

# VAST Concurrent Sessions

## Professional Development Institute

### FRIDAY

#### Concurrent Session Presentations

**Be sure to check for signs with last minute cancellations posted outside each presentation room. Don't wait for a presenter. Go to another presentation if the presenter is not in the room five minutes before the scheduled start of a presentation.**

#### **Friday, Session 1, 8:30 am to 9:20 am**

- Wilson **Improving Science Reading Comprehension** ELEM General  
Ashanda, Bickham, Norfolk Public Schools  
During this session, educators will explore strategies for linking science and literacy that support students' abilities to read, write, and discuss in the context of science and inquiry-based learning using fiction and nonfiction texts. Hands-on examples of how science supports literacy and literacy supports science will be used.
- Washington **Did Your Turtle Survive?** ELEM General  
Anne Mannarino, Regent University  
Come join the fun to see how you can use real world data and simple activities to teach environmental concepts. We will explore this using turtles as our means to teach predictions, data analysis, graphing, environmental impacts, life cycles and literacy strategies. This is a hands-on session. So let's see if your turtle survives!
- Harrison/Tyler **Stellarium: Bringing the Universe to YOUR Classroom** ELEM-MS Earth/Space Science, General  
Randy Bell, Oregon State University  
Learn ways that the excellent (and free!) planetarium program Stellarium can enhance science teaching and learning for astronomy learners of all ages. With Stellarium, students can view and manipulate the sky from anywhere on earth, the moon, or any other planet in our solar system. In this session, you will experience a series of inquiry and model-based lessons that make use of the powerful features of Stellarium to teach phases of the moon and other important astronomy topics."
- Monroe **Crash Boom Chemistry** ELEM-MS, Physics/Physical Science/Chemistry  
Angelo Bonilla, Roanoke City Public Schools; Brian Kreppeneck, Roanoke City Public Schools  
Simple class room demonstration in Middle School Chemistry and Physics to engage and ignite wonder in today's student. All demonstrations are aligned with the VDOE Science Standards. Emphasis on a hands-on learning environment.
- Crystal AB **Sun, Earth, Moon STEM Activities & NASA eClips Resources** ELEM-MS, Earth/Space Science, General  
Joan Harper-Neely, NASA eClips/NIA-CISE  
Participants will engage in hands-on STEM activities that explore the unique characteristics of Sun, Earth, and Moon as well as the relationships between them. Learn how NASA's heliophysics and planetary science divisions study Sun, Earth, and Moon from space and how the information is collected, analyzed and shared with the public. Participants will be introduced to the variety of citizen science campaigns in which their students can participate. (Not-for-Profit Exhibitor)
- Bent Mtn. **Collaborative Teaching in the Science Lab** MS-HS Biology/Life Science, General  
Kathryn Bender, Albemarle High School  
Collaborative teaching can be an incredible tool for differentiating instruction for students and increasing engagement through opportunities for connection between teachers and students. In the science lab there are specific concerns for planning and carrying out activities that can make collaborative teaching a challenge. In this session, we will discuss some of the foundational components to successful collaborative teaching to maximize learning potential of all students.
- Crystal C **Where Should the Wind Turbine Go?** MS-HS, Earth/Space Science, Engineering  
Melani Loney, Old Dominion University; Joanna Garner, Old Dominion University  
In this session, science teachers will examine and complete portions of a field-based lesson that helps students understand the science behind wind and air currents (natural world) and their role in the placement of a wind turbine (designed world). Teachers will leave the session with a copy of the wind turbine investigation, strategies for differentiation, and ideas for incorporating the lesson into their curriculum.
- Crystal D **Evolution for Middle & High School Educators** MS-HS Biology/Life Science  
Christopher Moran, The Teacher Institute for Evolutionary Science; Therese Wolak, The Teacher Institute for Evolutionary Science  
The Teacher Institute for Evolutionary Science helps teachers teach evolution with confidence. Teachers will be guided through a free classroom presentation embedded with all of the content, bell-ringers, hands-on activities, videos, and online games needed to cover their evolution unit without a hitch! Our goal is to make sure teachers have everything they need to cover Virginia's evolution curriculum standards, all in one place.

Appalachian

**Table Top Physics Demos and Activities**

MS-HS Physics/Physical Science

Tony Wayne, Albemarle High School

Drop by the showroom of physics demonstrations, activities, and ideas. Walk around the room as a collection of physics teachers show off physics resources that have worked for them or see new ideas invented and perfected by classroom professionals. Engage in meaningful discussions with others who share your passion for teaching physics. More info can be found at [www.viphysics.org/vast2019](http://www.viphysics.org/vast2019)

Pocahontas AB

**Buzzers Up: Competition Sparks Marine STEM Learning**

HS Marine Science, Competitions

Carol Hopper Brill, Virginia Institute of Marine Science; Celia Cackowski, Virginia Institute of Marine Science; Bill Dunn, Old Dominion University Pit your marine science knowledge head-to-head with VAST colleagues in the 2019 mock VAST Ocean Science Bowl, and bring home the gold! The multidisciplinary nature of marine science hits every aspect of STEM. Teachers can motivate STEM learning with academic competition, providing experiences students crave and presenting opportunities for building content mastery, team and leadership skills. Blue Crab Bowl, Virginia's Regional Competition of the National Ocean Sciences Bowl, is a case study. (Not-for-Profit Exhibitor)

Mill Mtn.

**Gas Laws Rotation Labs**

HS Chemistry

Stephanie Harry, Albert Einstein Fellow

Mini Gas Law Rotation experiment is a compilation of nine gas law demonstrations that I combined into one big experiment. As students rotate between each experiment they obtain a deeper understanding of the various gas laws. This PDI will explain the experiments and a few of the experiments will be demonstrated with attendees

Buck Mtn. AB

**UnBEElievable PBL and PBA in the Biology Classroom**

HS Biology/Life Science

Jackie Orgain, Pearson; Scott Skene, Pearson

Teachers will participate in a real-world PBL where they will investigate colony collapse disorder with bees. Teachers will simulate a bee colony that is being forced to meet many of today's challenges (increasing usage of pesticides, fungicides and growing numbers of parasites). Participants will learn why large numbers of bees choose to leave and never return. Finally, teachers will learn about global impacts of declining bee colonies on agriculture, environments and world economies. (commercial exhibitor)

Tinker Mtn.

**Taking Your Students to the World -Virtually!**

ALL GRADES Earth/Space Science, General

Michele Baird, Norfolk Public Schools

Using Ipad or Chromebooks and Google Expeditions and Tour creator, take your students on 3D virtual field trips. Download amazing tours of the wonders of the natural world, or create your own! No special tools required! VR goggles are nice, but not needed! Share your adventures through your Google Classroom!

Brush Mtn.

**Cultivating the Past While Growing the Future**

ALL GRADES General

Tekita Blackwell, "Roots for A-STEM, LLC"

Cultivating the Past While Growing the Future is designed to equip educators with essential tools for engaging African American learners in STEM. Participants will explore culturally appropriate teaching and behavioral strategies for motivating African American students during STEM lessons.

Crystal E

**Keys for Kids**

ALL GRADES Biology/Life Science

Ellen Powell, Va. Dept. of Forestry

Identification keys are an important tool for natural history field studies. Students may have an easier time learning to use keys if they first understand how a key is designed. Participants will practice using different keys and learn to create their own keys to identify a set of objects. (Not-for-Profit Exhibitor)

Roanoke AB

**Getting the Best Out of VAST - A Presentation for First Timers**

ALL GRADES First Timers

Michael Pratte, Stafford Co. Public Schools

VAST PDI first timers are invited to join us for an engaging opportunity to network and set their professional development goals for this year's PDI. This interactive forum will preview general sessions and help with planning a sequence of concurrent session presentations to meet attendee's interest and learning needs. VAST must-sees like our Night with the Exhibitors, Regional Challenge, DJ, and Dance will be highlighted.

Madison

**Assessing English Learners: How to Assess Content Knowledge**

ALL GRADES General

Alexis Rutt, University of Virginia

Assessment is a critical tool used by teachers to determine the extent of their students' content understanding. Unfortunately, many science classroom assessments end up assessing English Learners' (ELs) mastery of English, not their mastery of the science content. In this session, we will discuss ways to adapt classroom assessments to provide ELs the opportunity to fully express their content understanding, regardless of their current English ability.

Blue Ridge

**You're Never Too Old For Playtime!**

ALL GRADES Student Engagement

Erin Watson, York Co. Public Schools; Craig Doolittle, James Blair Middle School

Who said playtime was only for elementary students? Toys and games are a great way to get students of any age excited about, and involved in, their learning! Come to this hands-on session to play with and explore various toys and games that can be used for scientific instruction, and see how they can be used to help middle school students experience the joy of playtime again!

Jefferson

**Teaching about Variables as a Basic Component of Research**

ALL GRADES General

Scott B. Watson, Liberty University

This activity-based presentation will focus on teaching the use of variables in science. Use of variables is both a basic component of research methods and an essential integrated science process skill.

## Session 2, 9:35 am - 10:25 am

- Harrison/Tyler **Integrating Computer Science into Science K-5** ELEM Computer Science  
 Joshua Bearman, Virginia Dept. of Education; Timothy Ellis, Virginia Dept. of Education  
 Teaching science provides many natural opportunities to integrate technology and computing skills. In this presentation, we will delve into the Whys, s and activities that reinforce scientific concepts while building CS skills. Teachers will have opportunities to take home lessons and information that can be utilized in their classrooms.
- Monroe **Science and Engineering Practices is Not a Stand-alone Unit** ELEM-MS General  
 Kim Dye, Delta Education/FOSS; Diana Velez, Delta Education/FOSS  
 The Science and Engineering Practices describe behaviors that scientists engage in as they investigate the natural world and that engineers use as they design and build models and systems. Regular use of the practices strengthens student thinking and helps apply them to new contexts. Experience a FOSS investigation that authentically incorporates the practices while learning science content. (commercial exhibitor)
- Blue Ridge **Enhancing Math and Science with STEM for Students at Risk** ELEM-MS Math in Science  
 Marilyn Lanier, Fayetteville State University; Cynthia Wooten, Fayetteville State University  
 This presentation illustrates best practices for enhancing student success in Elementary and Middle School science and math classrooms with STEM engagements. The outcome will provide participants with a clear picture of what good teaching looks like when an empowering, experienced teacher implements pragmatic elements of third space theory and culturally responsive pedagogy to reduce the probability for at-risk behaviors in students from urban environments.
- Wilson **Game On: Game-Based Learning with Legends of Learning!** ELEM-MS 3rd-8th Grade SOL Aligned  
 Sean Reidy, Legends of Learning; Aryah Fradkin, Legends of Learning; Sandy Roskes, Legends of Learning  
 Legends of Learning employs original research to drive student performance using SOL-aligned games. Our Netflix-style game-based learning platform delivers a wide range of lessons and drives content proficiency for stronger subject mastery and classroom engagement. Participants will receive first hand experience of what collaboration and achievement can look like through our hands on game-based learning platform. Come ready to collaborate, compete, learn and have a whole lot of fun! (commercial exhibitor)
- Pocahontas AB **Shifting Sands, Moving Mud: Earth Science Stories & Research** MS-HS Earth/Space Science, Environmental Science  
 Carol Hopper Brill, Virginia Institute of Marine Science; Celia Cackowski, Virginia Institute of Marine Science  
 Sediment deposits tell earth science tales. What can layers of sand on the beach reveal about hurricane frequency? Where does mud go and how long does it stay there? 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 others at <https://tinyurl.com/VASEA-Lessons>. (Not-for-Profit Exhibitor)
- Appalachian **Physics Idea Shareathon** MS-HS Physics/Physical Science  
 Tony Wayne, Albemarle High School  
 Teachers from the Virginia Instructors of Physics (VIP) will share proven ideas, demonstrations, and resources for teaching physics. This will appeal to the middle and high school teacher. Everything from the simple to the high tech will be presented. This is an open session. If you have something to share bring 20 handouts and share with us. We want to hear from you too. More information can be found at [www.viphysics.org/vast2019](http://www.viphysics.org/vast2019).
- Crystal D **Free Evolution Resources at your Fingertips!** MS-HS Biology/Life Science  
 Therese Wolak, The Teacher Institute for Evolutionary Science; Christopher Moran, The Teacher Institute for Evolutionary Science  
 The Teacher Institute for Evolutionary Science helps teachers teach evolution with confidence. This session will focus on a hands-on activity and online resources. This Lab is for the Birds is based on the famous research of Peter and Rosemary Grant in the Galapagos Islands. We will also look at dozens of free resources organized by content standard at [www.tieseducation.org](http://www.tieseducation.org). This session complements "Evolution for Middle and High School Educators.
- Buck Mtn. AB **Experience Chemistry through a PBL Approach** HS Chemistry  
 Jackie Orgain, Pearson; Scott Skene, Pearson  
 Chemistry is everywhere in today's world. How do your students approach the world in which they live? Chemistry should be an experience not isolated to the chemistry classroom. Chemistry should be relevant, engaging, and learned in a hands-on environment. Come experience easy-to implement Problem-Based Learning strategies in this interactive workshop that you can take home to your classroom. (commercial exhibitor)
- Tinker Mtn. **STEM Majors in Sustainability, Environment, & Conservation** HS General, All Disciplines Covered  
 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)

