The Reflector

NCSTA

North Carolina Science Teachers Association

Editor: Dr. Mary Ellen Durham

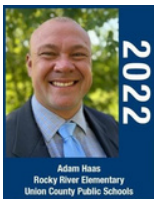
Spring 2025

North Carolina PAEMST Winners

North Carolina science educators Chasity Bolch, Adam Hass and Sara-Elizabeth Senseney have been named as recipients of the Presidential Award for Excellence in Mathematics and Science Teaching.

The Presidential Award for Excellence in Mathematics and Science Teaching (PAEMST) is the highest award kindergarten through twelfth grade mathematics and science teachers can receive from the United States government. Educators actively teaching in one of the fifty states, U.S. territories, Washington D.C. and Department of Defense Education Activity (DODEA) schools may be considered for the honor. Nominees must demonstrate deep content knowledge, adaptability to various teaching environments, and an ability to accommodate a broad range of learner needs. Recommendations for awardees are sent to the White House Office of Science and Technology Policy after a distinguished panel of state and national level scientists, mathematicians, and educators assess the nominations. Recipients are selected based on their distinction in the classroom and dedication to improving STEM education.

The North Carolina Science Teachers Association congratulates these three outstanding science educators.



Congratulations

2025 NCSTA President's Message

Hello NCSTA Members,

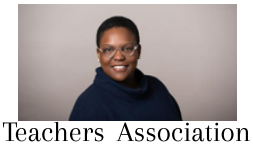
As spring unfolds, so does another exciting chapter for science education in North Carolina. This issue of The Reflector highlights the dedication and innovation of our members. We are celebrating the outstanding educators who inspire their students, showcasing unique learning experiences that spark curiosity, and recognizing the achievements of students in the spring science competitions.

These pages reflect the core of NCSTA's mission: promoting excellence in science teaching and learning. It's the passion and commitment of our members that drive this mission forward, shaping the next generation of scientists and critical thinkers. Thank you for your continued dedication to science education.

Sincerely,

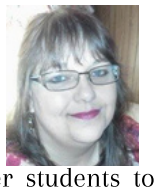
Adrienne Evans

Dr. Jennifer Redfearn Honored



The North Carolina Science Teachers Association congratulates Dr. Jennifer Redfearn upon receiving the Outstanding Instructional Leaders Award from the North Carolina Science, Mathematics, and Technology Education Center. The honor recognizes her contributions as an instructional leader in STEM education and her efforts to provide all children with the knowledge and skills to pursue successful careers as productive citizens. Dr. Redfearn is a senior STEM Specialist with the North Carolina Center for Advancement of Teaching (NCCAT). Prior to joining NCCAT, she served as a high school science teacher and was a central office administrator with Guilford County Schools. She is an NCSTA Board member and received the 2022 NCSTA Distinguished Service in Science Education Supervisor or Administrator award.

The Reflector Spotlight is on veteran science teacher, Stephane Grady



As students enter Stephanie Grady's classroom they are swept into an atmosphere filled with energy and personal discovery. Stephanie, who is in her 20th year at Lakewood High School (Sampson County Public Schools), possesses the ability to make science accessible and exciting for all her students. She doesn't just teach the subject; she provides venues for her students to actually engage in science through carefully designed projects, inquiry activities, simulations, and demonstrations. Stephanie has a well-deserved reputation for inspiring curiosity and enthusiasm for learning among her students. She frequently works with underachieving teens and uses humor in her one-on-one conversations to develop an atmosphere of mutual respect. Stephanie believes every student can be successful. She encourages each child, instilling intellectual confidence and willingness to engage in difficult tasks. Through her innovative lessons she purposefully addresses the various academic needs of her students by skillfully incorporating a variety of teaching strategies that keep the class engaged and promote problem solving and critical thinking. Ms. Grady's door is always open; prior to school, over lunch, after school, students find her, for extra help, impromptu science lessons or just to talk. Stephanie's classes are alive with student discourse, frequent laughter and academic success.

Stephanie is willing to assist other educators and is widely known for her expertise in formative assessment and laboratory-focused teaching strategies. In addition to participating in numerous Sampson County professional development workshops, she has formally presented at educational conferences including NSTA, NCSTA and Delta Kappa Gamma Society. She has served as a visiting instructor, teaching laboratory courses at Campbell University and has participated as an instructor in the Campbell University School of Pharmacy Outreach Program for Middle School Science Teachers.

Stephanie holds a bachelor's in biology with teaching certification from Campbell University, a master's in science education from North Carolina State University and has pursued addition graduate studies in science and science education. She has served on the NCSTA Board and is an NCSTA Outstanding Science Educator Awardee.

NCSTA RISING STAR

Anthony Brito, hoping to better understand his brother's illness and fascinated by data and statistical trends, pursued a BS in cellular and molecular biology followed by a master's degree in data analysis at Appalachian State University. He initially worked as a data analyst at EPA and coached wrestling on a part-time basis. As he helped his teenaged wrestlers understand the connections between the sport and anatomy, Anthony realized he truly wanted to be a science educator. He is now in his second-year teaching biology at Heritage High School (Wake County Public Schools) and is enrolled in UNC-Charlotte's Residency Licensure program.

