



The Science Educator

Summer 2021

A Publication of the Virginia Association of Science Teachers

ISSN 1945-7405 Vol. 70, No.1

ZOOM Meeting



Carole Nash, Ph.D.



Don Duggan-Haas, Ph.D.



Eric Pyle, Ph.D.



Joi Merritt, Ph.D.



Pres. Russell Kohrs, M.S.



Science, Systems, Solutions

Virtual PDI, Nov. 16-18; In-Person PDI Plus, Nov. 19-20, Harrisonburg

Learning, connecting, and innovating while keeping VAST members safe and engaged is what this year's Professional Development Institute has in store. Best practices have been incorporated from last year's teaching and learning to create dynamic virtual live afternoon sessions, as well as, best health practices for our enhanced "plus" field offerings during the final days of the conference. Meaningful engagement

between colleagues, vendors, and session presenters is paramount. VAST will continue to utilize the Whova platform in regional, content, and interest community networking, as well as, exploring our sponsors' offerings. Join us this November as we return to a healthy and nurturing experience focused on science, systems, and solutions.

[Link to PDI Page](#)



VAST needs your Help!

From the Executive Director

Finding Exhibitors - Pass this Forward

Please help us connect with exhibitors.

Why Should You Exhibit at the VAST PDI?

When you exhibit virtually at the VAST PDI, you will have your own booth and visitors can view live demos and/or videos that present your product or program. Additionally, you may provide a link to your website and make handouts available. Note: only VIRTUAL exhibits will be possible in 2021.

This year, Whova has created a gallery view for exhibitors. Attendees will see links to all the exhibits at once, instead of an alphabetized list. Virtual exhibits will be more equitably seen on the screen, and you are able to intermingle and interact with all attendees. Exhibitors may message attendees within the Whova application.

Once again, a passport contest will encourage attendees to visit every booth. If you offer a special deal or coupon, the platform is programmed to form lead generations when attendees click on your offer. Your offer will also be automatically emailed to the attendee!

Susan Booth, Ed.S.
Executive Director

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President's Corner...



Russell Kohrs, M.S. N.B.C.T.

Greetings from the President's Prep-room!

I just returned from a fabulous, refreshing, and inspiring expedition through the four-corners region. I was there because of the Donna Sterling Exemplary Science Teaching Award. While exploring the Ancestral and modern indigenous cultures of the region and their relationships with local environments over time, my camping experiences showed me first-hand the effects of the current megadrought. Water resources in the region are tight. River flows are way down from normal, affecting trout streams like the Dolores River (Colorado), among others. Rivers that have been dammed for generations are seeing their lowest flows in recent memory both up and downstream, affecting not only indigenous communities whose traditional livelihoods were originally affected by their building, but now, the lives of everyone are being affected profoundly. This megadrought is not only a water issue, but an electricity issue, a biodiversity issue, and even a national security issue.

The situation is screaming for a better understanding of climate **science**, associated natural and human **systems**, **and solutions** that take all of this knowledge to holistically benefit and balance the needs of the environment and the human population. There are many reasons the southwest is struggling with the effects of this megadrought. First, is that planning for development has not occurred over the decades that took the long history of seesawing drought and plenty along with the dramatic effects of anthropogenic climate changes. Indigenous people in the area have long knowledge of this. Tree ring, cave, and other natural data sources contained this information. And, we have always had some knowledge of how these systems work. Sadly, such data is often ignored in the face of economic progress.

Therefore, this year's PDI theme, "**Science, Systems, Solutions**" is so critical!

I want to challenge you to register and attend the PDI, both virtually and in-person. Virtually, you will experience the usual high-quality peer-led sessions and keynote speakers you have come to value, delivered in a way that is open to

more people than ever through technology. You'll also be able to interact with peers, play games through WHOVA, and visit sponsors and exhibitors in their booths.

By registering for the PDI⁺, you will attend field trips and get hands-on experience in modern research lab facilities looking at cutting edge explorations of science, systems, and solutions.

Friday's field trip (November 19th) will explore how we use the unified geosciences, chemistry, and physics to mine, crush, and create transportation products. The field trip will begin with a tour of Frazier Quarry, a local limestone mine and then continue with a trip to Rockingham Pre-Cast, where Frazier Quarry products are used to create items that are critical for our transportation and building infrastructure. The trip is sponsored by the VTCA, the Virginia Transportation Construction Alliance, who every year attend the PDI and given away the very popular rock kits. You'll get one of them for attending while also being entered to win a large, 70" display case full of Virginia rocks and minerals for your school, a nearly \$1000 value!

Saturday's (November 20th) lab visits are going to be exciting. Come and learn about cutting-edge research in radioactive decay, the neurosciences, protein unfolding, biodiversity, plant pigments, and so much more. These **labs** will be led by faculty. You'll leave feeling personally enriched, but also with ways to apply these innovative areas of science leading to solutions in your classroom.

We live in an amazing age where science is leading to many new understandings of the systems that make our environment work, so that we can create better solutions to benefit generations to come.

Join us at the 2021 PDI⁺ !

Russ Kohrs, VAST President 2021

“Science, Systems, Solutions”

The Virtual Exhibit Hall is available throughout the PDI.
Pre-recorded presentations are available throughout the PDI.
Be sure to check out the Community button on the WhoVa app!
You will be able to take part in discussion boards on teaching strategies, content areas, and even propose discussion topics of your own. This is a great networking feature to explore!
Recordings of the live presentations will be available to VAST members beginning in January 2022.



Tuesday, November 16

3:30 pm – Welcome to the PDI, Russ Kohrs – VAST President (Live Presentation)

4:00 pm – 4:45 pm: Concurrent Session One - Live Presentations

5:00 pm – 5:45 pm: Concurrent Session Two - Live Presentations

6:00 pm – 6:45 pm: **General Session One** (Live Webinar)

Dr. Don Duggan-Haas, Director of Teacher Programming, The Paleontological Research Institution
Title: *“It’s Too Late. Let’s Get to Work Anyway.”*

7:00 pm – 7:45 pm: Concurrent Session Three - Live Presentations

8:00 pm – 8:45 pm: Concurrent Session Four - Live Presentations

Wednesday, November 17

4:00 pm – 4:45 pm: Concurrent Session Five - Live Presentations

5:00 pm – 5:45 pm: Concurrent Session Six - Live Presentations

6:00 pm – 6:45 pm: **General Session Two** (Live Webinar)

Dr. Carole Nash, Director, Environmental Archaeology Laboratory
Title: *“Spinning Stories: The Science of Archaeology and Complex Problem Solving”*

7:00 pm – 7:45 pm: Concurrent Session Seven - Live Presentations

8:00 pm – 8:45 pm: Concurrent Session Eight - Live Presentations

9:00 pm – Treasurer’s Report, Matt Scott (Live Presentation)

Thursday, November 18

4:00 pm – 4:45pm: Concurrent Session Nine - Live Presentations

5:00 pm – 5:45 pm: Concurrent Session Ten - Live Presentations

6:00 pm – 6:45 pm: **General Session Three** (Live Webinar)

Dr. Joi Merritt, James Madison University
Title: *“Systems for Success in the Elementary Science Classroom”*

7:00 pm – 7:45 pm: Concurrent Session Eleven - Live Presentations

8:00 pm – 8:45 PM: **General Session Four** (Live Webinar)

Dr. Eric Pyle, President - National Science Teaching Association, James Madison University
Title: *“STEM in the 18th Century: How Navigation, Geodesy, and the Romance of Euclid made the Industrial Revolution Possible.”*

9:00 pm: PDI Closing and Welcome to the 2022 PDI, Becky Schnekser - VAST President Elect (Live Presentation)

2021 VAST IN-PERSON PDI PLUS SCHEDULE-AT-A-GLANCE

(The PDI Plus is an Add-On to the Virtual PDI) (draft as of 04-29-2021)

“Science, Systems, Solutions”

Come enjoy exciting field trips deep into a rock quarry, to a pre-cast concrete planet, an extinct volcano, and to taste some of the local viticultural products!

Come and experience some authentic research lab experiences led by James Madison University professors in their own labs!

Come and enjoy shows at the JMU planetarium and recently expanded mineral museum!

Come on Friday for the quarry field tip and then enjoy a “Night on the Town: Science, Systems, Solutions in the City”. It will be a fun scavenger hunt!



Friday November 19

2:30 pm – 5:30 pm:	Field trips such as: Frazier Quarries, Mineral Museum, Planetarium
6:00 pm – 7:00 pm:	Dinner – Meet up with teachers and dine together in downtown
7:00 pm -	“Night on the Town” with a “Science, Systems, and Solutions” Scavenger Hunt

Saturday, November 20

8:00 am – 9:30 am	Breakfast (included with registration)
9:30 am – 11:30 am	Choose from six authentic research lab experiences offered by JMU faculty
11:30 am – 1:00 pm	Lunch (included with the registration)
1:00 pm – 3:00 pm	Choose from six authentic research lab experiences offered by JMU faculty
3:15 pm – 5:30 pm	Choose from several in-person field trip opportunities
Various Times Both Days TBD	Mineral Museum, Planetarium Shows

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- To make a hotel reservations [click here.](#)
- To make an Online VAST PDI registration [click here](#)

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Tech)

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**Virginia Association of Science Teachers
2021 Virtual Professional Development Institute**



**General Session I
Tuesday November 16, 6:00 pm – 6:45 pm**

Dr. Don Duggan-Haas

Director of Teacher Programming
The Paleontological Research Institution

“It’s Too Late. Let’s Get to Work Anyway”

It is too late to prevent horrible consequences of climate change, but when it’s too late is when we generally get to work. We ended slavery too late. We stopped Hitler’s genocide too late. We got to work on civil rights and getting out of Vietnam too late. We began our response to Covid-19 too late. Being too late doesn’t mean that it’s too late to do something. It means we’re already letting people suffer, but we can prevent future suffering. Addressing climate change is a wicked interdisciplinary problem, and an all-hands-on-deck moment. This session will address key aspects of the physical science of climate change, bring home its massive scale, and delve into the social science that provides different sorts of challenges to teaching and learning climate change than is presented by teaching, for example, photosynthesis.

Biography

Don Haas (formerly, Don Duggan-Haas) is the Director of Teacher Programming at The Paleontological Research Institution and its Museum of the Earth & Cayuga Nature Center in Ithaca, NY. Don’s work in public outreach, teacher education, teacher professional development and curriculum materials development marries deep understandings of how people learn with deep understandings of the Earth system. He is a past president of the National Association of Geoscience Teachers, and a nationally regarded expert in climate and energy education, place-based and technology-rich Earth and environmental science education. He has led educator professional development programming throughout the US. He also is co-author of the books, *The Teacher-Friendly Guide to Climate Change* and *The Science Beneath the Surface: A Very Short Guide to the Marcellus Shale*. He served on the Earth & Space Science Design Team for the National Research Council’s **A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas**. Don has taught at Colgate, Cornell, and Michigan State Universities, the University at Buffalo, Kalamazoo College, and Tapestry and Norwich (New York) High Schools.

WhoVA is Back

Barbara Adcock, VAST Membership Chair

The WHOVA app is back at VAST again this year! It allows networking prior to, during and even after the PDI! Having both the app on your smart device and the web-based interface on your computer will allow you to seamlessly access the PDI on the go and when seated at your desk.

In WHOVA, you will be able to:

- See the complete agenda, and build your personal agenda.
- Visit our virtual exhibitor hall and take part in valuable exhibitor promotions!
- Access the links for the recorded and live sessions in both the app and the web version.
- Ask sessions presenters questions about their sessions.
- Network with fellow attendees, presenters and exhibitors.

In the community networking portion of the app, you will be able to post discussion topics, participate in discussion boards, and ask and answer questions. Networking is a huge piece of any conference, and with the app, you will be able to network prior to the VAST PDI, during the VAST PDI and even after the VAST PDI!

You will also be able to take part in three contests within the app to be put into a drawing for a free 2022 VAST PDI registration (registration only—hotel and meals are not included). There will be a photo contest, a passport contest where visiting each exhibitor booth gets you put in the drawing, and a leaderboard contest for participating in the networking opportunities in the app.

