

The Reflector



Editor Dr. Mary Ellen Durham Spring 2023

NCSTA Advocates for Science Educators by Carol Maidon

This spring House Bill 8 was introduced, requiring successful completion of a Computer Science course as part of the high school graduation requirements. The first version of the bill stated that the course would count as a science credit, but specifically not biology or chemistry. Concerned with the possible loss of the earth/environmental science course, NCSTA along with other groups such as the Environmental Educators of N various legislators. We are C (EENC) contacted grateful for their positive response to our concerns and amendments to the bill.

NCSTA acknowledged the value of a computer science requirement with the legislators but presented points for their consideration. We noted that there are other existing options for placement of a computer science course in the high school requirements; the preparation of future ready, scientifically literate citizens that includes understanding earth science concepts and its environment is the responsibility of the NC legislature among others; elimination of the earth/environmental science class would result in students who lack sufficient science preparation and foundational knowledge; without the earth/environmental science course there is no means to address critical earth/environmental science concepts identified in the NC Standard Course of Study, and finally, many in the computer science field do not classify it as a science.

The third, and hopefully final, version of the bill now states "[t]he computer science course shall fulfill one credit that is not an English, mathematics, science, or social studies credit." This version of the bill also states that the Computer Science Course requires that "[t]he State Board of Education shall include instruction in computer science in the standard course of study for middle and high school students. Computer Science shall mean the study of computers and algorithmic processes, including their (i) principles, (ii) hardware and software designs, (iii) implementation, (iv) impact on society". As the number of graduation credits cannot be increased, the course will likely take the place of an elective. The bill has been sent to the senate for approval and is working its way through their committees.

NCSTA President By Cliff Hudson



I want to thank each and every one of you for the hard work that you do in science education for the students of North Carolina. Eighteen years ago, when I first started teaching, I attended my first NCSTA conference. I remember the presentations and all the resources I received, but more importantly, it was the collaboration amongst professionals that was most significant. I am still friends and networking with many of those people. As president I want the promotion and continuation of excellence in science education across the great state of North Carolina to be the Association's number one priority. We are gearing up for another awesome PDI in November and I encourage you to come and bring a new science teacher. If there is anything I can do for you or if you have any suggestions, please reach out to me or your district director.

2023 K-12 Science Standards Update by Gavin Fradel

Work continues toward the adoption of the proposed 2023 North Carolina K-12 Science Standards. The Data Review Committee (DRC) completed the review and analysis of feedback from Draft 1 and submitted their report to the Standards Writing Team (SWT). SWT met in-person in February to review the DRC recommendations and began revising the first draft of the proposed standards. A second draft of the proposed standards was released for review by all stakeholders in late February 2023. This spring the DRC is charged with reviewing data from the second survey and reporting their findings to the Standards Writing Team who will edit or revise Draft 2 of the proposed standards.





Space Talk Brentwood

Elementary to ISS

A Brentwood Magnet Elementary School of Engineering student described a recent STEM learning experience as the coolest thing he has ever done in his life! This descriptor was certainly shared by all his classmates. Brentwood Magnet, located in Raleigh, was one of nine schools in the country selected to participate in the 2023 program called Amateur Radio on the ISS. To prepare them for the activity, Brentwood students learned about the use of amateur radio systems and studied the importance of the International Space Station. Then, last January they connected through an amateur radio in Belgium to talk to astronauts living aboard the International Space Station.

Prior to the “space talk”, NASA educators discussed with the students the importance of STEM fields and careers. Once connected, the students were able to ask the astronauts questions that had been voted on and decided upon by the students themselves. Questions included: Is space travel scary? What do you do for fun on the ISS? How do you exercise in space? What was your favorite class in elementary school?

Coordinating this incredible learning experience was stem teacher and magnate coordinator, Kristen McBryde. Ms. McBryde noted that the students learned directly from the astronauts about problem solving on the ISS and in turn, associated using STEM strategies to problem solve in their own lives.

NCSTA applauds Kristen McBryde for providing an extraordinary learning experience for her students.



Would you like to provide a causative learning experience for your students, but the resources and instructional materials are not available? Is there a professional opportunity that would expand your knowledge and enhance your instructional expertise, but you lack the financial support to participate? **NCSTA may be able to help.**

Association members may apply for an NCSTA Innovative Curriculum Support Grant, which provides funding for supplies, materials, equipment, and other expenses related to a creative curriculum project that uniquely involves students. Members who are participating in a workshop, enrolling in a study class, or attending a professional conference may receive partial monetary support by applying for an NCSTA Study Grant.