Anthony has honors, academic, and ESL students enrolled in his classes and has designed a data tracking system to assess the academic achievements of each student group. He also self-assesses! He uses the data to measure the effectiveness of his teaching with each class, and to determine if he should modify his instructional approach. All of his lessons incorporate student discourse and critical thinking, but based on the self-assessment data, Anthony purposefully decides which instructional strategies (simulations, laboratories, modeling, demonstrations) work best to specially accommodate the learners' needs demonstrated in each class.

Through this analysis, Anthony realized his ESL students often understood science concepts but could not properly articulate their knowledge. He has now adopted an interdisciplinary approach with these students where he combines the exploration of science concepts with English instruction. In a recent lesson, his ESL learners read, in both languages, a medical summary of a patient displaying Albinism. Then, working in pairs, the students visited learning stations where they completed a series of hands-on activities that examined the forms, causes, and symptoms of the condition. As they explored the genetics associated with albinism and learned scientific terminology, the students also engaged in activities that enhanced their ability to use English to discuss their findings. The students made recordings of what they had learned in English, which Anthony used to evaluate both the students' understanding of the science concept and language proficiency.

Anthony asks each of his students: "What is success for you personally?"; "Are you taking biology just to graduate or for another reason?". He combines these responses with assessment data to ensure his instructional strategies provide relevancy and instill a desire to learn with his students. His data-driven approach appears to be successful, as his tracking system reflects that learner engagement and comprehension is improving in all his classes.

In addition to teaching, Anthony is the assistant boys' wrestling coach at Heritage. NCSTA commends him on his efforts to provide effective science instruction for all his students.

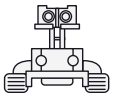
First North Carolina Robotics

The national organization, For Inspiration and Recognition of Science and Technology (*First),* provides young people opportunities to discover and develop an interest in science, technology, engineering and mathematics. *First* sponsors STEM-centered events designed to encourage student engagement in problem solving and critical thinking activities. It also introduces students to STEM related careers. Among the suite of student competitions offered by *First* are: *First* Lego League (ages 4-16), *First* Tech Challenge (a mid-level robotics challenge for ages (12-18), and *First* Robotics Competition (a large robotics experience for ages (14-18).

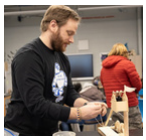
First North Carolina sponsors the *First* Robotics Competition for high school students. In March *First* North Carolina regional competitions were held in Catawba, Buncombe, Wake, Robeson, Mecklenburg, and Pitt Counties. At each regional, teams showcased their engineered devices, engaged in robot games and received recognition for their collaborative achievements. The Catawba County regional witnessed a particularly impressive team achievement as Team 6004(x) from Johnston County N.C. received the prestigious Imagery Award for the 6th consecutive year. This award is presented to the team with the most impressive branding.

In April UNC Greensboro hosted 40 regional winning robotic teams and robots at the 2025 *First* North Carolina state-level competition. Several additional *First* NC teams were also in attendance vying for the *First* Cultural, Engineering Inspiration, Rookie-All Star and First Impact Awards. Competition results are available at:

https://www.thebluealliance.com/event/2025nccmp



Science and History Address Medieval Warfare



Students at Community High School (Buncombe County Public Schools) recently engaged in an innovative, collaborative learning project. This interdisciplinary experience was designed and implemented by Community High teachers: Laney Bryant, physical science teacher, and Zane Weekman, history teacher. As students, in their history class, studied several Medieval conflicts that arose in Europe for territorial and resource control, they were also exploring the physics topics of force, motion, energy transfer and trajectory in their science class. The science and history units culminated in a unique hands-on test. In teams, the students designed and built miniature catapults using rubber bands and popsicle sticks. They then used their weapons to conduct a mock siege of a cardboard Medieval castle defended by an army of paper warriors. To conduct the siege, students had to develop an attack plan, then aim and fire their catapults at the castle and its defenders, adjusting angles and force to improve accuracy. This unique learning experience allowed the students to demonstrate their understanding of the mechanics and strategies behind medieval war tactics, as well as their comprehension of several physics' concepts.

According to Weekman and Bryant "the blending of concepts from the two disciplines provided a powerful way to create a deeper understanding of the topics studied. It let the students test their knowledge while providing opportunities to make adjustments for better understanding." The student reaction was very positive with one young man describing it as "this was a fun way to learn! Instead of just reading about history and science, we actually got to experience it!"

Brainy Yaks Score in Top 100 *First* Global Competiton

This spring, Brainy Yaks, the middle school robotics team from Cannon School, (Concord N. C.) advanced through a series of regional and district events earning the right to compete in Houston Texas at the 2025 *FIRST* World Championship. Over 600 teams faced off in rotating alliances during this four-day event. With each face-off, teams secured points by demonstrating creativity, collaboration, critical thinking, as well as technological and problem-solving skills.

Aligning their project with the competition's 2025 theme, "Submerged," the Brainy Yaks focused on environmental stewardship and coral reef restoration. After researching ways to protect young coral with marine biologists, the Brainy Yaks developed an innovative coral nursery design made from live rock substrates. This material is durable, eco-friendly, light penetrable and requires less maintenance than traditional substrates. The project was found to be an innovative, impactful solution to a real-world problem earning the Brainy Yaks recognition as a top 100 team in the global competition.

