NSTA AREA CONFERENCE ON SCIENCE EDUCATION

MAKING SCIENCE ACCESSIBLE

FULL SPEED AHEAD

BALTIMORE

OCTOBER 5–7

2017

#NSTA17

NSTA National Science Teachers Association

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4 FREE Workshops • Friday, Oct 6th, 2017 • Room #337
(See program for more details.)

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Save up to 50% on our bestselling titles...

When you sign up for or renew your NSTA membership, select the book club membership option, choose three books from any grade level and on topics readers love—*NGSS*, STEM, literacy, assessment, and more—then wait for your favorite books to arrive on your doorstep while enjoying all of your other NSTA member benefits.

See all membership options, including regular, new teacher, and institutional memberships, at *www.nsta.org/membership*

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www.nsta.org/bookclub

NSTA National Science Teachers Association

ARMY EDUCATIONAL OUTREACH PROGRAM

eCYBERMISSION

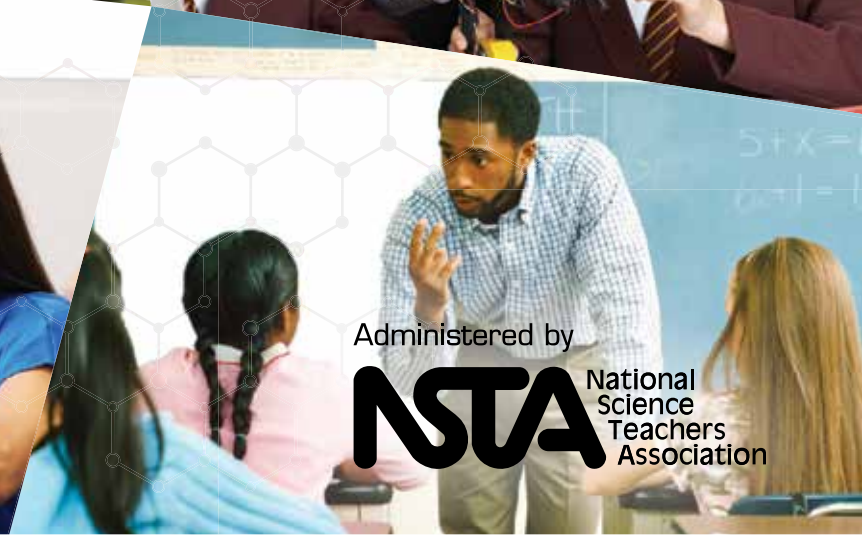
ACCEPT THE CHALLENGE

U.S.ARMY

eCYBERMISSION is a national web-based STEM competition for students in grades 6-9.

Teachers can apply for Mini-Grants to support the implementation of student projects.

www.ecybermission.com/AdvisorResources



Administered by

NSTA National Science Teachers Association

NSTA 2017 Area Conference on Science Education

Making Science Accessible: Full Speed Ahead

Baltimore, Maryland • October 5–7, 2017

Registration, Travel, and Hotels

Conference Resources

Conference Resources, cont.

Conference Program

Indexes

National Science Teachers Association

1840 Wilson Blvd.
Arlington, VA 22201-3000
703-243-7100
conferences@nsta.org
www.nsta.org

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 Baltimore: Making Science Accessible: Full Speed Ahead

Mary C.H. Weller

Asli Sezen-Barrie

Mary K. Stapleton

Welcome to the NSTA Baltimore Area Conference. On behalf of the science education community in Maryland, we welcome you to Baltimore. Located right on the Chesapeake Bay, Baltimore is home to the world-famous Inner Harbor, historic neighborhoods, and outstanding museums.

The conference committee wants you to join us in the journey to support all students to engage in science by *"Making Science Accessible: Full Speed Ahead."* We have organized a wide variety of experiences across all grade levels and disciplines that will challenge you and help you improve your practice as a science educator and leader.

The conference is organized around these three strands:

- Tying the Knot: Coherence in 3-D Science Learning
- Charting the Course for Innovation
- Anchoring Our Natural Treasures Through Environmental Literacy

From the exciting expert invited speakers, hands-on workshops, presentations, and short courses, you are sure to find innovative ideas and practices that will assist you in preparing students for the demands of the 21st century in STEM fields. We know that you will have a terrific learning experience while you are with us. We hope that you meet other like-minded educators who will become friends and colleagues. We are all in this together!

We look forward to meeting you as you engage in the wonderful adventure of learning and growing! We are so excited that you are here. Please stop by the MAST counter located at the Lower Pratt Street Lobby. We would love to meet you and share with you what your professional organization is doing to support you, including the 2018 NSTA Area Conference at National Harbor in November 2018.

2017 Baltimore Area Conference Committee Leaders
Mary C.H. Weller, Asli Sezen-Barrie, and Mary K. Stapleton

Baltimore 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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Volunteers Manager
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Manager of Services for People with Special Needs
Alison Hapka
Elkton High School
Elkton, MD

Program Committee

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DuVal High School
Lanham, MD

Strand Leader: Tying the Knot: Coherence in 3-D Science Learning
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Maria Montessori Academy
North Ogden, UT

Strand Leader: Charting the Course for Innovation
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Capitol Heights, MD

Stephanie Wright
Delaware Aerospace Education Foundation
Smyrna, DE

Conference Advisory Board Liaison
Carolyn Hayes
2015–2016 NSTA President and Retired Educator
Greenwood, IN

President's Welcome

Welcome to the NSTA Area Conference in Baltimore. If you have not explored the Inner Harbor area, you are in for a treat—great food, museums, and history await. You might even still catch an Orioles game at Camden Yards. What you will not want to miss are the great speakers and sessions that we have lined up for you. The conference theme is *Making Science Accessible: Full Speed Ahead*. Along with this theme, the conference committee has planned the conference around three strands that explore topics of current significance.

The first strand is *Anchoring Our Natural Treasures Through Environmental Literacy.* This strand focuses on how today's students are tomorrow's leaders. In this strand, participants will learn to elevate student experiences by partnering with informal educational providers, getting students outdoors, and participating in authentic research.

The second strand is *Tying the Knot: Coherence in 3-D Science Learning*. The *Next Generation Science Standards* emphasize three-dimensional learning to explain phenomena. Storylines and learning progressions are used within curriculum development and implementation to provide coherence within and across grade levels. In this strand, participants will learn to use storylines, find ways to adapt instruction using responsive strategies, and focus on learning progressions.

The final strand is *Charting the Course for Innovation*. To develop innovative scientific leaders for tomorrow, we must foster creativity, academic risk-taking, and perseverance within ALL students today. Participants will investigate effective classroom examples supporting preK–16 student learning that involves engineering design projects, use of technology, and computer science.

I encourage you to take full advantage of this area conference to improve your knowledge on making science accessible for all students, not only through these selected strands, but through the other featured speakers, sessions, professional learning opportunities, as well as the exhibit hall. Take time to find new colleagues and share ideas that you bring to this conference with others. I am sure that you will agree with me that NSTA provides a unique and exciting opportunity to hone your teaching craft and create new ideas to use with your students. I look forward to seeing you here in Baltimore!

David T. Crowther
2017–2018 NSTA President

Sponsors and Contributors to the Baltimore Conference

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

Sponsors

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

Contributors

American Association of Physics Teachers (AAPT) and the Chesapeake Section of the AAPT
American Chemical Society Education Division
American Society for Engineering Education (ASEE)

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 soy- or vegetable-based inks. Walsworth has also obtained certifications with the Sustainable Forest Initiative (SFI) and the Forest Stewardship Council® (FSC) to ensure paper products are being harvested from environmentally responsible sources.

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.

Baltimore Convention Center's Green Practices

The Baltimore Convention Center is committed to supporting "green initiatives" both at the center and throughout the community! In 2015, the center successfully completed the certification process and achieved level one of the APEX/ASTM Green Meetings for Venues Standard. This made Baltimore the first U.S. destination on the East Coast to achieve this certification.

Waste Reduction: The Diversion by Donation program partners with community-based not-for-profit groups to donate goods and food products that go unused by center events. In fiscal year 2016, the center's waste diversion rate was 29%, a 5.75% increase over fiscal 2015. This equates to an additional 81 tons of waste diverted from the local landfill.

Energy Savings: Started in 2012, the Constellation Energy project involved major upgrades to HVAC equipment, plumbing systems, and a total replacement of the center's lighting controls, including changing the entire exhibit hall lighting from halogen to induction technology.

West Side Cooling Renovation: In late 2016, the cooling tower on the west side of the center was replaced and upgraded to state-of-the-art equipment. This new tower reduces the amount of energy needed to provide conditioned air to the building significantly.

"Go Green" at the Baltimore 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 Registration Counter 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 hotels are Hilton Baltimore *(headquarters),* Days Inn Baltimore Inner Harbor, Hampton Inn Baltimore–Downtown Convention Center, and Holiday Inn Baltimore–Inner Harbor (Downtown). Conference registration, exhibits, the NSTA Hub, the NSTA Science Store, exhibitor workshops, and many sessions will be located at the Baltimore Convention Center. Other sessions and events will be held at the Hilton Baltimore. The conference will begin on Thursday, October 5, at 8:00 AM, and end on Saturday, October 7, at 12 Noon.

Registration

Registration is required for participation in all conference activities and the exhibits. The lapel badge e-mailed to you with your confirmation, or issued to you at registration on-site, is your "ticket of admission" to the Exhibit Hall and all conference activities except those for which a separate fee is stated.

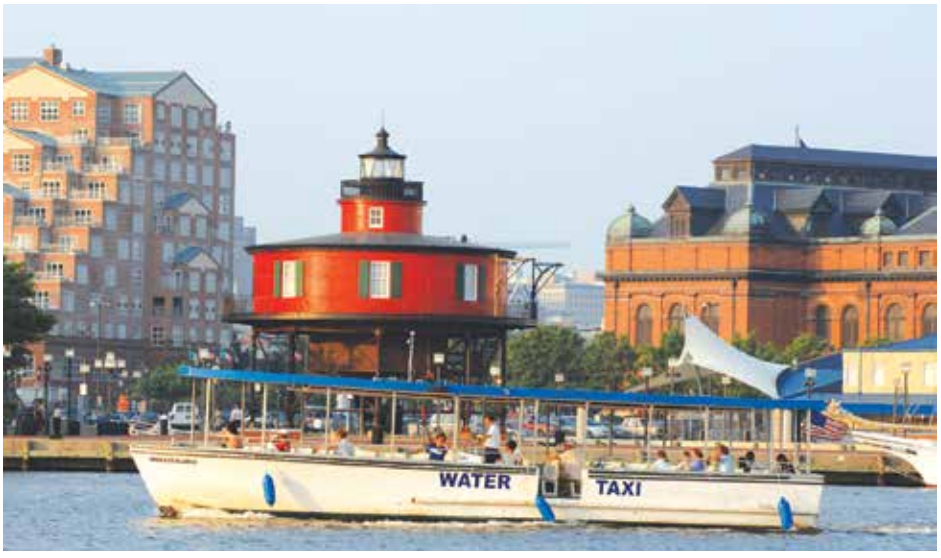
The Registration Area, located in Hall E of the Convention Center, will be open during the following hours:

Wed., Oct. 4	5:00–7:00 PM
Thu., Oct. 5	7:00 AM–5:00 PM
Fri., Oct. 6	7:00 AM–5:00 PM
Sat., Oct. 7	7:30 AM–12 Noon

If you misplace your badge or tickets, present your personal ID at the Badge Pick-Up/Replacement Counter in the Registration Area and you will be issued replacements. Only one replacement badge will be issued.

Purchasing Ticketed Events

The Baltimore Planning Committee has scheduled a variety of ticketed events. Each of these events requires a separate fee and ticket. You may purchase tickets for these events, space permitting, in the Registration Area. See the Conference Program section (starting on page 32) for details. Note that some events may have required advance registration.



—Photo courtesy of Visit Baltimore

Ground Transportation to/from Airport

A variety of ground transportation options are available to and from BWI Thurgood Marshall Airport. SuperShuttle to and from the Inner Harbor hotels is approximately $30 each way or $60 round-trip (for nonstop ride 1–3 passengers). Please proceed to one of the two BWI Shuttle ticket counters—both located on the lower level baggage claim area. Average taxi fare to downtown Baltimore is $30–35 (including 15% tip).

Getting Around Town

You'll find that many of Baltimore's hotels, attractions, restaurants, and nightlife are located within comfortable walking distance of each other. If you prefer not to walk, the Maryland Transit Administration (MTA) operates local bus routes, Metro Subway, and Light Rail. Call the MTA at 410-539-5000 or visit *mta.maryland.gov* for more information about MARC and other services.

Fast, frequent, and free…that's the trademark of downtown Baltimore's new shuttle bus system—the Charm City Circulator. The free shuttles run every 10 minutes from early morning to late night, seven days a week.

Parking

There are a number of parking lots at Camden Yards (across the street from the Convention Center). The closest lots are North and East Warehouse lots, followed by Lot A. Parking in these lots is $10 for the first hour, and $23 for the third hour (24-hour max.), $26 for a day. For more parking options, visit *bit.ly/2uYVlna*.

—Photo courtesy of Visit Baltimore

Registration, Travel, and Hotels

Airlines

NSTA has made arrangements with several major airlines to offer discounted fares to Baltimore conference attendees. Visit *www.nsta.org/baltimoretravel* for details.

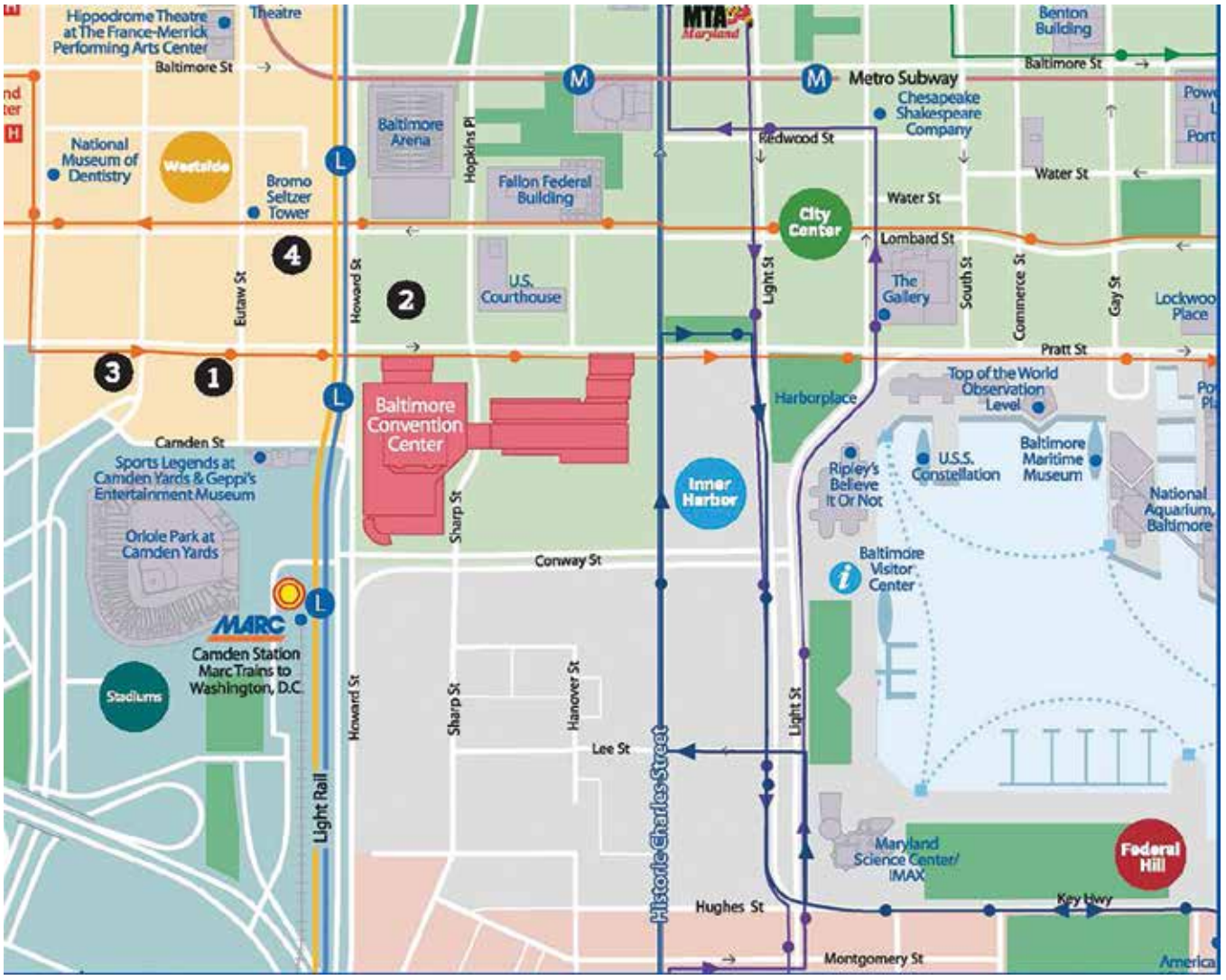
Discounted Rental Cars

The toll-free number to contact an NSTA-designated car rental company is:

Enterprise 800-593-0505 16AH230

** go to* www.enterprise.com *and use "16AH230" in the "Optional: Coupon, Customer or Corporate Number" box, click on "search" and enter PIN "NST."*

—Photo courtesy of Visit Baltimore



1. **Hilton Baltimore**
   (Headquarters Hotel)
   401 W. Pratt St.

2. **Days Inn Baltimore Inner Harbor**
   100 Hopkins Place

3. **Hampton Inn Baltimore–Downtown Convention Center**
   550 Washington Blvd.

4. **Holiday Inn Baltimore–Inner Harbor (Downtown)**
   301 W. Lombard St.

Shuttle service will not be provided as all hotels are within walking distance to the Convention Center.

If you have questions or concerns regarding your housing, please contact Orchid.Events (during business hours) Monday through Friday, 9:00 AM–8:00 PM ET at 877-352-6710 (toll-free) or 801-505-4611, or e-mail *help@orchid.events*. Available Monday–Friday, 9:00 AM–8:00 PM ET. After hours and on Saturday, call 801-243-4476.

Conference Resources

—*Photo courtesy of Mike Weiss*

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 much more. You'll discover something new and exciting in the world of science teaching.

The lapel badge e-mailed to you before the conference, or issued to you at registration on-site, is your "ticket of admission" to the Exhibit Hall and all conference activities. Maps of the Exhibit Hall and others meetings rooms will be accessible via our Conference app (see page 11). See page 111 for a complete list of exhibitors and contact information.

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

Thu., Oct. 5	11:00 AM–5:00 PM
Fri., Oct. 6	9:00 AM–4:00 PM
Sat., Oct. 7	9:00 AM–12 Noon

Did you know that NSTA offers Exclusive Exhibits 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., Oct. 5	11:00 AM–12:30 PM
Fri., Oct. 6	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 123 for a complete listing of exhibitor workshops.

NSTA Science Store

Visit us at the NSTA Science 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 *Argument-Driven Inquiry in Physics, Volume 1: Mechanics Lab Investigations for Grades 9–12; Beyond the Egg Drop: Infusing Engineering Into High School Physics; Eureka! Grade 3–5 Science Activities and Stories; Toward High School Biology;* and *Picture-Perfect STEM Lessons, K–2 and 3–5: Using Children's Books to Inspire STEM Learning*—and our newest children's books from NSTA Kids, such as *When the Sun Goes Dark, Next Time You See a Cloud,* and *Notable Notebooks: Scientists and Their Writings*
- "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 Hub

Come by the NSTA Hub located in the Pratt Street Lobby to meet NSTA staff and board members to learn more about NSTA membership and become part of the group that is crafting the future of science education. Win great prizes, including airfare on Southwest Airlines to the 2018 NSTA Atlanta National Conference on Science Education. We'll be handing out our new #ONLYatNSTA tweetshirts—come by and get one while supplies last!

Meet the Presidents and Board/Council

Be sure to stop by Friday from 2:45 to 3:30 PM at the entrance to Hall E 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!

One lucky person who attends this event will be eligible to win a **$100 gift certificate to the NSTA Science Store.** Must be present to win. Drawing will take place at 3:20 PM.

Wi-Fi in Convention Center

Complimentary Wi-Fi can be accessed in all of the lobby areas of the Convention Center. It's called "Free BCC Wi-Fi" and can be used for checking e-mail and casual internet access. No code is required.

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 Registration Area.

Welcome and Information Center

A Welcome and Information Center is located at the Pratt Street Lobby. Here you'll find information on tourist attractions, transportation, restaurant recommendations/reservations, and more. The center will be staffed the following hours:

Thursday–Friday, 10:00 AM–5:00 PM
Saturday, 7:30 AM–12:30 PM

MAST Counter

The Maryland Association of Science Teachers (MAST) counter is located at the Lower Pratt Street Lobby. 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, along with registration forms for graduate credit through Framingham State University. 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 conference from the palm of your hand! The NSTA Conference app provides all the tools necessary for a successful conference experience.

Features include the ability to view session and workshop listings by time and presenter; maps of the Convention Center, Hilton, and Exhibit Hall; social media plugins; and a note-taking tool. Visit *www.nsta.org/conferenceapp* to download the app. Please make sure to create a CrowdCompass account when logging in to be able to export any notes taken within the app. *Note:* The NSTA Conference app does not sync to our online Personal Scheduler.

First Aid Services/Mothers Room

The first aid office is right outside Hall E near the roll-up doors on the docks. For emergencies, contact Security at x7055 from an in-house phone or 410-649-7055.

In addition, a room for nursing mothers is located in the Pratt Street East Show Office of the Convention Center. See the NSTA Registration Desk for entry/key for mother's room.

Lost and Found

All lost-and-found items will be turned in at the Exhibitor Registration counter at the Convention Center.

Maryland Association of Science Teachers (MAST) Luncheon (M-1)

Date: Friday, October 6, 12:30–2:00 PM

Ticket Price: $35

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 Heidi Schweingruber, director of the Board on Science Education at the National Research Council. She co-directed the study that resulted in the report *A Framework for K–12 Science Education* (2011), which was the first step toward the *Next Generation Science Standards*. Guests can learn about opportunities for becoming more involved in the MAST board or committees that support educators from our region. Sponsored in part by the Towson Center for STEM Excellence.

Stop by the registration counter to purchase any available tickets.

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 the following rooms:

- Room 350, Convention Center
- Pickersgill, Hilton

Business Services

Operated by ABC Imaging, the Business Center is located in the Pratt Street Lobby (300 Level) of the Convention Center. The Business Center (410-649-7194) is available to serve your business needs. Hours are:

Thursday–Friday, 8:30 AM–4:30 PM
Saturday, 9:00 AM–2:00 PM

Services include photocopies and laser prints (color and black/white), faxes, PC rentals, network connections to both ABC printers and the internet, office supply sales (pens, tape, glue, batteries, etc.), and shipping services with DHL, UPS, and FedEx. ABC Imaging has a full-production print shop located at 400 East Pratt Street (three blocks down from the Convention Center). The shop is equipped to handle all of your large and small color graphic, binding, and mounting needs.

Graduate Credit Opportunity

Baltimore conference attendees can earn one graduate-level credit in professional development through Framingham State University. Learn more about the assignment requirements and pick up a registration form at the Maryland Association of Science Teachers (MAST) counter, located at the lower Pratt Street Lobby, or visit *www.framingham.edu/nsta*.
Deadline is November 3, 2017.

Online Session Evaluations and Tracking Professional Development

All attendees can evaluate sessions online while simultaneously tracking their professional development certification.

Help NSTA's **GREEN** efforts by visiting the conference session browser to complete session evaluations online, October 5–18, 2017. During the conference, session evaluations can be completed on the computers at the Presenters/Presiders check-in counter in the Registration Area. **And 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!**

To evaluate a session, attendees should follow these steps:

- Visit the conference session browser and search for part of the session title or presenter's name using the **Find Keyword** search option. *Note:* Our session evaluation system is designed to work from a computer and while it may work on smartphones/tablets, it is not really designed for them.
- Once you find the session you wish to evaluate, simply click the **Evaluate Session** button.
- Enter badge number (if you don't remember your badge number, click "help me find my badge number").
- When finished evaluating the session, click the **Submit Evaluation** button.
- Repeat this process for each session attended.

Concurrent session presenters may also complete evaluations for their own sessions in order to track professional development credit.

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.

Beginning October 30, 2017, an attendee can view his or her transcript at the NSTA Learning Center *(learningcenter.nsta.org)* by first logging on and then clicking "My Profile" under the Welcome. Here you'll find a "Certificates" tab, which you can use to access your transcript. Attendees can also document credit for activities that are not being evaluated (e.g., Exhibit Hall visits, etc.). In addition, the NSTA Learning Center offers professional development experiences (online and face-to-face) for your long-term growth and professionalism.

Each attendee is responsible for tracking his or her own attendance at such events. The transcript can be printed here and presented to an administrator who requires documentation of participation in the conference. All information in these transcripts will be maintained (and can be accessed) indefinitely as part of an attendee's individual profile.

The following venues have extended special offers for Baltimore Area Conference Registrants.

Baltimore Show Your Badge Program

Multiple venues, including restaurants

Courtesy of Visit Baltimore, just show your badge at the participating establishments to receive a special promotion or discounts. For complete details and a listing of special offers, visit *bit.ly/2hLjoTN*.

The National Aquarium

aqua.org

The National Aquarium located 501 East Pratt Street is offering a $5 discount off admission for Baltimore Area Conference registrants who show their badge at the ticket counter. With close to 20,000 animals from more than 700 species, National Aquarium is an amazing and informative journey through the wonders of our aquatic world.

Help us with your feedback...and get a chance for a free Apple iPad mini 4

We're giving you one more reason to evaluate conference sessions.

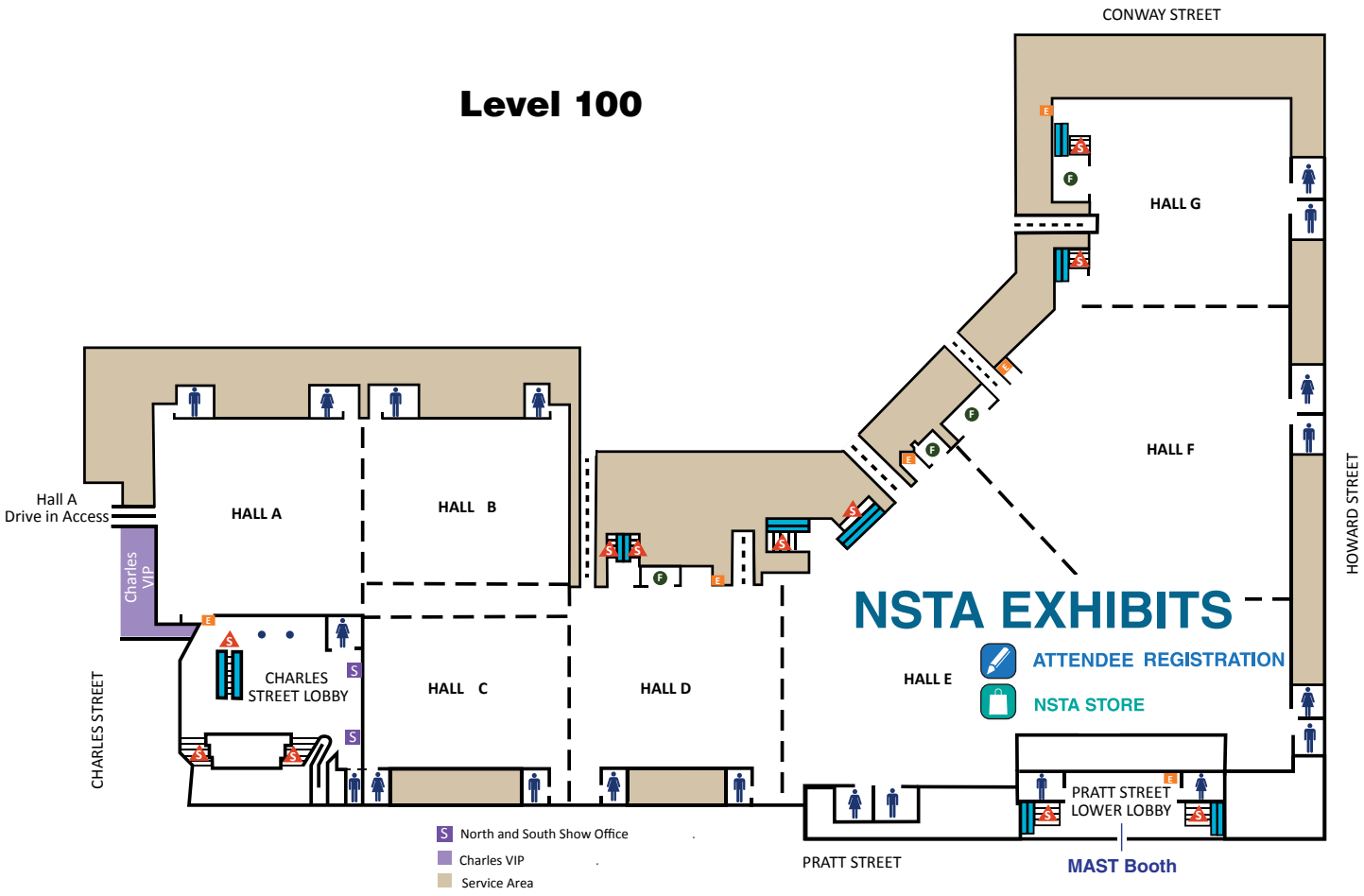
When you log on to *www.nsta.org/baltimorebrowser* and fill out an evaluation by clicking on the "evaluate session" button below the session you attended, you get entered into a drawing for a chance to win an Apple iPad mini 4 Wi-Fi tablet *courtesy of the NSTA Conference Department*.

Your feedback helps us in creating the best conference experience for you and other attendees.

- **WE'RE GIVING AWAY an APPLE iPAD MINI 4 Wi-Fi TABLET**

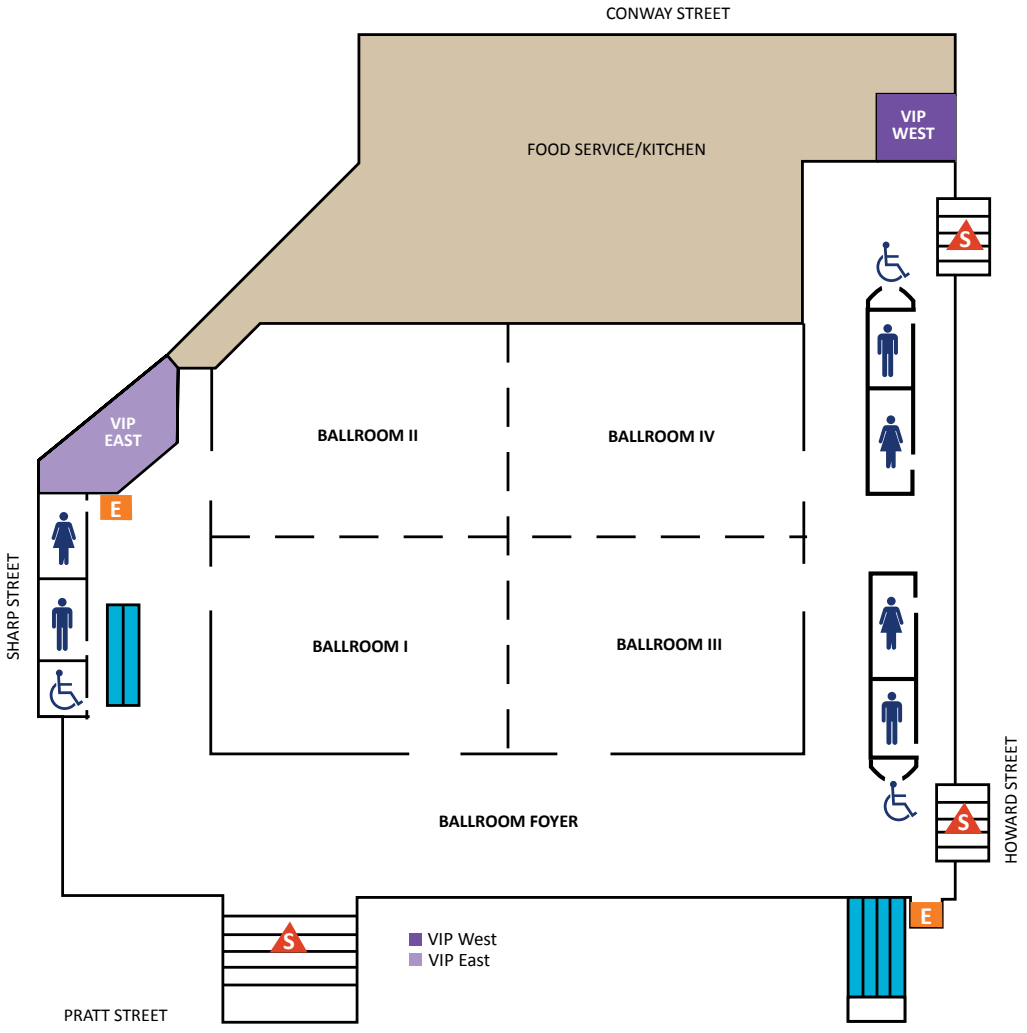
- **CONFERENCE APP**

- To access the app, visit *www.nsta.org/conferenceapp*


Level 100
CONWAY STREET
HALL G
HALL F
HALL A
HALL B
HALL C
HALL D
HALL E
Hall A
Drive in Access
Charles VIP
CHARLES STREET LOBBY
CHARLES STREET
HOWARD STREET
NSTA EXHIBITS
ATTENDEE REGISTRATION
NSTA STORE
PRATT STREET LOWER LOBBY
PRATT STREET
MAST Booth
North and South Show Office
Charles VIP
Service Area

Convention Center

Level 400



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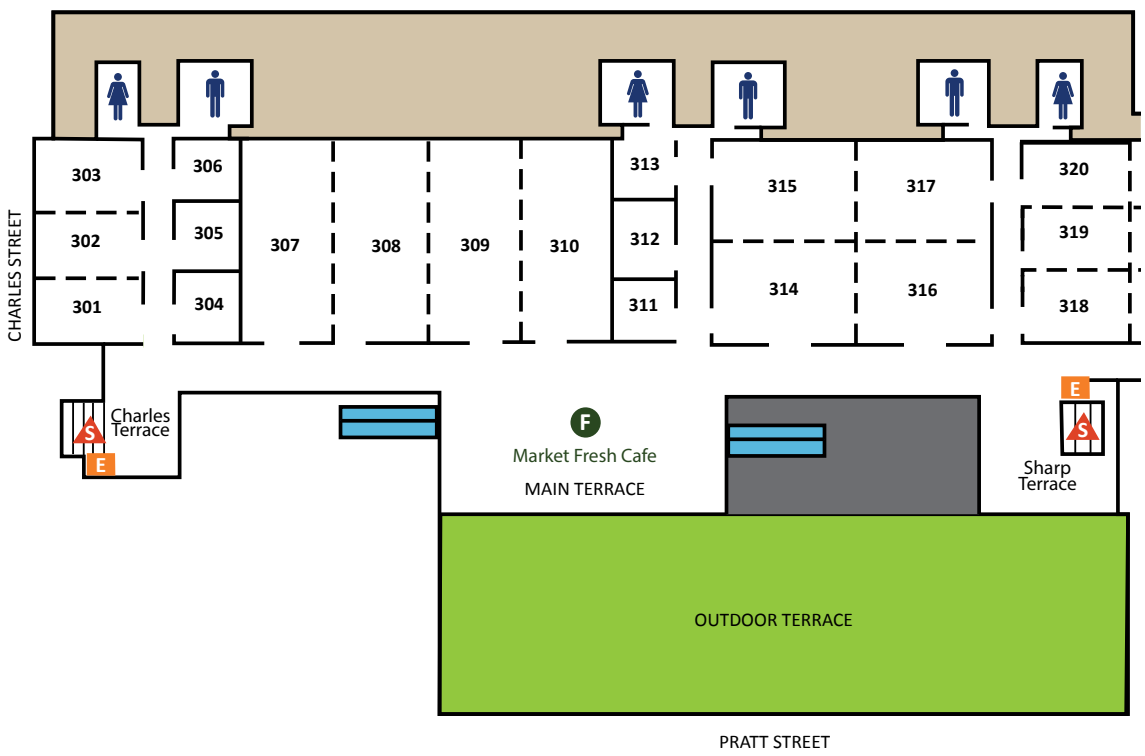
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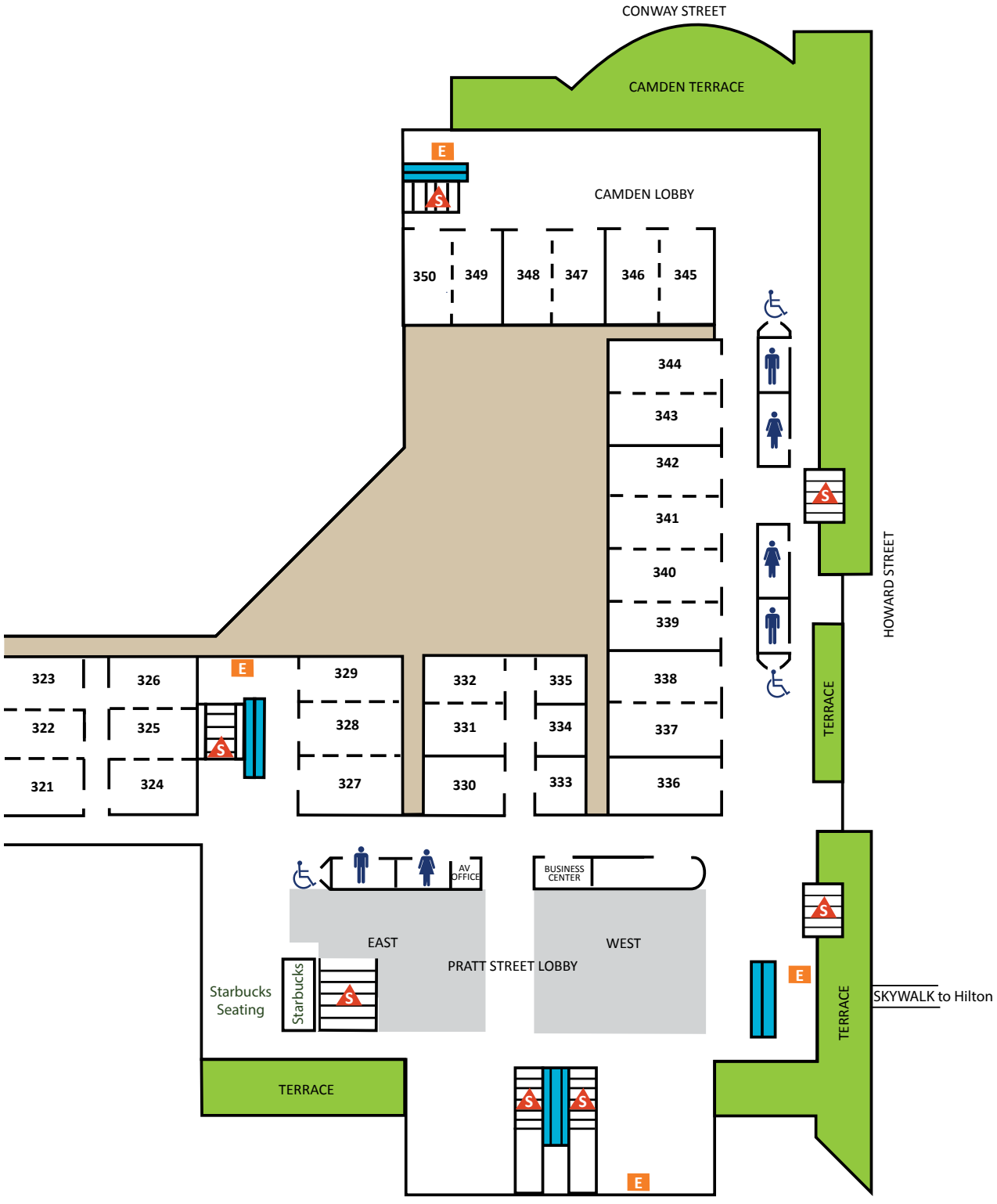
Sharp Terrace
OUTDOOR TERRACE
PRATT STREET

Convention Center



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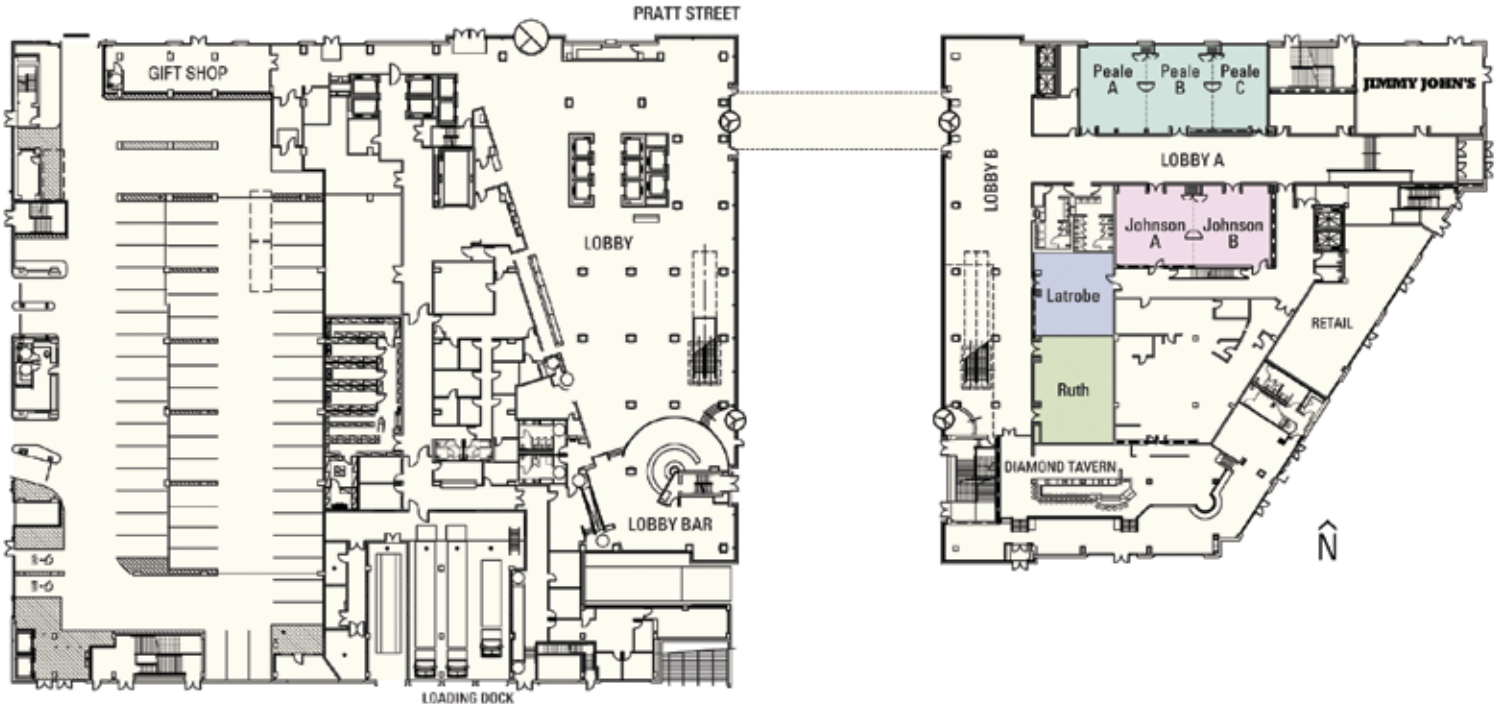

Second Floor

Third Floor


PRATT STREET
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Chase
Stone
Douglass
Hopkins
Tilghman
EAST FOYER
SOUTH FOYER
Paca
Marshall
Carroll B
Carroll A
Tubman B
Tubman A
OPEN TO HOLIDAY BALLROOM BELOW
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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

Atlanta, Georgia
March 15–18, 2018

St. Louis, Missouri
April 11–14, 2019

Boston, Massachusetts
April 2–5, 2020

Chicago, Illinois
April 8–11, 2021

7th Annual STEM Forum & Expo, *hosted by NSTA*

Philadelphia, Pennsylvania—July 11–13, 2018

Area Conferences on Science Education

2017 Area Conferences

Milwaukee, Wisconsin—November 9–11
New Orleans, Louisiana—November 30–December 2

2018 Area Conferences

Reno, Nevada—October 11–13
Gaylord National Harbor, Maryland—November 15–17
Charlotte, North Carolina—November 29–December 1

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ATLANTA

MARCH 15–18 2018

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- Network with more than **10,000** educators
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FEBRUARY 9, 2018

CONFERENCE STRANDS

- Focusing On Evidence of 3-D Learning
- Imagining Science as the Foundation for STEM
- Reflecting on Access for All Students
- Comprehending the Role of Literacy in Science

Learn more and register
www.nsta.org/atlanta

#NSTA18

NSTA National Science Teachers Association

—*Courtesy of Visit Baltimore*

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 40 for details.


LEARNING
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Empower your students and unleash their curiosity for science and discovery.
Vernier introduces Go Direct™ sensors. Wireless or USB—the versatility is built into these affordable sensors, so you have the flexibility to choose. All Go Direct sensors connect directly to student computers, Chromebooks, or mobile devices, so there's no interface needed. That's freedom, versatility, and boundless opportunity.
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The Baltimore 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.

Anchoring Our Natural Treasures Through Environmental Literacy

Today's students are tomorrow's leaders. It is imperative that they be equipped to rise to challenges, including preservation of natural resources, mitigation of air and water pollution, and adaptation to climate change. They must think critically and understand how their actions impact the environment. Engaging students in local action, research, or citizen science projects today fosters the environmentally literate leaders of tomorrow, who are connected to the world around them, and informed enough about the environment to be decision makers. In this strand, teachers will learn to elevate student experiences by partnering with informal educational providers, getting students outdoors, and participating in authentic research.

Tying the Knot: Coherence in 3-D Science Learning

The *Next Generation Science Standards* emphasize three-dimensional learning to explain phenomena. Story lines and learning progressions are used within curriculum development and implementation to provide coherence within and across grade levels. Story lines help students connect activities, goals, and big ideas to make sense of the world. The three-dimensional learning view requires new assessment strategies and tools that provide feedback to support students' sense-making. Assessment, both formative and summative, is instrumental in supporting responsive instruction. In this strand, participants will learn to use story lines, find ways to adapt instruction using responsive strategies, and focus on learning progressions.

Charting the Course for Innovation

To develop innovative scientific leaders for tomorrow, we must foster creativity, academic risk-taking, and perseverance within ALL students today. The next generation science learning environment must engage students in authentic problem solving that respects diverse thinking. A classroom culture that celebrates diverse ideas and solutions is essential for an effective STEM workforce. Presentations in this strand will focus on problem solving in STEM that involve all students. Participants will investigate effective classroom examples supporting preK–16 student learning that involves engineering design projects, use of technology, and computer science.

