



VAST's Vision:
Excellence in Science Education
Through Innovation

ISSN 1945-7405

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

The Science Educator

Summer 2022

A Publication of VAST, The Virginia Association of Science Teachers

Vol. 71, No. 1

Celebrating 70 Years of Fostering Excellence in Science Education

We look to the future in great anticipation! Join us for the 2022 PDI at the DoubleTree by Hilton Williamsburg, November 10-12. Check out our preconference, workshops, field



trips, general session speakers, concurrent sessions, exhibitors and sponsors. Make your reservations now for these events ([PDI registration link](#)) and the hotel ([hotel page link](#)).

Rock cabinet from 2021 PDI makes its home...will the next rock cabinet be yours?



VAST rock cabinet from 2021 PDI makes its home...maybe this year's cabinet will be yours! The sign outside the Prospect Heights Middle School in Orange said, "Education Rocks", but inside the school, Kristen Boudreau was waiting with great anticipation for the presentation of the display case of rock and mineral specimens she won at a professional development meeting last year hosted by the Virginia Association of Science Teachers (VAST).

The first of its kind display case was part of an ongoing educational outreach initiative between the Virginia Transportation Construction Alliance (VTCA) and Friends of Mineralogy Virginia (FMVA). Both organizations recognize the importance of materials and minerals as the building blocks for society and the need to educate and engage with communities as demand for these critical materials rise.

Rob Lanham, the aggregates program manager of VTCA, sponsored the display case, with support from seven aggregate companies across the Commonwealth. Thomas Hale, president of FMVA, worked with six mineral societies across the state and in Delaware and Maryland to provide contributions. Russell Kohrs, President of VAST at the time, helped coordinate the giveaway. The case was filled by Mr. Hale and a teacher manual was provided to Kristen Boudreau with support of Brandi Moore at FMVA. Hale gave a background of the specimens donated as well as educational materials for use by the teachers and students.

Together in a partnership with VAST, VTCA and FMVA came up with the idea of presenting an educational display to a Virginia school to help bring awareness to students of their local rocks and minerals. Both organizations were joined by representatives from Luck Stone, Vulcan Materials Co., and Frazier Quarry Inc. for the dedication. Libby Pritchard, an executive from the National Sand, Stone, and Gravel Association (NSSGA), also attended to represent the national quarry industry.

Lanham was proud to be able to make the presentation to Kristen Boudreau, who said it was the first drawing she ever won. Her students applauded her success as they learned about the gift that was given to the students for their education. Lanham described aggregate industry highlighted the everyday use of products that are produced throughout Virginia, ranging from toothpaste to cement, asphalt and other vital construction needs. The students asked a lot of questions and the principal, Renee Bourke, expressed her excitement about the quality of the donation. Her previous background was environmental geology, so it was the perfect place for the first donation to occur.

Lanham stated that this was the first venture of this kind for VAST, VTCA and FMVA, and one that he hoped will continue in the future....and it will this November at the VAST PDI.

Learn more about FMVA: <https://friendsofmineralogyvirginia.org>
Learn more about VTCA: <https://www.vtca.org>

Here We Come!!!



Exciting events await you at the PDI so as you prepare let's think what we will do:

First: Book your hotel room at the DoubleTree by Hilton in Williamsburg at \$115.12 per diem rate.

[Page 12.](#)

THEN....

1. Register for the Donna Sterling Institute: Finding Smart Solutions in Energy and Climate Change (Thurs 8-3 to include continental breakfast, lunch and on-site hotel room for Wed night. Space is limited.)

2. Register (Friday/Sat continental breakfast included)

- Attendee Early Bird \$170, by Sept./20/2022
- Regular \$205,
- Full Time Student Early Bird \$99,
- Full Time Student \$130 and
- Saturday Only \$100.

3. Purchase Ticketed Meals

- Friday Lunch \$15,
- Friday Dinner \$35 and
- Saturday Box Lunch \$15

4. Purchase one Preconference Workshop \$5 (3:15-5 Thurs)

-Elementary: Building Science & Math Lesson Integration w/ STEM Challenges

-MS: Balloon Aerodynamics Challenge

-HS: Introduction to Small Unmanned Aircraft Systems

5. Purchase one Field Experience \$10

Make sure you did not register for a preconference workshop with conflicting times.

-FT 1: Thurs 3:15-5 Env Testing at WM

-FT 2: Thurs 3:15-5 Museum Conservation Lab at Colonial Williamsburg Art Museum

-FT 3: Fri 8-noon Archaeology and Education at FAirfield Foundation in Gloucester

-FT 4: Fri 1-5 Wetlands Exploration at York River State Park

-FT 5: Sat 2-4 CBF Watershed Foundation Experience

I can only tell you to check out the Great

[Agenda-Schedule of Events](#)

BUT more importantly get ready for useful conversations-NETWORKING!!!!

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



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July Message



Dear Virginia Association of Science Teachers Expedition Team,

Can you believe that it is already July? Me neither! I just returned from a field season in the Peruvian Amazon at the Boiling River, and it was a magical experience. What have you done for yourself this summer? What are you still planning to do? I encourage you to take intentional time for you, whether it explicitly includes your passion for science or not, it is important that you restore yourself this summer. I provide this restoration for myself by being in the field, which combines my passion for science, the outdoors, and continuous learning about the world around me.

Speaking of restoration, this year's Professional Development Institute (PDI) in Williamsburg, VA, from November 10-12, is being restored as an in-person event! This is exciting, invigorating, and we look forward to seeing YOU there, along with your favorite science colleagues. We have an incredible lineup of speakers, field experiences, and preconference Donna Sterling Institute. Our exhibitors and sponsors are also excited to be back in person, delivering swag, giveaways, and resources for you and your learners. When and where else can you gain access to hundreds of presentations, networking events, free food, and undeniable energy of the science community of Virginia? Nowhere except Williamsburg from November 10-12.

So, will I see you there? I can't wait to meet you all in person and make this PDI the best one ever

Your Expedition Leader,
Becky Schneker,
VAST President 2022



Becky participated in a professional development expedition to Peru at the Amazon Boiling River.



Sponsors

\$5000 Level Plus

Virginia Department of Aviation*

WorldStrides*

\$5000 Level

The College of William & Mary School of Education*

\$2500 Level

Hands2Mind*

Jefferson Lab Science Education*

\$1000 Level

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Virginia Space Grant Consortium*

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George Mason University

Hands2Mind*

Jefferson Lab Science Education*

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NASA Langley Research Center

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eClips

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School Specialty

Science Research for All, Inc.

STEMscopes by Accelerate Learning

Science Museum of Virginia

Texas Instruments

Virginia Association of Environmental
Education

Virginia Association of Science Teachers

Virginia Institute of Marine Science/College
of William & Mary

Virginia Junior Academy of Science

Virginia Department of Aviation*

Virginia Living Museum

Virginia Space Grant Consortium*

Virginia Tech-College of Natural Resources
and Environment

Virginia Transportation Construction
Alliance

WHRO Public Media

WorldStrides*

All Sponsors denoted with *

VAST SCHEDULE AT A GLANCE - 2022

(draft as of July 3, 2022)



Wednesday November 9, 2022

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

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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

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

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

Elementary:

Speakers: Angie Meredith and Pam Caffery

Title: *Building Science and Math Lesson Integration with STEM Challenges*

Sponsor: Hand2Mind

Middle School:

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:

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**

William and Mary School of Education)

(transportation sponsored by the College of

#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.

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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***

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

7:00 PM – 8:15 PM

Awards Ceremony

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 Passport to Travel”

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)

(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***





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



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

Links to more about the VAST PDI 2022



Donna Sterling Institute Information (separate registration from the PDI) [Link](#)

Sterling Institute Registration [Here](#)

2022 Online Registration & Fees for the In-Person PDI attendees, presenters, exhibitors [Link](#)

Ticketed Thursday Afternoon Workshops [Link](#)

Ticketed Field Experiences [Link](#), [newsletter page 6](#).

