

# The Reflector



Editor Dr. Mary Ellen Durham

Fall 2023



## It's Almost Here! 2023 PDI

The NCSTA 2023 Professional Development Institute (PDI) is just around corner! Scheduled on November 2-3 at the Benton Convention Center in Winston-Salem, N.C., this year's conference offers opportunities for science educators to expand their scientific knowledge and instructional skills, connect with other energetic professionals, explore the most current classroom resources, and engage in many other fun-filled activities. The PDI includes a general meeting featuring a keynote address by the acclaimed [Laura Bottomley, share-a-thons](#), over 120 concurrent sessions, and multiple chances to win prizes.

Attendees are encouraged to examine and assess the latest instructional resources and learning experiences that will be on display in the extensive exhibit hall. (Visit the NCSTA website to see a [list of exhibitors](#)).

A special pre-conference sunset tour to Pilot Mountain State Park is available on November 1, 2023. This science enrichment outing promises to provide a memorable learning experience in a very unique North Carolina State Park.

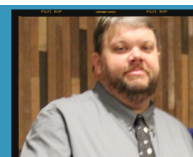
A [workshop](#) will be available on Friday for skills-seeking teachers. Remember, up to 1.2 CEU credits can be earned during the two-day conference.

Boost your creativity and amplify your professional practice. Join other like-minded Science Teachers at the 2023 PDI!

**[Register](#)** today!



NCSTA  
2023  
President



### Greetings.

I hope you have had a great start to your school year. I know that you are working tirelessly to provide the very best science educational experience for your students. Your NCSTA board, along with the PDI planning committee, remind you that it's still not too late to attend this year's awesome PDI in Winston Salem November 3rd & 4th. We have worked hard to provide the best possible experience to help and rejuvenate you. I gain so much from the Share-a-Thons, great sessions, wonderful teaching resources from the vendors and, of course, who can forget the opportunities to collaborate with incredible educators from across the great state of North Carolina.

Looking forward we ask that you save the date for next year's PDI to be held November 7th & 8th, 2024. Future plans are already in place, and we have started the necessary work to provide you with an excellent professional experience. Next year we will move the PDI to the Elliott University Center on the campus of UNC-G. Our theme will be "Rocking Out the New Standards in an Ever-Changing World!!". The PDI will feature the following strands: Strategies for Engaging Learners to Meet the New Science Standards, As the World Turns: Bringing the Spheres Together, and Meeting the Needs of our Diverse Learners. Stay tuned for more exciting information! Thank you for the effort, hard work and time you spend in meeting all the different needs of your students. You may not always see or feel that you are making a difference but please know that your passion for science is changing lives daily. Always remember you ROCK!!

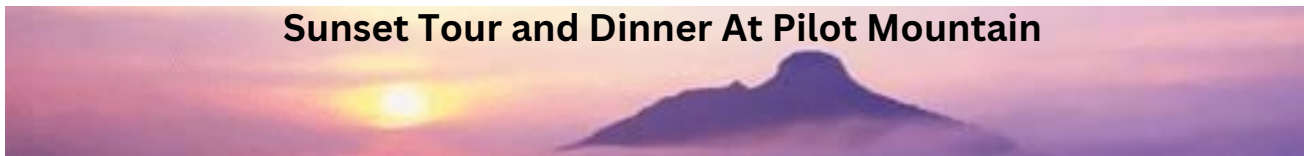
## Friday Workshop: Diverse Learners & Early Career Educators



This workshop focuses on the needs of novice educators, lateral-entry teachers and long-term substitutes and will address: How to Teach Effective Science Inquiry Lessons, Classroom Management Tips for the Science Classroom and Lab, Dos and Don'ts of Science Demonstrations, Measuring Understanding of Science Concepts, Practicing Safe Science, Planning to Meet the New Science Standards, 5E+ Science Lesson Cycles, and Tech Tools for Science Educators.

On day one of the PDI, registrants can take advantage of many resources and strategies to enhance their teaching; concurrent sessions are offered throughout the day along with exhibits and a keynote speaker. The workshop will be provided on the second day of the conference. Full PDI registration is required to attend the Friday Workshop. When registering for the PDI, you must click on four selection boxes: 1. Membership; 2. Upcoming Events; 3. Register; and 4. Workshop -click on 'Teaching Skills Workshop' in the Workshop selection box. The workshop fee is \$45 in addition to your PDI registration fee.