The fall deadline for submitting grant proposals is September 1, 2023. Information regarding grant eligibility and submission requirements is available on the NCSTA [website](#).

Invaders!!!!



The North Carolina Wildlife Federation is asking science teachers to inform their students and respective communities that the state is seeing a dramatic influx of highly invasive plant species. These alien culprits are compromising the health and sustainability of our native flora and fauna and are rapidly decreasing our pollinator species. Not only are these plants hurting our wildlife, but they are very difficult to combat. We are all aware of the carnage of Kudzu, a leafy vine that smothers everything in its path. However, there are other plants, originally introduced to the state for landscaping and gardens, that are just as harmful.

The NC Wildlife Federation has named these species the DIRTY DOZEN. A list of these twelve rapidly spreading and degrading species follows: Bradford Pear (*Pyrus calleryana*), Tree of Heaven (*Ailanthus altissima*), Mimosa (*Albizia Julibrissin*), Japanese Barberry (*Berberis thunbergia*), Paper Mulberry (*Broussonetia papyrifera*), Russian Olive (*Elaeagnus angustifolia*), Autumn Olive (*Elaeagnus umbellata*), Burning Bush (*Eunonymus alatus*), Japanese Privet (*Ligustrum japonica*), Chinese Privet (*Ligustrum sinense*), Princess Tree (*Paulownia tomentosa*), Multiflora Rose (*Rosa multiflora*)

Science teachers can lead the fight against these invaders by discussing the harm these plant pests cause, engaging students in community projects to remove the invasive species, and promoting the planting of native species.



NCSTA GRANT OPPORTUNITIES



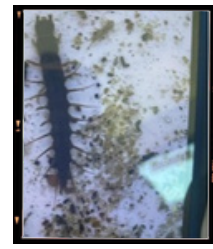
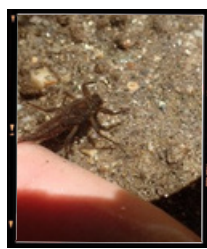
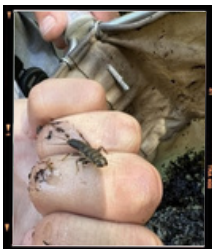
2022 Innovative Curriculum Grants

The purpose of NCSTA grants is to provide the support needed for science educators to enhance their professional skills and support excellence in educational practice. The Spring 2023 issue of the Reflector is honored to showcase how science teachers Kathy Bosiak and Annie McEntyre have optimized their Innovative Curriculum Grants.

Aquatic Kick Nets to Access Water Quality Project By Annie McEntyre Science Teacher East Rutherfordton High School

While engaging in a “job shadow experience” with the ETT Environmental Laboratory located in Greer, South Carolina the idea for a business-school collaborative partnership that would provide an authentic, hands-on learning experience was born. With me acting as the coordinator, **The Kick Netting to Assess Water Quality Project** was incorporated into the high Earth and Environmental Science Classes at East Rutherfordton High School and used for the E E2.2 standard to address human impacts on water quality and how industries have protocols in place to ensure they are meeting environmental standards. Students in these classes partnered with ETT Environmental Incorporation to learn how local industries must implement safeguards to protect local ecosystems and environments. The unit began with an investigative activity designed to illustrate how humans impact water quality. The students conducted a water quality inquiry laboratory activity that required the introduction of copper sulfate concentrations in simple aquatic environments and making daily observations for each aquatic site.

The students then began learning how to identify macroinvertebrates. Aquatic macroinvertebrates are good indicators of stream quality for several reasons, as they are affected by the physical, chemical, and biological conditions of the stream. The macroinvertebrates cannot escape pollution and show the effects of short and long-term pollution events. They may also show the cumulative impacts of pollution. The students used the kick nets and specimen containers obtained through a NCSTA grant, to collect macroinvertebrates from each of the aquatic sites under investigation and learned how the organisms are classified as either sensitive, somewhat sensitive, or tolerant to environmental fluctuations. These classifications were then used to determine an organism’s weighted factor. Students also had to consider the natural abundance of the organisms which were determined as rare, common, or dominate. Using both the information gathered by the introduction of copper sulfate into the respective water sources and data collected regarding the classifications of the collected invertebrate samples, calculations were used to determine the overall health of the aquatic environments. The project was a very effective learning experience for the participating high school students. This project will be modified to meet middle school standards for the next school year and then incorporated into elementary standards the following year.