VAST W-9 Form [Link](#)

2022 PDI Concurrent Session Presenters - all presenters must register and pay by **Sept. 23** to be included in the final program) [Link](#)

2022 PDI Schedule at a Glance (draft) [Link](#)

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

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

Dr. Ocean [Link](#)

General Session II, Friday 10:40 am, “*The Science of Making Science Accessible: DNA and Community Building*”,

Dr. Raquel Fleskes, University of Connecticut [Link](#)

General Session III, Saturday 12:30 pm, “*Hey Dude! Where’s My Flying Car?*”, Dr. Bruce Holmes, NASA [Link](#)

2022 PDI Concurrent Session Presentations List (coming soon) 2022 PDI Sponsor and Exhibitor List (coming soon)

2022 DoubleTree by Hilton-Williamsburg Information and Room Reservation (now open) [Link](#)

2022 PDI Sponsorship Opportunities [Link](#)

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



VAST PDI
INFORMATION:
Forms and
Registration

PDI 2022 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

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: VAST Hotel Reservation Link 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.

Journal of Virginia Science Education

You are invited to write for JVSE, a peer reviewed journal. The next issue is the Winter Issue and submissions are due July 31, for publication scheduled for December 15.

The theme for the issue is *Place-based Learning* and we'd love for you to share lesson activities, solutions, and research associated with all you've learned! Submissions unrelated to the theme are also welcome. Submissions due March 1, 2022 and the Summer issue will be published July 1, 2022. See the journal website for details: <https://vast.wildapricot.org/Journal>. If you have questions, please reach out to Amanda Gonczi and Jenn Maeng, journal co-editors at journal@vast.org.

2022 PDI 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.drjeannedavis.com>

General Session I, Thursday, 6:00 pm

Science is Everywhere, Science is for Everyone: The Art of Storytelling

Dr. Jeanette Davis also known as Dr. Ocean is a Marine Microbiologist and author of best-selling children's books *Science is Everywhere*, *Science is for Everyone* and *Jada's Journey Under the Sea* created to explore and diversify science. Dr. Ocean research ranges from fisheries management to bacterial symbiosis to find new medicines from the ocean. She is cited in *Science* for helping to discover a marine microbe that fights cancer. Dr. Ocean attributes her success to the strong foundation that she received at Hampton University. Dr. Ocean continues to be an ocean advocate and travels around the world to help manage ocean resources.



Dr. Raquel Fleskes

<https://www.raquelfleskes.com/>

General Session II, Friday, 10:30 am

The Science of Making Science Accessible: DNA and Community Building

Raquel Fleskes is an anthropological geneticist conducting post-doctoral research in the Department of Anthropology at the University of Connecticut. Her research falls at the intersection of ancient DNA, archaeology, and community engagement, and has been funded by the National Science Foundation and National Geographic Society. She uses ancient DNA and population genetic methods to understand the population history of the colonial period of North America. These methods are then interpreted alongside archaeological and other bio-molecular techniques to understand lived experience, ancestry, and relationships on the early colonial American frontier. She is passionate about science education to engage students of all ages in the process of learning and discovery.



Dr. Carolyn Williams

<https://coastalvirginiamag.com/article/the-first-mom-of-music/>

Awards Ceremony, Friday 7:00 pm

The Power of Possibility

Dr. Carolyn Williams was the former Director of Education and Board Chair for From One Hand To Another (FOHTA), a non-profit that provided supplemental education to under-served youth. As an educator with extensive years of experience with the Virginia Beach City Public School System ranging from the classroom to administrative responsibilities, she is a graduate of Old Dominion University. Ms. Williams earned her Doctorate Degree from Regent University. She was a member of and graduated from the Futures Academy (VBCPS), served as President of Virginia Beach Library Association, sponsor of Diversity Leaders (VBCPS), and worked at individual schools. Dr. Williams was a member of National Education Association, Virginia Education Association, and Phi Delta Kappa. The ThinkGreen, curriculum written by Dr. Williams for the Urban League Young Professionals Hampton Roads chapter won a national award. She has also written, ThinkRead a reading curriculum used at one of FOHTA's summer camp locations along with ThinkInvestigate: Science Fair Projects for the Titusville, FL summer camp location (FOHTA).

Currently, Dr. Williams is a Senior Education Advisor for YELLOW, an organization to "EVEN THE ODDS" for all youth through education.

Education is an integral part of Dr. Williams' life; she has great enthusiasm for both attaining and sharing knowledge. Her other great love is her family.

Dr. Williams believes in the life mission to "Never be content with someone else's definition of you".



Dr. Bruce J. Holmes

<https://www.linkedin.com/in/brucejholmes/>

General Session III, Sat. 12:30 pm

Hey Dude! Where's My Flying Car!?

Remember the 1960's cartoon series *The Jetsons*? Ever wonder why George's flying car never made it into the 21st century? I am here to introduce the very viable plausibility that well within the lifetimes of the students you teach, and even likely within my lifetime, we will see modern day versions of George's flying car. Why and how might that now be? My own story in aviation started when flying with my father in our family airplane when *The Jetsons* first appeared and watching him fly from our neighborhood in the Chicago suburbs to the downtown waterfront airport, Meigs Field, and thinking, "Well, this is how everyone should be able to get around." Years later, during my NASA career as an aerospace research engineer, elements of that thinking stayed with me as my like-minded colleagues and we worked with industry and universities to develop the enabling technologies that now will support the concept of personalized, democratized, individualized air mobility – George Jetson-style. My presentation describes the story leading to Virginia's Department of Aviation decision to secure one of the most modern and exciting small airplanes, the ICON A5 amphibian aircraft, for use in STEM outreach. The story follows the technology development pathway of the 1990's and early 2000's that led to the production of the ICON A5. This airplane embodies virtually all the innovations that had roots in NASA-led public-private research partnerships focused on creating a new base of technologies for the U.S. small aircraft industry. The ICON can serve to inspire students today who may choose to follow career paths in aviation, aeronautics, or aerospace.



VAST Grants

VAST Mini-Grant for Teaching

The purpose of the VAST Mini-grant program is to provide seed money for innovative curriculum activities which expand learning opportunities for science students. Team applications are welcome, however one person must be designated as the Project Director. The Project Director must be a member of VAST (dues paid for 2022), must have taught at the elementary or secondary level for a minimum of three years, and must be currently employed as a teacher. More information is on the website.

Due Date: September 30, 2022 To apply: [Click here to go to the Google Doc.](#)

TACT Mini Grant to Enhance Teaching of Chemistry

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

More information is on the website. Due date: September 30, 2022 To apply: [Click here to complete online.](#)

AIPG Russ Wayland Mini Grant to Improve Teaching of Geology supported by VAST

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

In 1993, the Virginia Section of AIPG established a mini-grant program to improve the teaching of Geology in the schools (K-12), Public and Private. The section has allocated \$1,000 to fund approved proposals for 2022. Applicants must be currently employed as classroom teachers and must be a member of VAST or WVSTA. Applicants must agree to share the outcomes of this project with other teachers through in-services and/or a presentation at the VAST PDI or the WVSTA conference.

Recipients are also expected to share the outcomes of the project with the members of the Virginia Section of the AIPG at one of their yearly meetings. (No meetings are scheduled as of April 1, 2022.)

The review committee is looking for proposals that will result in more hands-on activities, and a better understanding of the importance of geologic resources, and/or geologic principles. The grant may be awarded to one applicant or split among several applicants (to be determined by the AIPG selection committee). Grant monies are not intended as remuneration and should not be considered as such. The AIPG selection committee may elect to not make an award if it feels that none of the proposals meet the goals of AIPG. Applications are due August 20, 2022 [Download the pdf](#) document to print out hard copy to submit.

VAST Rise Awards: Nominate Today!



After what has arguably been the toughest school year of anyone's career, wouldn't nominating a colleague for an award for their hard work this year be a balm?

RISE Awards: VAST invites you to do so now! VAST's RISE awards (Recognition in Science Education) awards program is just the thing. There is a wide array of categories:

- ✿ Remote Teaching (Elementary, Middle, High)
- ✿ Elementary (K-5)
- ✿ Middle School (6-8)
- ✿ Biology
- ✿ Chemistry
- ✿ Earth Science
- ✿ Physics
- ✿ Environmental Science
- ✿ At-Risk Students (K-12)
- ✿ Resource Teacher (examples: Technology, Science Resource, Etc.)
- ✿ Science Educator (non K-12-Examples Science Supervisor, Information Education, Principal, Etc.)
- ✿ University/College Faculty
- ✿ Community Partnership (example: Businesses, Politicians, Other Organizations, Etc.)