Anchoring Our Natural Treasures Through Environmental Literacy

Thursday, October 5

8:00–9:00 AM
Finding Funding…for Free! How to Secure External Funding for Classroom Projects and Research

12:30–1:30 PM
EANR (Environment, Agriculture, and Natural Resources): Preparing Students for Environmental Careers

2:00–3:00 PM
Featured Presentation: Rigorous Citizen Science for Lasting Change
(Speaker: Gregg Treinish)

Creating and Maintaining Kid-Friendly/Bird-Friendly Gardens

3:30–4:30 PM
Are Humans Causing Earthquakes? Teaching High School Earth Systems and Human Sustainability Using Authentic Earthquake Location Data

5:00–6:00 PM
Environmental Toxicology: Introduction to Toxicity Testing

Friday, October 6

8:00–9:00 AM
The Teacher Environmental Literacy Leadership (TELL) Program: Advancing Innovation in Teacher and Student Learning with the Chesapeake Bay Foundation

9:30–10:30 AM
Marine Ecology: Using Local Resources to Engage Learners

11:00 AM–12 Noon
Evaluating School Yard Heat Islands and Thermal Mitigation

12 Noon–3:00 PM
Short Course: Using Your School as a Laboratory: Air Quality
(SC-4, ticket required)

1:00–1:30 PM
Migrating into Citizen Science

2:00–3:00 PM
Developing Student Scientists Through the Watershed Report Card Program

Saturday, October 7

8:00–8:30 AM
Students as Citizen Scientists: Data Collection and Sharing Using Fieldscope

8:00–9:00 AM
Freshwater Stewardship: Equip Your Student-Scientists with Cutting-Edge Resources from NOAA

9:30–10:30 AM
Standards and Stewardship: A Natural Fit

Carbon, Trees, and Climate

Tying the Knot: Coherence in 3-D Science Learning

Thursday, October 5

8:00–9:00 AM
Developing Curriculum for the *NGSS:* Navigating the Perfect Storm

12:30–1:30 PM
Bridging the Language Gap for ELLs in Science

2:00–3:00 PM
A Unique Ice Core Investigation That Integrates the Three Dimensions of *NGSS* and STEM

3:30–4:30 PM
Analysis of Supernova Remnants Using X-Ray Spectroscopy with NASA Data and STEM Tools

5:00–6:00 PM
STR2EAMing into LEARNing: The K–5 Convention

Friday, October 6

8:00–9:00 AM
Intersection of Understanding by Design Framework and *NGSS*

8:30–11:30 AM
NSTA Press® Short Course: Introducing a New *NGSS*-Focused Curriculum Unit—Toward High School Biology
(SC-3, ticket required)

9:30–10:30 AM
Featured Presentation: Creating an Understanding-Based Curriculum for the *Next Generation Science Standards*
(Speaker: Jay McTighe)

Practices in Action: Building Coherence Between *NGSS* and *CCSS ELA*

11:00 AM–12 Noon
BIG Data/BIG Skills: Improve Student Data Literacy Using Free Web Tools from NOAA

12:30–1:30 PM
Becoming Banneker: Find Place with Objects in Space

2:00–3:00 PM
What Affects Populations? A Hands-On Storylining Experience

Saturday, October 7

9:30–10:30 AM
From Science to Engineering

11:00–11:30 AM
Bundling Performance Expectations Around Phenomena

Charting the Course for Innovation

Thursday, October 5

8:00–9:00 AM
Three Teachers…60 Students…One Genuine STEM Unit of Study

2:00–3:00 PM
Inventing Success for All Learners in STEM

Maximize Your Makerspace Through Design Thinking and the Wallingford 3-D Learning Program

3:30–4:30 PM
Straw Rockets Are Out of This World!

5:00–6:00 PM
Modeling Scientific Concepts with SCRATCH

Friday, October 6

8:00–11:00 AM
Short Course: Promoting Children's Science Inquiry and Thinking About Living Things in Preschool and Kindergarten
(SC-2, Ticket required)

9:30–10:30 AM
How to Create a Challenge-Infused STEM Program

11:30 AM–12 Noon
Building Boats: Creating and Executing an Interdisciplinary Project Using Design Thinking and the Engineering Process

12:30–1:30 PM
University STEM Faculty and K–8 Teachers: A Winning Partnership for STEM Education

2:00–3:00 PM
Featured Presentation: Building a Nation of Makers: Lessons Learned While Serving as a Senior Adviser in the Obama White House (Speaker: Andrew Coy)

Early Childhood Engineers

5:00–6:00 PM
Blended Learning in the Elementary Science Classroom: Transitioning to the *NGSS* Using Individualized Learning

Saturday, October 7

11:00 AM–12 Noon
iPad: Data Collection, Analysis, and Student Lab Reporting

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, October 5

8:00–9:00 AM — *Argument-Driven Inquiry in Physics: Mechanics Lab Investigations for Grades 9–12*

12:30–1:30 PM — *Argument-Driven Inquiry in Physical Science: Lab Investigations for Grades 6–8*

Creating a STEM Culture for Teaching and Learning

2:00–3:00 PM — *Solar Science:* 3-D Learning Applied to the Study of the Sun's Daily and Annual Motion

3:30–4:30 PM — Finding Science in the Outdoors and Through a Good Book

5:00–6:00 PM — Picture Science in Early Childhood: Deepen Those Fun Explorations by Connecting with the Practices of Science and Engineering

Friday, October 6

8:00–9:00 AM — Phenomenon-Based Learning: Fun, Hands-On, Cooperative Learning

8:30–11:30 AM — NSTA Press® Short Course: Introducing a New *NGSS*-Focused Curriculum Unit—Toward High School Biology (SC-3, Ticket Required)

9:30–10:30 AM — Uncovering Student (and Teacher) Ideas in Earth and Environmental Science

11:00 AM–12 Noon — Diving Into Teaching with the *NGSS* Science Practices

12:30–1:30 PM — *EUREKA! Grades 3–5 Science Activities and Stories*

2:00–3:00 PM — Uncovering Student Ideas in Science with 3-D Assessment Probes

From Flower to Fruit

Saturday, October 7

8:00–9:00 AM — *Teaching for Conceptual Understanding in Science*

9:30–10:30 AM — Uncovering Students' (and Teachers') Ideas in Science, Engineering, and Mathematics with Formative Assessment Probes and Techniques

11:00 AM–12 Noon — *Argument-Driven Inquiry in Biology: Lab Investigations for Grades 9–12*

Meetings and Social Functions

Friday, October 6

Discover the *NGSS* Train-the-Trainer Workshop
(By Preregistration Only)
Key 12, Hilton.....8:00 AM–5:00 PM

MAST Luncheon (Speaker: Heidi Schweingruber)
(M-1, ticket required)
Ruth, Hilton..... 12:30–2:00 PM

Saturday, October 7

Discover the *NGSS* Train-the-Trainer Workshop
(By Preregistration Only)
Key 12, Hilton.....8:00 AM–5:00 PM

ACS Chemistry for Life™

Chemistry Day at NSTA

Sponsored by the American Chemical Society Education Division

Connecting Structure and Properties: Building and Applying Knowledge
For Grades 9–12

Friday, October 6, 8:00 AM–2:30 PM
Key 8, Hilton

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.

8:00–10:00 AM	**Relating Structure and Properties: Eliciting and Visualizing Student Initial Ideas**
10:30 AM–12 Noon	**Relating Structure and Properties: Constructing Science Ideas Through Exploring Data**
12:30–2:30 PM	**Relating Structure and Properties: Demonstrating Understanding Through Integration and Application of Knowledge**

Middle School Chemistry Day

Sponsored by the American Chemical Society

Middle School Chemistry—Big Ideas About the Very Small

Friday, October 6, 8:00 AM–1:30 PM
Key 7, Hilton

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**

Engineering Day at NSTA

Sponsored by the American Society for Engineering Education

Friday, October 6, 8:00 AM–3:00 PM
Key 6, Hilton

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	**Kindergartners Trying and Trying Again to Engineer Solutions to Problems**
9:30–10:30 AM	**Elementary Computer Science: Plugged vs. Unplugged Activities**
11:00 AM–12 Noon	**Simple Electric Circuits**
12:30–1:30 PM	**Using STEM in Action to Connect to DOE Resources**
2:00–3:00 PM	**ASEE's K–12 Outreach—Engineering, Go For It (eGFI), Teach Engineering, Link Engineering, the National Science Digital Library, and UC Project STEP**

Physics Day at NSTA

Sponsored by the American Association of Physics Teachers and the Chesapeake Section of the AAPT

Friday, October 6, 8:00 AM–6:00 PM
Key 9, Hilton

The American Association of Physics Teachers offers a full day of physics content. Physics Day consists of interactive hands-on workshops and sessions covering important physics topics for today's world. Each of these workshops or sessions is organized by experienced science educators and designed to deal with innovative teaching methods or hard-to-express concepts that can be immediately applied in your classroom.

8:00–9:00 AM	**Investigating Electrostatics with an Inexpensive Electrophorus**
9:30–10:30 AM	**Women and Minorities in the History of Physics: Role Models for Today**
11:00 AM–12 Noon	**Physics Demonstration Show**
12:30–1:30 PM	**Guesstimation—Solving the World's Problems on the Back of a Cocktail Napkin**
2:00–3:00 PM	**Student Ideas About Physics—Insights from Physics Education Research**
5:00–6:00 PM	**Simple Lessons to Teach Confusing Physics Ideas (K–8)**

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

Data, Data Everywhere (SC-1)

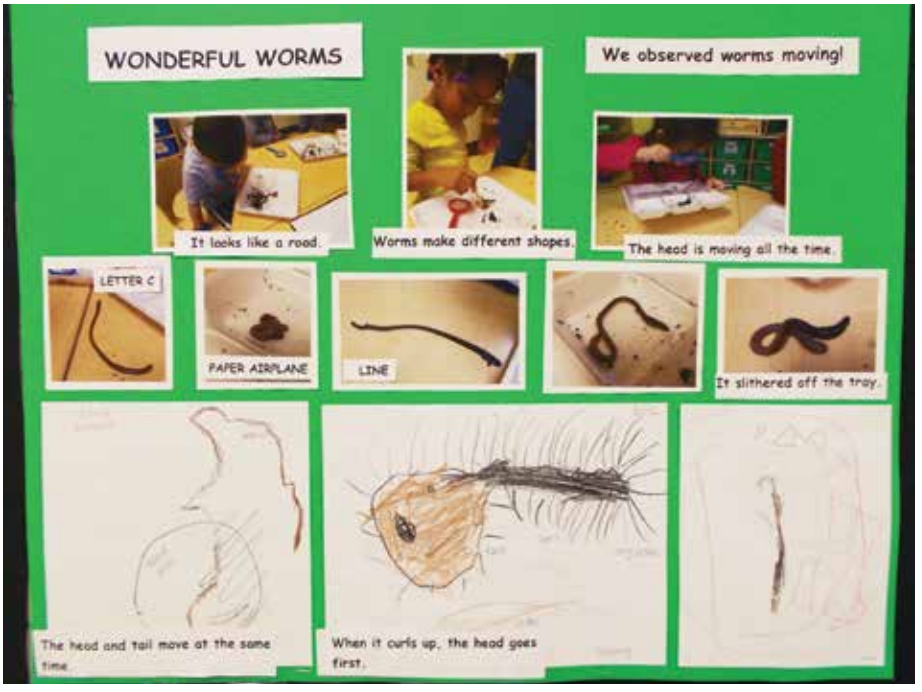
Eliza Richardson *(eur10@psu.edu),* **David Babb** *(dmb16@psu.edu),* and **Timothy White** *(tswhite@essc.psu.edu),* Penn State, University Park
Science Focus: ESS, SEP4
Level: Grades K–12
Date: Thursday, October 5, 1:00–4:00 PM
Location: Key 12, Hilton
Ticket Price: $21

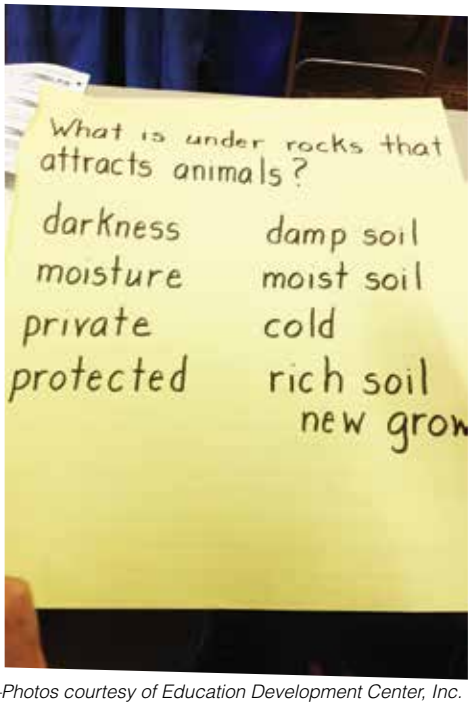
The internet houses vast arrays of environmental data that can be used to teach Earth science concepts in K–12 classrooms. In this short course, we will lead participants through data-rich exercises based on those found in online courses in Penn State's Master of Education in Earth Science program. These exercises use different types of data but emphasize the same skills: creating and reading graphs, interpreting contour plots, and working with time series. Through these exercises, we will provide participants with ready-to-go ideas and easily adaptable lesson plans that will engage students in acquiring, manipulating, and presenting Earth science data. An internet-connected laptop will be useful, but is not required.

Promoting Science Inquiry and Thinking About Living Things in Preschool and Kindergarten (SC-2)

Cindy Hoisington (@CAHoisy; *choisington@edc.org*), Education Development Center, Inc., Waltham, Mass.
Peggy Ashbrook (@PeggyAshbrook; *scienceissimple@yahoo.com*) Author/NSTA Early Years Columnist, Alexandria, Va.
Science Focus: LS
Level: PreK–1
Date: Friday, October 6, 8:00–11:00 AM
Location: Tubman, Hilton
Ticket Price: $23

In this short course, participants will experience life science inquiry and build their own knowledge of core ideas and concepts related to living things as they investigate a variety of plants and "mini-beasts" and construct explanations about their characteristics, needs, habitats, and life cycles. Participants will also learn strategies for propagating plants and maintaining "mini beasts" in the early childhood/elementary setting. Video vignettes of children's life science explorations will spark discussions about the teacher's role in supporting children's scientific thinking, conceptual development, and engagement in the practices of science. Short course activities will incorporate the integration of STEM and strategies for creating documentation and using books to extend children's science and language/literacy learning in context. For more information, visit *www.edc.org* and *www.nsta.org/earlyyears*.





—Photos courtesy of Education Development Center, Inc.

Investigate a variety of plants and "mini-beasts" and construct explanations about their characteristics, needs, habitats, and life cycles in SC-2.

This form is for planning purposes only. Do NOT submit to NSTA.

NSTA 2017 Baltimore Area Conference
Professional Learning Documentation Form

All attendees can evaluate concurrent teacher and exhibitor sessions online while simultaneously tracking professional learning certification (based on clock hours). Use this form to keep track of all sessions/events attended during the Baltimore conference. Sessions/events such as exhibit hall visits may not be available for online evaluation. However, these events still qualify for professional learning.

Beginning October 30, 2017, Baltimore transcripts can be accessed at the NSTA Learning Center *(learning center.nsta.org)* by logging on with your Baltimore Badge ID# and and first clicking on **My Profile** under the **Welcome.** Here you'll find a **Certificates** tab to access your transcript. Keep this form and use it to add the following activities to your Baltimore transcript. Completed transcripts can be printed from this website and presented to an administrator who requires documentation of participation in the conference. All information in these transcripts will be maintained (and can be accessed) indefinitely as part of an attendee's individual profile.

First Name: _____ **Last Name:** _____ **Badge ID#** _____

Evaluate sessions by accessing the conference session browser: *www.nsta.org/Baltimorebrowser*. You will need your badge number to evaluate sessions. See page 12 of the conference program for instructions. *Note:* Our session evaluation system is designed to work from a computer and while it may work on smartphones/tablets, it is not really designed for them. ***And don't forget, the more sessions you attend and evaluate, the more chances you have to win an Apple iPad mini 4 Wi-Fi!***

Sample Questions:

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

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

Thursday, October 5, 8:00 AM–6:00 PM

Start Time	End Time	Activity/Event Title

We're giving an Apple iPad mini 4 to one lucky attendee who evaluates sessions that he or she attends. The more sessions you attend and evaluate, the more chances you have to win!

Friday, October 6, 8:00 AM–6:00 PM

Start Time	End Time	Activity/Event Title

Saturday, October 7, 8:00 AM–5:00 PM

Start Time	End Time	Activity/Event Title

—Photo courtesy of Maryland Association for Environmental and Outdoor Education

Gain hands-on experience in collecting data on air quality and leading inquiry-based investigations at your school and school grounds in SC-4.

3D NSTA Press® Short Course: Introducing a New *NGSS*-Focused Curriculum Unit—Toward High School Biology (SC-3)

Jo Ellen Roseman (*jroseman@aaas.org*), and **Cari Herrmann Abell**, AAAS/Project 2061, Washington, D.C.
Sarah Quick Pappalardo, Dunloggin Middle School, Ellicott City, Md.
Meredith Long, Ellicott Mills Middle School, Ellicott City, Md.
Leah Donovan, Oakland Mills Middle School, Columbia, Md.
Damisha Drakes, Wilde Lake Middle School, Columbia, Md.
Science Focus: LS1.C, PS1.A, PS1.B, CCC5, SEP2, SEP4, SEP6, SEP8
Level: Grades 6–9
Date: Friday, October 6, 8:30–11:30 AM
Location: Key 10, Hilton
Ticket Price: $50

Join us for this short course to explore a new middle school unit developed by Project 2061, the science literacy initiative of the American Association for the Advancement of Science (AAAS) and BSCS. Working with the new unit, which was developed with support from the U.S. Department of Education's Institute of Education Sciences, participants will gain a deeper understanding of what it means to address the three dimensions of *NGSS* and have a chance to examine criteria for supporting claims of alignment specified in the Educators Evaluating the Quality of Instructional Products (EQuIP) Rubric for science. Take home copies of the Toward High School Biology unit, model kits, as well as teaching guides for special topics.

Using Your School as a Laboratory: Air Quality (SC-4)

Christina Gladmon (*greenschools@maeoe.org*) and **Laura Johnson Collard** *(director@maeoe.org),* Maryland Association for Environmental and Outdoor Education, Columbia
Rebecca Davis (*cleanairpartners@gmail.com*) Clean Air Partners, Washington, D.C.
Science Focus: GEN, SEP1
Level: Grades 4–12
Date: Friday, October 6, 12 Noon–3:00 PM
Location: Tubman, Hilton
Ticket Price: $20

This short course will provide classroom examples for understanding concepts of air quality that meet the *NGSS* and support student reflection and action. The student sustainable practices are a part of the Maryland Association for Environmental and Outdoor Education's (MAEOE) Green School application. A case study from Garrett County Public Schools will be used to demonstrate how teachers can gain hands-on experience in collecting data on air quality and define ways to lead students on inquiry-based investigations in their schools and school grounds. Participants will engage in two activities and discuss how they might integrate similar lessons.

Association for Multicultural Science Education (AMSE)

President: Sharon Delesbore

Friday, October 6

8:00–10:00 AM	George W. Carver Conversation Series on Diversity and Equity	Holiday 1, Hilton

Association for Science Teacher Education (ASTE)

President: Gillian Roehrig

Thursday, October 5

2:00–3:00 PM	Beyond Evolution: Addressing Interactions Between Science and Religion in Classrooms and Communities	Key 1, Hilton

Friday, October 6

8:00–9:00 AM	Visibility in STEM: Charting the Course for Making Minorities Visible in the STEM Curriculum	Holiday 4, Hilton

Council for Elementary Science International (CESI)

President: James McDonald

Thursday, October 5

8:00–9:00 AM	Integrating Science and Literacy: Proven Strategies Developed from Evidence-Based Practices	Key 5, Hilton

Friday, October 6

2:00–3:00 PM	Using Toys to Teach Physics	Key 5, Hilton

Council of State Science Supervisors (CSSS)

President: Tiffany Neil

Friday, October 6

9:30–10:30 AM	Using Science, Technology, Engineering, Agriculture, and Math (STEAM) as a Context to Teach High School Biology	Key 1, Hilton

National Association for Research in Science Teaching (NARST)

President: Barbara A. Crawford

Thursday, October 5

3:30–4:30 PM	Designing and Implementing Middle School Project-Based Watershed Investigations	Key 1, Hilton

Friday, October 6

8:00–9:00 AM	How to Promote Successful Teacher Enactment of Spatial Thinking and Technology-Enhanced Inquiry: PD Research and Its Implications for Teachers and Administrators	Key 5, Hilton

National Middle Level Science Teachers Association (NMLSTA)

Co-Presidents: Terri Hebert and Mary Lou Lipscomb

Thursday, October 5

12:30–1:00 PM	Meaningful Connections Through Professional Organizations	Key 1, Hilton
1:00–1:30 PM	Leveraging the Power of Place in Citizen Science Projects	Key 1, Hilton

National Science Education Leadership Association (NSELA)

President: Bob Sotak

Friday, October 6

9:30–10:30 AM	Tools for Science Leaders, Part 1	Johnson A, Hilton
11:00 AM–12 Noon	Tools for Science Leaders, Part 2	Johnson A, Hilton

Three Dimensions of the *Next Generation Science Standards (NGSS)*

Science and Engineering Practices

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

Crosscutting Concepts

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

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

Disciplinary Core Ideas in Life Science

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

Disciplinary Core Ideas in Earth and Space Science

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

Disciplinary Core Ideas in Engineering, Technology, and the Application of Science

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

Visit NSTA's SCIENCE STORE

Hall E

STORE HOURS

Wednesday, Oct. 4	4:00 PM – 7:00 PM
Thursday, Oct. 5	7:30 AM – 5:30 PM
Friday, Oct. 6	7:30 AM – 5:00 PM
Saturday, Oct. 7	8:00 AM – 12:30 PM

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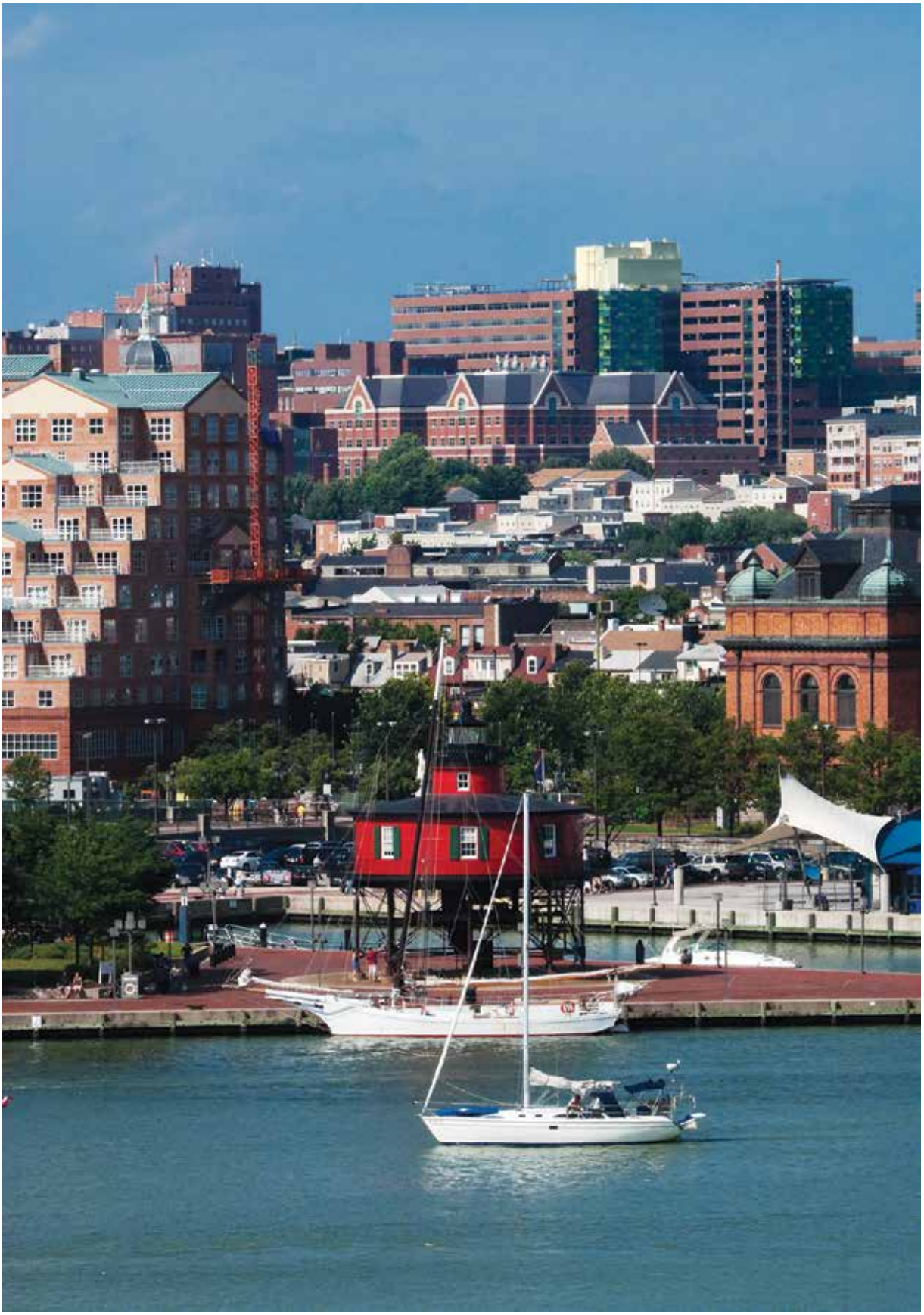
NSTA National Science Teachers Association



8:00–8:30 AM Presentation

Analysis and Interpretation of Ocean Data
(Grades 9–11) *Johnson A, Hilton*
Science Focus: ESS
Paul Orbe *(porbe@ucboe.us),* Academy for Enrichment and Advancement, Union City, N.J.
Come learn how to understand ocean acidification using technology and real data. Join me for an overview of the learning activity and some interesting results.

8:00–9:00 AM Presentations

***Stellaluna:* A Lesson on Appreciating Diversity Through Science and Literacy**
(Grades P–5) *323, Convention Center*
Science Focus: GEN, CCC
Eva Ogens *(eogens@ramapo.edu),* Ramapo College of New Jersey, Mahwah
The book *Stellaluna* provides a rich springboard through which to teach crosscutting concepts, address science and literacy standards, integrate many disciplines, and foster appreciation of diversity.

NSTA Press® Session: *Argument-Driven Inquiry in Physics: Mechanics Lab Investigations for Grades 9–12*
(Grades 9–12) *325, Convention Center*
Science Focus: PS, CCC, SEP
Victor Sampson (@drvictorsampson; *victor.sampson@gmail.com),* The University of Texas at Austin
Jonathon Grooms (@drjongrooms; *jgrooms@gwu.edu),* The George Washington University, Washington, D.C.
Learn about Argument-Driven Inquiry and how it can help students use disciplinary core ideas, crosscutting concepts, and science and engineering practices to explain natural phenomena.

Oysters as Teachers: An *NGSS* Story
(Grades 1–12) *333, Convention Center*
Science Focus: ESS3, LS2.A, CCC2, CCC6, CCC7, SEP
Bart Merrick *(bart.merrick@noaa.gov),* NOAA Chesapeake Bay Office, Annapolis, Md.
Peg Steffen *(peg.steffen@noaa.gov),* NOAA National Ocean Service, Silver Spring, Md.
Molly Harrison *(molly.harrison@noaa.gov),* NOAA Fisheries, Silver Spring, Md.
Hear about a regional partnership resulting in the development of K–12 science materials, reflective of the *NGSS,* on a locally relevant species, the Eastern oyster. We will cover the process, the product, an overview of best practices, and sample activities.

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. On page 128, you will find the conference sessions grouped according to their assigned science area category.

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 36 for a complete list of the *NGSS* codes used in this program.

Strands

The Baltimore 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 26.

Anchoring Our Natural Treasures Through Environmental Literacy

3D **Tying the Knot: Coherence in 3-D Science Learning**

Charting the Course for Innovation

The following icons will be used throughout this program.

NSTA Press® Sessions

NGSS@NSTA Forum Sessions

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

3D **Developing Curriculum for the *NGSS:* Navigating the Perfect Storm**
(Grades 9–College) *Holiday 3, Hilton*
Science Focus: GEN, NGSS
Julie Damico (@BCPSSci;@dwntwnjb73; *jdamico@bcps.org)* and **Tiffany Wendland** (@BCPSSci; *twendland@bcps.org),* Baltimore County Public Schools Office of Science, Towson, Md.
Hear how Baltimore County developed high school *NGSS*-focused courses and curricula and engage in a discussion about the process. Examples of curriculum resources will be shared.

Is This Your First NSTA Conference? First-Timer Conference Attendees' Orientation
(General) *Holiday 6, Hilton*
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.

Finding Funding…for Free! How to Secure External Funding for Classroom Projects and Research
(General) *Key 1, Hilton*
Science Focus: GEN
Ashley Pereira (@ashleypereiraCT; *pereiraa@easternct.edu),* Eastern Connecticut State University, Willimantic
Learn how to use free resources to find the funding you need to bring your ideas to life. BYOD for hands-on guided practice!

Three Teachers…60 Students…One Genuine STEM Unit of Study
(Grades 9–12) *Key 2, Hilton*
Science Focus: ESS3.C, ETS1
Rebecca Sarno (@becky_sarno; *rsarno@hpregional.org),* **Alexander Gonzalez** (@algonza30; *agonzalez@hpregional.org),* **Ann Yaccarino** *(ayaccarino@hpregional.org),* and **Brian Drelick** (@HighPointSTEM; *bdrelick@hpregional.org),* High Point Regional High School, Sussex, N.J.
Hear a firsthand account of how one math, one science, and one technology teacher created an authentic STEM unit of study.

BioBlitz—From Field to Classroom
(Grades K–8) *Key 4, Hilton*
Science Focus: LS2.B
Christie Davis (@BCPSOutdoorSci; *cdavis9@bcps.org),* **Tom Melito** (@BCPSOutdoorSci; *tmelito@bcps.org),* and **Dawn Dawson** *(ddawson@bcps.org),* Baltimore County Public Schools Office of Science, Towson, Md.
Find out how Baltimore County's 8,500 grade 5 students conduct field explorations comparing the biodiversity of a local park to their school yard ecosystems using geospatial technologies.

Tattoo Ink in Chemistry
(Grades 10–12) *Key 10, Hilton*
Science Focus: PS, SEP3, SEP4
Stephanie Harry *(sdharry@hampton.k12.va.us),* Kecoughtan High School, Hampton, Va.
Learn about the research and experiments conducted by students to help make a connection between chemistry and tattoo ink.

Teaching with Primary Literature
(Grades 9–College) *Key 11, Hilton*
Science Focus: GEN, SEP
Shelby Lake (@SciClassroom; *slake@aaas.org),* AAAS, Washington, D.C.
A collection of annotated *Science* papers, designed to help high school to undergraduate students understand the structure and workings of scientific research, will be presented.

Using Genetic Lines to Restore the American Chestnut Tree
(Grades 6–10) *Peale A, Hilton*
Science Focus: LS
Gary Hedges (@gehedges), Maryland State Dept. of Education, Frederick
Brad Yohe *(brad.yohe@gmail.com),* Retired Educator, Gettysburg, Pa.
Vince Hall *(hallv@cvcolonials.org),* New Oxford High School, New Oxford, Pa.
Provide roots for new learning as you hear how educators use the tenets of *NGSS* within the context of the restoration of the American chestnut to motivate students and increase their achievement.

8:00–9:00 AM Hands-On Workshops

Integrating Technology for Greater Engagement in the *NGSS*

(Grades 4–8) *322, Convention Center*

Science Focus: GEN, NGSS

Cheryl McDonough *(cmcdonough@maldenps.org),* Beebe School, Malden, Mass.

Discussion centers on helpful strategies and ways to integrate technology to increase student engagement and achievements of *NGSS* curriculum, as well as creating meaningful projects and connections in collaboration.

Energy Efficiency: Making a Difference Can Start Early

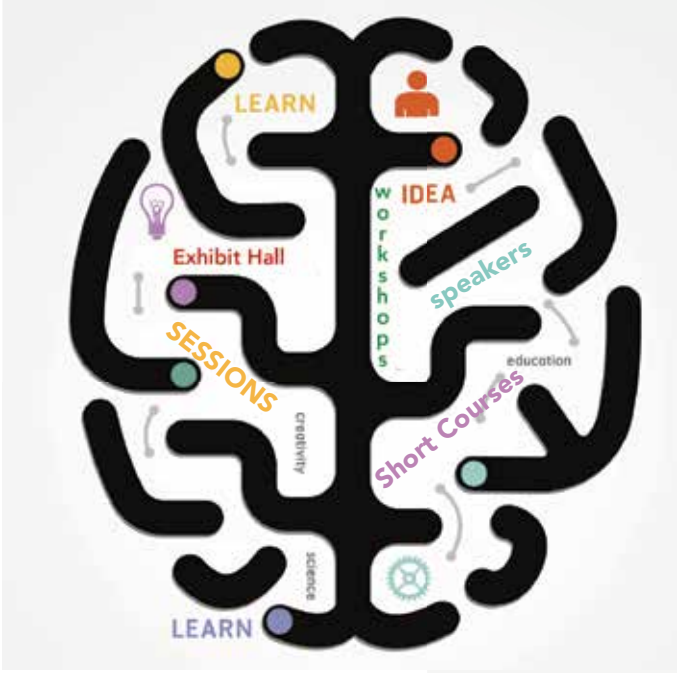
(Grades 4–8) *324, Convention Center*

Science Focus: ETS, PS, INF, CCC1, CCC2, CCC4, CCC5, SEP1, SEP6

Kimberly Swan (@NEED_Project; *kswan@need.org),* The NEED Project, Manassas, Va.

Introduce students to energy consumption and conservation using the school as a learning laboratory. Come learn how! Use tools like a Kill-a-Watt meter, Flicker Checker, and light meter.

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, October 5, 8:00–9:00 AM**
Holiday 6, Hilton Baltimore

National Science Teachers Association

Music to My Ears! 3-D Learning in Baltimore City Elementary Schools
(Grades 3–5) *326, Convention Center*
Science Focus: PS3.A, PS3.B, PS4.A
Amanda Laurier *(alaurier@bcps.k12.md.us)* and **Katya Denisova** *(kdenisova@gmail.com),* Baltimore (Md.) City Public Schools
Megan Healy *(mkhealy@bcps.k12.md.us),* Highlandtown Elementary/Middle School No. 237, Baltimore, Md.
Tap into the power of music. Participants will complete *NGSS*-focused investigations from a unit on the properties of sound from the STEM Achievement in Baltimore Elementary Schools (SABES) curriculum.

Carbon and Climate: E-Unit for Grades 6–8
(Grades 6–8) *349, Convention Center*
Science Focus: ESS3.C, ESS3.D, CCC2, CCC5
Sarah Haines *(shaines@towson.edu),* Towson University, Towson, Md.
Katie Dell (@kdellsci), Arbutus Middle School, Halethorpe, Md.
Explore and receive access to a new carbon-and-climate-centric electronic unit (e-unit) for middle schoolers that contains a familiar investigation-based lesson. Organized around science education's 5E instructional model and tied to current education standards (including *NGSS!),* join us to explore this new and innovative digital platform.

Integrating Technology into Middle School *NGSS* Engineering Design Performance Expectations
(Grades 5–12) *Holiday 4, Hilton*
Science Focus: ETS1, INF
Ruben Rosario *(rrosario@lsc.org)* and **Sophie Wakita** *(swakita@lsc.org),* Liberty Science Center, Jersey City, N.J.
Lean how to integrate technology into the *NGSS* engineering design performance expectations. Explore hands-on examples using 3D-printed materials and electronic components.

Producing STEM Equity Through the *CCSS Math* Practices
(Grades P–12) CANCELED *Holiday 5, Hilton*
Science Focus: GEN, NGSS
Christopher Duvall (@apoduvall; *apoduvall@gmail.com),* Montclair State University, Montclair, N.J.
Join me for this interactive, hands-on K–12 session and learn how to achieve a more equitable STEM classroom through activities that flatten access to *CCSS Math* practices.

CESI-Sponsored Session: Integrating Science and Literacy: Proven Strategies Developed from Evidence-Based Practices
(Grades K–6) *Key 5, Hilton*
Science Focus: GEN, NGSS
Jim McDonald (@jimscienceguy; *jim.mcdonald@cmich.edu),* Central Michigan University, Mount Pleasant
Find out how to integrate science with literacy and walk away with 33 proven instructional strategies to use in your classroom right away.

Enhancing Your Pedagogical Tool Kit in the Science Classroom
(Grades 9–12) *Key 7, Hilton*
Science Focus: GEN
Amy Chilinguerian (@achiliteach), Loch Raven High School, Towson, Md.
Ever feel like you are stuck in a pedagogical rut? Try mixing it up with a variety of engaging yet simple-to-implement activities.

Learn How READING LIKE A SCIENTIST Can Make Science Content Jump Off the Page for Your Students
(Grades 3–College) *Key 8, Hilton*
Science Focus: LS4
William Piercy *(piercys@aol.com)* and **Thomasina Piercy** *(piercys@aol.com),* Piercy Consulting Group, Harpers Ferry, W.Va.
Find out how science literacy practices can be taught for understanding through professional learning communities. We will identify why and how to develop a PLC as a vehicle for monitoring and improving science literacy by using American chestnut tree restoration as a context.

Threading 3-D Science Learning Through the Solar System: It's Not the Tholian Web
(Grades 4–12) *Key 9, Hilton*
Science Focus: ESS, ETS, CCC4, SEP1, SEP2, SEP7, SEP8
Barry Fried *(bfriedfab4@gmail.com),* Independent Consultant, East Meadow, N.Y.
Honora Dash *(hdash@schools.nyc.gov),* Edward R. Murrow High School, Brooklyn, N.Y.
Beam up new learning by using Earth and space sciences as a unifying theme in writing and oral argumentation of science and engineering. Explore how to incorporate problem-based and three-dimensional activities involving transdisciplinary models to enhance literacy skills through applied science learning experiences that make real-world connections.

8:00–9:00 AM Exhibitor Workshops

NGSS Waves: Protect Your Eyes!
(Grades 6–8) *327, Convention Center*
Science Focus: ETS, PS4.A, PS4.B, CCC6, SEP3, SEP4, SEP8
Sponsor: Lab-Aids, Inc.
Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, S.C.
Investigate wave properties before gathering evidence that energy varies with different colors of light. Start with tubes to investigate sound and then use a light station to explore light. Finally, experiment with colors and energy levels using a phosphorescent material.

CPO Science Biology Energy QUEST: Teaching Cell Energy Pathways
(Grades 5–12) *336, Convention Center*
Science Focus: LS
Sponsor: CPO Science/School Specialty Science
Kat Mills, School Specialty Science, Rosharon, Tex.
Erik Benton, CPO Science/School Specialty Science, Nashua, N.H.
Get ENERGIZED about teaching energy pathways with our latest LINK supplementary learning module, amplified by cutting-edge Augmented Reality. Through collaborative gameboard play, a content-rich digital curriculum, and by manipulating smartphone-ready 3D imagery with a swipe of a finger, students will be clamoring to earn 32 ATP and synthesize C6H12O6 molecules.

Ten Minutes to Improving Science Achievement
(Grades K–8) *337, Convention Center*
Science Focus: GEN
Sponsor: Delta Education/School Specialty Science–FOSS
Kathy Long, The Lawrence Hall of Science, University of California, Berkeley
"Assessment" can strike fear and trepidation 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 can embrace to create a classroom culture that motivates effort and growth to improve achievement.

How to Argue in a Middle School Science Class
(Grades 5–8) *338, Convention Center*
Science Focus: GEN, SEP7
Sponsor: Delta Education/School Specialty Science
Kathy Armstrong, Northside Elementary School, Midway, Ky.
Darrick Wood, Distance Learning Coordinator, Louisville, Ky.
Help students develop scientific argumentation skills by making claims based on observable evidence. Put these skills into practice with lessons from Delta Science Modules, as we prove (or disprove) fundamental science concepts. Leave with readers, equipment, and a lesson you can try with your students next week.

Martian Genetics: An Electrophoresis Exploration
(Grades 6–College) *339, Convention Center*
Science Focus: ETS, LS
Sponsor: Edvotek, Inc.
Brian Ell *(info@edvotek.com),* **Tom Cynkar** *(info@edvotek.com),* and **Maria Dayton** *(info@edvotek.com),* Edvotek Inc., Washington, D.C.
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? Discover how DNA technology can be used to explore the relationship between genotype and phenotype. Fluorescent dyes simulate DNA fragments, eliminating post-electrophoresis staining and saving classroom time!

Project-Based Inquiry Science™ (PBIS): Creating "Coherence and Science Storylines" for Middle School
(Grades 6–8) *348, 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. PBIS 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*.

9:15–10:30 AM General Session

Holding Fast to Dreams: Creating a Culture of STEM Success

(General) *Ballroom III/IV, Convention Center*

Science Focus: GEN

Freeman A. Hrabowski III, Consultant, and President, University of Maryland, Baltimore County, Baltimore

Presider and Introduction: David Crowther, NSTA President, and University of Nevada, Reno

Platform Guests: Mary Gromko, NSTA Retiring President, Colorado Springs, Colo.; Christine Anne Royce, NSTA President-Elect, and Shippensburg University, Shippensburg, Pa.; Jaclyn Austin, President, Maryland Association of Science Teachers (MAST), and Howard County Public School System, Ellicott City, Md.; Mary C.H. Weller, Chairperson, NSTA Baltimore Area Conference Chair, NSTA Director, District III, and Howard County Public School System, Ellicott City, Md.; Asli Sezen-Barrie, Program Coordinator, NSTA Baltimore Area Conference, and University of Maine, Orono; Mary Stapleton, Past President, Maryland Association of Science Teachers (MAST), Local Arrangements Coordinator, NSTA Baltimore Area Conference, and Towson University, Towson, Md.; David L. Evans, NSTA Executive Director, Arlington, Va.

Rapid and dramatic technological and demographic changes in the new century present our nation's schools and colleges and universities with enormous challenges for educating students from all backgrounds in STEM fields. Among the most critical questions we face are what will students need to know in order to succeed academically in science, and what skills and values must they possess? Additionally, what strategies can educators—working with parents and business and community leaders—use to support and ensure the success of all students in STEM areas? Join Freeman as he addresses these questions and shares innovative approaches to STEM teaching and learning, STEM teacher preparation, support for the growing population of diverse students who must participate and succeed in these fields, and the importance of partnerships between schools, universities, philanthropy, government agencies, and business.

Freeman A. Hrabowski III, president of UMBC since 1992, is a consultant on science and math education to national agencies, universities, and school systems. He was named by President Obama to chair the newly created President's Advisory Commission on Educational Excellence for African Americans. He also chaired the National Academies' committee that produced the recent report, Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroads.

9:30–10:30 AM Exhibitor Workshops

NGSS Ecology: Modeling the Introduction of a New Species

(Grades 6–8) *327, Convention Center*

Science Focus: LS2.B, LS2.C, CCC4, CCC5, SEP2

Sponsor: Lab-Aids, Inc.

Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, S.C.

How does a new species affect the flow of matter and energy in an ecosystem? This card sort–style activity models the introduction of a new species with special attention to the effect on existing predators and producers. This activity is from the new SEPUP middle level Ecology unit, revised and updated for the *NGSS* and published by Lab-Aids. Take home free samples of the activity.

DNA Structure and Function with a Twist of Dynamic DNA

(Grades 8–College) *330, Convention Center*

Science Focus: ETS, LS, CCC1, CCC2, CCC6, CCC7, SEP3, SEP6

Sponsor: 3D Molecular Designs

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

Support three-dimensional learning with engaging instructional materials that introduce DNA as a double-stranded helical molecule and as information that encodes proteins. Physical models allow students to explore DNA structure and function. A paper bioinformatics exercise focuses on the beta subunit of hemoglobin and the sickle cell disease mutation.

Engineer Physical Science Excitement in Your Classroom with a Carolina STEM Challenge®

(Grades 6–12) *331/332, Convention Center*

Science Focus: PS, SEP

Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

Bounce and race into 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 bring STEM to your classroom.

CPO's Wind Turbine: A STEM Approach to Engineering and Design

(Grades 5–12) *336, Convention Center*

Science Focus: ETS, SEP

Sponsor: CPO Science/School Specialty Science

Kat Mills, School Specialty Science, Rosharon, Tex.

Erik Benton, CPO Science/School Specialty Science, Nashua, N.H.

CPO's Link Wind Turbine learning module lets students learn in a real-time digital platform and engineer a wind turbine. Students build, test, and revise their designs. LINK uses STEM activities and an *NGSS* approach, giving students an understanding of how to apply the Engineering Cycle and demonstrate understanding.

What Does Argumentation Look Like in an Elementary Classroom?

(Grades K–5) *337, Convention Center*

Science Focus: GEN, SEP7

Sponsor: Delta Education/School Specialty Science–FOSS

Brian Campbell, The Lawrence Hall of Science, University of California, Berkeley

Join FOSS Next Generation Program developers to learn about science practices within the context of active investigations. Experience analyzing and interpreting data, constructing explanations, and engaging in argumentation from evidence as tools to deepen student learning within a FOSS lesson. Find out about transitioning to FOSS Next Generation.

Makerspaces with Options for All Students

(Grades 4–8) *338, Convention Center*

Science Focus: ETS

Sponsor: Delta Education and Frey Scientific

Kathy Armstrong, Northside Elementary School, Midway, Ky.

Darrick Wood, Distance Learning Coordinator, Louisville, Ky.

For students to develop the proper range of skills required of "makers", a makerspace should provide tools and resources to help them grow as scientists. Many makerspaces now include supplemental curriculum options that give students who are curious about science the resources designed for exploring classroom concepts in a maker setting.

Exploring the Genetics of Taste: SNP Analysis of the PTC Gene Using PCR

(Grades 9–College) *339, Convention Center*

Science Focus: LS

Sponsor: Edvotek, Inc.

Maria Dayton *(info@edvotek.com),* **Tom Cynkar** *(info@edvotek.com),* and **Brian Ell** *(info@edvotek.com),* Edvotek Inc., Washington, D.C.

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. Join us to learn how to use PCR to distinguish between PTC alleles. Free gift for attendees!

The Power of Modeling in K–8 Classrooms

(Grades K–8) *342, Convention Center*

Science Focus: GEN, NGSS

Sponsor: Amplify

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

How can students create and use models to enhance, explain, and expand their thinking? Experience a variety of ways students deepen and demonstrate their understanding of scientific phenomena through the use of models. Engage with K–8 exemplars from Amplify Science, the new *NGSS*-designed curriculum from The Lawrence Hall of Science.

Year-Round Solutions for Success in AP Chemistry from Flinn Scientific

(Grades 9–12) *343/344, Convention Center*

Science Focus: PS

Sponsor: Flinn Scientific, Inc.

Mike Marvel *(mmarvel@flinnsci.com)* and **Joan Berry** *(jberry@flinnsci.com),* Flinn Scientific, Inc., Batavia, Ill.

Join Flinn as we share AP Chemistry demonstrations, labs, inquiry activities, and more! 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. Prepare your students for the first day of class with FlinnPREP™, a new online review of foundational chemistry concepts. Handouts and door prizes. AP is a trademark of the College Board.

Hurricanes, Earthquakes, and Volcanoes Are Now Online!

(Grades 5–12) *345/346, Convention Center*

Science Focus: ESS2.B, ESS2.D

Sponsor: Simulation Curriculum Corp.

Herb Koller, Simulation Curriculum Corp., Minnetonka, Minn.

Join us as we use the acclaimed Layered Earth Geology and Meteorology with interactive lessons to learn about hurricanes, earthquakes, and volcanoes. And best of all, you can now access these complete curricula online using your Chromebooks and tablets, as well as using regular Windows and Mac computers.

Analyzing and Interpreting Data Using TCI's Bring Science Alive!

(Grades K–5) *347, Convention Center*

Science Focus: GEN, NGSS

Sponsor: TCI

Dawn Smith, TCI, Murray, Ky.

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.

Science Storylines and the Driving Question Board: Keeping *NGSS* Curricula Student Driven

(Grades K–12) *348, Convention Center*

Science Focus: GEN, CCC6, SEP2

Sponsor: Activate Learning

Heather Milo *(hmilo@activatelearning.com),* Activate Learning, Greenwich, Conn.

