We understand the importance of user-friendly, real-time data collection technology that provides students an opportunity to engage in higher-order thinking skills. That’s why Go Direct® SpectroVis® Plus Spectrophotometer makes such an impact on both students and teachers alike.

Simplify your lab setup by connecting Go Direct SpectroVis Plus wirelessly or via USB, making spectroscopy more accessible to your entire class, all while freeing up valuable time to teach. Teachers are amazed at how easily their students can collect a full spectrum in less than one second.

Visit TeachWithVernier.com to learn more.
Visit the NSTA STORE
Prince George’s Exhibit Hall C

STORE HOURS
Wednesday, Nov. 14  5:00 PM – 7:30 PM
Thursday, Nov. 15  7:30 AM – 5:30 PM
Friday, Nov. 16  7:30 AM – 4:30 PM
Saturday, Nov. 17  8:00 AM – 12 Noon

We have the latest resources for science teachers, including new releases and bestsellers!

• Purchase fun NSTA-branded gear—unique hats, shirts, mugs, and more.
• Join NSTA to get member pricing: 20% off bestseller NSTA Press® titles.
• Ask about our NSTA gift cards—great gift idea!

Download the conference app or follow #NSTA18 for special giveaways, contests, and more throughout the conference!

Visit www.nsta.org/store to make a purchase today, or call 800-277-5300.
JOIN US

8TH ANNUAL
STEM
Forum & Expo

HOSTED BY NSTA
San Francisco, CA
July 24–26, 2019

This dynamic event brings together educators and organizations who are actively implementing STEM programs in their schools or districts.

Come prepared to learn tactics that work, build your professional learning network, connect with effective outreach programs and partnerships, discover new resources, and build a strong curriculum.

For information and to register, visit www.nsta.org/stemforum

• Experience hands-on sessions that enhance your on-going development and improve your STEM knowledge.

• Explore ways to foster integration of research-based methods into the STEM curriculum.

• Network with colleagues and hone your STEM leadership skills.

• Compare project- and research-based activities that tackle issues of real-world relevance.

• Discover the aspirations of students who share their interests in STEM opportunities and careers.

• Check out the hottest tools and resources for STEM educators.

• Get the keys to success in developing partnerships with informal education groups, business, industry, and governmental agencies.

#STEMforum
NSTA National Harbor Area Conference on Science Education

NSTA 2018 Area Conference on Science Education

Science Education: A National Priority

National Harbor, Maryland • November 15–17, 2018

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NSTA National Harbor Area Conference on Science Education

NSTA Affiliates

NSTA Affiliates
Association for Multicultural Science Education (AMSE)
Association for Science Teacher Education (ASTE)
Association of Science-Technology Centers (ASTC)
Council for Elementary Science International (CESI)
Council of State Science Supervisors (CSSS)
National Association for Research in Science Teaching (NARST)
National Middle Level Science Teachers Association (NMLSTA)
National Science Education Leadership Association (NSELA)
Society for College Science Teachers (SCST)
Welcome to National Harbor: Science Education: A National Priority

On behalf of the science education community in Maryland, we welcome you to the NSTA National Harbor Area Conference. Located on the Maryland side of the Potomac River, from National Harbor you can look upstream to our nation’s capital—Washington, D.C., and across to Alexandria, Virginia.

Developing scientifically literate global citizens is increasingly critical in today’s society. The National Harbor Conference Committee wants you to join us in making “Science Education: A National Priority” by advocating for your students and science. The committee has organized a wide variety of experiences across disciplines and grade levels that will challenge you and help you enhance your practice as an educator and leader in science education.

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The National Harbor area conference is organized around three strands:
- Monumental Challenge: STEM Equity, Diversity, and Advocacy via NGSS
- Freedom to Become Scientifically Literate
- Cultivating Curiosity in the Capital Region

We know that you will have a terrific learning experience while you are here at National Harbor. From the exciting experts, invited speakers, hands-on workshops, presentations, and short course you are sure to explore tools, practices, and resources that will assist you in developing curious, innovative, and responsible citizens for tomorrow.

We encourage you to network with other professionals here at the conference who share your passion for teaching students science, as well as check out the great products and services offered in the exhibit hall. Thank you for making time to step away from your professional responsibilities and nurture your learning in support of creating inclusive classrooms that celebrate diverse ideas and solutions essential for STEM literacy. Each of us looks forward to meeting you as you engage in learning and growing here at the conference.

Please stop by the MAST Booth #233 in the Exhibit Hall. We would love to meet you and share with you how you can become involved in your local professional organization.

2018 National Harbor Area Conference Committee Leaders
Jaclyn Austin, Jonathon Grooms, and Anisha Campbell

We at NSTA wish to express our heartfelt thanks to the members of the Maryland Association of Science Teachers for the many hours of time they volunteered in planning this conference.
Together, We Advocate for Science Education: Tenacity—Leadership—Collaboration

Science Education: A National Priority is the theme for the National Harbor Area Conference and the theme says it all! What better place to focus on the need to recognize the importance of science education than to be a stone’s throw from the nation’s capital. The conference planning team has rallied the troops to tackle just this challenge. The following three strands help all of us examine how, advocate for, and proclaim that science education is important and necessary to the future of our nation.

- **Freedom to Become Scientifically Literate** brings to focus the need to develop scientifically literate citizens who consider global perspectives. Strategies and opportunities for doing so are the focus of these sessions, as well as suggestions for incorporating a variety of student experiences to build understanding.

- **Cultivating Curiosity in the Capital Region** seeks to do just that—cultivate curiosity in our students, in our peers, and in our administrators—using the best-known resources in the capital region. Not from the local region? That’s fine! Come see suggestions that might spark your own curiosity to find local resources in your area!

- **Monumental Challenge: STEM Equity, Diversity, and Advocacy via NGSS**. Meeting the needs of ALL learners is at the heart of this strand, which presents sessions that focus on the need for equity opportunities and strategies to foster the inclusive nature of science education within three-dimensional learning and the NGSS.

I encourage each of you to advocate for the importance of science education at school, district, state, and national levels as you engage in your own learning by participating in featured presentations, selected strand sessions, exhibit hall displays, and more than 200 sessions, as well as taking advantage of networking with colleagues.

Again, a special thank you to the conference planning committee for developing all of these topics and opportunities for professional experiences and development. May you have an outstanding experience with your colleagues and fellow NSTA members as you converge on the capital region to learn, promote, and advocate for not only the importance of science but also that of science education.

Christine Anne Royce
2018–2019 NSTA President

Sponsors and Contributors to the National Harbor Conference

NSTA, MAST, and the National Harbor Planning Committee are extremely grateful to the following companies and associations for their generous contributions to the NSTA National Harbor Area Conference on Science Education.

**Sponsors**
Maryland Association of Science Teachers
National Geographic Learning | Cengage
Southwest Airlines
Texas Instruments
Vernier Software & Technology

**Contributors**
American Chemical Society
American Society for Engineering Education

The environment is important to science educators. These programs are recyclable and were printed on recycled paper.
The National Science Teachers Association is committed to meeting today’s environmental challenges by adopting eco-friendly practices both in our own day-to-day operations and at our conferences, workshops, and other events. In addition, we strongly encourage our contracted conference facilities to follow green practices as well. Here are some of the ways NSTA’s conference department has worked to minimize our impact on the environment:

**Conference Previews**
Gone are the days of bulky, newspaper-style advance programs. Our conference preview is a smaller size and includes highlights for our three area conferences. As an added bonus, this new preview is more environmentally friendly, as it dramatically reduces both our print and mailing requirements.

**Online Conference Information and Personal Scheduler**
Most of your conference arrangements can now be accomplished online (www.nsta.org/conferences). Register and make your housing reservations on the web. Program details are available to you on our website using the Session Browser/Personal Scheduler. Scheduling information on our website is up to date and more complete than that available through a printed piece.

**Final Conference Programs by E-Mail/Conference App**
All conference pre-registrants are sent an electronic version (PDF) of the final conference program by e-mail approximately one week prior to the conference, further reducing print and shipping requirements. Also, attendees are encouraged to use the NSTA Conference app, which provides all the tools necessary for a successful conference experience.

**Recycled Paper and Sustainable Print Services**
Conference previews and final conference programs are printed on recycled paper whenever possible. In addition, Walsworth Inc., the printer for our conference materials, is in strict compliance with all environmental laws and exceeds these standards in many areas. Wherever possible, Walsworth works to reduce and recycle waste, use reduced- or low-VOC chemicals, increase the recycled content of raw materials, and use inks that are formulated with bio-renewable resins and vegetable oils.

**Environmentally Friendly Exhibition Practices**
Our conference partner, Hargrove, Inc., offers many green product options and services in the production of our conference exhibitions, including 100% recyclable carpet and padding, recycled exhibit structures, a “reclaimer” that recycles 92% of all solvents the company uses in production of graphics, use of LP natural gas in 75–90% of show-site vehicles, and many biodegradable and recycled products such as trash bags and wastebaskets. Their green efforts are extended operationally with reductions in electricity, heating fuel, and water usage, as well as a move to 100% recyclable and biodegradable products.

**Gaylord National Resort & Convention Center’s Green Practices**
The Gaylord National Resort & Convention Center is committed to supporting “green initiatives” both at the center and throughout the community! This year, the Gaylord National Resort & Convention Center has put in place a new CHP (Combined Heat and Power) system, consisting of three 2000 kW natural gas generators that will produce approximately 90% of the electricity used on-site.

**Energy Savings and Waste Reduction:** Waste heat from the CHP system’s generators will be used for domestic water and space heating. In addition to being able to utilize the waste heat from electrical production, generating power on-site saves electricity because transmission losses normally incurred are eliminated. This project will reduce the building’s carbon footprint by about 59%.

**“Go Green” at the National Harbor Conference!**
- Recycle your conference programs in the clearly marked recycle bins located throughout the Convention Center.
- Recycle or reuse your plastic badge holders—you can either turn them in at the NSTA Conference Services or use them at future conferences.
- In advance of the conference, presenters are encouraged to post their presentations and handouts on the Session Browser/Personal Scheduler.
- If you prefer to bring handouts to your session, use double-sided printing and/or recycled paper.
- Walk or use public transportation when possible at the conference.
- Bring your own refillable water bottle to the conference.
- Evaluate sessions attended online.
Meeting Location and Times
The conference hotel is the Gaylord National Resort & Convention Center. Conference Express Check-In, exhibits, the NSTA Community Hub, the NSTA Store, exhibitor workshops, and all sessions will be located there. The conference will begin on Thursday, November 15, at 8:00 AM, and end on Saturday, November 17, at 12 Noon.

Express Check-In
Registration is required for participation in all conference activities and the exhibits. Express Check-In and Attendee Services are located at the Maryland Ballroom Pre-Function space, and the NSTA Store is located in Prince George’s Exhibit Hall C. Proceed to Express Check-In to print your official badge and secure conference materials. Express Check-In and Attendee Services will be open the following hours:

- Wed., Nov. 14: 5:00–7:00 PM
- Thu., Nov. 15: 7:00 AM–5:00 PM
- Fri., Nov. 16: 7:00 AM–4:00 PM
- Sat., Nov. 17: 7:30 AM–12 Noon

The NSTA Store will be open the following hours:

- Wed., Nov. 14: 5:00–7:30 PM
- Thu., Nov. 15: 7:30 AM–5:30 PM
- Fri., Nov. 16: 7:30 AM–4:30 PM
- Sat., Nov. 17: 8:00 AM–12 Noon

If you misplace your badge, present your personal ID at Attendee Services and you will be issued a replacement. Only one replacement badge will be issued.

Purchasing Ticketed Events
The National Harbor Planning Committee has scheduled a short course and two educational trips, and MAST has a luncheon. Each of these events requires a separate fee and ticket. You may purchase tickets for the short course, space permitting, at Attendee Services. See the Conference Program section (starting on page 30) for details. The MAST Luncheon ticket is available for purchase on their website, www.emast.org/event-3070248.

Ground Transportation to/from Airport
A variety of ground transportation options are available to and from the Gaylord National and nearby airports. SuperShuttle has special discounts to and from:

- Reagan National (DCA) (closest)
- Dulles International Airport (IAD)
- Baltimore/Washington Airport (BWI)

Visit www.nsta.org/natharbortravel for details. To make a shuttle reservation, call 800-660-8000, visit online at www.supershuttle.com, or stop by the Transportation Desk located in the Front Lobby.

Getting Around Town
You’ll find that many of National Harbor’s attractions, restaurants, and nightlife are located within comfortable walking distance of each other. If you prefer not to walk, the Harbor Circulator Bus is an option. Registered overnight guests at Gaylord National can enjoy free transportation on the Harbor Circulator Bus as part of the resort fee. This shuttle runs 7 days a week from 11:00 AM to 10:15 PM Sunday–Thursday and until 1:00 AM on Fridays and Saturdays. Visit www.nationalharbor.com/circulator for more information.

Parking
There is parking available at the Gaylord National and a number of parking lots at National Harbor (across the street from the Gaylord). The closest option is St. George Garage, followed by Mariner and Fleet garages. Parking in these garages is $5 for 0–2 hours; $12 for 2–4 hours; and $20 for 4–24 hours. For more information, visit parking.nationalharbor.com.

Airlines and Amtrak
NSTA has made arrangements with several major airlines and Amtrak to offer discounted fares to conference attendees. Visit www.nsta.org/natharbortravel for details.

Discounted Rental Cars
- Alamo Car Rentals—Receive discounts by booking online at www.alamo.com and providing the Discount Code CD#LEADERS or by calling Alamo at 844-354-6962 and providing the Discount Code.
- Hertz Car Rentals—Receive discounts by booking online at www.hertz.com and providing the Discount Code #1170024 or by calling Alamo at 800-654-3131 and providing the Discount Code.
Gaylord National Resort & Convention Center
201 Waterfront St.
National Harbor, MD

For questions regarding your housing, call 301-965-4000 or 877-382-7299 or visit the resort front lobby desk.
WANT QUALITY NGSS LESSONS, BUT CAN’T FIND THEM?

BE A PART OF THE SOLUTION.

Help fill the void of quality materials by submitting what you are creating to Achieve’s Science Peer Review Panel (Science PRP). Receive detailed, evidence-based feedback and suggestions for improvement and get recognized for your hard work.

The Science PRP is working to build a library of excellent instructional materials that embody the NGSS and are freely available to teachers. Check out high-quality examples online and submit yours for a review free of charge today!

GO TO NEXTGENSCIENCE.ORG/PRP TO FIND OUT HOW TO SUBMIT MATERIALS.

If you’d like feedback on commercial or proprietary materials, go to ACHIEVE.ORG/REVIEWS to learn more.
NSTA Exhibits

The NSTA Exhibit Hall is a must-see! NSTA brings you the leading science education companies and organizations to showcase products, services, curricula, and more. You are sure to discover something new and exciting to take back to your classroom.

Go to Express Check-In to print your official badge. This badge is your “ticket of admission” to the Exhibit Hall and all non-ticketed forum activities. A map display of the Exhibit Hall is accessible via our Conference app. A complete list of exhibitors and contact information starts on page 103.

Exhibit Hall Hours. Located in Hall C, exhibits will be open for viewing during the following hours:

- Thu., Nov. 15 11:00 AM–5:00 PM
- Fri., Nov. 16 9:00 AM–4:00 PM
- Sat., Nov. 17 9:00 AM–12 Noon

Did you know that NSTA offers Exclusive Exhibit Hall and Exhibitor Workshop hours? During the hours listed below, there are no teacher sessions scheduled and it’s a perfect time to visit the exhibits or engage in an exhibitor workshop and discover all the products and services companies and organizations have to offer.

Thu., Nov. 15 11:00 AM–12:30 PM
Fri., Nov. 16 3:00–4:00 PM

Lead Retrieval. NSTA exhibitors use lead retrieval, a paperless tracking system that allows them to receive fast, accurate information about conference attendees who have visited their booths. With the lead retrieval system, an exhibitor scans your badge as you visit the booth. This allows exhibitors to send information to you while the conference is still fresh in your mind.

Exhibitor Workshops. Exhibitor-sponsored workshops for science teachers are offered throughout the conference. These workshops give you an opportunity to use a variety of commercial instructional materials. Attendance is on a first-come, first-served basis. See page 112 for a complete listing of exhibitor workshops.

NSTA Store

Visit us at the NSTA Store to explore a wide selection of resources and gear you’ll love! You’ll find hundreds of books that uniquely blend accurate science content with sound teaching strategies for science educators of all grade ranges and disciplines. Not only do we have books covering a wide range of topics to help you sharpen your content knowledge and hone your teaching methods, but we also carry a complete line of NSTA gear you can’t find anywhere else—such as T-shirts, mugs, and classroom supplies. We offer convenient free shipping for book purchases to addresses within the United States when you place your order on-site at the conference. Note: Free shipping is not offered to international addresses or for NSTA gear purchases.

We’ve lined up a number of unique opportunities for conference-goers:

- Exclusive author signings and meet-and-greet opportunities
- Our latest books—including Engineering in the Life Sciences, 9–12; Reading Nature: Engaging Biology Students With Evidence From the Living World; Instructional Sequence Matters, Grades 6–8; Structuring Lessons With the NGSS in Mind; The Power of Assessing: Guiding Powerful Practices; and Eureka! K–2 Science Activities and Stories—and our newest children’s books from NSTA Kids, Exemplary Evidence: Scientists and Their Data and The Beaks of Birds
- “I Love Science” and NSTA gear product lines to show your love of science and pride in teaching
- Member discounts of 20% on NSTA Press® items and 10% on books from other publishers
- Daily book and gear specials, product giveaways, and more.
NSTA Community Hub
Come by the NSTA Community Hub, located at Booths #430 and #431 in the Exhibit Hall. While you’re there, ask us about the prizes you can win! Find out more about the benefits of becoming an NSTA member, including all the best professional development and resources a science educator needs. The NSTA Community Hub will be open during exhibit hall hours.

NSTA Teacher’s Lounge
While in the Exhibit Hall, you can relax in the NSTA Teacher’s Lounge with a game of Jumbo Jenga or Supersized Connect 4 with your friends!

Meet the Presidents and Board/Council
Be sure to stop by Friday from 2:45 to 3:30 PM at the entrance to Hall C for a special session. Come “meet and greet” with your elected NSTA officers on your way to the exhibits. The President, President-Elect, and Retiring President along with your Board and Council members are looking forward to talking with you at the conference!

We will be giving away several gift cards for use in the NSTA Store totaling $100. Must be present to win. Drawing will take place at 3:20 PM.

Wi-Fi at the Gaylord
Complimentary Wi-Fi is offered in the hotel guest rooms at the Gaylord National. To access, guests need to log in with their name and room number. Complimentary Wi-Fi is not available at the Convention Center.

Concierge Desk
A Concierge Desk is located in the hotel lobby. Here you’ll find information on tourist attractions, transportation, restaurant recommendations/reservations, and more. The concierge desk will be staffed seven days a week from 7:30 AM to 9:30 PM.

MAST Booth
The Maryland Association of Science Teachers (MAST) Booth is located at Booth #233 in the Exhibit Hall. Stop by for information about Maryland and the benefits of becoming a member of MAST. Membership forms and information on association activities will be available. Stop by the booth to update your information, renew your membership, or become a member. Be a part of the professional community supporting science education across Maryland!

The NSTA Conference App
Navigate the National Harbor area conference from the palm of your hand! The NSTA Conference app provides all the tools necessary for a successful conference experience. Search sessions, exhibitors, and speakers to build a schedule of your favorites. Features include the ability to view session and workshop listings by time and presenter; maps of the Convention Center and Exhibit Hall; social media plugins; and a note-taking tool. Visit www.nsta.org/conferenceapp to download the app.

Audiovisual Needs
NSTA will fulfill AV needs originally requested on the program proposals as long as the request is within the limits of equipment that NSTA provides. For any last-minute AV needs, presenters must arrange and pay for their own equipment. Audio Visual Production Solutions, the designated AV company on-site, will be located in National Harbor 1, Convention Center.

Business Services
Located on the ballroom level of the hotel, between the hotel and Convention Center, FedEx Office Print and Ship Center is there for all your business needs. Open daily from 6:00 AM to 9:00 PM. Services include photocopies and laser prints (color and black/white), PC rentals, faxes, packing, and shipping.

First Aid Services/Mothers Room
The Gaylord National Resort & Convention Center maintains a 24/7 security staff trained in basic first aid, CPR, and the use of the automated external defibrillators on the property. In the case of emergency, contact Gaylord National Safety Services at 301-965-4500 or ext. 333 on any house phone. House phones are on walls throughout the meeting space, foyers, and Exhibit Hall.

In addition, a room for nursing mothers is located behind the front desk in the hotel lobby. Please ask a hotel front desk agent or manager on duty for assistance.

Presenters and Presiders Check-In
If you are presenting or presiding at a session, please check in at the Presenters/Presiders check-in counter in the Attendee Services Area.

Lost and Found
All lost-and-found items will be turned in at the NSTA Exhibitor Services counter at the Convention Center.

MAST Luncheon
($45 per person; ticketed event)
Friday, November 16, 12:30-2:00 PM
Baltimore 1
Join the Maryland Association of Science Teachers (MAST) for a learning luncheon. MAST will recognize teachers from across the state with the annual MAST Awards for Excellence in Science Teaching, as well as Maryland finalists and winners of the Presidential Awards for Excellence in Mathematics and Science Teaching. We are delighted to have guest speaker Matt Krehbiel from Achieve.

A limited number of tickets are available. To purchase tickets, visit www.emast.org/event-3070248.
Conference Resources

Graduate-Level Credit Opportunity
National Harbor conference attendees can earn one (1) or two (2) graduate-level credit/units in professional development through Dominican University of California course #EDUO 9029 (dominicanaonline.com).

To obtain credit/units, you must be registered for the NSTA National Harbor area conference, complete the required assignments, and pay a fee of $95 for one credit/unit or $190 for two credits/units. An NSTA transcript is also required. Your required assignments must be successfully completed and sent to the instructor within three weeks of the conference ending date. **Deadline is December 15, 2018.**

Visit bit.ly/2PSIP/jh for more information.

Online Session Evaluations and Tracking Professional Development

*All attendees can evaluate sessions online and via our conference app while simultaneously tracking their professional development certification.*

Help NSTA’s GREEN efforts by visiting the conference session browser or using our conference app to complete session evaluations, November 15–29, 2018. During the conference, session evaluations can be completed online and via our conference app. **We’re giving away an Apple iPad mini 4 Wi-Fi tablet to one lucky attendee who completes a session evaluation!** Remember, the more sessions you attend and evaluate, the more chances you have to win!

**To evaluate a session using our conference app,** attendees should follow these steps:

- Using the conference app, first click **My Planner** and log in with your e-mail address and password.
- Once logged in, click **Home** and then select **Session & Workshop Listings** to find the session you wish to evaluate.
- Once you have pulled up the session listing, then click the **Rate** icon to evaluate the session.
- When finished evaluating the session, click the **Save** button.
- Repeat this process for each session attended.

**To evaluate a session using our online browser,** attendees should follow these steps:

- Go to the designated conference site link.
- Click on the **Attend** tab and then navigate to the **Attendee Service Center.**
- Login: E-mail; Password
- Select the **Session Evaluations** tab.
- Find the session that you have attended, then click on the **Start** button.
- Follow the step-by-step process.
- Repeat for each session attended.

A Professional Development Documentation Form is included following page 32 to help attendees keep track of sessions/events attended that are NOT available for online session evaluation. This form can also be used to take notes on sessions attended that are available for online session evaluation.

On or before December 11, 2018, attendees will be e-mailed instructions for accessing their respective transcripts. All information in these transcripts will be maintained (and can be accessed) indefinitely as part of an attendee’s individual profile.
Check out these exclusive offerings for NSTA National Harbor Conference Attendees!

Show Your NSTA Badge for restaurant and business special offers
Visit bit.ly/2RUx8cK (case sensitive) for a flyer with special offers from area restaurants and businesses.

ICE!® featuring A Charlie Brown Christmas
ICE! is National Harbor’s signature holiday attraction. Watch Charlie Brown rediscover the meaning of Christmas as the beloved story unfolds through two million pounds of ice sculptures and displays. Starting November 16, show your NSTA conference badge at the main ticket office located on the Atrium (Exhibit Hall) level of the hotel outside of Hall B and receive $7 off retail price for a ticket. For more information, visit www.christmasontheapotomac.com.

Win Southwest Airlines tickets PLUS full conference registration!
Make Six Super Connections at the NSTA National Harbor Area Conference to win Southwest Airlines tickets PLUS full conference registration to either the 2019 NSTA National Conference in St. Louis or the 8th Annual STEM Forum & Expo in San Francisco.

Simply visit the Exhibit Hall and chat with exhibitors to earn one connection chip per exhibitor visited. Collect six chips and then head to the NSTA Community Hub to enter. Two (2) winners will be drawn each day of the conference. Make sure to visit the Exhibit Hall each day to earn connection chips because the more exhibitors you connect with, the more chances you have to win!

Courtesy of Southwest Airlines

CONFERENCE APP
Download our conference app for a social experience you don't want to miss.

- Search sessions, exhibitors, and speakers to build a schedule of your favorites
- Access maps of Exhibit Hall, Convention Center, and Hotels
- Take notes within app
- Bookmark an interesting speaker
- Tweet a memorable quote from a session
- Access conference FAQs

Available for download on
iPhone + iPad
Android

Download now at www.nsta.org/conferenceapp
Gaylord National Resort & Convention Center

Conference Rooms
Connected Science Learning is an online journal highlighting STEM education experiences that bridge the gap between in-school and out-of-school settings. It features articles about highly effective preK–12 STEM learning programs that promote collaboration between the in-school and out-of-school communities, and shares research that supports such efforts.
Conference Resources • Headquarters Staff

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NSTA National Harbor Area Conference on Science Education
NSTA Officers, Board of Directors, Council, and Alliance of Affiliates

NSTA Mission Statement

The mission of NSTA is to promote excellence and innovation in science teaching and learning for all.

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NSTA National Harbor Area Conference on Science Education 19
Conference Resources • Future Conferences

All cities are subject to change pending final negotiation.

National Conferences on Science Education

St. Louis, Missouri
April 11–14, 2019

Boston, Massachusetts
April 2–5, 2020

Chicago, Illinois
April 8–11, 2021

8th Annual STEM Forum & Expo, hosted by NSTA
San Francisco, California—July 24–26, 2019

9th Annual STEM Forum & Expo, hosted by NSTA
Louisville, Kentucky—July 22–24, 2020

10th Annual STEM Forum & Expo, hosted by NSTA
Detroit, Michigan—July 28–30, 2021

Area Conferences on Science Education

2018 Area Conference
Charlotte, North Carolina—November 29–December 1

2019 Area Conferences
Salt Lake City, Utah—October 24–26
Cincinnati, Ohio—November 14–16
Seattle, Washington—December 12–14

2020 Area Conferences
Pittsburgh, Pennsylvania—October 29–31
New Orleans, Louisiana—November 19–21
Phoenix, Arizona—December 10–12

2021 Area Conferences
Portland, Oregon—October 28–30
National Harbor, Maryland—November 11–13
Los Angeles, California—December 9–11

Share Your Ideas!

Have an idea for an inspiring presentation or workshop on science or STEM education? Submit a session proposal today for...

8th Annual STEM Forum & Expo, hosted by NSTA
Proposal Deadline: 12/3/2018

2019 Area Conferences
Salt Lake City, UT ....... October 24–26
Cincinnati, OH .............. November 14–16
Seattle, WA ................. December 12–14
Proposal Deadline: 1/15/2019

2020 National Conference
Boston, MA ................. April 2–5
Proposal Deadline: 4/15/2019

To submit a proposal, visit www.nsta.org/conferenceproposals
REGISTRATION OPEN
APRIL 11-14 • ST. LOUIS

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Conference Program • Highlights

Keynote Presentation

WILD ABOUT SCIENCE: My Journey from NFL Cheerleader to National Geographic Explorer

Thursday, November 15
9:15–10:30 AM

Mireya Mayor
Primatologist and National Geographic Explorer

Speaker sponsored by National Geographic Learning | Cengage.
(See page 37 for details.)

Thursday, November 15
8:00–9:00 AM
First-Timer Conference Attendees’ Orientation
(Is This Your First NSTA Conference?)

9:15–10:30 AM
Keynote Presentation: Mireya Mayor, sponsored by National Geographic Learning | Cengage

11:00 AM–5:00 PM
Exhibits (Exclusive exhibit/exhibitor workshop hours:
11:00 AM–12:30 PM)

2:00–3:00 PM
Featured Presentation: Heidi Schweingruber

Friday, November 16
8:00 AM–1:30 PM
Middle School Chemistry Day

8:00 AM–1:30 PM
High School Chemistry Day

8:00 AM–1:30 PM
Engineering Day

9:00 AM–4:00 PM
Exhibits (Exclusive exhibit/exhibitor workshop hours:
3:00–4:00 PM)

9:30–11:30 AM
Featured Presentation: Ned Tillman

12:30–2:00 PM
MAST Luncheon (Visit www.emast.org to purchase tickets)
Speaker: Matt Krehbiel

2:00–3:00 PM
Featured Panel Discussion (Moderator: David L. Evans)

2:45–3:30 PM
Meet the Presidents and Board/Council

Saturday, November 17
9:00 AM–12 Noon
Exhibits

Is This Your First NSTA Conference?

Yes, you say? Then you are invited to attend a special session on Thursday, 8:00–9:00 AM. Learn how you can gain the most from your conference experience and have fun doing it! See page 34 for details.

Win a round-trip Southwest ticket to the NSTA National Conference on Science Education in St. Louis, Missouri

Thanks to the generosity of Southwest Airlines we’re giving away three round-trip tickets on Southwest Airlines for educators to attend the NSTA National Conference in St. Louis, April 11–14, 2019!

The drawings will be held at:
• 4:00 PM, Thursday
• 2:00 PM, Friday
• 10:00 AM, Saturday

Stop by the NSTA Community Hub for all the details! You need not be present to win.
Your NSTA member benefits are begging to be used...like your Science Store discount to stock up on your book collection for the year. Also, as a member you’ll save on conference registration to our upcoming fall conferences coming to a city near you!

Only at NSTA can you get these savings and top-notch professional development. Visit www.nsta.org/conferences to register.

Charlotte, NC
Nov. 29–Dec. 1

Share your #onlyatNSTA moments with us on Twitter @NSTA

Learn about all your membership benefits at www.nsta.org/membership
The National Harbor Conference Committee has planned the conference around these three strands, enabling you to focus on a specific area of interest or need. Strand events are identified by icons throughout the daily program.

**Monumental Challenge: STEM Equity, Diversity, and Advocacy via NGSS**

"Arguably, the most pressing challenge facing U.S. education is to provide all students with a fair opportunity to learn" (Framework; NRC 2012, p. 282). Educators must advocate and take action to provide equity and access to STEM opportunities for students. The three-dimensional nature of the NRC Framework provides an incredible opportunity for teachers to engage ALL students in STEM education. To develop innovative and responsible citizens for tomorrow, we must foster creativity, academic risk-taking, and perseverance within ALL student groups today. This strand will focus on supporting teachers in creating inclusive classrooms that are culturally proficient and celebrate diverse ideas and solutions essential for STEM literacy.

**Freedom to Become Scientifically Literate**

Developing scientifically literate global citizens is increasingly critical in today's society. Opportunities for students to analyze data, make claims, engage in argument from evidence, and grapple with authentic science and engineering problems are essential to achieving this goal. Sessions in this strand will focus on creating environments that engage students in becoming connected to the world around them and prepare them to be the next generation of decision makers.

**Cultivating Curiosity in the Capital Region**

Children are born with natural curiosity that is often “schooled out” of them. The challenge of science education is to provide opportunities that spark their sense of curiosity, hone their critical-thinking skills, and help them to make sense of the world in which they live. The national capital region is rich in resources and environments that invite students to wonder about the world around them. Local contexts and relevant phenomena use, build, and sustain student curiosity by providing opportunities to ask questions, solve problems in multiple ways, and deepen understanding. In this strand, participants will explore tools, strategies, and local resources to tap into and maintain their students’ curiosity.
### Monumental Challenge: STEM Equity, Diversity, and Advocacy via NGSS

**Thursday, November 15**
- **8:00–9:00 AM**
  - Mystery River
- **12:30–1:30 PM**
  - Unpacking “Race” in the Science Classroom
- **2:00–3:00 PM**
  - How Do I Get All of My Students Involved in STEM? Think UDL!
- **3:30–4:30 PM**
  - Providing Equitable Learning Experiences for ELLs in Science

**Friday, November 16**
- **8:00–9:00 AM**
  - STEM in a Bag
- **9:30–10:30 AM**
  - Students’ Culture + NGSS = Science Success
- **11:00 AM–12 Noon**
  - Bridging the Gap: Equity for Girls and Minorities in the Science Classroom
- **12:30–1:30 PM**
  - The Intersection of NGSS, CCSS, and WIDA Can-Do Descriptors and the Implications for Science Instruction in the Early Grades
- **2:00–3:00 PM**
  - Featured Panel Discussion: Advocacy and Equity: Empowering Teachers to Speak Out
    (Moderator: David L. Evans, Panelists: Laura Casdorph; Maya Garcia; John B. King, Jr.; Roberto Rodriguez; and Mary Thurlow)

**Saturday, November 17**
- **8:00–9:00 AM**
  - Amazing Animal Senses: Using Movement and Games to Engage
- **9:30–10:30 AM**
  - STEM and ELLs: The Perfect Fit

### Freedom to Become Scientifically Literate

**Thursday, November 15**
- **8:00–9:00 AM**
  - Facilitating Student-Created Field Studies in Your Local Environment
- **12:30–1:30 PM**
  - Exploring Climate Change in the Polar Regions
- **2:00–3:00 PM**
  - Featured Presentation: Becoming Scientifically Literate: Insights from Research on Learning and Teaching
    (Speaker: Heidi Schweingruber)
- **3:30–4:30 PM**
  - A Taste of Project Maury: Measuring Sea Level from Space
- **5:00–6:00 PM**
  - Exploring Life Sciences and Climate Change in Antarctica to Develop Scientifically Literate Global Citizens

**Friday, November 16**
- **8:00–9:00 AM**
  - Constructing Science Models in the Elementary Classroom to Meet the NGSS
- **9:30–10:30 AM**
  - Citizen Scientist…It’s Easy When You Know the Three Keys
- **11:00 AM–12 Noon**
  - Insect Inspection: Developing Science Practices Through Field Investigations
- **11:30 AM–12 Noon**
  - Science Current Events Journals: Real Science and Media Literacy
- **2:00–3:00 PM**
  - Smart Devices: Data Collection, Analysis, and Reporting

**Saturday, November 17**
- **8:00–9:00 AM**
  - Students as Citizen Scientists: Data Collection and Sharing Using Fieldscope
- **9:30–10:30 AM**
  - Optimizing Sustainability in Schools Through Student Inquiry
- **11:00 AM–12 Noon**
  - Data Is Not a Four-Letter Word: Use NOAA Resources to Build Student Proficiency in Data Analysis
## Conference Program • Conference Strands

### Cultivating Curiosity in the Capital Region

**Thursday, November 15**

8:00–9:00 AM  
Using Pop Culture and Polymers to Create Inquisitive Minds

12:30–1:30 PM  
NOAA in Your Backyard: Free Professional Development and Local Educator Resources Are Closer Than You Think

2:00–3:00 PM  
STEM on a Budget: Leveraging University and Community Partnerships

3:30–4:30 PM  
Presenting the Teacher Institute for Evolutionary Science (TIES)

**Friday, November 16**

8:00–9:00 AM  
Local Ice Rinks Are a STEM Wonderland and Feature Newton’s Laws at Play—Year Round!