Rock Art Storylines

by Kathy Bosiak: Science Teacher Lincolnton High School



“Chase your dreams but always know the road that will lead you home again.” has always served as my guiding quote. Using my NCSTA Innovation Curriculum grant, I planned and managed a trip to New Mexico knowing that I would have opportunities to find and photograph hundreds of examples of rock art. These examples would provide phenomena necessary to create the storylines I wanted for my Earth & Environmental students, as well as provide opportunities for me to talk to local people and experts on the rock art meaning, hear legends and myths, and be completely immersed in what I wanted my students to use to drive their learning.

Storylines are phenomenon-driven learning. Storylines allow teachers to support science and engineering students to build and use science ideas in explaining actual phenomena and solve real problems. Students learn the content through collaboration and questioning, reflection and questioning, and finally, problem solving and reflection. My storylines, when completed, will cover content such as rock types, weathering, weather and climate zones and introduce cultural material as detours. As all roads are not straight paths, neither is learning and so storylines have, “detours” which allow students to explore complimentary material while they are on their journey. As with any detour, students are circled back to the main road (content) and then allowed to travel a more linear path until the next detour.

I traveled to little known areas where Rock Art was located and spoke with locals, who were elated to share information and stories about the sites, the mountains, the weather or the importance of the day. I solidified my knowledge of rock classification and the general type a rock artist would utilize. I learned that there are stories that MUST be told only during certain seasons and there are others which MUST not be told to individuals under a certain age because they will not be ready for the message that the story provides. I found rock art in unexpected places, and unfortunately found examples of extreme vandalism, which although anticipated, made me unexpectedly sad. Both of these experiences created ne detours to add to the content road in the storylines. In addition to the actual research I conducted, my amazing travel experiences provided other phenomena that can be used to create additional storylines. For example, I while eating a meal in Cuba, New Mexico I sat with the restaurant owner and chef and discussed the area, her culture and her fabulous, homemade, fresh food!

Driving home from New Mexico, I took every opportunity to look for areas that were geologically exciting for possible storyline inclusion. I was most surprised and excited to learn that there are examples of Rock Art in places other than Arizona, New Mexico, Utah or Colorado! There is Rock Art from Texas to Alabama to Tennessee; from Kentucky to North and South Carolina; and northward along the East coast. My mind is so full of ideas now, that I foresee expanding the storylines to include explorations that would include comparing and then analyzing why the Rock Art is much better preserved in the Southwest versus North Carolina, or why many of the Rock Art examples on the East Coast are currently accessible only by boat? My quote actually became a reality: I chased my dreams of where I thought the phenomena would be the most exciting and the road brought me right back home to examples that I can use in conjunction with my dream sites.



Why NCSTA



NCSTA membership offers multiple benefits. In addition to serving as a vehicle for professional collaboration via Tweeter and Facebook, the Association sponsors **The Reflector**, an online newsletter with district and state news, and a website providing current NCSTA information. The Association serves as a liaison with DPI and lobbies on your behalf with the state legislature. NCSTA offers grant opportunities to financially assist your pursuit of professional development opportunities and the acquisition of resources, as well as recognizes classroom excellence through its Awards program. NCSTA hosts a yearly conference (PDI) which showcases cutting edge resources, outstanding speakers, and peer presentations detailing effective classroom practices. Members can attend the PDI at a reduced fee and earn CEU credits. You are encouraged to continue your NCSTA membership and invite your colleagues to join.

Important Dates



- April 21-22, 2023 Science Olympiad
- April 28-29, 2023 Envirothon
- April 28-May 1, 2023 City Nature Challenge
- April 28-May 1, 2023 NC BioBlitz Science
- April 29, 2023 NC Gravity Games
- July 22-30, 2023 NC Moth Count
- November 2-3, 2023 NCSTA PDI

Look Up

Whether you plan a “sky watch” with your students or you simply enjoy star gazing, several interesting celestial events will occur this spring.



June 4 Strawberry Moon: The moon will be positioned on the opposite side of the Earth as the sun, so it’s “face” will be fully illuminated. This full moon will appear as it normally does regarding color and luminosity. The Algonquins gifted the moniker strawberry moon to the periodic June full moon as it occurs during the brief strawberry harvesting season.

June 4 Venus at Greatest Eastern Elongation: Elongation is the maximum angle, eastwardly or westwardly, between a planet and the sun as seen from Earth. On this night Venus will reach its greatest elongation (45.4 degrees) from the sun. As Venus will be at its highest point on the horizon in the early evening, look for a very bright planet just after sunset in the western sky.

July 18 New Moon: The orbit of the moon will position it on the same side of the Earth as the Sun and will not be visible. As there will be no reflected light from the moon to interfere, this is the best time of the month to view constellations, galaxies, and star clusters.

