The Science Educator

Early Spring **2021** **A Publication of the Virginia Association of Science Teachers** **ISSN 1945-7405, Vol. 69, No.4**

SAVE THE DATE!
2021 ANNUAL PROFESSIONAL DEVELOPMENT INSTITUTE
November 17-20
"Science, Systems, Solutions"

Science is a creative endeavor, giving us access to knowledge about the world around us. Systems represent the complex reality of this world and the challenges society faces. Solutions to these problems can be found when we model these systems using our scientific knowledge. None of this work is done in a vacuum, lab, or classroom alone, it involves many people with various skills, knowledge of economic realities, and sensitivity to the needs of our environment and planet. Science can help us find solutions to these systems challenges when we work together across disciplines to seek a balance between human and planetary needs.

We teach the science that helps our students understand complex systems, so that they can become problem solvers as adults. Whether the complex systems-based challenges society faces are related to transdisciplinary problems like climate change, pandemics, sending humans to Mars, or exploring the yet unknown environments of our planet or of the quantum world, the solutions are found through the scientific investigations, problem solving, and creative thinking that began in your classroom years before. We want our students to do science. We want them to understand systems. We want to help them seek solutions. A better world awaits!

Come explore Science, Systems, and Solutions with us at the 2021 VAST PDI in Harrisonburg, VA. Come experience where academic work and cutting edge science and pedagogy interact with the daily, the local, and the seemingly "unscientific". Come and share how you are teaching your own students to do science, understand systems, and seek solutions.

Virginia Department of Education Science Education Resources on VAST Website

"As members of the Virginia Association of Science Teachers you are joining a cadre of teachers that are eager to support science learning in the Commonwealth. At VDOE, our goal is to support all teachers in reaching the vision of science literacy at all levels. In order to do this effectively, we need the support of state science leaders, teachers, pre-service programs, state agencies, and science based organizations such as VAST. If you have suggestions on how we can improve our support, please feel free to contact us at anytime! Contact information is provided below."

Anne Peterson, Ph.D.
Myra Thayer

What is on the VAST DOE page?

Teacher Resources such as the 2018 Science Standards of Learning, Curriculum Frameworks, and Video Support.
Performance Assessment includes grades 3-5, 6-8, & 9-10 performance assessments.
Environmental Literacy Defines MWEE, and Gov. McAuliffe's Env. Literacy Challenge.
Safety Safety manuals, check lists, and guidance.
Assessment SOL Practice Items, Released SOL Tests, and Test Blue Prints.
Grants Check out four more grants to apply for.

Check it out!

…Being Inside When You Should Be Outside

While sitting in class virtually zooming or meeting, we are surrounded by our windows looking outside. Why not get out and go there? With today's technology You could easily bring the outdoors indoors into the classroom, or better yet, encourage your students to get their families excited about getting outside.

We are reaching the pandemic's first year anniversary, when we still wonder what the return to school plan might be. Are we recovering from the pandemic or have we put ourselves into a continued spiral. Challenges are everywhere whether it is on screen, in the chat or in the increasing work. What do we do? What do we talk about? What is the future?

That's exactly what we should be asking. Discuss all of these topics and give students experiences while opening their eyes to the world around them. Take time and enjoy resources to help you connect with the outdoors. Whether it is looking at the weather, the night sky, or the birds that come into your yard. Observe, record and analyze. These resources require little, to no technology and no, to low cost. So, let us stop being inside when we need to be outside to recover, thrive and learn like we do as the learners we are.

Susan Booth, **Ed.S.**
Executive Director

Menu

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Click "Menu" to return to this page.

President's Corner...

Russell Kohrs, MS NBCT

Greetings to my fellow travelers along the pathways of scientific knowledge.

I say fellow travelers because one year into a pandemic, we are *still* moving through unknown and challenging territory. In your classrooms and in cyberspace, you are finding yourself digging deep for ways to reach your students and to convey both your passion for science, and your dedication to teaching excellence. The work has never been harder. But, never have we found ourselves in a time where what science has to teach us about nature and natural processes is so at our fingertips! Amidst the massive concerns and stress of your work, there are also opportunities...teachable moments...to grasp. As we traverse these uncharted pathways toward another unusual end to a school year, I encourage you to use the science we hear about daily to encourage and enlighten your students.

Just this week, a third vaccine was added to our arsenal. We've hear about efficacy data from scientific trials yet again, after having two earlier rounds of news about these with the other vaccines. The spotlight being given to all of this data is unusual. We normally don't see it so publicly available and discussed. Words you may have used in class have a new living meaning. Words like "double-blind trial", "placebo", "efficacy", "nanolipids", and "mRNA" have come alive and exist naturally in our public discourse. We're daily privy to debates about vaccine safety, mask-wearing, and other pandemic measures. Though sometimes contentious, these debates are opportunities to highlight science. They're opportunities to highlight how science informs our understanding of complex systems that help us identify solutions. Hard as these conversations are, let's make sure we have them with students.