So, how do you do this? Gather some materials, including letters, videos, etc. You can upload up to five items. Then, complete the application here! Deadline for all applications is September 30th, 2022.

[Link to RISE Awards](#)

Donna Sterling Award for Exemplary Science Teaching: Are you a classroom teacher (K-6 AND Secondary) who has a dream to do something big? Do you want to plan a PD expedition of your own to the Amazon? How about to the American southwest? Or, do you have a project closer to home that \$4000 would help make happen? Then, apply for this award here! For 2022, there will be one K-6 award AND one secondary award. Deadlines for these grants are August 15th, 2022.

[Link to Awards](#)

In Memory of

Shirley and Russell Sypolt



It is with the deepest sadness that the Sypolt family announces the untimely and tragic passing of Shirley R. and Russell E. Sypolt Jr. on June 7th, 2022. Shirley, daughter of Beinfeld and Ruth Burnett (Fairbanks) was born on September 9th, 1953, in Prince Edward County, VA. Shirley was a retired teacher and member of multiple science organizations, which was her passion. Russ, son of Russell Sr. and Barbara Sypolt (Ellis) was born on May 27th, 1952, on Bolling Air Force Base. Russ was a retired Lieutenant Colonel and B-52 pilot in the United States Air Force. Their love of country was shared as well as their desire to contribute and give back to those they served beyond their professions. Both Russell and Shirley were Lifetime Members of VAST, with Shirley serving twice as President-elect, President, and Immediate Past President first from 2013-2015, then 2016-2018. Shirley served as Vice President 2020-2021. Shirley was a PAEMST winner and Board Certified to name a few of her accolades as a science teacher. She will be greatly missed as well as Russ as both supported science education in Virginia. Both will live in our hearts forever.

2022 Donna Sterling Institute: Finding Smart Solutions in Energy and Climate Science

Join us as we learn to apply a problem-based learning (PBL) approach to investigate and understand climate and energy, engage in National Energy Education Development (NEED) activities to support understanding of climate and alternative energy, and meet your students' needs. After attending the 2022 Sterling Institute, teachers will be able to address Virginia Science Standards of Learning for grade K-12 students associated with climate change including natural resources and conservation, earth resources, living systems, and energy transfer. The Institute also gives teachers tools to integrate the scientific investigation, reasoning and logic standards to teach climate change within this approach. Donna Sterling's vision of teaching using a PBL approach integrates science with math, engineering, technology, and language arts. She was committed to meeting the diverse needs of our students through culturally responsive and equitable practices.

We are pleased to announce 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 understanding 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.

The 2022 Sterling Institute is planned for 8am-3pm, Thursday November 10, 2022, at the DoubleTree by Hilton, Williamsburg, VA. The Sterling Institute which supports teachers in developing and enacting PBL units in their instruction through a 7-hour professional development experience and recertification points.

Registration fee of \$75 includes: <https://vast.wildapricot.org/event-4766879>

- an on-site hotel room for Wednesday night,
- continental breakfast, and
- lunch.

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. Here is your chance to learn how to implement this powerful teaching strategy! Instructors: Featuring Dr. Don Haas, Jaclyn Claytor, 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.

Apply Now! Registration ends October 31, 2022.

For more information or questions, contact Robin Curtis: secretary@vast.org.

Elementary (K-6) & Secondary (6-12) Teachers: Apply for the Donna Sterling Exemplary Science Teaching Award 2022

Donna Sterling was a visionary science educator with a passion for working with science teachers and developing habits of inquiry-based teaching. Her leadership in the Virginia Initiative for Science Teaching and Achievement (VISTA) focused on elementary and secondary teacher professional development. This award recognizes that exemplary teachers engage in continuous improvement and is designed to support a professional development plan for the improvement of science teaching. In 2022, the award will be given to an exemplary elementary teacher and an exemplary secondary teacher. **For the elementary award the 6th grade teacher must be teaching in an elementary setting. For the secondary award the 6th grade teacher must be teaching in a secondary setting such as middle or high school.**

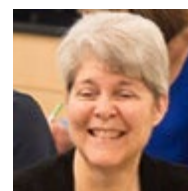


Becky Schnekser and Juanita Jo Matkins

Each awardee will receive a total of **\$4000**. In addition, registration and travel costs will be reimbursed to attend the 2022 VAST PDI to receive the award and to the 2023 VAST PDI to present a session on the professional development experience and outcomes. Each awardee will receive \$3000 at the VAST PDI in 2022, held at Williamsburg November 10-12, 2022. The remainder will be awarded after the awardee presents at the next VAST PDI and submits an article to the newsletter *The Science Educator* or the *Journal of Virginia Science Education*.

Deadline for Applications: August 15, 2022

Donna Sterling



To Apply:

1. In your cover letter, include information on yourself, including your preferred name, your home and school addresses, and phone numbers and email address(es) where you can be reached. Tell us how many years you have taught, where, and what subjects and grade levels.
2. In no more than two pages, single-spaced, describe an inquiry-based science unit that you taught. Describe how your unit is student-centered and includes community engagement. Give evidence that the unit was effective. Evidence documents such as student work can be submitted separately and will not count toward the two-page limit.
3. In no more than two pages, single-spaced, describe your plan for professional development, using the funds received through the Sterling award. These plans may include summer courses, attendance at workshops, study abroad opportunities, instructional materials development under the guidance of experts on-site, etc. Feel free to be creative in your plan. Submit the professional development description with anticipated outcomes, including plans for a presentation at the 2023 VAST PDI. Tell how this award will help you become a better teacher of science and will support the development of leadership skills. Tell about your plans for writing an article about your experiences.
4. Submit three letters of recommendation based on direct observations of teaching. One letter must be from the science supervisor or someone serving in that capacity, a second letter must be from the principal, assistant principal, or instructional leader, and a third letter must be from a fellow teacher or a parent. Letters should address the following: Why is this teacher a good candidate for this award? What qualities do they exhibit as teachers that make the recommender think they will use the funds from the award to improve their practice as teachers of science?

All materials must be submitted by 5 pm on August 15, 2022.

Submit applications and letters of recommendation to Dr. Juanita Jo Matkins, jjmatk@wm.edu.

VAST Needs YOU! Nominations for 2022 Positions



Come and serve your profession and your fellow educators with distinction and honor. Nominate someone, or yourself, for one of our open positions. A few are elected prior to the Fall 2022 PDI while others are open now!

Nominations also includes grants and awards. Do you know of a deserving fellow educator who would benefit from the resume building prestige of being a VAST RISE Award winner? In a few months time, you can nominate them!

Do you have an idea that needs a little cash to get off the ground? Soon, you'll be able to apply for mini-grants through VAST to help make it happen!

Annually, VAST elects a group of individuals according to our current bylaw requirements. Consider nominating someone who you think would serve well in 2023 as:

President-Elect: The President-elect shall serve as the Co- Chairperson of the standing Professional Development Institute (PDI) of the year in which they will serve as President.

Secretary: The Secretary shall keep a permanent record of all business transacted by VAST; keep the minutes of meetings for the general membership, Executive Committee, and Board of Directors; distribute copies of the minutes to members of each group in a timely manner; and perform such duties as are usually incidental to the office. The Secretary shall be elected for a term of three years.

Regional Director (Regions 2, 4, 6, and 8 are up for 2023!): Regional Director shall be elected from each of the eight (8) Department of Education regions. Directors shall be elected by the membership to serve a two-year term and may serve more than one term. Directors from even-numbered regions will be elected on even years, and those from odd-numbered regions will be elected on odd years. Directors will, within their region, promote VAST membership, regional professional development activities, and the VAST Professional Development Institute (PDI). Directors will serve as the coordinator of science leaders within their region and encourage an active and viable network within their region. Directors are expected to attend VAST Board meetings and provide a report on activities within their region. Directors shall actively participate as VAST leaders including submission of newsletter articles, awards nominations, and the solicitation of presenters for the VAST conference.