June 21 June Solstice: Earth’s North pole will be tilted toward the Sun, which will have reached its northernmost position in the sky, placing it directly over the Tropic of Cancer at 23.44 degrees north latitude. On the Northern Hemisphere this is the first day of summer (summer solstice) and the first day of winter (winter solstice) in the Southern Hemisphere.

July 3 Supermoon: The moon’s orbit is irregular and egg-shaped. It can be 252,000 miles from Earth and as close as 222,000 miles. As the moon approaches its closest position to Earth (perigee) it appears larger and brighter and is termed a supermoon. If the moon’s perigee coincides with its full phase, it appears 17% brighter and 30% larger than it normally does. On July 3, 2023 the moon will be 224,895 miles from Earth. Three more supermoons will occur this year; August 1 (the distance to the moon from earth will be 222,158 miles), August 31 (the distance to the moon from earth will be 222,043 miles) and September 29 (the distance to the moon from earth will be 222,657 miles).

Teaching Tip by Manley Midgett

The following is an Extend activity on MOTION. Although it is best suited for 5th graders it can be used at the 3rd and 4th grade level.

EXTEND “**Keeping an Eye on Your Speed**” (45 minutes)

Purpose of Activity: Students will be able to describe the motion of a car at different times during a trip.

Materials: (per student) travel scenario, table, graph paper, ruler, pencil

Instructional Plan/Directions:

1. Distribute the materials to each student.
2. Ask the students to read the scenario and record the data on the table.
3. Then ask students to plot the data on graph paper.
4. The students should answer the key questions individually and share answers with the class.
5. It may be necessary to record the data and make a graph on a transparency or chart so that everyone may check his/her work.

Your Challenge

Stan and Sally are participating in a miniature “road rally”. For this contest, each team has been given written instructions for driving a model car on a long strip of road. The car has a very accurate speedometer. The team is given a stopwatch to help them. They must follow directions precisely until they stop their car. The course has been measured and the stopping spot is a secret until every team finishes the contest.

The team who can follow the directions most accurately and stop closest to the ideal stopping spot will win a prize. Please read the travel scenario, make a table and plot a graph of the required travels of Stan and Sally. See if you could advise them on how far they must travel to stop in the correct spot.

Travel Scenario

- From the start line travel at a speed of 20 feet/second for 3 seconds.
- Then go 30 ft./sec. for the next 2 ½ seconds.
- Next change to 25 ft./sec. for 4 seconds.
- And then go 40 ft./sec. for 3 ½ seconds to the finish spot.

Make a table of the travel data and show how far Stan & Sally should travel during each second of their journey.

Then use the graph paper to show the distance traveled by Stan & Sally during each second of their journey.

“Keeping an Eye on Your Speed” -Continued

Answer the key questions. Be prepared to share your answers with the class.

Key Questions: Try to answer these questions in order.

1. What was the total distance that Stan & Sally should have traveled?
2. What was the total length of time that Stan & Sally should have traveled?
3. What was the average speed that Stan & Sally traveled during the trip?
4. How did you get the answer for question #3?
5. How far did they travel during the first 3 seconds?
6. How far did they travel during the next 2 ½ seconds?
7. How far did they travel during the next 4 seconds?
8. How far did they travel during the last 3 ½ seconds?
9. Draw a line on the graph from the beginning point to the finishing point. If this line is straight, what does this mean in terms of their speed?
10. What does the steepness of the line mean?

District Highlights

District 2 In 2023, the student STEM competitions returned to being in person events. While the regional lines are drawn differently for each type of competition, teams from district 2 were represented at both regional Science and Engineering Fairs and regional Science Olympiad Tournaments and winners have advanced to state level competitions. Teams from Pender, New Hanover and Sampson Counties participated in the Wilmington Regional SeaPerch Competition at UNCW in March 2023. Two teams are advancing to the International SeaPerch Challenge at the University of Maryland on May 13, 2023. Students within district 2 have also been involved with Junior Science and Humanities Symposium as well as various Robotics Competitions.

UNCW's Center for Education in STEM (CESTEM) will host the regional PK-12 STEM Education Conference at the Watson College of Education on Thursday, June 22nd. Due to the pandemic, it has been a few years since they have been able to facilitate this event. The theme for this 1-day conference is "Connecting the Dots: The Power of STEM". The \$30.00 registration fee includes all sessions and lunch. Click here to register: <https://bit.ly/STEMedConf>

District 5 Division B and C Science Olympiad regional tournaments were held in February at UNC-Greensboro. The Division A Science Olympiad regional tournament was hosted by Alamance Community College in early April. The Piedmont Earth Day Fair will be held at the Winston-Salem Fairground on April 22, 2023. Bettye Jo Moore of Wiley Middle/Magnet School has been selected to test student experiments in microgravity in Zero G.

