

The Reflector



Editor Dr. Mary Ellen Durham

Winter 2025

Editor's Comments

The mission of the North Carolina Science Teachers Association (NCSTA) is to promote excellence in science teaching and learning throughout the state. This issue of *The Reflector* recognizes some of North Carolina's science educators whose professional activities embody this goal. Their accomplishments and commitment to effective science instruction are commendable. This issue also includes reports on students who have engaged in outstanding science related activities. NCSTA congratulates these remarkable young scholars on their academic success in science.



North Carolina Stem Educator Named to Fulbright Teacher Exchange Program

Cori Cauble, STEM teacher at R. Brown McAllister STEM Elementary School (Cabarrus County Public Schools) has received a Fulbright Teacher Exchange award. Cori, along with other recipients, will teach,



study and conduct research abroad this academic year through the Fulbright Program. During their respective overseas assignments, Fulbright teachers develop partnerships with their global counterparts. This collaborative arrangement provides opportunities for educational research and allows for the exchange of instructional ideas. Upon their return to their home countries, Fulbright teachers share stories of their experience, become active supporters of international exchanges, host foreign scholars to their campuses, and encourage other educators and teachers to travel and study abroad.

The Fulbright program is the United States government's flagship international educational exchange program and is funded by the U.S. Congress via the Department of State's Bureau of Educational and Cultural Affairs. Participants actively exchange ideas with other outstanding professionals in efforts to find solutions to worldwide scientific and cultural challenges. The recipients are chosen for their academic merit and leadership potential. Notable Fulbright alumni include 89 Pulitzer Prize winners and 62 Nobel laureates.

Congratulations

NCSTA 2025 President's Message



2025: An Exciting Year of Celebration and Collaboration with NCSTA

Welcome to another exciting year of NCSTA! Science teaching and learning is enhanced when effective strategies and ideas are shared. NCSTA serves as a vehicle for professional collaboration through its newsletter, webpage, PDI and other activities. In addition to providing relevant information regarding science-related events and classroom practices, NCSTA recognizes the exceptional instructional skills and achievements of North Carolina's science educators and their students. This year your hard-working board and I look forward to promoting collaboration, as well as acknowledging and celebrating the accomplishments of our fellow science educators and their students.

We begin this year's celebration with this issue of *The Reflector*. There are articles showcasing science educators across the state who demonstrate excellence, as well as information about some North Carolina science students who have achieved outstanding accomplishments.

We encourage you to frequently visit the [NCSTA website](#). There you will find resources, including applications for grants, listservs, and forthcoming information about the upcoming Professional Development Institute. The website provides information regarding NCSTA sponsored awards: eligibility requirements and nomination forms.

Mark your calendar: our annual conference will be held in Winston-Salem at the Benton Convention Center on November 6th and 7th, 2025. The theme of this year's conference is "**Science is Phenomenal**". Please be thinking of ideas to present for either sessions or the share-a-thons.

Finally, we want to hear from you! We have set up a [Google Form](#) for you to list any upcoming events that may be of interest to our members.

We look forward to a year of continued learning, growth, and celebration within the NCSTA community.

Adrienne Evans

President, NCSTA



This *Reflector* spotlight is on Taylor Vicinus, 5th grade teacher at Jefferies Grove Magnet Elementary School (Wake County Public Schools). Ms. Vicinus creates a learning environment that supports the holistic development for each student by adapting her science lessons in ways that accommodate the different learning styles and abilities present in her class.



Considering the individual needs of her students, she employs a variety of instructional techniques within each lesson to insure every child is able to connect and understand the science topic. Ms. Vicinus makes the learning of science accessible and exciting. In each hands-on, inquiry-based lesson her students are "expected" to talk, question, debate, critique and think critically. Skillfully weaving concepts from language arts, mathematics, social studies and art throughout her lessons, she is able to illustrate the interconnections among science and other disciplines. This environment promotes student ownership of learning, as well as illustrates how science concepts are relevant to everyday life.

Whether in the classroom or on the campus, Ms. Vicinus creates opportunities for her learners to develop curiosity and interest in science. Her innovative learning experiences include taking her class to the playground to explore motion by playing kickball, turning her classroom into a mini-research laboratory to study ecosystems, and hosting a wide range of scientists, engineers, and medical professionals as guest speakers to her class so the children can learn of science-related professions. As noted by her principal, Julieta Ventura, Ms. Vicinus "doesn't just teach science, she sparks a life-long love for it."