9:30–10:30 AM  
The World “Deer” to Us

9:30–11:30 AM  
Featured Presentation: Seven Touches to Enlightenment (Speaker: Ned Tillman)

12:30–1:30 PM  
Curiosity Design for Inquiry Using Watersheds and Wetlands

2:00–3:00 PM  
Bring Authentic Science Practices to the Classroom

**Saturday, November 17**

8:00–9:00 AM  
Using Place to Create Connected Citizens

9:30–10:30 AM  
Elementary Science with NOAA: Free K–5 Science Resources from the National Oceanic and Atmospheric Administration

---

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NSTA Press Sessions

NSTA Press® books offer new classroom ideas and standards-based strategies, from Engineering to Solar Science and from preK to college. Join NSTA Press authors for these sessions linked to the topics of their books.

**Thursday, November 15**

8:00–9:00 AM  
*Engineering in the Life Sciences—Grades 9–12*

12:30–1:30 PM  
*Instructional Sequence Matters—Structuring Lessons with the NGSS in Mind*

2:00–3:00 PM  
*Argument-Driven Inquiry in the Life, Physical, and Earth/Space Sciences: Lab Investigations for Grades 6–8*

3:30–4:30 PM  
*Argument-Driven Inquiry in Grades 3–5*

5:00–6:00 PM  
*Engage Your Students! Designing Meaningful STEM Lessons*

**Friday, November 16**

8:00–9:00 AM  
*Picture-Perfect STEM Lessons—Using Children’s Books to Inspire STEM Learning*

9:30–10:30 AM  
*Argument-Driven Inquiry in Biology, Chemistry, and Physics: Lab Investigations for Grades 9–12 Eureka! Grades K–2 and 3–5 Science Activities and Stories*

11:00 AM–12 Noon  
*Teaching for Conceptual Understanding*  
Get Prepared for the January 2019 Total Lunar Eclipse Using NSTA Press’s *Solar Science*

**Saturday, November 17**

8:00–9:00 AM  
*From Flower to Fruit*

9:30–10:30 AM  
*Everyday Science Mysteries*

11:00 AM–12 Noon  
*Uncovering K–12 Three-Dimensional Ideas About Matter and Energy*

**Meetings and Social Functions**

**Friday, November 16**

**MAST Luncheon**  
(Tickets available at emast.org; speaker: Matt Krehbiel)  
Baltimore 1, Conv. Center ......................... 12:30–2:00 PM

**Friday–Saturday, November 16–17**

**Level 1: Making Sense of Three-Dimensional Teaching and Learning**  
(By Preregistration Only)  
Woodrow Wilson B, Conv. Center ......... 8:00 AM–5:00 PM

**Level 2: Designing Three-Dimensional Lessons and Units Workshop**  
(By Preregistration Only)  
Woodrow Wilson C, Conv. Center ......... 8:00 AM–5:00 PM
High School Chemistry Day

**Connecting Structure and Properties: Building and Applying Knowledge**
Friday, November 16, 8:00 AM–1:30 PM
Chesapeake E

Solutions to real-world problems involving chemistry are complex and explanations of relevant phenomena are multifaceted. A deep understanding of how the particle-level structures of substances affect their macroscopic properties is necessary if students are to develop explanations and design solutions to complex problems. Explore how to engage students in challenging problems and help them learn to collect and explore data in order to develop a scientific understanding of structure-property relationships. Demonstrate students’ learning through relevant-to-their-lives applications.

- 8:00–9:00 AM Exploring the Nature and Properties of Ionic and Covalent Compounds—Composition, State, and Conductivity
- 9:30–10:30 AM Constructing Science Ideas About Ionic Bond Strength—Solubility and Melting Point
- 11:00 AM–12 Noon Interparticle Forces in Covalent Compounds—Melting Point, Viscosity, and Vapor Pressure
- 12:30–1:30 PM Relating Structure and Properties—Demonstrating Understanding of Bond Strength and Interparticle Attractions

Middle Level Chemistry Day

**Middle Level Chemistry—Big Ideas About the Very Small**
Friday, November 16, 8:00 AM–1:30 PM
Maryland 1/2

Come to one, two, or as many sessions as you like during this day of activities and information for teaching and learning middle school chemistry. Staff from the American Chemical Society will introduce participants to the free online resource middleschoolchemistry.com. Each of the four sessions will include hands-on activities and explanations from the website that participants can easily incorporate into their teaching to support their current textbook and curriculum. Handouts of the session activities will be available for all participants.

- 8:00–9:00 AM Solids, Liquids, Gases, and Changes of State
- 9:30–10:30 AM The Water Molecule and Dissolving
- 11:00 AM–12 Noon Chemical Reactions—Breaking and Making Bonds
- 12:30–1:30 PM Chemical Reactions—Ocean Acidification

Sponsored by the American Chemical Society
Inspired by the Inductees of the National Inventors Hall of Fame, our preschool through 9th grade programs are designed to impact young minds through fun, hands-on activities infused with the spirit of innovation!

**Come visit us at Booth #223!**

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<thead>
<tr>
<th>Preschool</th>
<th>K - 6th grade</th>
<th>1st - 6th grade</th>
<th>6th - 9th grade</th>
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</thead>
<tbody>
<tr>
<td>Invention Playground</td>
<td>Camp Invention</td>
<td>Club Invention</td>
<td>Invention Project</td>
</tr>
</tbody>
</table>

Inspired by the Inductees of the National Inventors Hall of Fame, our preschool through 9th grade programs are designed to impact young minds through fun, hands-on activities infused with the spirit of innovation!

800.968.4332  | NIHFatmyschool@invent.org  | invent.org/inspire

In partnership with the United States Patent and Trademark Office

### Engineering Day at NSTA

*Sponsored by the American Society for Engineering Education*

Friday, November 16, 8:00 AM–1:30 PM
Chesapeake D

The American Society for Engineering Education has put together a public/private partnership to develop ways of engaging elementary, middle school, and high school students and teachers in engineering. Participants will learn about innovative, hands-on, project-based engineering activities, courses, curriculum options, events, outreach programs, professional development, and competitions designed to increase the engineering and technological literacy of all students; encourage more and more diverse students to pursue engineering careers; and enable teachers to learn about and experience engineering. Presenters will share lessons learned and examples of inquiry and design activities that have been developed in partnership with K–12 science teachers for use in the classroom and in informal educational settings. The materials result from a collaboration of engineering educators and STEM professionals working with Teachengineering.org. Engineering is Elementary, and Colleges of Engineering across the nation who actively engage in K–12 engineering in collaboration with partner teachers and schools. All sessions will help teachers understand the new ETS Engineering Design portion of the Next Generation Science Standards (NGSS).

- **8:00–9:00 AM**  
  *Make and Code…Together*

- **9:30–10:30 AM**  
  *Progressions of Learning in Engineering for High School Students—A Culturally Situated Experience*

- **11:00 AM–12 Noon**  
  *Engineering and STEM in the Elementary Classroom*

- **12:30–1:30 PM**  
  *ASEE’s K–12 Outreach—Engineering, Go For It (eGFI), Teach Engineering, Link Engineering, and the National Science Digital Library*
Conference Program • Short Course

Conference Program

Academic Vocabulary Through Engaging Phenomena (SC-1)
Kate Gallagher (@Kat5Kate: kate.gal56@gmail.com), RISE Community School, Berkeley, CA
Joanna Totino (jtotino@berkeley.edu), California Science Project, University of California, Berkeley
Level: Grades 3–5
Date/Time: Friday, November 16, 8:00–11:00 AM
Location: Maryland 3
Science Focus: LS4.C, CCC1, CCC2, SEP6, SEP7
Ticket Price: $17

We will explore owl pellets in a series of NGSS lessons designed to engage English language learners and build academic vocabulary through discussion, writing, and reading. This short course uses a 5E lesson plan to demonstrate how an inquiry into owl pellets and owl habitats can help grades 3–5 students access academic vocabulary, build their conceptual framework, and inspire reading and writing that will become the basis for further inquiry.

Conference Program • Educational Trips

U.S. Naval Academy Tour
free; by preregistration only
Friday, Nov. 16   9:00 AM–2:15 PM

Visit the United States Naval Academy in Annapolis, Maryland—the sailing capital of the United States. A top liberal arts college—and ranked #5 2018 STEM-centric school in the nation by Forbes—the U.S. Naval Academy offers a rigorous education and great career potential to young people from all states and U.S. territories. A National Historic Landmark, the USNA campus (aka “the Yard”) has many historical sites, buildings, and monuments, as well as the USNA Museum. Participants will tour the campus, located at the confluence of the Severn River and Chesapeake Bay, meet admissions counselors to learn more about the opportunities available to students, and learn more about USNA STEM programming for high school students, as well as teacher professional development, from STEM staff members. Transportation and lunch provided. First come/first served...this trip is limited to the first 40 participants. Contact Leigh McNeil at lmcneil@usna.edu to sign up. Travel time is roughly one hour each way.

Local Motors Facility Tour
free; e-mail contact below
Friday, Nov. 16   9:35–11:25 AM

Twenty-five complimentary tickets will be available to NSTA conference attendees to tour Local Motors. During the tour, get updated information about the Olli, the world’s first co-created, self-driving, electric, cognitive shuttle that integrates IBM Watson. The tour will also feature heritage showroom vehicles, Olli smart shuttle stop, and large-scale direct digital manufacturing equipment. Visit localmotors.com to learn more. Contact Ava Martin at ava.martin@pgeps.org to sign up. This event is first-come/first-served.
### Three Dimensions of the Next Generation Science Standards (NGSS)

<table>
<thead>
<tr>
<th>Science and Engineering Practices</th>
<th>Crosscutting Concepts</th>
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<tr>
<td>SEP1: Asking Questions and Defining Problems</td>
<td>CCC1: Patterns</td>
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<tr>
<td>SEP2: Developing and Using Models</td>
<td>CCC2: Cause and Effect: Mechanism and Explanation</td>
</tr>
<tr>
<td>SEP3: Planning and Carrying Out Investigations</td>
<td>CCC3: Scale, Proportion, and Quantity</td>
</tr>
<tr>
<td>SEP4: Analyzing and Interpreting Data</td>
<td>CCC4: Systems and System Models</td>
</tr>
<tr>
<td>SEP6: Constructing Explanations and Designing Solutions</td>
<td>CCC6: Structure and Function</td>
</tr>
<tr>
<td>SEP7: Engaging in Argument from Evidence</td>
<td>CCC7: Stability and Change</td>
</tr>
<tr>
<td>SEP8: Obtaining, Evaluating, and Communicating Information</td>
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### Disciplinary Core Ideas

<table>
<thead>
<tr>
<th>Disciplinary Core Ideas in Physical Science</th>
<th>Disciplinary Core Ideas in Life Science</th>
<th>Disciplinary Core Ideas in Earth and Space Science</th>
<th>Disciplinary Core Ideas in Engineering, Technology, and the Application of Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS1: Matter and Its Interactions</td>
<td>LS1: From Molecules to Organisms: Structures and Processes</td>
<td>ESS1: Earth’s Place in the Universe</td>
<td>ETS1: Engineering Design</td>
</tr>
<tr>
<td>PS3.B: Conservation of Energy and Energy Transfer</td>
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<td>PS3.C: Relationship Between Energy and Forces</td>
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<td>PS3.D: Energy in Chemical Processes and Everyday Life</td>
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<tr>
<td>PS4: Waves and Their Applications in Technologies for Information Transfer</td>
<td>LS3: Heredity: Inheritance and Variation of Traits</td>
<td>ESS3: Earth and Human Activity</td>
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</tr>
<tr>
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<td>LS4.B: Natural Selection</td>
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<td>LS4.C: Adaptation</td>
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<tr>
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<td>LS4.D: Biodiversity and Humans</td>
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Sprawling 70 feet across the National Harbor beach, *The Awakening* is an aluminum sculpture of a buried giant created by Seward Johnson.
This form is for planning purposes only. Do NOT submit to NSTA.

NSTA National Harbor Area Conference on Science Education
Professional Development Documentation Form

All attendees can evaluate concurrent teacher and exhibitor sessions on our conference app while simultaneously tracking professional development certification (based on clock hours). Use this form to keep track of all sessions/events attended during the NSTA National Harbor Area Conference. Some events such as exhibit hall visits are not available for online evaluation. However, these events still qualify for professional development.

On or before December 11, 2018, NSTA will e-mail attendees instructions for accessing their respective National Harbor transcripts. All information in these transcripts will be maintained (and can be accessed) indefinitely as part of an attendee's individual profile.

First Name: ______________________________ Last Name: ______________________________________________

To evaluate a session via the conference app, first click My Planner and log in with your e-mail address and password. Once logged in, click Home and then select Session & Workshop Listings to find the session you wish to evaluate. Once you have pulled up the session listing, then click the Rate icon to evaluate the session. When finished evaluating the session, click the Save button. Repeat this process for each session attended. See page 12 of the program for additional information.

Sample Questions:
1. I selected this session:
   a. for immediate classroom use.
   b. based on the reputation of the speaker.
   c. to improve my personal pedagogical knowledge/skill.
   d. to improve my STEM content knowledge.
2. The session met my needs.
3. The information presented was clear and well organized.
4. Safe practices were employed.
5. The session avoided commercial solicitation (n/a for exhibitor workshops and NSTA Press® sessions).
6. The session should be repeated at another NSTA conference.

Sample Responses:
1=Strongly Agree  2=Agree  3=Neutral  4=Disagree  5=Strongly Disagree

Thursday, November 15   8:00 AM–6:00 PM
Start Time   End Time   Activity/Event Title

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**Saturday, November 17  8:00 AM–5:00 PM**

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8:00–8:30 AM  Presentation
A Student-Designed Curriculum
(Grades 7–College) Maryland 4, Convention Center
Science Focus: ESS1, SEP1, SEP8
Mark Heilbrunn (mrheilbrunn@gmail.com), Preparatory Academy for Writers, Springfield Gardens, NY
Join me in exploring how to implement a student-designed/teacher-directed project-based curriculum in which the students decide what they will learn.

8:00–9:00 AM  Presentations
Using Pop Culture and Polymers to Create Inquisitive Minds
(Grades 7–12) Annapolis 3, Convention Center
Science Focus: GEN, NGSS
Sherri Rukes (sherri.rukes@d128.org), Libertyville High School, Libertyville, IL
Ever wonder how to get more students interested in what you teach? Add some pop culture and a pop culture project to make the connection with your students. Take home a CD.

Critter Crossings in the Classroom
(Grade 2) Azalea 2, Convention Center
Science Focus: LS2
Donna Wood (@wood3rd; dwood@washoeschools.net), Hunter Lake Elementary School, Reno, NV
Help drive instruction with a NGSS-focused Project-Based Learning unit that integrates STEM with CCSS to increase grade 2 students’ awareness of interdependent relationships in ecosystems and highway safety. The PBL included collaboration with Department of Transportation.

Where’s the Evidence?
(Grades 6–8) Baltimore 1, Convention Center
Science Focus: GEN, SEP7
Maria-Rose Cain (@MariaRoseCain; m-rcai@academyoftheholycross.org), The Academy of the Holy Cross, Kensington, MD
Helene Redmond (@HYRedmond; helene.redmond@stpetersolney.org), Saint Peter’s Catholic School, Olney, MD
Challenging students to support answers with evidence? Two middle school teachers (science and language arts) created a cross-curricular program focusing students on “Where’s the Evidence?”

The ideas and opinions expressed in the conference sessions, and in any handout materials provided, are those of the presenter. They are not those of the National Science Teachers Association nor can any endorsement by NSTA be claimed.

Science Area
A science area category is associated with each session. These categories are abbreviated on the Science Focus line for each session listing.

The science areas and their abbreviations are:
LS  =  Life Science
PS  =  Physical Science
ESS =  Earth and Space Science
ETS =  Engineering, Technology, and the Application of Science
GEN =  General Science Education
INF =  Informal Science Education

NGSS
See page 31 for a complete list of the NGSS codes used in this program.

Strands
The National Harbor Conference Committee has planned the conference around the following three strands, enabling you to focus on a specific area of interest or need. Strand events are identified by icons throughout the daily program. For strand descriptions, see page 24.

Monumental Challenge: STEM Equity, Diversity, and Advocacy via NGSS
Freedom to Become Scientifically Literate
Cultivating Curiosity in the Capital Region

The following icons will be used throughout this program.

NSTA Press® Sessions
NGSS NGSS@NSTA Forum Sessions
INF Sessions highlighting STEM learning experiences that occur in out-of-school environments.
Thursday, 8:00–9:00 AM

**Eureka! Science Trade Books—Good as Gold!**  
(Grades P–12)    
Baltimore 5, Convention Center  
Science Focus: GEN  
**Emily Brady** (ebrady@nsta.org), Director, Special Projects, Content, NSTA, Arlington, VA  
Need great books for student learning? Explore and use NSTA Recommends and the Children’s Book Council Outstanding Science Trade Books. Door prizes—books, of course!

**Integrating Engineering Design Challenges and Solutions with Natural Science and Social Studies**  
(Grades 1–5)    
Chesapeake B, Convention Center  
Science Focus: GEN, NGSS  
**Carol Schwartz**, Burgundy Farm Country Day School, Alexandria, VA  
See two cross-curricular elementary-level design challenges with examples of student solutions. NGSS, Problem-Based Learning, and modifications for different curricula will be discussed.

**Is This Your First NSTA Conference? First-Timer Conference Attendees’ Orientation**  
(General)    
Chesapeake D–F, Convention Center  
Science Focus: GEN  
**NSTA Board and Council**  
Feeling overwhelmed by all there is to see and do at an NSTA conference on science education? Join us for an interactive exploration through the program, the conference app, and NSTA’s social media. By the end of the session, you will know just how to get the most from your conference experience in addition to building new networks with science colleagues.

**Using Media from PBS KIDS to Help Young Children Acquire and Apply Science Knowledge**  
(Grades 1–2)    
Chesapeake G, Convention Center  
Science Focus: LS4.C, PS2, CCC6, SEP  
**Jean Crawford** (jb Crawford@pbs.org), PBS, Arlington, VA  
**Jeanne Paratore**, Boston University, Boston, MA  
**Alicia Poulin** (alicia.rmello@gmail.com), Devotion School, Brookline, MA  
Discover how to combine media resources from PBS KIDS into an engaging lesson that supports children’s development of science knowledge through connected learning.

**Recognizing Bias as a Vital Component of Scientific Literacy**  
(Grades 7–10)    
Chesapeake H, Convention Center  
Science Focus: GEN, SEP4, SEP8  
**Alice Chmil** (alice.chmil@ssfs.org) and **Angela Colegrove** (angela.colegrove@ssfs.org), Sandy Spring Friends School, Sandy Spring, MD  
Students encounter enormous amounts of information daily, frequently in graphs. We must teach them to critically examine those graphs to identify ones that are misleading.

**Science Leader Roundtable**  
(General)    
Maryland 1/2, Convention Center  
Science Focus: GEN  
**Pam Pelletier** (@BPSSciencePam; pam.pelletier@gmail.com), Retired Educator, Palmetto, FL  
**Mary C.H. Weller** (mary_weller@hcpss.org), Howard County Public School System, Ellicott City, MD  
Share ideas and concerns for leadership at the state, district, and school level with members of the NSTA Coordination and Supervision Committee. Topics may include leadership teams, elementary curricula, safety, resource vetting, messaging, and professional development.

**NSTA Press® Session: Engineering in the Life Sciences—Grades 9–12**  
(Grades 9–12)    
Woodrow Wilson D, Convention Center  
Science Focus: ETS1, LS  
**Rodney Custer** (rod.custer@bhsu.edu), Black Hills State University, Spearfish, SD  
**Katheryn Kennedy** (@kbkennedy7; kbkennedy7@gmail.com), Stevens Institute of Technology, Hoboken, NJ  
**Cory Culbertson** (cecuble@ilstu.edu), Illinois State University, Normal  
Join us for an overview of the recently released NSTA publication, *Engineering in the Life Sciences—Grades 9–12*. Attention will be paid to the value of engineering in the sciences, an overview of the book’s contents, and a brief discussion of professional development challenges and opportunities.
8:00–9:00 AM  Hands-On Workshops

Mystery River
(Grades 4–7)  Annapolis 2, Convention Center
Kate Tummino (katelease@hotmail.com), Frostburg State University, Cumberland, MD
Join in for a hands-on experience as we investigate the causes and effects of water pollution. Some activities include creating a polluted river, reading and using map skills, designing 3D objects in Tinkercad, using a 3D printer, writing an action proposal, and much more.

Getting Over Graphs in the Science Classroom
(Grades 9–12)  Annapolis 4, Convention Center
Jessica Kohout (@MrsKohout; jessica_kohout@hcpss.org), Reservoir High School, Fulton, MD
Many students have trouble finding meaning from the data they have collected in the lab. Learn ways to make graphing accessible and fun!

More Than a Lesson—What an NGSS Unit Looks Like
(Grades P–5)  Azalea 1, Convention Center
Science Focus: GEN, NGSS
Shelley Petzold (spetzold@madisoncountryday.org), Madison Country Day School, Waunakee, WI
Go beyond an NGSS lesson to experiencing an NGSS unit. Participate in an elementary unit on compression in which every lesson teaches the eight practices.

Facilitating Student-Created Field Studies in Your Local Environment
(Grades 9–College)  Baltimore 3, Convention Center
Science Focus: LS2, SEP3, SEP4, SEP8
Amanda Myatt (ammyatt@smcps.org) and Jessica Yohe, Chopticon High School, Morganza, MD
Find out how to facilitate student-created field studies of the local environment with emphasis on the Chesapeake Bay. NGSS and Maryland Environmental Literacy Standards will be included.

Need help navigating?

Feeling overwhelmed by all there is to see and do at an NSTA conference on science education? Join other first-time attendees for an interactive exploration through the conference program, the conference app, and NSTA's social media. By the end of the session, you will know just how to get the most from your conference experience in addition to building new networks with science colleagues.

First-Timer Attendee Session  Thursday, November 15, 8:00–9:00 AM
Chesapeake D-F, Gaylord National Resort & Convention Center
Building Global Citizens, One STEAM Challenge at a Time  
(Grades 1–12)  
Baltimore 4, Convention Center  
Science Focus: ETS2.B  
Shauneen Giudice (shauneen.giudice@delmar.k12.de.us), Delmar Middle School, Delmar, DE  
Susan Douglass (sld58@georgetown.edu), Education Consultant, Washington, DC  
Explore phenomena based on traditional practices and world cultures to inspire STEAM challenges, spark student curiosity, and foster connections with human cultures, past and present.

Exploring the Science and Engineering Practices  
(Grades K–12)  
Woodrow Wilson B, Convention Center  
Science Focus: GEN, NGSS  
Ted Willard (@Ted_NSTA; twillard@nsta.org), Assistant Executive Director, Science Standards, NSTA, Arlington, VA  
Come explore science and engineering practices (such as constructing explanations and developing models) that are central to the vision of education described in the Framework and NGSS.

8:00–9:00 AM  
NGSS—Body Systems: Gas Exchange  
(Grades 6–8)  
National Harbor 11, Convention Center  
Science Focus: LS1.A, PS3.D, CCC4, SEP3, SEP4  
Sponsor: Lab-Aids, Inc.  
Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, SC  
Teachers know their students have many misconceptions about respiration. In this activity from the SEPUP middle level life science program, participants use an acid-base indicator to determine the relative amount of carbon dioxide gas in a sample of their exhaled breath. They consider differences in individual response, explore qualitative versus quantitative measures, and examine the structure of the lungs and their role in the process of respiration.

Developing and Using Models with Augmented Reality  
(Grades 3–5)  
National Harbor 12, Convention Center  
Science Focus: ESS  
Sponsor: ScienceFLEX & MakerSpace/School Specialty Science  
Mary Anne Feller, Sts. Peter and Paul Catholic School, Haubstadt, IN  
Go on a journey to the center of Earth and explore its layers through digital modeling. Seamlessly blend hands-on experiences, technology, leveled readers, and science notebooks with Delta Education’s new ScienceFLEX modules. Leave with readers, equipment, and a lesson you can try with your students next week.

Go on a Cell Quest! Teaching Cell Structure Through Gaming  
(Grades 6–12)  
National Harbor 4, Convention Center  
Science Focus: ETS, LS  
Sponsor: CPO Science/School Specialty Science  
Judy Elgin Jensen, Concord Data Corp., Plant City, FL  
Your quest, should you choose to accept it, is to explore cell structure in 3D with new CPO Science Link Cell Quest! Go on a cell structure and function adventure using cutting-edge augmented reality, then use your knowledge to complete a quest in one of eight different cell types.
Ten Minutes to Improve Science Achievement  
(Grades 3–8)  National Harbor 5, Convention Center  
Science Focus: GEN  
Sponsor: Delta Education/School Specialty Science–FOSS  
Ann Moriarty, The Lawrence Hall of Science, University of California, Berkeley  
The word “assessment” can strike fear into the hearts of teachers and students. Join FOSS developers to learn how assessment can be transformed into an integrated teaching tool that grades 3–8 teachers and students both can embrace to create a classroom culture that motivates effort and growth mind-set to improve learning.

Patterns in the Sky: Phenomena and 3-D Instruction for Grades K–1  
(Grades K–1)  National Harbor 6, Convention Center  
CCC2, SEP  
Sponsor: Amplify  
Sophia Lambertsen and Rebecca Abbott, The Lawrence Hall of Science, University of California, Berkeley  
Experience how students investigate why the sky looks different in various parts of the world while figuring out Earth’s place in the universe. Get a hands-on dive into Amplify Science for Grades K–1, engaging with this new NGSS-designed curriculum from The Lawrence Hall of Science.

Martian Genetics: A DNA and Electrophoresis Exploration  
(Grades 6–College)  National Harbor 7, Convention Center  
Science Focus: LS  
Sponsor: Edvotek, Inc.  
Brian Ell, Edvotek Inc., Washington, DC  
Explore genetics with our “out of this world” workshop! Imagine being the first scientist to explore Mars and discovering extraterrestrials. How would you use biotechnology to learn about the Martians? Learn how to explore the relationship between genotype and phenotype and how to see DNA in your middle school classroom. We will cover both DNA extraction using spooling and the separation of simulated DNA fragments using electrophoresis.

9:15–10:30 AM  Keynote Presentation  
WILD ABOUT SCIENCE: My Journey from NFL Cheerleader to National Geographic Explorer  
(General)  Maryland A–D, Convention Center  
Science Focus: LS  
Speaker sponsored by National Geographic Learning | Cengage  
Mireya Mayor (@mireyamayor), Primatologist, Scientist, National Geographic Explorer, and Author, Washington, DC  
Presider and Introduction: Christine Anne Royce, NSTA President, and Shippensburg University, Shippensburg, PA  
Platform: Mireya Mayor; Christine Anne Royce; David Crowther, NSTA Retiring President, and University of Nevada, Reno; Dennis Schatz, NSTA President-Elect, and Pacific Science Center, Seattle, WA; Mary C.H. Weller, NSTA Director, District III, and Howard County Public School System, Ellicott City, MD; Emily Perry, President, Maryland Association of Science Teachers (MAST), and Thomas Viaduct Middle School, Columbia, MD; Jaclyn Austin, Chairperson, NSTA National Harbor Area Conference, and Howard County Public School System, Ellicott City, MD; Jonathon Grooms, Program Coordinator, NSTA National Harbor Area Conference, and The George Washington University, Washington, DC; Anisha Campbell, Local Arrangements Coordinator, NSTA National Harbor Area Conference, and University of Maryland, College Park; David L. Evans, NSTA Executive Director, Arlington, VA

Mireya Mayor’s life has been a wild ride. This talk follows her winding life journey—from a first-generation Cuban-American girl on the streets of Miami, to NFL cheerleader for the Miami Dolphins, to finding a love for anthropology and pursuing a doctoral degree, to discovering a new species of lemur on the island of Madagascar, becoming a Fulbright Scholar and National Geographic’s first woman wildlife correspondent, and the grueling adventure of motherhood.

Mireya believes that the first step to getting people to love and protect the planet is to open their eyes to the parts of it they hadn’t known before. That’s why she shares her journey with anecdotes from her distant explorations of South America, Africa, and Madagascar, recounting behind-the-scenes explorations and exciting scientific discoveries. As an advocate for science and education, her aim is to inspire teachers and students, particularly women and girls, to pursue their passions in the sciences, because “you ask people to name a female explorer, and they’re pretty hard-pressed.”
Thursday, 9:30–10:30 AM

9:30–10:30 AM  Exhibitor Workshops

The Smithsonian Presents Energy in Action
(Grades K–8)  National Harbor 10, Convention Center
Science Focus: PS3
Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner
How does energy move and change? Answer this question and others while experiencing one of the new modules from the Smithsonian Science for the Classroom series. Understand and use the Energy Model Diagram to construct an evidence-based explanation supporting the claim that energy can move and change.

NGSS—Evolution: Embry-OH!
(Grades 6–8)  National Harbor 11, Convention Center
Science Focus: LS4.A, CCC1, CCC6, SEP4
Sponsor: Lab-Aids, Inc.

Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, SC
What relationships across different animal species can you see in embryological data that you cannot observe by comparing mature animals? Identify patterns in embryological images from different species to provide evidence of closer evolutionary relationships.

How to Argue in an Elementary Science Class
(Grades 3–5)  National Harbor 12, Convention Center
Science Focus: GEN
Sponsor: ScienceFLEX & MakerSpace/School Specialty Science

Mary Anne Feller, Sts. Peter and Paul Catholic School, Haubstadt, IN
Help students develop scientific argumentation skills by making claims based on observable evidence. Put these skills into practice with lessons from ScienceFLEX, as we prove (or disprove) fundamental science concepts. Leave with readers, equipment, and a lesson you can try with your students next week.

The Longitudinal Results of Camp Invention’s STEAM Pedagogy
(Grades P–9)  National Harbor 13, Convention Center
Science Focus: GEN, INF
Sponsor: National Inventors Hall of Fame

Alaina Rutledge (arutledge@invent.org), National Inventors Hall of Fame/Camp Invention, North Canton, OH
Review findings from our recent longitudinal study exploring innovation. How do inventors and hands-on STEAM learning impact our children? Find out what is next for summer out-of-school-time STEAM programming. Explore how we inspire and motivate children to use creative and critical problem-solving while immersed in real-life science investigations.

Under the Influence: Proteins, Enzymes, and How Water Drives Structure and Function
(Grades 9–College)  National Harbor 14, Convention Center
Science Focus: ETS2, LS1, PS1, PS2, PS3, CCC1, CCC2, CCC3, CCC4, CCC6, CCC7, SEP2, SEP5, SEP6
Sponsor: 3D Molecular Designs

Gina Vogt (gina.vogt@3dmoleculardesigns.com), 3D Molecular Designs, Milwaukee, WI

Tim Herman (herman@msoe.edu), MSOE Center for Bio-Molecular Modeling, Milwaukee, WI
Investigate enzyme structure/function and the role water plays in protein folding using 5E instructional design. Engage students with molecular phenomena by exploring and explaining the properties of water and enzyme structure and function using hands-on/minds-on materials. Elaborate and evaluate with an insecticide enzyme inhibition model.

Year-Round Solutions for Success in AP Chemistry from Flinn Scientific
(Grades 9–12)  National Harbor 2, Convention Center
Science Focus: PS
Sponsor: Flinn Scientific, Inc.

Mike Marvel, Flinn Scientific, Inc., Batavia, IL
Join Flinn as we share AP chemistry demonstrations, labs, inquiry activities, and digital courseware! Come learn about new ways to engage your advanced students. Our activities are aligned to the learning objectives and skills your students need to be successful.

Energy Quest: Visualizing Cell Pathways Using Augmented Reality
(Grades 6–12)  National Harbor 4, Convention Center
Science Focus: ETS, LS
Sponsor: CPO Science/School Specialty Science

Judy Elgin Jensen, Concord Data Corp., Plant City, FL
Get ENERGIZED about teaching energy pathways with the CPO Science Link Energy Quest module—featuring cutting-edge augmented reality. Through collaborative game board play and manipulating 3D imagery with a swipe of a finger, students will be clamoring to earn 32 ATP and synthesize glucose molecules.
FOSS for All Students—Access and Equity  
(Grades K–5) National Harbor 5, Convention Center  
Science Focus: GEN  
Sponsor: Delta Education/School Specialty Science–FOSS  
Ann Moriarty, The Lawrence Hall of Science, University of California, Berkeley  
Providing equitable learning opportunities for all students requires knowing the curriculum, understanding the diverse needs of students, and responding effectively to those needs. Join us for a closer look at how the FOSS program provides both universal access and targeted instruction for your most vulnerable elementary students.