NCSAS Competiton

The North Carolina Student Academy of Science (NCSAS) is an organization for 6th to 12th graders. In alliance with the North Carolina Academy of Science, NCSAS aims to introduce teens to STEM careers, promote the study of science, technology, engineering and mathematics and provide venues for students to engage in research. Student researchers share their investigations at regional and state level competitions. The research competitions require both a paper and oral presentation and provide an opportunity for the students to receive positive feedback from scientists who judge the projects. Student science clubs may also participate in the Club Service Project Competition where they report on a science-related project completed by the student group that benefited their community. First, second and third place category winners at the district level qualify for the state-level competition. The high school student(s) with the most outstanding research at the state competition receives a subsidized trip to the American Association for the Advancement of Science/ American Junior Academy of Science annual meeting. The 2025 NCSAS winners are listed at https://www.ncsas.org/

North Carolina Science and Engineering Fair

This spring, over 1,500 students participated in ten Science and Engineering Fair regional competitions. The four hundred finalists from these events convened on the North Carolina State University campus on March 29th, 2025, for the 37th annual North Carolina Science and Engineering Fair.

The NCSU campus was buzzing with activity early that Saturday morning as participants set up their displays in the Carmichael Gymnasium. The students attended welcoming ceremonies in the Witherspoon Student Center and then returned to their respective displays to discuss their projects and answer questions as the judges assessed the research projects. Following the judging sessions, the gymnasium was opened for public viewing and the participants were able to interact with one another over lunch, examine special Stem presentations and displays, and take self-guided tours of the N. C. State campus. The Awards Ceremony marked the end of the day's competition.

To learn more regarding the winners of the 2025 North Carolina Science and Engineering Fair see: https://ncsef.org/

John Ramos Named Gaston County Schools 2025-2026 Teacher of the Year

The 2025-2026 Teacher of the Year for Gaston County Schools is John Ramos. John joined the Gaston County Schools' international faculty in 2021 and currently teaches biology, earth, and environmental sciences at Forestview High School. Prior to coming to Gaston County, he taught science and mathematics in the Philippines and has served as an education lead for academics at the national Youth Leadership Forum at the University of Michigan and University of California-Berkley. John is a National Board-Certified Teacher for secondary-level science (integrated science, biology, chemistry and physics). He earned his bachelor's degree in science education with a specialization in biology at Philippine Normal University and holds a master's degree from Philippine Christian University.

The Need to Think Beyond "They Should Know This"

submitted by: Kristen Kane

A lot is changing regarding effective science education. How do we science teachers generate student motivation, incorporate critical thinking, integrate technology, promote learner discourse, appropriately evaluate student comprehension, and so much more within our classroom practice? A common point of frustration among many science educators is the lack of perceived student abilities. Teachers will often say, "Why do the students not know how to study?" or "Why can't they sit still?"

My counter question is, "Whose specific role was it to teach the perceived necessary skills to the learners so they would attain success in your science class?" Many would identify that the parents, community, and previous teachers are responsible for this. Those parties may be important contributors to a child's skill development, but how would it be known to them exactly what learner competences would be needed to be proficient in a particular science class?

When it is noticed that students are missing certain skills, consider shifting your mindset. Assume responsibility. Ask yourself, "what does this student need?" If a student is struggling to sit still, does it source back to lacking the know-how to control his/her impulses? Is it a distractor within the class environment? Is the learner coping with undiagnosed learning disabilities? Does this learner need some executive functioning support?

If students lack study skills, how can you integrate assignments that help them understand how to learn at a higher level? Instead of having students just create flashcards, can you have them play a game with the flashcards, sort them into categories, or have them pick three random cards and determine which one does not fit and why?

Being an educator is hard. It takes a village to raise a child, as they say. So, the next time you wonder why students are missing skills, be proactive. Consider how you can help them grow by coupling skill development activities with your instructional strategy. Continue to focus on the core of what it means to be a teacher and provide your students with what they need to be successful.

BEE AWARE

Surprisingly the honeybee (Apis mellifera), which was named North Carolina's official state insect in 1973, is not native to the state or North America. This insect originated in Eurasia and Africa. European settlers brought honeybees to North America in the early 1600s; however, its arrival in North Carolina may not have occurred until around 1700. Beekeeping (apiculture) originated in the state's coastal settlements and quickly spread statewide with the expanding human demand for beeswax candles and honey.

Honeybee popularity in the state has continuously grown as these insects provide harvestable honey and wax, as well as pollinate some of the state's most important crops such as blueberries, cotton and apples. Efforts to sustain honeybee populations began in 1917 when forty North Carolina beekeepers started the N.C. State Beekeepers Association which is now the largest beekeeping association in the country.

Honeybees, though not native, are not considered invasive. Since they are maintained by humans and were intentionally brought to the state for agricultural purposes, they are classified as livestock. About 5.5 million pounds of honey valued at $10 million dollars are produced by the state's beekeepers per year. Over 120,000 pounds of beeswax, a critical material used in the candle, cosmetic, food preservation, leather tanning, and woodworking industries is harvested annually. Honeybees are critical pollinators and are attracted to flowers by scent and color. They often fly 6 or more miles away from their hive to forage pollen and nectar which is their primary food source. Pollen sticks to a bee's body when it lands on a blossom and is rubbed off on another flower's stigma if the insect moves across a second bloom. Thus, a single honeybee can fertilize about 5000 flowers daily. It is estimated that honeybees pollinate 30% of all the food Americans consume.

Honeybees may be great pollinators, but North Carolina's native bees are just as important. More than 500 native bee species call North Carolina home and are the primary pollinators of many of the state's food crops, flowers, and indigenous plants. Some of these native bees land on blooms and cross pollinate much like honeybees. Others, like the bumble bee, are buzz pollinators. When a bumble bee hovers close to a clump of flowers, the high frequency vibrations created by their wings shakes the pollen out of the anthers dispersing it across several blooms at once.