Laken Allen Participates in Educators of Excellence Program



Fifth-grade teacher, Laken Allen at Nash Everywhere Digital Academy (Nash County Schools) participated in the Educators of Excellence Yellowstone Institute. Ms. Allen was one of 11 other educators who spent ten days immersed in professional development activities in Yellowstone National Park. This program (sponsored by the North Carolina Museum of Natural Science) provided her hands-on learning experiences, as well as opportunities for her to network with other educators. The group observed wolves, bison, and grizzly bears; studied geology, landforms and geo-thermal sites; and examined the history, conservation initiatives, and the challenges facing the national park.

Inspired by her visit to Yellowstone, Allen created an interdisciplinary instructional unit that connected the elementary level ecosystems and biodiversity science standards with the Expansion and Nes Pece (Native Tribes) social studies topics. The lessons promote curiosity and encourage critical thinking among her students allowing them to delve into topics such as food chains, invasive species, and the impacts of human activity on the environment.

Ms. Allen spoke at a recent Educators of Excellence event at the North Carolina Museum where she shared her experiences during her Yellowstone trip and how she developed her science/history integrated lessons.

To learn more about the North Carolina Museum of Natural Sciences' Educators of Excellence Institute visit <https://educatorsofexcellence.org/about/>



Robeson County Teachers are Grant Winners



NCSTA congratulates elementary teachers, Camry Blue and Monica Britt, who are recipients of STEM grants from the North Carolina Chapter of the Armed Forces Communications and Electronics Association (AFEA NC). Peterson Elementary School teacher, Camry Blue was awarded a \$1,000.00 grant dedicated to enhancing science education across all 6 Peterson Elementary kindergarten classrooms. Ms. Blue's goal is to expand student exposure to science and will use this funding to provide resources and engage learners in interactive science activities that explore the natural world.

Monica Britt, at East Robeson Primary School, also received a \$1,000.00 grant to support a plant biology project. During the project, students will learn about pollination, plant life cycles and the environmental conditions necessary for plant growth. The project provides students opportunities to develop blueprints for planting beds, germinate seeds, plant and tend to vegetables and flowers, as well as harvest the produce from their plantings

The AFCEA North Carolina Chapter is comprised of over 300 technology professionals from North Carolina and Fort Liberty. The chapter supports initiatives that enhance STEM learning and provides grants to local educators. For more information <https://www.afcea.org/gravelly-and-paige-grants> and <https://www.afcea.org/ciena-teaching-grant>



High Schooler Presents at Professional Science Conference



Sally Lee, a senior at Atkins Academic & Technology High School (Winston-Salem, N.C.) traveled to Puerto Rico this past December to present at the annual conference of the American Society for Gravity and Space Research. Her presentation, entitled "The Effect of Aluminum Sulfate in the Cultivation of Baby Bok Choy in Lunar Regolith Simulant (LHS-1)" analyzed the effects of using aluminum sulfate in plants grown in lunar soil. Sally was mentored by Matt Brady, a science teacher at Atkins and professionally assisted by Dr. Rafael Luorenio at Winston-Salem State University.

For her investigation, Sally used a simulation to replicate the lunar regolith (LHS-1) For ten days she germinated baby bok choy. She then planted the seedlings into different treatments; a control group with no additives, a group with 0.5% aluminum sulfate, and a group with 0.7% aluminum sulfate. Throughout the time of cultivation, Sally measured pH levels, biomass, lengths and root count to observe differences between the treatment groups and the control. The results suggest that the addition of aluminum sulfate decreased the pH level in the regolith which allowed for increased growth of the seedlings under the stress conditions of the lunar regolith. These research findings suggest additional studies may be possible concerning plant cultivation in extraterrestrial environments.

Sally expressed gratitude for the opportunity to present and to connect with researchers from NASA, ISS, Princeton and Cryotech stating, "it was an opportunity that I will forever cherish." She plans to hone her investigative skills and intends to continue working with researchers at Winston-Salem State University to conduct additional research in astrobotany. Sally also plans to participate in the "Plant the Moon Challenge" with Space Club which is a NASA sponsored project for high schools.

Congratulations

Caldwell County Schools Partners for Science



South Caldwell High School and Barton Elementary School (Caldwell County Public Schools) formed a unique partnership to provide students an engaging science experience. Ms. McKinley Johnson, science teacher at South Caldwell, planned and coordinated the shared learning activities. Students in Johnson's anatomy class visited Barton Elementary as the third graders studied a "Wit and Wisdom Sea" Unit. Working with the younger students, the high schoolers dissected 25 squid, taking time to point out and describe the various anatomical features of the animal. Through this unique collaboration the elementary students learned about the characteristics of the organism featured in their unit of study. It also provided an opportunity for the anatomy students to use their knowledge of anatomy and dissection skills

Impressive!