Kaleideum North located in Winston Salem will host a Statewide Star Party called Celebrating the Night Sky on April 22, 2023. The Forsyth Astronomical Society will provide telescopes and binoculars and provide guide viewing instructions as they discuss the cosmos. Kaleideum North will also host MESSTAVILLE for elementary-aged children on May 20, 2023. Participants will explore science and create art as they immerse themselves in goo, gunk and grit. Children will learn the properties of matter while mud painting, playing in oobleck pools, and celebrating with a bubbles and foam party.

District 6 In March, NCSTA was a sponsor for the Middle Level Educators Conference that was held in Charlotte, NC. The sponsorship provided an opportunity for NCSTA representatives to showcase the benefits NCSTA offers its members. The event allowed for strong collaboration and networking with middle school science educators, administrators, and support staff.

In February Patriots STEM Elementary School in Cabarrus County hosted the regional elementary-level Science Olympiad competitions. Phillip O Berry Academy of Technology (Charlotte, NC) hosted the B and C divisions of the regional Olympiad events.

Carie Fugle, was awarded a grant from NC Outdoor Heritage Advisory Council to aid in the purchase of a greenhouse for her school, West Cabarrus High School. The school's Earth Club and Science Department fundraised for the remaining funds, and was successful in purchasing a Riga XL 6 Greenhouse for their school campus this past January. A collaboration with the school's construction classes and the Science Department allowed for West Cabarrus students to actually build the greenhouse foundation and to erect the structure. An open-house of the new greenhouse and gardens is scheduled for April 29, 2023. An official ribbon cutting ceremony is planned for May 19, 2023.

The West Cabarrus Honors Botany students, chaperoned by Carie Fugle will participate in a field trip to the University of North Carolina, Charlotte Botanical Gardens and Greenhouse on Tuesday, April 25, 2023. This beautiful tour through the gardens and greenhouses on the campus of UNCC will allow the students to immerse themselves in a living classroom and provide a first-hand experience of seeing and understanding the full potential of a working greenhouse

District 7 During April middle and high school science teachers were engaged in professional development at the Getting Started with Data and Research in the Classroom training event held on the new NCSS-Morganton campus. Science educators engaged in a day of professional learning that focused on supporting student research in the classroom.

STEM Trek: Family STEM Expo, was held at the Catawba/Salt Block in Hickory this spring. This event was open to children, adults, and science educators and focused on chemistry, life sciences, mathematics, earth and space sciences, physics, engineering, and technology topics. Local businesses provided hands-on activities related to their industry and provided opportunities for the attendees to engage in STEM career options.

In March two student competitions occurred in the district. NCSSM Morganton took 1st place at the Envirothon, NW Regional (Area 2). At the Hickory Invitation Science Olympiad Central Wilkes Middle School won 1st place (Division B) and Simon G Atkins Academic and Technology High School took 1st place (Division C).

District 8 The Western Regional Science Fair was February 9 and 10, resulting in area students moving on to the March state-level fair. Dr. Frank Forcino, the organizer, is interested in supporting more classroom teachers with participation in the Science and Engineering fair. If you are interested in outreach or becoming active, please contact him at flforcino@wcu.edu. The NC Science Olympiad in Asheville was a success, with teams from Asheville, Henderson County, and Mooresboro headed to the state competition. The FIRST robotics competition took place in Asheville March 4-5, 2023, as well.

Several events from the Smoky Mountain STEM Collaborative were held in April. These events included the Youth Program at Franklin Library, The Star Party at Innovation Station "Pour One Out for Pluto," and the Earth Day Celebration at Swain High School. The Smoky Mountain STEM Collaborative will host the Youth Program at Sylva Library on April 26, 2023, the STEM Careers Fair at SCC Jackson Campus on April 27, 2023, and the Space Apps Challenge at PARI October 7-8, 2023.

Two professional development opportunities are scheduled soon for district science teachers. These are Expanding your Tech Toolbox: Getting the Most Out of Digital Learning at NCCAT on April 3 - April 6, 2023, and Supporting the Implementation of Modeling Instruction in Rural Schools on Jun3 26 - 30, 2023 (week #1) July 10-14, 2023 (week #2, July 17-21, 2023 (week #3). St the NCSU Science House Mountain Satellite Office, Western Carolina University, Cullowhee, NC.