

NSTA AREA CONFERENCE ON SCIENCE EDUCATION

SCIENCE EDUCATION A National Priority

NATIONAL HARBOR, MD

NOVEMBER 15–17, 2018



#NSTA18

NSTA National
Science
Teachers
Association



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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

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NSTA National
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National Harbor, MD Area Conference
November 15–17, 2018

NSTA 2018 Area Conference on Science Education *Science Education: A National Priority*

National Harbor, Maryland • November 15–17, 2018

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National Science Teachers Association

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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



Jonathon Grooms, Jaclyn Austin, and Anisha Campbell (left to right)

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.

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

National Harbor Conference Committee

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.

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Program Committee

Strand Leader: Monumental Challenge: STEM Equity, Diversity, and Advocacy via NGSS
Sakon Kieh
District of Columbia Public Schools
Washington, DC

Strand Leader: Freedom to Become Scientifically Literate
Jennifer Silbaugh
Manor Woods Elementary School
Ellicott City, MD

Strand Leader: Cultivating Curiosity in the Capital Region
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Ellicott City, MD

Conference Advisory Board Liaison
David Crowther
NSTA Retiring President
Raggio Research Center for STEM Education
University of Nevada—Reno
Reno, NV

President's Welcome

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.

NSTA Conferences Go Green!

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)



—Photo courtesy of Gaylord National Resort & Convention Center

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.national-harbor.com/circulator for more information.

Parking

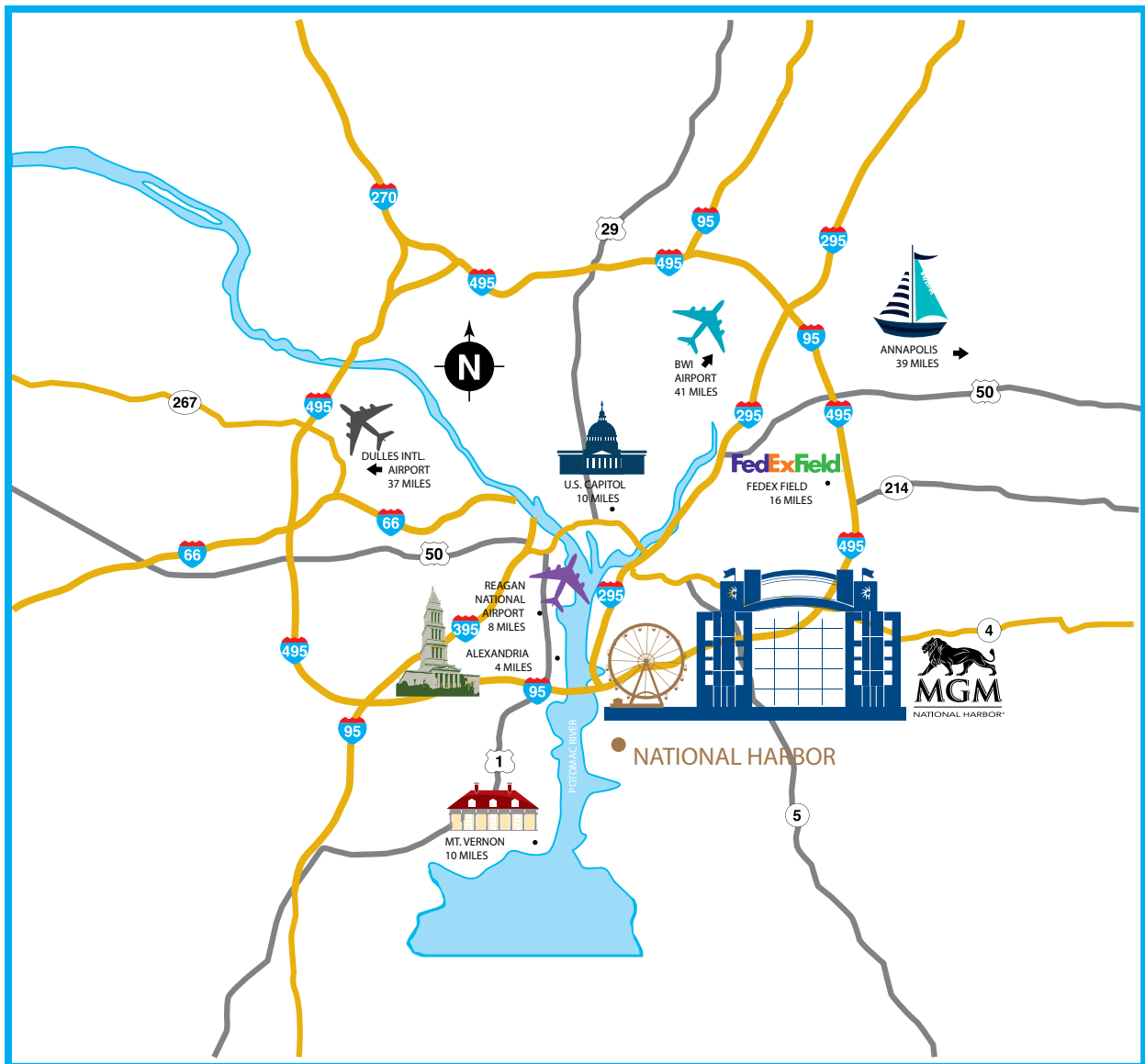
There is parking available at the Gaylord National and a number of parking lots at National Harbor (across the street from the Gaylord). The closest option is St. George Garage, followed by Mariner and Fleet garages. Parking in these garages is \$5 for 0–2 hours; \$12 for 2–4 hours; and \$20 for 4–24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

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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](https://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, Again! 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.

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** (dominicancaonline.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/2PSIPjh for more information.



—courtesy of Gaylord National Resort & Convention Center

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.christmasonthepotomac.com.

Southwest 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.