## Sunset Tour and Dinner At Pilot Mountain



**Wednesday 11/1/2023 5:00 PM to 8:30 PM**

**Hosts:** Sean Higgins, North Carolina State Parks; Lisa Tolley, NC Office of Environmental Education; Sarah Yelton, UNC Institute for the Environment; Jason Anthony, Pilot Mountain State Park

**Cost:** \$15.45 for transportation, after-hours tour and dinner.

[Register Here](#)

**Maximum:** 35 participants

**Description:** Join us on a science enrichment field trip to Pilot Mountain State Park. Enjoy the sunset (6:26 PM) from the overlook atop Pilot Mountain. See the new Visitor Center featuring natural science exhibits. We will provide dinner and talk with park rangers about the science of protecting the natural resources including monitoring migrating hawks and setting prescribed fires.

### Schedule

**5:00 PM** - Meet at the Winston-Salem Marriot-downtown lobby. Guided van shuttle to the summit of Pilot Mountain.

**5:45 PM** - Optional Guided Hike around the Pilot Knob Trail (1 mile), and/or Natural Resource Management discussion with Park Staff at the accessible overlook.

**6:35 PM** - Vans depart the summit for the Visitor Center at the base of Pilot Mountain.

**6:45 PM – 7:45 PM** - Buffet dinner in the Visitor Center. Welcome with Park Superintendent Jason Anthony. Short introduction to the Schools In Parks Program with UNC-Institute for the Environment. Tour exhibits.

**7:45PM – 8:30 PM** - Vans Depart Pilot Mountain visitor center to return to the Winston-Salem Marriot-downtown.

## Get Ready to Party! Reception and Awards Ceremony



PDI attendees are invited on Thursday evening to celebrate the advancement of science education in North Carolina at a reception sponsored by the Plasma Games, MiniPCR bio and the NCSTA board. Meet new science educators, collaborate, and reconnect with former colleagues as you enjoy a wide array of heavy hors d'oeuvres. (Cash wine, beer, and beverage bar available).

Immediately following the reception will be the annual awards ceremony, where NCSTA recognizes statewide and district-level nominees for their roles in promoting excellence in science education. This year's ceremony promises to be fun filled and exciting. Not only will our awardees be acknowledged, but Grant-a-Wish winners will be announced.



## Raffle Mania



Raffle tickets will be distributed throughout the PDI; registration, the General Session, entrance to the exhibit hall, and the Awards Ceremony. Winning tickets for the many NCSTA raffle prizes will be drawn during the Awards Ceremony. Save your tickets as you may be one of the lucky winners!

## SCHED APP

The conference APP SCHED will be used at the 2023 NCSTA PDI. For the latest updates to the conference sessions and activities, download and install SCHED on your preferred electronic device.

To access SCHED on your tablet or cell phone:

1. Download and install the SCHED APP. A free account is available. (If you choose to create an account you will be able to add sessions to your personal schedule).
2. Search for NCSTA PDI 2023
3. Tap on any listing for detail

For help in using SCHED use this link.  
<https://sched.com/support/section/guide-for-attendees/>

Presenters. use this link.  
<https://sched.com/support/section/speaker-tools/>



[www.eastern4hcenter.org](http://www.eastern4hcenter.org)  
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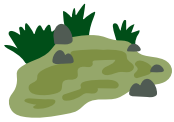


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Way at the  
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Book your school  
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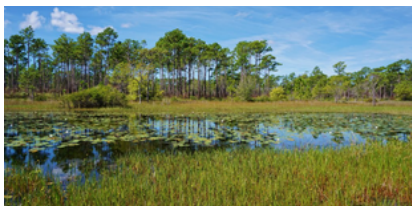


## Pocosin Power

North Carolina possesses a secret weapon against climate change in her vast pocosin peatlands that lay along her coastline. Slightly elevated from the surrounding land, these shrubby bogs have been building up organic material for millennia. The pocosins' importance lies in the content of their soil. Peatlands, such as these pocosins, compose less than 3 % of the Earth's land surface, yet they hold twice as much carbon as all of the world's woodlands. About half of the world's carbon stock is stored in peatlands!

Dry degraded peatlands release carbon. They also become vulnerable to wildfires that emit huge amounts of carbon dioxide rich smoke. Additionally, altered pocosins can't hold back water, resulting in flooding issues. Humans have dredged and drained these carbon-rich landforms since the 1700s to further timbering, agricultural, and construction projects. These actions have resulted in the loss of nearly 70% of the state's peatlands, damaging floods, and numerous wildfires.