Recent winter storms in the midwest have highlighted the effects of anomalous weather in places like Texas. The debates over the cause of massive power outages have taken place in public and the truth is sometimes hard to see, amidst the discussions. Such events present us with opportunities - more teachable moments - where we can, again, see how science informs our understanding of complex systems, allowing us to arrive at solutions to problems. Power plants need to be engineered to deal with such weather, even if they are already well engineered to deal with normal averages. If we don't take time to understand this science, the science behind our changing climate, we can misread how the anomalous weather events affect the systems we depend upon. Scientific systems, but also systems of economics, power grids, government, and people's lives.

This fall, VAST will explore these teachable moments more deeply. We'll look at how we can better help our students understand science. We'll look at how our students can better understand complex systems. And, we'll see how this progression of knowledge can help lead us to a better world for all of us. We're getting there, I promise you that! So, come and join us this November in Harrisonburg, VA. We have an exciting program for you!

As you finish this school year, VAST is here for you. We'll be reaching out to you through our newsletter and in other ways, but we'd also love for you to connect with us. VAST is your organization. VAST can provide you with a support network. Contact your Regional Director or one of our Content Area Chairs. In these challenging times, be encouraged that you're not alone in the struggle. Be encouraged that through all of these hardships, there are even more ways to highlight the critical importance of science for our students.

Russ Kohrs, **VAST President 2021**

2020 PDI Presentations Are Now Available to All VAST Members!

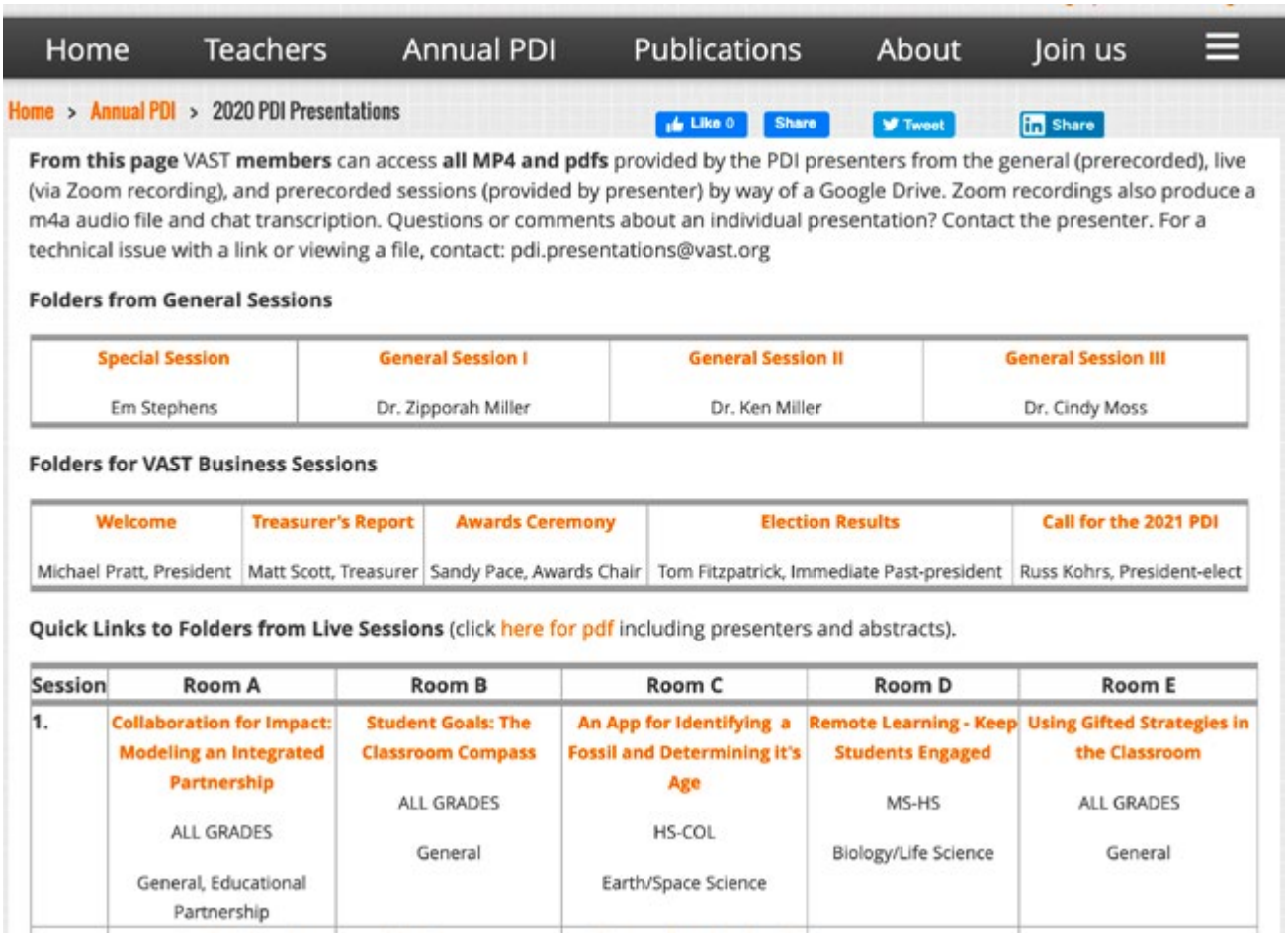
When we began the year, one of our goals was to provide more professional content for VAST members. Then came the challenge of the pandemic and we rose to the occasion by transitioning the annual PDI to a virtual format. That gave us a unique opportunity that we think you will appreciate and be able to use throughout 2021 and beyond!