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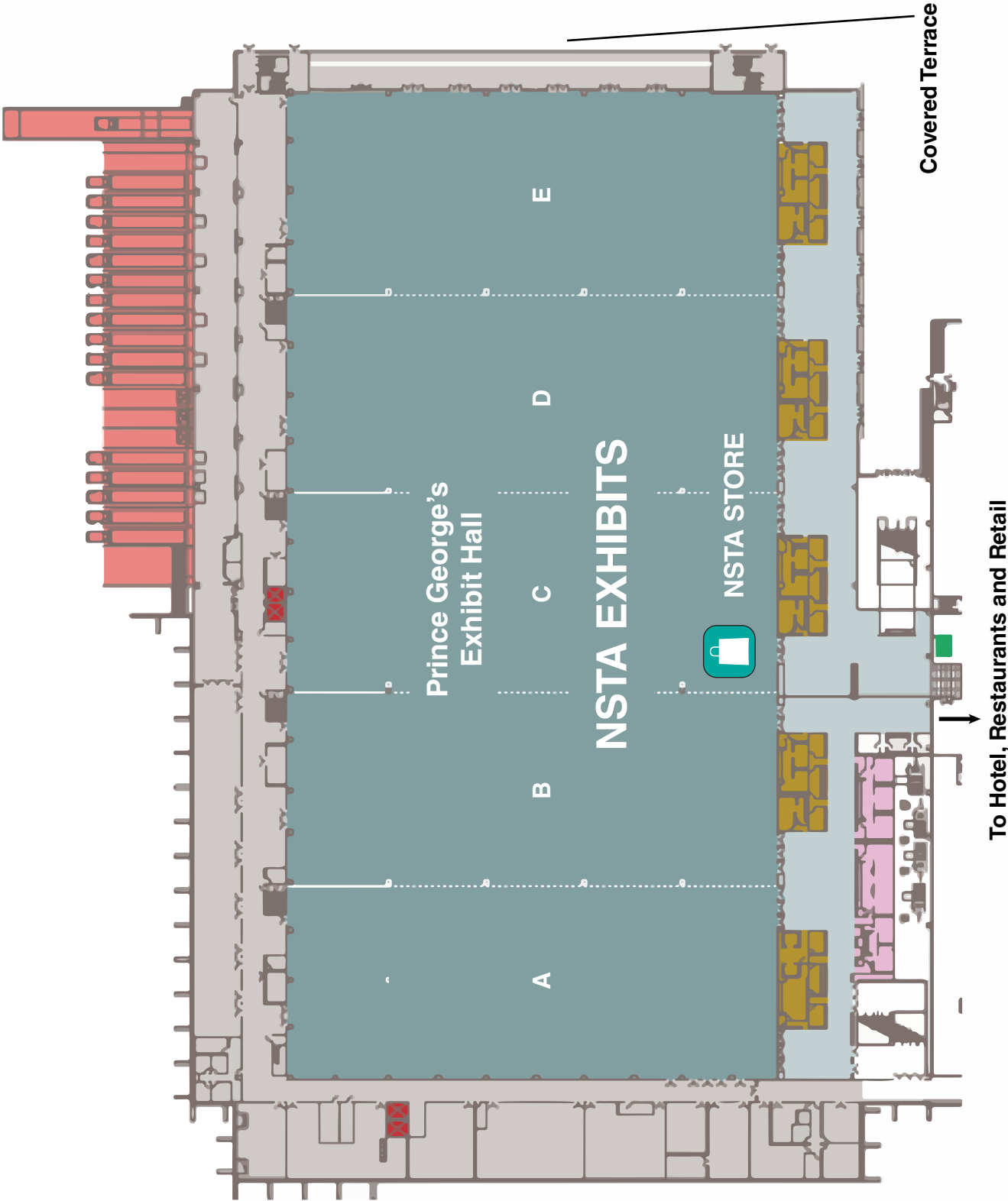
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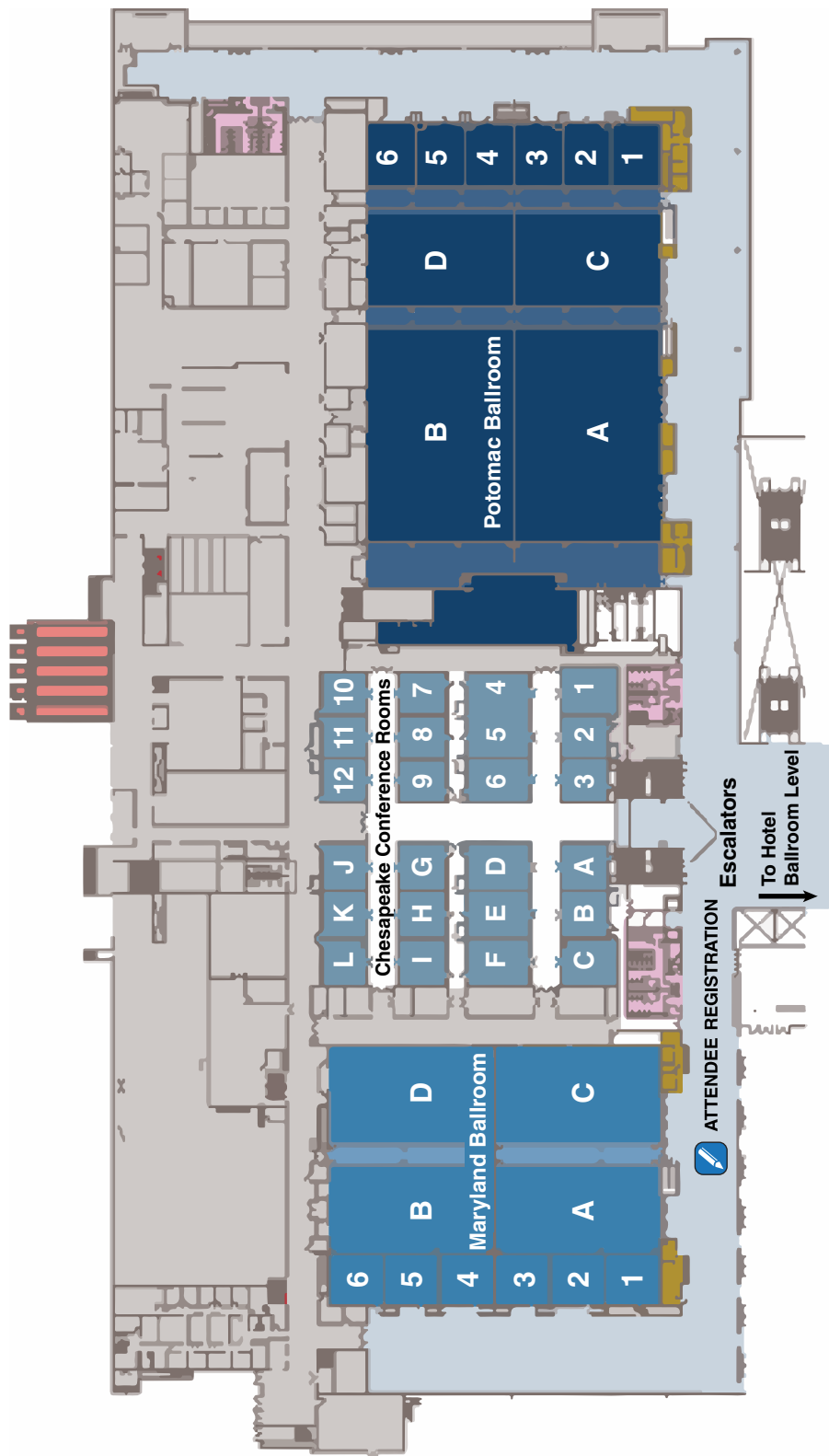
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Exhibition Level

