1952 VAST 2022

VAST's Vision: Excellence in Science Education Through Innovation

ISSN 1945-7405
VAST.Org
Check the web for news, conference updates, registration, and forms.

The Science Educator

Fall 2022 | A Publication of the Virginia Association of Science Teachers | Vol. 71, No.2

Celebrating 70 Years of Fostering Excellence in Science Education

You Do NOT Want to Miss the 2022 PDI!

Come to the PDI this year since you will not need a substitute if your school division is celebrating Veterans Day. Ask your division leaders to look at their tuition reimbursement, Title II and other funds to help defray costs.

"A Passport to Travel" exhibitor reception sponsored by the Virginia Department of Aviation will held on Thursday, November 10, 7:30 - 9:00 pm. Grab a passport and get on board with the Virginia Department of Aviation to begin your expedition. Take a picture with the ICON A5, There will be both food and networking and adventures to explore.

"A PDI Expedition" sponsored by WorldStrides and the VAST Regional Directors continues your travels Friday, November 11, 8:30 - 10:00 pm will be held in the Auditorium on the first floor.
Explore eight amazing locations through interactive activities with DJ, food, limited drink tickets, and door prizes!

COMMONWEALTH of VIRGINIA
DEPARTMENT OF EDUCATION

Anne M Petersen, Ph.D., Science Coordinator
Myra Thayer and Gregory MacDougall, Science Specialists
Office of STEM and Innovation

2022 Virginia Association of Science Teachers Professional Development Institute

The Virginia Association of Science Teachers (VAST) and the Virginia Department of Education are pleased to announce the 2022 VAST Professional Development Institute (PDI), "Reconnecting to Virginia's Space, Place, and Contributions to Science", to be held November 10-12, 2022, at Double Tree by Hilton in Williamsburg, Virginia. The VAST PDI is a forum for science educators and administrators to network with fellow science teachers, gain new instructional strategies and lesson ideas, enhance science content knowledge, and experience cutting-edge technology. This year's VAST PDI will offer over 200 concurrent sessions intended to support the *Virginia Science Standards of Learning* as well as Virginia Department of Education initiatives. In addition, presentations will be conducted by nationally recognized keynote speakers.

The Donna Sterling Institute, held in conjunction with the VAST PDI, is an additional opportunity for teachers and leaders to engage with targeted, in-depth professional learning. This year's Donna Sterling Institute is "Using Problem-based Learning in Finding Smart Solutions in Energy and Climate Science". This all day learning opportunity will be held at the same site as VAST on November 10, 2022.

VAST, a professional association with over 2000 members, advocates for high-quality science instruction for all students. The VAST PDI is designed to provide sessions for educators and administrators in all science content areas and at all grade levels. The PDI also provides an avenue for communication among all members of the science teaching community.

We encourage science educators and administrators to take the opportunity to include VAST PDI as part of their professional development plan. The VAST PDI provides educators an engaging opportunity to earn relicensure points while learning strategies to be used in the classroom.

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

From the Executive Director

AFFORDABLE Professional Development Opportunities


Susan Booth

Have you ever looked at the VAST Mission to:

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

What better place to see the VAST mission in action than at the VAST PDI in November. See the skill set that you have to offer, be a catalyst and ignite the organization as an ambassador.

While there, network and find other amazing people who do incredible work everyday and who care deeply about their work and their journey. Just think, you get to meet people you might never cross paths with and that they are there in the flesh. They are rock stars and heroes in their own right just like you. Take time and tell us your story of why you joined and why you continue to remain a member. Importantly what needs are we not fulfilling so we have time to still make the difference.

People = Power and You are the Foundation of VAST.

You have devoted without hesitation your time and energy to something that really matters to you. Working every day spreading your enthusiasm around and repairing the world. THANK YOU!

Susan Booth, Ed.S., VAST, Executive Director
Fellow, Virginia Academy of Science

Did you know this is the 70th Anniversary of VAST?

1952-2022

Do you have a lanyard from another VAST PDI? Bring it with you and show us your vintage SWAG! Snap a photo during the PDI and post in the WHOVA app for a special prize and shout-out!

Table of Contents

President's Page:

October Message

Dear Expedition Team,

It's October and you know what that means–our Professional Development Institute is SO CLOSE! I've been thinking a lot lately about what it is going to be like to see you all in person and here are the things I am most looking forward to:

Donna Sterling Institute: On Thursday, just before the PDI begins, you can learn how to implement PBL units centered around climate and energy that integrate state standards. A night at the hotel is included as well as breakfast and lunch in this registration fee.

Thursday afternoon workshops: Between the Donna Sterling Institute and PDI kickoff, there are three afternoon workshops available for elementary, middle, and high school teachers, hosted by three of our PDI sponsors.

Elementary: Building Science and Math Lesson Integration with STEM Challenges
Middle: Balloon Aerodynamics Challenge
High: Introduction to Small Unmanned Aircraft Systems (sUAS, or Drones)

Field Experiences: this year we welcome back field experiences allowing for practical application of scientific skills. Join an archaeological dig, water sampling exploration, investigate conservation science of museum curation, paddle through the watershed, and even join a wetlands exploration. Sign up for one or all of them! Learn more about each experience on the website

Exhibitors: We have AMAZING organizations and companies coming to support YOU and your students. There will be a reception Thursday AND Friday night filled with giveaways, food, and fun.

Giveaways: What would a professional development institute be without giveaways? From books, to drones, to free registrations for next year's conference, you will not want to miss these at exhibitor booths, general sessions, and concurrent sessions.

ICON a5 aircraft: Virginia Aviation is bringing an aircraft, you read that right! You won't want to miss this spectacular exhibit, especially Thursday during the reception! Sweet treats will be waiting near the aircraft just for you!

Speakers: All four of our Keynote Speakers are tied to Virginia. That's right, another reason they totally rock.

Thursday 6:00pm, **"Science is Everywhere, Science is for Everyone", Dr. Jeanette Davis AKA Dr. Ocean**

Friday 10:40am, **"The Science of Making Science Accessible: DNA and Community Building", Dr. Raquel Fleskes**

Friday 7:00pm, **"The Power of Possibility", Dr. Carolyn Williams**

Saturday 12:30pm, **"Hey Dude! Where's My Flying Car?", Dr. Bruce Holmes**

Laughs, high fives, and hands on learning: Probably the best part of being back together is going to be sharing laughs, sanitized high fives and hands on learning from and with one another! With over 100 sessions taking place by and for educators across the nation, there is so much to learn!

I could not be more excited to take part in all of these opportunities, especially with YOU there by my side! I hope your school year has begun well and that I will see you very soon in Williamsburg.

Your Expedition Leader,

Becky Schnekser
VAST President 2022

Election: 2023 Board of Directors

The biographies of the VAST Board of Directors nominations are listed below. Since we will all be voting by "absentee ballot," your ballot must be cast by **November 2, 2022**. To cast your ballot, you will need your VAST Member ID number. All members will be sent an email that provides your membership ID number and well as a link to the virtual ballot. You can also find your VAST Member ID once you log in at www.vast.org and click on edit profile,your number is on the first line.

Slate of Nominees

President Elect: LoriAnn Pawlik
LoriAnn has been on the VAST Board first as PAEMST representative and then as Technology Chair followed by her current position as Region 4 Director. LoriAnn also is a member of the Donna Sterling Institute Team. She is a phenomenal teacher with superb leadership skills.

Secretary: Janet Lundin
Janet has served as Middle School Chair on the VAST Board of Directors for 8 years. She has also read numerous VJAS Environmental Student papers and been an Exploravision Regional Judge. Since she has recently moved to Williamsburg this would be an easy transition. Her attention to detail will be an asset in this position.

Region II Director: Heather Overkamp
Recently appointed to serve in this role this summer, Heather is in her 21st year of teaching and has been involved with VAST for years as a presenter and in other capacities in addition to heavy involvement in the STEM community in Virginia. She has been successful in writing grants and has been a part of other organizations that support teachers. Heather would be able to easily share various resources for teachers in region 2 and at the VAST PDI. She is currently a DOD STEM Ambassador and as a result, a part of the newly formed STEM ecosystem for the Southside. Through this Ambassador program, she has made a lot of contacts with opportunities for teachers and students.

Region IV Director: No Nomination

Region VI Director: Tom Fitzpatrick and Angelo Bonilla

Tom is a Past President of VAST and has served several terms as District VI Director. We are fortunate to have him as a VAST Board Member. He represents VAST at the Virginia Math & Science Coalition. Tom has served as a middle school science teacher and as both a science and a science and mathematics supervisor. He has presented at many VAST Professional Development Institutes and is a trainer for Project WET, WILD, Growing Up WILD, and Project Learning Tree. In the past he served as a Certified Trainer for the JASON Project.

Angelo has been a member if VAST for a number of years and have presented at the VAST PDI for the last five years or so. He has taught physical science and earth science for Roanoke City Public Schools for 15 years. He has also taught STEM and rocketry for our summer programs. Currently, he serves as the science department chair for his school.

Region VIII Director: Dr. Ben Campbell
Dr. Campbell has been a member of VAST since joining the faculty of Longwood University and moving to Virginia in the fall of 2016. Previously, he has served as the Treasurer of the Central Arizona Chapter of the Society for Conservation Biology (2005-2007) and has been Director or Co-Director of Region VIII since first being appointed to this position in August 2017. In addition to VAST, he is a member of the National Association for Research in Science Teaching, the Association for Science Teacher Education, the National Science Teachers Association, and the National Association of Biology Teachers. Professionally, Dr. Campbell is completing his sixth year as an assistant professor of science education at Longwood University. Housed in the Department of Biological and Environmental Sciences, he teaches both biology content and science education courses. He is also currently the coordinator of Longwood's secondary science education program.

PDI Sponsors

Platinum

Gold

Silver

Bronze

Technology Support for Session Recordings

PDI Exhibitors

American College of Education

Associated Microscope, Inc.

Bio-Rad Explorers

BIOZONE Corporation

Carolina Biological Supply Co

Center at JMU for the Advancement of Sustainable Energy

Chesapeake Bay National Estuarine Research Reserve in VA

Christopher Newport University

CodeVA

EVERFI

ExploreLearning

Five Ponds Press

Friends of Mineralogy of Virginia

George Mason University

hand2mind

James River Association

Jefferson Lab Science

Legends of Learning

Microscope Solutions, Inc.

NASA Langley Research Center

National Institute of Aerospace/ NASA eClips

Nauticus/Battleship Wisconsin

NEED

NOVA SySTEMic

Old Dominion University

Pivot Interactives

Portsmouth Museums/Children's Museum of Virginia

Savvas Learning Company

School Specialty/Delta Education/FOSS

Science Museum of Virginia

Science Research for All, Inc.