What if K–12 lessons could both meet the standards and leverage student curiosity about the natural world? Join us for an engaging workshop on storyline coherence as a means to not only have pedagogy meet the *NGSS,* but also build on students' wonderment questions using the Driving Question Board. We will use the IQWST unit, How Can I Smell Things from a Distance?

11:00 AM–12 Noon Exhibitor Workshops

***NGSS* Reproduction: Breeding Critters—More Traits**

(Grades 6–8) *327, Convention Center*

Science Focus: LS1.B, LS3.A, LS3.B, CCC1, CCC2, SEP2, SEP6

Sponsor: Lab-Aids, Inc.

Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, S.C.

Students model and explain additional patterns of inheritance as they explore cause-and-effect relationships for additional traits of the critters. These patterns help them model and explain the wide variation that can result from sexual reproduction. This activity provides an opportunity to assess student work related to MS-LS3-2.

5 E'sy Ways to Investigate Enzymes!

(Grades 8–College) *330, Convention Center*

Science Focus: LS1, LS3, LS4, PS1, PS2, CCC1, CCC2, CCC4, CCC6, CCC7, SEP1, SEP2, SEP6

Sponsor: 3D Molecular Designs

Gina Vogt *(gina.vogt@3dmoleculardesigns.com),* MSOE Center for BioMolecular Modeling, Milwaukee, Wis.

ENGAGE students in investigating enzyme structure/function using multiple modeling strategies. EXPLORE and EXPLAIN catabolism, anabolism, and competitive/noncompetitive inhibition with hands-on/minds-on instructional materials. ELABORATE on insecticide inhibition at an enzyme active site resulting in unintended consequences. EVALUATE student learning with an enzyme molecular story. Handouts!

Coding with First Graders? The Smithsonian Says YES!

(Grades K–5) *331/332, Convention Center*

Science Focus: GEN, NGSS

Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

Join us for an engaging hands-on workshop with investigations for teaching coding to young children. From the new Smithsonian Science for the Classroom™ series, the "How Can We Send a Message Using Sound?" module is designed to use the *NGSS* practices that make the standards come alive.

CPO's LINK Genetics Learning Modules: Crazy Traits and Crazy Chromosomes

(Grades 5–12) *336, Convention Center*

Science Focus: LS

Sponsor: CPO Science/School Specialty Science

Kat Mills, School Specialty Science, Rosharon, Tex.

Erik Benton, CPO Science/School Specialty Science, Nashua, N.H.

CPO Science's LINK learning modules for genetics use *NGSS* strategies in a real-time digital learning environment. Students can study the relationship between DNA, genes and mitosis, meiosis, traits, alleles, phenotypes, and genotypes. Heredity will come alive as you use hands-on models to create crazy creatures in a unique, collaborative program.

What Does Conceptual Modeling Look Like in Grades K–5 Classrooms?

(Grades K–5) *337, Convention Center*

Science Focus: GEN, CCC

Sponsor: Delta Education/School Specialty Science–FOSS

Brian Campbell, The Lawrence Hall of Science, University of California, Berkeley

Join FOSS Next Generation Program developers to explore how students construct models about phenomena. Experience active investigations from two grade levels and create models about physical science concepts. Find out how student models can be used to guide future instruction within the FOSS program.

OK, Class, Please Open Your Science Notebooks…

(Grades K–8) *338, Convention Center*

Science Focus: GEN

Sponsor: Delta Education/School Specialty Science

Kathy Armstrong, Northside Elementary School, Midway, Ky.

Darrick Wood, Distance Learning Coordinator, Louisville, Ky.

Experience the feeling of starting with a blank notebook and filling it with new ideas to make sense of the world around you. Leave with ideas and strategies to improve student notebooking in your own classroom.

Left at the Scene of the Crime: Introduction to Forensic Science

(Grades 6–College) *339, Convention Center*

Science Focus: ETS, LS

Sponsor: Edvotek, Inc.

Brian Ell *(info@edvotek.com),* **Maria Dayton** *(info@edvotek.com),* and **Tom Cynkar** *(info@edvotek.com),* Edvotek Inc., Washington, D.C.

Explore genetic diversity using forensic science! Your students become crime scene investigators as they analyze biological evidence using DNA fingerprinting, a technique that identifies people via genetic differences. Gel electrophoresis is used to create DNA fingerprints from crime scene and suspect samples. A match between samples suggests which suspect committed the crime. Free gift for attendees!

Space Docking Failure: Phenomena and 3-D Instruction for Grades 6–8

(Grades 6–8) *342, Convention Center*

Science Focus: PS2

Sponsor: Amplify

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

Experience how students investigate a failed spacecraft docking while figuring out principles of force and motion and engaging in three-dimensional learning. Participants will get a hands-on dive into Amplify Science for grades 6–8, engaging with this new *NGSS*-designed curriculum from The Lawrence Hall of Science.

Community-Based Problems: Using Middle School Science and Engineering to Help Your Community

(Grades 6–9) *343/344, Convention Center*

Science Focus: GEN, SEP3

Sponsor: AEOP

Matthew Hartman, eCYBERMISSION Content Manager, NSTA, Arlington, Va.

Real-world connections help strengthen the lessons students learn. Find out how to help students identify community problems that are important to them and how the practical application of science and engineering can lead to solutions for those problems. In addition, we will discuss how eCYBERMISSION, an online competition for grades 6–9 students, encourages them to solve a problem in their community using science and engineering practices.

Are You Moody?
(Grades 6–12) *345/346, Convention Center*
Science Focus: ETS, PS, INF, CCC2, SEP5, SEP6
Sponsor: Texas Instruments
Stacy Thibodeaux, David Thibodaux STEM Magnet Academy, Lafayette, La.
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 their own 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!

Engineering Design in the *NGSS*
(Grades 6–8) *347, Convention Center*
Science Focus: ETS1
Sponsor: TCI
Dawn Smith, TCI, Murray, Ky.
Become 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 perspective as you take on the roles of engineers defining problems, developing solutions, and testing to best solve the problem.

Structuring Discussion to Be Equitable and Rigorous
(Grades K–12) *348, Convention Center*
Science Focus: PS2, SEP2, SEP6, SEP7, SEP8
Sponsor: Activate Learning
Heather Milo *(hmilo@activatelearning.com),* Activate Learning, Greenwich, Conn.
The *Framework* promotes learning as a fundamentally social endeavor supported by collaborative and communicative norms. Yet, sustaining these norms requires teachers to examine and support K–12 students' ways of talking so they all are able to articulate, make sense of, and evaluate each other's ideas. Walk away with ready-to-use tools that foster and assess productive talk. We'll use the IQWST unit, How Will It Move?

—Photo courtesy of Mike Weiss

11:00 AM–5:00 PM Exhibits

Hall E, Convention Center
Did you know that NSTA offers exclusive exhibit hall and exhibitor workshop hours today from 11:00 AM to 12:30 PM? During these hours there are no teacher sessions scheduled and it's a perfect time to visit the exhibits and discover all the products and services companies and organizations have to offer. Some exhibitors will offer materials for sale throughout the conference.

12:30–1:00 PM Presentation

NMLSTA-Sponsored Session: Meaningful Connections Through Professional Organizations
(Grades 4–8) *Key 1, Hilton*
Science Focus: GEN
Terri Hebert *(thebert@iusb.edu),* Indiana University South Bend
Find out more about what the professional organization of National Middle Level Science Teachers Association has to offer and the connections that can be made.

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

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In partnership with the United States Patent and Trademark Office

12:30–1:30 PM Presentations

NSTA Press® Session: *Argument-Driven Inquiry in Physical Science: Lab Investigations for Grades 6–8*
(Grades 6–8) *321, Convention Center*
Science Focus: PS
Victor Sampson (@drvictorsampson; *victor.sampson@gmail.com),* The University of Texas at Austin
Jonathon Grooms (@drjongrooms; *jgrooms@gwu.edu),* The George Washington University, Washington, D.C.
Learn about Argument-Driven Inquiry and how it can help students use disciplinary core ideas, crosscutting concepts, and science and engineering practices to explain natural phenomena.

Scrolling and SciFriday
(Grades P–2) *323, Convention Center*
Science Focus: GEN
Joanne Clapp *(jlclapp@smcps.org),* Chesapeake Public Charter School, Lexington Park, Md.
See how Scrolling and SciFriday can be used in an early childhood classroom to engage students in scientific learning and ensure that academic standards are met.

NSTA Press® Session: *Creating a STEM Culture for Teaching and Learning*
(General) *325, Convention Center*
Science Focus: GEN, NGSS
Jeffrey Weld *(jeff.weld@uni.edu),* Iowa Governor's STEM Advisory Council, Cedar Falls
Hot off the NSTA Press, this book is for teachers, administrators, business partners, community members, parents, scholars, and policymakers who seek to be up-to-speed on the many elements of STEM, from curriculum to professional development to assessment to partnerships to licensing and more.

Take the Edison Challenge!
(Grades K–12) *333, Convention Center*
Science Focus: GEN, NGSS
Cheri Garner (@cherigarner; *cheri.garner@adelsoncampus.org),* The Dr. Miriam and Sheldon G. Adelson Educational Campus, Las Vegas, Nev.
Get the tools to design an "Edison Challenge" for your students to complete. Points are earned as students use technology tools to explore science, engineering, and math connections.

Teach Engineering Practices on the Cheap with Concrete
(Grades 6–12) *Holiday 3, Hilton*
Science Focus: ETS1, INF, SEP
Debbie Goodwin *(nywin@hotmail.com),* Retired High School Science Teacher, Chillicothe, Mo.
Teach engineering using concrete and other composite materials. Discover inexpensive STEM projects that engage students using the #1 building material in the world. *NGSS* correlations shared.

The Perfect Match: Environmental Education and Project-Based Learning!
(Grades 9–12) *Johnson A, Hilton*
Science Focus: LS
Alicia Pressel, Creekside High School, St Augustine, Fla.
Come see how easy it is to integrate project-based learning into your environmental science curriculum! The Academy of Engineering and Environmental Sciences is a STEM academy teaching students how to easily integrate engineering skills and new technologies into the fields of environmental science. Students have opportunities to earn industry certifications, gain real-world experience, and have internships through community partnerships.

Stories in the Secondary Classroom
(Grades 10–12) *Johnson B, Hilton*
Science Focus: GEN, CCC
Cynthia Cykert *(christecykert@cox.net),* Rogers High School, Newport, R.I.
Discussion centers on 15 fiction and nonfiction books to use in secondary science classrooms. Daily activities and long-term project ideas will be shared.

EANR (Environment, Agriculture, and Natural Resources): Preparing Students for Environmental Careers
(Grades 9–12) *Key 2, Hilton*
Science Focus: LS, CCC4
Sarah Haines *(shaines@towson.edu),* Towson University, Towson, Md.
Elena Takaki *(etakaki@fishwildlife.org),* Association of Fish & Wildlife Agencies, Washington, D.C.
Come learn about a high school program in natural resources that includes a four-course sequence that prepares students to pursue postsecondary education in environmental fields.

Equity in Science Education Roundtable
(General) *Key 3, Hilton*
Science Focus: GEN
Natacia Campbell (@NataciaCampbell; *ncampbell@joliet86.org),* Joliet (Ill.) Public Schools District 86
Join me in sharing equity concerns and resources for enhancing equity and access in science education programs. Find out what NSTA is doing to support equity nationwide.

NGSS@NSTA Forum Session: Designing and Using Classroom Assessments to Support Meaningful *NGSS* Investigations
(Grades K–12) *Key 8, Hilton*
Science Focus: GEN, NGSS
Philip Bell (@philiplbell; *pbell@uw.edu),* University of Washington, Seattle
Embedding formative assessment sequences into instruction helps gauge progress in student understanding and reveals learning assets that students bring to the classroom. Through an examination of assessment examples and sample student responses, we'll explore how to design and interpret cognitive assessments of three-dimensional learning, as well as cultural formative assessments of student and community interests and funds of knowledge. STEM teaching tools will also be shared.

Using a Role-Playing Activity in the Teaching of Chemistry
(Grades 10–11) *Key 10, Hilton*
Science Focus: PS, CCC, SEP
Paul Orbe *(porbe@ucboe.us),* Academy for Enrichment and Advancement, Union City, N.J.
Explore assessing writing, collaboration, and debate skills of students through a role-playing activity. Join me for an overview of the activity and some interesting results.

Epidemiology in Your Classroom
(Grades 9–12) *Peale A, Hilton*
Science Focus: LS
Emilie Tekely, Dauphin County Technical School, Harrisburg, Pa.
Meet standards while allowing students to do authentic research about health-related events and behaviors in your school.

NSTA District Support
(Grades K–12) *Peale B, Hilton*
Science Focus: GEN
John Putnam (*jputnam@nsta.org*), Assistant Executive Director, Professional Programs, NSTA, Arlington, Va.
Kim Stilwell (@kimstilwellNSTA; *kstilwell@nsta.org),* Manager, New Business Development, NSTA, Arlington, Va.
Find out how NSTA can support your district with science PD opportunities that combine access to national thought leaders with high-quality NSTA products.

12:30–1:30 PM Hands-On Workshops

INF **Bridging the Gap: Collaboration in the "Next Generation Science Learning Environment"**
(Grades 5–8) *322, Convention Center*
Science Focus: GEN, INF, SEP
Emma Banay *(ebanay@expandedschools.org)* and **Sabrina Gomez** (@expand_school; *sgomez@expandedschools.org),* ExpandED Schools, New York City, N.Y.
Jasmine Maldonado *(jmaldonado@nyscience.org),* New York Hall of Science, Corona
Chezare Martinez *(chezarem1981@hotmail.com),* Kingsbridge Heights Community Center, Bronx, N.Y.
Diego Rodriquez *(drodriguez@ticharter.org),* Tech International Charter, Bronx, N.Y.
Educators can achieve the "next generation science learning environment" through collaboration with community partners. Come learn how to bridge formal and informal science environments.

Exploring Discrepant Events with Silly Putty®
(Grades 1–5) *324, Convention Center*
Science Focus: PS1.A, CCC2, SEP7
Mike Mangiaracina *(mike.mangiaracina@gmail.com),* Brent Elementary School, Washington, D.C.
By engaging with the discrepant event of the "Melting Snowman" toy, students immerse themselves in a world of inquiry. Is it a solid or a liquid?

Connecting Content, Critical Thinking, and Creativity Through Trade Books
(Grades 3–6) *326, Convention Center*
Science Focus: GEN, CCC1, CCC3, CCC6
Christine Anne Royce (@caroyce; *caroyce@aol.com),* NSTA President-Elect, and Shippensburg University, Shippensburg, Pa.
Steve Rich (@bflyguy; *bflywriter@comcast.net),* University of West Georgia, Carrollton
Investigate a series of activities that help to integrate science and literacy skills that use trade books focused on critical thinking, creativity, and developmentally appropriate content.

Let It Rain: A Hands-On Rain Garden Design Lab
(Grades 4–8) *349, Convention Center*
Science Focus: ESS3.C, ETS1.A, ETS1.B, INF, CCC2, CCC4, CCC6, SEP1, SEP2, SEP3, SEP4, SEP6, SEP8
Kerri Younkin *(kyounkin@towson.edu),* Towson University Center for STEM Excellence, Baltimore, Md.
Get dirty! Join us for an engineering challenge where you will create and test a model rain garden to absorb the most water (grades 4–8).

How to Read Like Scientists!
(Grades 4–10) *Holiday 4, Hilton*
Science Focus: GEN
Ann Berg *(aberg@c-ischools.org),* Cambridge Middle School, Cambridge, Minn.
Explore strategies through interactive activities and discussion that support success in reading science nonfiction and, most importantly, scientific inquiry.

3D **Bridging the Language Gap for ELLs in Science**
(Grades 3–10) *Holiday 5, Hilton*
Science Focus: GEN, NGSS
Emily Perry, Thomas Viaduct Middle School, Hanover, Md.
Deborah Puhak, Howard County Public School System, Ellicott City, Md.
Explore learning activities focusing on equitable access for English language learners using the dimensions of the *NGSS* and the *Framework.* Personalized supports for students will be modeled and shared.

Pursuing the Red Planet
(Grades 3–5) *Key 4, Hilton*
Science Focus: ESS
Susie Cohen *(susa600@aol.com),* Florida International University, Miami
Launch new learning as you engage in hands-on activities and discuss how to stimulate student interest in space travel and issues related to survival on Mars.

How to Invent the Wheel: Designing a STEM Program from Scratch
(Grades 9–12) *Key 7, Hilton*
Science Focus: ETS2, CCC, SEP
David Brock *(brockda@rpcs.org)* and **Amy Popp** *(poppa@rpcs.org),* Roland Park Country School, Baltimore, Md.
Join faculty of The STEM Institute at Roland Park to learn how to identify and develop your STEM needs into a working curriculum for your students. Engage in guided planning to build a model framework for constructing your STEM program(s).

Describing Data Using Central Tendencies, Graphs, and Statistics in AP and IB
(Grades 9–College) *Key 9, Hilton*
Science Focus: LS, SEP
Kristen Daniels Dotti *(kristen.dotti@catalystlearningcurricula.com),* Verde Valley School, Sedona, Ariz.
Collect data on groups of "mice" and use these sample sets to guide students in making good choices in the use of statistical parameters.

12:30–1:30 PM Exhibitor Workshops

***NGSS* Biomedical Engineering: Get a Grip**
(Grades 6–8) *327, Convention Center*
Science Focus: ETS, LS1.A, CCC6, SEP1, SEP2, SEP5, SEP6
Sponsor: Lab-Aids, Inc.
Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, S.C.
Use the approach of biomimicry to design, test, evaluate, and redesign a mechanical gripping device to meet criteria. An interactive process is used to optimize the device by investigating the relationship between structure and function and applicable technology.

Getting Students Through the Cellular Membrane
(Grades 6–College) *330, Convention Center*
Science Focus: LS1, PS1, PS2, CCC1, CCC2, CCC4, CCC6, CCC7, SEP1, SEP2, SEP6
Sponsor: 3D Molecular Designs
Gina Vogt *(gina.vogt@3dmoleculardesigns.com),* MSOE Center for BioMolecular Modeling, Milwaukee, Wis.
Support three-dimensional learning with materials that engage your students in an exploration of rare chemical and physical properties of water and the membranes that separate cells from their surrounding environment. Construct a model to explain diffusion, osmosis, and active and passive transport of molecules across the cell membrane.

Hands-On Science with Classroom Critters
(Grades K–12) *331/332, 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 hands-on activities with pill/sow bugs, termites, bessbugs, and butterflies that you can use in your labs. Learn about care and handling, as well as easy ways to introduce inquiry. Additional resources available online.

Modular Robotics for Elementary and Middle School: CUBELETS!
(Grades 3–8) *336, Convention Center*
Science Focus: ETS
Sponsor: Frey Scientific/School Specialty Science
Kat Mills, School Specialty Science, Rosharon, Tex.
Erik Benton, CPO Science/School Specialty Science, Nashua, N.H.
Encourage students to be inquisitive and unlock their inner inventor! Learn about types of robotic operations: THINK, SENSE, and ACT in a hands-on hour using Cubelets, blocks that can instantly connect and perform robot functions. What sensory input is needed? What output is generated? How many classroom applications are there?

Wave Properties and Information Transfer
(Grades 6–8) *337, Convention Center*
Science Focus: PS4, CCC, SEP
Sponsor: Delta Education/School Specialty Science–FOSS
Jessica Penchos, 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 properties of refraction and reflection that allow information transfer by fiber-optic technology, and identify connections to the three dimensions of *NGSS*.

What in the World Are Crosscutting Concepts?
(Grades K–8) *338, Convention Center*
Science Focus: GEN, CCC
Sponsor: Delta Education/School Specialty Science
Kathy Armstrong, Northside Elementary School, Midway, Ky.
Darrick Wood, Distance Learning Coordinator, Louisville, Ky.
Crosscutting concepts may be the most misunderstood dimension of the *NGSS*. Come be a student and experience Delta Science Module lessons that unleash the power of the crosscutting concepts and give them the attention they deserve. Leave with materials and strategies that you can use in your classroom next week.

Cancer Investigators: Medical Diagnostics in Your Classroom
(Grades 9–College) *339, Convention Center*
Science Focus: LS
Sponsor: Edvotek, Inc.
Brian Ell *(info@edvotek.com),* **Tom Cynkar** *(info@edvotek.com),* and **Maria Dayton** *(info@edvotek.com),* Edvotek Inc., Washington, D.C.
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. In this hands-on workshop, participants use microscopy and electrophoresis to explore the hallmarks of cancer. Free gift for attendees!

Puppet Theater Engineering: Phenomena and 3-D Instruction for Grades K and 1
(Grades K–1) *342, Convention Center*
Science Focus: PS
Sponsor: Amplify
Sophia Lambertsen and **Rebecca Abbott,** The Lawrence Hall of Science, University of California, Berkeley
Experience how students design shadow scenery and sound effects while figuring out principles of light and sound and engaging in three-dimensional learning. Get a hands-on dive into Amplify Science for grades K–1, engaging with this new K–8 *NGSS*-designed curriculum from The Lawrence Hall of Science.

Zombie Apocalypse!
(Grades 6–12) *345/346, Convention Center*
Science Focus: GEN
Sponsor: Texas Instruments
Jeffrey Lukens, Sioux Falls (S.Dak.) 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!

Literacy in the Context of Science in the Elementary Classroom
(Grades K–5) *348, Convention Center*
Science Focus: GEN, NGSS
Sponsor: Activate Learning
Ellen Mintz *(emintz621@gmail.com),* Charleston County School District, Charleston, S.C.
Experience a lesson that demonstrates the integration of literacy strategies in the context of science. This includes the incorporation of academic language in written responses in science notebooks and oral discourse in conjunction with investigations using an interactive word wall.

1:00–1:30 PM Presentation

INF **NMLSTA-Sponsored Session: Leveraging the Power of Place in Citizen Science Projects**

(Grades 4–8) *Key 1, Hilton*

Science Focus: LS2, INF, SEP1, SEP4, SEP8

Terri Hebert *(thebert@iusb.edu),* Indiana University South Bend

Find out more about how middle level students and teachers can experience powerful learning as they seek to engage the local landscape through citizen science projects.

1:00–4:00 PM Short Course

Data, Data Everywhere (SC-1)

(Grades K–12) **Tickets Required; $21** *Key 12, Hilton*

Science Focus: ESS, SEP4

Eliza Richardson *(eur10@psu.edu),* **David Babb** *(dmb16@psu.edu),* and **Timothy White** *(tswhite@essc.psu.edu),* Penn State, University Park, PA

For description, see page 32.

2:00–2:30 PM Presentation

Leaving the "Wright" Footprint

(Grades 5–8) *321, Convention Center*

Science Focus: ESS

Rachel Askew (@MsRDAskew; *rdking1@memphis.edu),* The University of Memphis, Tenn.

Are students invested in their school? How can we encourage students to care about their schools and the surrounding community through a lens of science? By leaving "The 'Wright' Footprint" students will lean how their school impacts the surrounding community and create a plan to improve their environmental footprint.

2:00–3:00 PM Featured Presentation

Rigorous Citizen Science for Lasting Change

(General) *328/329, Convention Center*

INF Science Focus: GEN, INF

Sponsored by National Geographic Learning | Cengage

Gregg Treinish (@Adventur-Science), Adventurer and Conservationist, Adventure Scientists, Bozeman, Mont.

Presider: Olukayode Banmeke, NSTA Baltimore Area Conference Strand Leader and DuVal High School, Lanham, Md.

Gregg Treinish will speak about his journey from adventurer to nonprofit CEO and how he has mobilized thousands to make a difference while they explore the outdoors. Through his organization, Adventure Scientists, some of the world's most challenging environmental issues are gaining new hope from solutions at scale. Gregg will focus on these solutions and share tales of data collection from expeditions around the world.

Gregg Treinish founded Adventurers and Scientists for Conservation (ASC), a nonprofit organization connecting outdoor adventurers with scientists in need of data from the field. He also organizes his own expeditions, contributing to research on wildlife–human interaction, fragmented habitats, and threatened species. Gregg has worked with students, teachers, military veterans, and families on vacation to collect samples, photographs, data, and observations in an effort to use "citizen science" as a main way that scientific data can be collected and shared.

—Photo courtesy of National Geographic Learning | Cengage

Gregg Treinish navigates in a Mokoro, a type of canoe used in the shallow waters of the Okavango Delta in Botswana.

2:00–3:00 PM Presentations

Enabling K–6 Students to Understand the Impact of STEM and Integration of All Its Disciplines: Explorations and Problem Solving with Physical Structures and Everyday Household Objects

(Grades K–6) *323, Convention Center*

Science Focus: GEN, NGSS

Donna Knoell *(dknoell@sbcglobal.net),* Educational Consultant, Overland Park, Kans.

Join me as I model the integration of STEM disciplines in classroom explorations by analyzing and constructing physical structures and everyday household objects to advance learning and ignite engagement and creativity. Handouts!

Advancing Awareness of Clean Energy Technologies and Careers Through an Educational Design Contest

(Grades 10–College) *333, Convention Center*

Science Focus: ETS2.B, SEP8

Phyllis King (@phyllking22; @INL; *phyllis.king@inl.gov)*, Idaho National Laboratory, Idaho Falls

Gain details about the 2016 Geothermal Design Challenge, diverse demographics of the participants, outreach methodologies and metrics, and the quantified impact the contest had on driving awareness of clean energy technologies and potential careers among the participants, the geothermal community, educational community, and the general public.

3D **A Unique Ice Core Investigation That Integrates the Three Dimensions of *NGSS* and STEM**

(Grades 7–12) *Holiday 3, Hilton*

Science Focus: ESS1.C, ESS2.B, ESS2.E, PS4.B, CCC1, CCC2

Donna Young *(dlyoung.nso@gmail.com),* NASA NSO STEM Coordinator, Bullhead City, Ariz.

Hear about 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.

Authentic LEARN-ing and Teaching

(Grades 3–12) *Johnson A, Hilton*

Science Focus: GEN, SEP

Alexandra Stroukoff *(astroukoff@ou.edu)* and **Danny Mattox** (@demattox; *dannyemattox@gmail.com),* The University of Oklahoma, Norman

We will share an investigation of an authentic learning lesson database, LEARN (Lessons and Engaging Activities Repository Network), that connects research-based strategies with the dimensions of the *NGSS*.

$TEM: Incorporating Career Connections

(Grades 6–12) *Johnson B, Hilton*

Science Focus: GEN, NGSS

Ashley Pereira (@ashleypereiraCT; *pereiraa@easternct.edu),* Eastern Connecticut State University, Willimantic

Same content, new focus. Come learn how to incorporate STEM career exploration into your existing curriculum using examples from two high school courses. Participants are encouraged to bring a unit or lesson plan to work with in this workshop-style presentation.

ASTE-Sponsored Session: Beyond Evolution: Addressing Interactions Between Science and Religion in Classrooms and Communities

(Grades 6–College) *Key 1, Hilton*

Science Focus: GEN

Joseph Shane *(jwshan@ship.edu),* Shippensburg University, Shippensburg, Pa.

Ronald Hermann *(rhermann@towson.edu),* Towson University, Towson, Md.

We will discuss historical, legal, and practical aspects of addressing science topics with frequent religious implications such as evolution, geochronology, and climate change.

INF **Creating and Maintaining Kid-Friendly/Bird-Friendly Gardens**

(Grades 1–12) *Key 2, Hilton*

Science Focus: GEN, INF, SEP

Lindsay Glasner (@BirdSleuth; *lig27@cornell.edu),* The Cornell Lab of Ornithology, Ithaca, N.Y.

Melanie Kane *(melanie.kane@hcps.org),* Harford Glen Environmental Education Center, Bel Air, Md.

School gardens inspire students to explore the characteristics that create good habitats for birds and wildlife. Discover grants, resources, and get your free bird feeder!

Spark Students' Curiosity with Chemistry!

(Grades K–12) *Key 3, Hilton*

Science Focus: PS1, PS3

Karen Kaleuati *(k_kaleuati@acs.org),* American Chemical Society, Washington, D.C.

Learn about the various free resources—games, lesson plans, grants, and more—available from the American Chemical Society (ACS) without being a member. Attendees will walk away with copies of the resources.

Inventing Success for All Learners in STEM
(Grades 1–12) *Key 4, Hilton*
Science Focus: ETS1
Joann Blumenfeld *(jblumenfeld@wcpss.net),* Broughton Magnet High School and Science House, North Carolina State University, Raleigh
Sheryl Sotelo (@SherylSotelo; *sherylsotelo@gmail.com),* STEMovations, Homer, Alaska
Walk away with many hands-on low-cost ideas, resources, and competitions that engage all kinds of learners in high-quality STEM learning while inventing.

Cars: A Fundamental Look at How Cars Work and the Science Involved
(Grades 8–12) *Key 10, Hilton*
Science Focus: ETS, PS3, INF, CCC, SEP
Andrew Nydam *(andrewnydam@hotmail.com),* Polymer Ambassador, Olympia, Wash.
Students love cars and tolerate school. Complex science concepts can be introduced and explored using the automobile as the focus (energy transformations, chemical reactions, gas laws, and solutions).

Countless Connections: Preservice Outreach Opportunities
(Grades K–12) *Key 11, Hilton*
Science Focus: GEN
Robbie Higdon *(rhigdon72@yahoo.com)* and **Eric Pyle** *(pyleej@jmu.edu),* James Madison University, Harrisonburg, Va.
We will present multiple examples of how to connect preservice teachers with local K–12 science classrooms for STEM and STEAM activities.

2:00–3:00 PM Hands-On Workshops

Diving into the Chemistry of the "Toward High School Biology" Curriculum
(Grade 8) *324, Convention Center*
Science Focus: LS1.B, LS1.C, PS1.A, PS1.B, CCC1, CCC5, SEP2, SEP4, SEP6, SEP7
Sarah Pappalardo (@PappyScience; *squick08@gmail.com),* Dunloggin Middle School, Ellicott City, Md.
Meredith Long (@LongEMMScience; *meredith_long@hcpss.org),* Ellicott Mills Middle School, Ellicott City, Md.
Damisha Drakes *(damisha_drakes@hcpss.org),* Wilde Lake Middle School, Columbia, Md.
Leah Donovan (@leahrdonovan; *leahrdonovan@hotmail.com),* Oakland Mills Middle School, Columbia, Md.
How do you teach the conservation of matter AND have it "stick"? We will share our classroom experiences with the Toward High School Biology unit.

NSTA Press® Session: *Solar Science:* 3-D Learning Applied to the Study of the Sun's Daily and Annual Motion
(Grades 6–9) *325, Convention Center*
Science Focus: ESS, CCC, SEP
Dennis Schatz (@DinoManSchatz; *dschatz@pacsci.org),* Pacific Science Center, Seattle, Wash.
Solar Science provides various examples of using three-dimensional learning. Come explore activities associated with the daily and annual motion of the Sun.

Let's Get Wet: Water and Weather
(Grades P–3) *326, Convention Center*
Science Focus: ESS
Ruth Ruud *(ruudruth61@gmail.com),* Cleveland State University, Cleveland, Ohio
Juliana Texley (@JulianaTexley; *jtexley@att.net),* 2014–2015 NSTA President, and Science Writer/Instructor, New Baltimore, Mich.
Don't look now, but the *CCSS* asks that you teach Earth science 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!

Science—A Family Event!
(Grades 6–8) *349, Convention Center*
Science Focus: PS, SEP2, SEP6, SEP8
Dawn Cronauer *(dawn.cronauer@hcps.org),* North Harford Middle School, Pylesville, Md.
Get parents involved and students excited about homework! Walk away with a set of home demonstrations to go with each physical science unit.

Inventing Is Just Plain Fun (for All)!
(Grades 4–College) *Holiday 4, Hilton*
Science Focus: ETS, SEP6
Anthony Perry (@tonyperry; *aperry@mit.edu),* The Lemelson-MIT Program, Cambridge, Mass.
John Stansbury (@stansburyj; *john_w_stansbury@mcpsmd.org),* Poolesville High School, Poolesville, Md.
Gain experience leading a design challenge and incorporating invention into your curriculum to provide authentic and integrated problem-solving opportunities for all students.

Evolution: DNA and the Unity of Life
(Grades 9–12) *Holiday 5, Hilton*
Science Focus: LS4, CCC1, CCC2, SEP2, SEP4, SEP7
Louisa Stark *(louisa.stark@utah.edu),* The University of Utah, Salt Lake City
Explore a curriculum unit integrating three-dimensional learning with published scientific data to address core ideas in biochemistry, common ancestry, heredity, natural selection, and speciation. Visit *learn.genetics.utah.edu* for more information.

Maximize Your Makerspace Through Design Thinking and the Wallingford 3-D Learning Program
(Grades K–12) *Key 6, Hilton*
Science Focus: ETS
Kate O'Donnell (@WPS_Science; *kodonnell@wallingfordschools.org)* and **Robert Kovi** (@robkovi; *rkovi@wallingfordschools.org),* Wallingford (Conn.) Public Schools
Presider: Salvatore Menzo *(smenzo@wallingfordschools.org),* Wallingford (Conn.) Public Schools
Hear how students from kindergarten through high school can apply design thinking and Wallingford three-dimensional learning in a makerspace to provide an authentic application of engineering, technology, and the application of science.

Teaching Cosmology
(Grades 9–College) *Key 7, Hilton*
Science Focus: ESS
Katrina Brown *(kwb@pitt.edu)* and **Todd Brown** *(ltbrown@pitt.edu),* University of Pittsburgh at Greensburg, Pa.
We will discuss methods for teaching cosmology, work through an activity that demonstrates the expanding universe, and explore the History of the Universe chart.

NGSS@NSTA Forum Session: Better Science for All
(Grades K–12) *Key 8, Hilton*
Science Focus: GEN, NGSS
Matt Krehbiel (@ksscienceguy; *mkrehbiel@achieve.org),* Achieve, Inc., Washington, D.C.
Implementation of the *NGSS* should focus on advancing science education for all students and doing this successfully means more than changing one or two classrooms, it means catalyzing strategic change within your school and district. Come explore how to leverage existing Achieve tools to address concrete needs (selecting instructional materials, evaluating classroom assessments, etc.) while simultaneously building long-term capacity to advance science instruction. This session is designed for classroom, building, and district leaders who are (or who want to be) thinking strategically about *NGSS* implementation and are looking for more ideas of how to move forward.

Engineering Underway: A Closer Look at the Engineering Design Process Through Naval-Relevant Project-Based Learning
(Grades 6–College) *Key 9, Hilton*
Science Focus: ETS1
Angela Moran *(amoran@usna.edu),* U.S. Naval Academy, Annapolis, Md.
The goal of this workshop is to develop participants' pedagogical content knowledge on the methodology of engineering design through hands-on, project-based, and Naval-relevant experiences. *Note:* Hands-on activities are available to the first 30 participants.

2:00–3:00 PM Exhibitor Workshops

Chemical Batteries

(Grades 6–8) *327, Convention Center*

Science Focus: PS1.B, PS3.B, PS3.C, PS3.D, CCC2, CCC5, SEP1, SEP2, SEP3, SEP4

Sponsor: Lab-Aids, Inc.

Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, S.C.

Although we live a battery-powered lifestyle, most of us (students included) have no idea how batteries actually work. In this hands-on workshop, we will engage in an activity from *Issues and Physical Science* from Lab-Aids. Make a wet cell battery, explore the effect of using different metal electrodes on battery output, and consider ways to reduce the number of discarded batteries in the waste stream.

Collecting Evidence: How Does an Owl Get All That Energy?

(Grades K–5) *331/332, Convention Center*

Science Focus: LS, CCC, SEP

Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

Join us to experience a lesson from Carolina's Building Blocks of Science® elementary curriculum. The lesson uses modeling to solve the problem, "Which animals provide energy for owls?" Leave with a set of ideas for using modeling with your students.

Solving the Mystery of STEM Using Forensic Science

(Grades 5–12) *336, Convention Center*

Science Focus: GEN

Sponsor: Frey Scientific/School Specialty Science

Kat Mills, School Specialty Science, Rosharon, Tex.

Erik Benton, CPO Science/School Specialty Science, Nashua, N.H.

Conduct STEM-focused beginner forensic activities that connect the scientific investigations to analysis and investigative skills. Solve "cases" involving fingerprinting, blood spatter, and document or fabric analysis. Using a digital learning environment with simple supplies, we will apply basic mathematic principles, plus integrate reading and writing strategies with Frey Scientific's Forensics Kit.

Identifying Energy Transfers in Motors and Generators

(Grades 6–8) *337, Convention Center*

Science Focus: PS3, CCC, SEP

Sponsor: Delta Education/School Specialty Science–FOSS

Jessica Penchos, The Lawrence Hall of Science, University of California, Berkeley

Dissect a motor to identify its components and make claims about energy transfers in the new FOSS Next Generation Electromagnetic Force Course for middle school. Compare the motor components to those of a generator and consider sustainability of energy sources. Identify connections to the three dimensions of *NGSS*.

Boosting the Makerspace Experience for Young Scientists!

(Grades K–3) *338, Convention Center*

Science Focus: ETS

Sponsor: Delta Education and Frey Scientific

Kathy Armstrong, Northside Elementary School, Midway, Ky.

Darrick Wood, Distance Learning Coordinator, Louisville, Ky.

Makerspaces are popping up everywhere, providing a creative space to explore questions and solve problems. But for younger 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.

Detecting the Silent Killer: Clinical Detection of Diabetes

(Grades 9–College) *339, Convention Center*

Science Focus: LS

Sponsor: Edvotek, Inc.

Maria Dayton *(info@edvotek.com),* **Brian Ell** *(info@edvotek.com),* and **Tom Cynkar** *(info@edvotek.com),* Edvotek Inc., Washington, D.C.

Over 380 million people worldwide are afflicted by diabetes, a disease that causes high blood sugar. Due to genetic predisposition and high-calorie, low-activity lifestyles, that number continues to grow. Without early treatment, diabetes causes severe medical complications. In this exploration, you will diagnose diabetes using simulated urinalysis and ELISA tests. Free gift for attendees!

Communicating Science Through Lab Notebooking

(Grades 9–College) *341, Convention Center*

Science Focus: GEN

Sponsor: Bio-Rad Laboratories

Cassy Granieri, Bio-Rad Laboratories, Hercules, Calif.

Maintaining a proper lab notebook is key to communicating processes and findings to build on your results. It can also be the difference between winning a patent or not. Learn about critical elements for good documention and rubics for assessment of student notebooks.

—Photo courtesy of Jennifer Williams and Mary Ellen Hamner

Green Chemistry Experiments for General and AP Chemistry from Flinn

(Grades 9–College) *343/344, Convention Center*

Science Focus: PS

Sponsor: Flinn Scientific, Inc.

Mike Marvel *(mmarvel@flinnsci.com),* Flinn Scientific, Inc., Batavia, Ill.

The *Green Chemistry Program* was initiated by the EPA with the goal of applying chemical principles to prevent pollution. Join us as we present unique experiments demonstrating the 12 principles of green chemistry. You'll learn how to build a solar cell using fruit, make a household surface cleaner, use leftover wood ash from a pizza oven to run an acid-base titration, and use lettuce seeds to study the ecotoxicity of road deicers. Handouts!

Literacy in the Context of Science in the Middle School Classroom

(Grades 5–8) *348, Convention Center*

Science Focus: GEN, NGSS

Sponsor: Activate Learning

Ellen Mintz *(emintz621@gmail.com),* Charleston County School District, Charleston, S.C.

Experience a lesson that demonstrates the integration of literacy strategies in the context of science. This includes the incorporation of academic language in written responses in science notebooks and oral discourse in conjunction with investigations using an interactive word wall.

3:30–4:00 PM Presentations

Using Seminars as a Form of Alternative Assessment

(Grades 9–12) *333, Convention Center*

Science Focus: GEN

Mary Chuboff (@mchuboff; *mchuboff@athensacademy.org),* Athens Academy, Athens, Ga.

Socratic seminars continue the tradition of Socrates, the classical Greek philosopher who taught his followers by asking questions. Today, Socratic dialogue can transform students' learning experience in classrooms through high school and beyond. When facilitated by a teacher, the Socratic method can lead to improved student achievement, increased motivation, and a more respectful classroom culture.

Blended Learning in the Lab Sciences

(Grades 4–College) *Peale B, Hilton*

Science Focus: GEN

Teresa Dobler *(tedobler@gmail.com),* Washington Latin Public Charter School, Washington, D.C.

Transform your classroom using free web-based tools. Learn to incorporate collaboration, critical argumentation, and inquiry while allowing students to work at their own level and pace.

3:30–4:30 PM Presentations

The Crown Jewels of the Ocean: Integrating the Principles of Ocean Literacy with National and State Standards Through a Cross-Curricular Approach
(Grades K–5) *321, Convention Center*
Science Focus: ESS
Eileen Biegel *(eileen.biegel@lcps.org),* Algonkian Elementary School, Sterling, Va.
Go in-depth into how to integrate the *NGSS,* state standards, and the principles of ocean literacy while using the National Marine Sanctuaries as a foundation for scientific understanding.

Redwood of the East
(Grades 6–8) *323, Convention Center*
Science Focus: ESS3.A, ESS3.C, ETS2.B, LS2, LS3, CCC2, CCC3, CCC7, SEP1, SEP4, SEP6, SEP7, SEP8
Gary Hedges (@gehedges), Maryland State Dept. of Education, Frederick
Brad Yohe *(brad.yohe@gmail.com),* Retired Educator, Gettysburg, Pa.
Justin Klingler *(Jklingler@gettysburg.k12.pa.us)* and **Lisa Deaner** *(ldeaner@gettysburg.k12.pa.us),* Gettysburg Area Middle School, Gettysburg, Pa.
Examine strategies for student research and data analysis within the context of restoration efforts of the American chestnut tree.

College Science Teaching and Student Success
(College) *Holiday 3, Hilton*
Science Focus: GEN, NGSS
Elizabeth Allan *(eallan@uco.edu),* University of Central Oklahoma, Edmond
Come join members of the College Science Teaching Committee to learn how to get involved with NSTA as we discuss the challenges of teaching science at the college level. Bring your strategies for student success and join us!

Comp Hydro Baltimore: Solving the Issues of Flooding in Baltimore
(Grades 9–12) *Johnson A, Hilton*
Science Focus: ESS2.C, ESS2.D, ESS3.C, ESS3.D, ETS2, LS2.C, SEP1, SEP2, SEP4, SEP5, SEP6
Bess Caplan (@BESlter; *caplanb@caryinstitute.org),* Cary Institute of Ecosystem Studies, Millbrook, N.Y.
Comp Hydro Baltimore integrates science and computational knowledge and practices into water systems instruction to enhance development of scientific reasoning among Baltimore City high school students.

Presentation 101: Learning About Presenting at Professional Conferences
(General) *Johnson B, Hilton*
Science Focus: GEN
Mary Stapleton (@SciTechTU; *mkstapleton@towson.edu)* and **Ronald Hermann** (@SciTechTU; *rhermann@towson.edu),* Towson University, Towson, Md.
Julie Damico (@dwntwnjb73; *jdamico@bcps.org),* Baltimore County Public Schools Office of Science, Towson, Md.
Find out what it takes to present at a conference, from choosing a topic, to crafting an abstract and designing an engaging, effective session.

NARST-Sponsored Session: Designing and Implementing Middle School Project-Based Watershed Investigations
(Grades 4–9) *Key 1, Hilton*
Science Focus: ESS2.C, LS2.C
Rebecca Krall, University of Kentucky, Lexington
Come explore project-based watershed units that a group of middle school teachers created for their students! Examples of units and activities will be shared.

Do You Need a New Science Lab?
(Grades 6–12) *Key 2, Hilton*
Science Focus: GEN
Ruth Ruud *(ruudruth61@gmail.com),* Cleveland State University, Cleveland, Ohio
Win a Shell Science Lab Makeover ($20,000 value) for your school! Are you a middle school or high school science teacher in need of a science lab makeover? Attend this session and learn how you can apply to win the Shell Science Lab Makeover! You will have an opportunity to actually begin to complete the application and have your questions answered.

Implementing 3-D Learning with NASA/GLOBE Earth System Learning Progressions
(Grades P–12) *Key 3, Hilton*
Science Focus: ESS, CCC, SEP
Tina Harte *(tina.r.harte@nasa.gov),* NASA Langley Research Center, Hampton, Va.
Janet Struble *(janet.struble2@utoledo.edu),* The University of Toledo, Ohio
Interact with an Earth science three-dimensional learning experience that incorporates GLOBE Program investigations, data collection, and NASA resources in a series of Mission Earth preK–12 learning progressions.

A Five-Step Path to Student-Generated Environmental Sustainability Projects

(Grades 9–12) *Key 10, Hilton*

Science Focus: ESS3, ETS, CCC1, CCC4, SEP1, SEP3, SEP4, SEP6, SEP7, SEP8

Stephanie Purington *(sbpurington@gmail.com),* UMass Amherst, Mass.

Find out about a curriculum developed to take students from interest in sustainability, through research, and on to the creation of materials and projects aimed at increasing sustainability.

Saturday Academy: Strengthening the K–16 STEM Pipeline

(General) *Key 11, Hilton*

Science Focus: ESS, LS, PS, SEP1, SEP2, SEP3, SEP4, SEP5, SEP8

Jonathan Wilson *(jonathan.wilson@morgan.edu)* and **Tia Keels** *(tia.keelsfields@morgan.edu),* Morgan State University, Baltimore, Md.

Prince Hunter *(princehunter@verizon.net),* STEM Consultant, Silver Spring, Md.

Hear how engaging students, teachers, and family members, as well as using curriculum enhancement activities and integrating emerging technologies in a Saturday Academy strengthens the K–16 STEM Pipeline.

High-Paying STEM Careers in the Medical Field That Use the *NGSS* Life Science Performance Expectations

(Grades 9–12) *Peale A, Hilton*

Science Focus: LS3.A

Molly Wilson *(mwilson@lsc.org),* Liberty Science Center, Jersey City, N.J.

Presider: Ruben Rosario, Liberty Science Center, Jersey City, N.J.

Experience an opportunity that integrates STEM and career pathways while observing a surgical procedure!

3:30–4:30 PM Hands-On Workshops

Invention and Innovation in Upper Elementary/Middle School

(Grades 4–7) *322, Convention Center*

Science Focus: ETS2, SEP

Lisa Chizek *(ljchizek@gmail.com),* North Tama Elementary School, Traer, Iowa

Scott Greenhalgh *(scott.greenhalgh@uni.edu),* University of Northern Iowa, Cedar Falls

Engage in an invention and innovation design process developed for upper elementary/middle school students. Learn ideas for implementing this process with your students.

Evidence and Explanations: Energy Changes and Transformations in a Bouncing, Flashing Ball

(Grades 3–8) *324, Convention Center*

Science Focus: ETS, PS

Karen Ostlund (@karen_ostlund; *klostlund@utexas.edu),* 2012–2013 NSTA President, and The University of Texas at Austin

Come play with a bouncing, flashing ball to make observations as evidence to explain types of energy changes and transfers.

NSTA Press® Session: Finding Science in the Outdoors and Through a Good Book

(Grades 2–5) *325, Convention Center*

Science Focus: LS

Christine Anne Royce (@caroyce; *caroyce@aol.com),* NSTA President-Elect, and Shippensburg University, Shippensburg, Pa.

Steve Rich (@bflyguy; *bflywriter@comcast.net),* University of West Georgia, Carrollton

Engage in lessons that connect literacy-based selections with activities that incorporate outdoor science themes.

STEAM It UP: Are You Learning to Read or Reading to Learn Using Literacy with Science?

(Grades K–5) *326, Convention Center*

Science Focus: GEN, NGSS

Ava Pugh *(apugh@ulm.edu),* **Teresa Hibbets** *(thibbets01@yahoo.com),* and **Rhonda Mann** *(mann@ulm.edu),* University of Louisiana at Monroe

Engage in hands-on STEM/STEAM activities merging science and literacy across the curriculum asking, " Are you learning to read or reading to learn?"