You can nominate someone here! Or, you can use the form attached to this newsletter to fill out and send in to Russell Kohrs at kohrsrh@gmail.com.

[CLICK to download a VAST Nomination Form. Nominate someone today.](#)



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.





DRAFT

Virginia Association of Science Teachers
November PDI Concurrent Session Presentations



COMMERCIAL EXHIBITOR PRESENTERS

Pam Caffery, hand2mind

TITLE: **Integrate Makerspace for Concept Development**

Grade Level: ELEM Content Area: STEM

Pam Caffery, hand2mind

TITLE: **Coding for the Ages**

Grade Level: ELEM Content Area: STEM

Pam Caffery, hand2mind

TITLE: **Phenomenal Hands-On Kits**

Grade Level: ELEM Content Area: STEM

Chelsea Chandler, STEMscopes by Accelerate Learning

TITLE: **Use Literacy & Writing Elements to Enhance Science Lessons**

Grade Level: ELEM Content Area: General, STEM, ELA and Reading Integration

Chelsea Chandler, STEMscopes by Accelerate Learning

TITLE: **Engaging Student Engineers: Designs for Your Sci Classroom**

Grade Level: ELEM-MS Content Area: Engineering, STEM

Erin Dlott, EVERFI

Teagan Seeley, EVERFI

TITLE: **Providing Equitable Access to STEM Skills and STEM Careers**

Grade Level: ALL GRADES Content Area: Environmental Science, Math in Science, STEM

Kim Dye, School Specialty

TITLE: **Your Standards, Your Time, Your Students**

Grade Level: ELEM Content Area: General

Kim Dye, School Specialty

TITLE: **Better Together: Hands-On Science and Active Literacy**

Grade Level: ELEM-MS Content Area: General

Michelle Grooms, Texas Instruments

TITLE: **Science in Motion**

Grade Level: MS-HS Content Area: Biology/Life Science, STEM

Naomi Hartl, School Specialty LLC/Frey Scientific

TITLE: **Choose Your Own Robotics Adventure!**

Grade Level: ALL GRADES Content Area: STEM

Taylor Ingles, American College of Education

TITLE: **Integrating Social Responsibility into the Science Classroom**

Grade Level: ALL GRADES Content Area: Biology/Life Science, Environmental Science, General

Cheryl Lindeman, Carolina.com

TITLE: **Hands-on Plus! Driving Student-Centered Learning K-5**

Grade Level: ELEM Content Area: Biology/Life Science, Physics/Physical Science, STEM

Cheryl Lindeman, Carolina.com

TITLE: **Exploring OpenSciEd from Carolina**

Grade Level: MS Content Area: STEM

Jenna Mercury, ExploreLearning

TITLE: **Now Trending: Science Simulations to Make Things Stick!**

Grade Level: ELEM Content Area: General, STEM

Jenna Mercury, ExploreLearning

TITLE: **Next Level Learning with Interactive STEM Cases**

Grade Level: MS-HS-COL Content Area: General, STEM, Project Based Learning

Angie Meredith, hand2mind

Pam Caffery, hand2mind

TITLE: **Science & Math Lesson Integration with STEM Challenges**

Grade Level: ELEM-MS Content Area: STEM

Kimberly Rice, Five Ponds Press

TITLE: **Reconnecting STEM with Science Standards for Elementary**

Grade Level: ELEM Content Area: Engineering, STEM

Kimberly Rice, Five Ponds Press

TITLE: **Reconnecting STEM with Science Standards for Middle School**

Grade Level: MS Content Area: Engineering, STEM

Tamica Stubbs, Bio-Rad Explorers

TITLE: **Real CRISPR Gene Editing and PCR Genotyping!**

Grade Level: HS-COL Content Area: Biology/Life Science

Carrie Weber, WorldStrides

Kiersten Teitelbaum, WorldStrides

TITLE: **Engaging Students with Science Using Local News and Events**

Grade Level: ELEM-MS-COL Content Area: Environmental Science, General, STEM

Joselyn Whetzel, Legends of Learning

Brooke Fields, Legends of Learning

TITLE: **Level Up Standards-Based Content with Game-Based Learning!**

Grade Level: ELEM-MS Content Area: Biology/Life Science, Math in Science, STEM

Christina Womble, Plasma Games

Frank Maraboli, Plasma Games

TITLE: **Level Up Your Science/STEM Program with Game Based Learning**

Grade Level: MS-HS Content Area: Chemistry, Physics/Physical Science

NOT-FOR-PROFIT EXHIBITOR PRESENTERS

Pamela Dixon Kuhn, Science Research for All, Inc.

TITLE: **Integrating Original Research in a Science Curriculum**

Grade Level: MS-HS Content Area: STEM

Lindsey Horner, WHRO Public Media

TITLE: **Say Hello to the New eMediaVA: VA's Free Media Library**

Grade Level: ALL GRADES Content Area: Earth/Space Science, Biology/Life Science, General

Devin Jefferson, Science Museum of Virginia

TITLE: **Community Science at the Science Museum of Virginia**

Grade Level: MS-HS-COL Content Area: Environmental Science, STEM

Lisa Lawrence, VIMS/VA Sea Grant

Celia Cackowski, VIMS/VA Sea Grant

Bethany Smith, VIMS/VA Sea Grant

Sarah Nuss, VIMS/CBNERR

TITLE: **Scallops and A Deep-Sea Killer: Research to K-12 Classroom**

Grade Level: MS-HS-COL Content Area: Biology/Life Science, Oceanography

Bianca Myrick, Virginia Association for Environmental Education

TITLE: **Environmental Education Connections**

Grade Level: ALL GRADES Content Area: Environmental Science

Remy Pangle, James Madison University Center for the Advancement of Sustainable Energy

Pam Northam, Retired

Dawit Haile, Virginia State University

TITLE: **Exploring Renewable Energy Resources Available Throughout Virginia**

Grade Level: ALL GRADES Content Area: Environmental Science through STEM Apply

Natalie Rhodes, CodeVA

Valerie Fawley, CodeVA

TITLE: **Strategies for CS Integration in the MS Science Classroom**

Grade Level: MS Content Area: Biology/Life Science, General

Angela Rizzi, NASA Langley Research Center

Desiray Wilson, NASA Langley Research Center

TITLE: **Earth Science Data Resources for Multilingual Learners**

Grade Level: ALL GRADES Content Area: Earth/Space Science

Kimberly Swan, National Energy Education Development Project

TITLE: **Ooh's & Aah's of Energy Transformations**

Grade Level: ALL GRADES Content Area: Chemistry, Physics/Physical Science

Kimberly Swan, National Energy Education Development Project

TITLE: **Exploring Solar Energy**

Grade Level: MS-HS Content Area: Physics/Physical Science, STEM

Kimberly Swan, National Energy Education Development Project

TITLE: **Exploring Offshore Wind Energy**

Grade Level: MS-HS Content Area: Physics/Physical Science, STEM

November PDI Concurrent Session Presentations

Kimberly Swan, National Energy Education Development Project
Emily Hawbaker, National Energy Education Development Project

TITLE: **Hands-on with Climate Science**

Grade Level: HS Content Area: Environmental Science

Bill Williams, Virginia Junior Academy of Science

TITLE: **Using Bird Data To Meet Living Systems & Processes Standards**

Grade Level: ALL GRADES Content Area: Biology/Life Science, Environmental Science, Math in Science

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

TITLE: **STEM Majors in Sustainability, Environment, and Conservation**

Grade Level: HS-COL Content Area: Biology/Life Science, Environmental Science, STEM

Betty Wilson, Virginia Department of Aviation

TITLE: **ICON A5 Introduction to Flight Program**

Grade Level: ALL GRADES Content Area: Physics/Physical Science, STEM

ATTENDEE-PRESENTERS

Barbara Adcock, Powhatan County Public Schools

Lisa Brown, Powhatan County Public Schools

TITLE: **MWEE: Engaging Watershed Activity**

Grade Level: ALL GRADES Content Area: Biology/Life Science, Environmental Science, STEM