Virtual Simulations and Labs at Farmville Central High School



Even the most science-averse students become engaged learners in Mr. Brad Woodard's classes. This 25-year veteran educator teaches earth science, physical science, chemistry and AP environmental science at Farmville Central High School (Pitt County Public Schools). Possessing an innate ability to make science accessible and engaging, Mr. Woodard creates a classroom environment that empowers his students to think critically. Mr. Woodard has embraced the inclusion of technology within his instructional approach. Coupling virtual simulations and laboratories with other inquiry-based strategies and class discussions, he is able to address individual student needs and facilitate the understanding of complex science topics.

The inclusion of virtual learning has been a work in progress for Mr. Woodard. He began with using simple computer-based learning games to reinforce the topics introduced to his classes. He then moved to Flash Animations to illustrate science phenomena and to provide remediation activities. Realizing that virtual learning provides a vehicle to cover a concept with greater depth, Mr. Woodard now frequently incorporates Gizmo interactive investigations and other virtual animations within his lessons. According to Mr. Woodard these learning experiences enhance student observation, measurement, graphing, and analysis skills, as well as stimulate student questioning. Recently, students in Mr. Woodard's physical science class used virtual simulations to explore the basics of electricity. The students were challenged to design virtual parallel and series circuits that could be used to power a light. Upon completing the challenge, the class critiqued the efficiency of the various configurations in terms of amperage, volts and ohms. Equipped with a basic understanding of electricity, student discussion smoothly transitioned into how humans use electrical energy and its relevancy in contemporary home and work settings

JOB WELL DONE!

STEM EXTRAVAGANZA

Last December Brunswick County Schools (BCS) sponsored a STEM event for over a hundred students at the Nuclear Energy Education Center in Southport. Hailing from every middle school in the county, sixth graders heard presentation from the Duke Energy professionals, explored multiple STEM concepts and participated in a wide range of hands-on learning experiences. The middle schoolers were led through the various activities by BCS high school students enrolled in the Career and Technical Education program. The Center was bustling as the middle schoolers painted using pipets, formulated gummy worms, connected circuits to illuminate light sabers, designed and tested battle bots, created floating fireworks, built and fired air cannons (airzookas), and engaged in many other fascinating STEM explorations.

Dawn Hollis, Brunswick County C&T Director, The Duke Energy Staff Southport, Bionetwork volunteers and Brunswick County Schools were instrumental in implementing this outstanding educational event and commitment.



Well done!



Tholen Receives Certification

Bryce Tholen, the Environmental Education Coordinator and Stewardship Assistant for the NC Coastal Land Trust has received his NC Environmental Education Certification. Tholen is an outdoor sports enthusiast and is a strong advocate of outdoor science education. He works with schools within the state's coastal counties to provide environmental science lessons and field trips.

Tholen credits the certification program with increasing his content knowledge and instructional skills. "I took courses on everything from the Justice, Equity, Diversity and Inclusion, to Methods of Teaching Environmental Education, to butterfly identification. I am amazed about the variety of information I learned through this process." His favorite program activity was learning to identify bats and amphibians at Carolina Beach State Park.

Tholen coordinated the environmental education activities and solicited volunteers for a Wilmington "Fire in the Pines" festival for his community project. This event served to inform the public about the importance of prescribed burns for the longleaf pine ecosystem. He also organized no cost educational field trips for students in local Title I schools to Halyburton Park.

Congratulations!

From Waste to Wonder

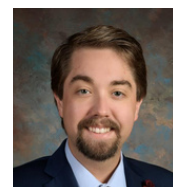
In the aftermath of Hurricane Helen, Buncombe County was left with no potable water. Students and staff at Eblen Intermediate School (Buncombe County Schools) were required to drink from disposable plastic water bottles. After a month a pile of used plastic bottles began to grow. That is when Dean Gibbs, STEM Laboratory Teacher, realized that instead of a problematic accumulation of plastic trash at the school, the bottles could serve as instructional materials.

Incorporating physics topics such as pressure, weight, tension, and compression with information about geography, environmental science and recycling, Mr. Gibbs created a novel learning experience. As the students learned about these different science concepts, they were challenged to use the plastic bottles to recreate three iconic structures: Big Ben, the Eiffel Tower, and the Empire State Building. The students, with some trial and error, were able to use the bottles to successfully recreate each structure. The most impressive was the Eiffel Tower which reached 101 inches in height and used 600 hundred water bottles.

Amazing!



Tyler Woodie Honored



Tyler Woodie, 8th grade science teacher at North Wilkes Middle School was named the school's teacher of the year this past December. Mr. Woodie, who has taught at North Wilkes Middle for many years, is known for his engaging classroom instruction. Incorporating a wide range of instructional strategies, he is able to create a rich learning environment that provides opportunities for his students to experience hands-on learning. He skillfully guides his students through discovery-based activities that not only enhance their understanding of science topics but instills curiosity and an interest in science.

