

VIRGINIA ASSOCIATION OF SCIENCE TEACHERS
2023 PROFESSIONAL DEVELOPMENT INSTITUTE
CONCURRENT SESSION PRESENTATIONS
Friday Morning

Session 1: Friday 8:30 AM - 9:20 AM, Crystal Ballroom A (Ballroom Level), Grade: ELEM, Content: General Science

1. Bringing Science to Life

Meryl Butler, Henrico County Public Schools

Rebecca Fischer, Laburnum Elementary School

This session will focus on hands-on learning experiences to support vocabulary development and conceptual understanding of science topics. Learn how to structure your lessons to allow students an opportunity to explore a topic before the science phenomena are explained while leveraging vocabulary development strategies to maximize student success. Participants will leave with a bank of ideas for making science engaging and accessible for all students.

Session 1: Friday 8:30 AM - 9:20 AM, Crystal Ballroom B (Ballroom Level), Grade: HS, Content: Physics/Physical Science

2. Physics for All

George T Dewey, Fairfax County Public Schools, retired

Robert C. Smith, Chantilly High School, Fairfax County Public Schools

For too long high school physics has had the reputation of being a course for only the top science and math (male) student. Join us to learn how a physics teacher and a special education teacher combined strategies to implement teamed and self-contained courses for a wide spectrum of students with special needs, including ELL's. We will emphasize hands-on-minds-on activities in a dialogue among participants, modeling highlights of our lab-oriented district program, Active Physics.

Session 1: Friday 8:30 AM - 9:20 AM, Crystal Ballroom C (Ballroom Level), Grade: ELEM-MS, Content: STEM

3. Integrating Coding Skills with Screen-free STEM Activities

Pam Caffery, hand2mind

Research indicates that coding enhances computational and complex problem-solving skills in our students. We also know that screen-free coding activities build a solid bedrock of foundational skills. In this session, we'll engage in a rich discussion on the benefits of integrating screen-free coding activities in science lessons. We'll take you through several screen-free coding stations (K-8) so you can experience as your students would. Commercial Exhibitor

Session 1: Friday 8:30 AM - 9:20 AM, Crystal Ballroom D (Ballroom Level), Grade: ALL GRADES, Content: Biology/Life Science

4. March Mammal Madness: if You're Learning, You're Winning!

Linda Correll, Fauquier County Public Schools

From marsupials and monotremes to mustelids and mammoths (with a few non-mammals sprinkled in for fun), March Mammal Madness is an entertaining and educational annual science event you can share with students, colleagues, or your whole school community!

Session 1: Friday 8:30 AM - 9:20 AM, Crystal Ballroom E (Ballroom Level), Grade: HS-COL, Content: Chemistry, Instructional Practices

5. A Catalyst for Independent Learners in a Science Classroom

Mithra Marcus, Rock Ridge High School

Heather Cox, Rock Ridge High School

Participants will engage in a learning experience about the journey that a High School Chemistry teacher began to engage, personalize and build independence in her AP Chemistry students, giving them the tools they need to excel. Participants will then have time to collaborate with other teachers and begin rethinking their instruction to catalyze student ownership.

Session 1: Friday 8:30 AM - 9:20 AM, Buck Mtn. (Ballroom Level), Grade: ELEM, Content: Elementary Science

6. Collaborative Elementary Curriculum Design

Tammy Stone, Rockingham County Public Schools

Carrie Lillard, Mountain View Elementary School

Allison Gidari, Elkton Elementary School

Miranda Lyle, John Wayland Elementary School

Rockingham elementary teachers collaborated to create 2018 aligned curriculum. We will share the collaborative process to develop innovative teaching materials. Learn from our experiences as we discuss the challenges we faced and the solutions we implemented along the way. We will also showcase some of the teaching materials and resources we have developed, providing you with inspiration and practical ideas.

Session 1: Friday 8:30 AM - 9:20 AM, Mill Mtn. (Ballroom Level), Grade: MS-HS-COL, Content: Chemistry, Engineering, STEM

7. Transdisciplinary Learning through Artifact Conservation

Rachel White, Landstown High School STEM Academy VBCPS

Megan Wong, Landstown High School STEM Academy VBCPS

Laura Newsham, Landstown High School STEM Academy VBCPS

A transdisciplinary learning approach of World History, Chemistry and Engineering through the intersection of conservation science, specifically frescoes from the Italian Renaissance, will be explored. Through a partnership with VCU, the curriculum was designed to enhance student knowledge about the application of STEM. Participants will get exposed to some of the curriculum and the experiential learning activities. Ideas on how to implement transdisciplinary learning will be discussed.