STEMscopes by Accelerated Learning

Texas Instruments

Toshiba/NSTA ExploraVision

United Poultry Concerns

Vernier Science Education

Vims/VA Sea Grant Extension

Virginia Association of Environmental Education

Virginia Association of Science Teachers

Virginia Department of Aviation

Virginia Department of Forestry

Virginia Department of Wildlife Resources

Virginia Junior Academy of Science

Virginia Living Museum

Virginia Lottery

Virginia Space Grant Consortium

Virginia Tech - College of Natural Resources and Environment

Virginia Tech, College of Science

Virginia Transportation Construction Alliance

Ward's Science/Sargent Welch

WHRO Public Media

WorldStrides

2022 PDI SCHEDULE AT A GLANCE

(draft as of July 3,2022)

Wednesday November 9, 2022

7:00 PM – 8:30 PM VAST Board of Directors Meeting

……

Thursday November 10, 2022

Ticketed Donna Sterling Institute (separate registration from the PDI)
Title: ***Using Problem-Based Learning in Finding Smart Solutions in Energy and Climate Science***

7:30 AM Continental Breakfast and Check in

8:00 AM – 3:00 PM Sterling Institute Presentations and Lunch

……

2:30 PM – 6:00 PM **VAST PDI Registration Desk Open**

3:15 PM – 5:00 PM **Pre-Conference Ticketed Workshops**

Elementary: (Room10, second floor)
Speakers: Angie Meredith and Pam Caffery
Title: ***Building Science and Math Lesson Integration with STEM Challenges***
Sponsor: Hand2Mind

Middle School: (Room11, second floor)
Speakers: Sharon Bowers, Joan Harper-Neely, Betsy McAllister
Title: ***Balloon Aerodynamics Challenge***
Sponsors: NASA eClips Education Team, National Institute of Aerospace Center for Integrative STEM Education

High School: (Room15, second floor)
Speakers: Chris Carter, Scott Bellows, Julie Young
Title: ***Introduction to Small Unmanned Aircraft Systems*** ***(sUAS or Drones)***
Sponsor: Virginia Space Grant Consortium

3:15 PM – 5:30 PM **Pre-Conference Ticketed Experiences** (transportation sponsored by the College of William and Mary School of Education)
#1: ***William and Mary Field Experience***
#2: ***Conservation Laboratory at the Colonial Williamsburg Art Museum***

6:00 PM – 7:15 PM **Welcome to the PDI, General Session I**
Speaker: **Dr. Jeanette Davis** AKA Dr. Ocean
Title: ***Science is Everywhere, Science is for Everyone: The Art of Storytelling***
Sponsored by Hand2Mind (door prize giveaway)

7:30 PM – 9:00 PM **Night with the Exhibitors**
VA Department of Aviation presents "A Passport to Travel" - Join us for pictures with ICON A5, exhibits and food.

……

Friday November 11, 2022

7:15 AM – 5:00 PM **Registration Desk Open**

7:30 AM Continental Breakfast in the Exhibit Hall

7:30 AM – 10:30 AM Exhibit Hall Open

8:00 AM – Noon Ticketed Field Experience #3: ***Archaeology and Education at Fairfield Plantation***
(transportation sponsored by the College of William and Mary School of Education)

8:30 AM – 9:20 AM Concurrent Session 1 Breakout Presentations

9:35 AM – 10:25 AM Concurrent Session 2 Breakout Presentations

Continued next page.

Friday November 11, 2022 - continued.

10:40 AM - Noon	**General Session II and Business Meeting** Speaker: Dr. Raquel Fleskes, Genetic Anthropologist, University of Connecticut Title: ***The Science of Making Science Accessible: DNA and Community Building*** (door prize giveaway)
Noon – 1:00 PM	Ticketed Buffet Lunch
12:30 PM – 6:00 PM	**Exhibit Hall Open**
1:00 PM – 5:00 PM	Ticketed Field Experience #4: ***York River State Park Exploration of Wetlands and Global Climate Change Indicators*** (Transportation sponsored by College of William and Mary School of Education, departs outside at the Ballroom Promenade entrance)
1:10 PM – 2:00 PM	Concurrent Session 3 Breakout Presentations
2:15 PM – 3:05 PM	Concurrent Session 4 Breakout Presentations
3:20 PM – 4:10 PM	Concurrent Session 5 Breakout Presentations
4:25 PM – 5:15 PM	Concurrent Session 6 Breakout Presentations
6:15 PM – 7:00 PM	Ticketed Dinner (cash bar) (Auditorium, first floor)
7:00 PM – 8:15 PM	**Awards Ceremony** (Auditorium, first floor) ***Speaker: Dr. Carolyn Williams, Senior Education Advisor*** Title: ***"The Power of Possibility"*** Sponsored by: YELLOW
8:30 PM – 10:00 PM	**WorldStrides and VAST Regions** present ***"A PDI Expedition"*** (Auditorium, first floor) Join us for a fun social evening and explore eight amazing locations through interactive activities. Dancing, DJ, food, limited drink tickets included, and some great prizes are up for grabs.

Saturday November 12, 2022

7:30 AM – 10:30 AM	**Registration Desk Open**
7:30 AM	Continental Breakfast in the Exhibit Hall
7:30 AM- 12:15 PM	**Exhibit Hall Open**
8:30 AM-9:20 AM	Concurrent Session 7 Breakout Presentations
9:35 AM – 10:25 AM	Concurrent Session 8 Breakout Presentations
10:40 AM – 11:30 AM	Concurrent Session 9 Breakout Presentations
11:30 AM – 12:15 PM	Last Chance to Visit the Exhibit Hall (Exhibitor Door Prizes, Complimentary Cider and Snacks) (no other events scheduled, all exhibitors open till 12:15 pm)
12:15 PM – 12:30 PM	Pickup Ticketed Box Lunch to eat during General Session III
12:30 PM – 1:45 PM	**General Session III, Meet Your VAST Officers** Speaker: Dr. Bruce Holmes, NASA Title: ***Hey Dude! Where's My Flying Car !?*** Sponsored by: VA Department of Aviation (Extra-Special Door Prizes Giveaway)
2:00 PM – 4:00 PM	Ticketed Field Experience #5: ***The Chesapeake Bay Foundation's Virginia Watershed Environmental Education Program*** (attendees provide their own transportation)

Games and Networking at the VAST PDI!

A Chance to Win a FREE 2023 PDI Registration

Have you registered for the 2022 VAST PDI? It is not too late to come and join the fun. We will be face to face in Williamsburg, November 10-12, 2022! We will also be using the WHOVA app, which will allow you to begin networking with other attendees, presenters and sponsors before, during and even after the PDI! There will be three contests within the app which will give you the chance to win a free registration to next year's PDI!

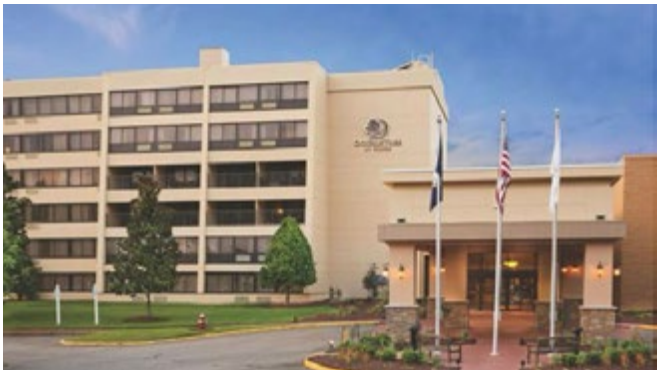
Photo Contest: Upload photos to the WHOVA app during the VAST PDI. Choose shots that epitomize the theme of the PDI: "Reconnecting to Virginia's Space, Place, and Contributions to Science". Be sure to caption your photo! If your photo is chosen as most representative of the theme, you will win a free registration to next year's PDI! (Registration only. Meals and lodging not included.)

Leaderboard Contest: Earn points based on your participation in the community board on the WHOVA app. At the end of the PDI, the attendee with the most points will win a free registration to next year's PDI! (Registration only. Meals and lodging not included.)

Passport Contest: Visit exhibitor's booths and get them to scan the QR code on your name badge. This gives the exhibitor your name and email address, and gives you a stamp on your passport! Collect at least 25 stamps on your passport to be entered into our raffle! One lucky winner will receive a free registration to next year's PDI! (Registration only. Meals and lodging are not included.)

2022 VAST Professional Development Institute

"Reconnecting to Virginia's Space, Place and Contributions to Science"
November 10-12, 2022



Double Tree by Hilton, Williamsburg
50 Kingsmill Road, Williamsburg, VA 23185
phone: 757-220-2500

Complete information about the 2022 VAST hotel can be found on the Annual PDI page. Click on Hotel Information, Prices, Online Reservation Form, WiFi, Menus, and Parking.

The link to access the 2022 VAST PDI Double Tree reservation page is active.

Hotel Room rate: $101.00 + 12% tax + $2.00 occupancy fee per night = $115.12 (The GSA per diem government rate may go up or down in August from this estimation.) Check for updates on the VAST website.

To register for hotel: All reservations need to be booked before October 8, 2022 (based on availability). Hotel Reservation link.

Be sure to check the VAST website for updates and over-flow hotels if they are needed. Meal Menus for the PDI, the hotel floor plan, WiFi and parking information are available on the website.

Go to the VAST Annual PDI page for up-to-date information.

Links to more about the VAST PDI 2022

Donna Sterling Institute Information (separate registration from the PDI) Link, **page 12**

Sterling Institute Registration Here

2022 Online Registration & Fees for the In-Person PDI attendees, presenters, exhibitors Link

Ticketed Thursday Afternoon Workshops Link **page 14**

Ticketed Field Experiences Link **page 13**

2022 PDI Schedule at a Glance (draft) Link **pages 7 & 8**

2022 PDI General Session Speakers **See pages 11-12 of this newsletter.**

General Session Speakers bios Link

General Session I, Thursday 6:00 pm, ***"Science is Everywhere, Science is for Everyone"***, Dr. Jeanette Davis AKA Dr. Ocean

General Session II, Friday 10:40 am, ***"The Science of Making Science Accessible: DNA and Community Building"***, Dr. Raquel Fleskes, University of Connecticut

General Session III, Saturday 12:30 pm, ***"Hey Dude! Where's My Flying Car?"***, Dr. Bruce Holmes, NASA

2022 PDI Concurrent Session Presentations List Link **pages 16-24**

2022 PDI Sponsors Link **page 5**

2022 PDI Exhibitor Link **page 6**

2022 DoubleTree by Hilton-Williamsburg Information and Room Reservation Link

2022 PDI Sponsorship Opportunities Link

2022 PDI Exhibitor and Vendor Information, Prices, Advertising and Form Link

Additional information may be found in : Link

Summer 2022 VAST Newsletter with PDI information

October 2022 VAST Newsletter with PDI Information

2022 post-PDI Survey and Certificate of Attendance (open after the PDI)

Contacts

Susan Booth, Executive Director, executive.director@vast.org

John Kowalski, PDI Chairman, pdi@vast.org

PDI Registration

Attendee-Presenter: $155 - Deadline for presenters to register at this special price is 9/23/22.