SeaPerch Competition

In March the Center for Education in Science, Technology, Engineering and Mathematics (CESTEM) hosted the Wilmington Regional SeaPerch Competition at the University of North Carolina-Wilmington. SeaPerch is an aquatic robotics competition for middle and high school students. Student teams engage in the engineering design process to construct and prepare a remotely operated vehicle (ROV). Using their ROV the teams competitively engage in a series of underwater pool challenges. Through the development of their ROVs the students learn engineering and design basics to enhance their creativity and develop collaboration and critical thinking skills.

The winning teams qualified to advance to the 2025 International SeaPerch Challenge in College Park, Maryland. The 2025 overall team winners were: Wave Riders from Myrtle Grove Christian School (middle school level) and Viking 1 from John T. Hoggard High School (high school level).

A listing of the individual event winners maybe found at SeaPerch | UNCW

NC Envirothon

The 2025 state-level North Carolina Envirothon was held in May at Cedarock Park in Burlington N.C. In this rigorous, interactive outdoor competition the top seven scoring teams from each of the Envirothon Area contests were challenged to demonstrate their knowledge of environmental science and natural resource management. Middle and high school teams were evaluated on their performance at testing stations that focused on the specific environmental science topics of soils/land use, aquatic ecology, forestry, wildlife, and current environmental issues. Additionally, teams were evaluated on their communication and problem-solving skills as they orally addressed an environmental problem and provided a practical solution.

The "High Rock FFA Honeybees", High Rock Homeschool team from Davidson County, was the middle school winner.

"Subchronic Exposure", the Enloe High School team from Wake County, won the high school division and is eligible to compete for recognition and scholarships at the National Conservation Foundation Envirothon this summer in Calgary, Alberta, Canada.

To learn more about team scores and awards click https://sites.google.com/site/envirothonnc/general-info/scores

Congratulations

North Carolina Students Are Regeneron Science Talent Search (STS) Awardees.

Started in 1942 as the Westinghouse Science Talent Search, the Regeneron STS is now the nation's oldest and most prestigious science research competition for high school students. This competition is designed to recognize and empower the country's most promising young scientists who are creatively thinking and developing ideas that could solve society's most urgent challenges. This 84-year-old competition seeks out and rewards young innovators who apply their STEM talents and leadership skills to expand the boundaries of discovery and creatively problem solve.

In April, 40 high school finalists were honored at the Regeneron STS award ceremony in Washington D.C. More than $2.8 million in prizes were given to the top finalists for their groundbreaking research, exceptional problem-solving skills and potential to impact the future of STEM in the United States.

Ava Grace Cummings, 18, of Smithfield, North Carolina earned second place and a monetary award of $175,000. For her research project she created a fruit fly model of STAC3 disorder, or Native American myopathy, which is a rare genetic muscle disease. The results of this study found that the common nettle herb, alone or combined with the drug Tirasemtiv, improved movement in both adult flies and larvae.

Thanush Patlolla, 17, of Cary, North Carolina placed 9th in the competition and received a $50,000 award for approximating the density of electrons using a finite nuclear model. Using density function, he created a model to map electrons in a nuclear simulation. The map increased the accuracy of energy distribution predictions by 0.6%.

Using the Outdoors for Regenerative Learning

(Teacher-leader Training)

Submitted by: Lisa Pope

Every student has a story to tell about his or her journey: about achievements and challenges that carve them into who they are as a person. A student's journey incorporates life experiences, interactions with others, values, inspirations, and reflections that help shape and give meaning to life.

Outdoor environmental learning is a power-tool for educators and students! It fosters environmental literacy, a deeper connection with the environment, connection to others and to self. School campuses are the best opportunity to emphasize systems that restore, renew, and revitalize learners as well as learning spaces.

Educators can facilitate regenerative education through curriculum design that incorporates compelling content, contextual, multisensory learning with environmental action. This approach encourages active engagement, problem-solving, and critical thinking through real-world projects that support the learning environment, children, and their communities.

Project-based learning and environmental action can inspire the transformation of the school campus into a Living Learning Laboratory and destination for collaborative, experiential learning each day. If you are interested in learning more about regenerative education and outdoor learning, join us for an exciting summer opportunity! The ForestSmart Schools Program is providing an exciting new workshop, The UnderStory Project. The workshop will take place on Thursday, July 24th at the Catawba College Center for the Environment from 8:30 am-4:30 pm. The workshop provides a unique K-5 curriculum with equipment and materials that enhance outdoor, interdisciplinary learning.

We are looking for teacher-leaders from across the state to participate in a "train-the-trainer" model using high impact practices and reflective learning strategies to boost literacy across all content areas. Teacher-leaders will strengthen content expertise, gain field experience, and learn how to optimize reflective learning strategies to inspire growth and resilience in students and the learning environment.

To Register, contact: Lisa Pope, ForestSmart Schools Coordinator (lrwear@catawba.edu)

Pungo Christian Academy Students Build Slingshot Cars

The Center for STEM East Carolina University recently provided a memorable hands-on experience in engineering and physics for elementary children at Pungo Christian Academy in Belhaven, North Carolina. During the outreach event students in grades 3, 4, and 5 were introduced to kinetic and potential energy through a slingshot car-building activity. Teaching Fellows Ashley and Kelly Williford served as volunteers to assist the students as they built and raced their slingshot cars. The highlight of the day was when the elementary students had the opportunity to operate robots constructed by East Carolina preservice teachers.