Congratulations!



Winston-Salem State University (STEAM) Mobile Lab Visits Cook Literacy Model School



The Winston-Salem State University (STEAM) Mobile Learning Laboratory recently visited Cook Literacy Model School (Winston-Salem/Forsyth County Schools). The Mobile Learning Lab offers instructional activities that provide learners of all ages opportunities to engage in interactive science experiences. Thirty Winston-Salem State students engaged in professional education studies, who assist the Cook School faculty throughout the year, helped the Mobile Learning Lab staff implement the planned science lessons.

Cook School 4th and 5th graders participated in critical thinking and problem-solving tasks as they rotated to stations focusing on animal biology, electrical engineering, computer coding, chemistry, and robotics. Each station introduced the children to STEM-related career fields. According to Dr. Denise Johnson, Director of the Mobile Learning Lab, "the activities were designed to help the students increase their analytical skills and connect the science concepts they were studying in class to real-life phenomena. According to 5th grade teacher Brandi Craver, "the learning opportunities offered by the Mobile Lab align with the commitment of the Cook School to provide challenging and authentic STEM experiences". Many of the students who participated in the Mobile Lab felt it provided for them an exciting view of science and technology.



WELL DONE



Rising Star

Young Educator working to Enhance Science Teaching and Learning

Submitted by: Adrienne Evans

The Reflector recognizes Kelli McDermott, third-year Earth and Environmental science teacher at South Central High School in Pitt County, as a Rising Star! Kelli, a novice teacher, exemplifies dedication, enthusiasm, and innovation.

Kelli attended her first NCSTA Professional Development Institute this past fall. Her unwavering commitment to professional growth was evident – she attended every training session and actively sought out curriculum resources for herself and her science department. Kelli enthusiastically cites her appreciation for NCSTA's "resources, learning, and networking opportunities."

Kelli's journey to the conference itself is a testament to her drive. Over the summer, she collaborated with a team to develop a new science curriculum for her county under the guidance of Jennifer Stalls, (NCSTA District 1 director). This hard work, Kelli hoped, would demonstrate her commitment to professional development and secure her administration's approval to attend the conference.

Kelli's dedication extends far beyond the conference walls. In her classroom, she has implemented many innovative techniques gleaned from NCSTA, including differentiation and specialized grading practices. Her passion for science and her students' success is truly inspiring.

NCSTA commends Kelli McDermott on her commitment to engaging in activities that promote effective science teaching and learning in North Carolina



Enloe Magnet High School Students' Project Showcased at National Stem Conference



Disturbed by the alcohol-related traffic death of a Wake County teen, Swayam Shah, a student at Enloe High School (Wake County Public Schools) decided there was a better way to prevent such tragedies. Swayam solicited the help of fellow students Krithin Visvesh, Bhavik Kanumuri, and Aadi Bharadwaj to develop a device that can be used to prevent drunk driving.

Using their science, technology and engineering skills the student team developed SoberRide, a multi-module breathalyzer that combines facial recognition with an AI-powered sensor to accurately read a driver's alcohol level. SoberRide differs from existing ignition lock systems in multiple ways. The facial recognition element ensures it is the driver and not another person being breathalyzed. The device also assesses symptoms of impairment such as eye redness and pupil dilation, as well as driver age and current driving conditions.

The team used a 3-d printer to form several parts, a jumper wire, house hold items, and a camera part purchased from Amazon to construct the device. The student team has applied for a patent and are developing an app for parental use that will sync with the device to provide information about the driver's status, track the vehicle, and give rideshare options.

Selected as National STEM Champions, Swayam will represent the team in Washington D.C. at the March 2025 National Stem Festival.

Congratulations

ForestSmart Schools Program: An Ecosystem of Opportunities!



submitted by: Lisa Pope

The Catawba College Center for the Environment is providing exciting opportunities for schools, teachers, and students through the ForestSmart Schools Program. According to Dr. Lee Ball, Executive Director of the Center for the Environment and founder of the program, "The ForestSmart Schools approach is designed to provide an easy access point, or trailhead for both students and teachers as they explore the natural environment surrounding them."