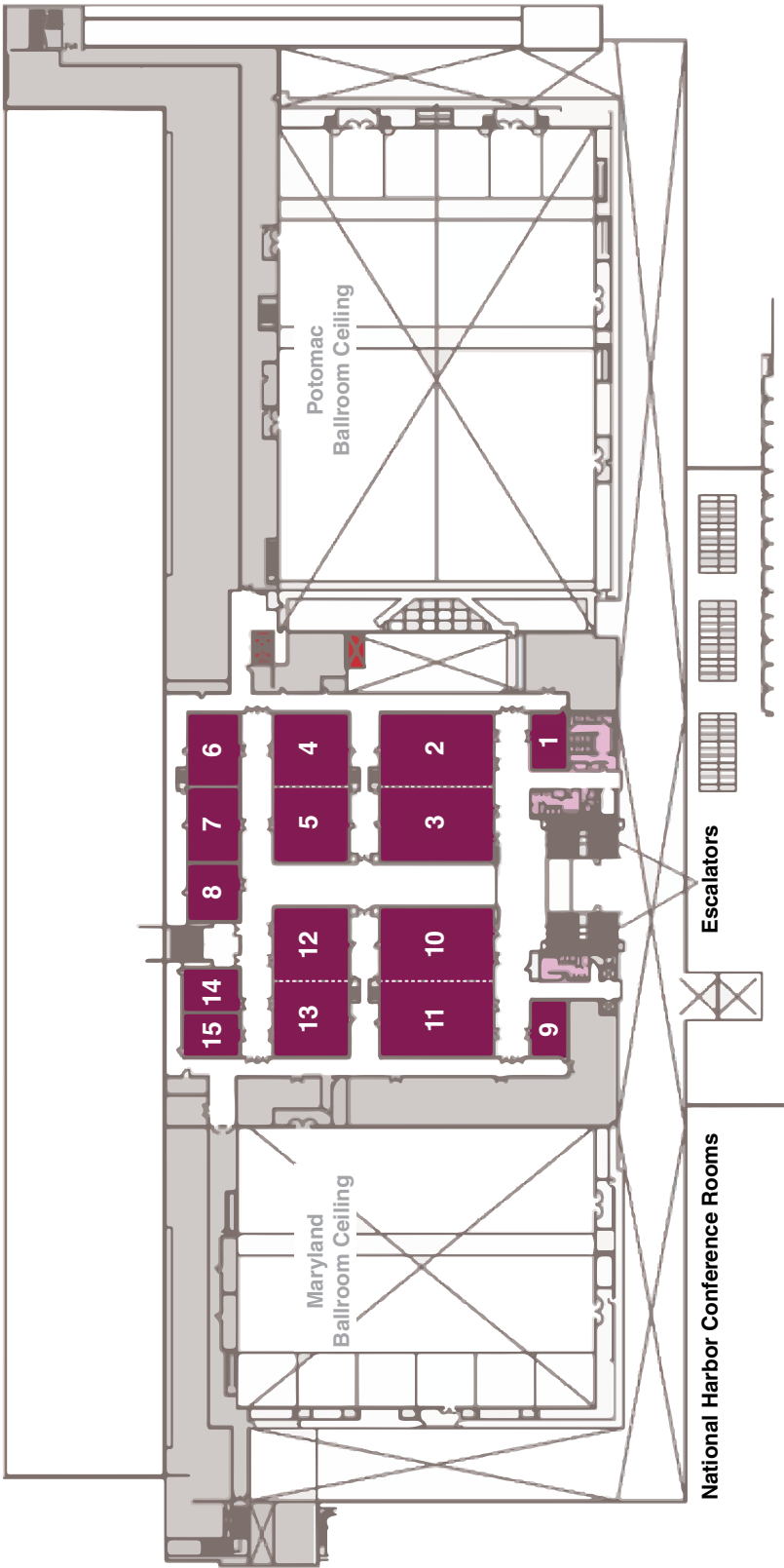


Ballroom Level



Gaylord National Resort & Convention Center

Conference Rooms



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csl.nsta.org

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.

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NSTA Mission Statement

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

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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!

NSTA's CONFERENCES ON SCIENCE EDUCATION

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*

San Francisco, CA July 24–26 (2019)

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

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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.)

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.

Thursday, November 15

8:00–9:00 AM	First-Timer Conference Attendees' Orientation	34
	(Is This Your First NSTA Conference?)	
9:15–10:30 AM	Keynote Presentation: Mireya Mayor, sponsored by National Geographic Learning Cengage	37
11:00 AM–5:00 PM	Exhibits (Exclusive exhibit/exhibitor workshop hours: 11:00 AM–12:30 PM)	41
2:00–3:00 PM	Featured Presentation: Heidi Schweingruber	46

Friday, November 16

8:00 AM–1:30 PM	Middle School Chemistry Day	28
8:00 AM–1:30 PM	High School Chemistry Day	28
8:00 AM–1:30 PM	Engineering Day	29
9:00 AM–4:00 PM	Exhibits (Exclusive exhibit/exhibitor workshop hours: 3:00–4:00 PM)	66
9:30–11:30 AM	Featured Presentation: Ned Tillman	72
12:30–2:00 PM	MAST Luncheon (Visit www.emast.org to purchase tickets) Speaker: Matt Krehbiel	83
2:00–3:00 PM	Featured Panel Discussion (Moderator: David L. Evans)	84
2:45–3:30 PM	Meet the Presidents and Board/Council	89

Saturday, November 17

9:00 AM–12 Noon	Exhibits	95
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Win a round-trip Southwest ticket to the NSTA National Conference on Science Education in St. Louis, Missouri



Thanks to the generosity of

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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.





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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

9:30–10:00 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 Rodríguez; 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

11:00–11:30 AM

Insect Inspection: Developing Science Practices Through Field Investigations

11:30 AM–12 Noon

Science Current Events Journals: Real Science and Media Literacy

12:30–1:30 PM

Scientific Literacy Requires Literacy

2:00–3:00 PM

Smart Devices: Data Collection, Analysis, and Reporting

Saturday, November 17

8:30–9:00 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

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*



- 12:30–1:30 PM Uncovering Elementary Students' Ideas About Science, Math, and Literacy
- 2:00–3:00 PM *Next Time You See—Sparkling Curiosity and Wonder with Natural Objects and Phenomena*

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



Sponsored by the American Chemical Society

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



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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**

Admission to this NSTA short course is by ticket only. Tickets, if still available, may be purchased at the Ticket Sales Counter in the Attendee Services Area.