Recently the North Carolina Wildlife Resources Commission and the North Carolina Nature Conservancy assumed the enormous task of redirecting natural coastal water patterns and restoring pocosin peatlands along the entire coast. These actions have resulted in a reduction in fires and flooding in the eastern portion of the state. Additionally, data from this restoration project appears to show an impact in the climate change battle. Ten acres of drained pocosin peatlands release, per year, the same amount of carbon dioxide as 21.5 passenger cars. Restored peatlands, a carbon sink, removed as much carbon as found in the annual emission of 3.25 passenger vehicles.



## Awardees

**NCSTA** extends its congratulations to the following outstanding science educators who were named this past spring as 2023 Burroughs Wellcome Fund Career Award for STEM Teacher Awardees.

### **Benjamin Davis**

Robbinsville High School (Graham County Schools)

### **Andrea Gladden**

East Burke Middle School (Burke County Schools)

### **Leslie Rhinehart**

Polk County Middle School (Polk County Schools)

### **Tom Savage**

Henderson County Early College (Henderson County Schools)

## Important Reminder

The North Carolina Science Teachers Board asks that all members of the Association visit the [NCSTA Website](#) to state your approval of the 2024 Slate of Officers.



# BRING LEARNING TO LIFE WITH PROJECT LEARNING TREE'S DIGITAL ACTIVITY COLLECTIONS!

Stop by the PLT booth at the NCSTA exhibit hall to learn more.



[WWW.PLT.ORG](http://WWW.PLT.ORG)

# A Call to Action in Support of Fellow Pre-Service & Beginning Teachers in Our State



by: **Laura Lowder**

Members, please share this invitation with the early career and pre-service teachers in your network and encourage them to join our organization as members and to attend our Fall 2023 PDI. We find, year after year, that an early career connection with NCSTA leads to long-term membership and engagement in the organization. Thank you for helping us to spread the word. The following opportunities at our PDI are especially supportive and fun for our pre-service and beginning teachers.

## An Open Invitation for Novice, Beginning, and Pre-Service Teachers

The board of the North Carolina Science Teachers Association seeks to welcome new teachers and pre-service teachers to our Fall Professional Development Institute. We hope you'll join us for the any or all of the following:

### Pre-Service Teacher Luncheon

Join us for a casual lunch provided to pre-service teachers and their faculty mentors. There is no additional cost to attendees for this luncheon. It will be held on Thursday, November 2nd, 12:00-1:30 PM. Look for the signs for the **Reality Check** and stop by for some yummy food and a warm welcome from a few of our members.

### Share-a-Thon

Pop in, stroll around the venue, and stop by the tables of novice and veteran science teachers who will be sharing ready-to-teach lessons, activities, and strategies. This session is informal and casual. Come and build your teacher toolkit.

**Elementary & Middle Grades Science**  
Thursday, November 2nd, 3:30-4:20 PM  
Winston Ballroom 2

**Earth/Environmental Sciences**  
Thursday, November 2nd, 9:30-10:20 AM  
Winston 1A

**Life/Biological Sciences & Chemistry/Physics**  
Friday, November 3rd, 8:30-9:20 AM  
Winston Ballroom 2

### Special Opportunity for Pre-Service & Novice Teachers: Share-a-Thon Presenters

Just because you are a new teacher doesn't mean your ideas should stay hidden just for you. Build your resume and your leadership in the field by presenting at one of our Share-a-thons. We love it when pre-service and beginning teachers share their science activity ideas at the Share-a-Thon as Presenters. If you are interested in this special opportunity, sign up [HERE](#). We are a fun group and are easy to share ideas with. Come gain this valuable experience and build professional connections in the field of science education, in our great state. More Information [Here](#)

**Friday Workshop: Tools to Support Diverse Learners and Early Career Educators**  
[Information Here](#)



## North Carolina Envirothon Winners

The North Carolina Science Teachers Association congratulates the Enloe Magnet High School Envirothon Team (Wake County Schools) and their science teacher/sponsor, Chad Ogren, for their recent accomplishments. The Enloe Envirothon team, known as Subchronic Exposure, won the 2023 North Carolina Envirothon. The team was tested in the areas of soil and land use, aquatic ecology, forestry, wildlife, and current environmental issues during the two-day, interactive outdoor competition. In addition to earning a \$200.00 cash prize and plaque, each team member received a \$500.00 scholarship to an institution of higher learning.

As state champions, Subchronic Exposure represented North Carolina at the international NCF-Envirothon competition in New Brunswick, Canada, where they achieved an impressive sixth place.



## Ants Everywhere

The Proceedings of the National Academy of Sciences reports that there are about 20 quadrillion ants (10,000 distinct species) roaming the Earth at any given time. They live on every continent except Antarctica. Those ant bodies contain twelve megatons of dry carbon, a biomass weighing more than all mammals and wild birds combined!

