to encourage each other in developing best practices for preparing K-12 science teachers. Come share how you incorporate inquiry methods into your courses, problem solve, and engage in a lively roundtable discussion.

General Science Grades 9 - 16
Dan Dickerson, Old Dominion University;

What are These Rocks, Anyway?

Connecting the Dots: Virginia Science Standards and Your Classroom
University, Virginia Transportation Construction Alliance

Over the last few years, the members of the Virginia Transportation Construction Alliance (VTCA) have provided free sample sets of rocks and mineral products to teachers, working through VAST. One mystery remains in the minds of many teachers - what are these rocks, anyway? This interactive session will explore what these rocks are, where they are from, and what do they represent for student learning in grades 6-12. See the VTCA exhibit booth for free samples.

Earth/Space Science Grades 6 - 12
Eric Pyle and Sam Hollins, James Madison

Grades 6 - 12

Experimenting with E&M: From Franklin to Maxwell

Connecting the Dots: Virginia Science Standards and Your Classroom

How do you provide a worthwhile lab experience for your students? How can you link the science concepts and the scientists into a comprehensive lab experience? This presentation will discuss demonstrations and labs that can help the student learn the science and the history behind our understanding of E&M.

Physics/Physical Science Grades 9 - 16
Bill Chamblee, Washington-Lee High School

Grades 9 - 16

Case of the Hungry Heron: PBL on Ecology & Experiment Design

STEM/Environmental Education: Integration and Innovation

In this classroom-tested problem-based learning unit, students drive the learning and decision-making process as they tackle an environmental mystery, discovering ecosystem complexity while learning to design sophisticated experiments through authentic inquiry. Workshop will overview the module, provide materials, and engage teachers in one hands-on slice of the PBL process.

Environmental Science Grades 9 - 16
Kevin Goff, Virginia Institute of Marine Science

Environmental Science in a World of 7 Billion

STEM/Environmental Education: Integration and Innovation

Discover timely, interdisciplinary, hands-on activities to help students understand the connections between human population growth and a host of environmental challenges. Engage in simulations, concept mapping and problem-based lessons geared toward all kinds of learners. Receive curriculum on CD-ROM linked to Virginia's SOLs.

Environmental Science Grades 9 - 16
Trudy Swan, Wise County Alternative Education Center

**FOR DAYS, TIMES AND UPDATES PLEASE GO TO THE WEBSITE FREQUENTLY.
REGISTER TODAY ON LINE!**

Down by the Riverside! Outdoor Science Investigations
STEM/Environmental Education: Integration and Innovation

Biology/Life Science Grades 10 - 12
Sarah Melissa Witiak, Leslie Whiteman, and Trina Spencer, Virginia State University

This session describes novel collaborations between an elementary preservice teachers' science methods course and a science majors' general biology laboratory course on an Appomattox River research project.

Preparing Your School for a Significant Weather Event

Environmental Science Grades 10 - 16
Phil Hysell, National Weather Service Blacksburg

The National Weather Service in Blacksburg will discuss how you can improve the readiness, responsiveness and resilience to extreme weather event for your school. By knowing your weather risk, you can help the National Weather Service Build a Weather-Ready Nation.

VAST Board Retreat Photos



Past President Juanita Jo Matkins is always experimenting!



Mary Strother models her retreat t-shirt.



VAST Board members at the beach ready to canoe.



Are you interested in motivating your students through use of a problem solving, web-based competition?

eCYBERMISSION is a free, web-based, **Science, Technology, Engineering and Mathematics (STEM)** competition for students in grades six through nine. Sponsored by the U.S. Army and managed by RDECOM, eCYBERMISSION is designed to share the importance of **STEM** education with the leaders of tomorrow and encourage them to understand the real-life applications of these subjects. Students compete for state and national awards by working in teams to identify a problem in their community and using scientific inquiry or STEM techniques to propose a solution. eCYBERMISSION is an Army Educational Outreach Program. <http://www.usaeop.com>

Within a state, opportunities are available to participate on many levels! You can participate as a student, a team advisor, an ambassador, a cyberguide, and a virtual judge. VAST encourages participation at any of these levels because when you sign up at the eCybermission website and enter by who referred you? NSTA: Referred by NSTA State Chapter, Vast will receive an incentive in the form of cash for your participation! I have been a virtual judge for the past two years and feel confident that our Virginia students are more than up to this task and can compete with other students on a national level.