Harnessing Spider Silk: Phenomena and 3-D Instruction for Grades 6–8  
(Grades 6–8) National Harbor 6, Convention Center  
Sponsor: Amplify  
Sophia Lambertsen and Rebecca Abbott, The Lawrence Hall of Science, University of California, Berkeley  
Experience how students investigate how to breed spiders whose silk can be used for medical purposes, while figuring out principles of genes, traits, and reproduction. Get a hands-on dive into the newest curriculum from The Lawrence Hall of Science, designed from the ground up for NGSS.

Exploring STEAM with Transformation  
(Grades 6–College) National Harbor 7, Convention Center  
Science Focus: LS  
Sponsor: Edvotek, Inc.  
Brian Ell, Edvotek Inc., Washington, DC  
Transforming bacteria with plasmids that express brightly colored or fluorescent proteins is an unforgettable way to teach the central dogma of molecular biology. Why not take it a step further and see the art your students can create using their transformed bacteria? Discover tips and tricks to maximize classroom success and also dust off your painting skills! Artistic? Our favorite design will win a free kit.

Thermal Energy from Impact Science: A Middle School NGSS Unit  
(Grades 6–8) National Harbor 8, Convention Center  
Science Focus: PS3  
Sponsor: Impact Science Education, Inc.  
Ladie Malek, Impact Science Education, Inc., El Cerrito, CA  
Can we make thermal energy concepts real and understandable for middle school students? Absolutely! Come preview our Thermal Energy unit, which makes tough concepts tangible and gives students a chance to design their own new and improved solar cookers!
Dynamic DNA: More Than Just As, Ts, Gs, and Cs
(Grades 8—College) National Harbor 14, Convention Center
Science Focus: ETS, LS1, LS3, LS4, CCC1, CCC6, CCC7, SEP2
Sponsor: 3D Molecular Designs
Gina Vogt (gina.vogt@3dmoleculardesigns.com), 3D Molecular Designs, Milwaukee, WI
Tim Herman (herman@msoe.edu), MSOE Center for Bio-Molecular Modeling, Milwaukee, WI
Explore a variety of hands-on/minds-on instructional materials that introduce students to DNA as a double-stranded helical molecule, as information (a sequence of As, Ts, Gs, and Cs) that encodes proteins, and as a 3.2 billion base-pair genome. Analyze the β-globin gene to discover the anatomy of a gene.

Space Science for the Modern, Interactive Classroom
(Grades 5—College) National Harbor 2, Convention Center
Science Focus: ESS1.A, ESS1.B
Sponsor: Simulation Curriculum Corp
Herb Koller, Simulation Curriculum Corp., Minnetonka, MN
Join us to see Simulation Curriculum’s acclaimed Starry Night on the Web. Now we offer our complete curriculum solutions for space science for grades 5–12, which includes animations, stunning simulations, and classroom-ready NGSS lessons available on Chromebook, Windows, Mac OS, iPad, or Android tablet.

Biotechnology, the Science of Our Age: Are Your Students Prepared?
(Grades 9—College) National Harbor 3, Convention Center
Science Focus: ETS, LS
Sponsor: Bio-Rad Laboratories
Sherri Andrews (sherr_i_andrews@bio-rad.com), Bio-Rad Laboratories, Hercules, CA
Glowing cats? Designer babies! Empower students to be independent thinkers. Learn from a leader in biotechnology teaching how to build your lab program step-by-step with equipment, supplies, and student credentials.

Modular Robotics: Constructing Explanations and Designing Solutions at K–8
(Grades K–8) National Harbor 4, Convention Center
Science Focus: ETS
Sponsor: CPO Science/School Specialty Science
Vincent Zaccardi, School Specialty Science, Naperville, IL
Encourage inquisitiveness and unlock your students’ inner inventor with Cubelets, blocks that magnetically connect to make robots. Use the robotic operations THINK, SENSE, and ACT to solve problems, create, and then design solutions. Answer questions like “What sensory input is needed to solve my design challenge?” with Cubelets!

Argumentation and Explanation in FOSS
(Grades K–5) National Harbor 5, Convention Center
Science Focus: GEN, SEP
Sponsor: Delta Education/School Specialty Science—FOSS
Ann Moriarty, The Lawrence Hall of Science, University of California, Berkeley
Investigate phenomena and experience how elementary students create models, construct explanations, and engage in argumentation from evidence in FOSS lessons. Explore how these NGSS science and engineering practices complement and reinforce each other to enhance student learning. Leave with instructional strategies to support student sensemaking.

What’s So Phenomenal About Phenomena?
(Grades K–8) National Harbor 6, Convention Center
Science Focus: GEN, NGSS
Sponsor: Amplify
Rebecca Abbott and Sophia Lambertsen, The Lawrence Hall of Science, University of California, Berkeley
You’ve probably heard about phenomenon-based instruction. Figure out what this actually means and how it’s embodied in an NGSS-designed curriculum. Leaders from The Lawrence Hall of Science will deliver this interactive presentation to unpack the meaning of phenomenon-based instruction through sharing the Hall’s research-based pedagogy.

Left at the Scene of the Crime: Introduction to Forensic Science
(Grades 6—College) National Harbor 7, Convention Center
Science Focus: LS
Sponsor: Edvotek, Inc.
Brian Ell, Edvotek Inc., Washington, DC
Explore genetic diversity using forensic science! Your students become crime scene investigators as they analyze biological evidence using blood typing and DNA fingerprinting. An agglutination test is used to conclusively identify crime scene samples as “blood” and to preliminarily screen suspects by ABO type. Next, gel electrophoresis is used to create DNA profiles from crime scene and suspect samples.
Ecology from Impact Science: A Middle School NGSS Unit  
(Grade 7) National Harbor 8, Convention Center  
Science Focus: LS2  
Sponsor: Impact Science Education, Inc.  
Ladie Malek, Impact Science Education, Inc., El Cerrito, CA  
Stability and change are natural conditions in an ecosystem. But some disturbances are disruptive in a more permanent way. Can we make these concepts meaningful for students? Absolutely! Come preview our NGSS ecology unit, which gets students involved through games, observations, hands-on activities, and mathematical modeling!

11:00 AM–5:00 PM Exhibits Hall C, Convention Center  
Did you know that NSTA offers exclusive exhibit hall and exhibitor workshop hours today from 11:00 AM to 12:30 PM? During these hours there are no teacher sessions scheduled and it’s a perfect time to visit the exhibits and discover all the products and services companies and organizations have to offer. Some exhibitors will offer materials for sale throughout the conference.
12:30–1:00 PM Presentations
Digital Designers: How to Use Technology to Create a Design-Thinking Mind-Set in Young Learners
(Grades P–2) Azalea 2, Convention Center
Science Focus: GEN, SEP1, SEP6
Sarah Allen (@msallenteaches; sallen@indiancreekschool.org) and Ab Bear (abeare@indiancreekschool.org), Indian Creek School, Crownsville, MD
Come join us as we show you how to use technology and arts integration to create design-based and problem-based STEM challenges with early elementary learners!

Grounding STEM Education Programs in NGSS Practices
(Grades 6–12) Baltimore 5, Convention Center
Science Focus: ESS1, ETS1
David Lockett (@DavidJLockett; david.lockett@lwcharter-schools.com), Bok Academy, Lake Wales, FL
Interested in exploring ways to support classroom teaching in integrating the NGSS practices? Want to move toward an inquiry-based approach in which students take more responsibility for their learning? Then join in to discover and share a multitude of hands-on approaches, curricula, and activities.

12:30–1:30 PM Presentations
NOAA in Your Backyard: Free Professional Development and Local Educator Resources Are Closers Than You Think
(Grades 1–12) Annapolis 3, Convention Center
Science Focus: GEN
Bekkah Lampe (@NOAAeducation; bekkah.lampe@noaa.gov), National Oceanic and Atmospheric Administration, Silver Spring, MD
The National Oceanic and Atmospheric Administration (NOAA) has hundreds of facilities and professional communicators across the nation. Get connected to guest speakers, field trips, and local and national professional development opportunities.

Exploring Climate Change in the Polar Regions
(Grades 7–12) Baltimore 2, Convention Center
Science Focus: ESS2, ESS3, SEP6, SEP7, SEP8
Natalie Harr Ylizarde (@allyonthepole; ylizarde@umd.edu), University of Maryland, College Park
Emily Freeland, MdBio Foundation, Inc., Gaithersburg, MD
Explore evidence-based tools and strategies for bringing climate change education and real-time polar research into your middle school and high school classrooms.

Polymers: Basics for the Science Classroom
(Grades 7–12) Chesapeake A, Convention Center
Science Focus: LS1.A, PS1
Debbie Goodwin (nywin@hotmail.com), Retired High School Science Teacher, Chillicothe, MO
Simple demonstrations, labs, and activities bring polymers into your curriculum that are STEM relevant. Concepts include formation, classification, structure, and properties. I’ll share NGSS correlations and a CD of activities/information.

Chemical Evolution of Earth for High School Chemistry and Earth Science Classes
(Grades 9–12) Chesapeake B, Convention Center
Science Focus: ESS1, ESS2, PS
Martin Schmidt, Jr. (mschmidt@mcdonogh.org), McDonogh School, Owings Mills, MD
Understand Earth as an active chemical refinery, examining what are the Earth materials and chemical processes, and how these have shaped the planet and our resources.
Strategies to Enable K–8 Students to Read Science Content with Understanding, and Communicate Concepts and Their Findings Effectively
(Grades K–8) Chesapeake C, Convention Center
Science Focus: GEN, NGSS
Donna Knoell (dknoell@sbcglobal.net), Educational Consultant, Overland Park, KS
Leave with content literacy strategies to enable students to read science text and visuals with understanding, and to communicate concepts, observations, and investigative findings orally and in writing. Handouts.

Transforming Your School with GreenSchools
(Grades P–12) Chesapeake G, Convention Center
Laura Johnson Collard (@MAEOE_MD; director@maeoe.org) and Winny Tan (@MAEOE_MD; greenschools@ maeoe.org), Maryland Association for Environmental and Outdoor Education, Columbia
Hear about GreenSchools as sustainable schools. This nationally recognized program connects science education with service learning, professional development, and environmental action. Through the program, students are able to bring about positive environmental changes to their schools and communities through service-learning projects.

12:30–1:30 PM Hands-On Workshops

Unpacking “Race” in the Science Classroom
(General) Annapolis 2, Convention Center
Science Focus: GEN, NGSS
Deb Morrison (@educatordeb; educator.deb@gmail.com), University of Washington, Seattle
How does racial identity interact with what we think of and study as science in our classrooms? We will unpack confusions about connections between “race” and science, and discuss how strategies to unpack “race” can be used to deepen communications, enlighten curricula, and develop brave spaces that foster classroom learning.

I Spy a Pattern: Teaching, Learning, and Assessing Crosscutting Concepts as a Path to Student Sense-making
(Grades K–12) Annapolis 4, Convention Center
Science Focus: GEN, NGSS
Aneesha Badrinarayan (abadrinarayan@achieve.org) and Vanessa Wolbrink (vwolbrink@achieve.org), Achieve, Inc., Washington, DC
We will explore how to use crosscutting concepts to enhance learning experiences and outcomes for all learners. We’ll dive into the different ways they are interpreted, used, and assessed; develop approaches to leverage their connections to core ideas, practices, and other content areas to deepen student learning; and discuss how to engage crosscutting concepts in assessment.
Evaluate Your Sessions Online!

This year, we’re giving away an Apple iPad mini 4 Wi-Fi tablet to one lucky attendee who completes a session evaluation!

Remember, the more sessions you attend and evaluate, the more chances you have to win! (See page 12 for details.)

Taking Trade Books and Science Outdoors
(Grades P–6) Azalea 1, Convention Center
Science Focus: LS, CCC
Steve Rich (@bflyguy; bflywriter@comcast.net), University of West Georgia, Carrollton
Christine Anne Royce (@caroyce; caroyce@aol.com), NSTA President, and Shippensburg University, Shippensburg, PA
The co-author’s practical lessons from Teaching Science Through Trade Books merge with strategies from the Outdoor Science author, activating student learning on concepts from nature.

Nurturing Computational Thinkers with a Technology-Rich Weather Curriculum
(Grades 6–9) Baltimore 3, Convention Center
Science Focus: ESS2.D, CCC, SEP5
Nanette Marcum-Dietrich (ndietrich@millersville.edu), Millersville University, Millersville, PA
Nathan Kimball, The Concord Consortium, Concord, MA
Find out how students can use computational thinking skills to manipulate computational weather models/simulations, engage in hands-on experimentation, and employ scientific language to explore relationships between weather variables.

NGSS for Struggling Learners in Chemistry
(Grades 9–12) Baltimore 4, Convention Center
Science Focus: PS1.A, PS1.B
Anjana Iyer (@AnjanaIyer; aiyer@htps.us) and Cathy Zavacki (@czavacki; czavacki@htps.us), Hillsborough High School, Hillsborough, NJ
Experience NGSS-focused chemistry activities made accessible to all students, including those with Individualized Education Plans. Presenters have 28 years of experience teaching inclusion students.

A Big Splash from a Small Program: Developing Student Scientists Through Stream Science and Action!
(Grades 6–12) Maryland 1/2, Convention Center
Science Focus: ESS2
Ann Strozyk (@AnnStrozyk; ann_strozyk@hcpss.org), Howard County Public School System, Ellicott City, MD
Jessica Kohout (@MrsKohout; jessica_kohout@hcpss.org), Reservoir High School, Fulton, MD
Go in-depth into how Howard County science teachers in cooperation with the Howard County Conservancy have implemented the NGSS through the “Watershed Report Card” program.

Tracking Mosquito Vector-Borne Disease Using GLOBE Observer Mosquito Habitat Mapper App
(Grades 4–College) Maryland 4, Convention Center
Science Focus: ESS3.C, INF, CCC2
Cassie Soeffing (@sdbikegirl; cassie_soeffing@strategies.org), Institute for Global Environmental Strategies, Arlington, VA
The GLOBE Observer Mosquito App is a mobile platform used to identify and locate mosquito breeding sites. The app also supports the identification of mosquito larva taxa via a built-in key. Citizen science data can be used to track the rate of range expansion of invasive vector species and associated health threats at fine-grain resolution. Topics include an introduction to mosquito biology. Participants will use their own mobile device and a clip-on microscope attachment to determine the type of connections between climate change and increased risk of vector-borne disease, including Zika, West Nile, as well as the importance of satellite data in models in creating forecasts of disease outbreaks and epidemics caused by mosquito vectors.

Using the NGSS to Plan a Unit of Instruction (Five Tools Session #1)
(Grades K–12) Woodrow Wilson B, Convention Center
Science Focus: GEN, NGSS
Cindy Gay (cindygjgay@gmail.com), BSCS, Colorado Springs, CO
Plan for instruction using a tool and NGSS card sets to deepen student understanding of the three dimensions and consider what students need to know.
12:30–1:30 PM  Exhibitor Workshops

Phenomenal Classroom Critters
(Grades K–12)     National Harbor 10, Convention Center
Science Focus: LS
Sponsor: Carolina Biological Supply Co.
Carolina Teaching Partner
Add action and excitement to your science class with live organisms! Discover fun, simple, hands-on three-dimensional activities that use a variety of insects and arthropods. Learn about care and handling, as well as easy ways to introduce phenomena. Additional resources available online for your classroom.

NGSS—Land, Water, and Human Interactions: Wait, I Thought Nutrients Were a Good Thing?
(Grades 6–8)     National Harbor 11, Convention Center
Science Focus: ESS2.C, ESS3.C, CCC2, SEP2, SEP3, SEP6
Sponsor: Lab-Aids, Inc.
Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, SC
How can a farm impact fishing nearby? Could it also impact the quality of drinking water in a nearby town? Use a model to gather evidence about the interaction of soil, water, and fertilizers in a laboratory investigation.

Making Science Accessible Through Blended Hands On and ELA
(Grades 3–5)     National Harbor 12, Convention Center
Science Focus: GEN
Sponsor: ScienceFLEX & MakerSpace/School Specialty Science
Mary Anne Feller, Sts. Peter and Paul Catholic School, Haubstadt, IN
Show off your inner-reading teacher in a hands-on science setting! Come be a student and experience ScienceFLEX lessons that integrate informational text and notebooking alongside hands-on science. Leave with readers, strategies, equipment, and a lesson you can try with your students next week.

Engineering Design Solutions with Wind Turbines
(Grades 6–12)     National Harbor 4, Convention Center
Science Focus: ETS
Sponsor: CPO Science/School Specialty Science
Vincent Zaccardi, School Specialty Science, Naperville, IL
Plan, build, test, and refine your designs to engineer your very own wind turbine with CPO Science Link Wind Turbine module. With STEM activities and an NGSS approach, you will try to generate the highest voltage using three different blade types or by even designing your own!

Structure and Function in Madagascar Hissing Cockroaches
(Grades 6–8)     National Harbor 5, Convention Center
Science Focus: LS
Sponsor: Delta Education/School Specialty Science–FOSS
Ann Moriarty, The Lawrence Hall of Science, University of California, Berkeley
Explore the phenomenon of structure and function with live Madagascar hissing cockroaches. Discover how students engage in three-dimensional learning as they explore and compare systems in multicellular organisms in the FOSS Next Generation Diversity of Life Course for middle school.

Are You Moody?
(Grades 6–College)     National Harbor 6, Convention Center
Science Focus: PS
Sponsor: Texas Instruments
Fred Fotsch, Texas Instruments, Dallas
We will bring science and coding together as participants learn to do some basic coding (no experience necessary) while developing a mood ring! The science of color mixing is explored while determining the right body temperature thresholds. Is fuchsia flirty? Should green be groovy? It’s up to you!

Exploring the Genetics of Taste: SNP Analysis of the PTC Gene Using PCR
(Grades 9–College)     National Harbor 7, Convention Center
Science Focus: LS
Sponsor: Edvotek, Inc.
Brian Ell, Edvotek Inc., Washington, DC
Explore the relationship between genotype and phenotype using Phenylthiocarbamide (PTC). Some think PTC tastes bitter, while others find it tasteless. The ability to taste PTC has been linked to variations in a taste receptor gene. Learn to use PCR to distinguish between PTC alleles. Discover tips and tricks along the way to ensure experimental success!
Thursday, 1:00–1:30 PM

1:00–1:30 PM  Presentation
Facilitating Online Discussions in the Elementary Classroom  
(Grades 3–5) Azalea 2, Convention Center
Science Focus: GEN
Nathan Haskins, West Friendship Elementary School, West Friendship, MD  
Jennifer Eckert (jennifer_eckert@hcpss.org), Atholton Elementary School, Columbia, MD
Find out how Howard County, MD, grade 5 teachers have used a web-based learning platform to facilitate student discussions.

2:00–2:30 PM  Presentation
Hosting a Successful Science Fair: 16 Years of Practice  
(Grades 6–8) Baltimore 1, Convention Center  
Science Focus: GEN, SEP
Anne Baumann (ambaumann@ccps.org) and Kim Huey (kjhuey@ccps.org), Perryville Middle School, Perryville, MD
Leave with tips and tricks for hosting a successful science fair that allows students to participate in authentic scientific research.

2:00–3:00 PM  Featured Presentation
Becoming Scientifically Literate: Insights from Research on Learning and Teaching  
(General) Maryland C, Convention Center  
Science Focus: GEN
Heidi Schweingruber (hschweingruber@nas.edu), The National Academies of Sciences, Engineering, and Medicine, Washington, DC
Presider: Jennifer Silbaugh, National Harbor Strand Leader, and Manor Woods Elementary School, Ellicott City, MD
Science is a way of knowing about our world. In a society where science and technology now touch nearly every part of our lives, it is critical to understand the processes and practices of science and to become critical consumers of scientific research. Drawing on studies from the National Academies of Sciences, Engineering, and Medicine, Heidi will share her insights on what scientific literacy is and the kinds of learning experiences students need to become more scientifically literate.

Heidi Schweingruber is the director of the Board on Science Education at the National Research Council (NRC). She has been involved in many of the major projects of the board since it was formed in 2004. She co-directed the study that resulted in the report A Framework for K–12 Science Education. In addition, Heidi has co-authored two books that translate findings from NRC reports for a broader audience: Ready, Set, Science! Putting Research to Work in K–8 Science Classrooms and Surrounded by Science.

Prior to joining the NRC, Heidi worked as a senior research associate at the Institute of Education Sciences in the U.S. Department of Education, where she administered the preschool curriculum evaluation program and a grant program in mathematics education. Previously, she was the director of research for the Rice University School Mathematics Project an outreach program in K–12 mathematics education, and taught in the psychology and education departments at Rice University.
2:00–3:00 PM Presentations

STEM on a Budget: Leveraging University and Community Partnerships
(Grades 1–6) Annapolis 3, Convention Center
Science Focus: GEN
Zach Pekor (zpekor@gwu.edu), The George Washington University, Washington, DC
By effectively using local institutions of higher education and community-based nonprofit organizations, educators can have their students engage in meaningful STEM experiences.

NMLSTA-Sponsored Session: Teaching the Engineering Design Process Through Urban Gardening
(Grades 5–8) Baltimore 2, Convention Center
Science Focus: ETS1, LS
Elizabeth Weissman (weissmane@ramaz.org), The Ramaz School, New York, NY
Presider: Mary Lou Lipscomb (mlscience@aol.com), National Middle Level Science Teachers Association, Naperville, IL
The goal of this project is to use engineering design principles to teach ecology and sustainability through active student involvement in an urban garden.

STEM Design Challenges in a Diverse Inclusion Classroom
(Grades 9–12) Baltimore 5, Convention Center
Science Focus: ETS1, SEP2, SEP3, SEP4, SEP5, SEP6, SEP8
Kristine Saja (ksaja@bcps.org) and Stephanie Whitehead (swwhitehead@bcps.org), Sparrows Point High School, Essex, MD
Hear how two teacher-made STEM units meet performance expectations for the NGSS and environmental literacy while engaging students in an engineering design challenge.

Teach Engineering Practices on the Cheap with Concrete
(Grades 6–12) Chesapeake A, Convention Center
Science Focus: ETS1, SEP
Debbie Goodwin (nywin@hotmail.com), Retired High School Science Teacher, Chillicothe, MO
Teach engineering using concrete. Discover inexpensive STEM projects that engage students using the #1 building material in the world. I’ll share NGSS correlations and a CD of information.

Find the Fund$ for STEM: Grant Writing 101
(Grades P–12) Chesapeake B, Convention Center
Science Focus: GEN
June Teisan (jteisan@gmail.com), Network of Michigan Educators, Grosse Pointe Woods
Do you have Cartier dreams for your classroom but a dollar store budget? Get tips and tricks for grant writing that can help you craft proposals to fund robust science learning—for your students and for YOU!

Creating Effective Science, Robotics, Engineering, and Technology Makerspaces: What and How?
(Grades K–8) Chesapeake C, Convention Center
Science Focus: GEN, NGSS
Donna Knoll (dknoll@sbglobal.net), Educational Consultant, Overland Park, KS
Discussion centers on how to create an effective makerspace specifically designed to advance science, robotics, technology skills, and engineering principles; increase learning and engagement; and fulfill the NGSS. Emphasis will be placed on criteria for what to include, how to use it to reach diverse populations, and how to measure its effectiveness.

Projects: How to Implement Them Successfully in a Diverse Classroom
(Grades 10–12) Chesapeake G, Convention Center
Science Focus: GEN
Kimberly Warschaw (kimberly.warschaw@apsva.us) and Hilary Sparrell (hilary.sparrell@apsva.us), Wakefield High School, Arlington, VA
Hear about the hands-on learning that can be applied immediately in the classroom environment through various Project-Based Learning. Grading rubrics and directions will be provided.

Modeling Wildlife Populations Using a Free, Dynamic Online Modeling Tool
(Grades 7–College) Chesapeake H, Convention Center
Science Focus: ESS2, ESS3, LS, CCC4, SEP2
Elena Takaki (@ProjectWILD; etakaki@fishwildlife.org), Association of Fish & Wildlife Agencies, Washington, DC
Marc Lefebre (@ProjectWILD; mlefeb@fishwildlife.org), Council for Environmental Education, Austin, TX
Use a free online modeling software to simulate wildlife populations. Students will understand modeling, variables, graphing to interpret data, and how to make connections to ecosystem health.
Five Steps for Integrating Social Media into Your Science Classroom to Enhance Your Instruction
(Grades 8–College) Maryland 3, Convention Center
Science Focus: GEN, SEP1, SEP8
Barbara Huth (@Huth_Barbara; bhuth@commonsense.org),
Common Sense Media, Washington, DC
Learn five practical steps for implementing social media effectively, safely, and purposefully in a science classroom and leave with resources you can use immediately.

Hypothesis Testing and the Meaning of Statistical Significance
(Grades 10–College) Maryland 4, Convention Center
Science Focus: LS1.A, LS1.C, CCC5, CCC6, SEP4, SEP5, SEP8
Robert Cooper (@bcooper721; bcooper721@gmail.com),
Pennsbury High School, West Campus, Fairless Hills, PA
Learn the rationale behind statistical methods like Student’s t-Test and Chi Square. A classroom activity will be presented. Bring a computer, tablet, or calculator.

2:00–3:00 PM Hands-On Workshops
How Do I Get All of My Students Involved in STEM? Think UDL!
(Grades K–12) Annapolis 2, Convention Center
Science Focus: GEN
Justin Leonard (@Leonard_Sci; justin.leonard@pgcps.org) and Betsy Bratek (@bratekedu; betsy.bratek@pgcps.org),
Prince George’s County Public Schools, Upper Marlboro, MD
Universal Design for Learning (UDL) provides a “best practices” approach for students to access a given curriculum by activating the strategic networks of the brain. Come find out how to apply UDL to your STEM classroom.

Planning and Carrying Out Investigations: Scaffold- ing to Support Student Learning
(Grades 6–12) Annapolis 4, Convention Center
Science Focus: LS, SEP3
Kara Berger (@tuSTEMcenter; kberger@towson.edu) and Mary Stapleton (@tuSTEMcenter; mkstapleton@towson.edu), Towson University Center for STEM Excellence, Baltimore, MD
Learn strategies for supporting students in planning and carrying out investigations. Walk away with useful tools to support and scaffold your students in this process.

Energy Explorations at the Primary Level
(Grades K–3) Azalea 1, Convention Center
Amy Truemper (@NEED_Project; kswan@need.org),
Bednarčík Junior High School, Aurora, IL
Plug in new learning with hands-on experiments that explore the fundamental concepts of energy at the primary level, while incorporating measurement skills and scientific process skills.

Water Works
(Grades 1–4) Azalea 3, Convention Center
Brian Bissinger (brian.bissinger@basisindependent.com),
BASIS Independent Brooklyn, NY
Let’s tie together weather and the water cycle as you perform hands-on labs to prove how molecules change as temperature changes.
Promoting Equity Science Learning Participation: Strategies for Formative Assessment and Science Classroom Talk  
(General) Baltimore 3, Convention Center  
Science Focus: GEN, NGSS  
Deb Morrison (@educatordeb; educator.deb@gmail.com), University of Washington, Seattle  
Have you ever wondered how to organize classroom talk for effective science learning and equity? Leave with practical solutions to this challenge.

Innovation in Biology  
(Grades 9–12) Baltimore 4, Convention Center  
Science Focus: ETS1, LS2.B, CCC2, CCC4, SEP2, SEP6  
Jessica Kohout (@MrsKohout; jessica_kohout@hcpss.org), Reservoir High School, Fulton, MD  
Learn ways to incorporate engineering design activities into your biology classroom. Get your students thinking critically and creatively as they collaborate in real-world problem solving.

Innovative and Integrated: STEM Activities from Chinese Classrooms  
(Grades 7–12) Maryland 1/2, Convention Center  
Science Focus: GEN, SEP  
Judith Lederman (ledermanj@iit.edu) and Norman Lederman (ledermann@iit.edu), Illinois Institute of Technology, Chicago  
Teachers from Beijing middle and secondary STEM schools will demonstrate unique integrated projects and activities. Participants will be actively engaged in model lessons that authentically include all STEM components.

Using Performance Expectations to Plan for Classroom Assessments (Five Tools Session #2)  
(Grades K–12) Woodrow Wilson B, Convention Center  
Science Focus: GEN, NGSS  
Cindy Gay (@cindygay; cindyjgay@gmail.com), BSCS, Colorado Springs, CO  
Use a tool to engage in a process that deepens understanding of NGSS performance expectations to consider evidence of learning and plan for classroom assessment.

NSTA Press® Session: Argument-Driven Inquiry in the Life, Physical, and Earth/Space Sciences: Lab Investigations for Grades 6–8  
(Grades 6–8) Woodrow Wilson D, Convention Center  
Science Focus: ESS2, LS, PS, CCC, SEP  
Victor Sampson (@drvictorsampson; victor.sampson@utexas.edu), The University of Texas at Austin  
Jonathon Grooms (@drjongsrooms; jgrooms@gwu.edu), The George Washington University, Washington, DC  
Discover Argument-Driven Inquiry and how it can help students learn how to use disciplinary core ideas, crosscutting concepts, and science and engineering practices to explain natural phenomena.

CANCELED

2:00–3:00 PM Exhibitor Workshops  
Keep Calm and Chemistry On: Successful Lab Activities for the New Chemistry Teacher  
(Grades 9–12) National Harbor 10, Convention Center  
Science Focus: PS  
Sponsor: Carolina Biological Supply Co.  
Carolina Teaching Partner  
Explore easy, engaging, and safe chemistry activities that guarantee a reaction in your students. Whether you’re new to chemistry or feeling out of your element, create excitement with hands-on labs, demonstrations, and Carolina’s digital content. These lab activities support three-dimensional learning and work every time, not just periodically.

NGSS—Weather and Climate: Atmosphere, Climate, and Global Warming  
(Grades 6–8) National Harbor 11, Convention Center  
Science Focus: ESS3.D, CCC1, CCC2, CCC4, CCC7, SEP1, SEP4, SEP5, SEP7  
Sponsor: Lab-Aids, Inc.  
Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, SC  
Students look at historical data spanning the past 100 years to try to understand the causes of current global warming. They ask questions related to the data to figure out what the evidence indicates and to better understand how human activities relate to global warming. Relates to MS-ESS2-6 (Earth’s Systems) and MS-ESS3-5 (Earth and Human Activity).
Thursday, 2:00–3:00 PM

Boosting the Makerspace Experience for Young Scientists!
(Grades 3–5) National Harbor 12, Convention Center
Science Focus: GEN
Sponsor: ScienceFLEX & MakerSpace/School Specialty Science
Mary Anne Feller, Sts. Peter and Paul Catholic School, Haubstadt, IN
Makerspaces are popping up everywhere, providing a creative space to explore questions and solve problems. But for elementary students, tackling STEM-related challenges requires a foundation in science investigation. Help young scientists build the skills needed for independent exploration in their makerspaces with programs like Science in A Nutshell®.

Using Models to Uncover Student Misconceptions in Chemistry
(Grades 5–9) National Harbor 14, Convention Center
Science Focus: PS1, PS2, CCC1, CCC2, CCC5, CCC7, SEP1, SEP2, SEP3, SEP4, SEP5
Sponsor: 3D Molecular Designs
Gina Vogt (gina.vogt@3dmoleculardesigns.com), 3D Molecular Designs, Milwaukee, WI
Tim Herman (herman@msoe.edu), MSOE Center for Bio-Molecular Modeling, Milwaukee, WI
Uncover students’ conceptual understanding of atoms, molecules, and compounds using NGSS science and engineering modeling practices. Explore chemistry topics in polarity, pH, density, solubility, bonding, and much more with three-dimensional teaching and learning manipulatives! Make learner thinking visible through student-centered simulations of dissociation and neutralization. Great formative assessment probes provided!

Analyzing and Interpreting Data Using TCI’s Bring Science Alive!
(Grades K–8) National Harbor 15, Convention Center
Science Focus: GEN
Sponsor: TCI
Albert Bower, TCI, Mountain View, CA
Get your students to do more than just read a graph, chart, or statement. Participants will be immersed in a Bring Science Alive! classroom where students analyze and interpret data and construct an argument based on research.

Positively Engaging Demos and Labs for Chemistry from Flinn Scientific
(Grades 9–12) National Harbor 2, Convention Center
Science Focus: PS
Sponsor: Flinn Scientific, Inc.
Mike Marvel, Flinn Scientific, Inc., Batavia, IL
Come join Flinn as we go through interactive and fun activities for your first-year chemistry students! Learn multiple ways to keep class interesting and ensure students understand the concepts. Entice students with the beauty of chemistry!

Fascinate Your Students with Glowing Bacteria
(Grades 9–College) National Harbor 3, Convention Center
Science Focus: LS
Sponsor: Bio-Rad Laboratories
Sherri Andrews (sherri_andrews@bio-rad.com), Bio-Rad Laboratories, Hercules, CA
Make bacteria glow fluorescent green in this hands-on transformation lab. Bacterial transformation is one of the most important techniques in genetic modification and medicine production.

Are You Crazy About Genetics?
(Grades 6–12) National Harbor 4, Convention Center
Science Focus: LS3
Sponsor: CPO Science/School Specialty Science
Vincent Zaccardi, School Specialty Science, Naperville, IL
Heredity comes alive when you use hands-on models to create crazy creatures in a unique collaborative program. Study the relationship between DNA, genes, mitosis, meiosis, traits, alleles, phenotypes, and genotypes with tools and strategies everyone is CRAZY about!