Susan Bardenhagen, AIAA & SWE Educator Associate

TITLE: **STEAM-Infused Instruction Gives Agency to All Learners**

Grade Level: ELEM Content Area: STEM + the ARTS = STEAM

Stephanie Bender, Salem Church Middle School

Patricia Thurston, Salem Church Middle School

TITLE: **Hatching in Higher Grades**

Grade Level: MS-HS Content Area: Biology/Life Science, Environmental Science

Kathryn Bender, Monticello High School

TITLE: **DIY Classroom Manipulatives on Cutting Machines (ex. Cricut)**

Grade Level: ALL GRADES Content Area: Biology/Life Science, General, STEM

Seth Berkeley, Harrisonburg High School

TITLE: **Physics Ideas Shareathon**

Grade Level: MS-HS Content Area: Physics/Physical Science

Seth Berkeley, Harrisonburg High School

TITLE: **Tabletop Physics Demos and Activities**

Grade Level: HS Content Area: Physics/Physical Science

Clair Berube, Virginia Wesleyan University

Sueanne McKinney, Old Dominion University

TITLE: **"STAR" Teacher Traits and Turnover in Urban STEM Classrooms**

Grade Level: ALL GRADES Content Area: General, STEM

November PDI Concurrent Session Presentations

Paul Bielema, Noel C Taylor Learning Academy

TITLE: **Gimkit: Fun for Them, Information for You**

Grade Level: ALL GRADES Content Area: General

Timothy Bill, Harrisonburg High School

TITLE: **Thirty Years of Formal Learning: A Personal Journey**

Grade Level: ALL GRADES Content Area: General

Lynn Black, Virginia Agriculture in the Classroom

TITLE: **Every Day is Earth Day with Agriculture in the Classroom**

Grade Level: ELEM Content Area: General

Jessa Campbell, Albemarle County Public Schools

Sandy Shaffer, Albemarle County Public Schools

Charli Nolan, Albemarle County Public Schools

TITLE: **Sensational Strategies to Integrate CS into Science**

Grade Level: ELEM Content Area: General, STEM, Interdisciplinary

Heather Carberry, Edward E Drew Middle School

Rebecca Garrett, Edward E Drew Middle School

Jeremy Utt, T Benton Gayle Middle School

TITLE: **NASA Inventions = Living Like Astronauts**

Grade Level: ELEM-MS Content Area: Earth/Space Science, STEM

Shanan Chappell Moots, Old Dominion University

Melani Loney, Old Dominion University

Keisha Tennessee, Virginia Department of Education

Natalie Rhodes, CodeVA

TITLE: **Integrating Computer Science in the K-5 Classroom**

Grade Level: ELEM Content Area: Computer Science Integration

Sara Chaves Beam, Chesapeake Bay Governor's School

TITLE: **Using StoryMap to Teach Ocean Acidification Impacts**

Grade Level: HS-COL Content Area: Earth/Space Science, Biology/Life Science, Environmental Science

Janine D'Elia, Chesterfield County Public Schools

Emily Stains, Chesterfield County Public Schools

TITLE: **Building Literacy In Secondary Science**

Grade Level: MS-HS Content Area: General

Cindy Duncan, Independent Consultant

TITLE: **Trailblazing Ideas for Re-Imagining Education**

Grade Level: ALL GRADES Content Area: General

Cindy Duncan, Chesapeake Bay Foundation

Kathlean Davis, Chesapeake Bay Foundation

TITLE: **Chesapeake Bay Foundation - Education Programs**

Grade Level: ALL GRADES Content Area: Biology/Life Science, Environmental Science, STEM

Martina Dunlap, Norfolk Public Schools

Demetrice Smith-Mutegi, Old Dominion University

TITLE: **Social Emotional Learning and Classroom Discourse**

Grade Level: MS Content Area: General

November PDI Concurrent Session Presentations

Elizabeth Edmondson, Virginia Commonwealth University

TITLE: **Engaging Inquiry: Pre-service Teachers Share Tested Lessons**

Grade Level: MS-HS Content Area: Earth/Space Science, Biology/Life Science, Environmental Science

Elizabeth Edmondson, Virginia Commonwealth University

TITLE: **Real Science: Science teachers in Research Labs**

Grade Level: MS-HS-COL Content Area: STEM

Thomas Fitzpatrick, Roanoke City Public Schools

Angelo Bonilla, Breckinridge Middle School

Leslie Barrett, Breckinridge Middle School

TITLE: **Five E Model: Ways to Engage the Students in Science**

Grade Level: Physics/Physical Science, General, STEM Content Area:

Cindy Frenzel, Virginia Department of Forestry

TITLE: **Project Learning Tree**

Grade Level: ELEM-MS Content Area: Biology/Life Science, Environmental Science, General

Amanda Gardner Gardner, Virginia High School

TITLE: **Antibiotic-Resistant Bacteria and Recycled Water**

Grade Level: HS-COL Content Area: Biology/Life Science, Environmental Science

Mollianne George, Fairfax County Public Schools

TITLE: **Grading for Equity: Summative and Standards-Based Assessment**

Grade Level: MS-HS-COL Content Area: General

Lydia Grote, James River High School- Chesterfield County

TITLE: **Trash Talk: Engaging ELLs in Science and Math**

Grade Level: MS-HS Content Area: Environmental Science, Math in Science

Kristie Gutierrez, Old Dominion University

Jennifer Kidd, Old Dominion University

Minjung Lee, Old Dominion University

TITLE: **Teaching Elementary Engineering Lessons Across Disciplines**

Grade Level: ELEM Content Area: Engineering, STEM

Don Haas, The Paleontological Research Institution

Jonathan Hendricks, The Paleontological Research Institution

TITLE: **Earth Science of the Southeast: Free Online Interactive Text**

Grade Level: ALL GRADES Content Area: Earth/Space Science, Environmental Science

Robbie Higdon, James Madison University

Andy Jackson, James Madison University

Seth Shantz, Harrisonburg High School Governor's STEM Academy

TITLE: **ESCAPE-Eco, Social, Cultural, Across-Planet Education**

Grade Level: HS-COL Content Area: General, STEM

Andrew Jackson, Harrisonburg City Public Schools

Gabbie Meis, Qubit by Qubit

Students in the Program, Harrisonburg High School

TITLE: **Quantum Computing for YOUR High School Students!**

Grade Level: HS Content Area: Physics/Physical Science, Engineering, STEM

November PDI Concurrent Session Presentations

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

TITLE: HABR - High Altitude Balloon Research

Grade Level: HS-COL Content Area: Environmental Science, Engineering, Authentic Student Research

Rudo Kashiri, Virginia Space Grant Consortium
Cindy Watson, Bedford County Schools/Forest Middle School

TITLE: Plant the Moon Challenge

Grade Level: ALL GRADES Content Area: General, STEM

Chris Kaznosky, Central High School (Shenandoah County)
Steve Leslie, James Madison University Department of Geology and Environmental Science

TITLE: The Backyard Mystery: How to Discover My Geologic History

Grade Level: ALL GRADES Content Area: Earth/Space Science

Carla Kersten, Goochland Middle School

TITLE: Exploring the Earth with Google Earth

Grade Level: MS Content Area: Earth/Space Science

Jennifer Kidd, Old Dominion University
Kristie Gutierrez, Old Dominion University
Minjung Lee, Old Dominion University

TITLE: Navigating Barriers & Challenges: K-6 Engineering Education

Grade Level: ALL GRADES Content Area: Engineering, General, STEM

Meredith Kier, College of William & Mary

Secondary Science Preservice Teachers College of William and Mary

TITLE: Inclusive Teaching of the Bird-Beak Lab

Grade Level: MS-HS Content Area: Biology/Life Science

Kate Kogge, US Department of Energy

TITLE: The Albert Einstein Distinguished Educator Fellowship in DC

Grade Level: ALL GRADES Content Area: General, STEM

Russell Kohrs, Massanutten Regional Governor's School for Environmental Science and Technology

TITLE: Geovirtual Reality Field Experiences

Grade Level: ALL GRADES Content Area: Earth/Space Science

Russell Kohrs, Virginia Cave Board

TITLE: The Virginia Cave Board: Resources for Teaching Karst!