Join us at the 2021 Virtual VAST PDI, and then at the Face-to-Face PDI PLUS! Use WHOVA to schedule meet-ups, virtually, or in person!



General Session II
Wednesday November 17, 6:00 pm – 6:45 pm



Dr. Carole Nash
Director of Environmental Archaeology Laboratory
Associate Professor, School of Integrated Sciences
James Madison University

“Spinning Stories: The Science of Archaeology and Complex Problem Solving”

Teaching complex problems requires us to integrate evidence from multiple disciplines. Inherently interdisciplinary in practice, archaeology models collaboration between the sciences to explain past events and demonstrate their relevance to contemporary issues. With its long-term perspective, archaeology also provides a systems basis for understanding human responses to social, environmental and technological change. Nevertheless, the real power of archaeology for teaching and learning lies in its storytelling -- the narratives that allow students to see themselves in both the process of the work and the result. We will explore examples of archaeological studies, ranging from the end of the Ice Age to the 20th century, from across Virginia.

Biography:

With over 40 years of experience in the archaeology of the Middle Atlantic region and Dr. Carole Nash, RPA, a specialist in the archaeology and historical ecology of the Appalachians. Her main research interests are the long-term environmental and cultural history of upland Native American cultures. She teaches courses in field technologies, historical ecology, environmental science, and human geography. She is the author of over 175 technical reports, scholarly papers, and publications, including co-author of *Foundations of Archaeology in the Middle Atlantic* (Routledge 2018). She has directed archaeological research in Shenandoah National Park (SNP) since 1999 and Wintergreen since 2003 and has employed over 100 undergraduate students in this work, resulting in student conference presentations, publications, and co-authorship on technical reports. She completed four years as the President of the Archeological Society of Virginia and has served as President of the Middle Atlantic Archaeological Conference and the Council of Virginia Archaeologists. She is a founding member of the Virginia Archaeology Charitable Trust and is involved in several projects that merge archaeological evidence with historical cartography and remote sensing to understand the impacts of sea level rise on heritage resources and contemporary communities. She is chair of the Society for American Archaeology's international committee on Climate Change Strategies and Archaeological Resources Committee. A practitioner of citizen science, Carole co-directs the Archaeological Technician Certification program for the Archeological Society of Virginia and the Department of Historic Resources.

Write for *The Science Educator* You are Invited to Submit!

Do you have lesson ideas or resources to share with other colleagues? We would like you to submit them for the newsletter. Think about the useful and interesting ideas you have discovered that other teachers would like to know about. Write about what you know best. Were your students excited about a lesson or activity that you used this year? Did you find a better way to explain or communicate a concept?

What should you do first?

- Decide your topic
- Write - Edit - Write - Repeat
- Send articles to the VAST Editor before the submission date.
- Using any suggestions and edits, finalize your article.

The next submission date is always on the last page of every newsletter. All the submission dates and more information are listed on the [publication -> newsletter page](#) on VAST.org.

Do you have questions? Please contact the editor, [Jean Foss](#).



General Session III
Thursday November 18, 6:00 pm – 6:45 pm



Dr. Joi Merritt
Associate Professor of Science Education
James Madison University

“Systems for Success in the Elementary Science Classroom”

At the elementary level, teachers are often responsible for teaching all subject areas. The narrowing of the elementary curriculum has resulted in limited time on science, which is an equity issue, as research shows students in our most marginalized schools have even fewer opportunities to engage in meaningful and powerful science learning than their counterparts in privileged schools. This talk will discuss solutions for providing access, engagement and success for elementary students in science.

Biography:

Dr. Joi DeShawn Merritt received her BS in Engineering (Chemical Engineering) from the University of Michigan, Ann Arbor. Prior to returning to the University of Michigan and receiving her Ph.D. in Educational Studies (Science Education), Dr. Merritt was a high school chemistry and physics teacher in Charlotte, NC. Her research focuses on: (a) designing science and engineering curriculum materials and assessments to investigate K-16 student learning over time, and (b) preparing elementary teacher candidates to teach science equitably in the inclusive, culturally and linguistically diverse classroom. Dr. Merritt teaches courses on elementary science methods, curriculum planning, inquiry and critical thinking.



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General Session IV
Thursday November 18, 8:00 pm – 8:45 pm



Dr. Eric Pyle

President, National Science Teaching Association
Professor, Department of Geology & Environmental Science
James Madison University

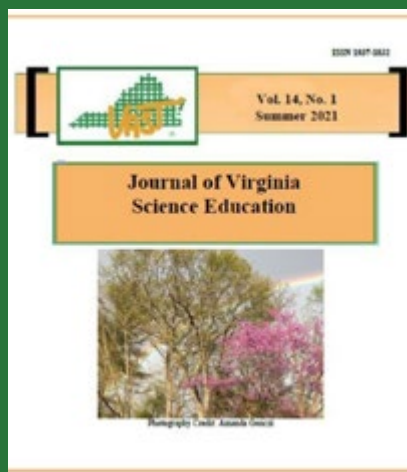
“STEM in the 18th Century: How Navigation, Geodesy, and the Romance of Euclid made the Industrial Revolution Possible.”

From the time of Tycho Brahe, astronomers sought ever more precise instruments in a quest to define the order of the heavens. This quest led not just to the development of a new mathematics (calculus), but applications of the classical mathematics of Euclid. With precision instruments in hand, scientists applied such instruments to the measure of the Earth, finding anomalies that not just showed how the Earth was “lumpy” and confirming Newton, but also demonstrating the practical limits of hand-made instruments. Standardized, machine-generated instruments, further guided by geometry, exceeded these limits and made possible the tolerances necessary for efficient engines and interchangeable parts – touchstones of the Industrial Revolution.

Biography

Eric J. Pyle is a professor of geology at James Madison University, specializing in geoscience education and teacher preparation. He has published on science teacher preparation and professional development as well as instructional materials development and evaluation. He has served in the leadership of five NSF-funded projects, including grants for GK-12 Teaching Fellows, GeoEd, and the Robert C. Noyce program. He was a member of the Earth & Space Science (ESS) Design Team for *A Framework for K-12 Science Education* and was a primary reviewer for the *Next Generation Science Standards*. A former junior and senior high school science teacher, he teaches coursework in Earth materials, contemporary Earth issues, and planetary geology, as well as joint courses in secondary teaching methods. Elected as President of the National Science Teaching Association (NSTA) for 2021- 2022, he served on the Board of Directors for NSTA heading the Preservice Teacher Preparation Division from 2014-2017. He is a past president of both the West Virginia Science Teachers Association (WVSTA) and the Virginia Association of Science Teachers (VAST). He received a BS cum Laude in Earth science from UNCCCharlotte (1983), an MS in Geology from Emory University (1986), and a PhD in Science Education from the University of Georgia (1995).

Write for the Journal !



We are pleased to publish the Summer 2021 issue of the [Journal of Virginia Science Education](#) .

Additionally, VAST invites pre-service and in-service teachers, school administrators, science education faculty, and informal science educators to submit papers for the Winter 2021 issue. The theme is Integrating the VA Computer Science Standards into K-12 Science Instruction and we'd love for you to share lesson activities, solutions, and research associated with all you've learned over the past year. Manuscripts unrelated to the theme are also welcome. Submissions are due July 31, 2021 and the winter issue will be published December 15, 2021.

Summer is a great time to reflect on your practice over the previous semester. If you have questions, please reach out to Amanda Gonczi and Jenn Maeng, journal co-editors at journal@vast.org. If you have questions, please reach out to Amanda Gonczi and Jenn Maeng, journal co-editors at journal@vast.org.



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2021 Donna Sterling Institute

The Path Forward: Finding Smart Solutions in Energy and Climate Science Using Problem-based Learning

Synchronous sessions: October 9 and 16 (3 hours each)
Asynchronous instruction: Oct 3-8 and 10-15 (~2 hours each)

Register May 1 to October 1 Online

<https://vast.wildapricot.org/Registration-Information>

We are pleased to announce the 2021 Donna Sterling Institute. It will be virtual this year. Donna Sterling was instrumental in her vision of problem-based learning (PBL) as a means of teaching and integrating science with math, engineering, technology, and language arts. She was committed to meeting the diverse needs of our students through culturally responsive practices. PBL prepares students for academic, personal, and career success by helping them make important connections. It also supports young people to meet the challenges of the world they will inherit.

The Sterling Institute supports teachers in developing and enacting PBL units in their instruction through a 10-hour professional development offered in a series of face-to-face and virtual sessions. Here is your chance to learn how to implement this powerful teaching strategy!

Participants will

- Use a PBL approach to learn about climate and energy
- Engage in National Energy Education Development (NEED) activities to support understanding climate and alternative energy
- Learn the key components of a PBL unit
- Consider ways to modify what you learn to meet the Standards you teach and the needs of your students
- Develop plans for their own PBL

Sterling Institute Schedule

Asynchronous Oct. 3-8 (2 hours)

Introduction to Sterling Institute and PBL
Introduction to the Scenario, Overarching Question, Culminating Activity
Climate Science (Don Haas)

Synchronous Oct. 9 (9-12)

Introduction to question mapping
“Hands on” inquiry activity
Introduce PBL planning template

Asynchronous Oct. 10-15 (2 hours)

PBL Planning: Each participant develops a unit plan, question map, and culminating activity

Synchronous Oct. 16 (9-12)

Small breakout groups (4-6 people) by content area/grade level with a Sterling facilitator.

Asynchronous Wrap Up by November 20

DEVELOPING EFFECTIVE SCIENCE EDUCATORS





2021 Donna Sterling Institute

Finding Smart Solutions in Energy and Climate Science

K-12 students need a fundamental understanding of energy to develop a thorough, comprehensive understanding of climate science and the path forward to climate and energy resiliency. However, decisions about climate and energy policy are seldom made from a foundation of science.

The 2021 Sterling Institute in collaboration with NEED Energy will engage participants in a PBL unit using a topic of climate and alternative energy, which is adaptable for elementary through high school students. Participants will learn about climate and alternative energy from nationally known climate educator Dr. Don Haas in a virtual presentation and engage in NEED lead activities to help understanding of climate and alternative energy.

Teachers learn the key components of a PBL unit including designing an authentic scenario and essential question, question map development, and creating culminating activities. Teachers will develop plans on how to modify what they learn to meet the Standards they teach and the needs of diverse students in their own classroom context and will begin planning their own PBL.

Donna Sterling Institute Registration Fee: \$30

(Institute registration fee does not include registration for the VAST PDI)

Register May 1 to October 1 Online

<https://vast.wildapricot.org/Registration-Information>

Instructors: Jaclyn Claytor, Robin Curtis, Dr. Elizabeth Edmondson, Dr. Don Haas, Emily Hawbaker, Suzanne Kirk, Dr. Jennifer Maeng, Dr. Anne Mannarino, Dr. Juanita Jo Matkins, Dr. Jackie McDonnough, LoriAnn Pawlik.



Elementary Teachers (K-6): Apply for the 2021 Donna Sterling Exemplary Science Teaching Award



Donna Sterling

Donna Sterling was a visionary science educator with a passion for working with science teachers and developing habits of inquiry-based teaching. Most recently, her leadership in the Virginia Initiative for Science Teaching and Achievement (VISTA) focused on elementary and secondary teacher professional development. This award recognizes that exemplary teachers engage in continuous improvement, and is designed to support a professional development plan for the improvement of science teaching. In 2021, the award will be given to an exemplary elementary teacher. **For the elementary award the 6th grade teacher must be teaching in an elementary setting. The award alternates between elementary and middle/secondary.**

The awardee will receive a total of **\$4000**. In addition, travel costs will be reimbursed to attend the 2021 VAST PDI to receive the award and to the 2022 VAST PDI to present a session on the professional development experience and outcomes. The awardee will receive \$3000 at the VAST PDI in 2021. The remainder will be awarded after the awardee presents at the next VAST PDI and also submits an article to either the newsletter *The Science Educator* or the *Journal of Virginia Science Education*.