This program has long provided guidance to schools in sustainability and outdoor learning. In 2025, the ForestSmart Schools Program is expanding its reach to a wider range of opportunities and benefits for teachers and students that includes:

- The Understory Project is an educational model that focuses on interdisciplinary learning through the lens of the new K-12 Science Standards, and Science and Engineering Practices (SEPs). This curriculum weaves outdoor, interactive investigations/SEPs with language development to boost academic achievement in science, mathematics, and ELA at the same time!
- The ForestSmart Learning Lab promotes the use of the school campus as an outdoor living-learning laboratory. In many areas across the country school campuses are the best opportunity to optimize natural systems where green space is needed most. This initiative focuses on the greening of school campuses to foster environmental literacy, native biodiversity, climate resilience, and healthier communities.
- ForestSmart Professional Development provides training for teachers in using the outdoors to teach experiential, reflective learning that brings content to life and life to content! This approach to learning is an equalizer in the classroom. Teacher workshops provide field experience and high impact strategies for teaching and learning outdoors.
- The ForestSmart News provides a direct way for teacher partners to stay connected. This newsletter will provide important information on events, workshops, cool sustainability projects, summer programs, and a place to highlight student projects and school activities.
- Summer Programs, both residential and day programs, for K-12 students.

The ForestSmart Schools Program is open to all K-12 teachers. Contact us for more information: Lisa Pope at lrwear@catawba.edu or Cathy Green at cgreen@catawba.edu.

Not Just a Lowly Bivalve



Whether grilled, steamed, baked, fried or raw on the half shell, oysters are considered a culinary treat in many cultures. Oyster shells are often crushed and incorporated into concrete, bricks, and pavement compounds, increasing the durability, strength and resistance to erosion of these construction materials. The high calcium carbonate content of the shells finds applications in glass making, food preservation, soil additives, fertilizers, animal feed and even cosmetics. In addition to being a food source and an industrial resource, these super mollusks provide significant environmental benefits.

- Oceans absorb carbon dioxide from the atmosphere. Oysters positively affect the acidification of seawater by effectively sequestering carbon ions from seawater as they grow their shells.
- As oysters eat, they pump water through their body which filters out algae and nutrients. This process improves water quality and prevents harmful algal blooms. A single oyster is able to filter up to 50 gallons of water each day.
- As oysters collect and form a reef, a habitat is created for other marine animals such as sea anemones, barnacles and mussels. These reefs also provide shelter and spawning nurseries for many food fish.
- Oysters can support healthy diets. These bivalves are packed with protein, zinc, vitamin B12, omega-3 fatty acids and other nutrients. Since oyster farms do not require feed, freshwater or fertilizer, raising oysters makes a much lower environmental impact than the production of other human food sources.
- According to research conducted by Sea Grant, if Americans replaced 10% of their beef consumption with oysters, the greenhouse gas emissions savings would be the same as keeping approximately 11 million cars off the roads.
- In 2023 North Carolina's oyster aquaculture industry was worth \$24.66 million and is expected to reach \$100 million by 2030. The N.C. Division of Marine Fisheries report that there are about 220 shellfish farmers in North Carolina with leases on 1,828 acres of public water. North Carolina ranks 5th in the United States in oyster farming.

There are several opportunities for science educators and students to learn more about oysters. The [North Carolina Aquarium on Roanoke Island](#) will open a new educational exhibit, Fish Filter Food, The Human Oyster Connection this summer. The [Aquarium at Pine Knoll Shores](#) offers outdoor learning experience on its Oyster Rock Reef Habitat. One can also visit the NC Oyster Trail <https://www.nccoast.org/resource/nc-oyster-trail-website/>

2025 NCSTA Board

The following individuals are on the 2025 NCSTA Board of Directors.

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PDI:

Conference Coordinators:

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- Manley Midgett

Business:

Business Manager and Webmaster:

- Joette Midgett

Bowties and Tid-Bits

Submitted by: Dr. Brad Rhew

Greetings NCSTA Members! I am excited to be your President-Elect for NCSTA. I know we are going to have a great year together empowering each other to grow as science educators.

If there is one thing I love more than my bowties, it is an engaging science classroom! Throughout this year, I will share some tid-bits of strategies that help me create an engaging science learning environment. This first Installation of "Bowties and Tid-bits" will focus on building a strong science classroom community.

Building a Strong Science Classroom Community: The Foundation for Effective Learning

As science educators, we are always looking for strategies to build classroom community and engagement. In the world of science education, creating a vibrant and supportive classroom community is not just a 'nice-to-have'; it's a critical component for fostering deep learning and engagement. A well-built classroom community in science education can significantly enhance students' understanding, curiosity, and passion for scientific inquiry.

A strong classroom community in science education serves multiple purposes. It creates a safe space for students to take intellectual risks, share ideas, and collaborate on complex problems. This environment is crucial for developing scientific thinking skills and encouraging students to approach challenges with creativity and perseverance. Moreover, a sense of community in the science classroom can lead to increased student motivation and participation. When students feel valued and connected to their peers and teacher, they are more likely to engage actively in lessons and discussions.