**Collect VAST Bucks! Visit the Exhibit Hall. Don't be shy. You just have to ask.  
 Use VAST Bucks to bid on science supplies and more at Friday night's auction.**

- Mill Mtn. **Stories Through Stratigraphy** HS-COL Earth/Space Science, Environmental Science  
Russell Kohrs, Massanutten Regional Governor's School  
The Paleozoic history of Virginia is represented well in the Valley and Ridge. These rocks tell stories of environmental change, the movement of continents, evolution and extinction, and so much more. In this session, we will look at sets of rocks assembled to represent the three cratonic sequences of the Paleozoic and explore how such sets can bring earth history to life. Development of these kits was supported by the AIPG Russ Wayland Mini Grant to Improve Teaching of Geology.
- Crystal E **A Beginner's Guide to Bioinformatics** HS-COL Biology/Life Science  
Mark Levy, Roanoke Valley Governor's School  
We frequently hear about genomic sequencing and the numerous opportunities these data provide to researchers – but did you know that many of these resources are freely available to you and your students? This session will equip you with some fundamental concepts, tools, and resources necessary to learn more about bioinformatics techniques to bring them into your classroom and student research projects. Bring your laptop so you can follow along with the activities!
- Roanoke AB **The Environmental Literacy Model and a MWEE** ALL GRADES Environmental Science  
Cindy Duncan, Chesapeake Bay Foundation  
This presentation will walk participants through the Environmental Literacy Model. (ELM) which will help to support in the development and curricular integration of Meaningful Watershed Educational Experiences. ELM is a lens with which any subject can be taught to gain a more comprehensive and in-depth understanding of the complex relationships that create our environment and allow for the seamless integration of resources, field investigations and student action projects into the curriculum.
- Bent Mtn. **Wildlife Habitat and Native Plant Conservation** ALL GRADES Biology/Life Science, Environmental Science  
Carol Heiser, VA Department of Game and Inland Fisheries  
Natural resources are an important component of the Science SOLs, but students seldom learn real-world examples about how to conserve or restore wildlife habitat and use native plants to protect aquatic resources. In this session we'll review the factors responsible for habitat loss and wildlife species decline, such as invasive plants and degraded water quality, then we'll highlight conservation landscaping practices that can improve habitat diversity on school grounds or other properties. (Not-for-Profit Exhibitor)
- Crystal AB **Where Kids and the Environment Meet: Starting a GLOBE Club** ALL GRADES Earth/Space Science, Environmental Science  
Elizabeth Joyner, NASA Langley Research Center; Angela Rizzi, NASA Langley Research Center; Nina Valdivieso, Northern Shores Elementary School (Suffolk Public Schools)  
Do you have a passion for engaging students in authentic environmental science but are not sure where to start? Learn from two sets of teachers who have started GLOBE (Global Learning Observations to Benefit the Earth) Clubs in the extended day hours in elementary and middle schools. Topics include how to start a club, the activities and goals, NASA resources to support your students, and international and regional science research symposia for students to present their research!
- Brush Mtn. **Increase Student Success with Socrative** ALL GRADES General  
Teresa Justice, Nelson Co. High School; Elizabeth Tyree, Northside High School  
Do you think you'd be more successful if you could duplicate yourself? Do you ever look around the room and see several students with their hands up? If so, Socrative is the app for you. With this app, you can make electronic worksheets or quizzes with instant feedback and grading AND let students retake them until they've reached mastery. In this session, you will learn how to create a free account with Socrative, take a Socrative quiz, create worksheets and quizzes, and view grades.
- Crystal C **Designing Solutions: Using Roof Models to Explore Run-off** ALL GRADES Engineering, Math in Science  
Candace Lutzow-Felling, UVA/Blandy Experimental Farm; Lillian Ledford, UVA/Blandy Experimental Farm  
Use simple materials to design, engineer, test, and redesign a roof model to investigate the impacts of surface water run-off from a roof and onto the ground. Explore ways to further refine your design to reduce erosion caused by water flowing from your roof. This activity combines science and math content with science and engineering practices. It is easily scalable and suitable for upper elementary, middle, and high school grade levels.
- Washington **Small Changes to Current Lessons Can Drive Discovery in a NGSS World** ALL GRADES General  
Jason Marshall, Filament Games (Sponsored by McGraw-Hill)  
Getting student to explore phenomena, engage in argument from evidence and communicate more is the hope of every science teacher these days. Does this mean re-inventing the wheel? It doesn't have to. Discover simple, yet dynamic adjustments that educators and classrooms can do to incorporate these skills and make a successful transition to three dimensional learning. (Commercial exhibitor)
- Jefferson **Tales from the Field--Grosvenor Teacher Fellows Tell All** ALL GRADES Environmental Science, General  
Becky Schnekser, Cape Henry Collegiate; Jennifer Burgin, Arlington Public Schools, Judith Painter  
Join three National Geographic and Lindblad Expedition Grosvenor Teacher Fellows as they talk about their expeditions to Galapagos, Antarctica, and Alaska. They will share about their expeditions, using the expeditions in their classrooms, resources they created, and how YOU can be in the next cohort of Fellows!

Madison **Addressing STEM Capacity for High Ability Minority Students** ALL GRADES Math in Science  
Kiang Thomas, Norfolk State University

This presentation will focus on instructional strategies to enhance the Science, Technology, Engineering, and Mathematics (STEM) environment for minority students in K-12. Furthermore, the session will address culturally responsive teaching and techniques to strengthen inquiry learning skills. In addition, participants will be exposed to “best-practices” in gifted education that can be provided for all learners.

## Noon - 1:00 pm

Pocahontas AB **Exclusively for Pre-service Teachers - What YOU Need to Know** ALL GRADES **Preservice Teachers**  
Alex Shafer, James Madison University; Jennifer Maeng, University of Virginia

Calling all pre-service teachers! Join us for lunch and 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 just you're beginning a teacher preparation program or graduating in May! (sponsored by the Virginia Space Grant Consortium)

## Session 3 1:10 pm - 2:00 pm

Wilson **Collisions and Friction - Smithsonian Science for Grade 5** ELEM Physics/Physical Science  
Erik Benton, Carolina/Smithsonian Science for the Classroom; Knans Griffing, Carolina/Smithsonian Science for the Classroom

We will engage participants in the Smithsonian's new module “How Does Motion Energy Change in a Collision?”. Using Bumper Cars participants will experience first hand how students: plan & carry out an investigation using a fair test, represent data on distance moved of a stationary object to identify cause & effect relationships, construct an explanation that faster objects have more motion energy and whether the texture of a surface affects the motion of a sliding object. (commercial exhibitor)

Monroe **Science First...Reading and Writing Will Follow** ELEM-MS General  
Kim Dye, Delta Education/FOSS; Diana Velez, Delta Education/FOSS

Hands-on science experiences provide three key factors not provided by traditional reading programs. Hands-on experience is motivating, is the fastest way to build background knowledge, and provides context for language for students who struggle with reading and writing. When we flip the instructional sequence, so the hands-on experience comes first, all students have a common experience from which to build content, an authentic way to acquire language, and a purpose for reading and writing. (commercial exhibitor)

Crystal D **Wanna Teach STEM? We Have an Explorer for That!** ELEM-MS Life, Earth & Physical Science  
Laura Reino, National Geographic Learning

National Geographic Explorers use STEM daily to answer questions about the world around us. Learn exciting ways to make life, Earth and physical science content engaging and relevant in your classroom. This session will show you how to connect standards-based content to exciting real-world research and exploration. (commercial exhibitor)

Harrison/Tyler **Integrating Computer Science into Middle School Classroom** MS Computer Science  
Joshua Bearman, Virginia Dept. of Education; Timothy Ellis, Virginia Dept. of Education

Teaching science provides many natural opportunities to integrate technology and computing skills. In this presentation, we will delve into the Whys, Hows, and Whats of computer science (CS) in the science classroom. We will focus on the value of computational thinking throughout 6-8 and introduce programs and activities that reinforce scientific concepts while building CS skills. Teachers will have opportunities to take home lessons and information that can be utilized in their classrooms.

Crystal AB **Develop Scientific Literacy Using Current Events** MS General  
Rebecca Musso, Gayle Middle School

Attendees will leave with materials to implement immediately in the classroom to develop student's scientific literacy through the use of current events and case studies. The use of current events and case studies in science promotes depth of knowledge and understanding of the intricacies of issues about which people have to make decisions.

Buck Mtn. AB **PBLs & PBAs in the Virginia Middle School Science Classroom** MS Physics/Physical Science, General  
Scott Skene, Pearson; Jackie Orgain, Pearson

This workshop will help Virginia Middle School teachers understand how PBLs help students acquire a deeper knowledge through active exploration of real-world scientific phenomena. Students explore a phenomena by working for an extended period of time to investigate and respond to a complex question, challenge, or problem. PBL contrasts with teacher-led instruction that presents established facts by instead posing questions, problems or scenarios. (commercial exhibitor)

Pocahontas AB **Engaging Inquiry: Pre-service Teachers Share Tested Lessons** MS-HS All Science Content Areas  
Elizabeth Edmondson, Virginia Commonwealth University; VCU MT Students

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.