You can check out the particulars and register at: <http://www.ecybermission.com> Do not wait, get started today!

Robin Curtis, Science Matters Coordinator



Question your world.



www.smv.org

Special thanks to our
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Doing What Counts

To look at any thing,
If you would know that thing,
You must look at it long;
To look at this green and say,
"I have seen spring in these
Woods," will not do – you must
Be the thing you see:
You must be the dark snakes of
Stems and ferny plumes of leaves,
You must enter in
To the small silences between
The leaves,
You must take your time
And touch the very peace
They issue from.

— To Look at Any Thing
By John Moffitt



Treaty of William Penn with Indians by Benjamin West
William Penn knew what it was like to be in prison and he knew what it was like to be free. His Quaker background and commitment both to freedom of religion and to freedom from coercion and tyranny gave him both notoriety and respect. For those in power in the late 17th Century he was perceived as a threat, for those in Colonial America he offered the hope of rational discourse and reconciliation. In keeping with both Moffitt and Proctor, he once wrote:

"I expect to pass through this world but once. Any good therefore that I can do, or any kindness or abilities that I can show to any fellow creature, let me do it now. Let me not defer it or neglect it, for I shall not pass this way again."

Wise words indeed as we begin another new year.

It isn't the thing you do...
It's the thing you leave undone,
Which gives you the bitter heartache
At the setting of the sun;
The tender word unspoken,
The letter you did not write,
The flower you might have sent...
Are your haunting ghosts at night.

The stone you might have lifted
Out of your brother's way,
The bit of heartsome counsel
You were hurried too much to say;
The loving touch of the hand...
The gentle and winsome tone,
That you had no time or thought for,
With troubles enough of your own...

— Adelaide Proctor



CC By Glavkos [CC-BY-SA-3.0 Wikimedia Commons
Although there are many ways in which our minority brothers and sisters have not yet attained full freedom and equality with Whites, his words show the same commitment and direction as the words of Martin Luther King, Jr over 50 years ago when he said, "And in winning our freedom, we will so appeal to your heart and conscience that we will win you in the process."

Is this not our vision as teachers? To be the thing we see, to know by looking long at it, enter in and touch the very peace and avoid the anguish of so many things left undone. There are those giant figures in history who have risen up and looked at things long, serving as lanterns in the darkness of ignorance and its consequence, fear. Surely this speaks to those of us who work with children in our classrooms and schools.

The ability and willingness to “enter in” and act now to make a positive difference was nicely laid out in the context of science education and the conflicts between “traditionalists” and “reformers,” in an article in *Phi Delta Kappan* by Mark Windschitl [*Why We Can't Talk to One Another about Science Education Reform*, Jan 1006, *Phi Delta Kappan*.] Windschitl outlines two “streams of talk” which traditionalists and reformers tend to use in defending their positions: in defending a particular point of view, each camp feels obligated to belittle the other, together with the power of exaggeration in “cobbling together an inflated target for critique.” And so, with cyclical regularity since the 1950's, we hear traditionalists extol the importance of giving kids the basics (facts, concepts, and skills, then problem-solving or investigations), of following careful step-by-step lab procedures whose outcomes are already known ahead of time, and of teachers giving students the knowledge they need to succeed. The reformers proclaim the virtues of acquiring concepts and skills in the context in which they are used, of problem-solving or inquiry being valued activities in themselves apart from the information acquired, and of teachers facilitating the acquisition of student knowledge (the familiar “guide on the side” rather than “sage on the stage”). In summary, one might say that for the traditionalist knowledge is acquired, the burden is upon the teacher, and students are relatively passive recipients (giving students the basics); for the reformist, knowledge is created, the burden is upon the student, and students are active doers.

Windschitl's Seattle newspaper article on this dichotomy brought such predictable responses as: “I have no criticism of giving high school students general knowledge about the environment, health, chemistry, and genetics, but don't call it science. Call it ‘popular science.’ Then offer courses in real science and offer the basics that are challenging.” “...the hands-on group learning method [is] something that most scientists disdain because it doesn't give you the fundamentals you need to conduct science, and it's very inefficient.” “...it is the teachers' primary duty to give students the information they need to succeed.”