Exploring Kinetic Energy Transfers in Collisions
(Grades 6–8) National Harbor 5, Convention Center
Science Focus: PS2, PS3
Sponsor: Delta Education/School Specialty Science–FOSS
Ann Moriarty, The Lawrence Hall of Science, University of California, Berkeley
Explore how potential energy is related to kinetic energy by planning and carrying out a collision investigation. Engage as students to make sense of data to develop an understanding of energy transfers in the FOSS Next Generation Gravity and Kinetic Energy Course for middle school.
Using Maggots, Flies, and Flesh to Solve a Mystery!
(Grades 6–College) National Harbor 6, Convention Center
Science Focus: GEN, INF
Sponsor: Texas Instruments
Jeffrey Lukens, Sioux Falls (SD) School District
A decomposing corpse is found in a field. Four possible missing persons fit the description. But who is it? Using clues near the scene will help determine identity. Forensic anthropologist Diane France helped to develop this free middle school and high school forensic science lesson.

Cancer Investigators: Medical Diagnostics in Your Classroom
(Grades 7–College) National Harbor 7, Convention Center
Science Focus: LS
Sponsor: Edvotek, Inc.
Brian Ell, Edvotek Inc., Washington, DC
Cancer contributes to almost one in every four deaths in the United States. Fortunately, innovations in biomedical research have improved our understanding of the differences between normal and cancer cells. Join us to use microscopy and electrophoresis to explore the hallmarks of cancer.

Building the Human Connection with National Geographic Learning
(Grades K–5) National Harbor 8, Convention Center
Science Focus: GEN
Sponsor: National Geographic Learning | Cengage
Pam Caffery (pam.caffery@cengage.com), National Geographic Learning | Cengage, Boston, MA
No one exemplifies a positive science-linked image than National Geographic with its diverse group of National Geographic Explorers. National Geographic Learning invites you to view our Exploring Science program and learn how students make the connections with our National Geographic Explorers while building opportunities to see themselves in science.

2:30–3:00 PM Presentation
Science for All
(Grades 6–8) Baltimore 1, Convention Center
Science Focus: LS, PS, INF, SEP7, SEP8
Janey Kelly (@jlk009; sci4allstudents@gmail.com), Arcola Intermediate School, Eagleville, PA
Kaitlyn McGlynn (sci4allstudents@gmail.com), Upper Merion Area Middle School, King of Prussia, PA
Come meet the authors of Science Scope’s “Science for All” column as they present strategies for meeting the needs of struggling learners in the classroom.

3:30–4:30 PM Presentations
Presenting the Teacher Institute for Evolutionary Science (TIES)
(Grades 6–8) Annapolis 3, Convention Center
Science Focus: LS, SEP8
Bertha Vazquez, Richard Dawkins Foundation for Reason and Science, Coral Gables, FL
Christopher Moran (cgmoran@fcps.edu), Lake Braddock Secondary School, Burke, VA
Hear how TIES can help you teach evolution with confidence. Receive a free unit of curriculum plus a guide to the Smithsonian’s Museum of Natural History’s resources.

It’s a Gassy World! A Hands-On/Minds-On Climate Change Lab Activity for Middle School Students
(Grades 6–8) Baltimore 1, Convention Center
Science Focus: ESS3
Kara Berger (@tuSTEMcenter; kberger@towson.edu) and Mary Stapleton (@tuSTEMcenter; mkstapleton@towson.edu), Towson University Center for STEM Excellence, Baltimore, MD
Join us in exploring a lab activity for students to plan and carry out investigations answering the driving question: Will warming oceans be better or worse at absorbing CO₂?
Design Thinking Our Way to a More Sustainable City
(Grades 5–12) Baltimore 5, Convention Center
Science Focus: ESS3, ETS1, INF, CCC2, CCC4, CCC5, SEP1, SEP4, SEP6, SEP8
Elizabeth Nunez (nunezelizabeth0218@yahoo.com), Lakisha Kincherlow, and Fatema Sheikh (fsheikh@ppsstaff.org), Paterson (NJ) Public Schools
Kathryn Dormann Healey (khealey828@gmail.com), Orange Scholars Academy, Orange, NJ
Alicia Acerra (aliciamacerra@icloud.com), Thomas Jefferson Middle School, Lodi, NJ
Join us as we describe how we used our local national park as a jumping-off point for leading middle school students on a quest to design a more sustainable city for their future.

Advancing Scientific Literacy with Lesson Plans That Meet the CCSS and NGSS
(Grades 9–12) Chesapeake A, Convention Center
Science Focus: PS, CCC1, SEP1, SEP2, SEP3, SEP4, SEP6, SEP7, SEP8
Christine Suh (@ACSChemmatters; c_suh@acs.org) and Kathleen Cooper (kmcooper15@gmail.com), American Chemical Society, Washington, DC
Are you asked to incorporate reading and writing into your lessons to support literacy in language arts? We have the right lesson plans for you!

Examination of Forensic Tire and Shoe Impression Evidence
(Grades 8—College) Chesapeake B, Convention Center
Science Focus: GEN, SEP
Anthony Bertino (abertino@nycap.rr.com), Retired Educator, Schenectady, NY
Patricia Nolan Bertino (nolanp@nycap.rr.com), Retired Educator, Schenectady, NY
Examine how to prepare, measure, and analyze plaster-of-paris inked and inkless shoe and tire impressions. We will cover proper methods to document, photograph, and analyze these impressions. Handouts.

Blended Learning in the Elementary Science Classroom: Transitioning to the NGSS Using Individualized Learning
(Grades P–8) Maryland 3, Convention Center
Science Focus: GEN, NGSS
Kendra Hinson, Frederick County Public Schools, Walkersville, MD
Kimberly Brandenburg (@kimberlybrande2; redsallyroo@msn.com), Oakdale Elementary School, Frederick, MD
Jeffrey Longenberger (@FCPSScienceTech), Christopher Horne (@moxiemath; chris.horne@fcps.org), and Kimberly Martin (@STEMwithKim; gosixers@gmail.com), Lincoln Elementary School, Frederick, MD
Casey Keenan (casey.keenan@fcps.org), Butterfly Ridge Elementary School, Frederick, MD
Experience a blended professional learning environment. Hear from teachers and system leaders on how they use blended learning models to focus on NGSS instruction.

Infusing Technology into Your Science Instruction
(Grades K–6) Maryland 4, Convention Center
Science Focus: GEN
Stephanie Hendrith (shendrith@murraystate.edu), Murray State University, Murray, KY
Attention will be paid to ways to merge technology into your elementary science instruction in order to reach all learners.
### Hands-On Workshops

**Providing Equitable Learning Experiences for ELLs in Science**  
(Grades 6–12)  
Annapolis 2, Convention Center  
Science Focus: GEN, NGSS  
Jessica Mulhern (@jMulhernBiology; jessica_mulhern@hcpss.org) and Deborah Puhak (@HCPSS_ESOL; deborah_puhak@hcpss.org), Howard County Public School System, Ellicott City, MD

Explore 3-D learning focusing on equitable access for English language learners. Personalized supports within the same learning experience will be modeled and shared.

**Gaming STEM-FLEET, a Free Engineering Video Game**  
(Grades 6–12)  
Annapolis 4, Convention Center  
Science Focus: ETS1, PS2, PS3, SEP1, SEP2, SEP3, SEP4, SEP6, SEP7  
Michael Briscoe (@NavalEngineers; mbriscoe@navalengineers.org), American Society of Naval Engineers, Fairfax, VA

Video games engage students with rich microworlds. The American Society of Naval Engineers promotes a 100% free video game and associated curricula to leverage this engagement for meaningful STEM learning.

**How to Implement STEM and NGSS into Your Classroom Through the Use of NSTA Competitions**  
(Grades K–12)  
Azalea 1, Convention Center  
Science Focus: GEN, NGSS  
Acacia McKenna (amckenna@nsta.org), Director, Competitions, NSTA, Arlington, VA  
Sue Whitsett (swhitsett@nsta.org), AEOP Project Director, NSTA, Arlington, VA

Hear about various NSTA competitions and how they can bring STEM and the NGSS into the classroom, as well as give students and teachers a chance to earn recognition and prizes. Free food and a gift bag will be distributed to each participant.

**Literacy Centers Anchored in Science**  
(Grades P–3)  
Azalea 3, Convention Center  
Science Focus: GEN, NGSS  
Valerie Patel (@valpatel; valerie_m_patel@mcpsmd.org) and Caitlin Walker (caitlin.a.walker@mcpsmd.org), William B. Gibbs, Jr. Elementary School, Germantown, MD

See examples of literacy center themes based around NGSS disciplinary core ideas. Leave with ideas for how to infuse science content into literacy practice, such as syllable sorting, rhyming words, and sentence building.

**A Taste of Project Maury: Measuring Sea Level from Space**  
(Grades 6–College)  
Baltimore 3, Convention Center  
Science Focus: ESS2, ETS2, CCC1, CCC2, CCC3, CCC4, SEP1, SEP2, SEP4, SEP5, SEP7  
David Curry (@CarlSaganRox; scienceguydave@mac.com), Council Rock School District, Newtown, PA  
Joseph Holm (jholm@crsd.org), Newtown Middle School, Newtown, PA  
William Licopoli (wlicopoli@gmail.com), Central Bucks High School West, Pennsburg, PA

Whether you teach near the coast or in the heartland, this oceanography lesson will bring the ocean to your students. Use satellite data to measure and plot sea level from space, bringing together math, art, and science.

**PolyWhat? Application of STEM Using Polymers**  
(Grades 1–12)  
Baltimore 4, Convention Center  
Science Focus: ETS1, PS  
Sherri Rukes (@polychemgirl; sherri.rukes@d128.org), Libertyville High School, Libertyville, IL

Deepen your students’ STEM experience by adding various polymer inquiry/engineering design challenges. Take “traditionally fun” polymer activities and turn them into NGSS investigations to create more critical thinkers in the classroom.

**Pseudoscience and Scientific Literacy: Teaching Students How to Apply Scientific Literacy and Fight Back Against Pseudoscience**  
(Grades 6–College)  
Maryland 1/2, Convention Center  
Science Focus: GEN  
Katie Busch, The University of Alabama at Birmingham

Engage in field-tested hands-on activities that teach students to think critically and discern between real and pseudoscience. Handouts and giveaways.

**Using the 5E Instructional Model to Develop a Conceptual Flow (Five Tools Session #3)**  
(Grades K–12)  
Woodrow Wilson B, Convention Center  
Science Focus: GEN, NGSS  
Cindy Gay (@CindyGay; cindyjgay@gmail.com), BSCS, Colorado Springs, CO

Compare classroom scenarios to learn the different phases of the BSCS 5E Instructional Model to plan for NGSS learning sequences.
NSTA Press® Session: Argument-Driven Inquiry in Grades 3–5
(Grades 3–5) Woodrow Wilson D, Convention Center
Science Focus: PS2.B, CCC, SEP
Victor Sampson (@drvictorsampson; victor.sampson@utexas.edu), The University of Texas at Austin
Jonathon Grooms (@drjongrooms; jgrooms@gwu.edu), The George Washington University, Washington, DC
Receive an introduction to a new approach to science instruction called Argument-Driven Inquiry (ADI), which gives children in grades 3–5 an opportunity to learn how to use the core ideas, practices, and crosscutting concepts of science to make sense of natural phenomena. Discussion centers on the stages of the ADI instructional model, how it was designed, and how it meets the NGSS, CCSS-ELA, and CCSS-Mathematics.

3:30–4:30 PM Exhibitor Workshops
Protein Necklace: Harnessing the Glow of Jellyfish
(Grades 6–12) National Harbor 10, Convention Center
Science Focus: LS
Sponsor: Carolina Biological Supply Co.
Carolina Teaching Partner
Illuminate the dark corners of your students’ curiosity by teaching them about proteins. This simple three-dimensional classroom activity allows students to isolate the green fluorescent protein (GFP) found in jellyfish. Show them that protein science can be tangible and engaging but not overwhelming with this beginner’s activity.

NGSS—Energy: Are These Light Bulbs Heating Up Our Energy Bill?
(Grades 6–8) National Harbor 11, Convention Center
Sponsor: Lab-Aids, Inc.
Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, SC
Some devices are less efficient than others—how does this impact our home energy costs? Compare thermal energy transferred by two different bulbs types to calculate the efficiency. Consider “lifetime” costs and trade-offs when deciding which type to purchase.

Maryland Association of Science Teachers (MAST) Luncheon
(Ticket Required; purchase on emast.org)
Date: Friday, November 16, 12:30–2:00 PM
Ticket Price: $45
Join the Maryland Association of Science Teachers (MAST) to learn, network, and celebrate STEM with educators and leaders from across Maryland. This ticketed event includes a plated lunch, followed by presentation of MAST awards and remarks from Matt Krehbiel, director of Science at Achieve Inc. Matt Krehbiel joined Achieve in October 2015 as associate director of Science. In August 2017, he was promoted to director. Matt has a variety of responsibilities within the science team to further Achieve’s efforts to provide support to states and districts in implementation of the Next Generation Science Standards. He is specifically responsible for supporting and managing EQuIP for science and the PEEC-alignment tool.
Purchase any available tickets at www.emast.org/event-3070248.
How to Argue in an Elementary Science Class  
(Grades 3–5)  
National Harbor 12, Convention Center  
Science Focus: GEN  
Sponsor: ScienceFLEX & MakerSpace/School Specialty Science  
Mary Anne Feller, Sts. Peter and Paul Catholic School, Haubstadt, IN  
Help students develop scientific argumentation skills by making claims based on observable evidence. Put these skills into practice with lessons from ScienceFLEX, as we prove (or disprove) fundamental science concepts. Leave with readers, equipment, and a lesson you can try with your students next week.

Enhancing Chemistry Content Through an Online Master’s Degree in Chemistry  
(Grades 6–College)  
National Harbor 13, Convention Center  
Science Focus: PS  
Sponsor: South Dakota State University  
Matthew Miller (matt.miller@sdstate.edu), South Dakota State University, Brookings  
We will introduce you to our online master’s degree program. This program is designed to enhance teacher content knowledge in chemistry by focusing on topics pertinent to the high school teacher. We will also demonstrate a variety of safe demonstrations to illustrate topics taught in degree courses.

“Going with the Flow” of Genetic Information  
(Grades 9–College)  
National Harbor 14, Convention Center  
Science Focus: ETS1, LS1, LS3, CCC, SEP1, SEP2, SEP4, SEP5, SEP6  
Sponsor: MSOE Center for BioMolecular Modeling  
Gina Vogt (gina.vogt@3dmoleculardesigns.com), 3D Molecular Designs, Milwaukee, WI  
Tim Herman (herman@msoe.edu), MSOE Center for BioMolecular Modeling, Milwaukee, WI  
Guide your students in the development and use of models as tools for “making sense” of phenomena. Learn how to help your students “think with models” to explain the cellular processes of transcription and translation as they relate to a genome sequencing molecular story. Handouts!

Science and Engineering Practices in the NGSS  
(Grades 6–8)  
National Harbor 15, Convention Center  
Science Focus: GEN, SEP  
Sponsor: TCI  
Albert Bower, TCI, Mountain View, CA  
Join TCI and take part in an engaging Bring Science Alive! investigation that has your elementary students developing solutions and making sense of the natural and designed world. Participants will experience this lesson from the student perspective as they carry out investigations, build models, and learn skills to analyze and interpret data, develop solutions, and communicate their methods just like professional scientists and engineers!

Group Work: Using Student Collaboration in the Middle School Science Classroom  
(Grades 6–9)  
National Harbor 2, Convention Center  
Science Focus: GEN, NGSS  
Sponsor: AEOP  
Alexandra Wakely, eCYBERMISSION Outreach Specialist, NSTA, Arlington, VA  
The practices described in the NGSS involve students collectively making sense of the world around them by working in groups. Discussion centers on aspects of quality group work and how it can be beneficial to the middle school science class through the use of hands-on activities. Hear about eCYBERMISSION, the online STEM competition that gives students a chance to explore and solve problems using science and engineering and learn how you and your students can participate at no cost.

Are Increased Incidences of Infection the Result of Climate Change?  
(Grades 9–College)  
National Harbor 3, Convention Center  
Science Focus: ESS3, LS  
Sponsor: Bio-Rad Laboratories  
Sherri Andrews (sherri_andrews@bio-rad.com), Bio-Rad Laboratories, Hercules, CA  
Why does climate change matter to me? There have been increased reports of infections with symptoms such as gastroenteritis, bloody stools, fever, and dark blisters. Find out which suspected microbes are associated with this increase and why they may be more common as the average temperature on Earth increases.
Atomic Structure: Fun with Atoms, Ions, and Bonding Through Modeling  
(Grades 6–12) National Harbor 4, Convention Center  
Science Focus: PS1  
Sponsor: CPO Science/School Specialty Science  
Vincent Zaccardi, School Specialty Science, Naperville, IL  
Experience innovative activities to introduce atomic structure with the CPO Science Link Atom Building Game and Periodic Table Tiles. Collaborate in groups using hands-on equipment to break misconceptions about atomic models, explore why so many models are needed in chemistry, and identify the limitations of each.

Wave Properties and Information Technologies  
(Grades 6–8) National Harbor 5, Convention Center  
Science Focus: PS4  
Sponsor: Delta Education/School Specialty Science–FOSS  
Ann Moriarty, The Lawrence Hall of Science, University of California, Berkeley  
Engage in activities using lasers and optical fibers in the new FOSS Next Generation Waves Course for middle school. Explore the phenomena of refraction and reflection that allow information transfer by fiber-optic technology, and identify connections to the three dimensions of NGSS.

Zombie Apocalypse!  
(Grades 6–12) National Harbor 6, Convention Center  
Science Focus: LS  
Sponsor: Texas Instruments  
Jeffrey Lukens, Sioux Falls (TX) School District  
Be part of a zombie apocalypse! Learn about disease-spread modeling using simulations and fun storylines about a zombie outbreak. Applicable for middle school and high school, this workshop is sure to scare you and your little zombies with its exciting Hollywood themes used to engage students in learning science!

What’s in My Lunch? Using Biotechnology to Detect GMOs and Common Allergens  
(Grades 9–College) National Harbor 7, Convention Center  
Science Focus: LS  
Sponsor: Edvotek, Inc.  
Brian Ell, Edvotek Inc., Washington, DC  
Biotech got its first break with the domestication of animals and plants and the use of microorganisms to make cheese, bread, beer, and wine. We want to bring the field back to these rich roots with two of our most delectable experiments! Discover how to identify foods containing GMOs by separating amplified DNA using gel electrophoresis. Next, use the enzyme-linked immunosorbent assay (ELISA) to detect common food allergens.

5:00–5:30 PM Presentations  
No GMO? Know GMOs…Get the Scientific Facts About GMO Technology  
(Grades 8–College) Chesapeake C, Convention Center  
Michael Stebbins (@GMOAnswers; mstebbins@council-forbiotech.org), GMO Answers, Washington, DC  
There are a lot of misconceptions out there about GMOs. We know you have questions, and this session will provide answers.

See the World as a Citizen Scientist  
(Grades 5–9) Chesapeake H, Convention Center  
Science Focus: ESS3  
Candice Autry (cautry@sheridanschool.org), Sheridan School, Washington, DC  
When teachers take risks, students are motivated to follow. Learn about research opportunities in the U.S. and abroad to lead as a citizen scientist teacher.
5:00–6:00 PM  Presentations
The Challenges of Developing and Implementing Curricula for the NGSS (Grades 9–12)  Annapolis 3, Convention Center
Science Focus: GEN, NGSS
Tiffany Wendland (@BCPSSci; twendland@bcps.org) and Julie Damico (@BCPSSci; jdamico@bcps.org), Baltimore County Public Schools Office of Science, Towson, MD
Learn how Baltimore County developed and implemented high school NGSS-focused courses and engage in discussion about the process. Examples of curriculum resources will be shared.

Got Composition Books? How to Empower ALL Students Through the Use of Authentic Science Journals in Your Elementary Classroom (Grades K–5)  Azalea 2, Convention Center
Science Focus: GEN, SEP
Elizabeth Htwar (@techehtwar; ehtwar@hcpss.org), Waverly Elementary School, Ellicott City, MD
Jennifer Silbaugh (jmascaro@udel.edu), Manor Woods Elementary School, Ellicott City, MD
Discover how to leverage science journals as a tool for equity and student voice when teaching science and engineering practices in your K–5 classroom.

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www.nsta.org/conferenceapp
Teach Astronomy Kinesthetically, Using Direct Observations and Models  
(Grades 6–9) Baltimore 1, Convention Center  
Science Focus: ESS1.B, CCC1, CCC3, CCC4, SEP2, SEP4  
Carolyn Balch (EngagingScienceLabs@gmail.com), Author, Great Falls, VA  
We’ll start with direct observation of the daytime Moon. Based on our findings, we’ll determine its direction of revolution, location in space, and phases, before building models.

Exploring Life Sciences and Climate Change in Antarctica to Develop Scientifically Literate Global Citizens  
(Grades 9–12) Baltimore 2, Convention Center  
Lolita Kiorpes, North Point High School, Waldorf, MD  
Natalie Harr Ylizarde (ylizarde@umd.edu), University of Maryland, College Park  
Discover life science lessons focused on Antarctica, applying authentic data and scientific research. These lessons incorporate climate change models, lessons, and activities. Make climate science literacy relevant to today’s students.

Taking STEM Outside  
(Grades K–8) Baltimore 5, Convention Center  
Science Focus: ESS3, LS1, LS2, LS4  
Winny Tan (@MAEOE_MD; greenschools@maeoe.org) and Beth Decker (@MAEOE_MD; plt@maeoe.org), Maryland Association for Environmental and Outdoor Education, Columbia  
Discover how outdoor and placed-based science lessons can enhance students’ knowledge of trees, forests, and the real-world environment while hitting STEM benchmarks.

Strengthen STEM with Community Partnerships That Integrate Arts and Social Studies  
(Grades 4–12) Chesapeake A, Convention Center  
Science Focus: GEN, INF, NGSS  
June Teisan (jtleisan@gmail.com), Network of Michigan Educators, Grosse Pointe Woods  
John Smith (@jftrey; jjf.trey.smith@gmail.com), Northwestern University, Evanston, IL  
Community partnerships that integrate the arts, social studies, and STEM activate a wider range of student interests and connect the real world with the classroom.

Kinesthetic Chemistry: Get Your Students Up and Moving  
(Grades 10–12) Chesapeake B, Convention Center  
Science Focus: PS1, SEP2  
Cathy Zavacki (@czavacki; czavacki@htps.us) and Anjana Iyer (@Anjanalyer; aiyer@htps.us), Hillsborough High School, Hillsborough, NJ  
Movement makes learning more robust, increases memory, and keeps all students actively engaged. Let’s get out of our seats!

5:00–6:00 PM Hands-On Workshops  
Empower Student Inquiry with Primary Sources from the Library of Congress  
(Grades 3–12) Annapolis 2, Convention Center  
Science Focus: GEN, SEP1, SEP3, SEP7, SEP8  
Sherry Levitt (sherry@tpswa.org) and Cynthia Szwajkowski (cynthia@tpswa.org), Teaching with Primary Sources, Virginia, Vienna, VA  
Bring the rich digital repository of primary sources from the world’s largest library into your classroom and spark curiosity and investigation while promoting scientific literacy.

Say What? Getting Students to Learn and Use Scientific Vocabulary Words  
(Grades 6–College) Baltimore 3, Convention Center  
Science Focus: GEN, CCC6, SEP1, SEP7, SEP8  
Jonte’ Lee (@JACOB2523; jonerlee@gmail.com), Woodrow Wilson High School, Washington, DC  
Emphasis will be placed on five-minute daily strategies that will get students to become fluent in scientific vocabulary.
3-D Natural Selection
(Grades 9–12) Maryland 4, Convention Center
Science Focus: LS4, SEP4, CCC2, SEP7
Molly Malone and Louisa Stark, The University of Utah, Salt Lake City
Explore a curriculum module that guides students in interpreting published scientific data to learn about natural selection and write an evidence-based argument. Free at teach.genetics.utah.edu.

STEM and NGSS: Two Converging Paths
(Grades K–12) Woodrow Wilson B, Convention Center
Science Focus: GEN, NGSS
Wendy Binder (wbinder@nsta.org), SPIR Project Director, NSTA, Arlington, VA
Tricia Shelton (@TdiShelton; tshelton@nsta.org), Standards Implementation Specialist, NSTA, Arlington, VA
In what ways are NGSS and STEM initiatives in harmony with each other? We will explore the NGSS vision for a scientifically literate society and how this vision is mutually supportive of STEM education focusing on aspects of the designed world through the application of science and engineering practices.

NSTA Press® Session: Engage Your Students! Designing Meaningful STEM Lessons
(Grades 3–10) Woodrow Wilson D, Convention Center
Science Focus: ETS1, CCC4, SEP2, SEP6, SEP7
Jackie Speake Dwyer (@JackieSpeake; Jackie.Speake@DrScienceGeek.com), Learning Sciences International, Pittsburgh, PA
Calling all nerds and geeks! Learn how to StEMTify lessons through engineering design; constructivism; inquiry; the 5E instructional model; and claims, evidence, reasoning.

5:30–6:00 PM Presentation
Encouraging Young Females to Be WISE
(Grades 7–College) Chesapeake H, Convention Center
Science Focus: LS2.C, INF, CCC7, SEP3, SEP4, SEP8
Michael Bindis (michael.bindis@msj.edu), Mount St. Joseph University, Cincinnati, OH
Hear about a residential summer camp tied to state and national learning standards that was developed to encourage high school females to become scientists.
Starting Friday, November 16, the Garden Atrium at Gaylord National comes alive with Cirque Dreams Unwrapped. Performed on the atrium stage, Seasons Dreamings is a 25-minute holiday fable filled with dazzling displays of artistry and acrobatics. For more details, visit www.christmasonthepotomac.com. See page 13 for details on Show Your Badge special offers.
8:00–9:00 AM  Presentations

A Unique Ice Core Investigation That Integrates the Three Dimensions of NGSS and STEM
(Grades 7–College)  Annapolis 3, Convention Center
Donna Young (dlyoung.nso@gmail.com), NASA/NSO UO1 Coordinator, Bullhead City, AZ
Discover a multidisciplinary open-ended investigation that incorporates absolute and relative dating, anomalies, historical context, volcanoes, solar proton events, energy cycles, Earth systems, terrestrial events, and supernovas.

STEM Throughout Your Day
(Grades P–3)  Azalea 2, Convention Center
Science Focus: GEN, SEP
Valerie Patel (@valpatel; valerie_m_patel@mcpsmd.org), William B. Gibbs, Jr. Elementary School, Germantown, MD
How do you fit it all in? Come here for early childhood classroom examples on how to integrate STEM projects into an already jam-packed curriculum.

Advocating for Science Education
(General)  Baltimore 2, Convention Center
Science Focus: GEN
Jodi Peterson (@stemedadvocate; jpeterson@nsta.org), Assistant Executive Director, Legislative and Public Affairs, NSTA, Arlington, VA
Douglas Hodum (@DougHodum; dhodum@mtbluersd.org), Mt. Blue High School, Farmington, ME
All stakeholders in education do what they believe is best for students. As practitioners, though, we know what it is like to do the work with students and understand how decisions affect our work with those students. We will identify some of the pathways for you to find your teacher voice and engage in those important conversations. You can be involved while staying in the classroom.

Aerospace Exploration with U.S. Navy Engineers
(Grades 4–8)  Chesapeake A, Convention Center
Science Focus: ESS, ETS
Alexis Soffler (asoffler@cesjds.org), Charles E. Smith Jewish Day School, Rockville, MD
Eric Silberg (eric.silberg@navy.mil), Naval Surface Warfare Center, Carderock Division, Bethesda, MD
In this project, fourth graders collaborated with U.S. Navy aerospace engineers to build, fly, and test model seaplanes.

Cars: Science Lessons That DRIVE Science Concepts
(Grades 6–12)  Chesapeake B, Convention Center
Andrew Nydam (andrewnydam@hotmail.com), Polymer Ambassador, Olympia, WA
Receive an overview of the chemistry, science, and physics involved in the modern automobile. This is for the science teacher with limited knowledge of how a car works.

ASEE Session: Make and Code…Together
(Grades 5–8)  Chesapeake D, Convention Center
Science Focus: ETS, SEP5
Rocco Barletta (@rocco_barletta; rocco.barletta@qacps.org), Stevensville Middle School, Stevensville, MD
Get ready to pull your code off the screen and into the physical world. Learn about physical computing, collaborative coding benefits, and pair programming.

Teachers’ Perceptions of a STEM Professional Development Initiative in Primary Schools in Barbados
(Grades K–12)  Chesapeake H, Convention Center
Science Focus: GEN, NGSS
Rozanne Walrond, Erdiston Teachers’ Training College, Bridgetown, Barbados
Review findings from a study on science instructional practices employed within local primary schools in Barbados. The study sought to ascertain the effectiveness of an inquiry-based STEM professional development intervention (STR) and the extent to which it influenced primary school teachers’ beliefs, instructional practices, and, by extension, student achievement.

How to Locate, Map, and Process an Outdoor Crime Scene
(Grades 8–College)  Maryland 5, Convention Center
Science Focus: ETS1, SEPI, SEP3, SEP4, SEP5, SEP6, SEP7, SEP8
Anthony Bertino (abertino@nycap.rr.com), Retired Educator, Schenectady, NY
Patricia Nolan Bertino (nolanp@nycap.rr.com), Retired Educator, Schenectady, NY
How are crime scenes mapped and processed? How is evidence collected, documented, and photographed? Learn how to develop an activity for your students. Handouts.
8:00–9:00 AM  Hands-On Workshops

Explore Chemistry Beyond the Classroom with ChemClubs
(Grades 9–12)  Annapolis 1, Convention Center
Science Focus: PS, INF
Karen Kaleuati (k_kaleuati@acs.org), American Chemical Society, Washington, DC
The ACS ChemClub program provides free fun and educational materials! Learn about the program, try out a few activities, and take home some resources.

STEM in a Bag
(Grades K–8)  Annapolis 2, Convention Center
Science Focus: ETS
Ramona Richardson (richarrv@pwcs.edu), Coles Elementary School, Manassas, VA
Cathy McAuley (@CathyAnnMcaule1; mcauleca@pwcs.edu), Woodbridge Middle School, Woodbridge, VA
Start your enginEERS! Get your students’ neurons fired up with 20 STEM challenge ideas, each able to fit into a small paper lunch bag.

Local Ice Rinks Are a STEM Wonderland and Feature Newton’s Laws at Play—Year Round!
(Grades K–5)  Annapolis 4, Convention Center
Science Focus: ETS, PS
Chérie Farrington (cherie.farrington@thestjames.com), SportScience Fun, LLC, Reston, VA
Engineers have made the ride on ice far less bumpy and super fast! Discover a fun way for students to explore STEM vocabulary and concepts, such as inertia, flow, and viscosity with a real-life connection to their local ice rink.

Engineering Success! Exploring Engineering Practices in Your Elementary Classroom
(Grades 3–5)  Azalea 3, Convention Center
Science Focus: ETS1, SEP
Steven Bernhisel (steveb@linfield.edu), Linfield College, McMinnville, OR
Join me for a variety of inexpensive hands-on activities that are designed to help children gain a stronger understanding of concepts relating to engineering design.

Ocean Acidification and Maryland Oysters: Effects of Increasing Levels of Carbon Dioxide
(Grades 6–12)  Baltimore 4, Convention Center
Science Focus: ESS3, LS2, PS1, CCC2, CCC4, CCC6, SEP2, SEP3, SEP6
Mary Stapleton (@tuSTEMcenter; mkstapleton@towson.edu) and Kara Berger (@tuSTEMcenter; kberger@towson.edu), Towson University Center for STEM Excellence, Baltimore, MD
Engage your students in planning and carrying out investigations and constructing explanatory models as they answer the driving question: How will increasing levels of CO₂ affect oysters in Maryland? Join us for a hands-on exploration.

ACS High School Session One: Exploring the Nature and Properties of Ionic and Covalent Compounds—Composition, State, and Conductivity
(Grades 9–12)  Chesapeake E, Convention Center
Science Focus: PS, CCC, SEP
Kimberly Duncan (@chemduncan; kimberly.z.duncan@gmail.com), American Association of Chemistry Teachers, Washington, DC
Discover how to elicit and explore students’ initial ideas and models of chemical compounds by using engaging phenomena in relevant contexts. Learn also how to engage students in data analysis to allow them to build an understanding of the structure and properties of ionic and covalent compounds.

Global Solutions in a Classroom World
(Grades 6–9)  Chesapeake F, Convention Center
Science Focus: ETS1, SEP
Sarah Andres (andresb@nv.ccsd.net), Hyde Park Middle School, Las Vegas, NV
Emphasis will be placed on gaining an understanding of engineering design as it is applied to science topics and student engagement. Take-home ideas/materials will be shared.

ACS Middle Level Session: Solids, Liquids, Gases, and Changes of State
(Grades 6–8)  Maryland 1/2, Convention Center
Science Focus: PS1.A
James Kessler, American Chemical Society, Washington, DC
Explore solids, liquids, and changes of state through hands-on activities and molecular model animations from the free 5E lesson plans at middleschoolchemistry.com.
Constructing Science Models in the Elementary Classroom to Meet the NGSS  
(Grades K–5)  
Maryland 4, Convention Center  
Science Focus: GEN, NGSS  
Kevin Hill (khill@wcboe.org), Wicomico County Public Schools, Salisbury, MD  
Learn to construct and use a wide variety of models and simulations in the classroom to help develop explanations about natural phenomena to support the science and engineering practices.

(Grades 6–12)  
Maryland A, Convention Center  
Science Focus: ESS2  
Suzanna Ribblett (sribblett@mountdesales.org), Mount de Sales Academy, Catonsville, MD  
Michael Passow (mpassow@gmail.com), Retired Teacher, Englewood, NJ  
Candice Autry (cautry@sheridanschool.org), Sheridan School, Washington, DC  
Learn about a complex ocean-atmosphere interaction, El Niño Southern Oscillation (ENSO), and use hands-on materials to teach this topic with confidence. Receive materials to conduct this lesson in your own learning environment.

Using the 5E Instructional Model to Design Learning Sequences (Five Tools Session #4)  
(Grades K–12)  
Maryland B, Convention Center  
Science Focus: GEN, NGSS  
Cindy Gay (@CindyGay; cindyjgay@gmail.com), BSCS, Colorado Springs, CO  
Using the BSCS 5E Instructional Model, participants will design an NGSS learning sequence that integrates the three dimensions: disciplinary core ideas, practices, and crosscutting concepts.