**Inspiring NASA's Future Workforce through STEM Engagement**MS-HS Earth/Space Science,  
EngineeringRosemary Smith, NASA Langley Research Center; Lindsay Thornton, NASA Langley Research Center; Adeline Dinehart,  
NASA Langley Research Center

NASA is engaging its future workforce through three pilots providing unique learning experiences for students focusing on current NASA missions. Join us as we discuss best practices for integrating STEM concepts and technology into your classroom, explain what you will need to get started, and immerse you in a NASA journey without ever leaving the classroom!

Tinker Mtn.

**Surveying and Geodesy in Colonial America: 18th Century**STEM MS-HS-COL  
Earth/Space Science Math in Science

Eric Pyle, James Madison University

Colonial America, especially Virginia, represented a chance for immigrants from Europe to actually own property. Land had to be measured, and when many maps were inaccurate, the work of surveyors, astronomers, and mathematicians defined the "shape" of the Earth leading to a precision of measurement unseen before. This demonstrative session will share how this work was done and how the instruments of scientific measurement relied on the elegance of classical mathematics.

Brush Mtn.

**Academic Controversy to Enhance Conceptual Understanding**

HS General

Angela Webb, James Madison University

To be scientifically literate, it is imperative students understand, apply, and critically examine key concepts and practices. This can be fostered via debate; yet not all debated topics are scientifically controversial (e.g., climate change). In this session, preservice teachers from JMU model and share ideas for introducing debate via constructive, cooperative, and academic controversy. Co-presenters: Spencer Knox, Andrew Lough, Chris McKinney, Daniel Paunovic, Alex Shafer, Shannon Van Tol

Washington

**3-D and Virtual Activities for HS Science, AP & Electives**

HS-COL General

Margo Dye, Houghton Mifflin Harcourt - HMH

With 3-D videos, Virtual dissection, and Google Expeditions, you will explore activities to enhance student engagement of high school AP and Elective science courses. The integration of 3-D learning, specifically the SEP's, make this immediately applicable to your science classes, and you will get access to online resources you can use the next day! (commercial exhibitor)

Madison

**An Ancient Mass Extinction with its Roots in Virginia**

HS-COL Earth/Space Science, Chemistry

Benjamin Gill, Virginia Tech

201 million years ago, massive volcanic eruptions caused one of the most severe mass extinctions in the history of Earth. Some of these volcanoes were located in Virginia. These eruptions injected large amounts of greenhouse gases into the atmosphere, producing prolonged global warming, climatic instability, and widespread acidification and deoxygenation in the oceans. In this session, we will discuss how geoscientists reconstruct these past changes on Earth and the evidence found in Virginia.

Crystal E

**Gene Editing & Bioethics: How & Why to Integrate**

HS-COL Biology/Life Science

Donna Rowlett, Gate City High School (Scott Co.); Jinx Rasmussen, Virginia High School (Bristol City)

Given advancements in genome editing and rise of CRISPR-Cas9, students must be introduced to and explore implications of these. Similarly, today's youth will face issues such as management of pandemics and climate change. This session will supply teachers with activities, resources, and access to free resources with which they can provide students with opportunities and tools to evaluate "risk assessment" as they identify benefits & harms and the stakeholders in potential real life situations.

Crystal C

**Quick and Easy Experiments Using the Latest Technology**

ALL GRADES General, STEM

Jackie Bonneau, Vernier Software &amp; Technology

Participate in fun, engaging, hands-on STEM activities using a variety of Vernier sensors that will teach students about data collection and analysis—practices that promote science inquiry, improve science literacy, and boost test scores. Help prepare students to meet state standards through lessons and experiments that support three-dimensional learning. (commercial exhibitor)

Mill Mtn.

**Phenomena, STEM, and Culturally Responsive Teaching (CRT)**ALL GRADES Environmental  
Science, General

Arthur Bowman, Norfolk State University; Kianga Thomas, Norfolk State University

See how blending natural and anthropogenic phenomena, NGSS Core Disciplines, and Culturally Responsive Teaching can provide more effective STEM instruction all learners. This presentation addresses the need to invite more students from underrepresented groups to develop a liking for STEM disciplines that can lead to the pursuit of STEM in a manner that could possibly allow them to seriously consider a STEM career. Phenomena are key to engagement, and CRT allows connecting with learners.

Bent Mtn.

**Strategies to Help Struggling Readers with Science Content**

ALL GRADES Biology/Life Science, General

Stephanie Henderson, Norfolk Public Schools

This presentation is intended to equip teachers with strategies to help motivate students with poor reading skills to build their science content knowledge. Participants will be engaged in strategies to help students analyze visuals, graphs, and test questions, and build scientific literacy skills to make practical responses during science instructional time.

Appalachian **Improve Student Achievement through STEM Teacher Actions** ALL GRADES General  
 Pam O'Brien, STEMscopes/Accelerate Learning, Inc.  
 Earning a STEM Teacher Certificate will refine and demonstrate your understanding of 15 STEM Teacher Actions. These effective, engaging, and evidence-based STEM instructional strategies will transform your students' outcomes and energize your campus. (commercial exhibitor)

Jefferson **Bringing Expedition and Field Science to the Classroom** ALL GRADES Environmental Science, General  
 Becky Schnekser, Cape Henry Collegiate  
 Empower and excite students through field and expedition science experiences that truly put them in the center of the action. Discover how to plan, implement, and dive deep into citizen, field, and expeditions with students of all ages, especially elementary.

### Session 4, 2:15 pm to 3:05 pm

Washington **National Geographic's Learning's Panorama Science** ELEM Biology/Life Science, General National Geographic  
 Lori Evans, National Geographic Learning/Cengage  
 In this session, we'll explore National Geographic Learning's newest ELA and Science program: Panorama Science. By looking at the benefits of its online learning platform, MindTap School, attendees will see the interactive tools for K-5 students and how our digital platform helps Science come to life. (commercial exhibitor)

Mill Mtn. **From Ordinary Worksheets into Exciting Hands-On Activities** ELEM-MS General  
 Arthur Bowman, Norfolk State University; Kianga Thomas, Norfolk State University  
 This session will show how any non-neuron stimulating STEM worksheets can be easily converted into a variety of hands-on activities that are aligned with teaching standards, the 5Es model of instruction, and in consideration of Culturally Responsive Teaching (CRT). How the worksheets can also be used as a basis for developing authentic scientific investigations will be discussed.

Monroe **Think Like and Engineer with Phenomenal Science Instruction!** ELEM-MS Engineering, General  
 Tom Gantt, Amplify Education  
 Teachers will learn how student driven engineering internships can incorporate all aspects of the new Science & Engineering Practices from the 2018 Virginia Science Standards of Learning while encompassing the "Five C's" competencies This session will engage educators with hands-on activities, digital tools, active reading and dynamic discussion with the purpose to integrate phenomena-based science instruction around real-world problem solving. (commercial exhibitor)

Appalachian **Mousetrap Cars: A How-to Guide to Teaching Forces and Motion** MS Physics/Physical Science  
 Carolyn Elliott, Goochland Middle School  
 Are you looking for an efficient and challenging way to teach forces and motion? Consider having your students build a car powered by the snap of a mousetrap. Friction, Newton's Laws, acceleration and speed all must be considered in construction of the car. This is an ideal way to teach forces and motion using a performance-based approach.

Bent Mtn. **Bridge DATA: Hold the Anchovie** MS-HS Biology/Life Science, Environmental Science  
 Celia Cackowski, Virginia Institute of Marine Science  
 During El Niño years, warm water piled up in the western Pacific flows toward the east bringing, heavy rains with it. However, scientists have begun examining historical climate and oceanography data back 100 years and are finding indications of a much larger climate swing in the Pacific. In this DATA exercise, participants will use Microsoft Excel to graph Pacific atmospheric and fisheries data over time and look for evidence of this larger shift and its connection to fish abundance. (Not-for-Profit Exhibitor)

Tinker Mtn. **Engaging Secondary Students in Authentic Research** MS-HS-COL STEM Inquiry & SOL.1  
 Julia Cothron, Virginia Junior Academy of Science; Debbie Neely-Fisher, Virginia Academy of Science  
 On May 28-29, the Virginia Junior Academy of Science (VJAS) will meet at James Madison University. Over six hundred secondary students will present STEM research and participate in special JMU events. Learn how your students can participate and obtain resources for implementing authentic research. Learn how educators can attend and experience the event before starting a research program at their school. (Not-for-Profit Exhibitor)

Crystal C **Infusing Culturally Sustaining Pedagogy in Secondary Science** MS-HS-COL General  
 Kristie Gutierrez, Old Dominion University  
 Secondary science education students from Old Dominion University designed and taught lessons in their middle/high school field placements using the 5E instructional model, with a Culturally Sustaining Pedagogical lens. In this session ODU students and faculty will share ways to integrate CSP into science lessons, provide attendees with innovative activities/lesson plans meeting the VA Science SOLs, and guide attendees through specific components of their CSP-focused lessons. (Not-for-Profit Exhibitor)

Buck Mtn. AB **Beat the Chemistry Blues with Indigo Dye** HS Chemistry  
 Gretchen Cessna, Harrisonburg High School  
 Are you looking for a highly engaging project that also reinforces chemistry content? One that is flexible enough to adapt for general up to AP level courses? This presentation will describe an indigo synthesis and tie-dye project inspired by the author's trip to West Africa. Key concepts demonstrated in the visually beautiful chemistry include: evidence for chemical reactions; solubility and polarity; oxidation/reduction; exothermic vs endothermic reactions; and stoichiometry and percent yield.