Session 1: Friday 8:30 AM - 9:20 AM, Bent Mtn. (Ballroom Level), Grade: HS-COL, Content: Climate Change Social Impacts

8. Exploring Climate Change Solutions in the Classroom

Anna Caputo, CBNERR

Teaching about climate change can be tough. This session will highlight one part of a new resource of climate change lesson plans that can help make teaching a little easier. Our high school geared lesson is focused on climate solutions and designed to get students thinking about a hopeful climate future. In this session we will go over the lesson plan and give a tutorial on how to use the En-ROADs climate change solution simulator in your classroom.

Session 1: Friday 8:30 AM - 9:20 AM, Tinker Mtn. (Ballroom Level), Grade: MS-HS, Content: Biology/Life Science

9. Getting Real to Get Better: Rebuilding Rigor and Rapport

Kristin Scheible, Massaponax High School

Participants will explore best practices for rebuilding positive student behaviors and academics. Subtopics will include building rapport, moving beyond traditional grading, engaging curiosity, raising the bar, balancing technology and embracing restorative practices.

Session 1: Friday 8:30 AM - 9:20 AM, Brush Mtn. Ballroom Level), Grade: ALL GRADES, Content: Pre-service and early career

10. Building the Future of Science Education

Robbie Higdon, VAST Colleges and Universities Chair

Elizabeth Edmondson, Virginia Commonwealth University

VAST needs YOU to support and mentor pre-service and early-career teachers! In this session, we will explore ways to serve as cheerleaders, instructional collaborators, and/or sounding boards for these science educators. How can we leverage our lived experiences to help these educators prepare for and make sense of what occurs in their classrooms? How can we help them better identify and manage the mental and physical stressors that can impact their ability/interest to teach science effectively?

Session 1: Friday 8:30 AM - 9:20 AM, Washington Lecture Hall (Conference Level), Grade: ALL GRADES, Content: Earth/Space Science, Environmental Science, Physics/Physical Science

11. Repairing the Climate System's Yellow Brick Road

John White, U.S. Gov't - Meteorologist

Laurie Ashworth, Pittsylvania County Schools

Yellow Brick Road? "Pay no attention to that man behind the curtain!" A bright young adventurer, Dorothy applies some critical thinking and logical lessons from her YBR journey to develop alternative explanations for the "Emerald City." Does our current metaphorical journey have multiple science-based explanations in addition to those of the "Wizard's"? Join the discussion -- should we be considering improvements for the YBR?

Session 1: Friday 8:30 AM - 9:20 AM, Wilson (Conference Level), Grade: MS-HS, Content: Biology/Life Science, STEM

12. Engaging Strategies for Teaching Forensic Science

Kaitlyn Ray, Charlottesville High School

Forensic Science is a multidisciplinary course that brings together knowledge from all areas of STEM. It involves students engaging in real-world, hands-on learning experiences. Yet, it is often only offered as an elective. Learn how to offer forensic science as a science course in your district with VDOE approval to reward students with science credits. The main take away will be ideas for labs, activities, and experiences you can offer. It is going to be a great time. Do not miss out.

Session 1: Friday 8:30 AM - 9:20 AM, Monroe (Conference Level), Grade: MS-HS-COL, Content: Biology/Life Science, Environmental Science

13. How Student-Driven Inquiry Can Address Climate Justice

Sandra Marr, Collegiate School

With this hands-on inquiry, we will use microscopes to find stomatal density and discuss how real-world science investigations can inform climate justice work. Now more than ever, science teachers need to mentor students as they navigate online science news and show them how reputable science research can be a catalyst for disrupting disproportionate environmental impacts. We will use our stomatal density data to discuss urban heat islands in Richmond, VA.

Session 1: Friday 8:30 AM - 9:20 AM, Harrison-Tyler (Conference Level), Grade: ELEM-MS, Content: Authentic learning

14. More Than Hands On

Karen Perry, Roanoke County Schools

Science demonstrations and hands on learning are fun, fantastic approaches to exploring the world. It is possible to take those experiences in a different direction and make learning authentic. This presenter will focus on what kinds of activities and lessons make learning "authentic" especially in the science classroom. There are resources available that can make these activities affordable if not free.

Session 1: Friday 8:30 AM - 9:20 AM, Madison (Conference Level), Grade: ALL GRADES, Content: General, STEM

15. AI-Driven Mock Classroom Science Fair

Demetrice Smith-Mutegi, Old Dominion University

Tamu Crisden, Old Dominion University

In this presentation, we will share our experiences as participants in the GM-ISTE Artificial Intelligence professional learning series. We will also share how AI tools can be used to support students as they work to develop a novel science fair project.