Although seen as pesty, annoying insects, ants are critical to the health of almost every ecosystem. They disperse plant seed, aerate the soil, and accelerate decomposition of organic waste and dead animals.

These often-overlooked, omnipresent organisms are facing harsh challenges. Increased threats from habitat fragmentation are leading to rapid decline in ant populations. Like birds, reptiles, and mammals, ants must have intact stretches of land to find food, water and nesting sites. Several conservation-oriented agencies are including calls for ant habitat preservation in their fight to protect natural areas from building and road construction.

## Dr. Dorothy Holley Named 2023-2024 Albert Einstein Distinguished Educator Award Fellow

Dr. Dorothy Holley, West Johnston High School Chemistry teacher, has been named as a 2023-2024 Albert Einstein Distinguished Educator Fellow (AEF). A veteran science teacher with Johnston County Public Schools, Dr. Holley is one of sixteen K-12 STEM educators from the United States chosen for this program.

Dr. Holley will spend eleven months serving in the U.S. Congressional Office in Washington, D.C. She will bring her insights about science and her extensive professional knowledge to collaborative examinations of national education issues. These collaborations, between Congress and the AEF recipients, provide opportunities for accomplished content teachers to share their classroom knowledge and experiences with their host offices in an effort to authentically assess the challenges and possibilities associated with STEM educational programs. In turn, Dr. Holley will be equipped with access to a national network of educational leaders and programs which she will be charged to use in efforts to advance science education in North Carolina.

The North Carolina Science Teachers Association congratulates Dr. Holley on this distinguished accomplishment and wishes her great success during her tenure in Washington.

## Greeting from Washington

by Dorothy Holly via interview



I am Dorothy Holly, chemistry teacher at West Johnston High School in Benson, North Carolina, and I am just beginning my year in Washington D.C. as an Albert Einstein Fellow (AEF). The AEF program is designed to “increase the understanding, communication, and cooperation between the Congress, the Department of Energy, other Federal agencies, and the mathematics and science education community.” (Improving America’s Schools Act of 1994). To that end, elementary and secondary school STEM teachers spend 11 months in Washington, DC, providing practical insights to the legislative and executive branches in establishing and operating education programs.

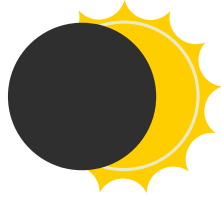
The U.S. Department of Energy (DOE) Office of Science, in collaboration with the Oak Ridge Institute for Science and Education (ORISE), manages the AEF program. Fellows, who are experienced STEM educators undergo a rigorous selection process. Individuals who are selected as a fellow are assigned to a host government office where they work and collaborate with their respective sponsoring agency addressing issues associated with the national STEM education arena. This year the DOE sponsors five fellow placements in U. S Congressional offices. Additionally, the Library of Congress, the U.S. Department of Defense, the U.S. Geological Survey, the National Science Foundation, the U.S. Department of Homeland Security, and the National Aeronautics and Space Administration host 2023-24 fellows.

Upon learning of the mission and goals of the Albert Einstein Fellows program, I was immediately interested. I applied for a fellowship in November 2021, but was notified in February 2022 that I was not selected. Obviously, I was very disappointed, but was encouraged by an AEF alumna to try again. So, I updated my application and reapplied in November 2022. I received an email in February 2023 that I was a semifinalist. I was among 35 applicants who were brought to Washington, DC to interview for positions with federal agencies. I had three interviews, the Department of Energy, the National Science Foundation, and the Department of Defense. I received a phone call telling me that I was selected to serve on Capitol Hill, and that I needed to come back to D.C. to interview with congressional offices. This time I was selected and will spend eleven months this year living in the capital area working in a congressional office.

To date, I am becoming more knowledgeable of educational opportunities and funding through the Department of Education. All AEF Fellows create their own PDP (plan for developing professional goals) for the year. Part of my work is to become more knowledgeable of First Nations and Hispanic cultures. I would also like to advocate for more North Carolina science teachers to take part in this amazing fellowship. As we learn more about how other states are working to help educators teach science, we increase our own state’s human capital and self-efficacy. I hope to learn new skills and strategies that will bring people together in efforts to advance science education in North Carolina. I want to amplify teacher voices, establish robust support systems, increase teacher retention, and ensure access to quality professional development; in other words, I want to develop as an education activist in order to elevate other teachers in my local and national education community. I am excited about actually living in D.C. and learning how our national government works. More importantly, I view the fellowship as a recognition of my work and authentic knowledge of what occurs in the science classroom and as an opportunity to leverage my career as an educator and educational researcher on the national level.