The elementary students described the activities as interesting and exciting and expressed strong interest in learning about more physics topics.

Science Olympiad

In April the N.C. State University campus was alive with excitement and rigorous competition as teams from across the state convened for the 2025 North Carolina Science Olympiad. Emily Torkelson, a former competitor, aerospace engineer and World Champion Flyer gave the keynote address. Torkelson told of how Science Olympiad competitions sparked her passion for STEM which led her to a career in aerospace engineering. Dave Glen was named the Volunteer of the Year. The Division B Coach of the Year was Jacob Tegensburger of Seventy-First Classical Middle School and Dana Barnes of Franklin Academy Charter School was named Division C Coach of the Year. Cary Academy captured the Conen Morgan Spirit Award.

Division B Winners are:
1. Piedmont IB Middle School
2. Fred J. Carnage Magnet Middle School
3. J. M. Robinson Middle School
4. Alston Ridge Middle School
5. Mills Park Middle School
6. Davis Drive Middle School
7. Wilmington Academy of Arts & Sciences
8. St. Mary's Catholic School
9. Triangle Math and Science Academy
10. Cary Academy

Division C Winners Are:
1. NCSSM (Durham)
2. William G. Enloe Magnet High School
3. Ardrey Kell High School
4. Green Hope High School
5. Raleigh Charter High School
6. East Chapel Hill High School
7. Durham Academy upper School
8. Simon G. Atkins High School
9. Ballantyne Ridge High School
10. John T. Hoggard High School

The North Carolina Science Olympiad teams that will advance to the national tournament are Division B teams Piedmont IB Middle School and Fred J. Carnage Middle School, and Division C teams North Carolina School of Science and Mathematics and William G. Enloe Magnet High School.

For information regarding team scores click:
https://www.duosmium.org/results/2025-04-26_NC_states_c/
https://www.duosmium.org/results/2025-04-26_NC_states_b/

Michele Hafey Recognized by NC Science Olympiad

Michelle Hafey, Program Associate CESTEM, was awarded the prestigious Dr. Jason L. Painter Distinguished Service Award for her continuous support for the Science Olympiad at the 2025 state competition. Throughout her involvement with the program, Michelle has made a significant impact on the Science Olympiad community as she has served as a coach, coach trainer, volunteer, event leader, event writer and many other roles. NCSTA congratulates Michelle on this well-deserved award.

Call for Presenters

The North Carolina Science Teachers Association invites you to share your most effective lessons and instructional strategies by presenting at the 2025 Professional Development Institute to be held November 6-7. 2025, at the Benton Convention Center, Winston-Salem. Download our Presenter Packet for 2025 for information. Application deadline is June 30, 2025.

Mussels Matter

Approximately 60 species of freshwater mussels are found in North Carolina, but currently more than half of these bivalves are threatened or endangered. The loss of these organisms is concerning as they are crucial for ecosystem health. Mussels keep wetland habitats in balance as they filter the water and are a major food source for other animals.

Protection of these bivalves is a significant challenge. Some of the mussel species are endemic. They are only found in specific water systems which have been severely compromised by the introduction of pollutants released by construction, farming and storm-created flooding. Additionally, many have a complex means of reproduction which is difficult to replicate outside of natural wetland environments. In some species the male mussel randomly releases sperm into the water. If the sperm enters a female while she is siphoning and fertilization occurs, a larva called a glochidia develops. When the glochidia is released into the water it must quickly find a fin fish and attach to its gills or fins. As the host fish swims about, the hitch-hiking glochidia develops internal organs and eventually drops to the bottom of the water source to begin life as an independent filter feeder.

Efforts to propagate freshwater mussel populations are being conducted by the North Carolina Wildlife Commission at the Marion State Fish Hatchery. To learn more about this activity visit ncwildlfie.gov/wildlife-habitat/species

BCS Annual STEAM DAY

On March 8, 2025, students and families participated in a day of discovery at the Buncombe County Schools' annual STEAM Day. Hands-on activities involving science, technology, engineering, art and mathematics were featured throughout Martin L. Nesbitt, Jr. Discovery Academy. Under the guidance of Buncombe County Schools (BCS) teachers and Nesbit student volunteers, participants performed experiments, controlled robots, and created art using objects found in nature. "The BCS STEAM Day is designed to spark curiosity, creativity and a passion for learning in every student," said BCS Science Specialist Kate Whittier. The intent is to provide engaging opportunities for students and their families to see the connections between what is learned in school and how that knowledge and skills can impact their futures, whether in future studies or within a career.

The event celebrates Buncombe County Schools and the system's community partners. All activities are designed to foster curiosity, creativity, problem solving and an appreciation of the STEAM disciplines. BCS STEAM Day was supported by the Buncombe County Schools Foundation, GE Aviation, Asheville Museum of Science, WNC Nature Center, Bricks-4-Kidz, Black Mountain Center for the Arts, Eagle Balloons, Asheville Makers Faire, XP League of Asheville, and Zaniac.