- Blue Ridge** **FPV Racing Drones - STEM Competition Team Grant Initiative** HS STEM Education  
Daniel Lewandowski, Portsmouth Public Schools (Office of Science); Paul Sarandria, Portsmouth Public Schools (Office of Science)  
What begins as a hobby may grow into a career! Portsmouth Public School students are building, programming and flying their own drones. Flying in First Person View (FPV) mode; meaning the student does not see the drone, rather they are seeing the streaming video imagery the drone transmits to the pilot's headset goggles. This program incorporates skills and knowledge from each of the four disciplines in a STEM education. In this session we will share our story into this journey.
- Crystal D** **STEM in Action with National Geographic Explorers** HS Life, Earth & Physical Science  
Laura Reino, National Geographic Learning  
Learn how to integrate the research and exploration of the National Geographic Explorers into all high school science classes. Get hands-on experience in bioengineering using a real-world case study on coral reefs and research from National Geographic Explorer Mike Gil. (commercial exhibitor)
- Crystal E** **Field Investigation Equipment on a Budget** ALL GRADES Biology/Life Science, Environmental Science  
Suzie Gilley, VA Dept of Game and Inland Fisheries; Page Hutchinson; VA Dept of Forestry  
Interested in going outside to conduct field investigations but think you can't afford basic equipment? This session will explore some basic equipment that can be made by you or your students and how to create a simple field investigation kit to take outside. Field investigations are best done over time and in all seasons. We will explore methods and materials needed. Handouts and instructions will be provided. Teachers will make a seed wand and research grid to take back to their class. (Not-for-Profit Exhibitor)
- Brush Mtn.** **Get Involved with JVSE! There is Room for Everyone!** ALL GRADES General  
Amanda Gonczi, Michigan Technological University; Jennifer Maeng, University of Virginia  
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.
- Pocahontas AB** **Teach an Old Dog with a New Trick: Fossils & Rock Meet Tech** ALL GRADES Earth/Space Science  
Chris Kaznosky, Central High School (Shenandoah Co.); Steve Leslie; James Madison University Dept. of Geology and Environmental Science  
Fossils and rocks are referenced in SOLs at all three Virginia public school levels as well as in college courses, but are often taught about in a fragmented manner. Attendees of this session will discover why specific fossils and rocks are found in Virginia's five physiographic provinces as well as the processes behind why they're there. Technology-based lessons will be shared, and it's suggested that you consider bringing a computer or tablet. Also, samples and resources will be provided.
- Madison** **Dinosaurs, Volcanoes, and Supercontinents in Virginia** ALL GRADES Earth/Space Science, Biology/Life Science  
Ben Kligman, Virginia Tech; Jonathan Prouty, Virginia Tech  
Virginia's rift basins run north to south across the Piedmont. They contain sedimentary, metamorphic, and igneous rocks formed over 200 million years ago during the Triassic and Jurassic periods. The sedimentary rocks preserve globally important fossils of plants, insects, mammals, lizards, and dinosaurs. The igneous and metamorphic rocks record cataclysmic volcanic eruptions and the breakup of the supercontinent Pangea. These basins provide a glimpse of part of the Commonwealth's ancient past.
- Wilson** **VDOE Update** ALL GRADES General  
Anne Petersen, Virginia Department of Education  
Myra Thayer; Virginia Dept. of Education, Josh Bearman, Virginia Dept. of Education  
This session will provide information on current state initiatives, the Science Curriculum Framework, and updates on both the state and national levels of science education."
- Jefferson** **National Geographic Educator Certification Phase 1** ALL GRADES, Formal & Informal Educators  
Becky Schnekser, Cape Henry Collegiate  
Do you believe in empowering students to think like explorers? In inspiring students to be global thinkers who can change the world? If so, you are invited to become a National Geographic Certified Teacher! We seek to inspire educators to teach students about the world in innovative and interdisciplinary ways. Come join the community of National Geographic Explorers, Educators, and Innovators! This session will provide you with Phase 1 of the certification process.
- Crystal AB** **NASA Digital Badging Resources** ALL GRADES General  
Anne Weiss, NASA Langley Office of STEM Engagement  
This session will provide an overview of the latest online NASA education resources, specifically digital badging. While primarily designed for professional development of STEM educators and district administrators (e.g., curriculum leads), this workshop will also introduce digital badges for student STEM engagement.

**Session 5, 3:20 pm to 4:10 pm**

- Crystal C **When Engineers and Educators Collide...to Teach Engineering** ELEM Engineering  
 Kristie Gutierrez, Old Dominion University; Jennifer Kidd, Old Dominion University  
 Elementary education students and engineering students, both from Old Dominion University, collaboratively designed and taught engineering lessons to local 4th and 5th grade students using the 5E instructional model. In this session ODU students and faculty will share more about the engineering/education partnership, provide attendees with innovative lesson plans meeting the revised VA Science SOLs, and guide attendees through a sample engineering lesson for upper-elementary classrooms. (Not-for-Profit Exhibitor)
- Harrison/Tyler **Growing Primary Roots in STEM** ELEM General  
 Angerina Jones, Chesapeake Public Schools  
 Growing Primary Roots in STEM aims to encourage and empower primary educators to deliberately plan STEM activities and lessons that intentionally engage African-American students. Participants will explore culturally specific learning styles and literature they should consider when planning STEM lessons.
- Monroe **Unpacking VA Science Standards with Phenomenal Instruction** ELEM-MS General  
 Tom Gantt, Amplify Education  
 Teachers will learn how phenomena-based science instruction designed around real-world problem solving can incorporate all aspects of the VA Science Standards while blending the “Five C’s”. Teachers will unpack the content strands as they relate to the six critical components for achieving science literacy. This session will engage educators with hands-on activities, active reading and dynamic discussion with the purpose to design instruction with 3-Dimensional Learning Statements. (commercial exhibitor)
- Blue Ridge **Designed to Align: Design Briefs in the Science Classroom** ELEM-MS Engineering to Learn Science  
 Liz Lynch, Martinsville City Public Schools; Greg Hackenberg, Martinsville City Schools;  
 Lizzy Fulcher, Martinsville City Schools; Chanda Prillaman, Martinsville City Schools  
 The updated VA Science SOLs have placed a greater emphasis on the design process, an easy way to integrate engineering into science is by using design briefs. During this workshop presenters will share multiple aligned design briefs for upper elementary school and middle school. Presenters will share tips and tricks for individuals who would like to start integrating design briefs, an opportunity for hands on exploration, and time for participants to share ideas for design briefs.
- Wilson **Have You Considered PAEMST?** ELEM-MS General  
 Anne Petersen; Virginia Department of Education  
 The Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST) are the highest honors bestowed by the United States government specifically for K-12 science, technology, engineering, mathematics, and/or computer science teaching. This years award recognizes K-6 teachers have both deep content knowledge of the subjects they teach and the ability to motivate and enable students to be successful in those areas.
- Mill Mtn. **STEM-ulating Activities on Human Ecology** MS Environmental Science  
 Michael Bentley, University of Tennessee-retired  
 Discover innovative ways to teach middle schoolers about human-environmental interactions, while also building STEM skills through problem solving, mathematical modeling, interactive technology and more! Presented activities cover a range of human ecology topics including human population and natural resource use trends, and their resulting impacts on ecosystems, biodiversity, climate and the availability of fresh water. Receive electronic lesson plans matched to SOLs.
- Brush Mtn. **Engaging Virginia’s Youth in STEM** MS-HS STEM  
 Trisha Deshumukh, Virginia Tech; Karen Emmons, Virginia Science Olympiad (VASO); Emily Owens, Virginia Science Olympiad (VASO)  
 Come learn about Science Olympiad (SO), an academic, team-based STEM competition for students from 3rd through 12th grade and how to get involved. SO allows students to work together to explore a wide range of science knowledge topics and applications and encourages collaborative problem-solving and investigation. Attendees will have the opportunity to interact with some of the events that will be offered at this year’s tournaments. (Not-for-Profit Exhibitor)
- Crystal AB **Earth Data At Your Fingers: Increasing Access to NASA Data** MS-HS Earth/Space Science, Environmental Science  
 Elizabeth Joyner, NASA Langley Research Center; Angie Rizzi, NASA Langley Research Center  
**TWO HOUR PRESENTATION (Sessions 5 & 6)** - Do you want to use authentic Earth data in your lesson but you get bogged down by complicated user interfaces and funny naming datasets? Attend this double My NASA Data session to learn how to use tools, like the Earth System Data Explorer, NASA Worldview, and NASA Earth Observer (NEO) to extract maps, graphs, videos, and more! You will also learn tricks for engaging students in a variety of Earth data and phenomena. Fully-charged laptop and your WiFi-enabled bluetooth device required.”
- Appalachian **Bridging Science and Engineering to Social Justice Problems** MS-HS Physics/Physical Science, Engineering  
 Meredith Kier, College of William and Mary  
 Secondary science preservice teachers will model how science and engineering can be used in tandem to break down social justice problems in the Tidewater Region, and be tools to facilitate racial and socioeconomic equity.

Buck Mtn. AB **Mystery Powders** HS Chemistry  
Erich Sneller, Harrisonburg High School; Kasey Fisher, Harrisonburg High School ; Suzanne Smith, Harrisonburg High School  
Come join this session and participate in a hands-on, guided inquiry investigation of five "Mystery Powders". Take on the role of a chemistry student as you explore the changes and properties of matter along with collaboration and lab safety. Leave with valuable experience and plan to engage your students' scientific creativity and collaboration. Materials provided will allow a teacher to incorporate this lab in the classroom in either a more open ended or scaffolded manner."

Washington **Cengage's OWL Platform for Chemistry Courses** HS-COL Chemistry  
Lori Evans, National Geographic Learning/ Cengage  
Cengage offers a multitude of Chemistry courses, from on-level to AP. In this session, we'll explore OWL, our online digital platform specifically designed by Chemistry teachers. We'll provide an overview of the platform, including the interactive eBook, the engaging assignments, and the multimedia activities. (commercial exhibitor)

Tinker Mtn. **Environmental Science investigations in Geosciences** ALL GRADES Earth/Space Science, Environmental Science  
John Chermak, Virginia Tech Geosciences  
This presentation will discuss the Environmental Science curriculum and career opportunities for students offered through the Department of Geosciences at Virginia Tech which is also available in other Geosciences departments in Virginia as well as in other States. The interdisciplinary nature of Geosciences allows students to be well-trained to solve complex real-world problems. With a geology degree, students have the opportunity to obtain professional certification and licensure.

Crystal E **Flora of Sicily: Communicating Through Scientific Names** ALL GRADES Biology/Life Science  
Kathy Frame, Papillion Education Services, LLC  
Follow the presenter to observe the flora of Sicily via scientific names and how these names link to the flora communities of Virginia. This will be translated into a hands-on lesson plan easily adapted to other flora communities that shows the importance of scientific names to our health, the environment, biodiversity, and the herb, food, and floral industries.

Pocahontas AB **Students Can Explore the World with ArcGIS and Google Earth** ALL GRADES Environmental Science, General  
Joyce Kuberek, Virginia Space Grant Consortium; Joyce Corriere, Virginia Space Grant Consortium  
Are you looking for free resources to enhance student learning? Are you tired of PowerPoint after PowerPoint? Setup your free account in Esri ArcGIS and through your account students can create and store their Story Maps. This can be used across curriculum for grades 5- 12. You will be provided information about features Google Earth has to offer and how to incorporate images and data into your ArcGIS Story Maps. (Not-for-Profit Exhibitor)

Crystal D **Science, Math, & Programming with Sensors (Grades 3 - 10)** ALL GRADES Circuits & Programming  
Angela Parsley, Virginia Department of Transportation, Christina Martin, Giles County Public Schools  
Sensors are everywhere! Come explore the different types of sensors used in the transportation industry. Create your own sensor and program it using Scratch. Utilize this and our other free technology-rich lessons in your classroom to show students up-to-date applications of science and math. Bring a laptop or device to connect to the internet. (Not-for-Profit Exhibitor)

Bent Mtn. **ReGifted: Differentiating for Your High-ability Students** ALL GRADES General  
Alex Shafer, James Madison University; Amber Sanders, James Madison University; Robbie Higdon, James Madison University; Russ Kohrs, Massanutten Regional Governor's School  
Perhaps you've experienced this: a student who seems like a bit of a know-it-all, or maybe a student who defies every rule, but clearly knows their stuff. If this sounds all too familiar, it is likely that you have a bored, but gifted student in your class. Join us for an interactive discussion on common issues in gifted education, and simple differentiation solutions that can be used in any class. Leave empowered with knowledge that will help you give better work to gifted students.

Madison **Systematic Project-Based Learning with Interactive Rubrics** ALL GRADES Biology/Life Science, General  
Caitlin Unterman, Virginia Episcopal School  
Projects are great, but only with great planning. Come learn about how to systematically plan productive projects based on learning objectives geared towards state SOLs. This presentation focuses on harmonizing productive projects with interactive rubrics for formative and summative learning goals- taking rubrics out of the normal table-like format, and into digital check-ups for individual student needs.