CSSS-Sponsored Session: Designing and Using Equitable 3-D Formative Assessments to Support Meaningful NGSS Investigations  
(General)  
Maryland D, Convention Center  
Science Focus: GEN, NGSS  
Paul Adams (@peadams11; padams@fhsu.edu), Fort Hays State University, Hays, KS  
Richard Duschl (rad19@psu.edu), Penn State, University Park, PA  
Come examine samples of student responses and explore how to design cognitive assessments of three-dimensional learning and engage in sense-making to interpret student responses.

NSTA Press® Session: Picture-Perfect STEM Lessons—Using Children’s Books to Inspire STEM Learning  
(Grades K–5)  
Woodrow Wilson D, Convention Center  
Science Focus: GEN, NGSS  
Emily Morgan (@PPSLessons; emily@pictureperfectscience.com) and Karen Ansberry (karen@pictureperfectscience.com), Picture-Perfect Science, West Chester, OH  
Discover how picture books can inspire elementary STEM learning with the authors of the Picture-Perfect STEM series from NSTA Press.
Friday, 8:00–9:00 AM

8:00–9:00 AM  Exhibitor Workshops

Comparative Mammalian Organ Dissection with Carolina’s Perfect Solution® Specimens
(Grades 6–12)  National Harbor 10, Convention Center
Science Focus: LS
Sponsor: Carolina Biological Supply Co.
Carolina Teaching Partner
Show us your surgical skills while you experience the superior quality of Carolina’s Perfect Solution specimens. Dissect a cow eye and then your choice of a sheep brain, pig heart, or pig kidney. Use this excellent comparative dissection to gain a better understanding of these mammalian organs.

Cell Differentiation and Gene Expression
(Grades 9–12)  National Harbor 11, Convention Center
Science Focus: LS1.A, LS1.B, CCC1, CCC4, CCC6, SEP2, SEP6
Sponsor: Lab-Aids, Inc.
Caroline Franek, Bolingbrook High School, Bolingbrook, IL
Students often have trouble conceptualizing how selective gene expression works. We will use manipulatives to teach this concept and explain how it is connected to genetic engineering. Innovative activities are selected from the new Science and Global Issues: Biology program from SEPUP and Lab-Aids. Activities focus on ways to integrate selective gene expression as a relevant and engaging sustainability issue.

Motion Graphing: Connecting Math Concepts to Displacement, Speed, and Velocity
(Grades 9–12)  National Harbor 12, Convention Center
Science Focus: PS2.A, CCC4, SEP5
Sponsor: PASCO
Fran Zakutansky, Retired Educator, Montvale, NJ
Help your students make the connection between their math lessons on graphing and slope to the real world by studying the motion of objects. Join us for a hands-on workshop to engage students with a lab activity from PASCO’s Essential Physics curriculum using the amazing Smart Cart!

An HHMI Coral Collection: Human Impacts on Reefs
(Grades 9–College)  National Harbor 13, Convention Center
Sponsor: HHMI BioInteractive
Laura Dinerman (laura_dinerman@mcpsmd.org), Sherwood High School, Sandy Spring, MD
Use free resources from HHMI BioInteractive to teach about human impact on coral reefs. Environmental changes are tracked with real data and stunning animations in engaging hands-on activities followed by data analysis. A short video featuring coral restoration efforts wraps it up and inspires students to work toward positive change.

Determine the Genotype for PTC Taster Versus Non-Taster by Electrophoresis
(Grades 7–College)  National Harbor 14, Convention Center
Science Focus: LS3, CCC1, CCC2, SEP4
Sponsor: MiniOne Systems
Richard Chan (info@theminione.com), MiniOne Systems, San Diego, CA
Learn and get hands-on experience teaching Mendelian genetics and genotyping by doing electrophoresis. You will pour, load, and run a gel; capture a gel image; analyze the results; and correlate the ability to taste PTC phenotype to genotype. See how you can teach a hands-on molecular genetics lab in one classroom session.

Engineering Design in the NGSS
(Grades 6–8)  National Harbor 15, Convention Center
Science Focus: ETS1
Sponsor: TCI
Albert Bower, TCI, Mountain View, CA
Participants will be immersed in a Bring Science Alive! investigation designed to reach all learners and make engineering design fun and engaging. Experience this lesson from the student’s perspective as you take on the role of engineers defining problems, developing solutions, and testing to best solve the problem.

Flinn Favorite Biology Activities and Games
(Grades 9–12)  National Harbor 2, Convention Center
Science Focus: LS
Sponsor: Flinn Scientific, Inc.
Mike Marvel, Flinn Scientific, Inc., Batavia, IL
Students learn better and faster when they are actively involved in hands-on activities that are not only fun, but also create learning opportunities along the way. We will share
some inquiry-based labs, interactive demonstrations, and collaborative games you can use to motivate your students.

**Forensic DNA Fingerprinting Plus Engineering on a Budget**  
*(Grades 9–College)*  
**National Harbor 3, Convention Center**  
Science Focus: ETS, LS  
Sponsor: Bio-Rad Laboratories  
**Sherri Andrews** (sherri_andrews@bio-rad.com), Bio-Rad Laboratories, Hercules, CA  
Crime scene DNA recovered, suspects identified, a mystery to solve— it’s a job for your students. From pieces to prototype, have your students design, build, and use working electrophoresis units to solve the crime. Learn to make an engaging DNA fingerprinting lesson both engineering-based and cheaper in this hands-on workshop.

**Demystifying 3-D, the NGSS, and STEM Literacy Through the Phenomenon of Earthquakes**  
*(Grades 3–10)*  
**National Harbor 4, Convention Center**  
Science Focus: ESS3.B, PS4, CCC1  
Sponsor: STEMscopes  
**Terry Talley** (drttalley@comcast.net), STEMscopes, Galveston, TX  
Join us as we demystify STEM, NGSS, 3-D, and the 5E model. We will be creating and using models of waves, seeing patterns through simulations, and designing authentic and engaging solutions in this study of the phenomenon of earthquakes.

**EarthComm: A Project-Based Earth and Space Systems Science Program Developed by the American Geosciences Institute**  
*(Grades 9–12)*  
**National Harbor 5, Convention Center**  
Science Focus: ESS  
Sponsor: Activate Learning  
**Gary Curts**, Activate Learning, Greenwich, CT  
Recent developments and the increasing societal importance of Earth-related issues have created a need for understanding Earth systems. See how the American Geosciences Institute’s new edition of *EarthComm* and its project-based Earth systems approach can help educators implement the practices and goals of the NGSS.

**Assessment for Learning in the Age of NGSS: Revealing Student Thinking and Taking Action**  
*(Grades K–8)*  
**National Harbor 6, Convention Center**  
Science Focus: GEN, NGSS  
Sponsor: Amplify  
**Sophia Lambertsen** and **Rebecca Abbott**, The Lawrence Hall of Science, University of California, Berkeley  
Explore the formative assessment system for Amplify Science, which is designed to help teachers monitor and support students’ three-dimensional learning by providing timely, actionable, and credible information to teachers and suggesting specific instructional responses tailored to that information.

**Integrating Chromebook with Vernier Data-Collection Technology**  
*(Grades 3–College)*  
**National Harbor 7, Convention Center**  
Science Focus: ETS, PS  
Sponsor: Vernier Software & Technology  
**David Carter**, Vernier Software & Technology, Beaverton, OR  
Collecting and analyzing data help students learn critical science concepts that increase test scores and promote science inquiry. Learn how Vernier supports teachers who use Chromebook devices in their classrooms. Experiments such as “Boyle’s Law,” “Grip Strength Comparison,” and “Ball Toss” will be conducted.

**DNA Glow Lab: A New Way to Investigate DNA Structure**  
*(Grades 6–College)*  
**National Harbor 8, Convention Center**  
Science Focus: LS1, LS3, SEP  
Sponsor: miniPCR  
**Emily Gleason** (emily@minipcr.com), miniPCR, Cambridge, MA  
Discover a completely new approach to studying DNA in the classroom. Have your students directly investigate how factors like temperature, pH, and genetic sequence affect DNA structure. Go beyond building paper and candy models; use modern biotechnology techniques to introduce an authentic lab component to your DNA unit. And it glows!
8:00–10:00 AM  Presentation
AMSE-Sponsored Session: George W. Carver Conversation Series on Diversity and Equity
(Grades 6—College) Chesapeake C, Convention Center
Science Focus: GEN, SEP
Deb Morrison (@educatordeb; educator.deb@gmail.com), University of Washington, Seattle
Lovelle Ruggiero (lovelleruggiero@mac.com), Consultant/Content Specialist, New Rochelle, NY
Natacia Campbell (@NataciaCampbell; ncampbell@joliet86.org), Joliet (IL) Public Schools District 86
Honoring the life of George Washington Carver, join AMSE in conjunction with the Multicultural/Equity Committee of NSTA as we dialogue to create action plans to incorporate equitable opportunities for ALL students in science.

8:00–11:00 AM  Short Course
Academic Vocabulary Through Engaging Phenomena (SC-1)
(Grades 3–5) Tickets Required; $17 Maryland 3, Conv. Center
Science Focus: LS4.C, CCC1, CCC2, SEP6, SEP7
Kate Gallagher (@Cat5Kate; kate.gal56@gmail.com), RISE Community School, Berkeley, CA
Joanna Totino (jtotino@berkeley.edu), California Science Project, University of California, Berkeley
For description, see page 30.

9:30–10:00 AM  Presentation
Students’ Culture + NGSS = Science Success
(Grades 6–8) Annapolis 3, Convention Center
Science Focus: LS1.A, PS1.A, CCC6, SEP2
Jomo Mutegi (@JomoMutegi; jmuteji@iupui.edu), Indiana University–Purdue University Indianapolis
Vanessa Gee (vangee91@gmail.com), Eastwood Middle School, Indianapolis, IN
Discussion centers on methods for pairing middle school students’ cultural background with the NGSS three dimensions to effectively engage them in science learning.

9:30–10:30 AM  Presentations
NSELA-Sponsored Session: NSELA Tools for Leaders I
(General) Annapolis 1, Convention Center
Science Focus: GEN
Missi Zender-Sakach (missisz@summitesc.org), Summit Educational Service Center, Cuyahoga Falls, OH
The National Science Education Leadership Association’s “Tools for Leaders” session provides an opportunity to learn about NSELA’s initiatives to “Advocate, Communicate, and Educate.”

Science and Literacy in the K–5 Classroom
(Grades P–5) Azalea 2, Convention Center
Science Focus: GEN
Leisa Clark, Assistant Executive Director, e-Products, NSTA, Arlington, VA
Engage your K–5 students in science and literacy through interactive e-books. This session showcases how interactive e-books, along with hands-on activities, can meaningfully engage students in learning science, English language arts, and mathematics.
Developing a Self-Directed Classroom for Middle School Science
(Grades 6–9) Chesapeake A, Convention Center
Science Focus: GEN
Carolyn Balch (EngagingScienceLabs@gmail.com), Author, Great Falls, VA
Imagine doing daily labs without going crazy. We will discuss the highlights of setting up a self-directed middle school science classroom.

Becoming a Scientifically Literate Leader of Tomorrow...Today
(Grades 5–College) Chesapeake B, Convention Center
Science Focus: GEN, INF
Indira Sukhraj (isukhraj@floridapoly.edu), FIPR Institute of Florida Polytechnic University, Bartow
What would your students do if they knew they couldn’t be wrong? This hands-on presentation with raffle will guide you through several scenarios that create environments that will engage students and connect them to the world around them from the classroom to careers.

Integrating STEAM into the NGSS Curriculum for Middle School and High School Classrooms
(Grades 6–12) Chesapeake F, Convention Center
Science Focus: GEN, SEP1, SEP3, SEP4, SEP6, SEP7, SEP8
Helen Dwyer (hdwyer@ccboe.com), St. Charles High School, Waldorf, MD
Amy Vanden Berg (avandenberg@ccboe.com), Milton M. Somers Middle School, La Plata, MD
Learn how to integrate STEAM activities into your classroom in order to enhance your NGSS curriculum and improve student engagement.

INF
Integrating Nonformal Education Practices into Teacher Preparation to Promote Teacher Efficacy in Science
(Grades 6–8/College) Chesapeake G, Convention Center
Science Focus: LS2, INF, CCC4, CCC6, CCC7
Sarah Haines (shaines@towson.edu) and Chelsea McClure (chelseamcclure@aol.com), Towson University, Towson, MD
Come learn about a partnership between a university teacher preparation program and the National Aquarium that allowed preservice teachers and middle level students to experience watershed science in a nonformal setting.

Using Real-World Data to Increase Ocean Literacy: Opportunities via the AMS Education Program
(General) Chesapeake H, Convention Center
Wendy Abshire (@AMSexeducation; wabshire@ametsoc.org), American Meteorological Society, Washington, DC
Presider: Elizabeth Mills (mills@ametsoc.org), American Meteorological Society, Washington, DC
Boost Earth science knowledge through AMS professional development opportunities. We’ll share information on summer workshops and semester-length courses full of real-world data for exploring weather, water, and climate science.

NARST-Sponsored Session: Using Watershed Modeling and Probeware to Teach Environmental Sustainability
(Grades 5–College) Maryland 4, Convention Center
Science Focus: ESS, SEP
Nanette Marcum-Dietrich (ndietrich@millersville.edu), Millersville University, Millersville, PA
Steve Kerlin (skerlin@stroudcenter.org), Stroud Water Research Center, Avondale, PA
Learn to explore, investigate, and design solutions for your local watershed problems using student-collected data and easy-to-use computer run-off models.

Polymers: Teaching “Hard” Concepts with Gooey Labs
(Grades 5–12) Maryland 5, Convention Center
Science Focus: PS, CCC, SEP1, SEP2, SEP3, SEP4, SEP5, SEP6
Andrew Nydam (andrewnydam@hotmail.com), Polymer Ambassador, Olympia, WA
Enhance and deepen science and math concepts taught in traditionally “fun” polymer labs. Add more scientific processes to make them inquiry based. Take home a CD of information.
9:30–10:30 AM  Hands-On Workshops

Breaking Down the Three Dimensions: Dissecting and Modeling NGSS-Based Lessons for Grades 6–8
(Grades 6–8)  Annapolis 2, Convention Center
Science Focus: GEN, NGSS
Rebecca Ellis (@LadyRebeckatha; rlellis@carrollk12.org) and Amy Levine (amelvin@carrollk12.org), Sykesville Middle School, Sykesville, MD
Dissect completed three-dimensional lessons written to NGSS performance expectations for grades 6–8, in order to identify and apply each of the dimensions.

The World “Deer” to Us
(Grades 6–8)  Annapolis 4, Convention Center
Ruth Gallagher (@RNatureGal; ruth_gallagher@hcpss.org), Howard County Public School System, Columbia, MD
Jennifer Furman-Berger, Hammond Middle School, Laurel, MD
Explore how a local school system and nature center partner to create NGSS-focused investigations related to the white-tailed deer’s interminable impact on our environment.

Let’s Get Wet—Wind, Water, and Weather for Grades PreK–3
(Grades P–3)  Azalea 1, Convention Center
Science Focus: ESS
Ruth Ruud (ruudruth61@gmail.com), Cleveland State University, Cleveland, OH
Juliana Texley (texlelj@gmail.com), 2014–2015 NSTA President, and Central Michigan University, Alpena
Don’t look now, but the CCSS asks that you teach Earth sciences as early as kindergarten, and the NGSS have specific goals for early primary. No more procrastinating! The good news is that you have your equipment. Come get easy activities, lit basics, and basic teacher background so that you can start right away!

STEAM from the Street
(Grades 6–12)  Azalea 3, Convention Center
Science Focus: GEN, NGSS
Judith Lederman (ledermanj@iit.edu) and Katie Rupe (katiemrupe@gmail.com), Illinois Institute of Technology, Chicago
Scientifically literate students should recognize the presence, importance, and impact of science in their daily lives. This session will engage participants in activities that help students to become more aware of the surprising places people are using STEAM concepts daily.

Citizen Scientist...It’s Easy When You Know the Three Keys
(Grades 3–12)  Baltimore 3, Convention Center
Science Focus: GEN, INF, NGSS
Judith Lucas-Odom (@Judith_Odom; judyps23@yahoo.com), Chester High School, Chester, PA
Get involved in activities that will encourage your students to design, administer, and share their citizen scientist projects. Leave with working models and research data to help jump-start student citizen projects.

Analyzing Hazards and Risks in High School Chemistry Labs
(Grades 9–12)  Baltimore 4, Convention Center
Science Focus: PS, SEP3
Marta Gmurczyk (m.gmurczyk@gmail.com), American Chemical Society, Washington, DC
Jennifer Bishoff (jlbishoff@frostburg.edu), Frostburg State University, Frostburg, MD
The American Chemical Society has produced Guidelines for Chemical Laboratory Safety in Secondary Schools. The guidelines also outline a protocol, designated by the acronym RAMP, for designing and writing improved safety procedures for chemistry experiments. We will explore examples and applications of the four principles of safety: Recognize the hazard; Analyze the risk of the hazard; Mitigate the risk; and Prepare for emergencies, as well as show examples for integrating RAMP into lab activities.

CSSS-Sponsored Session: Designing and Using Equitable Three-Dimensional Formative Assessments to Support Meaningful NGSS Investigations
(General)  Baltimore 5, Convention Center
Science Focus: GEN, NGSS
Michael Heinz (michael.heinz@doe.nj.gov), New Jersey Dept. of Education, Trenton
Come examine samples of student responses and explore how to design cognitive assessments of three-dimensional learning and engage in sense-making to interpret student responses.
ASEE Session: Progressions of Learning in Engineering for High School Students—A Culturally Situated Experience
(Grades 9–12) Chesapeake D, Convention Center
Science Focus: ETS1
Jamie Gurganus (@AEEngEdu; jgurganus@umbc.edu), University of Maryland, Baltimore County, Baltimore
Michael Grubbs (mgrubbs@bcps.org), Baltimore County Public Schools, Towson, MD
Explore background and activities of the Advancing Excellence in PreK–12 Engineering Education (AEEE) project. Specifically, we will cover taxonomy of concepts for secondary engineering and progression of learning in framework for engineering literacy.

ACS High School Session Two: Constructing Science Ideas About Ionic Bond Strength—Solubility and Melting Point
(Grades 9–12) Chesapeake E, Convention Center
Science Focus: PS, CCC, SEP
Kimberly Duncan (@chemduncan; kemberly.z.duncan@gmail.com), American Association of Chemistry Teachers, Washington, DC
Experience strategies for engaging students in analyzing and interpreting data to discover the structural factors that affect the solubility and melting point of ionic compounds. Explore how to help students use their findings to revise their original models and create solutions to relevant problems in the surrounding world.

ACS Middle Level Session: The Water Molecule and Dissolving
(Grades 6–8) Maryland 1/2, Convention Center
Science Focus: PS1.A
James Kessler, American Chemical Society, Washington, DC
Explore the characteristics of the water molecule and the process of dissolving through hands-on activities and molecular animations from the free 5E lesson plans at middleschoolchemistry.com.

Using Evidence of Learning Specifications to Develop Performance Tasks (Five Tools Session #5)
(Grades K–12) Maryland B, Convention Center
Science Focus: GEN, NGSS
Cindy Gay (@CindyGay; cindyjgay@gmail.com), BSCS, Colorado Springs, CO
Use a tool to engage in a process to create assessments that meet performance expectations based on task specifications.

NSTA Press® Session: Argument-Driven Inquiry in Biology, Chemistry, and Physics: Lab Investigations for Grades 9–12
(Grades 9–12) Chesapeake K/L, Convention Center
Science Focus: ESS, LS, PS1.B, CCC, SEP
Victor Sampson (@drvictorsampson; victor.sampson@utexas.edu), The University of Texas at Austin
Jonathon Grooms (@drjongrooms; jgrooms@gwu.edu), The George Washington University, Washington, DC
Learn about Argument-Driven Inquiry and how it can help students learn to use disciplinary core ideas, crosscutting concepts, and science and engineering practices to explain natural phenomena.

NSTA Press® Session: Eureka! Grades K–2 and 3–5 Science Activities and Stories
(Grades K–5) Woodrow Wilson D, Convention Center
Science Focus: PS2.A, SEP1, SEP5
Julie Thomas (julie.thomas@unl.edu), University of Nebraska–Lincoln
Take part in lessons linking nonfiction historical trade books and science content from the Eureka! series for grades K–2 and 3–5.
9:30–10:30 AM  Exhibitor Workshops

Solve the Mystery of the Beads in a Bottle
(Grades 6–12)  National Harbor 10, Convention Center
Science Focus: PS1
Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner
Make sense of density with the Smithsonian’s STCMS™ Matter and Its Interactions unit. Experience three-dimensional learning with this unit that uses a density phenomenon at its core. Leave with a better understanding of how student-planned investigations enhance their understanding.

Photosynthesis and Respiration Shuffle
(Grades 9–12)  National Harbor 11, Convention Center
Sponsor: Lab-Aids, Inc.
Caroline Franek, Bolingbrook High School, Bolingbrook, IL
Students have major misconceptions about photosynthesis and cellular respiration, but this content is essential for understanding how matter and energy flows, both at the micro (cellular) and macro (ecosystem) levels. Using a computer simulation, a hands-on activity, and notebooking and discussion strategies, expose student thinking—all from SEPUP’s new Science and Global Issues: Biology program from Lab-Aids.

Data Collection and Simulations to Help Take the Pressure Out of Understanding Gas Laws
(Grades 9–12)  National Harbor 12, Convention Center
Science Focus: PS1.A, CCC1, SEP3
Sponsor: PASCO
Fran Zakutansky, Retired Educator, Montvale, NJ
Help students understand gas laws by integrating real-life phenomena, data collection, and virtual simulations in this hands-on workshop from PASCO. Engage students with a relatable activity and then collect and analyze quantitative data using the Wireless Pressure sensor and SPARKvue software. Interactives from Essential Chemistry help students develop the mental models of gas particles that truly explain bulk-scale gas properties.

Become an Infectious Disease Detective with HHMI BioInteractive
(Grades 9–College)  National Harbor 13, Convention Center
Science Focus: LS3, LS4, CCC1, SEP4, SEP8
Sponsor: HHMI BioInteractive
Sarah Sechrist (slsechrist@bcps.k12.md.us), Carver Vocational-Technical High School, Baltimore, MD
Engage students and combat misconceptions with BioInteractive’s free infectious disease resources. Participants act as Ebola “disease detectives,” gathering background information using the Virus Explorer Click & Learn and analyzing Ebola sequences to determine the evolution of the virus during the 2014 outbreak. Participants are encouraged to bring laptops or tablets.

DNA Forensics Solves the Murder Mystery of Dr. Ward
(Grades 6–12)  National Harbor 14, Convention Center
Science Focus: LS3, CCC1, CCC2, SEP3, SEP4, SEP7
Sponsor: MiniOne Systems
Richard Chan (info@theminione.com), MiniOne Systems, San Diego, CA
Students analyze hair, fingerprint, and DNA evidences from the crime scene to determine who is the killer in this mini-lab. Learn how to get your students to pour, load, and run a gel; capture a gel image; and analyze the results using electrophoresis to perform DNA analysis for forensics.

Stream Ecology: Slimy Leaves for Healthy Streams
(Grades 4–College)  National Harbor 15, Convention Center
Science Focus: LS, SEP3, SEP4, SEP5, SEP8
Sponsor: LaMotte Co.
Tara Muenz, Stroud Water Research Center, Avondale, PA
Observe aquatic macroinvertebrate specimens, conduct experiments, learn classification skills, and calculate a biotic index in this hands-on introduction to stream ecology. Come learn from a Stroud Water Research Scientist. Takeaways and door prize.

Flipping AP Biology with FlinnPrep
(Grades 10–11)  National Harbor 2, Convention Center
Science Focus: LS
Sponsor: Flinn Scientific, Inc.
Mike Marvel, Flinn Scientific, Inc., Batavia, IL
Flipping your AP Biology class can help create an engaging and active classroom, focused on mastering the science practices. Learn how FlinnPREP™, a supplemental digital curriculum with assessment solution, can ease your transition by providing video, images, and written content in a condensed
Think Like an Engineer in Your Biology Class  
(Grades 9-College) National Harbor 3, Convention Center  
Science Focus: LS, SEP  
Sponsor: Bio-Rad Laboratories  
Sherri Andrews (sherri_andrews@bio-rad.com), Bio-Rad Laboratories, Hercules, CA  
Incorporate NGSS science and engineering practices into your biology class by engaging students to define the problem of world hunger. Considering constraints, students will design a treatment plan (solution) for protein-energy malnutrition, in the form of an evidence-based argument.

Demystifying 3-D, the NGSS, and STEM Literacy Using the Phenomenon of Light  
(Grades 3-9) National Harbor 4, Convention Center  
Sponsor: STEMscopes  
Terry Talley (drttalley@comcast.net), STEMscopes, Galveston, TX  
Join us as we look at a new approach to engage students in reading, writing, and using math to describe phenomena in collaborative learning groups. Learn ways to guide students toward mastery and high achievement in NGSS and three-dimensional learning.

Building a Rigorous and Equitable Discourse Culture  
(Grades 6-8) National Harbor 5, Convention Center  
Science Focus: GEN, NGSS  
Sponsor: Activate Learning  
Heather Milo, Activate Learning, Greenwich, CT  
The NGSS requires us to guide and assess student participation in the sociocultural aspects of our classrooms just as much as we guide and assess the content, but how do we begin to make that shift with students? We will use the phenomenon-based middle school curriculum Investigating and Questioning Our World through Science and Technology (IQWST®) to gain strategies that can be implemented in any science classroom!
9:30–11:30 AM  Featured Presentation
Seven Touches to Enlightenment
(General)  Maryland C, Convention Center
Science Focus: GEN

Ned Tillman (@nedtillman; ned@sustainable.us), Author, Speaker, and Sustainability Advisor, Columbia, MD
Presider: Alicia Shaw, Strand Leader, NSTA National Harbor Area Conference, and District of Columbia Public Schools, Washington, DC

Ned’s talk will focus on his successes in changing the behaviors of students, school systems, businesses, and governments so we all can learn to live in balance and co-evolve with the rest of the natural world. He will present his Seven Wonders of the Mid-Atlantic Region and the role “a sense of place” has in science education.

Attendees can sign up to meet one-on-one with Ned following his one-hour presentation in order to share ideas, explore opportunities to collaborate, or to learn more about his strategies. Sign up at the MAST Booth or at the end of his one-hour talk. Ned will be giving away 50 copies of his latest book, The Big Melt, to teachers interested in finding better ways for communicating climate change issues. Anyone who cannot attend can reach Ned at ned@sustainable.us or www.savingtheplaces.com.

Ned Tillman is a tireless advocate and strong voice in support of sustainability, with special emphasis on watershed restoration and land preservation. An accomplished environmental scientist and lifelong outdoorsman, his mantra is strength through organization. For 27 years, he provided energy and environmental consulting services to governments and corporations worldwide. Now he applies those skills to give others the tools to save the waters, forests, and land they love.

Ned has authored several books, including The Chesapeake Watershed: A Sense of Place and a Call to Action and Saving The Places We Love, Paths to Environmental Stewardship. More information about his sustainability campaign is available at www.savingtheplaces.com.

10:00–10:30 AM  Presentation
ASTE-Sponsored Session: Science Leaders Unite! Exploring and Defining Science Teacher Leadership
(General)  Chesapeake I, Convention Center
Science Focus: GEN
Jennifer Mayo (@spacegirljenn), Portland (OR) Public Schools
Science teacher leaders of all types are invited to explore and describe science teacher leadership. Participants will connect with fellow science leaders and actively contribute to current research.

11:00–11:30 AM  Presentation
Insect Inspection: Developing Science Practices Through Field Investigations
(Grades K–2)  Baltimore 2, Convention Center
Marc LeFebre (@ProjectWILD; mlefebre@fishwildlife.org), Council for Environmental Education, Austin, TX
Elena Takaki (@ProjectWILD; etakaki@fishwildlife.org), Association of Fish & Wildlife Agencies, Washington, DC

Student-centered field investigations are ideal for bringing early elementary learners outside, connecting them to nature, and providing opportunities for development of science skills and knowledge.

11:00 AM–12 Noon  Presentations
NSELA-Sponsored Session: NSELA Tools for Leaders II
(General)  Annapolis 1, Convention Center
Science Focus: GEN
Missi Zender-Sakach (missiz@summitesc.org), Summit Educational Service Center, Cuyahoga Falls, OH
The National Science Education Leadership Association’s “Tools for Leaders” session provides an opportunity to learn about NSELA’s initiatives to “Advocate, Communicate, and Educate.”

NSELA-Sponsored Session: NSELA Tools for Leaders II
(Grades K–8)  Annapolis 3, Convention Center
Science Focus: GEN
Krystal Rodney (@Krystal_Rodney) and Elisa Alexander (@elisateaches; elalexander@fcps.edu), Fairfax County Public Schools, Fairfax, VA
Discussion centers on why girls’ and minorities’ interest in science declines throughout their educational careers. Leave with strategies to combat this.
Unlocking the Code: A Model for Schoolwide Coding Implementation  
(Grades P–6) Azalea 2, Convention Center  
Science Focus: GEN, SEP5  
Sarah Allen (@msallenteaches; sallen@indiancreekschool.org) and Ab Bear (abe@indiancreekschool.org), Indian Creek School, Crownsville, MD  
Come join us as we show you how we successfully implemented a whole school (preK–6) coding initiative. Strategies and examples will be shared. Walk away with a usable model to get all students and teachers coding!

NGSS Professional Learning: An Innovative Approach  
(Grades 6–12) Chesapeake A, Convention Center  
Science Focus: GEN, NGSS  
Linda Mosser (@FCPSteachsc; linda.mosser@fcps.org) and Colleen Beall (@ColleenScience; colleen.beall@fcps.org), Frederick County Public Schools, Frederick, MD  
Explore NGSS professional learning with myriad approaches, including after-school learning communities, online learning, book studies, and differentiated face-to-face opportunities.

Applying Forensic Sand and Soil Analysis in Crime Scene Investigations (Forensics, Earth Science, History, and Technology)  
(Grades 8–College) Chesapeake B, Convention Center  
Science Focus: ESS2.D, ETS1, ETS2.B, SEP1, SEP3, SEP4, SEP5, SEP6, SEP7, SEP8  
Anthony Bertino (abertino@nycap.rr.com), Retired Educator, Schenectady, NY  
Patricia Nolan Bertino (nolasp@nycap.rr.com), Retired Educator, Schenectady, NY  
Why do we need to know this? Solve crimes comparing/contrasting sand and soil: minerals/chemical composition, size, soil profiles. We will cover Romanovs gravesite, Japanese Paper Bombs, and drug routes. Handouts.

Preparing Preservice Teachers to Teach Elementary School Science  
(College) Chesapeake G, Convention Center  
Science Focus: GEN  
Amy Lewis (amy.lewis@gse.rutgers.edu), Rutgers University, New Brunswick, NJ  
Review findings from a study conducted to examine what happens when a teacher preparation science methods course is co-taught by a physics expert and an elementary school methods expert in an attempt to merge the teaching of science content and pedagogies for teaching elementary school science.

NSTA Press® Session: Teaching for Conceptual Understanding  
(General) Chesapeake H, Convention Center  
Science Focus: GEN  
Richard Konicek-Moran (rkonicek@gmail.com), Professor Emeritus, UMass Amherst, MA  
Page Keeley (@CTSKeeley; pagekeeley@gmail.com), 2008–2009 NSTA President, and The Keeley Group, Fort Myers, FL  
Explore what it really means to teach science for conceptual understanding and leave with new strategies and ways of thinking about teaching and learning.

Promoting Girls in STEM  
(Grades 3–5/9–12) Maryland 5, Convention Center  
Science Focus: ETS, SEP5, SEP8  
Thomas Michocki (@TMichocki; tmichocki@bcps.org) and Kimberly Burton-Regulski (@kburton; kburton@bcps.org), Eastern Technical High School, Essex, MD  
Hear about a collaborative effort to promote interest for girls in STEM fields between a group of high school students and a group of elementary school students. This project was a Teach2Lead Summit proposal, which also addresses coding and literacy.
11:00 AM–12 Noon  Hands-On Workshops
From Harmony to Humpbacks: Using Technology to Study Sound and Music
(Grades 5–9)  Annapolis 2, Convention Center
Science Focus: ETS, PS4
Juliana Texley (texlelj@gmail.com), 2014–2015 NSTA President, and Central Michigan University, Alpena
From sea to shore, Earth music abounds. Study waves, sound, the science of acoustics, and the communications of whales with simple but high-tech investigations.

Yes, They Can! Strategies for Science Instruction for ELLs in the Early Years
(Grades P–3)  Azalea 1, Convention Center
Science Focus: GEN, CCC1, CCC6
May Lee (mhl11@psu.edu), Penn State, University Park, PA
Jennifer Cody (jlc479@psu.edu), Park Forest Elementary School, State College, PA
Marisa Lagana (loganam@hasdk12.org) and Austin Smith (smitha02@hasdk12.org), Arthur Street Elementary School, Hazleton, PA
Explore ways to meet English language learners’ literacy needs in early grades via a science content storyline with 3-D–focused investigations.

Easy Modeling Techniques for a Life Science Classroom
(Grades 9–12)  Baltimore 4, Convention Center
Science Focus: LS1, LS2, SEP
Christine Lesh (@lesh_chris; cllesh@carrollk12.org), Winters Mill High School, Westminster, MD
Modeling complex processes can be easy and economical. Students can gain confidence using models with the intent to develop the skills needed to design their own models using economical materials to represent molecules and structures.

Developing Early Childhood and Elementary School Teachers’ Science Knowledge Through Connected Learning
(Grades P–2)  Baltimore 5, Convention Center
Science Focus: PS2, PS3
Tami Mount (tamiwmount@icloud.com), PBS Education, Larchmont, NY
Jeanne Paratore (@parato@bu.edu), Boston University, Boston, MA
Engage children fully in important science literacy content from PBS KIDS. Analyze resources for learning opportunities and get hands-on experience with thematic video and games.