Strategies for Building Community

Science teachers can employ various strategies to foster a strong sense of community in their classrooms:

1. Establish Shared Norms and Expectations: Create a set of classroom norms collaboratively with students at the beginning of the year. These norms should emphasize respect, active listening, and constructive feedback.
2. Incorporate Community-Based Learning: Connect science concepts to students' lived experiences in their neighborhoods. This approach, known as community science teaching, increases the relevance of science education and helps students see themselves as part of the scientific community.
3. Invite Guest Speakers: Bring in local professionals, such as meteorologists or healthcare workers, to share their real-world experiences. This not only enriches the curriculum but also helps students see the connections between classroom learning and career opportunities.
4. Implement Collaborative Projects: Design projects that require students to work together, fostering teamwork and communication skills essential in scientific endeavors.
5. Create a Positive Classroom Environment: Set up the physical space to encourage interaction and collaboration. Use bulletin boards to showcase student work and scientific discoveries.

Fostering Student Discourse

Encouraging meaningful discourse is a crucial aspect of building community in the science classroom. Here are some effective strategies:

1. Implement Talk Moves: Use specific instructional approaches, such as the Talk Activities Flowchart, to support students' use of discourse as they learn. This can include techniques like turn-and-talk, small group discussions, and whole-class debates.
2. Promote Multiple Perspectives: Encourage students to share diverse viewpoints and approaches to problem-solving. This not only enriches discussions but also helps students understand the collaborative nature of scientific inquiry.
3. Use Guiding Questions: Prepare thought-provoking questions that stimulate discussion and deeper thinking about scientific concepts.
4. Assign Roles in Discussions: Give students specific roles during scientific discussions, such as "evidence checker" or "question asker" to help them practice different aspects of scientific discourse.
5. Implement Think-Pair-Share: This strategy allows students to formulate their thoughts individually before sharing with a partner and then with the larger group, building confidence in expressing scientific ideas.

By implementing these strategies, science teachers can create a classroom environment where students feel valued, engaged, and empowered to explore scientific concepts deeply. This sense of community not only enhances learning outcomes but also cultivates a lifelong appreciation for science and its role in our world. Building a strong classroom community in science education is an ongoing process that requires dedication and creativity from teachers. However, the rewards – increased student engagement, deeper understanding of scientific concepts, and the development of critical thinking skills – make it a worthwhile endeavor for any science educator committed to nurturing the next generation of scientific thinkers and innovators.

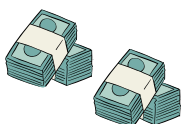
Hopefully you can utilize these ideas to continue to build classroom community and engagement. I look forward to working with you this year and sharing strategies for the science classroom.

North Carolina's Remarkable Salamander

North Carolina, with at least 65 distinct species, has more salamander biodiversity than any other place in the world, according to the N.C. Wildlife Resource Commission. Among our resident amphibians is *Ambystoma maculatum*, the yellow-spotted salamander. Like other salamanders, the yellow-spotted can regenerate limbs and sometimes internal organs after an injury. However, its endosymbiotic relationship with algae makes the yellow-spotted salamander really unique.

The female, yellow-spotted salamander lays her eggs in ephemeral spring pools which often hold green algae (*Oophila amblystomatis*). These eggs are covered in a thick gel that provides nutrients and protection for the embryos. Since this gel is permeable, water and algae enter the protective coating. Eventually the algae cells are absorbed into the developing salamander cells. Like other vertebrates, the mitochondria in the yellow-spotted salamander embryo's cells convert oxygen and a sugar by-product into energy-rich molecules that are stored for growth. But there is a dual power source at work in these organisms. The algae cells that have slipped inside the salamander embryos via the surrounding gel undergo photosynthesis. Thus, these algae cells are essentially using solar energy to increase the oxygen content of the eggs and embryos which is essential for the salamander's respiration during development. The algae also create carbohydrates the growing salamander's body can use and removes dangerous nitrogen wastes. There is evidence that the presence of algae protects the embryos from fungal infections. This relationship is beneficial to the algae as it needs nitrogen to grow and reproduce. The nitrogen waste from the salamander embryos is used by the algae to synthesize amino acids which are then used to form the proteins that make up algae cells. The dual power symbiosis does not appear to continue once the yellow spotted salamander reaches the adult stage. However, the algae DNA remains forever present in these amphibians' bodies. The yellow-spotted salamanders appear to be the only known vertebrate that has this endosymbiotic relationship with algae.