Academic Vocabulary Through Engaging Phenomena (SC-1)

Kate Gallagher (@Cat5Kate: kate.gal56@gmail.com), RISE Community School, Berkeley, CA

Joanna Totino (jtoto@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

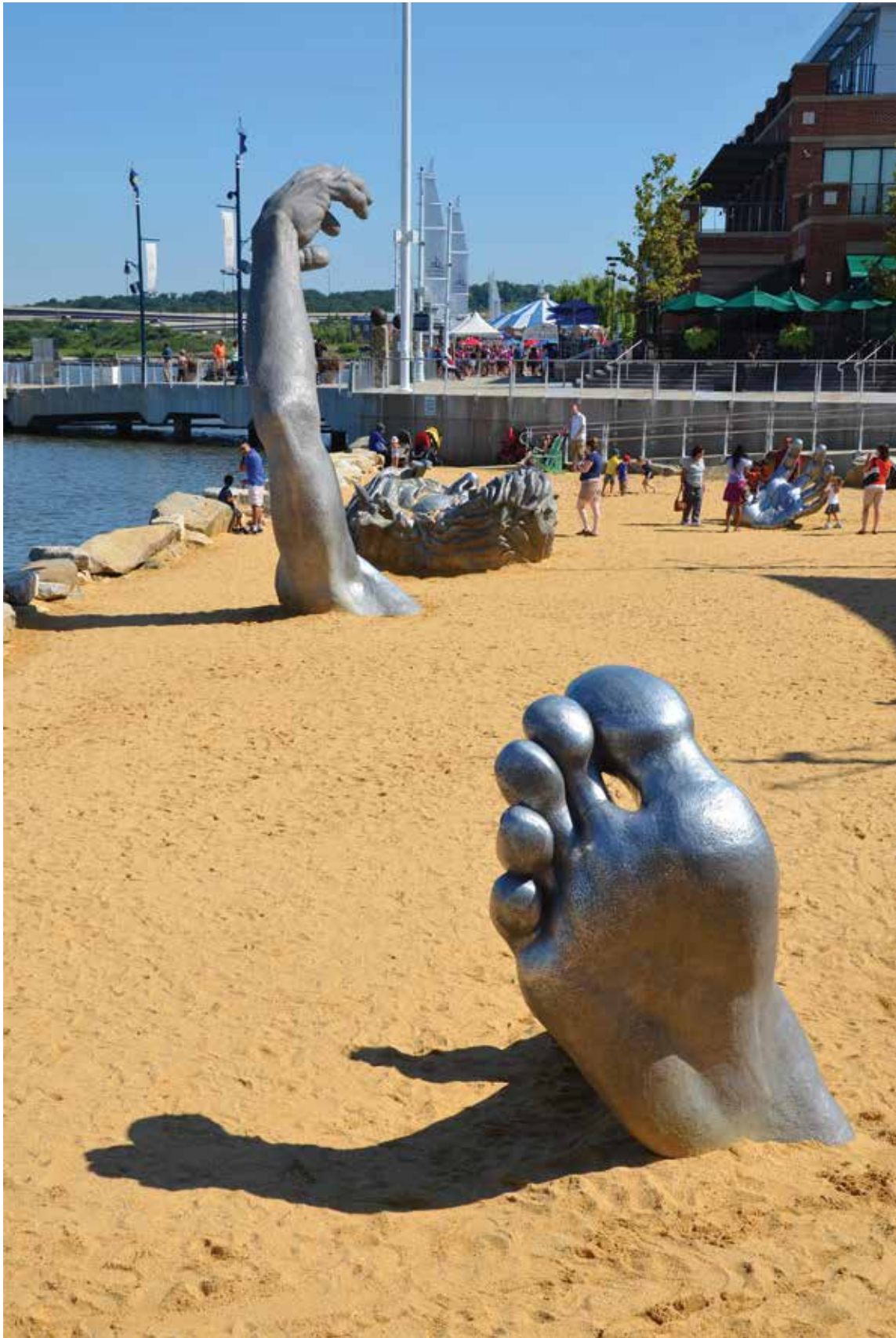
Twenty-five complimentary tickets will be available to NSTA conference attendees to tour Local Motors. During the tour, get updated information about the Olli, the world’s first co-created, self-driving, electric, cognitive shuttle that integrates IBM Watson. The tour will also feature heritage showroom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

Three Dimensions of the Next Generation Science Standards (NGSS)

Science and Engineering Practices	Crosscutting Concepts
SEP1 Asking Questions and Defining Problems SEP2 Developing and Using Models SEP3 Planning and Carrying Out Investigations SEP4 Analyzing and Interpreting Data SEP5 Using Mathematics and Computational Thinking SEP6 Constructing Explanations and Designing Solutions SEP7 Engaging in Argument from Evidence SEP8 Obtaining, Evaluating, and Communicating Information	CCC1 Patterns CCC2 Cause and Effect: Mechanism and Explanation CCC3 Scale, Proportion, and Quantity CCC4 Systems and System Models CCC5 Energy and Matter: Flows, Cycles, and Conservation CCC6 Structure and Function CCC7 Stability and Change

Disciplinary Core Ideas

Disciplinary Core Ideas in Physical Science	Disciplinary Core Ideas in Life Science	Disciplinary Core Ideas in Earth and Space Science	Disciplinary Core Ideas in Engineering, Technology, and the Application of Science
PS1: Matter and Its Interactions PS1.A: Structure and Properties of Matter PS1.B: Chemical Reactions PS1.C: Nuclear Processes PS2: Motion and Stability: Forces and Interactions PS2.A: Forces and Motion PS2.B: Types of Interactions PS2.C: Stability and Instability in Physical Systems PS3: Energy PS3.A: Definitions of Energy PS3.B: Conservation of Energy and Energy Transfer PS3.C: Relationship Between Energy and Forces PS3.D: Energy in Chemical Processes and Everyday Life PS4: Waves and Their Applications in Technologies for Information Transfer PS4.A: Wave Properties PS4.B: Electromagnetic Radiation PS4.C: Information Technologies and Instrumentation	LS1: From Molecules to Organisms: Structures and Processes LS1.A: Structure and Function LS1.B: Growth and Development of Organisms LS1.C: Organization for Matter and Energy Flow in Organisms LS1.D: Information Processing LS2: Ecosystems: Interactions, Energy, and Dynamics LS2.A: Interdependent Relationships in Ecosystems LS2.B: Cycles of Matter and Energy Transfer in Ecosystems LS2.C: Ecosystem Dynamics, Functioning, and Resilience LS2.D: Social Interactions and Group Behavior LS3: Heredity: Inheritance and Variation of Traits LS3.A: Inheritance of Traits LS3.B: Variation of Traits LS4: Biological Evolution: Unity and Diversity LS4.A: Evidence of Common Ancestry and Diversity LS4.B: Natural Selection LS4.C: Adaptation LS4.D: Biodiversity and Humans	ESS1: Earth's Place in the Universe ESS1.A: The Universe and Its Stars ESS1.B: Earth and the Solar System ESS1.C: The History of Planet Earth ESS2: Earth's Systems ESS2.A: Earth Materials and Systems ESS2.B: Plate Tectonics and Large-Scale System Interactions ESS2.C: The Roles of Water in Earth's Surface Processes ESS2.D: Weather and Climate ESS2.E: Biogeology ESS3: Earth and Human Activity ESS3.A: Natural Resources ESS3.B: Natural Hazards ESS3.C: Human Impacts on Earth Systems ESS3.D: Global Climate Change	ETS1: Engineering Design ETS1.A: Defining and Delimiting an Engineering Problem ETS1.B: Developing Possible Solutions ETS1.C: Optimizing the Design Solution ETS2: Links Among Engineering, Technology, Science, and Society ETS2.A: Interdependence of Science, Engineering, and Technology ETS2.B: Influence of Engineering, Technology, and Science on Society and the Natural World



Sprawling 70 feet across the National Harbor beach, *The Awakening* is an aluminum sculpture of a buried giant created by Seward Johnson.