Prior to the PDI, keynote speakers and presenters shared videos and pdfs. During the PDI, all the Zoom presentations were recorded in both video and audio files, chats were transcribed, and some presenters provided pdfs. Even if you weren't able to attend the PDI, or you did attend but missed an interesting sounding presentation, we have created a comprehensive web page with all the files organized for easy access. From this page VAST members can access all instructional materials including, video and audio recordings and pdfs from the 2020 virtual PDI!

Need points for recertification or just want to expand your science knowledge or instructional pedagogy, there are over 120 presentations and hundreds of support materials to explore across a wide range of science disciplines and levels. To learn more, VAST members go to: www.vast.org/2020pdipresentations/

Dr. Denny Casey

Screenshot of the 2020 PDI Presentations Page



Home Teachers Annual PDI Publications About Join us

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From this page VAST **members** can access **all MP4 and pdfs** provided by the PDI presenters from the general (prerecorded), live (via Zoom recording), and prerecorded sessions (provided by presenter) by way of a Google Drive. Zoom recordings also produce a m4a audio file and chat transcription. Questions or comments about an individual presentation? Contact the presenter. For a technical issue with a link or viewing a file, contact: pdi.presentations@vast.org

Folders from General Sessions

Special Session	General Session I	General Session II	General Session III
Em Stephens	Dr. Zipporah Miller	Dr. Ken Miller	Dr. Cindy Moss

Folders for VAST Business Sessions

Welcome	Treasurer's Report	Awards Ceremony	Election Results	Call for the 2021 PDI
Michael Pratt, President	Matt Scott, Treasurer	Sandy Pace, Awards Chair	Tom Fitzpatrick, Immediate Past-president	Russ Kohrs, President-elect

Quick Links to Folders from Live Sessions (click here for pdf including presenters and abstracts).

Session	Room A	Room B	Room C	Room D	Room E
1.	Collaboration for Impact: Modeling an Integrated Partnership ALL GRADES General, Educational Partnership	Student Goals: The Classroom Compass ALL GRADES General	An App for Identifying a Fossil and Determining it's Age HS-COL Earth/Space Science	Remote Learning - Keep Students Engaged MS-HS Biology/Life Science	Using Gifted Strategies in the Classroom ALL GRADES General

Virginia Association of Science Teachers
Board of Directors Nomination Form

Only members in good standing may apply.

Name of Nominee _____ *VAST Membership Number* _____

Nomination for the Office of

☐ President-Elect
☐ Vice-President

Nomination for Regional Director (Two-year Term: Regions II, IV, VI and VIII elected in even years. Regions I, III, V, and VII elected in odd years)

☐ Region I ☐ Region III ☐ Region V ☐ Region VII

Nominator (self-nominations are permitted and encouraged)_____

Nominator's Email: _____

The information below is for the Nominee to complete.

School/Institution _____

Position/Title _____

School/Institution Address _____

School/Institution Telephone Number (___) _____NA_____

School/Institution E-Mail _____

Home Address _____

Home/Cell Phone _____ Home E-Mail _____

Years as a Science Educator _____ Years as a VAST Member _____

Provide the names & e-mails of two individuals that have agreed to support your nomination:

(1) _____ E-mail _____

(2) _____ E-mail _____

Please attach a statement of 150-200 words detailing your experiences to include the bullets below.

- Leadership in VAST or other science organizations;
- Membership in other science-related organizations;
- Any additional activities, honors, and awards;
- Any science or educational publications you may have authored; and,
- The position(s) in VAST for which you would like to be considered.