Exhibitor-Presenters register as Exhibitors

Attendees:

$170 Earlybird Deadline 9/30/22

$205 Regular Registration After 9/30/22

$99 Full Time Student Earlybird Deadline 9/30/22

$130 Full Time Student After 9/30/22

$100 Saturday Only

VAST PDI 2022 Speakers

Meet the four exciting general session speakers for the upcoming, in person, Professional Development Institute. We are so pleased to introduce them. Plan to attend and to be inspired by them.

Dr. Jeanette Davis AKA Dr. Ocean
https://www.drjeanettedavis.com
General Session I, Thursday, 6:00 pm
Science is Everywhere, Science is for Everyone: The Art of Storytelling

Dr. Raquel Fleskes
https://www.raquelfleskes.com/
General Session II, Friday, 10:30 am
The Science of Making Science Accessible: DNA and Community Building

Dr. Carolyn Williams
https://coastalvirginiamag.com/article/the-first-mom-of-music/
Awards Ceremony, Friday 7:00 pm
The Power of Possibility

Dr. Bruce J. Holmes
https://www.linkedin.com/in/brucejholmes/
General Session III, Sat. 12:30 pm
Hey Dude! Where's My Flying Car!?

Journal of Virginia Science Education Announces New Co-Editors

We are excited to announce that Dr. Angela Webb, Associate Professor in the Department of Middle, Secondary, and Mathematics Education and Dr. Joi Merritt, Associate Professor of Early, Elementary, and Reading Education, both at James Madison University will be serving VAST as co-editors of the Journal of Virginia Science Education beginning in January 2023. They will be taking over for Dr. Amanda Gonczi and Dr. Jennifer Maeng, who have served
as co-editors of JVSE for the past 3 years. JVSE is a peer-reviewed journal that publishes twice annually and accepts lesson activities, research articles, and sharing solutions. If you are interested in authoring a manuscript or serving as a reviewer, please see the Journal web page for more details. https://vast.wildapricot.org/Journal

Donna Sterling Institute

Using Problem-based Learning in Finding Smart Solutions in Energy and Climate Science

November 10, 2022 8 am - 3 pm

Double Tree by Hilton-Williamsburg, VA

We are pleased to announce the 2022 Donna Sterling Institute with **Don Haas** as the featured speaker and in conjunction with **NEED Energy**.

Participants will:

1. Use a PBL approach to learn about climate and energy.
2. Engage in National Energy Education Development (NEED) activities to support under standing of climate and alternative energy.
3. Learn and apply the key components of a PBL unit to meet Virginia Standards and the needs of your students.

Registration includes a hotel room for Wednesday night, breakfast and lunch, plus seven hours of recertification points.

Donna Sterling Institute Registration: $75

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

https://vast.wildapricot.org/event-4766879

Registration Ends October 31, 2022

Donna Sterling's vision of problem-based learning (PBL) as a means of teaching and integrating science with math, engineering, technology, and language arts is timeless. She was committed to meeting the diverse needs of our students through culturally responsive and equitable practices. Her legacy lives on in the Sterling Institute which supports teachers in developing and enacting PBL units in their instruction through a 7-hour professional development experience.

Here is your chance to learn how to implement this powerful teaching strategy!

Instructors: Robin Curtis, Dr. Elizabeth Edmondson, Emily Hawbaker, Suzanne Kirk, Dr. Jennifer Maeng, Dr. Anne Mannarino, Dr. Juanita Jo Matkins, Dr. Jackie McDonnough, LoriAnn Pawlik, and Dr. Eric Pyle Retiring President NSTA.

Virginia Association of Science Teachers
2022 Professional Development Institute
"Reconnecting to Virginia's Space, Place, and Contributions to Science"

TICKETED FIELD EXPERIENCES
NOVEMBER 10 - 12

Preregistration is required, cost is $10.00 per field experience (nonrefundable). The deadline to register for a field experience is October 31. Register for a field experience when you register online for the PDI.
https://vast.wildapricot.org/2022pdi

Thursday PM Field Experiences (3:15pm – 5:00pm)

FT #1: William and Mary field experience
Join faculty from William and Mary on campus for field-based investigation of a water site. Paddling, specimen collection, and analysis covering geological history and chemistry concepts. **William and Mary Faculty**

FT #2: Conservation Laboratory at the Colonial Williamsburg Art Museum
Tour the Conservation, Paint Analysis, Paper Conservation Lab, and Textile Labs, learning what behind the scenes work happens to create engaging museum exhibits. What science concepts are involved in art museum curation? Come find out! **Colonial Williamsburg Art Museum Staff**

Friday AM Field Experience (8:00am – 12 noon)

FT #3: Archaeology and Education at Fairfield Plantation
Join the Fairfield Foundation for a hands-on archaeological experience at Fairfield Plantation. Tour the c. 1694 manor house ruins, learn about the organization's educational programming both at the site and in the classroom, and get your hands dirty digging side-by-side with Fairfield archaeologists. All equipment and instruction will be provided. Participants should wear close-toed shoes and clothes they don't mind getting dirty.
Dr. David Brown, Thane Harpole, and Anna Rhodes, Fairfield Foundation

Friday PM Field Experience (1:00pm – 5:00pm)

FT #4: York River State Park exploration of wetlands and global climate change indicators
A species rich series of wetland types occurs along a salinity gradient at York River State Park. Participants will contrast wetland types, core wetland trees, discuss evidence of sea-level rise and be invited to participate in a year-long Hands-On research collaboration with researchers at Christopher Newport University.
Facilitator: Dr. Rob Atkinson, Christopher Newport University

Saturday PM field Experience (2:00pm – 4:00pm)

FT #5: The Chesapeake Bay Foundation's Virginia Watershed Environmental Education Program
While paddling freshwater, non-tidal rivers and streams, students and educators examine the relationship between human activities and water quality in the Chesapeake Bay watershed. Hands-on activities encourage sensitivity and knowledge of local ecosystems, giving relevance and greater understanding to classroom curricula. Our program staff provides opportunities for careful observations, data collection, analysis, and synthesis of information gathered during the field study experience. They encourage participants to explore the complexity of the watershed, and to see themselves as part of the solution. Come experience a mini field experience. **This field experience occurs after the close of the PDI, participants will provide their own transportation.**
Cindy Duncan, Chesapeake Bay Foundation

THURSDAY AFTERNOON PRECONFERENCE WORKSHOPS

NOVEMBER 10, 3:15 PM - 5:00 PM

Preregistration is required, cost is $5.00 per workshop (nonrefundable).
The deadline to register for a workshop is October 31.
Register for a workshop when you register online for the PDI.
Register for only one workshop since all three meet simultaneously.
https://vast.wildapricot.org/2022pdi

Elementary School Workshop

Building Science and Math Lesson Integration with STEM Challenges

This session will dive into a model STEM lesson where science and math concepts are equal partners in understanding a phenomenon or solving a problem. Participants will be engaging in constructing a model, testing their model, and collecting data. Next, we'll look at the need to present this data in a way to promote explanation which moves the participants into a math mini-lesson on data and measurement.

Presenters: Angie Meredith and Pam Caffery, Hand2Mind

Middle School Workshop

Balloon Aerodynamics Challenge

The NASA eClips Team will introduce and model the Balloon Aerodynamics Challenge that places students in the role of scientists and engineers as they design, measure, build, test and redesign a neutrally buoyant helium balloon system. Through this problem-based approach, the participants will explore foundational concepts of force, motion and Newton's Laws. Team building skills of collaboration, creativity and critical thinking will set the stage for this design-based experience.

Presenters: NASA eClips Education Team, National Institute of Aerospace Center for Integrative STEM Education
Dr. Sharon Bowers, Senior STEM Educator, Joan Harper-Neely, STEM Education Specialist,
Betsy McAllister, Hampton City School Educator in Residence

High School Workshop

Introduction to Small Unmanned Aircraft Systems (sUAS, or Drones)

The Virginia Space Grant Consortium coordinates several programs that train teachers on how to integrate geospatial technology and small unmanned aircraft systems (sUAS) into the classroom. This workshop will give teachers an introduction to sUAS, the new VDOE course, and the FAA Part 107 Remote Pilot Certificate. The target audience is high school teachers with little knowledge of sUAS. Teachers will be introduced to various applications of sUAS and perform some safe hands-on drone flying.

Presenters: Chris Carter, Deputy Director, Virginia Space Grant Consortium
Dr. Scott Bellows, Technical Programs Coordinator, Virginia Space Grant Consortium
Julie Young, Program Head--Mechanical Engineering Technology and Unmanned Systems, Thomas Nelson Community College

Virginia Association of Science Teachers and The Virginia Lottery "Sponsor A Teacher" Online Raffle

VAST is excited to announce the fourth year of the Virginia Lottery's sponsorship, which includes a giveaway for two registrations for the Friday and Saturday VAST PDI this fall. Two teachers will receive lunch on each day, plus a seat at the Awards Dinner on Friday night. The giveaway does not include the preconference workshops.

The winners will be notified by phone or email by **October 30th** and acknowledged in the VAST newsletter, ***The Science Educator.*** At the PDI, the winners are invited to visit the Virginia Lottery booth for a certificate and meet the sponsors.

Watch your email for an VAST enote with a link to enter the contest. You will be asked to enter your name, phone number, and email so VAST can identify the winners.

Best of luck to all, and don't forget – early bird registration ends October 30th!

About Our Sponsor:
Since 1999, the Virginia Lottery has contributed nearly 11 billion dollars to K-12 public schools in the Commonwealth. Learn about local funding at valottery.com/playing_matters.

- Each year, Lottery proceeds represent ~10% of Virginia's education budget.
- 1/3 of Lottery proceeds go directly to Virginia K-12 public schools.
- 2/3 of Lottery proceeds go to specific programs.

PDI SWAP Table

This year there will not be an auction at the PDI. Instead there will be a SWAP table at the VAST booth. It you have items that you would like to donate, drop them off at the SWAP table and take an item if you see something you can use. It important to follow the following rules.

A FEW RULES TO FOLLOW FOR THE SWAP

• First, and foremost is safety – if the item is not safe to use, consider disposing of this item another way. Please don't donate such items. On the other hand, if an item is broken and could be repaired or is useful for parts, tag it as such.

• Second, don't bring chemicals to the SWAP table. There are just too many safety and storage issues, and besides, passing off a problem to someone else just isn't nice!