## Look Up



Whether you enjoy sky watching as an individual or want to introduce your students to this fascinating activity, mark your calendars, look skyward and enjoy Nature's show this fall.

**October 8-9, 2023: Draconids Meteor Shower** This meteor shower is produced by dust and particles left by Comet 21P Giacomini-Zinner which was first seen in 1900. The Draconids occurs annually from October 6th to 10th with most meteors radiating from the constellation Draco. The best viewing is in the early evening rather than in the dark of the early morning hours. Peak shower time for 2023 is predicted for the evening of the 8th and morning of the 9th.

**October 14: New Moon** Due to its location on the same side of the Earth as the Sun, the moon will not be visible in the night sky. If skies remain uncloudy, this evening will offer an optimal opportunity to observe star clusters and distant galaxies.

**October 14, 2023: Annular Solar Eclipse** An annular solar eclipse happens when the Moon is too far away from Earth to completely obscure the Sun, thus a ring of light appears around the darkened Moon and the Sun's corona is not visible. As the eclipse path runs from the Pacific coast of Canada, across the southwestern United States, toward Columbia and Brazil, the complete annular eclipse will not be visible in North Carolina. However, if there are clear skies, a partial eclipse can be viewed throughout most of the state. (If observing be sure to use protective eyewear)

**October 20-21, 2023: Orionids Meteor Shower** Produced by dust left behind by the comet Halley and radiating from the constellation Orion, the Orionids can produce up to 20 meteors per hour at its peak. This show occurs annually between October and November. Best viewing will be after midnight October 20 and 21.

**October 23, 2023: Venus at Greatest Western Elongation.** Venus, following its elliptical path, will reach its greatest eastern elongation (46.4 degrees) from the sun. It will be at its highest point above the horizon and will appear very bright in the eastern sky before sunrise.

**October 28, 2023: Hunter's Moon** This full Moon was named as the Hunter's Moon as it occurs yearly when the leaves are falling, and wild game was fat from summer grazing.

**November 3, 2023: Jupiter at Opposition** Jupiter, its face fully illuminated by the Sun, will be at its closest approach to Earth. This is the best to view and photograph the planet and its moons as it will be bright and visible throughout the night. A medium-sized telescope will show some details of the cloud belts and a good pair of binoculars should allow one to see Jupiter's four largest moons, as bright dots on either side of the planet. **May we suggest that viewing Jupiter on the Friday evening as a wonderful capstone to your 2023 NCSTA PDI experience.**



## District Highlights

### District 2

Regional Student STEM Competitions are being confirmed for District 2 and surrounding areas.

- The Regional Science and Engineering Fair will be held at the Watson College of Education on the UNCW campus on Saturday, February 10, 2024.
- The Wilmington Regional Science Olympiad B/C Tournament will be held on the UNCW campus on Saturday, March 9, 2024.
- The 2024 Science Olympiad Division A Tournaments are scheduled as follows:
  1. Brunswick- April 24, 2024 (tentative)
  2. Lenoir-March 16, 2024
  3. Onslow- February 3, 2024
  4. Pender- February 17, 2024
- Professional Development Opportunities are ongoing in District 2.
  1. Onslow County completed the first year of the STEM Grant that focused on PD for eighth Grade Science Teachers. They are moving into year 2 with a focus on PD for 7th Grade Science Teachers. Their first session with the seventh-grade teachers has been scheduled for October 7, 2023
  2. UNCW's Center for Education in STEM is offering "free PD" to teachers in New Hanover County (made possible by a grant received from the New Hanover County Endowment) for sessions related to the integration of technology in the classroom. The free sessions are open to public, private, and charter school employees that teach in New Hanover County.



### District 3

#### Johnston County Public Schools

Johnson county educator Dr. Dorothy Holley named Albert Einstein Distinguished Educator.