NCSTA Grant Opportunities

NCSTA members taking study classes, attending conferences or participating in workshops are eligible for one NCSTA study grant. (Graduate courses for the purpose of obtaining a degree are not eligible). NCSTA study grants will pay up to one half of your expenses, not to exceed the amount approved by the Association's board each year if your application is selected. Members may also apply for an innovative curriculum grant. This grant provides funds for supplies, materials, equipment, printing, travel or other expenses related to an innovative curriculum project that involves students a unique way. (Finances for a student field trip will not be considered). Recipients of NCSTA grants are required to submit an article to The Reflector on how the grant was used and make a presentation at the annual PDI. The application deadline for NCSTA grants is September 1, 2025. More information regarding NCSTA grants may be found at: Grants - NCSTA

Weathering the Storm: Helen's Impact on Western NC Environment

The impact of Hurricane Helene on western North Carolina is still emerging. Ensuring the safety and overall well-being of the citizens who live and work in that region of the state has been the primary concern, but as summer approaches the aftermath of the storm on the state's mountain environments is being revealed. According to the North Carolina Nature Conservancy over 822,000 acres of timberland were damaged, with the more significant amount of defoliation occurring on southeast-facing slopes. It is estimated that supersaturation of the mountainous terrain resulted in over 1,900 landslides. A particularly disturbing consequence of this erosion is the damage to mountain bogs that now threatens the continued existence of endangered species such as bog turtles, mountain sweet pitcher plants, and purple mountain pitcher plants. Hellbenders, the continent's largest salamanders, experienced displacement of their nesting rocks and egg clutches as well as sediment pollution into their river habitats. It's too early to tell, but many adult hellbenders are not expected to have survived the storm.

The impact on the overall forest composition is complex. The storm pushed over and/or destroyed many acorn-producing older oaks, which has reduced the number of future healthy trees. This not only dramatically alters the forest composition by allowing the overgrowth of poplars and maples, but it eliminates acorns, a vital food source for many animals. Open spaces in the forest created by the fallen oak trees allows invasive plants such as Chinese sliver grass to flourish.

A bright spot is found with golden-winged warblers. In decline for that last two decades, open spaces within the forest may provide much needed breeding habitats for these unique birds.

Bowties and Tid-Bits
Field Trips: Where Science Comes Alive in the Old North State

Submitted by: Dr. Brad Rhew

Field trips are an essential educational tool that enriches students' learning experiences by connecting classroom concepts to real-world applications. Field trips provide opportunities for experiential learning, fostering curiosity, engagement, and a deeper understanding of scientific principles. In North Carolina, the diverse natural and cultural resources offer excellent venues for science-based field trips that can be integrated into interdisciplinary units.

Field trips enhance students' learning by allowing them to interact with environments and tools unavailable in traditional classrooms. Through hands-on activities, students can observe scientific phenomena, engage in experiments, and apply theoretical knowledge in practical settings. These experiences make science concepts more memorable and help students build critical thinking skills. For example, visiting a local river or pond to study ecosystems and water quality enables students to explore topics such as biodiversity, chemistry, and environmental science firsthand. Moreover, field trips increase student engagement by bringing lessons to life. Experiencing science outside the classroom helps students see its relevance in everyday life and motivates them to explore further. Studies show that field trips improve academic performance, particularly in STEM subjects, as students can better grasp complex concepts through immersive experiences.

North Carolina offers a wealth of locations ideal for science field trips:

· Rivers and Ponds–Students can conduct water quality tests on features like salinity, turbidity, and flow rate while studying local ecosystems. This interdisciplinary approach can involve biology (examining aquatic organisms), chemistry (analyzing water samples), and engineering (using tools to measure environmental parameters).

· Zoos and Aquariums– Places like the North Carolina Zoo, NC Aquariums, Greensboro Science Center, or the Kaleideum provide opportunities to learn about animal biology, conservation efforts, and ecological systems. These venues often offer guided programs tailored to school groups.

· Science Museums– Interactive exhibits at museums such as the Museum of Natural Sciences in Raleigh allow students to explore physics, chemistry, and biology concepts through hands-on demonstrations.

· State Parks– Locations like Pilot Mountain or Hanging Rock State Park offer nature walks where students can study geology, botany, and environmental science while observing native habitats.

Field trips can serve as a platform for interdisciplinary education by integrating science with other subjects.

- Old Salem–A visit to this historic site allows students to learn about colonial life while exploring scientific applications such as cooking methods, candle making, and early agricultural practices. Teachers can connect history lessons with chemistry (e.g., reactions in cooking) or physics (e.g., heat transfer in candle making).
- Theme Parks– Physics concepts like Newton's laws of motion or energy conservation can be explored through roller coasters and other rides. Students can calculate speeds, forces, and energy transformations while enjoying a fun learning environment.

Teachers can plan interdisciplinary units by collaborating across subjects. For example, a water quality study could involve English classes writing reports on findings or math classes analyzing collected data statistically.

Field trips are transformative experiences that deepen students' understanding of science by connecting theoretical knowledge with real-world applications. They foster curiosity and engagement by providing tactile learning opportunities that appeal to diverse learners. Additionally, these excursions promote teamwork and socio-emotional growth as students collaborate on projects outside the classroom.

Funding

Funding is sometimes difficult to access for field trips. If you are looking for funding, check out the Department of Natural and Cultural Resources. They will reimburse costs for public schools throughout North Carolina to visit various approved sites. To learn more about which sites are funded, visit dncr.nc.gov/fieldtripfunding. Also, check with your local businesses and community partnerships. Many are looking for ways to fund school programs to get students into the community to learn more about science in the world.