Grade Level: ALL GRADES Content Area: Earth/Space Science, Environmental Science

Melinda Landry, Prince William County Schools

Jessica Doiron, Prince William County Schools

TITLE: Place-Based Learning: Using Waste Audits to Bring Change

Grade Level: ALL GRADES Content Area: Environmental Science, Math in Science, Cross Curricular Env. Literacy

Kathryn Lanouette, College of William & Mary

TITLE: Centering Place and Space in Elementary Science Lesson Plans

Grade Level: ELEM Content Area: General

November PDI Concurrent Session Presentations

Cheryl Lindeman, Central Virginia Regional Science Fair
Elizabeth Schuppe, Amherst County Public Schools
Allison Klapper, Bedford County Public Schools
Lani Patrick, Campbell County Public Schools
TITLE: We can make it work! : New Momentum for Science Fairs
Grade Level: ELEM-MS Content Area: STEM

Jeff Lukens, Roosevelt High School, Sioux Falls, SD
TITLE: Flattening the Curve of the Zombie Apocalypse
Grade Level: ALL GRADES Content Area: Biology/Life Science, Math in Science, STEM

Jeff Lukens, Roosevelt High School, Sioux Falls, SD
TITLE: Infect Your Science Classroom with Math!
Grade Level: MS-HS Content Area: Math in Science, General, STEM

Jeff Lukens, Roosevelt High School, Sioux Falls, SD
TITLE: Order Up a Helping of Forensics, With a Side of Maggots!
Grade Level: MS-HS Content Area: General, STEM

Liz Lynch, Patrick Henry Elem. School (Martinsville City)
Karlee Young, Patrick Henry Elementary School (Martinsville City)
Cameron Cooper, Patrick Henry Elem. School (Martinsville City)
Ashley Taylor, Patrick Henry Elementary School (Martinsville City)
TITLE: Using Machine Learning (AI) in the Elementary Classroom
Grade Level: ELEM Content Area: Engineering, General, STEM

Gregory MacDougall, Virginia Department of Education
Anne Petersen, Virginia Department of Education
TITLE: PAEMST Information Session
Grade Level: MS-HS Content Area: General

Gregory MacDougall, Virginia Department of Education
TITLE: Growing out of the Classroom: Becoming a Science Leader
Grade Level: ALL GRADES Content Area: Science Education Leadership

Victoria MacEntee, Woodside High School (Newport News Public Schools)
TITLE: Finding Funding for STEM Education
Grade Level: ALL GRADES Content Area: STEM

Victoria MacEntee, Woodside High School (Newport News Public Schools)
TITLE: Science News in the Classroom
Grade Level: MS-HS Content Area: General, STEM

Jennifer Maeng, University of Virginia
Anne Peterson, Virginia Department of Education
Sarah Nuss, Virginia Institute of Marine Science
TITLE: College and University Science Educators Share Session
Grade Level: HS-COL Content Area: General, STEM

Jennifer Maeng, University of Virginia
TITLE: Exclusively for Pre-service Teachers - What YOU Need to Know
Grade Level: All Grades Content Area: Preservice Teacher Session

November PDI Concurrent Session Presentations

Laura Perrine, Lynnhaven Middle School

TITLE: Earth Science Capstone Project: An alternative assessment

Grade Level: MS-HS Content Area: Earth/Space Science

Anne Petersen, Virginia Department of Education

Gregory MacDougall, Virginia Department of Education

Myra Thayer, Virginia Department of Education

TITLE: VDOE Update

Grade Level: ALL GRADES Content Area: General

Anne Petersen, Virginia Department of Education

Tyler Waybright, Virginia Department of Education

Myra Thayer, Virginia Department of Education

TITLE: State Assessments and the 2018 Science Standards of Learning

Grade Level: ALL GRADES Content Area: General

Paul Reibach, Colonial Forge HS and Commonwealth Governor's School

TITLE: Probeware for Biology and Chemistry Labs

Grade Level: HS-COL Content Area: Biology/Life Science, Chemistry, Environmental Science

Eric Rhoades, Pivot Interactives

TITLE: Transforming How You Teach Science

Grade Level: MS-HS-COL Content Area: Biology/Life Science, Chemistry, Physics/Physical Science

Donna Rowlett, Gate City High School

Jinx Rasmussen, Virginia High School (Bristol)

TITLE: Reconnect-Recover-Reengage: 3 R's of Interactive Notebooks

Grade Level: MS-HS Content Area: Biology/Life Science, Environmental Science

Tara Rudo, 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

TITLE: Sands to Drones: Research Translated to K-12 Classrooms

Grade Level: ALL GRADES Content Area: Biology/Life Science, Environmental Science, STEM

Jennifer Saleeba, Ferrum Elementary School/ Franklin County Public Schools

Lisa Angell, Ferrum Elementary/ Franklin County Public Schools

Victoria Taylor, Henry Elementary/Franklin County Public Schools

Ashli Johansson, Henry Elementary/Franklin County Public Schools

TITLE: Engaging All Learners Proficiently

Grade Level: ALL GRADES Content Area: Physics/Physical Science, General, STEM

Paul Sarandria, Manor High School

Cami Field, Churchland High School

TITLE: BayQUEST

Grade Level: MS-HS Content Area: Earth/Space Science, Biology/Life Science, Environmental Science

Natasha Schuh-Nuhfer, Northern Virginia Community College

Lisbeth Valladares Hernandez, Northern Virginia Community College

TITLE: Micro:bit Coding and Technology for the Science Classroom

Grade Level: ELEM-MS Content Area: Biology/Life Science, STEM

November PDI Concurrent Session Presentations

Patrick Scharf, Louisa County Middle School

TITLE: **Using Real Time Data for Authentic Projects**

Grade Level: MS-HS. Content Area: Biology/Life Science, Environmental Science

Demetrice Smith-Mutegi, Old Dominion University

TITLE: **Applying the Science of Learning to Assess Science Learning**

Grade Level: ALL GRADES Content Area: General

Erich Sneller, Harrisonburg City Public Schools

TITLE: **Classroom Dialogue: The Bedrock of Great Teaching & Learning**

Grade Level: ALL GRADES Content Area: General

Tyler St. Clair, Longwood University

Benjamin Campbell, Longwood University

TITLE: **Clearing the Air: Addressing Misconceptions about Gases**

Grade Level: HS Content Area: Chemistry

Tatsu Takeuchi, Virginia Tech Department of Physics

TITLE: **Newton's Laws and the Conservation of Momentum**

Grade Level: HS-COL Content Area: Physics/Physical Science

Keisha Tennessee, Virginia Department of Education

Anne Petersen, Virginia Department of Education

TITLE: **Using Robotics as a Vehicle for STEM**

Grade Level: ELEM Content Area: STEM

Myra Thayer, Virginia Department of Education

Anne Petersen, Virginia Department of Education

Gregory MacDougall, Virginia Department of Education

TITLE: **Exploring Science Literacy**

Grade Level: ELEM Content Area: General

Myra Thayer, Virginia Department of Education

Anne Petersen, Virginia Department of Education

Gregory MacDougall, Virginia Department of Education

TITLE: **What do I do About Vocabulary?**

Grade Level: ALL GRADES Content Area: General

Myra Thayer, Virginia Department of Education

Anne Petersen, Virginia Department of Education

Gregory MacDougall, Virginia Department of Education

TITLE: **Gotta Talk: Using Discourse in the Science Classroom**

Grade Level: ALL GRADES Content Area: General

Melinda VanDevelder, Virginia Commonwealth University, School of Education

Suzanne Kirk, Virginia Commonwealth University School of Education

TITLE: **Macro Mania**

Grade Level: ALL GRADES Content Area: Biology/Life Science, Environmental Science

Scott Watson, Liberty University

TITLE: **Teaching and Learning about Variables in Science**

Grade Level: ALL GRADES Content Area: General, STEM

November PDI Concurrent Session Presentations

Erin Watson, York County Public Schools
Craig Doolittle, Williamsburg / James City County Public Schools
TITLE: **Life Science Liveliness**
Grade Level: MS Content Area: Biology/Life Science