Session 1: Friday 8:30 AM - 9:20 AM, Jefferson Board Room (Conference Level), Grade: MS-HS-COL, Content: Adaptive STEM

16. Re-envisioning Science for Students with Visual Impairment

Dylan Boeckmann, The Virginia School for the Deaf and the Blind
Kerry Cresawn, James Madison University

Participants will engage in discussion and lab practices used in an outreach partnership for visually-impaired secondary students. This program aims to present scientific research as an obtainable career that does not always rely on vision. We will describe a successful partnership model between teacher, O&M specialist, and university scientists for developing authentic labs that contribute to current areas of research for which the data analysis protocols are auditory or tactile.

Session 2: Friday 9:35 AM - 10:25 AM, Crystal Ballroom A (Ballroom Level), Grade: ELEM, Content: Assessment/Performance Tasks

17. Performance Tasks for Elementary Science

Kimberly Rice, Five Ponds Press

How can science teachers lead from the classroom? With engaging performance tasks of course! In this session, teachers will learn how to engage students with creative and innovative performance tasks. Several examples will be shown that include "real world" challenges for the elementary science classroom. Participants will learn how to use and create a performance task that combines standards based content with 21st century skills. Commercial Exhibitor

Session 2: Friday 9:35 AM - 10:25 AM, Crystal Ballroom B (Ballroom Level), Grade: MS-HS, Content: Physics/Physical Science, STEM

18. Are you Moody?

Michelle Grooms, Texas Instruments Inc

Are You Moody - We will bring science and coding together as participants learn to do some basic coding (no experience necessary) while developing a mood ring! The science of color mixing is explored while determining the right body temperature thresholds. Is fuchsia flirty? Should green be groovy? It's up to you!
Commercial Exhibitor

Session 2: Friday 9:35 AM - 10:25 AM, Crystal Ballroom C (Ballroom Level), Grade: ELEM-MS, Content: Math in Science, General, STEM

19. Phenomenal Hands-On Kits Session

Pam Caffery, hand2mind

Come explore how everyday phenomena can be leveraged to engage students in meaningful scientific investigations, collect authentic data, and develop appropriate scientific models and explanations. Participants will investigate a wide range of everyday phenomena while gleaning turnkey strategies for a successful 5E learning experience. Commercial Exhibitor Commercial Exhibitor

Session 2: Friday 9:35 AM - 10:25 AM, Crystal Ballroom D (Ballroom Level), Grade: HS-COL, Content: Biology/Life Science

20. Unraveling Chromosomes Through Modeling

Alice Scheele, 3D Molecular Designs

Mitosis, meiosis, chromosome structure, and crossing over will be explored in this hands-on modeling event, Bring your student hat and be ready to engage. Commercial Exhibitor

Session 2: Friday 9:35 AM - 10:25 AM, Crystal Ballroom E (Ballroom Level), Grade: ALL GRADES, Content: Chemistry, Physics/Physical Science, General

21. Forms of Energy & Energy Transformations Interactive Lessons

Kimberly Swan, National Energy Education Development Project

Learn about forms of energy and their transformations by experimenting through six stations -potential and kinetic energy, endothermic and exothermic processes, radiant energy, thermal and motion energy, chemical energy, and electrical energy. Experiments are easily differentiated at the elementary, intermediate, and secondary level. Teachers can bring these lessons right back to their classrooms and confidently teach energy forms & transformations! Not-for-Profit Exhibitor

Session 2: Friday 9:35 AM - 10:25 AM, Buck Mtn. (Ballroom Level), Grade: ELEM-MS, Content: Biology/Life Science, Environmental Science

22. Building Critical Thinkers that are Prepared for the Future

Leslie Lausten, School Specialty - FOSS

In today's world, students need to have the skills to critically analyze information and build arguments from evidence. Join us to learn strategies for ensuring College and Career Readiness for your science students. Commercial Exhibitor

Session 2: Friday 9:35 AM - 10:25 AM, Mill Mtn. (Ballroom Level), Grade: HS, Content: Earth/Space Science, Environmental Science

23. A Report on Teaching Dual-Enrollment Geology in High School

David Matchen, VAST Earth Science Content Chair

During the Spring 2023 semester at Madison County High School, the DE Geology class was taught for the first time. This session will describe the class and offer suggestions for starting your own Geology class. It will also discuss reasons why you should start your own high school geology class using the VDOE guidelines that are in development.