Deadline for applications: July 15, 2021

To apply:

1. In your cover letter, include information on yourself, including your preferred name, your home and school addresses, and phone numbers and email address(es) where you can be reached. Tell us how many years you have taught, where, and what grade levels.

2. In no more than two pages, single-spaced, describe an inquiry-based science unit that you taught. Describe how your unit is student-centered and includes community engagement. Give evidence that the unit was effective. Evidence documents such as student work can be submitted separately, and will not count toward the two-page limit.

3. In no more than two pages, single-spaced, describe your plan for professional development, using the funds received through the Sterling award. These plans may include summer courses, attendance at workshops, study abroad opportunities, instructional materials development under the guidance of experts on-site, etc. Feel free to be creative in your plan. Submit the professional development description with anticipated outcomes, including plans for a presentation at the 2021 VAST PDI. Tell how this award will help you become a better teacher of science and will support the development of leadership skills. Tell about your plans for writing an article about your experiences.

4. Submit three letters of recommendation based on direct observations of teaching. One letter must be from the science supervisor or someone serving in that capacity, a second letter must be from the principal, assistant principal, or instructional leader, and a third letter must be from a fellow teacher or a parent. Letters should address the following: Why is this teacher a good candidate for this award? What qualities do they exhibit as teachers that make the recommender think they will use the funds from the award to improve their practice as teachers of science?

All materials must be submitted by 5 pm on July 15, 2021. Submit applications and letters of recommendation to Dr. Juanita Jo Matkins, jjmatk@wm.edu.

VISTA ALUM ATTENTION!!!!

Even though it has been a few years since VISTA, through the Donna Sterling Grant you are invited to register for free for the 2021 VAST PDI. Please contact Robin Curtis at secretary@vast.org for VISTA ALUM information on how to register for free. This will be available to the first 50 VISTA Alums who apply.



We're helping trees (and kids) grow.

Dominion Energy's Project Plant It! has worked with Virginia's educators and students to plant more than 500,000 trees since 2007. So our kids can grow up appreciating the environment.



Actions Speak Louder

COFFEE TALK

@ 10:00 AM



Are you the only teacher of your subject in your school? Feeling alienated? VAST is here to help. Drop in to discuss what you teach with your VAST content teacher. Share your ideas. Discuss your concerns. Ask what other teachers of your subject do in class. Make connections with others in your area you did not know. Looking for a mentor to bounce ideas off of? This is a great opportunity.

Any science teacher can join our next gathering in September. Even non-VAST members. (Other coffee talks are restricted to VAST members only.)

Date: Saturday September 18, at 10:00 AM via Zoom

Registration Information: Sign up with this link and you will receive a link to the meeting followed by a reminder in September before our gathering. Here's the registration link:

[Click to Link](#)

After registering, you will receive a confirmation email containing information about joining the meeting.

How to Continue Your Education

American College of Education Information Webinar

July 21

7 pm ET / 6 pm CT / 4 pm PT



Melissa Hill

Team Lead
EDU Field Operations

Learn more about American College of Education programs and how to continue your education through ACE's 100% online advanced degrees and single courses.



[Register Now](#) →

VAST Awards and Mini Grants



As you are recovering from 2021 in the classroom, by Zoom or by both, remember to nominate a colleague for one of the VAST RISE awards. The award reads that the person has made a difference in education. I know that you have a colleague that has made a difference in education or in your life as an educator.

Also, you may want to apply for a VAST Mini grant. All of you have creative ideas that you would try to implement if you had the funds. The deadline for both is September 1, 2021.

Sandy Pace, VAST Awards Chairman

VAST Recognition In Science Education (RISE) Awards

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

Elementary (pre K-5)	Middle School (6-8)	Biology
Chemistry	Earth Science	Physics
Environmental Science	At-Risk Students (K-12)	Resource Teacher
Science Educator	University/College Faculty	Community Partnership

The number of awards to be given each year will be determined by the Awards Selection Committee based on the qualifications of the nominees. The awardees are encouraged to use their funding of up to \$400 to attend the VAST Virtual PDI and In Person PDI Plus. Recognition will be at the In Person PDI Plus on Saturday at the Madison Hotel in Harrisonburg.

Awards Nomination **deadline is September 30, 2021**. Applicant does not need to be a VAST member.

To apply: click [here](#) to complete online, or [here](#) to print out the form. Nominations should be emailed to awards@vast.org

VAST Mini-Grant for Teaching

The purpose of the VAST Mini-grant program is to provide seed money for innovative curriculum activities which expand learning opportunities for science students. Team applications are welcome, however one person must be designated as the Project Director. The Project Director must be a member of VAST (dues paid for 2020), must have taught at the elementary or secondary level for a minimum of three years, and must be currently employed as a teacher.

Awardees will be selected by a committee appointed by the VAST President. The committee will be looking for projects that will directly impact student learning in the science classroom. The committee will also evaluate the originality, creativity and cost effectiveness of the proposals. Ideally, the projects that are funded will provide the students with new experiences and make possible new scientific investigations. Preference will be given to persons who have not received prior VAST Mini-grant awards. The selection committee may elect to not make an award if the proposals do not meet the stated criteria. It is anticipated that most awards will be made in the range of \$200-\$500.

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

Due Date: September 30, 2021

To apply: Click [here](#) to complete online, or [here](#) to download the pdf.

TACT Mini Grant to Enhance Teaching of Chemistry

The Tidewater Alliance of Chemistry Teachers (TACT) was founded in 1975 and it actively served the needs of area chemistry teachers for 37 years. When it ceased to exist in 2012, the organization made an endowment to VAST with the stipulation that the monies would continue to be used to promote the teaching of chemistry within Virginia. This mini-grant offering is funded by their generous endowment.

The purpose of the TACT Mini-grant is to provide seed money for innovative curriculum activities which expand chemistry learning opportunities for students. Team applications are welcome, however one person must be designated as the Project Director. The Project Director must be a member of VAST (dues paid for 2019), must have taught (K-12) for a minimum of three years, and must be currently employed as a teacher. Recipients will be selected by a committee appointed by the VAST President. The committee will be looking for projects that will directly impact chemistry learning (K-12). The committee will also evaluate the originality, creativity and cost effectiveness of the proposals. One, or more, grants totaling \$1,500 will be awarded. Ideally, the projects that are funded will provide the students with new experiences and make possible new scientific investigations. Proposals that include student hands-on activities are preferred. Preference will be given to persons who have not received prior TACT Mini-grant award.

Mini-grant funds may be spent for supplies, equipment, printing, and other materials essential to the project. Mini-grant funds may be used for student travel as long as less than 50% of the grant is designated for this purpose. Funds may not be used for the personal remuneration of the grant recipients. All materials will become the property of the school/school system in which the Project Director is employed at the time the grant is awarded.

Due date: September 30, 2021 To apply: Click [here](#) to complete online, or [here](#) to print out hard copy to submit.

AIPG Russ Wayland Mini Grant to Improve Teaching of Geology

Sponsored by the Virginia Section of the American Institute of Professional Geologists

In 1993, the Virginia Section of AIPG established a mini-grant program to improve the teaching of Geology in the schools (K-12), Public and Private. The section has allocated \$1,000 to fund approved proposals for 2021.

Applicants must be currently employed as classroom teachers and must be a member of VAST or WVSTA. Applicants must agree to share the outcomes of this project with other teachers through in-services and/or a presentation at the VAST PDI or the WVSTA conference.

Recipients are also expected to share the outcomes of the project with the members of the Virginia Section of the AIPG at one of their yearly meetings. (No meetings are scheduled as of April 1, 2021.)

The review committee is looking for proposals that will result in more hands-on activities, and a better understanding of the importance of geologic resources, and/or geologic principles. The grant may be awarded to one applicant or split among several applicants (to be determined by the AIPG selection committee). Grant monies are not intended as remuneration and should not be considered as such. The AIPG selection committee may elect to not make an award if it feels that none of the proposals meet the goals of AIPG. **Applications are due August 20, 2021**

Download the [pdf document to print](#) and to submit.

For more grant opportunities click [here](#). Elementary Teachers (K-6): Apply for the 2021 Donna Sterling Exemplary Science Teaching Award information click [here](#) or see page 13 of this newsletter.

VIRGINIA ASSOCIATION OF SCIENCE TEACHERS 2021 PROFESSIONAL DEVELOPMENT INSTITUTE LIST OF CONCURRENT SESSION PRESENTATIONS (Draft as of July 5, by last name of the first presenter)

It's Electric!

ELEM; Physics/Physical Science, STEM

Cover the electricity standards on the cheap with these hands-on ideas and strategies!

Barbara Adcock, Powhatan County Public Schools

Sketching Science in Biology Classrooms

HS-COL; Biology/Life Science

Emma Arents-Quagliano, Henrico County Public Schools, Henrico High School

With its reliance on systems-level understanding, students may find the biology curriculum intimidating. One of the greatest challenges of biology teaching for me has been the encouragement of students' model-based reasoning skills. This presentation will highlight drawing to learn techniques that have proven successful in the elicitation of higher-order thinking skills during my first year of teaching.

Standard-Based Escape Rooms & Forensic Scenes

ELEM-MS; Earth/Space Science, Biology/Life Science, Physics/Physical Science

Ben Bache, PBL Project

Participants in this session will be introduced to the related strategies of Escape Rooms and Forensic Scenes, which help students to develop critical and creative thinking while reviewing standard-based content. Attendees to this virtual session will also be provided with dozens of FREE digital Escape Rooms and Forensic Scenes that they can use throughout the school year.

Commercial Exhibitor

From Seed To Harvest: Cultivating CRE & Academic Liberation

ALL GRADES; Culturally Responsible Ed

LaNika Barnes, Albemarle High School/Albemarle County Public Schools

Remember when learning new things was not a requirement but just a part of life that brought joy and connection to the world around you? Or maybe you discovered later in life that we "do science" all the time? If you answered "Yes" to either of these questions, join me to discuss how we can effectively partner with colleagues, students, & families to plant culturally responsive & responsible learning seeds, in the realm of science education, in order to cultivate lasting academic liberation.

Investigating the Chesapeake Bay with Place-based Education

MS; Biology/Life Science, Environmental Science

Ani Basica, James Madison University

Robbie Higdon, James Madison University

Place-based education provides opportunities to make real life connections between the classroom content and events taking place in the world at the time students are learning it. For students, especially those living in the Chesapeake Bay Watershed, studying this unique ecosystem in relation to the classroom content in the four major subject areas can lead to a deeper understanding of how current environmental issues may impact their home and environment.

Sprouting Success with Agriculture in the Classroom

ELEM; General

Lynn Black, Virginia Agriculture in the Classroom

Join Agriculture in the Classroom for an engaging virtual session full of practical tips and classroom-ready activities to get you growing! The focus of this session will be on germination, life cycle, and plant systems activities for the elementary classroom. From school gardens to hydroponics to classroom germination projects, we'll show you how to sprout success in your classroom with our curriculum and resources.

Not for Profit Exhibitor

The Importance of Mentoring Teachers

ALL GRADES; General

Myron Blosser, Harrisonburg High School

Erich Sneller, Harrisonburg High School

Are you an educator that has won awards for your teaching? Are you a teacher or administrator interested in improving instruction in your school? Hear stories of mentoring from school leaders, teachers and preservice teachers and share your ideas on how to encourage and support others in your school. Presentation will include the importance of mentoring, and ask for the exchange of ideas and examples of mentoring.

Science "FUN"damentals

MS; General

Kristen Boudreau, Prospect Heights Middle School

Do you want to engage your middle school science students? The presenter will share with you ideas gathered from 20 years of teaching middle school science such as PBL projects, learning menus, stories, demonstrations, activities, songs, and yes even costumes! Because when science is real and exciting students not only remember facts better but they want to inquire more!

Explore-Before-Explain: A Practical Approach Towards NGSS

ELEM-MS; Chemistry, Physics/Physical Science

Patrick Brown, Fort Zumwalt School District

Get ready for the NGSS with ways to sequence instruction that promotes long-lasting understanding for your students by using a simple yet powerful approach: Explore-Before-Explain.