Erin Watson, York County Public Schools
TITLE: **How To Teach Like Peter Pan**
Grade Level: ALL GRADES Content Area: General

Cindy Watson, Bedford County Schools/Forest Middle School
Erika Mabry, Bedford County Schools/Forest Middle School
TITLE: **Mission to Mars: Mimicking Perseverance and Ingenuity Activity**
Grade Level: ELEM-MS Content Area: Earth/Space Science, Math in Science, STEM

Cassi Weathersbee, Patriot High School, Prince William County Schools
TITLE: **Dive in: Linking Ocean Exploration to Your Class**
Grade Level: MS-HS Content Area: Earth/Space Science, Environmental Science

Angela Webb, James Madison University
TITLE: **Using Talk as Tool for Learning in High School Science**
Grade Level: HS Content Area: General

Angela Webb, James Madison University
Emily Stewart, James Madison University
TITLE: **Experiencing Science as a Language Learner**
Grade Level: ALL GRADES Content Area: General

Anne Weiss, NASA Langley Office of STEM Engagement
TITLE: **Explore Solar System and Beyond: NASA Astrobiology**
Grade Level: ALL GRADES Content Area: Earth/Space Science, Biology/Life Science, Chemistry

Anne Weiss, NASA Langley Office of STEM Engagement
TITLE: **NASA Digital Badging Resources for Educators & Students**
Grade Level: ALL GRADES Content Area: STEM

Anne Weiss, NASA Langley Office of STEM Engagement
TITLE: **Explore Earth: Monitoring Microplastic Pollution from Space**
Grade Level: ALL GRADES Content Area: Earth/Space Science, Biology/Life Science, Environmental Science

Georgette Willis, Park Ridge Elementary School (Stafford County)
Debbie Novalski, Park Ridge Elementary (Stafford County)
Dawn Hillis, King George County
TITLE: **“What the Flow is Going On?” -- (All about flowcharts)**
Grade Level: ELEM Content Area: Computer Science in the Classroom

Laurie Witt, Albert Harris Elementary School, Martinsville City Public Schools
Krista Hodges, Dan River Basin Association
TITLE: **Reach Out Locally; Form Connections; Make Contributions Now**
Grade Level: ALL GRADES Content Area: Environmental Science, STEM

Laurie Witt, Albert Harris Elementary School, Martinsville City Public Schools
Krista Hodges, Dan River Basin Association
TITLE: **Make the Most of Your Space by Creating a Green Schoolyard**
Grade Level: ALL GRADES Content Area: Environmental Science, STEM

Laurie Witt, Albert Harris Elementary School, Martinsville City Public Schools
TITLE: **Elementary Science Teachers Meet Up**
Grade Level: ELEM Content Area: Elementary Science, STEM

Check the VAST website and the PDI page for updates.



VAST Coffee Talk with the Content Chairs. VAST wants you to remember you are not in this alone.

Looking for a way to collaborate with other teachers in your content? Then come be a part of the of the VAST community.

Coffee Talks are held on Saturdays and there is no cost to register.

Fall Coffee Talk Dates -

September 24 - Back -2-School

You are invited to the Zoom meeting.

When: September 4, 2022, 10:00 AM Eastern Time (US and Canada)

Register in advance for this meeting: Watch for an e-note with information about how to register later.

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



Trash Talk: Engaging ELLs in Science and Math

Lydia Belser

Science Teacher James River High School, Chesterfield County
National Science Foundation Noyce Scholar

As a newer teacher of English Language Learners (ELLs), I struggled to find ways to engage students in science and math due to language and cultural barriers. However, during the previous academic year, I created a lesson that aided ELLs at James River High School in showcasing their vast knowledge and understanding of math and science in a hands-on, tangible way.

My environmental science classes ventured down to Robious Landing Park in Chesterfield County to first make some observations about the landscape. The class practiced speaking and writing sentences that described the environment in English. Many students noticed that there was trash all along the riverfront, in the parking lots, and in the woods. This inspired me to attempt a clean-up of Robious Landing Park with my classes. This seemed like a great idea, but what was the connection to math and science, besides the obvious pollution problem? One of our objectives for the year was to further students' understanding and literacy of various data charts, graphs, and tables. Therefore, "Trash Talk" was formed- a lesson on marine pollution that incorporates graphing, data visualization, and discussion questions for students of all levels.

Throughout the spring semester, my environmental science classes would pick up trash near Robious Landing or the student parking lots approximately bi-weekly.

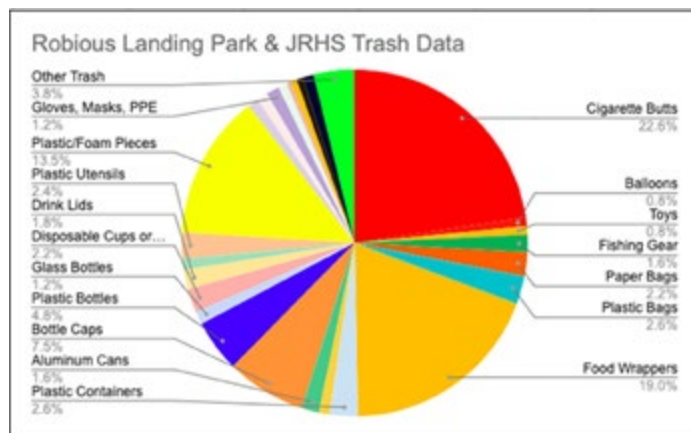
While students picked up the various trash, they worked as partners. One partner was the trash collector, and one student was the "recorder". Students used the [Ocean Conservancy Clean Swell App](#) or a printed checklist to record their trash findings. The findings were broken down into various categories, for example: plastic bags, plastic utensils, cigarette butts, or bottle caps. Students recorded what each trash item was when collected and were instructed to keep detailed records for a later activity.

After each outdoor excursion, students input their trash data into

a premade Google spreadsheet that automatically generated a pie chart of their trash data. Students were amazed by the results, and this sparked great discussion among the students. After the very first collection, students were asked to answer some guided questions. The questions made them think about their preconceived notions of trash, such as did the results surprise them. Additionally, ELL students were given the opportunity to compare and contrast American trash habits with trash habits in their home countries. Many students noted that there is no trash collection system in their home countries, leading to trash in the streets and waterways. However, ELL students also mentioned that they were shocked by how Americans can't even throw away their trash when a service is provided.

By the end of the semester, we picked up over 40 pounds of trash! This enabled students to get outside and feel active in their school and the local community.

All in all, this trash collection project enabled ELL students to have amazing experiences outside the classroom. It also allowed them to create a concrete final product in google sheets which made them feel proud of their abilities and further promoted discussions that helped them feel more confident in their English abilities.



Festina Lente

Time is the father of truth,
 Its mother is our mind.
 — Giordano Bruno

Like many families, we were given a dormant amaryllis bulb for the winter holidays in 2019. It bloomed gloriously with two stalks and eight flowers, then, as our Covid time began, had put forth a number of leaves, some growing about a meter long. The leaves continued over the following summer and fall, showing little change even when water was reduced. The next spring, we finally gave up and relegated the entire pot to that dead place of no returns in the garage to await recycling as compost. Having forgotten that step, it was not until late spring this year that we discovered a wilted flower stalk and a second one in bud rising a good foot or so from the abandoned pot. Having forsaken the appropriate treatment for amaryllis, the time had come for it to teach us by example, after having been abandoned for over a year. Nature's time and human time had been in conflict; you see the surprise result above!

There is a tale of a 19th Century explorer in Africa whose journey one day was exceptionally fast-paced. He was so pleased and excited that his journey would be much shorter than expected, saving both time and expense. But the next morning his native pack-bearers refused to move; after inquiring, he learned they had moved too fast the previous day and they needed time for their souls to catch up with their bodies.

The ancient Greeks had two words for time: *chronos* and *kairos*, clock / sequential time, from which we get "chronological," "chronometer," and "synchronize;" and opportune / event time, as in Lewis Carroll's *Through the Looking Glass*, where "The time has come, the Walrus said / to talk of many things: / Of shoes and ships – and sealing wax- / of cabbages and kings..." Or, as the ancient authors of Ecclesiastes once wrote: "For everything there is a season, and a time for everything...a time to plant and a time to pluck up what is planted...a time to keep, and a time to cast



away."