• Third, you need to make sure that if you are taking a "Swap", you intend to use it in the teaching of science and not selling it at your next yard sale.

• And Fourth, is permission, make sure that any item you donate is yours to donate OR that you have permission to donate the item for our SWAP table.

• Finally, you need to make sure that anything you swap for you can carry away. We don't deliver and we don't store, so if you swapped for it, you're taking it that evening! Do not leave it behind. If you do not want it, give it to someone else.

VIRGINIA ASSOCIATION OF SCIENCE TEACHERS 2022 PROFESSIONAL DEVELOPMENT INSTITUTE CONCURRENT SESSION PRESENTATIONS

Presentation descriptions and an Index of Presenters are on the WHOVA APP and the Annual PDI page at

https://vast.wildapricot.org/2022pdi

There will be last minute cancellations and room changes, so check on the WHOVA APP.

The VAST PDI will again utilize the WHOVA app, where you will be able to create your own personalized session schedule and network with other attendees, presenters and exhibitors before, during and after the PDI. You can even use it to schedule in-person meet-ups with other educators!

Friday

Session 1: Fri. 8:30-9:20 AM, Grade: ALL GRADES, Content: Biology/Life Science, Math in Science, STEM
1. Flattening the Curve of the Zombie Apocalypse
Jeff Lukens, Roosevelt High School, Sioux Falls, SD

Session 1: Fri. 8:30-9:20 AM, Grade: ALL GRADES, Content: General
2. Gotta Talk: Using Discourse in the Science Classroom
Myra Thayer, Virginia Department of Education; Anne Petersen, Virginia Department of Education; Gregory MacDougall, Virginia Department of Education

Session 1: Fri. 8:30-9:20 AM, Grade: ELEM, Content: Engineering, General, STEM
3. Using Machine Learning (AI) in the Elementary Classroom
Liz Lynch, Patrick Henry Elementary School; Karlee Young, Patrick Henry Elementary School; Cameron Cooper, Patrick Henry Elementary School; Ashley Taylor, Patrick Henry Elementary School

Session 1: Fri. 8:30-9:20 AM, Grade: MS-HS, Content: Biology/Life Science
4. Inclusive Teaching of the Bird-Beak Lab
Meredith Kier, College of William & Mary; Secondary Science Preservice Teachers College of William & Mary

Session 1: Fri. 8:30-9:20 AM, Grade: ELEM, Content: General, STEM
5. No TIME for Science!
Lori Pawlik, Prince William County Schools

Session 1: Fri. 8:30-9:20 AM, Grade: ELEM, Content: General
6. Placed-based Lesson Plans for Elementary Science: Framework, Praxis and Plans
Kathryn Lanouette, College of William & Mary

Session 1: Fri. 8:30-9:20 AM, Grade: ALL GRADES, Content: Engineering, General, STEM
7. Navigating Barriers & Challenges: K-6 Engineering Education
Jennifer Kidd, Old Dominion University; Kristie Gutierrez, Old Dominion University; Minjung Lee, Old Dominion University

Session 1: Fri. 8:30-9:20 AM, Grade: ELEM-MS, Content: Biology/Life Science
8. Life Science and Cells: No More Boring Worksheets
Erika Hackworth, Woodrow Wilson Middle School

Session 1: Fri. 8:30-9:20 AM
9. No Presentation

Session 1: Fri. 8:30-9:20 AM, Grade: MS-HS, Content: Biology/Life Science, Environmental Science
10. Using Historical and Real Time Data for Authentic Projects
Patrick Scharf, Louisa County Middle School

Session 1: Fri. 8:30-9:20 AM, Grade: HS-COL, Content: General, STEM
11. ESCAPE-Eco, Social, Cultural, Across-Planet Education
Robbie Higdon, James Madison University; Andy Jackson, James Madison University; Seth Shantz, Harrisonburg High School Governor's STEM Academy

Session 1: Fri. 8:30-9:20 AM, Grade: HS-COL, Content: Biology/Life Science, Environmental Science
12. Antibiotic-Resistant Bacteria and Recycled Water.
Amanda Gardner, Virginia High School

Session 1: Fri. 8:30-9:20 AM, Grade: MS, Content: Earth/Space Science
13. Exploring the Earth with Google Earth
Carla Kersten, Goochland Middle School

Session 1: Fri. 8:30-9:20 AM, Grade: MS-HS, Content: General, STEM
14. Science News in the Classroom
Victoria MacEntee, Woodside High School

Session 1: Fri. 8:30-9:20 AM, Grade: ALL GRADES, Content: Env. Sci., Math in Sci., Cross Curricular Environmental Literacy
15. Place-based Learning: Using Waste Audits to Bring Change
Melinda Landry, Prince William County Schools; Jessica Doiron, Prince William County Schools

Session 1: Fri. 8:30-9:20 AM, Grade: MS, Content: Earth/Space Science, Environmental Science, General
16. Incorporating Environmental Justice Into the Classroom
Jennifer Pinney, Rippon Middle School, Sharon Bicey, Rippon Middle School

****

Session 2: Fri. 9:35-10:25 AM, Grade: MS-HS, Content: General, STEM
17. Order Up a Helping of Forensics, With a Side of Maggots!
Jeff Lukens, Roosevelt High School, Sioux Falls, SD

Session 2: Fri. 9:35-10:25 AM, Grade: ALL GRADES, Content: General
18. What Do I Do About Vocabulary?
Myra Thayer, Virginia Department of Education; Anne Petersen, Virginia Department of Education; Gregory MacDougall, Virginia Department of Education

Session 2: Fri. 9:35-10:25 AM, Grade: ALL GRADES, Content: Biology/Life Sci., Environmental Sci., STEM
19. MWEE: Engaging Watershed Activity
Barbara Adcock, Powhatan County Public Schools; Lisa Brown, Powhatan COunty Public Schools

Session 2: Fri. 9:35-10:25 AM, Grade: MS-HS, Content: STEM
20. Integrating Original Research in a Science Curriculum
Pamela Dixon Kuhn, Science Research for All, Inc.

Session 2: Fri. 9:35-10:25 AM, Grade: ELEM, Content: Biology/Life Sci., Physics/Physical Sci., STEM
21. Hands-on Plus! Driving Student-Centered Learning K-5
Cheryl Lindeman, Carolina.com

Session 2: Fri. 9:35-10:25 AM, Grade: ELEM-MS, Content: Physics/Physical Science, General, STEM
22. Five E Model: Ways to Engage the Students in Science
Thomas Fitzpatrick, Roanoke City Public Schools; Angelo Bonilla, Breckinridge Middle School; Leslie Barrett, Breckinridge Middle School

Session 2: Fri. 9:35-10:25 AM, Grade: MS-HS-COL, Content: STEM
23. Real Science: Science teachers in Research Labs
Elizabeth Edmondson, Virginia Commonwealth University

Session 2: Fri. 9:35-10:25 AM, Grade: HS, Content: Physics/Physical Science, Engineering, STEM
24. Quantum Computing for YOUR High School Students!
Andrew Jackson, Harrisonburg City Public Schools; Students in the Program, Harrisonburg High School

Session 2: Fri. 9:35-10:25 AM, Grade: ALL GRADES, Content: Earth/Space Sci., Biology/Life Sci., Environmental Science
25. Explore Earth: Monitoring Microplastic Pollution from Space
Anne Weiss, NASA Langley Office of STEM Engagement

Session 2: Fri. 9:35-10:25 AM, Grade: MS-HS-COL, Content: Biology/Life Science, Oceanography
26. Scallops & A Deep-Sea Killer: Research to K-12 Classroom
Lisa Lawrence, VIMS/VA Sea Grant; Celia Cackowski, VIMS/VA Sea Grant; Bethany Smith, VIMS/VA Sea Grant; Sarah Nuss, VIMS/CBNERR

Session 2: Fri. 9:35-10:25 AM, Grade: ELEM, Content: Computer Science Integration
27. Integrating Computer Science in the K-5 Classroom
Shanan Chappell Moots, Old Dominion University; Melani Loney, Old Dominion University; Keisha Tennessee, Virginia Department of Education; Natalie Rhodes, CodeVA

Session 2: Fri. 9:35-10:25 AM, Grade: MS-HS, Content: Chemistry, Physics/Physical Science
28. Level Up Your Science/STEM Program with Game Based Learning
Kristen Holland, Plasma Games; Emily Frankoff, Plasma Games

Session 2: Fri. 9:35-10:25 AM, Grade: MS-HS, Content: Biology/Life Science, Environmental Science
29. Hatching in Higher Grades
Stephanie Bender, Salem Church Middle School; Patricia Thurston, Salem Church Middle School

Session 2: Fri. 9:35-10:25 AM, Grade: ALL GRADES, Content: STEM
30. Finding Funding for STEM Education
Victoria MacEntee, Woodside High School

Session 2: Fri. 9:35-10:25 AM, Grade: ELEM-MS, Content: STEM
31. TOP Chocolate Bar Design Challenge
Katherine Mangum, St. Catherine's School

Session 2: Fri. 9:35-10:25 AM, Grade: ELEM, Content: General
32. Your Standards, Your Time, Your Students
Kim Dye, School Specialty

****

Fri. noon-1:00 PM, Grade: ALL GRADES, Content: Pre-service Teachers
33. Exclusively for Pre-service Teachers - What YOU Need to Know
Jennifer Maeng, University of Virginia

****

Session 3: Fri. 1:10-2:00 PM, Grade: ALL GRADES, Content: General
34. VDOE Update
Anne Petersen, Virginia Department of Education; Gregory MacDougall, Virginia Department of Education; Myra Thayer, Virginia Department of Education

Session 3: Fri. 1:10-2:00 PM, Grade: MS-HS, Content: Math in Science, General, STEM
35. Infect Your Science Classroom with Math!
Jeff Lukens, Roosevelt High School, Sioux Falls, SD

Session 3: Fri. 1:10-2:00 PM, Grade: ELEM, Content: STEM
36. Coding for the Ages
Pam Caffery, hand2mind

Session 3: Fri. 1:10-2:00 PM, Grade: ALL GRADES, Content: Env Sc through STEM Apply
37. Exploring Renewable Energy Resources Available Throughout VA
Remy Pangle, James Madison University Center for the Advancement of Sustainable Energy; Pam Northam, Non-Profit Educator; Dawit Haile, Virginia State University

Session 3: Fri. 1:10-2:00 PM, Grade: MS, Content: STEM
38. Exploring OpenSciEd from Carolina
Cheryl Lindeman, Carolina.com

Session 3: Fri. 1:10-2:00 PM, Grade: HS, Content: Physics/Physical Science
39. Tabletop Physics Demos and Activities
Seth Berkeley, Harrisonburg High School

Session 3: Fri. 1:10-2:00 PM, Grade: MS-HS-COL, Content: General
40. Grading for Equity: Summative and Standards-Based Assessment
Mollianne George, Fairfax County Public Schools