#### Durham Public Schools:

- Has created a robust partnership with the Museum of Life and Science that involves the following components:
  - Museum staff are in five of our elementary schools each week, co-teaching 5th grade science. They provide hands-on science activities for DPS classrooms, and last year's participating schools showed an increase in 5th grade science proficiency compared to prior years.
  - PD opportunities for teachers around outdoor learning on teacher workdays and early release days.
  - Free field trips for DPS students
  - Community STEM nights at the museum for local elementary students and families, one in the fall and one in the spring
  - Programs for 4th grade classes at each school
- Has created a Durham Science Alliance that brings teachers and community partners together to facilitate classroom partnerships.
  - A fall event was held on 9/26, where Brian Donovan gave the keynote address; Genetics Education Needs to Move Beyond Mendel to Combat White Supremacy.
  - An event scheduled in December will be a social at the Museum of Life and Science. A SciSummit is scheduled for the spring at the museum.
  - Has received a Burroughs Wellcome Fund grant to create secondary lesson plans that engage students in investigating the causes and impacts of extreme heat in Durham. Students engage in solutions-focused activities that involve understanding this phenomenon from an environmental justice lens. Teachers were a part of developing and piloting the lessons and were provided a class set of heat sensors via a check out system.
  - Has worked hard to have a strong outdoor learning focus in DPS, including:
    - a. Take a Child Outside Week (September 25-29), where we have arranged family events and partnered with the district's outdoor learning specialist, Erin Carroll.
    - b. Installed outdoor classrooms by OutClass at all of our schools.
    - c. Partnered with The Hub Farm, an outdoor learning facility, in arranging learning experiences for all DPS students and teachers. It specifically will provide field trips and programs for 1st grade, 5th grade science, and 8th grade science.

### District 3 continued.

- Received a grant to take teachers on a field PD experience to the NC Aquarium at Fort Fisher. Five DPS teachers participated in this experience last year and there are arrangements for more teachers to participate this school year. Participants learned about citizen science programming, carnivorous plants, and aquarium programming to bring back to their classrooms. Two teachers will take students to the aquarium this school year, and one teacher is participating in the “Adopt a Sea Turtle” program they learned about on the trip.

### Wake County Public Schools:

- Millbrook Magnet HS STEM teacher (math), Austin James, was named as a finalist for the Presidential Award! He was recognized at the September 7, 2023 at the North Carolina State Board of Education meeting.
- On September 7, 2023, four WCPSS schools were recognized at the NC State Board of Education meeting as NC STEM Schools of Distinction: Vernon Malone College & Career Academy, Southeast Raleigh Magnet High School, AB Combs Magnet Elementary, and Reedy Creek Magnet Middle School.
- Congratulations to Sheba Gage from Broughton Magnet High and Anika Mahadeshwar from Enloe GT/IB Magnet High School for their research with North Carolina Section of the American Chemical Society Project SEED at NC State University. Sheba and Anika were able to present their findings to professors, graduate students and chemistry teachers at the NC Biotechnology Center, and even received invitations to the American Chemical Society Conference in San Francisco!
- Secondary science teachers are invited to participate in face-to-face training on the Science and Engineering Practices. There are 8 sessions being offered on our Professional Learning days.
- K-12 science teachers were able to attend an Outdoor Learning Summit For K-12 Educators Presented by: Wake Green Schools Partnership on September 25, 2023.



### District 5

- STEM in the Park is scheduled for November 18, 2023. Participants aged 8 to 14 will engage in science, technology, engineering and mathematics experiments and activities at the Caldcleugh Garden. More information is available at <https://www.greensboro-nc.gov/Home/Components/Calendar/Event/99681/>
- This fall the Greensboro Science Center (GSC) will offer special presentations that are aligned with the North Carolina Essential Standards for school groups visiting the center on field trips. Developed for learners in grades kindergarten through eight, these presentations address various life, earth/environmental and physical science topics.
- The NCSTA annual PDI will be held at the Benton Center, Winston Salem, NC on November 2-3, 2023.
- Davidson County Community College opens its door to the public this fall during their Open Aquarium Days. Each Day (October 19, 20, 24 and November 13) will feature animal encounters, presentations by the Zoo and Aquarium Science students, family science activities and animal feedings.



## District 7

- Andrea Gladden, from East Burke Middle School in Burke County was named as a 2023 Burroughs Wellcome Fund Career Award for STEM Teacher Awardee.
- The Northwest Regional Envirothon is scheduled for March 19, 2024, in Wilkes County
- The MADE (Morganton Arts Design and Engineering) Competition is scheduled for October 20, 2023. To register teams, click on this site. <https://morgantonfest.org/made-competition/>
- Course proposals for Summer Accelerator 2023 at both the NCSSM Durham and Morganton campuses is open. District 7 science educators are encouraged to participate in this wonderful program. Deadline for proposals is Friday, October 13, 2023. Details regarding the proposal process, age groups, and compensation can be found at [North Carolina School of Science and Mathematics – Instructor Opportunities \(ncssm.edu\)](https://www.ncssm.edu/summer). If there are questions, please reach out to [summer@ncssm.edu](mailto:summer@ncssm.edu)!
- The T. A. G Summit, a NCSSM-Morganton Teacher professional development event will be held on October 3, 2023. Registration forms can be found at [10/3T.A.G.Summit@NCSSM](mailto:10/3T.A.G.Summit@NCSSM) Morganton.
- Announcing Project EXPLORE: **Experiences Promoting Learning Outdoors for Research and Education** will engage students at their schoolyard in two free, environmental educator-led science programs based on current science curriculum standards. Students will be engaged in ongoing data collection at their schoolyard and will be invited to present their research. (Accepting applications until full). For more information visit [Project Explore - NC Arboretum](#)