## **Session 6, 4:25 pm - 5:15 pm**

Monroe **Sprouting Success with Agriculture in the Classroom** ELEM General  
Lynn Black, Agriculture in the Classroom  
The things we can learn from a cow and a worm! Join Agriculture in the Classroom for an engaging and hands-on session where you will find out what these two animals have in common. We'll examine nature's ultimate recyclers and explore ways that the earth's resources can be conserved and used efficiently. Highlighted elementary science topics will include Earth Resources, Living Systems, and Interrelationships in Earth Systems. Participants will receive curriculum and classroom resources.

**Measurement & Geometry in Origami**

ELEM Engineering, Math in Science

Kimberly Moore, Coleman Place Elementary School

Explore measurement and geometry by creating origami paper boats. This engineering lesson encompasses subdividing, measuring and classifying angles. We'll measure and differentiate among perimeter, area and volume. Culminating our lesson by exploring force and motion with the amazing boat race!

Appalachian

**Demos and Activities to Engage Students in Science**

MS-HS Physics/Physical Science

Craig Doolittle, James Blair Middle School; Erin Watson York Co. Schools

In this session you will see and participate in various teacher demos and student activities that will grab your students attention and increase engagement in the lesson for the day.

Crystal E

**Fun with Cells: No More Boring Worksheet**

MS-HS Biology/Life Science

Erika Hackworth; Woodrow Wilson Middle School (Roanoke City)

Are you tired of using the same worksheets year after year to teach the students about cells? We all know that kids learn better by doing. This PD session will provide attendees with various take home activities and ideas that they can incorporate into their classroom to engage students on a completely new level. Students will learn by doing while also addressing all learning styles. Students will make connections and have fun, thus gaining a better understanding of cells.

Pocahontas AB

**Using Google to Generate Graduates with 21st Century Skills**MS-HS Biology/Life Science,  
Environmental Science

Natasha Neagle, Stafford Co. Public Schools; Stacey Ludington, Stafford Co. Public Schools

Using Google for Education products to engage students while developing the 5Cs to generate graduates with 21st century skills. Excellent for blended learning or flipped classrooms and all learning levels.

Mill Mtn.

**Teaching Science in an English Classroom**

MS-HS Cross Curricular Applications

Jennifer Robinson-O'Brien, North Stafford High School STAT Program; Amy Verhaalen, North Stafford High School STAT Program

Want to build your own monster? Wipe out the world in a wave of zombies? Bow before our robotic overlords? Welcome to English in the Stafford Academy for Technology. By erasing traditional boundaries between English and Science classes, our program encourages student involvement by tapping into pop culture and literature to provide a framework for scientific concepts. Come gain ideas for your tool kit on integrating science and literature, or how to start a school wide STEAM day.

Buck Mtn. AB

**More Fun Chemistry Projects and Labs**

HS Chemistry

Paula Irwin, Stonewall Jackson High (Prince William Co. Schools)

This is a follow-up to last year's session and will provide more fun and hands-on projects, laboratory experiments and activities to reinforce the VA Chemistry SOL essential knowledge and skills? This is a session that both new and tenured teachers will not want to miss.

Tinker Mtn.

**Environmental Science - Lessons Learned**

HS Environmental Science

Peter Mecca, George Mason High School

During the 2018 - 2019 Academic Year, a new course - Environmental Science - was implemented at the high school. Enrollment in the new science course included special education students and English Language Learner students. The presenter will share information on curricular, instructional, and assessment (CIA) issues related to course implementation. Proposed CIA changes for the 2019 - 2020 Academic Year will be discussed.

Wilson

**VAST Colleges and University Share Session**

HS-COL General

Anne Petersen, Virginia Department of Education; Jennifer Maeng, University of Virginia

This session is an opportunity for college/university-based science teacher educators and other current/future teacher educators to participate in a professional learning community. We will begin the session with brief updates from each institution and then Dr Anne Petersen, Science Coordinator will provide an update on K-12 initiatives. A discussion will ensue concerning how VDOE and institutes of higher education can further support each other with our different missions.

Brush Mtn.

**Middle School Science Review Trifecta**

ALL GRADES Middle School Science Review

Laura Davenport, Bailey Bridge Middle School; Debbie Vasco, Bailey Bridge Middle School

Increase student understanding and engagement during SOL review by having your students create their own games, books, and posters. Three techniques of review will be presented, along with the rubrics and strategies to implement these methods.

Crystal D

**Using Technology to Create Interactive & Engaging Worksheets**

ALL GRADES General

Pernell Denson, Norfolk Public Schools; Danesha Bazemore, Norfolk Public Schools

Wizer.Me is an education platform that allows teachers to create quick, easy and fun digital worksheets, that can be with students and fellow teachers allowing tracking of student performance. The Wizer worksheet builder compliments teachers' experience and creativity by allowing quick creation of a wide variety of question types: open questions, multiple choice, matching pairs, fill in the blank, fill on an image, tables adding video, audio, images, and etc.

**Collect VAST Bucks! Visit the Exhibit Hall. Don't be shy. You just have to ask.  
Use VAST Bucks to bid on science supplies and more at Friday night's auction.**

Angela Lewis, Norfolk Public Schools; Analisa Santillan, Norfolk Public Schools; Michele Baird, Norfolk Public Schools

Throw away boring paper-pencil assessments and let Google technology do the work for you! Increase your knowledge of technology based assessments and virtual labs with grading programs that integrate with Google classroom. Then explore Google classroom and/or create science technology-based formative and summative assessments using multiple platforms for science content in your classroom. Keep your students engaged in your assessments independently and collaboratively all year!!

**Save the Date! Next Year's PDI: Nov. 14 - 16, 2020 DoubleTree Hotel, Williamsburg,**

**VAST PDI 2020 Theme: *SCIENCE Content, Courses, and Career Pathways*  
Plan to be a Presenter!**

***The online Presentation Proposal Form will be available on the  
"Annual PDI" page at  
www.VAST.org from February 15 to May 1, 2020.***

## **Secondary Teachers (6-12): Apply for the 2020 Donna Sterling Exemplary Science Teaching Award**



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. The award alternates between elementary and middle/secondary. In 2020, the award will be given to an exemplary secondary teacher. To qualify for the 2020 secondary award, a 6th grade teacher must be teaching in a secondary setting.

The awardee will receive a total of \$4000. In addition, travel costs will be reimbursed to attend the 2020 VAST PDI to receive the award and to the 2021 VAST PDI to present a session on the professional development experience and outcomes. The awardee will receive \$3000 at the VAST PDI in 2020. 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, 2020**

### **Do you Need a Certificate of Attendance?**

#### **POST-PDI SURVEY AND CERTIFICATE OF ATTENDANCE**

Log on to [www.VAST.org](http://www.VAST.org), click on "Annual PDI" in the black bar and then click on:

**"2019 post-PDI Survey and Certificate of Attendance"**

Complete the survey and print your Certificate of Attendance.

The link will be active from November 18 - December 31, 2019.

## My VAST 2019 Professional Development Plan

Name \_\_\_\_\_

Time	Session	Title/Presenter	Room	Initial If Attended
Thursday, November 14				
8:00-3:00	Ticketed Donna Sterling Institute	<i>"The Power of Problem-Based Learning for Teaching STEM"</i>		
3:15-5:00	Ticketed VDOE SOL Workshop			
5:30-6:45	Gen. Session I	<i>"How Science Can Save the World"</i> Dr. Mike Gill	Roanoke AB	
6:45-7:30	Regional Science Challenge	-----	Roanoke AB	
7:30-9:00	Night with the Exhibitors	-----	Roanoke C-H	
Friday, November 15				
7:30	Continental Breakfast	-----	Roanoke C-H	
7:30-10:30 12:30-6:00	Exhibit Hall open	-----	Roanoke C-H	
8:30-9:20	Concurrent Session 1 Presentation			
9:35-10:25	Concurrent Session 2 Presentation			
10:40-noon	Gen. Session II	<i>'STEM Students Don't Learn the Way We Teach, Why Don't We Teach the Way They Learn'</i> Dr. Kenneth Wesson	Roanoke AB	
noon-1:00	Ticketed Lunch	-----	Shenandoah AB	
1:10-2:00	Concurrent Session 3 Presentation			
2:15-3:05	Concurrent Session 4 Presentation			

3:20-4:10	Concurrent Session 5 Presentation			
4:25-5:15	Concurrent Session 6 Presentation			
6:15-7:00	Ticketed Dinner	-----	Roanoke AB	
7:00-8:15	Awards/Speaker	<i>"From 23 and Me to Epigenetics: Navigating the Ever-Changing Landscape of Science"</i> Dr. Ken Miller	Roanoke AB	
8:30-10:00	DJ and Auction	-----	Roanoke AB	
Saturday, November 16				
7:30	Continental Breakfast	-----	Roanoke C-H	
7:30-11:15	Exhibit Hall open		Roanoke C-H	
8:30-9:20	Concurrent Session 7 Presentation			
9:35-10:25	Concurrent Session 8 Presentation			
10:25-11:15	Last chance to visit exhibits	-----	Roanoke C-H	
11:00-11:25	Pick up ticketed box lunch			
11:30-12:45	Gen. Session III	<i>"STEM Dispositions Create Future Leaders and Innovators"</i> Dr. Robert Corbin	Roanoke AB	
1:00-1:50	Concurrent Session 9 Presentation			
2:05-2:55	Concurrent Session 10 Presentation			

# VAST Concurrent Sessions

## Professional Development Institute

### Saturday

#### Concurrent Session Presentations

**Be sure to check for signs with last minute cancellations posted outside each presentation room. Don't wait for a presenter. Go to another presentation if the presenter is not in the room five minutes before the scheduled start of a presentation.**