The most interesting thing about the article is Windschitl's insistence that this is not an “either-or” argument but need be framed as a “both-and” challenge. Science teachers need to be actively learning along with students, acknowledging the inherent uncertainties of “inquiry” itself, as *The National Science Education Standards* [1995] carefully defines it. He points out that “traditional teachers” or “reform classrooms” are “convenient fictions” because we all want our students to succeed in science; and neither camp wants to waste students' time having them do something they will get wrong. “While traditional talk about basics is like a billboard – compelling in its simplicity – reform talk about what is fundamentally important for students to know is like a plotted story that carries more meaning but requires greater commitment to understand.” Part of our ambivalence arises from our use of the phrase “discipline of science.” To some, “discipline” refers to a set of factual knowledge, skills and attitudes; to others, “discipline” describes a process, a method of doing science, more a practice than a product.

Is not our core responsibility as teachers to encourage and enable all our students to acquire or extend their commitment

to understand – in our case to engage in the search for meaning in the natural world? As the Cheshire Cat remarked in *Alice in Wonderland*, “If you don't know where you are going, any road will get you there.” The most helpful aspect of Mark Windschitl's essay is his conclusion describing how to enter a dialogue between the so-called traditionalist and reformist camps, a dialogue where consensus is not the goal, but clarity and listening over defensive posturing. Shared meaning can arise by abandoning personally held images in favor of four fundamental questions:

“What is really important for students to understand and be able to do?”

“What would it mean for our students to think deeply about this topic? [Such as mitosis, the gas laws, plate tectonics, or momentum.]

“What would mark the difference between a superficial understanding of the topic and an in-depth understanding?”

“How would you assess the knowledge and skills of your students?”

He further suggests sharing student work samples (notebooks, lab reports, concept maps) to show student thinking and the effects of instruction. Teachers are frequently surprised by the minimal impact upon learning which their favored method of instruction may have. He concludes by observing “Genuine dialogue [between teachers] is time-consuming, difficult, and often unsatisfactory, but it is entirely necessary.” Is this not true for our students as well?

When we “look at anything” or try “being the thing [we] see” we often are confronted by a sense of our own success or failure. A 10th Grade Nepalese student of mine put it this way:

“Throughout my experience that failure is not the worst thing, I believe it is one of the factors to be successful at the long term. The worst scenario is obviously not to try. I believe that attempting your best which matters the most than not even attempting. In my belief, that failure will lead to be triumph at the end. The main reason behind this is that, people who became successful probably failed many times. In addition, they were very persistent, never gave up and also believed in themselves. Failure is part of life because we are not good at everything, even sometimes when we do our honest effort, the result doesn't turn out positive.”

This young lady has discovered one of life's profoundest lessons, not from being told it, but through her own activity and persistence. Science could be said to be the major discipline which builds repeatedly upon its own failures and occasional public ridicule, from Galileo, through Pasteur, to Edison and Robert Goddard. The power of the null result is emphatic.

And so, we must “be the thing we see,” be it student or discipline itself. The attentiveness and commitment to understand our discipline or our students is easy enough to say, yet hard to fulfill when we hurry along and “had no time or thought for / With trouble enough of [our] own,” there are so many of “the thing[s] we] leave undone.” This suggests we might focus more intently upon the world into which our students graduate. We hear a lot about the “real” world, suggesting that our school/university world is fake, or at best virtual. This view is an outcome of some of the responses to Mark Windschitl's essay quoted earlier.