Instructional Sequence Matters: Structuring NGSS Lessons

HS; Chemistry, Physics/Physical Science

Patrick Brown, Fort Zumwalt School District

Learn how to be an explore-before-explain teacher who structures lessons so student evidenced-based claims are the foundation for learning and promote long-lasting physical science understanding.

Geology, Geothermal Energy, & Geography - Exploring Iceland

ALL GRADES; Earth/Space Science, Biology/Life Science, Environmental Science

Jennifer Burgin, Hoffman-Boston Elementary School/Arlington Public Schools & Virginia Geographic Alliance

Becky Schnekser, Expedition Schnekser & Virginia Geographic Alliance

Iceland is a place with unique geology, geothermal energy, and geography and your learners deserve to travel there, virtually or IRL! Join us to learn how using Iceland in your teaching practice will instill a sense of exploration, curiosity and excitement with learners of all ages. Attendees will leave with lesson inspiration, time for collaboration AND information on GeoCamp Iceland and how VA educators can apply for a scholarship to go on their own Icelandic Expedition!

Makerspace on the Move: Engaging Students in Engineering.

ELEM-MS; Engineering, STEM

Pam Caffery, hand2mind

How can you use makerspace while teaching in different learning environments? You'll learn great tips and strategies to engage students in science and engineering practices through hand2mind makerspace configurations while teaching in any type of learning environment. A drawing for a giveaway will be done at the end of the session.

Commercial Exhibitor

Coding for the Ages: Engaging Students in Offline Coding

ELEM-MS; Engineering, STEM

Pam Caffery, hand2mind

Your young coders can develop early STEM concepts through offline and online coding. Spend some time with us as we introduce you to hand2mind's coding solutions that teach fundamental coding skills. We'll begin with offline coding solutions for PreK-5 grades and then show you how students can progress from offline coding activities to online using our Artie 3000, an artistic robot.

Commercial Exhibitor

Blending the 5E: An Innovative Approach to Student Inquiry

MS-HS; General

Jacquelyn Calder, Mechanicsville High School

Cierra Coyner, Mechanicsville High School

Science teachers embrace the 5E lesson format because of its focus on inquiry. 5E can be integrated into a blended learning classroom to enhance student inquiry. Blended learning is a pedagogical approach where students have some control over path, pace and place. When the two are used together, students become active learners, while teachers become learning facilitators. This session will showcase example lessons of the 5E blended approach.

Interdisciplinary Planning: IDM Meets Science!

ELEM; Interdisciplinary Approach

Jessa Campbell, Greer Elementary School

Incorporating science throughout the day from morning meeting, math, literacy, and the content block. Using local resources in your community to support science learning.

Enlarging Projects in a Model STEM System

HS-COL; STEM

Kenneth Chapman, American Chemical Society Volunteer

Projects are a major constituent of a Model STEM System based on more than 50 years of teaching STEM content at high school and college levels and observing attempts at improving high school STEM education through national-level efforts by federal agencies and STEM membership organizations. This presentation will briefly describe the Model STEM System and emphasize elements of projects that may be new or not considered by most teachers.

Not-for-Profit Exhibitor

Ecosystem Health Analysis and Action plan PBL

HS-COL; Chemistry, Environmental Science

Denise Coleman, Jefferson Forest High School

Theresa Price, Jefferson Forest High School

Ecology student in coordination with their chemistry peers select an ecosystem of their choice and complete a detailed analysis of the ecosystem's current status using the guiding principles of the IUCN to present to their peers. Students will focus on how invasive species, climate change, pollution, and other human activities impact the abiotic/biotic factors of an ecosystem and an action plan to establish sustainability.

Camps, Un-Camps and Professional Development Workshops at VT

MS-HS; Math in Science, General, STEM

Victoria Corbin, College of Science at Virginia Tech

Kristy Morrill, College of Science at Virginia Tech

We will describe programs we've developed for inspiring and engaging your students in the process of doing science. In summers 2020-21, we ran short online "camps"—Un-Camps—and realized they would make fun and effective modules for use in middle school classrooms. We will describe these as well as in-person camps and a professional development workshop for high school science teachers for summer 2022. Our goal is to make science teaching and learning fun, easy and effective!

Five Minute Creations

ELEM-MS; STEM

Shannon Crawford, Virginia Virtual Academy at K12

What could you create in five minutes, that could help solve a problem, using everyday objects found around your home? Join me as we explore a five-minute engaging STEM activity. We will be finding, developing, and sharing our creations as a group. I always close my live class sessions by providing students with three everyday objects. I allow them to assume we have tape, scissors, string, and glue. They have five minutes to create a useful new product and share with our class.

JMU STEM Outreach and Engagement Opportunities for K-12

ALL GRADES; STEM

Kerry Cresawn, James Madison University

Remy Pangle, James Madison University

Visitors will learn about the multitude of opportunities for K-12 students and teachers to participate in informal STEM education with JMU faculty and students, both on and off campus. We will share information materials and discuss the programs' target audience, accessibility, platform, timing, and the types of STEM skills and disciplines practiced. We will also share measures taken by the various programs to increase access for historically excluded groups in STEM.

Not-for-Profit Exhibitor

Using Biotic and Abiotic Factors to Determine Stream Health

HS; Environmental Science, Biology II Ecology Class

Chandler DeHaven, Clarke County High School

Students will be capturing benthic macroinvertebrates from stream to gain a further understanding of the quality of the water from the type of organism in the water. After they complete the field studies, they will research ways to improve river health. They will find the best plants for the stream and share this information with the Ag class. Finally, Environmental Science class will study the data from Ecology and Ag classes in order to develop a law of sustainability for the local watershed.

Ditch the Worksheets with Wizer.me

ALL GRADES; General

Pernell Denson, Norfolk Public Schools

With Wizer, teachers can create digital worksheets by using different types of questions, incorporating images and videos, and even recording directions. Teachers can ask students to label images, categorize information, respond to open-ended and multiple-choice questions, or respond to video content. Flip the classroom by following videos with open response questions to be discussed in class. Create cloze reading passages to assess reading comprehension and vocabulary skills.

Lab Experiments Using Safe Inexpensive Chemicals

MS-HS; Chemistry, Physics/Physical Science

Barbara Derflinger, Central High School - Woodstock, VA

Hands on lab activities are vital to a rich understanding of chemical concepts. This presentation focuses on using safe, easily obtainable, and inexpensive chemicals. These activities can be used as demonstrations, video-taped for virtual students, or performed by lab groups in grade 6, physical science and chemistry. Examples include separating components of a mixture, chemical reactions, stoichiometric calculations, polarity, endothermic and exothermic reactions, and pH scale.

Adapting to the New Normal: What Has the Pandemic Taught Us?

ALL GRADES; General

George Dewey, Fairfax County Public Schools, retired

We all have had many questions about what our school's "new normal" might look like and how we adapt to it. Join us for an informal discussion where we share major successes and concerns: *What has the past year taught me? *What has worked well? *What has not worked so well? *What support do we need moving forward? *Successes and issues with remote, hybrid, and in-person learning? *How best to conduct lab work? Please email me in advance with any issues you want discussed: gtdewey3@outlook.com.

Chesapeake Bay Foundation Programs supporting Virginia

ALL GRADES; General

Cindy Duncan, Chesapeake Bay Foundation

The Chesapeake Bay Foundation's program have supported VA teachers and students for over 35 years. The immersive hands-on field investigations provided by CBF can enhance all the learning that happens virtually or in person in any subject discipline. Come see all the opportunities offered to assist teachers in and out of the classroom.

Re Imagining School Education

ALL GRADES; Social Emotional Learning

Cindy Duncan, Education Consultant

How do we provide school environments that are restorative places to heal, commune and nurture academic achievement, citizenship, stewardship, and compassion? 2020 was a year of challenges and opportunities for the everchanging American Education system. We no longer will attend schools that look like they have since the industrial revolution. See positive initiatives and opportunities in education that will IMPACT & ENHANCE the educational system in this country and possibly the world.

Real Science: Science Teachers in Research Labs

MS-HS; Biology/Life Science

Elizabeth Edmondson, Virginia Commonwealth University
Megan Rihn, Varina High School
Renee Goode-Boyd, George Wythe High School
James Key, Huguenot High School

Learn about the National Institute of Health funded project Health Education Research Opportunities for Teachers (HERO-T). Hero-T offers secondary science teachers an amazing opportunity to be mentored and work with a VCU research scientist for two consecutive summers.

Engaging in Science: Learning with Preservice Teachers

MS-HS; Biology/Life Science, Chemistry, Physics/Physical Science

Elizabeth Edmondson, Virginia Commonwealth University

Do you want to wow your students? Do you need to inject some pizzazz into your instruction? Attend our session where secondary science preservice teachers will share inquiry-based, hands-on lessons in this interactive session. You will have an opportunity to see and participate in these classroom tested activities.

Capital Science

ALL GRADES; All Science Disciplines

Carolyn Elliott, Goochland Middle School/VAST Region 1 Director

Whether virtual or in-person, a visit to Richmond Metropolitan Area (Region1) offers teachers and students a wide variety of opportunities to enrich their science knowledge. This presentation will provide an overview of science sites that offer educational opportunities in Region One.

VA STEM: Inspiration through Integration

ALL GRADES; General, STEM

Chuck English, Science Museum of Virginia

Virginia STEM continues to evolve. There are many great programs in the Commonwealth, but less in terms of collaborative efforts in STEM Education. The VA STEM Education Advisory Board is helping align STEM programming to create a more unified vision and collective impact in Virginia's STEM Education. There are various models of how schools implement STEM. What can we do as educators and leaders to ensure the most equitable access to this deeper learning opportunity for all youth?

If Newton Had Hot Wheels- Physics Fun Through Demos and Labs

ELEM-MS; Physics/Physical Science, Engineering, STEM

Thomas Fitzpatrick, Roanoke City Public Schools
Angelo Bonilla, Breckinridge Middle School
Leslie Barrett, Breckinridge Middle School

We will share simple low-cost demonstrations and lab activities designed to promote inquiry in your students and bring science to their real world. We will include pipe wrap roller coasters, embroidery hoop physics, toilet paper roll cannons, Newton's Laws demos with cheap skateboards, and as much more as we can cram into the time! Easy and natural connections to SOL.1 and engineering design. Intended for grades 5 to 8, can be adapted for lower grades and physics.

Chronic Traumatic Encephalopathy: Case Study and Design

HS; Biology/Life Science, Physics/Physical Science, Anatomy / Physiology

Mike Florek, Glenvar High School
Lezlie Yaeger, Glenvar High School

Chronic traumatic encephalopathy is a brain degeneration disorder that is becoming increasingly common in professional and amateur sports. It is undiagnosable, untreatable, but may be avoidable. This session describes a cross-curricular project between anatomy and physics featuring a high-profile case study of Aaron Hernandez and a project in which students design, construct, and test football helmet padding.

Using Real-World Phenomena to Engage Students in Science

ALL GRADES; General

Brad Fountain, Discovery Education
John David Son, Discovery Education

By introducing science concepts through real-world phenomena we help students experience the world the way scientist do, which is through asking questions and working toward solutions. We will explore real-world phenomena as it relates to challenges facing our world today and experience how having our students serve as lead scientist in our classrooms opens the door for them to be solution seekers. Commercial Exhibitor

How to Teach Nature Journaling

ALL GRADES; Environmental Science

Kathy Frame, Papillon Education Services LLC

Nature journaling is an extremely effective and engaging way to teach observation, curiosity, and creative thinking. Journals are the ubiquitous tools of scientists, naturalists, thinkers, poets, writers, and engineers. Using a journal is a skill that can change [your] students' lives forever.

Spreadsheets Aren't Only for Accountants: They're for STEM!

ELEM; STEM

Amanda Gonczi, Michigan Technological University
Jennifer Maeng, University of Virginia

In this session you will learn how spreadsheets can enhance your STEM instruction and strengthen students' STEM skills. We will model a lesson that takes advantage of spreadsheets for data collection and analysis. You will learn how spreadsheets can facilitate student engagement in science, engineering, and mathematics. Participants will work in small groups to brainstorm how to integrate spreadsheets into an existing lesson and will share these with the larger group.