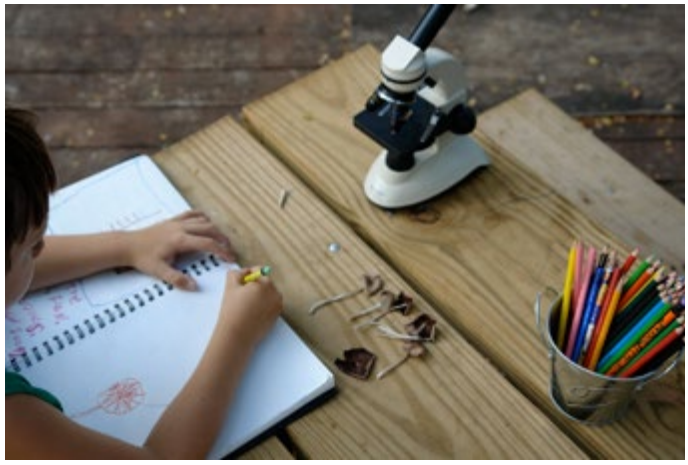
By signing this form, I attest that I am a member in good standing of the Virginia Association of Science Teachers and am willing to have my name submitted as a Nominee for the office of _____ to the Nominations Committee.

SIGNATURE_____ DATE _____

Submit this Nomination Form and your paragraph by email to past.president@vast.org by May 15, 2021.

Using Watercolor Pencils to Journal Nature

VAST Mini-grant Recipient Becky Schnekser, K-5 Science Educator Explorer



"Nature Journaling" by Blue Yonder is licensed under CC BY-NC-SA 2.0

Do you have an idea, project, or experience you want to provide for your students but funding is a challenge? Each year, Virginia Association of Science Teachers provides a $500 grant opportunity for educators. This year, I wanted to introduce my students to nature journaling with a specific focus on scientific observation, sketching, and integrating watercoloring. As a K-5 science educator, I teach over 300 students and with the added complexity of teaching during a pandemic, funding was extremely limited this year. To prepare my students to be outdoors, observing, sketching, and eventually watercoloring their journal entries, I proposed the purchase of binoculars, watercolor paper, and watercolor pencils for my students. To say my students have enjoyed this experience, would be a gross understatement. From my kindergarteners to fifth grade scientists, they have enjoyed learning the skills of binocular use, careful scientific observation, sketching, researching, and watercolor art. Some of the highlights of these experiences have been the sighting of a pileated woodpecker on campus, identification of 18 sparrow nests we had no idea existed in a courtyard on campus, and the incorporation of painting with worms and mud in combination with watercolors. Through this experience, my students learned about classification of living things, field notes and sketching, as well as the careful attention to detail of living things in order to identify scientific names to the species level, and add artistic components through watercolor art.

So what's your idea? What do you want to provide your students? I encourage you to seek this opportunity for your learners next year.

Becky Schnekser, K-5 Science Educator Explorer, Virginia Beach, VA

GeneLab for High Schools: Growing the Next Generation of Scientists

1. Students (for rising high school juniors and seniors) – attend a virtual four-week intensive training program sponsored by NASA's Ames Research Center. Focus on omics-based bioinformatics research, the science of collecting and analyzing complex biological data such as genetic codes, and computational biology.

2. Teachers - learn about NASA and Space Biology research and bioinformatics tools and analysis.

https://www.nasa.gov/ames/genelab-for-high-schools

2021 Donna Sterling Institute
Thursday November 18, 2021 8:00 am – 3:00 pm
James Madison Hotel Hotel-Harrisonburg

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

We are pleased to announce the 2021 Donna Sterling Institute to be held at the James Madison Hotel in Harrisonburg, VA on November 18, 2021 from 8am-3pm with a pre-institute asynchronous (2 hours once between November 8 to 13) and a post-Institute synchronous session (2 hours on Decmber 4). Donna Sterling was instrumental in her vision of problem-based learning (PBL) as a means of teaching and integrating science with math, engineering, technology, and language arts. PBL prepares students for academic, personal, and career success and prepares young people to rise to the challenges of their lives and the world they will inherit.
Here is your chance to learn how to implement this powerful teaching strategy!

Finding Smart Solutions in Energy and Climate Science

K-12 students need a fundamental understanding of energy to develop a thorough, comprehensive understanding of climate science and the path forward to climate and energy resiliency, However, decisions about climate and energy policy are seldom made from a foundation of science. Toolkit for teaching Energy and Climate; https://www.climate.gov/teaching/tool-box-teaching-climate-energy

The 2021 Sterling Institute in collaboration with NEED Energy will engage participants in a PBL unit using a topic of climate and alternative energy, which is adaptable for elementary through high school students. Participants will learn about climate and alternative energy from Dr. Don Haas in a virtual presentation and engage in NEED lead activities to help understanding of climate and alternative energy. Teachers learn the key components of a PBL unit including designing an authentic scenario and essential question, question map development, and creating culminating activities., Teachers will consider how to modify what they learn to meet the Standards they teach and the needs of students in their own classroom context.