As suggested by my Nepalese student's writing, here is a list of

the powers a graduate has according to our County's Science Supervisor: optimism, hope, creativity, articulate communication, perseverance (especially for a good cause) against impossible odds. However, to quote John F. Kennedy, "effort and courage are not enough without purpose and direction." So it was sobering to have heard in July on NPR a discussion on predictions about "Millennials" – it bore out comments made in a November 2011 Christian Science Monitor article on four obstacles facing those whose young lives crossed the 2000 line. One financial advisor commented about the short-term nature of youthful goals: get out of college debt, get a new car, live without roommates. Yet, the NPR interviewee predicted Millennials will have had 12 jobs by the time they are 38, want to be low on debt (no home or car ownership), and plan on college. Commitments, like time horizons, attention spans, and friendships, seem to have shrunk: depending on whether a person enters the work force at age 18 or 22, those twelve projected jobs would each last an average of 16-20 months, or less than one and a half to two years. It is sobering and sad to think of commitments or relationships (personal, marital, or societal) on such tenuous ground and of such miniscule duration. There are those who use such predictive or descriptive scenarios as though they were normative – as in the old (Charles Reade, 19th Century) quote from *A Simpleton*: "Well, everyone for himself, and Providence for us all – as the elephant said when he danced among the chickens." What is merely descriptive for the elephant is of much normative concern to the chickens.

The kind of stability and commitment to understanding – in science as in societal relationships – which we see in the ministry

of teachers and in the persistence and transformation of setbacks or failures into successes by students of all ages is where the life vision of John Moffitt, Adelaide Proctor, or William Penn begins. Whether in our communities, nation, or world, (politically, economically, socially) we suffer from short-term thinking at the expense of the poet's insight: "If you would know that thing, / You must look at it long ...you must / Be the thing you see...You must enter in / To the small silences...You must touch the very peace / They issue from." Else "at the setting of the sun" we are haunted by the thoughts of "The stone you might have lifted / Out of your brother's way, / The bit of heartsome counsel / You were hurried too much to say..." "Let me not defer it nor neglect it, for I shall not pass this way again."

Acknowledgments:

1. Windschitl, Mark. 2006. "Why We Can't Talk to One Another about Science Education Reform." *Phi Delta Kappan*, January, Vol. 87 (5) pp. 349-355.

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.

2014 Virginia Association of Biology Teachers (VABT) Annual Conference September 12 to 14, 2014 UVA Blandy Experimental Farm 400 Blandy Farm Lane, Boyce, VA 22620



Come spend the weekend or the day. Experience biology, environmental science, polar science, monarch honeybee studies and much more in the beautiful surroundings of the 700-acre UVA Blandy Experimental Farm. Onsite Amenities include bike paths, horseback riding (bring your horse), native plant trail, birding (bring your binoculars), Wilkins Lane Drive Tour, Conifer Trail, Walking Trails, American Chestnut and Meadow reclamation sites, and much more. For more information and to register, contact Kathy Frame (chuckframe@aol.com).



VAST Region 4's Professional Development Event: "Teaching Science with a T.E.A.M. Approach" (STEM + the Arts = S.T.E.A.M.)



**Susan Bardenhagen,
Region IV Director**

In the middle of the summer, on July 30th, at Osbourn High School in Manassas, 85+ educators- including twenty secondary Math and Science teachers- collaborated as panelists, presenters, and participants for VAST's regional professional development conference, "Teaching Science with a T.E.A.M. Approach." Co-sponsored by the region's **Battlefields of Northern Virginia Council of Teachers of Mathematics**, attendees represented George Mason University, ten school districts from Region 4- Arlington, Culpeper, Falls Church, Fauquier, Fairfax, Frederick, Loudoun, Manassas, Manassas Park, Prince William- and Suffolk and Richmond, too.

Curriculum directors and specialists in STEAM areas in the nineteen jurisdictions in Region 4 assisted in sharing the event's invitation to school teams and educators- both formal and informal. The northern Virginia STEAM Table, STEM Leading Ladies, and AAUW's STEM & "SUCCESS!" Conference supporters also spread the word. The result- attendance was more than double that of the region's 2012 STEM conference. 2014's participants and those who weren't able to attend this one want to have another STEAM conference soon- so plans are underway for STEAM 2.0!

The Wolf Trap National Park for the Performing Arts' program listing for the 2005 students' "International Festival" is where I first saw the acronym, STEAM. Then, a Kennedy Center for the Performing Arts January program, entitled, "Connections: Music Matters," how music is infused in STEM areas, inspired me to plan the July 30th program. Both arts centers were instrumental supporters. The Wolf Trap Institute for Early Childhood Learning through the Arts provided four vouchers for a preschool or kindergarten class to attend a performance, as door prizes. The National Symphony Orchestra's cellist, Yvonne Caruthers, reprised her January concert with three presentations.