Selecting Phenomena to Motivate Student Sense-making
(Grades K–12) *Holiday 4, Hilton*
Science Focus: GEN, NGSS
Ted Willard (@Ted_NSTA; *twillard@nsta.org),* Program Director, NGSS@NSTA, NSTA, Arlington, Va.
The right phenomena are a key ingredient 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.

3D **Analysis of Supernova Remnants Using X-Ray Spectroscopy with NASA Data and STEM Tools**
(Grades 9–12) *Holiday 5, Hilton*
Science Focus: ESS1.A, ETS2.A, PS1.B, PS4.B, PS4.C
Pamela Perry *(pperry@lewistonpublicschools.org),* Lewiston High School, Lewiston, Maine
Donna Young *(dlyoung.nso@gmail.com),* NASA NSO STEM Coordinator, Bullhead City, Ariz.
Identify elements in the spectra of supernova remnants to determine the properties of collapsed and exploded stars using NASA X-ray data and image analysis tools.

You Can Build It
(Grades 1–12) *Key 4, Hilton*
Science Focus: ETS1, CCC, SEP
Rima Garg (@rimagarg1; *rima.garg@pgcps.org),* Prince George's County Public Schools, Oxon Hill, Md.
Shobha NarayanaSundaram *(shobha.rani@pgcps.org),* Eleanor Roosevelt High School, Greenbelt, Md.
We will use the Engineering Design Process to build, reflect, analyze, and redesign structures while using a storyline and addressing the *NGSS.*

Are Humans Causing Earthquakes? Teaching High School Earth Systems and Human Sustainability Using Authentic Earthquake Location Data
(Grades 6–College) *Key 5, Hilton*
Science Focus: ESS2.B, ESS3
Lauren Morse, Liberty Science Center, Jersey City, N.J.
Enhance plate tectonics, natural hazards, and human impact lessons using real earthquake data. A free online global earthquake database will be explored using *NGSS*-focused lessons.

Straw Rockets Are Out of This World!
(Grades 3–8) *Key 6, Hilton*
Science Focus: PS, CCC2, SEP3, SEP4
Joan Gillman *(joan.gillman@calhoun.org),* The Calhoun School, New York, N.Y.
For this workshop, STEM skills will be emphasized. We will design, build, and test straw rockets using a special launcher. Propel new learning as you aim to create a rocket that can fly the farthest.

Zombies Are Knocking on Your Classroom Door
(Grades 7–12) *Key 7, Hilton*
Science Focus: GEN, SEP2, SEP4, SEP5
Jeffrey Lukens *(jeffreylukens0613@gmail.com),* Sioux Falls (S.Dak.) School District
When zombies knock, let them into your classroom and then battle them with STEM strategies! The zombies don't stand a chance.

NGSS@NSTA **NGSS@NSTA Forum Session: KLEWS to Language and Literacy Development Through 3-D Science Instruction in Early Grades**
(Grades K–12) *Key 8, Hilton*
Science Focus: GEN, NGSS
Carla Zembal-Saul (@czem; *czemsaul@gmail.com),* Penn State, University Park, Pa.
Mary Starr (@starrscience; *mary@starrscience.com),* Michigan Mathematics and Science Centers Network, Plymouth
We will share practices, resources, and tools for leveraging three-dimensional science instruction and formative assessment to enhance language and literacy development among young learners. Co-designed, classroom-based examples that bridge research and practice will be highlighted.

—Photo courtesy of Jennifer Williams and Mary Ellen Hamner

3:30–4:30 PM Exhibitor Workshops

Investigating a Cliff Model

(Grades 6–8) *327, Convention Center*

Science Focus: ESS2.C, ETS2.B, CCC4, SEP2, SEP3, SEP4, SEP6

Sponsor: Lab-Aids, Inc.

Cindy Lilly, Ocean Bay Middle School, Myrtle Beach, S.C.

Engineer a coastal breakwater (from the *Issues and Earth Science* "Erosion and Deposition" unit from Lab-Aids) and analyze the trade-offs of the design. Explore how the natural world is influenced by our engineered world, creating more societal issues that must be solved through science and engineering. See how SEPUP embeds the practices and uses real issues to powerfully deliver content learning.

Comparative Vertebrate Anatomy with Carolina's Perfect Solution® Specimens

(Grades 6–12) *331/332, Convention Center*

Science Focus: LS

Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

Explore animal diversity by comparing anatomical adaptations of four popular vertebrates. Dissect a preserved pig, rat, dogfish, or frog, and then discuss similarities and differences in the observed structures of the different specimens. This is an excellent comparative dissection activity featuring Carolina's Perfect Solution specimens.

CPO Science LINK Learning Module: Chemistry and the Periodic Table

(Grades 5–12) *336, Convention Center*

Science Focus: PS

Sponsor: CPO Science/School Specialty Science

Kat Mills, School Specialty Science, Rosharon, Tex.

Erik Benton, CPO Science/School Specialty Science, Nashua, N.H.

CPO Science's new LINK Chemistry learning module is an *NGSS* approach that lets students experience innovative activities to learn about atomic structure and the periodic table. Use a digital learning environment with hands-on equipment to study bonding, isotopes, subatomic particles, ions, balancing equations, energy levels, and periodicity. Door prizes.

Evolutionary Evidence in the Fossil Record

(Grades 6–8) *337, Convention Center*

Science Focus: LS4, CCC, SEP

Sponsor: Delta Education/School Specialty Science–FOSS

Ann Moriarty, The Lawrence Hall of Science, University of California, Berkeley

What does the fossil record tell us about how life has changed over time? Explore evolutionary history through hands-on activities from the new FOSS Next Generation Heredity and Adaptation Course for middle school, and identify connections to the three dimensions of *NGSS*.

How to Argue in the Elementary Science Class

(Grades K–4) *338, Convention Center*

Science Focus: GEN, SEP7

Sponsor: Delta Education/School Specialty Science

Kathy Armstrong, Northside Elementary School, Midway, Ky.

Darrick Wood, Distance Learning Coordinator, Louisville, Ky.

Help students develop scientific argumentation skills by making claims based on observable evidence. Put these skills into practice with lessons from Delta Science Modules, as we prove (or disprove) fundamental science concepts. Leave with readers, equipment, and a lesson you can try with your students next week.

Environmental Toxicology Using Edvotek's New EZ-elegans

(Grades 9–College) *339, Convention Center*

Science Focus: LS

Sponsor: Edvotek, Inc.

Maria Dayton *(info@edvotek.com),* **Brian Ell** *(info@edvotek.com),* and **Tom Cynkar** *(info@edvotek.com),* Edvotek Inc., Washington, D.C.

Model organisms allow scientists to investigate biological questions that cannot be studied in humans. Learn how Edvotek's EZ-elegans simplifies culturing *C. elegans* in your classroom. Then, explore effects of environmental factors on *C. elegans* using a simple locomotion assay. Integrate STEM concepts with data collection and statistics. Free gift for attendees!

Enzymes: Technology Inspired by Nature
(Grades 9–College) *341, Convention Center*
Science Focus: LS
Sponsor: Bio-Rad Laboratories
Cassy Granieri, Bio-Rad Laboratories, Hercules, Calif.
With rising greenhouse gases, scientists look to nature for a biofuel solution. Cellobiase enzyme, an engine for cellulosic biofuel production, takes center stage. Use an inquiry-based approach to extract enzyme, test activity, and design experiments to study how pH, temperature, and concentrations affect reaction rates.

Reconceptualizing Chemistry Through Play: Ionic Bonding
(Grades 7–12) *347, Convention Center*
Science Focus: PS1
Sponsor: PlayMada Games
Lindsay Plavchak *(lindsayp@playmadagames.com),* PlayMada Games, New York, N.Y.
Discover a new way to teach fundamental chemistry ideas in a fun and engaging way! Explore Collisions™, a digital chemistry game and experience gameplay that provides students with a deepened understanding of key concepts, including cation-anion attraction, neutrality, and ionic ratios. Bring your laptop/tablet and experience student-centered, classroom-ready activities!

Incorporating STEM into the Classroom (High School Science)
(Grades 9–12) *348, Convention Center*
Science Focus: ETS1, CCC, SEP
Sponsor: Activate Learning
Gary Curts, STEM Implementation Specialist/Retired Educator, Dublin, Ohio
Bringing STEM into the classroom by involving students in engineering design to solve a real-world problem gives students the opportunity to apply crosscutting concepts and disciplinary core ideas as well as demonstrate the *NGSS* science and engineering practices. Join us as we share how we have integrated STEM and the engineering design cycle into our core Earth science, chemistry, physics, and physical science courses.

4:00–4:30 PM Presentation

Making the Leap to a Digital Course
(Grades 9–12) *333, Convention Center*
Science Focus: GEN
Mary Chuboff (@mchuboff; *mchuboff@athensacademy.org),* Athens Academy, Athens, Ga.
Join me for a demonstration on how to gather resources into a single, easily updated electronic space that can make students, teachers, and parents willing to toss the textbook!

5:00–5:30 PM Presentation

Green City Design Challenge
(Grades 6–College) *Peale B, Hilton*
Science Focus: ESS, ETS, SEP1, SEP2, SEP4, SEP5, SEP6, SEP7, SEP8
Tim Dodds (@tdodds03; *tdodds@sssas.org)* and **Alexandra Mooskin** (@msmooskin; *amooskin@sssas.org),* St. Stephen's & St. Agnes School, Alexandria, Va.
Hear about St. Stephen's & St. Agnes School's "Green City Design Challenge" that has middle school students building sustainable cities of the future. Come learn about this five-month immersive learning experience!

5:00–6:00 PM Presentations

Bookworms in Science Class
(Grades 6–8) *323, 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 learn how to use literature to teach a variety of science concepts and increase student interest.

Assessing Students' Progress on the Energy Concept
(Grades 4–11) *333, Convention Center*
Science Focus: PS3
Cari Herrmann Abell *(cabell@aaas.org),* AAAS/Project 2061, Washington, D.C.
Join me as I present a set of instruments that can be used to monitor students' progress on understanding energy from late elementary school through high school.

3D **STR2EAMing into LEARNing: The K–5 Convention**
(Grades K–5) *Holiday 3, Hilton*
Science Focus: GEN, NGSS
Elizabeth Barrett-Zahn *(ezahn@nredlearn.org),* Columbus Elementary School, New Rochelle, N.Y.
Find out how to bring an entire school community together to celebrate collaborative thinking and learning by highlighting learning progressions and three-dimensional teaching and learning.

Making Redox Practical, Relevant, Engaging, and Fun Corrosion Chemistry!
(Grades 7–12) *Johnson A, Hilton*
Science Focus: PS, INF
Andrew Nydam *(andrewnydam@hotmail.com),* Polymer Ambassador, Olympia, Wash.
Discover real-world examples using labs, demonstrations, and examples that make reactivity, oxidation/reduction, and corrosion exciting, practical, and easy to teach and learn. I'll share STEM connections and a CD of information.

Math, Science, and History: Connecting Curricula Through Historical Documents
(Grades 6–12) *Key 1, Hilton*
Science Focus: GEN, SEP4
Lee Pruett *(leepruett@gmail.com)* and **Beverly Heigre** (@MathTeacherMS; *bheigre@ndsj.org),* Notre Dame High School, San Jose, Calif.
We use historical records and drawings from Thomas Jefferson as a springboard into our interdisciplinary curriculum that combines environmental science, geometry, and U.S. history.

Modeling Scientific Concepts with SCRATCH
(Grades 6–8) *Key 2, Hilton*
Science Focus: GEN, SEP
Hector Telford *(hector@hu-ms2.org),* Howard University Middle School of Mathematics and Science, Washington, D.C.
Explore the use of the computer program SCRATCH to model concepts such as atomic structure and bonding, the solar system, cell division, and germination in plants. Come with your computer.

Using STEM to Cultivate Youth Environmental Literacy and Foster Community Resilience
(Grades 9–12) *Key 10, Hilton*
Science Focus: ESS3, ETS2
Dana Haine *(dhaine@unc.edu),* The University of North Carolina at Chapel Hill
Emphasis will be placed on strategies for engaging high school students in interactive environmental investigations, evaluation of climate adaptation, and design of local action projects.

Discipline…the Final Frontier!
(Grades K–12) *Key 11, Hilton*
Science Focus: GEN
Rusty May (@rustymayinc; *rustymayinc@gmail.com),* Bullying & School Safety Foundation, Bear, Del.
You know your subject but discipline is stealing your time. Do you feel effective discipline is where no teacher has gone before? There's a solution.

5:00–6:00 PM Hands-On Workshops

NSTA Press® Session: Picture Science in Early Childhood: Deepen Those Fun Explorations by Connecting with the Practices of Science and Engineering
(Grades P–2) *325, Convention Center*
Science Focus: LS1, LS2, SEP
Peggy Ashbrook (@PeggyAshbrook; *scienceissimple@yahoo.com),* NSTA Early Years Columnist, Alexandria, Va.
Increase your understanding of the practices of science and engineering while seeing how young children joyfully engage in explorations using those practices.

Environmentally Speaking, Thinking, and Doing!
(Grades 6–10) *Holiday 4, Hilton*
Science Focus: ESS, CCC, SEP
Judith Lucas-Odom (@Judith_Odom; *judyps23@yahoo.com),* Chester High School, Chester, Pa.
Participants will be engaged in designing working models that can help students understand and use environmental literacy to explain local and global issues.

Mapping Our Way to Climate Change Solutions
(Grades K–12) *Holiday 5, Hilton*
Science Focus: ESS2.D, ESS3, ETS, PS, SEP
Jane Heinze-Fry *(jahfry@rcn.com),* MITS, Inc. (Museum Institute for Teaching Science), Brookfield, Mass.
Learn about and interact with two mapping tools (a strand map and a concept map) to help you address weather/climate change in the classroom.

Using the Science of Flight to Reinforce *NGSS* for Upper Elementary Students
(Grades 3–6) *Key 4, Hilton*
Science Focus: PS
Lee Siudzinski *(lee@blueskyfoundation.org),* Blue Sky Educational Foundation, Three Lakes, Wis.
Erron Sagen *(erron.sagen@gmail.com),* Oakwood Elementary School, Oshkosh, Wis.
Teaching an aviation curriculum that integrates *NGSS* is the perfect way to motivate students to learn and apply the forces of flight in their lives.

Environmental Toxicology: Introduction to Toxicity Testing
(Grades 6–College) *Key 5, Hilton*
Science Focus: LS2, SEP1, SEP2, SEP3, SEP5, SEP6
Jonathan Wilson *(jonathan.wilson@morgan.edu),* Morgan State University, Baltimore, Md.
Using hands-on activities and simulations, participants will design an acute toxicity test. Join in as we collect raw data, complete basic data analysis, and then interpret and present results to promote environmental literacy.

Elementary and Middle School Chemistry: Demonstrations and Lab Activities on a Shoestring Budget
(Grades K–6) *Key 6, Hilton*
Science Focus: PS, CCC, SEP
Kimberly Duncan *(k_duncan@acs.org),* American Association of Chemistry Teachers, Washington, D.C.
Come learn how you can implement budget-friendly classroom demonstrations, labs, and activities to teach fundamental chemistry topics in your elementary or middle school classroom.

Developing Coherent Storylines: Performance Tasks as a Tool for 3-D Learning
(Grades 8–12) *Key 7, Hilton*
Science Focus: LS, CCC6, SEP8
Elizabeth Chatham (@echathamnvps; *libbychat@gmail.com),* New Visions for Public Schools, New York, N.Y.
We will explore how to effectively integrate a performance task throughout a unit in order to build a coherent storyline in a way that engages diverse learners.

Engaging in Argument from Evidence in Secondary Urban Science Classrooms
(Grades 7–12) *Key 9, Hilton*
Science Focus: ETS2, CCC5, SEP1, SEP2, SEP7, SEP8
Susan Heiss, Westwood Community School District, Dearborn Heights, Mich.
Jeremy Sabatini *(kasabatini@live.com),* Robichaud High School, Dearborn Heights, Mich.
Tyler Cederlind *(litemichigan@gmail.com),* Wayne RESA, Wayne, Mich.
Use real-life phenomena and academically productive talk in the secondary science classroom to allow students to engage with language that represents real-world dialogue and allows student expression.

8:00–9:00 AM Presentations

Turning the Tide in Middle School Science
(Grades 6–8) *321, Convention Center*
Science Focus: GEN, INF, NGSS
Tiffany Wendland (@BCPSSci; *twendland@bcps.org)* and **Amy Hughes** (@BCPSSci; *ahughes@bcps.org),* Baltimore County Public Schools Office of Science, Towson, Md.
Find out how Baltimore County Public Schools has developed a phenomena-based spiraled curriculum. We will showcase the phenomena, discuss examples, and share how teachers have been architects of their students' learning.

Standards Make Strange Instructional Bedfellows: Science and Social Studies—Inquiry and Problem Solving
(Grades K–5) *323, Convention Center*
Science Focus: GEN, NGSS
David Allen (@dallenbio; *david.r.allen@rps205.com)* and **Cory Nilsen** (@rps205_ss; *cory.nilsen@rps205.com),* Rockford (Ill.) Public Schools
We will share how to use the *NGSS* as the backbone to a curriculum and instruction model that integrates science, social studies, and literacy in elementary classrooms.

The Teacher Environmental Literacy Leadership (TELL) Program: Advancing Innovation in Teacher and Student Learning with the Chesapeake Bay Foundation
(Grades P–12) *Holiday 3, Hilton*
Science Focus: ESS2, INF, SEP8
Amy Green (@CBFedu; *agreen@cbf.org)* and **Norah Carlos** (@CBFedu; *ncarlos@cbf.org),* Chesapeake Bay Foundation, Annapolis, Md.
Delve into how TELL supports a network of teacher leaders advancing Meaningful Watershed Education Experiences (MWEEs) for student achievement while exploring ways innovation is used to enhance 21st-century teacher professional learning.

NESTA Session: Earth-Space Science in Biology, Chemistry, and Physics
(Grades 9–12) *Holiday 6, Hilton*
Science Focus: ESS, LS, PS
Martin Schmidt, Jr., McDonogh School, Owings Mills, Md.
Examine content examples and *NGSS* performance expectations that weave Earth science into biology, chemistry, and physics to broaden understanding and applications of all four disciplines.

Solids: The Neglected "State" of Chemistry
(Grades 9–12) *Johnson B, Hilton*
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.

PolyWhat? Application of STEM Using Polymers
(Grades 5–12) *Key 3, Hilton*
Science Focus: ETS, PS, CCC, SEP
Sherri Rukes, Libertyville High School, Libertyville, Ill.
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. Take home a CD of information

High School Teachers: Birds of a Feather
(Grades 9–12) *Key 11, Hilton*
Science Focus: GEN, NGSS
Shannon Hudson, Crawfordsville Middle School, Crawfordsville, Ind.
Facilitated by NSTA's High School Committee, join in to discover NSTA resources, participate in discussions, as well as share high school needs/concerns in your state. How can we help?

NSTA's Online Resources and Communities
(General) *Peale B, Hilton*
Science Focus: GEN, NGSS
Flavio Mendez (@fljmendez; *flavio_m@nsta.org),* Assistant Executive Director, Learning Center, NSTA, Arlington, Va.
Ted Willard (@Ted_NSTA; *twillard@nsta.org),* Program Director, NGSS@NSTA, NSTA, Arlington, Va.
The NSTA Learning Center and the NGSS@NSTA Hub provide educators with a professional peer community and thousands of free resources and opportunities that support professional learning and classroom instruction. Get free resources.

8:00–9:00 AM Hands-On Workshops

Mars Here We Come
(Grades 4–8) *322, Convention Center*
Science Focus: ESS, SEP
Joan Gillman *(joan.gillman@calhoun.org),* The Calhoun School, New York, N.Y.
NASA's MAVEN Satellite has made some amazing discoveries about the "red planet." In this workshop, engage in an activity that identifies similarities found in both the landscapes of Earth and Mars.

Engaging Elementary Students in a 3-D Science Literacy Learning Experience
(Grades P–5) *324, Convention Center*
Science Focus: GEN, NGSS
Tina Harte *(tina.r.harte@nasa.gov),* NASA Langley Research Center, Hampton, Va.
Sarah McCrea *(sdepo@lists.nasa.gov),* SSAI/NASA Langley Research Center, Hampton, Va.
By implementing Elementary GLOBE in the classroom, teachers can open up a world of science literacy opportunities for their students in a diverse set of three-dimensional learning experiences.

NSTA Press® Session: Phenomenon-Based Learning: Fun, Hands-On, Cooperative Learning
(Grades 3–12) *325, Convention Center*
Science Focus: PS1.A, PS2.A, PS2.B, PS3.B, PS3.C, PS4, CCC2, CCC3, CCC4, CCC5, CCC6, SEP
Matt Bobrowsky, Delaware State University, Dover
Experience the kind of learning that propelled Finland to international leadership in education—not by memorizing facts, but by using scientific exploration and discovery.

Infusing, Scaffolding, STEM/STEAM, 5E Model, and Crosscutting the Curriculum…What More Could You Ask?
(Grades K–5) *326, Convention Center*
Science Focus: GEN, NGSS
Ava Pugh *(apugh@ulm.edu),* **Rhonda Mann** *(mann@ulm.edu),* and **Teresa Hibbets** *(thibbets01@yahoo.com),* University of Louisiana at Monroe
This hands-on STEM/STEAM workshop features Science inferencing, Technology implementation, Engineering synectics, and Mathematical patterns by infusing and crosscutting the curriculum with the book, *Somewhere Today.*

INF **Engaging Our Communities for a Sustainable Future**
(Grades P–12) *349, Convention Center*
Science Focus: ESS3, INF
Erin Landsman (@ENLandsman; *erin.landsman@fcps.org)* and **Kim Day** (@FCPSSTEM; *kim.day@fcps.org),* Frederick County Public Schools, Frederick, Md.
Get the tools to organize a fun and educational environmental day for students and families to explore local environmental issues. Planning resources and hands-on activities included.

20 in 20: The Next Generation
(Grades 7–12) *Holiday 2, Hilton*
Science Focus: LS, CCC, SEP
Whitney Hagins, Massachusetts Biotechnology Education Foundation, Cambridge
Come try numerous 20-minute inquiry-based activities that are sure to engage and excite your students. You and your students will be glad you did! Topics include genetics, electrophoresis, PCR, photosynthesis, and respiration (algae and yeast balls).

ASTE-Sponsored Session: Visibility in STEM: Charting the Course for Making Minorities Visible in the STEM Curriculum
(Grades 3–12) *Holiday 4, Hilton*
Science Focus: ETS, SEP
Catherine Quinlan *(catherine.quinlan@howard.edu),* **Francies Stephenson** (@ms_stephenson_; *francies.stephenson@gmail.com),* and **Jessica Onuzo** *(jessica.onuzo@bison.howard.edu),* Howard University, Washington, D.C.
Willa Banks *(wbanks@baltimorecountymd.gov),* Benjamin Banneker Historical Park and Museum, Catonsville, Md.
We will provide a historical perspective of the work and contributions of Benjamin Banneker followed by a hands-on exploration into the use of reverse engineering to understand science content and practices. Brief presentations on the scientific contributions of two African Americans will ensue.

3D **Intersection of Understanding by Design Framework and *NGSS***
(Grades 6–12) *Holiday 5, Hilton*
Science Focus: GEN, NGSS
Jessica Mulhern (@JMulhernBiology; *jessica_mulhern@hcpss.org)* and **Jaclyn Austin** (@jaclyn_austin; *jaclyn_austin@hcpss.org),* Howard County Public School System, Ellicott City, Md.
Explore intersections between the Understanding by Design framework and *NGSS* instruction. Investigate essential questions and performance tasks that promote understanding and transfer of content knowledge.

Man vs. Wild: Lessons on Earth and Human Impacts
(Grades 6–12) *Key 4, Hilton*
Science Focus: ESS3.A, ESS3.C, ESS3.D, LS2.A, LS4.D, CCC1, CCC2, CCC3, CCC4, CCC7, SEP
Eva El-Khatib (@PopulationEd; *elkhatibeva@gmail.com),* Optimal Health Physicians, Washington, D.C.
Engage in small-group problem solving, data analysis, online tools, and discussion that cover human population and consumption trends, impacts on land use and natural resources, as well as possible paths toward sustainability.

NARST-Sponsored Session: How to Promote Successful Teacher Enactment of Spatial Thinking and Technology-Enhanced Inquiry: PD Research and Its Implications for Teachers and Administrators
(Grades 4–12) *Key 5, Hilton*
Science Focus: ESS2, ESS3, CCC1, CCC7, SEP1, SEP4
Bridget Mulvey *(bkmulvey@gmail.com),* Kent State University, Kent, Ohio
Discussion centers on examples and suggestions to support teachers' spatial thinking and technology-enhanced inquiry instruction in Earth and environmental science contexts informed by research.

ASEE Session: Kindergartners Trying and Trying Again to Engineer Solutions to Problems
(Grades P–1) *Key 6, Hilton*
Science Focus: ETS1.B, ETS1.C, PS1.A, PS2.A CCC2, CCC6, SEP6, SEP7
Pamela Lottero-Perdue *(plottero@towson.edu),* Towson University, Towson, Md.
Michelle Bowditch *(michelle.bowditch@hcps.org),* **Michelle Kagan** *(michelle.kagan@hcps.org),* and **Tedra Webb** *(twebb00@hotmail.com),* Hall's Cross Roads Elementary School, Aberdeen, Md.
We will guide participants through engineering design challenges appropriate for kindergarten, and provide tips and strategies for implementing engineering challenges in their classrooms.

ACS Middle Level Session One: Solids, Liquids, Gases, and Changes of State
(Grades 6–8) *Key 7, Hilton*
Science Focus: PS1.A
James Kessler *(jhkessler@acs.org),* American Chemical Society, Washington, D.C.
Explore solids, liquids, gases, and changes of state through hands-on activities and molecular animations from the free 5E (Engage, Explore, Explain, Elaborate, and Evaluate) lesson plans at *middleschoolchemistry.com*.

AAPT Session: Investigating Electrostatics with an Inexpensive Electrophorus
(Grades 7–College) *Key 9, Hilton*
Science Focus: PS
Robert Morse *(ramorse@rcn.com),* Physics Master Emeritus, St. Albans School, Washington, D.C.
Find out how to build an "instrumented" version of Volta's Electrophorus. A classroom set can be readily assembled from common household/grocery store materials at very low cost.

Thoughtful Discourse in the Middle School Science Classroom
(Grades 6–8) *Ruth, Hilton*
Science Focus: GEN, SEP4, SEP6, SEP8
Joanne McGarry (@mcgarryscience; *joanne_mcgarry@hcpss.org)* and **Danielle Stephenson** (@stephenson6sci; *danielle_stephenson@hcpss.org),* Howard County Public School System, Ellicott City, Md.
Socratic seminars encourage students to communicate explanations through thoughtful discourse. Find out how to run a successful seminar and how to prepare students with the skills and knowledge to actively participate.

8:00–9:00 AM Exhibitor Workshops

Photosynthesis and Respiration Shuffle

(Grades 9–12) *327, Convention Center*

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

Sponsor: Lab-Aids, Inc.

Brian Gross, Delcastle Technical High School, Wilmington, Del.

Students have major misconceptions about photosynthesis and cellular respiration, but this content is essential for understanding matter and energy, both at the micro (cellular) and macro (ecosystem) levels. Using a computer simulation, a hands-on activity, and notebooking/discussion strategies, expose student thinking—all from SEPUP's new Science and Global Issues: Biology program from Lab-Aids.

Disorder Detectives: Karyotyping, Bioethics, and Beyond

(Grades 9–12) *331/332, Convention Center*

Science Focus: LS

Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

Explore the science and ethics behind diagnosing human genetic disorders. HudsonAlpha's Disorder Detectives puts a twist on traditional karyotyping by discussing specific case studies, shedding light on genetic anomalies. Leave with a better understanding of human disorders and the social impacts of cutting-edge science.

Take Your Students on a Quest! A Real-World Problem-Based Learning Project That Incorporates All Three Dimensions of *NGSS*

(Grades K–8) *336, Convention Center*

Science Focus: GEN, NGSS

Sponsor: Pearson Learning Services

Chuck McMillan, Pearson Education, Boston, Mass.

Take your students on a Quest! These real-world Problem-Based Learning projects incorporate all three dimensions of *NGSS*. A Quest! brings classroom concepts to life as students are immersed in a world of discovery to help solve real-world problems through a combination of hands-on digital simulations.

Untangling Electric Circuits: STEM Activities from Essential Physics

(Grades 7–12) *337, Convention Center*

Science Focus: PS3.A, PS3.B, PS3.D, CCC2, CCC6, SEP3, SEP4, SEP7

Sponsor: PASCO scientific

Fran Zakutansky, Retired Educator, Montvale, N.J.

Students are often confused when learning the basics of circuits because they cannot directly observe the phenomenon, or they become lost in tangled wires. There is a simpler way for students to learn the basics of circuits and have the freedom to easily explore their circuit designs to gain a deeper understanding of electrical concepts. Get hands on with new technology to discover a better way to teach circuits!

Integrating Chromebook with Vernier Data-Collection Technology

(Grades 3–College) *339, Convention Center*

Science Focus: ETS, PS, SEP

Sponsor: Vernier Software & Technology

David Carter *(info@vernier.com),* Vernier Software & Technology, Beaverton, Ore.

Collecting and analyzing data help students learn critical science concepts that increase test scores and promote science inquiry. In this hands-on workshop, 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.

Bringing the Wild to Life with WildCam Gorongosa

(Grades 9–College) *340, Convention Center*

Science Focus: LS2.A, LS2.C, LS2.D, CCC1, CCC3, SEP1, SEP4, SEP5

Sponsor: HHMI BioInteractive

Amanda Briody *(ambriody@bcps.k12.md.us),* Frederick Douglass High School, Croom, Md.

Sarah Sechrist *(slsechrist@bcps.k12.md.us),* Carver Vocational-Technical High School, Baltimore, Md.

Explore the complexity of the African savanna with a suite of free classroom-ready materials from HHMI BioInteractive centered around Gorongosa National Park in Mozambique. Learn how to use citizen science trail camera photos and data to teach scientific inquiry skills in biology and environmental science classes.

How to Use Pop Culture in Your Life Science Class
(Grades 9–College) *341, Convention Center*
Science Focus: LS
Sponsor: Bio-Rad Laboratories
Cassy Granieri, Bio-Rad Laboratories, Hercules, Calif.
Use popular science to engage high school and college students in your classroom. See how popular TV and movies connect to real-world science discoveries and issues. Learn to use examples like DNA fingerprinting to make gel electrophoresis the foundation of a fun hands-on lab that increases student involvement and understanding.

Research and Inquiry-Based STEM Program from Flinn Scientific
(Grades 6–College) *343/344, Convention Center*
Science Focus: GEN
Sponsor: Flinn Scientific, Inc.
Meg Griffith *(mgriffith@flinnsci.com)* and **Matt Anderson** *(manderson@flinnsci.com),* Flinn Scientific, Inc., Batavia, Ill.
Flinn presents interactive activities that showcase the features and benefits of the FlinnSTEM powered by IMSA Fusion curriculum modules! Created by educators from the internationally recognized Illinois Mathematics and Science Academy, IMSA Fusion is a teacher professional development and research-based inquiry program that ignites student interest.

Using Maggots, Flies, and Flesh to Solve a Mystery!
(Grades 6–12) *345/346, Convention Center*
Science Focus: GEN
Sponsor: Texas Instruments
Stacy Thibodeaux, David Thibodaux STEM Magnet Academy, Lafayette, La.
Jeffrey Lukens, Sioux Falls (S.Dak.) 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.

PTC Taster Lab—From Genotype to Phenotype
(Grades 6–College) *347, Convention Center*
Science Focus: LS1, LS3, LS4, CCC6, CCC7, SEP1, SEP2, SEP3, SEP4, SEP6, SEP7, SEP8
Sponsor: miniPCR
Robert Dennison *(robert@minipcr.com)* and **Sebastian Kraves** *(seb@minipcr.com),* miniPCR, Cambridge, Mass.
A single nucleotide change in your DNA can make you a supertaster. Come explore the molecular genetics of taste using PCR and gel electrophoresis. Learn how to amplify and analyze your own genes, linking your PTC taste receptor DNA sequence to your own taster phenotype.

Implementing the *NGSS* and Infusing STEM in Your School District
(Grades K–8) *348, Convention Center*
Science Focus: ETS
Sponsor: STEMscopes
Terry Talley, Accelerate Learning, Inc., Houston, Tex.
Brian Raygor, Wicomico Country Public Schools, Salisbury, Md.
Kevin Hill, Pemberton Elementary School, Salisbury, Md.
Find out how one school district has systematically written, implemented, and continues to support a K–8 *NGSS*-focused science curriculum that includes a countywide STEM competition. Experience several of the STEM challenges and learn how you can use engineering to excite your students about science. Brian Raygor and Kevin Hill from Wicomico County, Maryland, will be co-presenters.

8:00–10:00 AM Hands-On Workshops

AMSE-Sponsored Session: George W. Carver Conversation Series on Diversity and Equity

(General) *Holiday 1, Hilton*

Science Focus: GEN

Sharon Delesbore (@amsek16; *sjdelesbore@gmail.com),* Fort Bend ISD, Rosharon, Tex.

Marion Reeves, Science Education Consultant, Avondale Estates, Ga.

The life of George Washington Carver exemplifies excellence in spite of circumstances. Dialogue and plan for equitable actions to create opportunities for ALL students.

ACS High School Session One: Relating Structure and Properties: Eliciting and Visualizing Student Initial Ideas

(Grades 9–12) *Key 8, Hilton*

Science Focus: PS, SEP4, SEP8

Chad Bridle *(cbridle1@gpsbulldogs.org),* Grandville High School, Grandville, Mich.

Jennifer Keil *(jennifer.keil@colorado.edu),* Master Teacher, Boulder, Colo.

Rebecca Stober *(beckystober@gmail.com),* Mapleton Expeditionary School of the Arts, Denver, Colo.

Marta Gmurczyk *(m_gmurczyk@acs.org),* American Chemical Society, Washington, D.C.

Kimberly Duncan *(k_duncan@acs.org),* American Association of Chemistry Teachers, Washington, D.C.

Saul Trevino *(strevino@hbu.edu),* Houston Baptist University, Houston, Tex.

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.

8:00–11:00 AM Short Course

Promoting Children's Science Inquiry and Thinking About Living Things in Preschool and Kindergarten (SC-2)

(Grades P–1) **Tickets Required; $23** *Tubman, Hilton*

Science Focus: LS

Cindy Hoisington (@CAHoisy; *choisington@edc.org),* Education Development Center, Inc., Waltham, Mass.

Peggy Ashbrook (@PeggyAshbrook; *scienceissimple@yahoo.com),* Author/NSTA Early Years Columnist, Alexandria, Va.

For description, see page 32.

8:00 AM–5:00 PM Meeting

Discover the *NGSS* Train-the-Trainer Workshop

(By Preregistration Only) *Key 12, Hilton*

This workshop gives teacher leaders a solid understanding of the *NGSS,* tools for conducting teacher training, and the confidence they need to be leaders.

8:30–11:30 AM Short Course

NSTA Press® Short Course: Introducing a New *NGSS*-Focused Curriculum Unit—Toward High School Biology (SC-3)

(Grades 6–9) **Tickets Required; $50** *Key 10, Hilton*

Science Focus: LS1.C, PS1.A, PS1.B, CCC5, SEP2, SEP4, SEP6, SEP8

Jo Ellen Roseman *(jroseman@aaas.org)* and **Cari Herrmann Abell,** AAAS/Project 2061, Washington, D.C.

Sarah Quick Pappalardo, Dunloggin Middle School, Ellicott City, Md.

Meredith Long, Ellicott Mills Middle School, Ellicott City, Md.

Leah Donovan, Oakland Mills Middle School, Columbia, Md.

Damisha Drakes, Wilde Lake Middle School, Columbia, Md.

For description, see page 33.

9:00 AM–3:00 PM Exhibits

Hall E, 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

Using Data to Make Evidence-Based Claims

(Grades 9–12) *Key 2, Hilton*

Science Focus: GEN, SEP

Amy Chilinguerian (@achiliteach; *achilinguerian@bcps.org),* Loch Raven High School, Towson, Md.

Using data in the classroom can enhance your lesson and provide your students with opportunities to engage in argument from evidence.

9:30–10:30 AM Featured Presentation

3D **Creating an Understanding-Based Curriculum for the *Next Generation Science Standards***

(General) *328/329, Convention Center*

Science Focus: GEN, NGSS

Jay McTighe (@jaymctighe; *jay@mctighe-associates.com),* Educational Author and Consultant, Columbia, Md.

Presider: Asli Sezen-Barrie, Program Coordinator, NSTA Baltimore Area Conference, and University of Maine, Orono

The *NGSS* provide a clear set of worthy educational outcomes for science education. However, these standards are not curriculum. Educators must use the *NGSS* as a basis for designing high-quality curricula and assessments to support impactful teaching for effective learning. Jay McTighe will present a "blueprint" for transforming the *NGSS* into a coherent K–12 science curriculum that emphasizes conceptual understanding of content and transfer of the practices. The recommended framework uses a "backward design" approach addressing essential questions that spiral across the grades, as well as recurring performance tasks that integrate science content with the practices to involve students in "doing" science.

An accomplished author, Jay McTighe has co-authored 14 books, including the award-winning Understanding by Design *series with Grant Wiggins. He has also served as director of the Maryland Assessment Consortium, a state collaboration of school districts working together to develop and share formative performance assessments. Prior to this position, Jay was involved with school improvement projects at the Maryland State Department of Education where he helped lead Maryland's standards-based reforms, including the development of performance-based statewide assessments. He also directed the development of the Instructional Framework, a multimedia database on teaching.*

Jay has experience as a Prince George's County classroom teacher, resource specialist, and program coordinator. He holds a master's degree from the University of Maryland, and completed postgraduate studies at Johns Hopkins University.

Since education is a "learning" profession, Jay set a learning goal when he was 57 years of age to be surfing by 60. He did it!

9:30–10:30 AM Presentations

INF **Great Falls Summer STEAM: A Design Thinking Approach to Community Improvement**

(Grades 4–8) *321, Convention Center*

Science Focus: ESS2, ESS3, ETS1, LS2, INF, CCC1, CCC2, SEP1, SEP6

Sarah Sterling-Laldee *(patersonstem@gmail.com),* Paterson (N.J.) Public Schools

Elizabeth Nunez *(nunezelizabeth0218@yahoo.com),* Rosa Parks Community School, Orange, N.J.

Fatema Sheikh *(fatimas527@gmail.com),* HARP Academy, Paterson, N.J.

Kate Healey *(healeyk2@student.wpunj.edu),* William Paterson University, Wayne, N.J.

Nakeia Wimberly *(ms.nakeiawimberly@gmail.com),* Paterson School No. 2, Paterson, N.J.

Hear how middle school students, alongside formal and informal educators, used design thinking to address community problems and possibilities using three-dimensional design.

WIDA Session: Doing and Talking Science with ELs

(Grades 3–8) *322, Convention Center*

Science Focus: GEN, SEP8

Rita MacDonald *(rkmacdonald@wisc.edu),* Wisconsin Center for Education Research, Madison

Join me for video examples and discussion on how to implement discourse facilitation moves to strengthen students' reasoning and complex language, in ways fully inclusive of English learners.

Blending Science and Language Arts

(Grades P–5) *323, Convention Center*

Science Focus: GEN

Lindsay Glasner (@BirdSleuth; *lig27@cornell.edu),* The Cornell Lab of Ornithology, Ithaca, N.Y.

Children's books can be powerful tools for science learning. Explore book-related activities that connect STEM, art, and ELA while inspiring outdoor observation.

NSTA Press® Session: Uncovering Student (and Teacher) Ideas in Earth and Environmental Science

(Genera) *325, Convention Center*

Science Focus: ESS

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

Experience how formative assessment probes are used to elicit commonly held K–12 ideas about Earth, Earth processes, oceans, weather and climate, ecology, and natural resources.

Updating Science Fairs
(Grades 6–8) *333, Convention Center*
Science Focus: GEN, SEP3, SEP8
Kelly Anthony *(anthonkj@pwcs.edu),* Marsteller Middle School, Bristow, Va.
Do you and your students dread science fairs? Discover ways you can update traditional science fairs to increase student interest and enthusiasm.

Marine Ecology: Using Local Resources to Engage Learners
(Grades 4–8) *Holiday 3, Hilton*
Science Focus: ESS
Amanda Fabian *(afabian3@jhu.edu)* and **Jessica Stephenson Reaves** *(jsteph12@jhu.edu),* Johns Hopkins Center for Talented Youth, Baltimore, Md.
Centered around CTY's Marine Ecology course, we will discuss the development of this inquiry-based field course and partnerships with marine advocacy groups to create a unique learning experience.

NESTA and NOAA Share: NOAA Climate Stewards—Affecting Change Through Education, Collaboration, and Action
(Grades 1–12) *Holiday 6, Hilton*
Science Focus: ESS2.D, ESS3.C, ESS3.D
Bruce Moravchik *(bruce.moravchik@noaa.gov),* NOAA National Ocean Service, Silver Spring, Md.
Molly Harrison *(molly.harrison@noaa.gov),* NOAA Fisheries, Silver Spring, Md.
Hear success stories from teachers participating in a national community impacting climate change through sustained professional development, collaborative online tools, and active stewardship. Take part in hands-on activities and receive free education resources.

NSELA-Sponsored Session: Tools for Leaders Session 1
(Grades K–12) *Johnson A, Hilton*
Science Focus: GEN
Larry Plank (@nselascience), Hillsborough County Public Schools, Tampa, Fla.
Bob Sotak (@nselascience; *bobsotak@gmail.com),* Science/STEM Education Consultant, Edmonds, Wash.
The National Science Education Leadership Association welcomes you to join science leaders from around the nation who will share successful tools and best practices for leaders in science education. These tools can be curricular, instructional, or managerial in nature.

CSSS-Sponsored Session: Using Science, Technology, Engineering, Agriculture, and Math (STEAM) as a Context to Teach High School Biology
(Grades 6–12) *Key 1, Hilton*
Science Focus: ETS1, LS2
Peter Mecca *(meccap@fccps.org),* Falls Church (Va.) City Public Schools
Dig deeper to understand living systems. Hear how middle school and high school students are using hydroponics and aquaculture to supply fresh lettuce and tilapia to serve in the school cafeteria.

Bring All the Dimensions of Clouds into Your Classroom with NASA's Atmospheric Learning Progression
(Genera) *Key 3, Hilton*
Science Focus: ESS
Sarah McCrea *(sdepo@lists.nasa.gov),* SSAI/NASA Langley Research Center, Hampton, Va.
Tina Harte *(tina.r.harte@nasa.gov),* NASA Langley Research Center, Hampton, Va.
Explore a new learning progression developed by NASA Langley's Science Education Team. Use cloud observations and satellite interpretation as a foundation for three-dimensional learning.

Diffusion, the Cell Membrane, and Ourselves: Biology Comes Alive Through the Aesthetic Realism Method
(Grades 7–11) *Key 11, Hilton*
Science Focus: LS1.A, LS1.C
Rosemary Plumstead *(aldersgate@msn.com),* Retired Educator, Waretown, N.J.
Sarah Ross (@S_Ross3; *s.ross3@gmail.com),* Retired Educator, New York, N.Y.
Demos on diffusion vividly show its logical, beautiful structure of opposites, enabling students to eagerly learn and feel science is exciting and related to themselves!

Assistance from the Retiree Committee
(General) *Peale A, Hilton*
Science Focus: GEN
Lloyd Barrow *(barrowl@missouri.edu),* Professor Emeritus, University of Missouri, Columbia
Join in for suggestions from the NSTA Retiree Committee as you plan for your retirement.

Eureka! Science Trade Books—Good as Gold!
(General) *Peale B, Hilton*
Science Focus: GEN
Emily Brady *(ebrady@nsta.org),* Editor, NSTA Recommends, 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!

9:30–10:30 AM Hands-On Workshops

A Two-Part Maglev Challenge
(Grades 4–8) *324, Convention Center*
Science Focus: ETS
David Lisnitzer *(dlisnitzer@gmail.com),* P.S. 124 Osmond A. Church, South Ozone Park, N.Y.
Maglev cars are cars that float on magnets. Design, build, and test your own maglev car. Take home the entire unit, which includes rubrics, writing prompts, and templates.

Creating *NGSS* Storylines for Earth/Space Science
(Grades 6–12) *326, Convention Center*
Science Focus: ESS1.A
Jason Hayes (@JHScience1; *jwhayes@smcps.org),* St. Mary's County Public Schools, Leonardtown, Md.
Amanda Myatt *(ammyatt@gmail.com)* and **Patricia Sullivan Gronert** *(psgronert@smcps.org),* Chopticon High School, Morganza, Md.
Find out how to create storylines that are sequential lessons based on real-world phenomena in which students engage in the three dimensions of the *NGSS*. *Note:* This session is limited to the first 45 participants.

Climate Change and Argumentation: Using Pollen Proxy Data to Engage Students in 3-D Learning
(Grades 6–8) *349, Convention Center*
Science Focus: ESS2.A, ESS3.D, LS2.C, CCC1
Mary Stapleton (@SciTechTU; *mkstapleton@towson.edu),* Towson University, Towson, Md.
Asli Sezen-Barrie *(aslisezen@gmail.com),* University of Maine, Orono
Learn about an activity where students assume roles as paleoclimatologists and engage in argument from evidence using fossilized pollen from sediment cores to infer past climate.

Using Mitotic Division to Introduce Statistics in AP and IB Biology
(Grades 9–College) *Holiday 2, Hilton*
Science Focus: LS, SEP
Kristen Daniels Dotti *(kristen.dotti@catalystlearningcurricula.com),* Verde Valley School, Sedona, Ariz.
Turn the root tip mitosis lab into an opportunity to teach the test of correlation and chi-squared so students are prepared to analyze more complex data.

3D **Practices in Action: Building Coherence Between *NGSS* and *CCSS ELA***
(Grades K–5) *Holiday 5, Hilton*
Science Focus: GEN, SEP
Jennifer Brown-Whale (@HCPSSElemSci; @ElemSci_JenBW; *jennifer_brown-whale@hcpss.org)* and **Amy Reese** (@HCPSSElemSci; *amy_reese@hcpss.org),* Howard County Public School System, Ellicott City, Md.
Identify how the authentic application of *CCSS ELA* through journaling in elementary science instruction supports science literacy and the transfer of ELA skills.

INF **Connecting Chemistry to Your World Through ChemClub**
(Grades 9–12) *Key 4, Hilton*
Science Focus: PS, INF
Karen Kaleuati (@ACSChemClubs; *k_kaleuati@acs.org),* American Chemical Society, Washington, D.C.
The ACS ChemClub program provides fun and educational resources—all for free! Learn about the program, try out some of the activities, and take home a copy of the resources.

How to Create a Challenge-Infused STEM Program

(Grades 3–8) *Key 5, Hilton*

Science Focus: GEN

Jennifer LaBombard-Daniels *(jcdaniels175@gmail.com),* John Kerr Elementary School, Winchester, Va.

Jennifer Dunn *(jennifer.dunn@d51schools.org),* Chatfield Elementary School, Grand Junction, Colo.

Alison Bukacek *(abukacek@gmail.com)* and **Colleen Edwards** *(colleenedwards0@icloud.com),* Colorado Mesa University, Grand Junction

Creating a challenging and critical-thinking STEM program that solves real-world problems is the key to developing the elementary and middle school concept for future understandings. We will identify the problem you wish to challenge your students with, connect it to standards, and create an outline for the program.