Using Environmental Cartoons as Conversation Starters

ALL GRADES; Biology/Life Science, Environmental Science, Cartoons Can Stimulate Students

Richard Groover, Hanover Films & Communications

This program will demonstrate how cartoons can be an educational resource for teachers to engage student learning and create memorable knowledge.

Differentiating Science-The Possibilities are Endless

ALL GRADES; All science content

Mindy Gumpert, Old Dominion University, Virginia Wesleyan University

Differentiation is an instructional approach whereby teachers adjust their curriculum and instruction to maximize the learning of all students: average learners, English learners, struggling students, students with disabilities, and gifted students. In this session, participants will learn how to differentiate instruction for groups of students in the areas of content, process, and product. Strategies learned in this session can be applied to all grade levels and subjects.

Enliven Student Learning with Experimentation

MS-HS-COL; General, STEM

Angie Harr, Vernier Software & Technology

Excite your students with hands-on science whether you're in the classroom or teaching remotely through collaborative data collection and real time analysis. Seeing data collected right before their eyes using the Vernier Graphical Analysis™ Pro app gives students the ability to connect abstract concepts to real-world applications. We will show you how to use our app to energize your classroom through data sharing, interactive sample experiments with synced data, custom videos, and more.

Commercial Exhibitor

Shifting the Middle School Science Instructional Sequence

MS; Science Curriculum

Emily Harris, Appomattox Middle School

Shanee Dawson, Appomattox Middle School

In an effort to improve cumulative standardized test scores, a change in instructional pacing was implemented at our middle school. Instead of teaching sixth-general science, seventh-life science, and eighth- physical science we shifted the sequence to teach sixth- life science, seventh-physical science, and eighth-general science. Listen in to hear how we integrated this into our hybrid-block schedule and made it successful.

Leading from the Classroom

ALL GRADES; General

Stephanie Harry, VAST Chemistry Content Chair

This presentation will provide ideas and suggestions on how teachers can teach in the classroom and become a leader in education. I will share some personal experiences and different teacher leadership opportunities available to educators.

Coffee Chat with the Content Chairs

ALL GRADES; General

Stephanie Harry, VAST Chemistry Content Chair

David Matchen, VAST Earth Science Content Chair

Tony Wayne, VAST Physics Content Chair

Jessica Jasmine White, VAST Biology Content Chair

The goal of the VAST Content Chairs is to ensure all science teachers know they are not alone. We want to strengthen science community and we plan to do this content by content. Please join the VAST Content Chairs and let's have a discussion on how we can assist you to achieve your goals as a science educator.

Teaching the Gifted Student: Learning Contracts

ALL GRADES; General

Debra Hicks, Kilgore Gifted Center

This presentation is designed to help general education classroom teachers, meet the needs of their gifted students in the classroom. This year's presentation will be about using learning contracts to meet the needs for your gifted students who already know the material for the current or upcoming units of learning. You will leave the session with ideas and resources to implement the gifted education strategy of learning contracts in your classroom.

Strategies for Engaging EVERY Learner

ALL GRADES; General

Robbie Higdon, James Madison University

Frustrated with students tuning out? In this session, participants will have the opportunity to experience active, meaningful learning experiences that can engage all students. Use of these strategies can assist teachers in facilitating learning opportunities that can result in deeper understanding and higher levels of mastery for all students.

New Tools and Content in eMediaVA for Science Educators!

ALL GRADES; Earth/Space Science, Biology/Life Science, Environmental Science

Lindsey Horner, eMediaVA | WHRO Public Media

The goal of this session is to introduce you to the redesigned eMediaVA, with new easy-to-use features like LMS embedding and teacher-created collections. Educators will leave the session with ready-to-use digital media like videos, simulations, and interactives for science learners of all ages, as well as strategies educators can utilize to successfully integrate digital media into lessons to both engage learners and make content relevant to student's lives and experiences.

Not-for-Profit Exhibitor

Assessing Students in an Online Environment

ALL GRADES; Assessment Strategies

As a teacher herself Debbie has had to adjust to working in an online environment and both developing and adjusting her instructional materials to fit. In this session we will be looking at engagement strategies, online tools for spot checks, discussing online procedure for learning, and the big one, assessing what and how well they understand. Got a great idea to share? Please join us as we learn together in another online learning environment.

Debbie Huffine, American College of Education

Not-for-Profit Exhibitor

Oceanography Blended Learning Lab Activities

HS; Oceanography

I have converted some "typical" Oceanography lab activities to online versions that students can do in person in class, synchronous online or asynchronous. They are great because they are all environmentally friendly - no paperwork - all electronic. There will be some Excel graphing and Google My Maps activities that you will learn.

Paula Irwin, Unity Reed High School/ Prince William County Schools

Google My Maps in the Science Classroom

ALL GRADES; General

Come learn how to incorporate Google My Maps into your Science classroom. Google My Maps is so versatile. It can be used for individual lab activities or group activities.

Paula Irwin, Unity Reed High School/Prince William County Schools

High Altitude Balloon Research

HS-COL; Engineering, STEM, Student Designed Research

Hear from the staff and students who have conducted multiple successful flights of a high altitude research balloon to altitudes of approximately 98,000 feet. See video and data from the last two missions and hear why students gave a week of their summer to do it!

Andrew Jackson, Harrisonburg High School

Erich Sneller, Harrisonburg High School

Seth Shantz, Harrisonburg High School

Virginia Instructors of Physics - Share and Organizational

MS-HS-COL; Physics/Physical Science

A virtual meeting of the Virginia Instructors of Physics. We are an organization of and for physics teachers. We share lessons, labs, demonstrations, and pedagogy related to physics teaching at the physical science, physics, and college level.

Andrew Jackson, Harrisonburg City Public Schools

Tony Wayne, Albemarle County Public Schools

What's the Point, Curie?

HS-COL; Physics/Physical Science

The Currie temperature will be determined for a piece of iron wire through the use of ohm's law and the relationship between temperature and resistance of a metal wire. This is an advanced concept lab that can be done with materials from a local hardware store, an ammeter and a recording voltage probe, like a labQuest.

Andy Jackson, Harrisonburg High School

Rock of Ages: Geologic Maps and the Stories They Tell

ALL GRADES; Earth/Space Science, Environmental Science

Ever have a student bring you a rock and ask what it is? Well, now is your time to learn how to be their hero and more. In this session, you'll experience how to use free geologic maps and government resources to identify what's in your backyard and beyond as well as how each can be used to instruct concepts such as geologic history, rocks, soil, tectonics, and the story behind your local landscape. Resources and sample lessons will be provided including ones correlated with hands-on labs.

Chris Kaznosky, Central High School (Shenandoah County)

Steve Leslie, James Madison University

Their SYSTEMS; Their Solutions-Guiding Students With CER

ALL GRADES; General

Challenge your students to be problem solvers today & give them tools to do it! Allow them to design, conduct, and report on their own research. Use online simulations in a non-traditional way & CER to give your students exploration freedom resulting in a more authentic, engaging, and educational experience. Hear how one teacher transformed labs, increased interest, & created better questioners. Participants will work through their own example as well as see/ hear examples of student work.

Kathryn Kelchner, Poquoson High School

How to BLOW Your Students' Minds as They Learn About Weather

HS-COL; Earth/Space Science, Environmental Science, General

Use the Null School website to help students discover pressure centers and how they relate to weather. Students will compare pressure systems in Northern/Southern Hemispheres, and also see the other characteristics that the Nullschool website can teach.

Bonnie Keller, Colgan High School

Introduction to Bioinformatics

HS-COL; Biology/Life Science, Math in Science

The goal of this session is to give the opportunity for folks with limited or no background in bioinformatics to a comfort with the fundamental concepts in the field. We will start with an overview of key background information and terminology and will then touch on some important databases and techniques. The session will close with a guided demonstration of an activity that could be used in the classroom with students.

Mark Levy, Roanoke Valley Governor's School

Diving Deeper into Bioinformatics

HS-COL; Biology/Life Science, Math in Science

Mark Levy, Roanoke Valley Governor's School

The goal of this session is to help folks explore techniques and databases used in the field of bioinformatics. A participant most likely to benefit from this session would have a basic understanding of the field (consider attending concurrent session "Introduction to Bioinformatics"), but lacks experience or college coursework. We will explore a variety of databases and software tools and guided demonstrations of several software tools will be provided.

Explore Smithsonian Science: Investigating Freshwater

ELEM; Environmental Science, Engineering, STEM

Cheryl Lindeman, Retired STEM teacher educator

Knans Griffing, Smithsonian/Carolina

Our live workshop will explore the Smithsonian Science for the Classroom™ module, How Can We Provide Freshwater to Those in Need? Teachers will experience how engineering design, phenomena, and investigative science raise the bar for students solving for real-world problems. Using resources from the Smithsonian, this module scaffolds NGSS 3D collaborative systems thinking. Post workshop materials will be shipped for those interested.

Commercial Exhibitor

Inquiry Training for Preservice teachers: Virtual Water 3-6

ELEM; STEM Preservice Virtual

Cheryl Lindeman, retired STEM teacher educator

Sabrina Johnson, Randolph College

Taylor Murphy, Randolph College

We will share our 45-minute virtual inquiry lab experiences for Randolph College's 2021 virtual Science Festival and an after school face to face program. As preservice teachers planned the lab based on the Smithsonian Science for the Classroom™ module, How Can We Provide Freshwater to Those in Need, it became evident that inquiry labs are vigorous. The "wizards" facilitated a virtual PBL challenge with a Google slide deck. The after school program revealed the true essence of inquiry teaching.

Not Another Buzz Word: Culturally Responsive Science

MS-HS; Biology/Life Science, Chemistry, Physics/Physical Science

Anthony Little, Little Solutions

Buzz words. They can be found all throughout education. While some of them can be fluff, there are always best practices that indeed help students to succeed. The latter is true for culturally responsive teaching. Culturally responsive teaching is a research-based pedagogy that connects students' learning in the classroom to their culture and life experiences. Join us as we discuss using culturally responsive teaching in the secondary science classroom to help all students succeed.

Choose Your Own Adventure with Google Slides

ALL GRADES; Earth/Space Science

Stacey Ludington, Stafford High School

This presentation will cover how to use Google Slides to create Choose Your Own Adventure style guides for students and how students can use Google Slides to create their own Choose Your Own Adventure style projects.

Exclusively for Pre-service Teachers - What YOU Need to Know

All Grades; General

Jennifer Maeng, University of Virginia

Kaitlyn Smith, James Madison University

Sunny Johnson, Old Dominion University

Myra Thayer, Virginia Department of Education

Calling all pre-service teachers! Join us to learn how VAST can launch you into your career as a science teacher. Whether this is your first time attending VAST or your third, this session has something for you! Make connections with fellow preservice teachers and others that can support your career whether you are just beginning a teacher preparation program or graduating in May!

College and University Science Educators Share Session

HS-COL; General

Jennifer Maeng, University of Virginia

Sarah Nuss, Virginia Institute of Marine Science

Anne Petersen, Virginia Department of Education

This session is an opportunity for college/university-based science educators and other teacher educators to participate in a professional learning community. We'll begin the session with updates from each institution, then Dr. Anne Peterson, from VDOE, will share relevant information from VDOE including opportunities around the Commonwealth and resources to use with pre-service teachers.

Get involved with JVSE! There is Room for Everyone!

ALL GRADES; General

Jennifer Maeng, University of Virginia

Amanda Gonczi, Michigan Technological University

Did you know that publishing an article can be used toward teacher re-licensure points? Or that when you review a journal article submission you can include this on your resume as professional service? This session will help all members get involved with VAST's journal by publishing their own work or reviewing submitted manuscripts. Session attendees will brainstorm an idea for an article and work with the journal editors in developing an outline for their own publication.