Participants began by interacting in ten "new teams"- including elementary grade levels; coaches & curriculum specialists; specialists (which, by the way, included every area from P.E. to librarian); secondary Math & Science; gifted; administrators, special education, and ESOL; and K-12 supervisors with informal educators. They completed interest inventories with a pre-survey on STEAM for data gathering. I will report on my findings in the next newsletter.

The panel, "Why STEAM?" was moderated by George Mason University's associate professor of theatre and executive director of the Hylton Center for the Performing Arts, Rick Davis. The two panelists, National Arts Education Association consultant Kathi Levin and GMU's professor of Management Matt Cronin,

shared their support of the conference's theme, responded to topics posed by Rick Davis, and then responded to questions from the audience.

During the three one-hour breakout sessions, participants chose from these presentations: GMU Professor Changwoo Ahn's "EcoScience + Art," Casio's Teacher Mike Reiners' "Fostering Mathematics through Music," Rebecca Klemm aka "The Numbers Lady" on "Number Links," artist/writer Paul Glenshaw's "The Intersection of Math, Physics, & Jazz," Manassas' elementary STEM coaches' "Starting a Lego League Team at Your School," Andrea Brothers' "Scientist & Violinist Working for a Technology Company," and Yvonne Caruthers' "Music Matters; Math & Music, Science & Music, and Technology, Engineering, & Music- Unexpected Intersections."

#STEAM - One of the attendees tweeted on #STEAM that she was having a hard time deciding what to go to because there were so many great presentations.

School teams were encouraged- principals followed up with this idea and other subject/instructional area teams signed up until there were twenty teams- duets, trios, quartets, and quintets. During the working lunch, these teams collaborated while those solo met new colleagues by grade levels and subject areas. After the third session, participants all received door prizes including donations from local businesses supporting STEM with major sponsors Casio, Micron Technology, the National Wildlife Federation, VAST, and Numbers Alive! A voucher covering fees for the 2014 VAST PDI in Roanoke in November was won by a VAST member entrant- all attendees were alerted beforehand to the possibility of winning this prize so they could check their schedules to be able to enter. VAST and BNVCTM members brought guests with a two for one registration bonus.

VAST board members Mary Strother, Teacher Resources, and Elementary Representative, Michele Lombard, assisted with registration. Biology Committee chair Kathy Frame supplied flyers for the VAST conference in the region 4 in September. The conference was dedicated to the memory of GMU's Science Education Professor, Dr. Donna Sterling, life member of VAST and champion of VISTA.

A follow-up list of links to papers/articles, websites, and videos from the already mentioned STEM and STEAM related contributors and the presenters will be sent to all of attendees. One Math coach commented, "I gained good info to take back to (my school)"; another classroom teacher e-mailed me, "Today was wonderful! I learned so much!" A quote offered by a gifted education teacher who said, "I enjoyed the S.T.E.A.M. mini conference today!!" included:

"A child's mind stretched by a new idea, never regains its original dimension." Oliver Wendell Holmes

Virginia Association of Science Teachers Position Statement

The Role of the Laboratory in K-12 Science

Science is not just a body of knowledge that reflects current understanding of the world; it is also a set of practices used to establish, extend, and refine that knowledge.

—*A Framework for K-12
Science Education*,
National Research Council,
2012

Background and Introduction:

The laboratory provides the environment in which all science is studied. Science in this setting is not a check list of items to be covered or content to be mastered. We want students to learn science by doing it rather than by simply reading about it. The usefulness to learning through experiences lies at the heart of what it means to be human; we are wired to learn through the manipulation of objects. The laboratory is the means for the process of inquiry and provides an essential way to show comprehension, understanding, and application of knowledge. In the sense that sound science requires the active participation of the practitioner in discovering and verifying the principles upon which it depends, it could be said that science begins and ends in the laboratory. It involves multiple senses and approaches.