NSTA National Harbor Area Conference on Science Education

Professional Development Documentation Form

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.

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.

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.

Thursday, November 15 8:00 AM–6:00 PM[illegible]

Friday, November 16 8:00 AM–5:00 PM

[illegible]

Saturday, November 17 8:00 AM–5:00 PM

[illegible]

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-rcain@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



Sessions highlighting STEM learning experiences that occur in out-of-school environments.

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 (jbcrawford@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 (ceculbe@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

Science Focus: ESS3.C, ETS2.B, LS4.D, CCC2, CCC3, CCC6, SEP

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

Science Focus: ESS3.C, LS2.C, LS4.D, CCC1, CCC3, SEP4, SEP5

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 Exhibitor Workshops

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

Science Focus: ESS2.D, ESS3.B, ETS1.A, ETS1.B, PS3.B, 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.”

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.

INF 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*

Science Focus: LS1.A, LS1.B, LS3.A, LS3.B, LS4.B, CCC6, SEP1, SEP2, SEP6, SEP7, SEP8

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!

11:00 AM–12 Noon Exhibitor Workshops

Autopsy: Forensic Dissection Featuring Carolina's Perfect Solution® Pigs

(Grades 9–12) *National Harbor 10, Convention Center*

Science Focus: LS

Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

Ready for a dissection that is on the cutting edge? With this “real” classroom autopsy, easily revitalize your mammalian structure and function lesson while employing three-dimensional instruction. Dissect a Carolina's Perfect Solution pig by modeling the protocols of a professional forensic pathologist. Come experience our exclusive Perfect Solution specimens.

NGSS—Chemical Reactions: Designing Better Chemical Batteries

(Grades 6–8) *National Harbor 11, Convention Center*

Science Focus: ETS1.B, ETS1.C, PS1.B, CCC5, SEP6

Sponsor: Lab-Aids, Inc.

Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, SC
Students investigate how chemical energy can be transformed via a chemical process into electrical energy. After building a prototype wet cell, students brainstorm improvements and build, test, and evaluate new prototypes to meet a set of predetermined criteria within specified constraints.

Embedding Practices and Crosscutting Concepts into Hands-On Science

(Grades 3–5) *National Harbor 12, Convention Center*

Science Focus: GEN, NGSS

Sponsor: ScienceFLEX & MakerSpace/School Specialty Science

Mary Anne Feller, Sts. Peter and Paul Catholic School, Haubstadt, IN

Find out how to unleash the power of these two dimensions. Come be a student and experience ScienceFLEX lessons that give the crosscutting concepts and science and engineering practices the attention they deserve. Leave with materials and strategies you can use in your classroom next week.

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 (sherri_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.

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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** (abear@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 Closer 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 (@aflyonthepole; 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*
Science Focus: ESS2.C, ESS3.A, ESS3.C, LS2.A, LS2.C, LS2.D

Laura Johnson Collard (@MAEOE_MD; director@maeoe.org) and **Winnie 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.

NMLSTA-Sponsored Session: What Is Even More Amazing than Google Earth? ISS EarthKAM!

(Grades 4–10) *Maryland 3, Convention Center*
Science Focus: ESS1.B, ESS2.C, ESS2.D, ESS3.C, ESS3.D, ETS2.A, CCC1, CCC3, CCC4, SEP2, SEP4, SEP7

David Curry (@CarlSaganRox; scienceguydave@mac.com), Council Rock School District, Newtown, PA

Dan Leppold (@dolostone; dlepp@spring-ford.net), Spring-Ford Area School District, Royersford, PA

Presider: Mary Lou Lipscomb (mllscience@aol.com), National Middle Level Science Teachers Association, Naperville, IL
Find out how students at Holland Middle School in suburban Philadelphia use NASA's innovative, free ISS EarthKAM program to take pictures from the International Space Station.



NSTA Press® Session: Instructional Sequence Matters—Structuring Lessons with the NGSS in Mind

(Grades 5–8) *Woodrow Wilson D, Convention Center*
Science Focus: GEN, NGSS

Patrick Brown (@brownpatrick8; patbrown@fz.k12.mo.us), Fort Zumwalt School District R-II, O'Fallon, MO

Find out how to be an explore-before-explain teacher who structures lessons so student evidenced-based claims are the foundation for learning and promote long-lasting physical science understanding.



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, CCC4, 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 (cindyjgay@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!

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 Bartell Huey** (kjbhuey@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 (hscweingruber@nas.edu), The National Academies of Sciences, Engineering, and Medicine, Washington, DC

President: 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 (mllscience@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, SEP1, SEP2, SEP3, SEP4, SEP5, SEP6, SEP8

Kristine Saja (ksaja@bcps.org) and **Stephanie Whitehead** (swhitehead@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 (jlteisan@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 Knoell (dknoell@sbcglobal.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 LeFebvre (@ProjectWILD; mlefebvre@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: Scaffolding 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; mstapleton@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

Science Focus: PS2.A, PS3.A, PS3.B, PS3.C, CCC, SEP

Amy Truemper (@NEED_Project; kswan@need.org), Bednarck 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

Science Focus: ESS2.A, ESS2.C, ESS2.D, ESS3.A, CCC2, CCC4, CCC5, SEP

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 (@drjongrooms; 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.

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).

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?



INF 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; goesixers@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.



3:30–4:30 PM 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, Newton, 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*

Science Focus: PS3.A, PS3.B, CCC5, SEP3, SEP4

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 Bio-Molecular 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.

RESCHEDULED TO
12:30–1:30 PM
(see Program Changes)

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

Science Focus: ESS2.C, ESS2.D, ESS3, LS2.A, LS3, LS4.D, CCC, SEP1, SEP4, SEP7, SEP8

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 (jmscaro@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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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

Science Focus: ESS2.D, ESS3.C, ESS3.D, LS2, CCC1, CCC2, CCC5, SEP

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

Winnie 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.

INF 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 (jlteisan@gmail.com), Network of Michigan Educators, Grosse Pointe Woods

John Smith (@jftrey; jf.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@https.us) and **Anjana Iyer** (@AnjanaIyer; aiyer@https.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@tpsnva.org) and **Cynthia Szwajkowski** (cynthia@tpsnva.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; jonterlee@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; tskelton@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

INF 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.