Session 3: Fri. 1:10-2:00 PM, Grade: HS-COL, Content: Environmental Sci., Engineering, Authentic Student Research
41. HABR - High Altitude Balloon Research
Andrew Jackson, Harrisonburg City Public Schools; Seth Shantz, Harrisonburg City Public Schools; Erich Sneller, Harrisonburg City Public Schools; Students in the Program, Harrisonburg High School

Session 3: Fri. 1:10-2:00 PM, Grade: ALL GRADES, Content: Earth/Space Science, Biology/Life Sci., Chemistry
42. Explore Solar System & Beyond: NASA Astrobiology
Anne Weiss, NASA Langley Office of STEM Engagement

Session 3: Fri. 1:10-2:00 PM, Grade: HS-COL, Content: Biology/Life Sci., Chemistry, Environmental Sci.
43. Probeware for Biology and Chemistry Labs
Paul Reibach, Colonial Forge High School and Commonwealth Governor's School

Session 3: Fri. 1:10-2:00 PM, Grade: MS-HS-COL, Content: General, STEM, Project-based Learning
44. Next Level Learning with Interactive STEM Cases
Jenna Mercury, ExploreLearning

Session 3: Fri. 1:10-2:00 PM, Grade: MS-HS, Content: Earth/Space Science, Biology/Life Sci., Environmental Sci.
45. Engaging Inquiry: Pre-service Teachers Share Tested Lessons
Elizabeth Edmondson, Virginia Commonwealth University

Session 3: Fri. 1:10-2:00 PM, Grade: MS-HS-COL, Content: Biology/Life Sci., Chemistry, Environmental Science
46. Coastal Acidification in the Classroom
Sarah Nuss, Chesapeake Bay National Estuarine Research Reserve - VA; Anna Caputo, Virginia Institute of Marine Science

Session 3: Fri. 1:10-2:00 PM, Grade: ELEM, Content: General, STEM, ELA and Reading Integration
47. Use Literacy & Writing Elements to Enhance Science Lessons
Chelsea Chandler, STEMscopes by Accelerate Learning

Session 3: Fri. 1:10-2:00 PM, Grade: ELEM-MS, Content: Earth/Space Science, STEM
48. NASA Inventions = Living Like Astronauts
Heather Carberry, Edward E Drew Middle School; Rebecca Garrett, Edward E Drew Middle School; Jeremy Utt, T Benton Gayle Middle School

Session 3: Fri. 1:10-2:00 PM, Grade: ELEM-MS, Content: General
49. Better Together: Hands-on Science and Active Literacy
Kim Dye, School Specialty
****

Session 4: Fri. 2:15-3:05 PM, Grade: ALL GRADES, Content: General
50. State Assessments and the 2018 Science Standards of Learning
Anne Petersen, Virginia Department of Education; Tyler Waybright, Virginia Department of Education; Myra Thayer, Virginia Department of Education

Session 4: Fri. 2:15-3:05 PM, Grade: ALL GRADES, Content: General
51. How To Teach Like Peter Pan
Erin Watson, York County Public Schools

Session 4: Fri. 2:15-3:05 PM, Grade: ELEM, Content: STEM
52. Phenomenal Hands-on Kits
Pam Caffery, hand2mind

Session 4: Fri. 2:15-3:05 PM, Grade: ELEM-MS, Content: Biology/Life Science, Math in Science, STEM
53. Level Up Standards-based Content with Game-Based Learning!
Joselyn Whetzel, Legends of Learning; Brooke Fields, Legends of Learning

Session 4: Fri. 2:15-3:05 PM, Grade: MS-HS-COL, Content: Biology/Life Sci., Chemistry, Physics/Physical Science
54. Transforming How You Teach Science
Eric Rhoades, Pivot Interactives

Session 4: Fri. 2:15-3:05 PM, Grade: MS-HS, Content: Physics/Physical Science
55. Physics Ideas Shareathon
Seth Berkeley, Harrisonburg High School

Session 4: Fri. 2:15-3:05 PM, Grade: ALL GRADES, Content: Earth/Space Science, Environmental Science
56. Earth Science of the Southeast: Free Online Interactive Text
Don Haas, The Paleontological Research Institution; Jonathan Hendricks, The Paleontological Research Institution

Session 4: Fri. 2:15-3:05 PM, Grade: ALL GRADES, Content: Chemistry, Physics/Physical Science
57. Ooh's & Aah's of Energy Transformations
Emily Hawbaker, National Energy Education Development Project

Session 4: Fri. 2:15-3:05 PM, Grade: ALL GRADES, Content: Earth/Space Science
58. Earth Science Data Resources for Multilingual Learners
Angela Rizzi, NASA Langley Research Center; Desiray Wilson, NASA Langley Research Center

Session 4: Fri. 2:15-3:05 PM, Grade: HS-COL, Content: Biology/Life Science
59. Real CRISPR Gene Editing and PCR Genotyping!
Tamica Stubbs, Bio-Rad Explorers

Session 4: Fri. 2:15-3:05 PM, Grade: ELEM, Content: General, STEM
60. Now Trending: Science Simulations to Make Things Stick!
Jenna Mercury, ExploreLearning

Session 4: Fri. 2:15-3:05 PM, Grade: ALL GRADES, Content: STEM
61. Choose Your Own Robotics Adventure!
Naomi Hartl, School Specialty LLC/Frey Scientific

Session 4: Fri. 2:15-3:05 PM, Grade: ALL GRADES, Content: Environmental Science, Math in Science, STEM
62. Providing Equitable Access to STEM Skills and STEM Careers
Erin Dlott, EVERFI; Teagan Seeley, EVERFI

Session 4: Fri. 2:15-3:05 PM, Grade: ELEM-MS, Content: Engineering, STEM
63. Engaging Student Engineers: Designs for Your Sci Classroom
Chelsea Chandler, STEMscopes by Accelerate Learning

Session 4: Fri. 2:15-3:05 PM, Grade: ELEM, Content: Engineering, STEM
64. Reconnecting STEM with Science Standards for Elementary
Kimberly Rice, Five Ponds Press

Session 4: Fri. 2:15-3:05 PM, Grade: ALL GRADES, Content: Earth/Space Science, Environmental Science
65. The Virginia Cave Board: Resources for Teaching Karst!
Russell Kohrs, Virginia Cave Board

****

Session 5: Fri. 3:20-4:10 PM, Grade: HS-COL, Content: Physics/Physical Science
66. Newton's Laws and the Conservation of Momentum
Tatsu Takeuchi, Virginia Tech Department of Physics

Session 5: Fri. 3:20-4:10 PM, Grade: MS, Content: Biology/Life Science
67. Life Science Liveliness
Erin Watson, York County Public Schools; Craig Doolittle, Williamsburg / James City County Public Schools

Session 5: Fri. 3:20-4:10 PM, Grade: ALL GRADES, Content: General
68. Trailblazing Ideas for Re-imagining Education
Cindy Duncan, Independent Consultant

Session 5: Fri. 3:20-4:10 PM, Grade: ELEM, Content: Engineering, STEM
69. Teaching Elementary Engineering Lessons Across Disciplines
Kristie Gutierrez, Old Dominion University; Jennifer Kidd, Old Dominion University; Minjung Lee, Old Dominion University

Session 5: Fri. 3:20-4:10 PM, Grade: ELEM, Content: Computer Science in the Classroom
70. "What the Flow is Going On?" -- All About Flowcharts
Georgette Willis, Park Ridge Elementary School; Debbie Novalski, Park Ridge Elementary School

Session 5: Fri. 3:20-4:10 PM, Grade: ALL GRADES, Content: Physics/Physical Science, STEM
71. ICON A5 Introduction to Flight Program
Betty Wilson, Virginia Department of Aviation

Session 5: Fri. 3:20-4:10 PM, Grade: ALL GRADES, Content: General
72. Get Involved with JVSE! There Is Room for Everyone!
Jennifer Maeng, University of VIrginia

Session 5: Fri. 2:15-3:05 PM, Grade: HS, Content: Environmental Science
73. Hands-on with Climate Science
Emily Hawbaker, National Energy Education Development Project

Session 5: Fri. 3:20-4:10 PM, Grade: HS, Content: Chemistry
74. Clearing the Air: Addressing Misconceptions about Gases
Tyler St. Clair, Longwood University; Benjamin Campbell, Longwood University

Session 5: Fri. 3:20-4:10 PM, Grade: MS-HS, Content: Biology/Life Science, STEM
75. Science in Motion
Michelle Grooms, Texas Instruments

Session 5: Fri. 3:20-4:10 PM, Grade: ALL GRADES, Content: Biology/Life Sci., Environmental Sci., Math in Sci.
76. Using Bird Data to Meet Living Systems & Processes Standards
Bill Williams, Virginia Society of Ornithology, Virginia Junior Academy of Science

Session 5: Fri. 3:20-4:10 PM, Grade: MS-HS, Content: Earth/Space Science
77. Earth Science Capstone Project: An Alternative Assessment
Laura Perrine, Lynnhaven Middle School

Session 5: Fri. 3:20-4:10 PM, Grade: MS, Content: Biology/Life Science
78. Evolution! It's All in the Family!
Christopher Moran, The Teacher Institute for Evolutionary Science

Session 5: Fri. 3:20-4:10 PM, Grade: ELEM, Content: STEM + the ARTS = STEAM
79. STEAM-infused Instruction Gives Agency to All Learners
Susan Bardenhagen, AIAA & SWE Educator Associate

Session 5: Fri. 3:20-4:10 PM, Grade: MS, Content: Engineering, STEM
80. Reconnecting STEM with Science Standards for Middle School
Kimberly Rice, Five Ponds Press

Session 5: Fri. 3:20-4:10 PM, Grade: ALL GRADES, Content: Earth/Space Science
81. Geovirtual Reality Field Experiences
Russell Kohrs, Massanutten Regional Governor's School for Environmental Science and Technology
****

Session 6: Fri. 4:25-5:15 PM, Grade: ALL GRADES, Content: General
82. Thirty Years of Formal Learning: A Personal Journey
Timothy Bill, Harrisonburg High School

Session 6: Fri. 4:25-5:15 PM, Grade: MS-HS, Content: General
83. PAEMST Information Session
Gregory MacDougall, Virginia Department of Education; Anne Petersen, Virginia Department of Education

Session 6: Fri. 4:25-5:15 PM Grade: ALL GRADES, Content: Biology/Life Sci., Environmental Sci., STEM
84. Chesapeake Bay Foundation - Education Programs
Cindy Duncan, Chesapeake Bay Foundation; Kathlean Davis, Chesapeake Bay Foundation