By leveraging North Carolina's rich resources for science education, teachers can create meaningful field trip experiences that inspire students to explore scientific concepts from new perspectives while applying their knowledge in practical settings. Until next time, keep exploring and inspiring North Carolina’s future scientists!

North Carolina Science Teachers Association
District Highlights

District 1:

- Duke Energy Science Night for Elementary schools occurred district wide throughout April.
- Science Olympiad Regional Tournaments were held
  Elementary Tournament for Pitt County was held on March 8, 2025.
  Elementary School Winners: 1st place - Chicod Elementary School (varsity)
  2nd place - Wintergreen Elementary School (varsity) 3rd place - The Oakwood Elementary School (varsity)
  M*iddle and High School for East Carolina was held on March 1, 2025.*
  Middle School winners: 1st place - Hope Middle School V (varsity) - 2nd place - Chicod School (varsity) - 3rd place - Bath Middle School
  High School winners: 1st place - J. H. Rose High School (varsity) - 2nd place - Cary High School (varsity) - 3rd place - D. H. Conley High School (varsity)
- Qualifiers for the State Tournament: Hope Middle School and Bath Middle School
- ECU is hosting a free Engineering and Technology Symposium on August 7, 2025. Click to Register.
- Northeastern High School (Pasquotank County) team "Release the Quackin" won the NC Costal Envirothon

District 2:

- Science Olympiad Tournaments: Brunswick Division A was held April 12, 2025, at Shallotte Middle School
- 2025 Regional Eggs & Issues Breakfast: This event, designed to address North Carolina's Top Education Issues, was held Thursday, April 17, 2025, at UNCW's Warwick Center. The program highlighted several regional schools and outstanding district initiatives. Regional leaders engaged in a panel discussion focused on *Wellness and Resilience in Our Schools and Communities*, as well as the implications of each issue on education specifically in Southeastern North Carolina.
- Teacher Professional Development: CESTEM PK-12 STEM Education Conference - Soar into STEM is scheduled for June 24, 2025. For more details click here:
  https://uncw.edu/academics/colleges/wce/partnerships-centers/centers/cestem/stem-conference

District 3:

- WCPSS and WakeEd Partnership are accepting applications for SummerSTEM. SummerSTEM is PD focused on Project Based Learning. Participants receive high quality professional learning around PBL design, participate in immersive experiences with business partners, and conclude with a spring showcase STEMposium event.
- NCSU-WCPSS Design & Pitch Challenges in STEM event was held 4/12/25
- Crowder Park and NC Geologic Survey, Rockin Geology Party occurred 4/12/25
- NCCU Sci Expo event was held on April 12th from 11am-4pm.
- Applications for the Teen Climate Ambassador Program at North Carolina Museum of Natural Sciences Nature Research Center (NRC) were received. Selected students in grade 9-12 will participate in the program this summer.
- For highlights from WCPSS STEM Consortium click newsletter.

District 4:

- NC Science Olympiad Division A Sandhills was on April 5, 2025, at Alpha Academy.
- NCDPI Regional Meeting hosted by Robeson County Schools. Computer Science standards shared and demonstrated the integration with the Science Standards.
- Cumberland County was proud to have students place in the NC State Science Fair.

District 5:

- NC Science Olympiad Division A regional competition was held on April 5th at Alpha Academy.
- NCDPI Regional Meeting was hosted by Robeson County Schools. Computer Science standards shared and demonstrated the integration with the Science Standards.

District Highlights

District 6

- Cabarrus County Schools and Cabarrus County Cooperative Extension Agency co-hosted the "Agribusiness and Environmental Immersion Days" on March 4-5, 2025, and 6th for all of the 6th graders in the county to explore grade-level science standards. The event allowed students to create awareness and exposure for agricultural and environmental concepts and careers. 'Careers on wheels' were members of the community who presented students with demonstrations that showcased their role in the field of agriculture and STEM.
- Many local students participated at the state level of the NC Science and Engineering Fair on March 29, 2025.
- Cabarrus Regional Science Olympiad was held on March 29, 2025.
- Union County Library hosted on April 7, 2025, "Spacey Spheros" - Explore the wonders of space using simple coding to program small robots to mirror the motion of planets.
- On April 10, 2025, Cleveland County Library and Shiele Museum of Natural History hosted "Weather" - for children of all ages, use exciting experiments and demonstrations to explore how air, water, sunlight, and gravity combine to create Earth's weather.
- On April 11, 2025, Gaston College hosted sciVisit, a STEM Promotion, for Gaston and Lincoln County students. The students participated in experiential learning activities and demonstrations hosted by expert college faculty.
- Earth Day Jam, an Earth Day event sponsored by local non-profit "Happy Roots" was held on April 12, 2025. in Salisbury, NC. This event served to raise awareness for the environment, as well as a fundraiser for Happy Roots, Happy Roots brings gardening programs to Rowan County schools and community, including horticulture-therapy for elderly care facilities.
- April 27 saw the 2025 STEAM Innovation Expo - hosted by UNC Charlotte - The UNC Charlotte Center for STEM Education, UNC Charlotte STEM departments, and community stakeholders. Events focused on engaging and interactive STEM learning opportunities. Through hands-on activities, STEM talks, lab tours, nature experiences, exhibits and performances, the UNC Charlotte STEAM Expo engaged a wide range of public audiences while inspiring future generations.