#### Session 7, 8:30 am - 9:20 am

- Wilson **Hello Science, Meet Art** ELEM General, Early Elementary Science  
Perri Robinson, ExploreLearning  
Walk away with early education, multi sensory, hands-on art activities that can be used to help students make connections and deepen their understanding of science concepts. (commercial exhibitor)
- Madison **Connecting Current Events, Critical Thinking, & Science** ELEM Environmental Science  
Heather Shuler, Old Donation School; Janice Clark, Old Donation School; Kathryn Davey, Old Donation School  
Both erosion and watershed pollution are topics threaded throughout Virginia science standards that can be approached from multiple perspectives. Through the use of Paul's Reasoning Model, participants will learn how to guide students through identifying stakeholders in real world problems stemming from scientific concepts as well as identifying assumptions, implications, and solutions. Attendees will look at how this strategy can enhance critical thinking skills and boost the level of rigor.
- Shenandoah A **Empower Students Through Innovative Teaching Practices** ELEM-MS Math in Science General  
Mike San, National Inventors Hall of Fame  
The Invention Process builds a new relationship for teaching and learning, affording the learner to direct their own learning pathway. In a complex world, the foundational nature of education is to foster children's ability to invent their own lives, explore their passions and prepare a pathway for lifelong learning. This workshop reveals how the power of the Invention Process engages learners. Experience the Invention Process through hands-on activities that can be replicated in your classroom. (Not-for-Profit Exhibitor)
- Washington **Explore Solar Energy: A Bright Alternative** ELEM-MS Chemistry, General  
Kimberly Swan, The NEED Project  
Come investigate with UV beads, build a solar oven, and see how photovoltaic (PV) cells work! These hands-on activities let you see just how solar energy can be used in many different ways! You'll leave with a better understanding of radiant energy to share with your elementary and middle school students. (Not-for-Profit Exhibitor)
- Monroe **Teaching STEM Design Practices that Stick!** MS General  
Kim Dye, Delta Education/FOSS; Diana Velez, Delta Education/FOSS  
Engage as a student learner with the new FOSS Variables and Design course to consider the roles of scientists and engineers, learn about variables and experimental design. In this hands-on session, we explore rubber-band powered trolleys along a line to think critically about motion. (commercial exhibitor)
- Shenandoah B **Global Connections: Forests of the World** MS-HS Biology/Life Science, Environmental Science  
Page Hutchinson, Virginia Department of Forestry  
No matter who you are or where you live, you depend on forests. This module will help students explore a range of topics about the world's forests giving them a realistic view, a global perspective and a richer understanding of the concerns that affect natural resources. The activities help students develop the skills to participate meaningfully in public dialogue and decision-making processes concerning forests. Come participate in some of the activities and receive this Project Learning Tree Module. (Not-for-Profit Exhibitor)
- Jefferson **Online Simulations Bring Science to Life** MS-HS Earth/Space Science, Biology/Life Science  
Leah Whetzel, Mattawoman Middle School  
This session highlights a simulation that has the participant engage and learn about food chains. In this simulation, the ecosystem consists of hawks, snakes, rabbits, and grass, the population of each species can be studied as part of a food chain. Disease can be introduced for any species, and the number of animals can be increased or decreased at any time, just like in the real world. This session will also showcase the simulation's ability to collect data from multiple trials.

Blue Ridge

**An Environmental Institute to Increase E-STEM Diversity**

MS-HS-COL Environmental Science

Deirdre Gonsalves-Jackson, Virginia Wesleyan University; William McConnell, Virginia Wesleyan University

Many female students enter high school having an interest and history of high performance in science only to turn away from these interests before entering college. Research reveals that exposing female students to mentor scientists and authentic science experiences can sustain their interest and success in STEM. In this presentation we share findings from a university-based institute where female students engaged in authentic environmental science experiences with science mentors.

Mill Mtn.

**An Introduction to VDGIF's Angling/Aquatic Education Program**MS-HS-COL Biology/Life Science,  
Environmental Science

Alex McCrickard, Virginia Department of Game and Inland Fisheries

This presentation will be an introduction and overview of the Virginia Department of Game and Inland Fisheries angling and aquatic education program. The program focus is on angling and aquatic education with activities that promote Meaningful Watershed Educational Experiences, Virginia SOLs, Trout in the Classroom etc. Aspects of the program not only cover aquatic SOLs but introduce students to angling opportunities in the commonwealth. (Not-for-Profit Exhibitor)

Crystal D

**An Acid-Base Project Derived from an Industrial Procedure**

HS-COL Chemistry, All STEM Devotees

Kenneth Chapman, American Chemical Society, VA Section

Acid-base chemistry is critical for many segments of chemical industry products, including industrial cleaning compounds. Acid-base chemistry provides a methodologically simple foundation for quality control of such products and their raw materials. A student team project for developing both wet and instrumental procedures for real quality control is described. Students address acid-base chemistry, titration methods, experiment design and report preparation. Some STEM careers are addressed. (Not-for-Profit Exhibitor)

Brush Mtn.

**Developing Student-Specific Targets: Why Initiative Matters**

HS-COL General

McKinley Herndon, Monticello High School

The need for students to master 21st-Century skills is pivotal. Attendees will take on the role of students to complete a task and use a factor chart to rank their initiative. Attendees will then learn about the literature behind initiative and how self-directed learning promotes self-efficacy. To conclude, attendees will complete another task using self-directed learning. We will compare the outcomes and discuss how initiative can be used to promote student success in and out of the classroom.

Tinker Mtn.

**VA STEM Inventory: What is happening in STEM education?**

ALL GRADES STEM

Charles English, State / Science Museum of Virginia; Tina Manglicmot, Virginia Department of Education

Dr. Tina Manglicmot, VDOE STEM Director and Chuck English, VA STEM Coordinator are looking to collect and share stories of STEM programming; good and bad. This is a start in identifying what is working, what should be avoided and initiating an inventory so we can better support each other's work. The more we explore the STEM landscape the more we realize that there is a wide range of how people are interpreting STEM education and we need to start sharing these rich and inspiring stories.

Crystal E

**Beyond Balsa: Building Competencies with Card Stock Bridges**ALL GRADES Physics/  
Physical Science, Engineering

Mike Florek, Glenvar High School

This hands-on session will walk through a model bridge project from computer simulation to fabrication to weight testing. Colorful card stock takes the place of balsa wood, allowing for unique bridge elements and more creative designs. Card stock also introduces new challenges to the classic concept. Students utilize all five competencies (the 5 C's) in this detailed STEAM project. Attendees will try out folding and gluing for themselves, then handle actual student bridges.

Crystal AB

**Differentiate Instruction with Britannica LaunchPacks**

ALL GRADES General

Nick James, Britannica Digital Learning

Available for science, Britannica LaunchPacks makes it easier for teachers to differentiate instruction and for students to understand core Pre-K-12 topics. Britannica LaunchPacks are integrated with Kahoot! the popular learning games and trivia quizzes platform, for fun learning. (commercial exhibitor)

Pocahontas AB

**ST eMediaVA - The Beginning and the End of Instruction**

ALL GRADES General

Jane James, eMediaVA - WHRO Education

STEM starts with Science and ends with eM – eMediaVA. eMediaVA is a repository of over 160,000 learning objects (videos, interactivities, lesson plans and more), all searchable by SOL and all FREE to Virginia students and teachers. See how you can enrich instruction and build student engagement in areas like environmental science, biology, chemistry, physics (and the list goes on). Content comes from trusted sources like NASA, The Science Museum of Virginia, NOVA, and more. (Not-for-Profit Exhibitor)

Crystal C

**Shine Bright Like a Diamond**

ALL GRADES Earth/Space Science

Jennifer Maguire, Virginia Tech

Is the luster of your mineral lessons a little dull or earthy these days? Join us for a demonstration where we'll consider how to construct mineral activities that are investigative. Shine up those lesson plans and make them sparkle!

Appalachian **Let's Use the 5-Es to Provide Equity for All Students** ALL GRADES General  
Pam O'Brien, STEMscopes/Accelerate Learning, Inc.

The 5-E model of lesson design can drive equal access and opportunities for all students to succeed in STEM. STEM education strives to promote equity so that bias does not occur with gender, culture, and background. Come learn how to provide more equitable opportunities for students. (commercial exhibitor)

Buck Mtn. AB **Finding the Keys to Science Engagement** ALL GRADES General  
Jackie Orgain, Pearson

How can you inspire your students to explore science in an unexpected way? Give students the keys to unlock the clues in this escape room session. This workshop will encourage students to have inquiry, use the tools, and persevere to be successful. Be prepared to engage in an immersive Science experience with real-world take-aways. (commercial exhibitor)

Roanoke AB **Renewable Energy for your School: From Systems to Challenge** ALL GRADES Environmental Science, Engineering  
Remy Pangle, Office for the Advancement of Sustainable Energy at JMU

Come try your hand at designing a solar structure or a wind turbine. Or learn how to develop a wind or solar installation at your school. From teacher workshops to children's books and curricula resources, there are lots of FREE resources available to teach renewable energy in the classroom and these Challenges are great culminating group projects for your students. (Not-for-Profit Exhibitor)

Bent Mtn. **NSTA's Position Statement on the Teaching of Climate Science** ALL GRADES Earth/Space Science, Environmental Science  
Eric Pyle, James Madison University

NSTA has recently released a position statement that represents the best thinking on how to support teachers of science in their delivery of evidence-based science instruction. This document speaks not just to science teachers, but offers advice to school administrators, and to all those who would support quality teaching on climate science in general and climate change in particular. Come sampling the resources NSTA and other organizations provide for teaching about our changing climate.

Harrison/Tyler **Aquaponics on a Budget** ALL GRADES Biology/Life Science, Environmental Science  
Tabatha Zarkauskas, Forest Park High School

In this session, I'll present low-cost, space-saving ways to bring the aquatic world into your classroom. Learn how to build interest and curiosity while teaching biodiversity, ecosystems, aquaculture, agriculture, symbiotic relationships, photosynthesis, and more.

### **Session 8, 9:35 am - 10:25 am**

Shenandoah A **Purposeful STEAM Integration Weaves Science into Instruction** ELEM STEM + the Arts & Humanities  
Susan Bardenhagen, VAST Region IV Director

The 2018 consensus study of the National Academies of Science, Engineering, & Medicine, indicated that in higher education programs with integration of arts with sciences, engineering, and medicine are associated with positive learning outcomes. It is the presenter's contention that purposeful planning in K-6 with STEAM-infused approaches increases critical and higher order thinking. The previously-labeled "'1s'" in Science SOLs can be infused into STEAM activities and will be modeled.

Blue Ridge **Algae, Nutrients, and Our Environment** ELEM Environmental Science  
Bill McConnell, Virginia Wesleyan University; Arika Marosi, Virginia Wesleyan University, Emily Purdin, Virginia Wesleyan University

Science lessons in K-12 schools are rarely inspired by contemporary research, yet scientists are investigating local environmental issues all the time. Through an EPA funded grant, educators took part in a research apprenticeship that inspired an interactive and engaging environmental science lesson. Through the use of varied technologies, join us to solve the algal mystery present in our stormwater ponds.

Wilson **Physics is Elementary with VIP** ELEM Physics/Physical Science  
Jeff Steele, Central Virginia Governor's School

The Virginia Instructors of Physics polled elementary teachers and the VA DoE to ask "What areas of physical science can we help with?" Come find the answer in the forms of lessons you can put into action immediately that will have your students experiencing and learning physical science through inquiry. You will find answers to your questions, ideas to implement, and make-and-take experiments to implement while you enjoy experiencing some inquiry learning of your own.

Monroe **Science for All Students—Access and Equity** ELEM-MS General  
Kim Dye, Delta Education/FOSS; Diana Velez, Delta Education/FOSS

Providing equitable learning opportunities for all students requires knowing the curriculum, understanding the diverse needs of students, and responding effectively to those needs. Join us for a closer look at how the FOSS program provides both universal access and targeted instruction for your most vulnerable students. (commercial exhibitor)



Jefferson **Speed Dating for Science APPS!** ALL GRADES General  
 Michele Baird, Norfolk Public Schools; Angela Lewis; Norfolk Public Schools; Analisa Santillan, Norfolk Public Schools  
 Come and engage with 5 powerful apps in a speed-dating setting. TinkerCad, Phet, Google Expeditions, HP Reveal and Google Science Journal. Interact with these amazing science apps on both Chromebooks and Ipad and then take them back to your classes to spark excitement and engagement in your classes!