Session 6: Fri. 4:25-5:15 PM
85. No Presentation

Session 6: Fri. 4:25-5:15 PM, Grade: ALL GRADES, Content: General
86. Gimkit: Fun for Them, Information for You
Paul Bielema, Noel C Taylor Learning Academy

Session 6: Fri. 4:25-5:15 PM, Grade: ALL GRADES, Content: Physics/Physical Sci., General, STEM
87. Engaging All Learners Proficiently
Jennifer Saleeba, Ferrum Elementary School; Victoria Taylor, Henry Elementary School

Session 6: Fri. 4:25-5:15 PM, Grade: HS-COL, Content: General, STEM
88. College and University Science Educators Share Session
Jennifer Maeng, University of Virginia; Anne Petersen, Virginia Department of Education; Sarah Nuss, Virginia Institute of Marine Science

Session 6: Fri. 4:25-5:15 PM, Grade: MS-HS, Content: Earth/Space Sci, Biology/Life Sci., Environmental
89. BayQUEST
Paul Sarandria, Manor High School; Cami Field, Churchland High School

Session 6: Fri. 4:25-5:15 PM, Grade: ALL GRADES, Content: Earth/Space Sci., Biology/Life Sci., Environmental
90. Resources for Teaching the Science of Virginia
Brandi Williams, Matoaca Middle School

Session 6: Fri. 4:25-5:15 PM, Grade: ALL GRADES, Content: General
91. A Report on the VAST 2022 Rockin' PD
David Matchen, Madison County High School

Session 6: Fri. 4:25-5:15 PM, Grade: MS-HS, Content: Biology/Life Science, Environmental Science
92. Reconnect-Recover-Reengage: 3 R's of Interactive Notebooks
Donna Rowlett, Gate City High School; Jinx Rasmussen, Virginia High School

Session 6: Fri. 4:25-5:15 PM, Grade: ELEM, Content: Elementary Science, STEM
93. Elementary Science Teachers Meet Up
Laurie Witt, Albert Harris Elementary School

Session 6: Fri. 4:25-5:15 PM, Grade: ALL GRADES, Content: General
94. Science Saves! Spread the Word!
Christopher Moran, ScienceSaves

Session 6: Fri. 4:25-5:15 PM, Grade: HS-COL, Content: Biology/Life Science
95. Phylogenetic Trees and Differential Gene Expression Analysis
Mark Levy, Roanoke Valley Governor's School

Session 6: Fri. 4:25-5:15 PM, Grade: HS-COL, Content: Biology/Life Science, Environmental Sci., STEM
96. STEM Majors in Sustainability, Environment, & Conservation
John Gray Williams, Virginia Tech - College of Natural Resources and Environment

Session 6: Fri. 4:25-5:15 PM
97. No Presentation

Saturday

****

Session 7: Sat. 8:30-9:20 AM, Grade: ALL GRADES, Content: Earth/Space Science, Biology/Life Science, General
98. Say Hello to the New eMediaVA: VA's Free Media Library
Lindsey Horner, WHRO Public Media

Session 7: Sat. 8:30-9:20 AM, Grade: ALL GRADES, Content: Science Education Leadership
99. Growing Out of the Classroom: Becoming a Science Leader
Gregory MacDougall, Virginia Department of Education

Session 7: Sat. 8:30-9:20 AM, Grade: ELEM, Content: General, STEM, Interdisciplinary
100. Sensational Strategies to Integrate CS into Science
Jessa Campbell, Albemarle County Public Schools; Sandy Shaffer, Albemarle County Public Schools; Charli Nolan, Albemarle County Public Schools

Session 7: Sat. 8:30-9:20 AM, Grade: HS-COL, Content: Biology/Life Science, Engineering, STEM
101. Bring Biotechnology to Your Class on a Budget
Heather Overkamp, I.C. Norcom High School

Session 7: Sat. 8:30-9:20 AM, Grade: ALL GRADES, Content: General
102. Classroom Dialogue: The Bedrock of Great Teaching & Learning
Erich Sneller, Harrisonburg City Public Schools

Session 7: Sat. 8:30-9:20 AM, Grade: MS-HS, Content: Physics/Physical Science, STEM
103. Exploring Offshore Wind Energy
Emily Hawbaker, National Energy Education Development Project

Session 7: Sat. 8:30-9:20 AM, Grade: ALL GRADES, Content: General, STEM
104. The Albert Einstein Distinguished Educator Fellowship in DC
Kate Kogge, US Department of Energy

Session 7: Sat. 8:30-9:20 AM, Grade: ELEM-MS, Content: Earth/Space Science, Math in Science, STEM
105. Mission to Mars: Mimicking Perseverance & Ingenuity Activity
Cindy Watson, Forest Middle School; Erika Mabry, Bedford County Schools

Session 7: Sat. 8:30-9:20 AM, Grade: ALL GRADES, Content: STEM
106. NASA Digital Badging Resources for Educators & Students
Anne Weiss, NASA Langley Office of STEM Engagement

Session 7: Sat. 8:30-9:20 AM, Grade: ELEM-MS, Content: Biology/Life Science, STEM
107. Micro:bit Coding and Technology for the Science Classroom
Natasha Schuh-Nuhfer, Northern Virginia Community College; Lisbeth Valladares Hernandez , Northern Virginia Community College

Session 7: Sat. 8:30-9:20 AM, Grade: ALL GRADES, Content: Biology/Life Science, Environmental Sci., General
108. An Introduction to Project WILD
Courtney Hallacher, Virginia Department of Wildlife Resources

Session 7: Sat. 8:30-9:20 AM, Grade: ALL GRADES, Content: Biology/Life Sci., Physics/Physical Sci., General
109. Natural Inquirer: A Free Resource for Science
Anne Bryant, Cedar Lee Middle School

Session 7: Sat. 8:30-9:20 AM, Grade: ELEM, Content: General
110. Every Day is Earth Day with Agriculture in the Classroom
Lynn Black, Virginia Agriculture in the Classroom

Session 7: Sat. 8:30-9:20 AM,
111. No Presentation

Session 7: Sat. 8:30-9:20 AM, Grade: HS, Content: General
112. Using Talk as Tool for Learning in High School Science
Angela Webb, James Madison University

Session 7: Sat. 8:30-9:20 AM, Grade: ELEM-MS, Content: STEM
113. We Can Make It Work! : New Momentum for Science Fairs
Cheryl Lindeman, Central Virginia Regional Science Fair; Elizabeth Schupp, Amherst County Public Schools; Allison Kappler, Bedford County Public Schools; Lani Patrick, Campbell County Public Schools
****

Session 8: Sat. 9:35-10:25 AM, Grade: ELEM-MS-COL, Content: Environmental Science, General, STEM
114. Engaging Students with Science Using Local News and Events
Leigh Bartenstein, WorldStrides

Session 8: Sat. 9:35-10:25 AM, Grade: ELEM, Content: STEM
115. Using Robotics as a Vehicle for STEM
Keisha Tennessee, Virginia Department of Education; Anne Petersen, Virginia Department of Education

Session 8: Sat. 9:35-10:25 AM, Grade: ELEM, Content: STEM
116. Integrate Makerspace for Concept Development
Pam Caffery, hand2mind

Session 8: Sat. 9:35-10:25 AM, Grade: ELEM, Content: Earth/Space Sci., Biology/Life Sci., Environmental
117. Invasive Species Are Taking Over Our Playground!
William McConnell, Virginia Wesleyan University; Melissa Economou, Norfolk Collegiate School; Michelle McNaughton, Norfolk Collegiate School; Lolita Kraft, Norfolk Collegiate School

Session 8: Sat. 9:35-10:25 AM, Grade: MS-HS-COL, Content: Environmental Science, STEM
118. Community Science at the Science Museum of Virginia
Devin Jefferson, Science Museum of Virginia

Session 8: Sat. 9:35-10:25 AM, Grade: MS-HS, Content: Physics/Physical Science, STEM
119. Exploring Solar Energy
Emily Hawbaker, National Energy Education Development Project

Session 8: Sat. 9:35-10:25 AM, Grade: MS-HS, Content: General
120. Building Literacy In Secondary Science
Janine D'Elia, Chesterfield County Public Schools; Emily Stains, Chesterfield County Public Schools

Session 8: Sat. 9:35-10:25 AM, Grade: ALL GRADES, Content: Earth/Space Science
121. "Exploring Fun Mineral Properties and Their Uses"
Darryl Powell, Friends of Mineralogy Virginia Chapter

Session 8: Sat. 9:35-10:25 AM, Grade: ALL GRADES, Content: Biology/Life Science, Environmental Science
122. Macro Mania
Melinda VanDevelder, Virginia Commonwealth University, School of Education; Suzanne Kirk, Virginia Commonwealth University School of Education

Session 8: Sat. 9:35-10:25 AM, Grade: MS, Content: Biology/Life Science, General
123. Strategies for CS Integration in the MS Science Classroom
Natalie Rhodes, CodeVA; Valerie Fawley, CodeVA

Session 8: Sat. 9:35-10:25 AM, Grade: ELEM-MS, Content: Biology/Life Sci, Environmental Sci., General
124. Project Learning Tree: Sensational Trees and Biodiversity Blitz Activity Collections
Cindy Frenzel, Virginia Department of Forestry

Session 8: Sat. 9:35-10:25 AM, Grade: MS, Content: Biology/Life Sci., Physics/Physical Sci., General
125. Making Science Inclusive: Interactive Vocabulary Instruction
Anne Bryant, Cedar Lee Middle School; Michael Kennedy, University of Virginia; Rachel Kunemund, University of Virginia

Session 8: Sat. 9:35-10:25 AM, Grade: ALL GRADES, Content: General
126. Applying the Science of Learning to Assess Science Learning
Demetrice Smith-Mutegi, Old Dominion University

Session 8: Sat. 9:35-10:25 AM, Grade: HS, Content: Earth/Space Science, Environmental Science
127. Using Rock ID to Build Skills in Scientific Inquiry
David Matchen, Madison County High School; Richard Howell, Tabb High School

Session 8: Sat. 9:35-10:25 AM, Grade: ALL GRADES, Content: General
128. Experiencing Science as a Language Learner
Angela Webb, James Madison University; Emily Stewart, James Madison University

Session 8: Sat. 9:35-10:25 AM, Grade: ALL GRADES, Content: Environmental Science, STEM
129. Reach Out Locally, Form Connections, Make Contributions Now
Laurie Witt, Albert Harris Elementary School; Krista Hodges, Dan River Basin Association
****

Session 9: Sat. 10:40-11:30 AM, Grade: ALL GRADES, Content: Biology/Life Sci., Environmental Science, STEM
130. Sands to Drones: Research Translated to K-12 Classrooms
Bethany Smith, Virginia Institute of Marine Science; Sarah Nuss, Virginia Institute of Marine Science; Lisa Lawrence, Virginia Institute of Marine Science; Celia Cackowski, Virginia Institute of Marine Science