District 7:

- Summer Accelerator (June 8-July 25, 2025) NVDDM-Morganton, Durham, online HCCET-Hickory
- On 3/15/2025 North Carolina Destination Imagination tournament was held at Heritage Middle School in Valdese, NC.
- NC Student Academy of Science statewide event was held 3/28/25.
- Iredell-Statesville Schools hosted their 3rd annual Careers on Wheels Event on April 17, 2025, at the Iredell County Fairgrounds in Troutman, NC. This event featured 75 local business and industry leaders in STEM careers showcasing their businesses by hosting hands-on-experiences to more than 2000 6th graders. This district wide event allows students exposure to local STEM careers.
- STEM Trek for high school students and the public was held at the Hickory Metro Center on April 16-17, 2025. This is a community event that has been a standing partnership for over seven years between STEM West, the Catawba Science Center (CSC) and the Greater Hickory International Council (GHIC). The event is for high school students and the public. Over 50 businesses provided exhibits with hands-on activities related to science related employment opportunities.

District 8:

- Henderson County Schools has received a grant to support robotics teams in all elementary Schools.
- WRESA hosted sessions in February and March to share science Curriculum Documents created through a regional collaboration. The documents include lesson plans and resources aligned to the new standards.
- Buncombe County Schools' annual STEAM Day was held at Martin L. Nesbitt Jr. Discovery Academy on March 8, 2025.
- Click on https://www.nccat.org/programs/calendar-seminars for information regarding STEM opportunities at NCCAT.
- WNC Elementary STEM/Science Community of Practice Professional Development Day will be June 13, 2025 on the WCU campus, Cullowhee, NC. This event is open to all teachers, coaches, school leaders, professional development providers, and community partners interested in elementary science and STEM education in Western North Carolina. It is a continuation of the Community of Practice initiative that began in January 2024 and will focus on connecting, collaborating, and sharing innovative teaching practices. This year's theme is collaboration, and the event is designed so participants will leave with an action plan to guide efforts as they begin the 2025-2026 academic year. The day is sponsored by the Western Carolina University Jay M. Robinson Distinguished Professorship within the School of Teaching and Learning and College of Education and Allied Professions. There is no charge. Click to Register
- For more information regarding the WNC Elementary Science/STEM Community of Practice visit https://affiliate.wcu.edu/wncelementarystemcop/

Lesson Plan: Student Models

Submitted by: Kristen Kane

Activity Sheet 1: Developing a Model: DNA VS RNA

Your task will be to create a model with a partner. The model must be made out of classroom supplies, and it cannot just be a drawing!

Once you build your model, you must use it as a visual aid as you discuss each required vocabulary term with your teacher. Each term listed below must be shown and labeled in your model. Each partner must speak for the pair to earn credit!

Vocabulary that must be included:

DNA	RNA	Adenine	Nucleotide	Thymine	Ribose
Cytosine	Double Helix	Deoxyribose	Double Stranded	Guanine	Uracil
Phosphate Backbone	Phosphate	Single Stranded	Nitrogenous Base	Hydrogen Bond	

Function of DNA (explained)
Function of RNA (explained)
Complementary Base Pairing (explained)

1 pt for each aspect/vocabulary term to be included in the model. If the vocabulary term says “explain” then the term just has to be defined or clarified rather than be placed in the model

Points: ____/20

Activity Sheet 2: Cellular Respiration and Photosynthesis Model

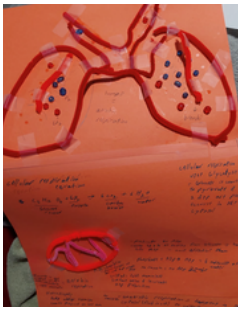
For the following activity, you need to develop a model that incorporates and explains what the following terms mean and how they relate to photosynthesis and cellular respiration. When you and your partner are finished, you will present your model and discuss each term with your teacher.

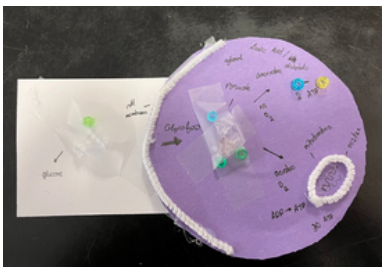
Vocabulary Terms:

Vocabulary Terms:

Photosynthesis	Cellular respiration	Stroma	Thylakoid
Granum	Anaerobic respiration	Heterotroph	Oxygen
Cristae	Autotroph	ATP	Cytosol
ADP	Fermentation	Mitochondria	Chloroplast
Glycolysis	Photolysis	Calvin Cycle	Glucose
Aerobic respiration	Alcoholic fermentation	Carbon Dioxide	Water
Lactic Acid fermentation	Sunlight	Pyruvate	

Light Dependent Photosynthesis
Light Independent Photosynthesis
Photosynthesis Equation
Cellular Respiration Equation





Student Examples of Photosynthesis and Cellular Respiration Models

Mark Your Calendar

May 31, 2025: Deadline NCSTA awards nominations

June 13, 2025: WNC Elementary STEM/Science Community of Practice Professional Development Day

June 24, 2025: Teacher Professional Development: CESTEM PK-12 STEM Education Conference: Soar into STEM

June 30, 2025: PDI Presentation Proposal deadline

July 24, 2025: Understory Workshop, Center for the Environment at Catawba College

August 7, 2025: ECU Engineering and Technology Symposium: Pathways to Enhance K-12 STEM Education

September 1, 2025: NCSTA Grant deadline

November 6-7, 2025: NCSTA PDI