As amazing as they are, these remarkable creatures are facing a problematic future. The yellow-spotted salamander can live up to 30 years in the wild and breeds only once every 2 to 3 years. The females can lay over 300 eggs with each breeding. However, loss of habitat through natural disasters, fragmentations, deforestation, mining, loss of ephemeral pools, disease, and collection for the exotic pet trade has dramatically decreased the population of this unique animal. Following the recent storm devastation witnessed in western North Carolina it is estimated that only a few hundred of these remarkable creatures still exist. The Center for Biological Diversity and 10 other partnering wildlife organizations are currently petitioning the U.S. Fish and Wildlife Service to protect the yellow-spotted salamander and its habitat under the Endangered Species Act.



NCSTA Grants

If you are an NCSTA member who is considering taking a class, attending a conference or participating in a professional workshop you may be eligible for an NCSTA study grant. If your grant request is approved, you may receive up to ½ of your expenses, not to exceed the amount approved by the NCSTA board for this year. (Graduate courses taken for the purpose of obtaining a degree are not eligible.). To receive a grant, applications must be submitted prior to your scheduled study. One must be an NCSTA member for one year or more immediately prior to applying and have not received a study grant within the past 3 years. Deadlines for study grant applications are Spring: March 1, 2025, and Fall: September 1, 2025. For more information and to apply click [NCSTA Study Grants](#).

NCSTA members may also apply for an Innovative Curriculum Grant. These grants provide funding for supplies, materials, equipment, printing, travel and other expenses related to an innovative curriculum project that involves students in a unique way. This funding cannot be used to cover travel costs for student field trips. Curriculum grants are selected based on innovativeness, establishment of need, realistic plan of action, ability to replicate and the number of individuals benefited. Deadlines for Innovative Curriculum Grant applications are Spring: March 1, 2025, and: Fall September 1, 2025. For more information and to apply click [NCSTA Innovative Curriculum Grants](#).

If awarded an Innovative Curriculum or Study grant, you must submit a summary article about the study or implementation of the curriculum for publication in the NCSTA newsletter, *The Reflector*, and make a presentation at the annual PDI.

District highlights

District 1: East Carolina University will host level B and C Regional Science Olympiad Tournaments on February 22, 2025

District 2: The Onslow Elementary Science Olympiad Team winners are: 1st Parkwood Elementary, 2nd Meadow View Elementary, 3rd Summersill Elementary and 4th Northwoods Elementary.

- The Wilmington Regional NCSO will be held March 8, 2025.
- The Region 2 (Southeast) NC Science and Engineering Fair is February 15, 2025, at UNCW Watson College of Education and Carion Hall Auditorium.
- The Wilmington Regional SeaPerch Competition will be held March 15, 2025, at UNC-Wilmington.
- The PK-12 STEM Education Conference will be held June 24, 2025.

District 3: West Johnston High School had 10 teams participating in the Molympics competition. The school-wide winners were Mole Masters.

- Science Olympiad Divisions B and C Tournament will be March 1, 2025, at Old Northern High School, Durham NC).
- The Wolfpack Science Olympiad divisions B and C competitions were held at NCSU, Raleigh NC on February 8, 2025.
- The North Carolina Student Academy of Science state competition (district 1-4) will be held March 28, 2025, in Durham NC.
- The Central Regional Science and Engineering Fair will be Feb. 15, 2025, at Wake Technical Community College in Raleigh, NC.
- The 37th Annual State Science and Engineering Fair will be March 29, 2025, at NC State University.

District 4: Fayetteville Technical Community College will host the regional divisions B and C Science Olympiad competitions on March 15, 2025. The South-Central Regional Science Fair will be hosted by UNC-Pembroke on February 15, 2025.

District 6: The Charlotte region divisions B and C Science Olympiad competitions will be held March 22, 2025, at Phillip O. Berry Academy of Technology.

District 7: The North Carolina Student Academy of Science Competition for districts 5,6,7,8 will be held in Morganton NC on April 25, 2025.

District 8: The 2025 western Regional Science Fairs dates are 2/13/2025 for grades 3-5 and 2/14/2025 for grades 6-12. The fairs will be hosted by Western Carolina University in the Apodaca Science Building.

The Western North Carolina Elementary Science/Stem Community of Practice sponsored by Western Carolina University continues their WNC Elementary Science and Stem Educators program through virtual meetings. Upcoming virtual meetings occur on February 18, and March 25, 2025. To register <https://affiliate.wcu.edu/wncelementarystemcop/>

Project Learning Tree Opportunity

The North Carolina Aquarium at Fort Fisher will host a professional development opportunity presented by Project Learning Tree for K-8 classroom teachers and nonformal science educators on Saturday, March 15, 2025. Participants will explore activities in the newly released Project Learning Tree - Explore Your Environment K-8 Activity Guide. The guide is an instructional resource that enhances the learner's knowledge of nature and generates environmental awareness. Included in the guide are 50 hands-on, multidisciplinary activities that are aligned with the Next Generation Science Standards. Each workshop participant receives a free copy of the activity guide courtesy of the NC Forestry Association.