ASEE Session: Engineering and STEM in the Elementary Classroom
(Grades K–4)  Chesapeake D, Convention Center
Science Focus: ETS1
Karen Parisi (kparisi@umbc.edu) and Jamie Gurganus (jjgurganus@umbc.edu), University of Maryland, Baltimore County, Baltimore
Delve deeply into the world of engineering and STEM in the elementary classroom with hands-on, age-appropriate activities that kids will love!

ACS High School Session Three: Interparticle Forces in Covalent Compounds—Melting Point, Viscosity, and Vapor Pressure
(Grades 9–12)  Chesapeake E, Convention Center
Science Focus: PS, CCC, SEP
Kimberly Duncan (@chemduncan; kimberly.z.duncan@gmail.com), American Association of Chemistry Teachers, Washington, DC
Experience strategies for engaging students in analyzing and interpreting data to discover the structural factors that affect the solubility and melting point of ionic compounds. Explore how to help students use their findings to revise their original models and create solutions to relevant problems in the surrounding world.

Decoding Starlight—From Photons to Pixels to Images—Using Science and Art
(Grades 7–12)  Chesapeake F, Convention Center
Pamela Perry (pperry@lewistonpublicschools.org), Lewiston High School, Lewiston, ME
Donna Young (dlyoung.nso@gmail.com), NASA/NSO UoL Coordinator, Bullhead City, AZ
Produce a photon-intensity image of a supernova remnant using NASA X-ray data and then convert the image into a public release image in this STEAM activity.
Strengthening Science Reasoning and Language for All Students Through Active 3-D Learning
(Grades 3–8) Chesapeake K/L, Convention Center
Science Focus: GEN, SEP
Rita MacDonald (rmacdonald@wisc.edu), Wisconsin Center for Education Research, Madison
David Crowther (@Dtcrowther; dcrowther@nsta.org), NSTA Retiring President, and University of Nevada, Reno
Explore balloon popping (or not popping) and learn how to engage ALL students in the collaborative reasoning and complex discussion of the rigorous and sophisticated 3-D framework.

ACS Middle Level Session: Chemical Reactions—Breaking and Making Bonds
(Grades 6–8) Maryland 1/2, Convention Center
Science Focus: PS1.B
James Kessler, American Chemical Society, Washington, DC
Explore the production of a gas, a precipitate, and changes in temperature through hands-on activities and molecular model animations from the free 5E lesson plans at middle-schoolchemistry.com.

DNA, Proteins, and the Molecular Unity of Life
(Grades 9–12) Maryland 4, Convention Center
Science Focus: LS, CCC1, CCC4, SEP2, SEP4
Molly Malone and Louisa Stark, The University of Utah, Salt Lake City
What shapes the characteristics of living things? Come experience materials that explore molecular processes fundamental to life and set the stage for evolution or genetics units. Visit teach.genetics.utah.edu for more information.

NESTA Shares: Going Beyond the Controversy—Promoting Critique, Evaluation, and Argument in Earth Science
(Grades 6–College) Maryland A, Convention Center
Christopher Roemmele (@CAlomme66WCU; croemmele@wcupa.edu), West Chester University, West Chester, PA
Tim Klavon (@TimKlavon; @SLRG_Temple; tklavon@gmail.com), Temple University, Philadelphia, PA
Discussion centers on instructional scaffolds for Earth science topics that help students critically evaluate connections between evidence and alternative scientific explanations.

NSTA Press® Session: Get Prepared for the January 2019 Total Lunar Eclipse Using NSTA Press’s Solar Science
(Grades 5–8) Woodrow Wilson D, Convention Center
Science Focus: ESS, CCC, SEP
Dennis Schatz (@DinoManSchatz; dschatz@pacsci.org), Pacific Science Center, Seattle, WA
NSTA Press’s Solar Science, an astronomy curriculum resource that is NGSS focused, is the perfect resource to prepare you for the 2019 total lunar eclipse. Come explore some of the many effective learning experiences.

NGSS@NSTA Forum Session: Selecting Phenomena to Motivate Student Sensemaking
(Grades K–12) Maryland B, Convention Center
Science Focus: GEN, NGSS
Ted Willard (@Ted_NSTA; twillard@nsta.org), Assistant Executive Director, Science Standards, NSTA, Arlington, VA
The right phenomena are key ingredients in successful three-dimensional teaching and learning. Emphasis will be placed on what makes some phenomena better than others and how to use them successfully in the classroom.

NSTA National Harbor Area Conference on Science Education 75
Engineer Excitement in Your Classroom with a Carolina STEM Challenge®
(Grades 6–12) National Harbor 10, Convention Center
Science Focus: PS
Sponsor: Carolina Biological Supply Co.
Carolina Teaching Partner
Rockets zoom and race cars zip through hands-on activities that engage middle school and high school students. Apply creative problem-solving skills and engineering practices to chemistry and physical science challenges. Experience how Carolina makes it easy to incorporate STEM and three-dimensional learning into your classroom.

What Is a Species?
(Grades 9–12) National Harbor 11, Convention Center
Science Focus: LS4.A, CCC1, CCC2, SEP6, SEP7, SEP8
Sponsor: Lab-Aids, Inc.
Caroline Franek, Bolingbrook High School, Bolingbrook, IL
In this activity from the SEPUP high school biology program, learn about conditions that lead to speciation, including isolation due to temporal, geographical, and behavioral factors, and more. Then determine whether selected animal or plant pairs are in the early, mid, or late stages of speciation.

Exploring Ecosystem Dynamics with HHMI BioInteractive
(Grades 7–12) National Harbor 13, Convention Center
Science Focus: ETS2, PS2.A, PS4.A, CCC2, CCC4, CCC6, SEP
Sponsor: HHMI BioInteractive
Joseph Evans (j-evans@kent.k12.md.us), Kent County High School, Worton, MD
Explore predator–prey dynamics with free classroom-ready resources from HHMI BioInteractive. This session focuses on Scientists At Work videos: short NGSS-focused videos that introduce real-world science to students. Discussion covers ecosystem dynamics and physical science. Life and physical science teachers are encouraged to attend!

Get a Move On! Modeling Molecular Transport Across the Cell Membrane
(Grades 8–College) National Harbor 14, Convention Center
Science Focus: ETS1, LS1, PS1, CCC1, CCC2, CCC3, CCC6, CCC7, SEP1, SEP2, SEP6, SEP7, SEP8
Sponsor: 3D Molecular Designs
Gina Vogt (gina.vogt@3dmoleculardesigns.com), 3D Molecular Designs, Milwaukee, WI
Tim Herman (herman@msoe.edu), MSOE Center for BioMolecular Modeling, Milwaukee, WI
Support three-dimensional learning with materials that engage your students in an exploration of the unique chemical and physical properties of water and the phospholipid bilayer that separates cells from their surrounding environment. Construct a model to explain diffusion, osmosis, as well as active and passive transport across cell membranes.

Performance Assessments—Engaging and Fun!
(Grades 6–8) National Harbor 15, Convention Center
Science Focus: GEN, NGSS
Sponsor: TCI
Albert Bower, TCI, Mountain View, CA
Join TCI as we examine performance assessments as resources for students to demonstrate their mastery of NGSS performance expectations. Learn how to create your own performance assessments, including a storyline, student guidelines, and rubrics that truly show the three-dimensional aspect of NGSS. Take home complete performance assessments for immediate use in the classroom.

Earth Science for the Modern, Interactive Classroom
(Grades 5–College) National Harbor 2, Convention Center
Science Focus: ESS2.B, ESS2.D
Sponsor: Simulation Curriculum Corp
Herb Koller, Simulation Curriculum Corp., Minnetonka, MN
Join us as we use Simulation Curriculum’s The Layered Earth—Geology and The Layered Earth—Meteorology to investigate plate tectonics and extreme weather. Classroom-ready NGSS lessons engage students with interactive simulations and thought-provoking exercises using an interactive model of Earth. Now available for all platforms including Chromebooks.
Become a GMO Investigator  
(Grades 9–College) National Harbor 3, Convention Center
Science Focus: LS
Sponsor: Bio-Rad Laboratories
**Sherri Andrews** (sherri_andrews@bio-rad.com), Bio-Rad Laboratories, Hercules, CA
Regardless of where you stand in the GM debate, wouldn’t it be interesting to know which foods you eat are GM foods? This hands-on workshop teaches basics of DNA extraction, PCR, and electrophoresis and how they are used to test grocery store food products for the presence of GM foods.

**STEM Teacher...Science Teacher—What’s the Difference?**  
(General) National Harbor 4, Convention Center
Science Focus: GEN, INF, SEP
Sponsor: STEMscopes
**Virginia Rhame** (vrhame@nise.institute), National Institute for STEM Education, Houston, TX
STEM integration into science brings out the unique nature of STEM. There is a need to shift instructional strategies. Getting a STEM certificate encourages shifting through self-reflection and growth.

Active Physics: The Leading Project-Based High School Physics Program Capturing the Essence of the NGSS and STEM  
(Grades 9–12) National Harbor 5, Convention Center
Science Focus: PS
Sponsor: Activate Learning
**Gary Curts**, Activate Learning, Greenwich, CT
Learn how you can implement STEM and NGSS in your physics or physical science classroom. Gain an understanding of the benefits of the embedded engineering design cycle. Learn how physicists and science educators collaborated to design this innovative, NSF-funded, and research-based project-driven curriculum that has demonstrated significant success to engage ALL students and increase student performance.

Integration in Middle Grades: Implementing an NGSS Approach to Cross-Disciplinary Teaching and Learning  
(Grades 6–8) National Harbor 6, Convention Center
Science Focus: GEN, NGSS
Sponsor: Amplify
**Sophia Lambertsen** and **Rebecca Abbott**, The Lawrence Hall of Science, University of California, Berkeley
Figure out what it means to teach in an integrated way within a unit and across a full year of science. Participants will dive into the Amplify Science Integrated Sequence for Grades 6–8, designed to support deep and coherent learning of disciplinary core ideas while providing opportunities to apply and connect across domains.

Biology with Vernier  
(Grades 9–12) National Harbor 7, Convention Center
Science Focus: ETS, LS, PS
Sponsor: Vernier Software & Technology
**David Carter**, Vernier Software & Technology, Beaverton, OR
Discover how Vernier supports biology teachers who want their students to use probeware. A variety of experiments from our popular biology lab books will be conducted. Learn how our innovative data-collection technology works across multiple platforms, such as LabQuest 2, computer, Chromebook, and iPad.

Making the Literacy Connection, National Geographic Learning Style  
(Grades K–5) National Harbor 8, Convention Center
Science Focus: GEN
Sponsor: National Geographic Learning | Cengage
**Pam Caffery** (pam.caffery@cengage.com), National Geographic Learning | Cengage, Boston, MA
No one does literacy better than National Geographic! Join us for an introduction to Exploring Science and its integration of literacy and science. Experience how literacy builds connections through a variety of lessons.
11:30 AM–12 Noon  Presentation

Science Current Events Journals: Real Science and Media Literacy
(Grades 7–12)  
Baltimore 2, Convention Center
Science Focus: GEN, NGSS

Elizabeth Weissman (weissmane@ramaz.org), The Ramaz School, New York, NY
Science current events journals bring real science into the classroom. Use the news to teach science content, media literacy, and analytical thinking, and to reinforce language arts.

12:30–1:30 PM  Presentations

The Intersection of NGSS, CCSS, and WIDA Can-Do Descriptors and the Implications for Science Instruction in the Early Grades
(Grades P–3)  
Annapolis 3, Convention Center
Science Focus: GEN, CCC1, CCC6

Jennifer Cody (jlc479@psu.edu), Park Forest Elementary School, State College, PA
May Lee (mhl11@psu.edu), Penn State, University Park, PA
We will explore connections between the NGSS, Common Core State Standards, and WIDA Can-Do Descriptors and how they can be addressed through a content storyline.

Vocabulary for English Language Learners: The What, the When, and the How
(Grades P–8)  
Azalea 2, Convention Center
Science Focus: GEN

Elisa Alexander (@elisateaches; elalexander@fcps.edu) and Krystal Rodney (@Krystal_Rodney), Fairfax County Public Schools, Fairfax, VA
Vocabulary is always a challenge, particularly with students learning English. Explore common stumbling blocks for English language learners and ways to overcome them.

Scientific Literacy Requires Literacy
(Grades 3–12)  
Baltimore 2, Convention Center
Science Focus: GEN, SEP7, SEP8

Rebecca Robinson (beckyrosew@yahoo.com) and Osha Smith (@yellowgiraffe7; osmith@cdschools.org), Central Dauphin Middle School, Harrisburg, PA
Inspiring future scientists requires teachers to get students reading, writing, listening, and speaking about science. Learn about seamlessly integrating Common Core State Standards into science exploration.

Building Creative Scientists
(Grades 6–8)  
Baltimore 5, Convention Center
Science Focus: GEN

Kelly Anthony (anthonykj@pwcs.edu), Marsteller Middle School, Bristow, VA
Creativity is essential to innovative science but is often left to art and music. Problem solving is a creative endeavor and a necessary part of any scientist’s tool box. Come learn how to build creative scientists!

Use Other People’s Money to Meet the Standards and Enhance Your Chemistry Classroom
(Grades 9–12)  
Chesapeake A, Convention Center
Science Focus: PS, CCC, SEP

Kenetia Thompson and Karen Kaleuati (k_kaleuati@acs.org), American Chemical Society, Washington, DC
Learn about grant opportunities available to high school chemistry teachers (including opportunities from the American Chemical Society) and the process for writing a fundable proposal.

Alternate Assessment? No, Awesome Assessment!
(Grades 8–College)  
Chesapeake B, Convention Center
Science Focus: GEN, SEP1, SEP2, SEP5, SEP8

Eric Walters (@EWaltersScience; ewalters@marymountnyc.org) and Katie Krueger (@KHirt), Marymount School of New York, NY
Come learn how to reimagine assessments in high school science classes that allow your students to demonstrate their knowledge and understanding.
Bringing STEAM and Literacy to the Periodic Table  
(Grades 7–11)  Chesapeake H, Convention Center  
Science Focus: PS  
Elizabeth Weissman (weissmane@ramaz.org), The Ramaz School, New York, NY  
Learn how an elements project integrates technology, literacy, and arts into the study of atomic structure and the periodic table.

Modeling Stellar Evolution and Supernovas Using NASA Images, Data, and STEM Analysis Tools  
(Grades 6–12)  Chesapeake I, Convention Center  
Donna Young (dlyoung.nso@gmail.com), NASA/NSO UoL Coordinator, Bullhead City, AZ  
Model stellar evolution processes using NASA images, plotting H-R diagram transitions, and determining the chemistry and physics of supernovas using NASA STEM image analysis tools.

Using the Chesapeake Watershed to Spark Curiosity in the Adventure of Learning  
(Grades 2–6)  Maryland 5, Convention Center  
Science Focus: ESS2.C, LS  
Deanna Wheeler (dwheeler@ccboe.com), J.C. Parks Elementary School, Indian Head, MD  
The Chesapeake Bay watershed provides a plethora of resources to cultivate students’ curiosity. Experience how one elementary school incorporates the local watershed throughout the curriculum to spark and enhance student learning.

Student-Empowered Project Through the Lens of NGSS  
(Grades 6–12)  Maryland 6, Convention Center  
Science Focus: GEN, NGSS  
Kevin Garner (ksgarner@bcps.k12.md.us), Baltimore (MD) City Public Schools  
Presider: Valerie Wesner (rvwesner@aacps.org), Anne Arundel County Public Schools, Annapolis, MD  
Hear how Anne Arundel County Public Schools have chosen to weave Project-Based Learning throughout each unit of study in NGSS-focused courses. Come away with strategies to meet the needs of all students.

12:30–1:30 PM  Hands-On Workshops  
WIDA Session: Engaging English Language Learners in Science and Engineering  
(Grades K–12)  Annapolis 1, Convention Center  
Science Focus: GEN, SEP  
Troy Dassler (@tmdassler; tmdassler@wisc.edu), University of Wisconsin–Madison  
In this interactive session, we will explore the latest strategies and supports to engage English language learners in the science and engineering practices.

(Grades K–12)  Annapolis 2, Convention Center  
Science Focus: GEN, SEP  
Michael Apfeldorf (@TeachingLC; mapf@loc.gov), Library of Congress, Washington, DC  
Discover hands-on strategies to engage students using scientific notebooks, letters, photos, and drawings that highlight science practices, nature of science, and connections between science and society.
Curiosity Design for Inquiry Using Watersheds and Wetlands  
(Grades 3–11)  
Annapolis 4, Convention Center  
Science Focus: ESS2, ETS1
Judith Lucas-Odom (@Judith_Odom; judyps23@yahoo.com), Chester High School, Chester, PA
Help your students become involved with why their watershed is important to their community. Turn the tide to new learning by having students engage in inquiry activities that allow them to understand and become more aware of their watershed.

STEM-ulating Activities on Human Ecology  
(Grades 6–8)  
Azalea 3, Convention Center  
Melissa Holmes, Carl Sandburg Middle School, Alexandria, VA
Discover innovative ways to teach middle schoolers about human-environmental interactions, while building STEM skills through problem solving, mathematical modeling, and more. Free online lesson access!

ASEE Session: ASEE’s K–12 Outreach—Engineering, Go For It (eGFI), Teach Engineering, Link Engineering, and the National Science Digital Library  
(General)  
Chesapeake D, Convention Center  
Science Focus: ETS
Martha Cyr (mcyr@wpi.edu), The STEM Education Center at WPI, Worcester, MA
The American Society for Engineering Education (ASEE) and its K–12 division will introduce teachers to innovative ways to introduce engineering into K–12 classrooms.

ACS High School Session Four: Relating Structure and Properties—Demonstrating Understanding of Bond Strength and Interparticle Attractions  
(Grades 9–12)  
Chesapeake E, Convention Center  
Science Focus: PS, CCC, SEP
Kimberly Duncan (@chemduncan; kimberly.z.duncan@gmail.com), American Association of Chemistry Teachers, Washington, DC
Discover how to help students integrate results and ideas from multiple explorations of the properties and structure of ionic and covalent compounds to build explanations and construct arguments based on structure-property relationships.

ACS Middle School Session: Chemical Reactions—Ocean Acidification  
(Grades 6–8)  
Maryland 1/2, Convention Center  
Science Focus: PS1.B
James Kessler, American Chemical Society, Washington, DC
Explore how excess carbon dioxide in the atmosphere makes water more acidic through hands-on activities from the free 5E lesson plans at middleschoolchemistry.com.

Breakout of Normal Review: How to Facilitate a Review BreakoutEDU Game  
(Grades 6–College)  
Maryland 3, Convention Center  
Science Focus: GEN, NGSS
Katie Busch (kabusch@uab.edu), The University of Alabama at Birmingham
Breakout games sound fun but intimidating? Come learn how to put together a kit and review game that will get your students racing to find answers!

ASTE-Sponsored Session: Modeling Filters and Processing Astronomical Images in an Informal Astronomy Program  
(Grades 6–12)  
Maryland 4, Convention Center  
Science Focus: ESS1, PS4, INF, CCC3, SEP2, SEP8
Robert Palmer (@WSHstarskier; rjpalmer@umn.edu) and Felicia Leammukda (@leammukda; tiba0002@umn.edu), University of Minnesota, St. Paul
Gillian Roehrig and Barbara Billington (bill0041@umn.edu), STEM Education Center, St. Paul, MN
Bonnie Boyd (bonniebio@msn.com), Franklin Middle School, Minneapolis, MN
Richard Sanchez (rsanchez@jcsd1.us), Clear Creek Middle School, Buffalo, WY
Experience a filter lesson and representational color image processing used as part of the informal astronomy curriculum known as Skynet Junior Scholars. Note: Participants will need to bring laptops to this session. Prior to attending the session, they should download and install AstroImageProcessor (drive.google.com/file/d/1uccrvlvtJtWNTU-QHPBY8x-szu60w0rx/view) and these images (drive.google.com/drive/folders/1i98k5vT8vauExsQsdW-Ptjff9KweQ1ir) on their laptops.
NESTA and IRIS Session: Analyze Data from Earthquakes and Models of Earth to Discover and Measure Earth’s Layered Interior (A 3-D Learning Activity from IRIS)

(Grades 6–College)  Maryland A, Convention Center
Science Focus: ESS2.A, CCC6, SEP2, SEP4, SEP7

John Taber (taber@iris.edu) and Wendy Bohon (@iris_epo; @wbohon; @seismoman; wendy.bohon@iris.edu), IRIS, Washington, DC

Lead students to discover and measure Earth’s outer core by building models, analyzing and comparing the model to earthquake data, and participating in scientific discourse!

NGSS@NSTA Forum Session: Passing the Sniff Test; What Are Publishers Really Telling You in Their Alignment Claims?

(Grades K–12)  Maryland B, Convention Center
Science Focus: GEN, NGSS

Vanessa Wolbrink (vwolbrink@achieve.org), Achieve, Inc., Washington, DC
Presider: Ted Willard, Assistant Executive Director, Science Standards, NSTA, Arlington, VA

What does it mean when a publisher claims their materials are “100% aligned to the NGSS”? We will dive into some of the most common claims about NGSS alignment that currently exist in the marketplace. Working together, we will evaluate these claims, as well as develop and practice strategies for talking to publishers about how well their materials meet teachers’ needs.

12:30–1:30 PM  Exhibitor Workshops

Structures and Functions K–5: What Is the Learning Progression?

(Grades K–5)  National Harbor 10, Convention Center
Science Focus: LS
Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

How does the structure of plants and bessbugs help these organisms survive? Why does NGSS suggest students learn better through a coherent learning progression? Can science be taught in 30-minute lessons? Experience a fun, inquiry-based workshop to answer these questions.

pH Scale

(Grades 9–12)  National Harbor 11, Convention Center
Science Focus: PS, SEP4, SEP5
Sponsor: Lab-Aids, Inc.

Brandon Watters, Vernon Hills High School, Vernon Hills, IL

What does pH actually measure? In this investigation, you will measure pH indirectly using indicators and absorption using the Lab-Master. Using their data, participants generate a graph of absorbance versus pH. This graph can be used to determine the pH of solutions, within the measured pH range. Join us for this activity from The Natural Approach to Chemistry program.

Patterns and Processes in Ecology with HHMI Bio-Interactive

(Grades 6–College)  National Harbor 13, Convention Center
Science Focus: LS2.C, CCC1, CCC7, SEP2, SEP5
Sponsor: HHMI BioInteractive

Takisha Reece (takisha.reece@ssfs.org), Sandy Spring Friends School, Sandy Spring, MD

What do spatial patterns reveal about biological processes? Explore patterns in the savanna landscape with free classroom-ready resources from HHMI BioInteractive. Model how researchers use math to explore important concepts in ecology. This hands-on workshop is NGSS-focused and adaptable for middle school through higher ed educators.

Touch a Nerve with Hands-On Modeling of Neuronal Communication

(Grades 9–College)  National Harbor 14, Convention Center
Science Focus: ETS1, LS1, CCC1, CCC2, CCC4, CCC6, CCC7, SEP1, SEP2, SEP6
Sponsor: 3D Molecular Designs

Gina Vogt (gina.vogt@3dmoleculardesigns.com), 3D Molecular Designs, Milwaukee, WI

Tim Herman (herman@msoe.edu), MSOE Center for Bio-Molecular Modeling, Milwaukee, WI

Engage students by exploring response to neuronal stimuli by incorporating three-dimensional learning and hands-on/minds-on models. Construct a neuronal synapse model with a sodium potassium pump and calcium, sodium, and potassium channels. Model resting and action potentials and neurotransmitter release. Develop explanations of ways drugs and toxins disturb neuronal communication. Handouts.
Phenomena-Driven Lessons for the Middle School Classroom  
(Grades 6–8) National Harbor 15, Convention Center  
Science Focus: GEN, NGSS  
Sponsor: TCI  
**Albert Bower**, TCI, Mountain View, CA  
We will conduct a Bring Science Alive! investigation that gets students engaged in explaining phenomena and solving problems like real-world scientists and engineers. Join TCI and leave with everything you need to implement phenomena-driven lessons in the science classroom.

Yearlong Learning: Turning a STEM Project into an Authentic Learning Experience!  
(Grades 6–9) National Harbor 2, Convention Center  
Science Focus: ETS1  
Sponsor: AEOP  
**Alexandra Wakely**, eCYBERMISSION Outreach Specialist, NSTA, Arlington, VA  
Are your students working on science fair projects that don’t advance their science or engineering knowledge? Are they copying projects they find online? Find out how to inspire students to choose authentic topics and what to do after the project is “done.” Hear about eCYBERMISSION, a web-based STEM competition that promotes real-life science and engineering by investigating problems in the local community and exploring possible solutions using scientific inquiry and the engineering design process.

Using Argumentation to Discuss Phenomena: Increasing Student Voice in the STEM Classroom  
(Grades 3–College) National Harbor 4, Convention Center  
Science Focus: GEN, SEP  
Sponsor: STEMscopes  
**Terry Talley** (drttalley@comcast.net), STEMscopes, Galveston, TX  
Reduce teacher talk and increase purposeful student talk as we model consensus building through argumentation around intriguing science phenomena that matter. ELA skills and the 21st-century skills of communication and collaboration are a must in the STEM classroom.

Reading, Writing, Thinking, and Talking Science: Literacy Strategies in the Science Classroom  
(Grades 6–8) National Harbor 5, Convention Center  
Science Focus: GEN, SEP8  
Sponsor: Activate Learning  
**Heather Milo**, Activate Learning, Greenwich, CT  
Experience a lesson from the phenomenon-based middle school curriculum Investigating and Questioning our World through Science and Technology (IQWST®) as a model for how instructional materials can engage children in fluent and contextualized ways of thinking, reading, writing, and talking science. Walk away with literacy tools and strategies that can be implemented in any science classroom!

STEMulating the Heart with Code!  
(Grades 6–College) National Harbor 6, Convention Center  
Science Focus: LS  
Sponsor: Texas Instruments  
**Jeffrey Lukens**, Sioux Falls (SD) School District  
**Fred Fotsch**, Texas Instruments, Dallas  
We will combine biology and coding to create an artificial heart! With some basic materials, you will construct a four-chambered heart and then innervate it with an artificial nervous system. From there, write some very simple code (no coding experience required) to bring the heart to life! If time permits, you will also create an AED (automated external defibrillator)! Appropriate for middle school and high school students.

Integrating Chromebook with Vernier Data-Collection Technology  
(Grades 3–College) National Harbor 7, Convention Center  
Science Focus: ETS, PS  
Sponsor: Vernier Software & Technology  
**David Carter**, Vernier Software & Technology, Beaverton, OR  
Collecting and analyzing data help students learn critical science concepts that increase test scores and promote science inquiry. Learn how Vernier supports teachers who use Chromebook devices in their classrooms. Experiments such as “Boyle’s Law,” “Grip Strength Comparison,” and “Ball Toss” will be conducted.

Earth Systems from Impact Science: A Middle School NGSS Unit  
(Grades 6–7) National Harbor 8, Convention Center  
Science Focus: ESS2.B  
Sponsor: Impact Science Education, Inc.  
**Ladie Malek**, Impact Science Education, Inc., El Cerrito, CA  
What evidence do we have for tectonic plates and their movement? And if the mantle is solid, how can tectonic plates move? Come preview our NGSS Earth systems unit, which gets students involved in modeling these phenomena for a deeper understanding of Earth systems!
12:30–2:00 PM  Networking Opportunity
MAST Luncheon
(Ticket Required; $45)  Baltimore 1, Convention Center

Matt Krehbiel, Achieve, Inc., Washington, DC

Join the Maryland Association of Science Teachers (MAST) for a learning luncheon. MAST will recognize teachers from across the state with the annual MAST Awards for Excellence in Science Teaching, as well as Maryland finalists and winners of the Presidential Awards for Excellence in Mathematics and Science Teaching. This ticketed event includes a plated lunch, followed by presentation of MAST awards and remarks from Matt Krehbiel from Achieve. He joined Achieve in October 2015 as associate director, Science. In August 2017, he was promoted to director. Matt has a variety of responsibilities within the science team to further Achieve’s efforts to provide support to states and districts in implementation of the Next Generation Science Standards. He is specifically responsible for supporting and managing EQuIP for science and the PEEC-alignment tool.

A limited number of tickets will be available for purchase on the MAST website (www.emast.org/event-3070248).

2:00–2:30 PM  Presentations
Preservice Teachers and Project-Based Instruction: A Case Study
(Grades 6–12)  Chesapeake C, Convention Center

Science Focus: GEN, SEP8
Sarah Haines (shaines@towson.edu) and Chelsea McClure (cmcclur4@students.towson.edu), Towson University, Towson, MD

Come learn how exposure to project-based teaching and learning practices can influence the development of preservice teachers’ self-efficacy in using this teaching method in their own classrooms.

ASTE-Sponsored Session: African Rock Art Image Analysis—Using African Rock Art to Explore Science and Culture
(Grades K–12)  Maryland 4, Convention Center

Science Focus: PS
Catherine Quinlan (catherine.quinlan@howard.edu), Howard University, Washington, DC

Find out how African rock art image analysis can be used to engage in the science practices as we explore chemistry, culture, climate, and other scientific processes.

The Quest Has Been Given! Video Games in the Classroom
(Grades K–12)  Maryland 6, Convention Center

Science Focus: GEN, SEP1, SEP3, SEP4, SEP5, SEP6, SEP7, SEP8
Erin Ziems (ziems@eriemason.k12.mi.us), Bowling Green State University and Mason High School, Erie, MI

Video games have long held the power to harness a player’s attention and teach perseverance, puzzle solving, and critical-thinking skills. Let’s use that!
During this panel discussion, education thought leaders will discuss ESSA (Every Student Succeeds Act) and why classroom teachers must be the driving force behind the practice and policy changes needed to address the serious equity challenges we face today.

Laura Casdorph is currently director of Pre-AP Chemistry and Physical Science Curriculum and Instruction at The College Board. Previously, she was a science instructional specialist at the Virginia Department of Education where she supported elementary and secondary science teachers in the Commonwealth. Prior to her work at VDOE, she served as the secondary science specialist for Henrico County Public Schools in Virginia. She began her career in education as a high school chemistry and physics teacher and she is still a teacher at heart.

Maya Garcia has been instrumental in D.C.’s adoption process of the NGSS, as well as the development of the District’s STEM Plan, in which she helped to identify current needs in STEM careers and opportunities and map out a strategic plan for how to best prepare D.C. students to meet this need. In addition to authoring the D.C. STEM Plan, Maya also leads OSSE’s work to partner with the Carnegie Science Foundation to launch and develop the D.C. STEM Network and is currently an adjunct professor in the School of Education at American University in Washington, D.C.

John B. King, Jr. is the president and CEO of The Education Trust, a national nonprofit organization that aims to identify and close opportunity and achievement gaps, from preschool through college. He served as the U.S. Secretary of Education from 2016 through 2017. In tapping him to lead the U.S. Department of Education, President Obama called Dr. King “an exceptionally talented educator,” citing his commitment to “preparing every child for success” and his lifelong dedication to education as a teacher, principal, and leader of schools and school systems.

Roberto J. Rodríguez served in senior roles in the United States Senate and in the White House. From 2009 to 2017, he developed and led President Obama’s education initiatives to build systemic change and improve opportunity and outcomes across the educational continuum. Under his leadership, support for higher academic standards, enhanced teacher development and advancement, and deeper investment in America’s schools ultimately led to the enactment by Congress of the bipartisan Every Student Succeeds Act of 2015. Prior to his service in the White House, Roberto spent eight years as principal education adviser to the late U.S. Senator Edward M. Kennedy.

Mary M. Thurlow’s responsibilities include evaluating curriculum related to the NGSS and overseeing preK–12 science instruction and assessment. In addition, Mary provides technical assistance to local school systems, organizes the Governor’s Academy for professional development of science teachers, and works with the MSDE Office of Mathematics to coordinate the Presidential Awards for Excellence in Mathematics and Science Teaching.
2:00–3:00 PM  Presentations

Using the NSTA Learning Center as an Online Textbook

(Grades College) Annapolis 1, Convention Center
Science Focus: GEN

Flavio Mendez (@fljmendez; flavio_m@nsta.org) Assistant Executive Director, Learning Center, and Megan Doty (@Megan_NSTA; mdoty@nsta.org), eLearning Engagement Specialist, NSTA, Arlington, VA

Professors are invited to learn how to use the NSTA digital resources and the Learning Center as an online textbook when teaching science preservice educators.

Bring Authentic Science Practices to the Classroom

(Grades 9–College) Annapolis 3, Convention Center
Science Focus: GEN, SEP2, SEP3, SEP4, SEP7

William Wallace (wwallace@gds.org), Georgetown Day School, Washington, DC

Have your students learn how to think like a scientist in student-centered original investigations. I will present a yearlong course in teaching how to conduct an authentic science research investigation in a high school setting.

Building Scientifically Literate Students Through Unit Dissemination with Elementary Teachers

(Grades P–5) Azalea 2, Convention Center
Science Focus: GEN, NGSS

Martha Inouye (mcinouye@gmail.com) and Ana Houseal (ahouseal@uwyo.edu), University of Wyoming, Laramie

Emphasis will be placed on strategies for disseminating NGSS-focused curricula to elementary teachers while promoting strategies that cultivate scientifically literate students. Developed from firsthand experience. Electronic handouts.

Solids: The Neglected “State” of Chemistry

(Grades 7–12) Chesapeake A, Convention Center
Science Focus: PS1

Debbie Goodwin (nywin@hotmail.com), Retired High School Science Teacher, Chillicothe, MO

Use solids to make chemistry more relevant for students. Hands-on STEM activities using solid materials (metals/polymers/ceramics) make concepts easier to teach/learn. I’ll share NGSS correlations and a CD of information.