—Photo courtesy of Gaylord National Resort & Convention Center

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*
Science Focus: ESS1.A, ESS1.C, ESS2.A, ESS2.B, ESS2.D, ESS3.C, ETS1.B, ETS2, PS1.A, PS1.B, PS2, PS3.C, PS4.B, SEP1, SEP2, SEP3, SEP4, SEP5, SEP7, SEP8

Donna Young (*dlyoung.nso@gmail.com*), NASA/NSO UoL 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*
Science Focus: ETS, PS1.A, PS1.B, PS2.B, PS2.C, PS3, CCC2, CCC3, CCC4, CCC5, CCC6, CCC7, SEP1, SEP2, SEP3, SEP4, SEP7

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, SEP1, 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.

NESTA Session: Making Complex Ocean-Atmosphere Connections Easily Understood: A Hands-On Approach for Learning ENSO

(Grades 6–12)

Maryland A, Convention Center

Science Focus: ESS2

Suzanna Ribblett (sribblett@mountdesales.org), Mount de Sales Academy, Catonsville, MD

Michael Passow (mjpassow@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.



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
Science Focus: ESS2.D, ESS3.C, ESS3.D, LS2.A, LS2.C, CCC2, CCC5, CCC7

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@joli86.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.

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.

9:00 AM–4:00 PM Exhibits

Hall C, Convention Center

Did you know that NSTA offers exclusive exhibit hall and exhibitor workshop hours today from 3:00 to 4:00 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.

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; jmutegi@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 (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."

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 (*avandenberga@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** (*chelseajmclure@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*
Science Focus: ESS2.C, ESS2.D, ESS3.B

Wendy Abshire (*@AMSeducation; 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 Goopy 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; rellis@carrollk12.org) and **Amy Levine** (amlevin@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

Science Focus: LS1.B, LS1.C, LS2, LS4.C, LS4.D, SEP1, SEP3, SEP4, SEP5, SEP6, SEP7

Ruth Gallagher (@RNatureGal; ruth_gallagher@hcpps.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 (texlej@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), IIT 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; judy23@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.

CANCELED

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 (@AEEEngEdu; 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; 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.

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.



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.

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: 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

Science Focus: LS1.C, LS2.B, PS3, CCC4, CCC5, SEP2, SEP6

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

form. Learn to use this tool to assess student understanding and as a jumping-off point for teaching modeling.

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*

Science Focus: PS4.A, PS4.B, CCC1, SEP3, SEP5, SEP6

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!

Establishing an Orangutan Reserve: Phenomena and 3-D Instruction for Grades 2–5

(Grades 2–5) *National Harbor 6, Convention Center*

Science Focus: ESS2.D, ESS3.B, ETS1, CCC1, SEP1, SEP3, SEP4, SEP5, SEP7, SEP8

Sponsor: Amplify

Sophia Lambertsen and **Rebecca Abbott**, The Lawrence Hall of Science, University of California, Berkeley

Experience how students investigate which locations are most suitable for a population of orangutans while analyzing data and figuring out principles of global weather and climate patterns. Get a hands-on deep dive into the newest curriculum from The Lawrence Hall of Science, designed from the ground up for NGSS.

Chemistry with Vernier

(Grades 9–12) *National Harbor 7, Convention Center*

Science Focus: ETS, PS

Sponsor: Vernier Software & Technology

David Carter, Vernier Software & Technology, Beaverton, OR

Discover how Vernier supports chemistry teachers who want their students to use probeware. A variety of experiments from our popular chemistry lab books will be conducted. Learn how our innovative data-collection technology works across multiple platforms such as LabQuest 2, computer, Chromebook, and iPad.

Sleep Lab: Are You a Genetic Owl or Lark?

(Grades 7–College) *National Harbor 8, Convention Center*

Science Focus: LS1, LS3, LS4, CCC4, CCC6, SEP1, SEP2, SEP3, SEP4, SEP6, SEP7, SEP8

Sponsor: miniPCR

Emily Gleason (emily@minipcr.com), miniPCR, Cambridge, MA

The miniPCR Sleep Lab links the genetic control of circadian rhythms to students' own DNA. Use PCR to amplify a locus associated with preference for morning versus evening activity, and DNA gel electrophoresis to read your own circadian genotype. Students explore a genetic association in an authentic research investigation.

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.savingthelaces.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.savingthelaces.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

Science Focus: LS1.A, LS1.B, LS2, CCC3, CCC6, SEP

Marc LeFebvre (@ProjectWILD; mlefebvre@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."



Bridging the Gap: Equity for Girls and Minorities in the Science Classroom

(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** (abear@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 (nolanp@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** (@kburtonr; 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 (*laganam@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; clesh@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 (*jparator@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** (*jgurganus@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*
Science Focus: ESS1.A, ETS2.A, PS4.B, PS4.C, CCC1, CCC4, SEP

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 (rkmacdonald@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*

Science Focus: ESS1.A, ESS1.B, ESS2.A, ESS2.C, ESS2.D, ESS3.C, ESS3.D, CCC2, CCC4, SEP2, SEP7, SEP8

Christopher Roemmele (@CROems66WCU; 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.

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 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.



11:00 AM–12 Noon Exhibitor Workshops
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 (jevans@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 Bio-Molecular 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

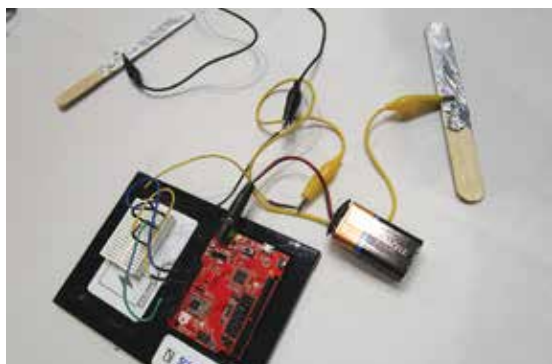
(Grades K–5) National Harbor 8, Convention Center

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 5–12)

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 (anthonkj@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*

Science Focus: ESS1.A, ETS1.A, ETS1.B, PS1, PS2, PS3.B, PS3.C, PS4.B, CCC1, CCC2, CCC4, CCC7, SEP2, SEP4, SEP5, SEP7, SEP8

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 (vwesner@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.



NSTA Press® Session: Uncovering Elementary Students' Ideas About Science, Math, and Literacy

(Grades K–5)

Woodrow Wilson D, Convention Center

Science Focus: GEN, NGSS

Page Keeley (@CTSKeeley; pagekeeley@gmail.com), 2008–2009 NSTA President, and The Keeley Group, Fort Myers, FL

Amy Ryan (amy.ryan@hcps.org), Harford County Public Schools, Forest Hill, MD

Explore how the *Uncovering Student Ideas in Science K–5* probes combined with formative assessment classroom techniques (FACTs) inform instruction, and support learning in science, mathematics, and literacy.