Instructors

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

Registration

Registration fee: $100.00 includes breakfast, lunch, and materials

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

Register online at:
https://vast.wildapricot.org/Registration-Information

2021 Online Registration Form and Fees for PDI attendees, exhibitors, and Donna Sterling Institute.

Online registration is open from April 1 to October 31. Onsite registration is NOT available on November 18.

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

Donna Sterling

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

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

Deadline for applications: July 15, 2021

To apply:

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

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

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

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

All materials must be submitted by 5 pm on July 15, 2021.

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

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

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

What should you do first?

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

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

Do you have questions? Please contact the editor, Jean Foss.

Write for the Journal !

We know you've learned a lot over the past year! JVSE invites pre-service and in-service teachers, school administrators, science education faculty, and informal science educators to submit papers for the Winter 2021 issue of JVSE. The theme is *Integrating the Virginia Computer Science Stadards into K-12 Science Instruction* and we'd love for you to share lesson activities, solutions, and research associated with all you've learned over the past year! Submissions due July 31, 2021 and the winter issue will be published in December 2021. Submissions unrelated to the theme are also welcome!!! If you have questions, please reach out to Drs. Amanda Gonczi and Jenn Maeng, journal co-editors at **journal@vast.org.**

National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Chesapeake Bay Online Courses

These free Chesapeake Exploration courses share new ideas and tools for classroom and outdoor instruction to support environmental literacy. Two new courses have been added: MWEE 201 and Next Generation Science Standards and Environmental Literacy. Check them out today!

SCIENCE FOR ALL *George Dewey*

While We Wait

For what a man more likes to be true,
he more readily believes.
—Francis Bacon

Nations reel and stagger on their way;
They make hideous mistakes;
They commit frightful wrongs;
They do great and beautiful things.
And shall we not best guide humanity by
Telling the truth about all this,
So far as the truth is ascertainable?
—W.E.B. duBois

"Project 366 #265: 210912 Go Placidly..." by comedy_nose is marked with CC PDM 1.0

In Memorium of 500,000 Covid Victims

It has been a year now since our schools shut down and many aspects of our personal and professional lives have changed: the neighborhood inside our home, outside our home, how and where to shop, what are necessities, which parent is in charge and where, how, when, and where do children study, providing synchronous, asynchronous, and hybrid learning experiences. It is a strange world where "unprecedented" is almost a cliché, the "new normal" can often shift daily, routines must be abandoned, altered, or assimilated anew, and the borders between virtual and real have become enveloped in the fog of changing weather patterns, literal and figurative. And, for teachers who may have learned mastery of face-to-face instruction, juggling the variations of virtual instruction and child care, we are in significant ways still first-year teachers.

There seems to be an updated version of Dickens' famous line, "It was the best of times, it was the worst of times." A time when the abyss and the heavens have opened simultaneously, a time when the authenticity of the internet has been both welcomed and challenged, a time in our schooling when teaching and learning have been exposing the inequities of the digital divide more than ever. Surrounding our altered sense of reality looms the emotional and physical impact from Covid19 as, in less than a year, over 500,000 of our friends and relatives are no longer with us. The fear and anxieties among survivors, wives, husbands, children, friends have continued to exacerbate pervasive increases in stress and depression.

We have been forced to experience the paradox in the terms "social distancing". Our deep human needs for social contact and communication have been curtailed: come together, but not too close and always behind an appropriate mask, limits in group size and separation, six feet or two meters depending on your country.

Nearly fifty years ago, Jacob Bronowski in his monumental work, *The Ascent of Man*, underscored throughout the book and TV program that man has a dual nature, a need for companionship and solitude. From his opening sentence ["Man is a singular creature."] to the concluding chapter, he reiterates his theme that man is both social and solitary: "…an animal is either social or solitary. Man alone aspires to be both in one, a social solitary." Despite the virtual connectedness of platforms in the internet, we are physiologically and psychologically wired for the intimacy of personal contact and communication.