Tinker Mtn. **Virginia STEM: Your Role in the State's Plan** ALL GRADES STEM  
 Charles English, State / Science Museum of Virginia; Tina Manglicmot, Virginia Department of Education  
 Dr. Tina Manglicmot, VDOE STEM Director and Chuck English, VA STEM Coordinator will talk about VA STEM and the State STEM Plan. We will discuss the State's unified vision for STEM and how it impacts the lives of not just students, but all Virginians. The plan includes goals aimed at PK-12 education hoping to inspire the next generation of innovative STEM leaders. How can science education become more engaged in STEM, leading others towards a better understanding of STEM as a pedagogy?

Pocahontas AB **Engaging Students in Authentic Science Experiences** ALL GRADES General  
 Renee Cartier, Discovery Education  
 In a student-centered learning environment, we want students to ask deep, meaningful questions, collaborate with their peers, arrive at meaningful conclusions and solve real world problems. Join us to learn about a variety of resources and instructional strategies to engage all students in authentic science experiences. (commercial exhibitor)

Appalachian **Using Argumentation to Discuss Phenomena** ALL GRADES Environmental Science, General  
 Pam O'Brien, STEMscopes/Accelerate Learning, Inc.  
 Reduce teacher talk and increase purposeful student talk as we model consensus building through argumentation around intriguing science phenomenon. ELA skills and the 21st Century Skills of communication and collaboration are a must in the STEM classroom. (commercial exhibitor)

Roanoke AB **NSTA Press K-12 Programs 2019** ALL GRADES General  
 Debra Sawyer, Ph.D. NSTA  
 Integrating science and literacy, NSTA offers popular core programs correlated to VDOE Science Standards. Picture Perfect Science and STEM K-5 include science lessons, Read-Alouds, and hands-on activities with manipulatives. The Eureka! K-5 books' lessons connect science content to trade-book biographies of scientists and engineers. Argument-Driven Inquiry 3-12 engages students in scientific practices; thus, students learn more from labs by practicing curricular areas in the context of science. (Not-for-Profit Exhibitor)

Crystal AB **Sharing Field Experiences in Your Classroom with Virtual Reality** ALL GRADES General  
 Matthew Scott, Douglas Freeman High School  
 We will use Google Cardboard & other apps in tandem with panoramic video technology to view field experiences in the comfort of your own classroom. We will explore public apps & custom videos made by the presenter. You can then design your own field trip experiences to share with students! There will be giveaways of Google Cardboard sets so you can make your own virtual trips. (Attendees may need internet capabilities, a smartphone, & the ability to download apps to get the best out of this experience.)

Madison **Severe Weather in Virginia** ALL GRADES Earth/Space Science  
 Chris White, Regarding Weather LLC  
 Severe weather occurs much more often across Virginia than is generally recognized. Large hail, strong straight line winds, tornadoes, lightning, and flooding all pose threats to life and property. This presentation will illustrate the factors involved in formation and prediction of severe weather, what such phenomena look like, and recommended actions to take in response to watches and warnings issued by the National Weather Service.

### **Session 9, 1:00 pm - 1:50 pm**

Jefferson **The WoW Club: Making Animal-Inspired Robots After School** ELEM-MS Engineering, General  
 Jennifer Kidd, Old Dominion University; Samuel Sacks, Old Dominion University  
 "The "WoW Club" combines an educational technology course at Old Dominion University with an after-school club at a public school in Norfolk, VA. The club is designed to introduce both pre-service teachers and 5th/6th grade students to engineering, coding, and robotics in a low-stakes environment. The club culminates in the creation of animal-inspired robots. We will present lessons learned, share ideas for starting a technology club, and direct attendees through a coding/crafting activity.

Crystal E **Schoolyard Surfaces: an Interdisciplinary Land-Based MWEE** ELEM-MS Environmental Science, Watershed Science  
 Lillian Ledford, UVA/Blandy Experimental Farm; Emily Ford, UVA/Blandy Experimental Farm; Leah Chaldares; UVA/Blandy Experimental Farm  
 Engage in a place-based investigation using inexpensive and easy-to-create materials and satellite imagery to map and calculate the area of permeable and impermeable surfaces of a schoolyard. Designed as the engage or explore portion of a Meaningful Watershed Educational Experience (MWEE), this lesson integrates mathematics and scientific evaluation of how water moves in and around the schoolyard and opens to door to engineering action projects. No body of water required for this MWEE!

### **Save the Date!**

**Next Year's PDI: Nov. 12 - 14, 2020, DoubleTree Hotel, Williamsburg**

- Wilson **Inquiry - Simple Electrical Circuits** ELEM-MS Physics/Physical Science, Engineering  
Janet Lundin; Mary Ellen Henderson Middle School  
An inquiry based electrical circuit lab that is suitable for upper elementary and middle school students. This session will demonstrate how to make very low cost light bulbs and holders, an effective strategy for organization of lab materials, and a grading rubric for students to show understanding of electrical circuits. This inquiry is based on Unit 15 Electrical Circuits of INQUIRY PHYSICS: A Modified Learning Cycle Curriculum by Granger Meador.
- Washington **Letting STEM Bloom in Your Classroom With Paperwhite Bulbs** ELEM-MS Engineering, Math in Science  
Laurie Witt, Albert Harris Elementary School (Martinsville Public Schools)  
During the winter when few plants are growing, students can easily learn to force Paperwhite bulbs in your classroom. Forcing Paperwhites is a wonderful way to learn how STEM starts with Science. Teachers learn to begin with a big idea and grow their lessons to integrate Technology, Engineering, and Mathematics. New ideas start to germinate on how to incorporate technology into lessons. An engineering design brief will be shared, as well as real-world math activities related to plant growth.
- Tinker Mtn. **Introducing Research Methods to Pre-Service STEM Teachers** MS-HS Research in Secondary STEM  
Clair Berube, Hampton University  
Many secondary teachers cannot implement research studies in their own classes. This study seeks to ensure that teachers can understand, and implement research methods in their classrooms. I will describe how we taught graduate level research methods to pre-service secondary STEM NOYCE scholars at Hampton University, who then co-constructed modules/lesson plans that incorporated this knowledge and designed T Test studies for use in their classrooms and finally, what outcomes they experienced.
- Crystal D **Science Safety - Covering Your Assets** MS-HS General  
Andrew Jackson, Harrisonburg City Public Schools  
This session is an overview of safety requirements and expectations in science teaching. We will utilize case studies to discuss legal outcomes as well as damages to property and person. An emphasis will be made on knowledge and maintaining a safe environment while documenting your attention to safety. If your PD portfolio doesn't already contain proof of safety training, let this be the first entry. If it does, then let this be another piece of your protection.
- Crystal C **Tools for Tackling Tough Topics--Teaching Climate Change** MS-HS Climate Change  
Melinda Landry, Patriot High School/NCSE  
There is no scientific controversy when it comes to the basics of climate change. We must help our students understand climate change, the evidence for climate change, and the fact that scientists find the evidence convincing. Utilizing NCSE lessons and tools, teachers will be introduced to the 5 characteristics of science denial and how to provide students with the ability to discern logical fallacies and bolster their climate resilience.
- Shenandoah A **Dive in: Linking Ocean Exploration to Your Class** MS-HS Biology/Life Science, Physics/Physical Science  
Cassi Weathersbee, Patriot High School  
95% of our world is unexplored & waiting to inspire future scientists, engineers, & creative thinkers. The Ocean Exploration Trust's E/V Nautilus explores the world below the waves & can connect your students with onboard scientists. Discover how Nautilus's rich hands-on resources supports your biology, physical science & engineering curricula. PRACTICE three STEM modules available from OET. Learn about the exciting PD opportunities for educators on board the Nautilus & win door prizes!
- Appalachian **Communicating through Science: Disciplinary Literacy** MS-HS General  
JillianWendt, University of the District of Columbia; Maya Barlev, Washington Latin Public Charter School  
In this session, presenters will define linguistic concepts related to oral proficiency and discuss the importance of these ideas in the science classroom, with a focus on teaching linguistically and culturally diverse students. Participants will engage in hands-on activities to learn approaches for developing the academic oral language of English learners in the science classroom and how to bridge speaking and listening skills into the traditional academic domains of reading and writing.
- Buck Mtn. AB **Applications of ADI in the Biology Classroom** HS Biology/Life Science  
Ashley Karunaratne, Princess Anne High School; Katie Liakos, Princess Anne High School  
Argument-Driven Inquiry is a research-based method to develop critical-thinking, analysis, and evidence-based argument skills. ADI provides valuable experiences for students to engage in scientific reasoning and discourse with others while covering course standards. This presentation will give examples of how ADI is used to cover different topics of biology. Presenters will provide classroom-tested examples of how ADI can enhance students' science proficiency at various learning levels.
- Crystal AB **Simulation Labs in STEM Classrooms** HS Biology/Life Science, Chemistry, Physics  
Vidhya Sankaranarayanan, Justice High School  
With increasingly high expectations set for our kids, it becomes crucial to allow them to explore their inquisitiveness in a rapid and safe learning environment that also meets their adolescent need to be intertwined with technology. We will see how the use of simulation labs integrated with target-based, game-based and project-based science instruction serves as an effective platform for visual modeling of natural phenomena through an eco-friendly, safe and engaging learning environment.

Blue Ridge

**Retention in a STEM Scholars Program**

HS-COL General

Deirdre Gonsalves-Jackson, Virginia Wesleyan University

Initial high levels of interest, followed by high attrition, and subsequent low enrollment in the STEM disciplines are documented challenges. This is especially problematic for low income students, women and minorities. To address low numbers of STEM majors, VWU developed a scholarship/mentoring program for undergrads with funding from the NSF S-STEM Program. This study presents results and profiles of students in the program to share insight on successful strategies for retention in STEM.

Roanoke AB

**STEM Starts with Science and Ends with LIFE**

HS-COL Biology/Life Science

Kristin Scheible, Massaponax HS (Spotsylvania Co. Schools)

The aim of the workshop is to share the story of the LIFE Project designed for use in my Advanced and AP courses. LIFE stands for Literacy, Inquiry, Freedom and Enrichment. Through this year-long project students investigate a current real world problem of their choosing and ultimately defend a solution to that problem visually, in writing, and through oral presentations. The goal is to encourage other science teachers to consider facilitating LIFE Projects with their students.

Pocahontas AB

**State of the Earth: Educating for Adaptation**

ALL GRADES Environmental Science, General

Michael Bentley, University of Tennessee-retired

Scientists warn that civilization may collapse if Earth's mean global temperature rises above the Paris goal of 1.5C, with catastrophic species losses and millions of climate refugees. How do educators prepare students? Living in this future will require "deep adaptation." Implications for science educators will be considered and resources shared.

Bent Mtn.

ALL GRADES Any Laboratory Science

**CER: For Critical Thinking, Communication and Collaboration**

Kathryn Brock, J.R. Tucker High School

The Claim, Evidence, Reasoning (CER) framework can increase critical thinking, communication and collaboration in science class. CER works well at all levels of instruction and of classes. It is easily tailored to the depth that you need and can prompt your students to think and analyze quickly. This session will provide practical examples and resources to get you ready to use this framework to increase student engagement and the quality of scientific explanations your students are developing.

Shenandoah B

**Game Making : Light Faster Than Light! => The "BIG" Why!**

ALL GRADES Environmental Science

Jim Disbrow, Retired

This Game Making precedes computer variations - leveling classes and engaging all participants - this is not gaming - it is game-making. We'll make games no one's ever heard of, e.g., Imagine teams challenged to identify a picture of light going faster than the speed of light: 3 minutes. Imagine teams doing predator-prey analyses, based on dice rolls, involving actions/events across time, around six tightly entangled strategic goods - by ecosystem & species: 3 minutes history => future.