As an organization of, by, and for science teachers, the Virginia Association of Science Teachers (VAST) maintains that the role of developmentally appropriate laboratory explorations is crucial for students to clarify the experiential nature of science. Much of current work in revising science standards and approaches [NRC, 2006; NGSS, 2013; AP Science Revisions, 2012] stresses the importance of engaging students in the process of inquiry including experimental design, data collection strategies, analysis and evaluation of data, and interpretation of scientific explanations and theories. For example, four of the seven overarching practices in Advanced Placement (AP) science revisions involve inquiry-based laboratory (lab) experiences.

VAST also maintains that rigorous inquiry-based experiences provide students the means to develop the essential hands-on practices of science during their K-12 development of critical thinking and problem-solving skills, habits much in demand in today's and tomorrow's world. Moreover, students show improved ability to cooperate and communicate with others, share responsibilities, assume different roles, and contribute and respond to ideas. [NSTA, 2007] Some lab experiences are exploratory in nature while some are confirmatory; however, lab experiences should be neither rote nor tangential to students' understanding of science. Well-designed rigorous laboratory experiences will give students actual exposure to both the empirical and the theoretical facets of science. In addition, students are exposed to the complexity and ambiguity of scientific research as they gain experience in manipulation, appropriate arrangement, and troubleshooting of apparatus. Research has shown that students at all levels learn science best by doing it rather than by being told about it [Donovan, 2005], an appropriate extension of David Kolb's well-known work on learning styles and the learning cycle.

Although demonstrations, computer simulations or analyses of data provided by others have their value, they must not replace the actual process of manipulating appropriate equipment and apparatus, collecting valid data, analyzing results, and communicating findings to others either verbally or in writing. [NRC, 2006] VAST is committed to the importance of making such lab experiences available to all K-12 students regardless of background, ability, or physical or academic need.

Declarations:

Integration of laboratory experiences into the science program:

Students need to understand science is a discipline whose theories and laws are subject to continual experiential examination and verification. Therefore, lab experiences should take a prominent position in any curriculum, serving as the core of every major topic or strand. Consistent with the increased emphasis on laboratory time in the revisions in AP science [College Board, 2012], multiple opportunities must exist for all K-12 students to collect and analyze data in the lab or field on a weekly basis. This is especially true of students enrolled in distance-learning science courses where local school- or laboratory-based opportunities need to be available for frequent hands-on lab experiences. Emphasis should be upon student-structured explorations over teacher-led activities.

Data Interpretation and Analysis [NRC 2012]:

Meaningful organization and interpretation of data are crucial to the expansion of laboratory experiences into everyday life. This includes:

- Asking questions and defining problems
- Developing mental and conceptual models
- Presenting data to show patterns and relationships
- Communicating these relationships with clarity
- Using mathematical and computational reasoning
- Constructing explanations and designing solutions
- Engaging in arguments from evidence
- Reflecting on significance of data and error analysis.

Structure:

Not only does there need to be sufficient time in the weekly schedule to permit genuine laboratory experience, but class size must be appropriate for the physical arrangement and safety in a class or laboratory. The Virginia Department of Education guidelines as published in *Safety in Science Teaching* recommend a minimum of 4.2 square meters (45 square feet) per student in a laboratory setting. Furthermore, studies have shown a dramatic rise in accident rates where student-teacher ratios exceed 24:1 regardless of physical space [NSELA 2013]. Higher ratios also have a detrimental effect on student-teacher and student-student interactions, both vital components of successful laboratory experiences.

Administrative support:

Administrative support is vital to the effectiveness of K-12 laboratory experience. Supportive measures must take a variety of forms:

- Scheduling (class size and location) must permit adequate time and space for safe and supportive laboratory work. Load limits need to adhere to all fire and occupancy codes.
- Budgetary allowances must exist for provision of sufficient equipment (apparatus, computer hardware, software, and probe-ware) for each student to have a reasonable chance for personal data-gathering.
- Adequate storage space and location of equipment should provide convenient access to all teachers in a team.
- Strong professional development programs should be provided for both pre-service and in-service training. Teachers need both the time and financial support to attend and conduct hands-on experiences either during or after school hours, including the availability of summer workshops.
- Safety training must be provided for teachers and students, including chemical storage and handling, equipment maintenance, and periodic safety checks.
- Liability protection is needed for the teacher as well as the school. [NSTA 2000]