Our need for connectedness, along with what we do to and with each other, have also jarred us to the core. As the *Christian Science Monitor* put it last June, "there is a deafening silence of resignation and denial about racial discrimination worldwide." In our own nation, the systemic infection of racism and antisemitism has erupted to cover churches and synagogues. The Black Lives movement has grown in outrage and frustration after the murders of Ahmaud Arbery in Brunswick,

Georgia; Breonna Taylor in Louisville, Kentucky; George Floyd in Minneapolis, Minnesota; Tony McDade in Tallahassee, Florida; Rayshard Brooks in Atlanta, Georgia; Jacob Blake in Kenosha, Wisconsin along with countless earlier tragedies including the slayings of Elijah McClain in Aurora, Colorado; Michael Brown in Ferguson, Missouri; Freddie Gray in Baltimore, Maryland; Tamir Rice in Cleveland, Ohio; Wayne Jones in Martinsburg, West Virginia; and Trayvon Martin in Miami, Florida. In our sense of justice as well as in education there has again arisen the absolute necessity for a fundamental reckoning, a sense of reparation and reconciliation after centuries of degradation and neglect.

Speak these names, we are urged, so their personhood shall no longer be denied. Add to these persons five hundred thousand more! The stark power of the Vietnam Memorial lies in the individual names of 58,000 victims. If similar spacing were to be followed for our Covid victims and the length of the Memorial remained unchanged, *The Washington Post* estimates the Memorial would extend to 87 feet high. Let that sink in…

As our closures commenced last March, there were the inevitable negative selfish aspects: hoarding of supplies from stores, shortages falling disproportionately upon the poor and marginalized, in Pittsburgh tractor-trailers needed police escorts to deliver food to stores. Yet it is essential to also point out the numerous selfless acts which reflected a true sense of community: the lady at checkout who returned most of the paper goods piled in her cart saying, "I don't really need all these;" the man who paid for the groceries of a couple ahead of him whose credit card was rejected; paying the toll for the car behind. In pouring rain, I was told at the Starbucks window that my drink had been paid for by the person ahead of me. We also heard of other acts of "paying it forward" in frozen Texas: the H-E-B Plus store in Leander which let customers leave without paying for their groceries when the power went out; the grocery delivery lady who got stuck in a customer's driveway and ended up staying with the family for five days; the New Jersey plumber who drove with supplies, family, and partner to Texas and ended up staying there for two weeks repairing water leaks from frozen pipes in many homes.

There are also many examples of teens giving assistance to their peers and to their teachers with the inevitable technological challenges and failures learning at a distance entails, especially in adjusting to different venues like Blackboard, Google Classroom, Teams, Moodle or Zoom. Add to this the problems inherent with Internet access in fringe areas where even hotspots or school bus centers are not effective, and teachers are especially challenged. Some teachers have called or visited student homes as working with families has taken on entirely new dimensions.

In addition to students who have helped pack and distribute meals, accenting the positive has involved the entire staff in our schools. On the notice board outside of Greenbriar West Elementary School where I have walked past every day, these messages have been posted since the fall: "Never look down on anyone, unless you are helping them up;" "Kindness is like snow — it beautifies whatever it covers;" and from Martin Luther King's 1957 speech in Montgomery, Alabama, "Life's most persistent and urgent question is 'What are you doing for others?'".

A response to King's probing question can be found in the 9 September *2020 Education Week* (Vol. 40, No. 4) article, "Students Deserve a Voice in Our Pandemic Response." The organization Mikva Challenge formed its pioneer National Youth Response Movement (NYRM) with a group of 22 high school students from 15 schools across the US, meeting twice each week with adult facilitators from April to August. In their own words:

> An interactive, youth-led, project-based education in democracy — also known as "action civics" — can only be successful when adult facilitators invest significant time in community building and storytelling to make young people feel safe enough to lead, engage with each other, and be vulnerable. We learned that students need ample time to express their thoughts, either in the group setting or in smaller breakout discussions – both of which must be virtual now. But here's the difficult part: Beyond the logistics of scheduling students across three time zones in the midst of the pandemic, NYRM adult facilitators need to take into account the issues students were managing while they sheltered

at home, including their mental health…Students steered discussions, did the research, and made the calls on policy recommendations…They wrote a series of policy recommendations for school and district leaders to dismantle the cradle-to-prison pipeline, build inclusive curriculum, and provide mental-health support in schools.

Such an inspiring antidote to the too-common negative perceptions of self-absorbed, preoccupied adolescents. As the President of Wesleyan University commented this winter, "Effective leaders learn from crises, and communities can become stronger by tackling them with **compassionate solidarity**," (emphasis mine) what he calls "focused collaboration."