Integrating E-Books into the Secondary Classroom

(Grades 6–12) Chesapeake B, Convention Center
Science Focus: GEN

Leisa Clark, Assistant Executive Director, e-Products, NSTA, Arlington, VA

Engaging and innovative—learn how interactive multimedia elements and text from interactive e-books can enhance science learning in middle school and high school.

Get Published in an NSTA Journal

(General) Chesapeake G, Convention Center
Science Focus: GEN

Ken Roberts (ken_r@nsta.org), Assistant Executive Director, Journals, NSTA, Arlington, VA

Patty McGinnis (@patty_mcginnis; pattymcginnis1@gmail.com), Field Editor, Science Scope, and Arcola Intermediate School, Eagleville, PA

Meet with a journal editor to learn how to successfully prepare and submit an article for publication in an NSTA journal.

Spark Students’ Curiosity with Chemistry!

(Grades K–12) Chesapeake H, Convention Center
Science Focus: PS

Karen Kaleuati (k_kaleuati@acs.org), American Chemical Society, Washington, DC

Learn about the various free resources—games, lesson plans, grants, and more—available from the American Chemical Society. Walk away with resources.

Exploring Science-Based Online Units

(Grades K–8) Chesapeake I, Convention Center
Science Focus: ESS3, LS2, LS4

Laura Johnson Collard (@MAEOE_MD; director@maeoec.org) and Winny Tan (@MAEOE_MD; greenschools@maeoec.org), Maryland Association for Environmental and Outdoor Education, Columbia

Explore and receive access to science-based online curricula for elementary and middle school audiences that contain familiar investigation-based lessons constructed using the BSCS 5E instructional model and NGSS.
Developing a Spiraled NGSS Curriculum for Middle School
(Grades 6–8)  
Maryland 5, Convention Center
Science Focus: GEN, NGSS
Tiffany Wendland (@BCPSSci; twendland@bcps.org), Baltimore County Public Schools Office of Science, Towson, MD
Amy Hughes (@BCPSSci; ahughes@bcps.org), Baltimore County Public Schools, Towson, MD

Join the science team from Baltimore County to discuss how we developed a phenomena-based, spiraled curriculum. We will showcase the phenomena, discuss examples, and hear how teachers have been architects of their students’ learning.

**Friday, 2:00–3:00 PM**

### Hands-On Workshops

**2:00–3:00 PM**  
**Hands-On Workshops**

**Calling All Curious Kids: Fostering the Science and Engineering Practices**
(Grades K–6)  
Azalea 1, Convention Center
Science Focus: GEN, SEP
Jill Bracksieck (jbracksieck@gmail.com), Middle Gate Elementary School, Newtown, CT
Kristine Feda (fedak@newtown.k12.ct.us), Sandy Hook Elementary School, Sandy Hook, CT
Chrissie Pierce (piercec@newtown.k12.ct.us), Head O’Meadow Elementary School, Newtown, CT
Amy Hiruo (hiruoa@newtown.k12.ct.us), Hawley School, Newtown, CT

Kids are natural scientists. Foster their curiosity by infusing your units with strategies that promote the science and engineering practices. Explore hands-on activities, learn strategies, and leave with handouts.

**Meeting the Needs of English Language Learners in the Science Classroom**
(Grades 6–8)  
Azalea 3, Convention Center
Science Focus: GEN, NGSS
Kelly Anne Hynson (khynson@schools.nyc.gov), MS 216 George J. Ryan Middle School, Fresh Meadows, NY

Do you have a student in your science class who speaks little or no English? Do you ever say to yourself, “Where do I even begin?” Learn strategies you can use right now to help ALL levels of ELL students in your class to meet the demands of the NGSS and CCSS.

**Smart Devices: Data Collection, Analysis, and Reporting**
(Grades 9–College)  
Baltimore 3, Convention Center
Science Focus: GEN
Greg Dodd (gbdodd@gmail.com), Retired Educator, Pennsboro, WV

Discover how to make smart devices an essential tool in your science laboratory. Handouts.

**Engaging Students with Educational Games**
(Grades 6–12)  
Baltimore 5, Convention Center
Science Focus: ETS, CCC1, CCC3, CCC4, CCC7, SEP2, SEP5
Matthew Stilwell (mstilwell@wisc.edu) and Anne Lynn Gillian-Daniel (agillian@wisc.edu), University of Wisconsin–Madison

We will introduce freely available educational digital games that were developed collaboratively between research scientists, engineers, and teachers, and are scientifically rigorous and engaging for students.
ASTC-Sponsored Session: Pump Up Your Energy Game with Informal Energy Activities  
(Grades 1–9)  
Chesapeake K/L, Convention Center  
Science Focus: PS3  
Ann Hernandez (@ahatastc; ahernandez@astc.org), Association of Science-Technology Centers, Washington, DC  
Struggling to make energy engaging for students? Join expert museum educators to create wind-powered cardboard buildings, solar-power cars, and more through problem-based energy activities.

NESTA Earth System Science Share-a-Thon  
(Grades P–12)  
Maryland A, Convention Center  
Science Focus: ESS  
Michael Passow (mjpassow@gmail.com), Retired Teacher, Englewood, NJ  
Join more than 20 NESTA members and other education specialists as they share their favorite NGSS-congruent classroom activities. Lots of free resources!

NGSS@NSTA Forum Session: Designing and Using Equitable Formative Assessments to Support Meaningful 3-D Science Investigations  
(General)  
Maryland B, Convention Center  
Science Focus: GEN, INF, NGSS  
Michael Heinz (michael.heinz@doc.nj.gov), New Jersey Dept. of Education, Trenton  
Deb Morrison (@educatordeb; educator.deb@gmail.com), University of Washington, Seattle  
Presider: Ted Willard, Assistant Executive Director, Science Standards, NSTA, Arlington, VA  
Come examine samples of student responses and explore how to design formative assessments of three-dimensional (3-D) learning and engage in sense-making to interpret student responses.

NSTA Press® Session: Next Time You See—Sparking Curiosity and Wonder with Natural Objects and Phenomena  
(Grades P–5)  
Woodrow Wilson D, Convention Center  
Science Focus: LS  
Emily Morgan (@EmilyMorganNTYS; emily@pictureperfectscience.com), Picture-Perfect Science, West Chester, OH  
Join the author of the Next Time You See series to discover how ordinary natural objects can become extraordinary in the eyes of your students.

2:00–3:00 PM  
Exhibitor Workshops  

Introduction to Wisconsin Fast Plants®  
(Grades K–12)  
National Harbor 10, Convention Center  
Science Focus: LS  
Sponsor: Carolina Biological Supply Co.  
Carolina Teaching Partner  
Experience the versatility of Wisconsin Fast Plants. These quick-growing plants engage students and are ideal for all grade levels. Easily integrate disciplinary core ideas, crosscutting concepts, and practices in life cycle, heredity, inheritance, variation, and evolution, as well as environmental science lessons. Learn to plant, pollinate, and teach with Fast Plants.

Distilling Aromatic Hydrocarbons  
(Grades 9–12)  
National Harbor 11, Convention Center  
Science Focus: PS  
Sponsor: Lab-Aids, Inc.  
Brandon Watters, Vernon Hills High School, Vernon Hills, IL  
We distill water to purify it, or so we think. So why does the clear distillate from apple cider smell like apples? Join us and find out! Using a clever test-tube distillation apparatus, distill the essence of vanilla and the scent of mint…and even learn how to make brandy from wine! Distillation is a crucial process in chemical engineering and technology, yet few students ever get to explore the process.

National Geographic's Geo-Inquiry Process in Action!  
(Grades K–12)  
National Harbor 12, Convention Center  
Science Focus: ESS, SEP1, SEP3, SEP4, SEP6, SEP7, SEP8  
Sponsor: National Geographic  
Anastasia Cronin, National Geographic, Washington, DC  
Geo-Inquiry is an exciting new integrated, project-based process that connects real-world challenges and National Geographic explorers to the classroom. Learn new strategies to help students develop the critical-thinking skills to ask geographic questions, collect information, use GIS to visualize, create a compelling story, and ultimately become advocates for change in their local communities. This introduction to the Geo-Inquiry process will highlight practical classroom applications.
Constructing Explanations with HHMI BioInteractive
(Grades 6—College) National Harbor 13, Convention Center
Sponsor: HHMI BioInteractive
Sydney Bergman (bergmans@hhmi.org), Howard Hughes Medical Institute, Chevy Chase, MD
Students often struggle with how to structure explanations, particularly those about evolution. Explore a framework that helps your students make connections between natural selection and change in populations over time, using free classroom-ready resources from HHMI BioInteractive. This framework is adaptable for middle school through higher ed educators.

Genome Editing with CRISPR: Connections to What You Already Teach
(Grades 9—College) National Harbor 14, Convention Center
Science Focus: ETS, LS1, LS3, LS4, CCC, SEP1, SEP2, SEP4, SEP6, SEP7
Sponsor: MSOE Center for BioMolecular Modeling
Gina Vogt (gina.vogt@3dmoleculardesigns.com), 3D Molecular Designs, Milwaukee, WI
Tim Herman (herman@msoe.edu), MSOE Center for BioMolecular Modeling, Milwaukee, WI
The development of CRISPR/Cas9 gene editing technology is revolutionizing the biological sciences. Explore physical models of this technology that will engage your students in a deeper understanding of foundational concepts of biology, and further your discussion of ethical issues associated with editing the human genome.

Solving Crimes with Science—Forensics for Your Classroom
(Grades 5—12) National Harbor 2, Convention Center
Science Focus: GEN
Sponsor: AEOP
Jarod Phillips, GEMS Project Manager, and Alexandra Wakely, eCYBERMISSION Outreach Specialist, NSTA, Arlington, VA
With shows like CSI and NCIS, forensics is very popular with students. Come experience some hands-on forensic activities that you can take back to your science classroom. Don’t commit the crime of letting this workshop pass you by! Also, learn about the AEOP GEMS and UNITE programs that give students the chance to experience STEM enrichment over the summer!

Conserving Panda Populations Through Understanding Their Reproductive Endocrinology
(Grades 9–C) National Harbor 3, Convention Center
Science Focus: LS
Sponsor: Bio-Rad Laboratories
Sherri Andrews (sherri_andrews@bio-rad.com), Bio-Rad Laboratories, Hercules, CA
Can your students save the giant pandas? See how your students can explore challenging topics such as homeostatic regulation and the effect of reproductive hormones, immunological responses, and ecosystem balance all at once as they engineer a hormone detection system that can be used for giant panda population conservation efforts.

Engage ALL Students by Integrating Engineering and Science into Daily Life
(Grades 8–12) National Harbor 5, Convention Center
Science Focus: ETS, PS3
Sponsor: Activate Learning
Gary Curts, Activate Learning, Greenwich, CT
Learn about Engineering the Future 2.0, a new curriculum for grades 8–12 that meets Standards for Technological Literacy and the NGSS. This curriculum engages students in solving daily problems of shelter, transportation, and entertainment by applying core ideas of energy, systems, and modeling.

Zombies Get OUT!
(Grades 6–12) National Harbor 6, Convention Center
Science Focus: PS
Sponsor: Texas Instruments
Wendy Peel and Fred Fotsch, Texas Instruments, Dallas
Zombies are people, too! But you don’t want them in your house. Build a humane zombie repulsion device using a calculator, a flashlight, and a little ingenuity. Combine some physical science with a little coding (no coding experience required) to create an exciting STEM project for your middle school or high school science class.
Integrating iPad with Vernier Data-Collection Technology
(Grades 3–College) National Harbor 7, Convention Center
Science Focus: ETS, PS
Sponsor: Vernier Software & Technology
David Carter, Vernier Software & Technology, Beaverton, OR
Collecting and analyzing data help students learn critical science concepts that increase test scores and promote science inquiry. Learn how Vernier supports teachers who use iPads in their classrooms. Experiments such as “Boyle’s Law,” “Grip Strength Comparison,” and “Ball Toss” will be conducted.

Electricity and Magnetism from Impact Science: A Middle School NGSS Unit
(Grade 8) National Harbor 8, Convention Center
Science Focus: ESS, ETS, PS
Sponsor: Impact Science Education, Inc.
Ladie Malek, Impact Science Education, Inc., El Cerrito, CA
Electricity and magnetism are back in the grade 8 curriculum. How do we teach them in a way that is interesting and empowering for all students, without expensive components? We will preview our electricity and magnetism unit that ties in Earth science, engineering, and systems thinking—all using inexpensive materials.

2:30–3:00 PM Presentation
NARST-Sponsored Session: Designing Computer Games About Climate Change: Assessing Students’ Content Knowledge
(Grades 6–8) Maryland 4, Convention Center
Science Focus: ESS, CCC4, SEP5
Michael Cassidy (@mccassidy29; michael_cassidy@terc.edu), TERC, Cambridge, MA
Laura Rossier (laura_rossier@newton.k12.ma.us), F.A. Day Middle School, Boston, MA
The purpose of this study is to ascertain eighth-grade students’ content knowledge about anthropogenic climate change, climate systems, mitigation and adaptation strategies, and STEM and computational thinking practices.

2:45–3:30 PM Special Session
Meet the Presidents and Board/Council
(General) Exhibit Hall Entrance, Convention Center
Science Focus: GEN
Be sure to stop by for this special session. Come “meet and greet” your elected NSTA officers on your way to the exhibits. The President, President-Elect, and Retiring President along with your Board and Council members are looking forward to talking with you at the conference! We will be giving away several gift cards for use in the NSTA Store totaling $100. Must be present to win. Drawing will take place at 3:20 PM.
Inspired by the *Roue de Paris*, The Capital Wheel lights up the National Harbor shoreline with its 1.6 million LED lights.
3:30–4:30 PM  Exhibitor Workshops
Chemical Formula and Amino Acids
(Grades 9–12)  National Harbor 11, Convention Center
Science Focus: ETS1, PS2.C,
Sponsor: Lab-Aids, Inc.
**Brandon Watters**, Vernon Hills High School, Vernon Hills, IL
What is the difference between subscripts and coefficients? What does “balancing” a chemical equation mean? Many students have trouble with these fundamental concepts in chemistry. If a student does not fully understand the chemical formula, then moles, reactions, and stoichiometry are hopelessly confusing. Join us for some elegant, intuitive, and well-differentiated lessons that allow students of all levels to master the chemical formula and thereby move confidently into a deeper understanding of chemistry.

Algae Blooms: Agriculture, Ecology, and Economy
(Grades 9–College)  National Harbor 3, Convention Center
Science Focus: LS
Sponsor: Bio-Rad Laboratories
**Sherri Andrews** (sherri_andrews@bio-rad.com), Bio-Rad Laboratories, Hercules, CA
Teach photosynthesis and cellular respiration together in the context of the dead zone in the Gulf of Mexico. Using algae beads together with an algae bloom case study, your students can engage in authentic inquiry investigations to learn about two connected processes and their ecological and economical implications.

Project-Based Inquiry Science™ (PBIScience): Creating “Coherence and Science Storylines” for Middle School
(Grades 6–8)  National Harbor 5, Convention Center
Science Focus: GEN, NGSS
Sponsor: Activate Learning
**Mary Starr**, Michigan Mathematics and Science Centers Network, Plymouth
STEM learning requires integration! Powerful questions and coherent storylines help solve the integration challenge. PBIScience is built around interesting and meaningful Big Questions and Big Challenges, supporting the integration of science and engineering, engaging ALL students in high-quality STEM learning, and embracing the vision of the Framework and NGSS.

Physics and Physical Science with Vernier
(Grades 7–12)  National Harbor 7, Convention Center
Science Focus: ETS, PS
Sponsor: Vernier Software & Technology
**David Carter**, Vernier Software & Technology, Beaverton, OR
Learn how Vernier supports physics and physical science teachers who want their students to use probeware. A variety of experiments from our popular lab books will be conducted. Learn how our innovative data-collection technology works across multiple platforms such as LabQuest 2, computer, Chromebook, and iPad.
Opening in April 2008, the Convention Center features a 19-story glass atrium.
8:00–8:30 AM Presentation
Principal Efforts to Support Advocacy for Equitable STEM Education in Early Elementary Grades
(Grades P–3) Chesapeake C, Convention Center
Science Focus: GEN
Jennifer Cody (jlc479@psu.edu), Park Forest Elementary School, State College, PA
May Lee (mh11@psu.edu), Penn State, University Park, PA
Phil Latella (latellap@hasdk12.org), Arthur Street Elementary School, Hazleton, PA
We will highlight principal efforts to support advocacy for equitable STEM education in early elementary grades through the development of curriculum and integration of technology.

8:00–9:00 AM Presentations
Using Place to Create Connected Citizens
(Grades P–3) Annapolis 3, Convention Center
Science Focus: LS2, PS4, CCC2, CCC7, SEP1
Elizabeth Nunez (nunezelizabeth0218@yahoo.com) and Lakisha Kincherlow, Paterson (NJ) Public Schools
Latoya Nelson-Piccott (lnelsonpiccott@ppstaff.org), Paterson Public School 26, Paterson, NJ
Join us as we describe how we capitalized on local resources to create a rich, integrated learning experience for teachers and students using an urban national park.

STEM Design Challenges
(Grades 7–12) Chesapeake A, Convention Center
Science Focus: ETS1, SEP1, SEP2, SEP3, SEP4, SEP5, SEP6
Emilie Tekely (ettekely@dcts.org), Dauphin County Technical School, Harrisburg, PA
Discussion centers on how to incorporate several design challenges into your classroom that will allow students to have hands-on STEM experiences.

Science Practices Take Practice: Encouraging Student-Led Inquiry
(Grades 6–12) Chesapeake B, Convention Center
Science Focus: GEN, SEP
Helene McLaughlin (@hcmclaughlin; helene.c.mclaughlin@mcpsmd.net), Northwood High School, Silver Spring, MD
Elisabeth Vincent (@lissavincnet89; lissa.vincent@gmail.com), Richard Montgomery High School, Rockville, MD
We will share teacher-developed recommendations for transitioning your students from a guided science classroom to an open-inquiry experience.

The Best STEM Books for Kids: What Are They, How Are They Selected, How to Use Them!
(Grades P–8) Chesapeake D, Convention Center
Science Focus: GEN
Juliana Texley (texleyj@gmail.com), 2014–2015 NSTA President, and Central Michigan University, Alpena
Emily Brady (ebrady@nsta.org), Director, Special Projects, Content, NSTA, Arlington, VA
Wondering how to add literacy to your STEM lessons? Come learn about NSTA’s initiative “Best STEM Books” and how to identify and integrate the best STEM Books.

High School Teachers: Birds of a Feather
(Grades 9–12) Chesapeake H, Convention Center
Science Focus: GEN, INF, NGSS
Scott Goldthorp (@scottgoldthorp; sgoldthorp@chlc.org), Cherry Hill (NJ) Public Schools
Laura Casdorph (lcasdorph@gmail.com), The College Board National Office, New York, NY
Lisa Powelson (mpowelson@chlc.org), Cherry Hill High School West, Cherry Hill, NJ
Facilitated by NSTA’s High School Committee, join in to discover NSTA’s resources, participate in discussions, and share high school needs/concerns in your state. How can we help?
Using a Socioscientific Issues Curriculum to Engage Middle School Students in Dialogue on the Cases of Asthma in Poor Communities
(Grades 6–College) Chesapeake I, Convention Center
Science Focus: GEN, SEP4, SEP7
Wardell Powell (wpowell1@framingham.edu), Framingham State University, Framingham, MA
Use socioscientific issues as research-based, interdisciplinary approach that enlists higher-order problem-solving, argumentation, and research skills to analyze challenging scientific concepts and issues in poor communities.

Aligning Assignment Rubrics to Course Objectives in Secondary Science Classrooms
(Grades 9–12) Maryland 5, Convention Center
Science Focus: GEN, SEP
Adam Keller (@GneissKeller; adam.keller@ssfs.org) and Sharon Wall, Sandy Spring Friends School, Sandy Spring, MD
Join us as we cover understanding the value rubrics have in communicating assignment requirements and course objectives, as well as providing students with feedback. Find out how to create rubrics aligned with the requirements of an assignment while reflecting course objectives and as a tool for formative assessment.

8:00–9:00 AM Hands-On Workshops
Building a Unit Plan Using American Association of Chemistry Teachers (AACT) Resources
(Grades 9–12) Annapolis I, Convention Center
Science Focus: PS
Kimberly Duncan (@chemduncan; @AACTconnect; kimberly.z.duncan@gmail.com), American Association of Chemistry Teachers, Washington, DC
Come learn how to put together a successful unit plan using the wide variety of classroom resources available on AACT’s website.

Amazing Animal Senses: Using Movement and Games to Engage
(Grades K–5) Annapolis 2, Convention Center
Science Focus: LS
Valerie Wesner (@aacps_science; rwesner@aacps.org) and Kate Adams (@aacps_k5science; kdozbrzeski@aacps.org), Anne Arundel County Public Schools, Annapolis, MD
Come learn strategies for maximizing student engagement for all learners through purposeful movement and games! These will be taught through the lens of an NGSS-focused unit for grade 4.

NASA’s Educator Tool Kit: Framing Phenomena-Based Student Investigations
(Grades 3–9) Azalea 2, Convention Center
Science Focus: ESS3.B, CCC1
Cassie Soeffing (@sdbikegirl; cassie_soeffing@strategies.org), Institute for Global Environmental Strategies, Arlington, VA
This tool kit features NASA resources for grades K–12 that can support and frame student investigations with NASA data and content. The tool kit includes a QuickStart Guide, Key Features, and an Online Interactive Guide. The session will feature hurricanes as a phenomenon that can be investigated using NASA Earth Observatory (NEO), Precipitation Measurement Missions, and NASA Worldview.

Connecting Students to the Sea
(Grades 7–8) Chesapeake E, Convention Center
Science Focus: ESS, LS2
Jennifer Hartigan (jenny@chart4.com), Lincoln Middle School, Alameda, CA
Join a NOAA Teacher at Sea to find out how she brought a NOAA field experience and scientists into the classroom.
Using Claim, Evidence, and Reasoning (CER) to Support Maryland Integrated Science Assessment (Grades 3–12)  Chesapeake K/L, Convention Center
Science Focus: GEN, SEP
Megan McKinney-Dyson (mmckinney-dyson@ccboe.com), Charles County Public Schools, Waldorf, MD
Erica Hughes (@matulascience; enhughes@ccboe.com), Mary H. Matula Elementary School, La Plata, MD
Engage in a hands-on session developing and using the Claim, Evidence, Reasoning strategy for answering argumentative questions in all science classrooms.

NSTA Press® Session: From Flower to Fruit (Grades K–5)  Woodrow Wilson D, Convention Center
Science Focus: LS
Richard Konicek-Moran (rkonicek@gmail.com), Professor Emeritus, UMass Amherst, MA
Kathleen Konicek-Moran (kathleen.konmor@gmail.com), Botanical Illustrator and Nature Artist, Bradenton, FL
Add botany to your curriculum. See how this is done using From Flower to Fruit as a guide.

8:00–9:00 AM Exhibitor Workshop
Using Climate Proxies to Learn About Earth’s Climate History (Grades 9–12)  National Harbor 11, Convention Center
Science Focus: ESS2, ESS3, ETS1
Sponsor: Lab-Aids, Inc.
Jenny Boldt, Solon High School, Solon, IA
How can scientists tell what Earth’s climate was like thousands of years before human measurements? This activity simulates the use of fossil ocean foraminifera, tiny organisms whose growth patterns are different in warm or cold water. Analyze and graph samples of replicas of these organisms to determine relative warm and cold periods in the past 200,000 years. This activity is from EDC Earth Science, a new NSF-supported high school program from Lab-Aids.

8:00 AM–5:00 PM Meetings
NGSS Workshop, Level 1: Making Sense of Three-Dimensional Teaching and Learning (By Separate Registration Only)  Woodrow Wilson B, Conv. Center
Participants build a solid understanding of the three dimensions and how they integrate, and take home a powerful toolkit of resources to further their implementation efforts.

NGSS Workshop, Level 2: Designing Three-Dimensional Lessons and Units Workshop (By Separate Registration Only)  Woodrow Wilson C, Conv. Center
Participants deepen their understanding of three-dimensional teaching and learning by focusing on developing storylines and learning how to use their resources to support broader implementation efforts in their schools and districts.

8:30–9:00 AM Presentations
Just the Right Fit: NGSS Performance Expectations and ESOL Students in the Mainstream Classroom Environment (Grades K–5)  Chesapeake C, Convention Center
Science Focus: ETS1
Krishni Patrick (krishni_patiﬁck@mcpsmd.org), Piney Branch Elementary School, Takoma Park, MD
Discover techniques for supporting learners in the elementary classroom. Success stories will be shared on increasing student academic discourse and proficiency in NGSS 3-5-ETS1, particularly students with limited English proficiency. A range of teacher-friendly visual, oral, and performance-based techniques will be showcased.

Students as Citizen Scientists: Data Collection and Sharing Using Fieldscope (Grades 9–12)  Maryland 6, Convention Center
Science Focus: ESS2, LS, INF, SEP3
Olukayode Banmeke (@kaybanms; kaybanms20014u@yahoo.com), DuVal High School, Lanham, MD
Delve into how to navigate and effectively use Maryland Fieldscope website with students to share their stream studies and action projects.

9:00 AM–12 Noon Exhibits
Hall C, Convention Center
The NSTA Exhibit Hall is a must-see! NSTA brings you the leading science education companies and organizations to showcase products, services, curricula, and much more. You’ll discover something new and exciting in the world of science teaching. Some exhibitors will offer materials for sale.
Saturday, 9:30–10:30 AM

9:30–10:30 AM Presentations

STEM and ELLs: The Perfect Fit
(Grades P–5) Annapolis 3, Convention Center
Science Focus: ETS1, ETS2, SEP2, SEP3, SEP8
Christine Ramirez (@MissRamirez01; christine_e_ramirez@mcpsmd.org), Kemp Mill Elementary School, Silver Spring, MD
Zulay Joa (@Zu1ay81203344; zulay_joa@mcpsmd.org), Glenallan Elementary School, Silver Spring, MD
Joanne Robbins (@JoD1018; joanne_d_robbins@mcpsmd.org), Georgian Forest Elementary School, Silver Spring, MD
Learn how STEM can be a pathway for English language learners to engage with the world around them. Hear from three educators on breaking barriers commonly found with ELLs.

Elementary Science with NOAA: Free K–5 Science Resources from the National Oceanic and Atmospheric Administration
(Grades K–5) Baltimore 1, Convention Center
Science Focus: ESS
Bekkah Lampe (@NOAAeducation; bekkah.lampe@noaa.gov), National Oceanic and Atmospheric Administration, Silver Spring, MD
The National Oceanic and Atmospheric Administration offers an array of free resources to teach K–5 Earth system and environmental science. Learn about our curricular units and stand-alone lessons, digital storybooks, and inquiry-based activities—resources that enhance literacy skills while encouraging scientific exploration by young minds.

Optimizing Sustainability in Schools Through Student Inquiry
(Grades K–12) Baltimore 2, Convention Center
Science Focus: GEN, SEP
Jenny Wiedower (@mygreenschools; jwiedower@usgbc.org), U.S. Green Building Council, Washington, DC
Mary Ann Settlementyre (msettlementyre@fcps.edu), Centreville Elementary School, Centreville, VA
Reimagine the school building and grounds, not as a container for education, but as a laboratory for engaging STEM-based education, and paying it forward!

Making Redox Practical, Relevant, Engaging, and Fun Corrosion Chemistry!
(Grades 6–12) Chesapeake A, Convention Center
Andrew Nydam (andrewnydam@hotmail.com), Polymer Ambassador, Olympia, WA
Discover real-world examples using labs and demonstrations that make reactivity, oxidation/reduction, and corrosion exciting, practical, and easy to teach and learn. Take home a CD of information.

Bookworms in Science Class
(Grades 6–8) Chesapeake C, Convention Center
Science Focus: GEN
Kelly Anthony (anthonkj@pwcs.edu), Marsteller Middle School, Bristow, VA
Do you have bookworms who think science isn’t for them? Come see how to use literature to teach a variety of science concepts and get your bookworms hooked on science.

NSTA’s Online Resources and Communities
(General) Chesapeake D, Convention Center
Science Focus: GEN, NGSS
Flavio Mendez (@fljmendez; flavio_m@nsta.org) Assistant Executive Director, Learning Center, and Ted Willard (@Ted_NSTA; twillard@nsta.org), Assistant Executive Director, Science Standards, NSTA, Arlington, VA
The NSTA Learning Center and the NGSS@NSTA Hub provide educators with thousands of free resources and opportunities—as well as a professional peer community—that support professional learning and classroom instruction. Get a free SciPack. NSTA gift cards will be raffled!

Do You Need a New Science Lab? Win a Shell Science Lab Makeover ($20,000 Value) for Your School
(Grades 4–12) Chesapeake H, Convention Center
Science Focus: GEN
Ruth Ruud (ruudruth61@gmail.com), Cleveland State University, Cleveland, OH
Are you a K–12 science teacher in need of a science lab makeover? Attend this session and learn how you can apply to win the Shell Science Lab or Regional Makeover! You will have an opportunity to actually begin to complete the application and have your questions answered.
Complex Concepts and Vocabulary for Diverse Students with Learning Differences
(Grades 6–8) Chesapeake K/L, Convention Center
Science Focus: GEN, CCC1, CCC2, CCC6
Christine Zito (joan.mele-mccarthy@thesummitschool.org) and Clinton Kittrell (clinton.kittrell@gmail.com), The Summit School, Edgewater, MD
Learn ways to modify science instruction and content for students with learning differences. Experienced teachers will describe vocabulary modifications, schema development, and kinesthetic activities.

Maps for Models and Data: Using Free Digital Maps and GIS in Earth Science
(Grades 7–12) Maryland 1/2, Convention Center
Science Focus: ESS2, ESS3
Martin Schmidt, Jr. (mschmidt@mcdonogh.org), McDonogh School, Owings Mills, MD
Learn ways to bring data into your class for all the spheres of the Earth system using free digital maps at local to global scales.

9:30–10:30 AM Hands-On Workshops
Using Modeling Activities in the High School Chemistry Class
(Grades 9–12) Annapolis 1, Convention Center
Science Focus: PS, SEP2
Kimberly Duncan (@chemduncan; kimberly.z.duncan@gmail.com), American Association of Chemistry Teachers, Washington, DC
Visualization is difficult for many students. Join me as I discuss and demonstrate several modeling activities you can use in your chemistry class.

The Mayflower Challenge
(Grades 2–10) Annapolis 2, Convention Center
Science Focus: ETS, CCC, SEP
Rima Garg (@rimagarg1; rima.garg@pgcps.org) and Jeff Holstine (@JeffHolstine; jeffrey.holstine@pgcps.org), Prince George’s County Public Schools, Upper Marlboro, MD
Participants will use the Engineering Design Process to build, reflect, analyze, and redesign structures while using a storyline and addressing NGSS performance expectations.

EDP and ME: Making the Engineering Design Process Come to Life in Your Classroom
(Grades K–5) Annapolis 4, Convention Center
Science Focus: ETS1
Elizabeth Bartleson (elizabeth_bartleson@hcpss.org) and Kelley Hatcher (kelley_hatcher@hcpss.org), Hollifield Station Elementary School, Elkridge, MD
Join Howard County Public Schools educators to explore the Engineering Design Process in elementary classrooms, by examining the parts, integrating technology, and making community connections.

JetStream: An Online School for Weather
(Grades 4–College) Azalea 2, Convention Center
Science Focus: ESS2.D
Dennis Cain (dennis.cain@noaa.gov), NOAA National Weather Service, Fort Worth, TX
JetStream is a free online resource from the National Weather Service with lesson plans and demonstrations for classroom teaching on various aspects of weather.
Inquiry in Action: Investigating Matter K–5  
(Grades K–5)  
Baltimore 3, Convention Center  
Patricia Galvan (p_galvan@acs.org), and James Kessler,  
American Chemical Society, Washington, DC  
What makes it rain? M&M’S® versus Skittles? Baking soda versus baking powder? Hands-on activities with free animations can help your elementary students build foundational concepts in chemistry.

Sharing with NESTA: Integrating Chemistry and Earth Science in Baltimore City Public Schools  
(Grades 9–12)  
Baltimore 4, Convention Center  
Bess Caplan (@BESlter; caplanb@caryinstitute.org), Cary Institute of Ecosystem Studies, Baltimore, MD  
Vonceil Anderson, Baltimore (MD) City Public Schools  
Bring your laptop and curiosity to engage in integrated chemistry–Earth science data set exploration and hands-on Earth science activities exploring the chemistry of Earth.

Materials Matter! Looking at Materials Science to Help Teach Chemistry  
(Grades 5–12)  
Chesapeake E, Convention Center  
Science Focus: PS  
Sherri Rukes (@polychemgirl; sherri.rukes@d128.org), Libertyville High School, Libertyville, IL  
Use the concepts of materials science to make the connections to all the areas of science. Instead of teaching in “silos,” make connections that students can relate to in all areas of science. Take home a CD of information.

How Paintings Spark Curiosity About STEM and Crosscutting Concepts  
(Grades P–5)  
Chesapeake F, Convention Center  
Science Focus: GEN, CCC  
Hillary Gruber (hgruber@cesjds.org) and Jessie Nathans (jrnathans@gmail.com), Charles E. Smith Jewish Day School, Rockville, MD  
Draw your students into STEM learning with an art exhibit based on Vermeer. We will then offer a chance to further spark curiosity between art and STEM through a hands-on art project that can be integrated into a general studies and art curriculum.

Intermeshing Science and Literacy Equals a Successful Connection  
(Grades 2–8)  
Maryland 3/4, Convention Center  
Science Focus: GEN  
Linda Linnen, Retired Teacher, Aurora, CO  
Demonstration lessons will be modeled to teach science simultaneously with reading and writing strategies.

Teaching Environmental Sustainability Using a Free Place-Based Watershed Model  
(Grades 5–12)  
Maryland 6, Convention Center  
Science Focus: ESS3, LS2, CCC4, SEP  
Nanette Marcum-Dietrich (ndietrich@millersville.edu), Millersville University, Millersville, PA  
Steve Kerlin (skerlin@stroudcenter.org), Stroud Water Research Center, Avondale, PA  
Model My Watershed is a free web-based application that invites students to explore the condition of their local watershed with a scientifically valid watershed model.
9:30–10:30 AM  Exhibitor Workshops

Prospecting for Mineral Ore
(Grades 9–12)  National Harbor 11, Convention Center

Science Focus: ESS3, ETS1
Sponsor: Lab-Aids, Inc.