Assessment:

Teachers need the time and training to construct appropriate and challenging authentic assessment vehicles to measure student understanding and interpretation of laboratory experiences. They should emphasize students' ability to communicate results and analyze data and conclusions for peer review in a classroom setting. Students' ability to demonstrate creative solutions and critical thinking is particularly important, the depth depending on their level of proficiency and advancement through the K-12 spectrum. In addition, teachers should review annually the set of laboratory investigations which they have used in order to strengthen, add, or discard exercises based on student success rates in understanding and analyzing data. Success should be measured not only by formative and summative assessment, but also in the setting of lab practica; in all cases both assessment of learning and assessment for learning should occur.

Further Reading:

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4. Donovan, M.S., & Bransfield, J.D. (Ed.). (2005). *How Students Learn*. Washington, D.C.: The National Academies Press.
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6. Kolb, David A. (1984). *Experiential Learning: Experience as the Source of Learning and Development*. Englewood Cliffs, NJ: Prentice-Hall.
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Greetings teachers! Yes! Science Matters in Virginia, especially to Virginia Association of Science Teachers. This is a partial listing of student competitions that you might find helpful as you organize your new year of teaching as these competitions require problem based learning (and solving) that will involve time.

Virginia Junior Academy of Science, grades 7-12. Students conduct original research and report their findings to the scientific community. <http://www.vacadsci.org> In order to achieve this students need to begin work very early in the fall.

ExploraVision, K-12. Teams of students identify, research, and then propose a solution to a problem for which they build a web site of 5 pages. A national competition, ExploraVision is more than just a student science competition; it's about helping students in building problem-solving, critical thinking, and collaboration skills which give students a head start. <http://www.exploravision.org>

The **Siemens We Can Change the World Challenge** is the premier national environmental sustainability competition for grades K-12 students. Through project-based learning, students learn about science and conservation while creating solutions that impact their planet. Beginning August 2014 through March 2015, teams from across the country will be challenged to create sustainable, reproducible environmental improvements in their local communities. To date, nearly 100,000 students

have participated in the Challenge. Give your students the opportunity, tools and inspiration to make a difference and become agents of change.

<http://www.wecanchange.com>

eCYBERMISSION is for students! The student's role is to choose a Mission Challenge and complete a Mission Folder. The primary role for teachers is to support their students as a Team Advisor, from choosing a mission, to reviewing the results. Volunteering can take several forms, whether you want to participate as a Team Advisor, a CyberGuide, an Ambassador or a Virtual Judge. <http://www.eCybermission.org>

Science Olympiad <http://www.sonic.org> For the past 30 years, **SCIENCE OLYMPIAD** has led a revolution in science education. What began as a grassroots assembly of science teachers is now one of the premiere science competitions in the nation, providing rigorous, standards-based challenges to nearly 7,000 teams in 50 states. Science Olympiad's ever-changing line-up of events in all STEM disciplines exposes students to practicing scientists and career choices, and energizes classroom teachers with a dynamic content experience.

There are many worthwhile competitions for students that will promote student learning in science. I am informing you of these because they incorporate problem based learning. Have a wonderful year!

Robin Curtis, Science Matters Coordinator



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Teacher Direct

August 6, 2014

http://www.doe.virginia.gov/testing/teacher_direct/

Quick Links

SOL News



SOL Events



SOL Library

**Did You Know?**

TeacherDirect is the Virginia Department of Education's direct line of communication with classroom teachers. TeacherDirect shares new instructional **resources** created by VDOE staff and publicizes professional development **events**, grant opportunities, and other **information** of interest to teachers and their students. Best wishes as we launch another great school year in Virginia!



Resources: http://www.doe.virginia.gov/testing/teacher_direct/sol_library/index.shtml

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

- A. The objective of VAST shall be to advance the study of science, to promote excellence in the teaching of science, and to provide an opportunity for communication among science educators in the Commonwealth of Virginia.
- B. Mission Statement: On October 19, 1991 the Advisory Board (henceforth the Board of Directors) developed the following statement:

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

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

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

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

Send articles, letters to the editor, or labs by the
copy deadline, **October 1, 2013**, for inclusion
in the next digital VAST Newsletter.

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