ASEE Session: Elementary Computer Science: Plugged vs. Unplugged Activities

(Grades K–5) *Key 6, Hilton*

Science Focus: ETS, CCC, SEP1, SEP5, SEP8

Jamie Gurganus (@UMBC; *jgurganus@umbc.edu)* and **Karen Parisi** *(kparisi@umbc.edu),* University of Maryland, Baltimore County, Baltimore

Engage in computer science concepts with both plugged and unplugged learning activities. Activities introduce computational thinking through binary numbers and algorithms without using computers.

ACS Middle Level Session Two: The Water Molecule and Dissolving

(Grades 6–8) *Key 7, Hilton*

Science Focus: PS

James Kessler *(jhkessler@acs.org),* American Chemical Society, Washington, D.C.

Explore the polarity of the water molecule and identify substances based on their solubility using hands-on activities and molecular animations from the free website *middleschool-chemistry.com.*

AAPT Session: Women and Minorities in the History of Physics: Role Models for Today

(Grades 9–College) *Key 9, Hilton*

Science Focus: ESS, ETS, PS

Gregory Good (@HistoryPhysics; *ggood@aip.org),* American Institute of Physics, College Park, Md.

Get hands on with stories about women and minorities in STEM and find out how the American Institute of Physics' online materials can help students to see themselves in STEM.

California Science Project Session: Cultivating Literacy Integration in Science

(Grades 3–5) *Ruth, Hilton*

Science Focus: GEN, CCC1, CCC2, SEP6, SEP7, SEP8

Joanna Totino *(jtotino@berkeley.edu),* California Science Project, Berkeley

Kate Gallagher (@Cat5Kate; *kate.gal56@gmail.com),* Rise Community School, Oakland, Calif.

Engage in a three-dimensional *NGSS* science lesson that builds academic language development through oral discourse, writing, and reading that connects to ELA and ELD standards.

9:30–10:30 AM Exhibitor Workshops

What Is a Species?

(Grades 9–12) *327, Convention Center*

Science Focus: LS4.A, CCC1, CCC2, SEP6, SEP7, SEP8

Sponsor: Lab-Aids, Inc.

Brian Gross, Delcastle Technical High School, Wilmington, Del.

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.

Keep Your Head Above Water with Magnetic Water Molecule Models

(Grades 4–College) *330, Convention Center*

Science Focus: ESS2, ESS3, ETS1, ETS2, LS1, LS4, PS1, PS2, CCC, SEP

Sponsor: 3D Molecular Designs

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

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

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

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

(Grades 9–12) *331/332, Convention Center*

Science Focus: LS

Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

Ready for a forensic dissection that is on the cutting edge? Engage students and revitalize your mammalian structure and function lessons with a real classroom autopsy. Participants dissect a Carolina's Perfect Solution pig by modeling the protocols of a professional forensic pathologist. Come experience our exclusive Perfect Solution preserved specimens.

From CRISPR to Three-Parent Babies and Back Again: What to Tell Our Students About the Coming Revolution in Human Biology

(Grades 9–12) *336, Convention Center*

Science Focus: LS1.B, LS3.A, LS3.B

Sponsor: Pearson Learning Services

Kenneth Miller *(kenneth_miller@brown.edu),* Brown University, Providence, R.I.

The past several years have seen the introduction of new techniques in genetic engineering and molecular biology that dramatically alter the landscape of human biology. I will describe how these powerful techniques work, suggest ways to incorporate them into the curriculum, and explore the promise and peril that awaits the brave new world of human genetic modification.

Understanding Photosynthesis: A Lab-Based Approach

(Grades 6–12) *337, Convention Center*

Science Focus: LS1.A, LS1.C, LS2.B

Sponsor: PASCO scientific

Fran Zakutansky, Retired Educator, Montvale, N.J.

How can you clear up student misconceptions about respiration only occurring in the dark, or that only green light is used for photosynthesis? With data! Collect data on plant pigments, light reactions, and carbon cycling to create a better conceptual model that students can synthesize for complete understanding of photosynthesis.

Science and Storytelling: An Interdisciplinary Approach to Environmental Literacy

(Grades K–12) *338, Convention Center*

Science Focus: ESS3.A, ESS3.C, ETS2.B, LS2.A, LS2.D

Sponsor: Boyer Sudduth Environmental Consultants

Kristin Kaye *(kristin@treedream.net)* and **Mary Ann Boyer** *(info@boyersudduth.com),* Boyer Sudduth Environmental Consultants, LLC, Philadelphia, Pa.

Experience how scientific observation and storytelling open students' eyes to the world around them. Use *Tree Dreams: A Field Guide* and three-dimensional graphic organizers (foldables) to observe, record, and make connections between imagination and the natural world. Enter to win a Tree Dreams classroom kit and ready-to-use lesson plans.

Chemistry with Vernier

(Grades 9–12) *339, Convention Center*

Science Focus: ETS, PS, SEP

Sponsor: Vernier Software & Technology

David Carter *(info@vernier.com),* Vernier Software & Technology, Beaverton, Ore.

In this hands-on workshop, learn 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.

Leapin' Lizards! That Was Fast! Selection by Predation
(Grades 9–12) *340, Convention Center*
Science Focus: LS2.A, LS2.C, LS4.B, LS4.C, CCC1, CCC2, CCC7, SEP1, SEP4, SEP6, SEP8
Sponsor: HHMI BioInteractive
Amanda Briody *(ambriody@bcps.k12.md.us),* Frederick Douglass High School, Croom, Md.
Sarah Sechrist *(slsechrist@bcps.k12.md.us),* Carver Vocational-Technical High School, Baltimore, Md.
Analyze how quickly natural selection occurs in the presence of strong selective pressures using free resources from HHMI BioInteractive. This case study asks students to hypothesize, collect, and analyze data, and draw conclusions about the effects of natural selection on specific traits of an isolated anole lizard population.

Get That Grant Money!
(Grades 9–College) *341, Convention Center*
Science Focus: GEN
Sponsor: Bio-Rad Laboratories
Cassy Granieri, Bio-Rad Laboratories, Hercules, Calif.
Successful grant writing isn't rocket science, but it can take your teaching to new heights. We will show you how to get organized and find resources. Experienced grant writers will share their powerful tips to get you to the next level.

Integrate Instruction and Assessment in Three Dimensions Using Learning Progressions
(Grades K–8) *342, Convention Center*
Science Focus: GEN, NGSS
Sponsor: Amplify
Rebecca Abbott and **Sophia Lambertsen,** The Lawrence Hall of Science, University of California, Berkeley
Explore how learning progressions may be used to organize a coherent sequence of instruction for a unit, define the focus and timing of assessments, and enable actionable inferences about students' progress. Engage with K–8 exemplars from Amplify Science, the new *NGSS*-designed curriculum from The Lawrence Hall of Science.

Out-of-School STEM Enrichment: AEOP Program Design Collaboration
(Grades K–12) *343/344, Convention Center*
Science Focus: GEN, NGSS
Sponsor: AEOP
Jarod Phillips, GEMS Project Manager, NSTA, Arlington, Va.
Come learn about what AEOP can do for your students' STEM enrichment outside of school time! This workshop is hosted by the Army Educational Outreach Program (AEOP), sponsors of out-of-school programs across the nation for K–12 students. Join in to get a chance to work with colleagues in developing your ideal (fictional) program and seeing how it stacks up to the programs offered by AEOP!

Cool! Can We Do That Again?!
(Grades 2–9) *345/346, Convention Center*
Science Focus: PS1.A, PS1.B, PS4.A
Sponsor: Educational Innovations, Inc.
Jeffrey Feidler, Consultant, Wilmington, Del.
Tired of hearing "Do we have to do that!?" from your students? Come check out some of the coolest activities involving polymers, color, and light. Your students will be asking if they can do that again—and again! Door prizes, freebies, and fun!

Bringing the World into Your Classroom with National Geographic Explorers
(Grades K–5) *347, Convention Center*
Science Focus: GEN
Sponsor: National Geographic Learning | Cengage
Pam Caffery *(pam.caffery@cengage.com),* National Geographic Learning | Cengage, Boston, Mass.
Your students will be inspired when they connect with National Geographic Explorers and National Geographic Learning! Discover great ideas on how to use National Geographic Learning's program and the Explorers to bring real-world exploration to the classroom.

Science Teacher/STEM Teacher: What's the Difference?
(Grades K–12) *348, Convention Center*
Science Focus: GEN, SEP
Sponsor: STEMscopes
Judy Zimny *(jzimny@NISE.institute),* Accelerate Learning, Inc., Houston, Tex.
Distinguishing between science and STEM is important as teachers integrate STEM into their practice. Join us to discuss the unique nature of STEM, the research-based instructional strategies necessary to support its outcomes, and a STEM certification pathway that encourages self-reflection and growth in STEM teaching.

10:30 AM–12 Noon Hands-On Workshop

ACS High School Session Two: Relating Structure and Properties: Constructing Science Ideas Through Exploring Data

(Grades 9–12) *Key 8, Hilton*

Science Focus: PS, CCC, SEP4, SEP8

Chad Bridle (@sciencebridle; *cbridle1@gpsbulldogs.org),* Grandville High School, Grandville, Mich.

Jennifer Keil *(jennifer.keil@colorado.edu)*, Master Teacher, Boulder, Colo.

Rebecca Stober *(beckystober@gmail.com),* Mapleton Expeditionary School of the Arts, Denver, Colo.

Marta Gmurczyk *(m_gmurczyk@acs.org),* American Chemical Society, Washington, D.C.

Kimberly Duncan *(k_duncan@acs.org),* American Association of Chemistry Teachers, Washington, D.C.

Saul Trevino *(strevino@hbu.edu),* Houston Baptist University, Houston, Tex.

Experience strategies for engaging students in analyzing and interpreting data to discover the structural factors that affect the solubility 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.

11:00 AM–12 Noon Presentations

Building Creative Scientists

(Grades 6–8) *321, Convention Center*

Science Focus: GEN, SEP1

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!

Evolving the Physics Mind-Set: Changing Perceptions and Attitudes Toward the Teaching and Learning of Physical Science

(Grades K–5/College) *323, Convention Center*

Science Focus: PS

Katya Denisova *(kdenisova@gmail.com),* Baltimore (Md.) City Public Schools

Christine Bell *(cmbell@bcps.k12.md.us),* Hamilton Elementary/Middle School, Baltimore, Md.

Kristin Covaleskie, Northwood Elementary School, Baltimore, Md.

Attention will be paid to the "instructional evolution" of a NSF-funded K–6 *NGSS* physical science professional development course over the first four years of its implementation in Baltimore City Public Schools.

NSTA Press® Session: Diving Into Teaching with the *NGSS* Science Practices

(Grades 5–12) *325, Convention Center*

Science Focus: GEN, SEP

Lara Gengarelly *(lara.gengarelly@unh.edu)* and **Karen Graham** *(karen.graham@unh.edu),* University of New Hampshire, Durham

Barbara Hopkins *(barbara.hopkins@doe.nh.gov),* New Hampshire Dept. of Education, Concord

The goal of this workshop is to explore the successes, challenges, and strategies of making the instructional shift to science practice integration (SPI). We will feature vignettes and field-tested learning activities that offer authentic teacher perspectives about conducting student investigations and integrating science practices that support the *NGSS*.

STEM and Trade Books: Strange Bedfellows
(Grades P–8/College) *333, Convention Center*
Science Focus: GEN
J. Carrie Launius (@janetcarrie; *janetcarrie@gmail.com),* NSTA Director, District XI, Saint Louis, Mo.
Emily Brady *(ebrady@nsta.org),* Editor, NSTA Recommends, NSTA, Arlington, Va.
Pamela Lottero-Perdue *(plottero@towson.edu),* Towson University, Towson, Md.
Wondering how to add literacy to STEM? Learn about NSTA's best STEM book initiative and how to identify a great STEM book.

3D **BIG Data/BIG Skills: Improve Student Data Literacy Using Free Web Tools from NOAA**
(Grades 5–8) *Holiday 3, Hilton*
Science Focus: ESS, SEP1, SEP3, SEP4, SEP5, SEP7, SEP8
Dan Pisut (@danpisut; *dan.pisut@noaa.gov),* NOAA Environmental Visualization Laboratory, Silver Spring, Md.
"Data in the Classroom" is a free online learning platform from the National Oceanic and Atmospheric Administration. Find out how to access these digital lessons and data exploration tools, and learn more about the curriculum's unique scaffolding that can help your middle school students navigate BIG data about dynamic Earth processes and the impact of environmental events on regional and global scales.

NESTA and IRIS Session: Record and Analyze Earthquake Data (With or Without a Seismometer!) in the Classroom with Free Software
(Grades 6–12) *Holiday 6, Hilton*
Science Focus: ESS2.B, CCC1, CCC6, SEP4, SEP5
John Taber *(taber@iris.edu),* IRIS, Washington, D.C.
Monitor Earth from your classroom! Display real-time data from school seismographs or nearby professional seismometers. Students can determine earthquake locations, magnitudes, and more.

NSELA-Sponsored Session: Tools for Leaders Session 2
(Grades K–12) *Johnson A, Hilton*
Science Focus: GEN
Larry Plank (@nselascience; *larry.plank@sdhc.k12.fl.us),* Hillsborough County Public Schools, Tampa, Fla.
Bob Sotak (@nselascience; *bobsotak@gmail.com),* Science/STEM Education Consultant, Edmonds, Wash.
The National Science Education Leadership Association welcomes you to join science leaders from around the nation who will share successful tools and best practices for leaders in science education. These tools can be curricular, instructional, or managerial in nature.

NOAA in Your Backyard: Free Professional Development and Local Educator Resources Are Closer Than You Think!
(Grades K–12) *Key 3, Hilton*
Science Focus: GEN, INF
June Teisan *(june.teisan@noaa.gov),* NOAA Office of Education, Washington, D.C.
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.

AAPT Session: Physics Demonstration Show
(General) *Key 9, Hilton*
Science Focus: PS
David Wright *(dwright@tcc.edu),* Tidewater Community College, Virginia Beach Campus, Virginia Beach, Va.
This "Phun with Physics" demo show will include classroom activities, YouTube videos, and a kit with some materials to take home.

Meet the Standards and Enhance Your Chemistry Classroom with Other People's Money
(Grades 9–12) *Key 11, Hilton*
Science Focus: PS, INF, CCC, SEP
Kenetia Thompson and **Karen Kaleuati** *(k_kaleuati@acs.org),* American Chemical Society, Washington, D.C.
We will share grant opportunities available to high school chemistry teachers (including those from the American Chemical Society) and the process for writing a fundable proposal.

Designing STEM Career Pathways for Student Success: A Step-by-Step Approach
(Grades 9–College) *Peale A, Hilton*
Science Focus: GEN, SEP
Jennifer Cusmano *(jcusmanoking@gmail.com)* and **David Janosz** (@TeachIngenuity; *janosz@nvnet.org),* Northern Valley Regional High School at Demarest, Demarest, N.J.
April Vella (@NVmathsuper; *vella@nvnet.org),* Northern Valley Regional High School District, Demarest, N.J.
Integrate science and engineering practices with mathematics into a STEM career pathways program, using industry and community partnerships, to meet the needs of all students.

Safer Makerspaces and STEM Labs
(General) *Peale B, Hilton*
Science Focus: GEN, SEP2, SEP6
Tyler Love (@UMES_Tech_Dept; *tslove@umes.edu),* University of Maryland Eastern Shore, Princess Anne
Safer design guidelines and teaching strategies for makerspaces and STEM labs will be discussed from Ken Roy and Tyler Love's (NSTA Safety Board) book.

11:00 AM–12 Noon Hands-On Workshops

S.T.E.A.M.y Excel and Google Sheets
(Grades 9–12) *322, Convention Center*
Science Focus: GEN, CCC4
Muhammad Ali Yousuf (@M_Ali_Yousuf; *mali@jhu.edu),* Johns Hopkins at Mt. Washington, Baltimore, Md.
Laura Saxton *(lsaxton@jhu.edu),* Johns Hopkins Center for Talented Youth, Baltimore, Md.
Learn how to generate Fractals, how two seemingly similar equations give completely different and chaotic graphs, and discover some of the number theory results.

Exploring the Arctic: Young Students and Climate Change
(Grades K–6) *324, Convention Center*
Science Focus: ESS2.C, ESS2.D, ESS3.D, CCC4, SEP2, SEP4
Rebecca Haynes, Montshire Museum of Science, Norwich, Vt.
Use maps, globes, models, and satellite apps to explore the changing Arctic in this hands-on workshop that introduces climate change to elementary students.

Make Time for Science
(Grades P–5) *326, Convention Center*
Science Focus: GEN, NGSS
Eva Ogens *(eogens@ramapo.edu),* Ramapo College of New Jersey, Mahwah
Teach smarter! Using children's books, learn how to engage students in *NGSS*-focused lessons while addressing language arts standards and using time wisely.

Beyond Spaceship Earth
(Grades 3–7) *349, Convention Center*
Science Focus: ESS, LS, INF, SEP1, SEP3, SEP6
Becky Wolfe *(beckyw@childrensmuseum.org),* The Children's Museum of Indianapolis, Ind.
Explore classroom STEM investigations related to the International Space Station. Human exploration of space integrates STEM disciplines from science research in microgravity to engineering life support systems for space travel.

Launching an Elementary STEM Program
(Grades P–5) *Holiday 1, Hilton*
Science Focus: GEN, NGSS
Kim Stilwell (@kimstilwellNSTA; *kstilwell@nsta.org),* Manager, New Business Development, NSTA, Arlington, Va
Need ideas of where to start with building an elementary STEM program or enhancing your current program? The initial steps in building an elementary STEM program can be an overwhelming thought. I'll share success stories and how using *Picture-Perfect Science* resources became part of the foundation to a successful implementation. Leave with links to helpful resources and ideas on how to start an elementary STEM program.

Decoding Starlight: From Photons to Pixels to Images—Using Science and Art
(Grades 7–12) *Holiday 2, Hilton*
Science Focus: ESS1.A, ETS2.A, PS1.B, PS4.B, PS4.C
Pamela Perry *(pperry@lewistonpublicschools.org),* Lewiston High School, Lewiston, Maine
Donna Young *(dlyoung.nso@gmail.com),* NASA NSO STEM Coordinator, Bullhead City, Ariz.
Produce a photon intensity image of a supernova remnant using NASA X-ray data and convert the image into a public release image with this STEAM activity.

Evaluating School Yard Heat Islands and Thermal Mitigation

(Grades 9–10) *Holiday 5, Hilton*

Science Focus: ESS3.C

Susan Simonson (@Hood_Biology; *simonson@hood.edu),* **Drew Ferrier** (@Hood_Biology; *dferrier@hood.edu),* and **Claire Hudson** (@Hood_Biology; *hudson@hood.edu),* Hood College, Frederick, Md.

Susan Faibisch *(susan.faibisch@fcps.org),* Walkersville High School, Walkersville, Md.

Students evaluate their school yard's thermal impact on local waters using IR thermometers, ready-to-build temperature loggers, and lessons on urban heat island effects.

***NGSS* in Action: Building a Coherent 3-D Science Lesson**

(Grades 6–12) *Key 4, Hilton*

Science Focus: PS3, CCC, SEP

Deepika Menon *(dmenon@towson.edu),* **Mary Sajini Devadas** (@Devadas_GroupTU; *mdevadas@towson.edu),* **Landon Bechdel** *(lbechd1@students.towson.edu),* **Angela Meola** *(ameola3@students.towson.edu),* and **Madeleine Taylor** *(mtaylo36@students.towson.edu),* Towson University, Towson, Md.

Engage in a model energy-nanoscience lesson through hands-on explorations and discussions. Learn about how the three dimensions of the *NGSS* are tied together in a science lesson.

ASEE Session: Simple Electric Circuits

(Grades 6–8) *Key 6, Hilton*

Science Focus: ETS, PS3.B, CCC5

LaDawn Partlow *(ladawn.biddle@morgan.edu)* and **Jumoke Ladeji-Osias** (@KemiLadejiOsias; *jumoke.ladeji-osias@morgan.edu),* Morgan State University, Baltimore, Md.

We will introduce simple electric circuits using an online circuit design tool. Participants will build simple circuits on a prototyping board.

ACS Middle Level Session Three: Chemical Reactions—Breaking and Making Bonds

(Grades 6–8) *Key 7, Hilton*

Science Focus: PS1

James Kessler *(jhkessler@acs.org),* American Chemical Society, Washington, D.C.

Explore the production of a gas, a precipitate, and changes in temperature through hands-on activities and molecular model animations from the free online resource *middleschoolchemistry.com.* Participants will receive a handout of the lessons.

11:00 AM–12 Noon Exhibitor Workshops

Cell Differentiation and Gene Expression

(Grades 9–12) *327, Convention Center*

Science Focus: LS1.A, LS1.B, LS2, LS3.A, LS3.B, LS4, CCC1, CCC2, CCC4, CCC6, SEP2, SEP6, SEP8

Sponsor: Lab-Aids, Inc.

Brian Gross, Delcastle Technical High School, Wilmington, Del.

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.

Of All the Nerve: Exploring Neuronal Communication Through Three-Dimensional Learning

(Grades 9–College) *330, Convention Center*

Science Focus: ETS, LS1, CCC1, CCC2, CCC4, CCC6, CCC7, SEP1, SEP2, SEP6

Sponsor: MSOE Center for BioMolecular Modeling

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

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 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!

Keep Calm and Chemistry On: Successful Lab Activities for the New Chemistry Teacher

(Grades 9–12) *331/332, Convention Center*

Science Focus: PS

Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

Looking for lab activities that work every time, not just periodically? Explore easy, engaging, and safe chemistry activities that will produce a reaction from your students. Whether you're new to chemistry or feeling out of your element, learn ways to create excitement with hands-on labs, digital content, and demonstrations.

Science Denial: Why It Continues and What Science Educators Can Do About It

(Grades 9–12) *336, Convention Center*

Science Focus: LS2.B, LS2.C, LS4.A, LS4.D

Sponsor: Pearson Learning Services

Kenneth Miller *(kenneth_miller@brown.edu),* Brown University, Providence, R.I.

U.S. public opinion continues to demonstrate a surprising unwillingness to embrace the scientific consensus on issues affecting our well-being and prosperity. While it might seem logical to attribute the prevalence of anti-science attitudes to religious dogma or factual unawareness, the roots of this problem go far deeper, and relate to popular perceptions of science and scientists. I will suggest how scientific enterprise and science education need to change to reclaim the cultural high ground in American society.

Evaporative Cooling: Visualizing Matter so It Makes Sense!

(Grades 6–12) *337, Convention Center*

Science Focus: PS1

Sponsor: PASCO scientific

Fran Zakutansky, Retired Educator, Montvale, N.J.

Why does perspiration make you feel cooler? How is cooling related to molecular properties? Help your students understand the process of evaporation by measuring the temperature difference when a substance changes from liquid to gas. Look at the process from a molecular perspective to understand how bonding and shape affect cooling.

Biology with Vernier

(Grades 9–12) *339, Convention Center*

Science Focus: ETS, LS, SEP

Sponsor: Vernier Software & Technology

David Carter *(info@vernier.com),* Vernier Software & Technology, Beaverton, Ore.

In this hands-on workshop, learn 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.

Exploring the Biology of Skin Color with HHMI BioInteractive

(Grades 9–12) *340, Convention Center*

Science Focus: LS3.A, LS3.B, LS4.A, LS4.B, LS4.C, CCC1, CCC2, CCC7, SEP1, SEP4, SEP7, SEP8

Sponsor: HHMI BioInteractive

Joseph Evans *(jevans@kent.k12.md.us),* Kent County High School, Worton, Md.

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

Variation in human skin color is a fascinating topic for students. Using a variety of free resources from HHMI BioInteractive, explore the complex connections between evolution, biogeography, and genetics. Lessons are adaptable for a range of grade levels from middle school through college.

Become a GMO Investigator

(Grades 9–College) *341, Convention Center*

Science Focus: LS

Sponsor: Bio-Rad Laboratories

Cassy Granieri, Bio-Rad Laboratories, Hercules, Calif.

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.

Implementing Argumentation: Evidence, Claims, Reasoning, and Science Seminars in Grades 6–8

(Grades 6–8) *342, Convention Center*

Science Focus: GEN, NGSS

Sponsor: Amplify

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

Participate in The Lawrence Hall of Science's argumentation-rich curricular approach that supports students as they gain expertise using evidence and reasoning to support claims. Engage in a science seminar, getting a glimpse of what the authentic and robust use of argumentation can look like in your classroom.

Middle Schoolers Solving Problems: Grant Opportunity to Bring STEM to Life!
(Grades 6–9) *343/344, Convention Center*
Science Focus: GEN
Sponsor: AEOP
Alexandra Wakely, eCYBERMISSION Outreach Specialist, NSTA, Arlington, Va.
Middle school students are full of creative solutions for problems in their community. Give your grades 6–9 students the opportunity to explore these solutions with a STEM-based program called eCYBERMISSION. Find out how our Mini-Grant opportunity can support the work that students are yearning to do. Hear how grant money can support the online STEM competition eCYBERMISSION in your school or district.

Should Pluto Be a Planet Again?
(Grades 5–College) *345/346, Convention Center*
Science Focus: ESS1.B
Sponsor: Simulation Curriculum Corp.
Herb Koller, Simulation Curriculum Corp., Minnetonka, Minn.
Some scientists want to make Pluto a planet again. Let's use the interactive lessons in Simulation Curriculum's award-winning Starry Night to help us decide. And best of all, Starry Night can now be accessed online using your Chromebooks and tablets, as well as regular Windows and Mac computers.

STEM Leaders in Action: The Albert Einstein Distinguished Educator Fellowship (AEF) Program
(Grades 3–12) *347, Convention Center*
Science Focus: GEN
Sponsor: Albert Einstein Distinguished Educator Fellowship
Jill Latchana *(einsteinfellows@orise.orau.gov)*, Oak Ridge Associated Universities, Arlington, Va.
Learn how Einstein Fellows bring their insights and experience as K–12 STEM educators to Federal STEM education programs, initiatives, and policy efforts by serving in U.S. Congressional Offices, or the U.S. Department of Energy (DOE), National Science Foundation (NSF), and the National Aeronautics and Space Administration (NASA). Find out from the panel of current Fellows about their day-to-day experiences, the substantial contributions to Federal-level education efforts, the unique professional and career development opportunities available to Fellows, and how to apply to the program.

INF **STEMrangers: Making Science Night Meaningful**
(Grades 3–8) *348, Convention Center*
Science Focus: ESS, INF
Sponsor: STEMscopes
Terry Talley *(ttalley@acceleratelearning.com),* Accelerate Learning, Inc., Houston, Tex.
STEMscopes has partnered with EarthEcho International to develop Science Nights for schools that turn learning into action. Come see how you can both learn new science content and help save Earth's most valuable resource. Leave with the tools to make your campus science night an unforgettable event for students and families.

11:30 AM–12 Noon Presentation

Building Boats: Creating and Executing an Interdisciplinary Project Using Design Thinking and the Engineering Process
(Grades 6–9) *Key 2, Hilton*
Science Focus: ETS1, PS1, PS2, CCC3, CCC6, SEP
Jonathan Olivera *(jolivera@cgps.org)* and **Sara Moldofsky,** Columbia Grammar and Preparatory School, New York, N.Y.
Launch new learning with a process of designing and executing a STEAM challenge using design thinking and the engineering process to create full-sized boats.

12 Noon–3:00 PM Short Course

Using Your School as a Laboratory: Air Quality (SC-4)
(Grades 4–12) **Tickets Required; $20** *Tubman, Hilton*
Science Focus: GEN, SEP1
Christina Gladmon *(greenschools@maeoe.org)* and **Laura Johnson Collard** *(director@maeoe.org),* Maryland Association for Environmental and Outdoor Education, Columbia
Rebecca Davis *(cleanairpartners@gmail.com),* Clean Air Partners, Washington, D.C.
For description, see page 33.

12:30–1:30 PM Presentations

Taking STEM Outside

(Grades 4–8) *321, Convention Center*

Science Focus: LS

Sarah Haines *(shaines@towson.edu),* Towson University, Towson, Md.

Katie Dell (@kdellsci), Arbutus Middle School, Halethorpe, Md.

In addition to hitting STEM benchmarks, learn how outdoor and placed-based science lessons can enhance students' knowledge of trees, forests, and the environment around them.

Advancing Science Literacy While Meeting *CCSS* and Making Science More Accessible and Understandable

(Grades K–6) *323, Convention Center*

Science Focus: GEN

Donna Knoell *(dknoell@sbcglobal.net),* Educational Consultant, Overland Park, Kans.

Join me as I share strategies to enable elementary students to read and comprehend informational science text, organize and communicate science concepts orally and in writing, develop their science vocabularies, increase achievement, and meet the *CCSS.* Handouts!

Lessons Learned: Writing Curricula and Assessments in Three Dimensions

(Grades 6–12) *Johnson B, Hilton*

Science Focus: GEN, NGSS

Joshua Gabrielse *(jmgabrielse@bcps.k12.md.us),* Baltimore (Md.) City Public Schools

Learn what Baltimore City Public Schools is doing for the secondary science curriculum to meet the *NGSS* and get an in-depth look at another district's *NGSS*-focused curriculum writing process.

Creating the I-Lab: Development and Implementation of the Eastern Tech Makerspace

(Grades 6–12) *Key 1, Hilton*

Science Focus: GEN

Thomas Michocki (@TMichocki; *tmichocki@bcps.org)* and **Kimberly Burton-Regulski** (@kburtonr; @ETHS_Makerspace; *kburton@bcps.org),* Eastern Technical High School, Essex, Md.

Get an in-depth look at the design, construction, and implementation of a high school makerspace.

University STEM Faculty and K–8 Teachers: A Winning Partnership for STEM Education

(Grades K–8) *Key 2, Hilton*

Science Focus: GEN

Jonathan Wilson *(jonathan.wilson@morgan.edu)* and **Tia Keels** *(tia.keelsfields@morgan.edu),* Morgan State University, Baltimore, Md.

Keisha Matthews *(dtraynhamm@comcast.net),* Curriculum Coordinator, Baltimore, Md.

Come gain successful strategies for providing content and resources that develop confidence to effectively teach integrated science and math at the elementary–middle school level.

AAPT Session: Guesstimation—Solving the World's Problems on the Back of a Cocktail Napkin

(Grades 9–College) *Key 9, Hilton*

Science Focus: PS1.B, PS2.A, PS3.A, PS3.B, PS3.D

Laurence Weinstein *(weinstein@odu.edu),* Old Dominion University, Norfolk, Va.

Hear how to estimate the answer to any quantitative question with simple tools plus common sense.

Materials Matter! Looking at Materials Science to Help Teach Chemistry

(Grades 6–12) *Key 11, Hilton*

Science Focus: ESS, ETS, PS, CCC, SEP

Sherri Rukes *(sherri.rukes@d128.org),* Libertyville High School, Libertyville, Ill.

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.

Using the NSTA Learning Center as an Online Textbook

(Grades 9–College) *Peale A, Hilton*

Science Focus: GEN

Flavio Mendez (@fljmendez; *flavio_m@nsta.org),* Assistant Executive Director, Learning Center, NSTA, Arlington, Va.

Ted Willard (@Ted_NSTA; *twillard@nsta.org),* Program Director, NGSS@NSTA, NSTA, Arlington, Va.

Professors are invited to come learn how to use the NSTA Learning Center as an online textbook when teaching science preservice teachers.

How to Implement STEM and *NGSS* into Your Classroom Through the Use of NSTA Competitions
(Grades K–12) *Peale B, Hilton*
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.

12:30–1:30 PM Hands-On Workshops

Getting Over Graphs in the Science Classroom
(Grades 9–12) *322, Convention Center*
Science Focus: GEN, 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!

Sounds Like Fun
(Grades 3–7) *324, Convention Center*
Science Focus: PS
Katrina Brown *(kwb@pitt.edu),* University of Pittsburgh at Greensburg, Pa.
Tune in to investigate fun, easy, and inexpensive ways to teach sound.

NSTA Press® Session: *EUREKA! Grades 3–5 Science Activities and Stories*
(Grades 3–5) *325, Convention Center*
Science Focus: GEN, NGSS
Julie Thomas *(julie.thomas@unl.edu),* University of Nebraska-Lincoln
Donna Farland-Smith *(farlandsmith@aol.com),* The Ohio State University at Mansfield
Take part in some of the 27 lessons linking nonfiction historical trade books and science content for grades 3–5.

Evolving Practice: An *NGSS*-Inspired Approach to Teaching with Fossils
(Grades 6–8) *349, Convention Center*
Science Focus: ESS, LS4, SEP
Jennifer Cross Peterson *(jennifer_peterson@harvard.edu),* Harvard Museum of Natural History, Cambridge, Mass.
Engage in a hands-on fossils activity as we delve into Earth science and evolution content and critical-thinking skills as outlined in the *NGSS*.

So You Want to Be an Environmentalist!
(Grades 6–10) *Holiday 2, Hilton*
Science Focus: ETS1, LS
Judith Lucas-Odom (@Judith_Odom; *judyps23@yahoo.com),* Chester High School, Chester, Pa.
Get involved in environmental stress reactions. Using what stresses a plant and the engineering design model help your students do authentic research!

Soil Ecology in the Classroom
(Grades 5–12) *Holiday 4, Hilton*
Science Focus: ESS, LS1, LS2, INF, CCC, SEP
David Brock *(brockda@rpcs.org),* Roland Park Country School, Baltimore, Md.
Unearth new learning with a nationally recognized ecology project, "The 'Little Things' That Run the World," and discover ways to engage your students in hands-on field studies.

3D **Becoming Banneker: Find Place with Objects in Space**
(Grades 4–8) *Holiday 5, Hilton*
Science Focus: ESS1, CCC1, SEP5
Eric Cromwell (@GIS_Cromwell; *ecromwell@bcps.org),* Baltimore County Public Schools Office of Science, Towson, Md.
Use the motion of objects in space to find your location and learn about the extraordinary life of an 18th-century Renaissance man from Baltimore.

NESTA Earth System Science Share-a-Thon
(Grades K–12) *Holiday 6, Hilton*
Science Focus: ESS
Michael Passow *(michael@earth2class.org),* Dwight Morrow High School, Englewood, N.J.
Join more than 20 NESTA members and other education specialists as they share their favorite *NGSS*-congruent classroom activities. Lots of free handouts!

Learn Ways to Connect the Life Sciences with Climate Change
(Grades 6–12) *Key 4, Hilton*
Science Focus: ESS3, LS2, PS1, CCC4, CCC5
Lolita Kiorpes *(ldc1388@gmail.com),* North Point High School, Waldorf, Md.
Incorporate climate change models, lessons, and activities into your life science curriculum. Use environment-based projects that integrate watershed and ocean health. Make climate change relevant to today's students.

ASEE Session: Using STEM in Action to Connect to DOE Resources
(General) *Key 6, Hilton*
Science Focus: ETS2.A, PS3.A, PS3.B, PS3.D, CCC3, CCC4, CCC7
Melinda Higgins (@energy; *melinda.m.higgins@gmail.com),* U.S. Dept. of Energy, Washington, D.C.
The Department of Energy's Girls of Energy engages students with cutting-edge research, incredible stories of our Women @ Energy, and activities and lessons that support our energy challenges.

ACS Middle Level Session Four: Chemical Reactions—Ocean Acidification
(Grades 6–8) *Key 7, Hilton*
Science Focus: PS1.A
James Kessler *(jhkessler@acs.org),* American Chemical Society, Washington, D.C.
Explore how excess carbon dioxide in the atmosphere makes water more acidic through hands-on activities from the free website *middleschoolchemistry.com.* Participate in simple and inexpensive experiments that show how excess carbon dioxide can contribute to ocean acidification and receive a handout of the lesson.

12:30–1:30 PM Exhibitor Workshops

pH Scale

(Grades 9–12) *327, Convention Center*

Science Focus: PS, SEP4, SEP5

Sponsor: Lab-Aids, Inc.

Brandon Watters, Vernon Hills High School, Vernon Hills, Ill.

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.

Take a Walk Through the Molecular World with Watercolor Landscapes

(Grades 9–College) *330, Convention Center*

Science Focus: LS1, LS3, PS1, CCC3, CCC4, CCC7, SEP1, SEP2

Sponsor: MSOE Center for BioMolecular Modeling

Tim Herman *(herman@msoe.edu),* MSOE Center for BioMolecular Modeling, Milwaukee, Wis.

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 new Flu Fight: Immunity & Infection Panorama illustrates how antibodies work to block the influenza infection cycle.

Introduction to Wisconsin Fast Plants®

(Grades K–12) *331/332, Convention Center*

Science Focus: LS

Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

Experience the versatility of Wisconsin Fast Plants. These small, quick-growing plants engage students, suit all learning levels, and let you integrate plant development, life cycle, environmental effects, genetics, and evolution into your instruction. Learn the basics for successful planting, flower dissection, and pollination.

Incorporating the *NGSS* Crosscutting Concepts into Your Teaching

(Grades K–12) *336, Convention Center*

Science Focus: GEN, CCC

Sponsor: Pearson Learning Services

Michael Wysession, Washington University in St. Louis, Mo.

Join professor and *NGSS* writing team leader Michael Wysession as he discusses ways teaching can meet the best practices concerning the *NGSS* crosscutting concepts. Seen as the most challenging of the three dimensions, the crosscutting concepts, if implemented well, can provide students with a deep and intuitive understanding of science.

Exploring Misconceptions: What Is pH?

(Grades 6–12) *337, Convention Center*

Science Focus: PS1.A, CCC1, CCC3, SEP2, SEP5

Sponsor: PASCO scientific

Fran Zakutansky, Retired Educator, Montvale, N.J.

What is pH and why is the scale 0–14? Help students understand the logarithmic pH scale by creating serial dilutions in this hands-on workshop. Using the Wireless pH sensor and universal indicator, your students will be able to analyze and visualize what pH actually means and measures!

Who Is Baby Whale's Father? DNA Fingerprinting Solves the Mystery!

(Grades 8–College) *338, Convention Center*

Science Focus: LS

Sponsor: MiniOne Systems

Richard Chan *(info@theminionesystems.com),* MiniOne Systems, San Diego, Calif.

Come learn and get hands-on experience on how to teach gel electrophoresis and DNA fingerprinting in a 60-minute classroom session. You will pour, load, and run a gel; capture gel image; analyze the results; and deduce a probable conclusion for a whale of a forensic mystery.

Integrating Chromebook with Vernier Data-Collection Technology

(Grades 3–College) *339, Convention Center*

Science Focus: ETS, PS, SEP

Sponsor: Vernier Software & Technology

David Carter *(info@vernier.com),* Vernier Software & Technology, Beaverton, Ore.

Collecting and analyzing data help students learn critical science concepts that increase test scores and promote science inquiry. In this hands-on workshop, 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.

Got Lactase? Exploring Genetics with HHMI BioInteractive Resources
(Grades 9–12) *340, Convention Center*
Science Focus: LS1.A, LS1.D, LS3, LS4.A, LS4.B, LS4.C, CCC1, CCC6, CCC7, SEP4, SEP5, SEP6
Sponsor: HHMI BioInteractive
Sydney Bergman *(bergmans@hhmi.org),* Howard Hughes Medical Institute, Chevy Chase, Md.
Why can some people digest milk and others can't? Trace the genetics and evolution of lactose tolerance using free HHMI BioInteractive resources. This exploration, which links classical and molecular genetics, is *NGSS* focused and appropriate for all levels of biology learners.

Disappearing Jaguars and Sloths: Phenomena and 3-D Instruction for Grades 2–5
(Grades 2–5) *342, Convention Center*
Science Focus: LS
Sponsor: Amplify
Rebecca Abbott and **Sophia Lambertsen,** The Lawrence Hall of Science, University of California, Berkeley
Experience how students investigate declining jaguar and sloth populations while figuring out principles of ecosystems and engaging in three-dimensional learning. Get a hands-on dive into Amplify Science for grades 2–5, engaging with this new *NGSS*-designed program from The Lawrence Hall of Science.

When Zombies Attack!
(Grades 6–12) *345/346, Convention Center*
Science Focus: ETS, LS, PS, SEP5, SEP6
Sponsor: Texas Instruments
Jeffrey Lukens, Sioux Falls (S.Dak.) School District
Fred Fotsch, Texas Instruments, Dallas
After the apocalypse, you must use any resources available to survive. In this session, survivors will use a little coding (no experience necessary), a simple speaker, and a flashlight to construct a zombie repulsion device. Using the science of sound and hearing, you may just find a way to stop the ZOMBIE ATTACK!

Science and Engineering Practices in the *NGSS*
(Grades K–8) *347, Convention Center*
Science Focus: GEN, NGSS
Sponsor: TCI
Dawn Smith, TCI, Murray, Ky.
Join TCI and take part in an engaging Bring Science Alive! investigation that has your students developing solutions and making sense of the natural and designed world. Experience this lesson from the student perspective as you 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!

Using Argumentation for Discussing Phenomena and Increasing Student Voice About STEM
(Grades K–12) *348, Convention Center*
Science Focus: GEN, SEP7
Sponsor: STEMscopes
Sharry Whitney *(swhitney@acceleratelearning.com),* Accelerate Learning, Inc., Houston, Tex.
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!

12:30–2:00 PM Networking Opportunity

Maryland Association of Science Teachers (MAST) Luncheon

(Tickets Required; $35) **#M-1** *Ruth, Hilton*

Heidi Schweingruber *(hschweingruber@nas.edu),* The National Academies of Sciences, Engineering, and Medicine, Washington, D.C.

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 Heidi Schweingruber, director of the Board on Science Education at the National Research Council. Heidi co-directed the study that resulted in the report *A Framework for K–12 Science Education* (2011), which was the first step toward the *Next Generation Science Standards.*

Guests can learn about opportunities for becoming more involved in the MAST board or committees that support educators from our region. Sponsored in part by the Towson Center for STEM Excellence.

12:30–2:30 PM Hands-On Workshop

ACS High School Session Three: Relating Structure and Properties: Demonstrating Understanding Through Integration and Application of Knowledge

(Grades 9–12) *Key 8, Hilton*

Science Focus: PS, CCC, SEP4, SEP8

Chad Bridle (@sciencebridle; *cbridle1@gpsbulldogs.org),* Grandville High School, Grandville, Mich.

Jennifer Keil *(jennifer.keil@colorado.edu),* Master Teacher, Boulder, Colo.

Rebecca Stober *(beckystober@gmail.com),* Mapleton Expeditionary School of the Arts, Denver, Colo.

Marta Gmurczyk *(m_gmurczyk@acs.org),* American Chemical Society, Washington, D.C.

Kimberly Duncan, American Association of Chemistry Teachers, Washington, D.C

Saul Trevino *(strevino@hbu.edu),* Houston Baptist University, Houston, Tex.

Learn how to help students integrate results and ideas from multiple explorations to build explanations and construct arguments based on structure-property relationships of covalent compounds. Learn how students can demonstrate a rich understanding of core chemical concepts and ideas by proposing solutions to complex problems.

1:00–1:30 PM Presentation

Migrating into Citizen Science

(Grades 3–12) *Holiday 3, Hilton*

Science Focus: LS1.B, LS2.A, LS2.C

Joseph Evans (@JosephEvans6; *jevans@kent.k12.md.us),* Kent County High School, Worton, Md.

Engage students in citizen science using butterflies as a model organism at little to no cost.

2:00–3:00 PM Featured Presentation

Building a Nation of Makers: Lessons Learned While Serving as a Senior Adviser in the Obama White House

(General) *328/329, Convention Center*

Science Focus: GEN

Andrew Coy (@andrewcoy), Consultant and Founder, Initial Velocity, Baltimore, Md.

Presider: Lauren Thompson Allen, Strand Leader, NSTA Baltimore Area Conference, D.C. Office of the State Superintendent of Education, Washington, D.C.

The difference between experience and wisdom is reflection. Join Andrew Coy as he shares some amazing experiences from his tenure at the White House but also spends the majority of the time reflecting on how to apply elsewhere the dozens of lessons learned. Regardless of your role in your organization or school, you will be sure to walk away with ideas and insights you can apply.

Andrew Coy is a driven problem-solver with experience at the intersection of nonprofit, education, government, and technology. Most recently, he served in President Obama's White House, Office of Science and Technology Policy as a senior adviser on the Tech and Innovation team. In this capacity, he led initiatives including the National Week of Making, Nation of Makers, and the Kid Science Advisors Campaign, as well as supported the Computer Science for All initiative. He was on the organizing team for numerous other efforts, including the White House Science Fair, Water Summit, Frontiers Conference, and South by South Lawn.

Prior to serving President Obama in the White House, he was the executive director of the Digital Harbor Foundation, where he led efforts to save the closed-down South Baltimore Rec Center by reopening it as the Digital Harbor Foundation Tech Center, a youth-centered makerspace located in Baltimore, Maryland, that provides after-school programs, summer camps, field trips, family make nights, educator training workshops, and other community-making opportunities. In 2017, he launched Initial Velocity (initialvelocity.co) *to help others launch their ideas with his added insight, skill set, understanding, and passion.*

2:00–3:00 PM Presentations

Camp FOCUS: Teachers Advocating for Inquiry-Centered Teaching

(Grades 6–8) *321, Convention Center*

Science Focus: GEN, INF, NGSS

Jennifer Stalls (@stallsj; *jstalls@gmail.com),* Greene County Middle School, Snow Hill, N.C.

Anna Price-Humphrey *(abcdhumprhey@suddenlink.net),* South Central High School, Winterville, N.C.

Led by teachers, Camp FOCUS is a STEM-centered camp that encourages inquiry-centered learning. Participants will learn strategies to implement in their classrooms.

Authors Wanted! How to Get Published in an NSTA Journal

(General) *323, Convention Center*

Science Focus: GEN

Ken Roberts, Assistant Executive Director, Journals, NSTA, Arlington, Va.

Patty McGinnis, Field Editor, *Science Scope,* and Arcola Intermediate School, Eagleville, Pa

Linda Froschauer, 2006–2007 NSTA President, and Field Editor, *Science & Children,* Pasadena, Calif

Steve Metz, Field Editor, *The Science Teacher,* and The Governor's Academy, Byfield, Mass.

Ann Cutler *(acutler@nsta.org),* Field Editor, *Journal of College Science Teaching,* Carmel, Ind.

Dennis Schatz *(schatz@pacsci.org),* NSTA Director, Informal Science; Editor, *Connected Science Learning;* and Pacific Science Center, Seattle, Wash.

Meet with NSTA's journal editors to learn how to successfully prepare and submit an article for publication.

NSTA Press® Session: Uncovering Student Ideas in Science with 3-D Assessment Probes

(Genera) *333, Convention Center*

Science Focus: GEN, NGSS

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

Experience how formative assessment probes from the *Uncovering Student Ideas* series elicit evidence of students' disciplinary core ideas while providing the opportunity to use science practices and crosscutting concepts.

Transgenic American Chestnuts—Pathway to Restoration?

(Grades 10–12) *Holiday 3, Hilton*

Science Focus: LS, CCC2, CCC6, CCC7, SEP1, SEP3, SEP4, SEP6, SEP7, SEP8

Gary Hedges (@gehedges), Maryland State Dept. of Education, Frederick

Brad Yohe *(brad.yohe@gmail.com),* Retired Educator, Gettysburg, Pa.

Uncover how applications of molecular biotechnology are impacting the restoration of the American chestnut tree. Lessons tracing restoration projects will be shared for classroom use.

Engaging Students in a Blended and Online Environment

(Grades 6–12) *Johnson B, Hilton*

Science Focus: GEN

John Wilson (@jwilson21CCCS; *jlcwilson@verizon.net),* 21st Century Cyber Charter School, Downingtown, Pa.

The presenter has many years at a highly performing online school and holds roles as a math/physics teacher and learning coach. Receive tips on creating, engaging, and maintaining a partnership with students and parents/families to maximize their student's academic success in the cyber world.

Early Childhood Engineers

(Grades P–3) *Key 2, Hilton*

Science Focus: ETS1, SEP1, SEP3, SEP6

Valerie Patel (@valpatel; *valerie_m_patel@mcpsmd.org)* and **Amy Kanapesky** *(amy_k_kanapesky@mcpsmd.org),* William B. Gibbs, Jr. Elementary School, Germantown, Md.