Evaluating and Teaching Spatial Reasoning

ALL GRADES; Earth/Space Science, Environmental Science

David Matchen, Madison County High School

Spatial reasoning is vital to understanding modern issues in Geoscience, yet spatial reasoning is difficult to teach, and evaluate. To evaluate the spatial reasoning ability in my Environmental Science classes, I use a short text article with geographic information and require my classes to draw a map based upon what they have read. In this session, I will provide a shortened version of that exercise and ask the group to construct their own maps.

I'm Fixin' to Simulate That: Simulations Make Science Stick!

ELEM; General

Jenna Mercury, ExploreLearning

Everyday events make us wonder. Some events are easily explained, while others cannot. When these events are examined and tested through virtual simulations, they give students an opportunity to think. Why do some objects float and others sink? What is the difference between a solar eclipse and a lunar eclipse and how often does that happen? Learn how to use virtual simulations to help K-5 students dig deeper and get inspired by science and STEM phenomenon!

Commercial Exhibitor

Improving Critical Thinking Skills with Virtual STEM Cases!

MS-HS-COL; STEM

Jenna Mercury, ExploreLearning

We need to provide our students with more in-depth, practical, concepts and practices to promote STEM career-readiness. Interactive STEM Cases will empower our students to jump into the role of a real STEM professional tasked to solve real-world problems. Participants will view interactive case studies, form and test ideas and find solutions. BYOD with any browser to jump into the program too!

Commercial Exhibitor

Teaching Evolution Virtually or In-Person

MS-HS; Biology/Life Science

Christopher Moran, The Teacher Institute for Evolutionary Science

Bertha Vazquez, The Teacher Institute for Evolutionary Science

The Teacher Institute for Evolutionary Science has FREE student-guided evolution units to cover your middle school evolution content standards in person or virtually. The units include: 1. The slideshow with embedded online games, hands-on activities, engaging videos, and interactive websites. 2. The student response sheet 3. The answer key and rubric 4. The final assessment and answer key. www.tieseducation.org is your one-stop shop for evolution education!!

Let's Talk Science: Strategies to Encourage Student Voice

ELEM; General

Pam O'Brien, STEMscopes by Accelerate Learning

Join us as we explore a simple yet effective talk process that will encourage students to more fully own their thinking and effectively communicate their ideas to peers. This interactive session will include a variety of talk strategies that support the Virginia Science Standards of Learning as well as best-practice instruction for all learners!

Commercial Exhibitor

Claim Evidence Reasoning: Strategies for Student Success

ELEM-MS; General

Pam O'Brien, STEMscopes by Accelerate Learning

Join us for an interactive workshop on Claim Evidence Reasoning (CER). We will discuss and explore strategies for implementing CER, scaffolding the process to reach more learners, and communicating clear expectations to students.

Commercial Exhibitor

Ensuring Access & Equity for All: It isn't Rocket Science!

ALL GRADES; Earth/Space Science, Engineering, STEM

Jacqueline Orgain, Savvas Learning

Take on the role of a consultant for NASA to design a system to model a rocket launcher. This challenge will highlight tools to support Gender Equity, Economically Disadvantaged Youth, English Learners, Students with Disabilities, and Advanced and Gifted Learners. Participants can immediately implement strategies with their students by using the workshop resources suggested and great take-aways. This really is rocket science but ensuring access and equity doesn't have to be.

Commercial Exhibitor

Give Them Something to Talk About!

ELEM-MS; General, STEM

Jacqueline Orgain, Savvas Learning

Students may be talking, but are they talking about science? Foundational communication skills in writing, speaking, and discourse in the context of science and engineering is essential for your students' success. Scientists and engineers collaborate while designing solutions, solving problems, presenting ideas, and providing meaningful feedback. Take home strategies and tools to get the most out of your students in their presentations and stimulate healthy conversations.

Commercial Exhibitor

The Challenge is On: Using Engineering in Chemistry

MS-HS; Chemistry, Engineering

Jacqueline Orgain, Savvas Learning

The challenge is on! Join chemistry teachers for an engaging, hands-on session as we explore the ways open inquiry and engineering and design challenges can be used within a chemistry program to support language development and deepen conceptual understanding for your diverse learners. The session will support teachers in the implementation of Scientific and Engineering Practices and offer suggestions for celebrating and meeting the needs of the diverse learners in their classroom.

Commercial Exhibitor

Conducting Field Trips for Virtual Experiments

ALL GRADES; All Topics; Specific to Tools.

Heather Overkamp, I.C. Norcom High School/Portsmouth Public Schools

Whether students are in the classroom and collecting data outside with their teacher, or at home learning virtually, this presentation will provide you with ideas for collecting data outside and online. Tools will also be presented for students to collect and analyze data in either scenario, including mapping software, environmental testing, citizen science projects, and smartphone apps.

Do You Mentor Students in Research for Competitions?

MS-HS-COL; Any Subjects: Research

Heather Overkamp, I.C. Norcom High School/Portsmouth Public Schools

If you mentor students in research for competitions such as eCybermission, VJAS, JSHS, Broadcom, Regeneron, or ISEF qualifiers, join me for a conversation about how we can form a cohort to support each other. I have written grants and been a part of programs that support teachers financially and with professional development. I also know of other competitions that may be a good stepping stone for your students to level up to more challenging and competitive science and engineering symposia.

Engaging Students in Creating Clean Energy Solutions

MS-HS-COL; Environmental Science, Engineering, STEM

Remy Pangle, JMU Center for the Advancement of Sustainable Energy

Explore ways to engage students finding solutions to problems such as climate change and energy justice. Participants will learn more about a summer camp offered by CASE that featured a solar solutionary suitcase built by high school students and deployed to Kenya to power a school in a refugee camp. The resources used for the camp will be reviewed and we will discuss how to do this with students in their classroom and how to develop a make-shift version using other resources.

Not-for-Profit Exhibitor

QUAD P: Post-AP Physics Projects Potpourri

HS-COL; Physics/Physical Science, STEM

LoriAnn Pawlik, Charles Colgan High School

What do you do in class after the AP Test in early-May... when school continues through mid-June? This presentation will suggest some ideas that you can implement with little cost and/or prep. These can be student-driven or whole-class.

RAD Science (Resources and Data Science)

ALL GRADES; Earth/Space Science, Environmental Science, Physics/Physical Science

LoriAnn Pawlik, Prince William County Schools- Colgan High School

Interested in using real-world data or finding abundant resources for your classroom? This session will share lessons and activities that you may not know about to help spark your science teaching. Better yet, design integrated content lesson around your science!

VDOE Update

ALL GRADES; General

Anne Petersen, Virginia Department of Education

Myra Thayer, Virginia Department of Education

Gregory MacDougall, Virginia Department of Education

The VDOE Update session is intended to provide teachers updates on current state and national science initiatives as well as to inform educators of new instructional resources and professional development opportunities. Time will also be built in for Q&A with the VDOE Science Instruction Team.

PAEMST Information Session

ELEM-MS; K-6 Science, CS, Eng, and Math

Anne Petersen, Virginia Department of Education

Myra Thayer, Virginia Department of Education

Gregory MacDougall, Virginia Department of Education

The Presidential Award of Excellence of Science and Mathematics Teachers (PAEMST) is regarded as the nation's top honor for math and science teachers. This award recognizes educators who develop and implement high-quality instructional programs that improve student learning in mathematics and science. This session will provide information and guidance concerning the PAEMST application process.

Using the Leafs as a Basis for Student Ownership in Learning

ALL GRADES; General

Anne Petersen, Virginia Department of Education

Myra Thayer, Virginia Department of Education

Gregory MacDougall, Virginia Department of Education

Leafs are used in the 2018 Science Curriculum Framework to indicate that students are to use the Scientific and Engineering Practices to support the development of science conceptual understanding. Learn how to effectively integrate opportunities for students to "do science" as they meet the expectations of the 2018 Science Standards of Learning.

Climate Change and the 2018 Science Standards of Learning

ALL GRADES; Earth/Space Science, Biology/Life Science, Environmental Science

Anne Petersen, Virginia Department of Education

Myra Thayer, Virginia Department of Education

Gregory MacDougall, Virginia Department of Education

Climate change is a hot topic in today's news and many opinions exist as to whether human actions directly impact the climate of the planet. This session will focus on providing opportunities for students to analyze evidence of the key indicators of climate change, to engage in discourse using the evidence, and develop their understanding of climate change.

Islands No Longer: Environmental Science Community Solutions

HS-COL; Environmental Science

Anajai Peterson, Henrico County Public Schools / Varina High School

Melinda VanDevelder, Virginia Commonwealth University, School of Education - Teaching and Learning

An environmental science teacher and a university-based STEM educator created a 9-weeks project that infused life skills and childhood play memories with the current issues of urban and suburban heat islands, food deserts, and lack of community green space. The project was designed to promote inquiry, research, critical thinking, community learning, creativity, and play. The goal for this project was to provide engaging learning opportunities with a focus on culturally relevant issues.

Coding in a STEM Classroom: It is More Than Just Gaming!

ALL GRADES; Math in Science, General, STEM

Michelle Plunkett, Riverside High School

Anything from robots, making a calculator, making a simulation, to keeping a lab notebook! Coding is becoming the language of science in modern jobs. This presentation will go over coding from kindergarten all the way up to AP science courses in high school. There will be multiple platforms, a resource bank for future exploration, and tons of time for questions or help.

Invention STEM: Giving the Chance to be Innovative in High School

HS-COL; Engineering, General, STEM

Michelle Plunkett, Riverside High School

Students have opportunities to demonstrate the 5C's but do not often get a chance to demonstrate citizenship in advanced science courses. This presentation will go through how to switch up your labs to have students develop and practice skills that build to letting them be prepared to enter undergraduate research, invention competitions, or generally changing the world in STEM.

Training and Volunteering as a Virginia Master Naturalist

ALL GRADES; Biology/Life Science, Environmental Science, General

Michelle Prysby, Virginia Master Naturalist Program (Virginia Cooperative Extension/Virginia Tech)

The Virginia Master Naturalist (VMN) program provides training on natural resources and engages volunteers in environmental education, citizen science, and stewardship in their communities. The 40-plus hour basic training course teaches about the plants, animals, and ecological systems of the local area through field and classroom learning. Trained volunteers participate in any of dozens of projects, from wildlife monitoring to habitat restoration to educating others about nature.

Not-for-Profit Exhibitor

Engage Students With Books About Women Who Defy the STEM Gap

ALL GRADES; General, STEM

Elizabeth Blackmon, Booksource

Melissa Reif, Booksource

Diane Garavaglia, Booksource

Tony Haney, Booksource

We will explore the use of authentic literature to enhance science lessons with high interest, STEM related trade books with an emphasis on the accomplishments of women and minorities. Our discussion will include a book talk with select books across all grade bands that will elevate your students' interest in science!

Commercial Exhibitor

Marsh to Lobster Eggs: Research Translated to K-12 Classrooms

ALL GRADES; Biology/Life Science, Environmental Science, Physics/Physical Science

Tara Rudo, Chesapeake Bay National Estuarine Research Reserve-Virginia

Sarah Nuss, Chesapeake Bay National Estuarine Research Reserve-Virginia

Lisa Lawrence, Virginia Institute of Marine Science

Celia Cackowski, Virginia Institute of Marine Science

What can we learn from marsh accretion? How does temperature affect lobster egg development? Graduate students at the Virginia Institute of Marine Science have translated their research into hands-on STEM activities for K-12 science classrooms. This session shares inventive activities with real-world connections. Participants receive these lesson plans and have on-line access to 30+ additional lessons at <https://tinyurl.com/VASEA-Lessons>.

Using the PK-12 Framework for Engineering Learning

ALL GRADES; Engineering, STEM

Amy Sabarre, Harrisonburg City Schools

The Framework for P-12 Engineering Learning was developed through a synergistic collaboration of teachers, school administrators, and researchers alongside the leaders of the AE3 research collaborative and ASEE (www.p12framework.asee.org). This workshop will introduce participants to content presented in the Framework (e.g. engineering habits of mind, practices, and knowledge), framework resources, and the implementation models each district used to institute transformative change.

Science and Literacy: Refining Sense Making Skills?