## District 8

- PARI (Pisgah Astronomical Research Institute) hosts the [NASA Space Apps Challenge](#) on October 6-8, 2023.
- The North Carolina Center for the Advancement of Teaching (NCCAT) offers [Science and Engineering Practices in the New Standards](#) on October 10-14, 2023.
- NCCAT will offer on November 27-30, 2023, [Supporting the N.C. Portrait of a Graduate Competencies in the STEM Classroom](#)
- STEAM Night in Jackson County at Southwestern Community College (SCC) is scheduled for November 30, 2023.
- The Western Region Education Service Alliance (WESA) is offering [Racing to STEM](#) webinars this fall.

## Did You Know?

- The North Carolina Science Teachers Association has been promoting excellence in science teaching and learning throughout the state for 54 years. NCSTA held its first annual conference on October 17-18, 1969 at the University of North Carolina at Greensboro.
- In addition to its [webpage](#), NCSTA provides multiple venues for its members to stay abreast of current science education issues within the state, as well as several platforms for collaboration, networking, and exchanging ideas. These include the newsletter (The Reflector), [Facebook](#), and [X \(twitter\)](#).
- Since 1980 NCSTA has honored 37 exemplary science educators with the Vi Hunsucker award. This award is named in honor of the Association's founder and first president, Vi Hunsucker who was instrumental in starting the organization and continued to provide leadership as it grew. The award recognizes an outstanding science educator who has gone above and beyond the call of duty to serve the students and teachers of North Carolina.



## Teaching Tip

### WORK, ENERGY, RESISTANCE, POWER ACTIVITY

### H.S. physics

by Mary Ellen Durham

If we exert a force on an object by lifting, towing, pulling, dragging, pushing, hitting, or kicking, the object is displaced (experiences a change in motion) and work is done. Objects reflect the work that is applied by breaking, changing shape, moving, stopping or changing positions. To do work, a force is applied over a distance. The applied force must counteract any other forces (called resistance) that are interacting with the object at any given time. To do work, a force must typically overcome four common resistance forces: inertia, friction, gravity and/or a combination of these. Sometimes doing work results in changing an object's Kinetic Energy (KE) which is sometimes called "motion energy". Other times doing work results in a change in Potential Energy (PE) called stored energy.

#### References:

Newton's Laws of Universal Gravity. Every piece of matter has gravity that creates a pull. Objects with more mass had a stronger pull, more gravity; those with less mass, a weaker pull. The gravitational pull between two objects decreases when you increase the distance between them.

Weight: Weight is the product of the object's mass  $m$  and the magnitude of the local gravitational acceleration  $g$ , thus:  $W = mg$ . Remember, mass is the amount of material in an object, and  $g$  is 32 ft/sec squared or 9.8 meters/second squared.

Work: Work is specifically defined as the product of the applied force to an object and the parallel distance through which the force acts.  $W = fd$

Power: Power = Work x Time  $P = Wt$ .

Gravitational Potential Energy (or PE): potential energy considers the object's mass, pull of gravity and the object's distance from the earth's surface.  $PE = mgh$

Kinetic Energy: Kinetic Energy (KE) considers the object's mass and the rate of movement.  $KE = \frac{1}{2} \text{mass} \times \text{velocity squared}$

In this activity you will work in 3 person teams, but each of you will perform the prescribed tasks, explain the behavior or force/object interactions based on observations and measures, create a data chart, and use this information to answer a series of questions.

**Materials:** Watch or stopwatch, rule or meter stick, scales, personal belongings, calculator, teacher predetermined walking path

#### Procedure:

1. You will work in a 3-person team. Each person is to take a few minutes and simply walk about the room until you attain your normal walking gait.
2. In mid-stride pause, so that all of your front foot is lying flat on the floor and your hind foot is positioned with your heel raised and the toes and ball of the foot flat on the floor.
3. Have a partner measure the distance from the toe of your hind foot to the toe of your forward foot. Record this measurement. This is the distance of your stride. (Your stride is the distance you walk with each step).
4. With your shoes, coat, and any other articles of clothing that you normally wear, step on the flat scale and measure your dressed body weight. Record this measurement for you and your partners.
5. With all that you were wearing in step four, pick up your backpack or tote, purse, and any other personal articles that you usually carry. Step back on the flat scale and measure your carrying weight. Record this measurement for you and your partners.
6. Dressed in what you normally wear and carrying your backpack, tote, and personal articles, each of you will walk from the classroom door (starting location), down the hall, through the exit door to (a predetermined location on the campus) and then back to the classroom door retracing exactly your path. You are to count your steps for the entire trip. You are not to stop. You are to specifically follow the designated route. Record the exact time you start your walk. Record the exact time at which you return to the classroom door.
7. Record the total number of steps taken by you and your partners in walking the route.