Session 9: Sat. 10:40-11:30 AM, Grade: ELEM, Content: General
131. Exploring Science Literacy
Myra Thayer, Virginia Department of Education; Anne Petersen, Virginia Department of Education; Gregory MacDougall, Virginia Department of Education

Session 9: Sat. 8:30-9:20 AM, Grade: ALL GRADES, Content: General, STEM
132. "STAR" Teacher Traits and Turnover in Urban STEM Classrooms
Clair Berube, Virginia Wesleyan University

Session 9: Sat. 10:40-11:30 AM, Grade: MS-HS, Content: Earth/Space Science, Environmental Science
133. Dive in: Linking Ocean Exploration to Your Class
Cassi Weathersbee, Patriot High School

Session 9: Sat. 10:40-11:30 AM, Grade: ELEM, Content: Biology/Life Sci., Environmental Sci., Math in Sci.
134. People, Resources and the Environment – It's Elementary!
Anne Mannarino, Regent University

Session 9: Sat. 10:40-11:30 AM, Grade: ALL GRADES, Content: Earth/Space Science
135. The Backyard Mystery: How to Discover My Geologic History
Chris Kaznosky, Central High School ; Steve Leslie, James Madison University Department of Geology and Environmental Science

Session 9: Sat. 10:40-11:30 AM, Grade: MS-HS, Content: Environmental Science, Math in Science
136. Trash Talk: Engaging ELLs in Science & Math
Lydia Grote, James River High School

Session 9: Sat. 10:40-11:30 AM,
137. No Presentation

Session 9: Sat. 10:40-11:30 AM, Grade: MS-HS, Content: Biology/Life Science, Environmental Science
138. What's Bugging You?
Debbie Mickle, VPM, Virginia's Home For Public Media; Melinda VanDevelder, Virginia Commonwealth University, School of Education

Session 9: Sat. 10:40-11:30 AM, Grade: ALL GRADES, Content: General, STEM
139. Teaching and Learning about Variables in Science
Scott Watson, Liberty University

Session 9: Sat. 10:40-11:30 AM,
140. No Presentation

Session 9: Sat. 10:40-11:30 AM, Grade: ALL GRADES, Content: Environmental Science
141. Environmental Education Connections
Bianca Myrick, Virginia Association for Environmental Education

Session 9: Sat. 10:40-11:30 AM, Grade: MS, Content: General
142. Social Emotional Learning and Classroom Discourse
Martina Dunlap, Norfolk Public Schools; Demetrice Smith-Mutegi, Old Dominion University

Session 9: Sat. 10:40-11:30 AM, Grade: ALL GRADES, Content: General
143. Coffee Chat with the VAST Content Chairs
David Matchen, Madison County High School; Jennifer Sharp, Floyd County High School; Jill Collins, Martinsville City Public Schools; Tony Wayne, Albemarle High School

Session 9: Sat. 10:40-11:30 AM, Grade: ALL GRADES, Content: General, STEM
144. Plant the Moon Challenge
Rudo Kashiri, Virginia Space Grant Consortium; Cindy Watson, Forest Middle School

Session 9: Sat. 10:40-11:30 AM, Grade: ALL GRADES, Content: Environmental Science, STEM
145. Make the Most of Your Space by Creating a Green Schoolyard
Laurie Witt, Albert Harris Elementary School; Krista Hodges, Dan River Basin Association

Online Vaccine Educational Research Study

What is this study about?

Researchers from Georgetown University Medical Center and Hampden-Sydney College are conducting this study to help young people learn more about vaccines-what they are, what they do, and how they can help prevent diseases.

This research study has been approved by the Hampden-Sydney College Institutional Review Board (IRB) and is designed to find out if 10th grade students will learn new information after watching educational videos about vaccines.

Who can participate?

This study is open to any 10th grade student in the Virginia school systems with access to a computer or mobile device with internet capability.

What will you need to do if you decide to participate?

It will take about 80-90 minutes to complete the study.

Participants will be asked to:

- Complete a brief survey with 16 multiple choice questions (10 minutes).
- Watch some educational videos. One group will watch some educational videos about vaccines. The other group will watch educational videos about the biology of cells. This will take about 60 minutes.
- Complete another brief survey with 20-25 multiple choice questions (10-15 minutes) after watching the videos.

One of the student's parents will need to give permission first and then the student will also need to sign a form agreeing to be involved in this study.

What will you get for participating?

All participants will have the opportunity to view the vaccine videos which contain important information about vaccines.

Participants who successfully complete the study will receive a check for $60 for contributing their time to this research.

What if you have any questions?

If you are interested in participating or have any questions, please **contact Dr. Edward Lewin's research team at mwolyniak@hsc.edu or scan the QR code and fill out the consent form.** The team will be in touch shortly after.

These materials are neither sponsored nor endorsed by the Board of Education the Superintendent of Schools, or this school.

VAS Offers a Mentorship for Students

The Virginia Academy of Science is excited to once again offer its mentorship program for K-12 classrooms across Virginia to pair scientists with K-12 classes to perform long-term science projects. Once again, we are looking to recruit both mentors: graduate students, postdoctorials, instructors, scientists, etc. and high school teachers; who would like their students to participate in a virtually-driven long-term research project. We have partnered with the Virginia Junior Academy of Science (www.vjas.org) in this endeavor in the hopes that this project will encourage participation in their 2023 Annual Research Symposium and give students the juried research experience necessary to earn the Virginia Department of Education's new Seal for Excellence in Science and the Environment on their diploma. Mentorships may be in-person, virtual, or hybrid.

We would like to offer middle and high school instructors the opportunity to either do a project of local interest or to participate in a "Citizen Science" type initiative in which their class will work with others across the Commonwealth and maybe the nation in the collection and analysis of data. I am excited for this model since it should allow a greater level of participation with geography and distance not being limiting factors.
Even if you signed up last year, to avoid unwanted emails to those who do not wish to participate this year, I am asking you to sign up using the appropriate link below.

If you are interested in serving as a mentor in this project, please fill out the form found at:
https://secure4.hsc.edu/forms/view.php?id=117158

If you are a high school teacher with an interest in having a mentor work with your class, please fill out the form found at:
https://secure4.hsc.edu/forms/view.php?id=116443

Please do not hesitate to contact me (**mwolyniak@hsc.edu**) with any questions you may have, and please pass this announcement along to any other contacts you think may wish to participate. Thank you for your consideration of this opportunity!

Michael J. Wolyniak, McGavacks Professor of Biology
Director, Office of Undergraduate Research, Hampden-Sydney College

VJAS

SENIOR'S ONLY:
THE VIRGINIA ENVIRONMENTAL ENDOWMENT SCHOLARSHIPS

The Frances and Sydney Lewis Environmental Science Scholarship

This $5,000 college scholarship may be awarded to the 12th-grade student whose project presented at the VJAS Research Symposium evidences the most significant contribution in the field of Environmental Science. The purpose of the award is to stimulate interest in environmental sciences and to enable promising young students to pursue undergraduate studies in a related field. The Virginia Environmental Endowment (VEE) and the VJAS offer this scholarship in tribute to the outstanding and generous services of VEE Directors Emeriti, Frances A. Lewis, and Sydney Lewis.

The Henry W. MacKenzie, Jr. Environmental Scholarship

This $5,000 college scholarship may be awarded to the 12th-grade student whose project presented at the VJAS Research Symposium evidences the most significant contribution in the field of Environmental Science dealing with the James River Basin and the Chesapeake Bay. The purpose of the award is to stimulate interest in environmental sciences and to enable promising young students to pursue undergraduate studies in a related field. The Virginia Environmental Endowment (VEE) and the VJAS offer this scholarship in tribute to the outstanding and generous services of Judge Henry W. MacKenzie, Jr., one of the founding directors of VEE who had a great interest in the James River and the Chesapeake Bay.

These scholarships must be applied for and are decided by a special set of judges. The payment shall only be available to students during their first year of college. Students must provide VJAS with proof of attendance no later than November of their first year in college. No student may win more than one of the scholarships. Students may choose to have payment made directly to the university or to the student. Failure to provide the requisite evidence will result in forfeiture.

See more details at vjas.org

SCIENCE FOR ALL George Dewey

Fractals

"We sometimes think the world's problems are so big, we can do little to help. On our own we cannot end wars or wipe out injustice, but the cumulative impact of thousands of small acts of goodness can be bigger than we imagine."
- Queen Elizabeth II, December 2016

Photo by Thắng Văn: https://www.pexels.com/photo/autumn-leaves-under-the-sun-10998142/

It began as an idea between mother and daughter, then grew into a virtual dialogue in their living room between a Palestinian Israeli, a Jewish Israeli, and a Native American. Conflict resolution was the topic between Mohammad Darawshe, Michal Sella, and Teresa Leger Fernández as moderated by Kinney Zalesne and her teenage daughter, Adina Siff, when they spoke together last December, as reported in *The Christian Science Monitor* in May[1]. With some trepidations as to there being a tense dialogue in an atmosphere of argument and defensiveness, Ms. Zalesne commented, "…all three leaders seemed remarkably determined to listen more than they spoke." Ms. Leger Fernández emphasized the fragility of the work of conflict resolution with the pointed reminder, "Dignity, democracy, mutual respect – these things must be nurtured with fierce sensitivity." Zalesne concluded, "…the hard, holy task of sharing comes down to what a US congresswoman and two foreign social entrepreneurs showed us in our living room: honor yourself, honor the other, and never give up the work." It also affected with a renewed harmony the occasionally contentious relationship between parent and teenager.

Both mother and daughter are Board members of the non-profit Heart of a Nation, which "believes that America, Israel, and Palestine are works in progress, and that with the right combination of goodwill, dissatisfaction, resources, and effort, each society can progress toward greater justice, equality, and compassion. We are Americans, Israelis, and Palestinians building relationships…" The effects of small acts like this living room dialogue, repeated countless times, can be more effective than, and lay the groundwork for, the most sweeping United Nations resolution. Could not the same be said about our classrooms, schools, and national educational policies?

It is difficult for a queen to show acts of goodness which are small, yet only five years after her Christmas message, Queen Elizabeth was at her husband's funeral for all to see: alone, all in black, head down, a poignant symbol of the Covid isolation her subjects had been enduring in their own lone lives. It seems, whether queen, congressperson, or member of a particular nationality or culture, what we do as individuals has an impact upon the whole. Re-phrasing Dwight Eisenhower's famous line, "Whatever America hopes to bring to pass in the world must first come to pass in the heart of America," one might well add, "Whatever progress a person hopes to bring about in our society, must first come to pass in the heart of that person."