Geoffrey Chaucer put it this way: "Time and tide wait for no man." And Albert Einstein once quipped, "The only reason for time is so that everything doesn't happen at once."

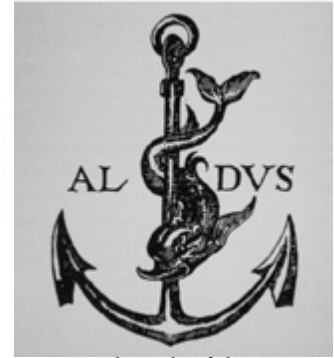
So much of the time we treat time as a commodity: we take time, we use time, we waste time, we save time, we spend time, we invest time, we buy time, we serve time; and we speak of time as being short or long. Our human perspective and our involvement definitely color our view of time: waiting for a traffic light to change; the length of a school year as experienced by a student or by her teacher. We perceive time on a human personal scale, saying that a hundred years is a long time, while in terms of the evolution of the universe, 100 years shrinks to nearly nothing at all, just seven ten-millionths of one percent! In our impatience and temptations toward rapid decisions, we design AI systems to take over human deliberations. Or at governmental levels, since democratic decision-making seems to take so long, some feel we need a good autocrat to make decisions for us; to others, the terms "good" and "autocrat" may constitute an oxymoron, as time has repeatedly shown.

All of which brings us to the timeless quote by the 16th Century Dominican friar, philosopher, mathematician, and developer of surprisingly modern cosmological theories, Giordano Bruno. Bruno's untimely fate together with Galileo's recantation 33 years later led to the shift of scientific leadership to the Protestant north as Descartes left France for Sweden and Hooke, Huygens, and Newton took center stage.

In both a mystical and a literal manner, we sense the wisdom in Bruno's thought that time is the father of truth, whose mother is our mind. Wherever truth may have her lodging, in science we have a well-tested method of ascertaining its presence or absence. Even in more prosaic terms, we use aphorisms such as "Time will tell." Or "One step at a time." Yet we as a modern culture seem obsessed with our sense of "chronos" time and all but unaware of "kairos" time.

A dear family member always sets not one, but two different alarms for waking on time for important appointments. We will ignore research on adequate amounts of sleep time, to jam in just one more thing. Why is it always good to seek a short cut, whether Alexa, cut across walkways on foot, or cut-throughs when driving? [Speaking of driving, I am alternately amused or terrified approaching a red light and being passed by high-speed drivers who suddenly jam on brakes just to get a car-length ahead.] We may choose the "graphic novel" approach to reading otherwise lengthy assignments, which, in earlier times in high school or college were simply Cliffs Notes. Efficiency seems trapped in Chronos' coils.

Of course, there are situations where careful and rapid timing IS absolutely essential, from emergency decisions by pilots to maneuvers such as those by teammates of Duke's recently-retired basketball legend, Michael Krzyzewski. There are some old-fashioned aphorisms for this talent as well: "A stitch in time saves nine;" or (for beer-drinkers), "Don't rush the growler." In music of all types, timing is everything. The composer sets the meter and phrasing for the effect they desire. Whether instrumental, choral, jazz, barber-shop, or freer forms like swing or rap, rhythms of melodic and accompanying lines are dependent on an innate sense of both "chronos" and "kairos" timing.



Festina lente, images of Roman coin and mark of the Renaissance printer, Aldus Manutius.

All of which bring us to the ancient Roman paradox: **festina lente**, or "make haste slowly." The first Roman emperor, Caesar Augustus (27 BCE – 14 CE) had gold coins minted with images of a crab and a butterfly on the side opposite to his profile. Others used a hare emerging from a snail's shell. The symbol of a dolphin twisted about an anchor was used by printers from Renaissance to modern times, and we are all familiar with Aesop's tale of the tortoise and the hare. The composer, Arvo Pärt, has written a piece for harp and strings called "Festina Lente," where violas have the melody, violins take the melody at twice the speed, and the basses at half the original tempo.

As our minds wrestle with the challenges of time being the father of truth, it seems both interesting and significant that we speak of "Father Time" and "Mother Earth." For, despite all our human machinations and tempo changes, nature's rhythms continue at paces governed by forces and motions not under human control. Whether developmentally, physiologically, or educationally, our systems are subject to patterns we are just learning about, from our Industrial-Revolution routines of everything from schooling and scheduling to MRI research showing us more accurately just how certain parts of children's brains function and develop. Children have been penalized or rewarded for not keeping pace with the "rest of the class," but all within educational strictures which today are just now becoming more flexible. Getting ahead quickly is not always the wisest choice in education... or in driving.

The poet, Naomi Shihab Nye, has written "Bug Hotel,"¹ a homage to the many time-keepers who keep our gardens alive and thriving. In it, she writes: "...

Precious denominators / Essential elements / Of a whole gorgeous meadow / A park / A desert / Royal families of the air and ground / Stay here / Stick around / All the keys / Are on your ring.” Cannot these words actually be descriptors of our students: “precious denominators, essential elements, royal families of air and ground,” and especially that all the keys are definitely on their ring?

In the latest issue of NSTA’s Science *Teacher*². Heidi Schweingruber uses the helpful metaphor of a garden to describe patterns and techniques for a thriving community garden of learners. I would also include us teachers as part of the science learners she describes. After observing popular metaphors from sports and military arenas (win-lose, reading and math wars, implying an end to the game), she feels they miss the point of nurturing and care. Noting the emphasis on opposition: our ends being goals, touchdowns, or wins (even our current preoccupation over culture wars), she emphasizes the *community* garden. For me, this necessitates reorganizing, even celebrating, the community within the garden, both varieties of plants and pollinators, as well as the external community which nurtures and cares for the garden.

Schweingruber urges us to work in the present, but with an eye to the future, develop shared goals, honor diverse experiences and adjust to the ever-changing environment. This latter point emphasizes the essential virtues of careful timing. To me, her most important point is the task of attending to suffering plants, whether the cause is internal or pests from the outside. She points out that diversity does indeed make our garden thrive, and concludes by saying, “If we tend the land well, we can cultivate the same plot for years while investing in and strengthening our community.” In gardening as in science education, our work is never done. Her community embraces teachers, supervisors, parents, legislators, and, most importantly, the “children and youth who are the very heart of our collective work.”

Some of you may recall the rousing closing song from Leonard Bernstein’s *Candide*, “Make Our Garden Grow.”

...The sweetest flow’rs, the fairest trees,
Are grown in solid ground.
We’re neither pure, nor wise, nor good;
We’ll do the best we know;
We’ll build our house, and chop our wood,
And make our garden grow.

The timing and the sentiment surely speak to science educators at all levels.

At a recent workshop at Sonoma State University north of San Francisco, we rehearsed to perform the work of American composer Damien Geter under the baton of Katherine FitzGibbon from Lewis and Clark College in Portland, Oregon, using a blend of texts, rhythms, and harmonies from Bach to African-American spirituals. His inspiring title is *Cantata for a More Hopeful Tomorrow*. The sense of timing, both “chronos” and “kairos,” was essential to our success as a musical community of performers. After our bus from the airport had stopped, the driver paused after his customary list of reminders and advisories, and added, “But the most important thing is that we look after each other.”

May we each make haste slowly and thoughtfully heading into this summertime – that time and timing become indeed the father of truth, and that our minds do, in fact, mother and nurture both our figurative and our literal gardens. Pacing is everything. **Festina lente.** Make haste, but slowly.

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: gtedewey3@outlook.com

References:

1. Nye, Naomi Shihab. 2021. “Bug Hotel,” *Sierra Magazine* (September 2021). Sierra Club, Oakland, CA.
2. Schweingruber, Heidi. 2022. “How Does Our Garden Grow?” *The Science Teacher*, National Science Teaching Association, Vol. 89, No. 5 (May-June 2022), “Inclusive Strategies for All Science Learners.”

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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

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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@scottsschools.com
Jinx Rasmussen
jasmussen@bvps.org

Region VIII

Dr. Ben Campbell
campbellbk@longwood.edu

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