**Teaching Tip: WORK, ENERGY, RESISTANCE, POWER ACTIVITY continued...**

8. Use your starting time and end time to determine how much time passed while each of you made your walk. Record this measurement for each member of your group.
9. To determine your displacement (distance moved) multiply the number of steps each person took by the length of their respective strides. Record this measurement for each person. Hint: converting this measurement to feet will make your calculations easier.
10. Since the carrying weight (which is the force) and the distance walked for each member of the group is known, the amount of work completed by each person while carrying their personal belongings can be calculated using  $W = F \times d$ . Make and record these calculations for you and your partner.
11. Calculate the amount of work each person does by simply walking across campus. Multiply the dressed weight of each person by the total distance she walked. ( $W = F \times d$ )
12. Power is the amount of work completed within a time interval and is found with this formula.  
 $P = W/t$ . Determine the power demonstrated by each team member completing the walk while carrying other objects. Divide the amount of work completed by each person by the total amount of time it took for him/her to complete the walk. Convert this measure for power into horsepower. Remember: 550 ftlbs /sec = 1 horsepower. Record the power for each group member.
13. Label and prepare a chart that reflects the measurements and calculations for your 3-person team. You will refer to this chart when answering the following questions.

**Analytical Tasks and Questions:**

1. Do the members of your three-person team have the same sized strides? Why do you think this occurs?
2. Most people typically weigh themselves while undressed and are surprised to learn there is a marked difference between their "dressed weight" and undressed weight. Was this difference evident during this activity? If so, was the disparity the same for everyone? Noting that these two weights actually reflect differences in the number of forces interacting among objects, determine what might be the reasons for the commonalities or differences between the two measures. Why do most people rarely notice a difference between their dressed and undressed weights?
3. Were the carrying weights similar for each person in the three- person team? If there were variances, what would be the contributing factors?
4. Contrast the amount of work completed by each individual while simply walking. Clarify why there were or were not different measurements.
5. Contrast the amount of work completed by each individual while walking and carrying objects. Clarify why there were or were not different measurements.
6. Was the amount of power demonstrated by each person the same? Clarify as to why these measurements were or were not equal.
7. In order to accomplish the work involved in this activity numerous resistance forces were overcome. For the following, comprehensively identify the resistance force or forces that were opposing the force you exerted: Lifting your materials; taking the first step; walking up the steps; walking across the brick walkway; stopping at the classroom door.
8. If each member of your team completed the walk as prescribed in half the recorded time, would she have accomplished more work? How would this change in time impact the power?



## Important Dates

October 7, 2023, Onslow County 7th grade science teachers Professional Development session.

October 20, 2023, Preregistration deadline for 2023 NCSTA PDI if paying by check.

October 29, 2023, Preregistration deadline for 2023 NCSTA PDI if paying by credit card.

### November 2-3 NCSTA PDI!!!!

November 1-3, 2023, onsite NCSTA PDI registration.



## Editor's Note

When, a year ago, I was asked by the NCSTA president to become the editor for The Reflector, I cautiously accepted the position. Having never engaged in any e-publishing enterprise, I knew I had a great deal to learn. However, I felt that the association's newsletter served a vital role in disseminating updates concerning the association's activities and providing regular and important information regarding the status of science education throughout the state. This year, as I have prepared each issue, I realized that The Reflector does so much more. It is a platform for collaboration and the sharing of instructional resources and ideas. Moreover, it is a means to highlight the successes and accomplishments of our members.

I would like to thank the many individuals who have assisted me in preparing the 2023 issues of our newsletter. Our NCSTA president, the executive committee, district directors, other members of the board, our webmaster, our conference coordinators, and several of our association's members have provided support and contributed ideas, photographs, and articles. Your input has been greatly appreciated and has insured the goals of the newsletter have been met.

If you have an idea for our Newsletter or wish to make a submission, please contact me at [durham@campbell.edu](mailto:durham@campbell.edu). I look forward to serving as your newsletter editor in 2024.

Dr. Mary Ellen Durham  
Editor, NCSTA The Reflector