ALL GRADES; Biology/Life Science

Eeman Salem, Chesterfield County Public Schools

To prepare the next generation of scientists and critical thinkers, we need to combine what we know about excellent literacy instruction with what we know about excellent science instruction. The benefits of this session is to develop students ways of thinking to better understand science ideas for reading and writing that are essential to the science discipline in refining sense making skills.

Nature Journaling; VAST Mini Grant Funded Project

ELEM; General

Becky Schnekser, Cape Henry Collegiate

Let's investigate how to use nature, writing, art, social emotional learning, and scientific observation to engage learners in nature journaling that features skills across all content and skill areas. This project was funded with VAST mini grant funds, come learn how your idea can be funded too!

Expedition Science: Empowering Learners through Exploration

ELEM; General

Becky Schnekser, Cape Henry Collegiate

Humans are natural scientists, let's tap into their curiosity and create meaningful experiences for them within the world of science and beyond. Come learn strategies to place learners in the driver seat of exploratory and investigative science.

GIS 101: Helping Students Become Map Producers

HS; Earth/Space Science, Environmental Science, STEM

Matthew Scott, Freeman High School

Students are constantly bombarded with packaged lessons and teacher-made products. Turn your classroom around by putting them in charge! Learn how to help students make Story Maps, collect data to create public information maps, and create their own personal GIS projects for science. You'll also get started setting up free professional-level GIS resources for your school.

Designing Online Lab Reports - Cut Down on Paper Use!

MS-HS-COL; Biology/Life Science, Chemistry, Environmental Science

Jen Sharp-Knott, Floyd County High School

One of the benefits of a year of online teaching is learning some more efficient ways to do things! Come and see some ways to create online versions of lab reports - what are the easiest ways to format? Is a google doc or a google form better for a certain lab? What about a virtual or make-up version? Attend this session to see some options and hear the pros and cons of different formats.

Trawls to Antibiotics: Research Translated to K-12 Classrooms

MS-HS-COL; Biology/Life Science, Environmental Science, STEM

Bethany Smith, Virginia Institute of Marine Science

Lisa Lawrence, Virginia Institute of Marine Science

Celia Cackowski, Virginia Institute of Marine Science

Sarah Nuss, Chesapeake Bay National Estuarine Research Reserve Virginia

What can we learn from a fish census? How can we determine antibiotic resistance? Graduate students at the Virginia Institute of Marine Science have translated their research into hands-on STEM activities for K-12 science classrooms. This session shares inventive activities with real-world connections. Participants receive these lesson plans and have online access to 40+ additional lessons at <https://tinyurl.com/VASEA-Lessons>.

Student Goals: The Classroom Compass

ALL GRADES; General

Erich Sneller, Harrisonburg City Public Schools

Like stellar constellations for old sailors, specific student goals give specific direction. Without them, we are unmoored from purpose. Thoughtful and detailed goals guide a student's education, providing them with reasons to engage in learning. In this session, we will explore our current goals and update them. The dialogue and reflection in this session will put wind in your sails and embolden your mission as an educator.

Ooh's & Aah's of Energy Transformations!

ALL GRADES; Chemistry, Physics/Physical Science, General

Kimberly Swan, National Energy Education Development Project

Explore six, hands-on stations: motion, sound, thermal, radiant, electrical and chemical energy! Using items encountered in our daily lives – glow sticks, hand warmers, batteries, etc. – but often have little understanding of the science behind how they work. Leave feeling confident to teach energy forms & transformations to your students. Receive resources and creative ideas for teaching energy concepts correlated to Virginia state standards.

Not-for-Profit Exhibitor

Illuminate Your Classroom with Solar Energy!

MS-HS; Physics/Physical Science, General

Kimberly Swan, National Energy Education Development Project

Most of the energy on Earth originates from radiant energy emitted by the sun. Explore hands-on activities for students to visualize just how solar energy can be used in many different ways. Investigate with UV beads, build a solar oven, and see how photovoltaic (PV) cells work! Activities align with state standards and contains hands-on inquiry investigations to explore how we use the sun's energy to produce heat, light, and electricity.

Not-for-Profit Exhibitor

Wind Can Do Work!

MS-HS; Physics/Physical Science, General, STEM

Kimberly Swan, National Energy Education Development Project

With an increased focus on engineering and design instruction, teachers are looking for activities that incorporate these concepts into their curriculum. Join in on our hands-on, critical thinking challenges designed for students to work as engineers in a competitive setting! Build an anemometer and a windmill to see just how wind can do work. Activities designed for students to analyze and interpret data, construct explanations and design solutions, and to plan and carry out investigations.

Not-for-Profit Exhibitor

Sweet and Salty Investigations with a 3-D Twist

MS-HS-COL; Chemistry, General

Stacy Thibodeaux, Southside High School/Texas Instruments

Jessica Kohout, Howard County Public Schools

Discover how to implement three-dimensional learning into any science curriculum, all while engaging learners to become phenomenal! In this session, participants will use real world data collection to determine a phenomenon, why salt is added to freezing roads and making homemade ice cream but also added to boiling water when making pasta. Participants will use the data collected to argue with evidence while creating a visible molecular level diagram of what occurred.

Commercial Exhibitor

Ramp Up Your STEM Data Collection

MS-HS-COL; Biology/Life Science, Chemistry, Math in Science

Stacy Thibodeaux, Southside High School/Texas Instruments

Jessica Kohout, Howard County Public Schools

Want to add more data collection to your STEM classroom? Then this session is for you! Data collection in the STEM classroom is what should drive all engineering design processes. This session will have you collecting real world data, analyzing that data, and use the analysis to design a digital pH monitoring system.

Commercial Exhibitor

Enhancing the Science Learning Environment with Mathematics

ALL GRADES; Math in Science

Kianga Thomas, Norfolk State University

Opel Jones, Towson University

This presentation will focus on how teachers can use mathematics concepts to enhance the teaching of science concepts, the scientific investigation process and basic experimentation exercises in the classroom. Attention will be given towards differentiating instruction to maximize learning for all learners, to include students with disabilities, English language learners and high ability learners. In addition, strategies for student-centered learning will be provided during the session.

Project Based Learning in the Science Classroom

MS; Physics/Physical Science

Kiara Thompson, Thomas C. Boushall Middle School (Richmond Public Schools)

Erin Kichinko-Willis, Thomas C. Boushall Middle School (Richmond Public Schools)

In this session, Kiara Thompson and Erin Kichinko-Willis will share how they incorporate project based learning into their middle school classrooms. Specifically, they will share the details of how they developed and implemented the Energy (PS.5c) and Element (PS.4a) projects, both of which are adaptable for virtual and in-person learning.

Favorite Physics Demonstrations

MS-HS-COL; Physics/Physical Science

Tony Wayne, Albemarle High School

Physics teachers in the Virginia Instructors of Physics, with decades of experience, will share with you some of their favorite demonstrations -both new and old. Many will use materials found at hardware stores, eBay, and/or Amazon. Descriptions and instructions will be provided.

Practical Physics Pedagogy

MS-HS-COL; Physics/Physical Science

Tony Wayne, Albemarle High School

The Virginia Instructors of Physics, (V.I.P.) will pool decades of experience in the classroom to share what works in the science classroom. How do you focus students when entering the room, do labs, present demonstrations, group your students, and/or check for understanding? We will provide a plethora of proven practiced methods to answer these questions. Bring your ideas to share because we love discussions.

Supporting Science Teachers During and After COVID-19

ALL GRADES; Science Teacher Development

Angela Webb, James Madison University

Robbie Higdon, James Madison University

Kerry Cresawn, James Madison University

Supporting teachers is crucial, especially during these uncharted pandemic times. In this session, we will share the ways in which the JMU Robert Noyce Teacher Scholarship Program supported preservice and novice science teachers during the pandemic and how we will continue to be responsive in our support as teachers and schools return to a semblance of pre-pandemic 'normal'. This presentation will be of interest to science teacher educators, division and school leaders, and professional developers.

Citizen Science: Authentic, Accessible, 3-Dimensional

HS; General

Angela Webb, James Madison University

Citizen (or community) science provides science learners rich opportunities to engage in meaningful science. In doing so, learners use science and engineering practices in authentic contexts and build scientific literacy. In this session, JMU preservice teachers discuss the benefits and barriers of including citizen science in the secondary classroom and share ideas for engaging learners in authentic, accessible, 3D citizen science projects that are aligned with the curriculum and standards.

The Art & Science of NASA's James Webb Space Telescope

ALL GRADES; Earth/Space Science, Arts/STE(A)M

Anne Weiss, NASA Langley Research Center Office of STEM Engagement

NASA, along with the European and Canadian Space Agencies, is now preparing the James Webb Space Telescope (JWST) for launch no earlier than November 2021. From its Lagrange (L2) vantage point one million miles away from Earth, the JWST promises to re-define humanity's perspectives of our Universe's history...from the Big Bang to birth of our Solar System. In this session, we'll combine space science with art to create an interdisciplinary cosmic connection that inspires your students.

Concurrent Sessions

NASA's X-57 Maxwell & Advanced Air Mobility

MS-HS-COL; Physics/Physical Science, Engineering

Anne Weiss, NASA Langley Research Center Office of STEM Engagement

With attention on the Commercial Crew Program and Perseverance rover, it might be easy to forget the first "A" in NASA. However, our engineers are creating new experimental planes that build upon the storied legacies of the X-1 and X-15. With breakthroughs in electric power technology, NASA is working towards a sustainable, more inclusive aviation future. In this session, we'll explore the X-57 and advanced air mobility vehicles...more ways that, "NASA is with you when you fly."

NASA Digital Badging Resources for Educators & Students

ALL GRADES; General

Anne Weiss, NASA Langley Research Center Office of STEM Engagement

For more than a year, lockdown measures in response to the global COVID-19 pandemic drastically altered how we interacted socially, economically and academically with each other. This session provides an overview of online NASA instructional resources, such as digital badges, that combine STEM content, mission assets (e.g., Orion spacecraft), and hands-on activities (with options to include social justice elements) for use in face-to-face, blended or virtual learning environments.

Get Your Game On: Student Engagement and Science Learning

ELEM-MS; Math in Science, General, STEM

Joselyn Whetzel, Legends of Learning

Experience how SOL-aligned gaming increases science test scores and student engagement. Learn science and math by flying helicopters, building ecosystems and LAUNCHING COWS into outer space! Participants will have hands-on fun and learn how to: make lessons fun while encouraging students to take personal responsibility for their education, personalize student learning based on their academic level, and create an equitable learning environment where students can progress at their own rate.

Commercial Exhibitor

STEM Majors in Sustainability, Environment, & Conservation

HS-COL; Earth/Space Science, Environmental Science, STEM

John Gray Williams, Virginia Tech - College of Natural Resources and Environment

Natural resources rarely come to mind when students hear the term STEM. But when you stop and think, virtually all consumer products, from the most basic to the most innovative, use materials that can ultimately be tied back to a natural resource. Come learn about the "other" STEM majors at Virginia Tech and how you can connect students interested in biology, chemistry, physics, technology, and engineering to career options in the environment, sustainability, and conservation.

Not-for-Profit Exhibitor

Green Schoolyards Enable Students to Become Problem Solvers

ALL GRADES; Environmental Science, STEM

Laurie Witt, Albert Harris Elementary School

Krista Hodges, Dan River Basin Association

Elementary students can learn the science necessary to address global problems. We have created the Green Schoolyard concept where students join action with learning. With a Monarch Butterfly Waystation, rain barrels, compost bins and a tasting garden, K-5 students experience being part of the solution to problems ranging from growing water shortages, decreasing bee populations, to increasing food insecurities. The Green Schoolyard provides hands-on opportunities to teach Virginia Science SOL.

Teaching Human Ecology with Models and Simulations

MS; Earth/Space Science, Biology/Life Science, Environmental Science

Rafael Woldeab, Population Education

Discover activities that use models and simulations to help students understand ecological concepts and cause-and-effect relationships in nature, including how human activities can change the physical landscape, affect ecosystems on land and in water, and alter the atmosphere. Demonstrations and interactive digital tools engage learners in the creation of 3-D representations of global land use, modeling amounts and sources of fresh water, simulating world population growth trends, and more.