Throughout, it seems that patterns of deep introspection and compassion need equally intense perception and *listening*. In the midst of our destabilizing swirl of polarizing patterns of controversy, we as individual teachers might seek a broader perspective, promoting instead of posturing, healing rather than hindering.

The world of Benoit Mandelbrot's fractals provides a model. As the Polish mathematician once put it, "A fractal pattern finds consistency in randomness." He explained in a TED talk, from ferns, to flashes of lightning, to snowflakes, to pulmonary circulation, to the geography of coastlines, that he discovered a way to measure the roughness of objects where each part is like the whole, but smaller; in his words, "The geometry of things which have no geometry. Yet the pattern persists with a different perspective… Bottomless wonders spring from simple rules…repeated without end," a sense of complexity from simplicity. In the language of mathematics: $f_c(z) = z^2 + c$.

One might look at a single two-dimensional sheet of paper crumpled up into a ball where a fractal-like shape fills more three-dimensional space than the paper, though less than a solid sphere of the same size. Its dimension might be D= 2.5, somewhere between D=2 and D=3. Fractal geometry allows something of great size to be packed into a small volume, like a person's lung having D=2.97, explains Michael Rose of the University of Newcastle in Australia.

We might see the branching pattern of a tree as the accumulation of smaller twiglets into the larger patterns of twigs, branches, then limbs. Or, view the overall patterns of sunflower ovules and seeds, or the florets of Romanesco broccoli which show a logarithmic spiral in something of a natural fractal. Nature's own fractal geometry has arisen from the interplay of

"Sunflower Head" by Mullica is licensed under CC by NC-2.0

Fractal patterns in a sunflower

"Romanesco Broccoli" by IsaacMao is licensed under CC BY 2.0.

Fractal swirl in Romanesco Broccoli

genetic code and environment, as an infinitesimal part of the cosmos in which we are embedded. A cosmos where we try to imagine immense swirls of gaseous matter obeying relatively simple laws of attraction and repulsion. And that is only the material universe we recognize, beyond which lie the more mysterious realms of strings, black hole, dark matter, and distorted galaxies.

In our social and interconnected worlds of family, classroom, and nation, examples abound of social complexity arising from individual simplicity, "bottomless wonders arising from simple rules repeated without end." Occasionally, these beautiful patterns are destroyed by violent acts which could have been averted with more careful and caring attention to smaller, individual units of the "fractal geometry" in our social structures.

In July 2022, *New York Times* columnist, David Brooks, wrote an opinion piece in which he searched out reasons why young men are driven to commit murders of innocent people. His research, especially a long article in Esquire[2], showed him the root of the problem was not mental disease, but rather cumulative effects of the indifference of people in position to reach out to young men who are ignored or ostracized. Whether childhood trauma (abuse or bullying), or humiliating experiences in school or at work, perpetrators who were later interviewed focused on agonizing loneliness and the desire to be noticed (in ending their life or others'), "to be known, to be recognized, to be famous… They want someone to tell them, 'You don't have to do this'". One young man told a reporter, "I wanted attention. If someone would have come up to me and said, 'You don't have to do this, you don't have to have this strange strength, we accept you,' I would have broken down and given up." What small deeds, done over time, would have produced a larger pattern of progress! [On a more global level, one can ponder his altered trajectory had Adolph Hitler received compliments and support as a young artist.] It has been said, "The uncommon life is the product of the day lived in an uncommon way." Fractal-like, the overall pattern is the same configuration of like parts seen as a whole, Mandelbrot's consistency in randomness.

After the series of school shootings from Colorado to Florida, including Columbine High School, Sandy Hook Elementary School, Parkland High School, and Robb Elementary School, it comes as gratifying relief to learn about what one person accomplished in June of 2013. With bullets having been fired outside and inside her office in an elementary school in Decatur, Georgia, a receptionist, Antoinette Tuff, listened deeply and took to heart the needs of the young man standing before her with gun and 500 rounds of ammunition. She put in calls to 911 and local TV as the shooter demanded, and with calm firmness, took on a motherly role convincing him he did not have to do this, to put down his AK-47, and lie down on the floor before police came in. No one was injured. Later she said to CNN and others that she had told him truthfully, she had been "hurting just like he was," and that "most important to me then" was that no one in the school, including him, would be killed. A small personal intervention had replaced an impersonal confrontation.

Other examples abound; here are several others:

A 6 June 2022 *Christian Science Monitor* editorial focused on the aftermath of a Ukrainian trial of a Russian sergeant who asked the widow of an unarmed civilian he had killed for forgiveness. Although she could not forgive, their conversation after the trial seemed as though she were speaking with a neighbor who was grasping for reconciliation. As the *Monitor* commented, "Justice that assigns guilt, bestows accountability, and restores social harmony is best served up individual by individual and in local settings for the public to witness." The overall pattern can then display the same geometry as its parts.

In a later article (27 June), the paper reported on a Georgetown University professor's book on housing inequality, "White Space, Black Hood: Opportunity Hoarding and Segregation in the Age of Inequality." The author, Sheryll Cashin, addresses the progress away from explicit racial zoning ordinances in cities like Louisville (Kentucky), Savannah (Georgia), and Newark (New Jersey). Utilizing what she calls an "ethic of love," she cites evidence-based strategies which "cost taxpayers less and produce better outcomes…A society based on separation, fear, and violence is not sustainable." Neither are schools.

Even within her first two years of teaching, Augusta Ridley, a 2019 graduate of Berea College, and a math and science teacher at Jack Jouett Middle School in Charlottesville, guided her eighth graders to present their idea for affordable housing to Albemarle County's Board of Supervisors, to convert unused structures into transitional housing. One result was using a shuttered hotel to house the homeless. She and her students also created a website for people in Charlottesville to share social-justice stories, in addition to her designing a nature education program in order to improve student mental health. Her answer to sceptics who said eighth graders cannot affect their community: "They are very creative and think of things that, as adults, we might think are impossible. But they're not as jaded as we are." Small individual acts can affect the overall geometry of the whole. Impossible, difficult, done.

The tale is told of Mother Teresa, who, on a TACA flight to Mexico City, asked the attendant who brought her a lunch if she could have the dollar amount it cost to give to the poor instead. Somewhat taken aback, the attendant returned after checking with the supervisor to say, yes, they could do that. Word spread throughout the passengers, resulting in none of them

eating their lunches, and the airline had $129 and 129 uneaten meals on hand. Having gained permission to get the money and deliver the meals to the poor, after landing, the tiny Albanian nun was driving a TACA truck off the tarmac to a neighborhood of cardboard shanties. "Impossible," she was told at first, but the geometry of many small pieces created much larger good. She once remarked, "We create poverty because we will not share." The greatest challenge of the day," Dorothy Day once wrote, "is how to bring about a revolution of the heart, a revolution which has to start with each one of us." Or as Britain's late Queen would put it: "…the impact of [many] small acts of goodness can be bigger than we imagine."

In emergencies there is a human instinct to help one's neighbor: floods in Kentucky, fires in California and New Mexico, Pakistanis, Haitians, and Puerto Ricans working to save fellow residents in one way or another. Is there not a similar role for us teachers to welcome the marginalized, to encourage the lonely, to act as small fractal bits of the whole? Otherwise, all the best-intended programs whether in DEI or specific subject matter, become useless. It was Mother Teresa who also said, "There are no great deeds, only small deeds done in great love." As with fractal geometry, the overall pattern comes from the continual repetition of individual parts.

The scientist, doctor, theologian, and musician, Albert Schweitzer, who forsook learned careers in Europe for mission work in Lambaréné, Gabon, in western Africa, put it this way: "Even if it's a little thing, do something for those who have need of help, something for which you get no pay but the privilege of doing it."

George

A VAST Life Member, George Dewey is a former VAST President, former NSTA District VIII Director, Presidential Awardee, and Albert Einstein Distinguished Educator. He taught physics in Fairfax County, NBCT since 1999. He can be reached at: gtdewey3@outlook.com

References:

1. Zalesne, Kinney and Adina Siff. 2022. "'It's fragile work': Conflict resolution for world leaders – and families." *The Christian Science Monitor*, Vol. 114, Issue 25.

2. Junod, Tom. 2022. "Why Mass Shootings Keep Happening." *Esquire*, 1 October 2014.

FIELD TRIPS
ARE BACK!

Nothing is better than the sights and sounds of young minds discovering the awesome science all around them!
From dissections to engineering challenges, there is something for curious minds of all ages at the Science Museum of Virginia.
If you're looking for a scientific adventure, but are unable to visit us in-person, we also offer a wide variety of Digital Demos.

Learn more at smv.org/groups

Science Museum of Virginia

2022 VAST Contact Information

President
Becky Schnekser
Expeditionschnekser@gmail.com

President-Elect
Stephanie Harry
president.elect@vast.org

Past-President
Russ Kohrs
kohrsrh@gmail.com

Vice President
Michael Pratte
vice.president@vast.org

Secretary
Robin Curtis
secretary@vast.org

Treasurer
Matt Scott
treasurer@vast.org

PDI Committee Chair
Dr. John Kowalski
pdi@vast.org

Editor, *The Science Educator*
Jean Foss
newsletter@vast.org

Executive Director
Susan Booth
executive.director@vast.org

Communications
Dr. Denny Casey
communications@vast.org

Journal Editors
Dr. Amanda Gonzi,
Dr. Jennifer Maeng
journal@vast.org

VAST Regional Directors

Regional Director Coordinator –Dr. Anne Mannarino amannarino@regent.edu

Region I
Carla Kersten.
ckersten@glnd.k12.va.us

Region II
Heather Overcamp
heather.overcamp@portsk12.com

Region III
Margaret Greene
mggjmu73@gmail.com

Region IV
LoriAnn Pawlik
pawlikla@pwcs.edu

Region V
Dr. Robbie Higdon
higdonrl@jmu.edu
Dr. Angela W. Webb
webbaw@jmu.edu

Region VI
Thomas Fitzpatrick
tfitzpatrick@rcps.info

Region VII
Donna Rowlett
donna.rowlett@scottschools.com
Jinx Rasmussen
jrasmussen@bvps.org

Region VIII
Dr. Ben Campbell
campbellbk@longwood.edu

VAST Board Link

Is Your Address Changing?

Be sure to let VAST know your new contact information. Neither the post office nor the internet will forward our newsletters. Please log in to VAST.org to edit your account or e-mail Barbara Adcock, Membership chair: Membership@vast.org .

Mission of the Virginia Association of Science Teachers (VAST)

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

Please send articles,
letters to the editor, or labs by the submission deadline, January 1, 2023,
for inclusion in the next Newsletter.

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

@vasciteachers

virginiascienceteachers

The Virginia Association of Science Teachers (VAST) is incorporated in Virginia as a charitable, scientific, and educational organization. VAST is an IRS 501 (c) 3 qualified organization, and is registered with the Virginia Department of Consumer Affairs.