Madison

**Planet Interiors: the Mars InSight Mission and Model Cakes**

ALL GRADES Earth/Space Science

Scott King, Virginia Tech Geosciences; Llyn Sharp, Museum of Geosciences, Virginia Tech

Come learn the latest about planetary interiors from a member of the Mars InSight mission team! (The mission that landed on Mars last November.) In addition to showing the latest results from Mars, this presentation will discuss using models to understand the inner working of planets. We will make our own model of a planet's interior. Out of cake! This naturally introduces the concepts of using models, measuring, and chemical reactions (changing the batter by baking). Recipes included.

Harrison/Tyler

**Scaffolding Problem Solving as a Gateway to Science**

ALL GRADES General

Hannah Mawyer, Henrico High School

Struggling learners are often unwilling to participate and take risks for fear of failure. It is difficult to teach these students to fully partake in the scientific method if they struggle with problem solving. In this session we will practice non-science based problem solving activities that scaffold the communication, collaboration, critical thinking, and character building skills needed for the successful science classroom.

Monroe

**Integrating 3D Printing into Science Instruction**ALL GRADES Biology/Life Science, Physics/  
Physical Science

Ellen Peterson, Smithfield Middle School

Learn how to incorporate 3D design and printing into regular science instruction. A brief overview of various 3D design software will be presented followed by project ideas and examples of using 3D printing to increase and strengthen science instruction and learning.

Brush Mtn.

**Using Geocaching to Teach Math and Science Concepts**ALL GRADES Math in Science, Any science  
subject

Anna Swenty, Lylburn Downing Middle School

Geocaching is a real-world, outdoor treasure hunting game using GPS enabled devices. Participants navigate to a specific set of GPS coordinates and then attempt to find the geocache hidden at that location. Learn how YOU can use geocaching to incorporate fun AND learning into your science lessons!

**Future VAST PDIs**

2020 DoubleTree Hotel, Williamsburg, Nov. 14 - 16, 2020

2021 Hotel Madison and Shenandoah Valley Conference Center, Harrisonburg (JMU), Nov. 17 - 20

2022 DoubleTree Hotel, Williamsburg, Nov. 11 - 13, 2022

Mill Mtn.

**Increasing Interest and Excitement with Edpuzzle!**

ALL GRADES General

Elizabeth Tyree, Northside High School (Roanoke Co. Schools); Teresa Justice, Nelson Co. High School

Have you ever been excited about an interesting science video but are met with blank stares and sleepy eyes? Have you ever been frustrated with trying to assess student comprehension during videos? Learn and explore how to use the free resource of Edpuzzle! This platform allows you to embed questions and comments into videos that students can watch at their own pace and can also be used for digital project-based learning. Laptops or cellphones encouraged but not required.

**Session 10, 2:05 pm - 2:55 pm****Exceptional Education and Hands on Learning for All**

ELEM General, Active/Hands on Science K-5

Nicole Nielsen, Henrico Co. Public Schools

This presentation will have examples of hands-on activities with lesson plans for specific science SOLs for grades K-5. This presentation is designed to help engage students with disabilities in science lessons. It should help educators incorporate more hands-on /active learning in their science practice. This will not only benefit your special education students but your typically developing students as well.

Wilson

**Shadow Art: How Light Interacts with Different Materials**

ELEM Physics/Physical Science

Cathy Whitesell, Rockbridge Co. Public Schools; Stephanie Tuttle, Rockbridge Co. Public Schools; Joe Hawes, Rockbridge Co. Public Schools

How do we create shadows? In this session, you will create shadow art using an assortment of crafting materials and junk! You will use your knowledge of light, opacity, transparency, translucency and reflection to create works of art that look nothing like their shadows. Using photographs of the shadows cast, see if you can match the photograph with the art.

Monroe

**Flipped Classroom Model--How to Make it Work**

ELEM-MS General

Melonie Yielding, Ellis Elementary School (PWCS); Heather Meek, Ellis Elementary School (PWCS)

In the flipped classroom model, students begin learning the material before teacher instruction is provided. Student achievement increases because student engagement increases. Despite its benefits, the flipped classroom model can seem impossible to implement if students do not have computers at home. This session will provide strategies to incorporate elements of the flipped classroom model into your science instruction. Bring your own device.

Crystal AB

**Technology and Collaboration in Math/Science Projects**

MS-HS Engineering, Math in Science

Michelle Douglass, Central Virginia Governor's School; Jeff Steele, Central Virginia Governor's School

Calculus students in teams used a 3D design software to create a 3-dimensional shape. Using calculus, the students estimated the volume of their design. Then the students 3D printed their shapes and measured the volume through a water displacement testing and compared their estimated to actual volume. While this was occurring, another class in Japan did a similar project and school teams interacted through Google Drive to get to know each other and share their designs and results.

Shenandoah B

**Describing What You See: Develop Vocabulary with Rocks**

MS-HS Earth/Space Science

David Matchen, Madison Co. High School

Rocks and minerals provide teachers with an opportunity to develop the observation and descriptive skills of students, while allowing them to develop a deeper scientific vocabulary. This session will explore methods of incorporating observation, inquiry, and critical thinking to a unit on earth materials. Session participants will model a hands-on activity using rocks and minerals to form their own descriptive classifications.

Buck Mtn. AB

**From Newbie to Pro: Evolution of "Hybrid" Biology Notebooks**

MS-HS-CO Biology/Life Science

Ashley Burke, Gate City High School (Scott Co.); Donna Rowlett, Gate City High School (Scott Co.)

A twist on interactive notebooks: These "hybrid" notebooks offer a valuable resource for review and study while providing an all in one location for notes. The design provides short bursts of knowledge followed by modeling of the topic which makes students pause, interact, and process the information. This technique allows access to different learning styles, ability to make connections between ideas, and allows an outlet for creativity. Free sample lesson plan.

Shenandoah A

**Real Science: Science Teachers in Research Labs**

MS-HS-COL Biology/Life Science

Elizabeth Edmondson, Virginia Commonwealth University; Katharine Goins, Chesterfield Co. Public Schools; Andrea Bryant, Richmond City Public Schools

The National Institute of Health funded project Health Education Research Opportunities for Teachers (HERO-T) offers secondary science teachers an amazing opportunity to be mentored and work with a VCU research scientist for two consecutive summers. Three Region I teachers, from the summers of 2018 & 2019, will share their experience working at VCU.

Crystal C

**Stepping out of the Bubble – RET Water E3G Experience at VT**

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

Katie Holcomb, Roanoke City Schools; Shaunna Young, Roanoke City Schools; Rachelle Rasco, Carroll County Public Schools; Catherine Twyman, Virginia Tech

High school and college instructors participated in a Research Experience for Teachers where they developed and implemented lessons based on their experiences with water quality research at Virginia Tech. The presenters will share their experiences and resources that inspired them to step out of their bubble, and the innovative activities implemented in their classrooms.

Crystal D

**Chemistry Templates for Interactive Notebooks**

HS-COL Chemistry

Jennifer Sharp-Knott, Floyd Co. High School

Chemistry is an advanced science offered in high school, and most published resources for Interactive Notebooks are geared toward lower level sciences and/or younger students. In this presentation, teachers will be given the templates for more advanced topics included in Chemistry I, such as: Nomenclature, Organic Chemistry Nomenclature, Colligative Properties, Gas Laws, Acid/Base Models, Macromolecules, Radiation Types, and more.

Crystal E

**Using Drones in the Science Classroom**

ALL GRADES Engineering, Math in Science

Tammy Bartlett, Dinwiddie Middle School

This presentation will highlight ways to integrate drone technology into the science classroom. Fly through some simple obstacle courses and see how the activity can be connected to math, science and computer science. Work together to create dynamic, cross curricular lessons students will love.

Appalachian

**Halifax Co. Herpetology and Marine Biology Center**

ALL GRADES Biology/Life Science, Chemistry

Nelson Baskervill, Halifax Co. Middle School

Highlight how student ambassadors from the middle school lead classes through the center, focusing specifically on their teacher's learning goal. This allows students to see, touch, and feel their way through science, make real-world connections, and truly interact with what they are learning to gain a deeper understanding, thus increasing test scores county wide.

**Engaging Science Through Culturally Responsive Teaching**

ALL GRADES General

Sharday Ewel, Kippon Middle School

In this session, participants will learn how to leverage the skills of interpersonal and intrapersonal awareness, learning partnerships, and community building in order to create an engaging, rigorous science classroom. Participants will walk away with strategies that can be used immediately in the classroom.

Bent Mtn.

**Physics Fights: A Rigorous Oral Exam for 9th Grade Science**

ALL GRADES Physics, but Works for \*All\*

Greg Jacobs, Woodberry Forest School; Alex Tisch, Woodberry Forest School

In lieu of a final exam, 9th grade conceptual physics classes participate in a tournament of "physics fights." During the 3-week preparation period, participants produce experimental evidence to answer college-level problems. AP students serve as mentors to help the conceptual students prepare. Each fight consists of a 1-2 minute presentation, followed by 5 minutes of questioning by an external jury - think of a miniature thesis defense. This approach is not physics- or high school- specific.

Blue Ridge

**National Geographic Educator Certification: Phase I**

ALL GRADES Overview, Process, &amp; Phase 1

LoriAnn Pawlik, PWCS, National Geographic Education

Interested in becoming a National Geographic Certified Educator with access to PD resources, Explorers, and opportunities? Come learn about it and leave with Phase 1 completed during this session! Caution: This will re-energize your teaching!

Tinker Mtn.

**Digital Classroom-Interactive Notes, Lab Notebooks, &More!**

ALL GRADES General

Michelle Plunkett, Riverside High School

Welcome to the digital age of teaching! If you are struggling to get started with interactive notebooks that are completely digital, having students submit lab notebooks digitally, including coding into your lab experiments, or just setting up a digital classroom then please stop by! Resources will be shared to all who come/ask.

Pocahontas AB

**Innovating Across the Curriculum**

ALL GRADES General

Donia Spott, Powhatan Middle School

A hands-on look into the first year of a new middle school STEM program, this session will briefly review the successes and challenges faced so far. From 6th grade history to 7th grade English to self-contained math, we have been able to design and implement activities that enhance and enrich all content areas. Most of the session time will be used for participants to explore examples of the activities and projects that students have worked on this year.

Mill Mtn.

**Getting Quizzzy with Quizizz!**

ALL GRADES General

Elizabeth Tyree, Northside High School (Roanoke Co. Schools); Teresa Justice; Nelson Co. High School

Do you like Kahoot, but can't get every student engaged in the chaos? Have you ever been frustrated with the finality of assessments and want to give instant feedback to every student? The free online resource Quizizz provides a platform to test student mastery, but also gives immediate feedback and allows retakes until students have reached that mastery. Teachers can make self-grading electronic worksheets that can be completed individually in class, as homework, or even as a class-wide game!

**Stay Until the End!!!**

*The giveaways at the end of each presentation of concurrent session 10 are provided by Vernier, Five Ponds Press and Mike Gil.*