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.

Exploring Practices, Nature of Science, and Science in Society: Analyzing Historical Primary Sources from the Library of Congress

(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

Science Focus: ESS3.A, ESS3.C, ESS3.D, LS2.A, LS4.D, CCC1, CCC2, CCC3, CCC7, SEP

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 Level 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 (@WSHstarkier; 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/1ucrlvtJtWNTU-QHPBPY8x-izbOw0rx/view) and these images (drive.google.com/drive/folders/1i98-k5vT8vauEFxQxdW-Ptff9KweQ1ir) 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

President: 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 Neuro-nal 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** (cmclur4@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!

2:00–3:00 PM Featured Panel Discussion



Advocacy and Equity: Empowering Teachers to Speak Out

(General)

Maryland C, Convention Center

Science Focus: GEN



David Evans



Laura Casdorff



Maya Garcia



John B. King, Jr.



Roberto J. Rodríguez



Mary Thurlow

Moderator:

David Evans, NSTA Executive Director, Arlington, VA

Panelists:

Laura Casdorff, Director of Pre-AP Chemistry/Physical Science Curriculum and Instruction, The College Board National Office, New York, NY

Maya Garcia (maya.garcia@dc.gov), Director of STEM, D.C. Office of the State Superintendent of Education, Washington, DC

John B. King, Jr. (@johnbking), President and CEO, The Education Trust, Washington, DC

Roberto Rodríguez (@RRodriguezTPlus; rrodriguez@teachplus.org), President and CEO, Teach Plus, Washington, DC

Mary Thurlow, Coordinator for Science, Division of Curriculum, Instructional Improvement, and Professional Learning; Maryland State Dept. of Education, Baltimore

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 Casdorff 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***(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@maeoe.org) and **Winny Tan** (@MAEOE_MD; greenschools@maeoe.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.



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 Fedak (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@doe.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*

Science Focus: LS1.D, LS3, LS4.B, LS4.C, CCC2, SEP6

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 Bio-Molecular 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)

(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

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 (@mcassidy29; 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 (mh111@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@ppsstaff.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 (etekely@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 (@lissavincent89; 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 (texlej@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@chclc.org), Cherry Hill (NJ) Public Schools

Laura Casdorph (lcasdorph@gmail.com), The College Board National Office, New York, NY

Lisa Powelson (mpowelson@chclc.org), Cherry Hill High School West, Cherry Hill, NJ

Facilitated by NSTA's High School Committee, join in to discover NSTA 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 1, 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; vwesner@aacps.org) and **Kate Adams** (@aacps_k5science; kdobrzenski@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_patrick@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.

9:30–10:30 AM Presentations



STEM and ELLs: The Perfect Fit

(Grades P–5)

Annapolis 3, Convention Center

Science Focus: ETS1, ETS2.B, SEP2, SEP3, SEP8

Christine Ramirez (@MissRamirez01; christine_e_ramirez@mcpsmd.org), Kemp Mill Elementary School, Silver Spring, MD

Zulay Joa (@Zulay81203344; 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 Settlemyre (mjsettlemyre@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

Science Focus: ESS3.A, ESS3.B, ESS3.C, ETS1.B, ETS1.C, ETS2, PS1.A, PS1.B, PS2, PS3.A, PS3.B, PS3.C, CCC, SEP1, SEP2, SEP3, SEP4

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.



NSTA Press® Session: Everyday Science Mysteries

(Grades 1–8) Woodrow Wilson D, Convention Center

Science Focus: ETS

Richard Konicek-Moran (rkonicek@gmail.com), Professor Emeritus, UMass Amherst, MA

Kathleen Konicek-Moran (@KKonmor; kathleen.kon-mor@gmail.com), Botanical Illustrator and Nature Artist, Bradenton, FL

See how this series can enliven literacy in your classroom, and lead to scientific research activities.

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

Science Focus: ESS2.D, PS1.A, PS1.B, CCC6, SEP2, SEP3, SEP6

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

Science Focus: ESS2.C, ESS3.C, PS1.B, PS2.C

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!

Middle School Matters: Modeling with Magnetic Water Molecules

(Grades 5–9) National Harbor 14, Convention Center

Science Focus: ESS2, ESS3, LS1, LS2, PS1, PS2, CCC, SEP1, SEP2, 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

ENGAGE students by modeling chemical and physical properties of water using magnetic water molecules. EXPLORE common phenomena such as density, erosion, and weathering. Construct physical representations to EXPLAIN the phases of water, density, and solubility. ELABORATE on the water cycle and its impact on the ecosystem. EVALUATE student learning with models.

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.

INF 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 (@mirandaoutside; mcrotsley@pa.gov), Jennings Environmental Education Center, Slippery Rock, PA

Sandra Strosko (stroskos@cmsd.k12.pa.us), **Emily Lohrer** (lohreere@cmsd.k12.pa.us), and **Ken Crowley** (crowleyk@cmsd.k12.pa.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; pagekeeley@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 1, Convention Center

Science Focus: LS4.B, LS4.C, CCC2, CCC6, CCC7

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; vwesner@aacps.org) and **Kate Adams** (@AACPS_K5Science; kdobrzanski@aacps.org), Anne Arundel County Public Schools, Annapolis, MD
Kevin Garner (@AACPS_912Scienc; 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 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@greenestreet-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 Bio-Molecular 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
Earth/Space Science	EA
Engineering	ENG
Environmental Science	ENV
Integrated/General Science	G
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Exhibit Hall maps are available on the conference app.

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B

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#606

C, EA, ENG, ENV,

G, M, PD, PH

K–12

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All

PreK–12

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E-mail: judy@nise.institute

Website: www.getstemcertified.com

#322

PD

PreK–12

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3D Molecular Designs (Booth #614)

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Friday, Nov.16	9:30–10:30 AM	National Harbor 14, Conv. Center	DNA Forensics Solves the Murder Mystery of Dr. Ward (p. 70)

miniPCR (Booth #420)

Friday, Nov.16	8:00–9:00 AM	National Harbor 8, Conv. Center	DNA Glow Lab: A New Way to Investigate DNA Structure (p. 65)
Friday, Nov.16	9:30–10:30 AM	National Harbor 8, Conv. Center	Sleep Lab: Are You a Genetic Owl or Lark? (p. 71)

MSOE Center for BioMolecular Modeling (Booth #614)

Thursday, Nov.15	3:30–4:30 PM	National Harbor 14, Conv. Center	“Going with the Flow” of Genetic Information (p. 55)
Friday, Nov.16	2:00–3:00 PM	National Harbor 14, Conv. Center	Genome Editing with CRISPR: Connections to What You Already Teach (p. 88)
Saturday, Nov.17	11:00 AM–12 Noon	National Harbor 14, Conv. Center	A Visual Journey Through the Human Cell Using Watercolor Landscapes (p. 101)

National Geographic (Booth #621)