Doing Middle School Sustainable Energy Solutions

ELEM-MS; Energy Science: Sustainability

John Woods, North Fork Middle School, Shenandoah County Public Schools

Good news! We don't have to have all the answers when we teach science. We just need to inspire: Curiosity! Exploration! Find and analyze evidence! DO science. Explore. Record observations. Organize findings. Share. Investigate. Analyze. This session will help you get on the road to Doing science using digital labs. We will get a feel for how to use a Big Problem to engage our elementary and middle school scholars, and move them onto the path to discovery.

While We Wait, II

The Best Way Out Is Always Through

...It's rest I want – there, I have said it out –
 From cooking meals for hungry hired men
 And washing dishes after them—from doing
 Things over and over that just won't stay done.
 By good rights I ought not to have so much
 Put on me, but there seems no other way.
 Len says one steady pull more ought to do it.
 He says the best way out is always through...

— Robert Frost

A Servant to Servants (1914)

The woman in Frost's poem from which this excerpt is taken is caught between the twin dilemmas of fatigue and despondency. She and her husband board several hired men from the nearby Vermont town as she shares her thoughts and feelings with campers below by the lakeside whom she has not yet met. For many of us teachers, also servant to servants, we only need to add to the servants' servant chores those of childcare, grading papers, endlessly revising lessons to cover several versions of remote and hybrid scheduling options (half days, shift scheduling, alternate days, 1-2 days per week), or classroom rearrangements.

It seems significant that Frost's "The best way out is always through" was the title of a high-school senior's oral presentation in a school-wide talk this winter. She sensed the importance of facing the challenges of the pandemic head-on, rather than skirting around or playing avoidance or denial games. A further example of Frost's line, showing the resilience and courage of our young adults came in the June high-school valedictory address of a senior who described the mental health challenges he had to face in his coming out as a freshman. He also spoke of the pandemic to his classmates: "We adapted to something we never thought possible."

A hundred years later than Frost, armed as we are with supposed labor-saving devices, particularly our smartphones, many of us have shared Frost's woman's feelings to the point of depression. This past year students, teachers, and parents have felt this burden to an increasing extent.

A PBS special report [*Tell My Story*, aired 21 June 2021] centered around a father's search for the causes of the suicide of his 14-year-old son. Although the suicide rate in the general US population hit a 5-year low in 2020, for 10-24-year-olds suicide ranks as the second major cause of death. As one recovering young man put it: "You see all these perfect happy people on Instagram, and realize you just don't measure up." This spring David Braumbach's "On Our Minds" podcast noted a spike in suicide ideation in several states. Something significant seems definitely to be troubling our adolescents.

Against a background where "only 8% of students identified 'interacting with teachers / school employees' as an activity that helped them maintain a positive state of mind in school during



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the pandemic," [*Education Week*, Vol. 40 No. 28, 3/3/21.] school psychologist, Marisa Marraccini reminds us of the importance of distinguishing between what might happen, what is actually happening, and what we think should happen next in regard to pandemic learning and suicide, focusing most on how suicide is preventable in the first place.

That said, as of March, there has been no evidence of any increase of suicides or linkage to remote learning; this despite multiple unfounded claims and misinformation in the media. All of which brings us to the point of information and how we use it.

A reminder of the comment of the late scientist, Lynn Margulis:

...American students' persistent low scores on international tests and faltering interest in science and mathematics reflect, in my opinion, a contradiction in our national psyche, a deep cultural divide. Intellectual truths in this country are often sacrificed to what people "like to be true" and thus "more readily believe." What sells to the multitudes is what people like. Our culture puts a premium on being liked; we tend to seek and value popularity over truth, especially abstract scientific truth...Having heard something on the grapevine of the day – newspaper, telephone, lecture hall, television, internet – does not constitute authority...But decent science education requires that we share the truth we find – whether or not we like it. [*American Scientist*, Vol. 93, No. 6, Nov-Dec 2005.]

Although as adults we like to think we are more in control of the forces which direct and control our lives than our students, Margulis's argument on being overly influenced by being liked and being swayed by the "grapevine of the day" has particular relevance to our uses (or abuses) of screen technology especially in this current pandemic. Our virtual connectedness has become a poor substitute for our physiological and psychological needs for personal contact and communication. This tension between realities (virtual and actual) has made us paradoxically lonelier and more isolated.

A paper in Kuala Lumpur, Malaysia, put it this way:

Diplomacy, particularly, has been hard hit by the new norms...
 When a diplomat is reduced to being a texting pen-pal, or

that disembodied voice on the phone, then discussing matters of state becomes a tricky thing. You simply cannot gauge the reaction of the other person through a text message.” [*Christian Science Monitor*, 17 May 2021.]

As the linguistic anthropologist, Elizabeth Keating, suggests in “Why Do Virtual Meetings Feel So Weird,”¹ online meetings such as the one between engineers in Houston and a team in Bucharest, Romania, cannot provide sufficient non-verbal communication as we are accustomed to having during in-person meetings. “The ability to see people and to observe them observing us during work builds a framework for a lot of important parts of teamwork.” Those small glances and informal interactions are just not happening despite the sophistication of much of today’s technology. Virtual meetings are less satisfying and more exhausting than in-person interactions; as one survey of 22,500 respondents (May-December 2020) has shown, more than half would prefer to be in office than not, once it is safe to return. This reluctance toward working from home from business persons has important implications for us in education where the need for children to interact academically, socially, and emotionally has been recently so sadly lacking.

Keating singles out the loss of two major forms of knowledge critical to any interaction: “non-verbal communication and peripheral participation.” She points to our lack of knowledge or even vocabulary needed to describe embodied (non-verbal) communication. The term “peripheral” sounds as though it is unimportant, but it serves as one of the most significant aspects of our communication environment. I think of the faculty lounge off the cafeteria in our school where a former teacher would hang out before school for coffee and conversation, or where teachers would gather at lunch to share birthday cake. Since he retired, the group dissipated to where one would grab their lunch, drink, or cake and leave for their own room. As Keating concludes, “Communication, after all, is about people – not just our words but our gestures, feelings, and mental images. But there’s still a long way to go to incorporate all these developments into more fulfilling and effective virtual work.” How ironic that most online guides actually advise us to subdue or eliminate our gestures or upper body movements.

There have been many attempts to address the powerful and pervasive effects of technological advances on our education and our culture. Thirty-five years ago, New York University professor, Neil Postman, addressed the issue of “Public Discourse in the Age of Show Business” in his little book, *Amusing Ourselves to Death*. He worries less about the Orwellian (1949) nightmares of *Nineteen Eighty-Four* than those of Aldus Huxley’s (1935) *Brave New World* where “truth would be drowned in a sea of irrelevance.” It was Huxley who pointed out that those alert to tyranny “failed to take into account man’s almost limitless appetite for distractions.” In 1985, Postman commented “... what I am claiming here is not that television is entertaining but that it has made entertainment itself the natural format for the representation of all experience.” As I have seen a teacher use an animated cartoon to catch students’ attention, it seems Postman’s message may be at least relevant to us in education, too.

Forced upon us by the exigencies of the Covid19 pandemic, most of our classrooms have become almost exclusively virtual. Ed-tech firms are urging us to “meet kids where they are,” as the slogan goes. “Instead of introducing education through educational software, teachers are now struggling to cram education into the technology with which young people are comfortable, like social media or video games,” comment Joe Clement and Mat Miles in *Screen Schooled*.² Unlike the advent of the television set, with the presence of smartphone, tablet, or laptop students have a virtual life which accompanies them everywhere and which is designed to be experienced alone. We are now accustomed to our students playing games with their friends during class, whether in the same classroom, or school or far beyond. “May I be excused?” turns into retrieving a Chick-Fil-A® lunch from Mom who had just texted her son in class. And we are too often accused of presenting a lesson which is “boring” when research shows us how significant down time can be to the human brain; boredom produces creativity, and wonder has inspired much of human progress.

As screen time has come to preoccupy the majority of kids’ waking hours (and interrupts significant amounts of sleeping hours as well), activities like sports are becoming increasingly spectator in nature. Even “e-sports” have become so popular that 18,118 people once paid good money to fill the Staples Center for a tournament to watch gaming experts play, as a student once explained to those of us unfamiliar with the world of e-athletics. No matter that our human body was designed to stand, to walk, to run and not to sit or lie down. As one gamer put it, “Real sports are just too slow, with too many breaks in them; they’re too boring.” Think of the antics of a child with VR headset, jumping with flailing arms. So, we jump to the curious conclusion that in order to be engaging, learning must be fun, as Postman might point out.

Humans have evolved to learn with their hands, something beyond the simple manipulation of a joy stick. After all, is this not the primary rationale behind our “hands-on” lab experiences? Learning about the experimental basis for scientific truths has taken a serious blow during our pandemic.

This being tethered to one’s virtual world, or specifically to one’s phone, goes beyond the mere ability to text or share images with Instagram or Spotify according to Sherry Turkle in her book *Alone Together, Why We Expect More from Technology and Less from Each Other*.³ From her vantage point as Professor of the Social Studies of Science and Technology at MIT, she has illustrated the paradox (together and alone) of the dependence upon the technology which both children and adults inhabit. As she puts it:

Today our machine dream is to never be alone but always in control. This cannot happen when one is face-to-face with a person. But it can be accomplished by a robot or...by slipping through the portals of a digital life.

We seem to have moved from a situation where the digital life is “better than nothing” to a place where it is “better than anything,” a place where one feels awkward communicating in real time, but safe in texting, in control. Our pandemic world

has produced situations which the old Second Life site or avatars on Facebook have created, a sense of “multi-lifing” the ultimate distractibility. Responses to texts must be measured in seconds, or else the sender shoots off the message to another “friend.” Tapping his shirt pocket where his new i-phone resided, a colleague commented, “This is my whole life, right here!” Yet what constitutes a fulfilling life is too rarely discussed.

Jeet Heer made the point in *The Nation* (April 5-12, 2021) that “Twitter allows us to play a role on a stage watched by millions, to become a hero in the drama of global debate. But there’s no worse fate for an actor than to confuse a performance for reality – and to let the role they play consume their real life.” We find multiple examples of this sort of confusion among our students and their roles in robotic and digital lives.

As John Sanbonmatsu put it as a philosophy and politics professor at Worcester Polytechnic Institute [*Christian Science Monitor* 6/6/2011.], somewhat tongue-in-cheek, we have become as “Homo distracticus,” in place of “genuine democracy” we have online polls and “Astroturf campaigns.”

As the virtual world becomes our substitute for direct, spontaneous experiences in the real one, we and our children are finding ourselves bereft of genuine connections.

It is these genuine connections which transcend the virtual, bringing us back to realizing that in any situation of trauma or conflict, “the best way out is always through.” A theater director, Bryan Doerries, has helped stage dramas of ancient tragedies for very broad audiences: tornado victims, veterans, correction officers, hospital workers, recovering addicts, victims of domestic violence. As he puts it, in his post-performance conversations, “people opened up about emotions that often get stifled, and opening up was healing...the only way to make sense of what had happened was to talk about it.” [PBS *Newshour*, 23 September 2016.] Such important words for us and our students in our traumatic confusion between virtual and real worlds.

Our loneliness in being together, or our togetherness in being alone, seems best remedied not by technology, but by human connectedness and real time communication, the servants’ servant. Here is how Steve Schleicher, prosecutor for the State of Minnesota during Derek Chauvin’s trial for the murder of George Floyd, put this in an interview the last week in April 2021:

Police (as others) need the heart of a public servant. And the public needs to do what it can to make the world a better place. You know, we have this anonymous system of looking out at each other online and lashing out at each other – things you would never say to someone’s face. We need to recognize each other’s **humanity**.”

Wise words indeed.

As an ancient writer once said, “None of us lives to himself, and none of us dies to himself.” The best way out is always through.

George

A VAST Life Member, George Dewey is a former VAST President, former NSTA District VIII Director, Presidential Awardee, and Albert Einstein Distinguished Educator. He taught physics in Fairfax County, NBCT since 1999. He can be reached at: gdewey3@outlook.com

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