This leads to one final point relevant to science and science teaching. The quotes which began this column address the issues of truth and its corollary, trust. Four hundred years ago, Francis Bacon wrote, "For what a man more likes to be true, he more readily believes." To which one might think, 300 years later, W.E.B. duBois could have added in 1935, "And shall we not best guide humanity by telling the truth…so far as the truth is ascertainable?". In 2005 the evolutionary biologist, Lynn Margulis, had these comments to make (*American Scientist*, Vol. 93, No. 6) about the scientific process:

> "For what a man more likes to be true, he more readily believes," wrote Francis Bacon (1561-1626). We researchers resist this natural tendency; we do not try to "discover" or "scientifically prove" preconceived notions, to find what we *like* to be true. We discount gossip. We distain common myth. We seek evidence, hard evidence. When doing science, we try to avoid the influence of…dogma.
>
> …American students' persistent low scores on international tests and faltering interest in science and mathematics reflect, in my opinion, a contradiction in our national psyche, a deep cultural divide. Intellectual truths in this country are often sacrificed to what people "like to be true" and thus "more readily believe." What sells to the multitudes is what people like. Our culture puts a premium on being liked; we tend to seek and value popularity over truth, especially abstract scientific truth.
>
> …The scientist studies nature in nature, and it is from nature that authentic scientists take dictation… To challenge unstated assumptions, to resist argument from authority, to detect and reject institutionalized bias, all are intrinsic to the scientific enterprise. In peer-reviewed professional journals, outlandish claims, overgeneralizations and personal experience don't count. Having heard something on the grapevine of the day – newspaper, telephone, lecture hall, television, internet – does not constitute authority…But decent science education requires that we share the truth we find – whether or not we like it.

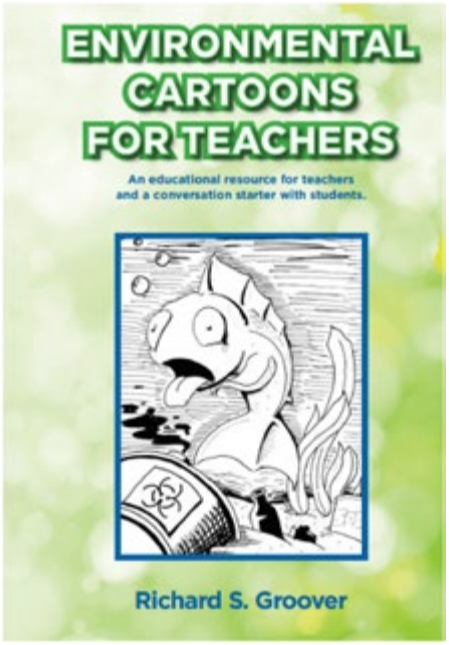
Both in civics lessons and in science lessons, how do we lead our students to *discover* what is true rather than simply *telling* them, which serves in the final analysis to be so ineffective? Immersed in coping with pandemic and other issues like our continuing systemic racism which have surfaced and boiled over during the past year, is this not an indication of how inconsistent we are in imparting to our students, now adults, the truths in science and beyond? In many cultures there is the quiet yet persistent voice which proclaims, "You shall know the truth, and the truth shall set you free."

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

Environmental Cartoons For Teachers by Dr. Richard S. Groover

Reviewed by Dr. Anne Mannarino



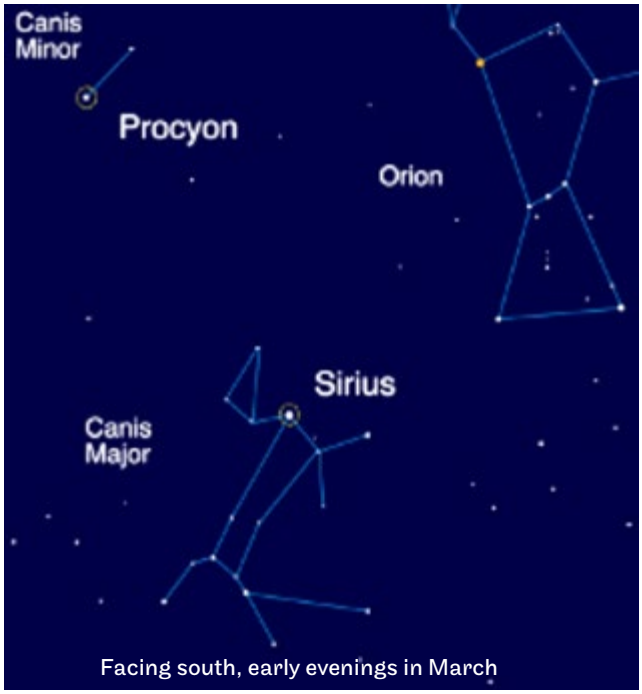
"The Environmental Cartoons for Teachers is a useful educational resource for teachers, at any level of education to get the conversations started. With over 40 mostly student drawn cartoons, teachers can copy for educational and public purposes to assist with teaching environmental and biological topics to students. For example, across the page from each image is a short statement that relates to the cartoon. One cartoon mentions that insects and pollinators provide a service for three-quarters of all our food crops, a value of $500 billion dollars per year. Another cartoon mentions the "Wood Wide Web" and how trees "talk" to each other."