Topics covered in the workshop include conservation, ecology, habitats, ecosystems, soil, trees, forests, animals, endangered species, nature awareness, sustainability, water, watersheds and environmental science career choices. Completion of the workshop counts toward NC Environmental Education Certification (criteria I) and consists of six contact hours that may count toward CEUs for teachers. The cost of the workshop is \$25.00. For more information call 910 722 0546 or visit this site: <https://reservations.ncaquariums.com/fortfisher/Info.aspx?EventID=20>

Teaching Strategy

Predicting Temperature Change

This simple physical science/introductory chemistry activity can be used to enhance student process, measurement, observation, analyses and prediction skills.

Materials: foam drinking cups, thermometer, two 50 ml graduated cylinders, stirring rod, hot water, cold water

Student groups of 2 or 3 identify and discuss situations in which predicting the temperature of a liquid might be useful. The students then determine a criterion to use to make such a prediction. Students conduct an investigation using these steps:

1. Copy the chart shown at the bottom of the page and use it to record your information.
2. Label the cups A, B, and C. Place 20 ml of cold water in cup A and 20 ml of hot water in cup B.
3. Measure and record the temperature of the water in each cup
4. Predict what the temperature will be if you mix the water in Cups A and B. Record your prediction.
5. Pour the water from each cup into cup C and stir with the stirring rod.
6. Record the amount of water in cup C.
7. Measure and record the temperature in the mixture (cup C).
8. Repeat steps 2-7 but change the amounts of water used to 20 ml. of cold water and 40 ml. of hot water.
9. Repeat steps 2-7 but change the amounts of water used to 40 ml of cold water and 20 ml of hot water.
10. Answer the following questions.

- a. How did your predictions compare with the actual temperatures? Explain any differences.
- b. How did the temperature of the mixture compare with the starting temperatures when equal volumes of hot and cold water were mixed?
- c. How did the temperature of the mixture compare with the starting temperatures when unequal volumes of hot and cold water were mixed?
- d. How can you predict the final temperature of a mixture of hot and cold water?
- e. Review the criteria you established prior to this investigation. What changes should you make, if any, in the criteria from what you have learned in this investigation?

Teacher information: The final temperature of the mixture is directly proportional to the temperatures of the water added together. A mathematical proportion can be used to predict the final temperature.

$$\frac{(m_1 \times t_1) + (m_2 \times t_2) = t_3}{m_3}$$

The investigation could be repeated using liquids other than water. Challenge the students to determine if the temperature change in another liquid occurs the same way as water.

cold water		hot water		mixture		
Temperature	Amount Vol	Amount Vol	Temperature	Combined Amount Vol	Predicted Temperature	Actual Temperature
	20 ml	20 ml				
	20 ml	40 ml				
	40 ml	20 ml				

Call for submissions

Is your science class engaged in a novel learning activity? Has your science club or other student group participated in a field trip or research project? Do you have information regarding science learning experiences that focus on diversity and inclusion? Are you celebrating the success of a student team at a science competition?

Do you know a science educator who should be recognized for his or her instructional skills. Has someone you know received a grant for science education or spearheaded a school/community event to promote science teaching and learning?

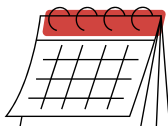
If you have answered yes to any of these questions, please let *The Reflector* know so these achievements can be reported to the NCSTA members. To submit an article, contact the editor of *The Reflector* at: durham@campbell.edu

Do you know of a rising star in your district?

If you know of a young science educator (1-3 years in the classroom) that demonstrates outstanding skill and promise as an effective teacher, please submit a summary of their achievements and photo for recognition in the NCSTA newsletter. Send submissions to (durham@campbell.edu)



Important Dates



March 15, 2025: Project Learning Tree at NC Aquarium, Ft. Fisher

March 28, 2025: Student Academy of Science State Competition for Districts 1-4 in Durham, NC

March 29, 2025: 37th Science and Engineering Fair at NCSU, Raleigh, NC

April 25, 2025: Student Academy of Science State Competition for Districts 5-8 in Morganton, NC

April 25-26, 2025: Science Olympiad State Tournament at NCSU, Raleigh, NC

May 2-3, 2025: NC Envirothon at Cedarock Park, Burlington, NC

November 6-7, 2025 NCSTA PDI at Benton Convention Center, Winston-Salem NC