Friday, Nov.16	2:00–3:00 PM	National Harbor 12, Conv. Center	National Geographic’s Geo-Inquiry Process in Action! (p. 87)
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National Geographic Learning | Cengage (Booth #621)

Thursday, Nov.15	2:00–3:00 PM	National Harbor 8, Conv. Center	Building the Human Connection with National Geographic Learning (p. 51)
Friday, Nov.16	11:00 AM–12 Noon	National Harbor 8, Conv. Center	Making the Literacy Connection, National Geographic Learning Style (p. 77)

National Inventors Hall of Fame/ Camp Invention (Booth #223)

Thursday, Nov.15	9:30–10:30 AM	National Harbor 13, Conv. Center	The Longitudinal Results of Camp Invention’s STEAM Pedagogy (p. 38)
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PASCO (Booth #523)

Friday, Nov.16	8:00–9:00 AM	National Harbor 12, Conv. Center	Motion Graphing: Connecting Math Concepts to Displacement, Speed, and Velocity (p. 64)
Friday, Nov.16	9:30–10:30 AM	National Harbor 12, Conv. Center	Data Collection and Simulations to Help Take the Pressure Out of Understanding Gas Laws (p. 70)

ScienceFLEX & MakerSpace/School Specialty Science (Booth #327)

Thursday, Nov.15	8:00–9:00 AM	National Harbor 12, Conv. Center	Developing and Using Models with Augmented Reality (p. 36)
Thursday, Nov.15	9:30–10:30 AM	National Harbor 12, Conv. Center	How to Argue in an Elementary Science Class (p. 38)
Thursday, Nov.15	11:00 AM–12 Noon	National Harbor 12, Conv. Center	Embedding Practices and Crosscutting Concepts into Hands-On Science (p. 39)
Thursday, Nov.15	12:30–1:30 PM	National Harbor 12, Conv. Center	Making Science Accessible Through Blended Hands-On and ELA (p. 45)
Thursday, Nov.15	2:00–3:00 PM	National Harbor 12, Conv. Center	Boosting the Makerspace Experience for Young Scientists! (p. 50)
Thursday, Nov.15	3:30–4:30 PM	National Harbor 12, Conv. Center	How to Argue in an Elementary Science Class (p. 55)

Simulation Curriculum Corp. (Booth #605)

Thursday, Nov.15	11:00 AM–12 Noon	National Harbor 2, Conv. Center	Space Science for the Modern, Interactive Classroom (p. 40)
Friday, Nov.16	11:00 AM–12 Noon	National Harbor 2, Conv. Center	Earth Science for the Modern, Interactive Classroom (p. 76)

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South Dakota State University (Booth #219)

Thursday, Nov.15	3:30–4:30 PM	National Harbor 13, Conv. Center	Enhancing Chemistry Content Through an Online Master's Degree in Chemistry (p. 55)
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STEMscopes (Booth #321)

Friday, Nov.16	8:00–9:00 AM	National Harbor 4, Conv. Center	Demystifying 3-D, the NGSS, and STEM Literacy Through the Phenomenon of Earthquakes (p. 65)
Friday, Nov.16	9:30–10:30 AM	National Harbor 4, Conv. Center	Demystifying 3-D, the NGSS, and STEM Literacy Using the Phenomenon of Light (p. 71)
Friday, Nov.16	11:00 AM–12 Noon	National Harbor 4, Conv. Center	STEM Teacher-Science Teacher: What's the Difference? (p. 77)
Friday, Nov.16	12:30–1:30 PM	National Harbor 4, Conv. Center	Using Argumentation to Discuss Phenomena: Increasing Student Voice in the STEM Classroom (p. 82)

TCI (Booth #422)

Thursday, Nov.15	2:00–3:00 PM	National Harbor 15, Conv. Center	Analyzing and Interpreting Data Using TCI's Bring Science Alive! (p. 50)
Thursday, Nov.15	3:30–4:30 PM	National Harbor 15, Conv. Center	Science and Engineering Practices in the NGSS (p. 55)
Friday, Nov.16	8:00–9:00 AM	National Harbor 15, Conv. Center	Engineering Design in the NGSS (p. 64)
Friday, Nov.16	11:00 AM–12 Noon	National Harbor 15, Conv. Center	Performance Assessments: Engaging and Fun! (p. 76)
Friday, Nov.16	12:30–1:30 PM	National Harbor 15, Conv. Center	Phenomena-Driven Lessons for the Middle School Classroom (p. 82)

Texas Instruments (Booth #527)

Thursday, Nov.15	12:30–1:30 PM	National Harbor 6, Conv. Center	Are You Moody? (p. 45)
Thursday, Nov.15	2:00–3:00 PM	National Harbor 6, Conv. Center	Using Maggots, Flies, and Flesh to Solve a Mystery! (p. 51)
Thursday, Nov.15	3:30–4:30 PM	National Harbor 6, Conv. Center	Zombie Apocalypse! (p. 56)
Friday, Nov.16	12:30–1:30 PM	National Harbor 6, Conv. Center	STEMulating the Heart with Code! (p. 82)
Friday, Nov.16	2:00–3:00 PM	National Harbor 6, Conv. Center	Zombies Get OUT! (p. 88)

Vernier Software & Technology (Booth #417)

Friday, Nov.16	8:00–9:00 AM	National Harbor 7, Conv. Center	Integrating Chromebook with Vernier Data-Collection Technology (p. 65)
Friday, Nov.16	9:30–10:30 AM	National Harbor 7, Conv. Center	Chemistry with Vernier (p. 71)
Friday, Nov.16	11:00 AM–12 Noon	National Harbor 7, Conv. Center	Biology with Vernier (p. 77)
Friday, Nov.16	12:30–1:30 PM	National Harbor 7, Conv. Center	Integrating Chromebook with Vernier Data-Collection Technology (p. 82)
Friday, Nov.16	2:00–3:00 PM	National Harbor 7, Conv. Center	Integrating iPad with Vernier Data-Collection Technology (p. 89)
Friday, Nov.16	3:30–4:30 PM	National Harbor 7, Conv. Center	Physics and Physical Science with Vernier (p. 91)

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11/16

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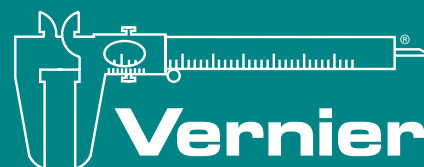
No pre-registration required

Time	Room National Harbor 7
8:00–9:00 a.m.	Integrating Chromebook™ with Vernier Data-Collection Technology
9:30–10:30 a.m.	Chemistry with Vernier
11:00–12:00 p.m.	Biology with Vernier
12:30–1:30 p.m.	Integrating Chromebook™ with Vernier Data-Collection Technology
2:00–3:00 p.m.	Integrating iPad® with Vernier Data-Collection Technology
3:30–4:30 p.m.	Physics and Physical Science with Vernier

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