Richard S. Groover, rgroover@reynolds.edu

"This book uses the power of over 40 visual cartoons to address environmental issues today. The focus is on climate change. As you read the book, you are first shown a cartoon in black and white with specific captions. Then the environmental issue is explained in a short paragraph. The book could be used as a starting point or ending point to discuss environmental issues. Not a lot of detail is given for each environmental issue, but it provokes the reader into wanting to learn more. There are also facts and figures referred to throughout the book. The websites are listed with the page numbers at the end of the book. If you teach any form of environmental sciences, then this book could be the stimulus needed to start much needed important conversations."
Reviewed by Dr. Anne Mannorino

Taking the Dog Stars for a Springtime Walk: Sirius and Procyon

David Prosper



Sirius and Procyon, the loyal hunting dogs of nearby Orion the Hunter! What other stories can you imagine for these stars? Learn about "Legends in the Sky" and create your own with this activity: **https://bit.ly/legendsinthesky** Image created with assistance from Stellarium.

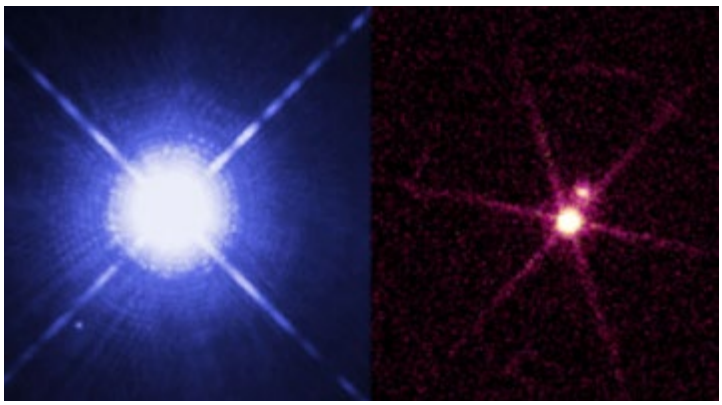
March skies feature many dazzling stars and constellations, glimmering high in the night, but two of the brightest stars are the focus of our attention this month: Sirius and Procyon, the dog stars!

Sirius is the brightest star in the nighttime sky, in large part because it is one of the closest stars to our solar system at 8.6 light years away. Compared to our Sun, Sirius possesses twice the mass and is much younger. Sirius is estimated to be several hundred million years old, just a fraction of the Sun's 4.6 billion years. Near Sirius - around the width of a hand with fingers splayed out, held away at arm's length - you'll find Procyon, the 8th brightest star in the night sky. Procyon is another one of our Sun's closest neighbors, though a little farther away than Sirius, 11.5 light years away. While less massive than Sirius, it is much older and unusually luminous for a star of its type, leading astronomers to suspect that it may "soon" – at some point millions of years from now – swell into a giant star as it nears the end of its stellar life.

Sirius and Procyon are nicknamed the "Dog Stars," an apt name as they are the brightest stars in their respective constellations – Canis Major and Canis Minor – whose names translate to "Big Dog" and "Little Dog." Not everyone sees them as canine companions. As two of the brightest stars in the sky, they feature prominently in the sky stories of cultures around the world. Sirius also captures the imaginations of people today: when rising or setting near the horizon, its brilliance mixes with our atmosphere's turbulence, causing the star's light to shimmer with wildly flickering color. This vivid, eerie sight was an indication to ancient peoples of changes in the seasons, and even triggers UFO reports in the modern era!

Both of these bright stars have unseen companions: tiny, dense white dwarf stars, the remnants of supermassive companion stars. Interestingly, both of these dim companions were inferred from careful studies of their parent stars' movements in the 1800s, before they were ever directly observed! They are a challenging observation, even with a large telescope, since their parent stars are so very bright that their light overwhelms the much dimmer light of their tiny companions. The white dwarf stars, just like their parent stars, have differences: Sirius B is younger, brighter, and more energetic than Procyon B. Careful observations of these nearby systems over hundreds of years have helped advance the fields of: astrometry, the precise measurement of stars; stellar evolution; and astroseismology, the study of the internal structure of stars via their oscillations. Discover more about our stellar neighborhood at nasa.gov!

Sirius A and B imaged by two different space telescopes, revealing dramatically different views! Hubble's image (left) shows Sirius A shining brightly in visible light, with diminutive Sirius B a tiny dot. However, in Chandra's image (right) tiny Sirius B is dramatically brighter in X-rays! The "Universe in a Different Light" activity highlights more surprising views of some familiar objects: **http://bit.ly/different-light-nsn** NASA, ESA, H. Bond (STScI), and M. Barstow (University of Leicester) (left); NASA/SAO/CXC (right)



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