Hear how to successfully engage students in the engineering design process in early childhood classrooms! We will discuss how to seamlessly integrate it into daily instruction.

Instructional Alignment Around a Phenomena-Driven Approach

(Grades K–12) *Key 3, Hilton*

Science Focus: GEN, CCC

Kenneth Huff *(huffkennethlee@gmail.com),* Mill Middle School, Williamsville, N.Y.

Join a member of the *NGSS* writing team to learn how you can implement an instructional sequence for making sense of phenomena.

Follow the Road to a Successful STEM Career!

(Grades 9–College) *Peale A, Hilton*

Science Focus: ETS

Kareem Burney *(ksburney@hotmail.com),* U.S. Food and Drug Administration, Silver Spring, Md.

Hear and apply lessons from a young minority mid-career level engineer on what post high school students should be doing in order to obtain a successful STEM career. The presenter has been to graduate school and works in industry so he will speak on how to obtain a STEM career in both fields.

2:00–3:00 PM Hands-On Workshops

Developing Student Scientists Through the Watershed Report Card Program

(Grades 9–12) *322, Convention Center*

Science Focus: ESS2, ESS3, LS2

Jessica Kohout (@MrsKohout; *jessica_kohout@hcpss.org),* Reservoir High School, Fulton, Md.

Ann Strozyk (@AnnStrozyk; *ann_strozyk@hcpss.org),* Howard County Public School System, Ellicott City, Md.

Go in-depth into how Howard County biology teachers in cooperation with the Howard County Conservancy have implemented the *NGSS* through the "Watershed Report Card" program.

Testing Look-Alike Liquids

(Grades 3–6) *324, Convention Center*

Science Focus: PS1.A, CCC1, CCC6, SEP2, SEP3, SEP6

Patricia Galvan *(p_galvan@acs.org),* American Chemical Society, Washington, D.C.

Conduct simple tests on four identical-looking clear, colorless household liquids. Testing reveals interesting differences elementary students will discover! Complete instructions will be provided and are available at *www.inquiryinaction.org.*

NSTA Press® Session: *From Flower to Fruit*

(Grades K–4) *325, Convention Center*

Science Focus: LS

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

Kathleen Konicek-Moran *(kathleen.konmor@gmail.com),* Botanical Illustrator and Nature Artist, Palmetto, Fla.

Put botany back in your curriculum using *From Flower to Fruit.* Learn about pollination, bees, fertilization, and how to teach for understanding.

A Picture-Perfect Approach to Connecting Literacy and Science

(Grades P–5) *326, Convention Center*

Science Focus: GEN, NGSS

Kim Stilwell (@kimstilwellNSTA; *kstilwell@nsta.org),* Manager, New Business Development, NSTA, Arlington, Va.

Need ideas to connect literacy and science? Never before has it been so easy to interest students in reading and science. *Picture-Perfect Science Lessons* combine the appeal of children's picture books with standards-based science content. Leave with ideas on how to begin the integration in your classroom.

INF Get WISE: Growing a Systemic Women In Science & Engineering Club

(Grades 9–12) *Holiday 1, Hilton*

Science Focus: INF

Colleen Beall (@ColleenScience; *colleen.beall@fcps.org)* and **Linda Mosser** (@LJMOSSER; *linda.mosser@fcps.org),* Frederick County Public Schools, Frederick, Md.

Lisa Bruck (@LisaBruck; *Lisa.bruck@fcps.org),* Earth and Space Science Lab, Frederick, Md.

Women In Science & Engineering (WISE) encourages females to consider STEM careers through meetings featuring speakers and hands-on activities. Learn about our success and structure.

Fully Engaged

(Grades 6–12) *Holiday 2, Hilton*

Science Focus: GEN, CCC1, CCC4, SEP

Susan Heiss, Westwood Community School District, Dearborn Heights, Mich.

Tyler Cederlind *(litemichigan@gmail.com),* Wayne RESA, Wayne, Mich.

Jeremy Sabatini, Robichaud High School, Dearborn Heights, Mich.

Engage your students through inquiry-based student-led learning centers.

3D What Affects Populations? A Hands-On Storylining Experience

(Grades 6–8) *Holiday 5, Hilton*

Science Focus: LS2.C, CCC7, SEP7

Nicole Rhoades (@nlrhoades; *nicole.rhoades@fcps.org)* and **Gena Hlavinka** (@mshlavinka; *hlavinkag@gmail.com),* Windsor Knolls Middle School, Ijamsville, Md.

Walk through a storylined learning progression. Experience hands-on student activities, review student exemplars, discuss the storylining process, and gain access to presented activities.

NESTA and IRIS Session: Yes, Humans Really Do Cause Earthquakes—Hydraulic Fracturing, Wastewater Injection, and Earthquakes

(Grades 7–College) *Holiday 6, Hilton*

Science Focus: ESS2.A, CCC1, CCC2, CCC5, CCC7, SEP1, SEP3, SEP4, SEP6, SEP7, SEP8

John Taber *(taber@iris.edu),* IRIS, Washington, D.C.

Explore the "hot topic" of induced earthquakes with your students through an activity built on the Argument-Driven Inquiry framework that supports three-dimensional learning.

CESI-Sponsored Session: Using Toys to Teach Physics
(Grades K–8) *Key 5, Hilton*
Science Focus: PS, SEP
Jim McDonald (@jimscienceguy; *jim.mcdonald@cmich.edu),* Central Michigan University, Mount Pleasant
Karen Ostlund (@karen_ostlund; *klostlund@utexas.edu),* 2012–2013 NSTA President, and The University of Texas at Austin
Betty Crocker *(betty.crocker@unt.edu),* Retired Educator, Denton, Tex.
Tinker with how toys can be used to teach physics to increase student motivation, excitement, and interest. Handouts!

ASEE Session: ASEE's K–12 Outreach: Engineering, Go For It (eGFI), Teach Engineering, Link Engineering, the National Science Digital Library, and UC Project STEP
(Grades K–12) *Key 6, Hilton*
Science Focus: ETS1, SEP1
Pamela Lottero-Perdue *(plottero@towson.edu),* Towson University, Towson, Md.
Join the American Society for Engineering Education (ASEE) and its K–12 division and discover innovative ways to introduce engineering into your K–12 classroom.

AAPT Session: Student Ideas About Physics—Insights from Physics Education Research
(Grades 9–College) *Key 9, Hilton*
Science Focus: PS2, PS3
Benjamin Dreyfus *(bdreyfu2@gmu.edu),* George Mason University, Fairfax, Va.
What ideas do students bring into physics? What does research tell us about the nature of these ideas? How does this apply to our teaching?

2:00–3:00 PM Exhibitor Workshops

Chemical Formula and Amino Acids
(Grades 9–12) *327, Convention Center*
Science Focus: ETS1, PS1, PS2
Sponsor: Lab-Aids, Inc.
Brandon Watters, Vernon Hills High School, Vernon Hills, Ill.
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.

The Science and Ethics of Genome Editing with CRISPR/Cas9
(Grades 9–College) *330, Convention Center*
Science Focus: ETS, LS1, LS3, LS4, CCC4, CCC6, CCC7, SEP1, SEP2, SEP3
Sponsor: MSOE Center for BioMolecular Modeling
Tim Herman (*herman@msoe.edu*), MSOE Center for BioMolecular Modeling, Milwaukee, Wis.
The development of CRISPR/Cas9 gene editing technology promises to revolutionize the biological sciences the same way that restriction endonucleases led to genetic engineering in the 1970s. Explore physical models of the Cas9 endonuclease and contrast the structure/function of this protein with restriction enzymes, zinc finger nucleases, and TALEN proteins.

Shifting to the Five Innovations: How Do We Transform Instruction?

(Grades 6–8) *331/332, Convention Center*

Science Focus: PS1, CCC, SEP

Sponsor: Carolina Biological Supply Co.

Carolina Teaching Partner

Experience the *NGSS* five innovations with the Smithsonian's new STC-Middle School "Matter and Its Interactions" module. This thought-provoking hands-on workshop will demonstrate three-dimensional learning using phenomena. Leave with a better understanding of how the five innovations enhance science instruction.

Ideas for Teaching About Earthquakes and Earth Structure

(Grades K–12) *336, Convention Center*

Science Focus: ESS2.B

Sponsor: Pearson Learning Services

Michael Wysession, Washington University in St. Louis, Mo.

Join geophysics professor Michael Wysession as he discusses exciting new discoveries about earthquakes and the structure of Earth and provides examples of activities that can be directly incorporated into *NGSS*-focused curricula. Also, receive an overview of the educational tools developed at IRIS (Incorporated Research Institutions for Seismology).

Viral Amplification: From One to a Billion Copies in 20 Minutes

(Grades 10–College) *338, Convention Center*

Science Focus: LS

Sponsor: MiniOne Systems

Richard Chan *(info@theminionesystems.com),* MiniOne Systems, San Diego, Calif.

Experience how engaging and accessible classroom biotechnology can be! Amplify sections of the Lambda phage genome using fast and robust PCR. You will set up the reaction, program and monitor the MiniOne PCR System from a tablet app, then separate and analyze your PCR products on the MiniOne Electrophoresis System.

Integrating iPad with Vernier Data-Collection Technology

(Grades 3–College) *339, Convention Center*

Science Focus: ETS, PS, SEP

Sponsor: Vernier Software & Technology

David Carter *(info@vernier.com),* Vernier Software & Technology, Beaverton, Ore.

Collecting and analyzing data help students learn critical science concepts that increase test scores and promote science inquiry. In this hands-on workshop, you will 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.

Free Apps That Put the World in Your Students' Hands

(Grades 6–College) *340, Convention Center*

Science Focus: ESS1.C, ESS2.B, ESS2.D, ESS3.C, ESS3.D, LS2.A, LS4.D, CCC1, CCC4, CCC7, SEP1, SEP2, SEP4, SEP8

Sponsor: HHMI BioInteractive

Sarah Sechrist *(slsechrist@bcps.k12.md.us),* Carver Vocational-Technical High School, Baltimore, Md.

Laura Dinerman *(laura_dinerman@mcpsmd.org),* Sherwood High School, Sandy Spring, Md.

Discover free classroom-ready resources with two HHMI BioInteractive apps. Explore the new BiomeViewer app, which features detailed ecosystem descriptions, beautiful photos, and climate and biodiversity data. Then buckle up for a ride back in time with the EarthViewer app and explore atmospheric changes, mass extinctions, and natural cycles.

Conserving Panda Population…One Hormone Test Design at a Time!

(Grades 9–College) *341, Convention Center*

Science Focus: LS

Sponsor: Bio-Rad Laboratories

Cassy Granieri, Bio-Rad Laboratories, Hercules, Calif

Come put your immunology and reproductive endocrinology systems knowledge basics to the test as you engineer a hormone detection system that can be used for Giant Panda Population Conservation efforts.

Drought in Africa Inspires Students to Invent a Smart Irrigation System

(Grades 6–12) *345/346, Convention Center*

Science Focus: ESS, ETS, CCC1, CCC2, CCC5, CCC7, SEP1, SEP2, SEP3, SEP4, SEP5, SEP6

Sponsor: Texas Instruments

Jeffrey Lukens, Sioux Falls (S.Dak.) School District

Fred Fotsch, Texas Instruments, Dallas

Come learn how to create a project-based camp or classroom lesson that enables students to apply concepts, such as photosynthesis and the water cycle, to design a smart irrigation system. Inspired by real-world events, students are motivated to apply problem-solving skills and learn some basic programming to come up with innovative solutions to the drought situation in southern Africa.

The Chemistry of Glow Sticks
(Grades 6–10) *347, Convention Center*
Science Focus: PS
Sponsor: Fisher Science Education
April Fischione (*april.fischione@thermofisher.com*), Fisher Science Education, Pittsburgh, Pa.
Relive your childhood by making your own glow stick. You may have wondered what happens when you snap a glow stick that causes it to glow. Join us for a fun chemistry experiment where you will create a glowing chemical reaction.

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" 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! One lucky person who attends this event will be eligible to win a **$100 gift certificate to the NSTA Science Store.** Must be present to win. Drawing will take place at 3:20 PM.

3:30–4:30 PM Exhibitor Workshops

Distilling Aromatic Hydrocarbons
(Grades 9–12) *327, Convention Center*
Science Focus: PS2
Sponsor: Lab-Aids, Inc.
Brandon Watters, Vernon Hills High School, Vernon Hills, Ill
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.

Cultivating a Culture of Argumentation in Your Classroom
(Grades K–8) *336, Convention Center*
Science Focus: GEN, SEP7
Sponsor: Pearson Learning Services
Zipporah Miller, NSTA Professional Learning Communities Institute, Arlington, Va.
Critical thinking, communication, collaboration, creativity, and innovation are skills that allow students to compete in today's global economy. Cultivating a culture of argumentation in the classroom affords students with opportunities to develop these skills. We will model techniques that help encourage students to formulate explanations based on evidence, in an effort to defend their ideas or challenge a classmate's ideas, as well as challenge the status quo based on evidence.

Physics and Physical Science with Vernier
(Grades 9–12) *339, Convention Center*
Science Focus: ETS, PS, SEP
Sponsor: Vernier Software & Technology
David Carter *(info@vernier.com),* Vernier Software & Technology, Beaverton, Ore.
In this hands-on workshop, 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.

Trophic Cascades: A Force of Nature
(Grades 9–College) *340, Convention Center*
Science Focus: LS1.C, LS2.A, LS2.C, CCC1, CCC2, CCC4, CCC5, CCC7, SEP2, SEP4, SEP6
Sponsor: HHMI BioInteractive
Joseph Evans *(jevans@kent.k12.md.us),* Kent County High School, Worton, Md.
Takisha Reece *(takisha.reece@ssfs.org),* Sandy Spring Friends School, Sandy Spring, Md.
A big question in ecology is understanding which organisms and processes determine the organization of natural ecosystems. Discover the new HHMI BioInteractive film and supporting activities on trophic cascades. This workshop highlights free *NGSS*-focused materials that translate the elegant, revolutionary work of scientists into classroom-ready resources.

Investigate Photosynthesis and Cellular Respiration with Algae Beads
(Grades 9–College) *341, Convention Center*
Science Focus: LS
Sponsor: Bio-Rad Laboratories
Cassy Granieri, Bio-Rad Laboratories, Hercules, Calif.
Use algae beads in a colorimetric assay to study both photosynthesis and cellular respiration through authentic inquiry investigations in formats to support both AP and *NGSS* biology. Learn how to extend this lab to study the effects of light intensity, light color, temperature, and other organisms on these processes.

Mission KT: Teacher Authoring Science Game
(Grades 3–8) *347, Convention Center*
Science Focus: GEN, INF, NGSS
Sponsor: TheBeamer LLC
Peter Solomon *(prsolomon@TheBeamer.com),* TheBeamer LLC, East Hartford, Conn.
TheBeamer LLC is creating, with support from the National Science Foundation, a science game with teacher authoring. The theme is "You are made of STARDUST that was once in the body of Albert Einstein and the Last T-Rex." We want your input on what you would like in the authoring function.

5:00–5:30 PM Presentations

Save the Bay! A Grade 5 Meaningful Watershed Educational Experience in Baltimore City
(Grades 3–5) *323, Convention Center*
Science Focus: ESS3, LS2.C
Amanda Laurier *(alaurier@bcps.k12.md.us),* Baltimore (Md.) City Public Schools
Blakely Glotfelty *(bdglotfelty@bcps.k12.md.us),* John Ruhrah Elementary/Middle School, Baltimore, Md.
Hear how Baltimore City grade 5 students take part in a Meaningful Watershed Educational Experience to investigate and improve the impacts of their local community on the Chesapeake Bay ecosystem.

Linking Science Fiction and Physics Courses
(Grades 9–College) *Key 11, Hilton*
Science Focus: PS, SEP8
Krista McBride *(krista.mcbride@belmont.edu),* Belmont University, Nashville, Tenn.
A learning community was created between two general education courses: a physics course entitled Intro to Physics and a literature course entitled Science Fiction, Science Fact at Belmont University. I'll share a paper concerning this linked learning community published in *The Physics Teacher* journal May 2016.

5:00–6:00 PM Presentations

Why Should I Care?
(Grades 4–10) *Holiday 5, Hilton*
Science Focus: GEN, SEP
Bridget Raburn, Loudoun County Public Schools, Ashburn, Va.
Jennifer Simons *(simonsj@pwcs.edu),* Benton Middle School, Manassas, Va.
We can all teach the standards, but making the material relevant is a whole separate story. We will discuss numerous ways to make science far more real-world applicable. Handouts!

Using Pop Culture and Polymers to Create Inquisitive Minds
(Grades 6–12) *Johnson B, Hilton*
Science Focus: GEN, SEP1, SEP2, SEP6, SEP8
Sherri Rukes, Libertyville High School, Libertyville, Ill.
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 the students. Take home a CD.

Polymers: Teaching "Hard" Concepts with Gooey Labs
(Grades 5–12) *Key 1, Hilton*
Science Focus: ETS, PS1, CCC, SEP2, SEP3, SEP4, SEP6
Andrew Nydam *(andrewnydam@hotmail.com),* Polymer Ambassador, Olympia, Wash.
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.

What Do You See? Unlock Curiosity with Digital Microscopy Images
(Grades K–12) *Key 2, Hilton*
Science Focus: LS, PS, CCC
Cheryl Lindeman *(clindeman@randolphcollege.edu)* and **Jasmine Fowler** (*jafowler@randolphcollege.edu),* Randolph College, Lynchburg, Va.
Using a scanning electron microscope image gallery of living and nonliving specimens, 5E instructional design lessons focusing on crosscutting themes will be shared.

Salamanders: Indicators of Our Changing Climate
(Grades 6–College) *Peale A, Hilton*
Science Focus: ESS3, LS, CCC, SEP
Adam Frederick *(frederic@mdsg.umd.edu),* Maryland Sea Grant, College Park
Jennifer Peglow (@peglowj; *j.peglow@upperadams.org),* Biglerville High School, Gardners, Pa.
Salamander species in the United States have long been considered harbingers of good water quality in the environment. Discover how these indicator species are also indicative of climate changes.

Authentic Assessment in Action: Using Personal Meaning Maps to Determine the Impact of an Enrichment Activity in the Secondary Classroom
(Grades 9–College) *Peale B, Hilton*
Science Focus: GEN, NGSS
Paul Orbe *(porbe@ucboe.us),* Academy for Enrichment and Advancement, Union City, N.J.
Measure student changes in understanding through Personal Meaning Maps (PMMs). Join me for an overview of the activity and some interesting results.

5:00–6:00 PM Hands-On Workshops

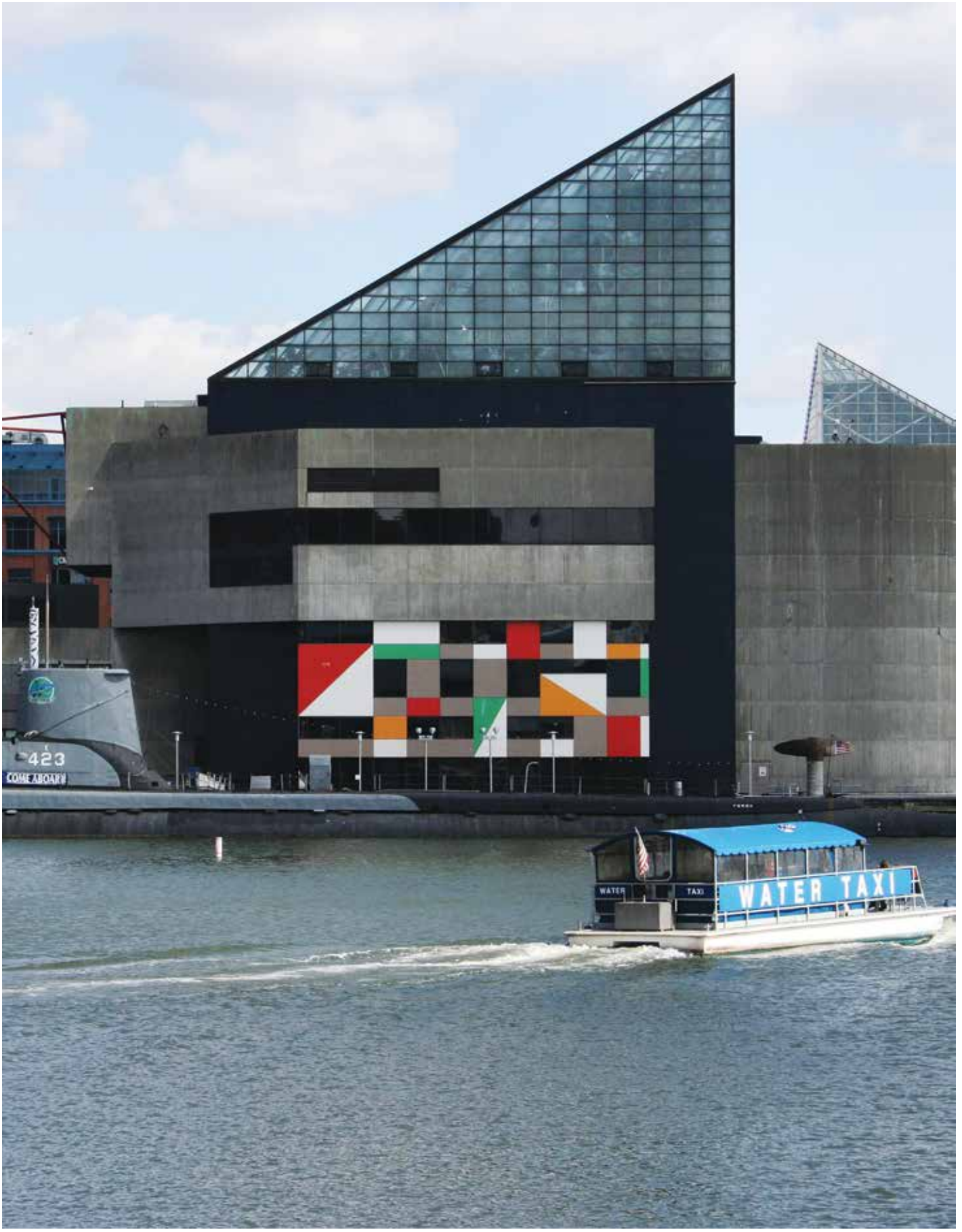
Blended Learning in the Elementary Science Classroom: Transitioning to the *NGSS* Using Individualized Learning
(Grades 3–5) *322, Convention Center*
Science Focus: GEN, NGSS
Kendra Hinson *(kendra.hinson@fcps.org),* **Christopher Horne** (@moxiemath; *chris.horne@fcps.org),* and **Jeffrey Longenberger** (@FCPSscienceTech; *jeffrey.longenberger@fcps.org*), Frederick County Public Schools, Frederick, Md.
Kimberly Brandenburg (@kimberlybrande2; *kimberly.brandenburg@fcps.org),* Oakdale Elementary School, Ijamsville, Md.
Kimberly Martin *(kimberly.martin@fcps.org),* Lincoln Elementary School, Frederick, Md.
Experience a blended professional learning environment. Hear from teachers on how they use blending learning models to focus on *NGSS* instruction. Devices available.

Science and the Arts: A Natural Fit
(Grades K–5) *326, Convention Center*
Science Focus: GEN, NGSS
Dawn Getzandanner (@dawngetzandanne; *dawn.getzandanner@fcps.org),* Spring Ridge Elementary School, Frederick, Md.
Engage in hands-on lessons that illustrate the connection between visual performing arts standards and the three dimensions of the *NGSS.* Explicit examples will be shared to show how using the arts can benefit all learners.

Greenhouse in a Beaker: Understand Climate Change
(Grades 8–12) *Holiday 2, Hilton*
Science Focus: ESS3, PS, CCC1, CCC2, CCC3, CCC4, CCC5, CCC7, SEP
Kimberly Swan (@NEED_Project; *kswan@need.org),* The NEED Project, Manassas, Va.
Engage in a hands-on activity addressing climate change and the science behind the carbon cycle. Students will understand why we use the sources we do, and how they impact the world.

Data, Data, Data: Tips and Tricks for Integrating Data and *NGSS* Science Practices into Any Classroom
(Grades 5–College) *Holiday 4, Hilton*
Science Focus: GEN, INF, SEP
Kristin Hunter-Thomson (@ru_dataspire; *kristin.hunter-thomson@gmail.com),* Rutgers Institute of Marine and Coastal Sciences, New Brunswick, N.J.
Explore the world of data, reflect on how people interact with data, and learn tips and tricks to integrate data successfully into your classroom.

AAPT Session: Simple Lessons to Teach Confusing Physics Ideas (K–8)
(Grades P–8) *Key 9, Hilton*
Science Focus: PS
Katya Denisova *(kdenisova@gmail.com),* Baltimore (Md.) City Public Schools
Join us as we demonstrate simple and low-budget ideas for engaging students in inquiry-driven argumentation of their own models of physics phenomena.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8:00–8:30 AM Presentation

Students as Citizen Scientists: Data Collection and Sharing Using Fieldscope

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(Grades 6–College) *322, Convention Center*

Science Focus: LS2, INF

Olukayode Banmeke, DuVal High School, Lanham, Md.

Discover how to navigate and effectively use the Maryland FieldScope website with students to share their stream studies/action projects.

8:00–9:00 AM Presentations

Journaling as a Key to Unlocking Science and Engineering for All Elementary Learners

(Grades K–5) *323, Convention Center*

Science Focus: GEN, SEP

Elizabeth Htwar (@techehtwar; *ehtwar@hcpss.org),* Waverly Elementary School, Ellicott City, Md.

Jennifer Silbaugh *(jennifer_silbaugh@hcpss.org),* Manor Woods Elementary School, Ellicott City, Md.

Join elementary special education and general educators to learn about leveraging journals to make science and engineering education accessible to all students.

NSTA Press® Session: *Teaching for Conceptual Understanding in Science*

(General) *325, Convention Center*

Science Focus: GEN

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

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

Explore what it really means to teach science for conceptual understanding and leave with new strategies and ways of thinking about teaching and learning.

Student-Centered Field Research Program Development

(Grades 2–8) *333, Convention Center*

Science Focus: GEN, INF, CCC, SEP1, SEP4

Christine Zito *(christine.zito@thesummitschool.org)* and **Clinton Kittrell** *(clinton.kittrell@gmail.com),* The Summit School, Edgewater, Md.

Discover how a field experience at a local farm promoted hands-on learning and cross-curricular collaboration. We will cover curriculum development, grant writing, and what we've learned thus far.

Beyond Written Assessment: Suggestions for Alternative Summative Assessments

(Grades 6–12) *Key 1, Hilton*

Science Focus: GEN

Debra Glassman *(dglassman@bcps.org),* Baltimore County Public Schools, Towson, Md.

Tired of grading reports? Leave with a list of project alternatives suitable for most secondary science classrooms.

Freshwater Stewardship: Equip Your Student-Scientists with Cutting-Edge Resources from NOAA

(Grades 5–12) *Key 2, Hilton*

Science Focus: ESS

June Teisan *(june.teisan@noaa.gov),* NOAA Office of Education, Washington, D.C.

Flooding. Water pollution. Freshwater is the lifeblood of our planet, and our future depends on the next generation of environmental stewards to preserve the health of watersheds. The National Oceanic and Atmospheric Administration (NOAA) has a wealth of online lesson plans, videos, data sets, webinars, and more to help inform and inspire students to action in research, stewardship, and resource management for vital freshwater ecosystems.

Discover the *NGSS:* NSTA's Interactive E-Book

(General) *Key 3, Hilton*

Science Focus: GEN, NGSS

Leisa Clark, Assistant Executive Director, e-Products, NSTA, Arlington, Va.

Learn how to put the pieces of the *NGSS* together with NSTA's interactive e-book on the standards—*Discover the* NGSS: *Primer and Unit Planner.*

Federal Resources for Cybersecurity Education and Talent Development

(Grades 9–College) *Key 10, Hilton*

Science Focus: GEN, CCC4

Noel Kyle *(noel.kyle@hq.dhs.gov),* U.S. Dept. of Homeland Security, Arlington, Va.

Join me as I introduce new tools and methods to educators who can identify and cultivate cybersecurity talent in their classrooms.

8:00–9:00 AM Hands-On Workshops

Teaching Core Ideas of Biology with Models of Operons

(Grades 10–College) *324, Convention Center*

Science Focus: LS1.A, LS1.D, LS4.B, LS4.C, CCC2, CCC6, CCC7, SEP2, SEP4, SEP6

Robert Cooper *(bcooper721@gmail.com),* Pennsbury High School, West Campus, Fairless Hills, Pa.

Add rigor to your lessons with an activity that requires students to reason with trp and lac operon models while using disciplinary core ideas of biology to construct explanations.

Meteoroids, Asteroids, and Moons, Oh My!

(Grades 3–8) *349, Convention Center*

Science Focus: PS, CCC2, SEP3, SEP4

Joan Gillman *(joan.gillman@calhoun.org),* The Calhoun School, New York, N.Y.

For this workshop, STEM skills will be emphasized. We will design, build, and test moon landing devices that allow two "marshmallow" people to land softly on the moon.

Polar ICE: Bringing Polar Research to Your Classroom

(Grades 7–12) *Holiday 4, Hilton*

Science Focus: ESS, CCC, SEP

Liesl Hotaling, Eidos Education, Highlands, N.J.

Learn about polar research and the impact of climate change. Leave with data-focused activities and visualization tools to connect your students to the poles.

"Robot Challenge" Makes Students Think Like Engineers

(Grades 9–12) *Key 5, Hilton*

Science Focus: ETS, SEP6

Neville Jacobs *(nevilleed@aol.com),* Director for Student Activities, IEEE Baltimore Section, Baltimore, Md.

Vince Bonina *(vbonina@btfiloh.org),* Beth Tfiloh Dahan High School, Pikesville, Md.

Let your students experience building a product; making it attractive, functional, and marketable; challenging it competitively; and presenting it to a team of engineers for evaluation.

Your School Can Start a Forensic Class, Too!
(Grades 6–12) *Key 7, Hilton*
Science Focus: GEN, SEP
Aaron Coleman (@colemanbio414; *aaron.coleman@nordoniaschools.org),* Nordonia Hills City School District, Northfield, Ohio
Plan and implement a forensics course in your school. Obtain a course outline connected to *NGSS* and digital/editable resources. Participate in a crime scene case study.

8:00–9:00 AM Exhibitor Workshop

Calling All Carbons
(Grades 9–12) *327, Convention Center*
Science Focus: ESS2.A, ESS3.A, ESS3.C
Sponsor: Lab-Aids, Inc.
Eric Pyle, James Madison University, Harrisonburg, Va.
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.

8:00 AM–5:00 PM Meeting

Discover the *NGSS* Train-the-Trainer Workshop
(By Preregistration Only) *Key 12, Hilton*
This workshop gives teacher leaders a solid understanding of the *NGSS,* tools for conducting teacher training, and the confidence they need to be leaders.

8:30–9:00 AM Presentation

Using Case Studies in the High School Science Classroom
(Grades 9–12) *322, Convention Center*
Science Focus: GEN
Mary Chuboff (@mchuboff; *mchuboff@athensacademy.org),* Athens Academy, Athens, Ga.
Case studies are a great tool for teaching science. Cases can be used to teach scientific concepts and content, process skills, and critical thinking.

9:00 AM–12 Noon Exhibits

Hall E, 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.

9:30–10:00 AM Presentation

Creating 21st-Century Science Students
(Grades 6–12) *Key 10, Hilton*
Science Focus: ESS1.B, ESS2, ESS3, ETS, PS2, PS3.A, PS3.B, PS3.C, CCC2, CCC4, CCC6, SEP
Bryan Dunn (@bryldunn; *bdunn@xbhs.com)* and **Ryan Howard** *(rhoward@xbhs.com),* Xaverian Brothers High School, Westwood, Mass.
Find out how inquiry, resilience, and problem solving can be incorporated into an engaging and rigorous science curriculum.

9:30–10:30 AM Presentations

Using Games to Develop and Refine Scientific Writing
(Grades 6–9) *333, Convention Center*
Science Focus: GEN
Carolyn Balch *(EngagingScienceLabs@gmail.com),* Author of *Engaging Science Labs,* Great Falls, Va.
Writing lab reports isn't a beloved activity for most students. Make this process more engaging by learning three games that develop and refine students' writing.

Polymers: Basics for the Science Classroom
(Grades 7–12) *Holiday 3, Hilton*
Science Focus: PS, INF
Debbie Goodwin *(nywin@hotmail.com),* Retired High School Science Teacher, Chillicothe, Mo.
Simple demonstrations, labs, and activities bring STEM-relevant polymers into your curriculum. Concepts include formation, classification, structure, and properties. I'll share *NGSS* correlations and you'll receive a CD of activities/information.

Getting Students to Read in Science
(Grades 7–College) *Key 3, Hilton*
Science Focus: LS2
Jonte' Lee *(jonte.lee@dc.gov),* Woodrow Wilson High School, Washington, D.C.
Reading should not be limited to English courses. Leave with strategies on how to motivate students to explore science through scientific novels. Review three years of qualitative data on how novels increased literacy, scientific fluency, scientific connectivity, and college preparation in a marine biology course.

Exposing Underrepresented Groups to Climate Change and Atmospheric Science Through Service Learning and Community-Based Participatory Research

(Grades 8–College) *Key 11, Hilton*

Science Focus: ESS2.D, ESS3, SEP1, SEP3, SEP4, SEP8

David Padgett (@TSUGIScLab; *dpadgett@tnstate.edu),* Tennessee State University, Nashville

Attention will be paid to a model for collaborative science learning among high school learners, preservice teachers, and inservice teachers from urban populations underrepresented in the STEM disciplines.

9:30–10:30 AM Hands-On Workshops

Standards and Stewardship: A Natural Fit

(Grades 9–12) *322, Convention Center*

Science Focus: ESS2.C, ESS3.C, ETS1, LS2.C

Joe Davis (@joebird1000; *jdavis3@bcps.org),* Baltimore County Public Schools Office of Science, Towson, Md.

Baltimore County high school students are investigating and improving local tributary health with local partners while meeting *NGSS* performance expectations and Maryland Environmental Literacy Standards.

NSTA Press® Session: Uncovering Students' (and Teachers') Ideas in Science, Engineering, and Mathematics with Formative Assessment Probes and Techniques

(Grades 1–12) *325, Convention Center*

Science Focus: GEN, SEP

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

Experience examples of how the *Uncovering Student Ideas* assessment probes and Formative Assessment Classroom Techniques (FACTs) can be used to elicit students' STEM-related ideas and inform instruction.

Starting STEM Early

(Grades P–2) *326, Convention Center*

Science Focus: PS1, PS3

Ruben Rosario (*rrosario@lsc.org*) and **Kengo Yamada** (@MisterKengo; *kyamada@lsc.org*), Liberty Science Center, Jersey City, N.J.

Discover some hands-on activities to appropriately introduce topics of matter, energy, and engineering into early childhood education.

Beyond Rockets: Using the History of Spaceflight in a STEM Classroom

(Grades 4–8) *349, Convention Center*

Science Focus: ETS1.A, ETS1.B, ETS2.A, CCC4, CCC7, SEP2, SEP3, SEP6

Becky Wolfe *(beckyw@childrensmuseum.org),* The Children's Museum of Indianapolis, Ind.

The history of spaceflight includes examples of human innovation and problem solving. Explore ways to merge literacy, engineering, and science using the lens of human spaceflight.

Exploring the Science and Engineering Practices

(Grades K–12) *Holiday 4, Hilton*

Science Focus: GEN, SEP

Ted Willard (@Ted_NSTA; *twillard@nsta.org),* Program Director, NGSS@NSTA, 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 the *NGSS.*

From Science to Engineering

(Grades 6–12) *Holiday 5, Hilton*

Science Focus: ETS, CCC, SEP

Anthony Williams (@beaconhouseinc; *williamsbiology2015@gmail.com),* Dr. Martin Luther King, Jr. Middle School, Germantown, Md.

Encounter small ways to effectively infuse a lesson with all three dimensions of learning. This is an active analysis and exploration to create a three-dimensional lesson from a pre-existing lesson.

Carbon, Trees, and Climate
(Grades 6–12) *Key 5, Hilton*
Science Focus: ESS2.D, ESS3.D, LS1.A, LS1.C, LS2.B, PS1.B, CCC2, CCC4, CCC5, SEP2, SEP3, SEP4, SEP5, SEP6
Pat Harcourt *(pharcourt@umces.edu),* MADE-CLEAR, Annapolis, Md.
Do saplings have superpowers? We will use evidence, models, and investigations to study carbon in trees and highlight their role in slowing climate change.

Transforming Students to Investigators: Sparking Their Curiosity Using Data Analysis and Interpretation
(Grades 9–12) *Key 6, Hilton*
Science Focus: GEN, SEP
Dionysius Gnanakkan *(dgnanakk@hawk.iit.edu),* **Judith Lederman** *(ledermanj@iit.edu),* and **Norman Lederman** *(ledermann@iit.edu),* Illinois Institute of Technology, Chicago
Selina Bartels *(selina.bartels@cuchicago.edu),* Concordia University Chicago, River Forest, Ill.
This e-mail activity is ideal to start the school year and teach Nature of Science and science practices by engaging students in a nonscientific context.

Memory, Attention, and Distraction
(Grades 9–12) *Key 7, Hilton*
Science Focus: LS1.D, SEP2
Louisa Stark *(louisa.stark@utah.edu),* The University of Utah, Salt Lake City
What can games, a murder mystery, and a driving test demonstrate about neurophysiology? Explore brain anatomy, memory, and attention for free at *learn.genetics.utah.edu.*

Sing, Dance, and Celebrate Science
(General) *Key 8, Hilton*
Science Focus: GEN, NGSS
Juliana Texley (@JulianaTexley; *jtexley@att.net),* 2014–2015 NSTA President, and Science Writer/Instructor, New Baltimore, Mich.
Sing with Pete Seeger, dance, enjoy poetry, and celebrate with the Innovation Collaborative. Join in for some effective practices research and free lessons for all ages.

9:30–10:30 AM Exhibitor Workshops

Prospecting for Mineral Ore
(Grades 9–12) *327, Convention Center*
Science Focus: ESS3, ETS1
Sponsor: Lab-Aids, Inc.
Eric Pyle, James Madison University, Harrisonburg, Va.
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!

Cells as Protein Engineers
(Grades 8–College) *330, Convention Center*
Science Focus: ETS1, LS1, LS3, CCC1, CCC2, CCC3, CCC4, CCC6, CCC7, SEP1, SEP2, SEP4, SEP5, SEP6
Sponsor: MSOE Center for BioMolecular Modeling
Tim Herman *(herman@msoe.edu),* MSOE Center for BioMolecular Modeling, Milwaukee, Wis.
Gina Vogt *(gina.vogt@3dmoleculardesigns.com),* 3D Molecular Designs, Milwaukee, Wis
Explore the cellular processes of DNA replication, transcription, and translation using hands-on instructional materials that support the three dimensions of *NGSS*, most notably the science and engineering practice of developing and using models. Handouts and information on borrowing instructional materials from a university model lending library program will be provided.

11:00–11:30 AM Presentation

3D **Bundling Performance Expectations Around Phenomena**
Grades 9–12) *Holiday 3, Hilton*
Science Focus: GEN, NGSS
Amy Chilinguerian (@achiliteach), Loch Raven High School, Towson, Md.
We will explore how a group of educators worked together to bundle performance expectations into units based on phenomena.

11:00 AM–12 Noon Presentations

Enabling All Students to Investigate, Explore, Inquire, Participate, and Achieve Success

(Grades K–6) *323, Convention Center*

Science Focus: GEN, NGSS

Donna Knoell *(dknoell@sbcglobal.net),* Educational Consultant, Overland Park, Kans.

Join me as I share the fundamentals of differentiation in the K–6 science classroom. Discussion centers on strategies for differentiating effectively, making science accessible to ALL, and maximizing participation and learning. Handouts!

NSTA Press® Session: *Argument-Driven Inquiry in Biology: Lab Investigations for Grades 9–12*

(Grades 9–12) *325, Convention Center*

Science Focus: LS, CCC, SEP

Victor Sampson (@drvictorsampson; *victor.sampson@gmail.com),* The University of Texas at Austin

Jonathon Grooms (@drjongrooms; *jgrooms@gwu.edu),* The George Washington University, Washington, D.C.

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.

The Commotion-Free Classroom: Developing a Self-Directed Classroom

(Grades 6–9) *333, Convention Center*

Science Focus: GEN, SEP2, SEP3

Carolyn Balch *(cesbalch@gmail.com),* Author of *Engaging Science Labs,* 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.

Learning to Teach About Climate Change: Options for Professional Development

(Grades 6–12) *Key 1, Hilton*

Science Focus: ESS2, ESS3, ETS1

Pat Harcourt *(pharcourt@umces.edu)* and **Melissa Rogers** *(mrogers@umces.edu),* MADE-CLEAR, Annapolis, Md.

We will describe three models for professional development in climate change and discuss advantages, challenges, and how to keep online sessions interactive.

How to Create Comic Strips for Classroom Instruction

(Grades 9–12) *Key 2, Hilton*

Science Focus: ETS

Thomas Windsor *(scott.windsor@sussexvt.k12.de.us),* Sussex Technical High School, Georgetown, Del.

Learn how to use an iPad app and PowerPoint to create comic strips to reinforce science concepts in the classroom. To fully take advantage of this session, participants are encouraged to bring an iPad or laptop computer with PowerPoint and iMovie already installed.

How to "MWEE": An Inside Look at a New Teacher's Guide to Planning and Implementing a MWEE

(Grades P–12) *Key 3, Hilton*

Science Focus: GEN, SEP1, SEP3, SEP4

Presenter to be announced

We will demonstrate the new Meaningful Watershed Educational Experience (MWEE) how-to guide and show how it helps science teachers create and implement MWEE projects.

Using Apps in Your Forensic Science Classroom Lessons

(Grades 9–College) *Key 11, Hilton*

Science Focus: GEN, SEP3, SEP4, SEP8

Anthony Bertino *(abertino@nycap.rr.com),* Retired Educator, Schenectady, N.Y.

Patricia Nolan Bertino *(nolanp@nycap.rr.com),* Retired Educator, Schenectady, N.Y.

Enhance your classroom presentations by integrating the use of inexpensive or free phone (iPhone and Android) and iPad apps in your crime scene and evidence analysis.

11:00 AM–12 Noon Exhibitor Workshop

Using Climate Proxies to Learn About Earth's Climate History

(Grades 9–12) *327, Convention Center*

Science Focus: ESS2, ESS3, ETS1

Sponsor: Lab-Aids, Inc.

Eric Pyle, James Madison University, Harrisonburg, Va.

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.

11:00 AM–12 Noon Hands-On Workshops

Modeling Magnetic Systems

(Grades 6–8) *322, Convention Center*

Science Focus: PS, CCC4, SEP2

Nicole Rhoades (@nlrhoades; *nicole.rhoades@fcps.org)* and **Gena Hlavinka** (@mshlavinka; *hlavinkag@gmail.com*), Windsor Knolls Middle School, Ijamsville, Md.

Come experience hands-on and virtual activities that build toward a mastery of physical science performance expectations. Emphasis will be placed on developing/revising student-generated models of magnetic systems.

Understanding the Chesapeake Watershed Through Investigations and Literature

(Grades 3–5) *324, Convention Center*

Science Focus: LS2

Christine Anne Royce (@caroyce; *caroyce@aol.com),* NSTA President-Elect, and Shippensburg University, Shippensburg, Pa.

Dive into intermediate-grade investigations that help explore the Chesapeake Watershed and water quality. Activities are paired with literature-based connections for integrated learning opportunities.

Understanding Complex Concepts for Diverse Learners

(Grades 6–8) *349, Convention Center*

Science Focus: LS, PS, CCC1, CCC2, CCC6, SEP1, SEP8

Christine Zito *(christine.zito@thesummitschool.org)* and **Clinton Kittrell** *(clinton.kittrell@gmail.com),* The Summit School, Edgewater, Md

Learn ways to modify science instruction for students with language-based learning differences. Experienced teachers will highlight ways to modify vocabulary instruction and incorporate kinesthetic activities.

High Five: Five Ways to Make Teaching Biotechnology Faster, Easier, and Cheaper

(Grades 7–College) *Holiday 4, Hilton*

Science Focus: LS, CCC

Whitney Hagins, Massachusetts Biotechnology Education Foundation, Cambridge

Make biotechnology more hands on, manageable, and meaningful. From reagent prep to running gels and PCR, you and your students will love these innovative ideas.

Bringing the "Bookends" of STEM Together

(Grades 7–12) *Holiday 5, Hilton*

Science Focus: GEN

Jeffrey Lukens, Sioux Falls (S.Dak.) School District

Integrating science and math can be seamless, natural, and painless. Come join the fun as we collect and analyze data!

iPad: Data Collection, Analysis, and Student Lab Reporting

(Grades 7–College) *Key 6, Hilton*

Science Focus: GEN, SEP

Gregory Dodd *(gbdodd@gmail.com),* Retired Educator, Pennsboro, W.Va

Join this "hands on" workshop demonstrating the enormous potential of iPads for data collection, analysis, and student lab reporting in your science laboratory. Handouts!

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

(Grades K–12) *Key 7, Hilton*

Science Focus: ETS2, SEP

Michael Apfeldorf (@TeachingLC; *mapf@loc.gov),* Library of Congress, Washington, D.C.

I'll share hands-on strategies to engage students with scientific notebooks, letters, photos, and drawings, highlighting scientific practices, nature of science, and connections between science and society.

Teachers Helping Teachers: Teaching Controversial Topics

(Grades 6–College) *Key 8, Hilton*

Science Focus: ESS, LS4

Claire Adrian-Tucci (@NCSEteach; *adrian-tucci@ncse.com),* National Center for Science Education, Oakland, Calif.

NCSE has spent decades defending the teaching of scientifically settled but socially controversial topics. In this session, we'll discuss teaching these topics.

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SCIENCE TECHNOLOGY ENGINEERING MATHEMATICS

Forum & Expo

HOSTED BY NSTA

Philadelphia, Pennsylvania

July 11–13, 2018

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

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

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

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NSTA National Science Teachers Association

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
Earth/Space Science	EA
Environmental Science	EN
Integrated/General Science	G
Physics/Physical Science	PH
Professional Development	PD
Technology Education	T

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Shift Learning is a UK-based research agency specializing in education. We are at the NSTA Baltimore Area Conference conducting interviews with elementary and middle school teachers.