Session 2: Friday 9:35 AM - 10:25 AM, Bent Mtn. (Ballroom Level), Grade: MS, Content: Biology/Life Science, STEM

24. Empowering Science Ed: Integrating CS for Engaging Learning

Valerie Fawley, CodeVA

Natalie Rice, CodeVA

The challenge many K-12 educators experience with the addition of the computer science state standards centers around the need to integrate content. Participants will explore fully integrated middle school science lessons, discover best practices for integration, and walk away with a variety of integration tools, skills, and resources. We will cover a broad range of ways to engage students in CS content from unplugged lessons to building computer models for scientific investigations. Not-for-Profit Exhibitor

Session 2: Friday 9:35 AM - 10:25 AM, Tinker Mtn. (Ballroom Level), Grade: ALL GRADES, Content:

Psychology/Behavioral Genetics

25. The Genetics of Education

Bryan Rhodes, Reynolds Community College

Previously scientist viewed humans as pieces of clay. The discovery of DNA began to change this assumption. But how do you determine whether genetics or the environment has a greater influence on educational outcomes? The twin method has become a potent tool for teasing apart these effects. These data show that ~60% of differences in educational achievement is due to genetics alone. Therefore, genetics matters more than everything else combined in determining differences in educational outcomes.

Session 2: Friday 9:35 AM - 10:25 AM, Brush Mtn. Ballroom Level), Grade: MS-HS, Content: Biology/Life Science, STEM

26. Real Science: Science Teachers in Research Labs

Elizabeth Edmondson, Virginia Commonwealth University

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 teachers, from summer 2023, will share their experience working at VCU. Come learn about their exciting summer and how you can bring authentic science into your classroom that motivates your students with rigorous hands-on activities.

Session 2: Friday 9:35 AM - 10:25 AM, Washington Lecture Hall (Conference Level), Grade: ALL GRADES, Content: Environmental Science, Engineering, STEM

27. Using Solar Energy to Power Learning

Remy Pangle, Center for the Advancement of Sustainable Energy at JMU

Meghan Milo, Sun Tribe Solar

Solar energy education can engage students of any age in STEM experiences and is a gateway for preparing students for some of the nation's fastest-growing careers. In this session, we will survey instructional resources that inspire students to explore energy careers and actively participate in their energy future. Participants will have an opportunity to build hands-on solar projects. Not-for-Profit Exhibitor

Session 2: Friday 9:35 AM - 10:25 AM, Wilson (Conference Level), Grade: ALL GRADES, Content: Biology/Life Science, Chemistry, STEM

28. Laparoscopic Surgery Simulation in Your Classroom

Cindy Watson, Bedford County Public Schools/Forest Middle School

Improve the exposure and understanding of K-12 students on health, medicine and technology from a holistic perspective by developing an experiential learning module on laparoscopic surgery training that touches upon the science of medicine, motor-control, learning and expertise, human performance and data analytics.

Learn how the medical device works and how you can build one yourself

Session 2: Friday 9:35 AM - 10:25 AM, Monroe (Conference Level), Grade: ELEM-MS, Content: Engineering, STEM

29. Debunking Myths about Engineering

Jennifer Maeng, University of Virginia

Amanda Gonczi, Michigan Technological University

What is engineering and what is it not? In this session, we will use hands-on activities and a conceptual change approach to investigate common misconceptions about the field of engineering and work engineers do and to explore the breadth of the field of engineering. The model activities can be used with elementary and middle school students to broaden their thinking about what engineering encompasses.

Session 2: Friday 9:35 AM - 10:25 AM, Harrison-Tyler (Conference Level), Grade: ALL GRADES, Content: STEM

30. Building a STEM Learning Ecosystem in Central Virginia

John Fife, Virginia Commonwealth University

A STEM Learning Ecosystem is a complex system of actively connected and collaborating organizations and individuals working to develop STEM education and career opportunities in their communities. Central Virginia's commitment to STEM – demonstrated via leadership from education, workforce development, business and industry, non-profits, philanthropy and others – makes it an ideal home for STEM ecosystems to proliferate and prosper. We will discuss the construction of this ecosystem.

Session 2: Friday 9:35 AM - 10:25 AM, Madison (Conference Level), Grade: ALL GRADES, Content: General

31. Methods for Fostering Dialogue in the Science Classroom

Ben Campbell, Longwood University

Erich Sneller, Harrisonburg High School

In this session we'll work on the challenges of getting students to productively participate in discussions of science concepts. Participants will become familiar with several methods of initiating a discussion. We'll also work with a selection of tools and techniques that teachers can use in the classroom to help students provide their own input, evaluate and respond to the contributions of others, and support their own claims and conclusions.

Session 2: Friday 9:35 AM - 10:25 AM, Jefferson Board Room (Conference Level), Grade: ALL GRADES, Content: Everyone/Every subject

32. The Shallow End of the Teacher Leader Pool

Heather Overkamp, Portsmouth Public Schools

Dara Brinkman, Portsmouth Public Schools

Want to do more for your students by leading from the classroom, but aren't sure where to start? Join our session to learn about teacher programs, resources, and ways that you can level up your teacher game without adding more work to your list!