Jenny Boldt, Solon High School, Solon, IA

How do geologists look for mineral ore? In this activity from EDC Earth Science, participants search for a layer of rock containing a valuable mineral called molybdenum by testing sediments collected in strategic spots along river systems—gathering data to decide where the deposit is located. This is no “cookie mining” activity!

11:00 AM–12 Noon  Presentations

Data Is Not a Four-Letter Word: Use NOAA Resources to Build Student Proficiency in Data Analysis
(Grades 5–12)  Baltimore 1, Convention Center

Science Focus: GEN
June Teisan (jlteisan@gmail.com), Network of Michigan Educators, Grosse Pointe Woods

Scientists at the National Oceanic and Atmospheric Administration collect a stunning array of data in their work. Learn how to access this treasure trove of archived and real-time data, and explore NOAA’s data-rich resources, lesson plans, and visualization tools to help you build student proficiency in scientific data analysis.

Where Do I Begin? An Approach for Building STEM Initiatives in Underrepresented Schools
(Grades K–12)  Chesapeake C, Convention Center

Science Focus: GEN
Janie Kimble (jkimble@ecsdnv.net), Carlin Combined School, Carlin, NV

Find out how a teacher from an underrepresented and underfunded school overcame resource and interest barriers to build a STEM-driven classroom initiative from scratch.

Fostering and Maintaining Curiosity Through Coherent Storylines: Creation and Execution of NGSS-Focused Units
(Grades P–12)  Chesapeake D, Convention Center

Science Focus: GEN, NGSS
Martha Inouye (mcinouye@gmail.com) and Ana Houseal (ahouseal@uwyo.edu), University of Wyoming, Laramie

Explore the process behind planning and executing units that foster student curiosity, are three dimensional, and create coherent storylines. Handouts.

Living Labs for All Learners: Real-World Inquiry Made Possible with Partnerships
(Grades 6–12)  Chesapeake G, Convention Center

Science Focus: LS2.A, LS2.C, INF, CCC7, SEP1, SEP3, SEP4, SEP5, SEP6, SEP7, SEP8
Miranda Crotsley (@mirandaooutside; mcrotsley@pa.gov), Jennings Environmental Education Center, Slippery Rock, PA
Sandra Strosko (stroskos@cmsd.k12.pa.us), Emily Lohrer (lohreer@cmsd.k12.pa.us), and Ken Crowley (crowleyk@cmrd.k12.ps.us), Canon-McMillan High School, Canonsburg, PA

Unleash student curiosity by engaging all learners in authentic research on water quality (at a Pennsylvania park). Partnering with professionals addressing real-world impacts on aquatic ecosystems provides rich, inquiry-based student research experiences that engage all learners in skills critical to global citizenship.
 Targeting Equity in Computer Education  
(Grades 9–12)  
Chesapeake H, Convention Center  
Science Focus: ETS2  
Courtney Hodge (@tealsk12org; courtney@tealsk12.org), TEALS Through Microsoft Philanthropies, Redmond, WA  
Students who are enrolled in computer science often fail to reflect regional racial and gender demographics. I will provide pointers to materials and discuss equity strategies.

Charles E. Smith Jewish Day School and George Washington University’s Project for Integrated STEM Education  
(Grades 1–5/College)  
Chesapeake I, Convention Center  
Science Focus: GEN, CCC  
Beth Short, The George Washington University, Washington, DC  
We will highlight a researcher-practitioner partnership between an elementary school and a university to design curricula using NGSS crosscutting concepts as a throughline for integration.

Forget Note-taking: Using Ordinary Models for Conceptual Understanding in Applied High School Chemistry  
(Grades 9–12)  
Maryland 5, Convention Center  
Science Focus: PS1.A, SEP2  
Mindy Cottrell, Princeton High School, Cincinnati, OH  
We will demonstrate using and developing models with everyday materials in an applied high school chemistry class to address the needs of diverse learners.

NSTA Press® Session: Uncovering K–12 Three-Dimensional Ideas About Matter and Energy  
(Grades K–12)  
Woodrow Wilson D, Convention Center  
Science Focus: PS  
Page Keeley (@CTSKeeley; pagekeey@gmail.com), 2008–2009 NSTA President, and The Keeley Group, Fort Myers, FL  
Explore how the collection of K–12 matter and energy formative assessment probes are used with the three dimensions to inform instruction and support learning.

11:00 AM–12 Noon  Hands-On Workshops  
Teaching Evolution in Middle School  
(Grades 6–8)  
Annapolis I, Convention Center  
Robert Cooper (@bcooper721; bcooper721@gmail.com), Pennsbury High School, West Campus, Fairless Hills, PA  
The Teacher Institute for Evolutionary Science supports middle school teachers teaching evolution. Hands-on activities are provided enabling teachers to confidently teach evolution in their classrooms.

Science Practices: Effective, Fun, and Relevant  
(Grades 3–10)  
Annapolis 2, Convention Center  
Science Focus: GEN, NGSS  
Steve Weinberg (weinberg@ntplx.net), Science Consultant, Boynton Beach, FL  
W. Tony Heiting (heitingtony@yahoo.com), Science Consultant, Portland, OR  
Take part in a number of authentic and engaging investigatory activities that exemplify specific science practices such as planning and carrying out investigations and analyzing and interpreting data that are effective, fun, and relevant.

Do Your Students Really Understand Chemical Equilibrium?  
(Grades 9–College)  
Annapolis 4, Convention Center  
Science Focus: PS  
Greg Dodd (gbdodd@gmail.com), Retired Educator, Pennsboro, WV  
Learn methods to overcome common student misconceptions. Take part in a hands-on lab with a chemical equilibrium having a large K value. Handouts.

Using Phenomena to Engage Middle School Students in Real-World Learning  
(Grades 6–8)  
Baltimore 3, Convention Center  
Science Focus: GEN, NGSS  
Valerie Wesner (@Aacps_Science; vwsner@aacps.org) and Kate Adams (@AACPS_K5Science; kdozbrenski@aacps.org), Anne Arundel County Public Schools, Annapolis, MD  
Kevin Garner (@AACPS_912Science; ksgarner@bcps.k12.md.us), Baltimore (MD) City Public Schools  
Are you interested in increasing engagement, promoting discourse, and facilitating inquiry-based learning? Come explore the power of phenomena-based storylines and receive sample units.
The Living Periodic Table  
*Grades 10–12*  
Chesapeake E, Convention Center  
Science Focus: PS1  
Tiffany Taylor (@ChemTeacherMsT; ttaylor@ccboe.com), St. Charles High School, Waldorf, MD  
Turn your classroom of students into a Living Periodic Table! This activity is a great way to assess your chemistry students' knowledge of the organization of the periodic table. Each seat in your classroom is assigned an element and they have to use what they know about “themselves” (their assigned element) in order to fill in a chart that has them describe the characteristics of their “neighbors” in each direction!

Assessing Inquiry Skills in Middle School Science  
*Grades 5–8*  
Chesapeake F, Convention Center  
Science Focus: PS, SEP2, SEP4, SEP5, SEP6, SEP7  
Josh Goodstein (@JoshGoodstein; jgoodstein@greenstreet-friends.org), Greene Street Friends School, Philadelphia, PA  
The inquiry process is often used to introduce new content, which is then assessed. But how can we measure students’ fluency with key practices such as developing models, interpreting data, and constructing explanations from evidence? Engage in performance-based assessments designed to evaluate these skills in chemistry and learn about a framework to design these assessments.

How to Read Like Scientists!  
*Grades 3–12*  
Chesapeake K/L, Convention Center  
Science Focus: GEN  
Ann Berg (abergtravels@gmail.com), Cambridge-Isanti Schools, Cambridge, MN  
Explore strategies through interactive activities and discussion that support success in reading science nonfiction and, most importantly, scientific inquiry.

Outdoor Science...Literally!  
*Grades K–8*  
Maryland 3/4, Convention Center  
Science Focus: GEN, CCC  
Steve Rich (@bflyguy; bflywriter@comcast.net), University of West Georgia, Carrollton  
Notebooks, journals, and children’s books connect students to active learning in the school yard. This NSTA Press®/NSTA Kids author will show you how. Free seeds.

Connecting Natural Selection and Speciation  
*Grades 9–12*  
Maryland 6, Convention Center  
Science Focus: LS4, CCC2, SEP3, SEP4, SEP7  
Molly Malone and Louisa Stark, The University of Utah, Salt Lake City  
What drives the diversification of life? Examine the process of speciation through a real-world example of genetic variation, natural selection, and reproductive isolation in action.

11:00 AM–12 Noon  
Exhibitor Workshops  
Calling All Carbons  
*Grades 9–12*  
National Harbor 11, Convention Center  
Science Focus: ESS2, ESS3  
Sponsor: Lab-Aids, Inc.  
Jenny Boldt, Solon High School, Solon, IA  
The element of carbon is critical to life on Earth. All living organisms contain different and essential carbon-based molecules. Several Earth processes work together to cycle carbon from one carbon reservoir to another and to keep the amount in each reservoir stable. Join in to learn about and model different carbon transfer processes.

A Visual Journey Through the Human Cell Using Watercolor Landscapes  
*Grades 9–College*  
National Harbor 14, Convention Center  
Science Focus: LS1, PS1, CCC3, CCC4, CCC6, SEP1, SEP3  
Sponsor: MSOE Center for BioMolecular Modeling  
Gina Vogt (gina.vogt@3dmoleculardesigns.com), 3D Molecular Designs, Milwaukee, WI  
Tim Herman (herman@msoe.edu), MSOE Center for BioMolecular Modeling, Milwaukee, WI  
Use vibrant watercolor landscapes to explore the molecular world in the cellular context within which proteins function. David Goodsell’s Tour of the Human Cell Panorama traces the production and secretion of antibodies. His Flu Fight: Immunity & Infection Panorama illustrates how antibodies work to block the influenza infection cycle.
Some exhibitors have classified their products by grade level and subject area. Subject areas are abbreviated here as follows:

- Biology/Life Science B
- Chemistry/Physical Science C
- Computer Science CS
- Engineering ENG
- Environmental Science ENV
- Integrated/General Science G
- Mathematics M
- Physics/Physical Science PH
- Professional Development PD
- Technology Education T

Exhibit Hall maps are available on the conference app.
www.nsta.org/conferenceapp

3D Molecular Designs #614
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Website: www.3dmoleculardesigns.com

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American Meteorological Society #534
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Amplify Science is a phenomena-based K–8 program developed from the ground up for the Next Generation Science Standards by UC Berkeley’s Lawrence Hall of Science. The program immerses students in a compelling real-world problem in every unit, teaching them to think, read, write, and argue like 21st-century scientists and engineers.

American Chemical Society #632
1155 16th St. NW C, G
Washington, DC 20036 K–12
Phone: 202-872-4600
E-mail: education@acs.org
Website: www.acs.org/education

The ACS Education Division serves learners and educators by building communities and providing effective chemistry education resources, grants, communities, professional development opportunities, standards, and guidelines. Stop by our booth to find information that can support your efforts to provide innovative, relevant, and effective chemistry education from kindergarten through professional education.

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Delta Education/School  #327
Specialty Science
80 Northwest Blvd,
Nashua, NH 03063
Phone: 800-258-1302
E-mail: customerservice.delta@schoolspecialty.com
Website: www.deltacad.com

Delta Education is your leading educational partner in providing hands-on, inquiry-based K–8 curriculum and instructional resources. With programs like FOSS® and DSM®, informational texts (Delta Science Content Readers), and NGSS and STEM resources, we help you develop students who set a world-class standard for college and workforce readiness.

Disney Youth Programs  #421
The Walt Disney Co./Disney Youth Program
PO Box 10111  B, C, ENG, G, PD, PH
Lake Buena Vista, FL 32830  1–12, College
E-mail: jemal.a.taylor@disney.com
Website: www.disneyouth.com

Disney Youth Education Series offers educational field trip programs and academic journeys year-round. Participants find enrichment, inspiration, and pure fun as they see how principles they’re learning in the classroom are making exciting things happen around the Disney parks.
Experience field research firsthand with Earthwatch! We connect teachers and students with PhD environmental scientists worldwide on 1–2 week research expeditions offering exclusive access to field stations, exotic species, and immersive, hands-on fieldwork. Great for professional development and student career exploration. Come say hello…and ask about our fully paid fellowships!

**Earthwatch Institute**

1380 Soldiers Field Rd.
B, C, EA, ENV, PD
2nd Floor
K–12, College
Boston, MA 02135
Phone: 800-776-0188
E-mail: info@earthwatch.org
Website: www.earthwatch.org

At Educational Innovations, we know how important it is to motivate young minds. We only choose products that are unique, durable, scientifically rigorous—and FUN! Let us help you develop lifelong learners—curious about their world with our Super! Wow! Neat!® hands-on science materials for grades K to college.

**Educational Innovations, Inc.**

5 Francis J. Clarke Circle
B, C, EA, ENG,
Bethel, CT 06801
ENV, G, PH, T
Phone: 203-748-3224
E-mail: ted@teachersource.com
Website: www.teachersource.com

In 1987, Edvotek envisioned how the emerging area of biotechnology could inspire students to choose a career in science. Since then, Edvotek has expanded to become the world’s leading supplier of safe, affordable, and easy-to-use biotechnology kits and equipment designed specifically for education.

**Edvotek Inc.**

1121 5th St. NW
B, ENV, G, T
Washington, DC 20001
Phone: 800-338-6835
E-mail: mariad@edvotek.com
Website: www.edvotek.com

In 1987, Edvotek envisioned how the emerging area of biotechnology could inspire students to choose a career in science. Since then, Edvotek has expanded to become the world’s leading supplier of safe, affordable, and easy-to-use biotechnology kits and equipment designed specifically for education.

**Enovative Technologies**

11935 Worchester Hwy.
Bishopville, MD 21813
E-mail: events@enovativetech.com
Website: www.epulsemassage.com

Enovative Technologies is a company based on the Eastern Shore part of Maryland. We provide pain relief to consumers in the form of TENS, EMS, and CES along with a full line of accessories.

**Envision EMI**

1919 Gallows Rd.
B, C, CS, EA, ENG,
Suite 700
ENV, G, M, PD, PH
Vienna, VA 22182
3–12, College
E-mail: lobrien@envisionexperience.com
Website: www.envisionexperience.com

Envision is a college- and career-readiness company that hosts summer programs throughout the country. We work with students who range from elementary through college age to encourage hands-on exploration in career interests. Our career, technology, and leadership summer programs are designed to prepare students to turn their careers into reality.

**ExploreLearning**

110 Avon St., Suite 300
B, C, EA, ENG,
Charlottesville, VA 22902
ENV, G, M, PH, T
Phone: 866-882-4141
E-mail: sales@explorelearning.com
Website: www.explorelearning.com

ExploreLearning Gizmos are interactive online simulations that drive conceptual understanding in math and science for students in grades 3–12. Comes complete with inquiry lessons, assessment, and reporting!

**Fisher Science Education**

300 Industry Dr.
B, C, EA, ENG, ENV,
Pittsburgh, PA 15275
G, M, PH, T
Phone: 800-955-1177
E-mail: april.fischione@thermofisher.com
Website: www.fisheredu.com

Fisher Science Education, a Thermo Fisher Scientific brand, is the industry leader in serving science education by providing the most innovative science supplies and resources to educators. From astronomy to zoology and everything between, Fisher Science Education will provide you with the best products to fill your science classroom.
Frey Scientific/School Specialty Science

Frey Scientific offers a complete line of supplies, equipment, technology, and lab design services for grades K–12. Frey also offers the CPO Science learning systems that are ideal for differentiated instruction. Secondary-level supplemental science curriculum offerings are Inquiry Investigations® and iNeoS/SCI®.

Grand Classroom

Grand Classroom provides worry-free educational travel to national parks, historic cities, and international destinations.

Greatest Stories Never Told

Meet aviation pioneer James Banning the first African American to fly across the United States! Greatest Stories Never Told uses minority heroes’ stories to create traveling exhibitions and Living History Plays to inspire students to reach for careers in STEM fields. Come see the Banning’s traveling exhibition and meet Banning!

HHMI BioInteractive

HHMI BioInteractive develops free resources, including short films, virtual labs, apps, and print materials. These high-quality multimedia resources are developed, vetted, and field-tested by educators and scientists—and are all tied to major curriculum standards.

Impact Science Education, Inc.

We provide a complete NGSS-focused middle school curriculum so that teachers can create an engaging science classroom for all students. Our material is inquiry based, contains daily 5E-based lesson plans, and is infused with a strong engineering component throughout. Written by teachers for teachers for maximum classroom support!

Inq-ITS by Apprendis

We offer personalized online labs that score themselves. Students engage in interactive science labs while receiving real-time coaching. Teachers get alerts when kids struggle. Schools get the data they need to demonstrate growth. While students work, teachers get real-time, automatic grading, tracking, and alerts to support instruction and provide 1:1 help.

Insurance Institute for Highway Safety

IIHS-HLDI in the Classroom is a new, free, STEM-based educational website from the Insurance Institute for Highway that applies physics and biology concepts to the real world of cars and car crashes.

Inventionland Institute

We offer a comprehensive K–12 curriculum for makerspaces, STEM/STEAM programs, and more. Innovative education leaders are asking us to design and build immersive classrooms as well, transforming traditional school libraries, shop classes, and more into extraordinary spaces for generations to come. We look forward to showing you why.

Johns Hopkins Center for Talented Youth

The world leader in gifted education, Johns Hopkins Center for Talented Youth is a non-profit dedicated to identifying and developing the talents of academically advanced pre-college students. We serve bright learners through our signature programs, and are here to recruit staff to work with them at summer sites nationwide.

Kendall Hunt/ConstructEd

Kendall Hunt is the premier publisher of innovative hands-on science, mathematics, gifted, and virtual reality curricula for grades preK–12. ConstructEd, a division of Kendall Hunt, allows schools and/or teachers to create made-to-order textbooks or digital products using existing products or by creating their own.
For almost 55 years, our company has been developing, manufacturing, and publishing core curriculum and supplementary programs that help students better understand science concepts through direct experience. Backed by decades of research, our programs give you the tools to teach, inspire, and help students become science literate citizens.

LaMotte Co.  #620
PO Box 329  ENV
802 Washington Ave.  4–12, College
Chestertown, MD 21620
Phone: 800-344-3100
E-mail: mkt@lamotte.com
Website: www.lamotte.com

Supporting environmental science education for over 95 years, LaMotte manufactures water and soil analysis test kits, curriculum packages, instruments, and sampling equipment for use in the classroom, lab, and field. Products cover a broad range of grade levels from grade 4 through college level. Engage your students with hands-on tests and activities.

Liberty Science Center  #426
222 Jersey City Blvd.  All
Jersey City, NJ 07305  PreK–12
E-mail: rosario@lsc.org
Website: www.lsc.org

Liberty Science Center houses 12 exhibition halls, live animals, giant aquariums, live simulcast surgeries, K–12 classrooms and labs, teacher-development programs, and the Western Hemisphere’s biggest planetarium—the Jennifer Chalsty Planetarium. More than 750,000 students, teachers, and parents visit each year, and tens of thousands more participate in off-site and online programs.

The Markerboard People, Inc.  #517
PO Box 80560  B, C, EA, ENG, M, PH
1611 N. Grand River Ave.  Lansing, MI 48906  PrK–12, College
Phone: 800-379-3727
E-mail: feedback@dryerase.com
Website: www.dryerase.com

We offer non-porous student dry erase, double-sided markerboards and response boards in class sets at unbeatable prices! They’re great for instant response and instant assessment—perfect for science, math, language arts, graphing, handwriting, and more. Long-lasting, nontoxic, ultra-low-odor markers, and durable student erasers, too!

Maryland Association of Science Teachers (MAST)  #233
PO Box 97  Finksburg, MD 21048
Website: www.emast.org

Stop by for information about Maryland and the benefits of becoming a member of MAST. Membership forms and information on association activities will be available. Be a part of the professional community supporting science education across Maryland!

Minerals Education Coalition  #222
12999 E. Adam Aircraft Circle  EA, ENG, G
Englewood, CO 80112  K–12
Phone: 303-948-4221
E-mail: mec@smenet.org
Website: www.mineralseducationcoaltion.org

Products you use daily come from mining. Technology, transportation, and buildings—and even toothpaste—all need mining! Visit the Minerals Education Coalition booth for FREE rock kits and posters to teach your students about the importance of mining and minerals. Visit www.MineralsEducationCoalition.org for free lessons, activities, demonstrations, videos, and more.
MiniOne Systems | #521
7738 Arjons Dr., San Diego, CA 92126
Phone: 650-417-5138
E-mail: info@theminione.com
Website: www.theminione.com

MiniOne Systems provides electrophoresis and PCR systems specifically for hands-on learning in classroom settings. Our student-centered systems are designed to be safe, reliable, robust, fast, and affordable. Our menu of MiniLabs simplify classroom management and engage students with real-world experiments. Teach and do electrophoresis or PCR in your classroom!

miniPCR | #420
1770 Massachusetts Ave., Cambridge, MA 02140
Phone: 414-277-7529
E-mail: herman@msoe.edu
Website: www.cbm.msoe.edu

As an instructional materials development laboratory, we create student-centered, hands-on kits and models for the molecular biosciences. Through our professional development experiences, teachers learn active teaching skills and are involved in developing and field-testing new kits. Ask about our outreach programs—SMART Teams and Science Olympiad.

MSOE Center for BioMolecular Modeling | #614
1025 N. Broadway St., Milwaukee, WI 53202
Phone: 414-277-7529
E-mail: herman@msoe.edu
Website: www.cbm.msoe.edu

National Geographic Learning | Cengage | #621
20 Channel Center St., Boston, MA 02210
Phone: 888-915-3276
E-mail: schoolcustomerservice@cengage.com
Website: www.ngl.cengage.com

National Geographic Learning, a part of Cengage, provides quality PreK–12, academic, and adult education instructional solutions for reading, science, social studies, mathematics, world languages, ESL/ELD, advanced, honors, and electives, career and technical education, and professional development. See our new catalog at NGL.Cengage.com/catalogs.

National Energy Education Development Project | #606
8408 Kao Circle, Manassas, VA 20110
Phone: 800-875-5029
E-mail: kswan@need.org
Website: www.need.org

The NEED Project is a nonprofit organization dedicated to promoting an energy conscious and educated society. Offering 100+ free curriculum guides for K–12 educators that are designed to incorporate activities that help synthesize energy information and create valuable connections between science and social science and the application of knowledge to decision making.

National Institute for STEM Education | #322
5177 Richmond Ave., Suite 1025, Houston, TX 77056
Phone: 800-531-0864
E-mail: judy@nise.institute
Website: www.getstemcertified.com

The National Institute for STEM Education (NISE) certifies teachers, campuses, and districts in STEM teaching using a competency-based, academic coach-led online learning platform in which educators produce a portfolio of work that demonstrates proficiency across 15 STEM teacher actions.
National Integrated Cyber Education  #531
Research Center  CS, M, PH, PD, T
6300 E. Texas St.  K–12
Bossier City, LA 71111
E-mail: claire.floyd@cyberinnovationcenter.org
Website: ncer.org

Based out of Bossier City, Louisiana, NICERC develops innovative cyber-based curricula for use by K–12 teachers across the country. The curricula developed by NICERC is free to any K–12 educator within the United States.

National Inventors Hall of Fame/ Camp Invention  #223
3701 Highland Park NW  PreK–12, College
North Canton, OH 44720
Phone: 800-968-4332
E-mail: kseagren@invent.org
Website: http://invent.org/inspire

WHERE BIG IDEAS BECOME THE NEXT BIG THING™. Camp Invention is the only nationally recognized nonprofit summer enrichment program for kindergartners through sixth-graders that is inspired by the greatest innovators around—the Inductees of the National Inventors Hall of Fame®. At Camp Invention, children are empowered to question, brainstorm, collaborate, and invent!

NatureBridge  #229
28 Geary St., Suite 650  ENV
San Francisco, CA 94108
Phone: 800-672-7722
E-mail: info@naturebridge.org
Website: www.naturebridge.org

NatureBridge provides residential environmental science programs for grades K–12 in the world’s best classrooms—our national parks. NatureBridge serves more than 30,000 students and their teachers each year and offers programs in five national parks: Prince William Forest, Yosemite, Golden Gate, Olympic, and the Santa Monica Mountains.

NOAA Office of Education  #228
14th and Constitution Ave. NW  G
Room 6863  PreK–12, College
Washington, DC 20230
Phone: 301-713-1208
E-mail: education@noaa.gov
Website: www.noaa.gov/education

NOAA is a federal science agency providing free information about weather, climate, oceans, coasts, fisheries, satellite data, and solar weather. NOAA’s science touches the lives of every American—protecting life and property and conserving natural resources. Our collaboration with NSTA fosters our mission to educate the nation and prepare a future workforce.

NorthBay  #535
11 Horseshoe Point Lane  ENV, PD
North East, MD 21901  4–12, College
Phone: 443-976-0500
E-mail: stietjens@northbayadventure.org
Website: www.northbayadventure.org

NorthBay, a stunning educational and retreat center overlooking the upper Chesapeake Bay, teaches, inspires, and empowers people to take positive actions for our shared environment. In the past year, over 30,000 people have been engaged in our transformative programs.
PASCO
10101 Foothills Blvd. B, C, CS, EA, Roseville, CA 95747 ENG, ENV, PH Phone: 800-772-8700 K–12, College E-mail: dferrari@pasco.com Website: www.pasco.com

PASCO, the award-winning leader in hands-on, inquiry-based science, transforms science education and student learning with innovative probeware, software, and curriculum. Because our products support the science and engineering practices, students gain a deeper understanding of science. PASCO products can be used with any tablet, computer, or smartphone.

Penn State Center for Science and the Schools and Science-U
B, C, CS, EA, Penn State University ENG, ENV, G, PD, PH University Park, PA 16802 K–12 E-mails: amn5306@psu.edu; jxk721@psu.edu Websites: csats.psu.edu; www.sciencecamps.psu.edu

Penn State Center for Science and the Schools creates K–12 professional development with STEM researchers that focuses on the practices of science and engineers. Penn State Science U offers summer camps to K–12 students in order to inspire future scientists and encourage critical thinking.

School Datebooks and
#626
STEM Education Works, powered by SDI Innovations
CS, ENG, G, M, PD, T 2880 Old US Hwy. 231 S 5–12, College Lafayette, IN 47909-2414 Phone: 800-705-7526 E-mail: sales@schooldatebooks.com Websites: www.schooldatebooks.com; http://stemeducationworks.com

STEM Education Works and School Datebooks, powered by SDI Innovations, have been fine-tuning a simple, worry-free experience designed to make teaching STEM a breeze. From student journals with corresponding lesson plans to robotics powered by educator-created curriculum—we’re here to help you dive into STEM with ease.

School Specialty Science
#327
80 Northwest Blvd. G Nashua NH 03063 PreK–12 Phone: 949-784-9233 E-mail: joel.ebro@schoolspecialty.com Website: www.schoolspecialty.com

At School Specialty, we’re driven to support your vision for STEM education by combining tested supplies, resources, curriculum, and expertise to create safe and innovative learning environments. Together, FOSS®, Delta Education®, Frey Scientific®, and CPO Science™ are ready to help you inspire the next generation of 21st-century STEM-literate citizens.

Shell Science Lab Challenge
#221
1840 Wilson Blvd. B, C, CS, EA, ENG, Arlington, VA 22201 ENV, G, PH, PD Phone: 703-312-9217 K–12 E-mail: aupton@nsta.org Website: www.nsta.org/shell/sciencelab

Do you need a new science lab? Would you like to win up to $20K for your science classroom? Come to the Shell booth to learn how you can apply and win the Shell Science Lab Challenge, the regional challenge, or one of the two awards that Shell sponsors.

Simulation Curriculum Corp.
#605
11900 Wayzata Blvd. All Suite 126 K–12, College Hopkins, MN 55305 E-mail: mygoodman@simcur.com Website: https://store.simulationcurriculum.com

Simulation Curriculum is a leading developer of interactive Earth, meteorology, and space science curriculum with software and mobile apps designed for use on conventional Windows and Mac computers, Chromebooks, iPads, and Android tablets.

South Dakota State University
#219
Dept. of Chemistry and Biochemistry C Avera Health Sciences Bldg. 6–12, College Room 351 Brookings, SD 57007 Phone: 605-688-6274 E-mail: matt.miller@sdstate.edu Website: www.sdstate.edu/chemistry-biochemistry

Stop by our booth to learn about our Master’s program in chemistry. This is an online program focused on important topics typically covered in the secondary chemistry curriculum. We will show a variety of safe demonstrations to engage your students in the classroom.

Speak Agent
#533
155 Gibbs St. All Rockville, MD 20852 PreK–10 Phone: 202-375-9572 E-mail: dan@speakeagent.com Website: www.speakeagent.com

Speak Agent is the only evidence-based instructional technology for learning academic language. Speak Agent addresses key academic concepts, related vocabulary, and syntax needed for science, math, and all subjects (any language). An independent 2017–2018 study funded by NSF, showed Speak Agent accelerated student mastery of new science concepts by 270%.

STEMscopes
#321
5177 Richmond Ave. B, C, EA, ENG, ENV, Suite 1025 G, PH, PD Houston, TX 77056 PreK–12, College Phone: 800-531-0864 E-mail: david@acceleratelearning.com Website: www.stemscopes.com

STEMscopes™, created by Accelerate Learning Inc., is an award-winning, research-based national leader in preK–12 STEM curriculum. Used by over 4 million students across all 50 states, STEMscopes provides comprehensive digital resources, supplemental print materials, and hands-on exploration kits that drive engagement and academic growth.

TCI
#422
2440 W. El Camino Real B, C, EA, ENG, Suite 400 ENV, G, PH, T Mountain View, CA 94040 K–8 E-mail: ttran@teachtci.com Website: www.teachtci.com

TCI is a K–12 publishing company that creates science and social studies curriculum that enables educators to engage all students in a diverse classroom.
TeacherGeek, Inc. #318
16551 Ridge Rd.  CS, ENG, G, PH, PD, T
Holley, NY 14470  PreK–12, College
Phone: 888-433-5345
Website: www.teachergeek.com
TeacherGeek offers critical, amazing, free, and low-cost materials for your makerspace, STEM, STEAM, engineering, or science classroom.

Texas Instruments #527
13532 N. Central Expressway  B, C, CS, EA
MS 3817  ENG, G, M, PD, PH, T
Dallas, TX 75265  5–12, College
Phone: 1-800-TI-CARES
E-mail: ti-cares@ti.com
Website: https://education.ti.com
Texas Instruments (TI) provides free classroom activities that enhance math, science, and STEM curricula; technology that encourages students to develop a deeper understanding of concepts; and professional development that maximizes your investment in TI technology. Visit education.ti.com.

Toshiba/NSTA ExploraVision #526
1840 Wilson Blvd.  B, C, CS, EA
Arlington, VA 22201  ENG, ENV, G, T
Phone: 703-312-9373  K–12
E-mail: exploravision@nsta.org
Website: www.exploravision.org
The ExploraVision science competition for K–12 students engages the next generation in real-world problem-solving with a strong emphasis on STEM. ExploraVision challenges students to envision and communicate new technology five years in the future through collaborative brainstorming and research of current science and technology.

UMUC–Asia #332
University of Maryland–CLG  B, CS, G, M, T
Unit 5060, Box 0100  College
APO, Armed Forces Pacific 96328
Phone: 240-684-2013
E-mail: dean-asia@umuc.edu
Websites: www.umuc.edu
University of Maryland University College was founded more than 70 years ago to serve working adults and service members. We’re an online state university that offers undergraduate and graduate programs in fast-growing and in-demand fields. With no-cost digital course materials in nearly every course.

Underwriters Laboratories #635
Northbrook, IL 60062  5–12
E-mail: dennis.avelar@ul.com
Website: www.ulxplorlabs.org
UL Xplorlabs is an educational platform designed to encourage students to “solve through science.” Through interactive videos, instructional experiences, hands-on classroom activities, and creative classroom challenges, this free, STEM-focused experience is the perfect resource to use real-life science from the UL Laboratories to your classroom.

Vernier Software & Technology #417
13979 SW Millikan Way  B, C, EA, ENG,
Beaverton, OR 97005  ENV, G, PH, T
Phone: 888-837-6437  PreK–12, College
E-mail: info@vernier.com
Website: www.vernier.com
Vernier Software & Technology is a leading innovator of scientific data-collection technology. Focused on STEM, Vernier is dedicated to developing creative ways to teach and learn using hands-on science. Vernier creates easy-to-use science interfaces, sensors, and graphing/analysis software. Vernier’s technology-based solutions enhance STEM education, increase learning, and build students’ critical-thinking skills.

Water Environment Federation #532
601 Wythe St.  B, C, EA, ENG, ENV
Alexandria, VA 22314-1994  9–12
E-mail: shunt-cottrell@wef.org
Website: www.wef.org
The Water Environment Federation is a nonprofit, technical, and educational organization of 33,000 members and 75 affiliate member associations representing water professionals throughout the world. We will be providing educational materials regarding water and wastewater for all grade levels, as well as a scholarship opportunity for high school students.

WorldStrides #328
218 W. Water St., Suite 400  B, ENV, G
Charlottesville, VA 22902  6–12
Phone: 434-982-8673
E-mail: conferences@worldstrides.org
Website: www.worldstrides.org
Every trip is a journey of possibilities. We provide students a world of travel experiences that immerse them in knowledge, culture, and inspiration. We help students grow by bringing learning to life—new ideas, new friends, and the memories of a lifetime. Explore. Discover. Become.

Wyndham Destinations #234
250 Mariner Passage  Suite 201
Oxon Hill, MD 20745
Website: www.wyndhamhotels.com
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