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Exhibitors

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3D Molecular Designs (Booth #508)

Thursday, Oct 5	9:30–10:30 AM	330, Conv. Center	DNA Structure and Function with a Twist of Dynamic DNA (p. 44)
Thursday, Oct 5	11:00 AM–12 Noon	330, Conv. Center	5 E'sy Ways to Investigate Enzymes! (p. 46)
Thursday, Oct 5	12:30–1:30 PM	330, Conv. Center	Getting Students Through the Cellular Membrane (p. 53)
Friday, Oct 6	9:30–10:30 AM	330, Conv. Center	Keep Your Head Above Water with Magnetic Water Molecule Models (p. 79)

Activate Learning (Booth #317)

Thursday, Oct 5	8:00–9:00 AM	348, Conv. Center	Project-Based Inquiry Science™ (PBIS): Creating "Coherence and Science Storylines" for Middle School (p. 43)
Thursday, Oct 5	9:30–10:30 AM	348, Conv. Center	Science Storylines and the Driving Question Board: Keeping *NGSS* Curricula Student Driven (p. 46)
Thursday, Oct 5	11:00 AM–12 Noon	348, Conv. Center	Structuring Discussion to Be Equitable and Rigorous (p. 48)
Thursday, Oct 5	12:30–1:30 PM	348, Conv. Center	Literacy in the Context of Science in the Elementary Classroom (p. 54)
Thursday, Oct 5	2:00–3:00 PM	348, Conv. Center	Literacy in the Context of Science in the Middle School Classroom (p. 60)
Thursday, Oct 5	3:30–4:30 PM	348, Conv. Center	Incorporating STEM into the Classroom (High School Science) (p. 65)

AEOP (Booth #424)

Thursday, Oct 5	11:00 AM–12 Noon	343/344, Conv. Center	Community-Based Problems: Using Middle School Science and Engineering to Help Your Community (p. 47)
Friday, Oct 6	9:30–10:30 AM	343/344, Conv. Center	Out-of-School STEM Enrichment: AEOP Program Design Collaboration (p. 80)
Friday, Oct 6	11:00 AM–12 Noon	343/344, Conv. Center	Middle Schoolers Solving Problems: Grant Opportunity to Bring STEM to Life! (p. 86)

Albert Einstein Distinguished Educator Fellowship (Booth #605)

Friday, Oct 6	11:00 AM–12 Noon	347, Conv. Center	STEM Leaders in Action: The Albert Einstein Distinguished Educator Fellowship (AEF) Program (p. 86)

Amplify (Booth #511)

Thursday, Oct 5	9:30–10:30 AM	342, Conv. Center	The Power of Modeling in K–8 Classrooms (p. 45)
Thursday, Oct 5	11:00 AM–12 Noon	342, Conv. Center	Space Docking Failure: Phenomena and 3-D Instruction for Grades 6–8 (p. 47)
Thursday, Oct 5	12:30–1:30 PM	342, Conv. Center	Puppet Theater Engineering: Phenomena and 3-D Instruction for Grades K and 1 (p. 54)
Friday, Oct 6	9:30–10:30 AM	342, Conv. Center	Integrate Instruction and Assessment in Three Dimensions Using Learning Progressions (p. 80)
Friday, Oct 6	11:00 AM–12 Noon	342, Conv. Center	Implementing Argumentation: Evidence, Claims, Reasoning, and Science Seminars in Grades 6–8 (p. 85)
Friday, Oct 6	12:30–1:30 PM	342, Conv. Center	Disappearing Jaguars and Sloths: Phenomena and 3-D Instruction for Grades 2–5 (p. 91)

Bio-Rad Laboratories (Booth #101)

Thursday, Oct 5	2:00–3:00 PM	341, Conv. Center	Communicating Science Through Lab Notebooking (p. 59)
Thursday, Oct 5	3:30–4:30 PM	341, Conv. Center	Enzymes: Technology Inspired by Nature (p. 65)
Friday, Oct 6	8:00–9:00 AM	341, Conv. Center	How to Use Pop Culture in Your Life Science Class (p. 73)
Friday, Oct 6	9:30–10:30 AM	341, Conv. Center	Get That Grant Money! (p. 80)
Friday, Oct 6	11:00 AM–12 Noon	341, Conv. Center	Become a GMO Investigator (p. 85)
Friday, Oct 6	2:00–3:00 PM	341, Conv. Center	Conserving Panda Population: One Hormone Test Design at a Time! (p. 97)
Friday, Oct 6	3:30–4:30 PM	341, Conv. Center	Investigate Photosynthesis and Cellular Respiration with Algae Beads (p. 100)

Index of Exhibitor Workshops

Boyer Sudduth Environmental Consultants (Booth #702)

Friday, Oct 6	9:30–10:30 AM	338, Conv. Center	Science and Storytelling: An Interdisciplinary Approach to Environmental Literacy (p. 79)

Carolina Biological Supply Co. (Booth #300)

Thursday, Oct 5	9:30–10:30 AM	331/332, Conv. Center	Engineer Physical Science Excitement in Your Classroom with a Carolina STEM Challenge® (p. 44)
Thursday, Oct 5	11:00 AM–12 Noon	331/332, Conv. Center	Coding with First Graders? The Smithsonian Says YES! (p. 46)
Thursday, Oct 5	12:30–1:30 PM	331/332, Conv. Center	Hands-On Science with Classroom Critters (p. 53)
Thursday, Oct 5	2:00–3:00 PM	331/332, Conv. Center	Collecting Evidence: How Does an Owl Get All That Energy? (p. 59)
Thursday, Oct 5	3:30–4:30 PM	331/332, Conv. Center	Comparative Vertebrate Anatomy with Carolina's Perfect Solution® Specimens (p. 64)
Friday, Oct 6	8:00–9:00 AM	331/332, Conv. Center	Disorder Detectives: Karyotyping, Bioethics, and Beyond (p. 72)
Friday, Oct 6	9:30–10:30 AM	331/332, Conv. Center	Autopsy: Forensic Dissection Featuring Carolina's Perfect Solution® Pigs (p. 79)
Friday, Oct 6	11:00 AM–12 Noon	331/332, Conv. Center	Keep Calm and Chemistry On: Successful Lab Activities for the New Chemistry Teacher (p. 84)
Friday, Oct 6	12:30–1:30 PM	331/332, Conv. Center	Introduction to Wisconsin Fast Plants® (p. 90)
Friday, Oct 6	2:00–3:00 PM	331/332, Conv. Center	Shifting to the Five Innovations: How Do We Transform Instruction? (p. 97)

CPO Science/School Specialty Science (Booth #505)

Thursday, Oct 5	8:00–9:00 AM	336, Conv. Center	CPO Science Biology Energy QUEST: Teaching Cell Energy Pathways (p. 43)
Thursday, Oct 5	9:30–10:30 AM	336, Conv. Center	CPO's Wind Turbine: A STEM Approach to Engineering and Design (p. 45)
Thursday, Oct 5	11:00 AM–12 Noon	336, Conv. Center	CPO's LINK Genetics Learning Modules: Crazy Traits and Crazy Chromosomes (p. 47)
Thursday, Oct 5	3:30–4:30 PM	336, Conv. Center	CPO Science LINK Learning Module: Chemistry and the Periodic Table (p. 64)

Delta Education (Booth #501) and Frey Scientific (Booth #503)

Thursday, Oct 5	9:30–10:30 AM	338, Conv. Center	Makerspaces with Options for All Students (p. 45)
Thursday, Oct 5	2:00–3:00 PM	338, Conv. Center	Boosting the Makerspace Experience for Young Scientists! (p. 59)

Delta Education/School Specialty Science (Booth #501)

Thursday, Oct 5	8:00–9:00 AM	338, Conv. Center	How to Argue in a Middle School Science Class (p. 43)
Thursday, Oct 5	11:00 AM–12 Noon	338, Conv. Center	OK, Class, Please Open Your Science Notebooks… (p. 47)
Thursday, Oct 5	12:30–1:30 PM	338, Conv. Center	What in the World Are Crosscutting Concepts? (p. 54)
Thursday, Oct 5	3:30–4:30 PM	338, Conv. Center	How to Argue in the Elementary Science Class (p. 64)

Delta Education/School Specialty Science-FOSS (Booth #501)

Thursday, Oct 5	8:00–9:00 AM	337, Conv. Center	Ten Minutes to Improving Science Achievement (p. 43)
Thursday, Oct 5	9:30–10:30 AM	337, Conv. Center	What Does Argumentation Look Like in an Elementary Classroom? (p. 45)
Thursday, Oct 5	11:00 AM–12 Noon	337, Conv. Center	What Does Conceptual Modeling Look Like in Grades K–5 Classrooms? (p. 47)
Thursday, Oct 5	12:30–1:30 PM	337, Conv. Center	Wave Properties and Information Transfer (p. 54)
Thursday, Oct 5	2:00–3:00 PM	337, Conv. Center	Identifying Energy Transfers in Motors and Generators (p. 59)
Thursday, Oct 5	3:30–4:30 PM	337, Conv. Center	Evolutionary Evidence in the Fossil Record (p. 64)

Educational Innovations, Inc. (Booth #208)

Friday, Oct 6	9:30–10:30 AM	345/346, Conv. Center	Cool! Can We Do That Again?! (p. 80)

Edvotek, Inc. (Booth #500)

Thursday, Oct 5	8:00–9:00 AM	339, Conv. Center	Martian Genetics: An Electrophoresis Exploration (p. 43)
Thursday, Oct 5	9:30–10:30 AM	339, Conv. Center	Exploring the Genetics of Taste: SNP Analysis of the PTC Gene Using PCR (p. 45)
Thursday, Oct 5	11:00 AM–12 Noon	339, Conv. Center	Left at the Scene of the Crime: Introduction to Forensic Science (p. 47)
Thursday, Oct 5	12:30–1:30 PM	339, Conv. Center	Cancer Investigators: Medical Diagnostics in Your Classroom (p. 54)
Thursday, Oct 5	2:00–3:00 PM	339, Conv. Center	Detecting the Silent Killer: Clinical Detection of Diabetes (p. 59)
Thursday, Oct 5	3:30–4:30 PM	339, Conv. Center	Environmental Toxicology Using Edvotek's New EZ-elegans (p. 64)

Fisher Science Education (Booth #602)

Friday, Oct 6	2:00–3:00 PM	347, Conv. Center	The Chemistry of Glow Sticks (p. 98)

Flinn Scientific, Inc. (Booth #415)

Thursday, Oct 5	9:30–10:30 AM	343/344, Conv. Center	Year-Round Solutions for Success in AP Chemistry from Flinn Scientific (p. 45)
Thursday, Oct 5	2:00–3:00 PM	343/344, Conv. Center	Green Chemistry Experiments for General and AP Chemistry from Flinn (p. 60)
Friday, Oct 6	8:00–9:00 AM	343/344, Conv. Center	Research and Inquiry-Based STEM Program from Flinn Scientific (p. 73)

Frey Scientific/School Specialty Science (Booth #503)

Thursday, Oct 5	12:30–1:30 PM	336, Conv. Center	Modular Robotics for Elementary and Middle School: CUBELETS! (p. 53)
Thursday, Oct 5	2:00–3:00 PM	336, Conv. Center	Solving the Mystery of STEM Using Forensic Science (p. 59)

HHMI BioInteractive (Booth #405)

Friday, Oct 6	8:00–9:00 AM	340, Conv. Center	Bringing the Wild to Life with WildCam Gorongosa (p. 72)
Friday, Oct 6	9:30–10:30 AM	340, Conv. Center	Leapin' Lizards! That Was Fast! Selection by Predation (p. 80)
Friday, Oct 6	11:00 AM–12 Noon	340, Conv. Center	Exploring the Biology of Skin Color with HHMI BioInteractive (p. 85)
Friday, Oct 6	12:30–1:30 PM	340, Conv. Center	Got Lactase? Exploring Genetics with HHMI BioInteractive Resources (p. 91)
Friday, Oct 6	2:00–3:00 PM	340, Conv. Center	Free Apps That Put the World in Your Students' Hands (p. 97)
Friday, Oct 6	3:30–4:30 PM	340, Conv. Center	Trophic Cascades: A Force of Nature (p. 98)

Lab-Aids, Inc. (Booth #601)

Thursday, Oct 5	8:00–9:00 AM	327, Conv. Center	*NGSS* Waves: Protect Your Eyes! (p. 43)
Thursday, Oct 5	9:30–10:30 AM	327, Conv. Center	*NGSS* Ecology: Modeling the Introduction of a New Species (p. 44)
Thursday, Oct 5	11:00 AM–12 Noon	327, Conv. Center	*NGSS* Reproductions: Breeding Critters—More Traits (p. 46)
Thursday, Oct 5	12:30–1:30 PM	327, Conv. Center	*NGSS* Biomedical Engineering: Get a Grip (p. 53)
Thursday, Oct 5	2:00–3:00 PM	327, Conv. Center	Chemical Batteries (p. 59)
Thursday, Oct 5	3:30–4:30 PM	327, Conv. Center	Investigating a Cliff Model (p. 64)
Friday, Oct 6	8:00–9:00 AM	327, Conv. Center	Photosynthesis and Respiration Shuffle (p. 72)
Friday, Oct 6	9:30–10:30 AM	327, Conv. Center	What Is a Species? (p. 78)
Friday, Oct 6	11:00 AM–12 Noon	327, Conv. Center	Cell Differentiation and Gene Expression (p. 84)
Friday, Oct 6	12:30–1:30 PM	327, Conv. Center	pH Scale (p. 90)
Friday, Oct 6	2:00–3:00 PM	327, Conv. Center	Chemical Formula and Amino Acids (p. 96)
Friday, Oct 6	3:30–4:30 PM	327, Conv. Center	Distilling Aromatic Hydrocarbons (p. 98)
Saturday, Oct 7	8:00–9:00 AM	327, Conv. Center	Calling All Carbons (p. 105)
Saturday, Oct 7	9:30–10:30 AM	327, Conv. Center	Prospecting for Mineral Ore (p. 107)
Saturday, Oct 7	11:00 AM–12 Noon	327, Conv. Center	Using Climate Proxies to Learn About Earth's Climate History (p. 108)

Index of Exhibitor Workshops

MiniOne Systems (Booth #310)

Friday, Oct 6	12:30–1:30 PM	338, Conv. Center	Who Is Baby Whale's Father? DNA Fingerprinting Solves the Mystery! (p. 90)
Friday, Oct 6	2:00–3:00 PM	338, Conv. Center	Viral Amplification: From One to a Billion Copies in 20 Minutes (p. 97)

miniPCR (Booth #600)

Friday, Oct 6	8:00–9:00 AM	347, Conv. Center	PTC Taster Lab—From Genotype to Phenotype (p. 73)

MSOE Center for BioMolecular Modeling (Booth #510)

Friday, Oct 6	11:00 AM–12 Noon	330, Conv. Center	Of All the Nerve: Exploring Neuronal Communication Through Three-Dimensional Learning (p. 84)
Friday, Oct 6	12:30–1:30 PM	330, Conv. Center	Take a Walk Through the Molecular World with Watercolor Landscapes (p. 90)
Friday, Oct 6	2:00–3:00 PM	330, Conv. Center	The Science and Ethics of Genome Editing with CRISPR/Cas9 (p. 96)
Saturday, Oct 7	9:30–10:30 AM	330, Conv. Center	Cells as Protein Engineers (p. 107)

National Geographic Learning | Cengage (Booth #611)

Friday, Oct 6	9:30–10:30 AM	347, Conv. Center	Bringing the World into Your Classroom with National Geographic Explorers (p. 80)

PASCO scientific (Booth #200)

Friday, Oct 6	8:00–9:00 AM	337, Conv. Center	Untangling Electric Circuits: STEM Activities from Essential Physics (p. 72)
Friday, Oct 6	9:30–10:30 AM	337, Conv. Center	Understanding Photosynthesis: A Lab-Based Approach (p. 79)
Friday, Oct 6	11:00 AM–12 Noon	337, Conv. Center	Evaporative Cooling: Visualizing Matter so It Makes Sense! (p. 85)
Friday, Oct 6	12:30–1:30 PM	337, Conv. Center	Exploring Misconceptions: What Is pH? (p. 90)

Pearson Learning Services (Booth #204)

Friday, Oct 6	8:00–9:00 AM	336, Conv. Center	Take Your Students On a Quest! A Real-World Problem-Based Learning Project that Incorporates All Three Dimensions of *NGSS* (p. 72)
Friday, Oct 6	9:30–10:30 AM	336, Conv. Center	From CRISPR to Three-Parent Babies and Back Again: What to Tell Our Students About the Coming Revolution in Human Biology (p. 79)
Friday, Oct 6	11:00 AM–12 Noon	336, Conv. Center	Science Denial: Why It Continues and What Science Educators Can Do About It (p. 85)
Friday, Oct 6	12:30–1:30 PM	336, Conv. Center	Incorporating the *NGSS* Crosscutting Concepts into Your Teaching (p. 90)
Friday, Oct 6	2:00–3:00 PM	336, Conv. Center	Ideas for Teaching About Earthquakes and Earth Structure (p. 97)
Friday, Oct 6	3:30–4:30 PM	336, Conv. Center	Cultivating a Culture of Argumentation in Your Classroom (p. 98)

PlayMada Games (Booth #414)

Thursday, Oct 5	3:30–4:30 PM	347, Conv. Center	Reconceptualizing Chemistry Through Play: Ionic Bonding (p. 65)

Simulation Curriculum Corp (Booth #518)

Thursday, Oct 5	9:30–10:30 AM	345/346, Conv. Center	Hurricanes, Earthquakes, and Volcanoes Are Now Online! (p. 46)
Friday, Oct 6	11:00 AM–12 Noon	345/346, Conv. Center	Should Pluto Be a Planet Again? (p. 86)

STEMscopes (Booth #409)

Friday, Oct 6	8:00–9:00 AM	348, Conv. Center	Implementing the *NGSS* and Infusing STEM in Your School District (p. 73)
Friday, Oct 6	9:30–10:30 AM	348, Conv. Center	Science Teacher/STEM Teacher: What's the Difference? (p.80)
Friday, Oct 6	11:00 AM–12 Noon	348, Conv. Center	STEMrangers: Making Science Night Meaningful (p. 86)
Friday, Oct 6	12:30–1:30 PM	348, Conv. Center	Using Argumentation for Discussing Phenomena and Increasing Student Voice About STEM (p. 91)

TCI (Booth #504)

Thursday, Oct 5	9:30–10:30 AM	347, Conv. Center	Analyzing and Interpreting Data Using TCI's Bring Science Alive! (p. 46)
Thursday, Oct 5	11:00 AM–12 Noon	347, Conv. Center	Engineering Design in the *NGSS* (p. 48)
Friday, Oct 6	12:30–1:30 PM	347, Conv. Center	Science and Engineering Practices in the *NGSS* (p. 91)

Texas Instruments (Booth #400)

Thursday, Oct 5	11:00 AM–12 Noon	345/346, Conv. Center	Are You Moody? (p. 48)
Thursday, Oct 5	12:30–1:30 PM	345/346, Conv. Center	Zombie Apocalypse! (p. 54)
Friday, Oct 6	8:00–9:00 AM	345/346, Conv. Center	Using Maggots, Flies, and Flesh to Solve a Mystery! (p. 73)
Friday, Oct 6	12:30–1:30 PM	345/346, Conv. Center	When Zombies Attack! (p. 91)
Friday, Oct 6	2:00–3:00 PM	345/346, Conv. Center	Drought in Africa Inspires Students to Invent a Smart Irrigation System (p. 97)

TheBeamer LLC (Booth #722)

Friday, Oct 6	3:30–4:30 PM	347, Conv. Center	Mission KT: Teacher Authoring Science Game (p. 100)

Vernier Software & Technology (Booth #401)

Friday, Oct 6	8:00–9:00 AM	339, Conv. Center	Integrating Chromebook with Vernier Data-Collection Technology (p. 72)
Friday, Oct 6	9:30–10:30 AM	339, Conv. Center	Chemistry with Vernier (p. 79)
Friday, Oct 6	11:00 AM–12 Noon	339, Conv. Center	Biology with Vernier (p. 85)
Friday, Oct 6	12:30–1:30 PM	339, Conv. Center	Integrating Chromebook with Vernier Data-Collection Technology (p. 90)
Friday, Oct 6	2:00–3:00 PM	339, Conv. Center	Integrating iPad with Vernier Data-Collection Technology (p. 97)
Friday, Oct 6	3:30–4:30 PM	339, Conv. Center	Physics and Physical Science with Vernier (p. 98)

Earth and Space Science

Thursday

8:00–8:30 AM	9–11	Johnson A, Hilton	Analysis and Interpretation of Ocean Data (p. 39)
8:00–9:00 AM	9–12	Key 2, Hilton	Three Teachers…60 Students…One Genuine STEM Unit of Study (p. 40)
8:00–9:00 AM	4–12	Key 9, Hilton	Threading 3-D Science Learning Through the Solar System: It's Not the Tholian Web (p. 42)
8:00–9:00 AM	1–12	333, Conv. Center	Oysters as Teachers: An *NGSS* Story (p. 39)
8:00–9:00 AM	6–8	349, Conv. Center	Carbon and Climate: E-Unit for Grades 6–8 (p. 42)
9:30–10:30 AM	5–12	345/346, Conv. Center	Hurricanes, Earthquakes, and Volcanoes Are Now Online! (p. 46)
9:30–10:30 AM	K–12	338, Conv. Center	Science and Storytelling: An Interdisciplinary Approach to Environmental Literacy (p. 79)
12:30–1:30 PM	3–5	Key 4, Hilton	Pursuing the Red Planet (p. 53)
12:30–1:30 PM	4–8	349, Conv. Center	Let It Rain: A Hands-On Rain Garden Design Lab (p. 52)
1:00–4:00 PM	K–12	Key 12, Hilton	SC-1: Data, Data Everywhere (p. 55)
2:00–2:30 PM	5–8	321, Conv. Center	Leaving the "Wright" Footprint (p. 55)
2:00–3:00 PM	P–3	326, Conv. Center	Let's Get Wet: Water and Weather (p. 57)
2:00–3:00 PM	9–C	Key 7, Hilton	Teaching Cosmology (p. 58)
2:00–3:00 PM	7–12	Holiday 3, Hilton	A Unique Ice Core Investigation That Integrates the Three Dimensions of *NGSS* and STEM (p. 56)
2:00–3:00 PM	6–9	325, Conv. Center	NSTA Press® Session: *Solar Science:* 3-D Learning Applied to the Study of the Sun's Daily and Annual Motion (p. 57)
3:30–4:30 PM	P–12	Key 3, Hilton	Implementing 3-D Learning with NASA/GLOBE Earth System Learning Progressions (p. 61)
3:30–4:30 PM	9–12	348, Conv. Center	Incorporating STEM into the Classroom (High School Science) (p. 65)
3:30–4:30 PM	6–C	Key 5, Hilton	Are Humans Causing Earthquakes? Teaching High School Earth Systems and Human Sustainability Using Authentic Earthquake Location Data (p. 63)
3:30–4:30 PM	6–8	327, Conv. Center	Investigating a Cliff Model (p. 64)
3:30–4:30 PM	K–C	Key 11, Hilton	Saturday Academy: Strengthening the K–16 STEM Pipeline (p. 62)
3:30–4:30 PM	9–12	Johnson A, Hilton	Comp Hydro Baltimore: Solving the Issues of Flooding in Baltimore (p. 61)
3:30–4:30 PM	9–12	Key 10, Hilton	A Five-Step Path to Student-Generated Environmental Sustainability Projects (p. 62)
3:30–4:30 PM	9–12	Holiday 5, Hilton	Analysis of Supernova Remnants Using X-Ray Spectroscopy with NASA Data and STEM Tools (p. 63)
3:30–4:30 PM	6–8	323, Conv. Center	Redwood of the East (p. 61)
3:30–4:30 PM	K–5	321, Conv. Center	The Crown Jewels of the Ocean: Integrating the Principles of Ocean Literacy with National and State Standards Through a Cross-Curricular Approach (p. 61)
3:30–4:30 PM	4–9	Key 1, Hilton	NARST-Sponsored Session: Designing and Implementing Middle School Project-Based Watershed Investigations (p. 61)
5:00–5:30 PM	6–C	Peale B, Hilton	Green City Design Challenge (p. 65)
5:00–6:00 PM	9–12	Key 10, Hilton	Using STEM to Cultivate Youth Environmental Literacy and Foster Community Resilience (p. 66)
5:00–6:00 PM	6–10	Holiday 4, Hilton	Environmentally Speaking, Thinking, and Doing! (p. 67)
5:00–6:00 PM	K–12	Holiday 5, Hilton	Mapping Our Way to Climate Change Solutions (p. 67)

Friday

8:00–9:00 AM	4–12	Key 5, Hilton	NARST-Sponsored Session: How to Promote Successful Teacher Enactment of Spatial Thinking and Technology-Enhanced Inquiry: PD Research and Its Implications for Teachers and Administrators (p. 71)
8:00–9:00 AM	P–12	349, Conv. Center	Engaging Our Communities for a Sustainable Future (p. 70)
8:00–9:00 AM	P–12	Holiday 3, Hilton	The Teacher Environmental Literacy Leadership Program: Advancing Innovation in Teacher and Student Learning with the Chesapeake Bay Foundation (p. 69)
8:00–9:00 AM	6–12	Key 4, Hilton	Man vs. Wild: Lessons on Earth and Human Impacts (p. 71)

8:00–9:00 AM	4–8	322, Conv. Center	Mars Here We Come (p. 70)
8:00–9:00 AM	9–12	Holiday 6, Hilton	NESTA Session: Earth-Space Science in Biology, Chemistry, and Physics (p. 69)
9:30–10:00 AM	6–12	Key 10, Hilton	Creating 21st-Century Science Students (p. 105)
9:30–10:30 AM	4–8	321, Conv. Center	Great Falls Summer STEAM: A Design Thinking Approach to Community Improvement (p. 75)
9:30–10:30 AM	8–C	Key 11, Hilton	Exposing Underrepresented Groups to Climate Change and Atmospheric Science Through Service Learning and Community-Based Participatory Research (p. 106)
9:30–10:30 AM	6–12	326, Conv. Center	Creating *NGSS* Storylines for Earth/Space Science (p. 77)
9:30–10:30 AM	K–C	Key 3, Hilton	Bring All the Dimensions of Clouds into Your Classroom with NASA's Atmospheric Learning Progression (p. 76)
9:30–10:30 AM	6–8	349, Conv. Center	Climate Change and Argumentation: Using Pollen Proxy Data to Engage Students in 3-D Learning (p. 77)
9:30–10:30 AM	9–C	Key 9, Hilton	AAPT Session: Women and Minorities in the History of Physics: Role Models for Today (p. 78)
9:30–10:30 AM	K–C	325, Conv. Center	NSTA Press® Session: Uncovering Student (and Teacher) Ideas in Earth and Environmental Science (p. 75)
9:30–10:30 AM	4–8	Holiday 3, Hilton	Marine Ecology: Using Local Resources to Engage Learners (p. 76)
9:30–10:30 AM	4–C	330, Conv. Center	Keep Your Head Above Water with Magnetic Water Molecule Models (p. 79)
11:00 AM–12 Noon	K–6	324, Conv. Center	Exploring the Arctic: Young Students and Climate Change (p. 83)
11:00 AM–12 Noon	5–C	345/346, Conv. Center	Should Pluto Be a Planet Again? (p. 86)
11:00 AM–12 Noon	3–8	348, Conv. Center	STEMrangers: Making Science Night Meaningful (p. 86)
11:00 AM–12 Noon	6–12	Holiday 3, Hilton	BIG Data/BIG Skills: Improve Student Data Literacy Using Free Web Tools from NOAA (p. 82)
11:00 AM–12 Noon	7–12	Holiday 2, Hilton	Decoding Starlight: From Photons to Pixels to Images—Using Science and Art (p. 83)
11:00 AM–12 Noon	3–7	349, Conv. Center	Beyond Spaceship Earth (p. 83)
11:00 AM–12 Noon	9–10	Holiday 5, Hilton	Evaluating School Yard Heat Islands and Thermal Mitigation (p. 84)
11:00 AM–12 Noon	6–12	Holiday 6, Hilton	NESTA and IRIS Session: Record and Analyze Earthquake Data (With or Without a Seismometer!) in the Classroom with Free Software (p. 82)
12:30–1:30 PM	4–8	Holiday 5, Hilton	Becoming Banneker: Find Place with Objects in Space (p. 89)
12:30–1:30 PM	K–12	Holiday 6, Hilton	NESTA Earth System Science Share-a-Thon (p. 89)
12:30–1:30 PM	5–12	Holiday 4, Hilton	Soil Ecology in the Classroom (p. 89)
12:30–1:30 PM	6–8	349, Conv. Center	Evolving Practice: An *NGSS*-Inspired Approach to Teaching with Fossils (p. 88)
12:30–1:30 PM	6–12	Key 11, Hilton	Materials Matter! Looking at Materials Science to Help Teach Chemistry (p. 87)
12:30–1:30 PM	6–12	Key 4, Hilton	Learn Ways to Connect the Life Sciences with Climate Change (p. 89)
2:00–3:00 PM	6–C	340, Conv. Center	Free Apps That Put the World in Your Students' Hands (p. 97)
2:00–3:00 PM	6–12	345/346, Conv. Center	Drought in Africa Inspires Students to Invent a Smart Irrigation System (p. 97)
2:00–3:00 PM	K–12	336, Conv. Center	Ideas for Teaching About Earthquakes and Earth Structure (p. 97)
2:00–3:00 PM	9–12	322, Conv. Center	Developing Student Scientists Through the Watershed Report Card Program (p. 95)
2:00–3:00 PM	6–12	345/346, Conv. Center	Drought in Africa Inspires Students to Invent a Smart Irrigation System (p.)
2:00–3:00 PM	7–C	Holiday 6, Hilton	NESTA and IRIS Session: Yes, Humans Really Do Cause Earthquakes—Hydraulic Fracturing, Wastewater Injection, and Earthquakes (p. 95)
5:00–5:30 PM	3–5	323, Conv. Center	Save the Bay! A Grade 5 Meaningful Watershed Educational Experience in Baltimore City (p. 100)
5:00–6:00 PM	8–12	Holiday 2, Hilton	Greenhouse in a Beaker: Understand Climate Change (p. 101)
5:00–6:00 PM	6–C	Peale A, Hilton	Salamanders: Indicators of Our Changing Climate (p. 101)

Saturday

8:00–9:00 AM	5–12	Key 2, Hilton	Freshwater Stewardship: Equip Your Student-Scientists with Cutting-Edge Resources from NOAA (p. 103)
8:00–9:00 AM	9–12	327, Conv. Center	Calling All Carbons (p. 105)
8:00–9:00 AM	7–12	Holiday 4, Hilton	Polar ICE: Bringing Polar Research to Your Classroom (p. 104)
9:30–10:30 AM	9–12	322, Conv. Center	Standards and Stewardship: A Natural Fit (p. 106)
9:30–10:30 AM	6–12	Key 5, Hilton	Carbon, Trees, and Climate (p. 107)

9:30–10:30 AM	9–12	327, Conv. Center	Prospecting for Mineral Ore (p. 107)
11:00 AM–12 Noon	6–12	Key 1, Hilton	Learning to Teach About Climate Change: Options for Professional Development (p. 108)
11:00 AM–12 Noon	9–12	327, Conv. Center	Using Climate Proxies to Learn About Earth's Climate History (p. 108)
11:00 AM–12 Noon	6–C	Key 8, Hilton	Teachers Helping Teachers: Teaching Controversial Topics (p. 109)

Engineering, Technology, and the Application of Science

Thursday

8:00–9:00 AM	4–12	Key 9, Hilton	Threading 3-D Science Learning Through the Solar System: It's Not the Tholian Web (p. 42)
8:00–9:00 AM	6–8	327, Conv. Center	*NGSS* Waves: Protect Your Eyes! (p. 43)
8:00–9:00 AM	9–12	Key 2, Hilton	Three Teachers…60 Students…One Genuine STEM Unit of Study (p. 40)
8:00–9:00 AM	5–12	Holiday 4, Hilton	Integrating Technology into Middle School *NGSS* Engineering Design Performance Expectations (p. 42)
8:00–9:00 AM	4–8	324, Conv. Center	Energy Efficiency: Making a Difference Can Start Early (p. 41)
8:00–9:00 AM	6–C	339, Conv. Center	Martian Genetics: An Electrophoresis Exploration (p. 43)
9:30–10:30 AM	8–C	330, Conv. Center	DNA Structure and Function with a Twist of Dynamic DNA (p. 44)
9:30–10:30 AM	K–12	338, Conv. Center	Science and Storytelling: An Interdisciplinary Approach to Environmental Literacy (p. 79)
9:30–10:30 AM	4–8	338, Conv. Center	Makerspaces with Options for All Students (p. 45)
9:30–10:30 AM	5–12	336, Conv. Center	CPO's Wind Turbine: A STEM Approach to Engineering and Design (p. 45)
11:00 AM–12 Noon	6–8	347, Conv. Center	Engineering Design in the *NGSS* (p. 48)
11:00 AM–12 Noon	6–12	345/346, Conv. Center	Are You Moody? (p. 48)
11:00 AM–12 Noon	6–C	339, Conv. Center	Left at the Scene of the Crime: Introduction to Forensic Science (p. 47)
12:30–1:30 PM	6–12	Holiday 3, Hilton	Teach Engineering Practices on the Cheap with Concrete (p. 50)
12:30–1:30 PM	6–8	327, Conv. Center	*NGSS* Biomedical Engineering: Get a Grip (p. 53)
12:30–1:30 PM	3–8	336, Conv. Center	Modular Robotics for Elementary and Middle School: CUBELETS! (p. 53)
12:30–1:30 PM	4–8	349, Conv. Center	Let It Rain: A Hands-On Rain Garden Design Lab (p. 52)
12:30–1:30 PM	9–12	Key 7, Hilton	How to Invent the Wheel: Designing a STEM Program from Scratch (p. 53)
2:00–3:00 PM	10–C	333, Conv. Center	Advancing Awareness of Clean Energy Technologies and Careers Through an Educational Design Contest (p. 56)
2:00–3:00 PM	4–C	Holiday 4, Hilton	Inventing Is Just Plain Fun (for All)! (p. 58)
2:00–3:00 PM	1–12	Key 4, Hilton	Inventing Success for All Learners in STEM (p. 57)
2:00–3:00 PM	8–12	Key 10, Hilton	Cars: A Fundamental Look at How Cars Work and the Science Involved (p. 57)
2:00–3:00 PM	6–C	Key 9, Hilton	Engineering Underway: A Closer Look at the Engineering Design Process Through Naval-Relevant Project-Based Learning (p. 58)
2:00–3:00 PM	K–12	Key 6, Hilton	Maximize Your Makerspace Through Design Thinking and the Wallingford 3-D Learning Program (p. 58)
2:00–3:00 PM	K–3	338, Conv. Center	Boosting the Makerspace Experience for Young Scientists! (p. 59)
3:30–4:30 PM	6–8	327, Conv. Center	Investigating a Cliff Model (p. 64)
3:30–4:30 PM	1–12	Key 4, Hilton	You Can Build It (p. 63)
3:30–4:30 PM	9–12	Holiday 5, Hilton	Analysis of Supernova Remnants Using X-Ray Spectroscopy with NASA Data and STEM Tools (p. 63)
3:30–4:30 PM	4–7	322, Conv. Center	Invention and Innovation in Upper Elementary/Middle School (p. 62)
3:30–4:30 PM	9–12	Johnson A, Hilton	Comp Hydro Baltimore: Solving the Issues of Flooding in Baltimore (p. 61)
3:30–4:30 PM	6–8	323, Conv. Center	Redwood of the East (p. 61)
3:30–4:30 PM	3–8	324, Conv. Center	Evidence and Explanations: Energy Changes and Transformations in a Bouncing, Flashing Ball (p. 62)
3:30–4:30 PM	9–12	Key 10, Hilton	A Five-Step Path to Student-Generated Environmental Sustainability Projects (p. 62)
5:00–5:30 PM	6–C	Peale B, Hilton	Green City Design Challenge (p. 65)
5:00–6:00 PM	9–12	Key 10, Hilton	Using STEM to Cultivate Youth Environmental Literacy and Foster Community Resilience (p. 66)

5:00–6:00 PM	K–12	Holiday 5, Hilton	Mapping Our Way to Climate Change Solutions (p. 67)
5:00–6:00 PM	7–12	Key 9, Hilton	Engaging in Argument from Evidence in Secondary Urban Science Classrooms (p. 67)

Friday

8:00–9:00 AM	3–12	Holiday 4, Hilton	ASTE-Sponsored Session: Visibility in STEM: Charting the Course for Making Minorities Visible in the STEM Curriculum (p. 70)
8:00–9:00 AM	P–1	Key 6, Hilton	ASEE Session: Kindergartners Trying and Trying Again to Engineer Solutions to Problems (p. 71)
8:00–9:00 AM	5–12	Key 3, Hilton	PolyWhat? Application of STEM Using Polymers (p. 69)
8:00–9:00 AM	3–C	339, Conv. Center	Integrating Chromebook with Vernier Data-Collection Technology (p. 72)
8:00–9:00 AM	K–8	348, Conv. Center	Implementing the *NGSS* and Infusing STEM in Your School District (p. 73)
9:30–10:30 AM	6–12	Key 1, Hilton	CSSS-Sponsored Session: Using Science, Technology, Engineering, Agriculture, and Math (STEAM) as a Context to Teach High School Biology (p. 76)
9:30–10:30 AM	9–12	339, Conv. Center	Chemistry with Vernier (p. 79)
9:30–10:30 AM	4–8	349, Conv. Center	Beyond Rockets: Using the History of Spaceflight in a STEM Classroom (p. 106)
9:30–10:30 AM	4–8	321, Conv. Center	Great Falls Summer STEAM: A Design Thinking Approach to Community Improvement (p. 75)
9:30–10:30 AM	4–8	324, Conv. Center	A Two-Part Maglev Challenge (p. 77)
9:30–10:30 AM	9–C	Key 9, Hilton	AAPT Session: Women and Minorities in the History of Physics: Role Models for Today (p. 78)
9:30–10:30 AM	4–C	330, Conv. Center	Keep Your Head Above Water with Magnetic Water Molecule Models (p. 79)
9:30–10:30 AM	K–5	Key 6, Hilton	ASEE Session: Elementary Computer Science: Plugged vs. Unplugged Activities (p. 78)
11:00 AM–12 Noon	9–12	339, Conv. Center	Biology with Vernier (p. 85)
11:00 AM–12 Noon	6–8	Key 6, Hilton	SEE Session: Simple Electric Circuits (p. 84)
11:00 AM–12 Noon	9–C	330, Conv. Center	Of All the Nerve: Exploring Neuronal Communication Through Three-Dimensional Learning (p. 84)
11:30 AM–12 Noon	6–9	Key 2, Hilton	Building Boats: Creating and Executing an Interdisciplinary Project Using Design Thinking and the Engineering Process (p. 86)
12:30–1:30 PM	6–10	Holiday 2, Hilton	So You Want to Be an Environmentalist! (p. 88)
12:30–1:30 PM	G	Key 6, Hilton	ASEE Session: Using STEM in Action to Connect to DOE Resources (p. 89)
12:30–1:30 PM	3–C	339, Conv. Center	Integrating Chromebook with Vernier Data-Collection Technology (p. 90)
12:30–1:30 PM	6–12	Key 11, Hilton	Materials Matter! Looking at Materials Science to Help Teach Chemistry (p. 87)
12:30–1:30 PM	6–12	345/346, Conv. Center	When Zombies Attack! (p. 91)
2:00–3:00 PM	K–12	Key 6, Hilton	ASEE Session: ASEE's K–12 Outreach: Engineering, Go For It (eGFI), Teach Engineering, Link Engineering, the National Science Digital Library, and UC Project STEP (p. 96)
2:00–3:00 PM	9–C	330, Conv. Center	The Science and Ethics of Genome Editing with CRISPR/Cas9 (p. 96)
2:00–3:00 PM	6–12	345/346, Conv. Center	Drought in Africa Inspires Students to Invent a Smart Irrigation System (p. 97)
2:00–3:00 PM	P–3	Key 2, Hilton	Early Childhood Engineers (p. 94)
2:00–3:00 PM	6–12	345/346, Conv. Center	Drought in Africa Inspires Students to Invent a Smart Irrigation System (p.)
2:00–3:00 PM	9–C	Peale A, Hilton	Follow the Road to a Successful STEM Career! (p. 94)
2:00–3:00 PM	3–C	339, Conv. Center	Integrating iPad with Vernier Data-Collection Technology (p. 97)
2:00–3:00 PM	9–12	327, Conv. Center	Chemical Formula and Amino Acids (p. 96)
3:30–4:30 PM	9–12	339, Conv. Center	Physics and Physical Science with Vernier (p. 98)
5:00–6:00 PM	5–12	Key 1, Hilton	Polymers: Teaching "Hard" Concepts with Gooey Labs (p. 100)

Saturday

8:00–9:00 AM	9–12	Key 5, Hilton	"Robot Challenge" Makes Students Think Like Engineers (p. 104)
9:30–10:00 AM	6–12	Key 10, Hilton	Creating 21st-Century Science Students (p. 105)
9:30–10:30 AM	9–12	322, Conv. Center	Standards and Stewardship: A Natural Fit (p. 106)
9:30–10:30 AM	6–12	Holiday 5, Hilton	From Science to Engineering (p. 106)

9:30–10:30 AM	9–12	327, Conv. Center	Prospecting for Mineral Ore (p. 107)
9:30–10:30 AM	8–C	330, Conv. Center	Cells as Protein Engineers (p. 107)
11:00 AM–12 Noon	6–12	Key 1, Hilton	Learning to Teach About Climate Change: Options for Professional Development (p. 108)
11:00 AM–12 Noon	K–12	Key 7, Hilton	Exploring Practices, Nature of Science, and Science in Society: Analyzing Historical Primary Sources from the Library of Congress (p. 109)
11:00 AM–12 Noon	9–12	327, Conv. Center	Using Climate Proxies to Learn About Earth's Climate History (p. 108)
11:00 AM–12 Noon	9–12	Key 2, Hilton	How to Create Comic Strips for Classroom Instruction (p. 108)

Life Science

Thursday

8:00–9:00 AM	K–8	Key 4, Hilton	BioBlitz—From Field to Classroom (p. 40)
8:00–9:00 AM	1–12	333, Conv. Center	Oysters as Teachers: An *NGSS* Story (p. 39)
8:00–9:00 AM	6–10	Peale A, Hilton	Using Genetic Lines to Restore the American Chestnut Tree (p. 40)
8:00–9:00 AM	3–C	Key 8, Hilton	Learn How READING LIKE A SCIENTIST Can Make Science Content Jump Off the Page for Your Students (p. 42)
8:00–9:00 AM	5–12	336, Conv. Center	CPO Science Biology Energy QUEST: Teaching Cell Energy Pathways (p. 43)
8:00–9:00 AM	6–C	339, Conv. Center	Martian Genetics: An Electrophoresis Exploration (p. 43)
9:30–10:30 AM	6–8	327, Conv. Center	*NGSS* Ecology: Modeling the Introduction of a New Species (p. 44)
9:30–10:30 AM	9–C	339, Conv. Center	Exploring the Genetics of Taste: SNP Analysis of the PTC Gene Using PCR (p. 45)
9:30–10:30 AM	8–C	330, Conv. Center	DNA Structure and Function with a Twist of Dynamic DNA (p. 44)
11:00 AM–12 Noon	6–8	327, Conv. Center	*NGSS* Reproductions: Breeding Critters—More Traits (p. 46)
11:00 AM–12 Noon	6–C	339, Conv. Center	Left at the Scene of the Crime: Introduction to Forensic Science (p. 47)
11:00 AM–12 Noon	5–12	336, Conv. Center	CPO's LINK Genetics Learning Modules: Crazy Traits and Crazy Chromosomes (p. 47)
11:00 AM–12 Noon	8–C	330, Conv. Center	5 E'sy Ways to Investigate Enzymes! (p. 46)
12:30–1:30 PM	6–C	330, Conv. Center	Getting Students Through the Cellular Membrane (p. 53)
12:30–1:30 PM	K–12	331/332, Conv. Center	Hands-On Science with Classroom Critters (p. 53)
12:30–1:30 PM	9–12	Johnson A, Hilton	The Perfect Match: Environmental Education and Project-Based Learning! (p. 50)
12:30–1:30 PM	9–12	Peale A, Hilton	Epidemiology in Your Classroom (p. 51)
12:30–1:30 PM	9–12	Key 2, Hilton	EANR (Environment, Agriculture, and Natural Resources): Preparing Students for Environmental Careers (p. 50)
12:30–1:30 PM	6–8	327, Conv. Center	*NGSS* Biomedical Engineering: Get a Grip (p. 53)
12:30–1:30 PM	9–C	Key 9, Hilton	Describing Data Using Central Tendencies, Graphs, and Statistics in AP and IB (p. 53)
12:30–1:30 PM	9–C	339, Conv. Center	Cancer Investigators: Medical Diagnostics in Your Classroom (p. 54)
1:00–1:30 PM	4–8	Key 1, Hilton	NMLSTA-Sponsored Session: Leveraging the Power of Place in Citizen Science Projects (p. 55)
2:00–3:00 PM	9–12	Holiday 5, Hilton	Evolution: DNA and the Unity of Life (p. 58)
2:00–3:00 PM	8	324, Conv. Center	Diving into the Chemistry of the "Toward High School Biology" Curriculum (p. 57)
2:00–3:00 PM	K–5	331/332, Conv. Center	Collecting Evidence: How Does an Owl Get All That Energy? (p. 59)
2:00–3:00 PM	9–C	339, Conv. Center	Detecting the Silent Killer: Clinical Detection of Diabetes (p. 59)
3:30–4:30 PM	9–12	Johnson A, Hilton	Comp Hydro Baltimore: Solving the Issues of Flooding in Baltimore (p. 61)
3:30–4:30 PM	4–9	Key 1, Hilton	NARST-Sponsored Session: Designing and Implementing Middle School Project-Based Watershed Investigations (p. 61)
3:30–4:30 PM	9–C	339, Conv. Center	Environmental Toxicology Using Edvotek's New EZ-elegans (p. 64)
3:30–4:30 PM	6–12	331/332, Conv. Center	Comparative Vertebrate Anatomy with Carolina's Perfect Solution® Specimens (p. 64)
3:30–4:30 PM	9–C	341, Conv. Center	Enzymes: Technology Inspired by Nature (p. 65)
3:30–4:30 PM	6–8	337, Conv. Center	Evolutionary Evidence in the Fossil Record (p. 64)
3:30–4:30 PM	K–C	Key 11, Hilton	Saturday Academy: Strengthening the K–16 STEM Pipeline (p. 62)
3:30–4:30 PM	6–8	323, Conv. Center	Redwood of the East (p. 61)
3:30–4:30 PM	9–12	Peale A, Hilton	High-Paying STEM Careers in the Medical Field That Use the *NGSS* Life Science Performance Expectations (p. 62)
3:30–4:30 PM	2–5	325, Conv. Center	NSTA Press® Session: Finding Science in the Outdoors and Through a Good Book (p. 62)

5:00–6:00 PM	P–2	325, Conv. Center	NSTA Press® Session: Picture Science in Early Childhood: Deepen Those Fun Explorations by Connecting with the Practices of Science and Engineering (p. 67)
5:00–6:00 PM	8–12	Key 7, Hilton	Developing Coherent Storylines: Performance Tasks as a Tool for 3-D Learning (p. 67)
5:00–6:00 PM	6–C	Key 5, Hilton	Environmental Toxicology: Introduction to Toxicity Testing (p. 67)

Friday

8:00–9:00 AM	9–C	341, Conv. Center	How to Use Pop Culture in Your Life Science Class (p. 73)
8:00–9:00 AM	9–C	340, Conv. Center	Bringing the Wild to Life with WildCam Gorongosa (p. 72)
8:00–9:00 AM	9–12	Holiday 6, Hilton	NESTA Session: Earth-Space Science in Biology, Chemistry, and Physics (p. 69)
8:00–9:00 AM	9–12	331/332, Conv. Center	Disorder Detectives: Karyotyping, Bioethics, and Beyond (p. 72)
8:00–9:00 AM	7–12	Holiday 2, Hilton	20 in 20: The Next Generation (p. 70)
8:00–9:00 AM	6–12	Key 4, Hilton	Man vs. Wild: Lessons on Earth and Human Impacts (p. 71)
8:00–9:00 AM	6–C	347, Conv. Center	PTC Taster Lab—From Genotype to Phenotype (p. 73)
8:00–11:00 AM	P–1	Tubman, Hilton	SC-2: Promoting Children's Science Inquiry and Thinking About Living Things in Preschool and Kindergarten (p. 74)
8:30–11:30 AM	6–9	Key 10, Hilton	SC-3: NSTA Press® Short Course: Introducing a New *NGSS*-Focused Curriculum Unit—Toward High School Biology (p. 74)
9:30–10:00 AM	6–12	Key 10, Hilton	Creating 21st-Century Science Students (p. 105)
9:30–10:30 AM	9–12	340, Conv. Center	Leapin' Lizards! That Was Fast! Selection by Predation (p. 80)
9:30–10:30 AM	K–12	338, Conv. Center	Science and Storytelling: An Interdisciplinary Approach to Environmental Literacy (p. 79)
9:30–10:30 AM	9–12	327, Conv. Center	What Is a Species? (p. 78)
9:30–10:30 AM	4–8	321, Conv. Center	Great Falls Summer STEAM: A Design Thinking Approach to Community Improvement (p. 75)
9:30–10:30 AM	9–C	Holiday 2, Hilton	Using Mitotic Division to Introduce Statistics in AP and IB Biology (p. 77)
9:30–10:30 AM	7–11	Key 11, Hilton	Diffusion, the Cell Membrane, and Ourselves: Biology Comes Alive Through the Aesthetic Realism Method (p. 76)
9:30–10:30 AM	6–8	349, Conv. Center	Climate Change and Argumentation: Using Pollen Proxy Data to Engage Students in 3-D Learning (p. 77)
9:30–10:30 AM	9–12	331/332, Conv. Center	Autopsy: Forensic Dissection Featuring Carolina's Perfect Solution® Pigs (p. 79)
9:30–10:30 AM	6–12	337, Conv. Center	Understanding Photosynthesis: A Lab-Based Approach (p. 79)
9:30–10:30 AM	6–12	Key 1, Hilton	CSSS-Sponsored Session: Using Science, Technology, Engineering, Agriculture, and Math (STEAM) as a Context to Teach High School Biology (p. 76)
9:30–10:30 AM	4–C	330, Conv. Center	Keep Your Head Above Water with Magnetic Water Molecule Models (p. 79)
9:30–10:30 AM	9–12	336, Conv. Center	From CRISPR to Three-Parent Babies and Back Again: What to Tell Our Students About the Coming Revolution in Human Biology (p. 79)
11:00 AM–12 Noon	9–C	330, Conv. Center	Of All the Nerve: Exploring Neuronal Communication Through Three-Dimensional Learning (p. 84)
11:00 AM–12 Noon	9–12	340, Conv. Center	Exploring the Biology of Skin Color with HHMI BioInteractive (p. 85)
11:00 AM–12 Noon	9–C	341, Conv. Center	Become a GMO Investigator (p. 85)
11:00 AM–12 Noon	9–12	327, Conv. Center	Cell Differentiation and Gene Expression (p. 84)
11:00 AM–12 Noon	9–12	339, Conv. Center	Biology with Vernier (p. 85)
11:00 AM–12 Noon	9–12	336, Conv. Center	Science Denial: Why It Continues and What Science Educators Can Do About It (p. 85)
11:00 AM–12 Noon	3–7	349, Conv. Center	Beyond Spaceship Earth (p. 83)
12:30–1:30 PM	4–8	321, Conv. Center	Taking STEM Outside (p. 87)
12:30–1:30 PM	6–8	349, Conv. Center	Evolving Practice: An *NGSS*-Inspired Approach to Teaching with Fossils (p. 88)
12:30–1:30 PM	5–12	Holiday 4, Hilton	Soil Ecology in the Classroom (p. 89)
12:30–1:30 PM	K–12	331/332, Conv. Center	Introduction to Wisconsin Fast Plants® (p. 90)
12:30–1:30 PM	6–10	Holiday 2, Hilton	So You Want to Be an Environmentalist! (p. 88)
12:30–1:30 PM	2–5	342, Conv. Center	Disappearing Jaguars and Sloths: Phenomena and 3-D Instruction for Grades 2–5 (p. 91)
12:30–1:30 PM	9–C	330, Conv. Center	Take a Walk Through the Molecular World with Watercolor Landscapes (p. 90)
12:30–1:30 PM	6–12	345/346, Conv. Center	When Zombies Attack! (p. 91)
12:30–1:30 PM	8–C	338, Conv. Center	Who Is Baby Whale's Father? DNA Fingerprinting Solves the Mystery! (p. 90)

12:30–1:30 PM	6–12	Key 4, Hilton	Learn Ways to Connect the Life Sciences with Climate Change (p. 89)
1:00–1:30 PM	3–12	Holiday 3, Hilton	Migrating into Citizen Science (p. 92)
2:00–3:00 PM	6–C	340, Conv. Center	Free Apps That Put the World in Your Students' Hands (p. 97)
2:00–3:00 PM	6–8	Holiday 5, Hilton	What Affects Populations? A Hands-On Storylining Experience (p. 95)
2:00–3:00 PM	10–12	Holiday 3, Hilton	Transgenic American Chestnuts—Pathway to Restoration? (p. 94)
2:00–3:00 PM	9–C	341, Conv. Center	Conserving Panda Population: One Hormone Test Design at a Time! (p. 97)
2:00–3:00 PM	K–4	325, Conv. Center	NSTA Press® Session: *From Flower to Fruit* (p. 95)
2:00–3:00 PM	9–12	322, Conv. Center	Developing Student Scientists Through the Watershed Report Card Program (p. 95)
2:00–3:00 PM	10–C	338, Conv. Center	Viral Amplification: From One to a Billion Copies in 20 Minutes (p. 97)
2:00–3:00 PM	9–C	330, Conv. Center	The Science and Ethics of Genome Editing with CRISPR/Cas9 (p. 96)
3:30–4:30 PM	9–C	340, Conv. Center	Trophic Cascades: A Force of Nature (p. 98)
3:30–4:30 PM	9–C	341, Conv. Center	Investigate Photosynthesis and Cellular Respiration with Algae Beads (p. 100)
5:00–5:30 PM	3–5	323, Conv. Center	Save the Bay! A Grade 5 Meaningful Watershed Educational Experience in Baltimore City (p. 100)
5:00–6:00 PM	5–12	Key 1, Hilton	Polymers: Teaching "Hard" Concepts with Gooey Labs (p. 100)
5:00–6:00 PM	K–12	Key 2, Hilton	What Do You See? Unlock Curiosity with Digital Microscopy Images (p. 100)
5:00–6:00 PM	6–C	Peale A, Hilton	Salamanders: Indicators of Our Changing Climate (p. 101)

Saturday

8:00–8:30 AM	6–C	322, Conv. Center	Students as Citizen Scientists: Data Collection and Sharing Using Fieldscope (p. 103)
8:00–9:00 AM	10–C	324, Conv. Center	Teaching Core Ideas of Biology with Models of Operons (p. 104)
9:30–10:30 AM	9–12	Key 7, Hilton	Memory, Attention, and Distraction (p. 107)
9:30–10:30 AM	7–C	Key 3, Hilton	Getting Students to Read in Science (p. 105)
9:30–10:30 AM	6–12	Key 5, Hilton	Carbon, Trees, and Climate (p. 107)
9:30–10:30 AM	9–12	322, Conv. Center	Standards and Stewardship: A Natural Fit (p. 106)
9:30–10:30 AM	8–C	330, Conv. Center	Cells as Protein Engineers (p. 107)
11:00 AM–12 Noon	6–8	349, Conv. Center	Understanding Complex Concepts for Diverse Learners (p. 109)
11:00 AM–12 Noon	3–5	324, Conv. Center	Understanding the Chesapeake Watershed Through Investigations and Literature (p. 109)
11:00 AM–12 Noon	9–12	325, Conv. Center	NSTA Press® Session: *Argument-Driven Inquiry in Biology: Lab Investigations for Grades 9–12* (p. 108)
11:00 AM–12 Noon	7–C	Holiday 4, Hilton	High Five: Five Ways to Make Teaching Biotechnology Faster, Easier, and Cheaper (p. 109)
11:00 AM–12 Noon	6–C	Key 8, Hilton	Teachers Helping Teachers: Teaching Controversial Topics (p. 109)

Physical Science

Thursday

8:00–9:00 AM	6–8	327, Conv. Center	*NGSS* Waves: Protect Your Eyes! (p. 43)
8:00–9:00 AM	3–5	326, Conv. Center	Music to My Ears! 3-D Learning in Baltimore City Elementary Schools (p. 42)
8:00–9:00 AM	10–12	Key 10, Hilton	Tattoo Ink in Chemistry (p. 40)
8:00–9:00 AM	4–8	324, Conv. Center	Energy Efficiency: Making a Difference Can Start Early (p. 41)
8:00–9:00 AM	9–12	325, Conv. Center	NSTA Press® Session: *Argument-Driven Inquiry in Physics: Mechanics Lab Investigations for Grades 9–12* (p. 39)
8:30–11:30 AM	6–9	Key 10, Hilton	SC-3: NSTA Press® Short Course: Introducing a New *NGSS*-Focused Curriculum Unit—Toward High School Biology (p. 74)
9:30–10:30 AM	6–12	331/332, Conv. Center	Engineer Physical Science Excitement in Your Classroom with a Carolina STEM Challenge® (p. 44)
9:30–10:30 AM	9–12	343/344, Conv. Center	Year-Round Solutions for Success in AP Chemistry from Flinn Scientific (p. 45)
11:00 AM–12 Noon	6–8	342, Conv. Center	Space Docking Failure: Phenomena and 3-D Instruction for Grades 6–8 (p. 47)
11:00 AM–12 Noon	K–12	348, Conv. Center	Structuring Discussion to Be Equitable and Rigorous (p. 48)
11:00 AM–12 Noon	6–12	345/346, Conv. Center	Are You Moody? (p. 48)

11:00 AM–12 Noon	8–C	330, Conv. Center	5 E'sy Ways to Investigate Enzymes! (p. 46)
12:30–1:30 PM	6–8	337, Conv. Center	Wave Properties and Information Transfer (p. 54)
12:30–1:30 PM	1–5	324, Conv. Center	Exploring Discrepant Events with Silly Putty® (p. 52)
12:30–1:30 PM	K–1	342, Conv. Center	Puppet Theater Engineering: Phenomena and 3-D Instruction for Grades K and 1 (p. 54)
12:30–1:30 PM	6–8	321, Conv. Center	NSTA Press® Session: *Argument-Driven Inquiry in Physical Science: Lab Investigations for Grades 6–8* (p. 50)
12:30–1:30 PM	10–11	Key 10, Hilton	Using a Role-Playing Activity in the Teaching of Chemistry (p. 51)
12:30–1:30 PM	6–C	330, Conv. Center	Getting Students Through the Cellular Membrane (p. 53)
2:00–3:00 PM	6–8	349, Conv. Center	Science—A Family Event! (p. 57)
2:00–3:00 PM	6–8	337, Conv. Center	Identifying Energy Transfers in Motors and Generators (p. 59)
2:00–3:00 PM	7–12	Holiday 3, Hilton	A Unique Ice Core Investigation That Integrates the Three Dimensions of *NGSS* and STEM (p. 56)
2:00–3:00 PM	6–8	327, Conv. Center	Chemical Batteries (p. 59)
2:00–3:00 PM	K–12	Key 3, Hilton	Spark Students' Curiosity with Chemistry! (p. 56)
2:00–3:00 PM	8–12	Key 10, Hilton	Cars: A Fundamental Look at How Cars Work and the Science Involved (p. 57)
2:00–3:00 PM	8	324, Conv. Center	Diving into the Chemistry of the "Toward High School Biology" Curriculum (p. 57)
2:00–3:00 PM	9–C	343/344, Conv. Center	Green Chemistry Experiments for General and AP Chemistry from Flinn (p. 60)
3:30–4:30 PM	3–8	324, Conv. Center	Evidence and Explanations: Energy Changes and Transformations in a Bouncing, Flashing Ball (p. 62)
3:30–4:30 PM	7–12	347, Conv. Center	Reconceptualizing Chemistry Through Play: Ionic Bonding (p. 65)
3:30–4:30 PM	9–12	Holiday 5, Hilton	Analysis of Supernova Remnants Using X-Ray Spectroscopy with NASA Data and STEM Tools (p. 63)
3:30–4:30 PM	K–C	Key 11, Hilton	Saturday Academy: Strengthening the K–16 STEM Pipeline (p. 62)
3:30–4:30 PM	5–12	336, Conv. Center	CPO Science LINK Learning Module: Chemistry and the Periodic Table (p. 64)
3:30–4:30 PM	3–8	Key 6, Hilton	Straw Rockets Are Out of This World! (p. 63)
5:00–6:00 PM	7–12	Johnson A, Hilton	Making Redox Practical, Relevant, Engaging, and Fun Corrosion Chemistry! (p. 66)
5:00–6:00 PM	K–6	Key 6, Hilton	Elementary and Middle School Chemistry: Demonstrations and Lab Activities on a Shoestring Budget (p. 67)
5:00–6:00 PM	4–11	333, Conv. Center	Assessing Students' Progress on the Energy Concept (p. 66)
5:00–6:00 PM	3–6	Key 4, Hilton	Using the Science of Flight to Reinforce *NGSS* for Upper Elementary Students (p. 67)
5:00–6:00 PM	K–12	Holiday 5, Hilton	Mapping Our Way to Climate Change Solutions (p. 67)

Friday

8:00–9:00 AM	7–C	Key 9, Hilton	AAPT Session: Investigating Electrostatics with an Inexpensive Electrophorus (p. 71)
8:00–9:00 AM	P–1	Key 6, Hilton	ASEE Session: Kindergartners Trying and Trying Again to Engineer Solutions to Problems (p. 71)
8:00–9:00 AM	9–12	Johnson B, Hilton	Solids: The Neglected "State" of Chemistry (p. 69)
8:00–9:00 AM	9–12	Holiday 6, Hilton	NESTA Session: Earth-Space Science in Biology, Chemistry, and Physics (p. 69)
8:00–9:00 AM	6–8	Key 7, Hilton	ACS Middle Level Session One: Solids, Liquids, Gases, and Changes of State (p. 71)
8:00–9:00 AM	9–12	327, Conv. Center	Photosynthesis and Respiration Shuffle (p. 72)
8:00–9:00 AM	7–12	337, Conv. Center	Untangling Electric Circuits: STEM Activities from Essential Physics (p. 72)
8:00–9:00 AM	3–C	339, Conv. Center	Integrating Chromebook with Vernier Data-Collection Technology (p. 72)
8:00–9:00 AM	3–12	325, Conv. Center	NSTA Press® Session: Phenomenon-Based Learning: Fun, Hands-On, Cooperative Learning (p. 70)
8:00–9:00 AM	5–12	Key 3, Hilton	PolyWhat? Application of STEM Using Polymers (p. 69)
8:00–10:00 AM	9–12	Key 8, Hilton	ACS High School Session One: Relating Structure and Properties: and Visualizing Student Initial Ideas (p. 74)
9:30–10:30 AM	6–8	Key 7, Hilton	ACS Middle Level Session Two: The Water Molecule and Dissolving (p. 78)
9:30–10:30 AM	9–C	Key 9, Hilton	AAPT Session: Women and Minorities in the History of Physics: Role Models for Today (p. 78)
9:30–10:30 AM	9–12	Key 4, Hilton	Connecting Chemistry to Your World Through ChemClub (p. 77)
9:30–10:30 AM	2–9	345/346, Conv. Center	Cool! Can We Do That Again?! (p. 80)
9:30–10:30 AM	9–12	339, Conv. Center	Chemistry with Vernier (p. 79)

9:30–10:30 AM	4–C	330, Conv. Center	Keep Your Head Above Water with Magnetic Water Molecule Models (p. 79)
10:30 AM–12 Noon	9–12	Key 8, Hilton	ACS High School Session Two: Relating Structure and Properties: Constructing Science Ideas Through Exploring Data (p. 81)
11:00 AM–12 Noon	6–8	Key 7, Hilton	ACS Middle Level Session Three: Chemical Reactions—Breaking and Making Bonds (p. 84)
11:00 AM–12 Noon	6–12	337, Conv. Center	Evaporative Cooling: Visualizing Matter so It Makes Sense! (p. 85)
11:00 AM–12 Noon	P–C	Key 9, Hilton	AAPT Session: Physics Demonstration Show (p. 82)
11:00 AM–12 Noon	6–12	Key 4, Hilton	*NGSS* in Action: Building a Coherent 3-D Science Lesson (p. 84)
11:00 AM–12 Noon	6–8	Key 6, Hilton	ASEE Session: Simple Electric Circuits (p. 84)
11:00 AM–12 Noon	9–12	331/332, Conv. Center	Keep Calm and Chemistry On: Successful Lab Activities for the New Chemistry Teacher (p. 84)
11:00 AM–12 Noon	K–5,C	323, Conv. Center	Evolving the Physics Mind-Set: Changing Perceptions and Attitudes Toward the Teaching and Learning of Physical Science (p. 81)
11:00 AM–12 Noon	9–12	Key 11, Hilton	Meet the Standards and Enhance Your Chemistry Classroom with Other People's Money (p. 82)
11:30 AM–12 Noon	6–9	Key 2, Hilton	Building Boats: Creating and Executing an Interdisciplinary Project Using Design Thinking and the Engineering Process (p. 86)
12:30–1:30 PM	G	Key 6, Hilton	ASEE Session: Using STEM in Action to Connect to DOE Resources (p. 89)
12:30–1:30 PM	9–C	Key 9, Hilton	AAPT Session: Guesstimation—Solving the World's Problems on the Back of a Cocktail Napkin (p. 87)
12:30–1:30 PM	6–8	Key 7, Hilton	ACS Middle Level Session Four: Chemical Reactions—Ocean Acidification (p. 89)
12:30–1:30 PM	3–7	324, Conv. Center	Sounds Like Fun (p. 88)
12:30–1:30 PM	6–12	Key 11, Hilton	Materials Matter! Looking at Materials Science to Help Teach Chemistry (p. 87)
12:30–1:30 PM	9–12	327, Conv. Center	pH Scale (p. 90)
12:30–1:30 PM	3–C	339, Conv. Center	Integrating Chromebook with Vernier Data-Collection Technology (p. 90)
12:30–1:30 PM	9–C	330, Conv. Center	Take a Walk Through the Molecular World with Watercolor Landscapes (p. 90)
12:30–1:30 PM	6–12	345/346, Conv. Center	When Zombies Attack! (p. 91)
12:30–2:30 PM	9–12	Key 8, Hilton	ACS High School Session Three: Relating Structure and Properties: Demonstrating Understanding Through Integration and Application of Knowledge (p. 92)
2:00–3:00 PM	9–C	Key 9, Hilton	AAPT Session: Student Ideas About Physics—Insights from Physics Education Research (p. 96)
2:00–3:00 PM	6–8	331/332, Conv. Center	Shifting to the Five Innovations: How Do We Transform Instruction? (p. 97)
2:00–3:00 PM	3–6	324, Conv. Center	Testing Look-Alike Liquids (p. 95)
2:00–3:00 PM	K–8	Key 5, Hilton	CESI-Sponsored Session: Using Toys to Teach Physics (p. 96)
2:00–3:00 PM	3–C	339, Conv. Center	Integrating iPad with Vernier Data-Collection Technology (p. 97)
2:00–3:00 PM	9–12	327, Conv. Center	Chemical Formula and Amino Acids (p. 96)
2:00–3:00 PM	6–10	347, Conv. Center	The Chemistry of Glow Sticks (p. 98)
3:30–4:30 PM	9–12	327, Conv. Center	Distilling Aromatic Hydrocarbons (p. 98)
3:30–4:30 PM	9–12	339, Conv. Center	Physics and Physical Science with Vernier (p. 98)
5:00–5:30 PM	9–C	Key 11, Hilton	Linking Science Fiction and Physics Courses (p. 100)
5:00–6:00 PM	5–12	Key 1, Hilton	Polymers: Teaching "Hard" Concepts with Gooey Labs (p. 100)
5:00–6:00 PM	3–6	Key 4, Hilton	Using the Science of Flight to Reinforce *NGSS* for Upper Elementary Students (p.)
5:00–6:00 PM	K–12	Key 2, Hilton	What Do You See? Unlock Curiosity with Digital Microscopy Images (p. 100)
5:00–6:00 PM	8–12	Holiday 2, Hilton	Greenhouse in a Beaker: Understand Climate Change (p. 101)
5:00–6:00 PM	P–8	Key 9, Hilton	AAPT Session: Simple Lessons to Teach Confusing Physics Ideas (K–8) (p. 101)

Saturday

8:00–9:00 AM	3–8	349, Conv. Center	Meteoroids, Asteroids, and Moons, Oh My! (p. 104)
9:30–10:30 AM	7–12	Holiday 3, Hilton	Polymers: Basics for the Science Classroom (p.105)
9:30–10:30 AM	6–12	Key 5, Hilton	Carbon, Trees, and Climate (p. 107)
9:30–10:30 AM	P–2	326, Conv. Center	Starting STEM Early (p. 106)
11:00 AM–12 Noon	6–8	322, Conv. Center	Modeling Magnetic Systems (p. 109)
11:00 AM–12 Noon	6–8	349, Conv. Center	Understanding Complex Concepts for Diverse Learners (p. 109)

General Science Education

Thursday

8:00–9:00 AM	P–5	323, Conv. Center	*Stellaluna:* A Lesson on Appreciating Diversity Through Science and Literacy (p. 39)
8:00–9:00 AM	9–C	Key 11, Hilton	Teaching with Primary Literature (p. 40)
8:00–9:00 AM	P–12	Holiday 5, Hilton	Producing STEM Equity Through the *CCSS Math* Practices (p. 42)
8:00–9:00 AM	9–12	Key 7, Hilton	Enhancing Your Pedagogical Tool Kit in the Science Classroom (p. 42)
8:00–9:00 AM	4–8	322, Conv. Center	Integrating Technology for Greater Engagement in the *NGSS* (p. 41)
8:00–9:00 AM	9–C	Holiday 3, Hilton	Developing Curriculum for the *NGSS:* Navigating the Perfect Storm (p. 40)
8:00–9:00 AM	P–C	Key 1, Hilton	Finding Funding…for Free! How to Secure External Funding for Classroom Projects and Research (p. 40)
8:00–9:00 AM	K–6	Key 5, Hilton	CESI-Sponsored Session: Integrating Science and Literacy: Proven Strategies Developed from Evidence-Based Practices (p. 42)
8:00–9:00 AM	P–C	Holiday 6, Hilton	Is This Your First NSTA Conference? First-Timer Conference Attendees' Orientation (p. 40)
8:00–9:00 AM	5–8	338, Conv. Center	How to Argue in a Middle School Science Class (p. 43)
8:00–9:00 AM	K–8	337, Conv. Center	Ten Minutes to Improving Science Achievement (p. 43)
8:00–9:00 AM	6–8	348, Conv. Center	Project-Based Inquiry Science™ (PBIS): Creating "Coherence and Science Storylines" for Middle School (p. 43)
9:15–10:30 AM	P–C	Blrm. III/IV, Conv. Center	General Session: Holding Fast to Dreams: Creating a Culture of STEM Success (p. 44)
9:30–10:30 AM	K–8	342, Conv. Center	The Power of Modeling in K–8 Classrooms (p. 45)
9:30–10:30 AM	K–5	337, Conv. Center	What Does Argumentation Look Like in an Elementary Classroom? (p. 45)
9:30–10:30 AM	K–12	348, Conv. Center	Science Storylines and the Driving Question Board: Keeping *NGSS* Curricula Student Driven (p. 46)
9:30–10:30 AM	K–5	347, Conv. Center	Analyzing and Interpreting Data Using TCI's Bring Science Alive! (p. 46)
11:00 AM–12 Noon	6–9	343/344, Conv. Center	Community-Based Problems: Using Middle School Science and Engineering to Help Your Community (p. 47)
11:00 AM–12 Noon	K–5	331/332, Conv. Center	Coding with First Graders? The Smithsonian Says YES! (p. 46)
11:00 AM–12 Noon	K–5	337, Conv. Center	What Does Conceptual Modeling Look Like in Grades K–5 Classrooms? (p. 47)
11:00 AM–12 Noon	K–8	338, Conv. Center	OK, Class, Please Open Your Science Notebooks… (p. 47)
12:30–1:00 PM	4–8	Key 1, Hilton	NMLSTA-Sponsored Session: Meaningful Connections Through Professional Organizations (p. 48)
12:30–1:30 PM	K–12	333, Conv. Center	Take the Edison Challenge! (p. 50)
12:30–1:30 PM	K–C	325, Conv. Center	NSTA Press® Session: *Creating a STEM Culture for Teaching and Learning* (p. 50)
12:30–1:30 PM	K–12	Key 8, Hilton	NGSS@NSTA Forum Session: Designing and Using Classroom Assessments to Support Meaningful *NGSS* Investigations (p. 51)
12:30–1:30 PM	4–10	Holiday 4, Hilton	How to Read Like Scientists! (p. 52)
12:30–1:30 PM	5–8	322, Conv. Center	Bridging the Gap: Collaboration in the "Next Generation Science Learning Environment" (p. 52)
12:30–1:30 PM	3–6	326, Conv. Center	Connecting Content, Critical Thinking, and Creativity Through Trade Books (p. 52)
12:30–1:30 PM	3-10	Holiday 5, Hilton	Bridging the Language Gap for ELLs in Science (p. 52)
12:30–1:30 PM	K–C	Key 3, Hilton	Equity in Science Education Roundtable (p. 51)
12:30–1:30 PM	K–12	Peale B, Hilton	NSTA District Support (p. 51)
12:30–1:30 PM	10–12	Johnson B, Hilton	Stories in the Secondary Classroom (p. 50)
12:30–1:30 PM	P–2	323, Conv. Center	Scrolling and SciFriday (p. 50)
12:30–1:30 PM	K–8	338, Conv. Center	What in the World Are Crosscutting Concepts? (p. 54)
12:30–1:30 PM	6–12	345/346, Conv. Center	Zombie Apocalypse! (p. 54)
12:30–1:30 PM	K–5	348, Conv. Center	Literacy in the Context of Science in the Elementary Classroom (p. 54)
2:00–3:00 PM	3–12	Johnson A, Hilton	Authentic LEARN-ing and Teaching (p. 56)
2:00–3:00 PM	6–12	Johnson B, Hilton	$TEM: Incorporating Career Connections (p. 56)
2:00–3:00 PM	1–12	Key 2, Hilton	Creating and Maintaining Kid-Friendly/Bird-Friendly Gardens (p. 56)
2:00–3:00 PM	K–6	323, Conv. Center	Enabling K–6 Students to Understand the Impact of STEM and Integration of All Its Disciplines: Explorations and Problem Solving with Physical Structures and Everyday Household Objects (p. 56)
2:00–3:00 PM	K–12	Key 11, Hilton	Countless Connections: Preservice Outreach Opportunities (p. 57)

2:00–3:00 PM	6–C	Key 1, Hilton	ASTE-Sponsored Session: Beyond Evolution: Addressing Interactions Between Science and Religion in Classrooms and Communities (p. 56)
2:00–3:00 PM	K–12	Key 8, Hilton	NGSS@NSTA Forum Session: Better Science for All (p. 58)
2:00–3:00 PM	9–C	341, Conv. Center	Communicating Science Through Lab Notebooking (p. 59)
2:00–3:00 PM	5–12	336, Conv. Center	Solving the Mystery of STEM Using Forensic Science (p. 59)
2:00–3:00 PM	5–8	348, Conv. Center	Literacy in the Context of Science in the Middle School Classroom (p. 60)
2:00–3:00 PM	P–C	328/329, Conv. Center	Featured Presentation: Rigorous Citizen Science for Lasting Change (p. 55)
3:30–4:00 PM	4–C	Peale B, Hilton	Blended Learning in the Lab Sciences (p. 60)
3:30–4:00 PM	9–12	333, Conv. Center	Using Seminars as a Form of Alternative Assessment (p. 60)
3:30–4:30 PM	K–12	Holiday 4, Hilton	Selecting Phenomena to Motivate Student Sensemaking (p. 63)
3:30–4:30 PM	K–12	Key 8, Hilton	NGSS@NSTA Forum Session: KLEWS to Language and Literacy Development Through 3-D Science Instruction in Early Grades (p. 63)
3:30–4:30 PM	6–12	Key 2, Hilton	Do You Need a New Science Lab? (p. 61)
3:30–4:30 PM	7–12	Key 7, Hilton	Zombies Are Knocking on Your Classroom Door (p. 63)
3:30–4:30 PM	K–5	326, Conv. Center	STEAM It UP: Are You Learning to Read or Reading to Learn Using Literacy with Science? (p. 62)
3:30–4:30 PM	P–C	Johnson B, Hilton	Presentation 101: Learning About Presenting at Professional Conferences (p. 61)
3:30–4:30 PM	5–12	336, Conv. Center	CPO Science LINK Learning Module: Chemistry and the Periodic Table (p.)
3:30–4:30 PM	K–4	338, Conv. Center	How to Argue in the Elementary Science Class (p. 64)
3:30–4:30 PM	C	Holiday 3, Hilton	College Science Teaching and Student Success (p. 61)
4:00–4:30 PM	9–12	333, Conv. Center	Making the Leap to a Digital Course (p. 65)
5:00–6:00 PM	7–12	Key 9, Hilton	Engaging in Argument from Evidence in Secondary Urban Science Classrooms (p. 67)
5:00–6:00 PM	K–12	Key 11, Hilton	Discipline…the Final Frontier! (p. 66)
5:00–6:00 PM	6–8	323, Conv. Center	Bookworms in Science Class (p. 66)
5:00–6:00 PM	6–12	Key 1, Hilton	Math, Science, and History: Connecting Curricula Through Historical Documents (p. 66)
5:00–6:00 PM	6–8	Key 2, Hilton	Modeling Scientific Concepts with SCRATCH (p. 66)
5:00–6:00 PM	K–5	Holiday 3, Hilton	STR2EAMing into LEARNing: The K–5 Convention (p. 66)

Friday

8:00–9:00 AM	K–5	326, Conv. Center	Infusing, Scaffolding, STEM/STEAM, 5E Model, and Crosscutting the Curriculum… What More Could You Ask? (p. 70)
8:00–9:00 AM	9–12	Key 11, Hilton	High School Teachers: Birds of a Feather (p. 69)
8:00–9:00 AM	P–C	Peale B, Hilton	NSTA's Online Resources and Communities (p. 69)
8:00–9:00 AM	P–5	324, Conv. Center	Engaging Elementary Students in a 3-D Science Literacy Learning Experience (p. 70)
8:00–9:00 AM	6–12	Holiday 5, Hilton	Intersection of Understanding by Design Framework and *NGSS* (p. 70)
8:00–9:00 AM	6–8	Ruth, Hilton	Thoughtful Discourse in the Middle School Science Classroom (p. 71)
8:00–9:00 AM	K–5	323, Conv. Center	Standards Make Strange Instructional Bedfellows: Science and Social Studies—Inquiry and Problem Solving (p. 69)
8:00–9:00 AM	6–8	321, Conv. Center	Turning the Tide in Middle School Science (p. 69)
8:00–9:00 AM	6–12	345/346, Conv. Center	Using Maggots, Flies, and Flesh to Solve a Mystery! (p. 73)
8:00–9:00 AM	6–C	343/344, Conv. Center	Research and Inquiry-Based STEM Program from Flinn Scientific (p. 73)
8:00–9:00 AM	K–8	336, Conv. Center	Take Your Students On a Quest! A Real-World Problem-Based Learning Project that Incorporates All Three Dimensions of *NGSS* (p. 72)
8:00–10:00 AM	P–C	Holiday 1, Hilton	AMSE-Sponsored Session: Conversation Series on Diversity and Equity (p. 74)
9:30–10:00 AM	9–12	Key 2, Hilton	Using Data to Make Evidence-Based Claims (p. 74)
9:30–10:30 AM	6–8	333, Conv. Center	Updating Science Fairs (p. 76)
9:30–10:30 AM	P–C	Peale A, Hilton	Assistance from Retiree Committee (p. 76)
9:30–10:30 AM	P–5	323, Conv. Center	Blending Science and Language Arts (p. 75)
9:30–10:30 AM	P–C	Peale B, Hilton	Eureka! Science Trade Books—Good as Gold! (p. 77)
9:30–10:30 AM	K–8	342, Conv. Center	Integrate Instruction and Assessment in Three Dimensions Using Learning Progressions (p. 80)
9:30–10:30 AM	9–C	341, Conv. Center	Get That Grant Money! (p. 80)
9:30–10:30 AM	K–12	Johnson A, Hilton	NSELA-Sponsored Session: Tools for Leaders Session 1 (p. 76)

9:30–10:30 AM	P–C	328/329, Conv. Center	Featured Presentation: Creating an Understanding-Based Curriculum for the *Next Generation Science Standards* (p. 75)
9:30–10:30 AM	3–8	322, Conv. Center	WIDA Session: Doing and Talking Science with ELs (p. 75)
9:30–10:30 AM	3–5	Ruth, Hilton	California Science Project Session: Cultivating Literacy Integration in Science (p. 78)
9:30–10:30 AM	3–8	Key 5, Hilton	How to Create a Challenge-Infused STEM Program (p. 78)
9:30–10:30 AM	K–5	Holiday 5, Hilton	Practices in Action: Building Coherence Between *NGSS* and *CCSS ELA* (p. 77)
9:30–10:30 AM	K–12	348, Conv. Center	Science Teacher/STEM Teacher: What's the Difference? (p. 80)
9:30–10:30 AM	K–5	347, Conv. Center	Bringing the World into Your Classroom with National Geographic Explorers (p. 80)
9:30–10:30 AM	K–12	343/344, Conv. Center	Out-of-School STEM Enrichment: AEOP Program Design Collaboration (p. 80)
11:00 AM–12 Noon	K–12	Key 3, Hilton	NOAA in Your Backyard: Free Professional Development and Local Educator Resources Are Closer Than You Think! (p. 82)
11:00 AM–12 Noon	P–8,C	333, Conv. Center	STEM and Trade Books: Strange Bedfellows (p. 82)
11:00 AM–12 Noon	P–C	Peale B, Hilton	Safer Makerspaces and STEM Labs (p. 83)
11:00 AM–12 Noon	9–C	Peale A, Hilton	Designing STEM Career Pathways for Student Success: A Step-by-Step Approach (p. 83)
11:00 AM–12 Noon	P–5	326, Conv. Center	Make Time for Science (p. 83)
11:00 AM–12 Noon	6–8	321, Conv. Center	Building Creative Scientists (p. 81)
11:00 AM–12 Noon	9–12	322, Conv. Center	S.T.E.A.M.y Excel and Google Sheets (p. 83)
11:00 AM–12 Noon	K–12	Johnson A, Hilton	NSELA-Sponsored Session: Tools for Leaders Session 2 (p. 82)
11:00 AM–12 Noon	6–8	342, Conv. Center	Implementing Argumentation: Evidence, Claims, Reasoning, and Science Seminars in Grades 6–8 (p. 85)
11:00 AM–12 Noon	P–5	Holiday 1, Hilton	Launching an Elementary STEM Program (p. 83)
11:00 AM–12 Noon	5–12	325, Conv. Center	NSTA Press® Session: Diving Into Teaching with the *NGSS* Science Practices (p. 81)
11:00 AM–12 Noon	6–9	343/344, Conv. Center	Middle Schoolers Solving Problems: Grant Opportunity to Bring STEM to Life! (p. 86)
11:00 AM–12 Noon	3–12	347, Conv. Center	STEM Leaders in Action: The Albert Einstein Distinguished Educator Fellowship (AEF) Program (p. 86)
12 Noon–3:00 PM	4–12	Tubman, Hilton	SC-4: Using Your School as a Laboratory: Air Quality (p. 86)
12:30–1:30 PM	6–12	Key 1, Hilton	Creating the I-Lab: Development and Implementation of the Eastern Tech Makerspace (p. 87)
12:30–1:30 PM	K–6	323, Conv. Center	Advancing Science Literacy While Meeting *CCSS* and Making Science More Accessible and Understandable (p. 87)
12:30–1:30 PM	6–12	Johnson B, Hilton	Lessons Learned: Writing Curricula and Assessments in Three Dimensions (p. 87)
12:30–1:30 PM	P–12	Key 3, Hilton	Encouraging Grit with Standards-Based Career Exploration (p.)
12:30–1:30 PM	K–12	Peale B, Hilton	STEM and *NGSS* into Your Classroom Through the Use of NSTA Competitions (p. 88)
12:30–1:30 PM	9–C	Peale A, Hilton	Using the NSTA Learning Center as an (p. 87)
12:30–1:30 PM	6–12	337, Conv. Center	Exploring Misconceptions: What Is pH? (p. 90)
12:30–1:30 PM	K–8	Key 2, Hilton	University and K–8 Teachers: A Winning Partnership for STEM Education (p. 87)
12:30–1:30 PM	9–12	322, Conv. Center	Getting Over Graphs in the Science Classroom (p. 88)
12:30–1:30 PM	3–5	325, Conv. Center	NSTA Press® Session: *EUREKA! Grades 3–5 Science Activities and Stories* (p. 88)
12:30–1:30 PM	9–12	340, Conv. Center	Got Lactase? Exploring Genetics with HHMI BioInteractive Resources (p. 91)
12:30–1:30 PM	K–8	347, Conv. Center	Science and Engineering Practices in the *NGSS* (p. 91)
12:30–1:30 PM	K–12	348, Conv. Center	Using Argumentation for Discussing Phenomena and Increasing Student Voice About STEM (p. 91)
12:30–1:30 PM	K–12	336, Conv. Center	Incorporating the *NGSS* Crosscutting Concepts into Your Teaching (p. 90)
2:00–3:00 PM	P–C	323, Conv. Center	Authors Wanted! How to Get Published in an NSTA Journal (p. 93)
2:00–3:00 PM	P–5	326, Conv. Center	A Picture-Perfect Approach to Connecting Literacy and Science (p. 95)
2:00–3:00 PM	6–8	321, Conv. Center	Camp FOCUS: Teachers Advocating for Inquiry-Centered Teaching (p. 93)
2:00–3:00 PM	6–12	Holiday 2, Hilton	Fully Engaged (p. 95)
2:00–3:00 PM	6–12	Johnson B, Hilton	Engaging Students in a Blended and Online Environment (p. 94)
2:00–3:00 PM	P–C	328/329, Conv. Center	Featured Presentation: Building a Nation of Makers: Lessons Learned While Serving as a Senior Adviser in the Obama White House (p. 93)
2:00–3:00 PM	K–C	333, Conv. Center	NSTA Press® Session: Uncovering Student Ideas in Science with 3-D Assessment Probes (p. 93)

2:00–3:00 PM	K–12	Key 3, Hilton	Instructional Alignment Around a Phenomena-Driven Approach (p. 94)
2:45–3:30 PM	P–C	Exhibit Hall Entrance	Meet the Presidents and Board/Council (p. 98)
3:30–4:30 PM	3–8	347, Conv. Center	Mission KT: Teacher Authoring Science Game (p. 100)
3:30–4:30 PM	K–8	336, Conv. Center	Cultivating a Culture of Argumentation in Your Classroom (p. 98)
5:00–6:00 PM	9–C	Peale B, Hilton	Authentic Assessment in Action: Using Personal Meaning Maps to Determine the Impact of an Enrichment Activity in the Secondary Classroom (p. 101)
5:00–6:00 PM	4–10	Holiday 5, Hilton	Why Should I Care? (p. 100)
5:00–6:00 PM	K–5	326, Conv. Center	Science and the Arts: A Natural Fit (p. 101)
5:00–6:00 PM	6–12	Johnson B, Hilton	Using Pop Culture and Polymers to Create Inquisitive Minds (p. 100)
5:00–6:00 PM	5–C	Holiday 4, Hilton	Data, Data, Data: Tips and Tricks for Integrating Data and *NGSS* Science Practices into Any Classroom (p. 101)
5:00–6:00 PM	3–5	322, Conv. Center	Blended Learning in the Elementary Science Classroom: Transitioning to the *NGSS* Using Individualized Learning (p. 101)

Saturday

8:00–9:00 AM	1–C	325, Conv. Center	NSTA Press® Session: *Teaching for Conceptual Understanding in Science* (p. 103)
8:00–9:00 AM	6–12	Key 7, Hilton	Your School Can Start a Forensic Class, Too! (p. 105)
8:00–9:00 AM	K–C	Key 3, Hilton	Discover the *NGSS:* NSTA's Interactive E-Book (p. 103)
8:00–9:00 AM	6–12	Key 1, Hilton	Beyond Written Assessment: Suggestions for Alternative Summative Assessments (p. 103)
8:00–9:00 AM	K–5	323, Conv. Center	Journaling as a Key to Unlocking Science and Engineering for All Elementary Learners (p. 103)
8:00–9:00 AM	9–C	Key 10, Hilton	Federal Resources for Cybersecurity Education and Talent Development (p. 104)
8:00–9:00 AM	2–8	333, Conv. Center	Student-Centered Field Research Program Development (p. 103)
8:30–9:00 AM	9–12	322, Conv. Center	Using Case Studies in the High School Science Classroom (p. 105)
9:30–10:30 AM	K–12	Holiday 4, Hilton	Exploring the Science and Engineering Practices (p. 106)
9:30–10:30 AM	P–C	Key 8, Hilton	Sing, Dance, and Celebrate Science (p. 107)
9:30–10:30 AM	9–12	Key 6, Hilton	Transforming Students to Investigators: Sparking Their Curiosity Using Data Analysis and Interpretation (p. 107)
9:30–10:30 AM	1–12	325, Conv. Center	NSTA Press® Session: Uncovering Students' (and Teachers') Ideas in Science, Engineering, and Mathematics with Formative Assessment Probes and Techniques (p. 106)
9:30–10:30 AM	6–9	333, Conv. Center	Using Games to Develop and Refine Scientific Writing (p. 105)
11:00–11:30 AM	9–12	Holiday 3, Hilton	Bundling Performance Expectations Around Phenomena (p. 107)
11:00 AM–12 Noon	7–C	Key 6, Hilton	iPad: Data Collection, Analysis, and Student Lab Reporting (p. 109)
11:00 AM–12 Noon	6–9	333, Conv. Center	The Commotion-Free Classroom: Developing a Self-Directed Classroom (p. 108)
11:00 AM–12 Noon	9–C	Key 11, Hilton	Using Apps in Your Forensic Science Classroom Lessons (p. 108)
11:00 AM–12 Noon	P–12	Key 3, Hilton	How to "MWEE": An Inside Look at a New Teacher's Guide to Planning and Implementing a MWEE (p. 108)
11:00 AM–12 Noon	K–6	323, Conv. Center	Enabling All Students to Investigate, Explore, Inquire, Participate, and Achieve Success (p. 108)
11:00 AM–12 Noon	7–12	Holiday 5, Hilton	Bringing the "Bookends" of STEM Together (p. 109)

Informal Science Education

Thursday

8:00–9:00 AM	5–12	Holiday 4, Hilton	Integrating Technology into Middle School *NGSS* Engineering Design Performance Expectations (p. 42)
8:00–9:00 AM	4–8	324, Conv. Center	Energy Efficiency: Making a Difference Can Start Early (p. 41)
11:00 AM–12 Noon	6–12	345/346, Conv. Center	Are You Moody? (p. 48)
12:30–1:30 PM	5–8	322, Conv. Center	Bridging the Gap: Collaboration in the "Next Generation Science Learning Environment" (p. 52)
12:30–1:30 PM	6–12	Holiday 3, Hilton	Teach Engineering Practices on the Cheap with Concrete (p. 50)
12:30–1:30 PM	4–8	349, Conv. Center	Let It Rain: A Hands-On Rain Garden Design Lab (p. 52)
1:00–1:30 PM	4–8	Key 1, Hilton	NMLSTA-Sponsored Session: Leveraging the Power of Place in Citizen Science Projects (p. 55)
2:00–3:00 PM	1–12	Key 2, Hilton	Creating and Maintaining Kid-Friendly/Bird-Friendly Gardens (p. 56)
2:00–3:00 PM	8–12	Key 10, Hilton	Cars: A Fundamental Look at How Cars Work and the Science Involved (p. 57)
2:00–3:00 PM	P–C	328/329, Conv. Center	Featured Presentation: Rigorous Citizen Science for Lasting Change (p. 55)
5:00–6:00 PM	7–12	Johnson A, Hilton	Making Redox Practical, Relevant, Engaging, and Fun Corrosion Chemistry! (p. 66)

Friday

8:00–9:00 AM	6–8	321, Conv. Center	Turning the Tide in Middle School Science (p. 69)
8:00–9:00 AM	P–12	349, Conv. Center	Engaging Our Communities for a Sustainable Future (p. 70)
8:00–9:00 AM	P–12	Holiday 3, Hilton	The Teacher Environmental Literacy Leadership Program: Advancing Innovation in Teacher and Student Learning with the Chesapeake Bay Foundation (p. 69)
9:30–10:30 AM	9–12	Key 4, Hilton	Connecting Chemistry to Your World Through ChemClub (p. 77)
9:30–10:30 AM	1–12	Holiday 6, Hilton	NESTA and NOAA Share: NOAA Climate Stewards—Affecting Change Through Education, Collaboration, and Action (p. 76)
9:30–10:30 AM	4–8	321, Conv. Center	Great Falls Summer STEAM: A Design Thinking Approach to Community Improvement (p. 75)
11:00 AM–12 Noon	K–12	Key 3, Hilton	NOAA in Your Backyard: Free Professional Development and Local Educator Resources Are Closer Than You Think! (p. 82)
11:00 AM–12 Noon	3–7	349, Conv. Center	Beyond Spaceship Earth (p. 83)
11:00 AM–12 Noon	9–12	Key 11, Hilton	Meet the Standards and Enhance Your Chemistry Classroom with Other People's Money (p. 82)
11:00 AM–12 Noon	3–8	348, Conv. Center	STEMrangers: Making Science Night Meaningful (p. 86)
12:30–1:30 PM	5–12	Holiday 4, Hilton	Soil Ecology in the Classroom (p. 89)
2:00–3:00 PM	6–8	321, Conv. Center	Camp FOCUS: Teachers Advocating for Inquiry-Centered Teaching (p. 93)
2:00–3:00 PM	9–12	Key 1, Hilton	Get WISE: Growing a Systemic Women In Science and Engineering Club (p. 95)
3:30–4:30 PM	3–8	347, Conv. Center	Mission KT: Teacher Authoring Science Game (p. 100)
5:00–6:00 PM	5–C	Holiday 4, Hilton	Data, Data, Data: Tips and Tricks for Integrating Data and *NGSS* Science Practices into Any Classroom (p. 101)

Saturday

8:00–8:30 AM	6–C	322, Conv. Center	Students as Citizen Scientists: Data Collection and Sharing Using Fieldscope (p. 103)
8:00–9:00 AM	2–8	333, Conv. Center	Student-Centered Field Research Program Development (p. 103)
9:30–10:30 AM	7–12	Holiday 3, Hilton	Polymers: Basics for the Science Classroom (p. 105)

Index of Participants

Index of Participants

Notes

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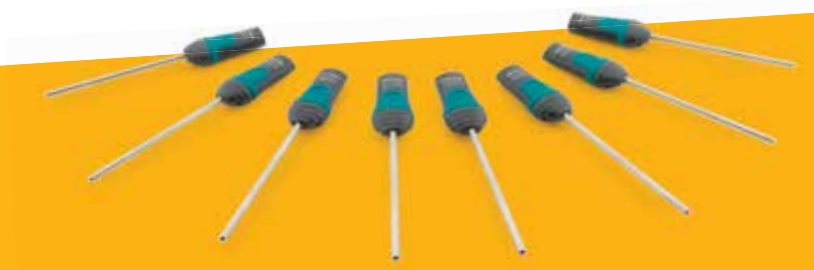
FRIDAY
10/6

Time	Room Number 339
8:00–9:00 a.m.	Integrating Chromebook™ with Vernier Data-Collection Technology
9:30–10:30	Chemistry with Vernier
11:00 a.m.–12:00 p.m.	Biology with Vernier
12:30–1:30	Integrating Chromebook™ with Vernier Data-Collection Technology
2:00–3:00	Integrating iPad® with Vernier Data-Collection Technology
3:30–4:30	Physics and Physical Science with Vernier



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